City of Lincoln and City of Rocklin
Joint Report to the California State Legislature

as required by

Assembly Bill 2963
(Chapter 422, Section 1. Chapter 7

# Neighborhood Electric Vehicle Transportation Plan Evaluation

Prepared by: Ray Leftwich, P.E., Construction Manager, City of Lincoln
Justin Nartker, Public Works Operations Supervisor, City of Rocklin

Date: January 1, 2011

**NEV Transportation Plan Evaluation**

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# EXECUTIVE SUMMARY

In August 2006, Lincoln's City Council formally adopted a resolution to approve its Neighborhood Electric Vehicle (NEV) Transportation Plan (EXHIBIT A) that implements the City's vision to provide safe and efficient access for NEVs to downtown and other commercial areas. Prior to 2005, federal law only permitted NEVs to operate on streets with a posted speed limit of 35 mph or less, but California state law, **Assembly Bill (AB) 2353**, established special provisions to define the use of NEVs on city streets. The legislation allowed NEVs to operate on streets with posted speed limits above 35 mph where designated NEV lanes are available.

On January 1, 2008 the City of Lincoln submitted a Report to the California State Legislature that evaluated the NEV Transportation Plan in the City of Lincoln with regard to traffic and safety impacts on higher speed facilities permitted by **AB2353** (EXHIBIT B). The report also evaluated the design and implementation of NEV-specific signage and pavement makings as part of the plan.

On July 22, 2008, **AB 2963** was enacted to extend the January 1, 2009, termination date applicable to these NEV provisions to January 1, 2012. It also extended the reporting requirements for both cities (Lincoln and Rocklin), to the extent they implement a NEV transportation plan, to report to the Legislature by January 1, 2011, relative to whether the NEV transportation provisions should be terminated, continued, or expanded statewide.

In accordance with AB 2963, Section 1, 1963.7 (b), this report shall include all of the following:

(1) A description of all NEV transportation plans and their elements that have been authorized up to that time.

(2) An evaluation of the effectiveness of the NEV transportation plans, including their impact on traffic flows and safety.

(3) A recommendation as to whether this chapter should be terminated with respect to the City of Rocklin in the County of Placer or expanded statewide.

Based on these findings, it is recommended that the provisions in **AB2963** should be expanded statewide.

# CITY OF LINCOLN NEV TRANSPORTATION PLAN IMPLEMENTATION

Improvements identified on APPENDIX G of EXHIBIT B, NEV Transportation Plan Map, have not been fully implemented for various reasons, such as the following:

- Construction of roadway enhancements have not been completed due to global economic conditions that have stalled development.
- Reduction of workforce available to construct signing and striping improvements to existing roads.
- Existing roadway cross section is not sufficient to allow designation of NEV Route in accordance with the design standards set forth in the NEV Transportation Plan.

Status of signing and striping improvements for each roadway identified on the NEV Transportation Plan Map as being “DESIGNATED NEV LANES” are shown on Table 1.

## *CHALLENGES TO IMPLEMENTATION – PHYSICAL*

Physical challenges to implementation of the plan include insufficient cross sections of older roadways, roadways that have only been partially built in a phased approach to development, roadways that have not been constructed at all due to a slowdown of development, and roadways that connect to roadways outside of City jurisdiction with posted speed limits that are greater than 35 mph.

Many older roadways lack sufficient roadway cross sections to include Class II bicycle lanes, let alone shared NEV / Bicycle Class II lanes. However, these types of roadways are generally located in areas that are not fully developed. As future development proceeds, it is anticipated that these roadways will be improved to include widths sufficient to accommodate shared NEV / Bicycle Class II lanes as part of a “Complete Streets” approach to Roadway Development.

Portions of Ferrari Ranch Road and East Joiner Parkway were constructed in a phased approach. As development proceeds, these roadways will be further developed with roadway cross sections that are consistent with the provisions of the NEV Transportation Plan for designation as NEV routes.

Several portions of roadway extend to City Limit boundaries, where they connect to County roads with posted speed limits greater than 35 mph. Until such time that the State expands the provisions of **AB2353 / AB2963** Statewide, and the County implements necessary improvements to provide for NEV facilities on

these roadways, the City will continue to terminate designated NEV routes at the nearest logical termini within Lincoln City limits.

## *CHALLENGES TO IMPLEMENTATION – ROADWAY USERS*

One of the primary challenges experienced by the City of Lincoln during the early stages of implementation of the NEV Transportation Plan was educating the public about the physical, legal and functional differences between NEVs and golf carts.

The area of the City where the majority of NEV users are located in is Sun City Lincoln Hills. The first phase of Lincoln Hills opened ten years ago as an age-restricted golf cart community. Lincoln Hills now includes 6,800 single family units and a population of approximately 11,000 residents. Amenities include two championship golf courses, and as a result there are a large number of golf cart owners in Lincoln Hills.

Golf cart users may still occasionally utilize the roadways outside the golf cart transportation plan (Ref: California Vehicle Code 21115 – the legal radius is one mile from any golf course area). The need for additional signage, and educating golf cart users on legality, may continue to be challenging to some extent.

## SIGNING AND STRIPING ANALYSIS

As the City began installing signing and striping improvements throughout the City, many golf cart owners mistakenly believed that they were entitled to operate their golf carts throughout the City. In response to this misconception, the City's Public Works Department, Police Department and NEV user groups initiated informational campaigns to educate golf cart users about the functional and legal differences between golf carts and NEVs. According to front line City staff who fielded most of the phone calls and office visits by golf cart owners regarding the use of golf carts vs. NEVs in the City, public information requests went from almost daily occurrences to the point where no requests have come in within the past nine months. The Lincoln Police Department has also reported a significant decline in the number of infractions cited for golf carts operating outside the confines of the golf cart community on NEV lanes. **Therefore, existing signage and striping has shown to be appropriate.**

In addition, it has also been reported that golf cart purchases by Lincoln Residents have virtually stopped, as the residents are more frequently opting for NEVs as an alternative, which are allowed on the Lincoln Hills golf courses.

## *CONFLICTS BETWEEN ROADWAY USERS*

The conflicts between NEVs, bicycles and motor vehicles appear to have decreased since the 2008 Report to the Legislature. This decrease in conflicts can be partially attributed to roadway users becoming increasingly familiar with NEVs and how they operate. It can also be attributed to further implementation of the NEV Transportation Plan, which has provided substantially more designated facilities on the roadways, which lessen conflicts between NEVs and motor vehicles.

### NEVs AND BICYCLES

There have been a few minor conflicts between NEVs and bicyclists that have been reported. These conflicts are in the form of complaints by bicyclists due to the NEVs operating at slightly higher speeds than bicycles and the quiet operation of NEVs. Bicyclists may become startled by an NEV that suddenly appears along side, without much warning.

These conflicts can be reduced by NEV users extending courtesy to bicyclists when passing. These courtesies include providing sufficient room when passing, and providing an auditory signal in advance of passing the bicyclist. This solution is similar to what should be done when a bicyclist is passing another bicyclist.

### NEVs AND MOTORISTS

Since the inception of the NEV Transportation Plan there has only been one reported collision involving an NEV. The collision involved an NEV rear ending a motor vehicle that had temporarily stopped in a Class II golf cart / NEV lane within Lincoln Hills. The driver of the NEV was found to be at fault, and arrested for driving under the influence of alcohol. Neither of the drivers of the NEV or the motor vehicle were injured, and property damage to both vehicles was minor.

Had the impaired NEV driver been operating a typical motor vehicle, it is likely that a similar collision would have resulted in more significant damage to both vehicles, and an increased likelihood that injuries would have resulted. This would have been a result of the driver most likely traveling at a higher rate of speed than an NEV, and the increased vehicle weight would have transmitted significantly greater momentum into the collision. Therefore it could be reasoned that the presence of a low-speed and lighter weight vehicle reduced the potential for damage and injuries, and ultimately increased safety for other roadway users. However, the City of Lincoln does not recommend that the operation of an NEV be considered as a mitigating factor for cases of driving under the influence of alcohol or drugs, or any other forms of unsafe driving behavior.

### NEV LEFT-TURN MOVEMENT CONFLICTS

The City of Lincoln has not received any significant complaints, issues or concerns regarding NEV use of left turn pockets.

NEVs tend to move over to the left turn lane, much like bicycles are able to do. The general feelings of safety for turning and maneuvering an NEV are subjective. Driving skills, experience, and familiarity with the driver's surroundings area all key factors. However, as a general rule of thumb, if a bicycle has sufficient speed, site distance, and capability to move from a bike lane to a left turn lane, then an NEV would certainly have similar capability, since NEVs are generally faster and more visible than a standard bicycle.

## CITY OF ROCKLIN

In November of 2007, Rocklin's City Council formally adopted a resolution approving a NEV Transportation Plan that meets the City's vision to allow NEV to operate on city streets with speed limits over 35 MPH. This is in keeping with California State Law, Assembly Bill (AB) 2353, which defines the use of NEVs on high speed (over 35 MPH) streets as applicable to the City of Rocklin and the City of Lincoln.

Although the City has posted NEV Route signs on some roadways with a speed limit of 35 or less due to economic conditions funding was not available to implement the resolution described above. Currently the City of Rocklin is on track to receive funding from the Congestion Mitigation and Air Quality Improvement Program (CMAQ) in the City's 2010-2011 fiscal year which will allow the City to further implement its NEV Transportation Plan.

The overall goal is to complete a comprehensive NEV circulation system that provides an alternative mode of transportation for existing residents and new developments planned for Whitney Ranch and the downtown area.

## CONCLUSSION

The NEV Transportation Plan has generally been successful for the City of Lincoln, and early results show promise for the City of Rocklin.

It is apparent that the installed infrastructure (pavement markings, signage, and striping) has been effective, and has enhanced the safety of NEV users on roadways with speed limits of 35 mph and above.

Challenges with educating the public regarding NEV uses, signs and capabilities have tended to work themselves out over time. Motorist from outside of the City

of Lincoln would require similar education to reduce the confusion surrounding NEVs and NEV facilities.

Conflicts related to implementation of roadway improvements are generally found to be a result of roadways that were constructed without consideration for NEVs. Construction of new roadways can be designed to accommodate NEVs with minimal modification of development plans and at an incremental cost relative to construction of the remainder of the roadway.

Modification of existing roadways to accommodate NEV facilities can be more challenging if roadway widening is necessary. Public agencies may lack sufficient land tenure to widen roadways, and the costs for widening roadways are most certainly to be a major consideration. However, routes can be mapped in such a way as to avoid high-speed arterials (over 35 mph), thus eliminating the need for roadway widening and a shared NEV / Bicycle Class II lane.

NEV users tend to be constrained to remain within their own city's boundaries, or even within particular neighborhoods, as adequate facilities do not extend to all parts of the city, and into adjacent cities or county regions. Development of statewide standards will facilitate regional planning.

Expansion of the provisions of AB2963 statewide could yield the following benefits:

- The familiarity of NEVs and NEV facilities would likely increase outside of the Cities of Lincoln and Rocklin.
- Benefits may include: reduction of gasoline consumption for short trips; improved air quality; calmer streets; and alternative to older drivers who have aged out of driving conventional vehicles; additional shared lanes provide capacity of bicyclists' use.
- NEV facilities would likely become components of "Complete Streets" designs for new developments.
- Increased public buy in towards the idea of utilizing public funds for renovating existing roadways to include NEV facilities.
- Improved connectivity, and ability for NEV users to travel between city and county boundaries as more agencies install NEV facilities.

## Table 1

| Roadway | From | To | Status |
|---|---|---|---|
| Del Webb Blvd | E. Joiner Pkwy | E. Joiner Pkwy | Complete - [1, 3] |
| Spring Valley Pkwy | Del Webb Blvd | Stoneridge Blvd | Complete - [1, 3] |
| Stoneridge Blvd | Del Webb Blvd | Twelve Bridges Dr | Complete - [1, 3] |
| Sun City Blvd | Del Webb Blvd | Coachman Ln | Complete - [1, 3] |
| Sun City Blvd | Coachman Ln | Ferrari Ranch Rd | Incomplete - [2, 4] |
| Ingram Pkwy | Del Webb Blvd | Lariat Ln | Complete - [1, 3] |
| Ingram Pkwy | Lariat Ln | Ferrari Ranch Rd | Incomplete - [2, 4] |
| E. Joiner Pkwy | Del Webb Blvd (north) | Twelve Bridges Dr | Incomplete - [3, 4] |
| E. Joiner Pkwy | Twelve Bridges Dr | Rocklin City Limit | Incomplete- [3, 6] |
| E. Joiner Pkwy | Del Webb Blvd (north) | Sterling Pkwy | Complete - [3] |
| Twelve Bridges Dr | Industrial Ave | Colonnade Dr | Incomplete - [2, 5] |
| Twelve Bridges Dr | Colonnade Dr | Stoneridge Blvd | Complete - [2] |
| Twelve Bridges Dr | Stoneridge Dr | Camino Verdera | Incomplete - [2, 4] |
| Twelve Bridges Dr | Camino Verdera | Sierra College Blvd | Incomplete - [2, 5] |
| Bella Breeze Dr (south) | E. Joiner Pkwy | Dresden Dr | Complete - [1, 3] |
| Bella Breeze Dr. (north) | E. Joiner Pkwy | Dresden Dr | Incomplete - [3] |
| Sterling Pkwy | E. Joiner Pkwy | SR 65 | Incomplete - [3, 4] |
| Joiner Pkwy | Sterling Pkwy | Nicolaus Rd | Complete - [2] |
| Joiner Pkwy | Nicolaus Rd | Lakeside Dr | Incomplete - [3, 4] |
| First St | Fuller Ln | Joiner Pkwy | Incomplete - [3, 4] |
| First St | Joiner Pkwy | SR 65 | Complete - [3] |
| First St | SR 65 | Ina Way | Incomplete - [3, 4] |
| Third St | Joiner Pkwy | SR 65 | Complete - [3] |
| Fifth St | Joiner Pkwy | SR 65 | Complete - [3] |
| McBean Park Dr | Ferrari Ranch Rd | East Ave | Incomplete - [3, 9] |
| East Ave | McBean Park Dr | Twelfth St | Incomplete - [3, 4] |
| Twelfth St | East Ave | McCourtney Rd | Incomplete - [3, 4] |
| McCourtney Rd | Twelfth St | Placer County limits | Incomplete - [3, 4] |
| Gladding Pkwy | East Ave | Nicolaus Rd | Incomplete - [3, 7] |
| Nicolaus Rd | Gladding Pkwy | O St | Incomplete - [3, 6] |
| Nicolaus Rd | O St | Joiner Pkwy | Incomplete - [3, 4] |
| Nicolaus Rd | Joiner Pkwy | Teal Hollow Dr | Incomplete - [2, 4] |
| Nicolaus Rd | Teal Hollow Dr | Aviation Blvd | Incomplete - [2, 6] |
| Nicolaus Rd | Aviation Blvd | Airport Rd | Incomplete - [2, 5, 6] |
| Aviation Blvd | Nicolaus Rd | end | Incomplete - [2, 4] |

| Roadway | From | To | Status |
|---|---|---|---|
| Venture Dr | Aviation Blvd | McClain Dr | Incomplete - [2, 4] |
| Venture Dr | McClain Dr | Lakeside Dr | Incomplete - [3, 4] |
| Ferrari Ranch Rd | SR 193 | Ingram Pkwy | Incomplete - [3, 5] |
| Ferrari Ranch Rd | Ingram Pkwy | Caledon Cir (west) | Incomplete - [3, 4] |
| Ferrari Ranch Rd | Caledon Cir (west) | Fiddyment Rd | Incomplete - [3, 7] |

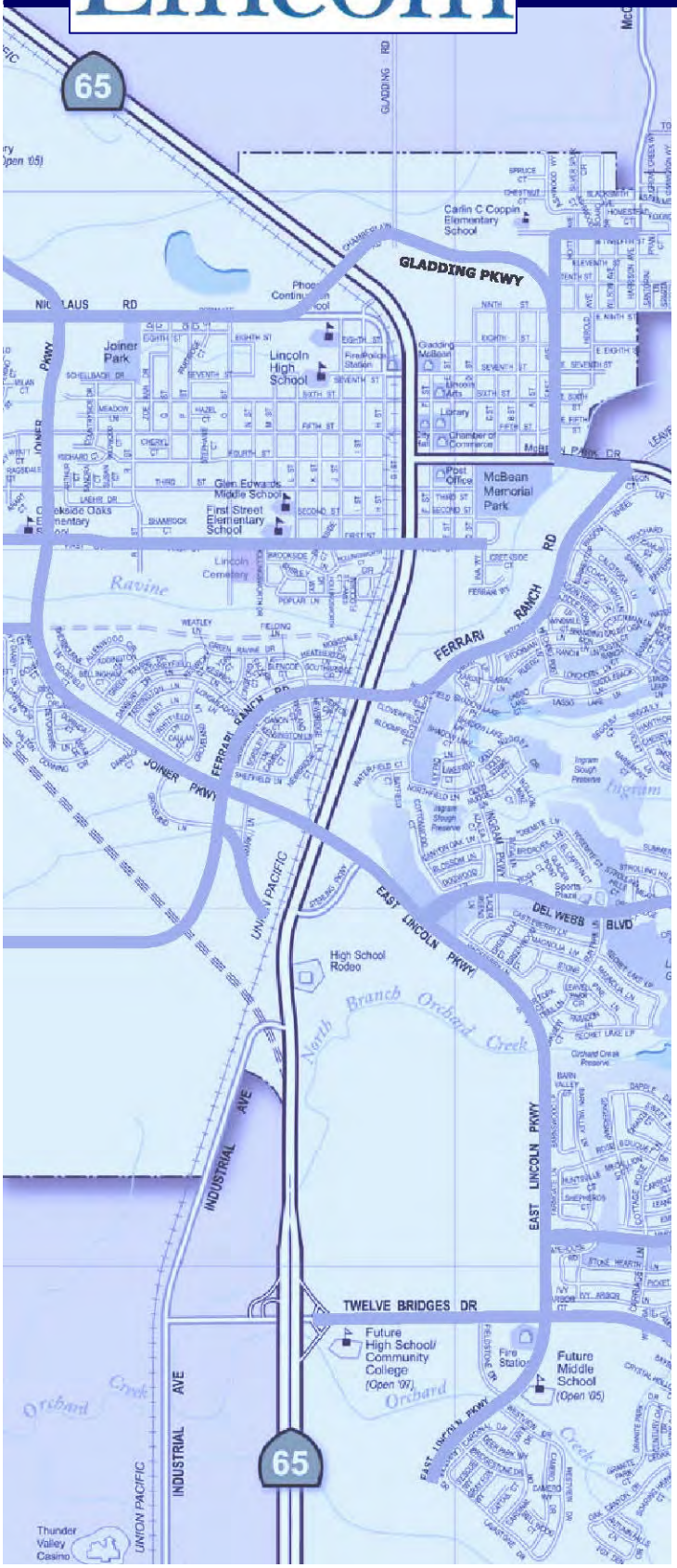
1. Roadway within existing Golf Cart Community with individual Class II lanes for Golf Carts / NEVs and Bicycles.
2. Roadways with posted speed limit over 35 mph, signed and striped with a shared NEV / Bicycle Class II lane.
3. Roadway with a posted speed limit of 35 mph or less, signed as NEV route. Shared NEV / Bicycle Class II lane provided when appropriate.
4. Lack of personnel available to implement signing and striping improvements.
5. Roadway does not have logical termini to destination of other roadway that permits use by NEVs
6. Current cross section of roadway is insufficient to permit signing and striping of roadway as a designated “NEV Route” in accordance with the design standards in the NEV Transportation Plan.
7. Construction of roadway has not occurred due to global economic conditions and downturn of development.
8. East Joiner Parkway formerly known as East Lincoln Parkway. Name changed on September 26, 2006 by Resolution 2006-196.
9. Currently State Highway. Modifications to be made after relinquishment to City by State.

# EXHIBIT A

City of Lincoln NEV Transportation Plan

Date: August 2006

City of Lincoln



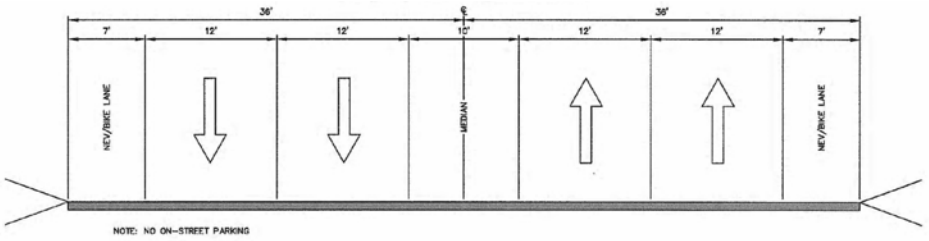

# NEV Transportation Plan

Prepared by MHM Engineers & Surveyors

FINAL - August 2006

M·H·M
ENGINEERS & SURVEYORS SINCE 1892

**Four Lane Arterial with**
**Class II NEV/Bike Lanes**





**City of Lincoln**

John E. Pedri, P.E.,
Director of Public Works

Carl Walker, P.E.,
Senior Engineer

640 Fifth Street
Lincoln, CA 95648
(916) 645-8576

**MHM Engineers & Surveyors**

Leo Rubio, P.E.,
Project Engineer

Steven Ainsworth, P.E.,
Project Manager

Robert O. Watkins, P.E.,
Principal Investigator

1082 Sunrise Avenue, Suite 100
Roseville, CA 95661
(916) 783-4100

**Sage Community Group**
Annie R. Embree, Esq.,
SCG,
Legal Consultant
(530) 885-5123

**Autumn Wind**

Greg Gilbert,
Air Quality
(916) 663-6353

**Fehr & Peers**

Rich Ledbetter,
Transportation/Planning
(916) 773-1900

# NEIGHBORHOOD ELECTRIC VEHICLES (NEV) TRANSPORTATION PLAN

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## Chapter I - Project Overview

### A. Program Description

The City of Lincoln has requested city-wide NEV routes that would "enable any resident to travel from their home to Downtown Lincoln" reports Councilmember Tom Cosgrove.

The City of Lincoln NEV project is an effort to accommodate the City's changing urban lifestyle by encouraging the use of Neighborhood Electric Vehicles, or NEVs for short. This effort will result in air quality improvements, community cohesion, energy savings, reduced travel costs, increased mobility, independence for aging drivers, and greater use of public transit. NEVs are small, electric powered personal vehicles. They have a limited range and can travel up to speeds of 25 mph. They are an ideal transportation alternative for short, (up to 30 miles) local trips. While they may look like a golf-cart to the casual observer, they are actually a motor vehicle requiring a driver's license, registration, and insurance. NEVs such as the Chrysler GEM are specifically designed to meet federal safety standards for low-speed vehicles as defined in Section 571.500, Title 49 Code of Federal Regulations.

NEVs are a desirable new form of transportation for many reasons:

- NEVs have a great safety record.
- NEVs are zero emission electric vehicles.
- NEVs improve air quality.
- The energy consumption of an NEV is less than 1/5 that of a conventional automobile.
- NEVs provide freedom and continued mobility for aging or impaired drivers.
- NEVs are affordable.
- NEVs support the local economy by encouraging residents to shop locally.
- NEVs encourage use of existing public transportation.

California's first major citywide NEV transportation project is well underway in the City of Lincoln. Lincoln plans relatively minor modifications to accommodate NEVs. The city will implement signing and striping improvements, create special parking spaces, and build an NEV crossing at the Auburn Ravine, a stream that divides this fast-growing city. Businesses have already begun to accommodate and encourage NEV transportation by providing special parking for their NEV customers.

The City of Lincoln is in a very favorable position to accommodate the beneficial use of NEVs. NEVs are already circulating in the *Sun City Lincoln Hills* development and special parking areas are provided in the adjacent Safeway and Raley's shopping center. The City believes that with the advent of a comprehensive NEV circulation system, the number of NEVs users will dramatically increase.

To accommodate use of NEVs, the City of Lincoln must become "NEV Ready". An NEV ready city can be defined as having the necessary infrastructure, including charging facilities, striping, signage, parking, and education to safely accommodate NEV travel. The City intends to implement these changes in stages. This plan will allow limited NEV use in the near future, culminating in a comprehensive NEV travel plan throughout the City.

In accordance with Assembly Bill (AB 2353), the City of Lincoln plan envisions three levels of NEV routes:

Class I NEV Route:
Class I NEV routes provide a completely separate right-of-way for the exclusive use of NEVs, pedestrians and bikes with cross-flow minimized. The minimum paved width for a Class I NEV route is 14-feet (for two way travel) with a minimum 2-foot wide graded area provided adjacent to the pavement. The proposed bridge over Auburn Ravine connecting Sun City Lincoln Hills area to E Street is an example of a Class I NEV route. It is the intent to design all Class I NEV routes to allow combined NEV/bicycle use.

Class II NEV Route:
Class II NEV routes are designated as a separate striped lane adjacent to traffic. There is one striped lane for each travel direction. The desirable minimum width for a Class II NEV route is 7-feet. Del Webb Blvd. is an example of a Class II NEV lane. It is the intent to design all Class II NEV routes to allow combined NEV/bicycle use.

Class III NEV Route:
Class III NEV routes provide for shared use with automobile traffic on streets with a posted speed limit of 35 mph or less. All residential streets within Sun City Lincoln Hills are Class III NEV routes. The City will provide signage to direct NEVs to preferred streets. Some streets within the City that are posted 35 mph may be designated as not appropriate for NEV use.

(NEV Route plans are shown in Appendix A.)

## B. Impact and Benefits

### 1. General

Many other entities in the region will benefit from the City of Lincoln's experience in implementing an NEV transportation plan. When the plan is complete, the process will be made available to other entities to help facilitate their own NEV transportation plan. Here are a few of the benefits of the Lincoln NEV Project:

- The emergence of an NEV friendly Lincoln has allowed home builders in Lincoln to customize new development to accommodate NEVs.
- Lincoln plans to include NEV routes in their General Plan update.
- NEV routes can double as bicycle routes with proper design, thus the miles of bike trails will increase within the City.
- Accommodating NEVs is more effective and less costly than dial-a-ride programs for unmet transit needs.
- Air Quality improvements result from the use of small electric motors that emit no pollutants in the local atmosphere. Over half of the otherwise short cold-start automobile trips in cities the size of Lincoln are within the range of NEVs.
- NEVs can achieve the energy equivalent of over 150 mpg for a standard gasoline powered vehicle.
- NEV use provides for a more cohesive community due to their limited travel range.
- NEV travel encourages residents to support their local businesses.
- NEVs provide mobility for people who cannot drive an automobile, including aging drivers.
- NEVs are affordable and can reduce personal travel cost.
- The NEV industry is seeing an increase in the use of these vehicles for use beyond the golf course.

**2. NEVs Promote Safety and Provide Independence for Aging Drivers**

With the State's aging population, we are confronted with the conflicting interest of providing continued mobility to aging drivers while promoting a safe driving environment for all drivers. The State has implemented a process that will result in new driver testing, which will result in the suspension of automobile driver's licenses' for some people. The City's plan includes a proposal for a separate classification of driver's license for NEVs.

The loss of a driver's license often brings lifestyle changes that make it hard to cope. Understandably, no one wants to feel isolated and dependent on others for their personal mobility. NEVs are an ideal solution to meet the States competing interest between mobility and safety. NEVs will provide personal mobility to local stops including the grocery store, bus stops and the doctor's office. An NEV commute beats the alternatives of risking a high-speed accident in a conventional automobile or sitting at home waiting for a ride from a friend or relative.

**3. Taking the Lead**

The City of Lincoln, the fastest growing city in the west, has fostered the use of NEVs within Sun City Lincoln Hills, but that is not enough. The City envisions a plan to promote NEV travel throughout the City. With the City's growing retirement population, the opportunity to accommodate NEV travel is at hand. City engineers have already signed and striped some City streets for NEV use. Merchants are providing special parking and charging stations. The City is planning for a pathway and bridge across the Auburn Ravine to accommodate NEV travel on both sides of town. While the City of Lincoln appears to be ahead of the rest of the state, the City is not ahead of their people. More NEVs are on City streets every day. There are NEVs in Rocklin, Roseville, Auburn, and Folsom today and their presence is expanding.

## C. Project Status

The following steps having been taken by the City in order to implement the NEV transportation plan:

- Placer County Air Pollution Control District (PCAPCD) approved $10,000.00 on August 14, 2003 towards Lincoln's NEV transportation plan.
- The City has reviewed the Draft Twelve Bridges Golf Cart Transportation Plan (Fehr & Peers) in order to coordinate that plan within the proposed NEV transportation plan.
- SACOG funding guidelines have been altered to include NEVs per the City's request. Prior to the City's input, SACOG's funding guidelines did not mention NEVs.
- The City has coordinated with PCAPCD to include NEV questions to be included in PCAPCD semi-annual transportation survey.
- The City has coordinated with Assemblyman Tim Leslie's office regarding AB 2353.
- The City has submitted NEV funding requests to SACOG through PCTPA, and to date has received funding approval for over $270,000 from SACOG.
- AB 2353 signed into Law on January 1, 2005.
- Public Workshop held on August 30, 2005
- MUTCD approved experimental signage and striping.
- Developed NEV Standards.
- NEV Standards shared with the City of Rocklin
- Putnam Award for Excellence recipient 2006.

## D. Reporting Requirements of Assembly Bill No. 2353

City of Lincoln and Rocklin shall jointly submit a report to the Legislature on or before January 1, 2008, in consultation with the Department of Transportation, the Department of the California Highway Patrol, and local law enforcement agencies.

The report shall include the following:

- A description of all NEV transportation plans and their elements that have been authorized up to that time.
- An evaluation of the effectiveness of the NEV transportation plans, including their impact on traffic flows and safety.
- A recommendation as to whether Chapter 7 should be terminated, continued in existence applicable solely to the City of Lincoln and the City of Rocklin in the County of Placer, or expanded statewide.

Chapter 7 shall remain in effect only until January 1, 2009, and as of that date is repealed, unless a later enacted statue, that in enacted before January 1, 2009, deletes or extends that date.

## E. Reporting Requirements of CTCDC for experimental signage and striping

Reporting requirements for the CTCDC are similar to the requirements of AB 2353, as stated above. It is recommended the report be submitted to both agencies at the same time.

## Chapter II - Legal Constraints / Opportunities

This section will outline the current federal, state, and local laws and ordinances relative to implementing a comprehensive NEV transportation plan as well as define the terms necessary to describe such a program. While the existing regulatory framework (AB 2353) allows for NEV travel within the City of Lincoln and Rocklin, an expansion of AB 2353 statewide would facilitate and promote the use of NEVs throughout the State.

### A. Definitions

1. **"Low Speed Vehicle" or "LSV"** is defined as a motor vehicle, other than a motor truck, having four wheels on the ground and an unladen weight of 1,800 pounds or less, that is capable of propelling itself at a minimum speed of 20 miles per hour and a maximum speed of 25 miles per hour, on a paved level surface. A 'low speed vehicle' is not considered a golf cart, except when operated pursuant to Section 21115 or 21115.1 of the California Vehicle Code (CVC) pertaining to operations within a golf course facility/community. (CVC Section 385.5)

   Low-speed vehicle is a relatively new motor vehicle classification created by the National Highway Traffic Safety Administration (NHTSA) in 1998 to permit the manufacture and circulation of small, four-wheeled motor vehicles with top speeds of 20-25 miles per hour. This new classification is codified as Section 571.500 Title 49 code of Federal Regulations and California Vehicle Code Section 385.5. LSVs are required to have California license plates in order to utilize public roads.

2. **"Neighborhood Electric Vehicle" (NEV)** is an electrically powered LSV. They are manufactured by car companies and meet federal safety standards for low speed vehicles. Examples include the Daimler Chrysler "GEM" car. While "low-speed vehicle" is technically the correct term, NEV is the more popularly used and recognized term. NEVs are required to have a California license plate in order to utilize public roads.

3. **"Conventional Golf Cart"** is a motor vehicle having not less than three wheels in contact with the ground, weighs less than 1,300 pounds, is designed to be operated at no more than 15 miles per hour, is designed to carry golf equipment and not more than two persons, including the driver. CVC Section 345. A conventional-golf cart is not a low-speed vehicle.

4. **"Speed-modified Golf Cart"** means a golf cart that is modified to meet the safety requirements of Section 571.500 of Title 49 of the code of Federal Requirements and designed to travel at not more than 20 miles per hour. A modified golf-cart must be inspected and approved as meeting all the safety requirements for a low-speed vehicle and is required to have a California license plate in order to utilize public roads.

5. **"City"** means the City of Lincoln.

6. **"Study Area"** means the City of Lincoln's sphere of influence.

7. **"NEV Lanes"** means all publicly owned facilities that provide for NEV travel including roadways designated by signs or permanent marking which are shared with pedestrian, bicyclists, and other motorists in the plan area.

**B. Summary of AB 2353 Introduced by Assemblyman Leslie**

1. "It is the intent of the Legislature, in enacting this chapter, to authorize the City of Lincoln and the City of Rocklin in the County of Placer to establish a neighborhood electric vehicle (NEV) transportation plan for a plan area in the city. It is the further intent of the Legislature that this transportation plan be designed and developed to best serve the functional travel needs of the plan area, to have a physical safety of the NEV driver's person and property as a major planning component, and to have the capacity to accommodate NEV drivers of every legal age and range of skills. It is the intent of the Legislature, in enacting this chapter, to encourage discussions between the Legislature, the Department of Motor Vehicles, and the California Highway Patrol regarding the adoption of a new classification for licensing motorists who use neighborhood electric vehicles." – 1963, Chapter 7, AB 2353

2. For the cities of Lincoln and Rocklin, AB 2353 brings California Law up to date with the new Federal Regulations governing Low Speed Vehicles including Neighborhood Electric Vehicles. AB 2353 provides a formal process for Lincoln and Rocklin to obtain agency approvals to bridge the legal gaps that currently exist for extensive use of Neighborhood Electric Vehicles. In doing this, AB 2353 provides a tool for planning, design, and implementation of a comprehensive NEV transportation program.

3. The current Street and Highways Code Section 1951, which applies to golf carts, was enacted prior to federal legislation designating a low-speed motor vehicle category and prior to the popular emergence of NEVs. NEVs are a safer mode of transportation than golf-carts as they have stricter safety requirements. Further, unlike golf-carts, NEVs are motor vehicles subject to same rules and regulations governing motor vehicles.

4. A key aspect of AB 2353 is it provides local jurisdictions with choice. Federal Law allows NEVs on all streets posted 35 mph or less. AB 2353 allows Lincoln and Rocklin to determine which streets posted 35mph and under are appropriate for NEVs. The City of Lincoln is supporting NEV use, but has some streets posted 35 mph that are deemed unsafe for NEVs.

5. Until now NEVs were prohibited from streets posted above 35 mph. AB 2353 allows NEVs on streets posted above 35 mph where designated NEV lanes are available. Similar to bicycle laws, the bill describes three classes of NEV lanes.

6. AB 2353 allows NEVs to use and cross State highways where deemed safe and appropriate by the City and the State Department of Transportation

7. According to a recent survey of NEV owners, NEV users in the City of Lincoln drive an average of 1000 miles per year per NEV. That is 1000 miles of otherwise short cold start automobile trips. AB 2353 lets the cities of Lincoln and Rocklin accommodate the expanding popularity of low cost Neighborhood Electric Vehicles, and reap the transportation and air quality improvement benefits.

8. NEVs are also an ideal transportation option for aging drivers. As low-speed vehicles with a top speed of 25 mph and a limited travel range, NEVs have the ability to provide continued mobility and independence to aging and disabled drivers. Through AB 2353 the DMV committed to work with Assemblyman Leslie's office and the City of Lincoln to explore the feasibility of offering separate category of driver's license to NEV drivers.

9. AB 2353 was signed by the governor and became law January 1, 2005.

**C. Existing Regulations for NEVs**

**1.** NEVs must comply with all the rules and regulations for a motor vehicle as set for in the California Vehicle Code. Vehicle Code §21251 provides in relevant part that:

"…a low-speed vehicle is subject to all the provisions applicable to a motor vehicle, and the driver of a low-speed vehicle is subject to all the provisions applicable to the driver of a motor vehicle or other vehicle, when applicable, by this code or any other code, with the exception of those provisions which, by their very nature, can have no application."

**2.** NEVs must be registered with the State Department of Motor Vehicles and the driver must hold a valid California driver's license and be insured.

**3.** NEVs may travel on any street with a posted speed limit of 35 miles per hour or less. However, the City, by local ordinance or resolution, may restrict or prohibit the use of NEVs. CVC §21266(a). The City plans to designate approved NEV travel routes to direct NEV traffic to the safest available route.

**4.** NEVs may cross state-highways at controlled intersections only. Crossing at uncontrolled intersections is permitted with the approval of the agency with primary responsibility for that intersection. CVC §21260(2).

**D. Safety Standards**

NEVs must meet all safety standards for low-speed vehicles as defined by NTHSA. All vehicles sold as NEVs, such as the GEM, already meet these safety standards. Modified golf carts must include these safety modifications to comply with federal safety mandates. All NEVs must be equipped with:

- Seat belts (lap only, or lap and shoulder)
- Brake lights
- Rear lights
- Headlights
- Mirrors, one of the following selection; (1) left side and right side mirrors, (2) left-side and rear-view mirrors, or (3) multi-directional cross bar window.
- Windshield
- Horn
- Front and rear turn signal indicators
- Rear red-reflectors
- Parking brake
- Covered passenger compartment.

**E. NEVs in Golf Cart Lanes**

Current Law in Lincoln and Rocklin per AB 2353 allows dual use; however, outside of Lincoln and Rocklin, a conflict still exists.

**F. NEV/Bicycle Lane Compatibility**

NEV travel is permitted by AB 2353 on roads with speed limits in excess of 35 mph where there is a designated Class II NEV lane on the right shoulder. Bicycles are permitted to travel in these designated NEV lanes.

## Chapter III - Energy/Cost Considerations

**A. Energy Consumption**

1. **Standard Car** (27.5 mpg)
2. **NEV** (Equivalent to 150mpg, 0.223 kwh/mile)

**B. Operational Costs** (For standard fleet car and NEV)

**Table 1 – Annual Operating Costs**

| Annual Operating Costs * | | | | | |
|---|---|---|---|---|---|
| **Vehicle Type** | **Insurance** | **Registration** | **Fuel Costs** | **Maintenance** | **Total** |
| NEV | $200 | $50 | $16.90 | $293.00 | $559.90 |
| Gas Auto | $1,200 | $600 | $292.40 | $1,428.00 | $3,520.40 |

**Table 2 – Operating Costs per Mile**

| * Based on Data from the Luke AFB 9/14/2000 Report (1998 figures) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vehicle Type** | **Cost New** | **Annual Operating Costs** | **Yrs** | **Salvage Value** | **10-YEAR COST** | **10-Year Total Miles** | **Average Operating Cost per Mile** | **Vehicle Cost per Mile** |
| NEV | $7,560 | $560 | 10 | $1,500 | $11,659 | 13,000 | $0.043 | $0.90 |
| Gas Auto | $18,500 | $3,520 | 10 | $1,850 | $51,854 | 34,000 | $0.104 | $1.53 |

**C. Potential Energy Sources**

1. Photovoltaic Cells/Batteries
2. Fuel Cells
3. Utility/Batteries

**D. Energy Benefits**

The cost to operate an NEV is less than 1/5 that required for a conventional automobile. In accordance with the July 1, 2002 report to CEC (p600-02-020F) demonstration of NEVs, NEVs achieve an equivalent mpg of 150. The actual measured energy use is 0.223 kwh/mile. The average auto mpg is 27.5 as of 2002, and less in urban traffic.

**E. Incentives/Subsidies**

1. Federal: 2.5% of purchase price tax credit
2. Local: designated parking spaces and lanes, free charging stations.

## Chapter IV - Air Quality Benefits

### A. Air Quality Setting

The city of Lincoln is located within the Sacramento Federal Non-attainment Area (SFNA), a region federally designated as "severe non-attainment" of federal air quality standards for ozone air pollution. Only the Los Angeles basin in California is designated as "extreme" with worse air quality. Under federal law, the SFNA must demonstrate attainment by 2005, then maintain healthy air thereafter. NEVs will provide real, quantifiable emission benefits for local and regional air attainment strategies.

NEV trips made possible by the development of this project will produce a variety of air emission benefits to Lincoln and its citizens, and to the five-county air basin. Ozone air pollution is formed by "tailpipe" oxides of nitrogen (NOx) and reactive organic gases (ROG) mixing in the presence of sunlight. The great majority of local ozone air pollution comes from "mobile sources", with the largest portion resulting from light-duty on-road vehicle use. Some air pollution also comes from evaporative (fuel) emissions that escape from the vehicle during fueling and operation. In winter, carbon monoxide (CO), a product of incomplete combustion that increases as temperatures drop, can be a problem near heavily traveled intersections and in lower lying areas that tend to trap air pollutants in stagnant weather conditions.

Vehicle exhaust also contains toxic air contaminants, such as benzene and formaldehyde. Emission control systems take time to come up to operating temperature, especially in winter. A recent report to the California Energy Commission (TIAX, LLC) stated:

> "It is well documented that cold-start emissions have significant impact on air quality. Due to cold-start fuel enrichment, subsequent quenching of hydrocarbons in a cold engine, and the delayed attainment of proper operating temperatures of the catalytic converter, between 60 and 80% of the toxic air emissions from automobiles occur during the cold-start period."

The good news is that NEVs eliminate the issue of cold starts, with their high rates of toxic and criteria pollutant emissions.

### B. NEV Emission Benefits to Lincoln and the Air Basin

NEVs eliminate NOx, CO, ROG and toxics emissions that otherwise result from internal combustion-powered vehicle. NEVs operating in Lincoln will displace gasoline vehicle trips. To demonstrate the emission benefits of a successful NEV program, the following assumptions were used to model the most important emission benefits with the URBEMIS2002 mobile source emissions estimation program:

- 5000 NEVs at program buildout
- 2008 is the modeling year
- Each NEV will travel 1000 miles/year
- NOx is primary target; emission reductions annualized from summer conditions
- Only vehicle emissions were calculated with URBEMIS2002 (no area or construction emissions)
- Trip characteristics derived as 2.78 miles/each for 1000 mile/year
- Trips calculated as home to work
- 95% light duty passenger car and 5% light duty truck ratio assumed

**Table 3 – Lbs/Day Emissions Reduced with 5000 /NEVs**

| ROG lbs/day | NOx lbs/day | CO lbs/day | SO2 lbs/day | PM10 lbs/day |
|---|---|---|---|---|
| **86.80** | **15.35** | **286.90** | **.14** | **20.87** |

**Table 4 – Tons/Year Emissions Reduced with 5000 NEVs**

| ROG tons/year | NOx tons/year | CO tons/year | SO2 tons/year | PM10 tons/year |
|---|---|---|---|---|
| **15.84** | **2.8** | **52.36** | **.026** | **3.8** |

## C. Cost-Effectiveness of NEV Air Emission Benefits for Lincoln

The cost of reducing air pollution is often calculated in units of dollars spent per unit of emission reduction received. In simple terms, when the local Placer Air Pollution Control District calculates the value of funding it provides "mobile source" (vehicle) emission reduction projects, including NEVs, it divides the tons of emissions reduced by what it spent to achieve them.

The NEV project does NOT require large investments by air agencies, in spite of the considerable emission reductions that will occur. This is because NEVs will take advantage of existing roadway improvements and infrastructure. Since NEVs have a much lower cost to operate, and even "green image" environmental benefits important to increasing numbers of drivers and local businesses, the "costs" for the emission reductions produced by the NEVs will be substantially underwritten by the vehicle buyer. Therefore, the cost-effectiveness of the emission benefits to Lincoln and the broader Sacramento air basin is a bargain.

Because NEVs operate at essentially zero emissions, (using grid power) vehicles with an internal combustion engine will operate with greater emissions. No grid power in the Sacramento region is generated in the local air basin, and it is reasonable to argue that because NEVs produce a wide range of emission benefits to society they should be able to claim that their grid power comes from hydroelectric or other environmentally benign sources.

## D. Luke Air Force Base NEV Fleet Demonstration Program Report

The September 14, 2000 Luke Air Force Base NEV Fleet Demonstration Program report provided the following air quality benefits for each of their NEVs:

**Table 5 – Air Quality Benefits**

| **Vehicle Type** | **10-Year Total Miles** | **10-Yr VOC lb** | **10-Yr CO lb** | **10-Yr NOX lb** |
|---|---|---|---|---|
| NEV Elect. | 13,000 | (52.0) | (390.0) | (67.6) |
| Gas Auto | 34,000 | 136.0 | 1,020.0 | 176.8 |

**E. Community Design Benefits**

The NEV program represents "inside out transportation planning"; or planning from the user's perspective.

**F. Environmental Justice**

The City of Lincoln's proposed NEV transportation plan will enhance the quality of life for aging, disabled, and low-income persons within the City.

**1. NEVs Will Provide Inexpensive Mobility for Low-Income Drivers**

The high cost of a conventional automobile can be a barrier to independence and mobility for low or fixed income persons. The initial and operating costs of an NEV are substantially less than those of a conventional automobile.

A new NEV retails for approximately $7,560.00. Used NEVS are also available for less. The least expensive conventional automobile is at least three times the amount of a new NEV.

The operating costs of an NEV are also substantially lower than those of a conventional automobile. The average annual operating cost for an NEV including insurance, registration, fuel, and maintenance is $559.00. The same costs for a conventional automobile are $3,520.00; over six times the operating costs of an NEV.

**2. NEVs Will Promote Safety and Provide Independence for Aging and Disabled Drivers**

With the State's aging population, we are confronted with the conflicting interest of providing continued mobility to aging drivers while promoting a safe driving environment for all drivers. After the tragic accident in Southern California, where an elderly driver crashed into a farmers market killing several bystanders, the State's population has become acutely aware of the dangers of drivers with diminished skills often brought on by old age. After the accident, the State immediately began considering new driver's license testing, a move that will inevitably result in the loss of a driver's loss for drivers with diminished driving skills, included the elderly and disabled.

The loss of a driver's license can lead to isolation and dependence on others for mobility. The proposed NEV transportation plan will provide for a special driver's permit, issued by the local jurisdiction, which will allow aging or disabled persons to drive an NEV in designated NEV routes. Since NEVs are smaller, have a limited travel range, and a top speed of 25 miles-per-hour, they provide a safe alternative to impaired drivers when compared to a conventional high-speed automobile. The emergence of an NEV transportation plan in the City of Lincoln will provide continued mobility and independence to aging or disabled drivers, allowing them to access businesses, medical centers, and visit friends while driving an NEV.

NEVs also will reduce the need for comparatively expensive and under-funded dial-a-ride programs.

In conclusion, the City's proposed NEV transportation plan will enhance the lives of low-income, elderly, and disabled persons throughout the City by providing them with affordable transportation options. The City plans to conduct outreach to all members of the community, including the elderly, disabled, low-income, and other minority groups to determine their transportation needs when preparing the City's comprehensive NEV transportation plan.

## G. Conclusion – Air Quality Benefits

Facilitating NEV operation will result in substantial air quality benefits to Lincoln, while providing extremely cost-effective pollutant reductions to assist the air basin in attaining and then maintaining federally enforced ambient air quality standards. Cost-effectiveness per ton of emission reduced will be unsurpassed, since air agencies will not be expected to provide per-vehicle subsidies. With deployment of 5000 NEVs as a result of this proposal, nearly eighteen tons per year of ozone pre-cursor emissions will be avoided based on URBEMIS estimation. Moreover, once this NEV pilot study is completed for Lincoln, results will be made available to other communities similarly interested in reducing dependence on petroleum products while simultaneously reducing vehicle-caused air pollution.

## Chapter V - Community Considerations

The NEV program represents "inside out transportation planning"; or planning from the user's perspective.

### A. NEVs Provide Multiple Community Benefits

NEVs are already in use in Lincoln and Rocklin areas within a limited radius of golf courses. NEV users are asking officials of both Lincoln and Rocklin "how can I legally get to a shopping area in my NEV?" The NEV project is designed to accommodate NEV use and is already successful at eliminating automobile trips.

NEVs travel at a slower speed than autos and provide opportunity to develop a more friendly cohesive community at the neighborhood level than fast autos. The slower speed also contributes to NEV safety for impaired drivers.

As discussed in Chapter II, Legal Constraints, the NEV project included legislation (AB 2353) that has a requirement for DMV to work with the California Highway Patrol and the Legislature to create a new driver's license classification for NEV operation. With an "NEV operators permit" a person who no longer felt comfortable to drive an automobile could continue to be independent. NEVs will provide individual transportation to public transit systems and satisfy some of the more costly unmet transit needs.

NEVs operate for about 20% of the cost of owning and operating automobiles. For low income families that live near their work, an NEV could replace a gross polluting auto. Part of the NEV project includes proposals to include NEVs in State incentive, grant and rebate programs.

### B. Discussion of other NEV/Golf Cart Communities

The City of Lincoln's efforts to accommodate and encourage NEVs has many of its roots in other electric vehicle communities. With the advent of the active adult communities, (age 55 or older) golf carts and electric vehicles have become a common sight.

Other Sun City communities have long encouraged the use of electric vehicles. That is certainly the case in *Lincoln Hills* where the use of electric vehicles in local neighborhoods has increased over the years, since first being introduced in the spring of 1999. Rush hour in *Lincoln Hills* isn't necessarily at 8 a.m. and 5 p.m., it is more likely at 10 a.m. after the morning softball game, or 2:30 p.m. after golf as the NEVs and golf cart vehicles make their way to the neighborhood shops.

Every day in *Lincoln Hills* numerous electric vehicles make their way through neighborhood connections to get a cup of coffee from Starbuck's, or go to Safeway for groceries or do their banking at any of the four neighborhood banks. NEVs are convenient, safe, affordable, non-polluting and good for the local economy. Business owners near *Sun City Lincoln Hills* and other Sun City communities appreciate electric vehicle users patronizing their businesses and accommodate NEV and Golf Cart use with special parking spaces.

As a part of this study and proposed pilot program for the City of Lincoln, it might be helpful to review some other electric vehicle plans over the past 10 to 15 years. Electric vehicle activities have been taking place in California and Arizona Sun City communities for quite some time now. NEVs have proven to be natural, efficient alternative forms of transportation in many active adult communities.

These programs were started for ease of accessibility to neighborhood activities through use of an electric vehicle. The various community programs started with golf cart transportation plans, which still exist and now include a good amount of NEV use as well, depending on the community and access to roadways and commercial centers. It is worth a quick review and look at other Sun City/Del Webb communities.

**CONCLUSION:**

NEVs are an affordable, safe, non-polluting alternative to traditional modes of transportation. It is apparent that as communities make commercial and downtown business sites available and accessible, the use of NEVs increases. NEVs have proven to be natural, efficient alternative forms of transportation and will provide a multitude of benefits to the City of Lincoln.

## Chapter VI - NEV Transportation Planning

### A. Background

Existing law (Chapter 6, Streets and Highways Code, Section 1950 – 1965) authorizes a city or county to establish a golf cart transportation plan subject to the review of the appropriate transportation planning agency and traffic law enforcement agency. Assembly Bill 2353 adds Chapter 7 (commencing with Section 1963) to Division 2.5 of the Streets and Highways Code to authorizes the City of Lincoln (until January 1, 2009) to establish a neighborhood electric vehicle (NEV) transportation plan subject to the same review process established for a golf cart transportation plan (GCTP). The bill defines "neighborhood electric vehicle (NEV)" the same as a "low speed vehicle." Within California, only electric powered LSVs can be sold. Therefore, all LSVs in the state of California are NEVs.

In enacting Chapter 7, it is the intent of the Legislature to authorize the City of Lincoln and Rocklin in the County of Placer to establish a neighborhood electric vehicle (NEV) transportation plan. It is the further intent of the Legislature that this transportation plan be designed and developed to best serve the functional travel needs of the plan area, to have the physical safety of the NEV driver's person and property as a major planning component, and to have the capacity to accommodate NEV drivers of every legal age and range of skills.

The City of Lincoln NEV project is an effort to accommodate the City's changing urban lifestyle by encouraging the use of bicycles and NEVs to travel from their home to the downtown Lincoln commercial areas. This effort will result in air quality improvements, energy savings, reduced travel costs, and increased mobility and independence for aging and impaired drivers.

Minor modifications to the existing street and circulation system are needed to accommodate NEVs. The City plans to implement signing and striping improvements consistent with this report, create special parking spaces, and develop a Class II NEV path system to facilitate access to the City of Lincoln, and to increase safety.

The City of Lincoln is well positioned to integrate the beneficial use of NEVs with their existing golf cart transportation system. NEVs are already circulating in the Sun City – Lincoln Hills development and special parking areas are provided in the adjacent Safeway shipping center. The overall goal is to complete a comprehensive NEV circulation system so that the number of users will increase commensurate with the amount of new development planned for Twelve Bridges and the City of Lincoln proper. Figure 1 shows the project study area.

### B. Data Collection and Review

We reviewed the following materials in preparation of this report.

- The Revised Twelve Bridges Specific Plan EIR (August 1997)
- City of Lincoln, *NEV Transportation Plan*, CMAQ Application to SACOG, 1-15-04
- Administrative Draft – Transportation and Circulation Section 4.2 (May 2000)
- The City of Lincoln General Plan
- The Sun City – Lincoln Hills Golf Cart Transportation Plan (2001)
- City of Lincoln Parkway Pointe Offsite Improvement Plans (November 2004)

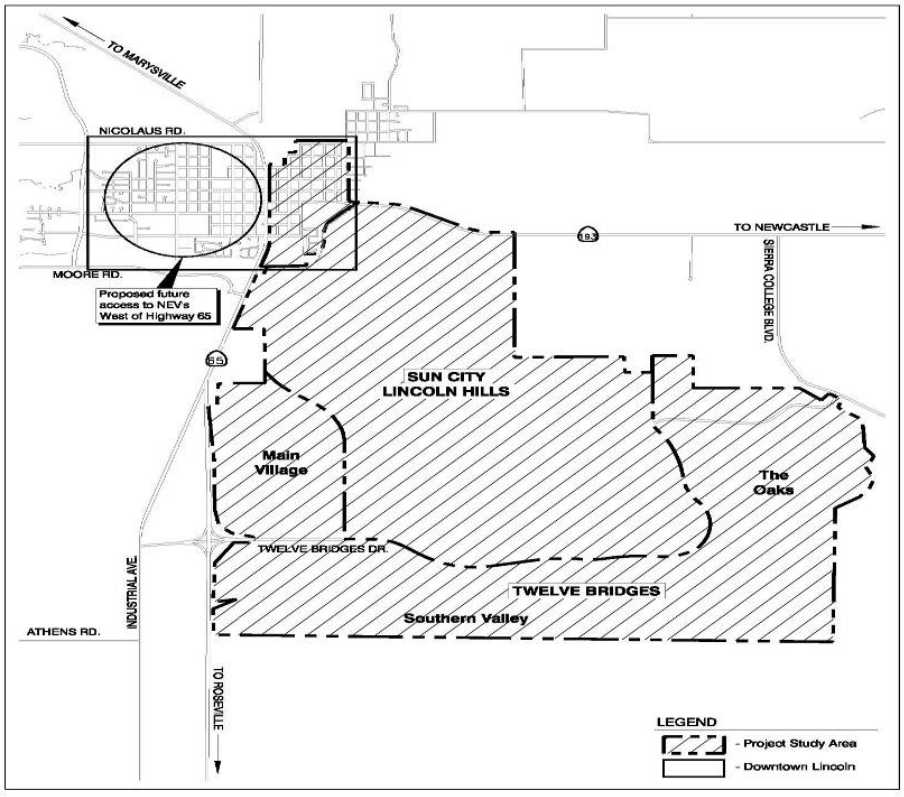
- The City of Lincoln current street design standards (2003)
- City of Palm Desert Golf Cart Transportation Plan (1999)
- 2000 Census journey-to-work data
- AB 2353 (signed into law)
- California Vehicle Code (CVC) (2003)
- Manufactures brochures and dimensions for typical golf carts and NEVs
- City of Lincoln *Neighborhood Electric Vehicle Transportation Program Draft #2 Report* prepared by MHM Engineers & Surveyors, 12-2-03.

This information provides a basis for determining the feasibility of integrating NEVs into the existing golf cart circulation system within the City of Lincoln, identifying key crossing points that allow access to planned retail, commercial, educational, and medical facilities in Twelve Bridges, and recommending street standards, crossing design, and signage to accommodate NEVs. The existing golf cart facilities and circulation routes in the City of Lincoln are summarized below along with their feasibility of accommodating NEVs.

## C. Mode Share and Trip Generation Summary

Table 9 provides information from the 2000 Census on the mode shares for journey-to-work for Placer County, City of Lincoln and City of Rocklin. For the City of Lincoln (including Twelve Bridges) the automobile continues to be the primary mode of travel to work. Drive alone and carpool account for approximately 96 percent of all work trips.

**Figure 1 – Project Study Area**

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**PROJECT LOCATION**
**FIGURE 1**

**Table 6 – Mode Shares from the 2000 Census Journey to Work**

| City | Drive Alone | Carpool | Transit | Bicycle | Walk | Other Means | Subtotal |
|---|---|---|---|---|---|---|---|
| Lincoln CA | 79.8% | 16.5% | 0.0% | 0.4% | 3.0% | 0.2% | 100.0% |
| Rocklin CA | 86.9% | 9.9% | 0.8% | 0.6% | 1.5% | 0.4% | 100.0% |
| Roseville CA | 86.4% | 10.3% | 1.4% | 0.4% | 1.0% | 0.4% | 100.0% |
| | | | | | | | |
| | | | | | | | |
| Lincoln CA | 3,395 | 701 | 0 | 18 | 129 | 10 | 4,253 |
| Rocklin CA | 14,574 | 1,661 | 129 | 95 | 244 | 60 | 16,763 |
| Roseville CA | 29,809 | 3,565 | 485 | 145 | 332 | 153 | 34,489 |

Table 7 summarizes the number of dwelling units and daily person trips for Sun City – Lincoln Hills and for the remainder of Twelve Bridges. Recent data (September 2004) from the City of Lincoln shows that since 1998, there have been 3,356 building permits issued for the City of Lincoln excluding Sun City – Lincoln Hills. This represents approximately 50% of the adopted General Plan build-out The Del Webb community (Sun City – Lincoln Hills) has received 5,521 building permits during the same time frame, which represents approximately 80 percent of plan build-out.

**Table 7 – Trip Generation Summary for Sun City - Lincoln Hills and Twelve Bridges**

| Land Use Category | Daily Trip Rate[1] | Total Daily Trips | | |
|---|---|---|---|---|
| | | Twelve Bridges | Sun City - Lincoln Hills | Total |
| Low Density Residential | 9.0/d.u. | 33,525 | 0 | 33,525 |
| High Density Residential | 6.5/d.u. | 6,825 | 0 | 6,825 |
| Age-Restricted Residential | 4.6/d.u. | 0 | 31,280[1] | 31,280 |
| Commercial | 525/acre | 26,075 | 14,700 | 40,775 |
| Employment Center | 230/acre | 18,860 | 0 | 18,860 |
| Schools | 50/acre | 3,750 | 0 | 3,750 |
| Golf Course | 37.6/hole | 677 | 1,354 | 2,031 |
| **Total** | | **89,712** | **47,334** | **137,046** |

Source: City of Lincoln Traffic Model; Del Webb Specific Plan DEIR, 1993; Revised Twelve Bridges Specific Plan EIR (1997); City of Lincoln Building Permit Section
[1] Revised consistent with recent building permit data

**Feasibility**: There is ample opportunity to increase non-auto mode shares within the City of Lincoln based on recent census data. Walking already shows a higher percentage of work trips than either Roseville or Rocklin. The use of golf carts and/or NEVs is captured in the "Other" category (0.2 percent). The potential for mode shifting to bike, walk or NEV travel within the City of Lincoln will depend on several factors including, a well connected on-street and off-street system, jobs-housing balance (for work related trips), adequate parking and major attractors and activity centers, and appropriate safety measures. The City of Lincoln has taken important steps to improve these elements through adoption of their bicycle master plan, development of a citywide extended golf cart transportation plan, and development of the main village and surrounding commercial, retail and employment areas. If NEV travel accounted for just one percent of the current Del Webb generated trips, there would be a potential of 400 daily trips by this efficient non-polluting mode. If the same one percent is applied to the total trips generated by Del Webb and Twelve Bridges, over 1,000 daily trips by NEV are possible.

New NEV trips resulting from the development of the circulation plan will produce a variety of air emission benefits to Lincoln and its citizens, and to the five-county air basin. The great majority of local ozone air pollution comes from "mobile sources", with the largest portion resulting from light-duty on-road vehicle use. In winter, carbon monoxide (CO) can be a problem near heavily traveled intersections and in lower lying areas that tend to trap air pollutants. The good news is that NEVs eliminate toxic emissions that otherwise result from these mobile sources.

Although trip length information is difficult to establish, a neighborhood electric vehicle program questionnaire was distributed to NEV owners in the City of Lincoln in 2003 as part of the MHM Draft NEV Report, in an attempt to refine usage and trip length information. The results from 35 responses showed the following trends:

- 77% of respondents use their NEV at least 5-days a week
- 70% of respondents drive their NEV more than 500 miles per year and 23% drive more than 1,000 miles per year
- 62% of respondents use their NEV for purposes other than recreation or golf
- 38% indicated they would drive at least 50 additional miles per week if they were allowed to drive anywhere within the City of Lincoln, and if it were safe to do so

The City of Lincoln – NEV Transportation Plan CMAQ application provided an estimate of the air quality benefits available from a mode shift to NEVs and bicycles within the downtown area based on the survey results. Table 8 provides a summary of the information. The calculation methodology is detailed in the application.

**Table 8 – Air Quality Benefits of NEV and Bicycle Use**

| Air Quality Benefits of NEV and Bicycle Use | | | | |
|---|---|---|---|---|
| Category | NEV | Bike | Combined | Notes |
| Annual Auto Trip Reduced | 312,732 | 28,322 | 341,054 | Trips/year |
| Annual Auto VMT Reduced | 2,501,856 | 56,644 | 2,558,500 | Miles/year |
| Ozone (ROG) | 4,146 | 174 | 4,320 | Lbs/year |
| Nitrous Oxide (NOx | 3,636 | 114 | 3,750 | Lbs/year |
| Particulates (PM10) | 1,245 | 29 | 1,274 | Lbs/year |
| Annual Emission Reduction | 9,027 | 317 | 9,343 | Lbs/year |
| Source: NEV Transportation Plan CMAQ Application to SACOG 1/04 | | | | |

**Feasibility:** The potential for NEV and bicycle use resulting from an approved NEV circulation plan results in very positive air quality benefits for the City of Lincoln and ultimately the 5-county region.

## D. Traffic Volume Data

The feasibility of using NEVs on the study area roadways considered "level of service (LOS)" and traffic volume thresholds. Table 9 provides the average daily traffic (ADT) volume LOS for various roadway types. These thresholds have been established for previous environmental analyses in the Cities of Lincoln, Rocklin and the Counties of Placer and Sacramento. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst in terms of congestion and delay.

**Table 9 – Average Daily Traffic Volume Level of Service Thresholds**

| Facility Type | Average Daily Traffic Volume Threshold | | | | |
|---|---|---|---|---|---|
| | LOS A | LOS B | LOS C | LOS D | LOS E |
| Two-Lane Street | 9,000 | 10,700 | 12,000 | 13,500 | 15,000 |
| Four-Lane Undivided Arterial | 18,000 | 21,300 | 24,000 | 27,000 | 30,000 |
| Four-Lane Divided Arterial | 20,250 | 23,625 | 27,000 | 30,375 | 33,750 |
| Four-Lane Restricted-Access Arterial | 21,600 | 25,200 | 28,800 | 32,400 | 36,000 |
| Six-Lane Divided Arterial | 30,315 | 36,000 | 40,500 | 45,560 | 50,525 |
| Six-Lane Restricted-Access Arterial | 32,400 | 37,800 | 43,200 | 48,600 | 54,000 |
| Two-Lane Freeway | 18,800 | 26,400 | 34,000 | 38,000 | 40,000 |
| Four-Lane Freeway | 37,600 | 52,800 | 68,000 | 76,000 | 80,000 |
| Six-Lane Freeway | 56,400 | 79,200 | 102,000 | 114,000 | 120,000 |
| Two-Lane Conventional Highway | 3,100 | 4,800 | 7,900 | 13,500 | 22,900 |

Sources: *Sunset West Development Plan EIR* (1995), *Draft Subsequent Twelve Bridges Specific Plan EIR*, (1997), *Placer County General Plan Update DEIR* (1994), and *Sacramento County Traffic Impact Guidelines* (1997).

The City of Lincoln has adopted LOS C as their minimum criteria for urban area intersections and roadways. The feasibility of allowing NEVs to travel on area roadways were evaluated by comparing ADT to the daily volume LOS thresholds in Table 10. Figure 2 shows 2025 traffic volumes for the Main Village including Twelve Bridges Drive and East Lincoln Parkway. The future (2025) traffic forecasts are based on trip generation estimates for proposed General Plan Amendment land uses, prepared by Fehr &Peers for the Main Village.

**Feasibility**: The feasibility of operating NEVs on roadways within the City of Lincoln and Twelve Bridges based on speed limits and volumes is shown in Table 10.

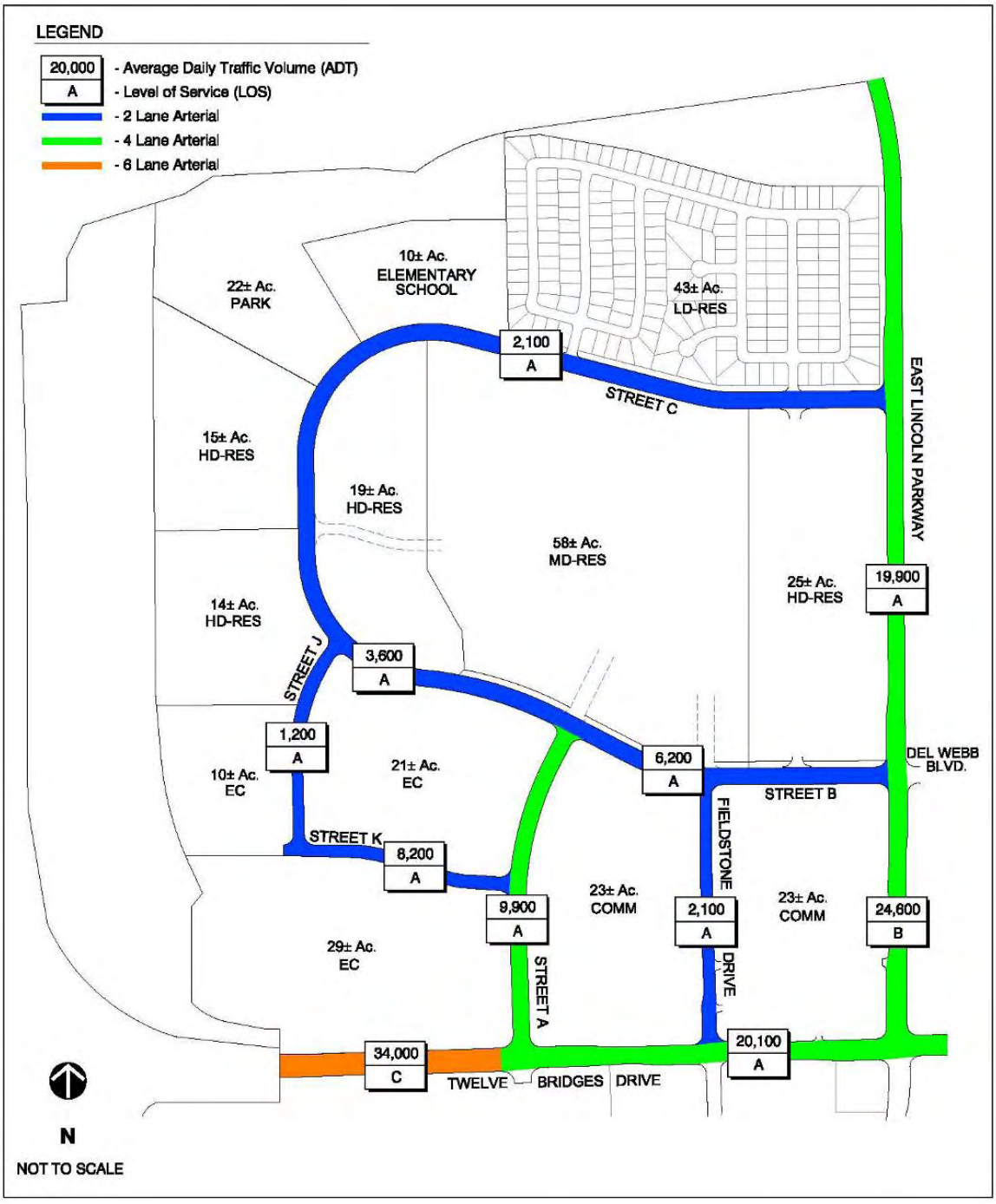
**Table 10 – Operational Feasibility of NEVs on Study Roadways**

| Facility (Speed Limit) | Roadway Speed Limit | 2020 Traffic Volume | LOS C Threshold | Operational Feasibility |
|---|---|---|---|---|
| SR 193 | 35 mph | 18,000 | 12,000 | Limited[1] |
| Ferrari Ranch Road | 35 mph | 19,000 | 24,000 | Yes[2] |
| Sterling Parkway | 35 mph | 17,000 | 24,000 | Yes |
| E. Lincoln Parkway | 35 mph | 22,000 | 24,000 | Yes |
| Twelve Bridges Drive* | 35 mph | 20,000 | 24,000 | Yes |
| Street C (Main Village) | 35 mph | 2,100 | 12,000 | Yes |
| Street B (Main Village | 25 mph | 6,200 | 12,000 | Yes |
| Fieldstone Drive (Main Village) | 25 mph | 2,100 | 12,000 | Yes |
| Street A (Main Village | 25 mph | 9,900 | 24,000 | Yes |
| Street K (Main Village) | 25 mph | 8,200 | 12,000 | Yes |
| Street J (Main Village) | 25 mph | 1,200 | 12,000 | Yes |
| Downtown Lincoln (Residential Streets) east of Highway 65 | 25 mph | No recent estimates | Not expected to exceed 12,000 | Yes |
| Source: Fehr & Peers 2004 | | | | |

*The segment of Twelve Bridges Drive between State Route 65 and East Lincoln Parkway has a posted speed limit of 35 mph. Other portions of Twelve Bridges Drive are currently posted at 45 mph.

NEVs would be allowed to travel on SR 193 between Ferrari Ranch Road and A Street to access the downtown residential streets in Lincoln. NEVs will not be allowed on SR 193 east of Ferrari Ranch Road. Although NEVs are legal to operate on Ferrari Ranch Road, a separate Class II path system is proposed when the road is built out to complete width.

**Figure 2 – Average Daily Traffic Volumes**




FEHR & PEERS
TRANSPORTATION CONSULTANTS

**AVERAGE DAILY TRAFFIC VOLUMES -
GENERAL PLAN AMENDMENT
CUMULATIVE YEAR (2025) CONDITIONS**

**Figure 2**

## E. Standard NEV Signage and Street markings

The standard NEV signage and street markings are shown in Appendix B. These signs and markings are consistent with the MUTCD 2003 California Supplement, May 20, 2004 issued by the California Department of Transportation. The size and general design of signage for the NEV plan is consistent with Part 9 of the MUTCD for bicycles and with the adopted 2001 Golf Cart Transportation Plan (GTCP) for Sun City – Lincoln Hills.

The following standards and policies for NEV signing and pavement markings are recommended for use within the plan area.

1. **Combination NEV/Bike Lane Sign**. The Combination NEV/Bike Lane sign should be placed on NEV Lanes where a Class II Bike Lane is also provided. The sign should be placed at the far side of collector street intersections and at a minimum of one-half mile intervals on all continuous residential streets. (Appendix B Figure 1)

2. **NEV Pavement Marking**. The Pavement Marking should be placed on local streets, which have been designated as NEV Routes. (Appendix B Figure 2)

3. **NEV Lane Striping**. The stripe is to be placed between the traffic lane and the NEV/Bike lane. (Appendix B Figure 3)

4. **NEVs Prohibited Beyond This Point**. The NEV Prohibited Beyond This Point educational plate may be placed at entrances to public streets that will not accommodate NEV travel. This sign may be placed on the right-hand side of the roadway approximately 25 feet past the intersection so it is visible to operators before they enter that portion of the public right-of-way (Appendix B Figure 4)

5. **NEV Route**. The NEV Route sign should be placed on local streets, which have been designated as NEV Routes. The sign should be placed at the far side of collector street intersections and at a maximum of one-half mile intervals on all continuous **residential** streets. (Appendix B Figure 5)

## F. NEV Standards: Lane Widths and Parking Requirements

### 1. Functional Classification of NEV Facilities

**a. Two-Way Paths** are defined for the purposes of this study as an off-street path with a minimum width of 14 feet plus a one foot shoulder on each side (total right-of-way width of 16 feet). This width is deemed necessary to allow NEVs to pass safely in the opposite direction considering their size and speed (See Table 13). NEV paths are designed to provide access between residential areas and commercial/retail areas, and between public streets and private property. The multi-modal design of the paths is intended for pedestrians, bicyclists, skateboarders and roller-bladders to share the facility. Note: The minimum path width may be reduced to 12-feet at the discretion of the Director of Public Works.

**b. One-Way Paths** are defined for the purposes of this study as an off-street path with a minimum width of 8 feet plus a one foot shoulder on each side (total right-of-way width of 10 feet). The 8 feet width is deemed necessary to allow pedestrians, bicyclists, skateboarders and roller-bladders to share the facility.

**c. Class II NEV/Bike Lanes:** NEV/bike lanes are portions of public roadways that are designated by signs and pavement markings for NEV/bike travel. NEV/bike lanes should be 7 feet wide and allow NEVs, bikes and golf carts (within the Golf Cart Transportation Plan) to travel adjacent to automobile traffic but within a striped separated space. Bicyclists may share NEV lanes if there is not a separate bicycle lane on the roadway. In addition, NEV/bike lanes may be reduced to 6-feet at the discretion of the Director of Public Works. NEV/bike lanes are appropriate on arterials and collector streets that meet the following design criteria:

- Road Design Speed – 45 miles per hour or less

- Automobile Traffic Volume – Streets should be capable of providing a high level of service to insure that adequate capacity exists for automobiles, bicyclists and NEVs. The City of Lincoln Public Facilities Element (PFE Policy 5-1) of the General Plan requires streets and intersections to operate at no worse than LOS "C". Based on the traffic volume thresholds shown in Table 12, a two lane collector street suggests a target vehicular threshold of 12,000 vehicles per day to maintain LOC C.

**d. Class III NEV Routes** provide for shared use by NEVs with conventional vehicle traffic on streets with a posted speed limit of 35 miles per hour or less.

**2. Minimum Street Standards**

The minimum street standards and typical cross-sections are shown in Appendix A. These cross-sections are based on existing City of Lincoln standards and reflect similar design widths for NEV and/or golf cart travel in Sun City – Lincoln Hills and the City of Palm Desert. Included are:

- Two lane residential collector streets with Class II NEV/Bike lanes
- Four lane arterials with Class II NEV/Bike lanes
- Residential streets (shared use)
- One-way Class 1 NEV/Golf Cart Path (off-road)
- Two-way Class 1 NEV/Golf Cart Path (off-road)

Table 11 provides a physical and operational comparison of NEVs and Golf Carts based on manufacturer specifications. The additional width and speed of the NEV requires Class I paths to be a minimum of 14-feet of pavement with at least a one foot shoulder on each side for a total right-of-way width of 16 feet. Similarly, one way Class 1 NEV/Golf Cart paths are recommended to be 8 feet of pavement with at least a one foot shoulder on each side for a total right-of-way width of 10 feet. This will allow for multi-modal travel and passing in the same direction.

**Table 11 – NEV vs. Golf Cart Specifications and Comparisons**

| **Neighborhood Electric Vehicle (NEV) vs. Standard Golf Cart Specifications and Comparisons** | | | | |
|---|---|---|---|---|
| CATEGORY | NEV (GEMCO) | | GOLF CART (CLUB CAR) | |
| | 2 Passenger | 4 Passenger | 2 Passenger | 4 Passenger |
| Curb Weight | 1,100 lbs | 1,280 lbs | 495 lbs | 500 lbs |
| GVW | 1,600 lbs | 2,100 lbs | NA | NA |
| Length | 98.5" | 126.5" | 91.5" | 91.5" |
| Height | 68" | 69.75" | 68.5" | 68.5" |

| | | | | |
|---|---|---|---|---|
| Width | 55” | 55” | 47.25” | 47.25” |
| Wheelbase | 71.1” | 101” | 65.5” | 65.5” |
| Tires | 10-inch | 12-inch | 8.5-inch | 8.5-inch |
| Rating | Street/Turf | Street | Street/Turf | Street |
| Speed | 15/30 mph | 30 mph | 15 mph | 15 mph |
| Source: Manufacturer specifications for GEMCO and CLUB CAR | | | | |

Table 12 provides a comparison of operational characteristics across various “low-speed” modes. All of these modes should be able to use the Class I NEV/Golf Cart paths within the plan area.

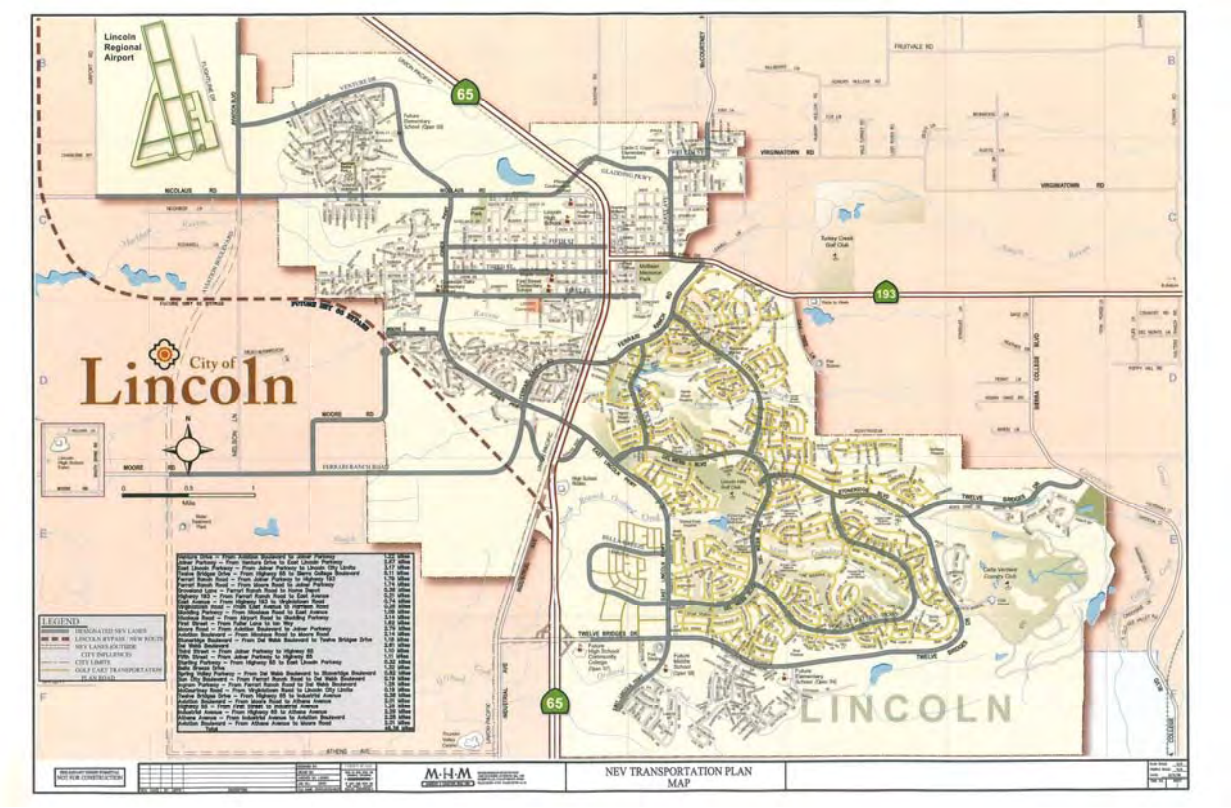
**Table 12 – Operational Characteristics Across Low-Speed Modes**

| Operational Characteristics Across Low-Speed Modes | | | | |
|---|---|---|---|---|
| Low Speed Mode | Speed (mph) | Width (feet) | Braking Distance (feet) | Turning Radius (feet) |
| Pedestrians | 2.7 | NA | NA | NA |
| Bicycles | 15 | 3.3 | 15 | 56.3 |
| Skates | 10.5 | 4 | 20 | NA |
| Skateboards | NA | NA | NA | NA |
| Scooters | 5 to 8 | 1.2 | 25 | NA |
| Wheelchairs | 4 to 7 | 2.5 | NA | 2 to 4 |
| Golf Carts | 5 to 15 | 3.9 | NA | NA |
| NEVs | 5 to 30 | 4.6 | NA | NA |
| Source: TRB Paper “What the Literature Says about Low Speed Modes,” Rodier, Shaheen, and Chung, August 2003; Manufacturer specifications for GEMCO and CLUB CAR | | | | |

### 3. Proposed NEV Circulation Plan

The proposed NEV Transportation Plan is illustrated in Figure 3.

**Figure 3 – Proposed Circulation Plan**




The following outlines the NEV routes included in the NEV Transportation Plan:

1. Venture Drive – From Aviation Boulevard to Joiner Parkway
2. Joiner Parkway – From Venture Drive to East Lincoln Parkway
3. East Lincoln Parkway – From Joiner Parkway to Lincoln City Limits
4. Twelve Bridges Drive – From Highway 65 to Sierra College Boulevard
5. Ferrari Ranch Road - From Joiner Parkway to Highway 193
6. Ferrari Ranch Road – From Moore Road to Joiner Parkway'
7. Groveland Lane – Ferrari Ranch Road to Home Depot
8. Highway 193 – From Ferrari Ranch Road to East Avenue
9. East Avenue – From Highway 193 to Virginiatown Road
10. Virginiatown Road – From East Avenue to Harrison Road
11. Gladding Parkway – From Nicolaus Road to East Avenue
12. Nicolaus Road – From Airport Road to Gladding Parkway
13. First Street – From Fuller Lane to Ian Way
14. Moore Road – From Aviation Boulevard to Joiner Parkway
15. Aviation Boulevard – From Nicolaus Road to Lincoln City Limits
16. Stoneridge Boulevard – From Del Webb Boulevard to Twelve Bridges Drive
17. Del Webb Boulevard
18. Third Street – From Joiner Parkway to Highway 65
19. Fifth Street – From Joiner Parkway to Highway 65
20. Sterling Parkway – From Highway 65 to East Lincoln Parkway
21. Bella Breeze Drive
22. Spring Valley Parkway – From Del Webb Boulevard to Stoneridge Boulevard

23. Sun City Boulevard – From Ferrari Ranch Road to Del Webb Boulevard
24. Ingram Parkway – From Ferrari Ranch Road to Del Webb Boulevard
25. McCourtney Road – From Virginiatown Road to Lincoln City Limits

Future routes outside of City of Lincoln limits but within the sphere of influence:

1. Twelve Bridges Drive – From Highway 65 to Industrial Avenue
2. Aviation Boulevard – From Nicolaus Road to Athens Avenue
3. Highway 65 – From First Street to Industrial Avenue
4. Industrial Avenue – From Highway 65 to Athens Avenue
5. Athens Avenue – From Industrial Avenue to Aviation Boulevard

## G. NEV/Golf Cart Parking Facilities

In order to promote NEV travel, NEVs/golf carts should be given preferential parking at all common facilities, including retail centers, commercial centers, parks, medical facilities and educational facilities. Although no industry or local standards exist, we recommend the following minimum number of spaces based on our experience with other Golf Cart communities and plans, and our site review of existing parking stalls for NEVs and golf carts in the City of Lincoln:

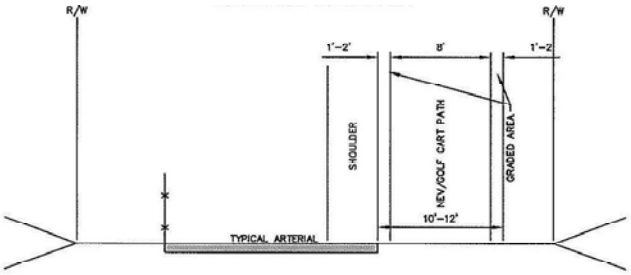
- Retail Centers – 2 to 3 spaces (7 feet x 15 feet) per 100,000 square feet plus one additional space for each additional 30,000 square feet.
- Commercial Centers – 2 to 3 spaces (7 feet x 15 feet) per 100,000 square feet plus one additional space for each additional 30,000 square feet
- Private Neighborhood Parks – four to six spaces (7 feet x 15 feet)
- Medical Facilities – Four to six spaces (7 feet x 15 feet)
- Educational Facilities – Six to eight spaces (7 feet x 15 feet)

**Note:** The number of spaces suggested above, are guidelines. Larger facilities may require more parking spaces.

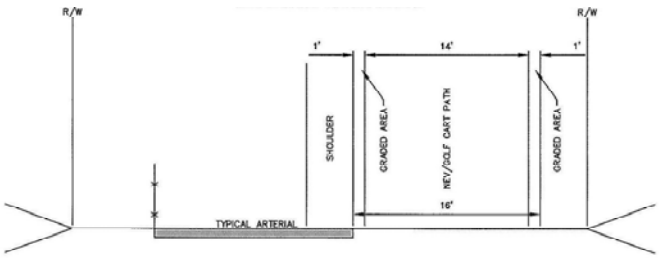
# APPENDIXES

# APPENDIX A
# STREET CROSS SECTIONS

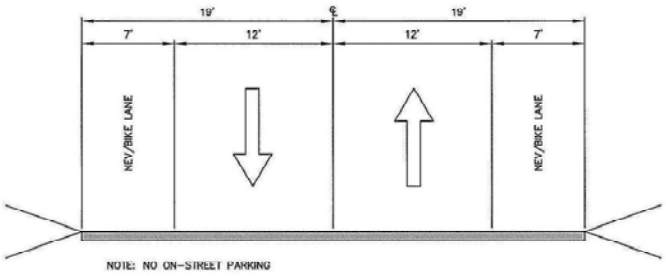
**One-way Class I**
**NEV/Golf Cart Path**



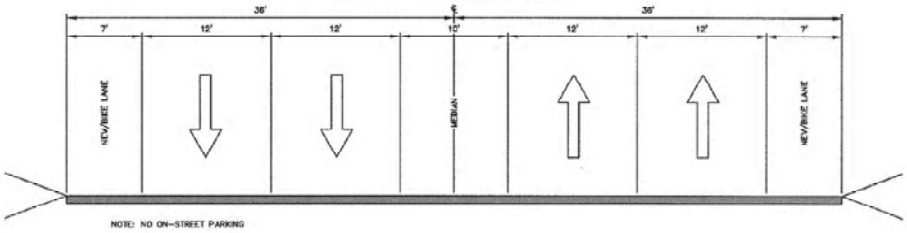

**Two-way Class I**
**NEV/Golf Cart Path**



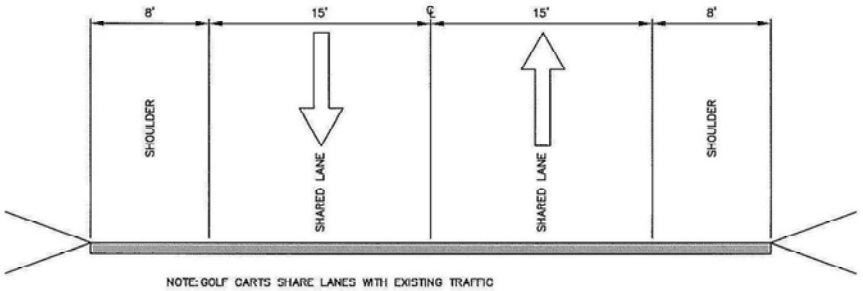

**Collector Street with**
**Class II NEV/Bike Lane**




**Four Lane Arterial with**
**Class II NEV/Bike Lanes**




**Residential Street with**
**Class III NEV/Golf Cart Route**




Images courtesy of: FEHR & PEERS TRANSPORTATION CONSULTANTS

## APPENDIX B

## STANDARD SIGNS AND MARKINGS

***Figure 1***

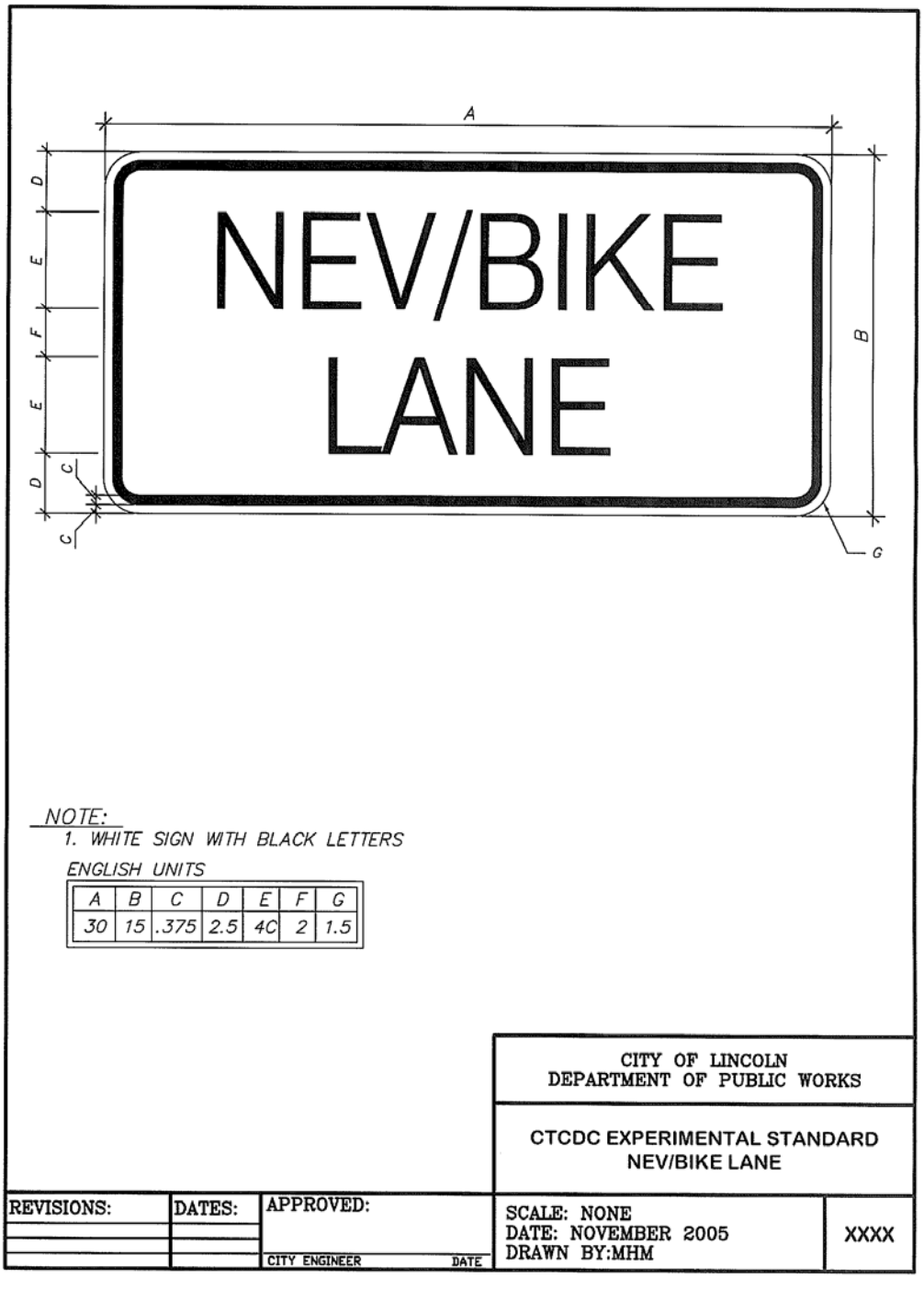


***Figure 2***

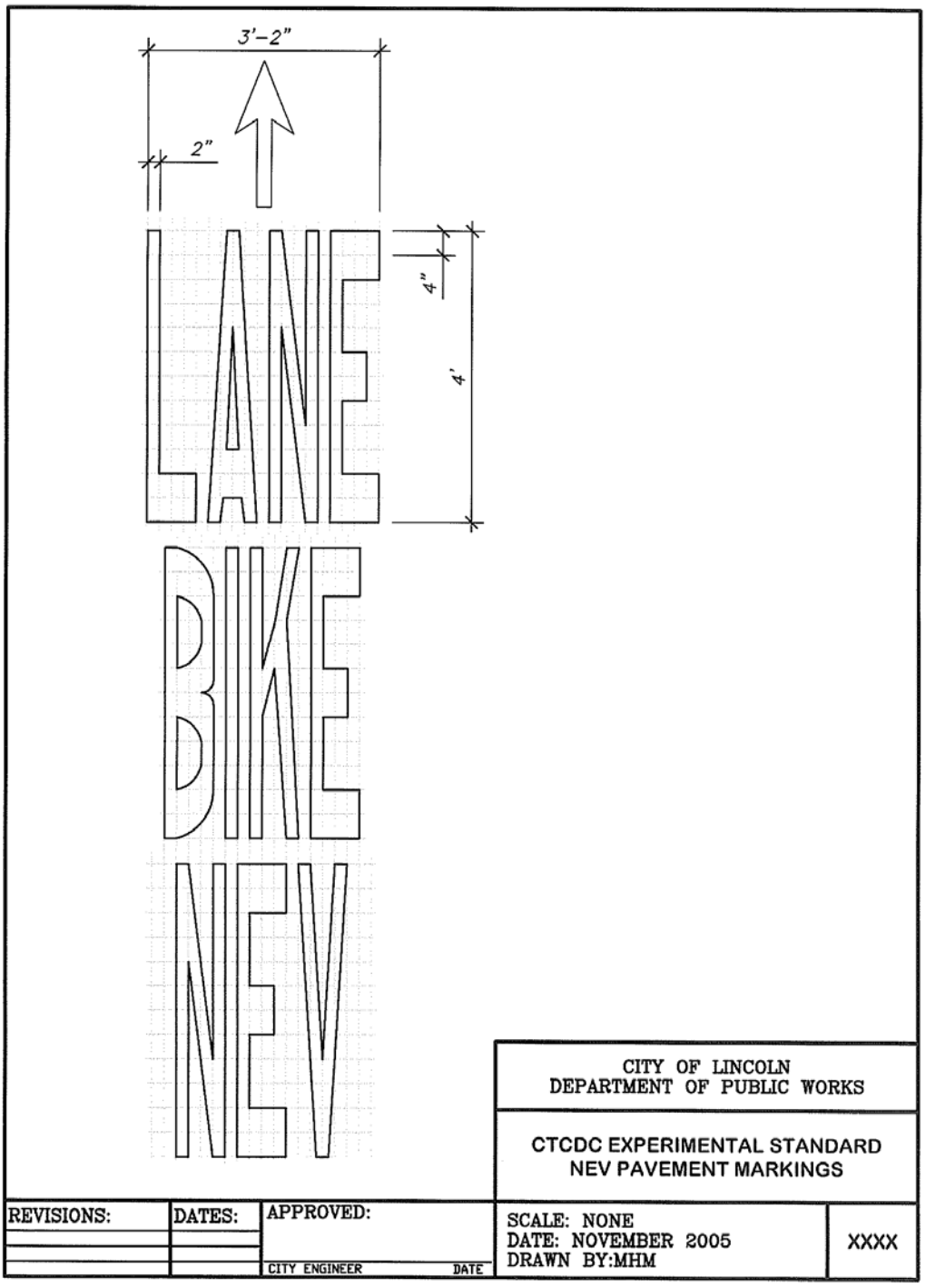

3'-2"
2"
LANE
4"
4'
BIKE
NEV
CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS
CTCDC EXPERIMENTAL STANDARD
NEV PAVEMENT MARKINGS
REVISIONS:
DATES:
APPROVED:
CITY ENGINEER
DATE
SCALE: NONE
DATE: NOVEMBER 2005
DRAWN BY:MHM
XXXX

***Figure 3***

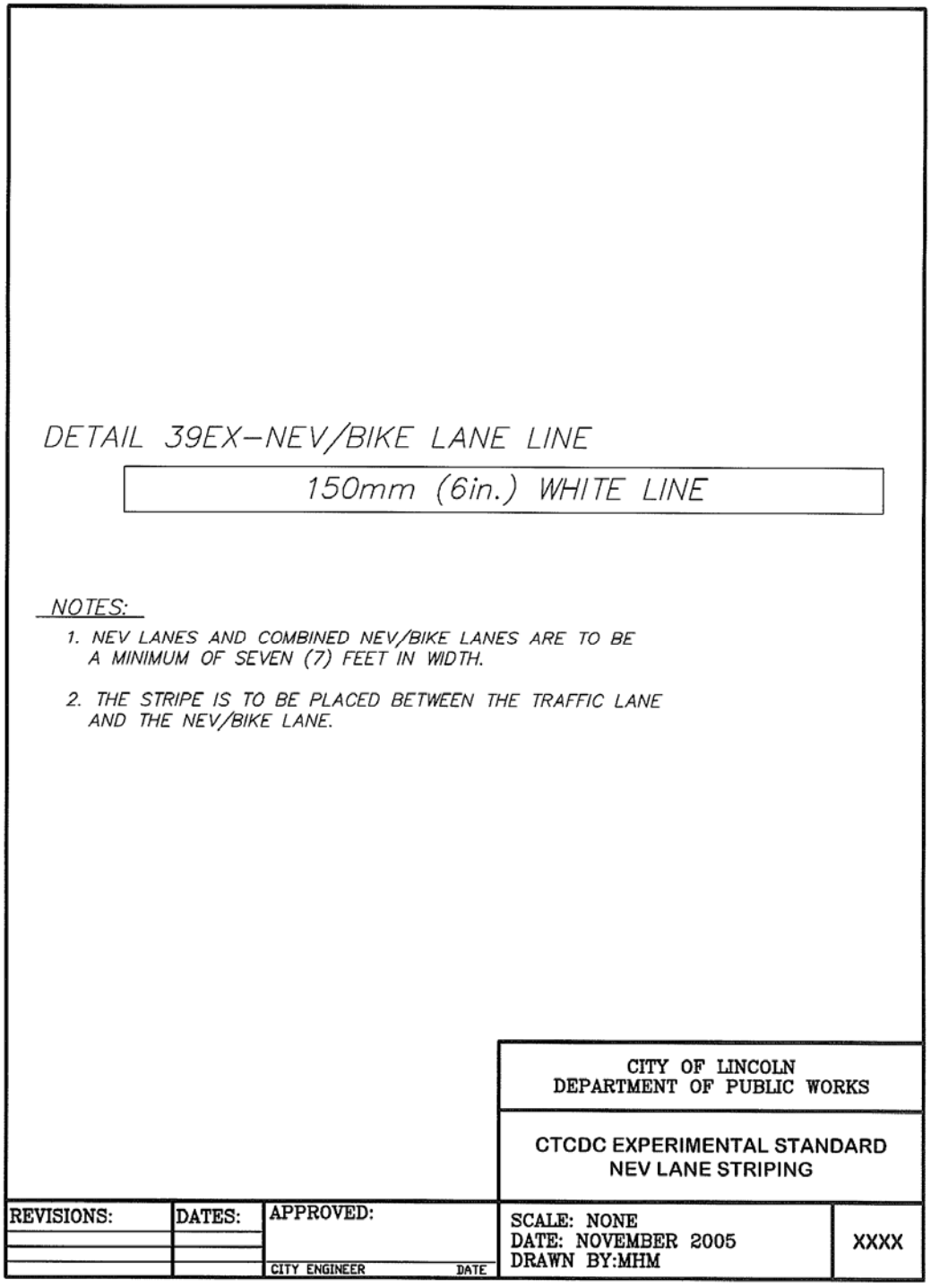

DETAIL 39EX–NEV/BIKE LANE LINE
150mm (6in.) WHITE LINE
NOTES:
1. NEV LANES AND COMBINED NEV/BIKE LANES ARE TO BE A MINIMUM OF SEVEN (7) FEET IN WIDTH.
2. THE STRIPE IS TO BE PLACED BETWEEN THE TRAFFIC LANE AND THE NEV/BIKE LANE.
CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS
CTCDC EXPERIMENTAL STANDARD
NEV LANE STRIPING
REVISIONS:
DATES:
APPROVED:
CITY ENGINEER
DATE
SCALE: NONE
DATE: NOVEMBER 2005
DRAWN BY:MHM
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***Figure 4***

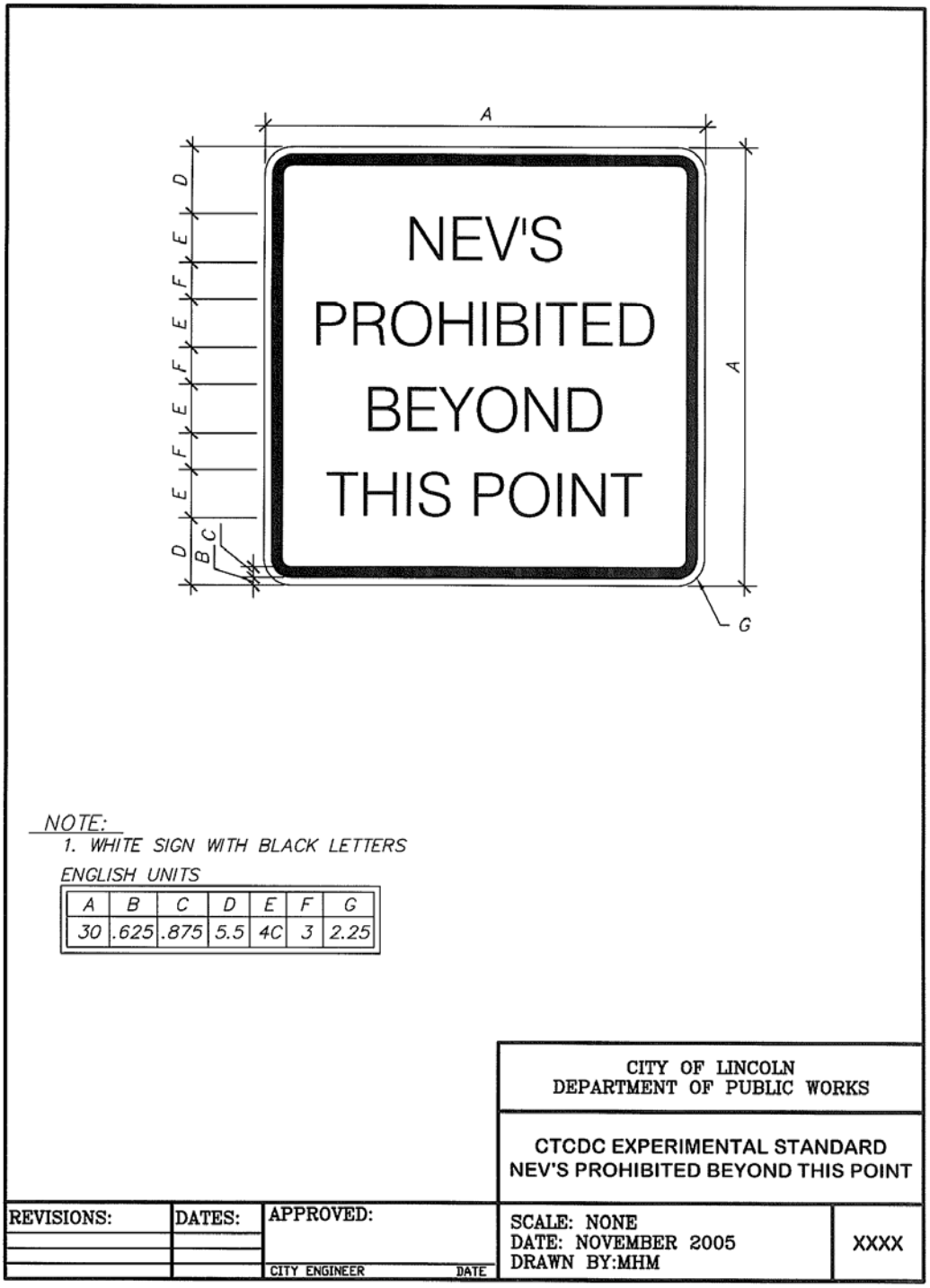
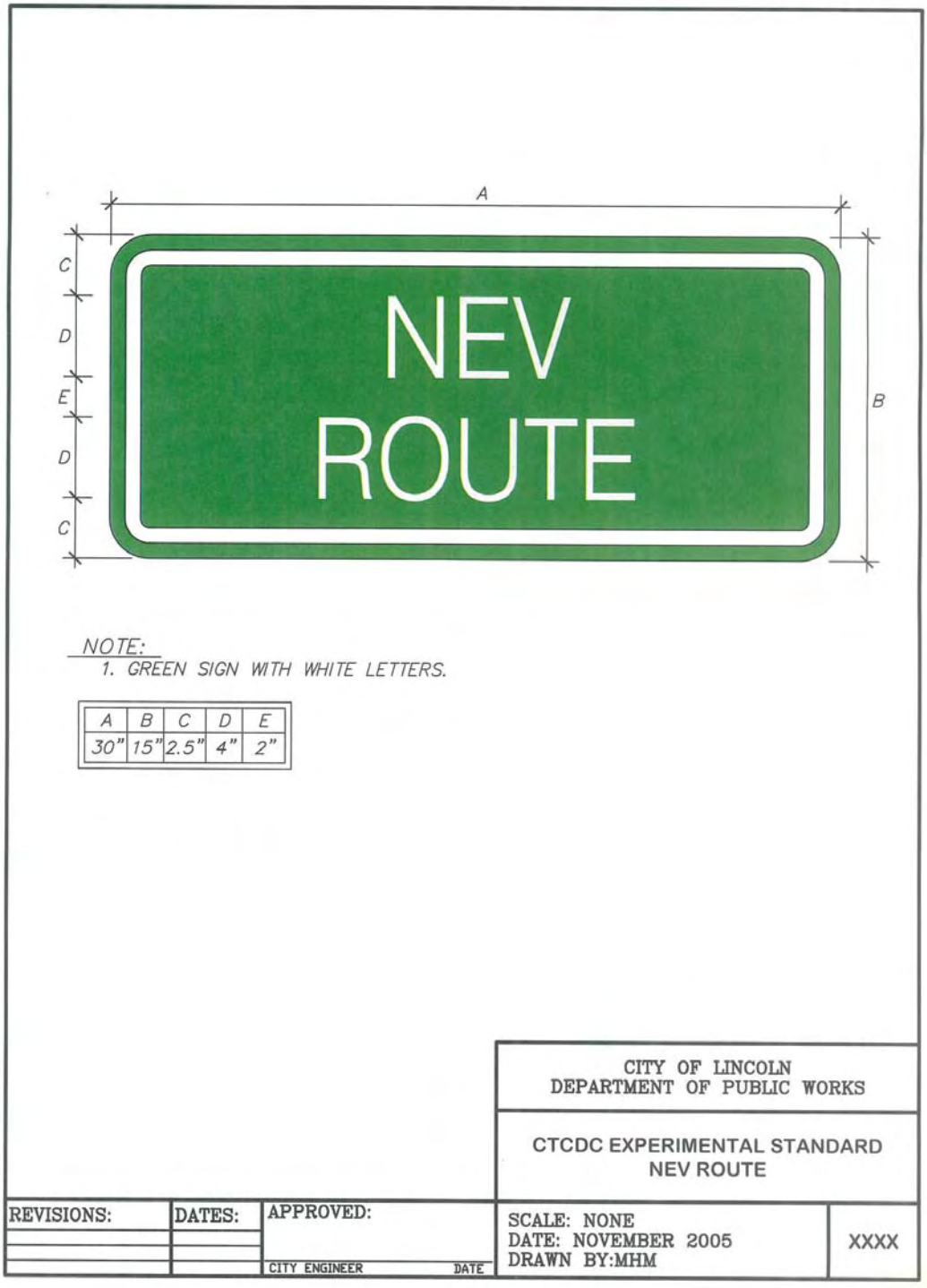

A
D
E
F
E
F
E
F
E
D
B
C
NEV'S
PROHIBITED
BEYOND
THIS POINT
A
G
NOTE:
1. WHITE SIGN WITH BLACK LETTERS
ENGLISH UNITS
A B C D E F G
30 .625 .875 5.5 4C 3 2.25
CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS
CTCDC EXPERIMENTAL STANDARD
NEV'S PROHIBITED BEYOND THIS POINT
REVISIONS:
DATES:
APPROVED:
CITY ENGINEER
DATE
SCALE: NONE
DATE: NOVEMBER 2005
DRAWN BY:MHM
XXXX

***Figure 5***


A
B
C
D
E
D
C
NEV
ROUTE
NOTE:
1. GREEN SIGN WITH WHITE LETTERS.
A B C D E
30" 15" 2.5" 4" 2"
CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS
CTCDC EXPERIMENTAL STANDARD
NEV ROUTE
REVISIONS:
DATES:
APPROVED:
CITY ENGINEER
DATE
SCALE: NONE
DATE: NOVEMBER 2005
DRAWN BY:MHM
XXXX

## APPENDIX C

## PARKING AND CHARGING STATION STANDARDS

***Figure 1***

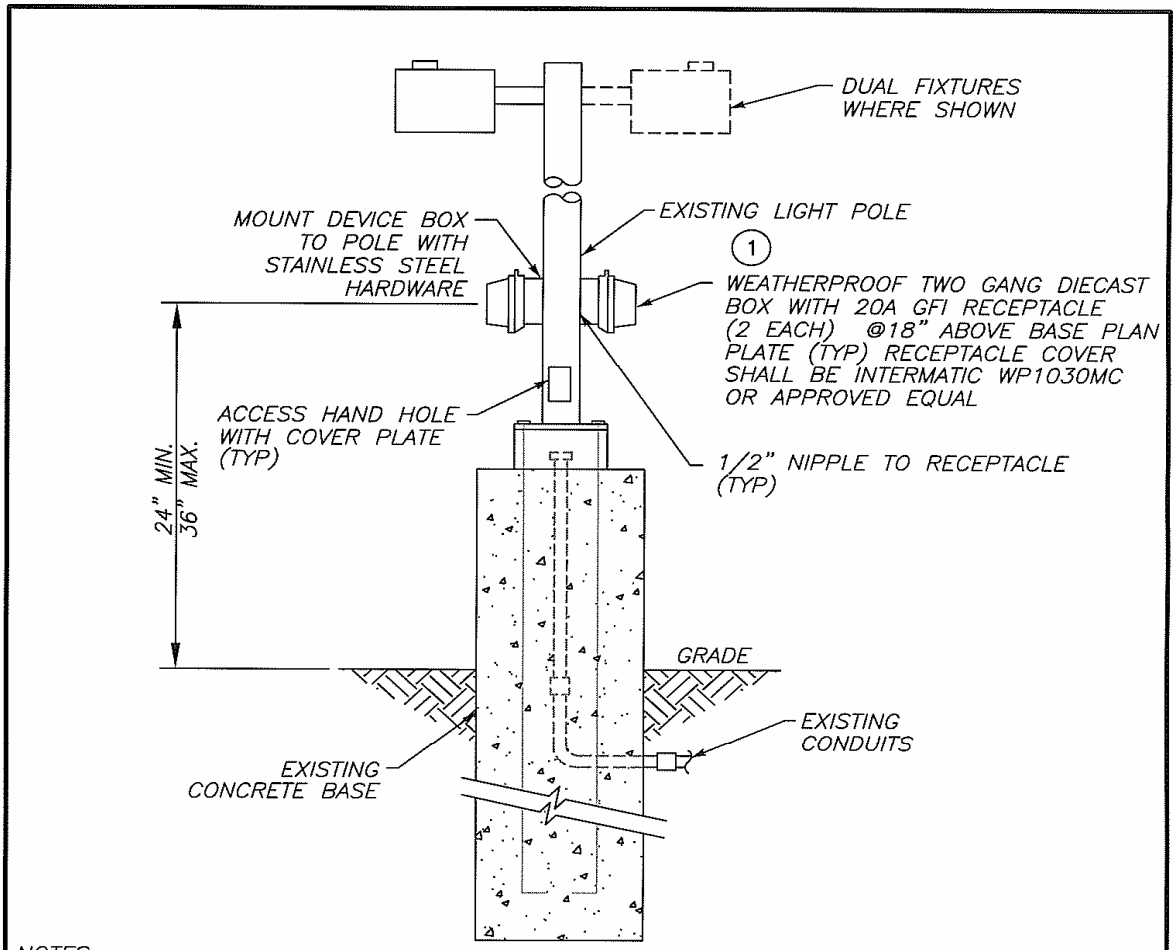


***Figure 2***

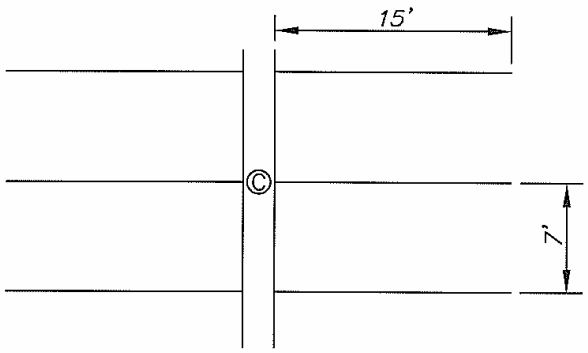

NOTE:
1. WHITE SIGN WITH BLACK LETTERS

ENGLISH UNITS

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 18 | 16.5 | .375 | 2.5 | 4C | 2 |

| | | | | |
|---|---|---|---|---|
| | | | CITY OF LINCOLN<br>DEPARTMENT OF PUBLIC WORKS | |
| | | | STANDARD NEV SIGNS<br>NEV PARKING ONLY | |
| REVISIONS: | DATES: | APPROVED:<br>CITY ENGINEER DATE | SCALE: NONE<br>DATE: NOVEMBER 2005<br>DRAWN BY:MHM | XXXX |

***Figure 3***




©• NEV CHARGING STATION LOCATION 1–4PLEX CHARGING STATION FOR EVERY 8 SPACES.

• LOCATE CHARGING STATION(S) NEAR CENTER OF STALLS AT NORMAL LIGHT POLE LOCATIONS

NUMBER OF SPACES:

- RETAIL & COMMERCIAL: MINIMUM 2 SPACES FOR THE FIRST 10,000 SQUARE FEET OF BUILDING AREA PLUS ONE ADDITONAL SPACE FOR EACH ADDITIONAL 6,000 SQUARE FEET.
- MEDICAL FACILITIES: MINIMUM 4 SPACES
- EDUCATIONAL FACILITIES: MINIMUM 8 SPACES
- NEIGHBORHOOD PARKS: MINIMUM 4 SPACES

CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS

**NEV PARKING STANDARDS**
**STALL NUMBER AND SIZE**

| REVISIONS: | DATES: | APPROVED: | SCALE: NONE<br>DATE: NOVEMBER 2005<br>DRAWN BY:MHM | XXXX |
|---|---|---|---|---|
| | | CITY ENGINEER DATE | | |

# APPENDIX D

# ASSEMBLY BILL NO. 2353

## Assembly Bill No. 2353

CHAPTER 422

An act to add and repeal Chapter 7 (commencing with Section 1963) of Division 2.5 of the Streets and Highways Code, and to amend Sections 385.5, 21250, 21251, and 21260 of the Vehicle Code, relating to neighborhood electric vehicles.

[Approved by Governor September 9, 2004. Filed with Secretary of State September 9, 2004.]

LEGISLATIVE COUNSEL'S DIGEST

AB 2353, Leslie. Neighborhood Electric Vehicles.

Existing law defines "low-speed vehicle" for purposes of the Vehicle Code as a motor vehicle, other than a motor truck, with 4 wheels on the ground that is capable of a minimum speed of 20 miles per hour and a maximum speed of 25 miles per hour on a paved level surface and that has an unladen weight of 1800 pounds or less. Existing law imposes certain restrictions on the use of low-speed vehicles on public streets and highways, and generally requires an operator of a low-speed vehicle to have a driver's license. A violation of the Vehicle Code is an infraction, unless otherwise specified.

Existing law authorizes a city or county to establish a golf cart transportation plan subject to the review of the appropriate transportation planning agency and traffic law enforcement agency. Existing law provides that operating a golf cart other than on an authorized roadway is an infraction punishable by a fine not exceeding $100.

This bill would authorize, until January 1, 2009, the City of Lincoln and the City of Rocklin in the County of Placer to establish a neighborhood electric vehicle (NEV) transportation plan subject to the same review process established for a golf cart transportation plan. The bill would define "neighborhood electric vehicle" for these purposes to have the same meaning as the above definition of "low-speed vehicle." The bill, among other things, would provide for the plan to authorize the use of state highways by NEVs under certain conditions. The bill would require a report to the Legislature by January 1, 2008. The bill would enact other related provisions. Because the bill would revise the definition of a crime, it would impose a state-mandated local program.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state.

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Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

*The people of the State of California do enact as follows:*

SECTION 1. Chapter 7 (commencing with Section 1963) is added to Division 2.5 of the Streets and Highways Code, to read:

CHAPTER 7. NEIGHBORHOOD ELECTRIC VEHICLE TRANSPORTATION PLAN

1963. It is the intent of the Legislature, in enacting this chapter, to authorize the City of Lincoln and the City of Rocklin in the County of Placer to establish a neighborhood electric vehicle (NEV) transportation plan for a plan area in the city. It is the further intent of the Legislature that this transportation plan be designed and developed to best serve the functional travel needs of the plan area, to have the physical safety of the NEV driver's person and property as a major planning component, and to have the capacity to accommodate NEV drivers of every legal age and range of skills. It is the intent of the Legislature, in enacting this chapter, to encourage discussions between the Legislature, the Department of Motor Vehicles, and the California Highway Patrol regarding the adoption of a new classification for licensing motorists who use neighborhood electric vehicles.

1963.1. The following definitions apply to this chapter:

(a) "Plan area" means that territory under the jurisdiction of the City of Lincoln or the City of Rocklin designated by the city for a NEV transportation plan, including the privately owned land of any owner that consents to its inclusion in the plan.

(b) "Neighborhood electric vehicle" or "NEV" means a low-speed vehicle as defined by Section 385.5 of the Vehicle Code.

(c) "NEV lanes" means all publicly owned facilities that provide for NEV travel including roadways designated by signs or permanent markings which are shared with pedestrians, bicyclists, and other motorists in the plan area.

(d) "Speed-modified golf cart" means a golf cart that is modified to meet the safety requirements of Section 571.500 of Title 49 of the Code of Federal Regulations.

1963.2. (a) The City of Lincoln and the City of Rocklin may, by ordinance or resolution, adopt a NEV transportation plan.

(b) The transportation plan shall have received a prior review and the comments of the appropriate transportation planning agency designated under subdivision (a) or (b) of Section 29532 of the Government Code and any agency having traffic law enforcement responsibilities in the City of Lincoln or the City of Rocklin.

(c) The transportation plan may include the use of a state highway, or any crossing of the highway, subject to the approval of the Department of Transportation.

1963.3. The transportation plan shall include, but is not limited to, all of the following elements:

(a) Route selection, which includes a finding that the route will accommodate NEVs without an adverse impact upon traffic safety, and will consider, among other things, the travel needs of commuters and other users.

(b) Transportation interfacing, which shall include, but not be limited to, coordination with other modes of transportation so that a NEV driver may employ multiple modes of transportation in reaching a destination in the plan area.

(c) Citizens and community involvement in planning.

(d) Flexibility and coordination with long-range transportation planning.

(e) Provision for NEV related facilities including, but not limited to, special access points and NEV crossings.

(f) Provisions for parking facilities, including, but not limited to, community commercial centers, golf courses, public areas, parks, and other destination locations.

(g) Provisions for special paving, road markings, signage and striping for NEV travel lanes, road crossings, parking, and circulation.

(h) Provisions for NEV electrical charging stations.

(i) NEV lanes for the purposes of the transportation plan shall be classified as follows:

(1) Class I NEV routes provide for a completely separate right-of-way for the use of NEVs.

(2) Class II NEV routes provide for a separate striped lane adjacent to roadways with speed limits of 55 miles per hour or less.

(3) Class III NEV routes provide for shared use by NEVs with conventional vehicle traffic on streets with a posted speed limit of 35 miles per hour or less.

1963.4. If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan, it shall do both of the following:

(a) Establish minimum general design criteria for the development, planning, and construction of separated NEV lanes, including, but not

limited to, the design speed of the facility, the space requirements of the NEV, and roadway design criteria.

(b) In cooperation with the department, establish uniform specifications and symbols for signs, markers, and traffic control devices to control NEV traffic; to warn of dangerous conditions, obstacles, or hazards; to designate the right-of-way as between NEVs, other vehicles, and bicycles; to state the nature and destination of the NEV lane; and to warn pedestrians, bicyclists, and motorists of the presence of NEV traffic.

1963.5. If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan, each city may do the following:

(a) Acquire, by dedication, purchase, or condemnation, real property, including easements or rights-of-way, to establish NEV lanes.

(b) Establish a NEV transportation plan as authorized by this chapter.

1963.6. If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan, each city shall also adopt all of the following as part of the plan:

(a) NEVs eligible to use NEV lanes shall meet the safety requirements for low-speed vehicles as set forth in Section 571.500 of Title 49 of the Code of Federal Regulations.

(b) A permit process for golf carts that requires speed-modified golf carts to meet minimum design criteria adopted pursuant to subdivision (a). The permit process may include, but not be limited to, permit posting, permit renewal, operator education, and other related matters.

(c) Minimum safety criteria for NEV operators, including, but not limited to, requirements relating to NEV maintenance and NEV safety. Operators shall be required to possess a valid California driver's license and to comply with the financial responsibility requirements established pursuant to Chapter 1 (commencing with Section 16000) of Division 7.

(d) (1) Restrictions limiting the operation of NEVs to separated NEV lanes on those roadways identified in the transportation plan, and allowing only those NEVs and speed-modified golf carts that meet the safety equipment requirements specified in the plan to be operated on separated NEV lanes of approved roadways in the plan area.

(2) Any person operating a NEV in the plan area in violation of this subdivision is guilty of an infraction punishable by a fine not exceeding one hundred dollars ($100).

1963.7. (a) If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan pursuant to this chapter, the cities shall jointly submit a report to the Legislature on or before January 1, 2008, in consultation with the Department of Transportation, the Department of the California Highway Patrol, and local law enforcement agencies.

(b) The report shall include all of the following:

(1) A description of all NEV transportation plans and their elements that have been authorized up to that time.

(2) An evaluation of the effectiveness of the NEV transportation plans, including their impact on traffic flows and safety.

(3) A recommendation as to whether this chapter should be terminated, continued in existence applicable solely to the City of Lincoln and the City of Rocklin in the County of Placer, or expanded statewide.

1963.8. This chapter shall remain in effect only until January 1, 2009, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2009, deletes or extends that date.

SEC. 2. Section 385.5 of the Vehicle Code is amended to read:

385.5. A "low-speed vehicle" is a motor vehicle, other than a motor truck, having four wheels on the ground and an unladen weight of 1,800 pounds or less, that is capable of propelling itself at a minimum speed of 20 miles per hour and a maximum speed of 25 miles per hour, on a paved level surface. For the purposes of this section, a "low-speed vehicle" is not a golf cart, except when operated pursuant to Section 21115 or 21115.1. A "low-speed vehicle" is also known as a "neighborhood electric vehicle."

SEC. 3. Section 21250 of the Vehicle Code is amended to read:

21250. For the purposes of this article, a low-speed vehicle means a vehicle as defined in Section 385.5. A "low-speed vehicle" is also known as a "neighborhood electric vehicle."

SEC. 4. Section 21251 of the Vehicle Code is amended to read:

21251. Except as provided in Sections 1963 to 1963.8, inclusive, of the Streets and Highways Code, and Sections 4023, 21115, and 21115.1, a low-speed vehicle is subject to all the provisions applicable to a motor vehicle, and the driver of a low-speed vehicle is subject to all the provisions applicable to the driver of a motor vehicle or other vehicle, when applicable, by this code or any other code, with the exception of those provisions which, by their very nature, can have no application.

SEC. 5. Section 21260 of the Vehicle Code is amended to read:

21260. (a) Except as provided in paragraph (1) of subdivision (b), or in an area where a neighborhood electric vehicle transportation plan has been adopted pursuant to Chapter 7 (commencing with Section 1963) of Division 2.5 of the Streets and Highways Code, the operator of a low-speed vehicle shall not operate the vehicle on any roadway with a speed limit in excess of 35 miles per hour.

(b) (1) The operator of a low-speed vehicle may cross a roadway with a speed limit in excess of 35 miles per hour if the crossing begins and ends on a roadway with a speed limit of 35 miles per hour or less and occurs at an intersection of approximately 90 degrees.

(2) Notwithstanding paragraph (1), the operator of a low-speed vehicle shall not traverse an uncontrolled intersection with any state highway unless that intersection has been approved and authorized by the agency having primary traffic enforcement responsibilities for that crossing by a low-speed vehicle.

SEC. 6. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school district will be incurred because this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

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# APPENDIX E

# CTCDC APPROVAL MINUTES

## MINUTES

### CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE (CTCDC) MEETING

Sacramento, July 28, 2005

The second CTCDC meeting of year 2005 was held in Sacramento, on July 28, 2005.

Chairman John Fisher opened the meeting at 9:10 a.m. with the introduction of Committee Members and guests. Chairman Fisher thanked Caltrans for hosting the meeting. The following Members, alternates and guests were in attendance:

| ATTENDANCE | ORGANIZATION | TELEPHONE |
|---|---|---|
| **Members (Voting)** | | |
| John Fisher<br>Chairman | League of CA Cities<br>City of Los Angeles | (213) 972-8424 |
| Farhad Mansourian<br>Vice Chairman | CA State Association of Counties<br>Marin County | (415) 499-6570 |
| Gerry Meis | Caltrans | (916) 654-4551 |
| Lenley Duncan | CHP | (916) 657-7222 |
| Ed von Borstel | League of CA Cities<br>City of Modesto | (209) 577-5266 |
| Merry Banks | California State Automobile Association | (415) 241-8904 |
| Jacob Babico | CA State Association of Counties<br>San Bernardino County | (909) 387-8186 |
| Hamid Bahadori | Auto Club of Southern California | (714) 885-2326 |

| ALTERNATES | ORGANIZATION | TELEPHONE |
|---|---|---|
| Gain Aggarwal | League of CA Cities<br>City of Vacaville | (707) 449-5349 |

| ATTENDEES | ORGANIZATION | TELEPHONE/E-Mail |
|---|---|---|
| Matt Schmitz | FHWA | matthew.schmitz@fhwa.dot.gov |
| Kent Milton | CHP Head Quarter | Kmilton@CHP.CA.GOV |
| Bret Goss | FCF Inc. | Bret@FirstCallFlagging.com |
| Steve Ainsworth | City of Lincoln | SAINSWORTH@MHMENGR.co |
| Chad Dornsife | Highway Safety Group | cdornsife@highwaysafety.us<br>(858) 673-1926 |
| Richard Haggstorm | Caltrans | richard_haggstorm@dot.ca.gov<br>(916) 654-6600 |
| Walter Laabs | City of Santa Rosa | wlaabs@srcity.org |
| Keith Lee | LA County, DPW | klee@ladpw.org |
| Dwight Ku | CSAA | DWIGHT-KU@CSAA.com |
| Joe Jeffrey | Road-Tech Safety | joe@roadtech.com<br>(530) 676-7797 |
| Don Howe | Caltrans | dhowe@dot.ca.gov |
| Ken Kochevar | FHWA | KenKochevar@fhwa.dot.gov<br>(916) 498-5853 |
| Nancy Dean | National Weather Service | nancy.dean@noaa.gov<br>(707) 443-5610 x222 |
| Barb Alberson | Co Dept. of Health Services | barberso@dhs.ca.gov |
| Ginny Mecham | CHP | Gmecham@chp.ca.gov |
| Meriko Hoshida | CHP | mhoshida@chp..ca.gov |
| Roger M. Bazeley | SF PTA | GAZeleg@designstlategy-usa.com |
| Craig A. Copelan | Caltrans | craig.copelen@dot.ca.gov |
| Carl Walker | City of Lincoln | cwalker@ci. Lincoln.ca.us |
| Jesse Bhullar | Caltrans | jesse-bhullar@dot.ca.gov |
| Ricardo Olea | City of San Francisco | ricardo.olea@sfgov.org |
| Bond M. Yee | | bond.yee@sfgov.org |
| Robert Anderson | CSSC | anderson@stateseismic.com |
| Ken Coleman | LA Safe | colemank@metro.net<br>(213) 922-2951 |
| Ahmad Rastegarpour | CT | ahmud_rastegarpour@dot.ca.gov |
| Dennis Anderson | 3M | d-anderson@mmm.com |
| Tedi Jackson | CSD | Tjackson@sandiego.gov<br>(619) 527-3121 |
| Mark Stone | City of San Diego | mstone@sandiego.gov |
| Kevin Taber | County of Placer | ktaber@placer.ca.gov |

**05-5 Proposal for Experimentation Use of a Nonstandard Signage for Neighborhood Electric Vehicles (NEV).**

Chairman Fisher asked Gerry Meis to introduce item 05-5 experiment with Signage for Neighborhood Electric Vehicle (NEV) requested by the City of Lincoln.

Gerry introduced Carl Walker, City of Lincoln and asked him to present his experiment proposal to the Committee.

Carl Walker, City of Lincoln, stated that the City of Lincoln and City of Rockln are 6 months into a five-year pilot program for NEV travel within the city. The five-year trial is a result of AB2353 which became law as of January 1, 2005. Carl explained about NEVs and how they differ from golf carts. NEV is a compact vehicle, one to four passenger vehicles powered by rechargeable batteries and an electric motor. NEV are classified as a "low speed vehicle" (LSV) under Title 49 C.F.R Part 571.500. Because NEVs are classified as LSVs, they must meet all safety standards such as seat belts, brake lights, rear lights, headlights, mirrors and windshield. NEVs must comply with all the rules and regulations for a motor vehicle as set for in the California Vehicle Code. NEVs must be registered with the State Department of Motor Vehicles and the driver must hold a valid California driver's license and be insured. NEVs may travel on any street with a posted speed limit of 35 miles per hour or less. NEVs may cross state-highways at controlled intersections only. Golf carts are designed to carry golf equipment and not more than two persons, including the driver. Golf carts are not required to possess the safety equipment required of a low speed vehicle and have a top speed 15-mph. State law prohibits use of golf carts on public roadways outside of a "Golf Cart Transportation Plan".

Carl also pointed out a PowerPoint slide containing the specifications of the NEV. Carl added that the benefits of NEV uses are for short distance at low speeds where traffic, parking and air pollution might be of concern. NEV can travel 150 miles per gallon and it supports local businesses. NEV can reduce personal travel cost and provide mobility for people who cannot drive an automobile. A critical element of the NEV Transportation Plan includes the development of special paving, road markings, signage and striping for NEV travel lanes. Carl added that there are currently no State or Federal standards for NEV lane widths. The City of Lincoln's goal is to provide a safe NEV lane width without the lane being so wide that it encourages automobile use.

Carl also discussed different alternatives for NEV travel lanes, such as Class I NEV lanes, Class II NEV lanes and Class III NEV routes. Class II NEV lanes would be a portion of public roadways that are designated by signs and pavement markings for NEV travel. Class III NEV routes are mixed with traffic on most streets posted 35 mph or less. Carl also discussed different striping patterns which he shares with the Committee members by a Power Point Presentation. Carl also showed a proposed new symbol for the NEV, however he informed the Committee that the City will approach FHWA for symbol approval. In closing, Carl stated that the State of California would benefit from to the City of Lincoln's experience in implementing an NEV transportation plan. The City will identify the hurdles that will be encountered during the implementation of the NEV plan.

Chairman Fisher stated that the presentation showed marking and striping in addition to the signage. However the proposal in the agenda packet only talked about signs.

Carl responded that the City does not have the complete package for application submittal.

Farhad Mansourian stated that the proposed signage does not cover under Section 1A.3 which was recommended to include in the California Supplement earlier by the Committee.

Gerry Meis responded no, the earlier recommendation allows addition of date, extra timing, not to create a verbal message sign.

Hamid Bahadori stated that a golf cart is allowed on roadways with 25 mph or less speeds, so why is there a need to create new signs and striping.

Carl responded that the NEV could operate on roadways with speeds up to 35 mph. The purpose of a separate lane is that if a roadway has a speed higher than 35 mph, then the NEV will have their own travel lane.

Hamid asked whether the City would collect data to determine if NEVs are acceptable to travel on roadways having speeds over 35 mph as long as they have there own travel lanes.

Carl responded that AB2353 allows NEVs on roadways with speeds over 35 mph as long as there is proper signing, striping and a separate travel lane.

Chairman Fisher asked about the Vehicle Code allowing the establishment of separate bus lanes, bicycle lanes, then does this legislation allow the development of separate NEV lanes.

Carl responded yes.

Jacob Babico asked about the sign specification shown on page 32 0f 60 shows "NEV Lane", in his opinion the sign should be "NEV Route".

Carl responded that is correct, it should be "NEV Route".

Chairman Fisher suggested that "NEV Route" sign should be "White on Green".

Hamid added that the request is also for authorization of new pattern of striping.

Gerry Meis added that he was not aware if there would be a request for a marking and striping approval.

Chairman Fisher asked any other comments from the audience and from Committee members.

Roger Bazeley stated that if the proposal is proven to be successful, then it could be expanded throughout California.

**Motion**: Moved by Farhad Mansourian, seconded by John Fisher, to authorize experimentation with the signage package with the change of "NEV Lane" to "NEV Route" with the use of existing striping details available. Experiment will be conducted on Class II NEV Routes.

Motion carried 8-0.

**Action**: Item approved for experimentation.

## APPENDIX F

## PHOTOGRAPHS


"The GEM (Global Electric Motorcar) is manufactured in Fargo, North Dakota and sold by Chrysler dealers. It is a street legal electric vehicle with 3-point seat belts, safety glass windshield, head and tail lights, turn signals, four wheel hydraulic brakes, independent front suspension, 72-volt motor, six 12-volt batteries, approximate driving range is 30 miles on one charge."



GEM Photos courtesy of:
Roger Oldencamp


SPEED


5CQA922

# City of Lincoln

| | |
|---|---|
| Venture Drive – From Aviation Boulevard to Joiner Parkway | 1.22 Miles |
| Joiner Parkway – From Venture Drive to East Lincoln Parkway | 2.67 Miles |
| East Lincoln Parkway – From Joiner Parkway to Lincoln City Limits | 3.17 Miles |
| Twelve Bridges Drive – From Highway 65 to Sierra College Boulevard | 5.11 Miles |
| Ferrari Ranch Road – From Joiner Parkway to Highway 193 | 1.79 Miles |
| Ferrari Ranch Road – From Moore Road to Joiner Parkway | 1.74 Miles |
| Groveland Lane – Ferrari Ranch Road to Home Depot | 0.36 Miles |
| Highway 193 – From Ferrari Ranch Road to East Avenue | 0.21 Miles |
| East Avenue – From Highway 193 to Virginiatown Road | 0.74 Miles |
| Virginiatown Road – From East Avenue to Harrison Road | 0.26 Miles |
| Gladding Parkway – From Nicolaus Road to East Avenue | 1.09 Miles |
| Nicolaus Road – From Airport Road to Gladding Parkway | 3.14 Miles |
| First Street – From Fuller Lane to Ian Way | 1.62 Miles |
| Moore Road – From Aviation Boulevard to Joiner Parkway | 2.79 Miles |
| Aviation Boulevard – From Nicolaus Road to Moore Road | 2.14 Miles |
| Stoneridge Boulevard – From Del Webb Boulevard to Twelve Bridges Drive | 1.18 Miles |
| Del Webb Boulevard | 2.61 Miles |
| Third Street – From Joiner Parkway to Highway 65 | 1.10 Miles |
| Fifth Street – From Joiner Parkway to Highway 65 | 1.11 Miles |
| Sterling Parkway – From Highway 65 to East Lincoln Parkway | 0.32 Miles |
| Bella Breeze Drive | 1.32 Miles |
| Spring Valley Parkway – From Del Webb Boulevard to Stoneridge Boulevard | 0.82 Miles |
| Sun City Boulevard – From Ferrari Ranch Road to Del Webb Boulevard | 0.19 Miles |
| Ingram Parkway – From Ferrari Ranch Road to Del Webb Boulevard | 1.26 Miles |
| McCourtney Road – From Virginiatown Road to Lincoln City Limits | 0.19 Miles |
| Twelve Bridges Drive – From Highway 65 to Industrial Avenue | 0.38 Miles |
| Aviation Boulevard – From Moore Road to Athens Avenue | 2.01 Miles |
| Highway 65 – From First Street to Industrial Avenue | 1.26 Miles |
| Industrial Avenue – From Highway 65 to Athens Avenue | 2.29 Miles |
| Athens Avenue – From Industrial Avenue to Aviation Boulevard | 2.28 Miles |
| Aviation Boulevard – From Athens Avenue to Moore Road | 2.01 Miles |
| Total | 48.38 Miles |

LEGEND
- DESIGNATED NEV LANES
- LINCOLN BYPASS / NEW ROUTE
- NEV LANES (OUTSIDE CITY INFLUENCE)
- CITY LIMITS
- GOLF CART TRANSPORTATION PLAN ROAD

PRELIMINARY DESIGN SUBMITTAL NOT FOR CONSTRUCTION

| REV. | DATE | BY | APPR. | DESCRIPTION |
|---|---|---|---|---|

DESIGNED BY: | DRAWN BY: | CHECKED BY: LRUBIO | JOB NO.: 05401 | FILE NAME: 05401NEVLINCOLNMAP

VERIFY SCALE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

M·H·M ENGINEERS & SURVEYORS SINCE 1892
ENGINEERING-SURVEYING
1063 SUNRISE AVENUE, Ste. 100
ROSEVILLE, CALIFORNIA 95661
Ph:(916)783-4100 Fax:(916)783-4110

NEV TRANSPORTATION PLAN MAP



PLAN SCALE: N/A | PROFILE SCALE: N/A | DATE: 8/15/06 | DWG. NO. | SHEET 1

## EXHIBIT B.

A Report to the California State Legislature

Neighborhood Electric Vehicle Transportation Plan Evaluation

Date: January 1, 2008

# A Report to the California State Legislature

*as required by*

## Assembly Bill 2353
**(Chapter 422, Section 1. Chapter 7)**

Neighborhood Electric Vehicle
Transportation Plan Evaluation


Prepared by: Kevan Shafizadeh, Ph.D., P.E., PTOE, and
Kimberly Fox, California State University, Sacramento

The City of Lincoln – John E. Pedri, P.E.,
Lincoln Director of Public Works/City Engineer


Date: January 1, 2008

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## EXECUTIVE SUMMARY

In August 2006, Lincoln's City Council formally adopted a resolution to approve its Neighborhood Electric Vehicle (NEV) Transportation Plan that implements the City's vision to provide safe and efficient access for NEVs to downtown and other commercial areas. Prior to 2005, federal law only permitted NEVs to operate on streets with a posted speed limit of 35 mph or less, but California state law, Assembly Bill (AB) 2353, established special provisions to define the use of NEVs on city streets. The legislation allowed NEVs to operate on streets with posted speed limits above 35 mph where designated NEV lanes are available. This report evaluates the NEV Transportation Plan in the City of Lincoln with regard to traffic and safety impacts on higher speed facilities permitted by AB2353. The report also evaluates the design and implementation of NEV-specific signage and pavement markings as part of the plan.

While a large majority of the proposed NEV Transportation Plan is pending implementation of signage and striping, this report finds that the City of Lincoln is meeting its goals of maintaining safety and acceptable levels traffic flow while increasing mobility to its residents. Continued public education efforts are necessary to inform the general public about the presence NEVs and the introduction of new signage and striping, which has helped to integrate their use on facilities with traditional automobiles and bicycles.

The City of Rocklin has completed an NEV Transportation Plan and is awaiting City Council approval as of January 2008.

Based on these findings, it is recommended that the provisions in AB2353 should be continued in the Cities of Lincoln and Rocklin. The provisions in AB2353 can be expanded statewide, provided that more comprehensive analysis is conducted once the City of Lincoln's NEV Transportation Plan has been completely implemented. A more comprehensive analysis would help to better evaluate the potential safety concerns that may exist on higher speed facilities. At this time, only a fraction of total lane miles in the NEV Transportation Plan are located on higher-speed facilities, and there have been some safety concerns by NEV users on facilities shared with traditional automobiles and by bicyclists on facilities shared by NEVs.

## BACKGROUND

Neighborhood Electric Vehicles (NEVs) are electric-powered low -speed vehicles (LSVs) that typically weigh less than 1,800 pounds and can travel up to 25 miles per hour (AASHTO, 2000). While they may look like golf carts to the casual observer, NEVs are not golf carts and must meet greater safety standards set forth by the National Highway Traffic Safety Administration (NHTSA, 1998); NEVs must be equipped with basic safety equipment including: headlights, rear lights, brake lights, turn signals, rearview mirrors, reflex reflectors, parking brake, windshields, seatbelts, and vehicle identification numbers (VINs). Additionally, drivers of NEVs must possess a valid driver's license, vehicle registration and insurance.

NEVs are designed as zero-emissions vehicles to accommodate short trips in neighborhoods and urban areas. NEVs are a federally-recognized sub-class of low-speed vehicle and are limited to 25 miles per hour (mph), and may be driven on streets with speed zones of 35 mph or less. Popularity for these energy-efficient vehicles is rapidly increasing, especially within the retirement community. Yet, very few cities have modified their infrastructure to accommodate this growing mode of transportation. With the rise in active adult communities, the need for electric vehicle plans has been growing (NHTSA, 2004). Slowly, small, efficient, low speed vehicles have migrated outside these communities for local trips. Still, little infrastructure has been modified. NEV signage and striping on preferred routes need to be posted on NEV facilities, and these facilities need to be integrated into city plans.

### Assembly Bill 2353

In January 2005, The California State Legislature signed Assembly Bill (AB) 2353 into law, which enabled the cities of Lincoln and Rocklin, in Placer County, to create their own NEV transportation plans. It permitted each city to go beyond the federal regulation, which only allows NEVs on all streets with a posted speed limit of 35 mph or less, to allow NEVs on streets with a posted speed limit above 35 mph if designated NEV lanes are provided. Also, the bill states that NEVs may use and cross state highways where it is determined to be safe by the City and the State Department of Transportation. Prior to AB2353, California law lacked any formal process to create a city transportation plan involving the extensive use of low speed vehicles, and while the concept of these efficient low speed vehicles has been around for some time, little has been done to integrate them into our communities (Stein et al, 1996). The City of Lincoln represents the first major citywide NEV transportation project in the State of California (MHM, 2006).

Proposed experimental traffic control standards were presented by the City of Lincoln and approved by the California Traffic Control Devices Committee (CTCDC) in July 2005. In August 2005, the City conducted a public workshop with Caltrans in attendance to participate in consensus-building process and discuss NEV issues, such as signage, striping, lane spacing, and NEV lane designation priorities.

### Evaluation Goals

While AB2353 allowed the City of Lincoln to create an NEV transportation plan, it also requires that a report be submitted to the Legislature by January 1, 2008. This report serves to meet the reporting requirements for both the State Legislature for AB2353 and the California Traffic Control Devices Committee (CTCDC) for experimental signage and striping. This report contains the following:

1. A description of all NEV transportation plans and their elements that have been authorized up to that time.
2. An evaluation of the effectiveness of the NEV transportation plan elements, including their impact on traffic flows and safety.
3. A recommendation as to whether the provisions in AB2353 should be terminated, continued in existence applicable solely to the City of Lincoln and the City of Rocklin in the County of Placer, or expanded statewide.

## NEV TRANSPORTATION PLAN DESCRIPTIONS

### Lincoln

On August 8, 2006 the Lincoln City Council unanimously approved the NEV Transportation Plan in accordance with AB2353 which incorporated the CTCDC approved standards. Lincoln's goal was to become "NEV ready" by having the "necessary infrastructure, including charging facilities, striping, signage, parking, and education to safely accommodate NEV travel" (MHM, 2006). This plan is still being implemented in stages, ultimately extending the transportation network throughout the City. The plan aims to reduce the use of traditional automobiles for short trips along with creating a more cohesive community, reducing travel and energy costs, increasing mobility and independence for aging drivers, and increasing the use of public transit.

A major design goal of the plan was to provide infrastructure improvements to allow for the safe, smooth flow of NEVs with pedestrians, bicycles, and other motor vehicles and to allow NEV users access to every part of the city (MHM, 2006). A circulation plan (shown in Figure 1) was approved that includes three different classes of NEV routes:

- Class I routes are designed for the exclusive use of NEVs and bicycles.
- Class II routes designate a separate striped lane adjacent to traffic for the use of both NEVs and bicycles.
- Class III routes allow NEVs to share lanes with automobiles on streets with a posted speed limit of 35 mph or less.

NEV facilities within the NEV Transportation Plan area are listed in Table 1.


**Figure 1. City of Lincoln NEV Transportation Plan Map**

**Table 1. Facilities Authorized by Lincoln NEV Transportation Plan (2006)**

| Street | Between | Distance |
|---|---|---|
| Venture Drive | Aviation Boulevard to Joiner Parkway | 1.22 |
| Joiner Parkway | Venture Drive to East Lincoln Parkway | 2.67 |
| East Lincoln Parkway | Joiner Parkway to Lincoln City Limits | 3.17 |
| Twelve Bridges Drive | Highway 65 to Sierra College Boulevard | 5.11 |
| Ferrari Ranch Road | Joiner Parkway to Highway 193 | 1.79 |
| Ferrari Ranch Road | Moore Road to Joiner Parkway | 1.74 |
| Groveland Lane | Ferrari Ranch Road to Home Depot | 0.36 |
| Highway 193 | Ferrari Ranch Road to East Avenue | 0.21 |
| East Avenue | Highway 193 to Virginiatown Road | 0.74 |
| Virginiatown Road | East Avenue to Harrison Road | 0.26 |
| Gladding Parkway | Nicolaus Road to East Avenue | 1.09 |
| Nicolaus Road | Airport Road to Gladding Parkway | 3.14 |
| First Street | Fuller Lane to Ian Way | 1.62 |
| Moore Road | Aviation Boulevard to Joiner Parkway | 2.79 |
| Aviation Boulevard | Nicolaus Road to Moore Road | 2.14 |
| Stoneridge Boulevard | Del Webb Boulevard to Twelve Bridges Drive | 1.18 |
| Del Webb Boulevard | (all) | 2.61 |
| Third Street | Joiner Parkway to Highway 65 | 1.10 |
| Fifth Street | Joiner Parkway to Highway 65 | 1.11 |
| Sterling Parkway | Highway 65 to East Lincoln Parkway | 0.32 |
| Bella Breeze Drive | (all) | 1.32 |
| Spring Valley Parkway | Del Webb Boulevard to Stoneridge Boulevard | 0.82 |
| Sun City Boulevard | Ferrari Ranch Road to Del Webb Boulevard | 0.19 |
| Ingram Parkway | Ferrari Ranch Road to Del Webb Boulevard | 1.26 |
| McCourtney Road | Virginiatown Road to Lincoln City Limits | 0.19 |
| Twelve Bridges Drive | Highway 65 to Industrial Avenue | 0.38 |
| Aviation Boulevard | Nicolaus Road to Athens Avenue | 2.01 |
| Highway 65 | First Street to Industrial Avenue | 1.26 |
| Industrial Avenue | Highway 65 to Athens Avenue | 2.29 |
| Athens Avenue | Industrial Avenue to Aviation Boulevard | 2.28 |
| Aviation Boulevard | Athens Avenue to Moore Road | 2.01 |
| TOTAL | | 48.38 |

The signage and pavement markings identified in the NEV Transportation Plan are consistent with Part 9 of the 2003 California Supplement of the Manual on Uniform Traffic Control Devices (MUTCD) issued by the California Department of Transportation (Caltrans) for bicycles and with the adopted 2001 Golf Cart Transportation Plan (GTCP) for Sun City Lincoln Hills (Fehr & Peers, 2006). The following NEV signs and pavement markings (shown in Appendix A) have been authorized for use within the plan area:

- NEV Route sign is designed to be placed on local streets, which have been designated as NEV Routes. The sign should be placed at the far side of collector street intersections and at a maximum of one-half mile intervals on all continuous residential streets. [Shown in Figure 2 on East Lincoln Parkway.]

- Combination NEV/Bike Lane Sign is designed to be placed on NEV lanes where a Class II bike lane is also provided. The sign should be placed at the far side of collector street intersections and at a minimum of one-half mile intervals on all continuous residential streets. [Shown in Figure 3 on East Lincoln Parkway.]

- Combination NEV/Bike Lane Pavement Marking is designed to be placed on NEV lanes where a Class II bike lane is also provided. [Shown in Figure 3 on East Lincoln Parkway.]

- NEV Pavement Marking is designed to be placed on local streets, which have been designated as NEV Routes.

- NEV Lane Striping is designed to be placed between the traffic lane and the NEV/Bike lane.


**Figure 2. Combination NEV/Bike Lane Sign and NEV Route Sign**


**Figure 3. Combination NEV/Bike Lane Pavement Marking and Striping**

**Rocklin**

The City of Rocklin has completed their NEV Transportation Plan and is awaiting City Council approval in January 2008 (Foster et al, undated). The City of Rocklin proposed to implement signage and striping in phases. The first phase includes identifying preferred Class III NEV routes and striping Class II routes where necessary to link to Class III routes. The first phase could begin as early as Spring 2008 and involve installing proper signage on all designated NEV routes where the speed limit is 35 miles per hour or less. The second phase includes striping Class II routes in preferred arterial roads. NEV facilities within the proposed Rocklin NEV Transportation Plan are shown in Figure 4.

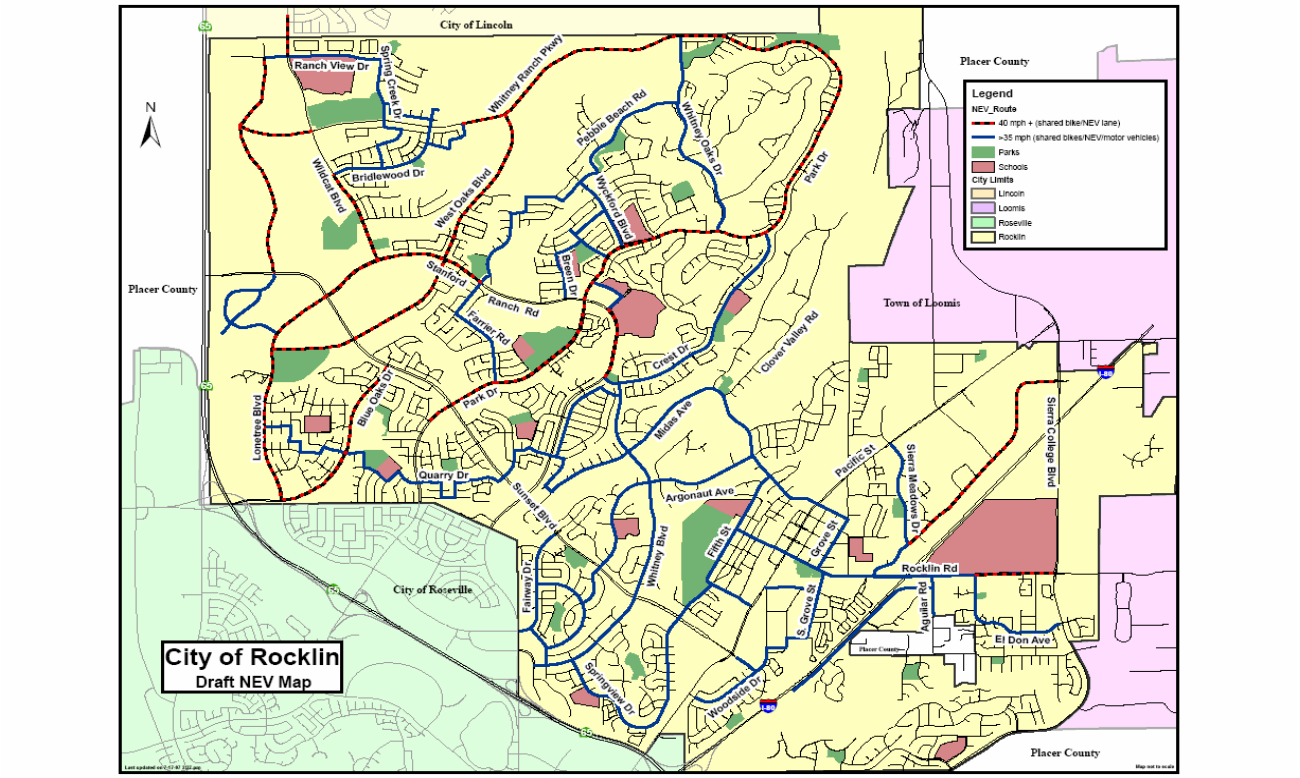


**Figure 4. City of Rocklin Proposed NEV Transportation Plan Map**

## EFFECTIVENESS OF NEV TRANSPORTATION PLAN ELEMENTS

This report evaluates the effectiveness of the NEV Transportation Plan for the City of Lincoln, focusing on its impact on traffic flows and safety. We contacted the Lincoln Police Department and California Highway Patrol (CHP) to gather any reported information involving crashes or collisions involving NEVs in the City, and a public survey was administered regarding any non-reported incidents. The survey also included questions regarding the general perceived safety of NEVs by NEV users and the general public as well as questions about signage, striping, travel costs, community cohesion, mobility and independence for aging drivers, and the use of public transit. Finally, we gathered traffic speed data to compare the speeds before and after the NEV Transportation Plan was implemented to evaluate the effect of NEVs on traffic operations.

## DATA COLLECTION AND ANALYSIS

This section reviews the three sets of data that were collected to evaluate the NEV Transportation Plan, paying particular focus on traffic conditions on higher speed facilities permitted by AB2353 as well as traffic signage and striping permitted by the CTCDC. The

three sources of data used in this study included: crash/collision incident databases and traffic violation data, traffic speed and compliance data, and user surveys. Each data source is explained in greater detail below.

## Traffic Incident and Violation Databases

Collision crash data were requested from both the Lincoln Police Department and California Highway Patrol to determine if a common theme existed among incidents involving NEVs, or if common themes existed among moving traffic violations. Formal inquiry requests were made for collision/crash data involving NEVs in the City to the Lincoln Police Department and the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS). Safety records did not provide any issues with conflicts between bicycles, NEVs, and automobiles.

## Traffic Engineering Studies

### *Speed Studies and Level of Service Analysis*

Speed studies were conducted before and after NEV lanes were installed to determine if NEVs impacted traffic speed along travel corridors. During May and June 2005, engineering consulting firm TY Lin Inc. conducted speed surveys along twenty roadways (41 segments) throughout the City of Lincoln as required by the California Vehicle Code, Manual of Uniform Traffic Control Devices (MUTCD), and the 2003 California Supplement to the MUTCD to determine speed limits on the roadways. A random sample of the speed data were collected using machine counters during the mid-morning and mid-afternoon hours of the weekday was made based on the selection criteria that these be at least seven seconds apart. The random sample, at least 100 per direction, was used to calculate the mean, median, and 85$^{th}$ percentile speed (that speed at which 85% of the traffic is traveling at or below) for each direction. The same methodology was followed to collect and sample data at the same location during the same time of day in August 2007, and used as a basis of comparison to the 2005 data.

The location chosen for the study was East Lincoln Parkway between Del Webb Boulevard and Sterling Parkway, shown in Figure 5. The same location on East Lincoln Parkway was used to collect traffic volume data for a “level of service” (LOS) analysis, which was compared to similar analysis completed by Fehr & Peers in 2006. East Lincoln Parkway is a north/south two-lane collector with NEV lanes with approximately 12,800 vehicles per day with the planned medical and commercial development in place (Fehr & Peers, 2006).


**Figure 5. Location of Traffic Engineering Data Collection**

It should be noted here that the City plans to provide NEV facilities on several streets identified in the NEV Transportation Plan and shown in Figure 1, but only two facilities both 1) currently provide NEV facilities with speeds at or above 35 mph and 2) had data from 2005 to use for comparison, as shown in Table 2. These two facilities are East Lincoln Parkway and Joiner Parkway. On Joiner Parkway, however, the locations where TY Lin collected data in 2005 were within close proximity of traffic control devices (i.e., stop signs) in 2007. The introduction of these stop control devices would affect vehicle speeds, so data at those locations along Joiner Parkway were not used for this evaluation.

**Table 2. Facilities Surveyed by TY Lin (2005)**

| Street | Between | Within NEV Plan? | Speed Limit |
|---|---|---|---|
| Aviation Rd | Nicolaus Rd and Venture Blvd | Yes | 40 mph |
| D Street | First Street and SR 193 (McBean Park Dr) | No | 25 mph |
| East Ave | Seventh and 12th St | Yes | 30 mph |
| East Ave | SR 193 and Seventh St | Yes | 30 mph |
| East Lincoln Pkwy | SR 65 and Del Webb Blvd | Yes | 35 mph |
| East 12th Street | East Ave and McCourtney Rd | Yes | 35 mph |
| Ferrari Ranch Rd | Joiner Pkwy & Kensington/Danbury | Yes | 35 mph |
| Ferrari Ranch Rd | SR 65 and Ingram Pkwy | Yes | 35 mph |
| Ferrari Ranch Rd | Sun City Blvd and SR 193 | Yes | 35 mph |
| Fifth Street | O Street and SR 65 | Yes | 25 mph |
| Fifth Street | Joiner Pkwy and Chambers Dr | No | 25 mph |
| Fifth Street | O Street and Joiner Pkwy | Yes | 25 mph |
| First Street | SR 65 and O Street | Yes | 25 mph |
| Ingram Pkwy | Ferrari Ranch Rd and Northfield Ln | Yes | 35 mph |
| Ingram Pkwy | Northfield Ln & Del Webb Blvd | Yes | 30 mph |
| Joiner Pkwy | Ferrari Ranch Rd and SR 65 | Yes | 40 mph |
| Joiner Pkwy | Nicolaus Rd and Third Street | Yes | 40 mph |
| Joiner Pkwy | Moore Rd and Nicolaus Rd (Third?) | Yes | 40 mph |
| Lakeside Dr | Venture Dr and Moraga Rd | No | 35 mph |
| Lakeside Dr | Nicolaus Rd and Moraga Dr | No | 35 mph |
| Nicolaus Rd | Aviation and Waverly | Yes | 40 mph |
| Nicolaus Rd | Waverly and Joiner Pkwy | Yes | 40 mph |
| Nicolaus Rd / 9th St | O Street and SR 65 | Yes | 40 mph |
| O Street | First St and Fourth St | No | 25 mph |
| O Street | Fourth St and Nicolaus Rd | No | 25 mph |
| Seventh Street | SR 65 and East Ave | No | 30 mph |
| Southcreek St | Twelve Bridges and Oak Valley Dr | No | 25 mph |
| Southcreek St | Oak Valley Dr & Eastridge | Yes | 25 mph |
| Stoneridge Blvd | E Spring Valley Blvd and Twelve Bridges | Yes | 35 mph |
| Stoneridge Blvd | Del Webb and E Spring Valley Pkwy | Yes | 35 mph |
| Sun City Blvd | Ferrari Ranch Rd and Hawthorne Ln | Yes | 30 mph |
| Third Street | O Street and Joiner Parkway | Yes | 25 mph |
| Third Street | O Street and SR 65 | Yes | 25 mph |
| Twelve Bridges Dr | Sierra College and Stoneridge Blvd | Yes | 40 mph |
| Twelve Bridges Dr | Stonebridge Blvd and Rossi Ln | Yes | 40 mph |
| Twelve Bridges Dr | Eastridge Dr and Rossi Ln | Yes | 40 mph |
| Twelve Bridges Dr | Lincoln Pkwy and Eastridge Dr | Yes | 40 mph |
| Twelve Bridges Dr | SR 65 and E Lincoln Pkwy | Yes | 40 mph |

### Surveys

The effectiveness of authorized traffic devices and the perceived safety of NEVs, were evaluated through the administration of a transportation survey. The survey was administered on-line between June and August of 2007 and made available to NEV users, bicyclists, and the general public (traditional motorists, users of public transit, etc). The survey contained questions for all road users regarding the perceived safety of NEVs and their perceived affect on traffic flow. Traditional motorists and bicyclists were questioned about their opinions regarding safety issues and potential conflicts in shared use lanes with NEVs. NEV users were asked to express their opinion about many different aspects of their NEV usage including but not limited to: 1) implemented signage, striping, and pavement markings, 2) safety concerns with motorists, such as at intersection or in left turning lanes, and 3) safety concerns with bicyclists and shared NEV/bicycle lanes. It also contained questions about NEV signage and striping as well as questions about goals identified in the NEV Transportation Plan. The complete survey and its results are provided in Appendices C and D, respectively.

The survey website was sent out to NEV users and bicyclists through their local clubs. A presentation was given to the Lincoln Hills Low-Speed Vehicle (LSV) Users Group in June 2007, and a link to the survey was e-mailed to members of the Lincoln Bicycle Club. The survey was also made available to the general public through a link on the City of Lincoln's website. Hard copies were made available by telephone or e-mail request, and some surveys were completed for individuals who telephoned the number available on the survey.

In an attempt to capture more traditional motorists and users of other modes, intercept surveys were conducted outside of the Safeway Market on SR 65 in Lincoln in August 2007, which resulted in a very limited sampling of users. To obtain a more representative sample of Lincoln residents, additional sampling in the downtown core or at other mixed-use areas of the City should be considered.

## EVALUATION RESULTS

In this section, we review results from all three data sources.

### Incident and Traffic Violation Databases

Neither inquiry to LPD or CHP yielded any results about NEV incidents/crashes or traffic violations. According to CHP, there have not been any documented incidents involving NEVs in the Statewide Integrated Traffic Records System (SWITRS). A conversation with an officer in the Lincoln Police Department indicated that NEVs were perceived to be safe in areas where the transportation plan has been implemented.

### Traffic Engineering Studies

### *Speed Studies*

Histograms of the observed speeds by the general vehicle traffic, excluding NEVs, for northbound and southbound East Lincoln Parkway are shown in Figure 6 and Figure 7, respectively. Histograms of only NEV traffic on northbound and southbound East Lincoln Parkway are shown in Figure 8 and Figure 9, respectively. Data for general vehicle traffic were collected separately from NEVs so that general vehicle traffic could be compared between 2005 and 2007 without the influence of NEVs.

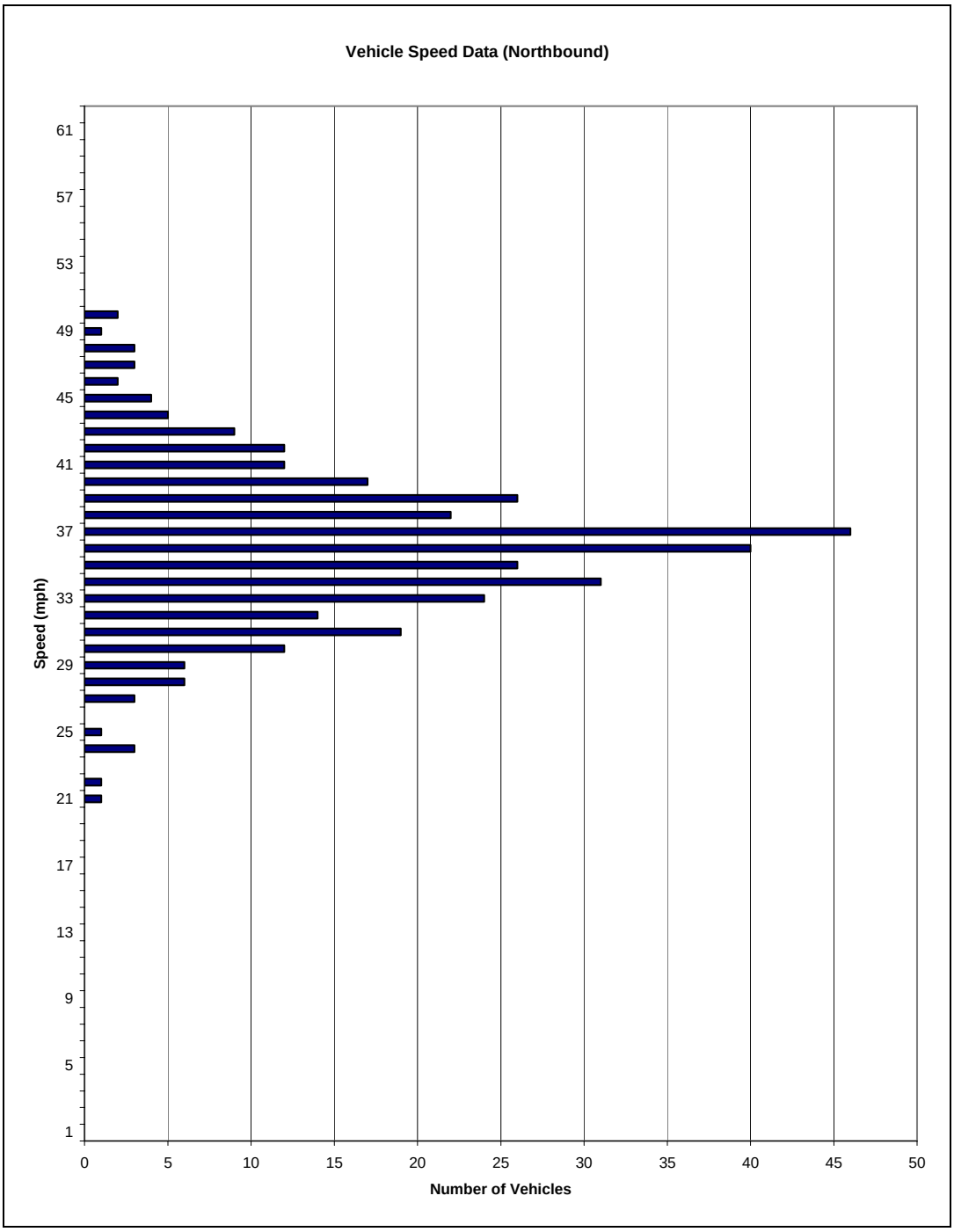


**Figure 6. Vehicle Speeds on Northbound East Lincoln Parkway**

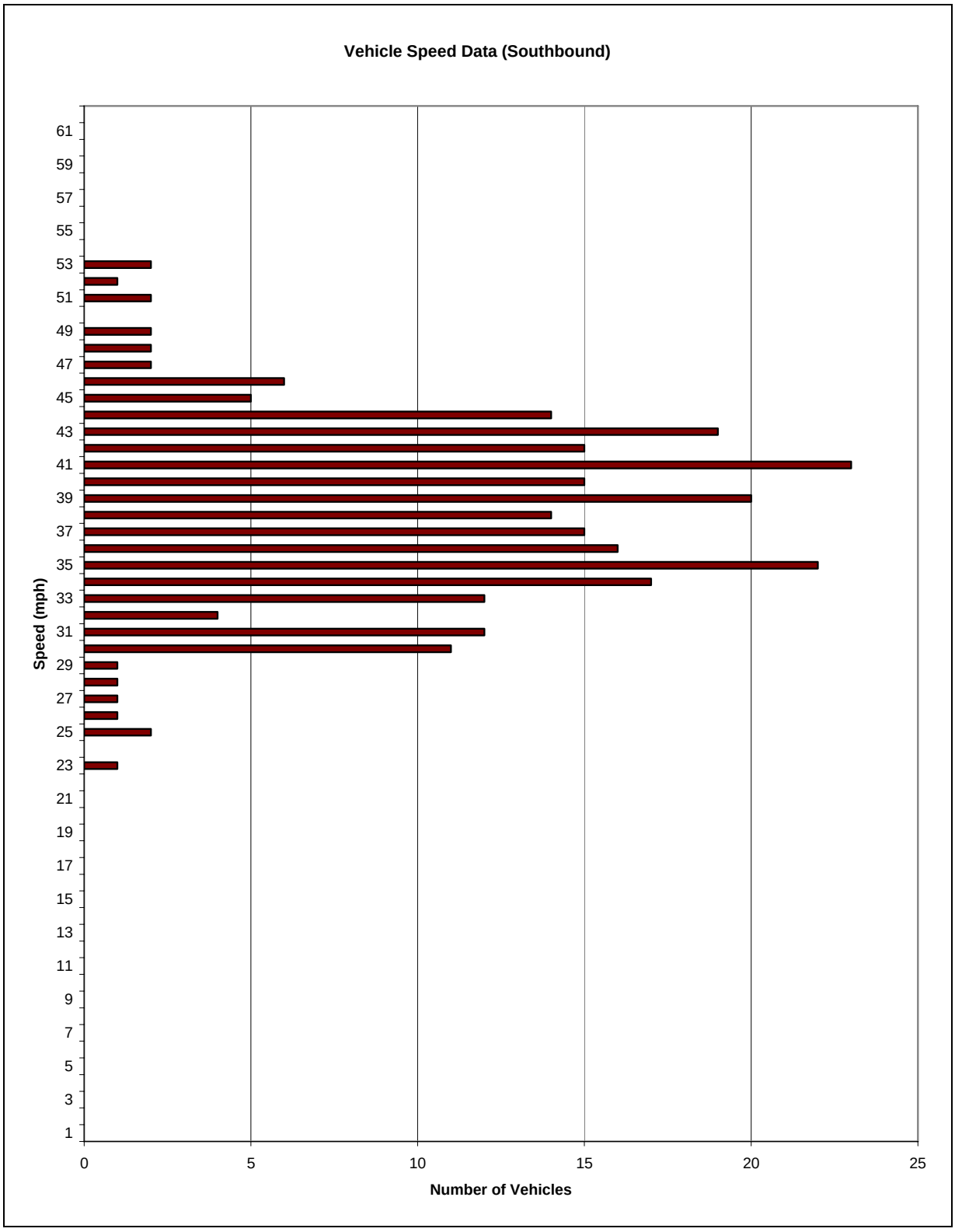


**Figure 7. Vehicle Speeds on Southbound East Lincoln Parkway**

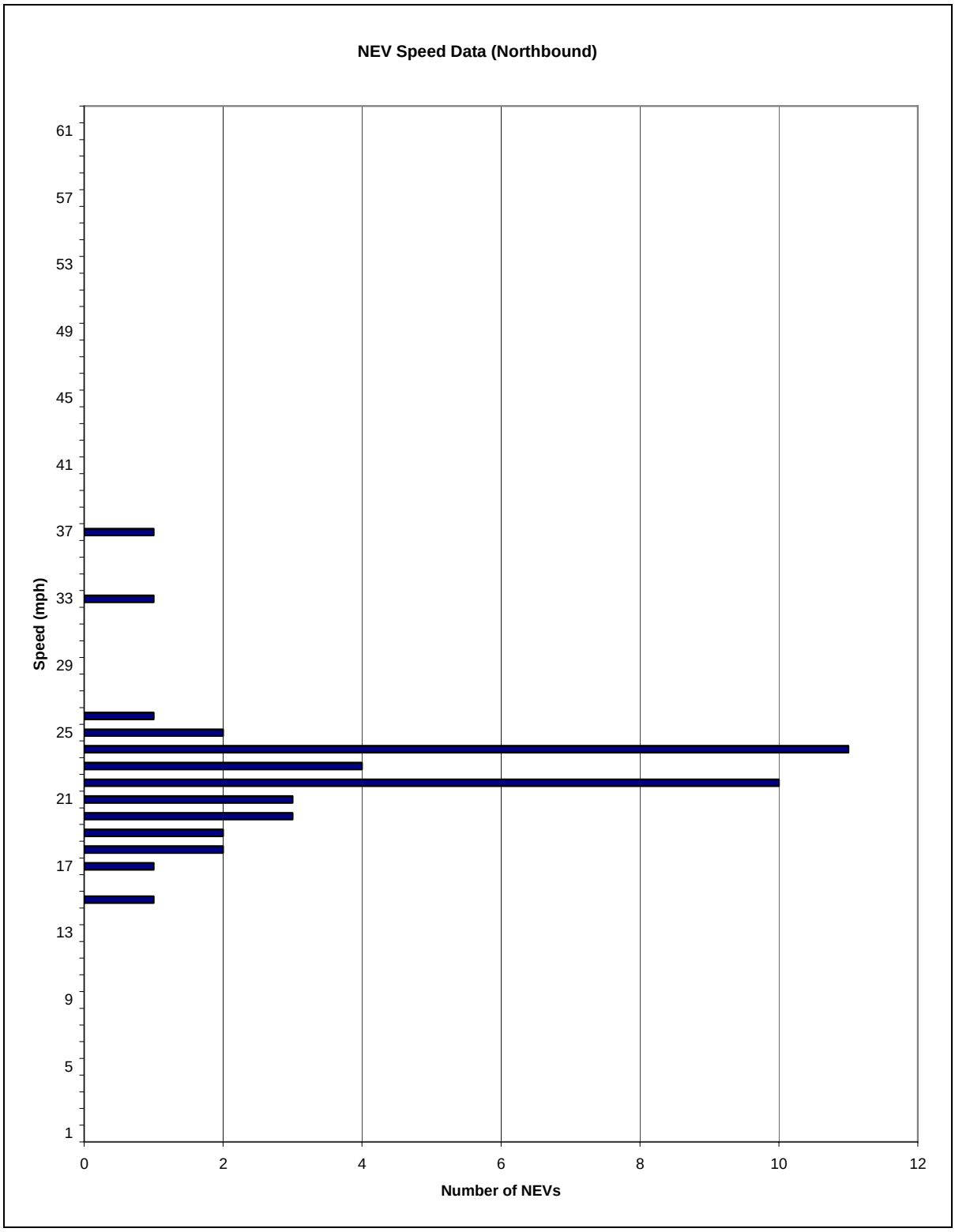


**Figure 8. NEV Speeds on Northbound East Lincoln Parkway**

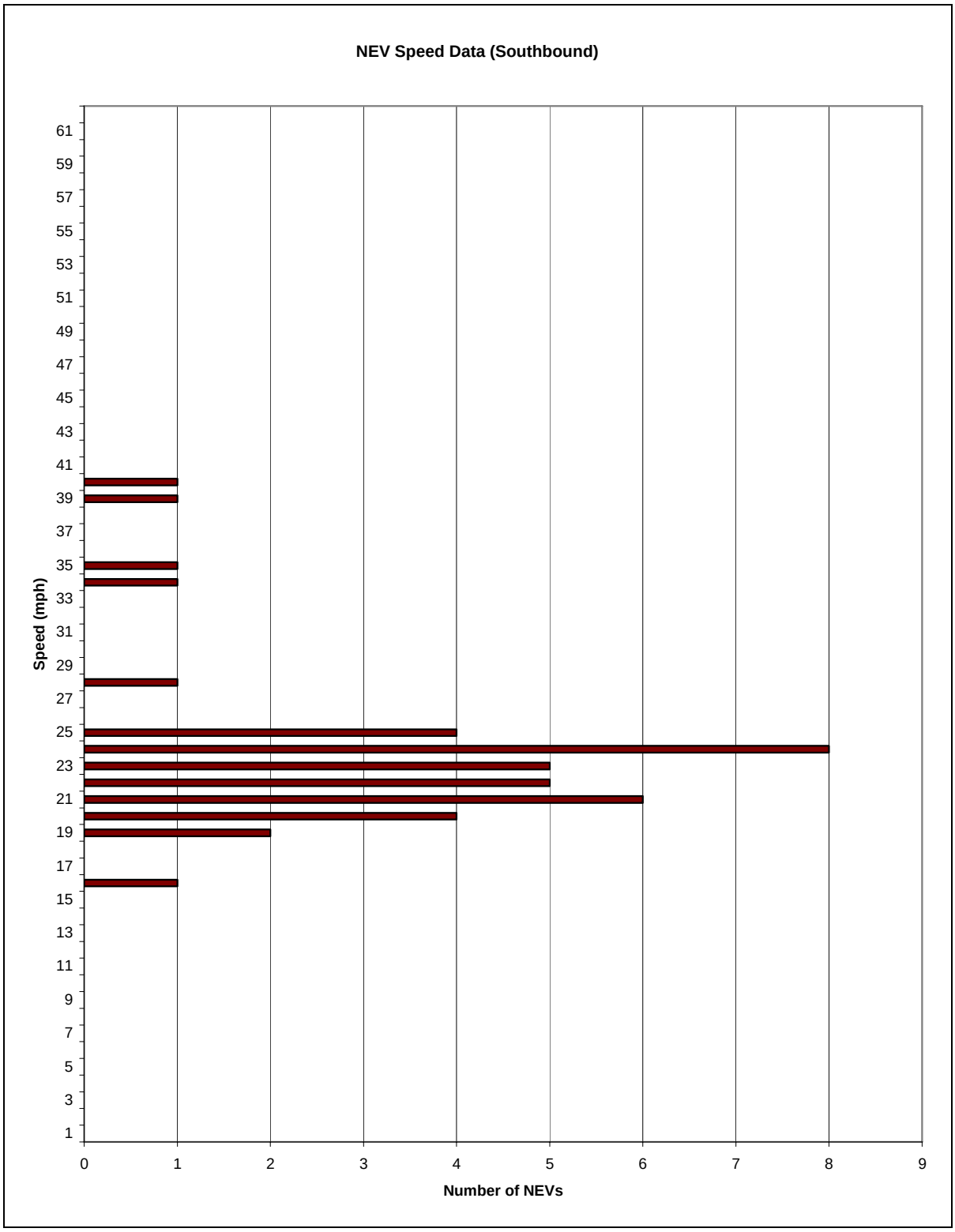


**Figure 9. NEV Speeds on Southbound East Lincoln Parkway**

The summary of results from both 2005 and 2007 traffic engineering studies is shown in Table 3 below. The results indicate that the average (mean) and median speeds in both directions decreased slightly from 2005 to 2007. The 85th percentile speed decreased by three miles per hour in the northbound direction and remained the same in the southbound direction. A statistical analysis indicates that the decrease in speed from 2005 to 2007 was statistically significant at the 95% confidence level. (This analysis is detailed in the appendix). In both 2005 and 2007, however, the average, median, and 85th percentile speeds were still above the posted speed limit of 35 miles per hour. As we might expect, this table also indicates that NEVs travel at a much lower speed, on average, than traditional automobiles. From this analysis, we can conclude that the introduction of NEVs has had little effect on traffic flow. In fact, it is possible that the introduction of NEVs may have a calming effect on vehicle speeds.

**Table 3. Speed Data Analysis on East Lincoln Parkway**

| | | Automobiles | | | NEVs |
|---|---|---|---|---|---|
| | **Parameter** | **2005 (Before NEV Plan)** | **2007 (After NEV Plan)** | **Difference** | **2007** |
| Northbound | Average Speed | 39 mph | 36 mph | -3 mph* | 23 mph |
| | Median Speed | 38 mph | 36 mph | -2 mph | 22 mph |
| | 85th Percentile Speed | 44 mph | 41 mph | -3 mph | 24 mph |
| | Standard Deviation | 4.6 mph | 4.6 mph | - | 3.7 mph |
| | Observations | 162 | 351 | - | 42 |
| Southbound | Average Speed | 40 mph | 38 mph | -2 mph * | 24 mph |
| | Median Speed | 39 mph | 38 mph | -1 mph | 23 mph |
| | 85th Percentile Speed | 44 mph | 44 mph | 0 mph | 25 mph |
| | Standard Deviation | 4.4 mph | 5.2 mph | - | 5.0 mph |
| | Observations | 101 | 258 | - | 40 |

* Difference is statistically significant at the 95% confidence level.

At this point, it is important to note, however, that these data were collected on one street in a growing part of the City. In 2005, East Lincoln Parkway ended at Sterling Parkway. Today, East Lincoln Parkway connects to a shopping area at Sterling Parkway then crosses over SR 65 to connect to the west side of Lincoln. While these changes are significant, it was assumed that vehicle speeds on the backside of an overcrossing would probably have yielded higher speeds than observed in 2005. In other words, these findings are assumed to be more conservative with the introduction of an overcrossing than without. Because of the little data available, it is recommended that a more comprehensive study be conducted once the City has implemented the majority of the proposed in the NEV Transportation Plan.

***Level of Service Analysis***

Level of service (LOS) is a qualitative measure of congestion and delay on intersections and roadways that is reported on a scale from A to F, with A representing the best performance

and F the worst in terms of congestion and delay. LOS is determined by comparing the measured daily volumes to LOS thresholds in Table 4 for various roadway types. These thresholds had been established for previous environmental analyses in the Cities of Lincoln and Rocklin and the Counties of Placer and Sacramento (MHM, 2006). The City of Lincoln has adopted LOS C as their minimum criteria for urban area intersections and roadways.

**Table 4. Average Daily Traffic Volume Level of Service Thresholds**

| | Average Daily Traffic Volume Threshold | | | | |
|---|---|---|---|---|---|
| **Facility Type** | **LOS A** | **LOS B** | **LOS C** | **LOS D** | **LOS E** |
| Two-Lane Street | 9,000 | 10,700 | 12,000 | 13,500 | 15,000 |
| Four-Lane Undivided Arterial | 18,000 | 21,300 | 24,000 | 27,000 | 30,000 |
| Four-Lane Divided Arterial | 20,250 | 23,625 | 27,000 | 30,375 | 33,750 |

While it is not clear that a two-lane street with two additional NEV lanes (four lanes total) is necessarily equivalent to a traditional four-lane arterial, based on these criteria East Lincoln Parkway with an approximate daily traffic volume of 8,961 vehicles in both directions (less than 2% of which are NEVs) would easily maintain LOS A for a four-lane divided arterial, and remains well within the City's minimum criterion.

**Surveys**

Before the survey results pertaining to safety and traffic impacts of NEVs are discussed, it is useful to characterize the respondents. Of the 148 people surveyed, all drove traditional automobiles while 94 (64%) also drove NEVs and 24 (16%) also rode bicycles. Summary statistics of the average respondent are provided in Table 5 and indicates that the average respondent was a 63 year old, retired, married male without children living at home with 1.7 vehicles at home (not including an NEV), and an approximate average household income of $84,000. While this survey may provide valuable information regarding the perceived safety of the NEV Transportation Plan, it is clear that this study did not capture a representative sample of Lincoln residents and should not be used for generalizations beyond this evaluation. A representative sample would emulate the entire population of all residents in the City of Lincoln, not a subset of its residents.

**Table 5. Survey Respondent Summary Statistics**

| | |
|---|---|
| Gender | 63% Male / 37% Female |
| Average Age | 63 years |
| Martial Status | 82% Married / 14% Single |
| Employment Status | 75% retired / 12% part-time / 10% full-time |
| Avg. Number of Workers in Household | 0.4 persons |
| Avg. Annual Household Income (approx) | $84,000 |
| Avg. Auto Ownership (not including NEVs) | 1.7 vehicles |

Additional analysis of the 94 NEV users who participated in the survey had an average of over 31 months (2.6 years) of NEV ownership (Q3), shown in Figure 10. They also averaged

almost 15 NEV one-way trips per week (Q22) while averaging a little less than 4.5 miles per trip (Q23). Based on these figures, the average NEV would travel almost 3,500 miles per year, which is over three and a half times higher than previous estimates (MHM, 2006). The amount of travel and potential benefits associated with NEV use is an area in need of future research.

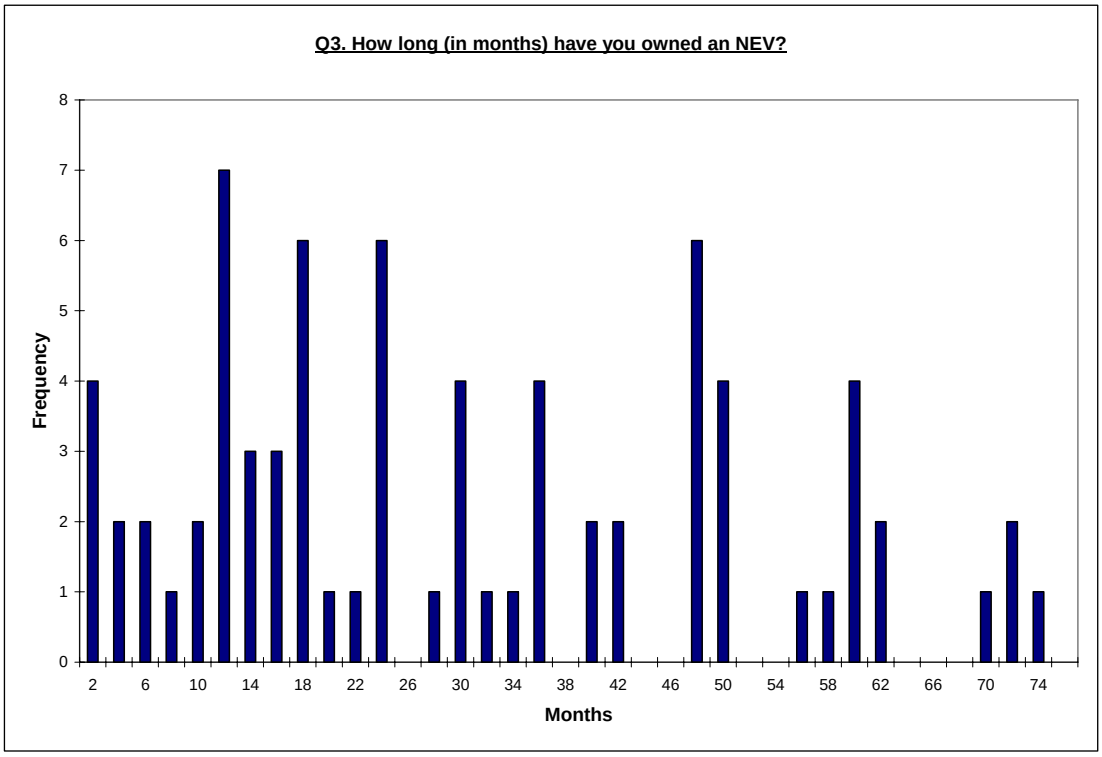


**Figure 10. Duration of NEV Ownership by Survey Respondents**

The following sections highlight noteworthy findings from the survey pertaining to perceived traffic flow, safety, as well as signage and striping by NEV users, traditional motorists, and bicyclists. The complete survey questionnaire and results are available in the appendix.

***Perceived Safety by NEV Users***

Table 6 indicates that NEV users perceive the greatest safety when separated from traditional automobiles. Roads with shared NEV lanes were perceived to be between "neither safe nor unsafe" and "somewhat safe" while roads with separate lanes for NEVs were "somewhat safe" to "very safe." Although not in part of the plan, NEV users perceive NEV-only paths to be the most safe.

**Table 6. Perceived Safety of NEV Facilities by NEV Users**

| | Roads with *shared* lanes for NEVs and autos | Roads with *separate* lanes for NEVs and autos | Paths restricted only to NEVs |
|---|---|---|---|
| Very Safe (5) | 13 (16.67%) | 54 (69.23%) | 70 (89.74%) |
| Somewhat Safe (4) | 32 (41.03%) | 22 (28.21%) | 3 (3.85%) |
| Neither Safe nor Unsafe (3) | 11 (14.10%) | 0 (0%) | 0 (0%) |
| Somewhat Unsafe (2) | 16 (20.51%) | 1 (1.28%) | 0 (0%) |
| Very Unsafe (1) | 3 (3.85%) | 0 (0%) | 0 (0%) |
| No Basis to Judge | 3 (3.85%) | 1 (1.28%) | 5 (6.41%) |
| Mean | 3.48 | 4.68 | 4.96 |

Surprisingly, the findings from Table 6 (Q6 – Q8) do not seem to coincide with the results from Question 9 which asked, "Where do you prefer to drive your NEV?" The results, shown in Table 7, indicate that most NEV users prefer to travel on facilities with separated NEV lanes paths restricted only to NEVs. This finding can be interpreted two ways. Because paths do not currently exist as part of the plan, NEV users may not have considered it to be a viable choice.

**Table 7. Preferred Facilities by NEV Users**

| Facility Type | Response |
|---|---|
| Shared Lanes with Automobiles | 0% |
| Separated NEV lanes | 76.9% |
| NEV-only paths | 8.97% |
| No preference | 14.1% |

The result from Question 9 may also indicate that NEV users prefer the additional separation from traditional automobiles available through on-street NEV lanes but also prefer the flexibility of being on the street, like a traditional automobile, without being relegated to off-street paths. As a result, the City may want to consider experimenting with NEV-only paths and enhancing traditional road facilities for NEVs before attempting to securing right-of-way for off-street NEV paths. This second explanation is supported by Question 10 where exactly half (50%) of all NEV users indicated that they would not drive longer distances to travel on dedicated NEV facilities. In other words, NEV facilities will only be effective if they provide direct access to destinations equivalent to traditional automobiles.

Over 88% of respondents indicated that the current NEV signs (Q13), were easy to read and understand, and 90% of respondents indicated that the current pavement markings (Q14), were easy to read and understand. All of the remaining 12% of respondents who indicated that NEV signs were not easy to understand provided similar comments to suggest that a public education campaign is needed for the general public and traditional automobilists who do not know what "NEV" means. In fact, one NEV user responded to this issue by asking, "What does the N stand for?" Some of these education issues also manifest themselves when

the NEV parking spaces are used by traditional automobiles. It is possible that signage may need to be designed to contain the phrase "neighborhood electric vehicle," instead use of the acronym.

Other responses (Q11 & Q12) seem to suggest that the NEV transportation plan seem to be working. The interaction between vehicles and NEV is important, yet the majority of NEV users do not indicate having problems merging from NEV lanes through traditional vehicle lanes (87%) or problems crossing mixed traffic to make left turns (83%). These findings are important reassurance to the City as it continues to implement more of the NEV Transportation Plan.

From the survey, it was revealed that exactly half (50%) of all NEV users surveyed cross or use a road designated for NEVs with a speed limit over 35 mph at least "occasionally" (Q15), implying that a large portion of NEV users in the City have benefited from AB2353 becoming law.

***Perceived Safety of NEVs by Traditional Automobile Users***

The survey results indicate that the majority of traditional motorists (54.8%) feel that NEVs affect the travel speeds on traditional roads where traditional automobiles and NEVs *share* lanes (Q29), but only a fraction (15.08%) feel that NEVs affect the travel speeds on roads where traditional automobiles and NEVs have *separate* lanes (Q30).

When traditional automobilists were questioned about their interaction with NEVs, most respondents indicated that they feel safe (either "very safe" or "somewhat safe") around NEVs (Table 8). The general perception by traditional automobilists is that traditional roads with separated NEV lanes are safer than traditional roads without NEV facilities, which, in turn, are safer than traditional roads with shared lanes. These findings seem to suggest that designated shared facilities are less desirable for traditional motorists than traditional roads without NEV designations, while traditional roads with separate facilities are the most desirable. Regardless of the facility type, a large majority of traditional motorists (70% to 88%) do not appear to feel their safety is threatened by NEVs.

**Table 8. Perceived Safety of NEV Facilities by Traditional Auto Users**

| Facility | Traditional roads | Traditional roads with *shared* lanes for NEVs and autos | Traditional roads with *separate* lanes for NEVs and autos |
|---|---|---|---|
| Very Safe (5) | 69 (54.76%) | 57 (45.60%) | 80 (64.00%) |
| Somewhat Safe (4) | 43 (34.13%) | 32 (25.60%) | 30 (24.00%) |
| Neither Safe nor Unsafe (3) | 6 (4.76%) | 13 (10.40%) | 6 (4.80%) |
| Somewhat Unsafe (2) | 6 (4.76%) | 14 (11.20%) | 6 (4.80%) |
| Very Unsafe (1) | 1 (0.79%) | 5 (4.00%) | 0 (0%) |
| No Basis to Judge | 1 (0.79%) | 4 (3.20%) | 3 (2.40%) |
| Mean | 4.38 | 4.01 | 4.51 |

Regardless of the facility type, 55% of traditional automobile users feel that NEVs affect the travel speed on roads where NEVs and traditional automobiles either share lanes (Q29), while only 19% of those respondents believe that NEVs affect travel speeds when both have separate lanes (Q30). Many traditional motorists commented that NEVs affect their driving speed, especially when on 35 mph roads where NEVs reach a top speed of 25 mph: "Traditional automobiles normally travel above the speed limits. NEVs have a maximum speed of 25 mph. Conflicts can and do occur especially on roadways posted at 30-35 mph." For this reason, it is critical that NEV lanes be available where appropriate to avoid impeding traditional automobiles." This finding appears to match the findings from the previous section where an analysis of the speeds indicated a reduction in average speed on the facility. It may be that NEVs exhibit a "calming effect" on traditional traffic.

As expected, traditional motorists perceived greater safety with NEVs in separated lanes than in shared lanes. Interestingly, they also perceived traditional roads as being safer than traditional roads with shared lanes for NEVs. It is possible that "traditional roads" was interpreted by some survey respondents to mean "traditional roads without the presence of NEVs" while it may have been interpreted by others to mean "traditional roads with the presence of NEVs but without NEV provisions."

***Perceived Safety of NEVs by Bicyclists***

Organized bicyclists have struggled for years to get adequate shoulders and roadside striping, and the needs of bicyclists were considered during the NEV planning process (Cosgrove et al, 2007). Some bicyclists are willing to use the new NEV/bike lanes but are reluctant to see a bicycle lane converted to a wider shared NEV/bike lane. Approximately 40% of all bicyclists surveyed also feel that the presence of NEVs affected their bicycling speed (Q44). Over 34% of bicyclists surveys do not believe that the combination NEV/bike signs easy to read and understand (Q45), and almost 49% of bicyclists find the NEV/bike pavement markings and striping easy to read and understand (Q46). Most of the comments by these bicycle respondents, like the traditional motorist respondents, indicate a need for better education by road users, "Many bicyclists don't know what an NEV is." The large proportion of the 49% who had a difficult time reading and understanding the pavement

markings attributed their response to faded striping or pavement markings. It should be noted that the NEV/bike lane markings or striping in the NEV Transportation Plan are new and are not faded. Some of the sentiment expressed by survey respondents may be a reflection of bicycle lane striping in other parts of the city which may be fading.

Others commented that the wider lanes present a potential safety hazard by traditional vehicles that misinterpret the NEV/bike lane as a smaller automobile lane. One respondent stated, "I think it is difficult for drivers who visit our city to understand that the bicycle-NEV lane is not to be entered by other motor vehicles. It is close to the same size as a regular lane and is used by some drivers to pass on the right." Another stated, "The new NEV/Bike lane is 7 feet wide. The standard automobile lane is 12 feet wide. A 7-foot wide lane tends to look like another car lane to some drivers. This is dangerous and a potential liability to the City of Lincoln." These concerns can be mitigated with proper signage and public education efforts aimed at general motorists.

From Table 9, we can see that bicyclists generally perceive traditional roads without bicycle lanes as being somewhat unsafe, while they perceive traditional roads with shared bicycle/NEV lanes as being neither safe nor unsafe. While shared bicycle/NEV lanes appear to help separate conflicts with motor vehicles, they seem to introduce new potential conflicts with bicyclists who travel at similar speeds. The primary issue in these instances seems to relate to conflicts when a passing event occurs, which may be because the speeds of these two modes are close and it may be more difficult to pass.

**Table 9. Perceived Safety of NEV Facilities by Bicyclists**

| | Traditional roads without bicycle lanes or paths | Traditional roads with shared bicycle/NEV lanes | Traditional roads with bicycle-only lanes | On separated bicycle-only paths |
|---|---|---|---|---|
| Very Safe (5) | 2 (5.26%) | 2 (5.26%) | 10 (26.32%) | 28 (73.68%) |
| Somewhat Safe (4) | 7 (18.42%) | 16 (42.11%) | 22 (57.89%) | 7 (18.42%) |
| Neither Safe nor Unsafe (3) | 7 (18.42%) | 5 (13.16%) | 3 (7.89%) | 0 (0%) |
| Somewhat Unsafe (2) | 11 (28.95%) | 7 (18.42%) | 2 (5.26%) | 2 (5.26%) |
| Very Unsafe (1) | 10 (26.32%) | 6 (15.79%) | 0 (0%) | 0 (0%) |
| No Basis to Judge | 1 (2.63%) | 2 (5.26%) | 1 (2.63%) | 1 (2.63%) |
| Mean | 2.46 | 3.03 | 4.08 | 4.65 |

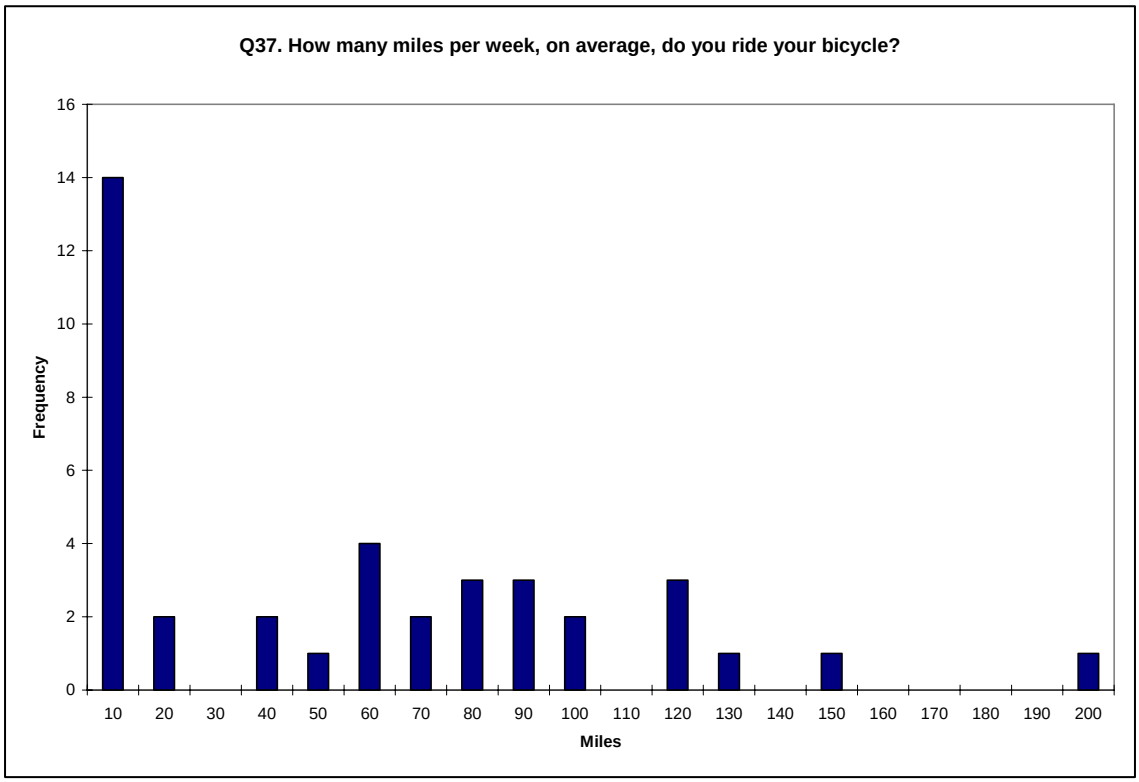


**Figure 11. Bicycling Respondents Average Weekly Mileage**

Figure 11 indicates that the survey participants who bicycle may not be a typical bicyclist. These findings may be expected as a result of encouraging bicyclists in the local bicycle club to participate in the survey during the summer months. The average and median weekly bicycling distance were both found to be a little a 55 miles per week.

Six of the 38 respondents (16%) indicated that they had been involved in "an accident or an incident" with an NEV (Q38). The comments of those six respondents, however, did not seem to involve crashes or collisions but "close calls" due to the interactions between NEVs and bicyclists. All six comments involved common driver courtesy when using a shared space. The bicyclists expressed particular concern about the quiet nature of NEVs which surprise or startle bicyclists especially when an NEV passes a bicyclist. NEVs are quieter than traditional automobiles and bicyclists may not have rear-view mirrors, so a potential conflict can arise when an NEV passes a slower moving bicyclist from the rear. For example, one respondent, "It is difficult to hear an NEV approaching from the rear when you are on a bicycle and I have been startled by them if they come too close to me as they pass." Another respondent indicated, "They have come up behind me fast then cut out into traffic to get past me. They… have often almost clipped me either when cutting out or cutting back in."

There were also two respondents who also expressed issues sharing the right-of-way. One crash, which was not reported to the police, that was identified occurred in a Class II bicycle lane and seemed to involve an NEV failing to provide adequate space for the bicyclist while

passing through a work zone. Neither the NEV nor the bicyclist yielded. "The NEV came along side me and pushed me into the cones and maintenance truck. Driver (male) looked back but never stopped. [I] could not get the license plate number." One respondent stated that an "NEV driver indicated displeasure with our group [while] riding in the NEV lane," and another complained about NEVs "not giving me space to ride along side them."

These issues between bicyclists and NEVs also became apparent when bicyclists were asked "Does the presence of an NEV affect your bicycle riding speed?" Most of the 40% of bicycle respondents who claimed that NEVs affect their travel behavior made reference to the quiet operation and speed capabilities of NEVs as well as aggressive or inconsiderate driving behavior by some NEV users.

Based on these findings, it is recommended that public awareness programs continue to educate both bicyclists and NEV users who may be traveling at similar speeds on shared facilities. Some education campaigns have already started to help NEV drivers interact with bicyclists, such as the driving tips provided on LincolnNEV.com website: http://www.lincolnev.com/driving.html. Similar public awareness efforts can emanate from the local bicycle and NEV user clubs.

This issue needs to be addressed because the City plans to encourage NEV users and bicyclists to continue to share right-of-way as all NEV striped lanes will be with sufficient width to allow lane sharing with bicycles. Striping a single, dual-use lane will be less expensive to implement and maintain than multiple- lane striping for each use.

***Travel Impacts of NEVs***

While not a focus of this study, the potential benefits of travel impacts of NEVs were explored in the survey. According to the survey, almost one quarter (24%) of NEV owners indicated that they had sold or disposed of a traditional automobile after they acquired their NEV. NEV users also reported an average almost 15 one-way trips per week and a little less than 4.5 miles per trip. Based on these figures, the average NEV would travel almost 3,500 miles per year, which is over three times higher than previous estimates (MHM, 2006). The results from the survey also indicate that NEVs generate fewer auto trips, fewer bicycle trips, but the same number of walking and transit trips (Table 10). Clearly, there is a discrepancy here because the same respondents also indicated that they take about the same number of trips overall, shown in the last column of Table 10 below. These findings indicate NEV use has been used to substitute primarily for traditional vehicle travel and some bicycle-related travel, but they do not seem to create an increase in the use of public transit as suggested by the NEV Transportation Plan (MHM, 2006). Clearly, the amount of travel and potential benefits associated with NEV use (and foregone travel by other modes) is an area in need of future research.

**Table 10. Travel Behavior and Use of Other Modes Prior to Owning an NEV**

| Mode | Automobile | Bicycle | Transit | Walking | More Trips |
|---|---|---|---|---|---|
| More (1) | 71 (91.03%) | 8 (10.26%) | 1 (1.28%) | 6 (7.69%) | 5 (6.41%) |
| Same (0) | 3 (3.85%) | 17 (21.79%) | 9 (11.54%) | 43 (55.13%) | 50 (64.10%) |
| Less (-1) | 4 (5.13%) | 2 (2.56%) | 1 (1.28%) | 6 (7.69%) | 5 (6.41%) |
| No Basis to Judge | 0 (0%) | 51 (65.38%) | 67 (85.90%) | 23 (29.49%) | 18 (23.08%) |
| Mean | 0.86 | 0.22 | 0 | 0 | 0 |

***Community Cohesion***

It is hypothesized that NEV travel provides an opportunity to develop a cohesive community because NEVs travel at lower speeds and invite attention from passers-by (Cosgrove, 2007). Because NEVs have a limited travel range (approximately thirty miles on one battery charge.), NEV users will be more likely to shop locally and support local businesses. From the survey, 94% of NEV respondents indicated that they use their NEV to attend or participate in community or social activities, and 81% would still attend or participate in these activities without their NEV. These findings indicate that NEVs do help develop community cohesion as some of the activities are NEV-based, such as the Lincoln Hills Low-Speed Vehicle (LSV) Users Group meetings and activities. Because most respondents indicated that they would participate in many of the same activities that are not NEV-based without an NEV, however, it is unclear if the NEVs provide more cohesion than traditional forms of transportation. This area would also be better understood with more research through a detailed travel study.

## FINDINGS AND RECOMMENDATIONS

This evaluation of the Lincoln NEV Transportation Plan indicates that the City of Lincoln is meeting its goals of maintaining safety while increasing mobility to its residents. Based on these findings, the provisions in AB2353 should be continued in the City of Lincoln and the City of Rocklin in the County of Placer, and possibly expanded statewide. This evaluation shows no safety impacts with the implementation of the NEV Transportation Plan. While speeds may decrease slightly, traffic flow does not appear to be impeded. No crashes or incidents involving NEVs have been reported within the City, and survey responses indicate that traditional motorists feel safe around NEVs. Although bicyclists and NEV users have both indicated that they feel safer in their own lanes than in shared lanes, only 16% of all bicyclists surveyed indicated that they had a problem sharing space with NEVs in shared NEV/bicycle lanes. The primary issue in these instances seems to relate to conflicts when a quiet and generally faster NEV tries to pass and overtake a bicycle, which may be because these two modes operate at similar speeds and it may be more difficult to pass.

With regards to traffic flow, the survey indicates that traditional automobile drivers feel that NEVs slightly decrease the travel speed. A speed study on East Lincoln Parkway confirmed this finding, but it should be noted that the reduced speed was still above the posted speed

limit. With regard to signage and pavement markings, most NEV users, traditional motorists, and bicyclists confirm that the current signage and striping is easy to read and understand. However, it is clear that work still needs to be done to better educate the general public and all road users about what an "NEV" is.

Based on these findings, it is recommended that the provisions in AB2353 should be continued in the cities of Lincoln and Rocklin. The program can be successfully implemented statewide, but it is recommended that a more comprehensive analysis be conducted when more of the approved NEV Transportation Plan has been implemented. A more comprehensive analysis would help to better evaluate the potential safety concerns that may exist on higher speed facilities. At this time, only a small fraction of the total lane-miles in the NEV Transportation Plan are located on higher-speed facilities, and there have been some safety concerns by NEV users sharing facilities with traditional automobiles and by bicyclists sharing facilities with NEV users.

## FUTURE WORK AND REFINEMENTS TO LINCOLN'S NEV TRANSPORTATION PLAN

To better evaluate Lincoln's NEV Transportation Plan and the associated benefits to the City, more comprehensive studies are needed. For the NEV Transportation Plan to continue to be successful, the City of Lincoln will need to continue to work with its residents as well as members of the NEV community to continue to evaluate potential safety and traffic issues related to signage, striping, and pavement marking. The user survey in this report was limited to the front of Safeway Market and resulted in a very limited sampling of users. To obtain a more representative sample of Lincoln residents, additional sampling in the downtown core or at other mixed-use areas of the City should be considered. The traffic engineering studies were limited to one facility on East Lincoln Parkway and resulted in a limited assessment of traffic impacts of NEVs. Additional data collection on other high-speed facilities should be considered where both speed and level of service (LOS) are evaluated.

As a result of this evaluation, the City Lincoln may consider addressing several items related to the implementation of the existing NEV Transportation Plan. These items include, but are not limited to:

- Exploring striping concepts to help facilitate the merging of NEVs across multiple general purpose lanes to make a left-hand turn at an intersections,
- Providing increased enforcement on NEV parking facilities,
- Implementing Class I NEV routes along major arterials and collectors where practical.

Along with continued evaluation of the NEV Transportation Plan, future research needs to address the energy and air quality impacts associated with trips generated by NEVs and substituted for other modes. There is a clear need for detailed travel studies by NEV users, which can help to provide additional insight on some of the following questions:

- What is the modal split of NEVs in the City of Lincoln?
- What are typical NEV trip characteristics, including trip length, frequency, and purpose?
- What household characteristics affect NEV trip generation?
- What factors affect the substitution of traditional automobile trips by NEVs?
- What roadway characteristics affect NEV route choice?

Through continued study and evaluation of these issues, NEVs can continue to add to the mobility of residents in the City of Lincoln and Rocklin and eventually throughout the State of California.

## STATEWIDE NEV POLICY IMPLEMENTATION

To encourage statewide implementation of NEVs, the Cities of Lincoln and Rocklin may want to develop a statewide task force to coordinate efforts with other cities that are interested in similar NEV Transportation Plans. It is also recommended that the Cities of Lincoln and Rocklin continue to work with state legislature to coordinate these efforts.

There are several communities that are currently pursuing drafting legislation to allow them to stripe NEV lanes on roadways with speed limits above 35 mph. Orange County was successful in drafting legislation (California Senate Bill 936) and in obtaining approval to begin developing an NEV Transportation Plan, similar to that of Lincoln and Rocklin, shown in Appendix G. Cities in Yolo County such as Davis and Woodland have also expressed interest in developing an NEV Transportation Plan. If a statewide NEV policy is implemented, it could include the standardization of signage, striping, and design specifications, all of which could help Caltrans and federal transportation agencies expedite the approval process while helping to ensure consistency among local jurisdictions throughout the state.

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## APPENDIX A. APPROVED SIGNAGE AND PAVEMENT MARKING

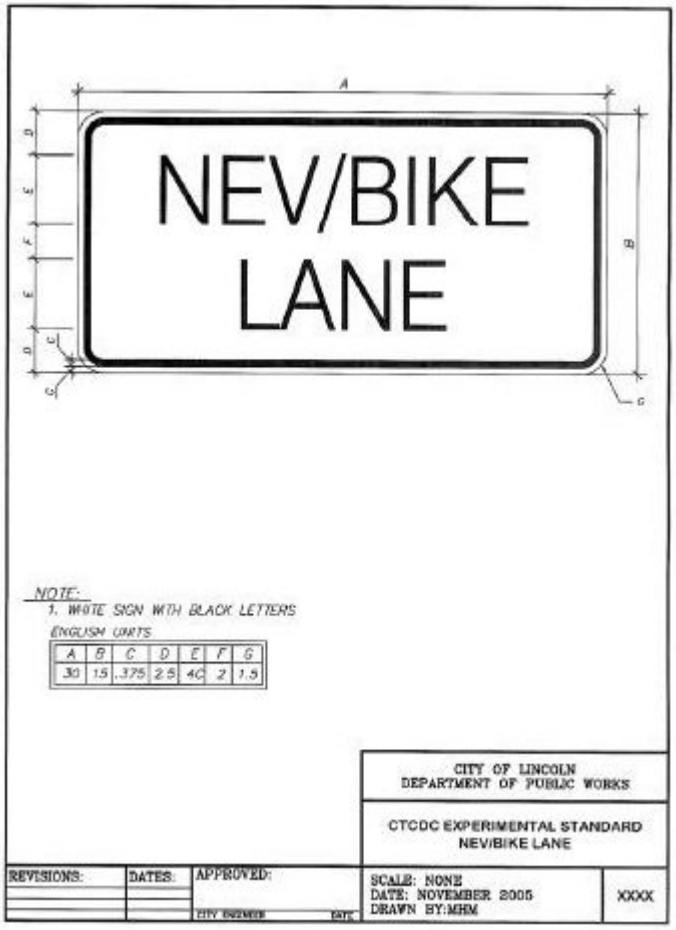



**Figure 12. Combination NEV/Bike Lane Sign**

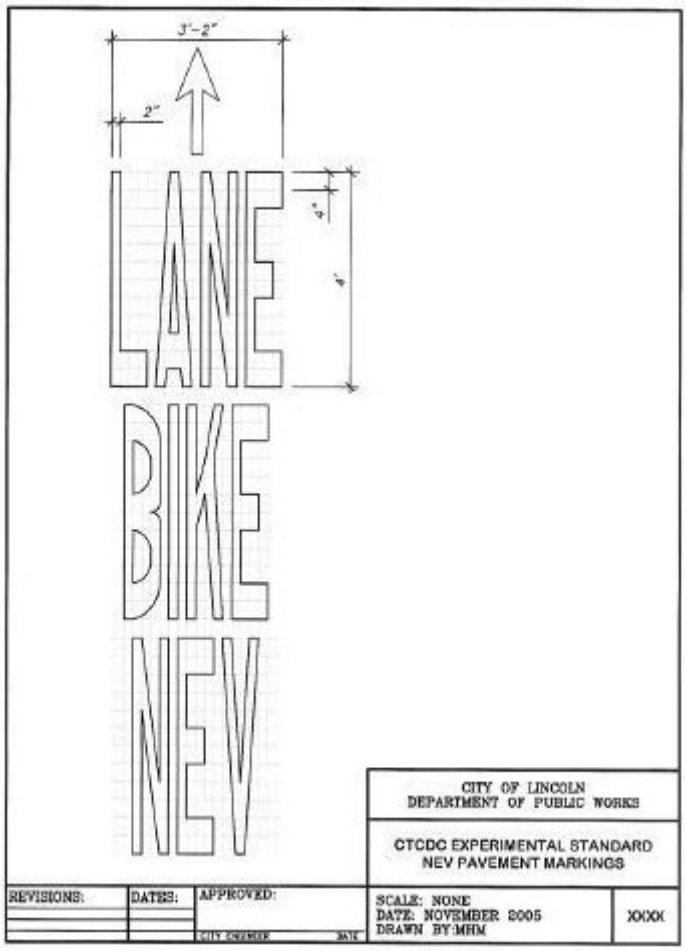



**Figure 13. Combined NEV/Bicycle Lane Pavement Marking**

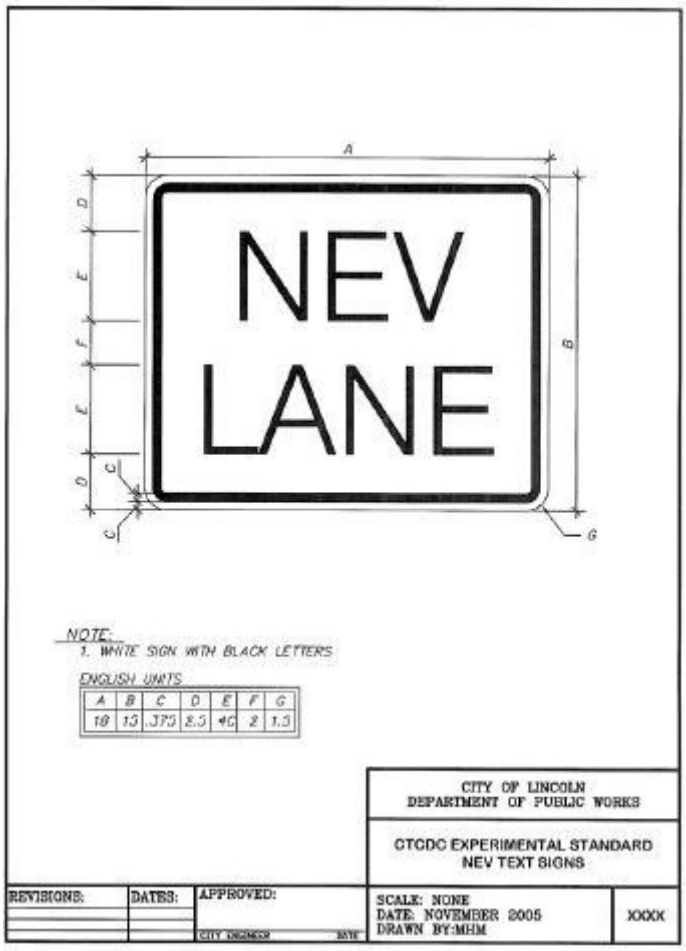



**Figure 14. NEV Lane Sign**

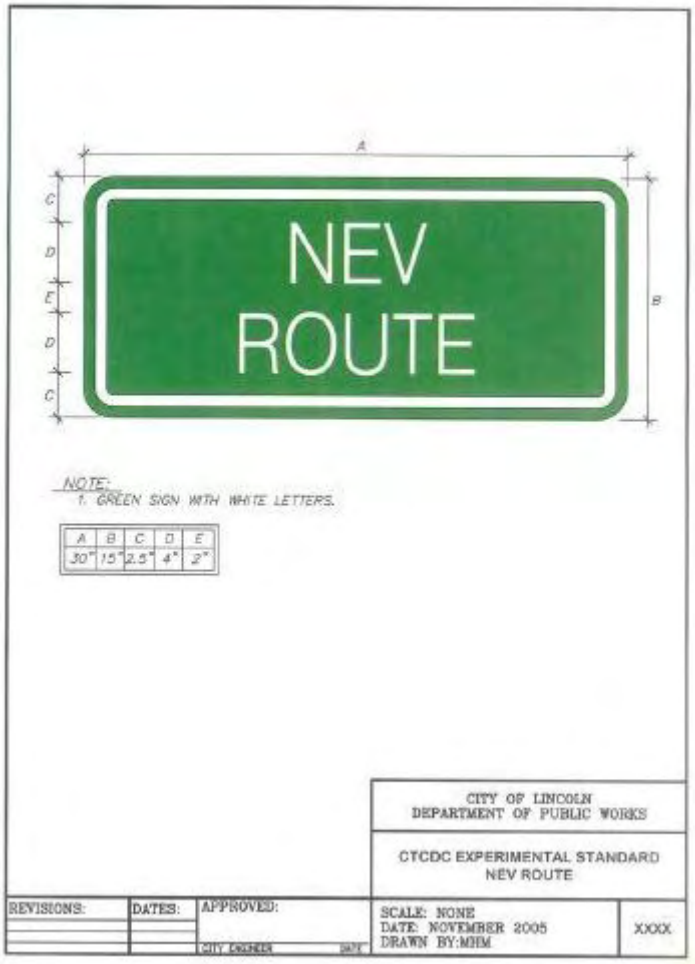



**Figure 15. NEV Route Sign**

## APPENDIX B. STATISTICAL ANALYSIS OF DIFFERENCES IN MEAN SPEEDS

The t-test is used to assess whether the observed difference between the two mean speeds are *statistically* different from each other. The t-test can be used to determine if the difference between the mean (average) speeds is large enough, given the amount of variability or spread among the observed speeds.

The formula for the t-test is a ratio. The numerator of the ratio is just the difference between the two mean speeds, while the denominator is a measure of the variability or dispersion of the speeds. The difference in the average speed between 2005 and 2007 is thought to be attributable to changes along the roadway (i.e., the introduction of NEVs), while the bottom part of the formula is a measure of variability of the speed ($s^2$), given the number of observations (N).[1] The formula shows the formula for the t-test and how the numerator and denominator are related to the distributions.

$$t_{calc} = \frac{\overline{X}_{2005} - \overline{X}_{2007}}{\sqrt{\frac{s_{2005}^{\ 2}}{N_{2005}} + \frac{s_{2007}^{\ 2}}{N_{2007}}}}$$

The calculated t-statistic is compared with a t-statistic in a table to determine if it is too large to be attributable to the randomness of the observed speeds. Instead, we must infer that the difference is due to the some other source, like the addition of an NEV lane.

**Table 11. T-Test for Northbound Traffic**

| | 2005 | 2007 |
|---|---|---|
| Mean, mph | 39 | 36 |
| Standard Deviation, mph | 4.6 | 4.6 |
| Sample Size, N | 162 | 351 |
| Calculated t- statistic | 6.9 | |

**Table 12. T-Test for Southbound Traffic**

| | 2005 | 2007 |
|---|---|---|
| Mean, mph | 40 | 38 |
| Standard Deviation, mph | 4.4 | 5.2 |
| Sample Size, N | 101 | 258 |
| Calculated t- statistic | 3.4 | |

In both cases, the calculated t-statistics of 6.9 and 3.4, respectively, are greater than the value of 1.96 associated with a 95% confidence level, indicating that the difference in speeds is statistically significant in both directions.

[1] The variability or variance ($s^2$) is equal to the standard deviation (s) squared.

## APPENDIX C. LINCOLN TRANSPORTATION SURVEY

The goal of this survey is to obtain your opinion of the transportation choices, particularly with regard to public opinion about the introduction of neighborhood electric vehicles (NEVs) in the City of Lincoln. Your views, experiences and insights will be greatly appreciated. It is hoped that this survey results could help the City of Lincoln prioritize future transportation planning, so your participation and input will make a difference. This survey is anonymous and your answers will not be associated with your name. If you have any questions, please call (916) 278-5348.

### A. NEV USERS

Q1. Do you use a Neighborhood Electronic Vehicle (NEV) as a mode of transportation?
☐ Yes, go to Q2. ☐ No, jump to Q28.

Q2. How many NEVs do you own?
☐ One ☐ Two ☐ Three or more

Q3. How long (in months) have you owned an NEV? (If you own multiple NEVs, please enter the number of months for the NEV you have owned the longest.)
Enter numerical response: _____

Q4. How many individuals does the NEV (which you use most frequently) seat (including the driver)?
☐ One ☐ Two ☐ Three ☐ Four ☐ Five or more

Q5. Have you ever been in an accident or crash with your NEV?
☐ No ☐ Yes
If "Yes," please explain:_____.

Q6 through Q8. Please indicate how safe you feel driving your NEV ….

Q6. …On traditional roads with <u>lanes shared</u> by traditional automobiles and NEVs
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q7. …On traditional roads with <u>separate lanes</u> designated for NEVs:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q8. …On <u>paths</u> restricted only to NEVs
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q9. Where do you prefer to drive your NEV?

- ☐ Shared lanes with traditional automobiles
- ☐ Separated NEV lanes
- ☐ NEV-only paths
- ☐ No preference

Q10. Do you drive longer distances to avoid traveling off dedicated NEV facilities?

☐ Yes ☐ No ☐ Not sure

Q11. Do you have problems merging from NEV lanes through into lanes with regular vehicles and mixed traffic?

☐ Yes ☐ No

Q12. Do you have problems crossing mixed traffic to make left turns?

☐ Yes ☐ No

Q13. Are the current NEV signs easy to read and understand?

☐ Yes ☐ No

If "No," please explain:_____.

Q14. Are the current NEV pavement markings and striping easy to read and understand?

☐ Yes ☐ No

If "No," please explain:_____.

Q15. While in your NEV, how often do you find yourself crossing or using a road designated for NEVs with a speed limit over 35 mph?

☐ Very Often ☐ Occasionally ☐ Rarely ☐ Never ☐ Not Sure

Q16 through 20. Before owning my NEV, I ….

Q16. … Drove a traditional automobile:

☐ More. ☐ With the same frequency as I do now. ☐ Less.

Q17. ... Rode my bicycle:

☐ More. ☐ With the same frequency as I do now. ☐ Less.

Q18. … Used public transportation:

☐ More. ☐ With the same frequency as I do now. ☐ Less.

Q19. … Walked:

☐ More. ☐ With the same frequency as I do now. ☐ Less.

Q20. … Traveled outside of my home

☐ More. ☐ With the same frequency as I do now. ☐ Less.

Q21. Did you sell or get rid of a traditional vehicle after acquiring your NEV?

☐ Yes ☐ No

Q22. How many trips (one-way) do you make in your NEV each week? (For example, if you go to the grocery store and back, you would be making two one-way trips.)

Enter numerical response: _____

Q23. Approximately, how far (on average) is each of your NEV trips?

☐ Less than one mile ☐ 1 – 2 miles ☐ 3 – 4 miles
☐ 5 – 6 miles ☐ 7 – 8 miles ☐ 9 – 10 miles
☐ 11 miles or more

Q24. Do you use your NEV to attend or participate in community or social activities?

☐ Yes ☐ No

Q25. What types of community or social activities do you use your NEV to attend or participate in?

Enter open-ended response: _____

Q26. Would you still attend or participate in these activities without your NEV?

☐ Yes ☐ No ☐ Not Applicable

Q27. Would you suggest expanding or reducing the NEV system in the City of Lincoln?

☐ Expanding ☐ Reducing ☐ Neither

## B. TRADITIONAL MOTORISTS

Q28. Do you use an automobile as a form of transportation?

☐ Yes, go to Q29. ☐ No, jump to Q36.

Q29. Do you think NEVs affect the travel speed on roads where NEVs and traditional automobiles share lanes?

☐ Yes ☐ No

If "Yes," please explain:_____.

Q30. Do you think NEVs affect the travel speed on roads where NEVs and traditional automobiles have separate lanes?

☐ Yes ☐ No

If "Yes," please explain:_____.

Q31. While driving your traditional automobile, have you ever been in an accident or incident with a neighborhood electric vehicle (NEV)?

☐ Yes ☐ No

If "Yes," please explain:_____.

Q32 though Q34. Please indicate how safe you feel driving your automobile ….

Q32. …On traditional roads:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q33. … On traditional roads with lanes shared by traditional automobiles and NEVs:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q34. … On traditional roads with separate lanes designated for NEVs.
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

## C. BICYCLISTS

Q35. Do you use a bicycle as a mode of transportation?
☐ Yes, go to Q36. ☐ No, jump to Q48.

Q36. How many days per week do you typically ride your bicycle?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

Q37. How many miles per week, on average, do you ride your bicycle?
Please enter numeric response: _____

Q38. Have you ever been in an accident or incident with an NEV?
☐ Yes ☐ No
If "Yes," please explain:_____.

Q39 through Q43. Please indicate how safe you feel riding your bicycle ….

Q39. … On traditional roads without bicycle lanes or paths:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q40. … On traditional roads with shared bicycle/NEV lanes:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q41. … On traditional roads with bicycle-only lanes:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q42. … On separated bicycle/NEV paths:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q43. … On separated bicycle-only paths:
☐ Very Safe ☐ Somewhat Safe ☐ Neither Safe Nor Unsafe
☐ Somewhat Unsafe ☐ Very Unsafe ☐ No Basis to Judge

Q44. Does the presence of an NEV affect your bicycle riding speed?
☐ Yes ☐ No
If "Yes," please explain:_____.

Q45. Are the current bicycle/NEV signs easy to read and understand?
☐ Yes ☐ No ☐ No Basis to Judge
If "No," please explain:_____.

Q46. Are the current bicycle/NEV pavement markings and striping easy to read and understand?
☐ Yes ☐ No ☐ No Basis to Judge
If "No," please explain:_____.

Q47. Do you use your bicycle to attend community or social activities?
☐ Yes ☐ No

## D. GENERAL INFORMATION (ALL RESPONDENTS)

Q48. In what city do you live?
☐ Lincoln ☐ Other: _____

Q49. Gender: ☐ Male ☐ Female

Q50. Marital status: ☐ Married ☐ Single ☐ Other

Q51. Age:
☐ Under 21 ☐ 36-40 ☐ 56-60
☐ 21-25 ☐ 41-45 ☐ 61-65
☐ 26-30 ☐ 46-50 ☐ 66-70
☐ 31-35 ☐ 51-55 ☐ Over 70

Q52. Employment status: ☐ Full-time ☐ Part-time ☐ Retired ☐ Unemployed

Q53. Please indicate your highest level of education:
☐ Some high school ☐ Technical college degree (A.A.)
☐ High school diploma ☐ College degree (Bachelors degree)
☐ Post-graduate degree

Q54. Including yourself, how many people live in your household?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

Q55. How many people living in your household work outside the home?
☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 or more

Q56. How many children under age 6 live in your household?
☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 or more

Q57. How many children 6 to 16 live in your household?
☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 or more

Q58. How many automobiles (not including NEVs or golf carts) are in your household?
☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 or more

Q59. Do you have a disability that prevents you from driving an automobile?
☐ Yes ☐ No

Q60. Do you have a condition (other than a disability) that prevents you from driving an automobile?
☐ Yes ☐ No

Q61. What is your approximate annual household income?

| | | |
|---|---|---|
| ☐ No Income | ☐ under $15,000 | ☐ $15,000 –24,999 |
| ☐ $25,000 – 34,999 | ☐ $35,000 – 44,999 | ☐ $45,000 –54,999 |
| ☐ $55,000 – 64,999 | ☐ $65,000 – 74,999 | ☐ $75,000 – 84,999 |
| ☐ $85,000 – 99,999 | ☐ $100,000 – 150,000 | ☐ over 150,000 |

Q62. Would you be willing to participate in future transportation studies for the City of Lincoln?
☐ Yes ☐ No

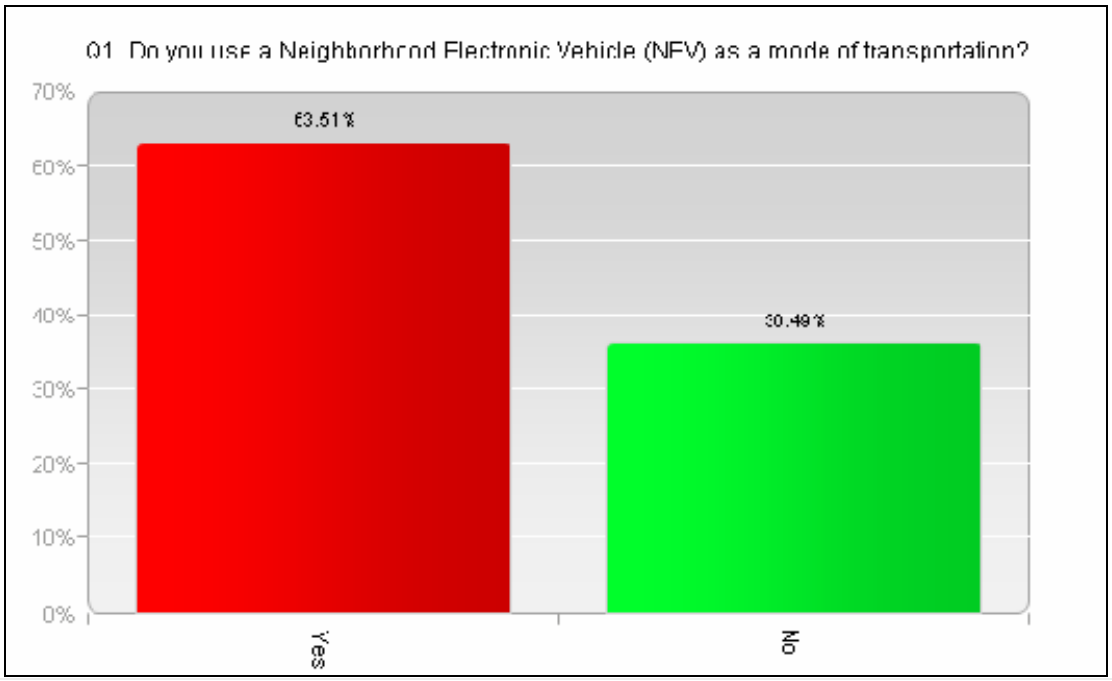
If "Yes," please include your name, and telephone number or e-mail address below so that we may contact you for further information and assistance.

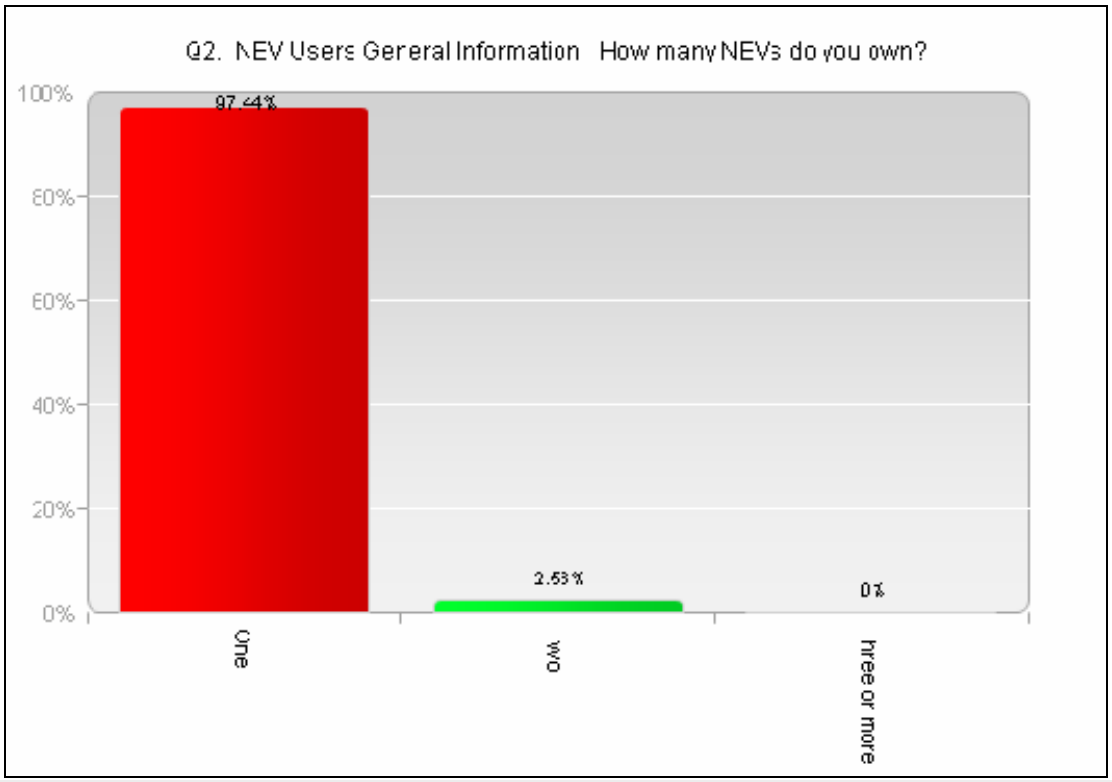
Name: _____

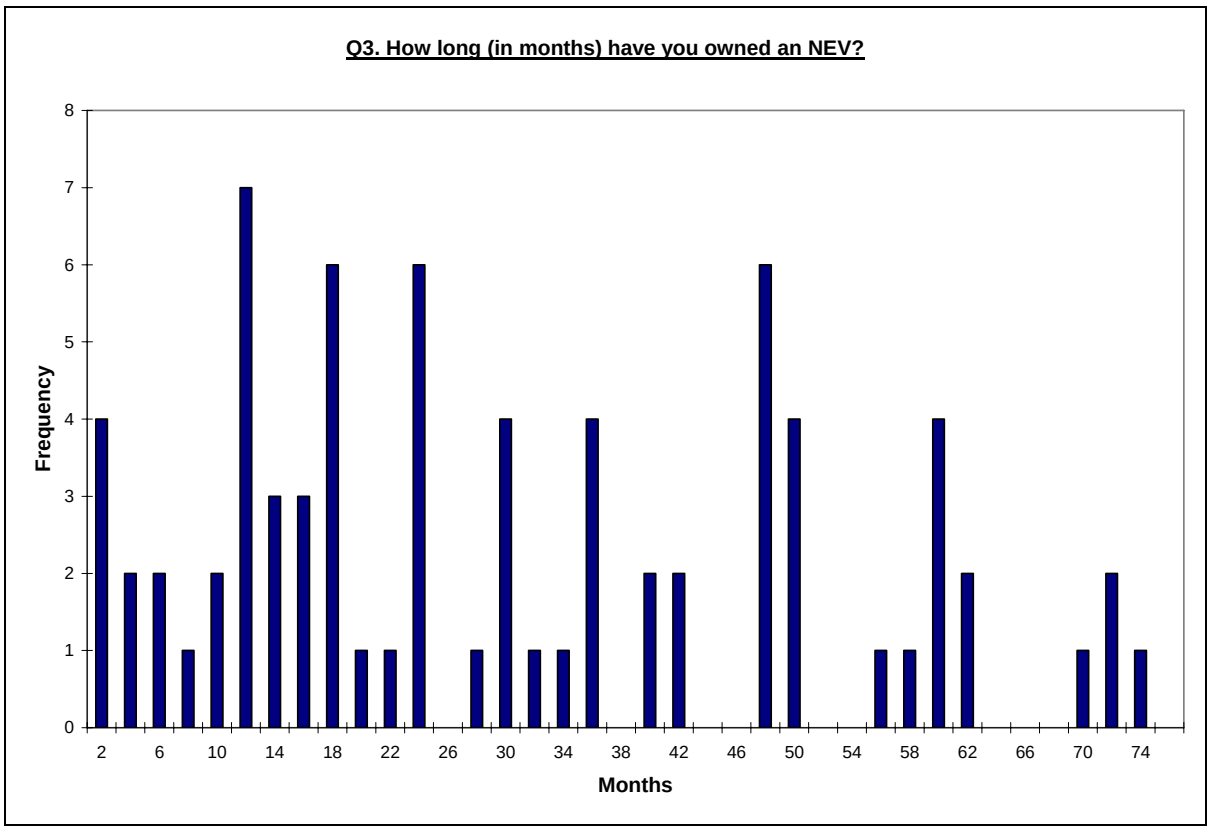
Phone Number: _____ (please include area code)
or
E-Mail Address: _____

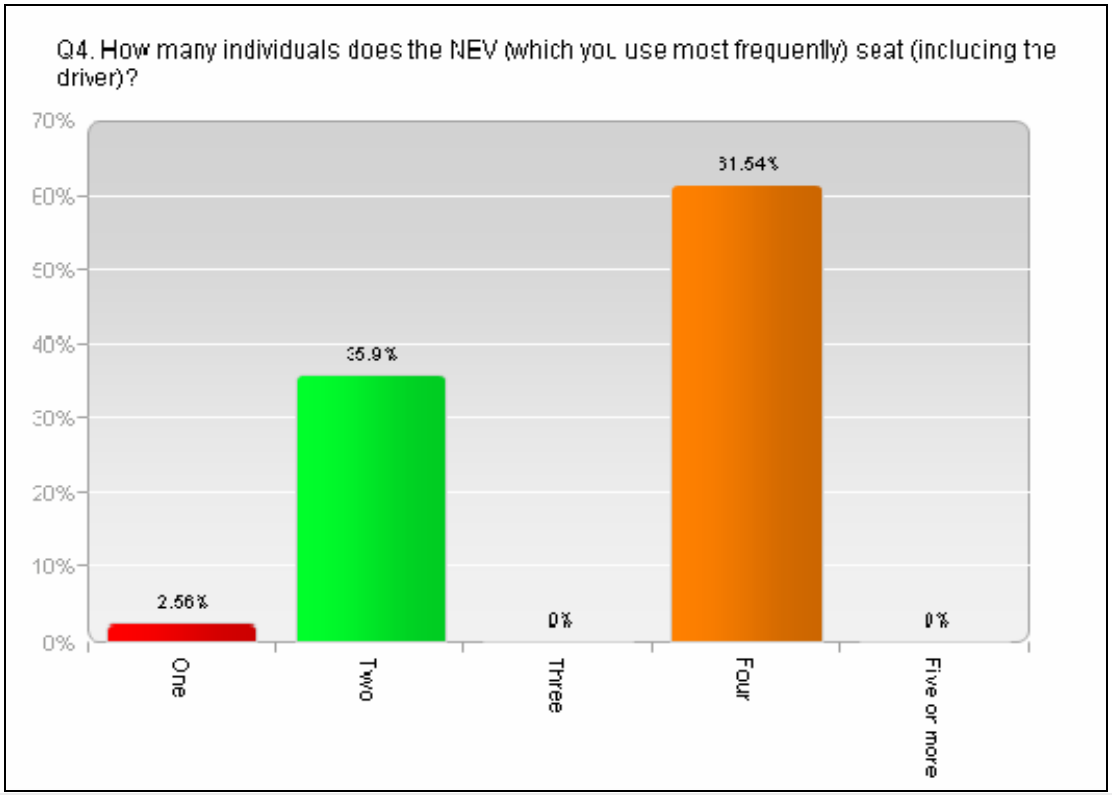
**THANK YOU FOR YOUR PARTICIPATION!**

## APPENDIX D. LINCOLN TRANSPORTATION SURVEY RESULTS



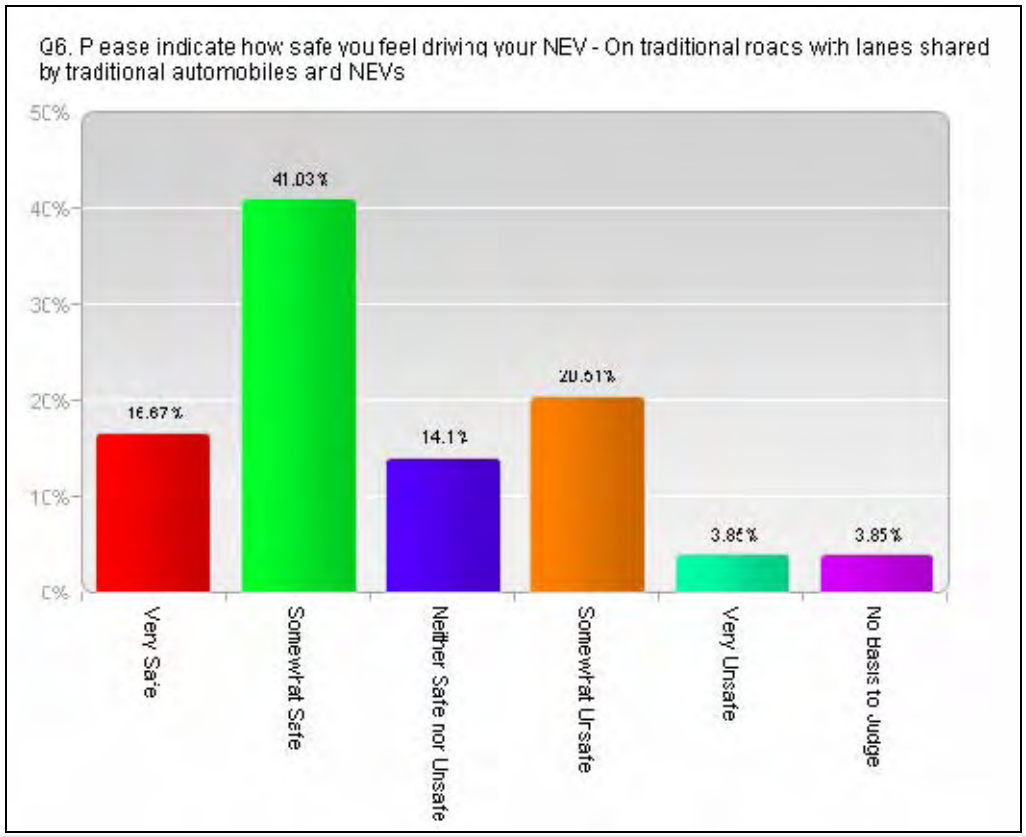



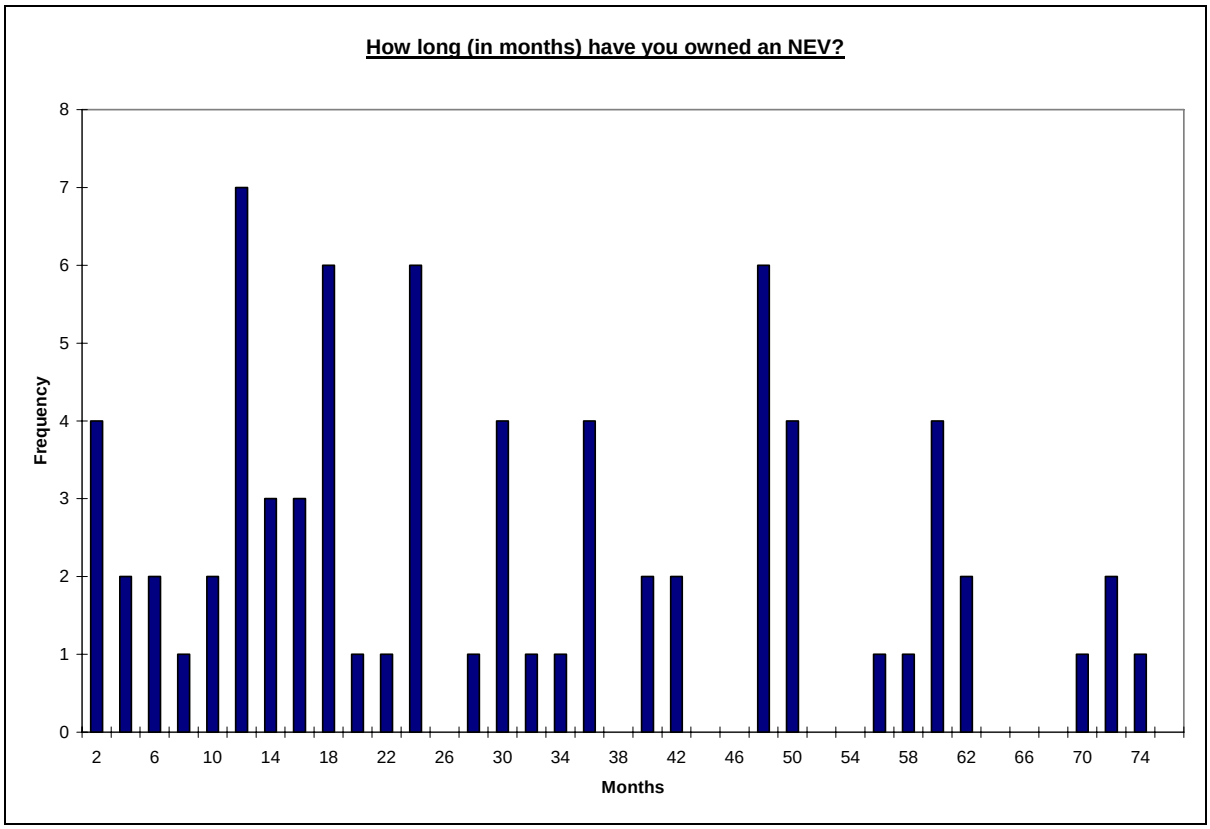

Q3. How long (in months) have you owned an NEV?
Frequency
Months
0
1
2
3
4
5
6
7
8
2
6
10
14
18
22
26
30
34
38
42
46
50
54
58
62
66
70
74

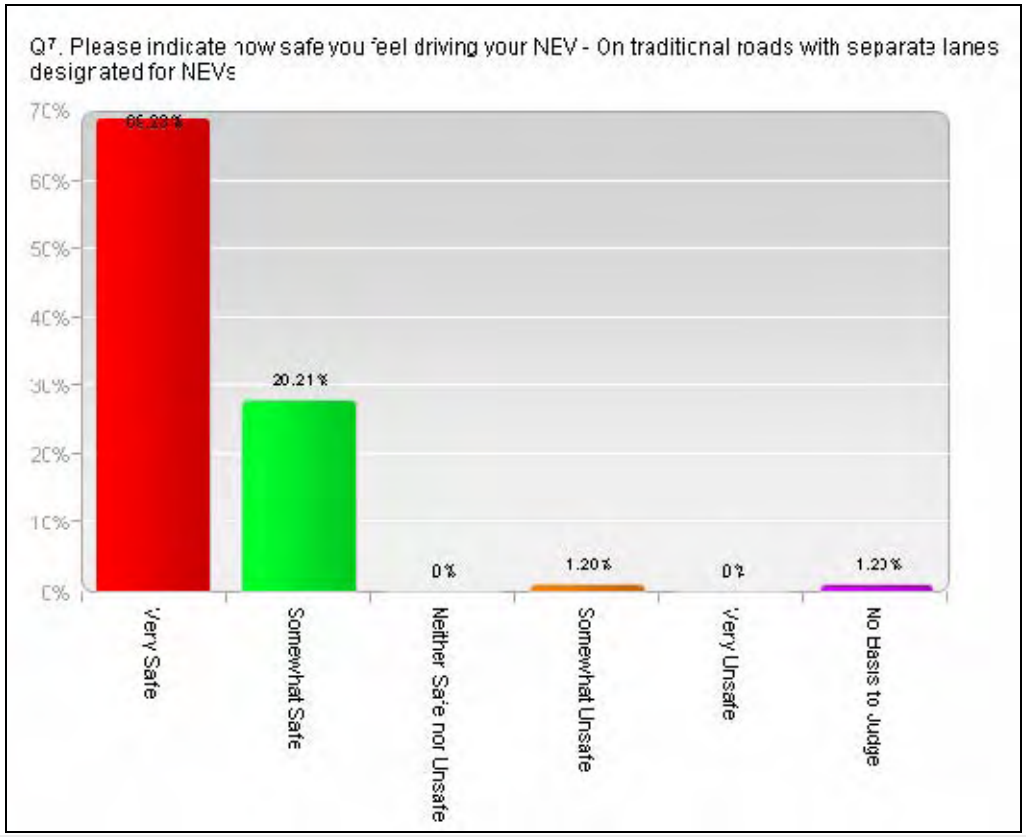

Q4. How many individuals does the NEV (which you use most frequently) seat (inclucing the driver)?
70%
60%
50%
40%
30%
20%
10%
0%
2.56%
35.9%
0%
61.54%
0%
One
Two
Three
Four
Five or more

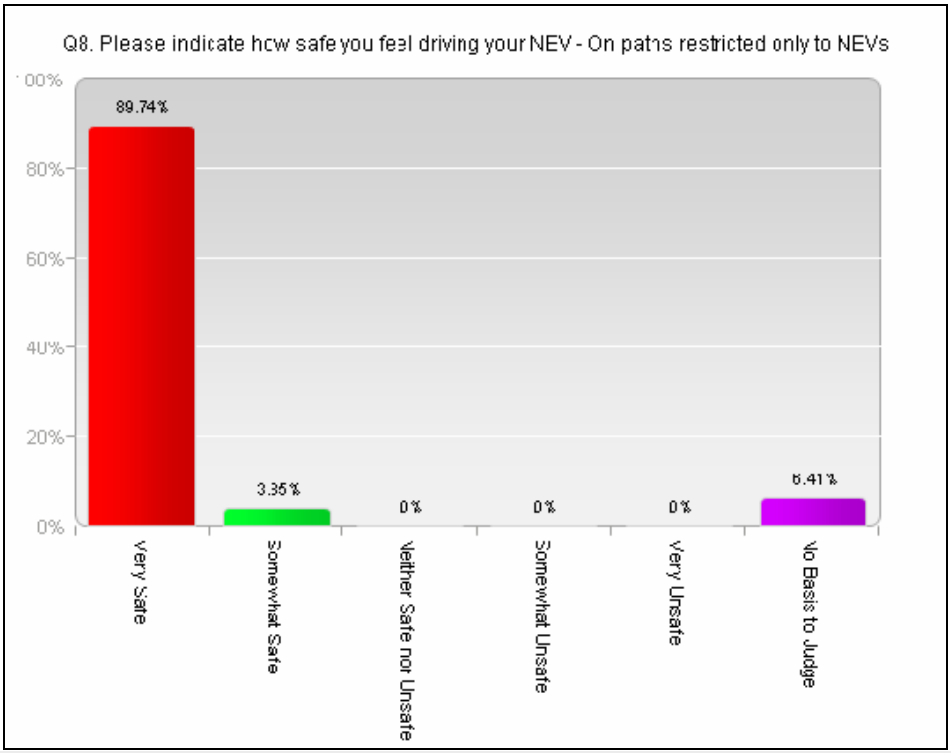
| Q5. Safety Have you ever been in an accident or crash with your NEV? | | |
|---|---|---|
| **Count** | **Percent** | |
| 1 | 1.28% | Yes (please describe): |
| 77 | 98.72% | No |
| 78 | Respondents | |

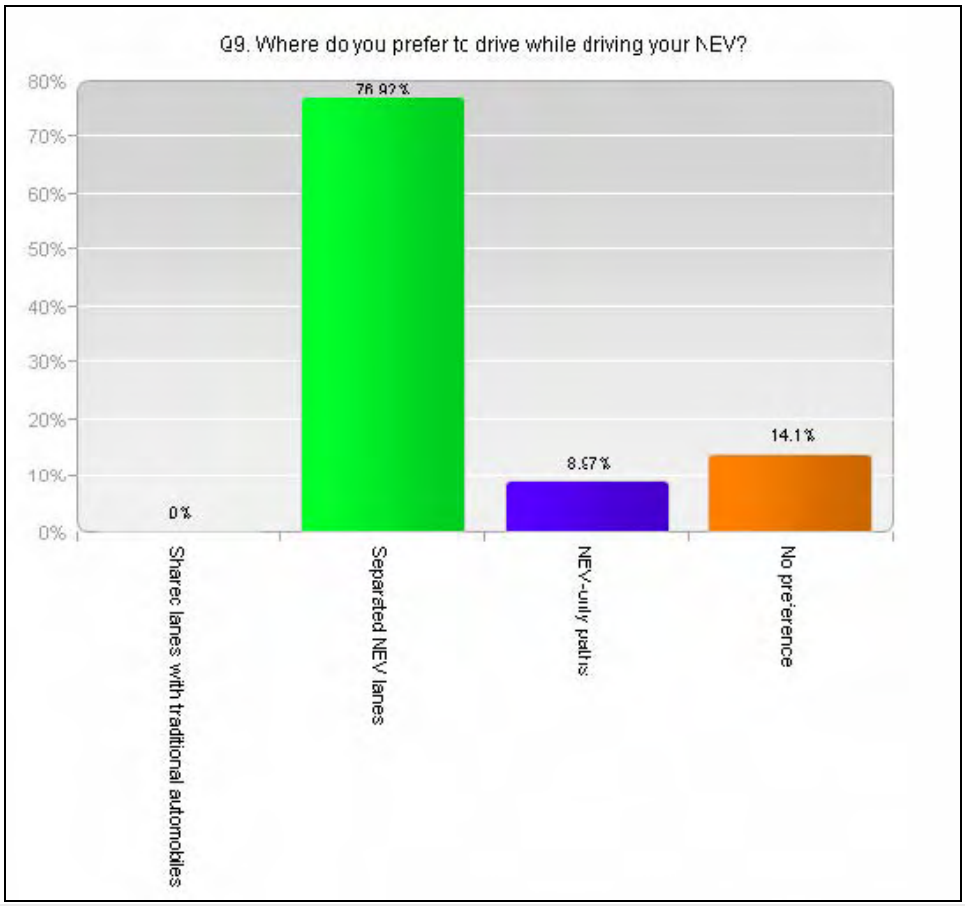
Note: The one “yes” response simply indicated “ran a red light” but the respondent did not elaborate on who was at fault or what the outcome was.

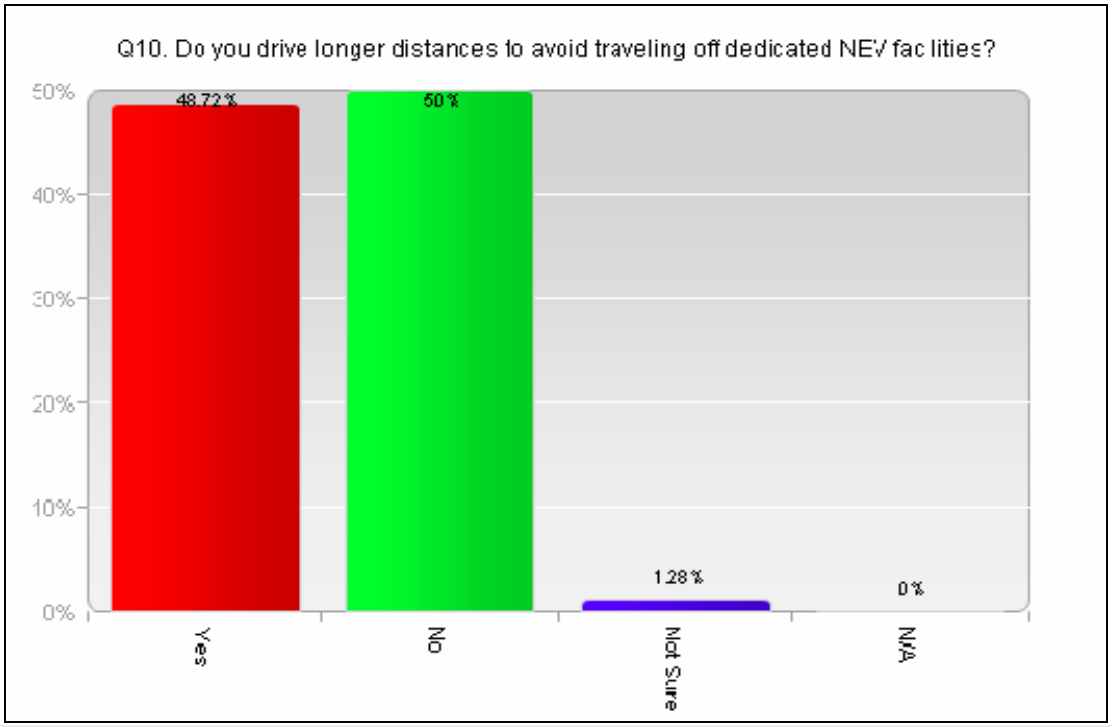


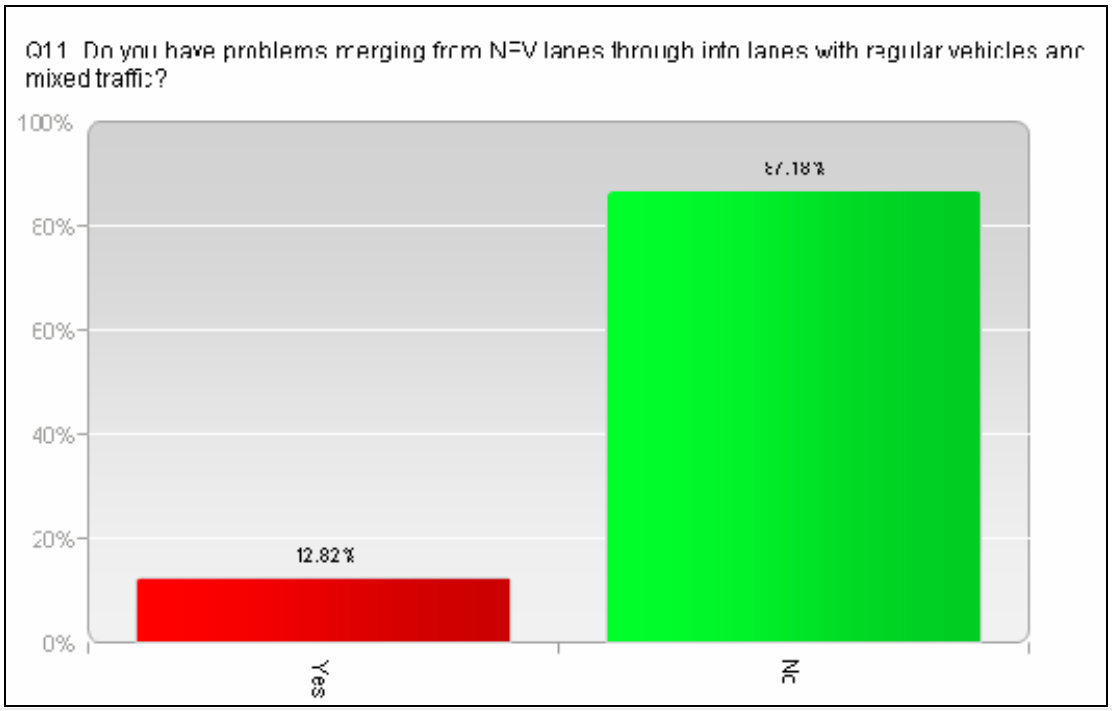

How long (in months) have you owned an NEV?
Frequency
Months
0
1
2
3
4
5
6
7
8
2
6
10
14
18
22
26
30
34
38
42
46
50
54
58
62
66
70
74

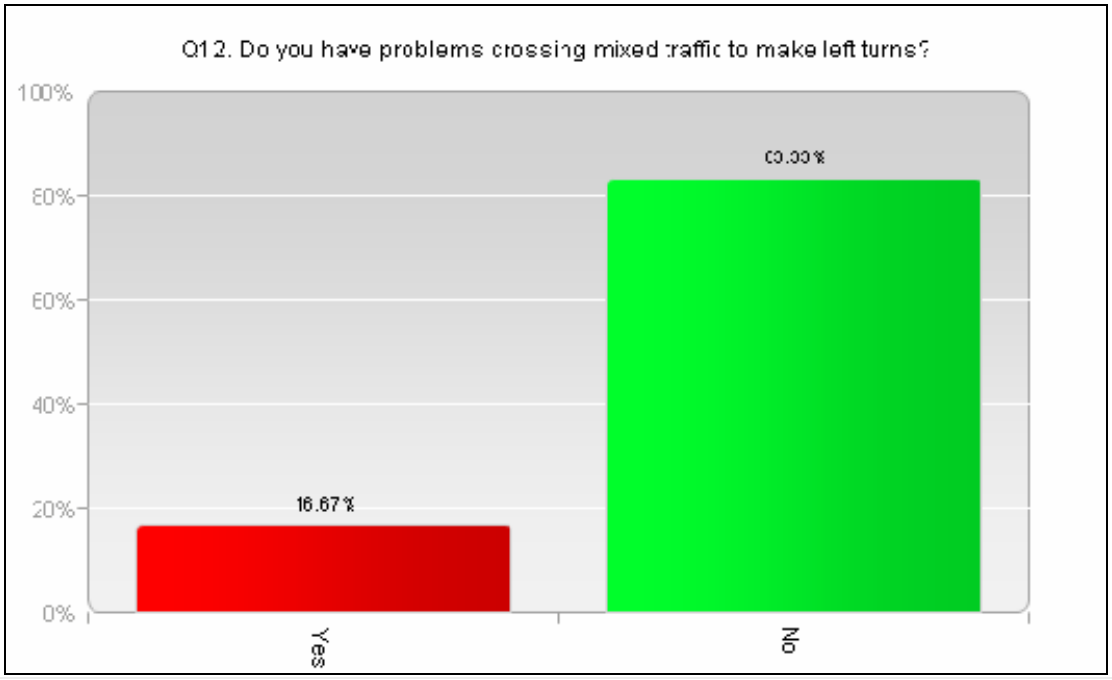

Q7. Please indicate how safe you feel driving your NEV - On traditional roads with separate lanes designated for NEVs
70%
60%
50%
40%
30%
20%
10%
0%
20.21%
0%
1.20%
0%
1.20%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

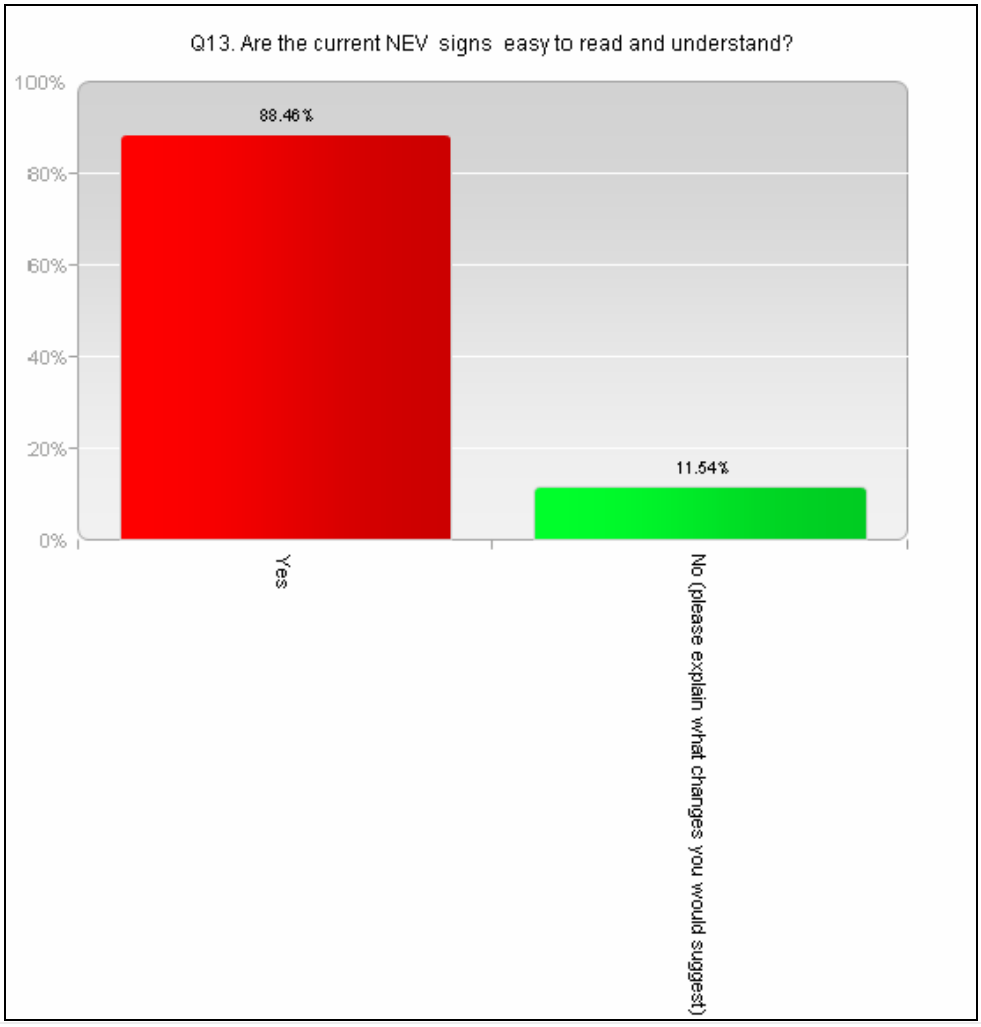

Q8. Please indicate how safe you feel driving your NEV - On paths restricted only to NEVs
100%
80%
60%
40%
20%
0%
89.74%
3.35%
0%
0%
0%
6.41%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

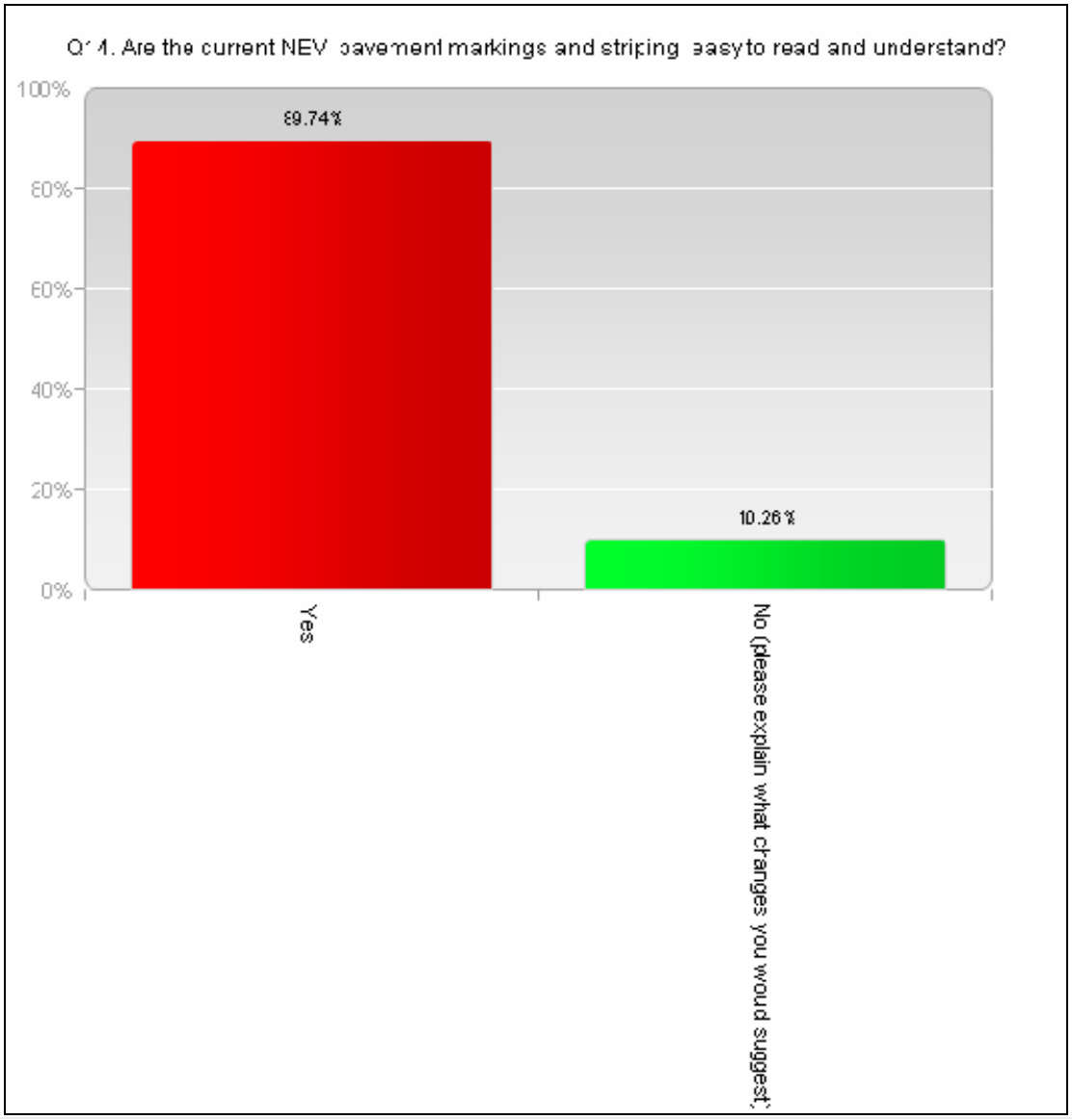

Q9. Where do you prefer to drive while driving your NEV?
80%
70%
60%
50%
40%
30%
20%
10%
0%
0%
76.92%
8.97%
14.1%
Shared lanes with traditional automobiles
Separated NEV lanes
NEV-only paths
No preference

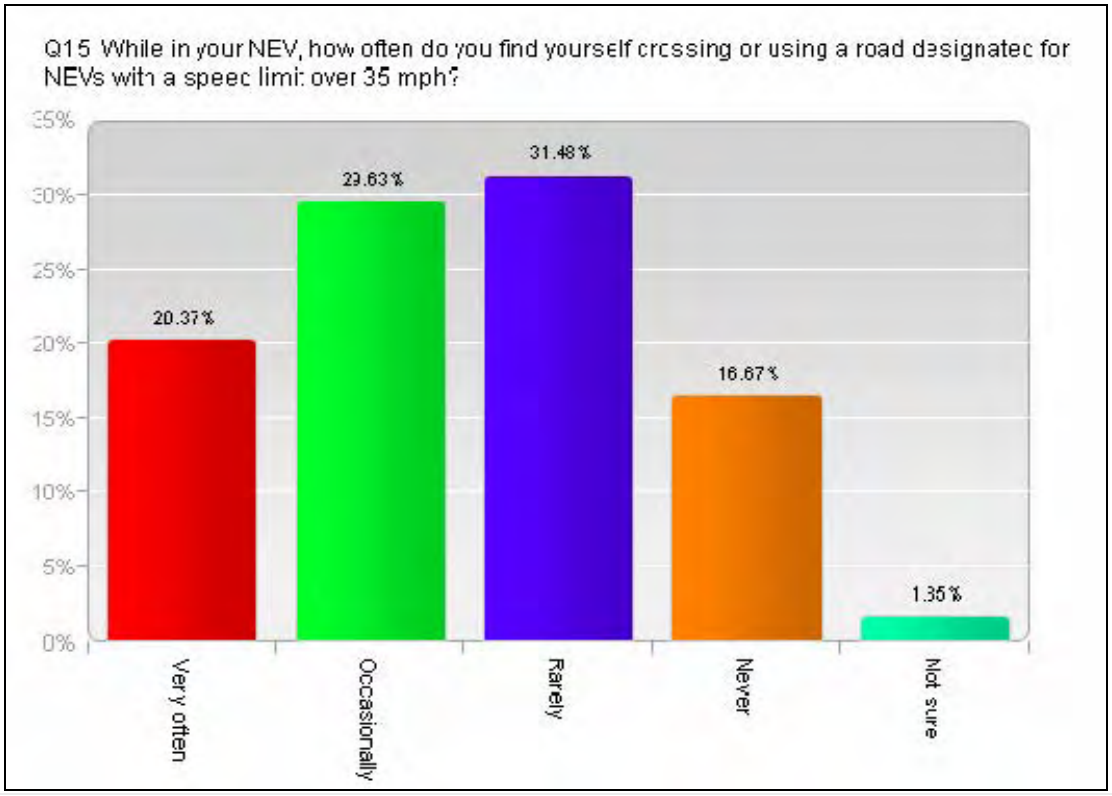

Q10. Do you drive longer distances to avoid traveling off dedicated NEV facilities?
50%
40%
30%
20%
10%
0%
48.72%
50%
1.28%
0%
Yes
No
Not Sure
N/A

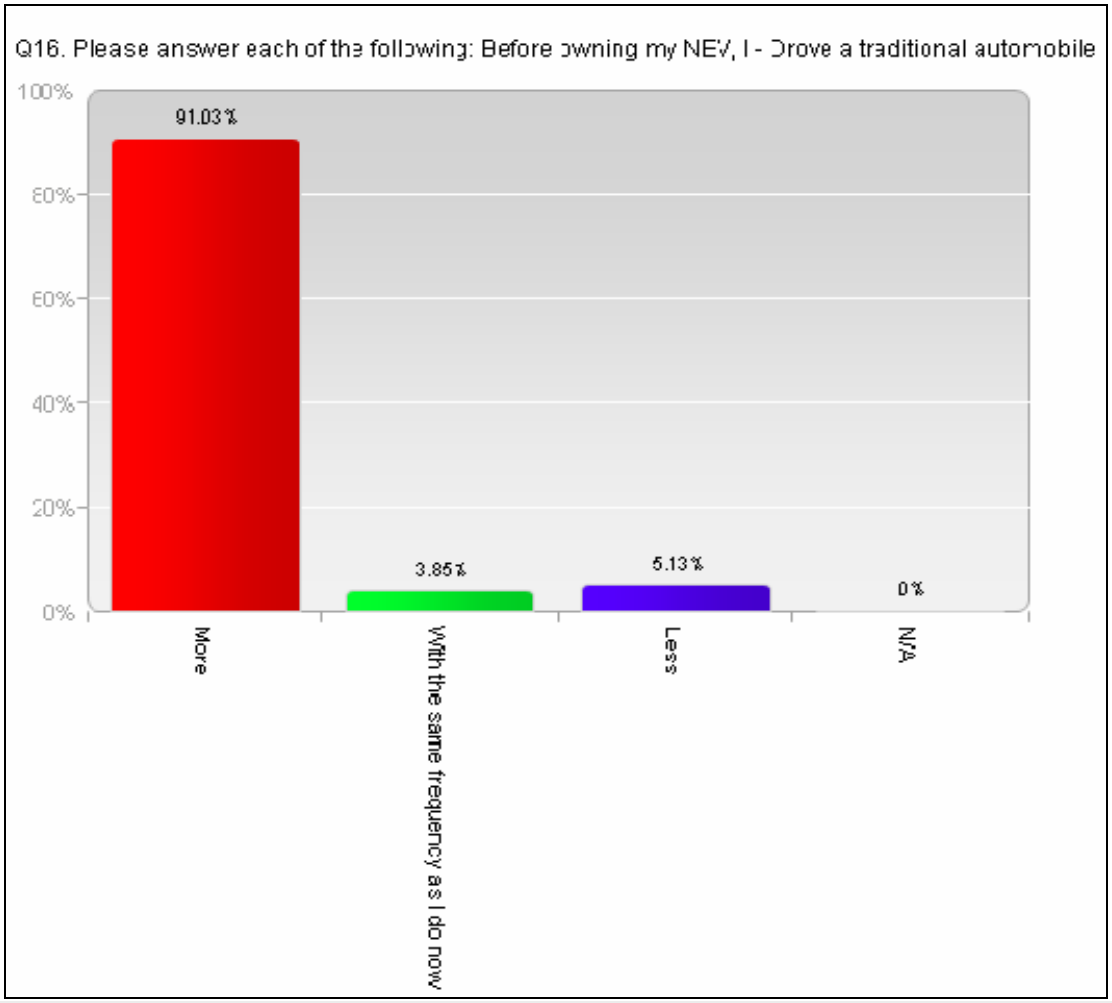

Q11. Do you have problems merging from NEV lanes through into lanes with regular vehicles and mixed traffic?
100%
80%
60%
40%
20%
0%
87.18%
12.82%
Yes
No

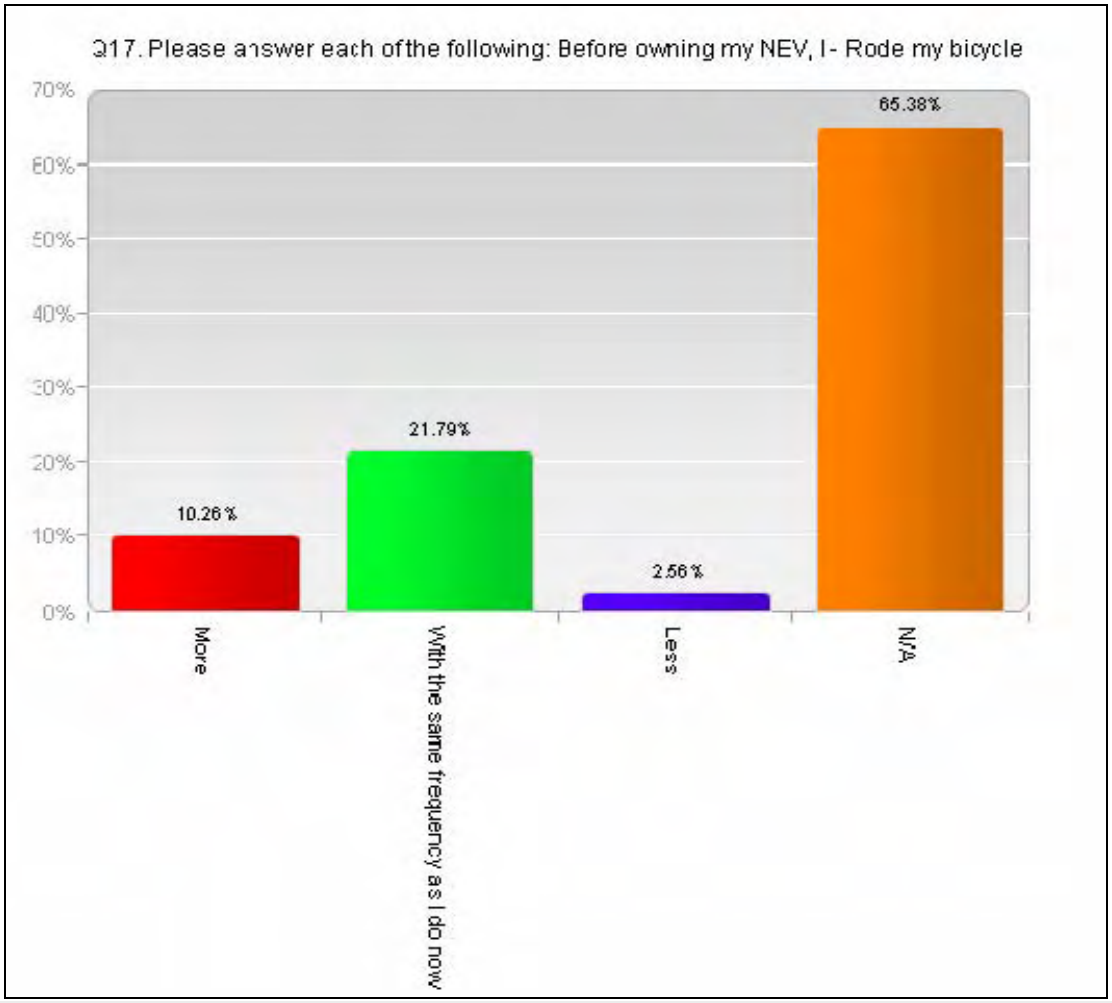

Q12. Do you have problems crossing mixed traffic to make left turns?
100%
80%
60%
40%
20%
0%
16.67%
Yes
No

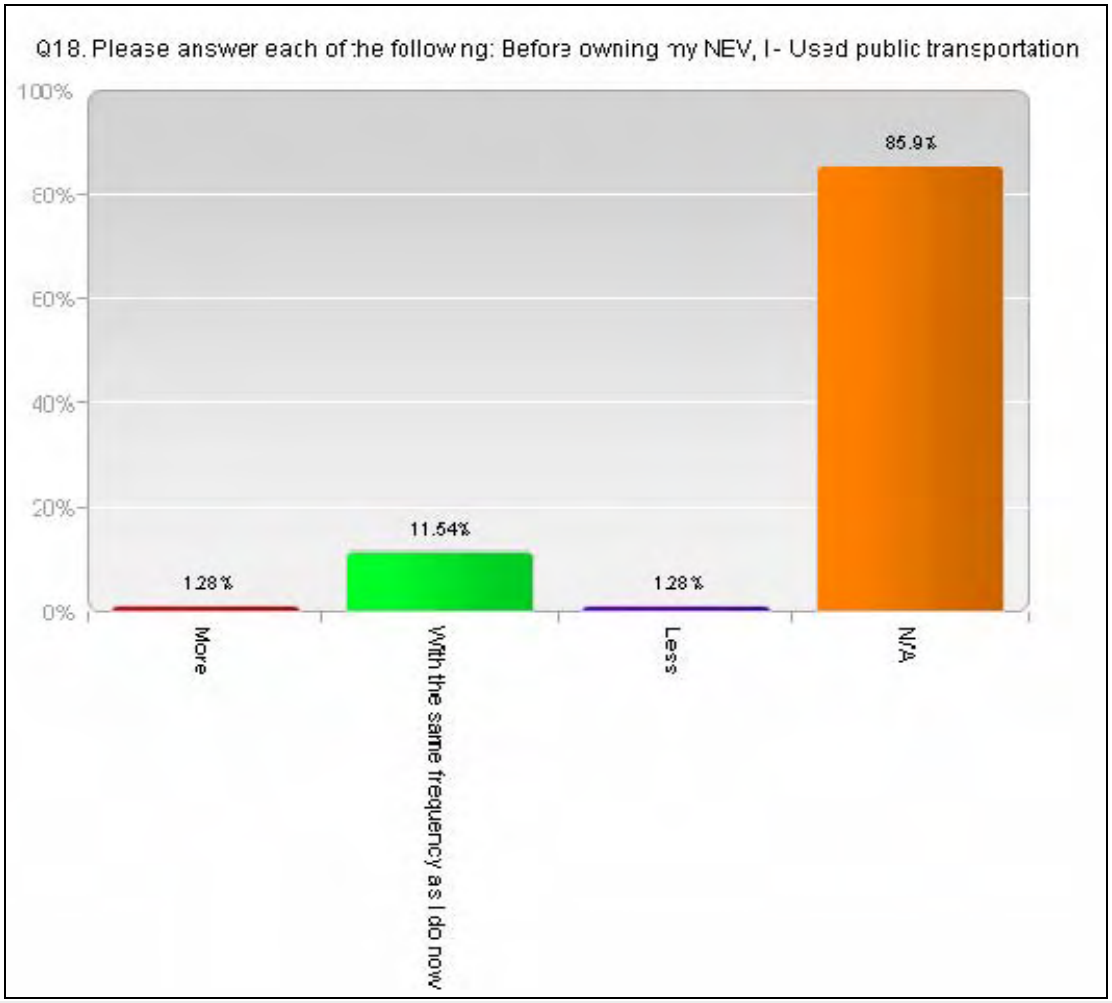

Q13. Are the current NEV signs easy to read and understand?
100%
80%
60%
40%
20%
0%
88.46%
11.54%
Yes
No (please explain what changes you would suggest)

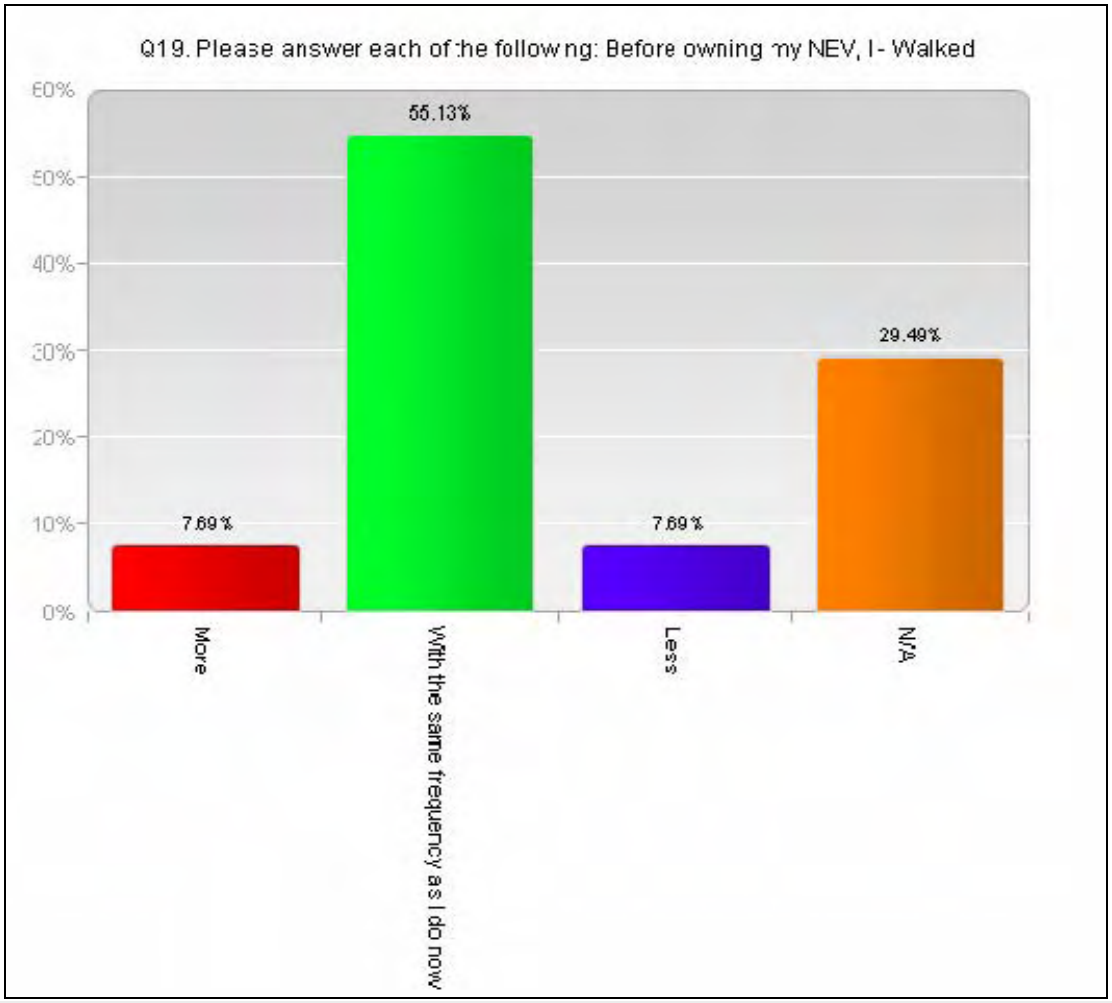

Q1. Are the current NEV pavement markings and striping easy to read and understand?
100%
80%
60%
40%
20%
0%
89.74%
10.26%
Yes
No (please explain what changes you would suggest)

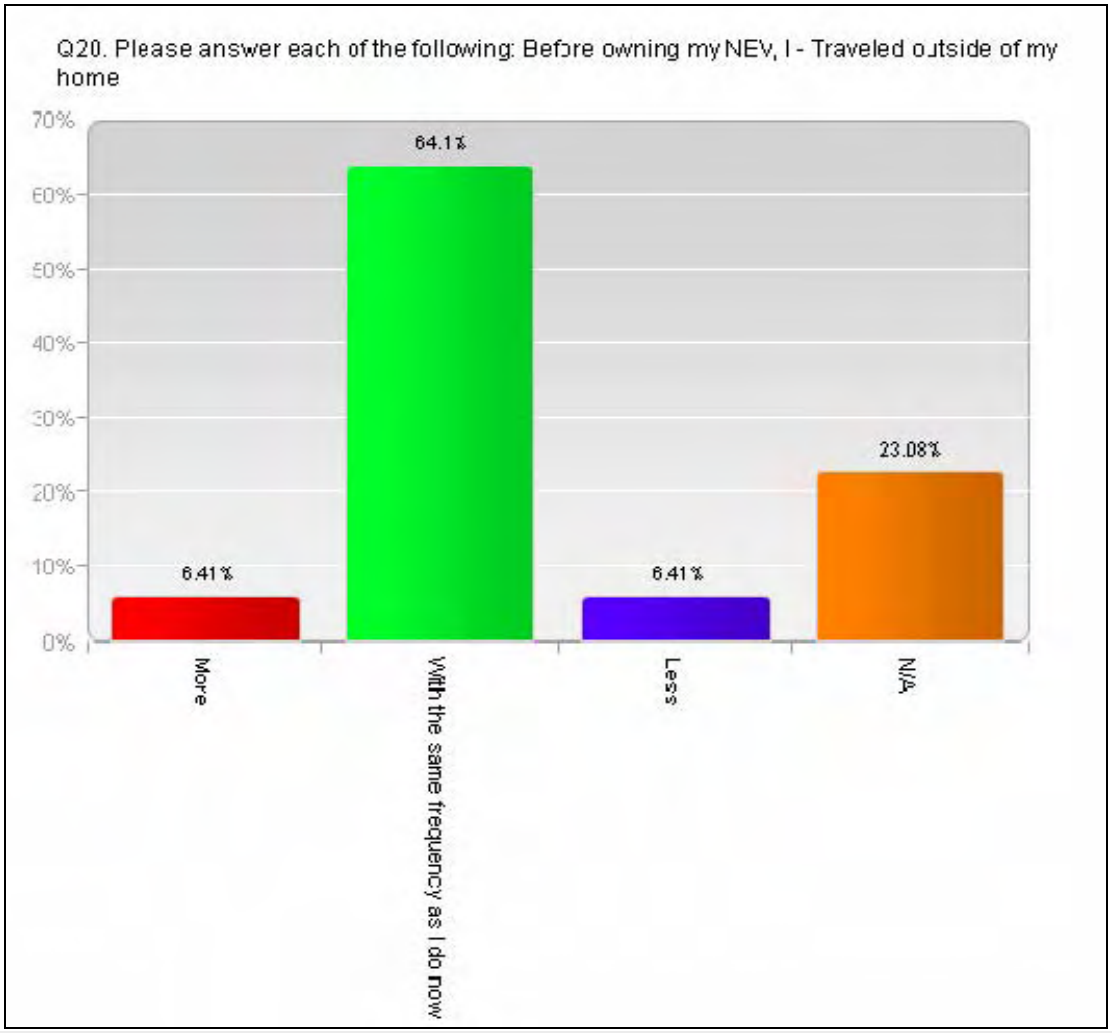

Q15 While in your NEV, how often do you find yourself crossing or using a road designated for NEVs with a speed limit over 35 mph?
35%
30%
25%
20%
15%
10%
5%
0%
20.37%
29.63%
31.48%
16.67%
1.85%
Very often
Occasionally
Rarely
Never
Not sure

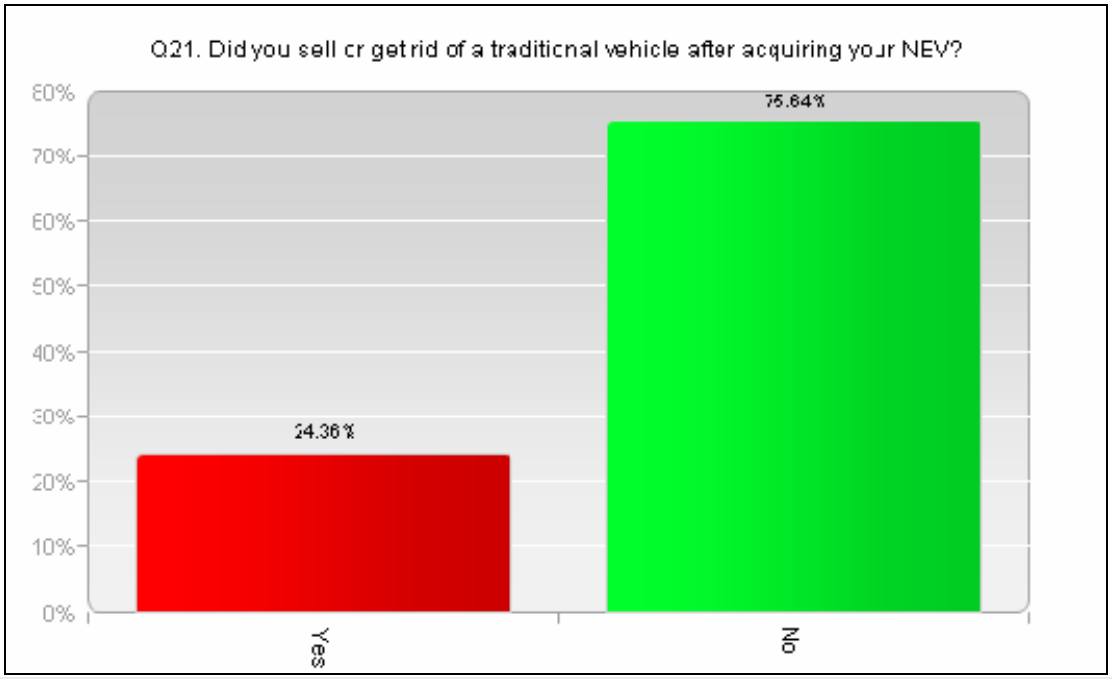

Q16. Please answer each of the following: Before owning my NEV, I - Drove a traditional automobile
100%
80%
60%
40%
20%
0%
91.03%
3.85%
5.13%
0%
More
With the same frequency as I do now
Less
N/A

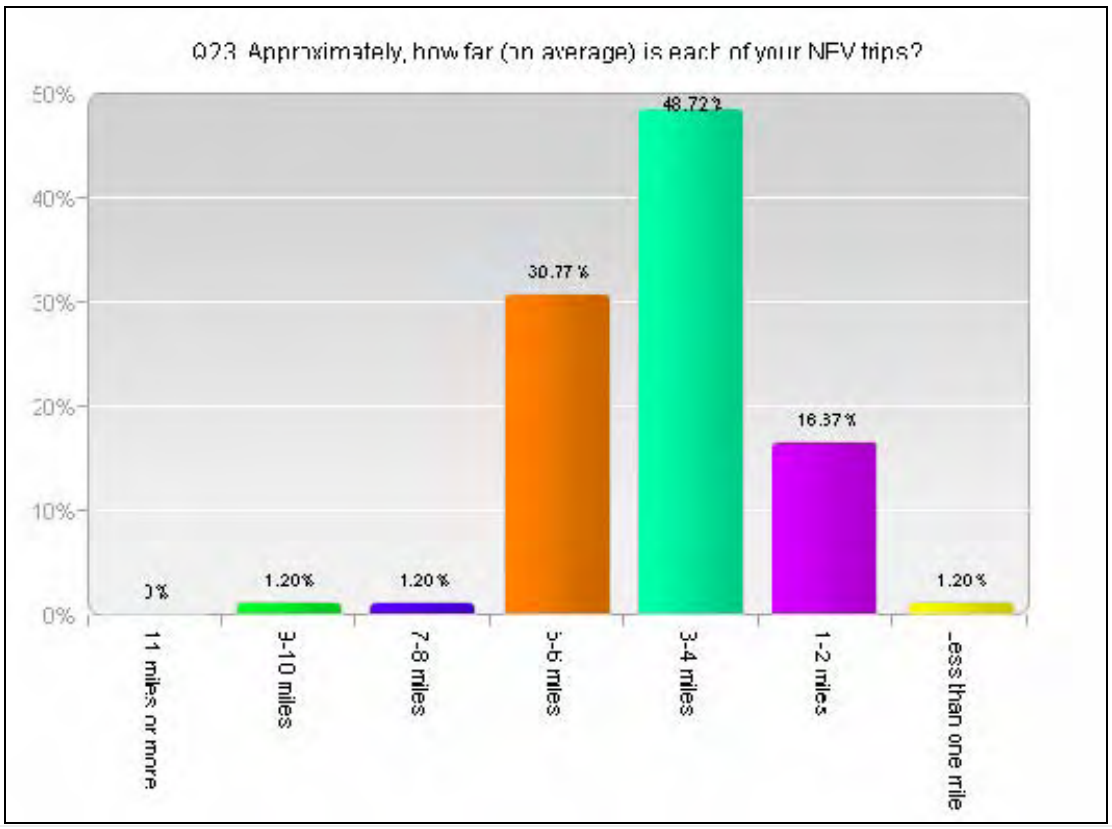

Q17. Please answer each of the following: Before owning my NEV, I - Rode my bicycle
70%
60%
50%
40%
30%
20%
10%
0%
10.26%
21.79%
2.56%
65.38%
More
With the same frequency as I do now
Less
N/A

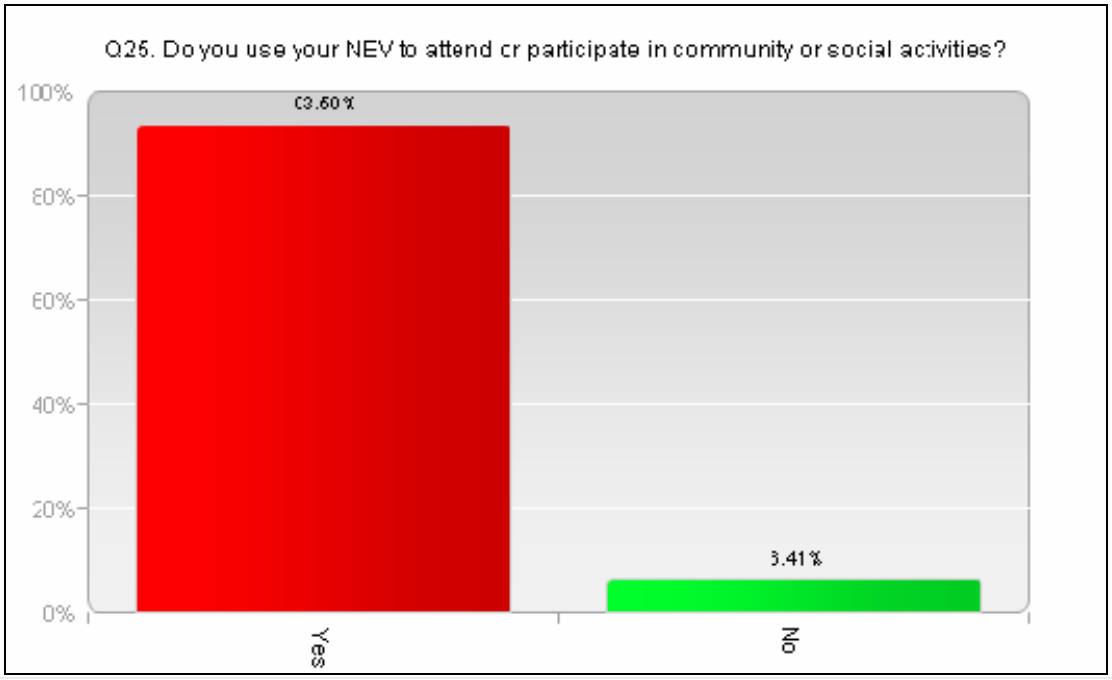

Q18. Please answer each of the following: Before owning my NEV, I - Used public transportation
100%
80%
60%
40%
20%
0%
1.28%
11.54%
1.28%
85.9%
More
With the same frequency as I do now
Less
N/A

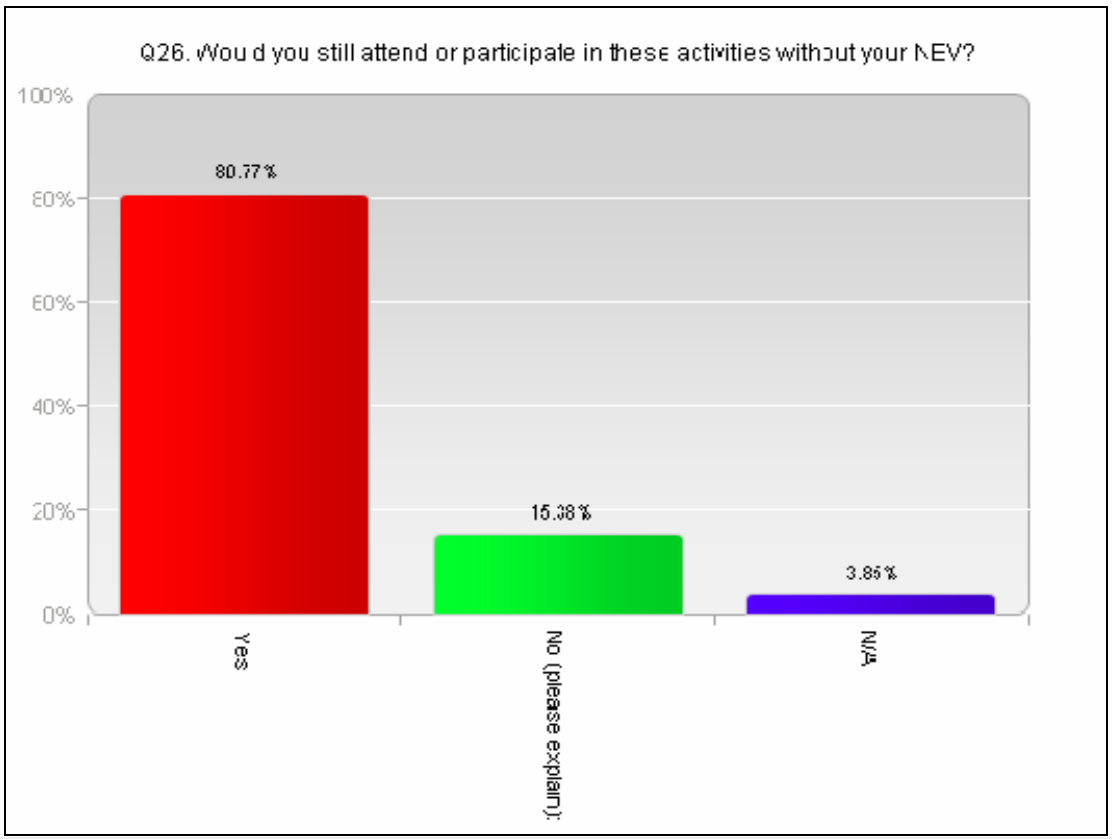

Q19. Please answer each of the following: Before owning my NEV, I - Walked
60%
50%
40%
30%
20%
10%
0%
7.69%
55.13%
7.69%
29.49%
More
With the same frequency as I do now
Less
N/A

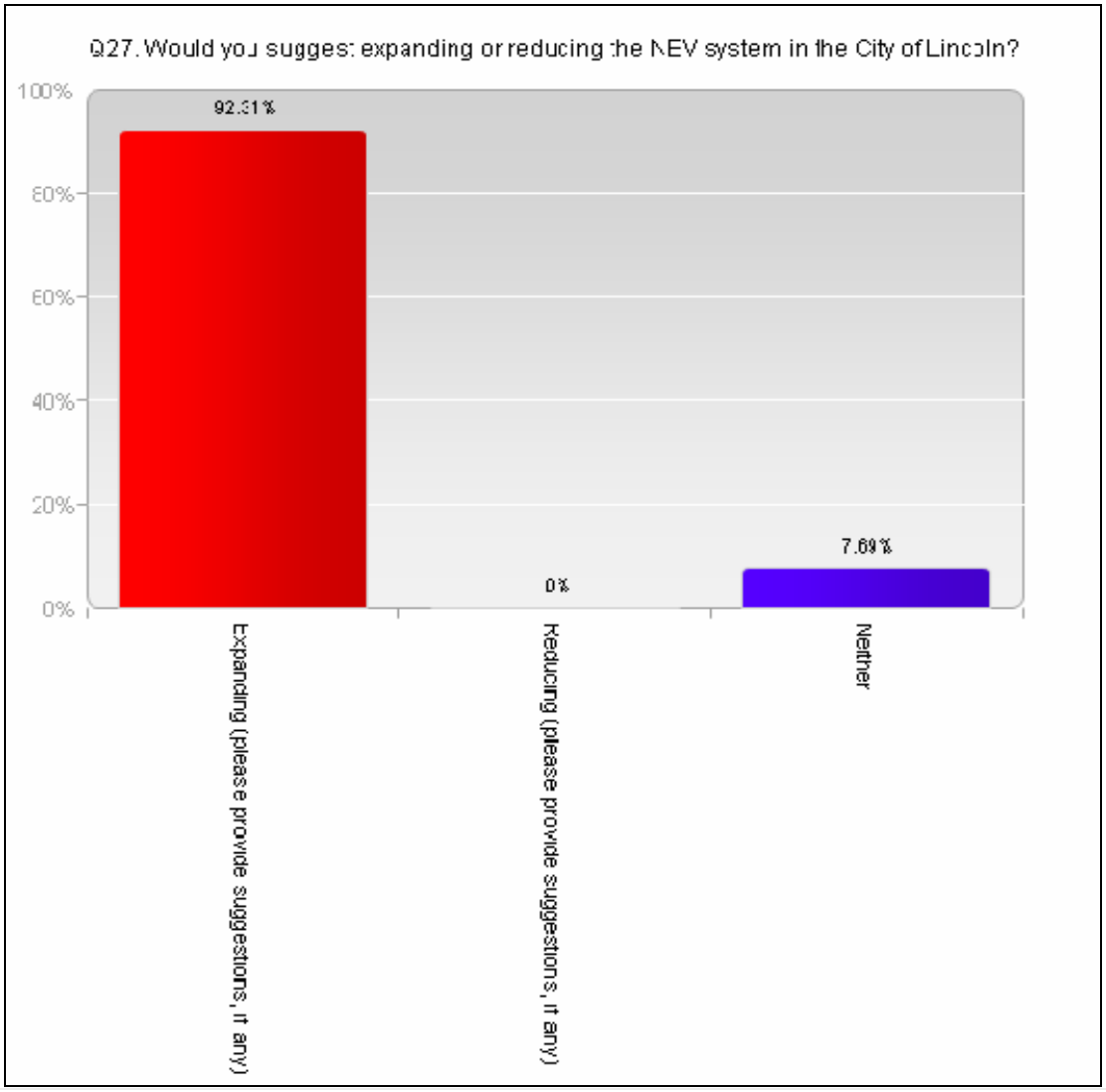

Q20. Please answer each of the following: Before owning my NEV, I - Traveled outside of my home
70%
60%
50%
40%
30%
20%
10%
0%
64.1%
23.08%
6.41%
6.41%
More
With the same frequency as I do now
Less
N/A

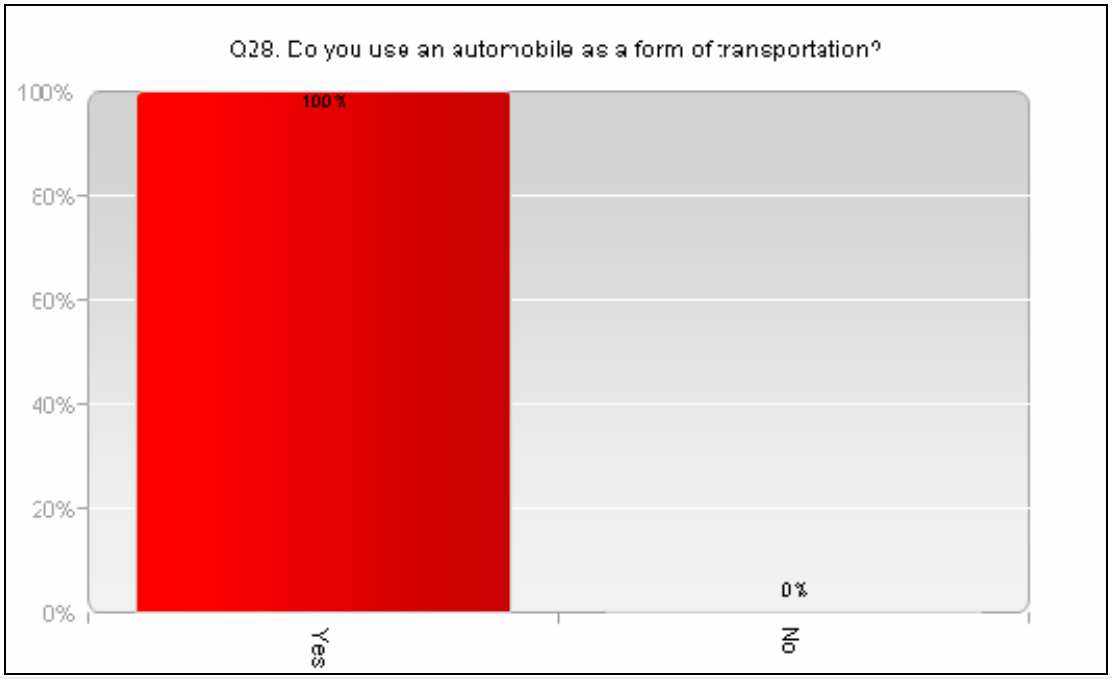

Q21. Did you sell or get rid of a traditional vehicle after acquiring your NEV?
80%
70%
60%
50%
40%
30%
20%
10%
0%
24.36%
75.64%
Yes
No

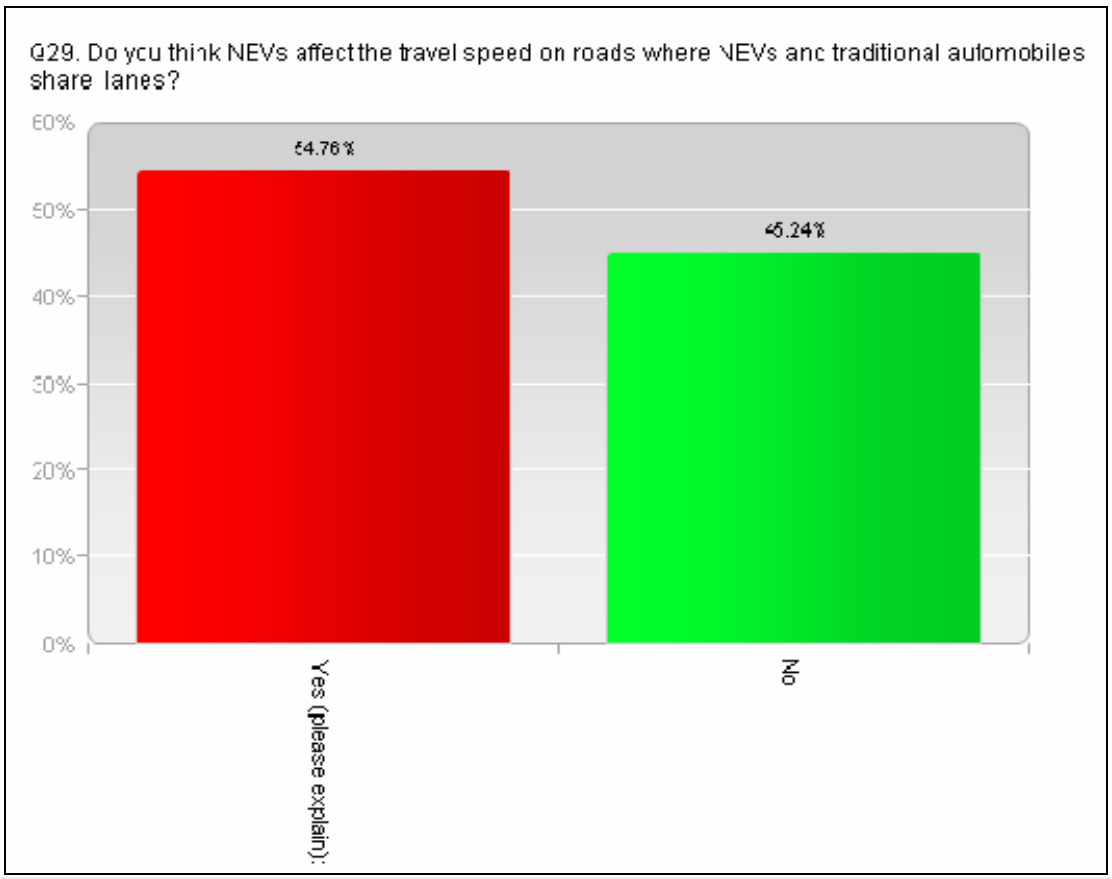

Q23. Approximately, how far (on average) is each of your NEV trips?
50%
40%
30%
20%
10%
0%
0%
1.20%
1.20%
30.77%
48.72%
16.37%
1.20%
11 miles or more
3-10 miles
7-8 miles
5-6 miles
3-4 miles
1-2 miles
Less than one mile

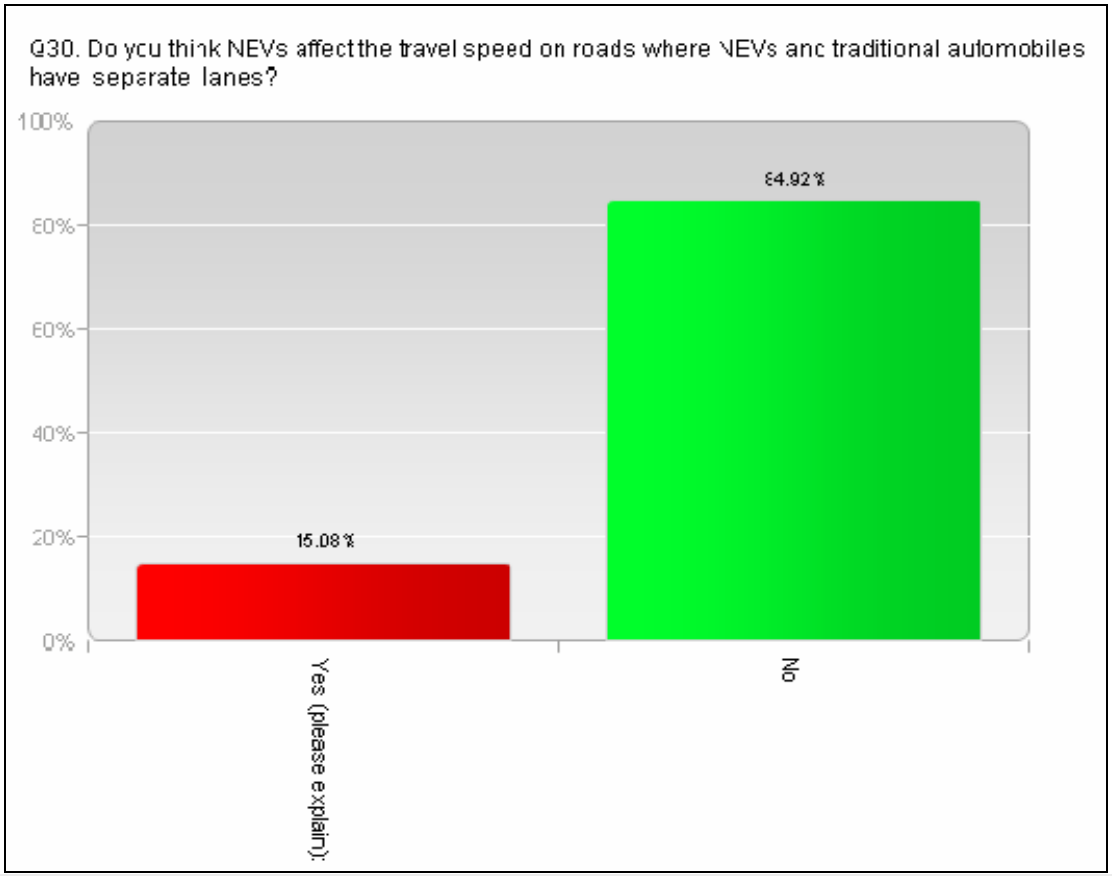

Q25. Do you use your NEV to attend or participate in community or social activities?
100%
80%
60%
40%
20%
0%
96.59%
3.41%
Yes
No

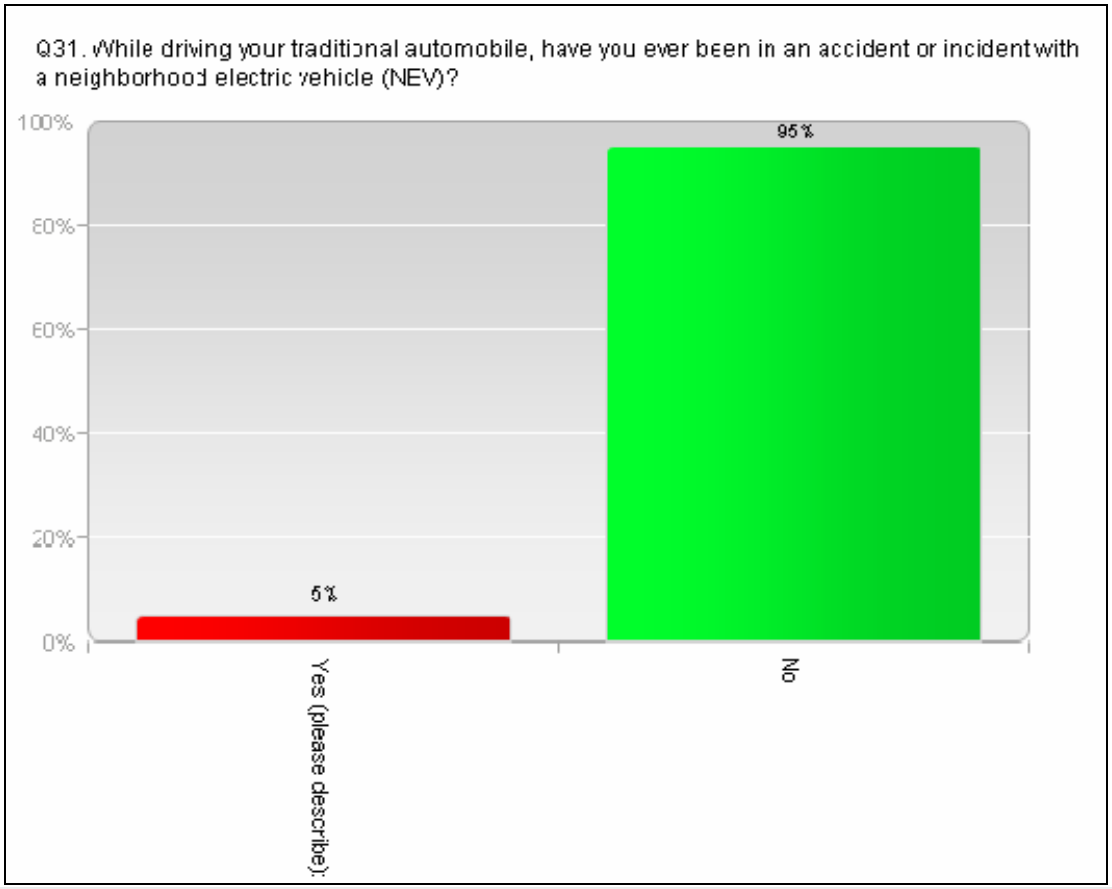

Q26. Would you still attend or participate in these activities without your NEV?
100%
80%
60%
40%
20%
0%
80.77%
15.38%
3.85%
Yes
No (please explain):
N/A

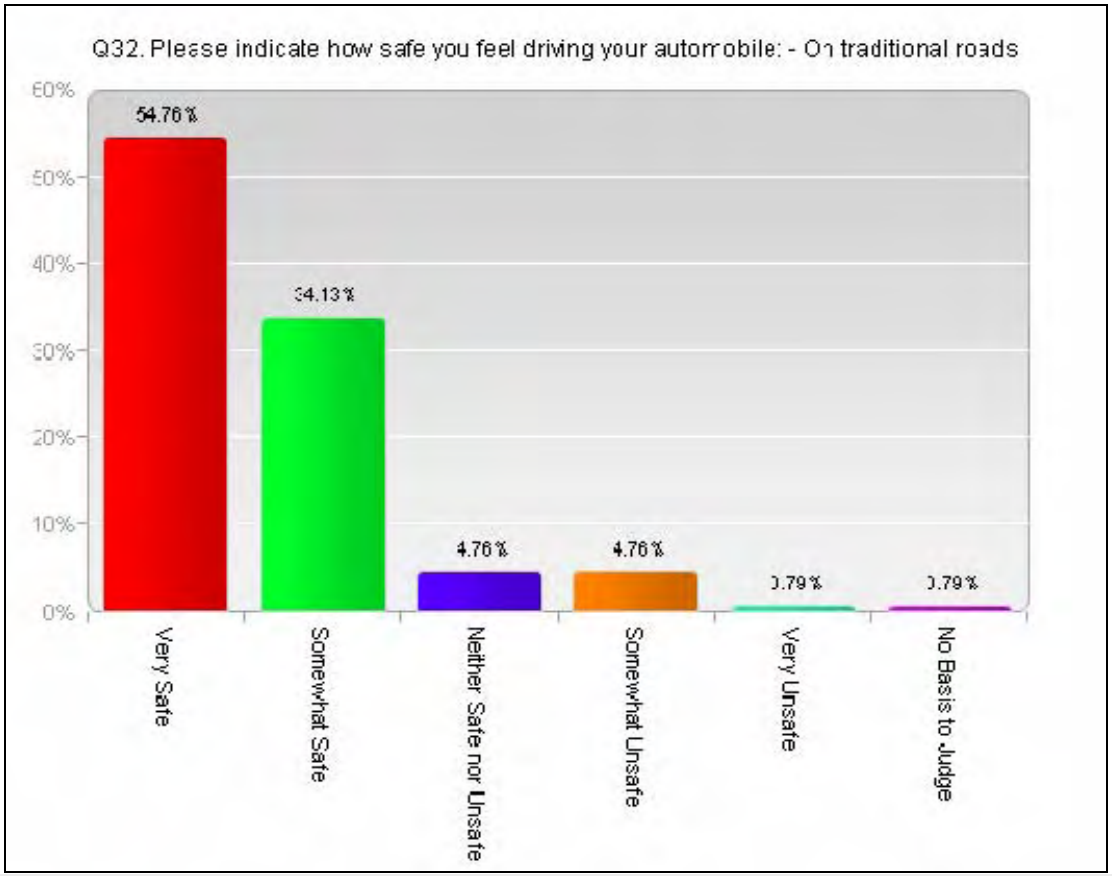

Q27. Would you suggest expanding or reducing the NEV system in the City of Lincoln?
100%
80%
60%
40%
20%
0%
92.31%
0%
7.69%
Expanding (please provide suggestions, if any)
Reducing (please provide suggestions, if any)
Neither

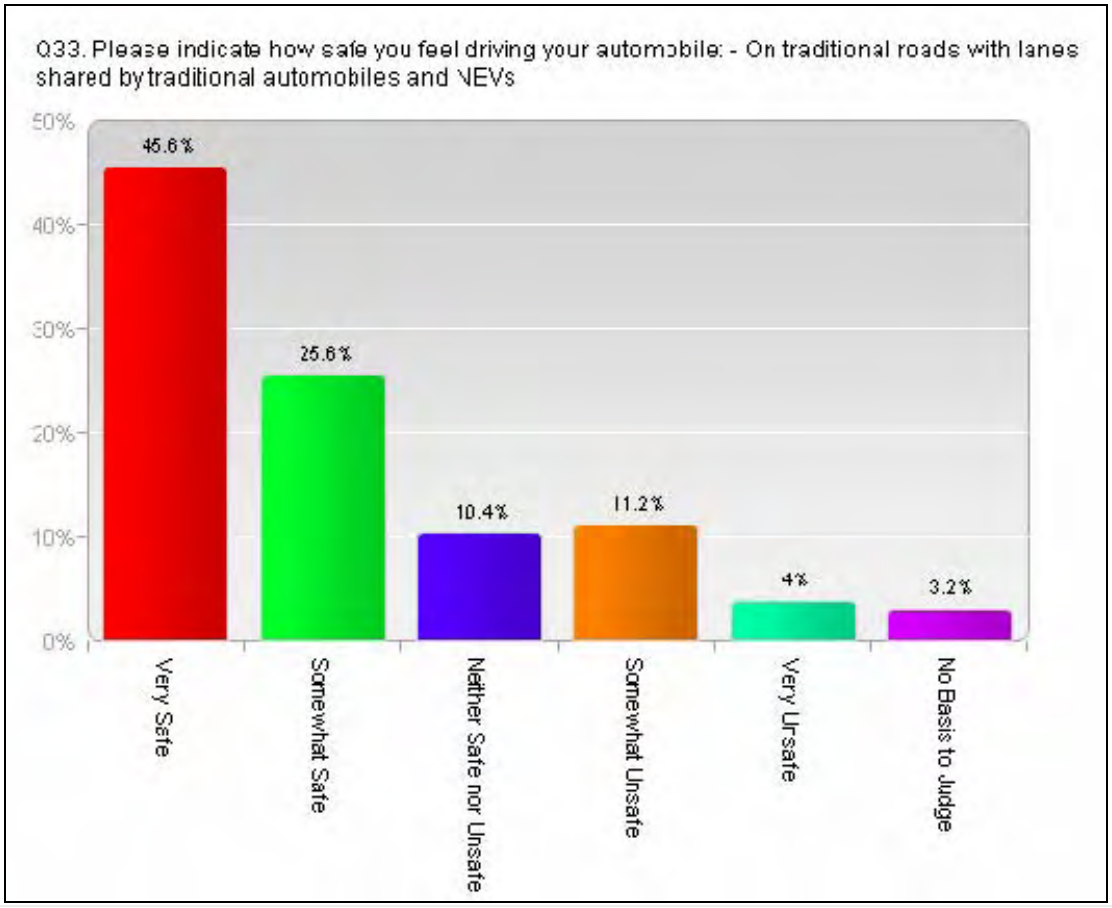

Q28. Do you use an automobile as a form of transportation?
100%
80%
60%
40%
20%
0%
100%
0%
Yes
No

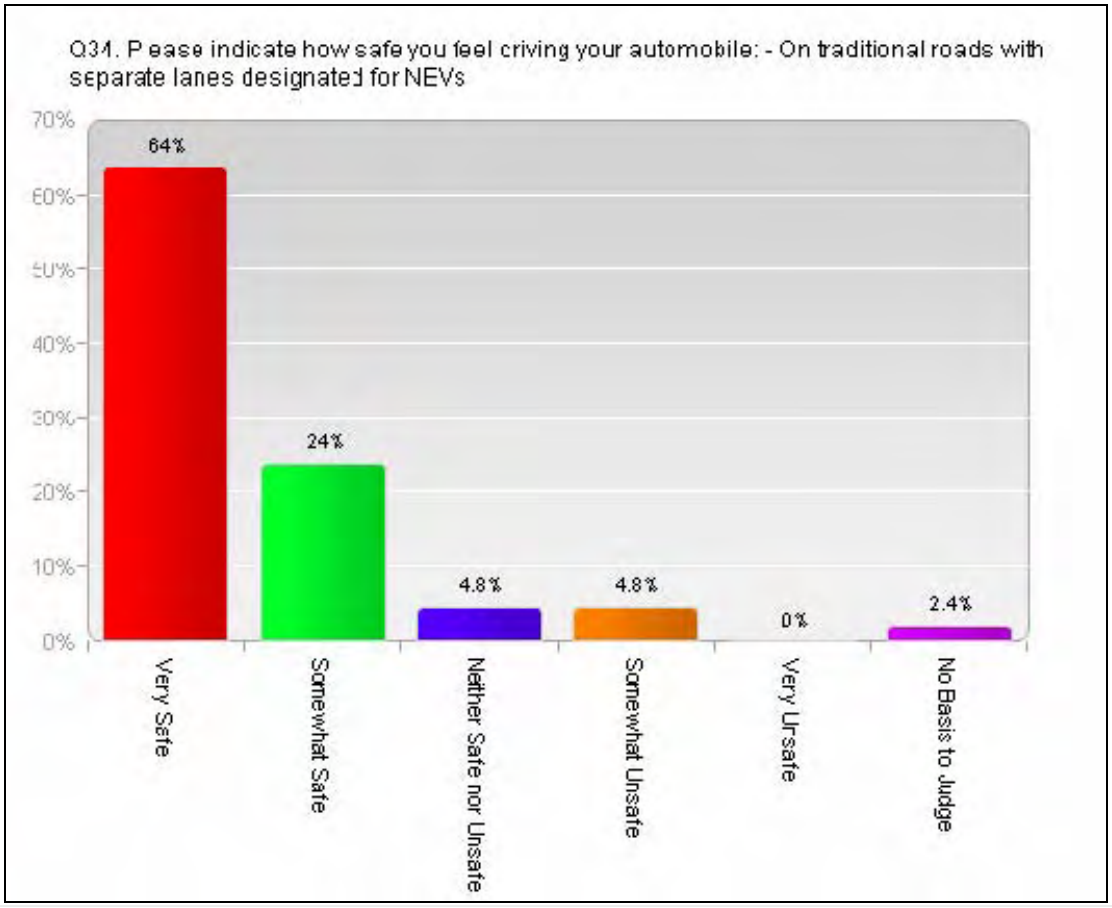

Q29. Do you think NEVs affect the travel speed on roads where NEVs and traditional automobiles share lanes?
60%
50%
40%
30%
20%
10%
0%
54.76%
45.24%
Yes (please explain)
No

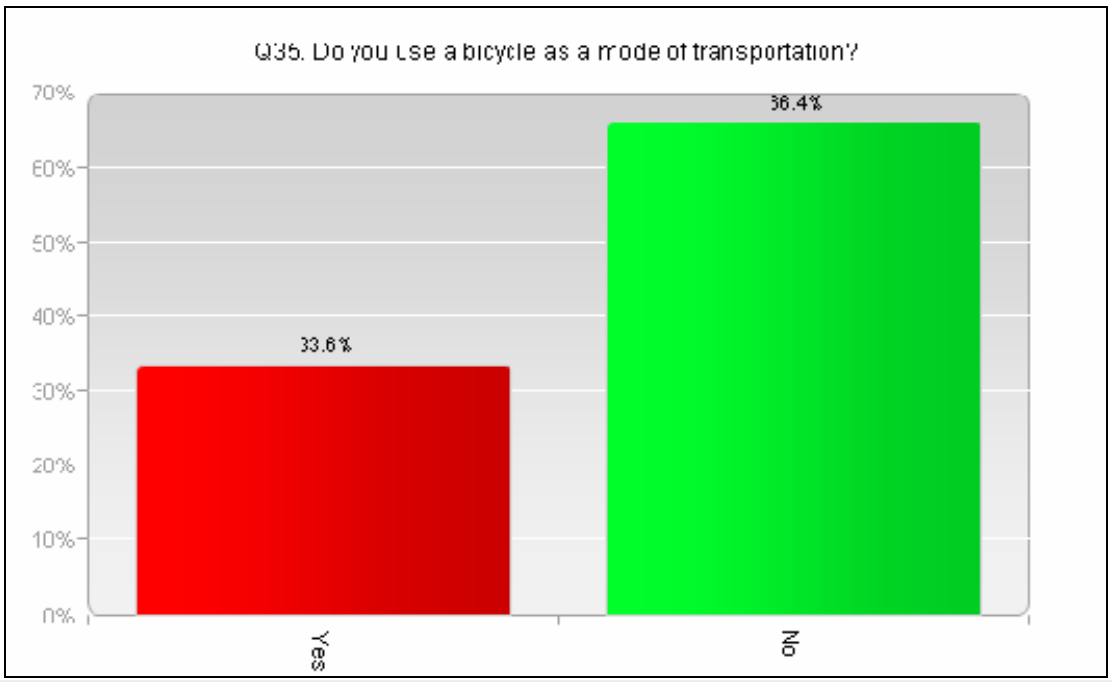

Q30. Do you think NEVs affect the travel speed on roads where NEVs and traditional automobiles have separate lanes?
100%
80%
60%
40%
20%
0%
84.92%
15.08%
No
Yes (please explain):

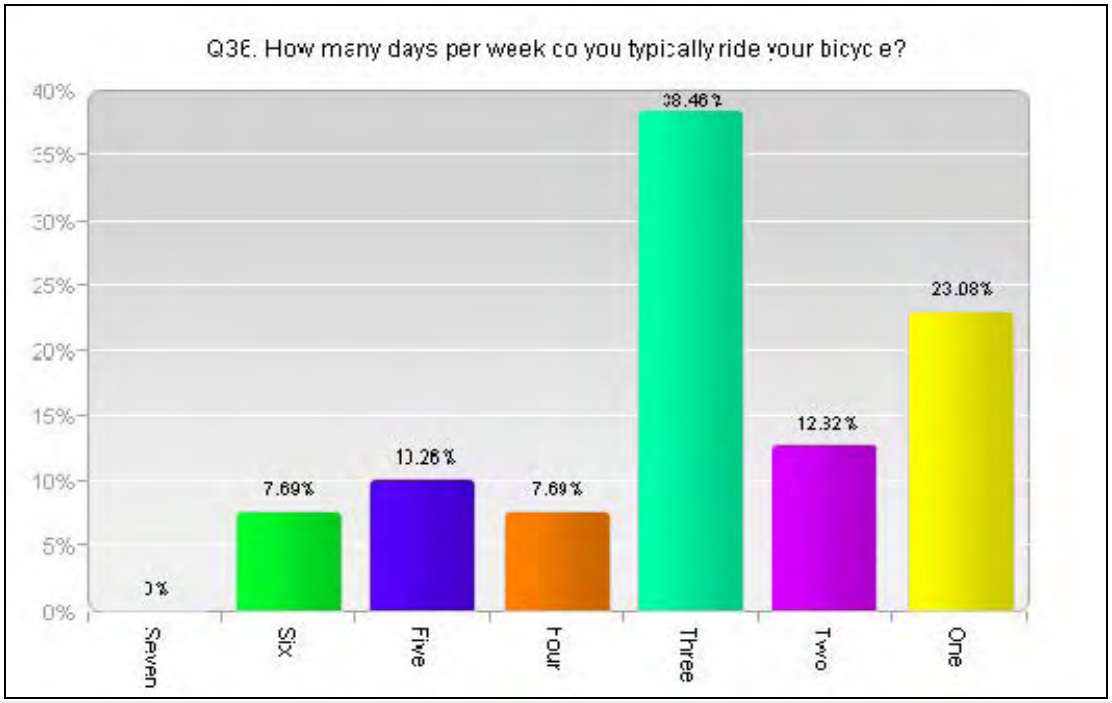

Q31. While driving your traditional automobile, have you ever been in an accident or incident with a neighborhood electric vehicle (NEV)?
100%
80%
60%
40%
20%
0%
5%
95%
Yes (please describe):
No

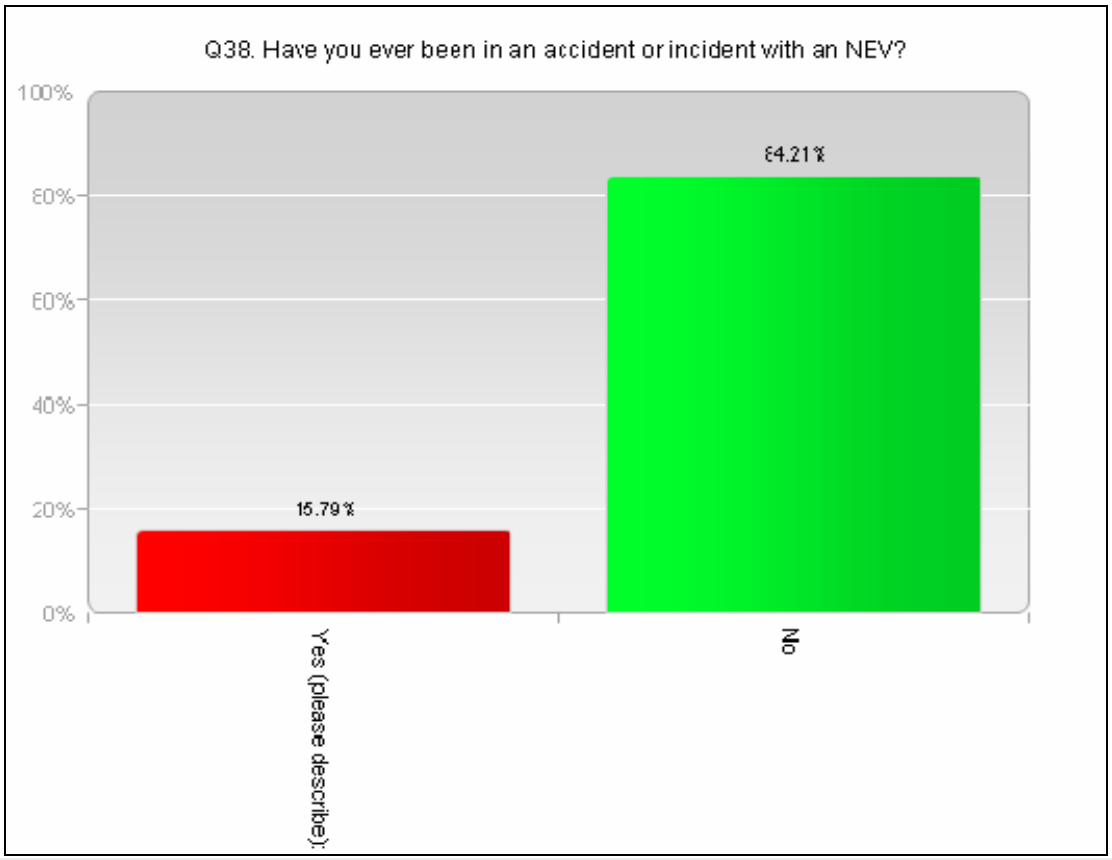

Q32. Please indicate how safe you feel driving your automobile: - On traditional roads
60%
50%
40%
30%
20%
10%
0%
54.76%
34.13%
4.76%
4.76%
0.79%
0.79%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

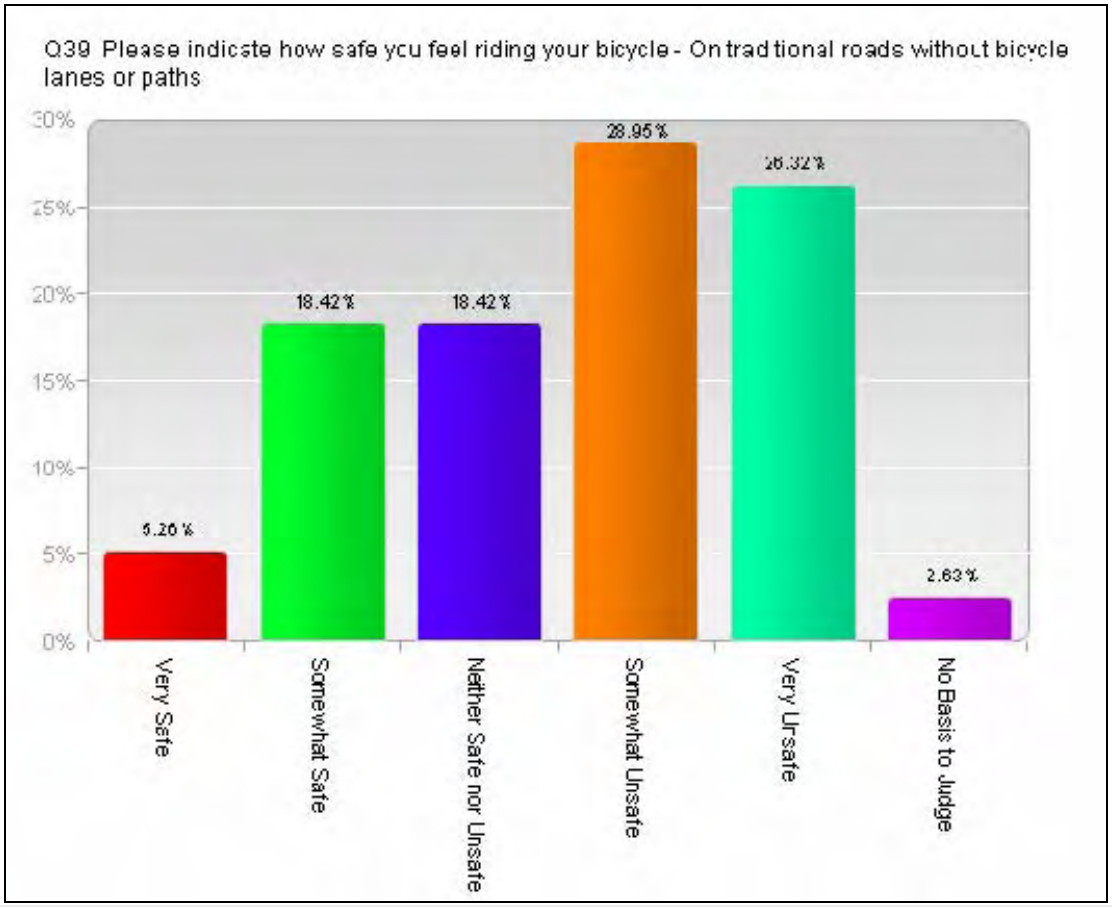

Q33. Please indicate how safe you feel driving your automobile: - On traditional roads with lanes shared by traditional automobiles and NEVs
50%
40%
30%
20%
10%
0%
45.6%
25.6%
10.4%
11.2%
4%
3.2%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

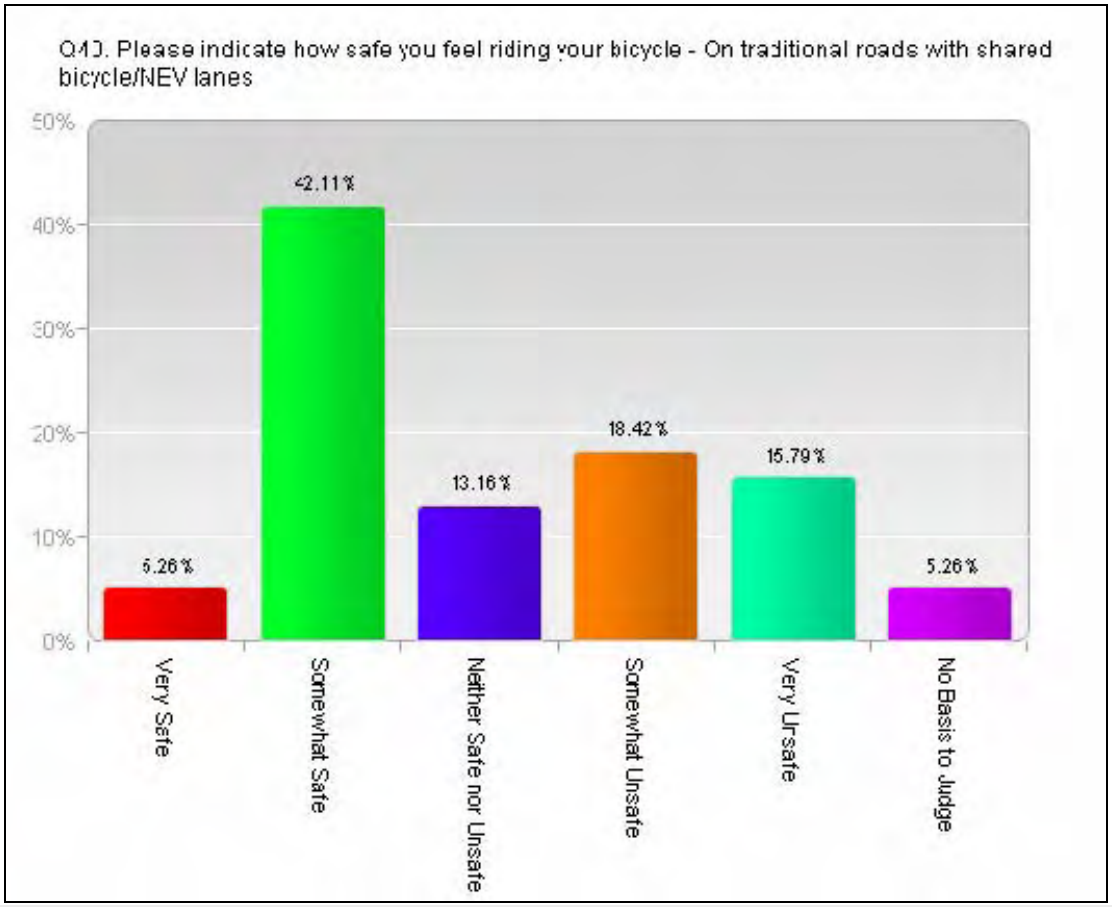

Q31. Please indicate how safe you feel driving your automobile: - On traditional roads with separate lanes designated for NEVs
70%
60%
50%
40%
30%
20%
10%
0%
64%
24%
4.8%
4.8%
0%
2.4%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

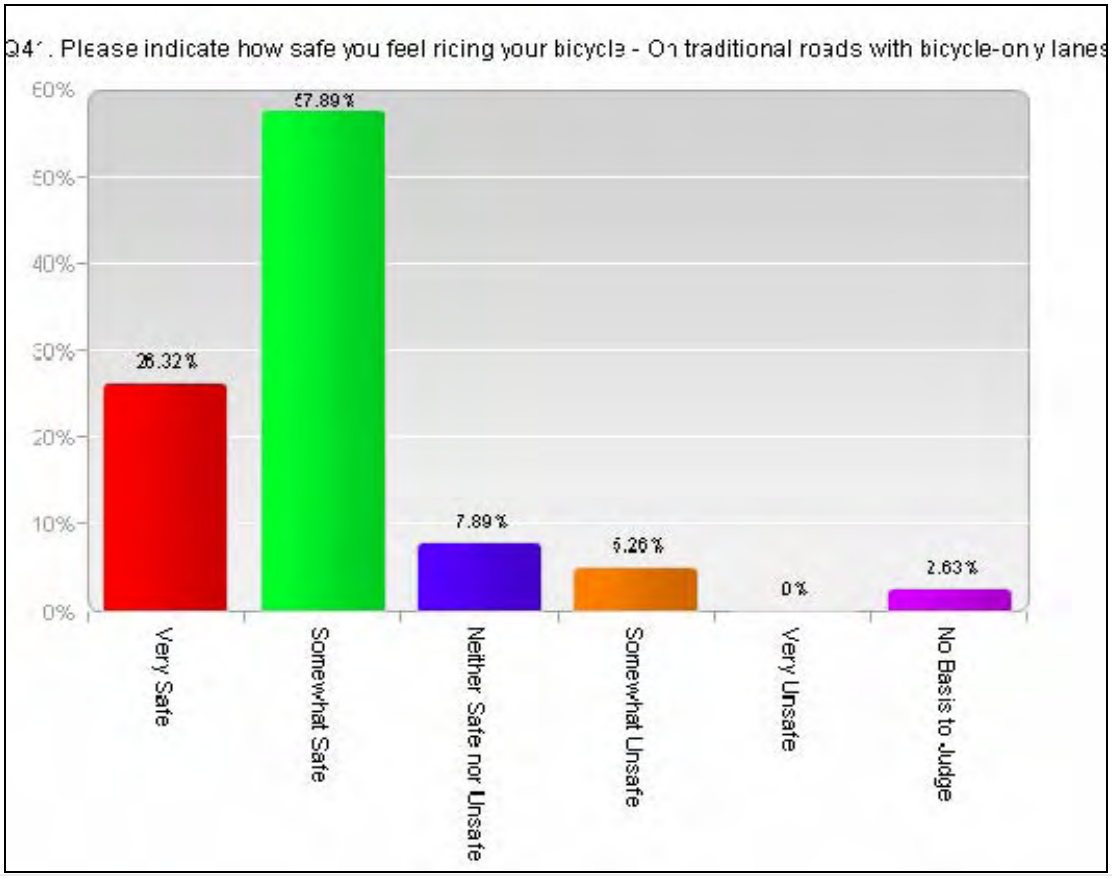

Q35. Do you use a bicycle as a mode of transportation?
70%
60%
50%
40%
30%
20%
10%
0%
36.4%
33.6%
Yes
No

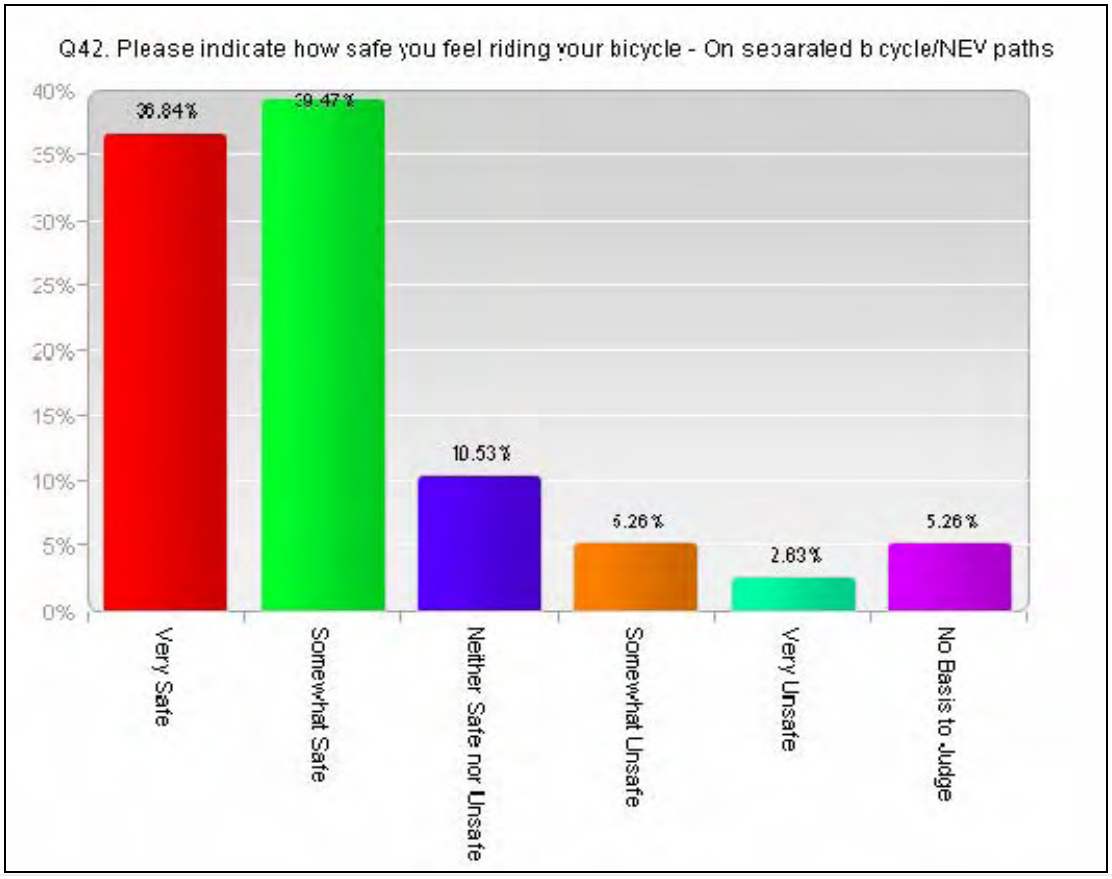

Q36. How many days per week do you typically ride your bicycle?
40%
35%
30%
25%
20%
15%
10%
5%
0%
0%
7.69%
10.26%
7.69%
38.46%
12.32%
23.08%
Seven
Six
Five
Four
Three
Two
One

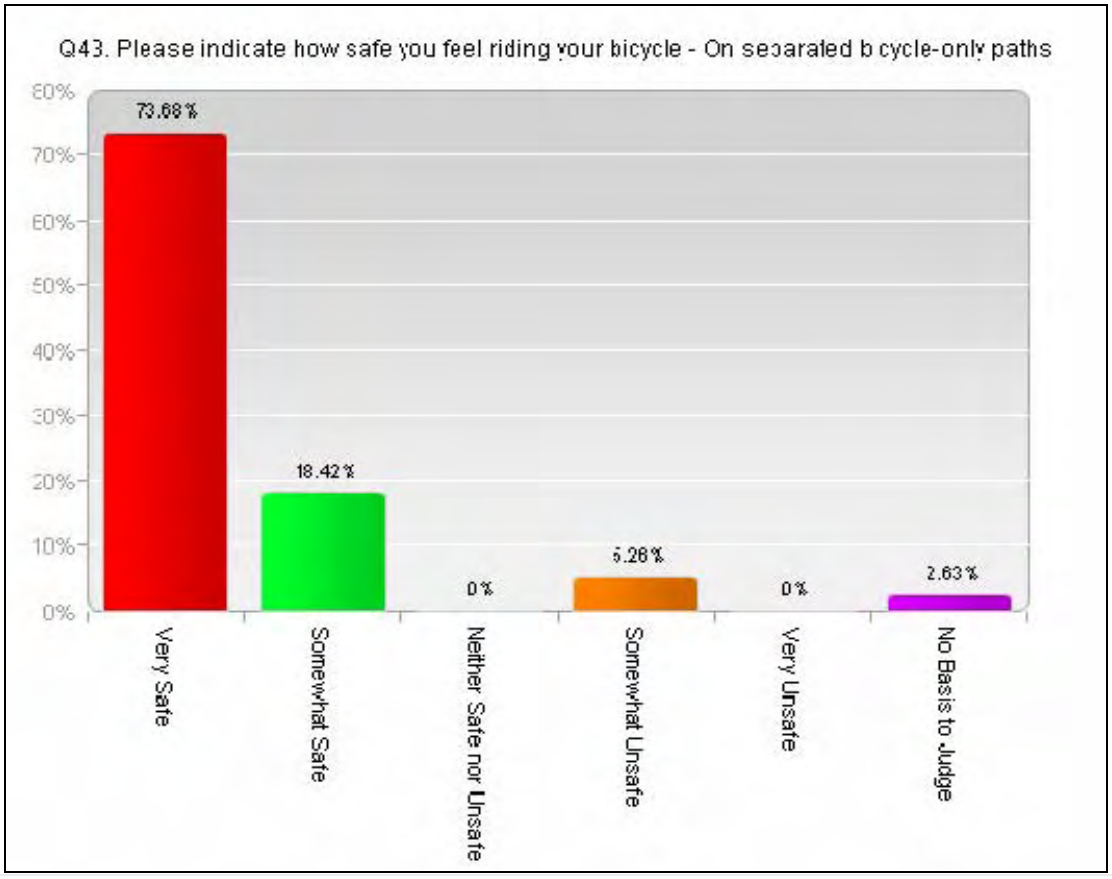

Q38. Have you ever been in an accident or incident with an NEV?
100%
80%
60%
40%
20%
0%
15.79%
84.21%
Yes (please describe)
No

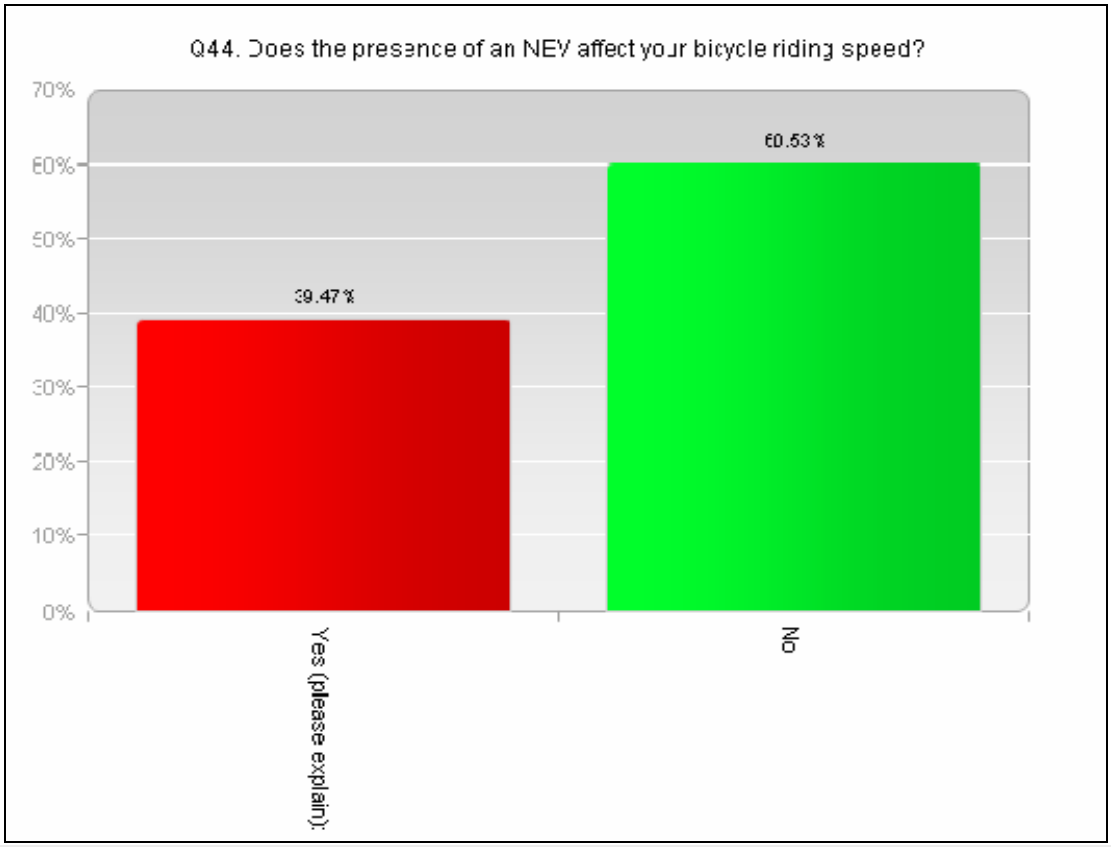

Q39 Please indicate how safe you feel riding your bicycle - On traditional roads without bicycle lanes or paths
30%
25%
20%
15%
10%
5%
0%
5.26 %
18.42 %
18.42 %
28.95 %
26.32 %
2.63 %
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

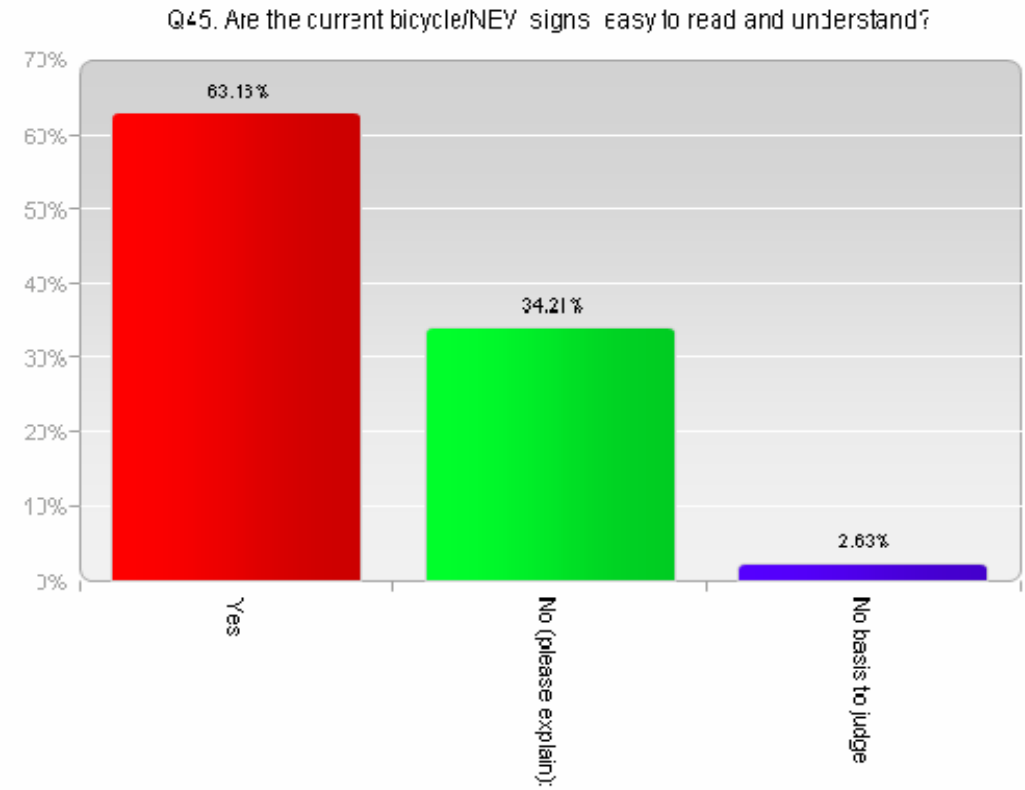

Q10. Please indicate how safe you feel riding your bicycle - On traditional roads with shared bicycle/NEV lanes
50%
40%
30%
20%
10%
0%
5.26%
42.11%
13.16%
18.42%
15.79%
5.26%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

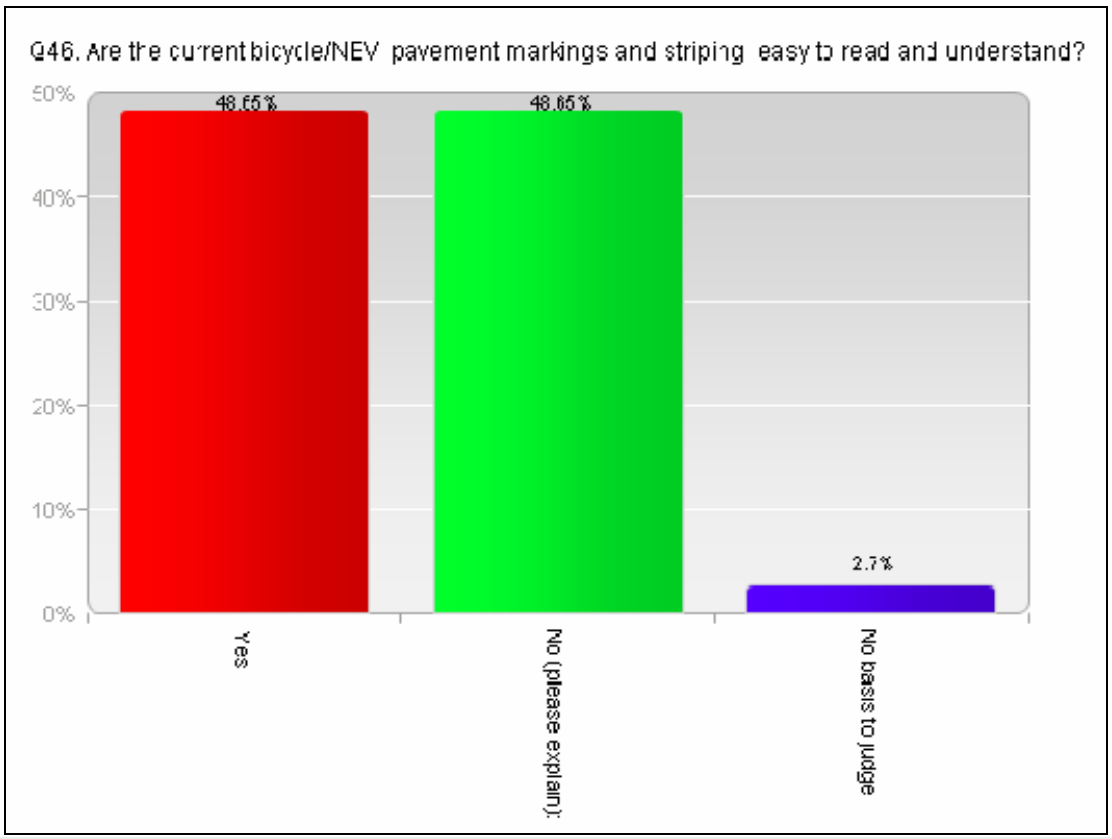

Q4'. Please indicate how safe you feel ricing your bicycle - On traditional roads with bicycle-only lanes
60%
50%
40%
30%
20%
10%
0%
26.32%
57.89%
7.89%
5.26%
0%
2.63%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

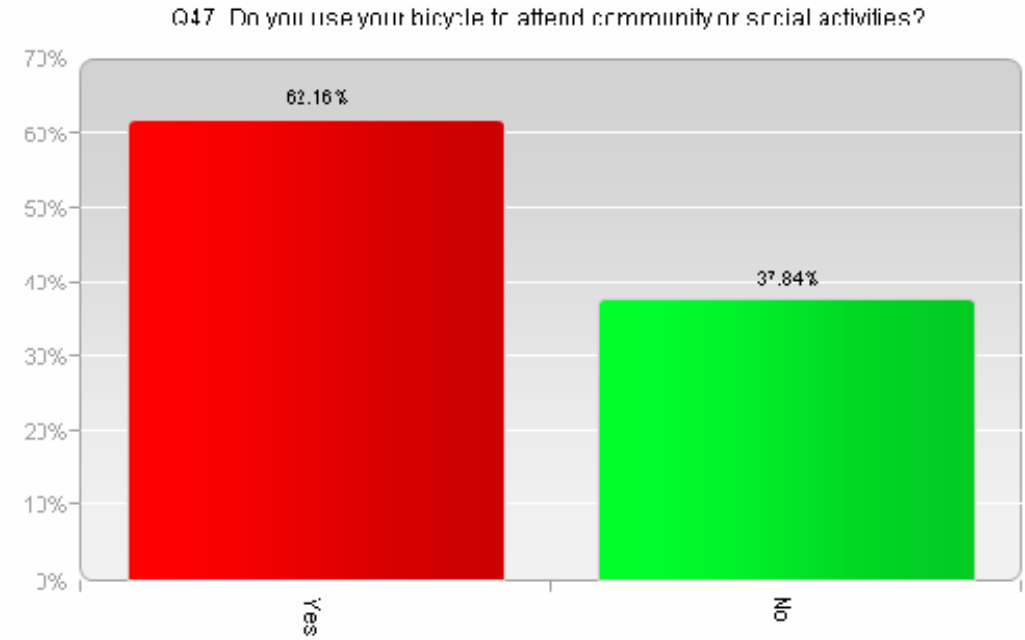

Q42. Please indicate how safe you feel riding your bicycle - On separated b cycle/NEV paths
40%
35%
30%
25%
20%
15%
10%
5%
0%
36.84%
39.47%
10.53%
5.26%
2.63%
5.26%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

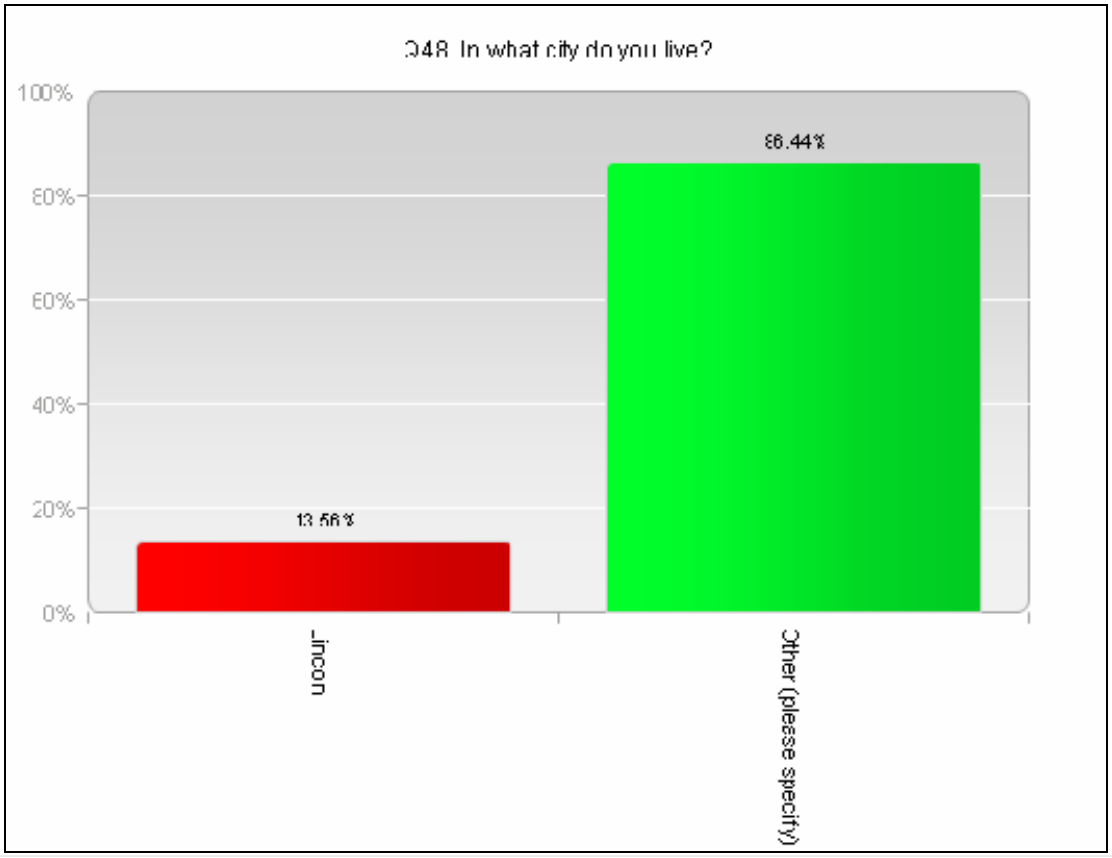

Q43. Please indicate how safe you feel riding your bicycle - On separated b cycle-only paths
80%
70%
60%
50%
40%
30%
20%
10%
0%
73.68%
18.42%
0%
5.26%
0%
2.63%
Very Safe
Somewhat Safe
Neither Safe nor Unsafe
Somewhat Unsafe
Very Unsafe
No Basis to Judge

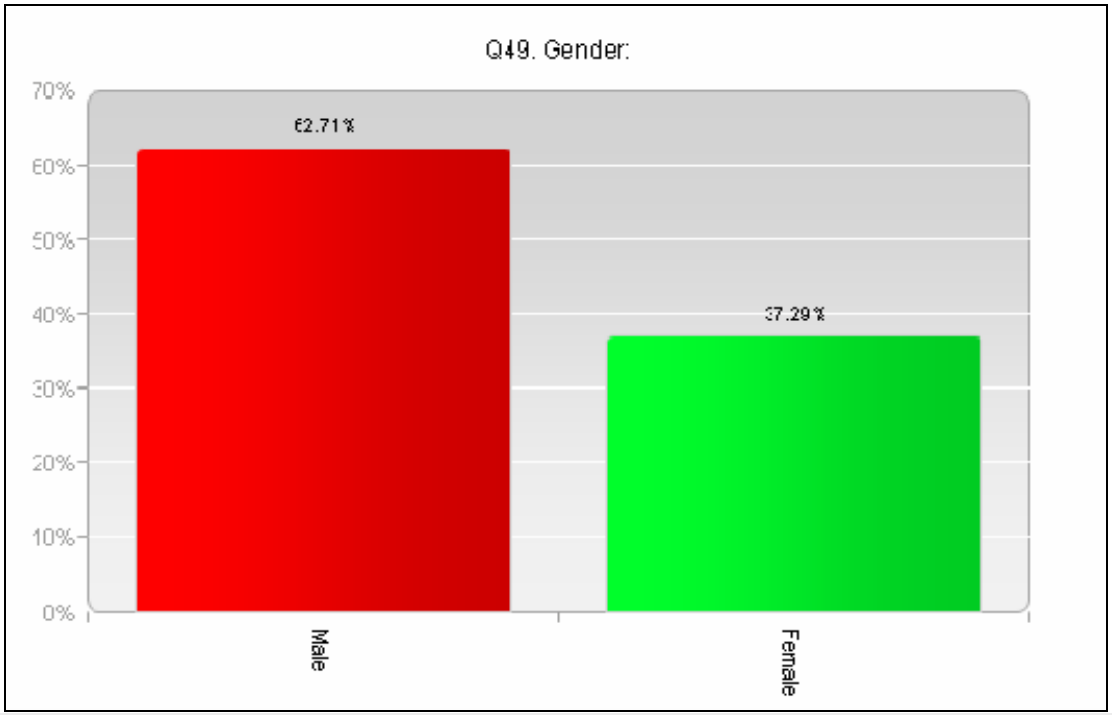

Q44. Does the presence of an NEV affect your bicycle riding speed?
70%
60%
50%
40%
30%
20%
10%
0%
39.47%
60.53%
Yes (please explain):
No

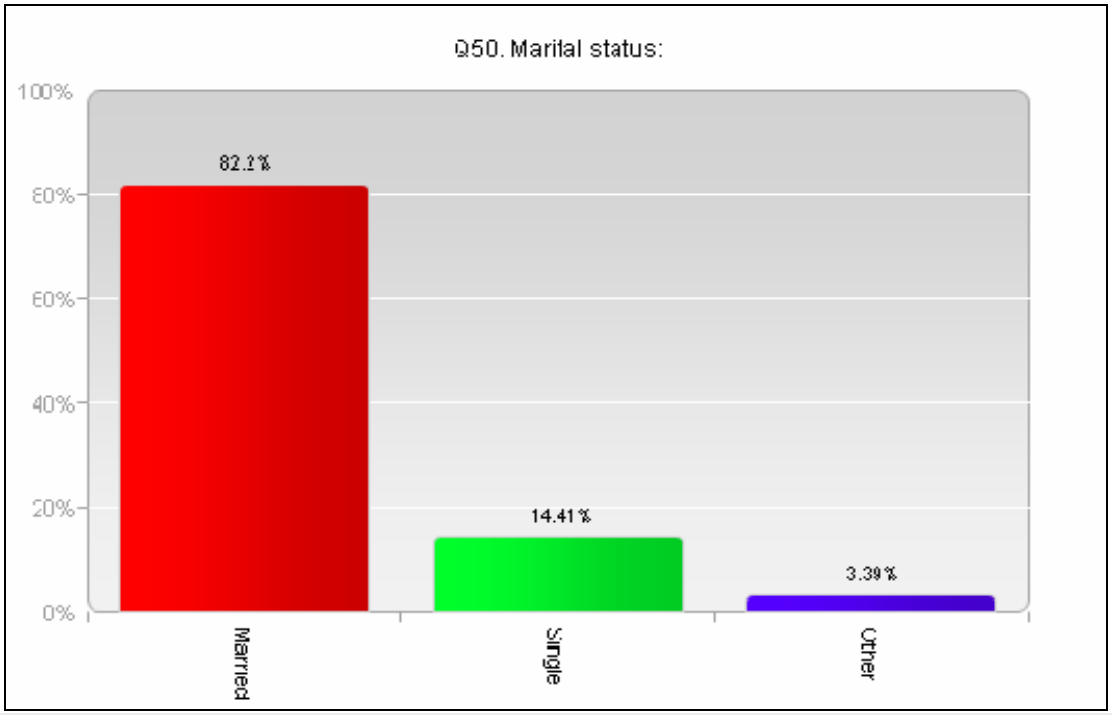

Q45. Are the current bicycle/NEV signs easy to read and understand?
70%
60%
50%
40%
30%
20%
10%
0%
63.16%
34.21%
2.63%
Yes
No (please explain):
No basis to judge

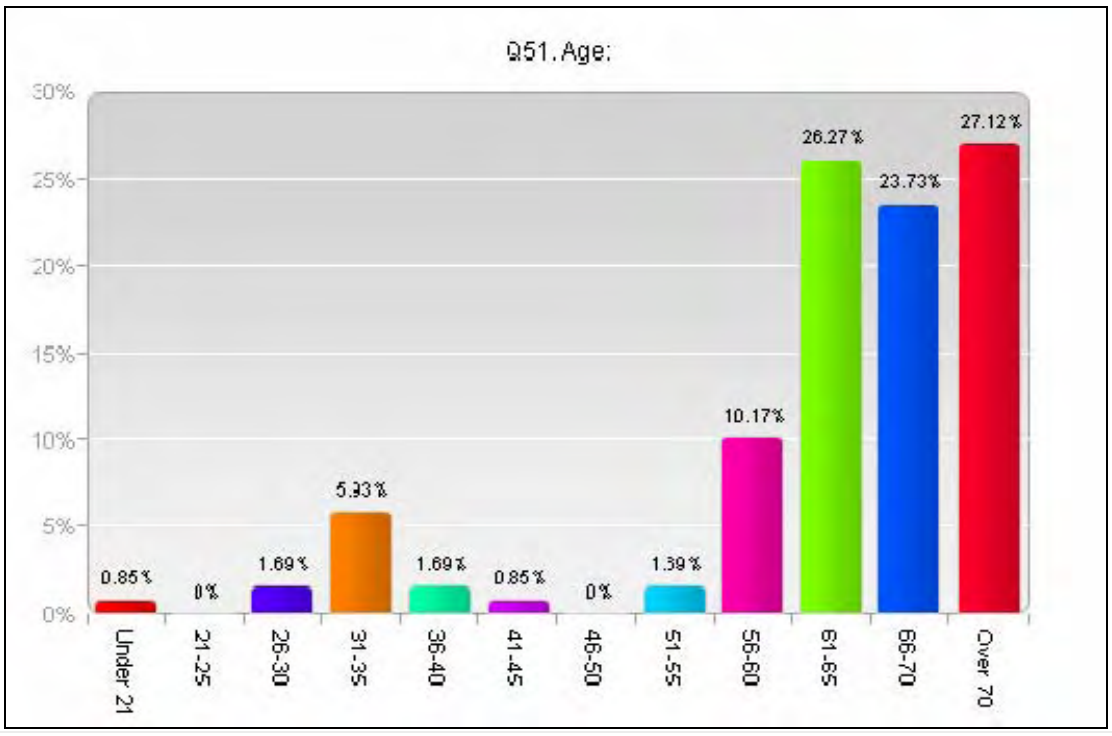

Q46. Are the current bicycle/NEV pavement markings and striping easy to read and understand?
50%
40%
30%
20%
10%
0%
48.65%
48.65%
2.7%
Yes
No (please explain):
No basis to judge

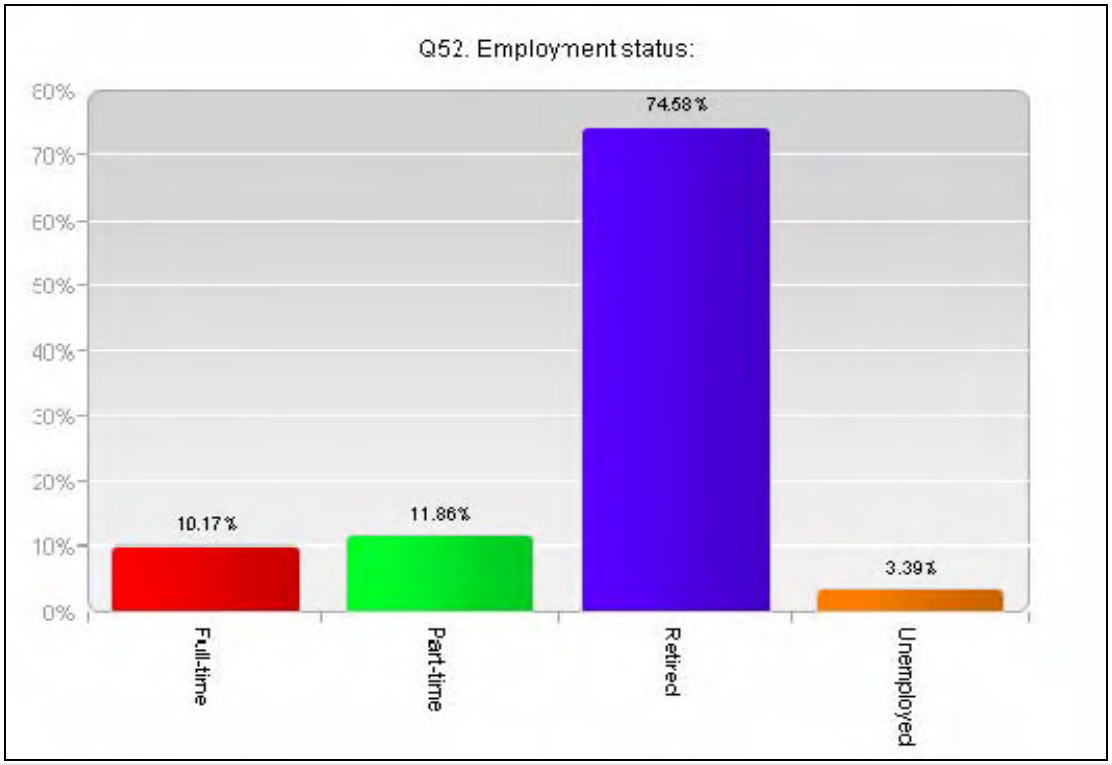

Q47. Do you use your bicycle to attend community or social activities?
70%
60%
50%
40%
30%
20%
10%
0%
62.16%
37.84%
Yes
No

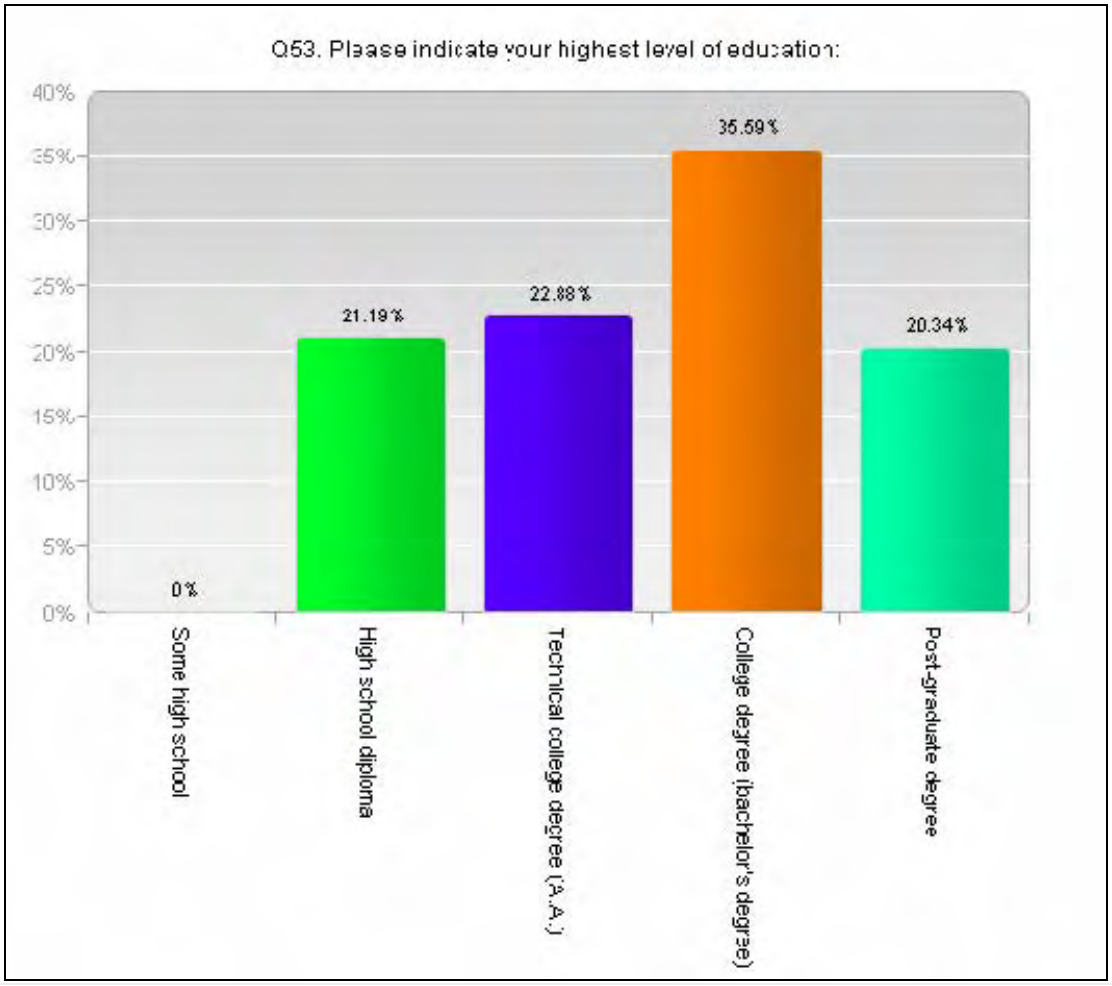

Q48. In what city do you live?
100%
80%
60%
40%
20%
0%
86.44%
13.56%
_incon
Other (please specify)

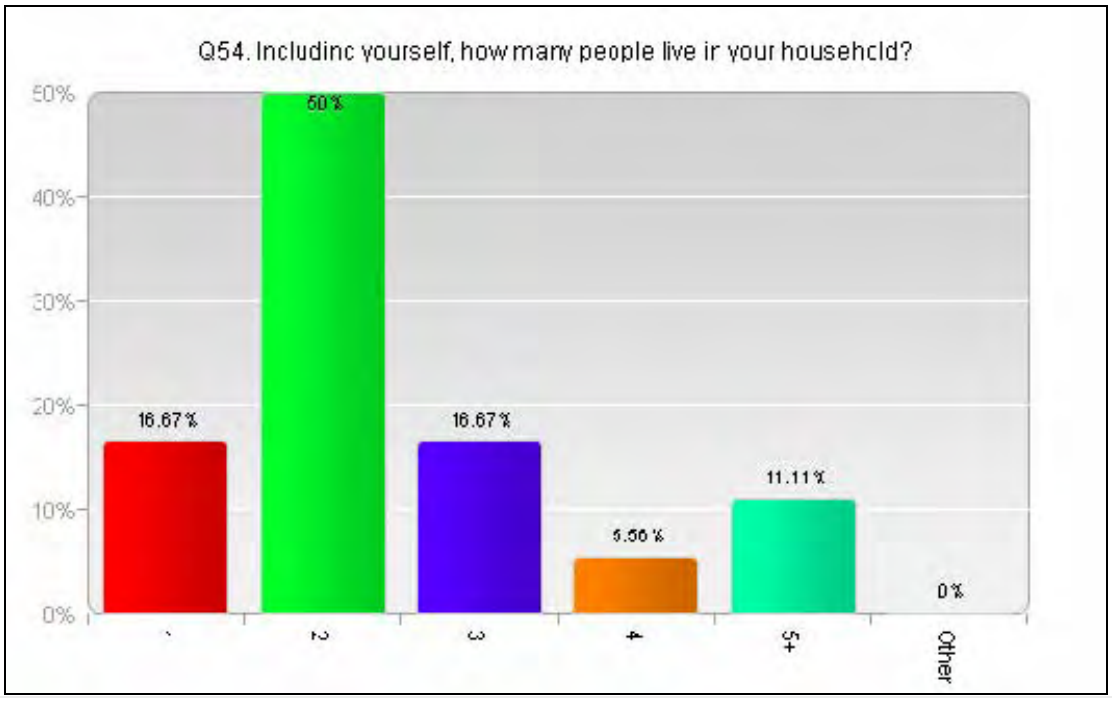

Q49. Gender:
70%
60%
50%
40%
30%
20%
10%
0%
62.71%
37.29%
Male
Female

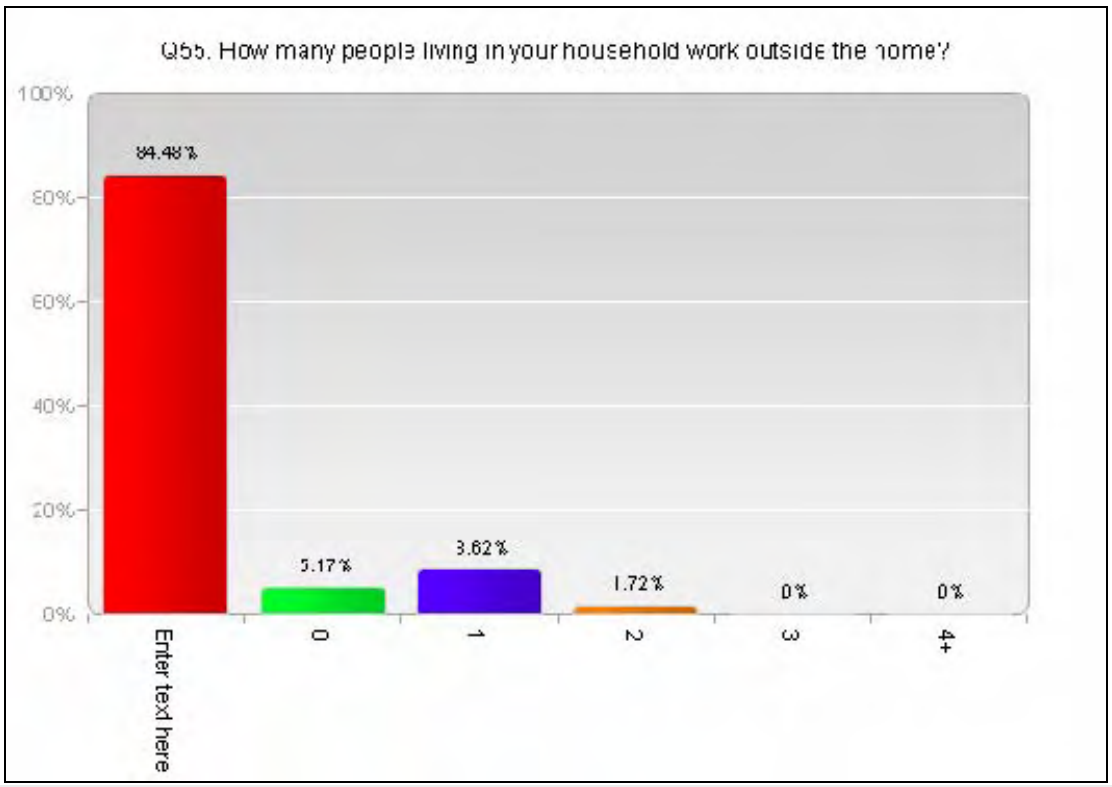

Q50. Marital status:
100%
80%
60%
40%
20%
0%
82.2%
14.41%
3.39%
Married
Single
Other

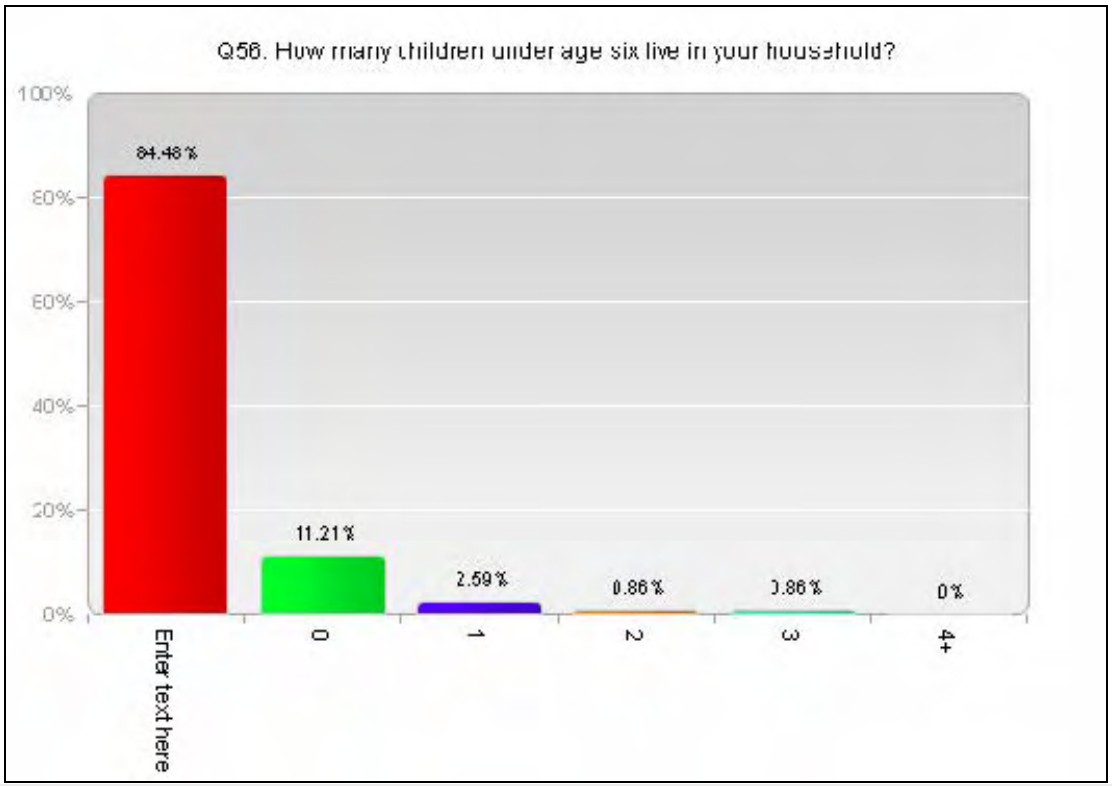

Q51. Age:
30%
25%
20%
15%
10%
5%
0%
0.85%
0%
1.69%
5.93%
1.69%
0.85%
0%
1.39%
10.17%
26.27%
23.73%
27.12%
Under 21
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66-70
Over 70

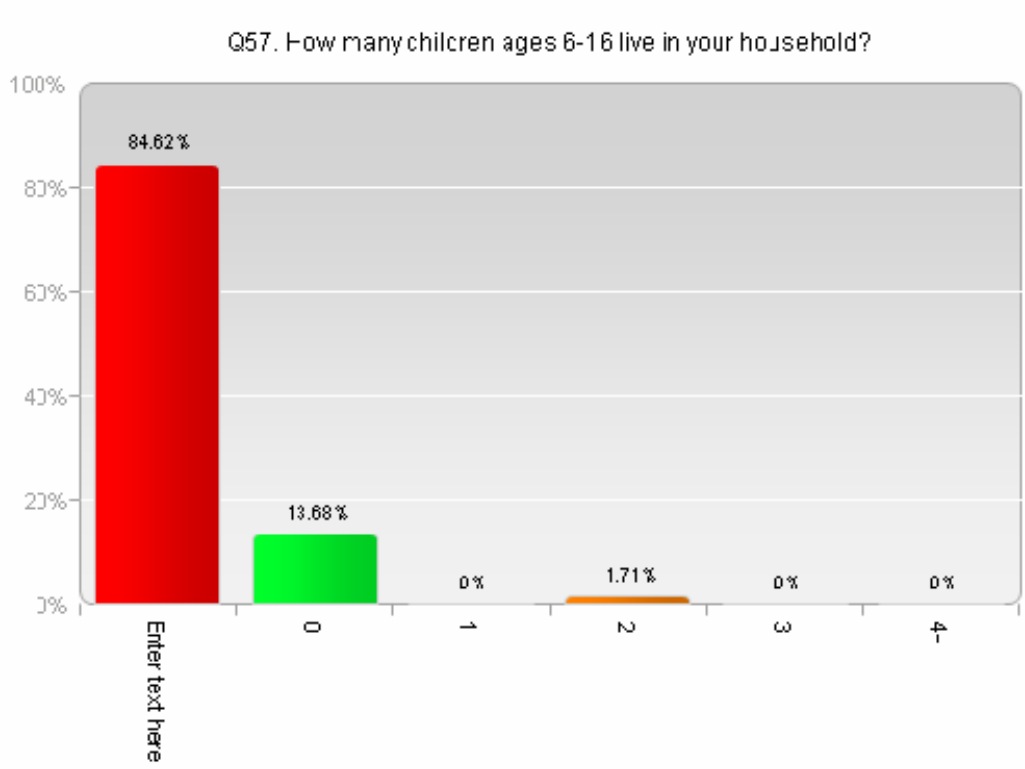

Q52. Employment status:
80%
70%
60%
50%
40%
30%
20%
10%
0%
10.17%
11.86%
74.58%
3.39%
Full-time
Part-time
Retired
Unemployed

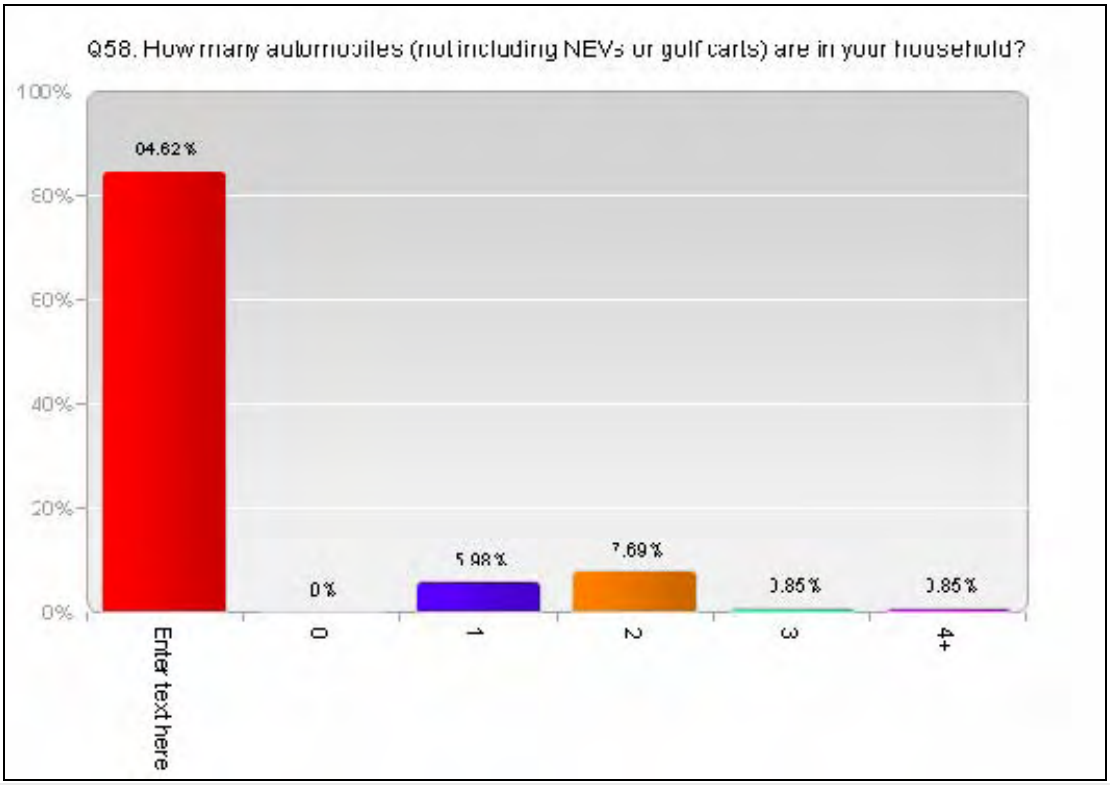

Q53. Please indicate your highest level of education:
40%
35%
30%
25%
20%
15%
10%
5%
0%
0%
21.19%
22.88%
35.59%
20.34%
Some high school
High school diploma
Technical college degree (A.A.)
College degree (bachelor's degree)
Post-graduate degree

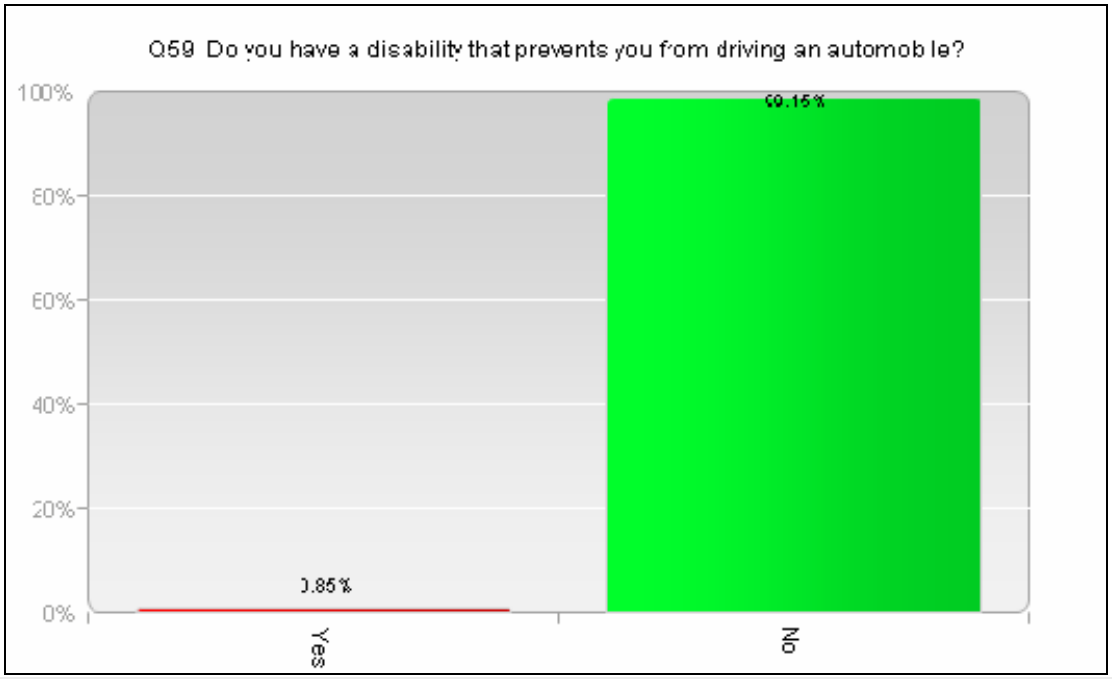

Q54. Including yourself, how many people live in your household?
60%
40%
30%
20%
10%
0%
16.67%
50%
16.67%
5.56%
11.11%
0%
2
3
4
5+
Other

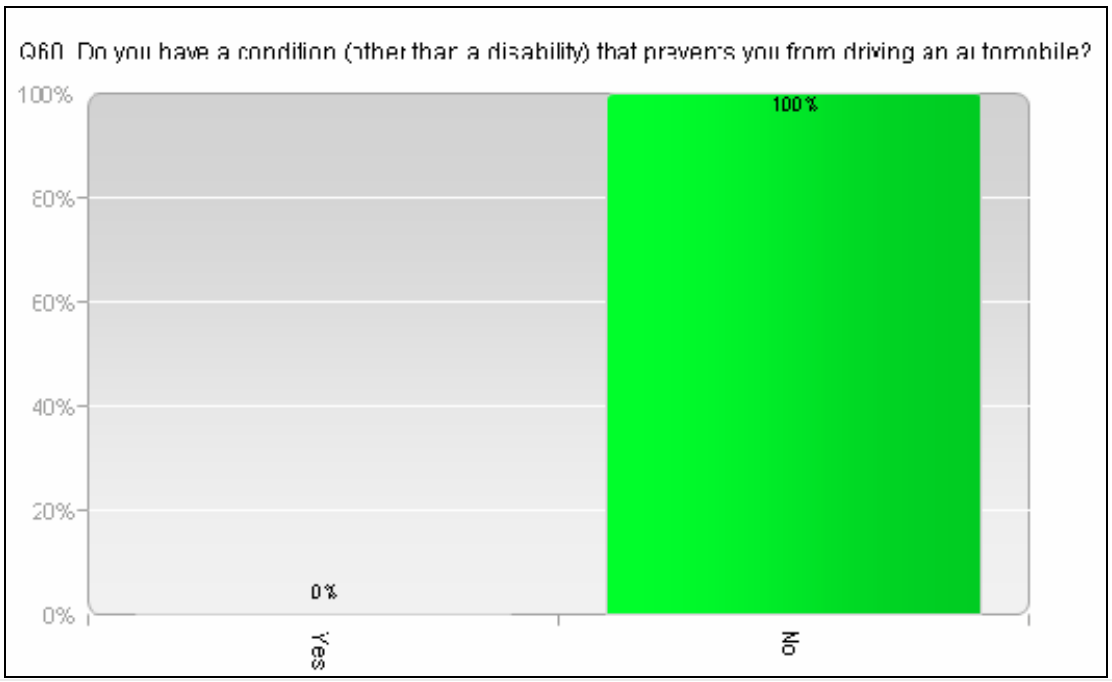

Q55. How many people living in your household work outside the home?
100%
80%
60%
40%
20%
0%
84.48%
5.17%
3.62%
1.72%
0%
0%
Enter text here
0
1
2
3
4+

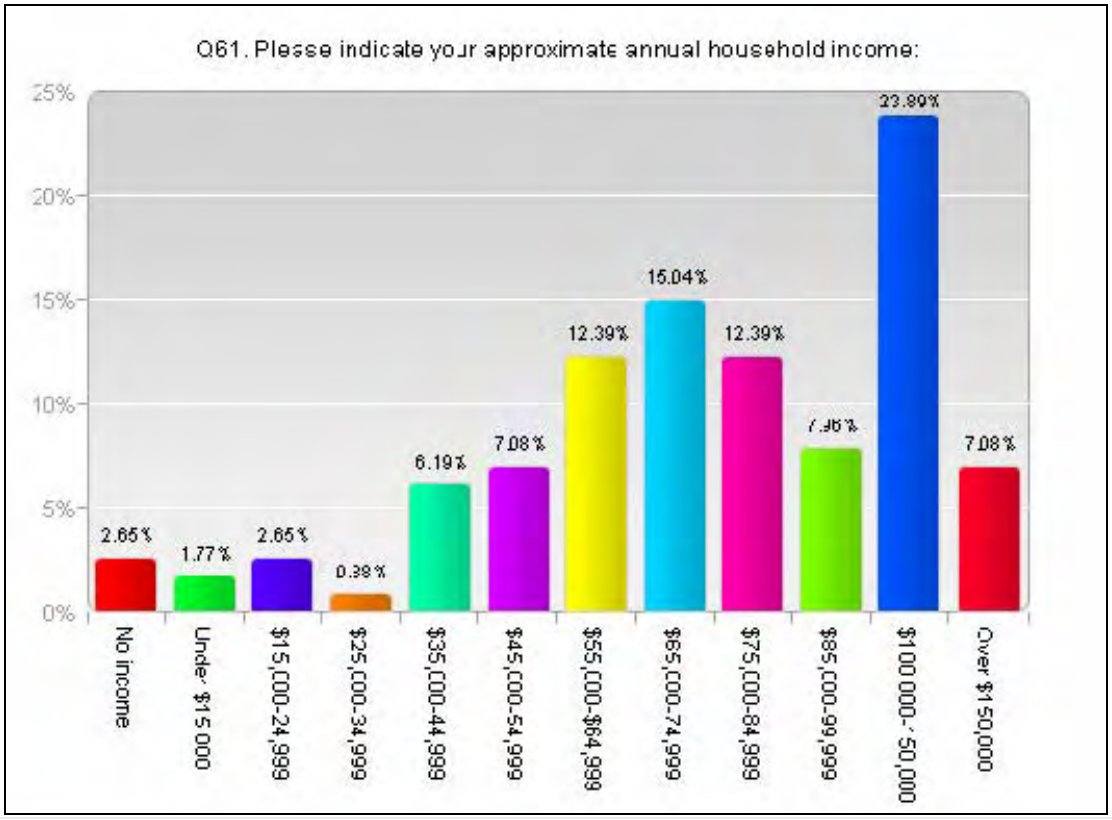

Q56. How many children under age six live in your household?
100%
80%
60%
40%
20%
0%
84.48%
11.21%
2.59%
0.86%
0.86%
0%
Enter text here
0
1
2
3
4+


Q57. How many children ages 6-16 live in your household?
100%
80%
60%
40%
20%
0%
84.62%
13.68%
0%
1.71%
0%
0%
Enter text here
0
1
2
3
4+

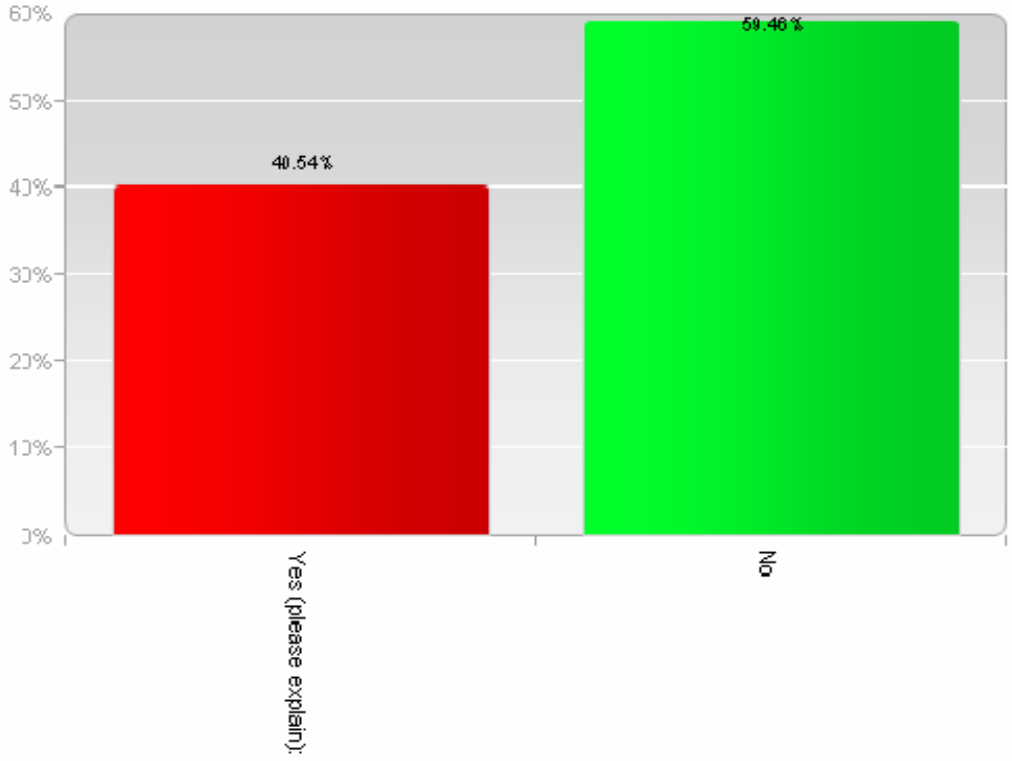

Q58. How many automobiles (not including NEVs or golf carts) are in your household?
100%
80%
60%
40%
20%
0%
84.62%
0%
5.98%
7.69%
0.85%
0.85%
Enter text here
0
1
2
3
4+


Q59 Do you have a disability that prevents you from driving an automobile?
100%
80%
60%
40%
20%
0%
0.85%
99.15%
Yes
No


Q60 Do you have a condition (other than a disability) that prevents you from driving an automobile?
100%
80%
60%
40%
20%
0%
0%
100%
Yes
No


Q61. Please indicate your approximate annual household income:
25%
20%
15%
10%
5%
0%
2.65%
1.77%
2.65%
0.38%
6.19%
7.08%
12.39%
15.04%
12.39%
7.96%
23.89%
7.08%
No income
Under $15,000
$15,000-24,999
$25,000-34,999
$35,000-44,999
$45,000-54,999
$55,000-64,999
$65,000-74,999
$75,000-84,999
$85,000-99,999
$100,000-150,000
Over $150,000

Q64. Do you think NEVs affect the travel speed on roads where NEVs and traditional automobiles have separate lanes?



# APPENDIX E. CALIFORNIA ASSEMBLY BILL 2353

## Assembly Bill No. 2353

CHAPTER 422

An act to add and repeal Chapter 7 (commencing with Section 1963) of Division 2.5 of the Streets and Highways Code, and to amend Sections 385.5, 21250, 21251, and 21260 of the Vehicle Code, relating to neighborhood electric vehicles.

[Approved by Governor September 9, 2004. Filed with Secretary of State September 9, 2004.]

LEGISLATIVE COUNSEL'S DIGEST

AB 2353, Leslie. Neighborhood Electric Vehicles.

Existing law defines "low-speed vehicle" for purposes of the Vehicle Code as a motor vehicle, other than a motor truck, with 4 wheels on the ground that is capable of a minimum speed of 20 miles per hour and a maximum speed of 25 miles per hour on a paved level surface and that has an unladen weight of 1800 pounds or less. Existing law imposes certain restrictions on the use of low-speed vehicles on public streets and highways, and generally requires an operator of a low-speed vehicle to have a driver's license. A violation of the Vehicle Code is an infraction, unless otherwise specified.

Existing law authorizes a city or county to establish a golf cart transportation plan subject to the review of the appropriate transportation planning agency and traffic law enforcement agency. Existing law provides that operating a golf cart other than on an authorized roadway is an infraction punishable by a fine not exceeding $100.

This bill would authorize, until January 1, 2009, the City of Lincoln and the City of Rocklin in the County of Placer to establish a neighborhood electric vehicle (NEV) transportation plan subject to the same review process established for a golf cart transportation plan. The bill would define "neighborhood electric vehicle" for these purposes to have the same meaning as the above definition of "low-speed vehicle." The bill, among other things, would provide for the plan to authorize the use of state highways by NEVs under certain conditions. The bill would require a report to the Legislature by January 1, 2008. The bill would enact other related provisions. Because the bill would revise the definition of a crime, it would impose a state-mandated local program.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state.

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Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

*The people of the State of California do enact as follows:*

SECTION 1. Chapter 7 (commencing with Section 1963) is added to Division 2.5 of the Streets and Highways Code, to read:

CHAPTER 7. NEIGHBORHOOD ELECTRIC VEHICLE TRANSPORTATION PLAN

1963. It is the intent of the Legislature, in enacting this chapter, to authorize the City of Lincoln and the City of Rocklin in the County of Placer to establish a neighborhood electric vehicle (NEV) transportation plan for a plan area in the city. It is the further intent of the Legislature that this transportation plan be designed and developed to best serve the functional travel needs of the plan area, to have the physical safety of the NEV driver's person and property as a major planning component, and to have the capacity to accommodate NEV drivers of every legal age and range of skills. It is the intent of the Legislature, in enacting this chapter, to encourage discussions between the Legislature, the Department of Motor Vehicles, and the California Highway Patrol regarding the adoption of a new classification for licensing motorists who use neighborhood electric vehicles.

1963.1. The following definitions apply to this chapter:

(a) "Plan area" means that territory under the jurisdiction of the City of Lincoln or the City of Rocklin designated by the city for a NEV transportation plan, including the privately owned land of any owner that consents to its inclusion in the plan.

(b) "Neighborhood electric vehicle" or "NEV" means a low-speed vehicle as defined by Section 385.5 of the Vehicle Code.

(c) "NEV lanes" means all publicly owned facilities that provide for NEV travel including roadways designated by signs or permanent markings which are shared with pedestrians, bicyclists, and other motorists in the plan area.

(d) "Speed-modified golf cart" means a golf cart that is modified to meet the safety requirements of Section 571.500 of Title 49 of the Code of Federal Regulations.

1963.2. (a) The City of Lincoln and the City of Rocklin may, by ordinance or resolution, adopt a NEV transportation plan.

(b) The transportation plan shall have received a prior review and the comments of the appropriate transportation planning agency designated under subdivision (a) or (b) of Section 29532 of the Government Code and any agency having traffic law enforcement responsibilities in the City of Lincoln or the City of Rocklin.

(c) The transportation plan may include the use of a state highway, or any crossing of the highway, subject to the approval of the Department of Transportation.

1963.3. The transportation plan shall include, but is not limited to, all of the following elements:

(a) Route selection, which includes a finding that the route will accommodate NEVs without an adverse impact upon traffic safety, and will consider, among other things, the travel needs of commuters and other users.

(b) Transportation interfacing, which shall include, but not be limited to, coordination with other modes of transportation so that a NEV driver may employ multiple modes of transportation in reaching a destination in the plan area.

(c) Citizens and community involvement in planning.

(d) Flexibility and coordination with long-range transportation planning.

(e) Provision for NEV related facilities including, but not limited to, special access points and NEV crossings.

(f) Provisions for parking facilities, including, but not limited to, community commercial centers, golf courses, public areas, parks, and other destination locations.

(g) Provisions for special paving, road markings, signage and striping for NEV travel lanes, road crossings, parking, and circulation.

(h) Provisions for NEV electrical charging stations.

(i) NEV lanes for the purposes of the transportation plan shall be classified as follows:

(1) Class I NEV routes provide for a completely separate right-of-way for the use of NEVs.

(2) Class II NEV routes provide for a separate striped lane adjacent to roadways with speed limits of 55 miles per hour or less.

(3) Class III NEV routes provide for shared use by NEVs with conventional vehicle traffic on streets with a posted speed limit of 35 miles per hour or less.

1963.4. If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan, it shall do both of the following:

(a) Establish minimum general design criteria for the development, planning, and construction of separated NEV lanes, including, but not

limited to, the design speed of the facility, the space requirements of the NEV, and roadway design criteria.

(b) In cooperation with the department, establish uniform specifications and symbols for signs, markers, and traffic control devices to control NEV traffic; to warn of dangerous conditions, obstacles, or hazards; to designate the right-of-way as between NEVs, other vehicles, and bicycles; to state the nature and destination of the NEV lane; and to warn pedestrians, bicyclists, and motorists of the presence of NEV traffic.

1963.5. If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan, each city may do the following:

(a) Acquire, by dedication, purchase, or condemnation, real property, including easements or rights-of-way, to establish NEV lanes.

(b) Establish a NEV transportation plan as authorized by this chapter.

1963.6. If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan, each city shall also adopt all of the following as part of the plan:

(a) NEVs eligible to use NEV lanes shall meet the safety requirements for low-speed vehicles as set forth in Section 571.500 of Title 49 of the Code of Federal Regulations.

(b) A permit process for golf carts that requires speed-modified golf carts to meet minimum design criteria adopted pursuant to subdivision (a). The permit process may include, but not be limited to, permit posting, permit renewal, operator education, and other related matters.

(c) Minimum safety criteria for NEV operators, including, but not limited to, requirements relating to NEV maintenance and NEV safety. Operators shall be required to possess a valid California driver's license and to comply with the financial responsibility requirements established pursuant to Chapter 1 (commencing with Section 16000) of Division 7.

(d) (1) Restrictions limiting the operation of NEVs to separated NEV lanes on those roadways identified in the transportation plan, and allowing only those NEVs and speed-modified golf carts that meet the safety equipment requirements specified in the plan to be operated on separated NEV lanes of approved roadways in the plan area.

(2) Any person operating a NEV in the plan area in violation of this subdivision is guilty of an infraction punishable by a fine not exceeding one hundred dollars ($100).

1963.7. (a) If the City of Lincoln or the City of Rocklin adopts a NEV transportation plan pursuant to this chapter, the cities shall jointly submit a report to the Legislature on or before January 1, 2008, in consultation with the Department of Transportation, the Department of the California Highway Patrol, and local law enforcement agencies.

(b) The report shall include all of the following:

(1) A description of all NEV transportation plans and their elements that have been authorized up to that time.

(2) An evaluation of the effectiveness of the NEV transportation plans, including their impact on traffic flows and safety.

(3) A recommendation as to whether this chapter should be terminated, continued in existence applicable solely to the City of Lincoln and the City of Rocklin in the County of Placer, or expanded statewide.

1963.8. This chapter shall remain in effect only until January 1, 2009, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2009, deletes or extends that date.

SEC. 2. Section 385.5 of the Vehicle Code is amended to read:

385.5. A "low-speed vehicle" is a motor vehicle, other than a motor truck, having four wheels on the ground and an unladen weight of 1,800 pounds or less, that is capable of propelling itself at a minimum speed of 20 miles per hour and a maximum speed of 25 miles per hour, on a paved level surface. For the purposes of this section, a "low-speed vehicle" is not a golf cart, except when operated pursuant to Section 21115 or 21115.1. A "low-speed vehicle" is also known as a "neighborhood electric vehicle."

SEC. 3. Section 21250 of the Vehicle Code is amended to read:

21250. For the purposes of this article, a low-speed vehicle means a vehicle as defined in Section 385.5. A "low-speed vehicle" is also known as a "neighborhood electric vehicle."

SEC. 4. Section 21251 of the Vehicle Code is amended to read:

21251. Except as provided in Sections 1963 to 1963.8, inclusive, of the Streets and Highways Code, and Sections 4023, 21115, and 21115.1, a low-speed vehicle is subject to all the provisions applicable to a motor vehicle, and the driver of a low-speed vehicle is subject to all the provisions applicable to the driver of a motor vehicle or other vehicle, when applicable, by this code or any other code, with the exception of those provisions which, by their very nature, can have no application.

SEC. 5. Section 21260 of the Vehicle Code is amended to read:

21260. (a) Except as provided in paragraph (1) of subdivision (b), or in an area where a neighborhood electric vehicle transportation plan has been adopted pursuant to Chapter 7 (commencing with Section 1963) of Division 2.5 of the Streets and Highways Code, the operator of a low-speed vehicle shall not operate the vehicle on any roadway with a speed limit in excess of 35 miles per hour.

(b) (1) The operator of a low-speed vehicle may cross a roadway with a speed limit in excess of 35 miles per hour if the crossing begins and ends on a roadway with a speed limit of 35 miles per hour or less and occurs at an intersection of approximately 90 degrees.

(2) Notwithstanding paragraph (1), the operator of a low-speed vehicle shall not traverse an uncontrolled intersection with any state highway unless that intersection has been approved and authorized by the agency having primary traffic enforcement responsibilities for that crossing by a low-speed vehicle.

SEC. 6. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school district will be incurred because this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

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# APPENDIX F. APPROVED CTCDC MEETING MINUTES

## MINUTES

### CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE (CTCDC) MEETING

Sacramento, July 28, 2005

The second CTCDC meeting of year 2005 was held in Sacramento, on July 28, 2005.

Chairman John Fisher opened the meeting at 9:10 a.m. with the introduction of Committee Members and guests. Chairman Fisher thanked Caltrans for hosting the meeting. The following Members, alternates and guests were in attendance:

| ATTENDANCE | ORGANIZATION | TELEPHONE |
|---|---|---|
| **Members (Voting)** | | |
| John Fisher<br>Chairman | League of CA Cities<br>City of Los Angeles | (213) 972-8424 |
| Farhad Mansourian<br>Vice Chairman | CA State Association of Counties<br>Marin County | (415) 499-6570 |
| Gerry Meis | Caltrans | (916) 654-4551 |
| Lenley Duncan | CHP | (916) 657-7222 |
| Ed von Borstel | League of CA Cities<br>City of Modesto | (209) 577-5266 |
| Merry Banks | California State Automobile Association | (415) 241-8904 |
| Jacob Babico | CA State Association of Counties<br>San Bernardino County | (909) 387-8186 |
| Hamid Bahadori | Auto Club of Southern California | (714) 885-2326 |

| ALTERNATES | ORGANIZATION | TELEPHONE |
|---|---|---|
| Gain Aggarwal | League of CA Cities<br>City of Vacaville | (707) 449-5349 |

| ATTENDEES | ORGANIZATION | TELEPHONE/E-Mail |
|---|---|---|
| Matt Schmitz | FHWA | matthew.schmitz@fhwa.dot.gov |
| Kent Milton | CHP Head Quarter | Kmilton@CHP.CA.GOV |
| Bret Goss | FCF Inc. | Bret@FirstCallFlagging.com |
| Steve Ainsworth | City of Lincoln | SAINSWORTH@MHMENGR.co |
| Chad Dornsife | Highway Safety Group | cdornsife@highwaysafety.us (858) 673-1926 |
| Richard Haggstorm | Caltrans | richard_haggstorm@dot.ca.gov (916) 654-6600 |
| Walter Laabs | City of Santa Rosa | wlaabs@srcity.org |
| Keith Lee | LA County, DPW | klee@ladpw.org |
| Dwight Ku | CSAA | DWIGHT-KU@CSAA.com |
| Joe Jeffrey | Road-Tech Safety | joe@roadtech.com (530) 676-7797 |
| Don Howe | Caltrans | dhowe@dot.ca.gov |
| Ken Kochevar | FHWA | KenKochevar@fhwa.dot.gov (916) 498-5853 |
| Nancy Dean | National Weather Service | nancy.dean@noaa.gov (707) 443-5610 x222 |
| Barb Alberson | Co Dept. of Health Services | barberso@dhs.ca.gov |
| Ginny Mecham | CHP | Gmecham@chp.ca.gov |
| Meriko Hoshida | CHP | mhoshida@chp..ca.gov |
| Roger M. Bazeley | SF PTA | GAZeleg@designstlategy-usa.com |
| Craig A. Copelan | Caltrans | craig.copelen@dot.ca.gov |
| Carl Walker | City of Lincoln | cwalker@ci. Lincoln.ca.us |
| Jesse Bhullar | Caltrans | jesse-bhullar@dot.ca.gov |
| Ricardo Olea | City of San Francisco | ricardo.olea@sfgov.org |
| Bond M. Yee | | bond.yee@sfgov.org |
| Robert Anderson | CSSC | anderson@stateseismic.com |
| Ken Coleman | LA Safe | colemank@metro.net (213) 922-2951 |
| Ahmad Rastegarpour | CT | ahmud_rastegarpour@dot.ca.gov |
| Dennis Anderson | 3M | d-anderson@mmm.com |
| Tedi Jackson | CSD | Tjackson@sandiego.gov (619) 527-3121 |
| Mark Stone | City of San Diego | mstone@sandiego.gov |
| Kevin Taber | County of Placer | ktaber@placer.ca.gov |

**05-5 Proposal for Experimentation Use of a Nonstandard Signage for Neighborhood Electric Vehicles (NEV).**

Chairman Fisher asked Gerry Meis to introduce item 05-5 experiment with Signage for Neighborhood Electric Vehicle (NEV) requested by the City of Lincoln.

Gerry introduced Carl Walker, City of Lincoln and asked him to present his experiment proposal to the Committee.

Carl Walker, City of Lincoln, stated that the City of Lincoln and City of Rocklin are 6 months into a five-year pilot program for NEV travel within the city. The five-year trial is a result of AB2353 which became law as of January 1, 2005. Carl explained about NEVs and how they differ from golf carts. NEV is a compact vehicle, one to four passenger vehicles powered by rechargeable batteries and an electric motor. NEV are classified as a "low speed vehicle" (LSV) under Title 49 C.F.R Part 571.500. Because NEVs are classified as LSVs, they must meet all safety standards such as seat belts, brake lights, rear lights, headlights, mirrors and windshield. NEVs must comply with all the rules and regulations for a motor vehicle as set for in the California Vehicle Code. NEVs must be registered with the State Department of Motor Vehicles and the driver must hold a valid California driver's license and be insured. NEVs may travel on any street with a posted speed limit of 35 miles per hour or less. NEVs may cross state-highways at controlled intersections only. Golf carts are designed to carry golf equipment and not more than two persons, including the driver. Golf carts are not required to possess the safety equipment required of a low speed vehicle and have a top speed 15-mph. State law prohibits use of golf carts on public roadways outside of a "Golf Cart Transportation Plan".

Carl also pointed out a PowerPoint slide containing the specifications of the NEV. Carl added that the benefits of NEV uses are for short distance at low speeds where traffic, parking and air pollution might be of concern. NEV can travel 150 miles per gallon and it supports local businesses. NEV can reduce personal travel cost and provide mobility for people who cannot drive an automobile. A critical element of the NEV Transportation Plan includes the development of special paving, road markings, signage and striping for NEV travel lanes. Carl added that there are currently no State or Federal standards for NEV lane widths. The City of Lincoln's goal is to provide a safe NEV lane width without the lane being so wide that it encourages automobile use.

Carl also discussed different alternatives for NEV travel lanes, such as Class I NEV lanes, Class II NEV lanes and Class III NEV routes. Class II NEV lanes would be a portion of public roadways that are designated by signs and pavement markings for NEV travel. Class III NEV routes are mixed with traffic on most streets posted 35 mph or less. Carl also discussed different striping patterns which he shares with the Committee members by a Power Point Presentation. Carl also showed a proposed new symbol for the NEV, however he informed the Committee that the City will approach FHWA for symbol approval. In closing, Carl stated that the State of California would benefit from to the City of Lincoln's experience in implementing an NEV transportation plan. The City will identify the hurdles that will be encountered during the implementation of the NEV plan.

Chairman Fisher stated that the presentation showed marking and striping in addition to the signage. However the proposal in the agenda packet only talked about signs.

Carl responded that the City does not have the complete package for application submittal.

Farhad Mansourian stated that the proposed signage does not cover under Section 1A.3 which was recommended to include in the California Supplement earlier by the Committee.

Gerry Meis responded no, the earlier recommendation allows addition of date, extra timing, not to create a verbal message sign.

Hamid Bahadori stated that a golf cart is allowed on roadways with 25 mph or less speeds, so why is there a need to create new signs and striping.

Carl responded that the NEV could operate on roadways with speeds up to 35 mph. The purpose of a separate lane is that if a roadway has a speed higher than 35 mph, then the NEV will have their own travel lane.

Hamid asked whether the City would collect data to determine if NEVs are acceptable to travel on roadways having speeds over 35 mph as long as they have there own travel lanes.

Carl responded that AB2353 allows NEVs on roadways with speeds over 35 mph as long as there is proper signing, striping and a separate travel lane.

Chairman Fisher asked about the Vehicle Code allowing the establishment of separate bus lanes, bicycle lanes, then does this legislation allow the development of separate NEV lanes.

Carl responded yes.

Jacob Babico asked about the sign specification shown on page 32 0f 60 shows "NEV Lane", in his opinion the sign should be "NEV Route".

Carl responded that is correct, it should be "NEV Route".

Chairman Fisher suggested that "NEV Route" sign should be "White on Green".

Hamid added that the request is also for authorization of new pattern of striping.

Gerry Meis added that he was not aware if there would be a request for a marking and striping approval.

Chairman Fisher asked any other comments from the audience and from Committee members.

Roger Bazeley stated that if the proposal is proven to be successful, then it could be expanded throughout California.

**Motion**: Moved by Farhad Mansourian, seconded by John Fisher, to authorize experimentation with the signage package with the change of "NEV Lane" to "NEV Route" with the use of existing striping details available. Experiment will be conducted on Class II NEV Routes.

Motion carried 8-0.

**Action**: Item approved for experimentation.

# APPENDIX G. CALIFORNIA SENATE BILL 956

**Senate Bill No. 956**

CHAPTER 442

An act to add and repeal Chapter 8 (commencing with Section 1965) of Division 2.5 of the Streets and Highways Code, and to amend Sections 21251 and 21260 of the Vehicle Code, relating to neighborhood electric vehicles.

[Approved by Governor October 10, 2007. Filed with Secretary of State October 10, 2007.]

LEGISLATIVE COUNSEL'S DIGEST

SB 956, Correa. Neighborhood electric vehicles.

Existing law defines "low-speed vehicle" for purposes of the Vehicle Code as a motor vehicle, other than a motor truck, with 4 wheels that is capable of a minimum speed of 20 miles per hour and a maximum speed of 25 miles per hour on a paved level surface and that has a gross vehicle weight rating of less than 3,000 pounds. Existing law imposes certain restrictions on the use of low-speed vehicles on public streets and highways, and generally requires an operator of a low-speed vehicle to have a driver's license. A violation of the Vehicle Code is an infraction, unless otherwise specified.

Existing law authorizes a city or county to establish a golf cart transportation plan subject to the review of the appropriate transportation planning agency and traffic law enforcement agency. Existing law provides that operating a golf cart other than on an authorized roadway is an infraction punishable by a fine not exceeding $100. Existing law authorizes, until January 1, 2009, the City of Lincoln and the City of Rocklin in the County of Placer to establish a neighborhood electric vehicle transportation plan subject to the same review process established for a golf cart transportation plan, and defines "neighborhood electric vehicle" for these purposes to have the same meaning as the above definition of low-speed vehicle. A person operating a neighborhood electric vehicle in the plan area in violation of certain provisions is guilty of an infraction punishable by a fine not exceeding $100.

This bill, until January 1, 2013, would enact similar provisions authorizing the County of Orange to establish a neighborhood electric vehicle transportation plan for the Ranch Plan Planned Community in that county, subject to similar penalties. The bill would require a report to the Legislature by November 1, 2011. Because the bill would create a new crime, it would impose a state-mandated local program.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

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This bill would provide that no reimbursement is required by this act for a specified reason.

*The people of the State of California do enact as follows:*

SECTION 1. Chapter 8 (commencing with Section 1965) is added to Division 2.5 of the Streets and Highways Code, to read:

CHAPTER 8. NEIGHBORHOOD ELECTRIC VEHICLE TRANSPORTATION PLAN FOR RANCH PLAN PLANNED COMMUNITY IN ORANGE COUNTY

1965. It is the intent of the Legislature, in enacting this chapter, to authorize the County of Orange to establish a neighborhood electric vehicle (NEV) transportation plan for the Ranch Plan Planned Community in the county. The purpose of this NEV transportation plan is to further the community's vision of creating a sustainable development that reduces gasoline demand and vehicle emissions by offering a cleaner, more economical means of local transportation within the plan area. It is the further intent of the Legislature that this NEV transportation plan be designed and developed to best serve the functional travel needs of the plan area, to have the physical safety of the NEV driver's person and property as a major planning component, and to have the capacity to accommodate NEV drivers of every legal age and range of skills.

1965.1. The following definitions apply to this chapter:

(a) "Plan area" means the Ranch Plan Planned Community project area and all streets located within the project area.

(b) "Neighborhood electric vehicle" or "NEV" means a low-speed vehicle as defined by Section 385.5 of the Vehicle Code.

(c) "NEV lanes" means all publicly or privately owned facilities that provide for NEV travel including roadways designated by signs or permanent markings which are shared with pedestrians, bicyclists, and other motorists in the plan area.

(d) "Ranch Plan Planned Community" means the comprehensive land use, conservation, and development program initially approved by the Orange County Board of Supervisors on November 8, 2004, and covering the remaining 22,815 acres of the historic Rancho Mission Viejo located in southeastern Orange County.

(e) "Transportation planning agency" means the Orange County Transportation Authority.

1965.2. (a) The County of Orange may, by ordinance or resolution, adopt a NEV transportation plan for the Ranch Plan Planned Community.

(b) The transportation plan shall have received a prior review and the comments of the transportation planning agency and any agency having traffic law enforcement responsibilities in the County of Orange.

(c) The transportation plan may include the use of a state highway, or any crossing of the highway, subject to the approval of the Department of Transportation.

1965.3. The transportation plan shall include, but is not limited to, all of the following elements:

(a) Route selection, which includes a finding that the route will accommodate NEVs without an adverse impact upon traffic safety, and will consider, among other things, the travel needs of commuters and other users.

(b) Transportation interfacing, which shall include, but not be limited to, coordination with other modes of transportation so that a NEV driver may employ multiple modes of transportation in reaching a destination in the plan area.

(c) Provision for NEV related facilities including, but not limited to, special access points and NEV crossings.

(d) Provisions for parking facilities, including, but not limited to, community commercial centers, golf courses, public areas, parks, and other destination locations.

(e) Provisions for special paving, road markings, signage and striping for NEV travel lanes, road crossings, parking, and circulation.

(f) Provisions for NEV electrical charging stations.

(g) NEV lanes for the purposes of the transportation plan shall be classified as follows:

(1) Class I NEV routes provide for a completely separate right-of-way for the use of NEVs.

(2) Class II NEV routes provide for a separate striped lane adjacent to roadways with speed limits of 55 miles per hour or less.

(3) Class III NEV routes provide for shared use by NEVs with conventional vehicle traffic on streets with a speed limit of 25 miles per hour or less.

1965.4. If the County of Orange adopts a NEV transportation plan for the Ranch Plan Planned Community, it shall do both of the following:

(a) Establish minimum general design criteria for the development, planning, and construction of separated NEV lanes, including, but not limited to, the design speed of the facility, the space requirements of the NEV, and roadway design criteria.

(b) In cooperation with the department, establish uniform specifications and symbols for signs, markers, and traffic control devices to control NEV traffic; to warn of dangerous conditions, obstacles, or hazards; to designate the right-of-way as between NEVs, other vehicles, and bicycles; to state the nature and destination of the NEV lane; and to warn pedestrians, bicyclists, and motorists of the presence of NEV traffic.

1965.5. If the County of Orange adopts a NEV transportation plan for the Ranch Plan Planned Community, it shall also adopt all of the following as part of the plan:

(a) NEVs eligible to use NEV lanes shall meet the safety requirements for low-speed vehicles as set forth in Section 571.500 of Title 49 of the Code of Federal Regulations.

(b) Minimum safety criteria for NEV operators, including, but not limited to, requirements relating to NEV maintenance and NEV safety. Operators shall be required to possess a valid California driver's license and to comply with the financial responsibility requirements established pursuant to Chapter 1 (commencing with Section 16000) of Division 7 of the Vehicle Code.

(c) (1) Restrictions limiting the operation of NEVs to separated NEV lanes on those roadways identified in the transportation plan, and allowing only those NEVs and golf carts that meet the safety equipment requirements specified in the plan to be operated on separated NEV lanes of approved roadways in the plan area.

(2) Any person operating a NEV in the plan area in violation of this subdivision is guilty of an infraction punishable by a fine not exceeding one hundred dollars ($100).

1965.6. (a) If the County of Orange adopts a NEV transportation plan for the Ranch Plan Planned Community pursuant to this chapter, the county shall submit a report to the Legislature on or before November 1, 2011, in consultation with the Department of Transportation, the Department of the California Highway Patrol, and local law enforcement agencies.

(b) The report shall include all of the following:

(1) A description of the NEV transportation plan and its elements that have been authorized up to that time.

(2) An evaluation of the effectiveness of the NEV transportation plan, including its impact on traffic flows and safety.

(3) A recommendation as to whether this chapter should be terminated, continued in existence and applicable solely to the Ranch Plan Planned Community, or expanded statewide.

1965.7. This chapter shall remain in effect only until January 1, 2013, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2013, deletes or extends that date.

SEC. 2. Section 21251 of the Vehicle Code is amended to read:

21251. Except as provided in Chapter 7 (commencing with Section 1963) and Chapter 8 (commencing with Section 1965) of Division 2 of the Streets and Highways Code, and Sections 4023, 21115, and 21115.1, a low-speed vehicle is subject to all the provisions applicable to a motor vehicle, and the driver of a low-speed vehicle is subject to all the provisions applicable to the driver of a motor vehicle or other vehicle, when applicable, by this code or any other code, with the exception of those provisions which, by their very nature, can have no application.

SEC. 3. Section 21260 of the Vehicle Code is amended to read:

21260. (a) Except as provided in paragraph (1) of subdivision (b), or in an area where a neighborhood electric vehicle transportation plan has been adopted pursuant to Chapter 7 (commencing with Section 1963) or Chapter 8 (commencing with Section 1965) of Division 2.5 of the Streets and Highways Code, the operator of a low-speed vehicle shall not operate the vehicle on any roadway with a speed limit in excess of 35 miles per hour.

(b) (1) The operator of a low-speed vehicle may cross a roadway with a speed limit in excess of 35 miles per hour if the crossing begins and ends on a roadway with a speed limit of 35 miles per hour or less and occurs at an intersection of approximately 90 degrees.

(2) Notwithstanding paragraph (1), the operator of a low-speed vehicle shall not traverse an uncontrolled intersection with any state highway unless that intersection has been approved and authorized by the agency having primary traffic enforcement responsibilities for that crossing by a low-speed vehicle.

SEC. 4. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school district will be incurred because this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

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