



FEHR & PEERS
TRANSPORTATION CONSULTANTS

TWELVE BRIDGES GOLF CART TRANSPORTATION PLAN

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*Prepared for:
The City of Lincoln*

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TWELVE BRIDGES GOLF CART TRANSPORTATION PLAN

I. Introduction

The Twelve Bridges golf cart transportation plan (GCTP) provides unique opportunities for using golf carts as part of the transportation and circulation system for Twelve Bridges in Lincoln. The GCTP addresses how the existing golf cart circulation system in Sun City – Lincoln Hills can be expanded to integrate with other portions of the Twelve Bridges Specific Plan and with other planned commercial, retail, educational, and medical facilities within the City of Lincoln. In order to develop the plan, Fehr & Peers Associates was asked to review the City of Lincoln tentative map and street system for Twelve Bridges to assess the feasibility of golf cart use outside of Sun City – Lincoln Hills.

Note: Federal law (49 CFR Part 571) now includes a new vehicle category of “low speed vehicle” (LSV) which includes “neighborhood electric vehicle” (NEV) and “speed-modified golf cart”. Under current federal interpretations and regulations, golf carts that are incapable of exceeding 20 miles per hour are subject to only state and local requirements regarding safety equipment. However, LSVs that are designed to travel up to 25 miles per hour are classified as motor vehicles and are required to have automotive grade headlights, stop lamps, turn signal lamps, tail lamps, parking brakes, rearview mirrors, seatbelts, windshields, brakes and vehicle identification numbers. For the purposes of this plan, all golf carts that are allowed to travel outside of Sun City – Lincoln Hills are subject to federal safety requirements. Since all “LSVs” sold in California are electric, signage and street markings for Twelve Bridges and the City of Lincoln refer to the NEV designation.

The following tasks were completed:

Task 1 – A review of existing land use and transportation plans, golf cart routes, golf cart parking, and golf cart design criteria.

Task 2 – An assessment of golf cart circulation requirements including the appropriate routes and parking facilities; the legal and statutory requirements for registration, licensing and equipment; and the safe integration of golf carts with autos, bicycles and pedestrians.

Task 3 – An evaluation of potential golf cart crossing locations on East Lincoln Parkway and Twelve Bridges Drive.

Task 4 – The development of a golf cart circulation map showing suggested golf cart paths, lanes, routes and crossings

The information from these tasks is presented in the remainder of this report.

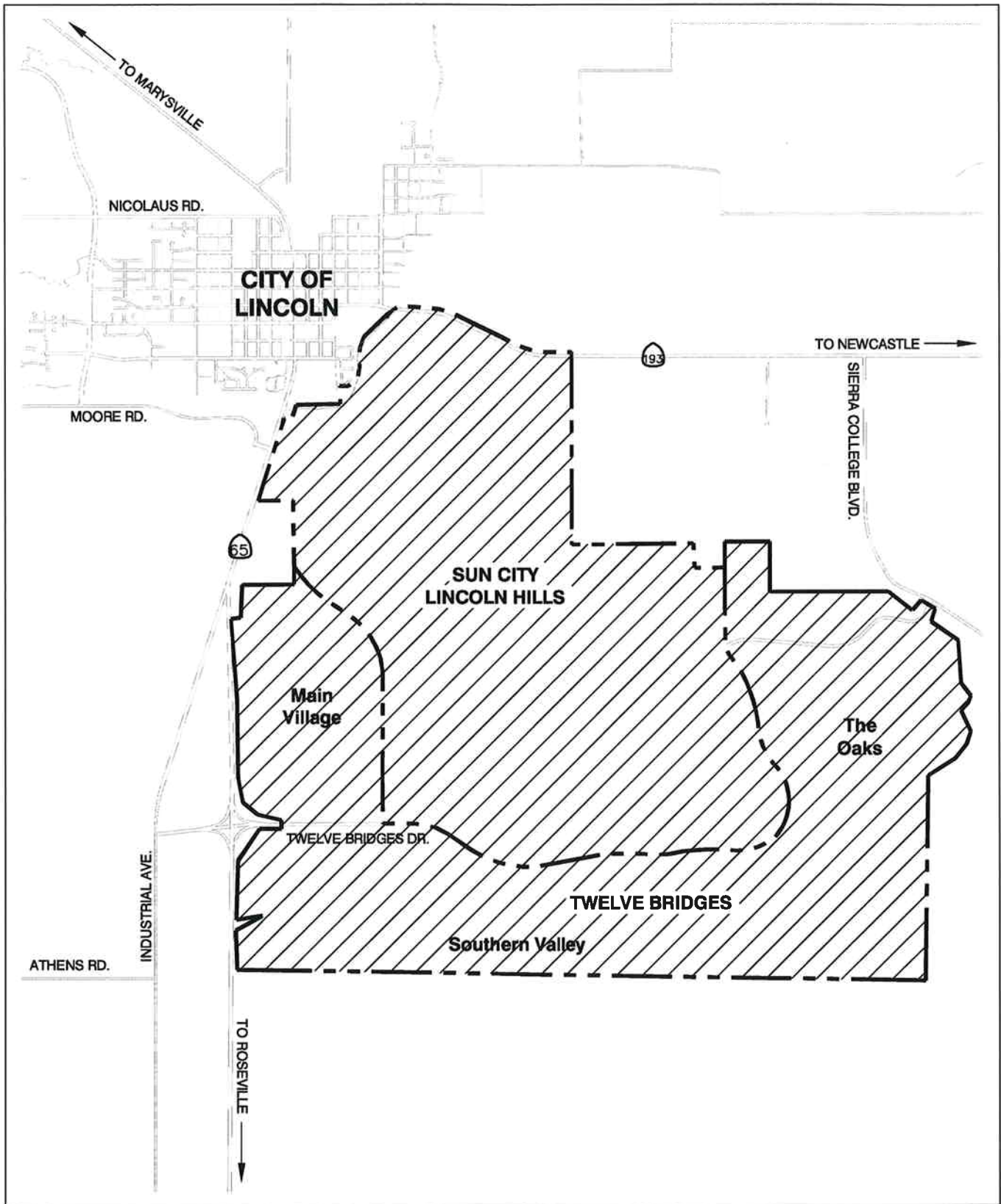
A. Background

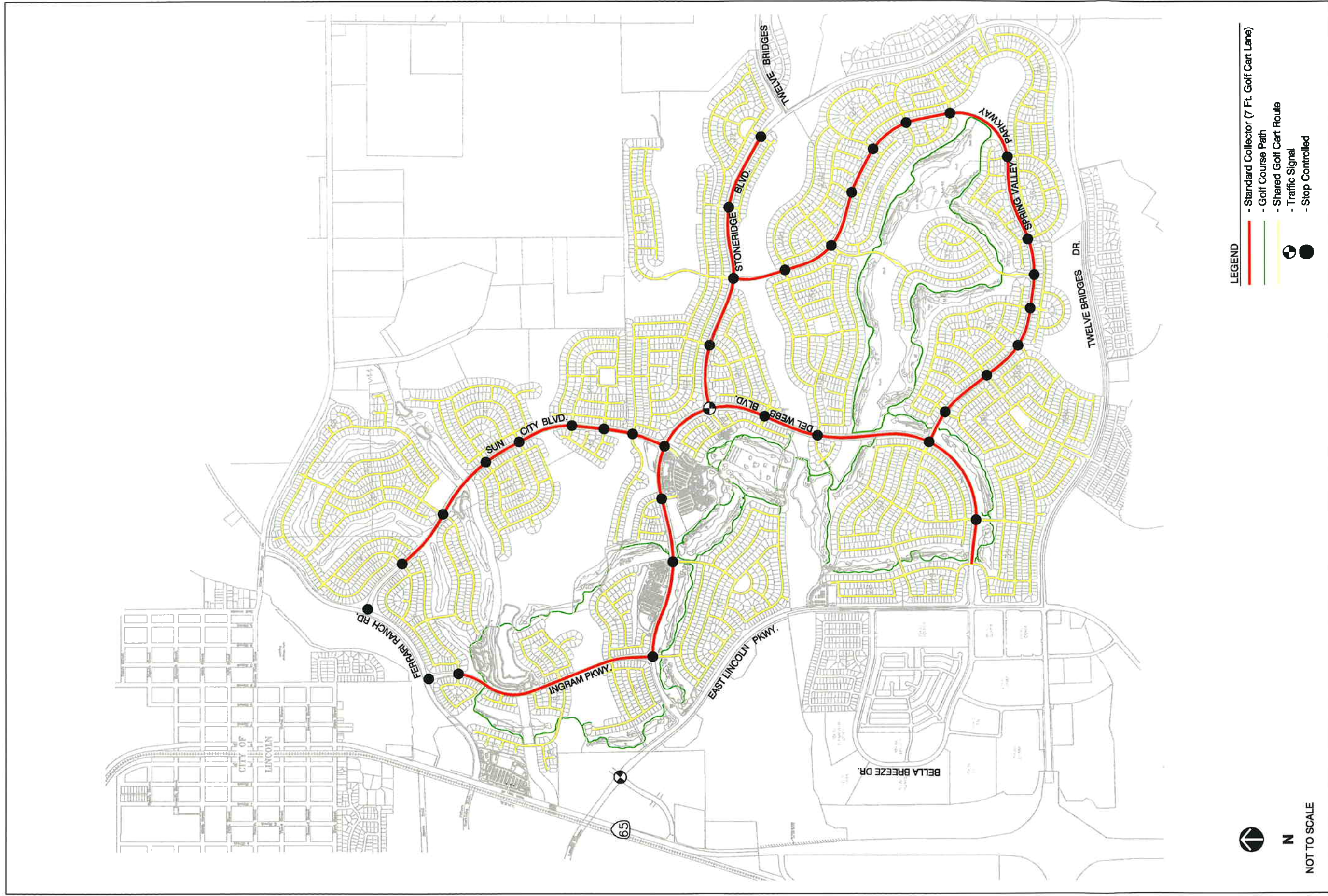
Twelve Bridges (Specific Plan Area A) is a planned mixed-use, non-age restricted conventional residential community located in the southern portion of Lincoln, California. The development includes the existing Twelve Bridges Golf Course facility, and the developing eastern, southern and western portions of the Specific Plan area. Twelve Bridges provides a variety of housing, business, and commercial opportunities and is composed of three community districts: The Main Village, The Southern Valley, and The Oaks. Each district is separated and buffered by open space, with the intent of establishing individual identity and sense of community. Housing types within Twelve Bridges will include both low-density and high-density designs to accommodate a variety of family interests and life styles. The community will include commercial and retail districts, educational facilities, churches and medical facilities.

Sun City – Lincoln Hills is a master planned residential community also within the City of Lincoln. As part of the Del Webb community, it is designed for active adults. The Revised Twelve Bridges Specific Plan EIR allowed an expansion of Sun City - Lincoln Hills from its original 5,300 units on 2,370 acres to 6,800 units on 3,000 acres. The expansion areas included the Ferrari option property, Leavell and Grey properties (East Lake) and the PH1 310 property. The project site is shown in Figure 1.

The land use expansion and resulting transportation system changes modified the on-site street circulation system within Sun City – Lincoln Hills and required a revision to the existing Sun City - Lincoln Hills golf cart transportation plan (GTCP). The Lincoln City Council adopted the revised GCTP in May 2001. The revised golf cart circulation plan (existing) for Sun City – Lincoln Hills is shown in Figure 2.

The City of Lincoln believes that alternative forms of clean, non-polluting transportation such as walking, biking and electric vehicles are essential to maintain the air quality and overall environmental quality of the community. Golf Carts have proven to be natural, efficient alternative vehicles in many adult oriented active communities. Note: The use of LSVs defined in the California Vehicle Code Section 385.5 is encouraged by the City of Lincoln.





As part of the GCTP development, five active golf cart development communities were contacted to determine if there are restrictions on the use of golf carts in the public right-of-way, and if safety has been an issue. The five golf cart communities contacted included:

- City of Avalon, Catalina Island, California
- City of Mesa, Arizona
- City of Phoenix, Arizona
- City of Orlando, Florida
- City of Palm Desert, California

A summary of each interview is included in Appendix A.

B. Definitions

The following words and phrases are used in this study:

- **“City”** means the City of Lincoln
- **“Plan Area”** means Twelve Bridges and Sun City – Lincoln Hills (Figure 1)
- **“Golf Cart”** means a motor vehicle having not less than three wheels in contact with the ground and an unladen weight of less than 1,300 pounds which is designed to be and is operated at not more than 15 miles per hour and is designated to carry golf equipment and not more than two persons, including the driver. (CVC Sec 345)
- **“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. A “low speed vehicle” is not a golf cart, except when operated pursuant to CVC Section 21115 or 21115.1. (CVC Sec 385.5)
- **“Golf Cart Facilities”** means all publicly owned facilities that provide for golf cart travel including golf cart lanes, golf cart routes, and golf cart crossings.
- **“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

C. Study Purpose

Chapter 6, Sections 1950 - 1965 of the Streets and Highway Code outlines the requirements for a city or county to establish and adopt a golf cart transportation plan. As described in Section 1950, the intent of the Legislature in enacting Chapter 6 is that the transportation plan be developed and designed to best serve the functional travel needs of the plan area, to have the physical safety of the golf cart driver's person and property as a major planning component, and to have the capacity to accommodate golf cart drivers of every legal age and range of skills. We believe GCTP complies with that intent.

The use of golf carts as an alternative means of travel for City of Lincoln residents is consistent with the City's general plan and promotes diversity in the transportation and circulation system. The following criteria were considered in evaluating the feasibility of using golf carts in the City of Lincoln:

- Golf carts should be used, to the extent possible, to access Lincoln's neighborhood community attractions, recreation centers, medical facilities, educational facilities, neighborhood commercial and retail facilities, and neighborhood parks and open spaces
- Golf cart routes should be provided on most residential streets to provide residents both mobility and accessibility without having to drive their automobile
- The use of golf carts should provide for the safe interaction between golf carts and all other transportation modes within the community including bicycle and pedestrian travel
- The use of golf carts should meet the intent of statutory (Streets and Highway Code and California Vehicle Code) and City of Lincoln provisions that include establishing design criteria for golf cart crossings, appropriate signage and markings to promote safety, rules for golf cart operations and circulation, permitting requirements, and parking

D. Study Approach

Consistent with Chapter 6.0, Sections 1950 - 1965 of the Streets and Highways Code, the study addresses the following key elements.

Route Planning. This section reviews the legal definitions and design considerations for golf cart circulation including whether the streets and other functional classifications of use will accommodate golf carts without an adverse impact on traffic safety.

Modal Integration. This section assesses the opportunities for coordination with other modes of transportation so that a golf cart driver may employ multiple modes of transportation in reaching a destination in the plan area. This section also considers integration with the existing golf cart facilities at Sun City – Lincoln Hills, and the City of Lincoln Neighborhood Electric Vehicle (NEV) Plan.

Golf Cart Parking Facilities. This section looks at parking requirements and design considerations at commercial centers, public areas, educational facilities, medical facilities, parks, and other destination locations.

Minimum General Design Criteria for Golf Cart Operations. This section discusses relevant design considerations and requirements for golf cart lanes, routes, signs, crossings, markers, and parking. It also addresses pedestrian and bicycle safety issues.

Minimum Design and Safety Criteria for Golf Carts. This section reviews safety, permitting and equipment requirements applicable to golf carts on public streets.

II. Existing Conditions

The following information summarizes the existing golf facilities within the Sun City – Lincoln Hills. This information provide a basis for determining the best locations for future connections and for key crossing points to allow access to the Twelve Bridges Village Center located west of Lincoln Parkway, the medical facilities and future Library located south of Twelve Bridges Drive, and retail opportunities at Sterling Pointe. Note: Future crossings of Highway 65 to access the western portions of the City of Lincoln will be part of an expanded study effort for NEVs.

A. SUN CITY - LINCOLN HILLS

The City of Lincoln adopted the Sun City – Lincoln Hills Golf Cart Transportation Plan (GTCP) in May 2001. The plan includes a designated golf cart circulation system within the Sun City development (see Figure 2). The circulation plan allows golf carts to share the travel lane with vehicles, pedestrians and bicycles on all residential streets within the Del Webb community. In addition, golf carts travel within marked golf cart lanes on the following collectors:

- Del Webb Boulevard
- Spring Valley Parkway
- Stoneridge Boulevard
- Ingram Parkway
- Sun City Boulevard

Golf carts are allowed to cross these collectors from residential streets at designated locations. Both intersection and mid-block crossings are allowed. As a safety measure, golf carts are not allowed beyond designated points on each of the five collectors listed above. In order to get golf carts into the Village Center, educational facilities, and Sterling Pointe, golf cart travel for permitted golf carts beyond these points will be necessary.

The following collectors are not currently designated for golf cart travel or crossing within the 2001 Sun City – Lincoln Hills GCTP:

- Twelve Bridges Drive
- East Lincoln Parkway
- Ferrari Ranch Road

Designated crossing points for some of these facilities will be necessary for golf carts to access locations south of Twelve Bridges Drive, and west of East Lincoln Parkway.

B. Twelve Bridges – South of Twelve Bridges Drive

The residential community south of Twelve Bridges Drive does not have an adopted golf cart plan. There is a desire by the City of Lincoln to allow golf cart access from this portion of Twelve Bridges to the rest of Sun City – Lincoln Hills, and to the retail and commercial opportunities planned for the Village Center west of East Lincoln Parkway and the educational and library facilities to be located south of Twelve Bridges Drive.

C. Golf Cart Access To Safeway Shopping Center At Highway 65 And Ferrari Ranch Road

Golf carts in the residential areas north of Twelve Bridges Drive and east of East Lincoln Parkway currently have golf cart access to the Safeway shopping center through the golf cart path system west of Ingram Parkway. Golf carts can travel on an 8 foot path and enter the parking lot through an opening protected by bollards. Striped golf cart parking stalls (7' x 15' are provided at various locations within the shopping center. The pictures below show the existing path, access point, and striped parking stalls with signs.

Photos looking toward Ingram Parkway from entrance to shopping center and Parking stalls in the Safeway shopping center.



III. Golf Cart Circulation

A. Functional Classifications

- **Golf Cart Lanes:** Golf cart lanes are portions of public roadways that are designated by signs and pavement markings for golf cart travel. Golf cart lanes are 7 feet wide and allow golf carts to travel adjacent to automobile traffic but within a striped separated space. Bicyclists may share golf cart lanes if there is not a separate bicycle lane on the roadway. Golf cart lanes are appropriate on residential collector streets that meet the following design criteria:
 - ⇒ Road Design Speed – between 25 and 45 miles per hour
 - ⇒ Automobile Traffic Volume – Streets should be capable of providing a high level of service to insure that adequate capacity exists for automobiles, bicyclists and golf carts. 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 1, a two lane collector street suggests a target vehicular threshold of 12,000 vehicles per day to maintain LOC C.
- **Golf Cart Routes** are designated residential streets and alleys, which are in compliance with Section 515 of the California Vehicle Code, have speed limits of 25 miles per hour or less, and are shared with other motor vehicles and bicyclists. Golf Cart Routes are feasible on residential streets and private alleys meeting the following design criteria:
 - ⇒ Road Design Speed: 25 mph or less. CVC Sec 345 and Sec 515.
 - ⇒ Forecast Automobile Traffic Volume: In order to facilitate the safe co-existence between golf carts, autos, bicycles and pedestrians, candidate golf route streets should have relatively low volumes of traffic. Based on our experience, the speed restriction and safety concerns suggest that residential streets should carry no more than 3,000 to 4,000 vehicles per day.

Table 1
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)*.

- **Two-Way Golf Cart Paths** are defined for the purposes of this study as an off-street path with a minimum width of 14 feet with a center lane stripe plus a one foot shoulder on each side (total right-of-way width of 16 feet). This width is deemed necessary to allow golf carts to pass safely in the opposite direction considering their size and speed. Golf cart 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 and to pass in the same direction of travel
- **One-Way Golf Cart 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 traveling in the same direction.

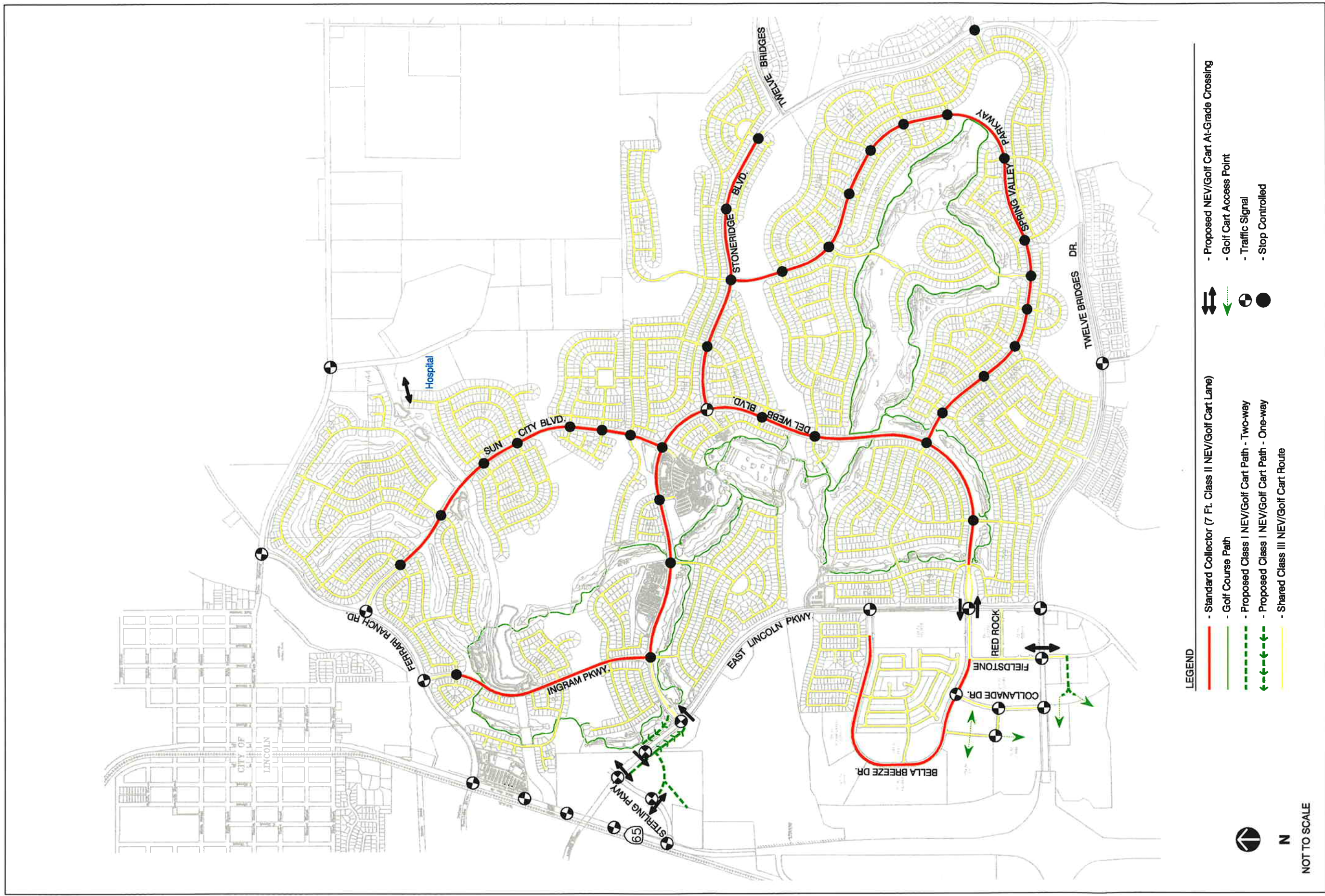
- **Golf Course Cart Crossing Zones**, as defined in Section 21115.1 of the CVC, are locations on public streets for use by golf carts to cross, at any time other than during darkness, on any street, other than a state highway, which has a posted speed limit of 45 miles per hour or less and which is immediately adjacent to a golf course. For the purpose of this section, “golf cart” includes “low speed vehicle”.

B. Expanded Golf Cart Circulation System

The proposed Golf Cart Circulation System for Twelve Bridges and Sun City – Lincoln Hills is illustrated in Figure 3.

The expanded golf cart circulation system includes the following components in addition to those in the adopted Sun City – Lincoln Hills GCTP.

- **Golf Cart Lanes:** Striped 7-foot golf cart/NEV lane on the following facilities:
 - Bella Breeze Drive (residential collector) - North and south sides of Bella Breeze Drive beginning at Fieldstone and continuing around the loop to just west of E. Lincoln Parkway. If the right-of-way permits, a separated four-foot bike lane is recommended adjacent to the golf cart lane on each side. Otherwise, bicyclists will share the golf cart/NEV lane.
- **Golf Cart Routes:** Shared use golf cart routes are designated on the following facilities:
 - Del Webb Boulevard north entrance from Ingram Parkway to East Lincoln Parkway; and Del Webb Boulevard south entrance from the monument sign to East Lincoln Parkway.
 - Bella Breeze Drive from Last Lincoln Parkway to Fieldstone
 - Red Rock Road between East Lincoln Parkway and Bella Breeze Drive
 - Collanade Drive between Bella Breeze Drive and Twelve Bridges Drive
 - Fieldstone Drive between Bella Breeze Drive and the Library/educational complex
 - Designated residential streets and alleys with speed limits of 25 miles per hour or less (Figure 3)



- LEGEND**
- Standard Collector (7 Ft. Class II NEV/Golf Cart Lane)
 - Golf Course Path
 - Proposed Class I NEV/Golf Cart Path - Two-way
 - Proposed Class I NEV/Golf Cart Path - One-way
 - Shared Class III NEV/Golf Cart Route
 - Proposed NEV/Golf Cart At-Grade Crossing
 - Golf Cart Access Point
 - Traffic Signal
 - Stop Controlled

 N
 NOT TO SCALE

**PROPOSED CITY OF LINCOLN TWELVE BRIDGES
GOLF CART CIRCULATION PLAN
FIGURE 3**

Note: The designation of these facilities as shared use golf cart routes is consistent with their functional classification (residential streets) and/or design speed of 25 miles per hour or less. In addition, the intended crossing at Twelve Bridges Drive and East Lincoln Parkway so that golf carts may continue to other destinations, is consistent with Section 21115.1 of the CVC.

- **Two Way Cart Paths:** Two-way off-street cart paths (14 feet in width) are proposed in the following locations.
 - West side of East Lincoln Parkway from Parkway Pointe to Sterling Pointe retail and commercial.
 - South side of Twelve Bridges Drive and west of Fieldstone extending across Collonade Drive extension to the library/educational facilities (currently vacant land)
- **One Way Cart Paths:** A one-way off-street golf cart path (8 feet in width) is proposed on the following locations:
 - The east side of East Lincoln Parkway extending from Del Webb Boulevard to the first intersection at Parkway Point. This path will allow one-way travel for golf carts, pedestrians, roller-bladders, skateboarders and bicyclists. The path will be protected by a 12 inch white stop bar at East Lincoln Parkway.
 - The west side of East Lincoln Parkway extending from Parkway Point adjacent to the sidewalk on East Lincoln Parkway to Del Webb Boulevard. Golf carts will cross at the signalized intersection to access the golf cart lanes on Del Webb Boulevard. Bollards and warning signs will be posted to prevent golf carts from driving on East Lincoln Parkway.
- **Golf Cart Crossings:** Several at-grade crossings of collector streets are proposed for the golf cart plan. These crossings will exist at either signal or stop controlled intersections. Specific crossing design recommendations for the following crossing locations are described below:
 - East Lincoln Parkway (four locations)
 - Twelve Bridges Drive (two locations)

- Sterling Parkway (one location)

East Lincoln Parkway

East Lincoln Parkway is currently a north/south two-lane collector extending from SR 65 to Twelve Bridges Drive. The existing plus project (ADT) volume with the planned medical and commercial development in place is estimated to be approximately 12,800 vehicles per day between Twelve Bridges Drive and Sterling Pointe. Cumulative plus project volumes (2020) are estimated to increase to approximately 19,000 through 24,000 vehicles per day.

Four at-grade golf cart crossings are proposed on East Lincoln Parkway at the intersection of: 1) East Lincoln Parkway/Del Webb Boulevard/Bella Breeze Drive; 2) East Lincoln Parkway/Del Webb Boulevard/Church property; 3) East Lincoln Parkway/Sterling Parkway; and 4) East Lincoln Parkway at Parkway Pointe.

- 1) The crossing design for East Lincoln Parkway/Del Webb Boulevard/Bella Breeze Drive should provide for through travel within the existing travel lane and adjacent to the striped crosswalk. Golf carts should drive as close as practical to the right side of the lane while crossing the intersection. After crossing the intersection, golf carts would continue on Fieldstone (golf cart route) to access to the internal street and/or path system south of Bella Breeze Drive, or enter the striped golf cart lane on Bella Breeze Drive to access the various commercial facilities adjacent to it. Photographs of the crossing location are shown below.



Photo – Del Webb Boulevard looking west across East Lincoln Parkway at the intersection with Bella Breeze Drive

- 2) The crossing design for East Lincoln Parkway/Del Webb Boulevard/Church site should provide for through travel within the existing travel lane and adjacent to the marked

crosswalk. After crossing, golf carts would enter the designated two-way path system to access the private church sites just west of East Lincoln Parkway or proceed to Sterling Pointe.

The two way cart path would be approximately 14-feet wide in order to accommodate golf carts traveling in the opposite direction, as well as sharing the facility with other non-auto modes. "Bollards" would be placed on either side of the entrance to the path to prevent golf carts from driving on any sidewalks planned for the site. The spacing of the Bollards would allow for a 4-foot opening, consistent with the Americans with Disability Act of 1990 (Public Law 101-336) and the building requirements contained in Government Code Sec 4450 - 4460.



Looking south across East Lincoln Parkway toward proposed church site from proposed entrance at Del Webb Boulevard

3) The crossing design for East Lincoln Parkway/ Sterling Parkway provides for through travel from the path system to Parcel A via a crossing at Sterling Parkway (signalized intersection or stop controlled) or to Parcel C via a crossing of East Lincoln Parkway/Sterling Parkway (signalized intersection) within the existing travel lane. All streets within Sterling Point will be 25 miles per hour or less and therefore are designated golf cart routes.

4) The crossing at Parkway Point will be via a 12 foot white cart crosswalk. Golf carts will cross at the signal controlled intersection then proceed to the two-way path system to access either Sterling Point commercial or the church site on the south side of East Lincoln Parkway.

Twelve Bridges Drive

1) A north/south crossing of Twelve Bridges Drive is feasible at the proposed signal controlled intersection of Twelve Bridges Drive and Fieldstone Drive. The crossing design should provide for through travel within the existing travel lane and adjacent to the

marked crosswalk. Golf carts would have access to the library/educational facility complex south of Twelve Bridges Drive as shown in Figure 3.

Sterling Parkway

A north-south crossing of Sterling Parkway is shown to provide access from Sterling Point Parcel A to Parcel B at the proposed signalized intersection. Golf carts would enter the intersection via the proposed path system from the Church site or internal street system, which ever is constructed. (see Figure 3)



Photo showing left turns from E. Lincoln Parkway to Sterling Parkway

IV Golf Cart Operations and Design Criteria

A. Modal Integration

Golf cart, bicycle and pedestrian facilities will interface on the local, residential and collector streets within the plan area. These streets will be designated with appropriate signage alerting residents to the shared use function of the street and/or separated golf cart lanes (see Appendix B). In addition, the off-street path system will be designed to accommodate a variety of users including golf carts, “permitted golf carts”, “speed modified golf carts”, NEVs, pedestrians, skateboarders and roller-bladders. The functional classification and integration of these various modes is discussed below.

Table 2 summarize the type of Low Speed Vehicle (LSV) and the type of roadway the LSV is permitted to use outside of a Golf Cart Transportation Plan (GCTP), inside a GCTP, and within a Neighborhood Electric Vehicle (NEV) Transportation Plan. The following definitions apply to the types of LSVs represented.

A **Golf Cart** is an electric vehicle that does not possess the full compliment of safety equipment mandated by federal legislation for a LSV to use public roadways. Due to the lack of safety equipment, Golf Carts are restricted from operating within the public right of way. Golf Carts are only able to cross public roadways at designated crossings within a GCTP.

A **Permitted Golf Cart** is an electric vehicle that possesses all safety equipment mandated by federal legislation for a LSV to use public roadways. This group also includes “speed modified” golf carts. Currently, Permitted Golf Carts are not allowed to operate on public streets outside of a GCTP. Permitted Golf Carts are allowed to operate on public streets within a GCTP, with the exception of “arterial” roadways.

NEV & Golf Carts with License Plates are LSVs licensed by the State Department of Motor Vehicles (DMV) and have access to all public roadways, either within or outside of a GCTP, as long as the roadway’s speed limit is 35 mph.

The table also summarize roadway use for LSVs by “functional classification”. These functional classifications include “residential”, “collector”, and “arterial” roadways.

Residential streets have a prima facia speed limit of 25 mph. These roadways are typically narrow, allow parking on both sides of the street, and are shared by vehicles and bicycles.

Collector streets can have speed limits that range between 25 mph and 35 mph. They are typically wider than residential streets and may or may not allow parking. Collector roadways also typically provide striped bike lanes and, in GCTP areas, include striped bicycle and Permitted Golf Cart lanes.

Arterial roadways typically have speed limits higher than 35 mph. They primarily receive traffic from collector roadways. Intersections and driveways for commercial uses are moderately spaced to increase the capacity of the arterial roadways. Driveways from residences are prohibited.

Arterial roadways include: Ferrari Ranch Road; Joiner Parkway; East Lincoln Parkway; Twelve Bridges Drive; and Nicolaus Road

Table 2
Functional and Operational Classifications for Golf Carts
STREETS OUTSIDE GOLF CART TRANSPORTATION PLAN

	Functional Classification		
	Residential Speed: ≤ 25 mph	Collector Speed: 25 mph ≤ 35 mph	Arterial Speed: > 35 mph
Golf Cart	No	No	No
Permitted Golf Cart	No	No	No
NEV & Golf Cart w/License Plate	Yes	Yes	No

STREETS WITHIN GOLF CART TRANSPORTATION PLAN

	Functional Classification		
	Residential Speed: ≤ 25 mph	Collector Speed: 25 mph ≤ 35 mph	Arterial Speed: > 35 mph
Golf Cart	No (Except at designated crossings)	No (Except at designated crossings)	No (Except at designated crossings)
Permitted Golf Cart	Yes	Yes	No (Except at designated crossings)
NEV & Golf Cart w/License Plate	Yes	Yes	No (Except at designated crossings)

STREETS WITHIN NEV TRANSPORTATION PLAN (outside of GCTP)

	Functional Classification		
	Residential Speed: ≤ 25 mph	Collector Speed: 25 mph ≤ 35 mph	Arterial Speed: > 35 mph
Golf Cart	No (Except at designated crossings)	No (Except at designated crossings)	No (Except at designated crossings)
Permitted Golf Cart	No (Except at designated crossings)	No (Except at designated crossings)	No (Except at designated crossings)
NEV & Golf Cart w/License Plate	Yes	Yes	Yes (in NEV/Bike Lane)

B. Golf Cart Parking Facilities

In order to promote golf cart travel, 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:

- 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 – two to three 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 may vary with larger size structures and/or user demand

C. Golf Cart Operations

The following are required of a golf cart operator using a golf cart on a public street:

1. Golf Cart Operator Requirements
 - a. A golf cart operator must have a valid driver's license issued by the State of California or an acceptable foreign jurisdiction, in accordance with CVC Sections 12502-12505 CVC
 - b. A golf cart operator must comply with the financial responsibility requirements established pursuant to Chapter 1 (commencing with Section 16000) of Division 7 of the CVC
 - c. All golf carts operated on public streets within the plan area must have a valid permit issued by the local jurisdiction, except those carts devoted exclusively for use on golf course paths which cross public streets at designated crossings. These crossings only apply to the Del Webb development within Sun City – Lincoln Hills
 - d. Golf carts must be maintained in a safe condition after initial permitting. Golf carts are normally subject to a regular inspection by the local police department as part of the permit process described under Section 8.2 of the CVC.

2. Permit Process

Golf carts operated on a public street, except those restricted to operation within a designated crossing between golf holes, are subject to a permit and inspection process by the local jurisdiction. The following has been established by the City of Lincoln for golf cart operations at Sun City - Lincoln Hills Adult Community and would have application to golf cart operations within Twelve Bridges and downtown Lincoln.

- a. Golf cart applications are obtained from the City of Lincoln Police Department. The application includes resident information, a checklist of operator/safety requirements, proof of insurance, and a \$25 fee.
- b. Golf carts are inspected by the City of Lincoln Police Department to make sure safety requirements are met.
- c. Golf cart operator permits and inspection certificates are valid for two years.

Note: It would be feasible to extend the same permitting process to golf carts operated within Twelve Bridges and/or downtown Lincoln.

D. Minimum Golf Cart Design Criteria

1. Authority to Install

The City's Director of Public Works is authorized to place and maintain, or cause to be placed and maintained, the signs, striping and pavement markings described in this study. *Note: any modification of golf cart circulation routes and/or crossings will be at the discretion of the Director of Public Works of the City of Lincoln.*

2. Golf Cart Facility Design Standards

- a) **NEV/Golf Cart Lanes:** Cart lanes should be at least seven feet (7') wide measured from the adjacent lip of gutter, have a minimum vertical clearance of eight (8) feet from obstructions, have a smooth paved or concrete surface, and be separated from vehicle travel lanes by two solid four inch (4") wide white lines. On approaches to intersections, golf cart lanes should end, with "dashed" cart lane lines beginning 200 feet from the intersection. Cart lanes should be designated by appropriate pavement legends and signs posted along the way.

- b) **NEV/Golf Cart Routes:** Cart routes may be designated on local streets with a maximum posted speed limit of 25 miles per hour. All golf cart route transitions should be clearly marked. It is the intent of golf cart routes to be facilities shared with bicycles and motorists.
- c) **NEV/Golf Cart Crossings:** For the purpose of this plan, cart crossings outside of Sun-City Lincoln Hills will occur at signal or stop controlled intersections. Golf carts will cross the intersection within the right-hand travel lane adjacent to any marked cross walk. No marked crosswalks, other than those for bicyclists and pedestrians will be provided. Crossings have to meet minimum Caltrans sight distance requirements (Highway Design Manual).

3. Specifications for Signs and Pavement Markings outside of Sun-City Lincoln Hills

The following standards and policies for NEV/golf cart signing and pavement markings are recommended outside of Sun City – Lincoln Hills (Del Webb). Sign designations are subject to change when adopted by Caltrans.

- a) **SG-bb, Neighborhood Electric Vehicle (NEV) Community.** The NEV Community sign (SG-bb) should be placed along streets entering the plan area (Appendix B Figure 1)
- b) **SR-x, Neighborhood Electric Vehicle (NEV) Lane.** The NEV Lane symbol sign (SR-x) should be placed at the beginning of each designated NEV Lane, at all major changes in direction, at the far-side of collector street intersections and at a maximum of one-half mile intervals (Appendix B Figure 2)
- c) **SR-xx Combination NEV Lane/Bike Lane.** The Combination NEV Lane/Bike Lane sign (SR-xx) should be placed on NEV Lanes where a Class II Bike Lane is also provided. (Appendix B Figure 3)
- d) **SR-y No NEVs.** The NO NEVs symbol sign (SR-y) should be placed at entrances to public streets within the development that will not have NEV lanes or will not be designated as an NEV route. The sign would 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 the public right-of-way. (Appendix B Figure 4)
- e) **SR-yy, NEVs Prohibited Beyond This Point.** The NEV Prohibited Beyond This Point educational plate (SR-yy) may be placed below the SR-y No NEVs symbol sign for added emphasis. (Appendix B Figure 4)

- f) **SR-z, No Golf Carts Symbol Sign.** The NO Golf Carts symbol sign (SR-z) should be placed at entrances to public streets within the development that will not accommodate golf cart travel unless the cart is an NEV or speed-modified. This sign would be appropriate on Del Webb Boulevard and Ingram Parkway where they cross East Roseville Parkway and Ferrari Ranch Road respectively. The sign would 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 5)
- g) **SR-zz, Golf Carts Prohibited Beyond This Point.** The Golf Carts Prohibited Beyond This Point educational plate (SR-zz) may be placed below the SR-z No Golf Cart symbol sign for added emphasis (Appendix B Figure 5)
- h) **SW-bb, NEV Crossing.** The NEV Crossing symbol sign (SW-bb) should be used at an NEV crossing location other than a signalized intersection. The sign may also be posted up to 50 feet in advance of the crossing (SW-aa) (Appendix B Figure 6)
- i) **SW-cc, NEV Crossing.** The NEV Crossing symbol educational plate (SW-cc) may be placed below the SW-bb NEV crossing symbol sign or the Advanced NEV Crossing sign SW-aa for added emphasis (Appendix B Figure 6)
- j) **SG-aa, NEV Route.** The NEV Route symbol sign (SG-aa) 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 7)

4. Safety Criteria for Golf Carts

The following equipment specifications are required for operation of NEVs and speed-modified golf carts on public streets within the City of Lincoln and Twelve Bridges:

- a) The golf cart shall conform to the specifications contained in Section 345 of the California Vehicle Code (CVC).
- b) In addition, golf carts shall be equipped and operated with the following:
 - 1) Brake Lights conforming to CVC 24603;

- 2) Front and rear Turn Signal Indicator Lights, conforming to CVC 24952 and 24953;
- 3) Full Rear View Mirror mounted in a continuous multi-section array across the top of the passenger compartment CVC 26709;
- 4) Single Beam HeadLamps, conforming to CVC 24400;
- 5) Tail Lights, conforming to CVC 24600;
- 6) Parking Brake CVC 26450;
- 7) Seatbelts for both Driver and Passenger, in two point (i.e., lap) mounting, conforming to 49-CFR-571.209 and 571.210;
- 8) Safely equipped or properly loaded to conform to CVC Section 24002.

The above standards do not apply to golf carts used exclusively for normal play on the golf course within Sun City – Lincoln Hills or Twelve Bridges, and that are not intended for use on the adjacent public streets system.

APPENDIX A – INTERVIEWS

APPENDIX A - INTERVIEWS

As part of our data collection efforts, we contacted the following active golf cart development communities to determine if there are restrictions on the use of golf carts in the public right-of-way, and if safety has been a concern:

- City of Avalon, Catalina Island, California
- City of Mesa, Arizona
- City of Phoenix, Arizona
- City of Orlando, Florida
- City of Palm Desert, California

City of Avalon, California

The City of Avalon was contacted concerning the use of golf carts on Catalina Island. A representative from the planning department advised that golf carts were allowed on all streets within the downtown area of the City of Avalon. To date, golf cart safety has not been a problem. Specific operational requirements include:

- Golf carts are required to comply with all equipment requirements in the Streets and Highway Code and California Vehicle Code
- Golf cart operators are required to have a drivers license
- All streets within the downtown area are posted with a 25 miles per hour limit
- There are no special designated lanes for golf carts and they do share the road with bicycles, pedestrians and vehicles
- Accidents and safety have not been a problem

City of Mesa, Arizona

Rene Aim, transportation planner with the City of Mesa was contacted by telephone. Ms Aim advised that the City of Mesa promoted the use of golf carts/electric vehicles for its retirement communities. Mis Aim advised that electric vehicles travel within the vehicle right-of-way but usually close to the right hand side of the road. They share facilities with pedestrians and bicycles. Accidents and safety have not been a problem.

Mis Aim also indicated that the City had recently passed some revised statutes as part of the transportation section of their Municipal Code (28.966 – Neighborhood Electric Vehicles: speed: restrictions). The following sections are direct quotes from Section 28.966:

- “A neighborhood electric vehicle shall not be operated at a speed of more than twenty-five miles per hour”
- “A neighborhood electric vehicle shall not be driven on a highway that has a posted speed limit of more than thirty-five miles per hour. This subsection does not prohibit a neighborhood electric vehicle from crossing a highway that has a posted speed limit of more than thirty-five miles per hour at an intersection.”
- “A neighborhood electric vehicle shall have a notice of the operational restrictions applying to the vehicle permanently attached to or painted on the vehicle in a location that is in clear view of the driver.”

City of Phoenix, Arizona

The Del Webb Corporation in Phoenix, Arizona was contacted concerning golf cart usage and policies. The Land Development Department for Del Webb advised that golf carts are allowed within the Del Webb community on all residential streets, and on cross collector streets in order to travel between golf holes. If the cart is operated within the public right-of-way on the street, the operator must be licensed and the golf cart must comply with the equipment requirements in the Arizona Vehicle Code. If the cart is only operated on the golf course or to cross streets to continue golf play, no equipment requirements are in effect. Golf carts must use the designated golf cart lane on arterials and collectors within the development. The Land Development Department did indicate that golf carts have been observed traveling outside of the development and crossing a major 6-lane arterial (Grand Boulevard) to access the Sun City West Del Webb community. Del Webb does not sanction this movement.

We also contacted the City of Phoenix, Department of Public Works and were referred to Steve Turner of the Department of Parks and Recreation. Mr. Turner advised that golf carts and electric vehicles are allowed on public streets if they meet all equipment requirements and if the drivers have a valid drivers license. However, due to the size of roadways in Phoenix and the high traffic speeds, he does not see much golf cart activity outside of the Del Webb communities. According to Mr. Turner, the crossings that take place on Grand Boulevard occur at a signalized

intersection. To his knowledge, no striped golf cart lanes are provided outside of the communities.

City of Orlando, Florida

Ken Steigerwald from the Neighborhood Traffic Management Program was contacted concerning the use of golf carts in the City of Orlando. Mr. Steigerwald advised that golf carts are not allowed on any streets outside of golf cart communities. Within the golf communities, carts can be operated on all streets and share the facility with pedestrians, bicycles and vehicles.

City of Palm Desert, California

The most detailed information on the use of golf carts was obtained from the City of Palm Desert in California. Palm Desert has been participating in a five-year pilot program (AB 1229; AB 3298) on the use of golf carts to access not only golf and recreational amenities, but also schools, colleges, parks, shopping centers, employment centers and governmental offices. Mr. Mark Greenwood, the City's transportation engineer, was contacted by telephone concerning the program. Mr. Greenwood sent Fehr & Peers a copy of the Golf Cart Transportation Program Engineering Study, safety guidelines and operator restrictions prepared for the study.

Based on the information obtained, the purpose of the program was to evaluate the feasibility of golf carts as a means of alternative transportation within the City of Palm Desert. The study had the following goal and objectives:

Goal: Establish a Golf Cart Circulation System that will provide safe and convenient transportation for golf carts within the City of Palm Desert.

Objectives:

- Golf cart facilities should provide linkages between residential neighborhoods, civic center, parks, educational, shopping and recreational facilities
- Develop designated routes on or adjacent to local roadways with proper striping and signing within the City of Palm Desert
- Off-street golf cart paths should use open space corridors, flood control and utility easements where possible and minimize cross traffic conflicts with automobiles
- Provide connections to the proposed golf cart system within the City of Indian Wells

Mr. Greenwood indicated the program was working very well and there were plans to extend the program into neighboring communities.

This program is of particular interest because the proposed system of routes includes crossings of two state highways (SR 111 and SR 74). It should be noted that information obtained through telephone conversations with Mr. Greenwood and with a representative from Caltrans indicated that the crossing designs were similar to other signalized intersections along state highways. Nothing special was added. As-built designs for these crossings were requested from Caltrans, District 8, but received to-date.

Sergeant Jaksch from the City of Palm Desert Police Department was contacted concerning safety and accident concerns they may have with the program. According to Sergeant Jaksch, neither safety nor accidents have been a problem. Sergeant Jaksch recalled only one accident occurring over the past three years that involved a golf cart. To his recollection, the accident was a non-injury collision with a motor vehicle.

Within the City of Palm Desert, golf carts are allowed to:

- Share the road with bicycles, pedestrians, and vehicles on streets with 25 mile per hour speed limits
- Use a designated striped golf cart lane on streets posted 35 miles per hour or greater
- In some cases, share sidewalks that are wide enough to accommodate bicycles and pedestrians.

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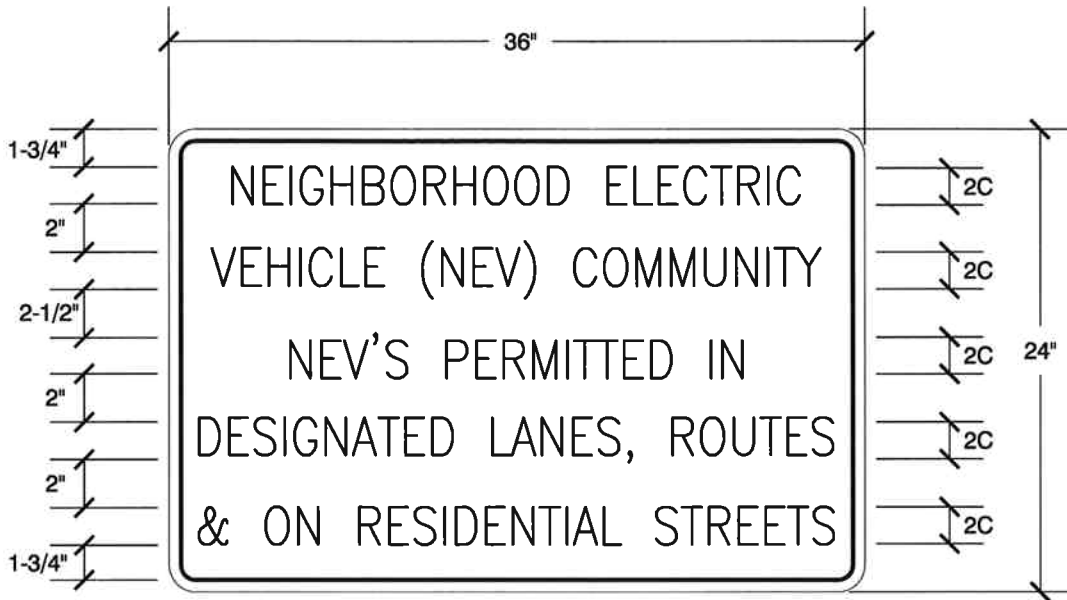
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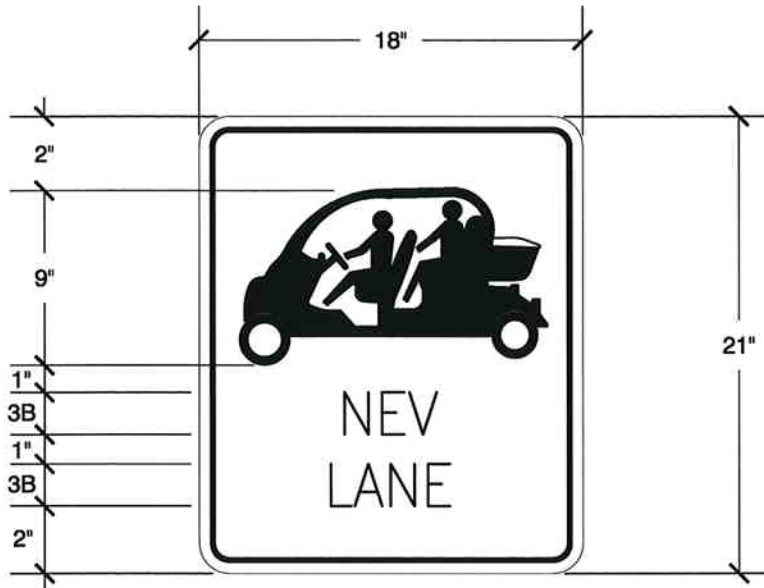
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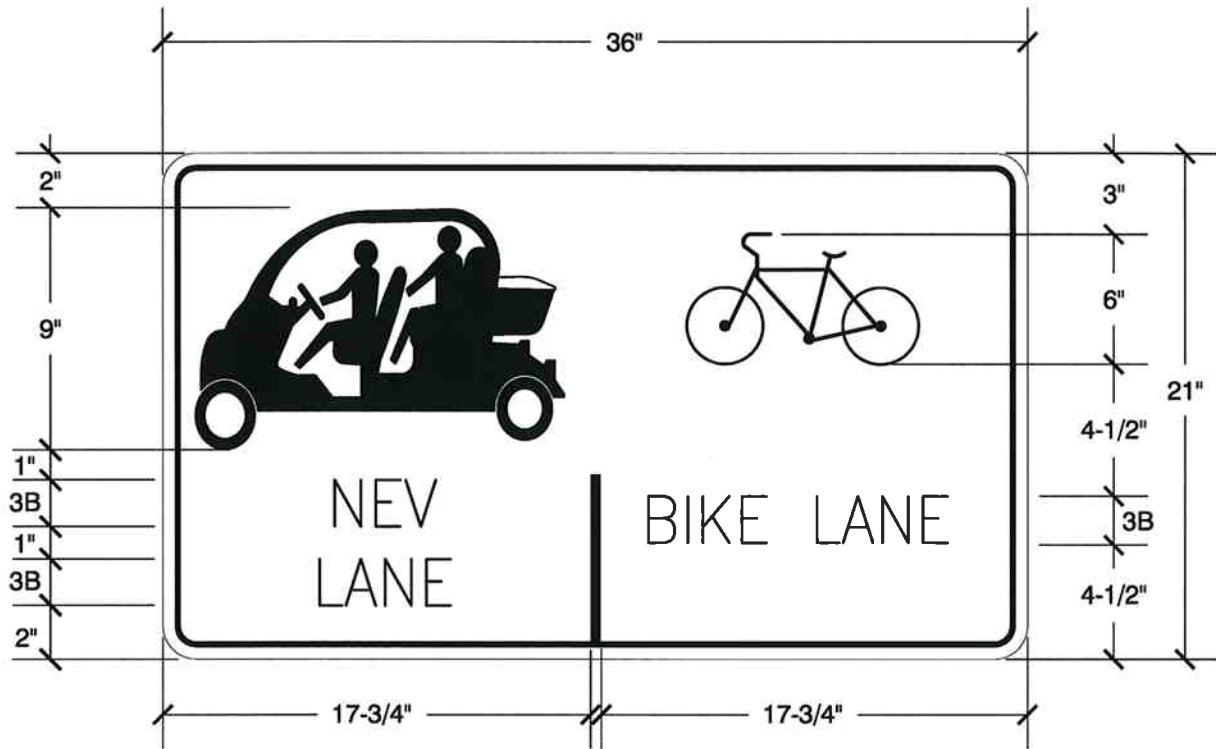
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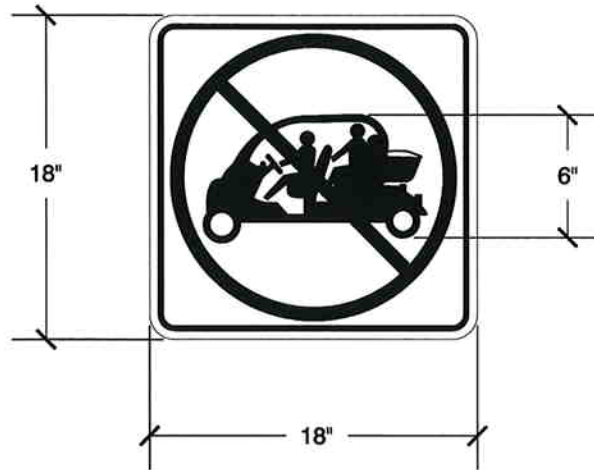
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APPENDIX B – SIGNS AND MARKINGS

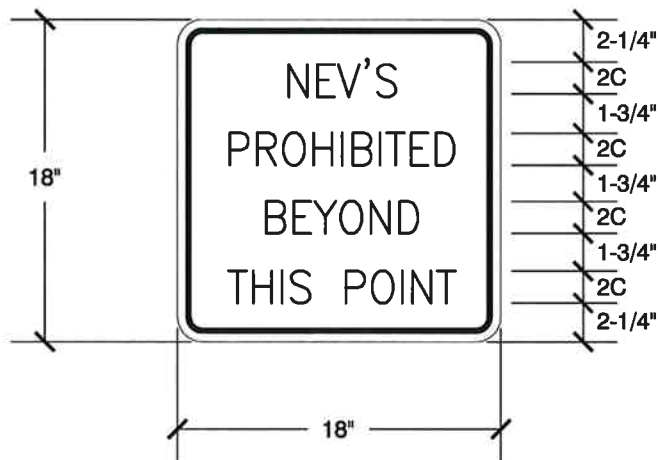






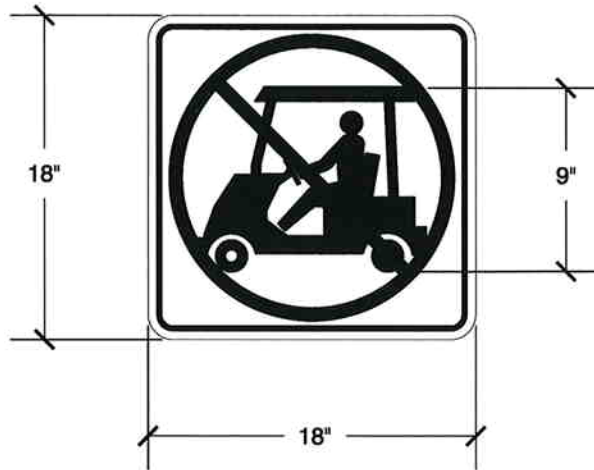


SR-y NO NEV'S SYMBOL SIGN

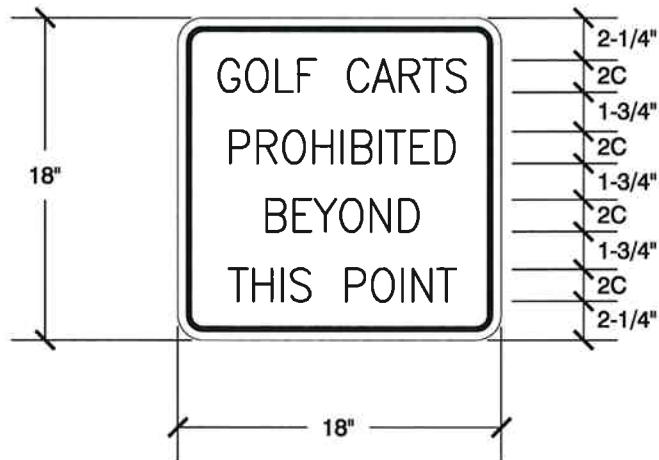


SR-yy NEV'S PROHIBITED BEYOND THIS POINT

**SR-y NO NEV'S SYMBOL SIGN
SR-yy NEV'S PROHIBITED
BEYOND THIS POINT**

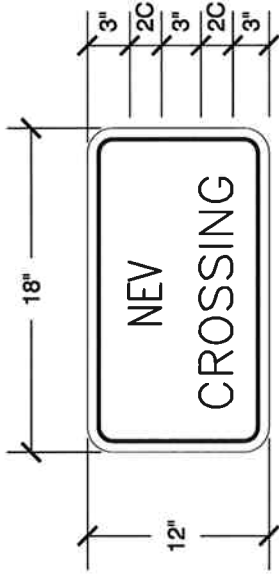


SR-z NO GOLF CARTS SYMBOL SIGN

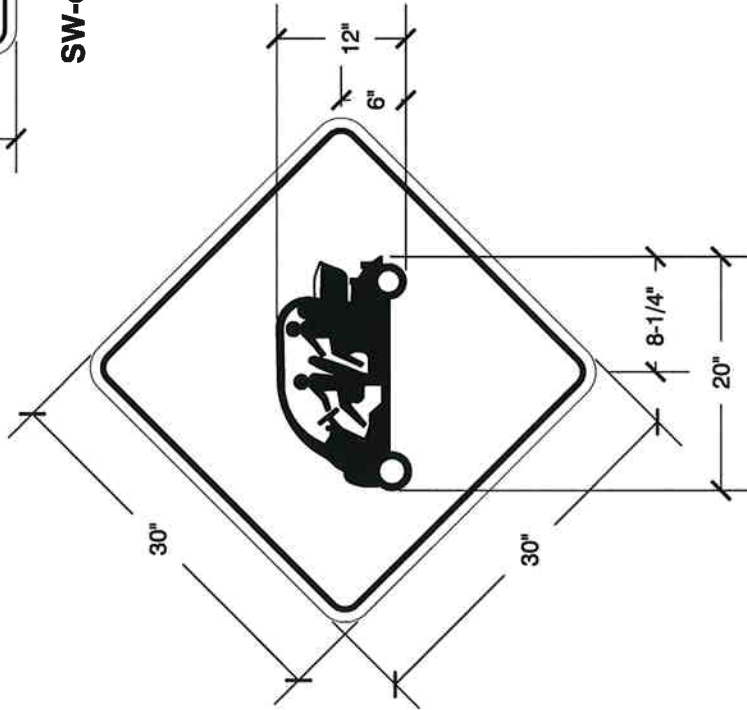


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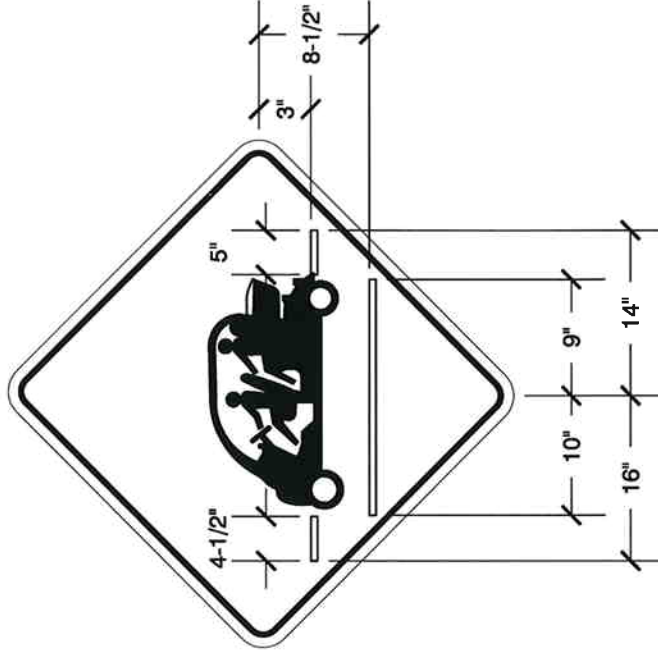
**SR-z NO GOLF CARTS SYMBOL SIGN
SR-zz GOLF CARTS PROHIBITED
BEYOND THIS POINT**



SW-cc NEV CROSSING



SW-aa ADVANCE NEV CROSSING



SW-bb NEV CROSSING

SW-aa ADVANCE NEV CROSSING
SW-bb NEV CROSSING
SW-cc NEV CROSSING

APPENDIX FIGURE 6

