

TO: Kevin Johnston, County of San Diego
FROM: Dawn Wilson, PE TE
DATE: June 10, 2020

1. OBJECTIVE

The focus of the Valley Center Road Corridor Concept Plan is to formalize recommendations that improve access and mobility for users of all abilities. The corridor study area extends along Valley Center Road from Cole Grade Road to Woods Valley Road. This technical memorandum explores potential solutions that address identified issues and opportunity areas identified in the existing conditions report (April 2019) and from comments received from the community (March 2019 Workshop). Various trade-offs and best practices are presented that will improve overall mobility along the corridor. As shown in Figure 1, there are a variety of travel modes along Valley Center Road that can be further improved. Three themes have been developed that provide for a combination of solutions that will be presented to the community at the second Workshop for their input through a preference survey.

The study area shown in Figure 2 covers the segment of Valley Center Road through the two Villages of Valley Center. The South Village is centered around the Valley Center Road and Mirar De Valle intersection and extends from Banbury Drive in the south to Lilac Road in the north. The North Village is centered around the Valley Center Road and Indian Creek Road intersection and extends just west of Miller Road on the west and to the area of the Valley Center Road and Vesper Road intersection on the east. The Villages are areas where higher intensity development and wider range of land uses are planned.



Figure 1: Valley Center Road near Canyon Road at "The Curve" with Raised Medians.

2. EXISTING CONDITIONS

In 2006, Valley Center Road was widened from two to four lanes, which also included construction of intermittent raised medians between Cole Grade Road and Woods Valley Road. In April 2019, an Existing Conditions Analysis was completed that assessed the physical roadway conditions and intersection traffic operations as well as documented the current pedestrian, bicycle, and transit facilities within the study area.

The results of the roadway segment analysis showed all study segments along Valley Center Road operate at acceptable levels of service (LOS D or better). The intersection analysis showed all the study locations operating at acceptable levels of service in the AM peak hour and two of the 7 study locations operating at deficient levels of service (LOS E or F) during the PM peak hour. These include the unsignalized intersections of Mirar De Valle Road / Valley Center Road and Sunday Drive / Valley Center Road.

The results of the speed survey showed that all the 85th percentile speeds along Valley Center Road exceed the posted speed limit of 45 miles per hour. The 85th percentile speeds collected represent the speed at which 85 percent of all vehicles are observed to travel at or below, measured over a specific period of time for a specific location. The 85th percentile speeds are used by agencies to set speed limits based on free-flowing traffic conditions.

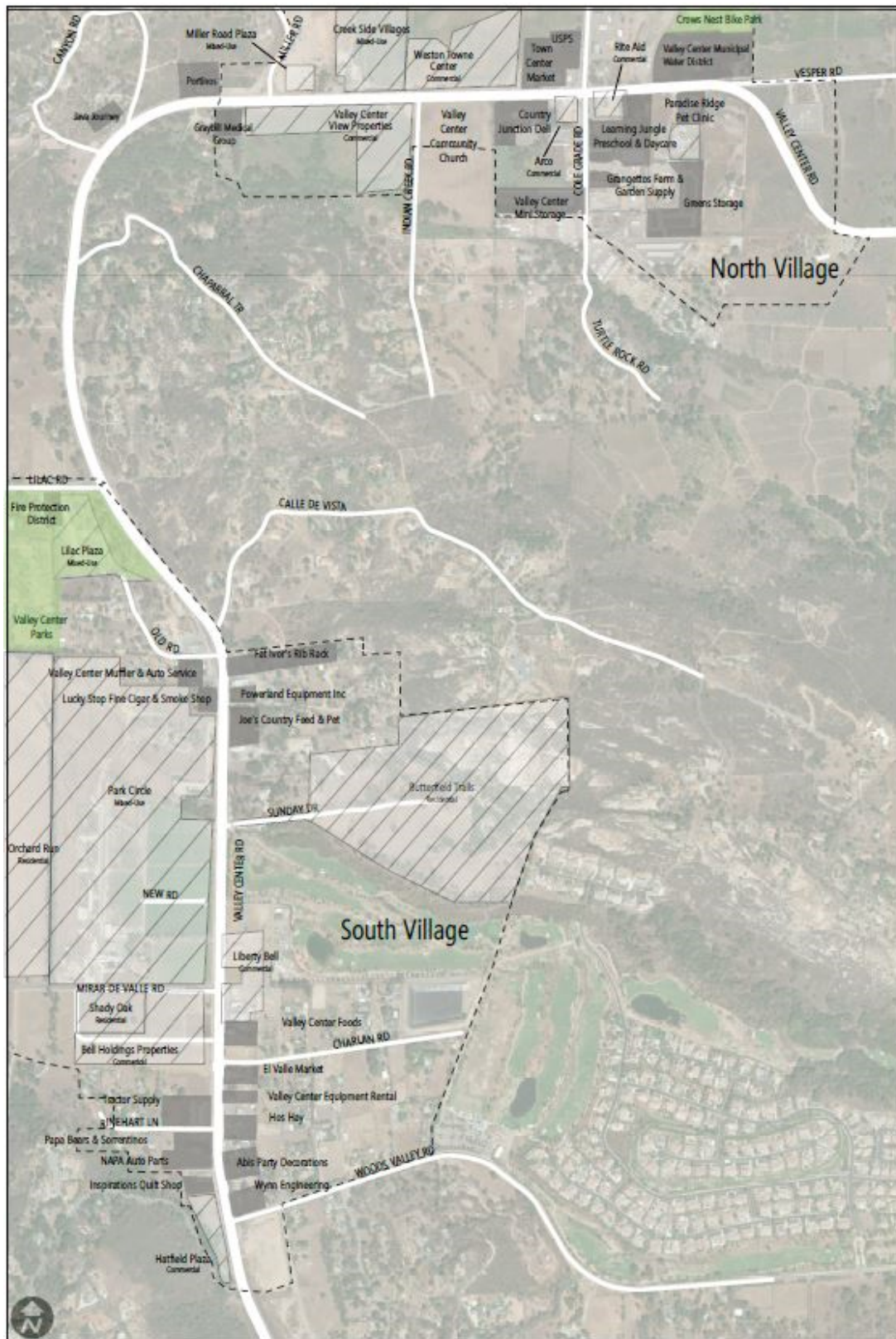


Figure 2: Study Area With North & South Village Boundaries

Crash data for a five-year period included a total of 178 crashes reported along Valley Center Road with one fatality at Miller Road. The majority of crashes were attributed to unsafe speeds, right-of-way violations, and improper turning.

Transit service is provided by North County Transit District (NCTD) Route 388 with 11 bus stops on Valley Center Road within the study area. Amenities at each bus stop vary along the corridor; however, the majority of the bus stops are Americans with Disabilities Act (ADA) compliant and have both a bench and sign.

Pedestrian conditions show that out of 28 segments, the walking environment for 9 segments were “very good”, 9 segments were “good”, 7 segments were “average”, and 3 segments were “poor”. Most pedestrians utilize the Heritage Trail, which will remain unchanged through the concept development. Existing bicycle facilities along Valley Center Road were evaluated using a Level of Stress (LTS) analysis and show that the bike lanes provided were suitable for “Strong and Fearless Bicyclists” (LTS level 4). This LTS 4 condition is heavily influenced by the lack of buffer and speed of the road.



Figure 3: Heritage Trail with split rail fencing (looking westbound on Valley Center Rd.). The Heritage Trail will remain unchanged with all concepts.

3. COUNTY PLANS, CODES & POLICIES INFLUENCING THE CONCEPT DEVELOPMENT

The following County documents were consulted as part of the Concept Development.

Valley Center Community Plan (VCCP)

Within San Diego County, diverse communities have distinct and unique settings, history, culture, and character. As part of the County's General Plan, the *Valley Center Community Plan* provides goals, policies, and other guidance for land use within the Valley Center Community Plan Area (CPA), in addition to serving as a reference for important community issues. The County is currently working with stakeholders on a comprehensive update to the Community Plan, which is running parallel to the Valley Center Road Village Corridor Concept Plan.

San Diego County Active Transportation Plan (ATP)

“Active Transportation” is a term used to describe any non-motorized form of travel, including biking, walking, horseback riding, etc. The County of San Diego's *Active Transportation Plan* is a plan that balances environmental, economic, and community interests and identifies goals, objectives and actions related to:

- Improving safety to reduce auto collisions with cyclists and pedestrians;
- Increasing accessibility and connectivity with an active transportation network; and
- Improving public health by encouraging walking and biking.



Figure 4: Illustration from County of San Diego ATP, Class IV Bikeway with Bollards Concept (referred to as flexible delineator posts in the concept development)

The ATP includes recommendations to upgrade the existing Class II bike lanes to Class IV Separated Bikeways the length of the corridor. This recommendation was incorporated into the Mobility Element for this Valley Center Road corridor as part of the adoption of the ATP.

County Light Pollution Code

The *San Diego County Code of Regulatory Ordinances* (Title 5, Chapter 2) defines any area within a 15-mile radius of Palomar Observatory as "Zone A". The project study area is within an approximate 12 to 14-mile radius of Palomar Observatory and is subject to the requirements for Zone A. According to Section 51.204, any street lighting above 4,050 lumens is prohibited and all low-pressure sodium lamps must be fully shielded. Any unshielded luminaires must be less than 2,000 lumens. Street lighting along the corridor must comply with these and other requirements for Zone A.

4. ENGINEERING DESIGN STANDARDS & BEST PRACTICES

In addition to the regulation and guidance documents discussed above, the conceptual designs presented with this report consider the guidance provided in the following documents:

Valley Center Design Guidelines

While design review is administered by the County's Planning & Development Services Department, development projects subject to design review are also evaluated by the Valley Center Design Review Board. Properties subject to design review for development applications include all properties within the Village boundaries and additional properties with commercial or industrial zoning located outside the Villages. This design review process is intended to preserve the rural character and environment of Valley Center while accommodating future growth. Specific design objectives and requirements are outlined in the *Valley Center Design Guidelines* and must be considered when establishing recommendations for the corridor plan as future development may be responsible for frontage improvements and subject to the standards established in these guidelines.

County of San Diego Public Road Standards

The County's *Public Road Standards* serve as guidelines for the design and construction of public road improvement projects within the unincorporated County. These standards apply to both County and developer initiated public road improvement projects. Improvements to public roads are often required as conditions of land development (discretionary permit) approval.

Valley Center Community Right of Way Development Standards (VCCRDS)

The *VCCRDS* is a guide to the streetscape design within the public right-of-way. The purpose is to ensure the community develops in a complimentary and consistent manner that reflects Valley Center's distinctive natural features. These standards only apply to areas outside of the travel way including curb and gutters, sidewalks and pathways, medians, shoulders, etc.

Traffic Control at Intersections

As part of this project, various intersection control options were considered within the study area, including traffic signals, roundabouts, controlled pedestrian crossings, and minor street stop controls. The combinations of traffic control features will determine how traffic will flow along the corridor. Limited traffic control along the corridor has led to 85th percentile speeds above the posted speed limit for the length of the corridor. It has also resulted in challenges for drivers crossing traffic to make a left turn from the corridor and for drivers on side streets to gain access to the corridor.

Traffic signals are an effective traffic control device that clearly defines the right-of-way for vehicles at an intersection. To determine if a signal is appropriate at an isolated location, an analysis of traffic signal warrants can be conducted. These warrants provide a procedure to determine whether installation of a traffic signal is justified at a particular location. A warrant may or may not be satisfied based on conditions outlined in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD), which consider such factors as vehicular volumes, pedestrian volumes, safety concerns, or signal coordination gaps to determine the viability of a traffic signal. Although a warrant provides justification for installation of a traffic signal along the corridor, other factors may also be considered. Other factors such as spacing between signals, access requirements, pedestrian activity, and others may determine a signal is needed that may not meet a CA MUTCD warrant.

Roundabouts are also traffic control devices and define the right-of-way for drivers. All drivers yield when entering the roundabout and should enter when there is a gap in traffic flow. While roundabouts are not subject to specific warrants, each proposed roundabout is justified on its own merits as the most appropriate intersection treatment. Additional details regarding roundabouts are provided in the following section.

Roundabouts and traffic signals were considered for key locations along the corridor based on:

- Controlled intersection spacing (varies by theme)
- Pedestrian and bicycle connections to bus stops
- Planned development and conditions of approval for traffic signals along the corridor
- Collision history
- Potential speed reduction features

5. CONCEPT ELEMENTS AND BEST PRACTICES

The following pages provide descriptions and examples of the concept elements included in the recommendations for the corridor. These concept elements have been applied to the proposed themes as shown in **Table 1**. Details about each theme are provided in Section 6.

Table 1: Proposed Theme Concept Elements

Elements		Theme 1	Theme 2	Theme 3
Roundabout	Single Lane			✓
	Two-Lane	✓	✓	
	Single Lane w/ Taper		✓	✓
Curb-Extension		✓	✓	
Controlled Ped. Crossing (Signal or HAWK)		✓	✓	
Raised Median		✓	✓	✓
Sidewalk		✓	✓	✓
Class IV Separated Bikeway with Bollards		✓	✓	✓
Class II Bike Lane with Buffer				✓
Gateway Feature				✓



Single-Lane Roundabout

A single-lane roundabout is an intersection controlled by road signs where all traffic moves counterclockwise around a central island. Single-lane roundabouts provide vehicles with one entry/exit lane and one travel lane through the roundabout.

BENEFITS & CHALLENGES

Auto:

Access to the roundabout is usually controlled by yield signs which reduces but does not eliminate the need for vehicles to stop prior to entering the intersection. Vehicles yield to traffic that is already in the roundabout and travel counterclockwise around the center island. This continuous flow through the roundabout decreases overall travel time or delays at the intersection. Figure 5 illustrates a conceptual layout of a single-lane roundabout at Valley Center Road and Miller Road under Theme 2.

Safety:

Roundabouts are one of the safest types of intersections since they are designed for lower speed driving, generally 25 to 35 MPH and all traffic is moving in the same direction. In addition, left turn movements across oncoming traffic is eliminated. Most significantly, roundabouts reduce the severity of crashes such as T-bone and head-on collisions. Figure 6 shows an example of an existing three-legged single-lane roundabout at La Jolla Boulevard and Colima Street.

Pedestrians:

Roundabouts can also improve pedestrian safety by offering a short crossing distance of one-way traffic moving at slower speeds. As shown in the figures to the right, the splitter islands or raised medians provide an opportunity for pedestrians to cross one direction of traffic at a time.

Bicycles:

On single-lane roundabouts, bicyclists have the option of either mixing with traffic or using the multi-use path with the pedestrians. The multi-use path accommodates both types of users around the perimeter of the roundabout. Bicyclist who use the path cross the legs of the roundabout by dismounting and crossing with pedestrians in the marked crosswalks.

Design, Operations & Maintenance:

Roundabouts can be more expensive to construct than a traffic signal due to potential right-of-way constraints and the amount of new pavement area, curbs and gutters needed to meet the design standards for emergency vehicles and trucks. However, single-lane roundabouts generally have lower maintenance and operational cost compared to signalized intersections.

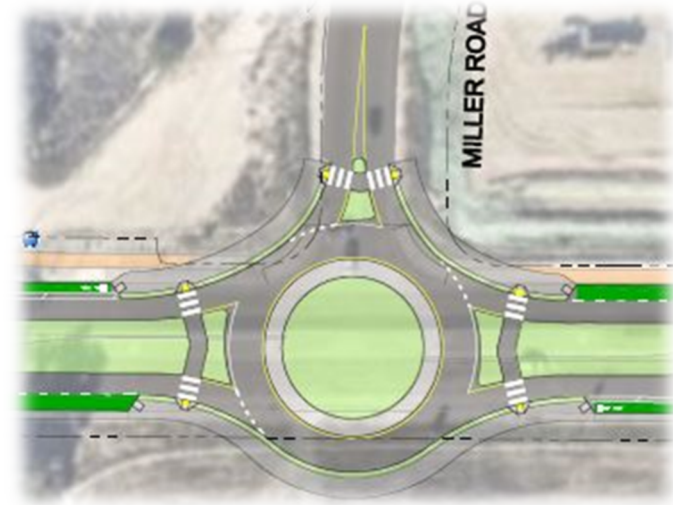


Figure 5: Theme 2 – Single Lane Roundabout at Valley Center Road & Miller Road



Figure 6: Single Lane Roundabout at La Jolla Boulevard & Colima Street



Two-Lane Roundabout

A two-lane roundabout is an intersection controlled by signs where all traffic moves counterclockwise around a central island. Two-lane roundabouts provide vehicles with two entry/exit lanes and two travel lanes through the roundabout.

BENEFITS & CHALLENGES

Auto:

At a two-lane roundabout, drivers need to decide which lane to use before approaching the roundabout. Drivers then need to yield to two lanes of traffic circulating within the roundabout. If a left-turn or U-turn is desired, the driver should use the left lane to approach and travel through the roundabout. If a driver wishes to make a right-turn, the right lane should be used to approach and travel through the roundabout. Figure 7 illustrates a conceptual layout of a two-lane roundabout at Valley Center Road and Old Road under Theme 1.

Safety:

In general, two-lane roundabouts have some of the same safety characteristics for drivers and vehicle occupants as a single-lane roundabout. However, due to the presence of two entry lanes and the need to provide wider circulatory and exit roadways, two-lane roundabouts often cannot achieve the same levels of speed reduction as a single-lane roundabout. Figure 8 shows an example of an existing two-lane roundabout at Tremont Street and Pottery Avenue in the state of Washington.

Pedestrians:

Pedestrians crossing two-lane roundabouts are exposed for a longer period and to faster vehicles when compared to a single lane roundabout. Similar to single-lane roundabouts, splitter islands at the entry point of a two-lane roundabout can be used as a refuge for pedestrians.

Bicycles:

Similar to a single-lane roundabout, a multi-use path of sufficient width can accommodate both types of users around the perimeter of the roundabout. However, bicyclist can also choose to navigate through the roundabout with vehicles.

Design, Operations & Maintenance:

Two-lane roundabouts are larger than single lane roundabouts and therefore require more right of way and are more expensive to construct. Similar to a single-lane roundabout, two-lane roundabouts generally have lower maintenance and operational costs compared to a signalized intersection.



Figure 7: Theme 1 - Two-Lane Roundabout at Valley Center Road & Old Road



Figure 8: Two-Lane Roundabout at Tremont Street & Pottery Avenue in Washington



Single-Lane Roundabout with Taper

A single-lane roundabout with a taper generally consists of a four-lane roadway that reduces one travel lane at each approach to the single-lane roundabout and then widens back to two lanes after exiting the roundabout. This configuration allows the necessary roadway capacity along the corridor while also providing the safety and operational benefits of a single-lane roundabout.

BENEFITS & CHALLENGES

Auto:

Drivers are required to merge from two to one travel lane prior to entering the single-lane roundabout. This helps reduce travel speeds approaching and traveling through the roundabout. Figure 9 shows an example of an existing one-lane roundabout with a taper approaching the roundabout at Santa Fe Drive and Devonshire Drive in the City of Encinitas. Figure 10 provides a conceptual layout from Theme 2 of a single-lane roundabout with a taper from 4 lanes to 2 lanes on the west leg of the intersection at Valley Center Road and Lilac Road.

Pedestrians:

Tapering down to one travel lane approaching and through the roundabout minimizes the crossing distance for pedestrians. This reduction in travel lanes produces slower travel speeds to maximize safety and comfort for pedestrians.

Bicycles:

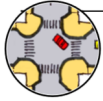
The taper would not affect the bicyclists since the bike lane is maintained in a similar manner to a single-lane roundabout without a taper. A shared bicycle-pedestrian path of sufficient width to accommodate both types of users around the perimeter of the roundabout would still be provided.



Figure 10: Theme 2 - Single-Lane Roundabout with taper at Valley Center Road & Lilac Road



Figure 9: Single-lane Roundabout with taper at Santa Fe Drive & Devonshire Drive in Encinitas



Curb Extensions (Bulb-outs)

A curb extension, also known as a bulb-out, is a traffic calming measure that widens the sidewalk for a short distance and extends the curb space at the corners of an intersection in order to reduce the crossing distance for pedestrians. Curb extensions may be constructed at intersection corners or mid-block crosswalks.

BENEFITS & CHALLENGES

Auto:

Curb extensions increase visibility for pedestrians and drivers by bringing the pedestrian closer to the edge of the travel-way at a marked crossing. Curb extensions also provide visual friction which can result in more cautious driving and can result in slower vehicle speeds. Figure 11 shows a conceptual layout of curb extensions for Theme 2 at the intersection of Valley Center road and Indian Creek Road.

Pedestrians:

Curb extensions improve pedestrian crossings by reducing the pedestrian crossing distance, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street. Figure 12 shows an example of curb extensions recently installed at the intersection of Camino Del Mar and 12th Street in the City of Del Mar.

Bicycles:

Bicycle lanes shift from the main travel-way and are separated by a raised channelizer. At crosswalks, the bike lane angles into a ramp, so that pedestrians can cross the bike lane at a constant grade. Bicyclist should yield to pedestrians at crossings.

Design, Operations & Maintenance:

Road classification, lane width, road width, sidewalks, curb radii, and on-street parking should all be considered when designing curb extensions. Appropriate signage for vehicles, bicyclists, and pedestrians should be provided at all potential conflict points. Placement of street furniture and landscaping on curb extensions should ensure that sight lines are not obstructed and properly maintained.



Figure 11: Theme 2 – Curb extensions at Valley Center Road & Indian Creek Road



Figure 12: Curb extensions at Camino Del Mar & 12th Street in Del Mar



Controlled Pedestrian Crossing

Controlled Pedestrian Crossings are used to warn and control vehicle traffic at a marked crosswalk. Controlled Pedestrian Crossing are typically located mid-block or at an intersection where a traffic signal is not warranted for vehicular traffic.

BENEFITS & CHALLENGES

Auto:

Vehicles are required to stop at these controlled crossings when activated by a pedestrian. If the signal is not activated by a pedestrian, motorists are permitted to drive through the crosswalk but are cautioned to slow down and look for the presence of nearby pedestrians. Figure 13 shows a controlled pedestrian crossing at Valley Center Road and Old Road in Theme 2.

Pedestrians & Bicycles:

These crossings provide a clear indication for the assignment of right of way at the marked crosswalk. Both the driver and the pedestrian or bike are provided a clear indication of when to stop or wait and when to proceed. The signal or HAWK is activated by the pedestrian using a push-button. Pedestrians must wait for the WALK sign to proceed. During that time, autos are provided a RED light and are required to stop.



Figure 13: Theme 2 - Controlled Ped Crossing at Valley Center Road & Old Road



Figure 15: Ped Signal Example

High-Intensity Activated Crosswalk (HAWK) Signal:

HAWK signals are traffic devices used to assist pedestrians and bicyclists crossing a busy street. When a pedestrian activates the system by pressing a button, overhead signal flashing indicates to the motorists a pedestrian wishes to cross the street and vehicles are required to stop and wait for the pedestrian to cross. HAWKs are best in mid-block situations, not intersections where minor streets have no visibility to a signal. Figure 14 shows an existing HAWK signal on Mission Center Road in Mission Valley.

Pedestrian Signal:

Operates as a traditional signal with the green priority given to vehicles until activated by the pedestrian. Utilizes traditional green, yellow and red vehicular indications and traditional pedestrian signal heads (with or without countdown timer). Figure 15 shows an example of a ped signal.



Figure 14: HAWK signal on Mission Center Road in Mission Valley

..... Raised Median

Raised medians are curbed sections that typically occupy the center of the roadway. Raised medians within a roadway such as Valley Center Road can be either landscaped or paved.

BENEFITS & CHALLENGES

Auto:

Continuous raised medians may restrict vehicular access at intersections and driveways. They may be used to concentrate left-turn movements at specific locations and tend to result in an increase of the frequency of U-turns at a signalized intersection or at gaps in the median. However, raised medians can improve safety by providing a physical barrier between opposing directions of traffic thus reducing vehicle conflicts. Figures 16 and 17 show existing raised medians with landscaping along Valley Center Road.

Pedestrians & Bicyclists:

Raised medians tend to serve as a place of refuge for pedestrians and bicyclists who cross a street midblock or at intersections. In addition, raised medians allow pedestrians and bicyclists to cross one direction of traffic at a time.

Safety:

Raised medians may reduce crashes caused by conflicting traffic such as T-bone and head-on collisions.

Landscaping:

Medians with natural landscaping also serve as natural bio-swales for managing stormwater. Figure 18 shows Theme 1 with a raised landscaped median along Valley Center Road within the South Village.



Figure 18: Theme 1 - Raised Landscaped Median on Valley Center Road in South Village



Figure 16: Raised Landscaped Median on Valley Center Road west of Lilac Road



Figure 17: Raised Landscaped Median on Valley Center Road west of Cole Grade Road

Crosswalks

A marked crosswalk is a place designated for pedestrians to cross a road. Crosswalks are typically marked on the roadway with parallel or dashed pavement markings to provide visibility to drivers. Typical crosswalks are striped with white paint. However, in school zones yellow paint should be used to mark the crossings.

BENEFITS & CHALLENGES

Auto:

Marked crosswalks indicate a preferred location for pedestrians to cross a roadway, and alert motorists to anticipate pedestrians. Marked crosswalks are complemented by curb ramps and ADA access signage with improved visibility of the crossing. At signalized intersections, pedestrian countdown signal heads help inform pedestrians of how much time they have left to cross. Marked crosswalks at locations other than signalized intersections or roundabouts should be coupled with either a pedestrian signal or HAWK on Valley Center Road. Due to the high speed and four lanes of traffic, uncontrolled marked crossings are not recommended. Figure 19 shows marked pedestrian crosswalks at the intersection of Valley Center Road and Indian Creek Road for Theme 2.

Pedestrians:

High visibility crosswalks, also known as continental crosswalks, increase awareness in motorists and pedestrians at established pedestrian crossing locations. Some crossing locations include pedestrian refuge islands to shorten a pedestrian's crossing distance and provide pedestrians a refuge. A yellow crosswalk indicates a school crossing, whereas a white crosswalk indicates a standard crosswalk. An example of a marked pedestrian crosswalk is shown in Figure 20.

Bicycles:

Bicyclists should dismount their bicycle and walk in the crosswalks with pedestrians.

Design, Operations & Maintenance:

Pedestrian crosswalks are typically 10 feet in width with white or yellow markings. However, design and installation of marked crosswalks should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. Crosswalks should remain visible and may require ongoing maintenance to minimize fading.

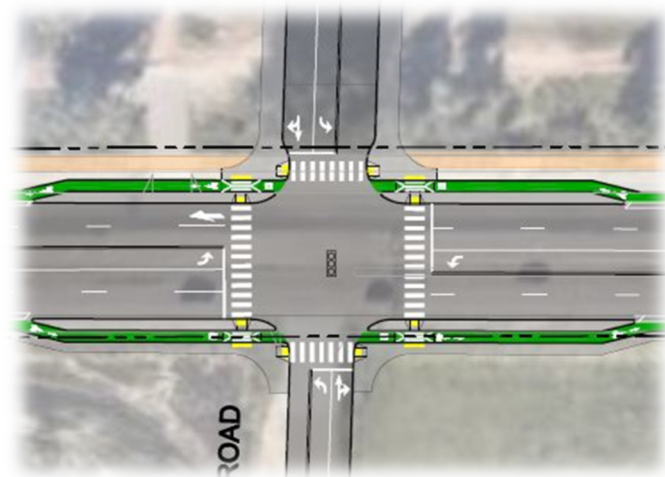


Figure 19: Theme 2 – Marked Crosswalk at Valley Center Road & Indian Creek Road



Figure 20: Marked Crosswalk at La Jolla Hermosa Avenue & Colima Street in La Jolla

Sidewalks and Pathways

A sidewalk is a path with a hard surface by the side of a road. Sidewalks are often constructed of concrete or cement, though occasionally asphalt. Sidewalks must meet the minimum ADA requirements. Pathways, like the Heritage Trail, are typically wider (8 feet) than a sidewalk (4 to 5 feet) and typically consist of decomposed granite base rather than concrete. Pathways can also include physical barriers such as landscaping or fencing between the pathway and roadway, refer to Figure 21.

BENEFITS & CHALLENGES

Auto:

Sidewalks and pathways are designated for pedestrians and bicyclists, not vehicles. Along a roadway, sidewalks provide a dedicated ADA accessible space for users of all ages and abilities.

Pedestrians & Bicyclists:

Sidewalks are primarily used by pedestrians but sometimes used by bicyclists, specifically younger and unexperienced riders. Sidewalks provide pedestrians and bicyclists a connection to parks, schools, restaurants, retail shops, libraries, public transit and other attractions. Figure 22 shows an example of a sidewalk with a clear path of travel for pedestrians.

Pathways create a multi-modal system for pedestrians, bicyclists, equestrians and other non-motorized travelers. However, it can be challenging for pathways to meet the minimum ADA requirements.

Design:

Within the Valley Center Community, San Diego County Policy endeavors to provide a "Type D" pathway, as seen in Figure 8, on one side of Valley Center Road and sidewalks on the other.



Figure 22: Example of Sidewalk

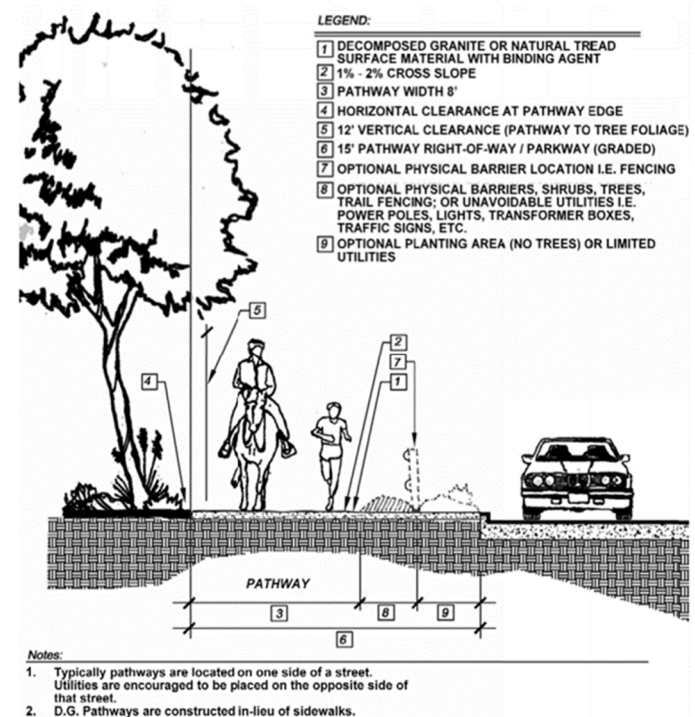


Figure 21: Valley Center Community Right of Way Design Standards. Figure 8 – Type D Pathways

Class IV Separated Bikeway with Flexible Delineator Posts

Protected bike lanes (Class IV Bikeway), also known as cycle tracks, provide space that is exclusively for bicyclists and separated from vehicular travel lanes, parking and sidewalks. Parked cars, curbs, bollards, or planter boxes may provide physical separation between bicyclists and vehicles.

BENEFITS & CHALLENGES

Auto:

Class IV bikeways are on-street bicycle facilities that include a vertical physical barrier such as flexible bollards (delineators), a raised curb, on-street parking or planter boxes between the bikeway and moving traffic. These physical barriers help increase the level of comfort to both the motorist and bicyclists.

Pedestrians:

Bicycle lanes are not intended for pedestrian use. To prevent pedestrians from using the bicycle lane, a sidewalk or trail should be provided adjacent to the bicycle lane. Pedestrians in the bicycle lane provide a risk to bicycles due to the differential between bicycle and pedestrian travel speeds. Pedestrians in the bicycle lane should be discouraged.

Bicycles:

The added separation provided by separated bikeways creates additional considerations at intersections and driveways when compared to conventional bike lanes. To preserve sightlines and identify potential conflict areas between vehicles and bicyclists, conflict areas may be marked by green dashed stripes near intersections and driveways. At driveways and minor street crossings, bicyclists would not be expected to stop if the auto traffic does not stop. Class IV bikeways with flexible delineator posts (bollards) are proposed along Valley Center Road as shown in Figure 23. Along Leucadia Boulevard in the City of Encinitas, protected bike lanes have been installed in both the eastbound and westbound directions as shown in Figure 24.

Design, Operations & Maintenance:

Along Valley Center Road, 5-foot Class IV bike lanes with 3-foot buffers are proposed. However, design and installation of Class IV bikeways should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. Specialized street sweeping equipment might be necessary to maintain these bikeways.



Figure 23: Theme 1 – Class IV Bikeway along Valley Center Road near Miller Road



Figure 24: Class IV Bikeway with buffer and flexible delineator posts along Leucadia Boulevard looking westbound

Class II Bike Lanes with Buffer

Bike lanes (Class II) are defined by pavement striping and signage and effectively dedicate a portion of the roadway right-of-way for exclusive bicycle travel. Bike lanes are one-way facilities typically located on the far-right side of the road adjacent to the curb. Class II bike lanes with a buffer are conventional Class II bike lanes paired with a designated buffer space (18 inches to 3 feet) separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

BENEFITS & CHALLENGES

Auto:

Class II bike lanes with a buffer provide a designated separation (typically 18 inches to 3 feet) between the bike lane and moving traffic. This design does not include any physical barriers so drivers will need to watch for bicyclists when turning right at cross-streets or driveways and when crossing the buffered lane to park. Figure 25 shows Class II bike lanes with buffers along Valley Center Road in Theme 2.

Pedestrians:

Bicycle lanes are not intended for pedestrian use. To prevent pedestrians from using the bicycle lane, a sidewalk or trail should be provided adjacent to the bicycle lane. Pedestrians in the bicycle lane provide a risk to bicycles due to the differential between bicycle and pedestrian travel speeds. Pedestrians in the bicycle lane should be discouraged.

Bicycles:

Class II bike lanes with a striped buffer provide a more comfortable riding environment for bicycle riders who prefer to ride adjacent to traffic as shown in Figure 26. Similar to Class IV Separated Bikeways, conflict areas between vehicles and bicyclists may be marked by green dashed stripes near intersections and driveways.

Design, Operations & Maintenance:

Under Theme 3 in the North Village, 6-foot Class II bike lanes with 3-foot buffers are proposed along Valley Center Road. However, design and construction of Class II bikeways should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. This design would not restrict street sweeping equipment from maintaining the bike lane or parking along the curb. Class II bike lanes are proposed only in Theme 3 in the North Village because that Theme includes one auto travel lane in each direction with parallel parking along the road, to make use of the additional right-of-way. The flexible delineator posts (bollards) used in Class IV bike lanes would not be possible in this section under this Theme, due to the parked cars needing to cross the buffer to enter the travel lanes.

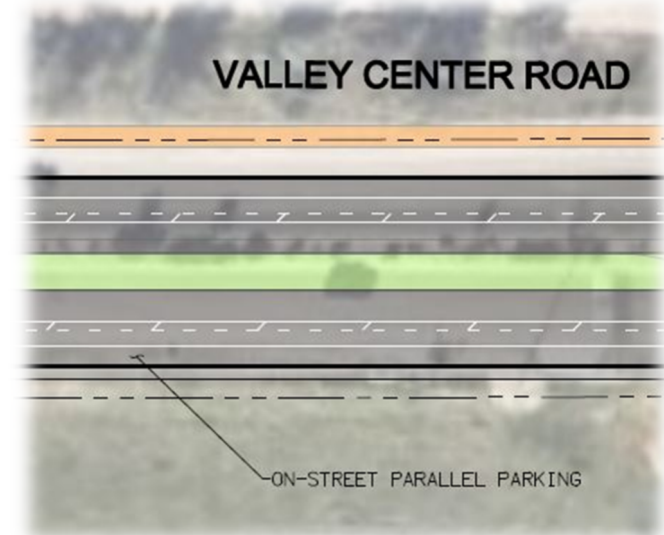


Figure 25: Theme 2 – Class II Bike Lanes along Valley Center Road in North Village.

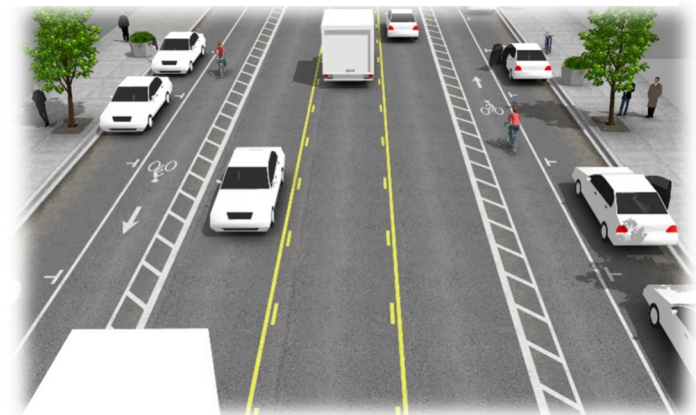


Figure 26: Example of Class II Bike Lanes With Buffer

Gateway Feature

A gateway feature is any type of free-standing monument, archway, statue, sculpture, or sign which identifies the name of a community, city, or town.

Benefits:

Gateway features provide a unique identifier for the community and a sense of ownership for the residents. They also increase aesthetics and comfort while enhancing the overall community. Landscaping may also be integrated into the design of the gateway feature to improve the visual elements of the monument. Figures 27 through 29 provide examples of existing gateway features.

Challenges:

The gateway feature should not obstruct or block the view of motorists. Sightlines should be maintained along the corridor so that movement of all modes are visible.

Design & Maintenance:

The design of the gateway feature should comply with all County guidelines and standards, including the Zoning Ordinance section 6207.b.2 on Community Identification Signs. The design should harmonize the roadway with existing topography and land uses. The gateway feature including any landscaping will need to be maintained to preserve the structural integrity, quality and beautification of the monument.



Figure 27: City of Carlsbad Gateway Feature



Figure 29: City of Escondido Gateway Feature



Figure 28: City of La Mesa Gateway Feature

6. CONCEPT THEMES

Three themes were developed for the corridor and are presented in this section. Each theme integrates combinations of the Concept Elements presented in Section 5.

Theme 1: Pedestrian and Bicycle Focus

Theme 1 aims to maximize pedestrian and bicycle access along the corridor by providing continuous walking and bicycling facilities, providing frequent crossing locations and integrating features that reduce traffic speeds. **Table 2** summarizes the key Concept Elements included in Theme 1. The following describes the theme in greater detail.

Pedestrian Access and Connectivity

Theme 1 provides a continuous pedestrian path of travel on both sides of Valley Center Road. The Heritage Trail is located on the west and north side of the street and sidewalks are provided on the east and south side of the street from Cole Grade Road to Woods Valley Road. Per the Valley Center Community Right of Way Development Standards, in the Villages, a Type D Pathway is allowed on the west and north side of Valley Center Road and a sidewalk is allowed on the east and south side of Valley Center Road.

In the South Village, marked pedestrian crossings across Valley Center Road are provided a maximum of one quarter mile (0.25 mile) apart and are provided at signalized intersections, roundabouts and controlled pedestrian crossings. Controlled pedestrian crossings could be either include a pedestrian signal or HAWK and are proposed at Rinehart Lane and north of Sunday Drive. At the Rinehart Lane crossing, the median would be closed thereby restricting auto movements to right turns only in order to reduce the potential left turn/pedestrian conflict in the marked crossing. At both controlled pedestrian crossings, the raised median provides for a pedestrian refuge area while crossing the street.

Bicycle Facilities

Class IV Separated Bikeways with flexible delineator posts (bollards) are proposed for the length of the corridor on both sides of Valley Center Road. At or near conflict areas (i.e. unsignalized intersections and driveways) "skip stripe" and solid green pavement markings would replace the striped buffer and bollards where vehicles cross the bicycle path of travel.

At roundabouts, bicyclists may use the multi-use path to bypass riding through the roundabout or they may merge with traffic and travel through the roundabout. For bicyclists who choose to ride through the roundabout, a gap in the buffer and bollards allows them to exit the bicycle lane and to merge into traffic as they approach the roundabout. For bicyclists who choose to use the multi-use path, ramps are provided where the bikeway approaches the multi-use path. The multi-use path is the wider sidewalk around the roundabout that can be used by both pedestrians and bicyclists. The multi-use path is provided around the roundabout only and connects with either sidewalk or the Heritage Trail. If a cyclist chooses to use the multi-use path, they would dismount their bicycles and cross the legs of the roundabout with pedestrians in the marked crosswalks.

At locations with curb extensions, the bike lane shifts from a location adjacent to the travel lanes to being located between the curb and the curb extension. Where the pedestrians cross the bike lane, the bike lane angles into a ramp, allowing pedestrians to cross the bike lane at the grade of the sidewalk. Bicyclists yield to pedestrians at crossings. In accordance with the California Manual on Uniform Control Devices, W11-15 signage shows a black symbol of a left-facing bicycle above a black symbol of a left-facing walking person on a vertical rectangular yellow sign. A fluorescent yellow-green background color may be used for this sign. This could be used to help warn drivers approaching the bulb-outs that pedestrians and bicyclists may be crossing.

Table 2: Theme 1 Concept Elements

Elements of Theme 1		
Roundabout	Single Lane	
	Two-Lane	✓
	Single Lane w/ Taper	
Curb-Extension		✓
Controlled Ped. Crossing (Signal or HAWK)		✓
Raised Median		✓
Sidewalk		✓
Pathways		✓
Class IV Separated Bikeway with Flexible Delineator Posts		✓
Class II Bike Lane with Buffer		
Gateway Feature		

Traffic Control

Traffic signals in Theme 1 are located at the following intersections along Valley Center Road: Mirar De Valle, New Road (new road of Park Circle development, just north of Mirar De Valle), Miller Road and Cole Grade Road. The traffic signals at Mirar De Valle and New Road will be constructed by the Park Circle mixed use development, which was under construction at the time this report was prepared. Depending on timing, other development projects may be required to contribute to the construction of the Mirar De Valle traffic signal. An approved discretionary permit has a condition for a traffic signal at Miller Road; however specific intersection control may be reevaluated at the time traffic warrants are met.

Two-lane roundabouts are included at Woods Valley Road and Old Road. These roundabouts aim to reduce traffic speeds entering the South Village from either end. They also provide an opportunity for art and landscape to complement the existing design elements along the corridor.

Traffic signals, roundabout and pedestrian crossings are spaced at 0.25-mile intervals in the South Village order to maximize pedestrian access across the corridor. The traffic control devices were aligned with existing transit stops as well. When necessary, the transit stops were shifted to align with crossings or shifted to outside of a signalized intersection or roundabout. Although some traffic signals may not meet warrants in either the North or South Villages, the devices are recommended to meet the overall goals of providing improved pedestrian and bicycle access along the corridor – specifically in the South Village for this theme.

Traffic Calming

Three features in Theme 1 aim to reduce travel speeds along the corridor: curb extensions, roundabouts, and narrower lanes. Curb extensions are proposed at the signalized intersection of Mirar De Valle Road/Valley Center Road. They reduce the pedestrian crossing distance and help reduce traffic speeds by narrowing the width of pavement between the raised median and the curb. Where the curb extension is proposed along the edge of the travel lane, the bicycle lane shifts from a location adjacent to travel lanes to being located between the sidewalk and the curb extension. A raised pedestrian crossing across the bike lane allows pedestrians to cross at-grade from the sidewalk, across the bike lane, to the curb extension. By moving the pedestrians closer to the travel lanes to the other side of the bike lane, the crossing distance across vehicle travel lanes is reduced by 16 feet compared to the existing condition.

In addition to serving as a traffic control device, roundabouts are effective at reducing speeds of automobiles entering the South Village from either end. The travel speed approaching and through the roundabout is approximately 35 mph. The center island of the roundabout provides an opportunity to integrate art, landscape and other features that complement the rural village design into the corridor. Roundabouts also reduce the crossing distance for pedestrians. The splitter islands at the roundabout provide a refuge area so pedestrians only cross one approach of traffic at a time.

In order to provide the buffer between the bike lanes and the travel lanes, travel lanes are reduced from 12 feet to 11 feet the length of the corridor. The narrower lanes help create friction which in turn results in reduced travel speeds without affecting the capacity of the roadway.

Raised Median

Theme 1 adds new sections of raised median in the South Village where there is currently a striped two-way left turn lane. In this theme, there are gaps in the raised median at the signalized intersections and at the one-way stop-controlled intersection at Charlan Road. Between Old Road and Miller Road, no changes are proposed to the medians. In the North Village, raised medians are proposed between Miller Road and Cole Grade Road with gaps in the median at Indian Creek and at Valley Center Community Church. The raised medians will restrict left-turn movements and vehicles will be required to make U-turns at the nearest available controlled intersection.

Other Key Features

New streetlights would be included along the length of the corridor. Streetlight spacing and type will be determined in final design. The streetlights would adhere to the County Light Pollution Code and Valley Center Design Guidelines.

Theme 2: Traffic Calming Focus

Theme 2 focuses on reducing traffic speeds by modifying the physical conditions along the corridor. Roundabouts are included in both the North and South Villages, which help to reduce traffic speeds, along with an integrated system of narrower lanes and curb extensions. **Table 3** summarizes the key Concept Elements included in Theme 2. The following describes the theme in greater detail.

Pedestrian Access and Connectivity

Theme 2 provides a continuous pedestrian path of travel on both sides of Valley Center Road from Cole Grade Road to Woods Valley Road. The Heritage Trail is provided on the west and north side of the street and sidewalks are provided on the east and south side of the street. Per the Valley Center Community Right of Way Development Standards, in the Villages, a Type D Pathway is allowed on the west and north side of Valley Center Road and a sidewalk is allowed on the east and south side of Valley Center Road.

Marked pedestrian crossings across Valley Center Road are provided at signalized intersections, roundabouts and controlled pedestrian crossing. The controlled pedestrian crossing could either include a pedestrian signal or HAWK and is proposed at Old Road near existing transit stops. At the Old Road crossing, the median would be closed thereby restricting auto movements to right turns only in order to reduce the potential left turn/pedestrian conflict in the marked crossing. The raised median through this intersection also provides for a pedestrian refuge area while crossing the street.

Bicycle Facilities

Class IV Separated Bikeways with flexible delineator posts (bollards) are proposed for the length of the corridor on both sides of Valley Center Road. At or near conflict areas (i.e. unsignalized intersections and driveway) "skip stripe" and solid green pavement markings would replace the striped buffer and bollards where vehicles cross the bicycle path of travel.

At roundabouts, bicyclists may use the multi-use path to bypass riding through the roundabout or they may merge with traffic and travel through the roundabout. For bicyclists who choose to ride through the roundabout, a gap in the buffer and bollards allows them to exit the bicycle lane and to merge into traffic as they approach the roundabout. For bicyclists who choose to use the multi-use path, ramps are provided where the bikeway approaches the multi-use path. The multi-use path is a wider sidewalk around the roundabout that can be used by both pedestrians and bicyclists. The multi-use path is provided around the roundabout only and connects with either the sidewalk or the Heritage Trail. If a cyclist chooses to use the multi-use path, they would dismount their bicycles and cross the legs of the roundabout with other pedestrians in the marked crosswalks.

At locations with curb extensions, the bike lane shifts from a location adjacent to the travel lanes to being located between the curb and the curb extension. Where the pedestrians cross the bike lane, the bike lane angles into a ramp, allowing pedestrians to cross the bike lane at the grade of the sidewalk. Bicyclists yield to pedestrians at crossings.

Traffic Control

Three roundabouts are included in Theme 2. The roundabout at Woods Valley Road is a two-lane roundabout. Single lane roundabouts with tapers are included at the intersections at Miller Road and at Lilac Road. On the approach to the intersections at Lilac Road and at Miller Road, Valley Center Road will be tapered from two-lanes in each direction (4-lane roadway) to one lane

Table 3: Theme 2 Concept Elements

Elements of Theme 2		
Roundabout	Single Lane	
	Two-Lane	✓
	Single Lane w/ Taper	✓
Curb-Extension		✓
Controlled Ped. Crossing (Signal or HAWK)		✓
Raised Median		✓
Sidewalk		✓
Pathways		✓
Class IV Separated Bikeway with Flexible Delineator Posts		✓
Class II Bike Lanes with Buffer		
Gateway Feature		

entering the single-lane roundabout. Single lane roundabouts are smaller than a two-lane roundabout, so reducing the travel lanes from four to two results in a smaller roundabout at the intersections.

Traffic signals are included at Mirar De Valle, New Road, Indian Creek Road and Cole Grade Road. The traffic signals at Mirar De Valle and New Road (new road of Park Circle development, just north of Mirar De Valle) are conditioned as part of the Park Circle mixed use development that was under construction when this report was prepared. Depending on timing, other development projects may be required to contribute to the construction of the Mirar De Valle traffic signal. An approved discretionary permit has a condition for a traffic signal at Miller Road; however specific intersection control may be reevaluated at the time traffic warrants are met.

Although some traffic signals may not meet warrants in either the North or South Villages, the devices are recommended to meet the overall goals of providing slower speeds and improved access along the corridor. The limited disruptions in traffic flow along the corridor under the existing condition has resulted in speeds higher than the posted speed limit. The traffic signals will provide controlled access for left turns along the corridor and will improve driver awareness of intersections and the potential need to stop. These visual cues will help maintain driver awareness and help to reduce speeds in the corridor.

Traffic Calming

Three features in Theme 2 aim to reduce traffic speeds: curb extensions, roundabouts and narrower lanes. Curb extensions are proposed at the signalized intersections along Valley Center Road: Mirar De Valle Road, New Road, and Indian Creek Road. They will reduce the pedestrian crossing distance and help reduce traffic speeds by narrowing the width of pavement between the raised median and the curb extension. Where the curb extension is proposed along the edge of a travel lane, the bicycle lane shifts from a location adjacent to travel lanes to being located between the sidewalk and the curb extension. A raised pedestrian crossing across the bike lane allows pedestrians to cross at-grade from the sidewalk, across the bike lane, to the curb extension. The crossing distance across Valley Center Road is reduced by 16 feet compared to the existing condition.

In addition to serving as a traffic control device, roundabouts are effective at reducing speeds. At Woods Valley Road, the roundabout will help reduce speeds as drivers enter the South Village, and will help establish the rural village environment by integrating landscape and art to help create a sense of place. At Lilac Road and Miller Road, the road tapers from four to two lanes approaching and through the single lane roundabouts, reducing travel speeds along the corridor. Drivers will need to slow down to merge into a single lane and to travel through the roundabouts. The two single lane roundabouts will help to reduce speeds through the existing curve in Valley Center Road, which has some of the highest reported speeds along the Valley Center Road corridor.

In order to provide the buffer between the bike lanes and the travel lanes, travel lanes are reduced from 12 feet to 11 feet the length of the corridor. The narrower lanes help create friction which in turn results in reduced travel speeds without affecting the capacity of the roadway.

Raised Medians

Raised medians are proposed in the South Village between Woods Valley Road and Old Road with gaps in the median at signalized intersections and at the one-way stop-controlled intersection at Sunday Drive. Between Old Road and Miller Road, the median is modified where the four-lane section of roadway narrows to two lanes for the single lane roundabout. As a result, the existing driveway located immediately north of Lilac Road will be restricted to right turns.

In the North Village, raised medians are proposed between Miller Road and Cole Grade Road with gaps at the signalized intersection of Indian Creek Road and at Valley Center Community Church driveway. The raised medians will restrict left-turn movements and vehicles will be required to make U-turns at the nearest intersection where U-turns are permitted.

Other Key Features

New streetlights would be included along the length of the corridor. Streetlight spacing and type will be determined in final design. The streetlights would adhere to the County Light Pollution Code and Valley Center Design Guidelines.

THEME 3: VILLAGE FOCUS

Theme 3 focuses on improvements that create a unique character in each of the two villages. In the North Village, Valley Center Road is narrowed to two lanes (one in each direction) and includes roundabouts at Miller Road and Cole Grade Road. These features aim to slow traffic along the corridor to create a walkable corridor with buffered bicycle lanes and on-street parking. In the South Village, narrower lanes and traffic signals aim to improve access and connectivity within the commercial core. **Table 4** summarizes the key Concept Elements included in Theme 3. The following describes the theme in greater detail.

Pedestrian Facilities

Theme 3 provides a continuous pedestrian path of travel on both sides of Valley Center Road from Cole Grade Road to Miller Road and from Lilac Road to Woods Valley Road. Between Miller Road and Lilac Road the Heritage Trail is provided on the west side of the street, but there is no sidewalk on the east side. Per the Valley Center Community Right of Way Development Standards, in the Villages, a Type D Pathway is allowed on the west and north side of Valley Center Road and a sidewalk is allowed on the east and south side of Valley Center Road. Marked pedestrian crossings across Valley Center Road are provided at signalized intersections and roundabouts only. There are no controlled pedestrian crossings in this theme, outside of the signalized intersections.

Bicycle Facilities

Class IV Separated Bikeways with flexible delineator posts are provided between Miller Road and Woods Valley Road. At or near conflict areas (i.e. intersections and driveways) green pavement markings would replace the striped buffer and bollards where vehicles cross the bicyclists path of travel.

Between Miller Road and Cole Grade Road, buffered Class II Bike Lanes are provided to allow access to the on-street parallel parking. The buffer is provided between the travel lanes and the bicycle lane. At or near conflict areas (i.e. intersections and driveway) green pavement markings would replace the striped buffer where vehicles cross the bicyclists path of travel.

At the two roundabouts in North Village, bicyclists may use the multi-use path to bypass riding through the roundabout or they may merge with traffic and travel through the roundabout. For bicyclists who choose to ride through the roundabout, a gap in the buffer and bollards allows them to exit the bicycle lane and to merge into traffic. For bicyclists who choose to use the multi-use path, ramps are provided where the bikeway approaches the multi-use path. The multi-use path is the wider sidewalk around the roundabout that can be used by both pedestrians and bicyclists. The multi-use path is provided around the roundabout only and connects with either sidewalk or the Heritage Trail. If a cyclist chooses to use the multi-use path, they would dismount their bicycles and cross the legs of the roundabout with pedestrians in the marked crosswalks.

Traffic Control

Traffic signals are included at Woods Valley, Mirar De Valle, New Road (new road of Park Circle development, just north of Mirar De Valle), Old Road and Lilac Road. The traffic signals at Mirar De Valle and New Road will be constructed by the Park Circle mixed use development, which was under construction at the time this report was prepared. Depending on timing, other development projects may be required to contribute to the construction of the Mirar De Valle traffic signal. The series of traffic signals in the South Village aim to improve access to existing commercial and planned mixed use developments in the commercial corridor. These signals will improve pedestrian access between businesses along the corridor and improve access to existing transit stops.

Table 4: Theme 3 Concept Elements

Elements of Theme 3		
Roundabout	Single Lane	✓
	Two-Lane	
	Single Lane w/ Taper	✓
Curb-Extension		
Controlled Ped. Crossing (Signal or HAWK)		
Raised Median		
Sidewalk		
Pathways		
Travel Lanes Reduced from 4 to 2 in North Village		
Class IV Separated Bikeway with Flexible Delineator Posts		
Class II Bike Lanes with Buffer		
Gateway Feature		

Single lane roundabouts are included at Miller Road and at Cole Grade Road. Valley Center Road narrows from two-lanes in each direction (4-lane roadway) north of Lilac Road to one-lane entering the proposed single-lane roundabout at Miller Road and remains one-lane in each direction (2-lane roadway) between Miller Road and the Cole Grade Road.

Traffic Calming

Three features in Theme 3 will help reduce travel speeds along Valley Center Road: road diet, roundabouts and narrower lanes. The road diet occurs in the North Village where the corridor narrows from four lanes to two lanes. This narrowing will effectively reduce the travel speeds through the corridor. The section from Cole Grade Road to Miller Road is also flanked by single lane roundabouts, which will help establish the slower speeds entering the North Village as the speed entering and through the roundabout will be about 35 mph. The combination of lane reduction and roundabouts will help maintain the slower speed along the corridor.

Between Miller Road and Woods Valley Road, narrow lanes and the raised median aim to reduce traffic speed. The existing 12-foot lanes are narrowed to 11 feet and a continuous median is provided from Miller Road to Lilac Road. The friction caused by narrowing the lanes will help reduce traffic speeds.

Raised Medians

The existing two-way left turn lane through the South Village remains unchanged in this section. The existing raised medians between Mirar De Valle and Lilac Road remain unchanged in this theme. A continuous raised median is proposed between Lilac Road and Miller Road with no gaps at any driveways or intersections. As such, the intersections at Chaparral Terrace and at Canyon Road will be restricted to right turns only. The median closures at these intersections under this theme would prevent head-on or broadside collisions. Stakeholders have expressed concerns about high speeds along the curve and dangerous left turns at these intersections. In the North Village, a continuous raised median extends from Cole Grade Road to Miller Road except at Indian Creek Road. Access at driveways would be restricted to right turn only through this section. By restricting left-turn movements at driveways and intersections, vehicles will be required to make U-turns at the nearest intersection. The roundabouts at either end of the North Village section of the corridor would provide an opportunity for drivers to U-turn.

Other Key Features

New streetlights would be included along the length of the corridor with pedestrian scale lighting along the Heritage Trail. Streetlight spacing and type will be determined in final design. The streetlights would adhere to the County Light Pollution Code and Valley Center Design Guidelines.

On-street parallel parking will be provided along Valley Center Road in the North Village. The additional parking is not only a benefit to the nearby retail shops and restaurants, but also acts as a traffic calming measure along Valley Center Road.

A gateway treatment is included in Theme 3, south of Woods Valley Road in the form of a monument or sign to serve as a welcome to the community.

7. CONCEPT DRAWINGS

The attached figures illustrate the elements included in each of the themes and cross-sections for selected locations along the corridor. The figures are labeled as follows:

Figure EX-1	Existing Conditions
Figure 1-1	Theme 1, Concept Plan
Figure 1-2	Theme 1, Cross Sections
Figure 2-1	Theme 2, Concept Plan
Figure 2-2	Theme 2, Cross Sections
Figure 3-1	Theme 3, Concept Plan
Figure 3-2	Theme 3, Cross Sections

- South Village (Section A): Woods Valley Road to just south of Sunday Drive
- Curve (Section B): Sunday Drive to just south of Canyon Road
- North Village (Section C): Canyon Road to Cole Grade Road

The key map below illustrates the extent of each of the sections. For each of the sections, the key elements of Existing Conditions, Theme 1, Theme 2 and Theme 3 are shown in Figure 30.

