HIGHWAY 17
ACCESS MANAGEMENT PLAN

2016

California Department of Transportation

Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability

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HIGHWAY 17
ACCESS MANAGEMENT PLAN

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ACKNOWLEDGEMENTS

Caltrans greatly appreciates the guidance and support of our partners and colleagues.

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HIGHWAY 17
ACCESS MANAGEMENT PLAN

DECEMBER 23, 2016

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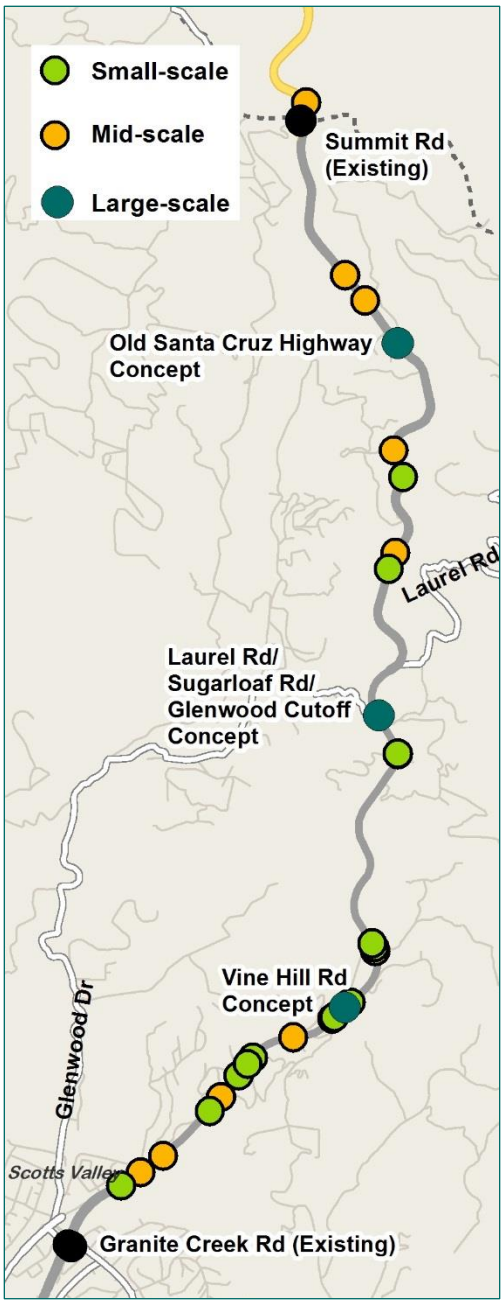
EXECUTIVE SUMMARY

The Highway 17 Access Management Plan (17 AMP) is a long-range plan that will improve traffic flow, provide for strategic accessibility, and maintain safety by managing the roadway design where vehicles enter and exit the highway. The overall planning effort took place over a two-year timeframe between fall 2014 and fall 2016. This effort consisted of partnership building, extensive literature research, performance analysis, and robust public outreach.

Through this process, Caltrans and its partners identified a 32-concept comprehensive strategy to reduce conflict points and preserve the functional integrity of the 7.1-mile conventional highway corridor between Granite Creek Road in Scotts Valley and Summit Road, near the Santa Cruz-Santa Clara border. This strategy includes small-, mid-, and large-scale concepts that are designed to work together to ultimately make Highway 17 a more efficient corridor with strategic access management. These concepts include three large-scale concepts representing new interchanges:

- Old Santa Cruz Highway
- Laurel Rd/Sugarloaf Rd/Glenwood Cutoff
- Vine Hill Road



Additional small- and mid-scale concepts at various streets and driveways throughout the corridor include turning improvements, access point relocation, multimodal improvements, and median barrier improvements.

This report documents the efforts included within the plan development process, and provides information about key plan components:

- **Introduction:** details plan goals, partnerships, and major activities.
- **Access Management Overview:** provides a brief description of access management and related benefits.
- **17 AMP Concepts:** includes a detailed listing of all recommended concepts.
- **Next Steps & Implementation:** describes potential actions for carrying any concept into further project development phases.

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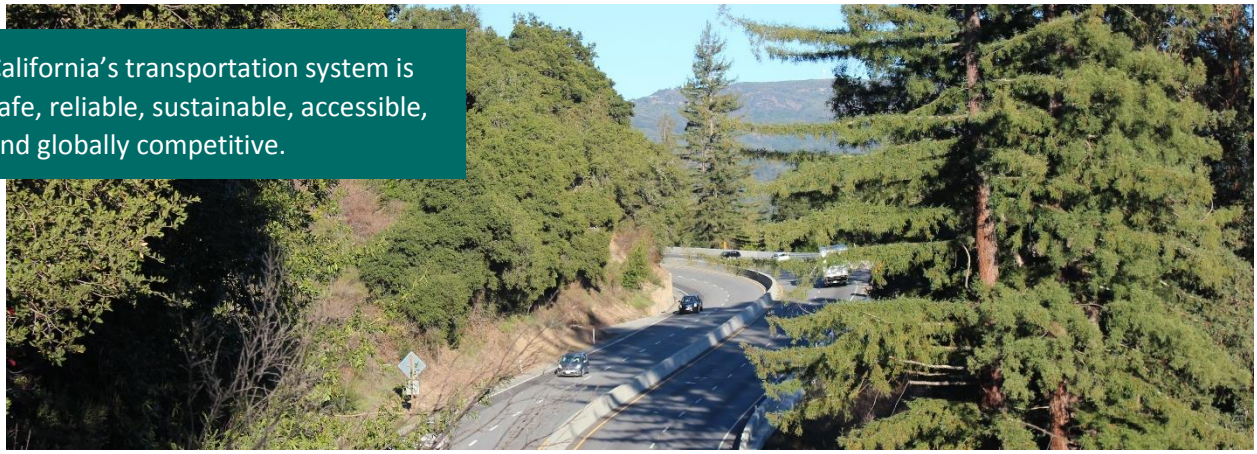
CHAPTER 1: INTRODUCTION

California's transportation system is safe, reliable, sustainable, accessible, and globally competitive.



INTRODUCTION

This plan evaluates corridor needs and recommends potential improvements for the Highway 17 (Hwy 17) conventional highway corridor from Granite Creek Road in Scotts Valley to Summit Road at the Santa Cruz/Santa Clara County line.

PURPOSE

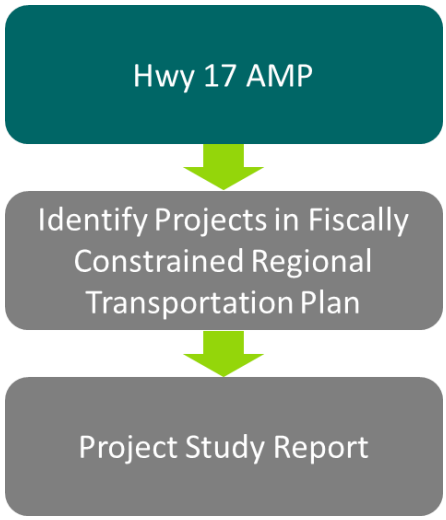
The purpose of the Highway 17 Access Management Plan (17 AMP) is to develop access management strategy recommendations to address access, mobility, and safety needs in the Hwy 17 corridor. The final 17 AMP will serve as a long-range plan for managing the corridor to achieve optimal conditions for regional and interregional travelers. This plan will allow Caltrans and its transportation planning partners to proactively manage the existing and future access along the corridor.

NEED

Existing conditions on Hwy 17 are indicative of congestion and delay during commute periods. These conditions are projected to worsen over time. Major arterial capacity improvements to the highway system without access management considerations are considered impractical and unfeasible. Proactive study of access management needs on Hwy 17 is needed to develop a comprehensive approach that more effectively directs resources to address short- and long-term needs.

ROLE

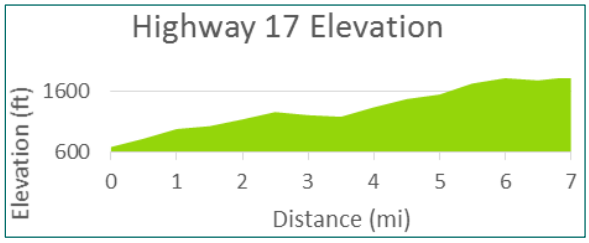
The strategies and recommendations identified in this plan are intended to inform the Regional Transportation Plan and identify priorities for future funding that will ultimately lead to project implementation. The plan will also be used as an integral tool for promoting environmental and economic sustainability for the communities along the corridor.



LOCATION

The study area limits begin in Scotts Valley at the Granite Creek Road interchange and extend north to the Santa Cruz/Santa Clara County line. This segment of the corridor is 7.1 miles in length. The study area covers the limits of SR 17 within Santa Cruz County designated as a conventional highway, meaning that it operates without control of access. The Caltrans transportation concept for this segment is conventional highway with access control.

The context of the study location requires an innovative approach to access management. The housing and other surrounding land uses are rural while the traffic volumes resemble urban area volumes. On top of that, the mountainous terrain is a limiting factor for many standard transportation projects and practices.



GOALS AND OBJECTIVES

Well-defined goals are critical to the success of all corridor plans. The 17 AMP proposed recommendations are intended to achieve four goals:

- **Mobility**
- **Safety**
- **Access**
- **Coordination**

The goals and objectives for this plan were developed and defined under the direction of the public, stakeholders, and multijurisdictional project advisory groups. The goals and objectives served as overarching principles throughout the planning process to indicate what we want to achieve and to guide decision making. These principles mirror both Caltrans mission and goals as well as nationally accepted best practices.

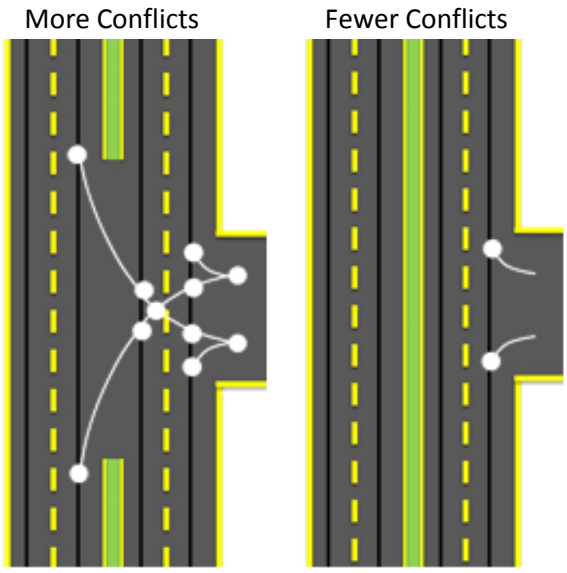
MOBILITY

The objective of the Mobility goal is to preserve the function and operation of the Hwy 17 corridor.

Proactive planning for access management serves mobility needs for the traveling public by maintaining the efficiency of the roadway. The benefits of successful access management applications include decreases in commute times, fuel consumption, and emissions. User groups benefitted include motorists, transit riders, and freight.

SAFETY

The objective of the Safety goal is to reduce conflict points on Hwy 17. Traffic conflicts can occur when vehicles' paths intersect, locations known as conflict points.



There is a potential for collision at each conflict point. The objective of reducing the number of conflict points aligns with national, state, and local safety goals. Access management also aims to separate concentrations of conflict point areas. These improvements also improve operations by decreasing the complexity of driving conditions and creating a driving environment with less friction between through vehicles and turning vehicles.

Caltrans' Strategic Highway Safety Plan aims to reduce traffic collision fatalities and serious injuries on public roads. Caltrans continues to monitor and evaluate locations with particular collision concentrations. The 17 AMP study area may require engineering countermeasures, including access modifications. The countermeasures used at specific locations may be accelerated to address a collision pattern and may supersede 17 AMP concepts on a temporary or permanent basis.

ACCESS

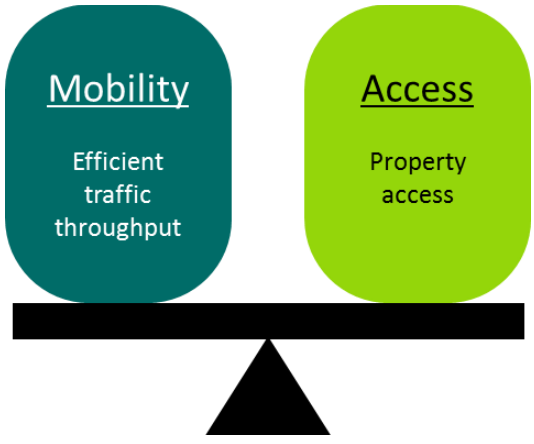
The objective of the Access goal is to enhance the function and operation of the local road network. Improving mobility of the local road network and efficiency of access is another principle of access management. Improvements on Hwy 17 need to be coordinated with the local system to provide a supportive network for internal circulation and to connect communities with Hwy 17 intersections and interchanges. Access and connectivity for bicyclists and transit riders is an important consideration.

COORDINATION

The objective of the Coordination goal is to coordinate land use and transportation planning in the Hwy 17 corridor. Access management involves both transportation and land use considerations. Multijurisdictional coordination involving local, regional, and state agencies is required to achieve access management objectives. Collaboration is especially critical for a major interregional highway crossing multiple jurisdictional boundaries.

GOAL SUMMARY

In theory as well as practice, these goals are fundamentally interrelated. Proper application of access management techniques is intended to optimize the *balance* between safe, efficient transportation and access.



17 AMP ORGANIZATION

The 17 AMP is a conceptual plan to guide the process for improving the corridor. The success of the plan hinges on several key characteristics of the study organization. This section provides an overview of the fundamental management and administration aspects of the plan.

STUDY CHARTER

Caltrans initiated a study Charter with the Santa Cruz County Regional Transportation Commission (SCCRTC) and Santa Cruz County to identify roles and responsibilities and document support for the project. The Charter documents the commitment of Caltrans and its partners to cooperate in the development and implementation of the 17 AMP. Developing an access management plan is complementary to, and consistent with, federal provisions for a continuing, cooperative and comprehensive planning process among transportation partners.

The partners agree to develop and approve in partnership an effective Access Management Plan to guide corridor management toward optimum productivity, reliability, safety, and preservation based on performance assessment and measurement. Improvements identified in the Access Management Plan to achieve optimal corridor productivity should be candidates for all categories of state, regional and local funding as applicable.

All parties also agree that this corridor's productivity can best be sustained through a collaborative planning and management effort of all the transportation partners. They also acknowledge that the corridor's productivity is vital to the state, regional and local economies, and quality of life and safety for all travelers.

– Study Charter

STUDY PARTNERS

In addition to the Charter members, the 17 AMP is guided by local and regional stakeholders. Other core partners include Scotts Valley and the California Highway Patrol (CHP).

STEERING COMMITTEE

These core study partners represent the Steering Committee for the 17 AMP. The Steering Committee is a high-level group that provides guidance and leadership throughout the study. The Steering Committee includes the following:

- **Caltrans District 5**
- **Santa Cruz County District 1**
- **Santa Cruz County District 5**
- **SCCRTC**
- **Scotts Valley**

This committee directed the overarching goals and objectives for the study. It established a communication protocol and framework for coordination throughout the study and beyond.

PROJECT DEVELOPMENT TEAM

The Project Development Team (PDT) is a staff-level group of public agencies and Caltrans functional units for local and technical expertise. This team provided detailed recommendations throughout the study. The PDT served as the point of contact for routine issues and information sharing. It also assisted with data collection and public outreach. In addition to core study partners, this team included representatives from Association of Monterey Bay Area Governments (AMBAG) and Santa Cruz Metropolitan Transportation District (Metro).

69 percent of corridor management studies have used some kind of cooperative agreement

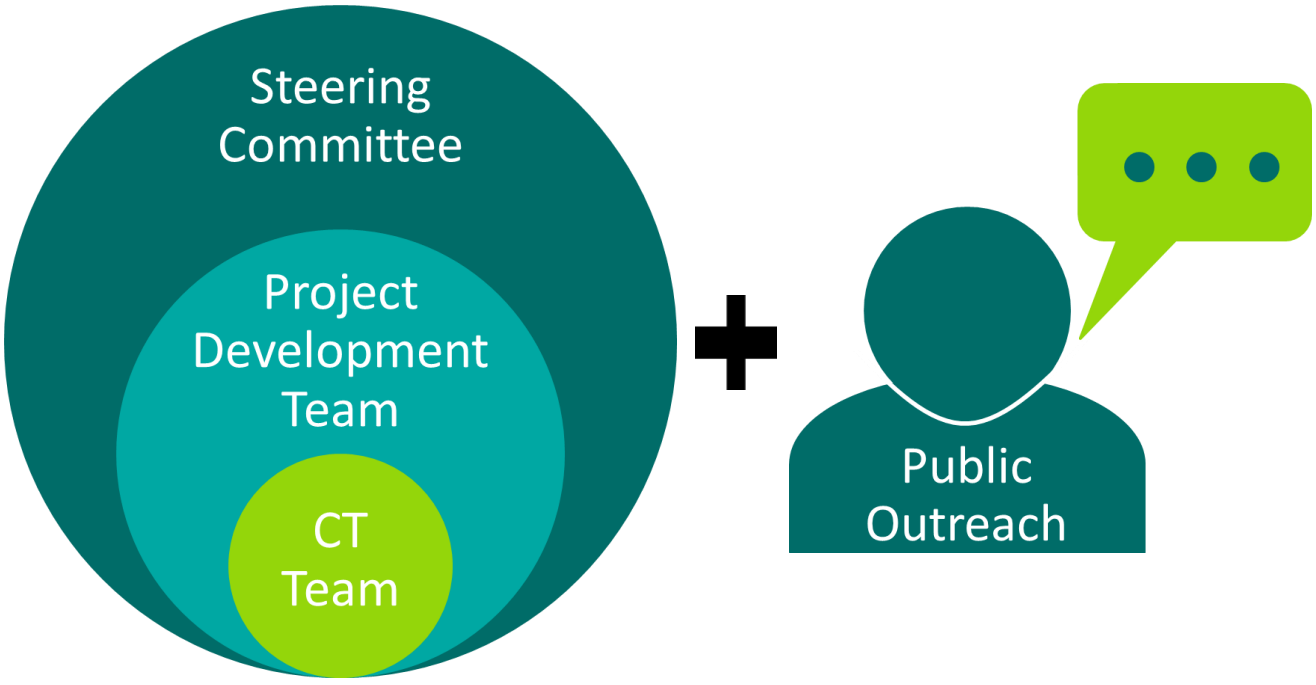
– Transportation Research Board

CALTRANS TEAM

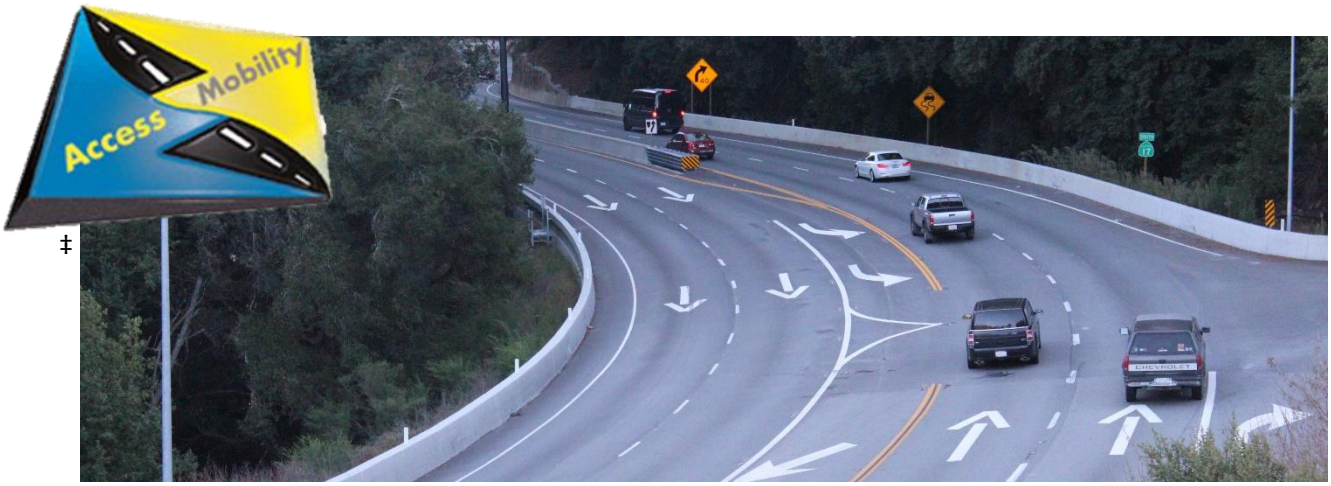
The Caltrans team consists of representatives from the District 5 Planning and Design units. Responsibilities include project coordination, outreach, and report development.

PUBLIC OUTREACH

Public outreach is an essential component of the plan. The final recommendations in this plan are based on information gathered during all phases of public engagement as well as technical analysis conducted by the project team.



CHAPTER 2: ACCESS MANAGEMENT OVERVIEW



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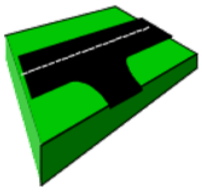
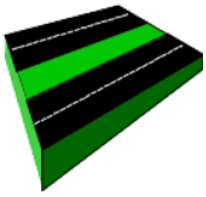
ACCESS MANAGEMENT OVERVIEW

Access management is a practice used by transportation professionals for controlling where vehicles enter and exit the roadway. Access management techniques help to reduce conflict points, preserve mobility and maintain safety by controlling the location, spacing, design and operation of key highway elements:

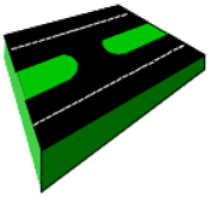
Driveways:



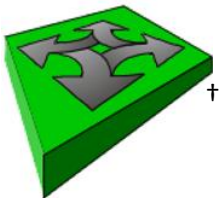
Medians:



Median Openings:



Interchanges:



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Access management requires the coordination and integration of roadway design and land use development patterns to improve accessibility for vehicles, pedestrians, people who bike, and public transit.

† Image source: Florida DOT Median Handbook

Access management techniques leverage over 100 years of research and experience that have been developed and implemented by multidisciplinary transportation professionals throughout the world. These techniques are intended to balance the primary functions of the road system: accessibility and mobility.

The **mobility** of a road is the ability to move people and goods from one point to another point. **Accessibility** is the provision of ingress and egress to connect people and goods to specific properties or locations. Mobility, access, and safety are interrelated characteristics of the California State Highway System.

Access Management is the process of balancing the competing needs of traffic movement and land access.

– Federal Highway Administration

‡ Image source: Transportation Research Board

ROAD SYSTEM FUNCTIONS

Different roads serve different purposes, and the facilities that make up the State Highway System serve a wide range of functions.

Freeways are the best example of a type of road with the primary focus on mobility. Freeways serve a large amount of people and goods without compromising mobility by limiting the number of access points to a few appropriately-spaced interchanges.

Conversely, a local street in a neighborhood connects to each property and thus provides a high level of accessibility. The traffic flow on a local street would not be ideal for traveling long distances or moving large volumes of people and goods.

Preserving the functional integrity of the road system aligns with Caltrans overarching strategic goals identified in the 2015 Strategic Management Plan. Maintaining appropriate access within the context of specific road types is a sustainable way to protect the public's investment in infrastructure. Access management is a way to anticipate and prevent roadway safety issues and congestion, helping to prolong the functional lifespan of a highway.

These considerations are important for Hwy 17, a Principal Arterial. Hwy 17 is unique compared to many other arterials. Considering the high daily and peak period volumes, Hwy 17 operates and functions similar to many urban expressways or freeways; however, it is located within an area that is predominantly rural. Unlike expressways or freeways, Hwy 17 provides local access to many neighborhoods via local street intersections and driveways. Because of this contrast, several challenges stem from an imbalance between access and mobility. In addition to this imbalance, the mountainous terrain is a limiting factor for many standard transportation projects.

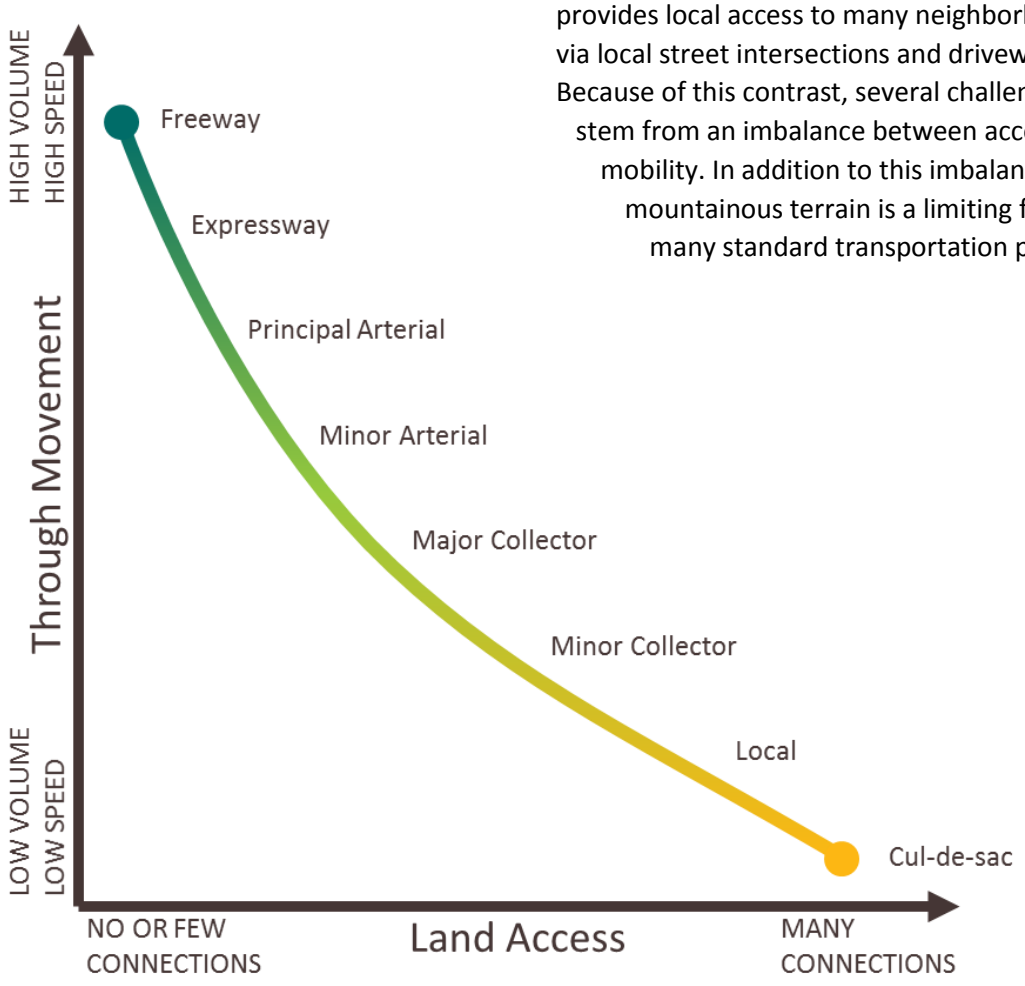


Image source: Transportation Research Board

ACCESS MANAGEMENT AND SUSTAINABILITY

Existing conditions on Hwy 17 are indicative of congestion and delay during commute periods. These conditions are projected to worsen over time. Attempting to address these conditions with facility widening or replacement perpetuates a cycle that is clearly unsustainable.

TRANSPORTATION AND LAND USE CYCLE

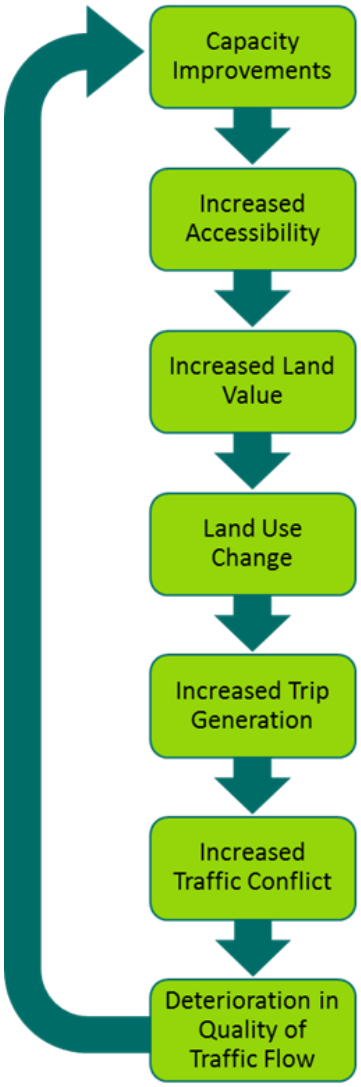


Image source: Based on materials developed by the Transportation Research Board

> *The lack of access control along arterial highways has been the largest single factor to the obsolescence of highway facilities.*
>
> *– NCHRP 121: Protection of Highway Utility*

Ultimately, this cycle leads back to congestion along with additional assets that require costly maintenance. Major arterial capacity improvements to the highway system without access management considerations are now considered impractical and infeasible.
This is especially significant for Hwy 17, since the physical constraints make widening Hwy 17 even more challenging and expensive than other roads. The recommendations included in this plan are intended to help break from this pattern for Hwy 17.

The rationale for access management, especially in place of capacity, is based on the key benefits described below:

Proper access management provides…

- **Operational benefits**
- **Safety benefits**
- **Sustainability benefits**
- **Economic benefits**

These benefits have proven that effective access management strategies can decrease and delay the need for much more expensive, unsustainable capacity expansion projects. Rather than trying to carelessly address congestion with capacity, proactive access management on Hwy 17 is needed develop a comprehensive approach to more effectively direct resources to address short- and long-term needs.

OPERATIONAL BENEFITS

Maintain reliable travel conditions is achieved by limiting access points to strategic locations. Controlling access to highways can reduce congestion and improve the movement of through traffic, preserving the functionality of California's roads. An effective access management program can increase roadway capacity by up to 45 percent and reduce travel time and delay by up to 60 percent[1].

Access points can introduce friction into the traffic stream, and vehicles entering and exiting the mainline tend to slow through traffic. Capacity measurement techniques show that the typical reduction in free-flow speed is approximately 0.25 mph per access point and 0.005 mph per right-turning movement[1].

Access points and free-flow speed:

Access Points per Mile	Reduction in Free-flow Speed
0	0.0
10	2.5
20	5.0
30	7.5
≥40	10.0

Source: Highway Capacity Manual 2010

The relationship between access points and reliability is connected to the driving needs of the traveling public. Drivers need to constantly monitor access points for potential turning vehicles. When access points are concentrated, it becomes difficult for drivers to prepare to respond to potential turning vehicles at each access point. Drivers perceive Hwy 17 as stressful and inefficient because the amount of access points can cause unexpected changes in traffic. Reducing access points reduces the number and variety of events to which drivers must monitor and respond.

Access management techniques can successfully increase capacity and travel reliability. A 2004 study by the Texas Transportation Institute showed that access management techniques resulted in a reduction of average travel times by up to 38 percent[2].

A 1985 Colorado demonstration project is frequently cited as an example. This project conducted a before-and-after study on multiple similar arterials to gauge the effect of access management. Using speed as a metric, the results showed that highly access-managed arterials operated more efficiently than the control group.

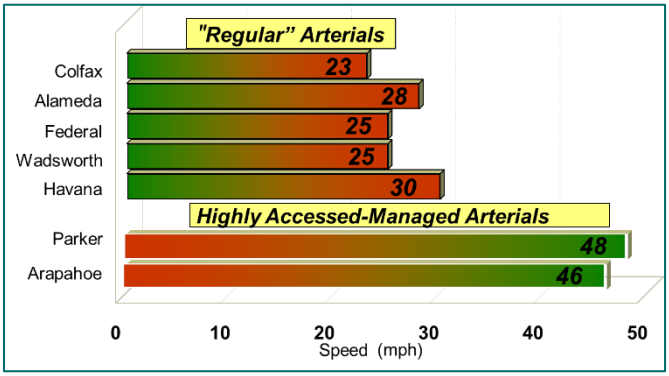


Image source: Colorado Access Control Demonstration

These operational improvements will yield benefits to all groups:

- **Hwy 17 Express rider:** experiences reduced delay and travel times;
- **Freight industry:** experiences lower transportation costs and delivery times;
- **Communities:** experience less diverted cut-through traffic through the local road system;
- **Transportation agencies:** benefit from reduced cost of delivering an efficient and safe transportation system.

[1] Transportation Research Board Access Management Manual, 2014

[2] Estimating the Impacts of Access Management Techniques, Texas Transportation Institute, 2004

SAFETY BENEFITS

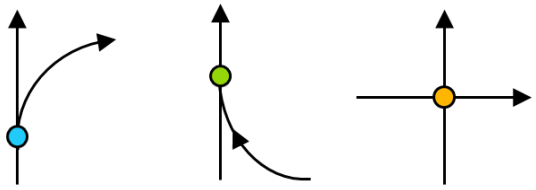
Access management positively influences safety performance by separating access points so that turning, crossing, and stopping movements occur at fewer locations. Every access point presents the potential for conflicts between vehicles, or conflict points. Conflict points are locations where the travel paths of two different vehicles may legally cross.

Driveways are inevitable and necessary but as their numbers go up, so too does the propensity for accidents in that corridor.

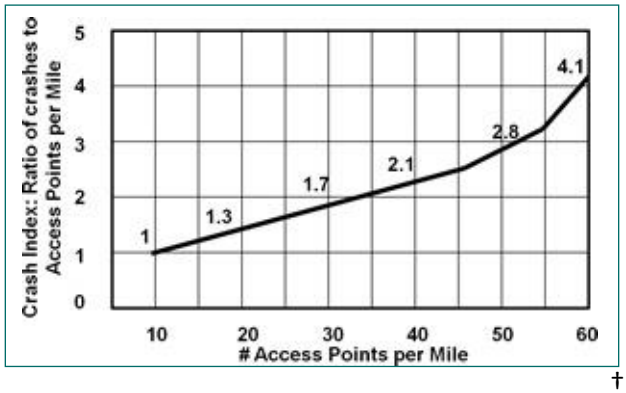
– FHWA Introduction to Access Management Principles

There are multiple types of conflict points:

Diverging: **Merging:** **Crossing:**



Conflict points can be reduced by managing and planning the spacing and design of access points. This is important because national level best practice studies show that collision rates are higher in locations with greater access point densities[3].



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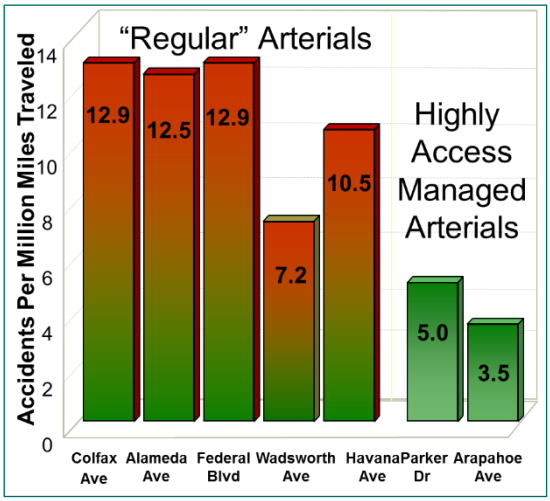
This linear relationship is understandable considering that approximately 55 percent of all collisions are access-related, and over 70 percent of access-related collisions involve left turns[4].

†Image source: Transportation Research Board

Fewer driveways and intersections spaced further apart allow for more orderly traffic operations. Transportation Research Board studies conclude that an effective access management program can reduce collisions by 50 percent[1].

The 1985 Colorado demonstration project showed a collision rate decrease of almost 50 percent for the arterials that were retrofitted with access management applications[5]. The improvements were attributed to the installation of non-traversable medians and turn lanes to separate traffic and provide positive guidance to direct motorists.



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‡Image source: Colorado Access Control Demonstration

[3] Transportation Research Board Access Management Manual, 2014

[4] Federal Highway Administration Introduction to Access Management Principles, 1997

[5] Colorado Access Control Demonstration, 1985

SUSTAINABILITY BENEFITS

In the era of climate change, the transportation system must continue to meet mobility and safety demands while achieving reductions in greenhouse gas (GHG) emissions. The 17 AMP as a whole aligns with statewide sustainability policy objectives by addressing congestion problems in a holistic way, at a corridorwide scale.

Access management improves **fuel efficiency**. Fuel energy consumption is lowest for passenger cars at speeds between 35 and 55 mph.

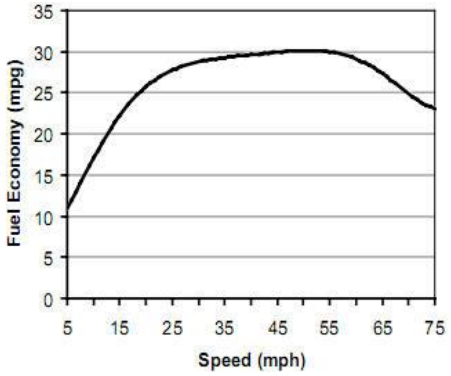


Image source: MyCarStats.com

Stop-and-go traffic conditions reduces fuel efficiency. Successful access management techniques would yield fuel savings from increased speed and reduced delay. An example study in Texas estimated that increasing signal spacing and limiting access points would equate to 57,500 gallons of fuel saved per mile per year[6].

[6] Evaluating Mobility and Energy Efficiency, Texas Transportation Institute, 1994

Since improvements in fuel economy result in reduced carbon dioxide emissions, any access management-related improvements to increase speed and stabilize traffic flow will reduce **air pollution emissions**. Motor vehicles are the primary generator of carbon monoxide (CO) and volatile organic compounds (VOC). Vehicles are also major contributors to carbon dioxide (CO_2).

> *A 10 percent reduction in fleet fuel consumption would result in an estimated 2 percent CO_2 emissions.*
>
> *– TRB Access Management Manual*

The congestion experienced on Hwy 17 can lead to frequent braking and acceleration, which directly affects emissions. Access management project designs are intended to reduce conflict between users, leading to smoother, more uniform traffic flow.

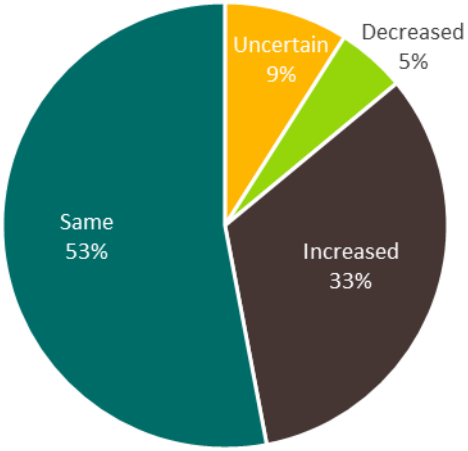
Access management helps protect against **land and habitat degradation** by focusing on getting the most out of the existing system rather than adding new roadways or bypasses. Adding new capacity or building new roads has direct consequences for the environment, and can indirectly lead to induced growth and sprawl.

Hwy 17 is located within an important wildlife corridor and the California Essential Habitat Connectivity Project model depicts this area as having a high value for wildlife connectivity. The long range concepts presented in this plan align with Land Trust of Santa Cruz County efforts to install a wildlife habitat connectivity crossing near Laurel Road.

ECONOMIC BENEFITS

Congestion and delay are bad for the economy. Reliable traffic flow can make a corridor more attractive and result in benefits to businesses along the corridor. An Iowa before-and-after case study examined business conditions on eight corridors in the state. The study determined that a majority of businesses on access-managed corridors reported equal or increased sales following access management improvements[7].

Business reported sales comparisons[7]:



Although there are a limited number of commercial land uses surrounding the study area, benefits attributed to more efficient performance would be generated throughout the region.

Effects of travel time and market area:

Reduction in Average Speed	Market Area Relative to Previous Size
0%	100%
10%	81%
20%	65%
30%	45%
40%	36%
50%	25%

Source: Transportation and Land Development, Institute of Transportation Engineers, 1988

[7] Iowa Access Management Research and Awareness Project, Iowa State University, 1997

For example, the many tourism and recreational opportunities throughout the county make Santa Cruz a popular destination for Bay Area residents. Despite these attractions, many visitors may be deterred by gridlock congestion or perceived safety hazards. Improving conditions on Hwy 17 would result in benefits to local businesses throughout the county.

Hwy 17 is also an important freight connection between Santa Cruz and San Jose. Maintaining the efficiency of Hwy 17 is critical for business that rely on goods movement. Delay can directly increase shipping and distribution costs, which can ultimately effect profits and hurt local businesses.

> *Where the loss of customers or the increase in costs is sufficiently large, businesses may close or relocate. The value of the investment at the existing location is lost, the property value declines, and the municipality loses both property tax and sales tax revenue.*
>
> *– TRB Access Management Manual*

Fiscal sustainability is equally important. The California highway system represents a valuable resource and a major public investment. Caltrans has the responsibility of properly managing the system in an efficient manner. For Hwy 17 and similar interregional arterials, the functional focus is to maintain efficient through movement. Without managing access, concentrations of driveways would gradually increase over time and degrade the functional integrity of the corridor. Managing highway access is a proven method of preserving capacity, and thus the public investment.

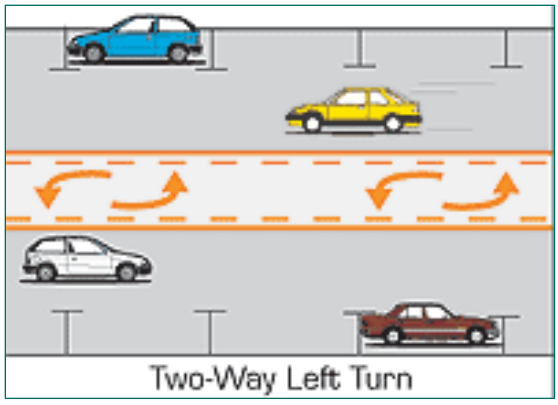
ACCESS MANAGEMENT TECHNIQUES

This section provides an overview of typical access management techniques that fit into the Hwy 17 context. This summary is provided for a theoretical background on access management, and is not intended to represent specific Caltrans guidance or standards.

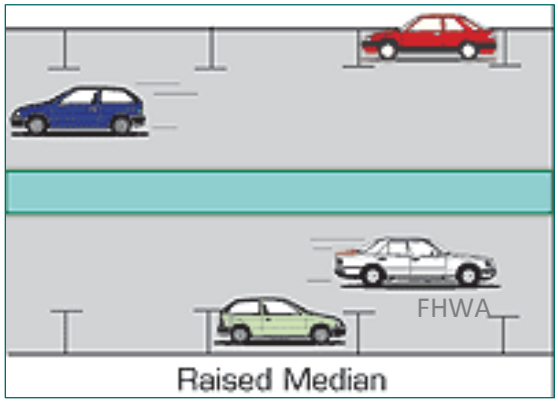
MEDIAN TREATMENTS

There are two main types of median treatments used in access management:

Two-way left-turn lane (TWLTL):



Nontraversable median barrier:



The 17 AMP recommendations focus on the nontraversable median barrier.

The presence of a raised, nontraversable median provides separation of opposing traffic and prevents left turns across the mainline, making these treatments an effective means of reducing the potential for collisions and improving operations. The TRB Access Management Manual summarizes that nontraversable medians are more desirable than a TWLTL on arterial roadways in excess of 28,000 vehicles per day.

Many studies have documented significant safety benefits from raised medians. Design guidelines of the American Association of Highway Transportation Officials (AASHTO) recommend a median for arterials of four or more lanes. A TRB multistate analysis in the National Cooperative Highway Research (NCHRP) Report 420 – Impacts of Access Management Techniques showed that raised medians reduce collisions by over 40 percent in urban areas and 60 percent in rural areas[8].

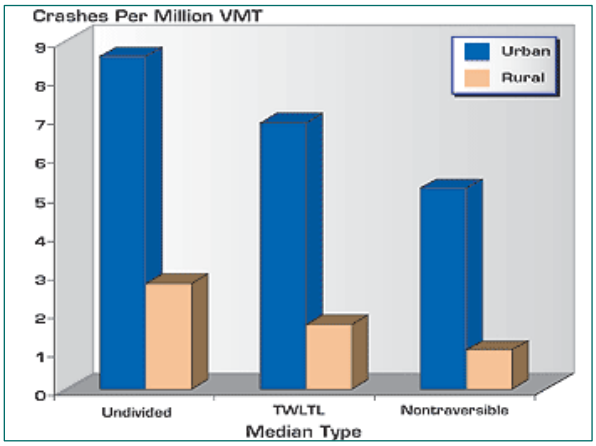


Image source: FHWA Introduction to Access Management Principles

NCHRP Report 395 – Capacity and Operational Effects of Midblock Left-turn Lanes concluded that raised medians achieve improved safety performance over TWLTL treatments for roads with traffic volumes of 17,500 vehicles per day or greater.

[8] NCHRP Report 420 – Impacts of Access Management Techniques, 1999

Similarly, a Florida study concluded that the collision rate of a four-lane road with a nontraversable median is **25 percent** lower than that of a four-lane road with a TWLTL[9].

Nontraversable medians reduce or eliminate left turn movements, minimizing the total number of conflict points and concentration of conflict points. The effectiveness of median barriers is clear considering that over 70 percent of access-related collisions involve left turns:

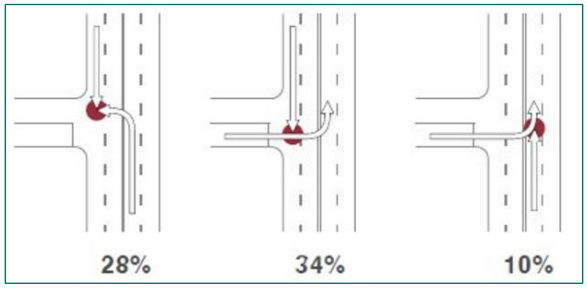


Image source: FHWA Access Management in the Vicinity of Intersections

In addition to reductions in collisions caused by left turns, nontraversable medians can reduce head-on and crossover collisions. Per the AASHTO Highway Safety Manual, locations with effective access management can experience a 25 to 31 percent reduction in injury and fatal collisions[10].

<u>At the same time…</u>

Transportation officials need to consider the tradeoffs regarding community access when turn movements are restricted at driveways. While median treatments yield benefits to some highway performance characteristics, they present an obvious effect on access. It is important for planners and engineers to factor access needs in addition to safety and mobility needs. Access is significant, and the 17 AMP recommendations are intended to reconcile these competing needs.

Laurel Road provides an example. From 2004 through September 2010, 26 percent of all Hwy 17 collisions were located at Laurel Curve. In March, 2012, Caltrans installed a temporary median barrier on Hwy 17 at Laurel Road to evaluate the effect on reducing fatal and severe injury collisions at this location.

The median barrier effectively decreased the potential conflict points from eleven to two.

Before 3/20/12:

After 3/20/12:

[9] Safety Impacts of Selected Median and Access Design Features, UF Transportation Research Center

[10] AASHTO Highway Safety Manual

While the project reduced convenient access to Hwy 17, the safety features of the median barrier are clearly supported by decades of access management theory, research, and practice.

> *"Ultimately we want the safest area possible for motorists, the commuters and the tourists."*
>
> *– Susana Cruz, Caltrans Public Affairs Public Workshop in Happy Valley, June 2016*

Moving forward, the 17 AMP is necessary to develop a proactive approach to balancing the important functions of the highway. This approach lays out a framework for improving long-range access and connectivity for Hwy 17 communities, including the Laurel community. This framework includes a listing of concepts designed to provide grade-separated opportunities for motorists to make the crossing movement, uninterrupted by traffic flows in the through lanes.

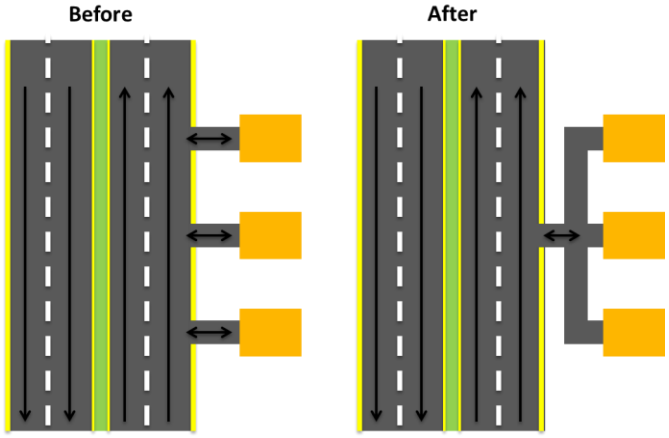
Secondly, the recommendations in this plan are comprehensive and coordinated. Without this planning effort, improvement projects are typically considered individually as needs develop over time. This long-range plan takes a more proactive approach toward managing the corridor as a whole.

For example, concepts at some locations do reduce access and include median barrier closure to achieve the benefits associated with access management. These concepts, however, are strategically coordinated with other concepts that provide improved access within a reasonable distance.

DRIVEWAY LOCATION IMPROVEMENTS

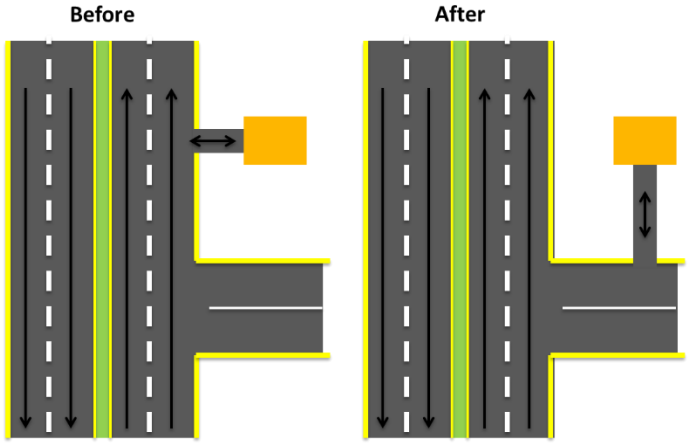
There are a variety of techniques involving modifications to driveways to reduce friction created by numerous access points. These techniques range in design, but follow similar principles: limit the number of conflict points, separate conflict areas, and remove turning vehicles from through traffic lanes.

Driveway consolidation:



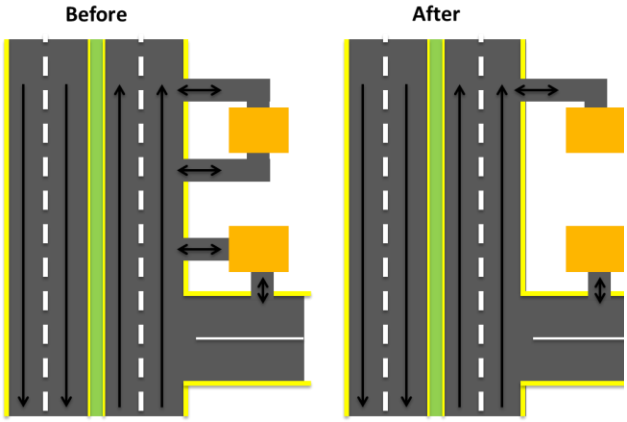
This technique involves consolidating access for neighboring properties along Hwy 17. The shared connection reduces the number and density of conflict points.

Driveway relocation:



Limiting direct access by connecting a private driveway to a more appropriate local road will help preserve the functional integrity of Hwy 17 as a high capacity interregional highway.

Driveway elimination:

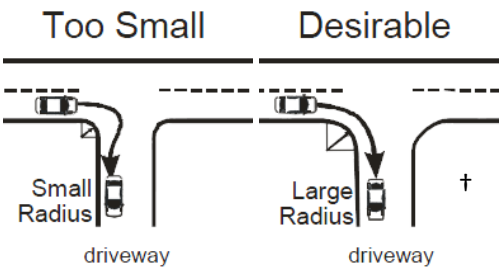


In some cases, eliminating driveways will not be noticeably disruptive or reduce access for property owners. 17 AMP recommendations consider these as viable opportunities to reduce conflict points.

DRIVEWAY DESIGN IMPROVEMENTS

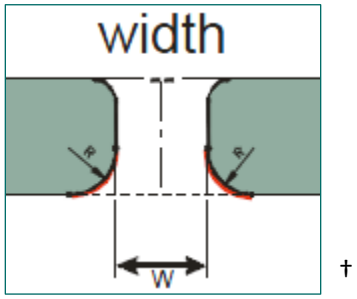
Improving the geometric design of driveway features is another means of managing vehicle turning movements. Improving right-in, right-out movements can help efficiently remove turning vehicles from mainline traffic, minimizing interference caused by vehicle ingress and egress. There are multiple ways to improve driveway design.

Driveway turning radius:



Increasing the turning radius for some driveways will make it easier for vehicles to enter and exit the mainline, minimizing the difference in speeds between turning vehicles and through traffic.

Driveway entry width:

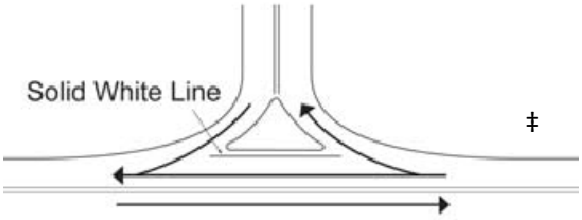


The design of a driveway entry width, or throat width, is interrelated with turning radius design. Ensuring that driveway entry width is adequate is an important consideration for maintaining driveway entry speeds appropriate for the Hwy 17 corridor. A safe and efficient combination of turning radius and entry width will also reduce the distance

Driveway slope:

The slope, or grade, of a driveway factors into its maneuverability. Driveways that are too steep can cause the undercarriage of a vehicle to scrape unless the driver transitions to a slow speed. The maximum recommended slope for a driveway on a major arterial is 6 percent[11].

Driveway channelization:



Channelization islands are used to improve right-in, right-out turning movements. These are another method of restricting left turning movements, and therefore accomplish similar safety benefits as nontraversable medians. They also improve operations by reducing interruptions to the traffic flow on the mainline.

†Image source: Florida DOT Driveway Information Guide
‡Image source: NCHRP Report 659 – Guide for the Geometric Design of Driveways

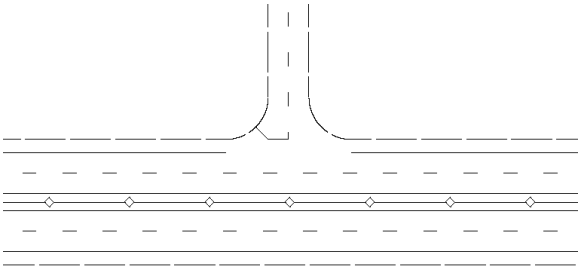
[11] TRB Access Management Manual

AUXILIARY LANES

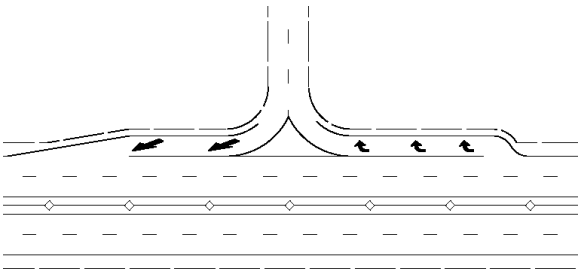
Auxiliary lanes are lanes that do not increase general through lane capacity, but rather provide for enhanced roadway operations. These lanes reduce the overall disruption to traffic flow caused by vehicles entering and exiting the road. They provide operational benefits by effectively reducing the speed differential between mainline traffic and turning vehicles.

Auxiliary lanes assist with turning movements, deceleration, acceleration, and their associated transitions and storage needs.

Before auxiliary lane turn channelization:



After auxiliary lane turn channelization:



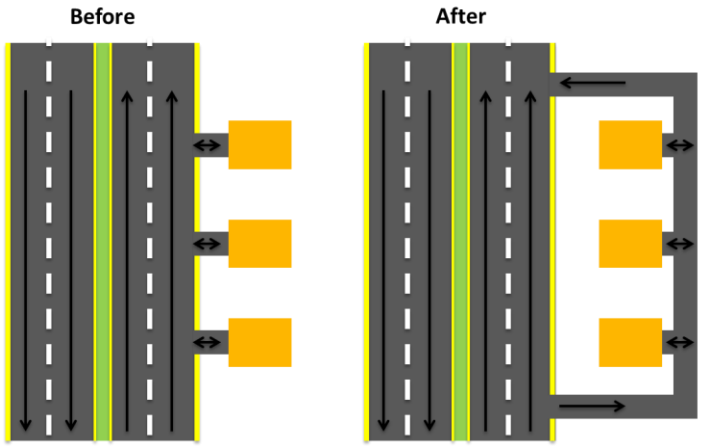
Right-turn lanes and **deceleration** lanes provide a safe and efficient means for remove turning vehicles from the through traffic. These facilities reduce the disruption to traffic flow caused According to the National Highway Institute (NHI), right turning lanes result in a 20 percent reduction in collisions[12].

Merging lanes and **acceleration** lanes give vehicles entering the roadway a chance to increase speeds to allow for a smooth entrance.

[12] NHI Course 133078

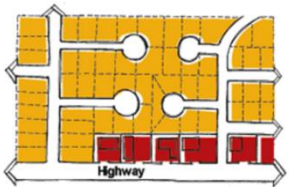
FRONTAGE ROADS

Frontage roads are roads that parallel a major arterial or freeway to provide alternative access to development along the mainline. This technique is also intended to reduce direct access to major roadways. With frontage roads, access to properties is provided by the internal local road network rather than the main highway.

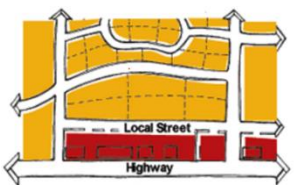


Frontage roads exemplify a well-organized functional classification system of the overall road network. By providing a high level of property access, they are a complementary facility to major state highway arterials intended to serve interregional trips.

Along with frontage roads, increasing connectivity within the local street network is another access management strategy.



Networks that provide little internal connectivity require local trips to use the highway.



A more integrated network distributes traffic efficiently.

Image source: Minnesota DOT

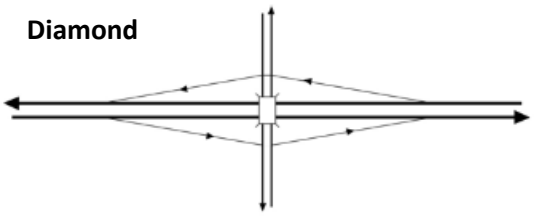
INTERCHANGES

Among all techniques, interchanges are the most significant investment in the highway system. An interchange is a combination of ramps and grade separations at the junction of two or more roads for the purposes of consolidating access and reducing or eliminating traffic conflicts. Eliminating crossing conflicts maintains system safety and traffic capacity.

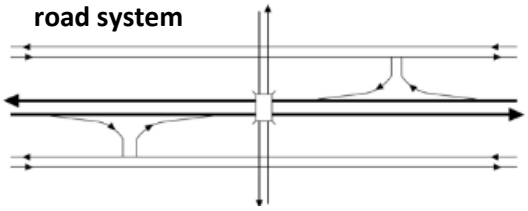
For freeway facilities with full access control, all access connections to the local network are made via interchanges. Hwy 17, on the other hand, is a unique facility because it is designed as a conventional arterial, but functions similarly to an expressway or freeway. The addition of new interchanges at strategic locations may be justified, in light of access management considerations and future traffic projections on Hwy 17.

There are a variety of interchange designs; there are several variations to the basic design summaries presented below:

Diamond



"Hook" Ramps connecting to parallel road system



Partial Cloverleaf

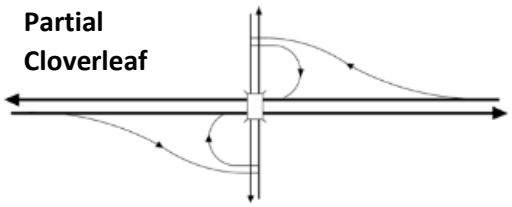


Image source: Caltrans Highway Design Manual

The selection of interchange type and design is based on several factors. Hwy 17 presents obvious constraints that preclude many typical designs, including topography, environmental considerations, and lack of alternative detour routes during construction. Ultimately, these factors influence project cost. The sketch-level concept designs included in this study represent an innovative approach to meeting the constraints on Hwy 17 while still achieving access management objectives.

Considering the major investment required for a new interchange, each concept will require significant planning and local coordination to protect the long range function and lifecycle of the facility. This will include developing a land use strategy to ensure that future land uses are compatible with the way the interchange is designed and managed.

LEGAL BASIS FOR ACCESS MANAGEMENT

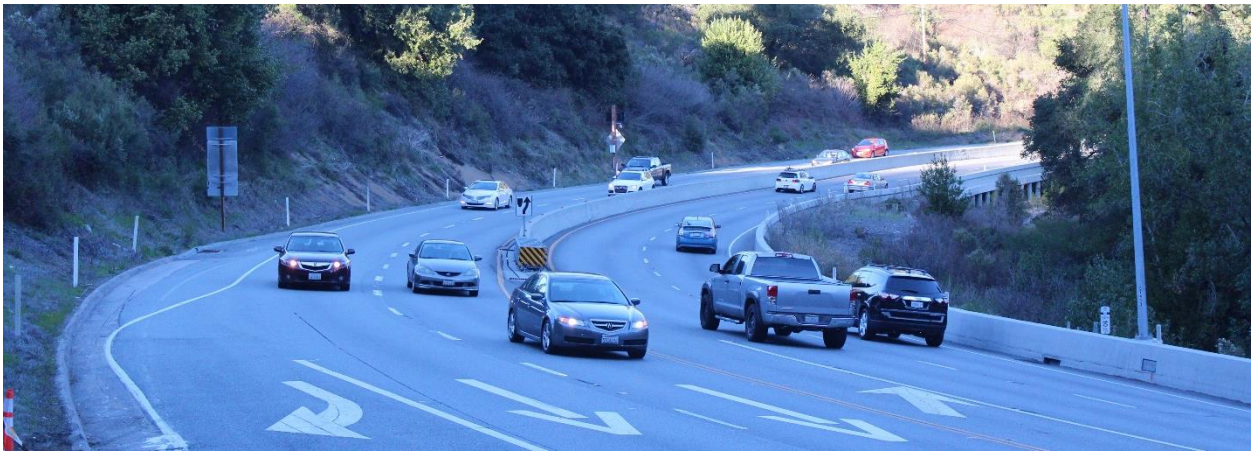
In general, "a property owner has right to have access but does not have right to expect absolute access at any point", according to the FHWA Introduction to Access Management Principles.

Caltrans has the authority to manage traffic control features with the right-of-way:

- Median use
- Median design
- Median openings
- Site access location
- Site access quantity

Authority for access management is established by statute in Sections 92 and 670.1(b) of the Streets and Highways code. The Streets and Highways Code authorizes Caltrans to manage its right-of-way and to require encroachment permit applications to conform to Caltrans' specifications.

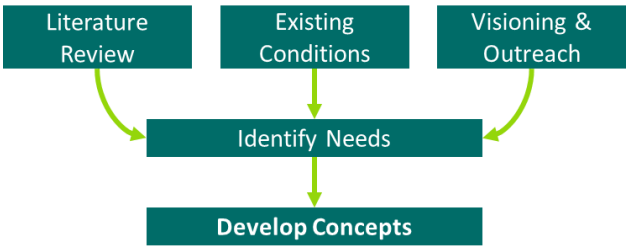
CHAPTER 3:
17 AMP
PROPOSED CONCEPTS



SUMMARY OF PROPOSED CONCEPTS

The Goals and Objectives summarized earlier in this report represent the overarching policies of the 17 AMP. This section presents a listing of potential investments, or *concepts,* that are intended to implement 17 AMP policies. These recommendations are only conceptual alternatives that should be evaluated further for project initiation.

These concepts reflect the results of a combination of literature review, corridor performance analysis, partner visioning, and public outreach.



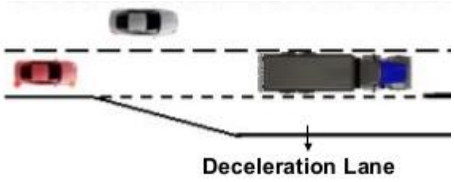
CONCEPT ORGANIZATION

Addressing corridor needs comprehensively requires consideration of multiple variables. Each concept will directly affect surrounding locations, and the cumulative results and benefits of all conceptual improvements will affect the entire corridor. In addition to individual concept utility, coordinating the concepts in a systematic way around these variables ensures that the concepts are complementary.

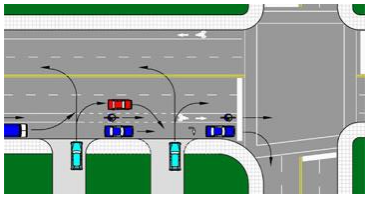
Scale:

Scale directly influences the interrelated variables of cost, timeframe, and potential environmental and community disruption. Developing appropriately-scaled concepts at the most strategic locations aligns with Caltrans' sustainability and accountability goals. Concept scale is an approximation relative to the full range of concepts, and is used in this plan for organizational purposes only. While there are no strict criteria for defining scale, the following examples provide a general description:

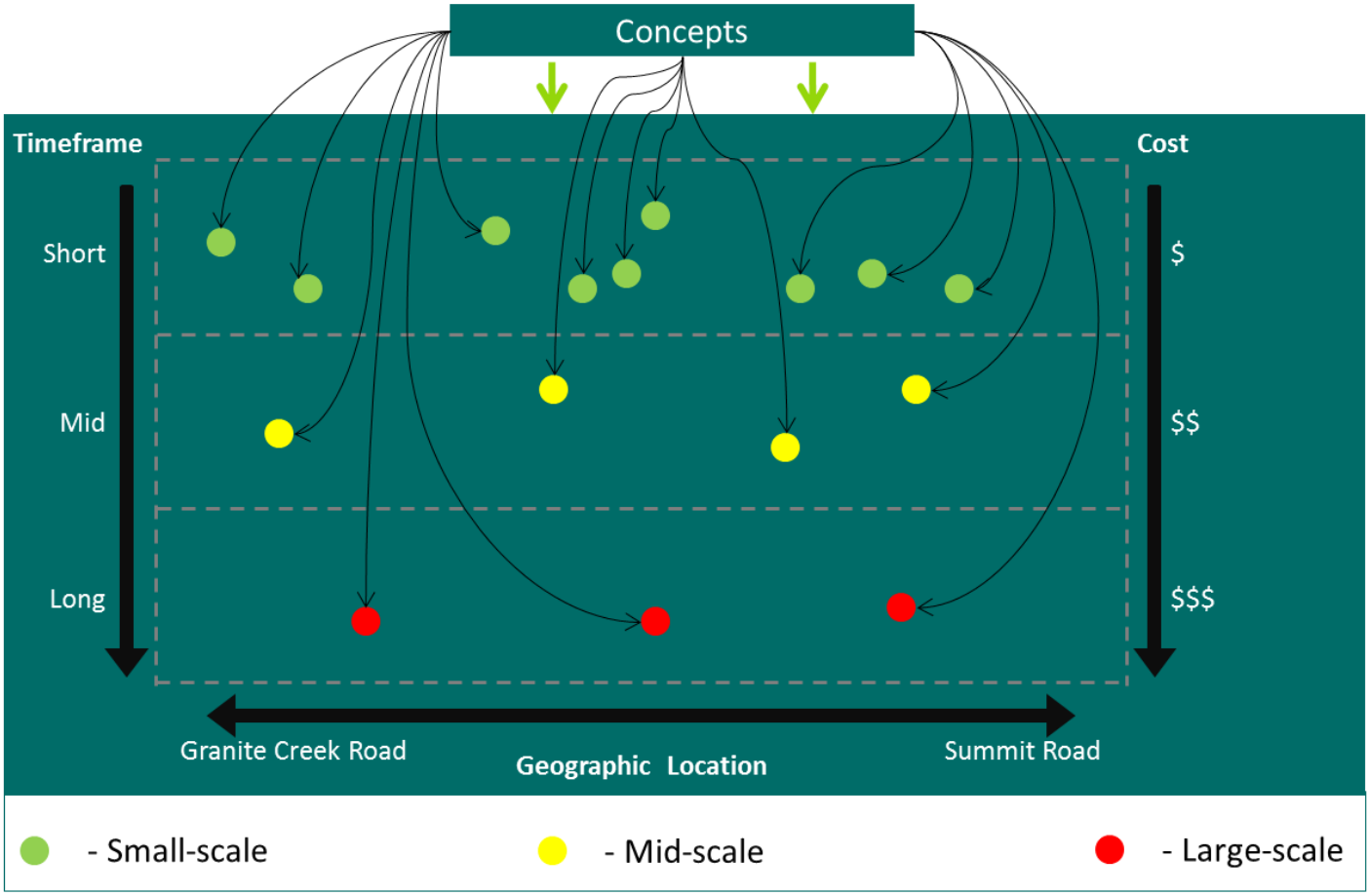
- Small scale – Driveway improvements:



- Medium scale – Driveway consolidation



- Large scale – Interchange



Cost Estimate:
Considering the needs at all levels of government, the resources available for transportation are exceptionally limited. The 17 AMP reflects a concerted effort to develop a package of improvements that reflect the best use of any applicable funding source, whenever available.

This level of study does not estimate concept costs at the level of detail typically developed at further, engineering-level phases. It includes preliminary, approximate estimates using *order of magnitude* ranges for construction costs only:

Small-scale: $0 to $5 million

Mid-scale: $5 to $10 million

Large-scale: $25 to $75 million

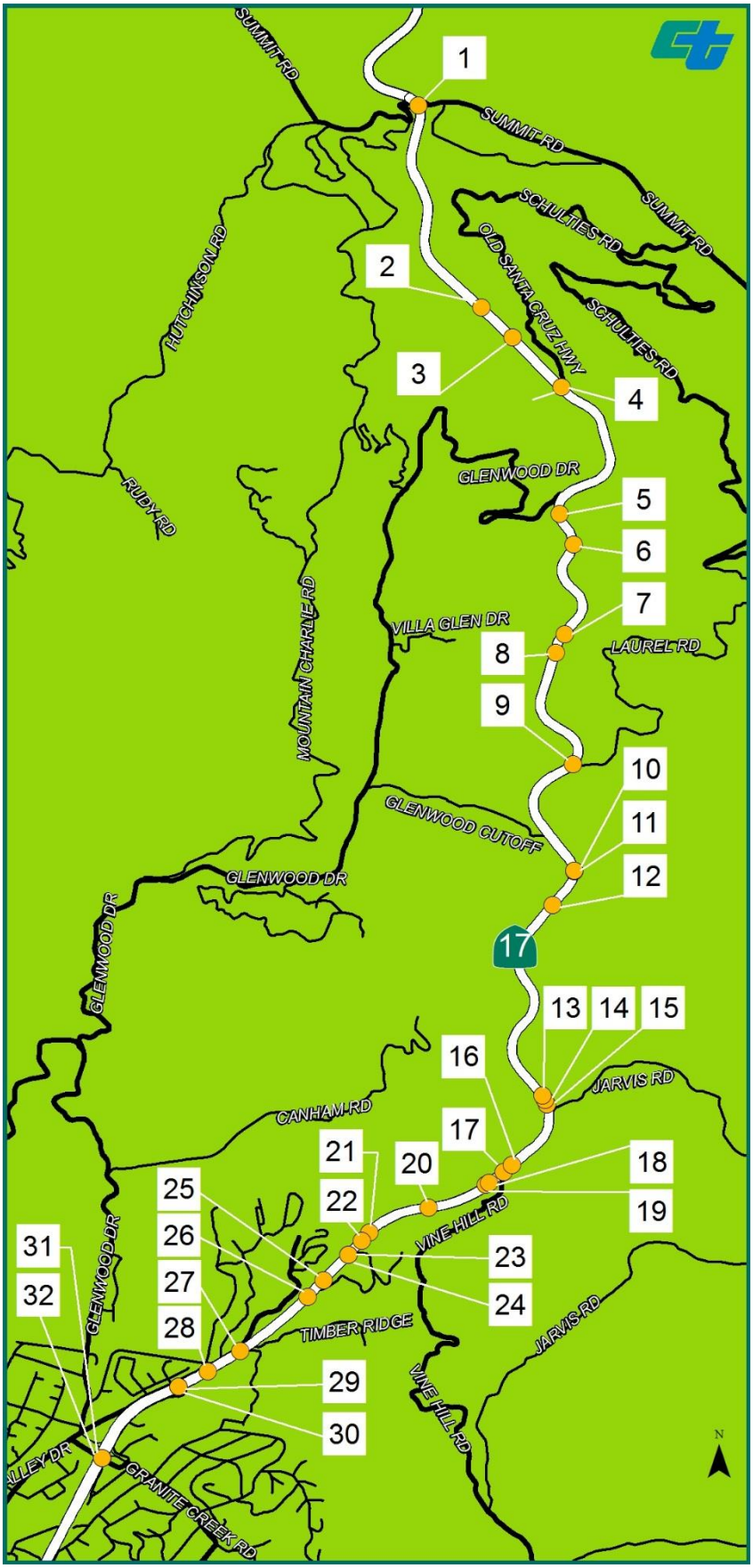
Timeframe:
Each concept is proposed as a standalone project once a fund source is identified. The timeframe for implementation would be established during the Project Initiation Document (PID) phase for individual concepts. Additionally, an accurate timeframe for project completion can only be established after funding is identified and programmed. Following programming, the timeframe for project completion is dependent on multiple factors.

Location:
Each concept represents a potential benefit to a specific location. Simultaneously, the total package of concepts will work together to provide corridorwide benefits.

CONCEPT LIST

MAP ID	LOCATION	CONCEPT
1	Summit Rd	Summit Rd Interchange Improvements
2	Business Entrance	OSC Highway Area Multiple Driveway Channelization
3	Business Exit	Business Exit (PM 11.611) Acceleration Lane
4	Old Santa Cruz Hwy	Old Santa Cruz Hwy Interchange
5	Glenwood Dr	Glenwood Dr Intersection Improvements
6	Driveway (Gated)	Driveway (Gated) (PM 10.499) Driveway Channelization
7	Spanish Oaks Rd	Spanish Oaks Rd Intersection Improvements
8	Driveway (Gated)	Driveway (Gated) Intersection Improvements
9	Laurel Rd	Laurel Rd Extension
10	Eagle Crest Dr	Eagle Crest Dr Intersection Improvements
11	Carl Dr	Carl Dr Intersection Improvements
12	Sugarloaf Rd	Sugarloaf Rd/Glenwood Cutoff Interchange
13	Driveway	Driveway (PM 7.807) Driveway Consolidation
14	Driveway	Driveway (PM 7.786) Driveway Consolidation
15	Jarvis Rd	Jarvis Rd Intersection Improvements
16	W Vine Hill Rd	W Vine Hill Rd Intersection Improvements
17	Vine Hill Rd (North)	Vine Hill Rd Interchange
18	Driveway (Gated)	Driveway (PM 7.341) Relocation
19	Driveway	Driveway (PM 7.326) Relocation
20	Vine Hill Rd (South)	Vine Hill Rd Frontage Road System
21	Driveway (Gated)	PM 6.8 Multiple Driveway Channelization
22	Sawyer Circle	Sawyer Circle Intersection Improvements
23	Driveway	Sawyer Cir and Driveway (PM 6.712) Local Connection
24	Driveway	Driveway (PM 6.712) Intersection Improvements
25	Crescent Dr (South)	Crescent Dr Frontage Road System
26	Driveway	Driveway (PM 6.485) Driveway Consolidation
27	Timber Ridge Ln (South)	Timber Ridge Ln Frontage Road System
28	Vine Hill School Rd	Vine Hill School Rd Bike/ped Overcrossing
29	Santas Village Rd	Santas Village Rd Ramp Modifications
30	Santas Village Rd	Santas Village Rd Extension
31	Granite Creek Rd	Granite Creek Rd Ramp Modifications
32	Granite Creek Rd	Granite Creek Rd Ramp Modifications

CONCEPT MAP


SUMMIT RD
SUMMIT RD
SUMMIT RD
SCHULTIES RD
SCHULTIES RD
OLD SANTA CRUZ HWY
HUTCHINSON RD
RUDY RD
GLENWOOD DR
MOUNTAIN CHARLIE RD
VILLA GLEN DR
LAUREL RD
GLENWOOD CUTOFF
GLENWOOD DR
GLENWOOD DR
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JARVIS RD
CANHAM RD
VINE HILL RD
GLENWOOD DR
TIMBER RIDGE
JARVIS RD
VINE HILL RD
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LARGE SCALE CONCEPTS

The concept recommendations includes three large scale interchange concepts. These interchange concepts will effectively help transform Hwy 17 into an access-controlled highway. The three interchange locations are geographically spaced along the 7.1-mile corridor, providing convenient opportunities for crossing movements at reasonably-spaced intervals.

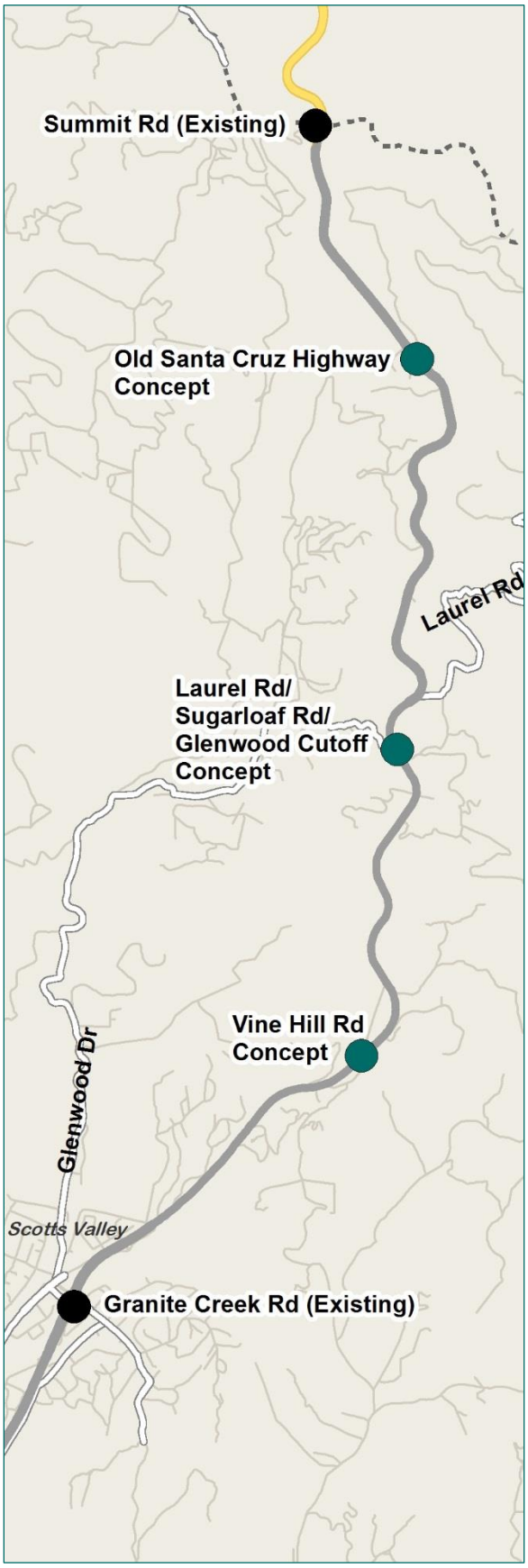
The long range plan for Hwy 17 includes the addition of interchanges at the following locations:

- **Old Santa Cruz Highway**
- **Laurel Rd/Sugarloaf Rd/Glenwood Cutoff**
- **Vine Hill Road**

Along with the additional, complementary short- and mid-range concepts, these three long-term grade-separation concepts are intended to enhance the mobility, safety, and accessibility on Hwy 17.

These concepts would enable the closure of the median, with design improvements for most driveways and local roads to function smoothly as right-in/right-out access points. While it is true that some traffic will eventually need to travel out of the way to get to these interchanges, the *reliability* of all trips will be enhanced by more efficient crossing as well as improved operations on the corridor as a whole. Overall this plan intends to significantly reduce conflict points and improve operations, without adversely reducing accessibility.

Note that this plan does not take place of the continuing effort to monitor and evaluate locations for safety performance. The plan does not supersede required engineering countermeasures to address collision concentrations. It likewise does not preclude safety projects not identified in the plan.



MAP ID #4: OLD SANTA CRUZ HWY

Cost Estimate: $25 to $75 million

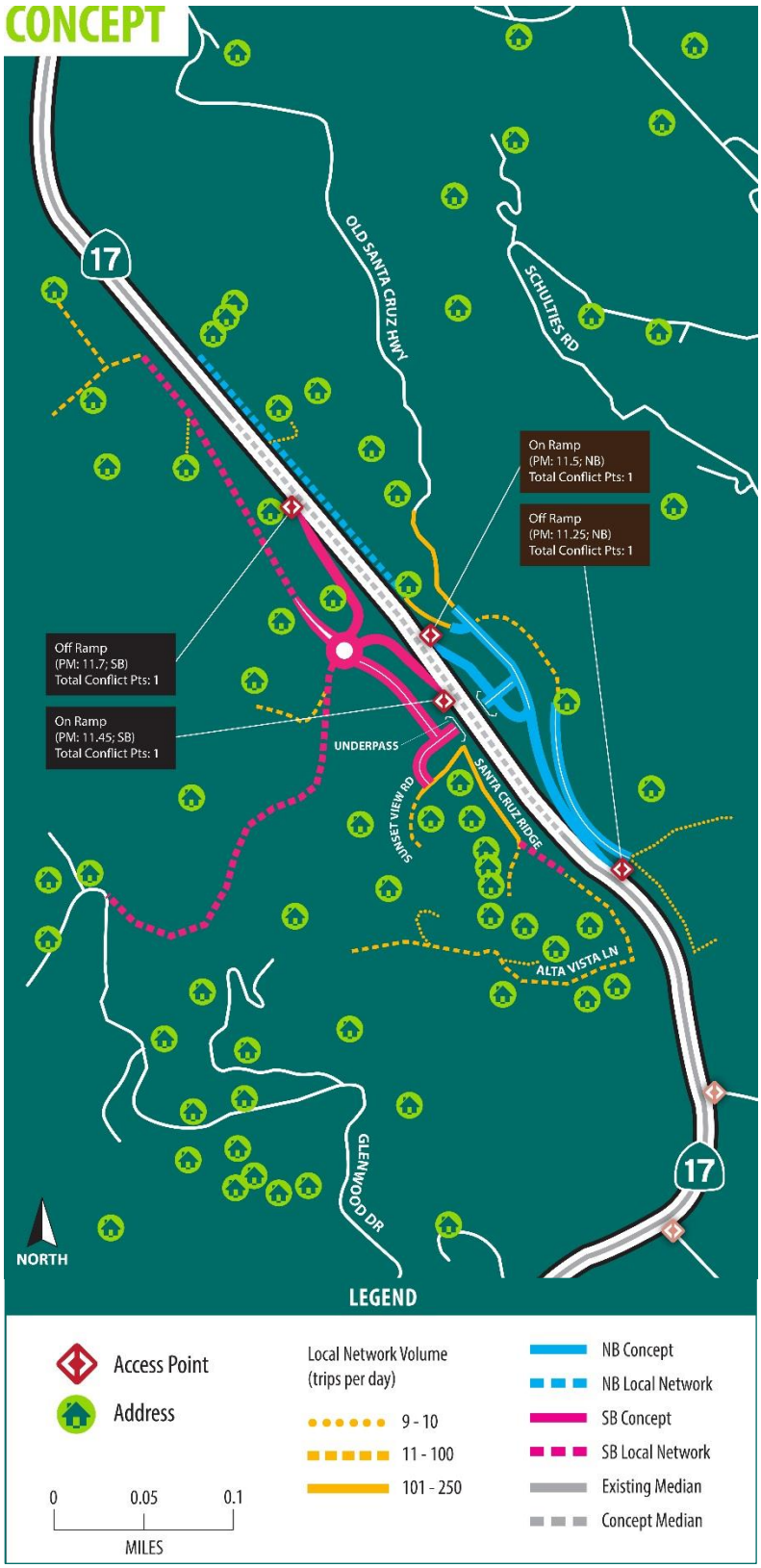
Benefit: Reduces conflict points from 60 to 4.

Description: Old Santa Cruz Highway ties into Hwy 17 along the northbound side and allows for left turns in and out. There are numerous businesses and driveways along both sides of the highway through this location and a two-way left turn lane exists for a majority of the area. The conceptual interchange here would provide ramps for both directions of the highway. The northbound ramps would be located in the same general area as the existing Old Santa Cruz Highway intersection.

The southbound ramps would be located further north, near the location of the Summit House. A frontage road network would consolidate access for all driveways and local roads in the area. The frontage road connecting the northbound and southbound ramps would go underneath the existing highway, maintaining the Hwy 17 alignment and profile.

A new median barrier would extend from the existing Old Santa Cruz Highway intersection up to the existing median barrier near Casa Del 17.

As with all of the alternatives, intersections at the ends of ramps can include roundabouts, which would further reduce the potential for broadside collisions.



#12: LAUREL ROAD/SUGARLOAF ROAD/GLENWOOD CUTOFF

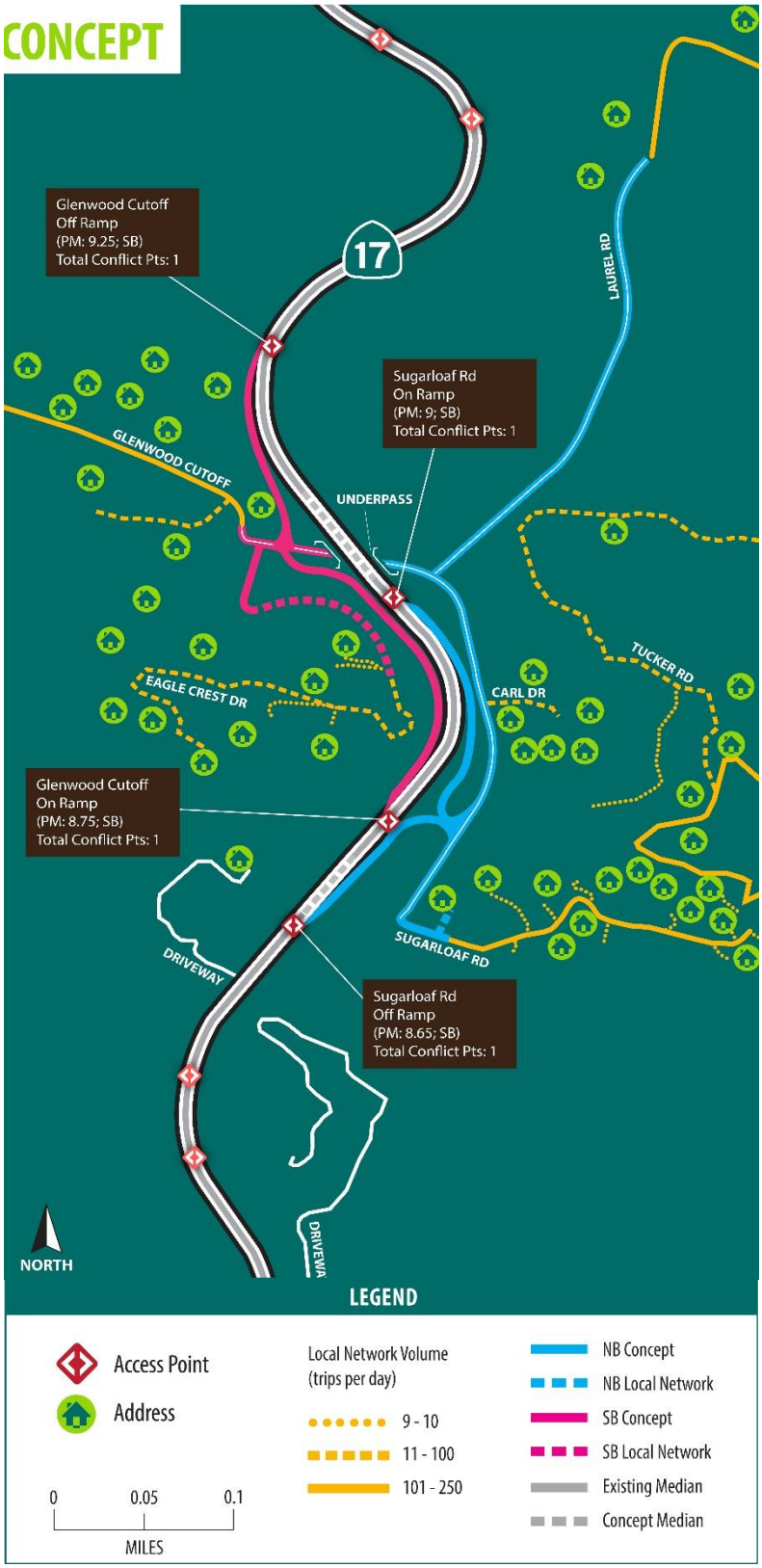
Cost Estimate: $25 to $75 million

Benefit: Reduces conflict points from 26 to 4.

Description: This concept serves the location surrounding Sugarloaf Road, Glenwood Cutoff, and Laurel Road. The conceptual interchange at these three intersections would provide ramps for each direction of Hwy 17 and reconnect all previous accesses with a frontage road network.

In this concept, the northbound ramps would be located at Sugarloaf Road and the southbound ramps would be at Glenwood Cutoff. Laurel Road would connect to the interchange with a new alignment around the backside of a hill between Glenwood Cutoff and the existing Laurel Road intersection with Hwy 17.

A new bridge would maintain the existing highway profile and the frontage road would travel below the highway. A new median barrier would close off all left turns across the highway between Sugarloaf Road and Laurel Road. Access to southbound Hwy 17 would be restored to Laurel Road, eliminating the need for out-of-direction travel.



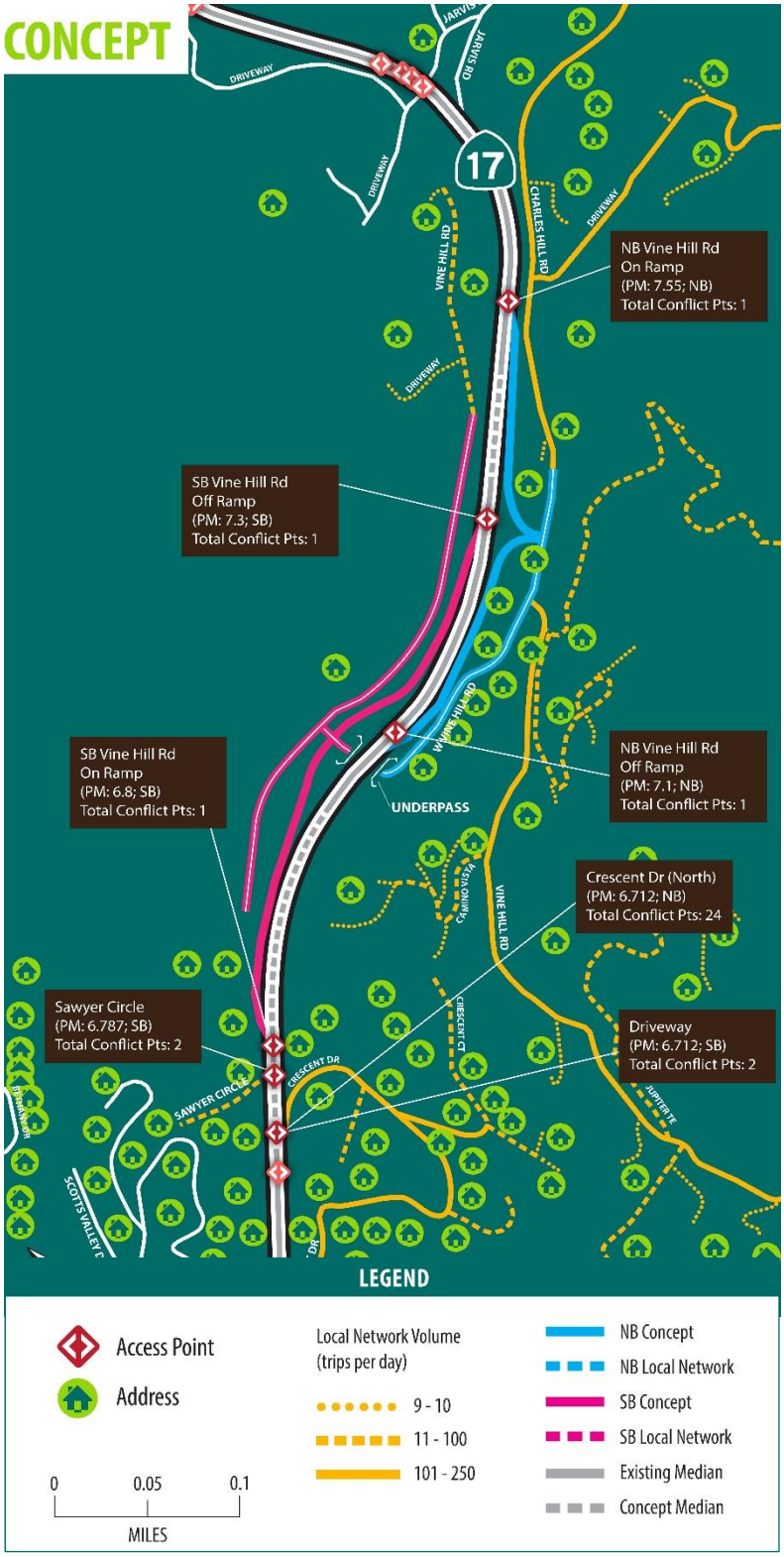
#17: VINE HILL ROAD

Cost Estimate: $25 to $75 million

Benefit: Reduces conflict points from 105 to 26.

Description: This concept is intended to provide for improved connectivity and access. Vine Hill Road is an important intersection within the study area. The existing at-grade intersection allows left-turns in and out of Vine Hill Road.

This conceptual-level project could provide enhanced ability for vehicles to make left turns and cross Hwy 17 on a grade-separated structure. This concept includes construction of on- and off-ramps, connected with a frontage road on each side of the highway. The northbound ramps would be located in the general area of the existing intersection of Vine Hill Road and Hwy 17. The southbound ramps would be located further south. The frontage road connecting the two sets of ramps would follow the existing alignment of West Vine Hill Road (the portion that currently functions similar to an off-ramp). A new structure would be built to carry highway traffic over the frontage road. No change in profile of the highway would occur with this concept.



Other existing roads and driveways would be connected to the frontage road in order to maintain existing access. A median barrier would be built to close access across the highway, extending from Crescent Drive to north of Vine Hill Road.

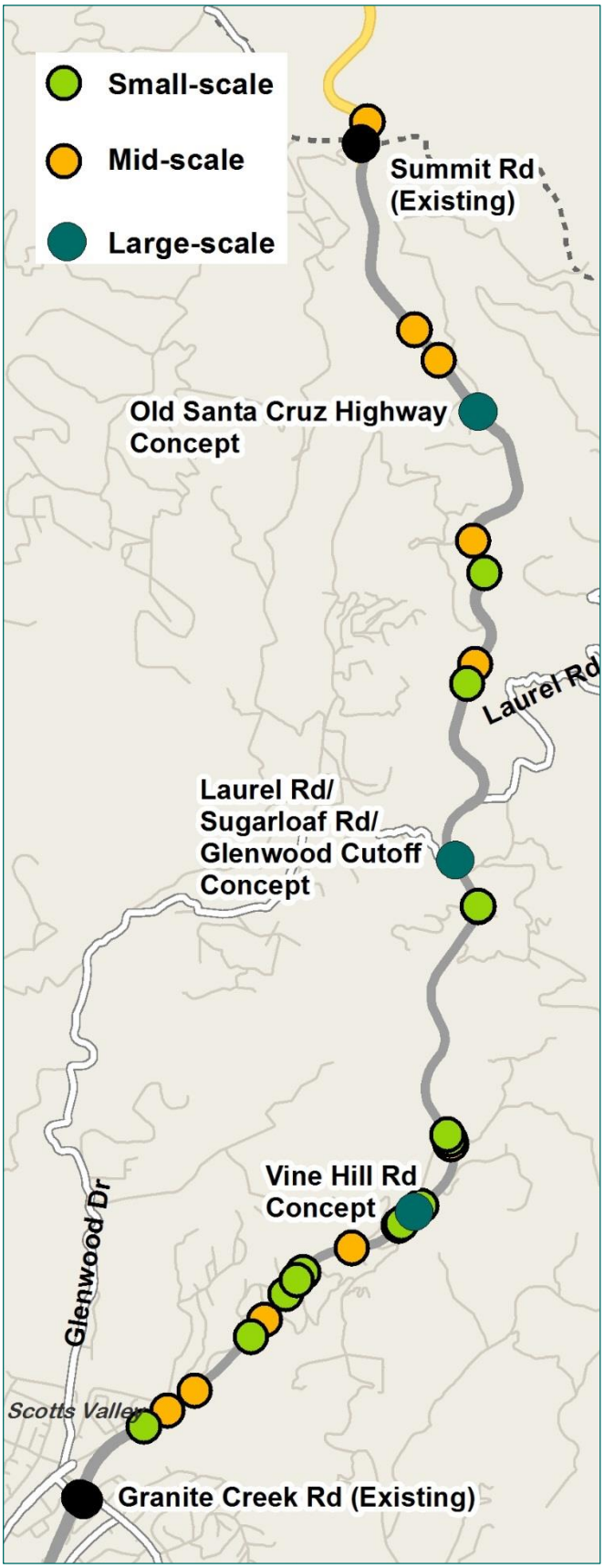
LARGE-SCALE CONCEPT NOTES

The three locations recommended for consideration for project development were selected to meet the needs and challenges specific to the Hwy 17 study area. These represent the most viable large-scale, long-range concepts because they are projected to provide the highest level of benefit for all stakeholders, as based on data review and outreach findings.

However, identifying these concepts in the Hwy 17 plan will not preclude any future alternative improvements deemed by Caltrans and its partners as beneficial to travelers. The sketch-level concept designs also present a single design alternative; if one of these concepts moves forward into project development phases more rigorous analysis will be needed to identify and select among multiple alternatives at a location.

SMALL- AND MID-SCALE CONCEPTS

The majority of the concept recommendations in the 17 AMP are small- and mid-scale. These concepts would achieve a smaller scale of benefit relative to the interchange concepts, but they would also cost less. Each concept is designed for long-range compatibility with the other concepts in the list, including the three interchange concepts.



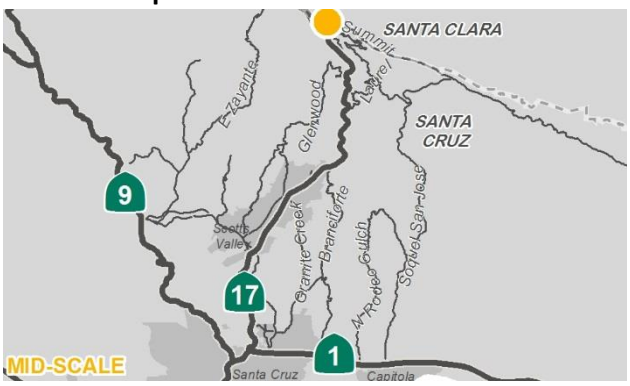
1. SUMMIT RD INTERCHANGE IMPROVEMENTS

Cost Estimate: $5 to $10 million

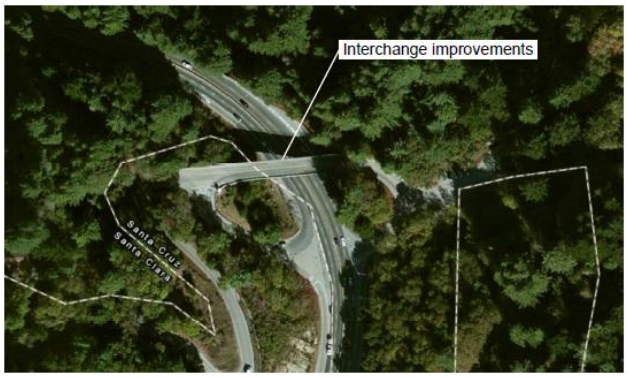
Benefit: Improve traffic operations at the existing interchange.

Description: Potential improvements include intelligent transportation systems, ramp modifications, acceleration and deceleration lane, roundabouts, and other operational improvements to sight distance and intersections.

Location map:



Location aerial:



Location streetview:

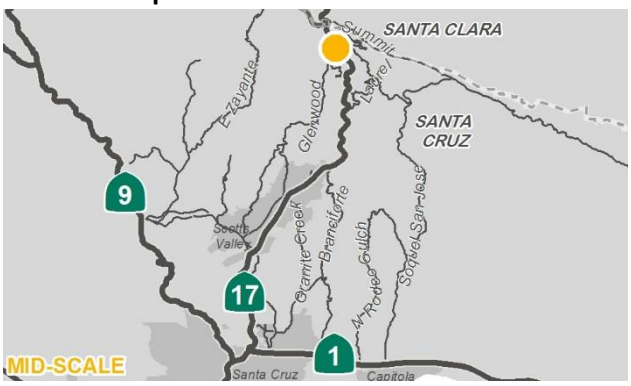
2. OLD SANTA CRUZ HIGHWAY AREA CHANNELIZATION

Cost Estimate: $5 to $10 million

Benefit: Conflict point reduction.

Description: This area is currently characterized by a wide driveway width serving multiple possible entrances and exits. The width conditions equate to a lack of defined access points. Turning and driveway channelization provides positive guidance to motorists, benefitting turning vehicles and through traffic.

Location map:



Location aerial:

Location streetview:

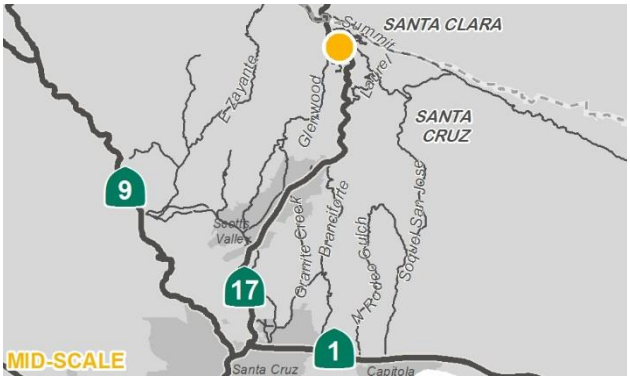
3. BUSINESS EXIT (PM 11.611) ACCELERATION LANE

Cost Estimate: $5 to $10 million

Benefit: Improved merging efficiency.

Description: An extended acceleration lane at this location would provide exiting vehicles additional space to increase speed to more closely match the speeds of vehicles on the mainline.

Location map:



Location aerial:

Location streetview:

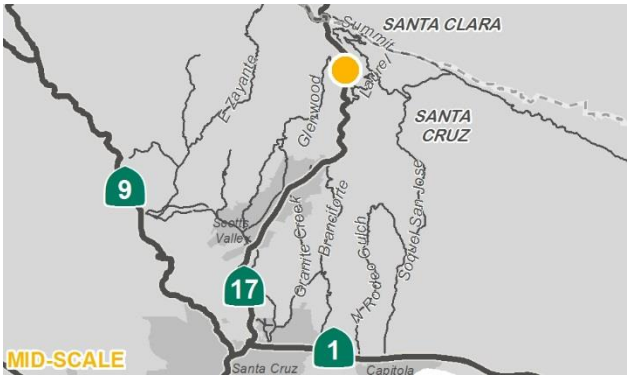
5. GLENWOOD DRIVE INTERSECTION IMPROVEMENTS

Cost Estimate: $5 to $10 million

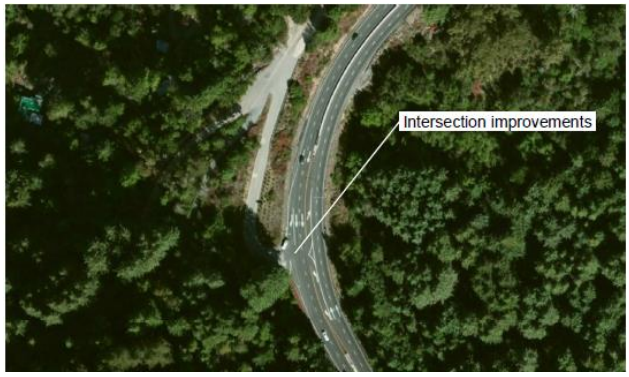
Benefit: Improved turning movements.

Description: This concept will improve the turning movements for vehicles exiting and entering at Glenwood Drive. It includes modifying the deceleration lane, through potential extension as well as improved geometry. This concept also includes an acceleration lane for merging movements.

Location map:



Location aerial:



Location streetview:

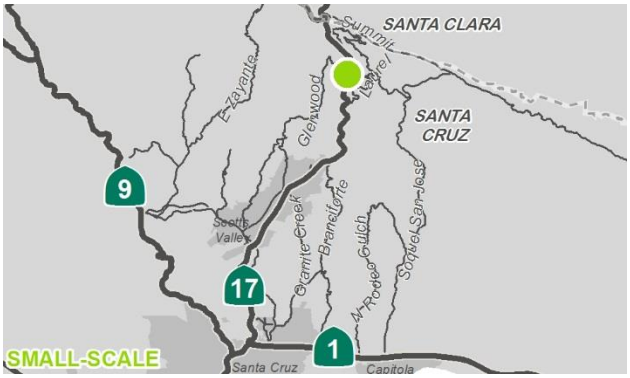
6. DRIVEWAY (PM 10.499) CHANNELIZATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: This area is currently characterized by a wide driveway width serving multiple possible entrances and exits. The width conditions equate to a lack of defined access points, or locations where vehicles may enter or exit. Turning and driveway channelization is intended to provide positive guidance to motorists.

Location map:



Location aerial:

Location streetview:

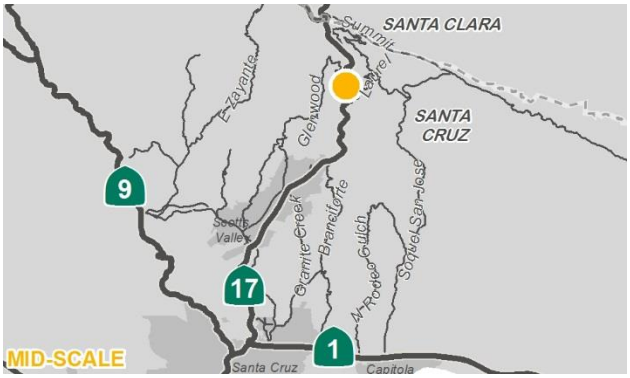
7. SPANISH OAKS ROAD INTERSECTION IMPROVEMENTS

Cost Estimate: $5 to $10 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out movements at Spanish Oaks Road through driveway modifications.

Location map:



Location aerial:

Location streetview:

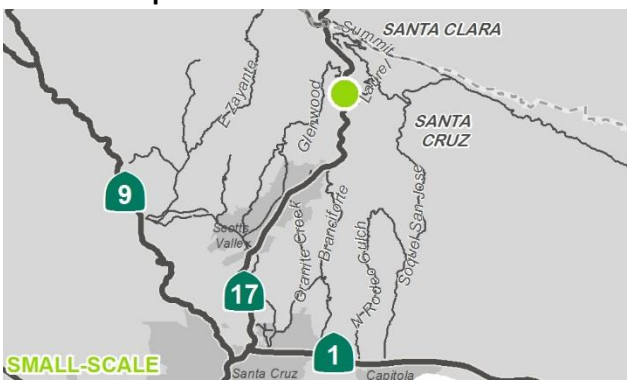
8. DRIVEWAY (PM 9.532) INTERSECTION IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out movements at Driveway (PM 9.532).

Location map:



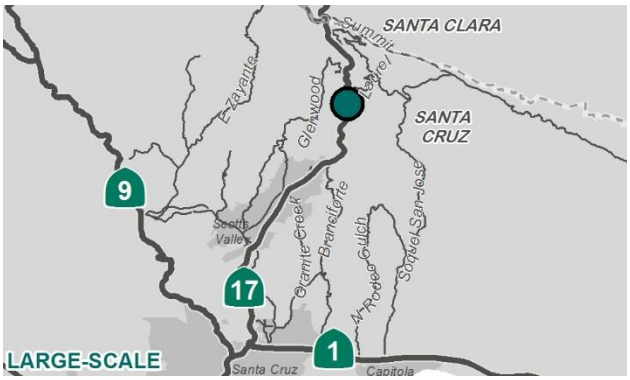
Location aerial:

Location streetview:

9. LAUREL ROAD EXTENSION

Description: This concept is a subcomponent of the large-scale interchange concept at this location, presented here because it may provide benefits as a standalone concept phased prior to the interchange. It involves extending Laurel Road south via a new facility to connect to the Sugarloaf Road/Glenwood Cutoff. This new alignment is intended to benefit the planned wildlife connection north of Laurel Road by moving the paths of vehicles further south.

Location map:



Location aerial:

Location streetview:

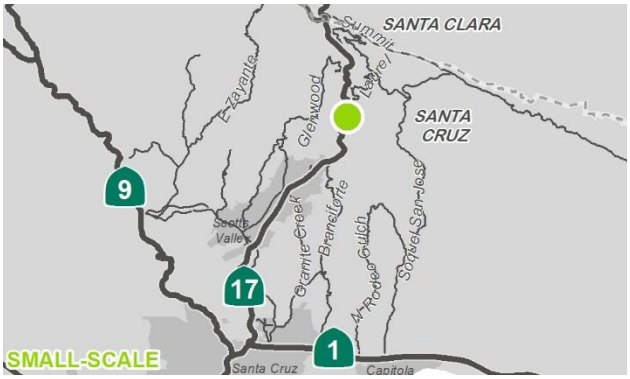
10. EAGLE CREST DRIVE INTERSECTION IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out movements at Eagle Crest Drive through driveway modifications.

Location map:



Location aerial:

Location streetview:

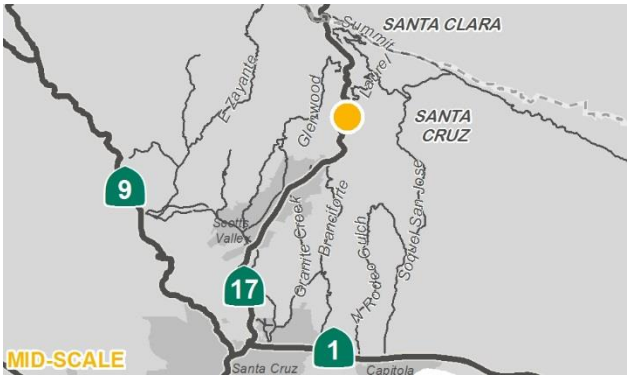
11. CARL DRIVE INTERSECTION IMPROVEMENTS

Cost Estimate: $5 to $10 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out movements at Carl Drive through driveway modifications. The concept includes shoulder conversion to current width and cross slope standards.

Location map:



Location aerial:

Location streetview:

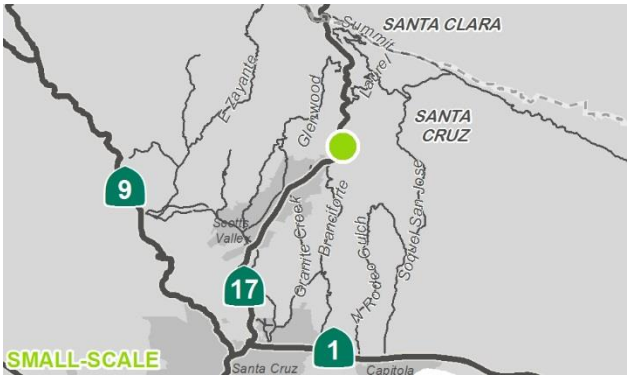
13. DRIVEWAY (PM 7.807) CONSOLIDATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: Concept to replace the existing direct-access driveway with an alternative driveway connecting to Jarvis Road to the south.

Location map:



Location aerial:

Location streetview:

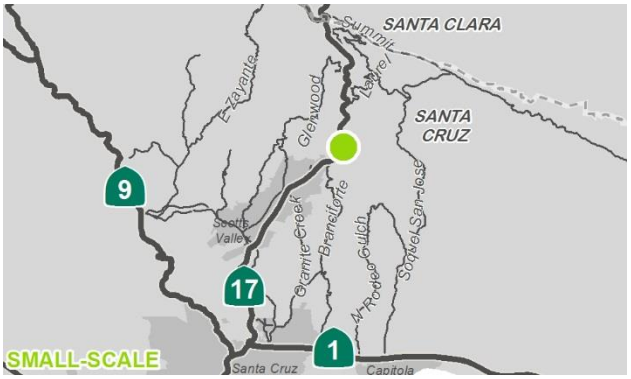
14. DRIVEWAY (PM 7.786) CONSOLIDATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: This driveway is one of multiple accesses for the parcel. This concept involves consolidating access at another point, Driveway (PM 7.987)

Location map:



Location aerial:

Location streetview:

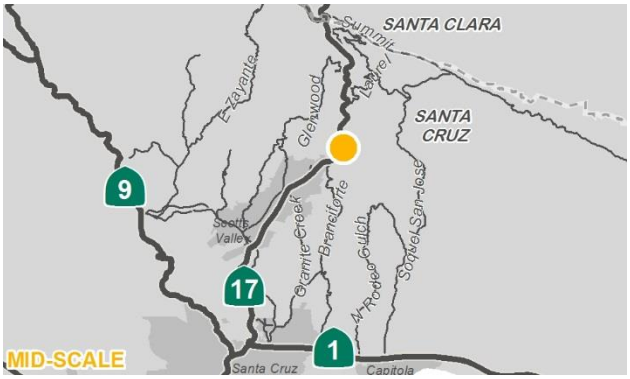
15. JARVIS ROAD INTERSECTION IMPROVEMENTS

Cost Estimate: $5 to $10 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out driveway operations. This includes improving the driveway taper to facilitate highway exiting

Location map:



Location aerial:

Location streetview:

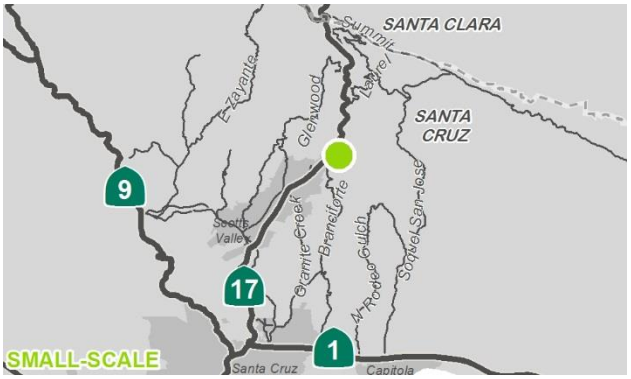
16. VINE HILL ROAD (WEST) INTERSECTION IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept includes right-in, right-out improvements to the intersection to current standards, including minimum design for service truck turns.

Location map:



Location aerial:

Location streetview:

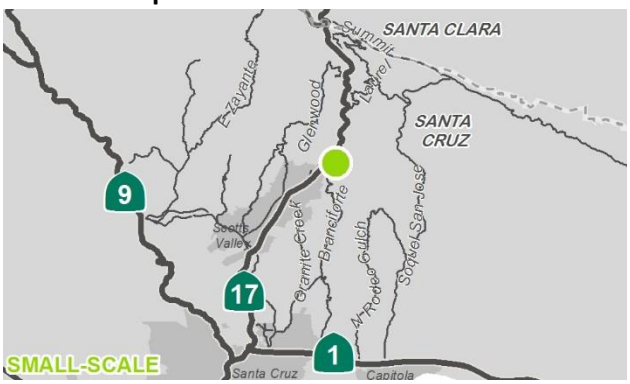
18. DRIVEWAY (PM 7.341) RELOCATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: Relocate as needed to complement large-scale interchange concept.

Location map:



Location aerial:

Location streetview:

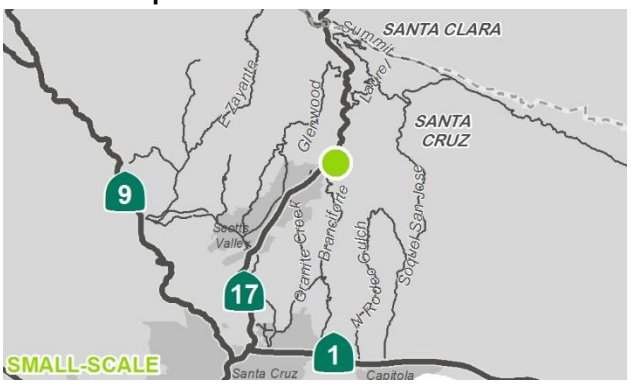
19. DRIVEWAY (PM 7.326) RELOCATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: Relocate as needed to complement large-scale interchange concept.

Location map:



Location aerial:

Location streetview:

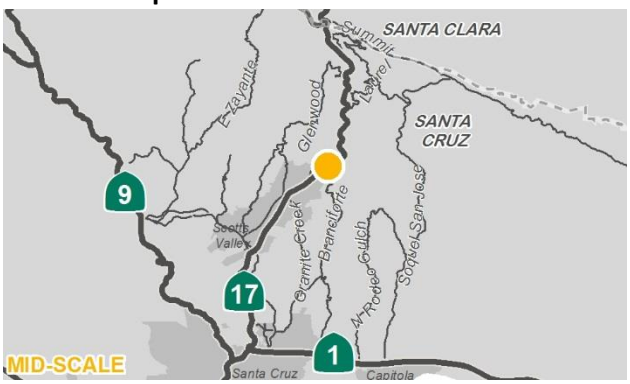
20. VINE HILL RD FRONTAGE ROAD SYSTEM

Cost Estimate: $5 to $10 million

Benefit: Conflict point reduction.

Description: Concept to consolidate access at Vine Hill Road (north intersection), and converting Vine Hill Road to operate as a frontage road system.

Location map:



Location aerial:

Location streetview:

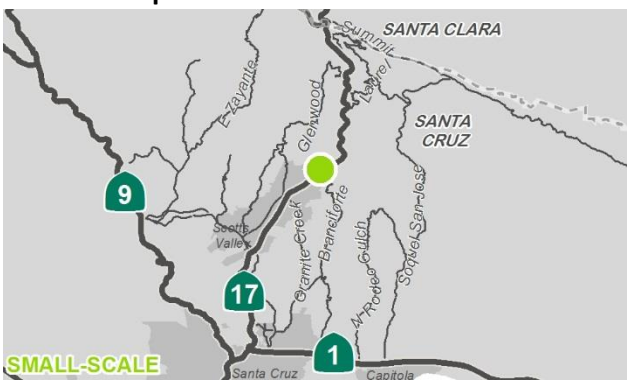
21. PM 6.8 MULTIPLE DRIVEWAY CHANNELIZATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: Concept to add driveway channelization consolidating access to right-in, right-out movements for Driveway (PM 6.829) through Driveway (PM 6.87).

Location map:



Location aerial:

Location streetview:

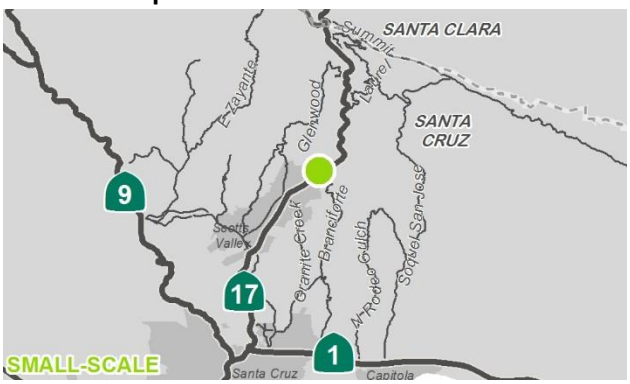
22. SAWYER CIRCLE INTERSECTION IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out movements at Sawyer Circle through driveway modifications.

Location map:



Location aerial:

Location streetview:

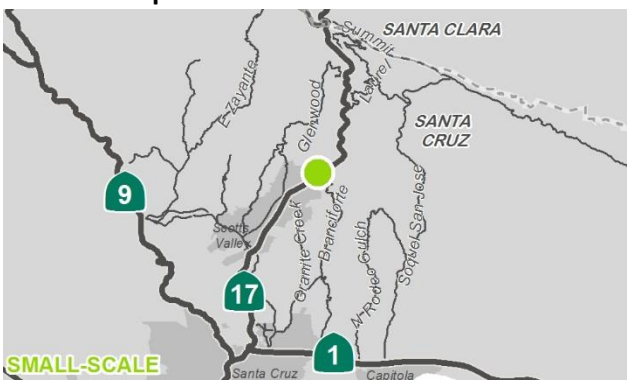
23. SAWYER CIRCLE AREA LOCAL NETWORK CONNECTION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: Concept includes improving and/or formalizing connection between Sawyer Circle and Driveway (PM 6.712) to Sawyer Court of the local network.

Location map:



Location aerial:

Location streetview:

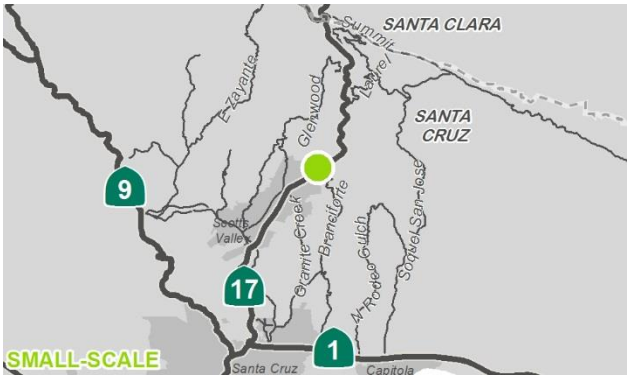
24. DRIVEWAY (PM 6.712) INTERSECTION IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept to improve right-in, right-out movements at Driveway (PM 6.712) through driveway modifications.

Location map:



Location aerial:

Location streetview:

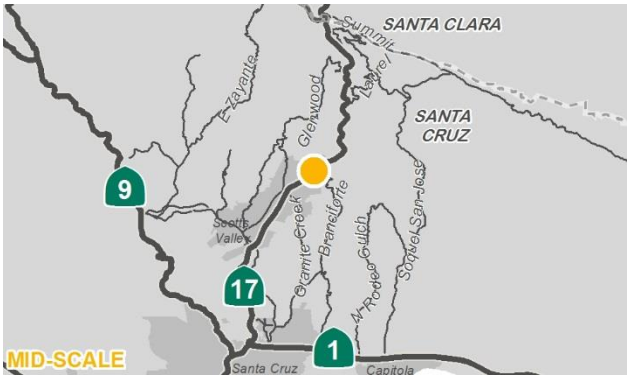
25. CRESCENT DRIVE FRONTAGE ROAD SYSTEM

Cost Estimate: $5 to $10 million

Benefit: Conflict point reduction.

Description: Concept to consolidate access at Crescent Drive (north intersection), and converting Vine Hill Road to operate as a frontage road system.

Location map:



Location aerial:

Location streetview:

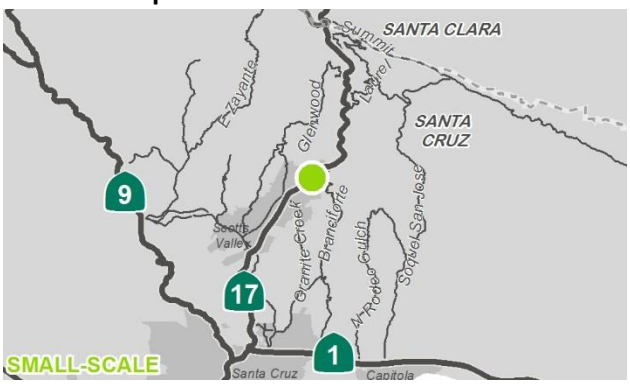
26. DRIVEWAY (PM 6.485) CONSOLIDATION

Cost Estimate: $1 to $5 million

Benefit: Conflict point reduction.

Description: Concept to replace Driveway (PM 6.485) access to Hwy 17 with new access to Crescent Drive.

Location map:



Location aerial:

Location streetview:

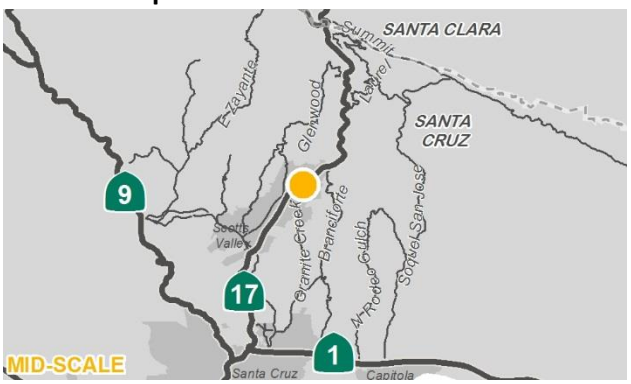
27. TIMBER RIDGE LANE FRONTAGE ROAD SYSTEM

Cost Estimate: $5 to $10 million

Benefit: Conflict point reduction.

Description: Concept to formalize frontage road connection between Timber Ridge Lane and Orchard Run.

Location map:



Location aerial:

Location streetview:

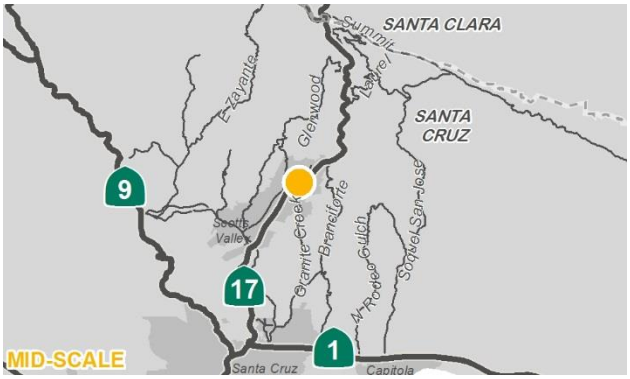
28. VINE HILL SCHOOL RD BIKE/PED OVERCROSSING

Cost Estimate: $5 to $10 million

Benefit: Travel demand reduction.

Description: Concept includes adding bike/ped overcrossing connecting Vine Hill School Rd and Santas Village Rd

Location map:



Location aerial:

Location streetview:

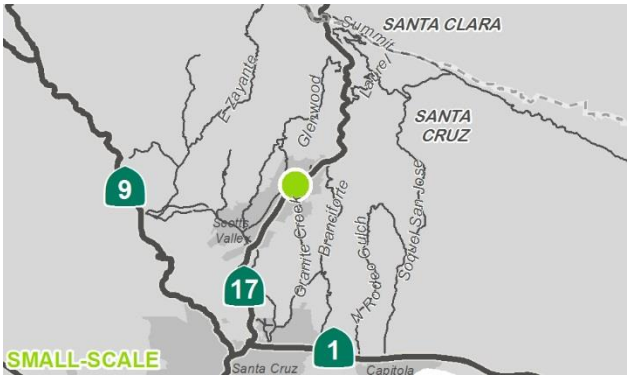
29. SANTAS VILLAGE ROAD INTERCHANGE IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept to extend acceleration and deceleration lanes to improve interchange operations.

Location map:



Location aerial:

Location streetview:

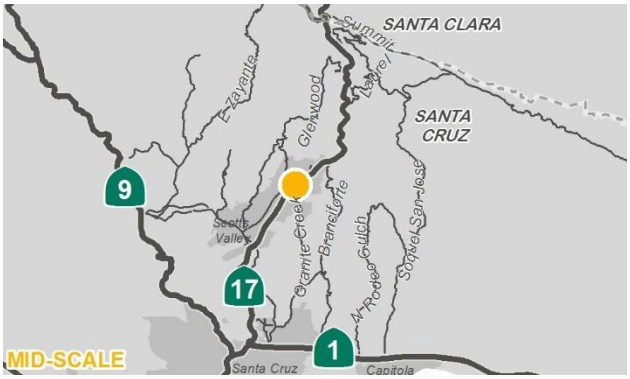
30. SANTAS VILLAGE ROAD EXTENSION

Cost Estimate: $5 to $10 million

Benefit: Conflict point reduction.

Description: Concept to formalize frontage road connection between Santas Village Rd and Orchard Run, ultimately providing connectivity to the Timber Ridge neighborhood via the Santas Village ramps.

Location map:



Location aerial:

Location streetview:

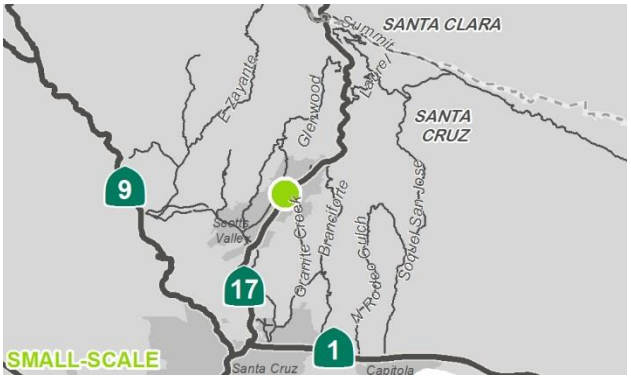
31. GRANITE CREEK ROAD INTERCHANGE IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Improved turning movements.

Description: Concept to add northbound auxiliary lane to connect with the turning lane at Santas Village Road.

Location map:



Location aerial:

Location streetview:

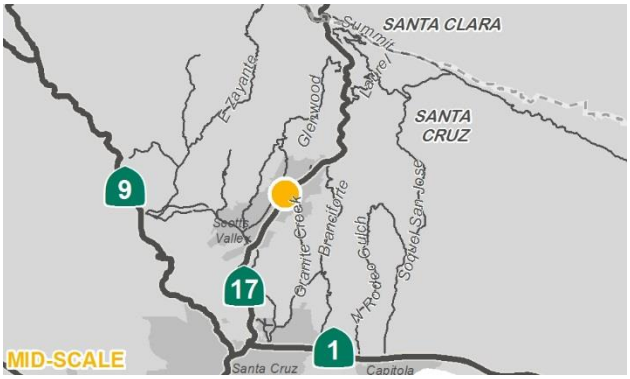
32. GRANITE CREEK ROAD INTERCHANGE IMPROVEMENTS

Cost Estimate: $5 to $10 million

Benefit: Multimodal improvement.

Description: Concept includes reconfiguring Granite Creek Rd overcrossing by adding bike lanes and sidewalks.

Location map:



Location aerial:

Location streetview:

CONCEPT STRATEGY SUMMARY

The 17 AMP multifunctional team deliberately developed concepts to achieve synergy and consistency amongst the full package of recommendations. Organizing the concepts in a strategic manner will help guide decision making for Caltrans and its partners over the long run.

For example, understanding the most viable long term concept at a specific location helps guide the short- and mid-term decisions in adjacent locations. If an interchange is recommended at one location, the surrounding concepts are designed to be complementary to the interchange. Likewise, it would not be efficient to install interim improvements that would require removal or significant reconstruction when it comes time to construct the interchange.

This strategic outlook also helps balance the needs of mobility and access. Median barrier closure, for example, represents a small scale improvement. However, in order to maintain community access, this improvement would need to be phased simultaneously with a large-scale interchange in the functional vicinity.

OTHER RECOMMENDATIONS

During the 17 AMP study efforts, the project team identified potential opportunities that may have merit despite not being directly related to access management. These concepts are presented in the following section for reference.

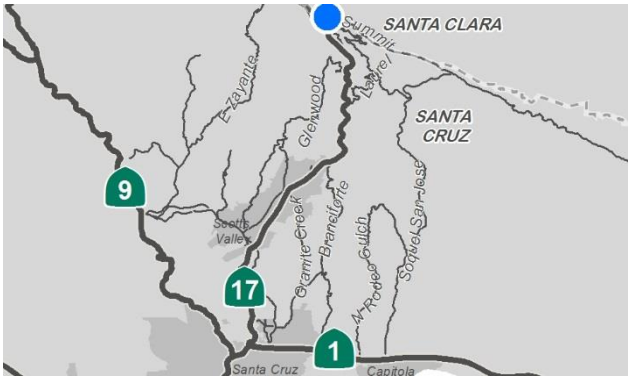
SUMMIT RD PARK AND RIDE IMPROVEMENTS

Cost Estimate: $5 to $10 million

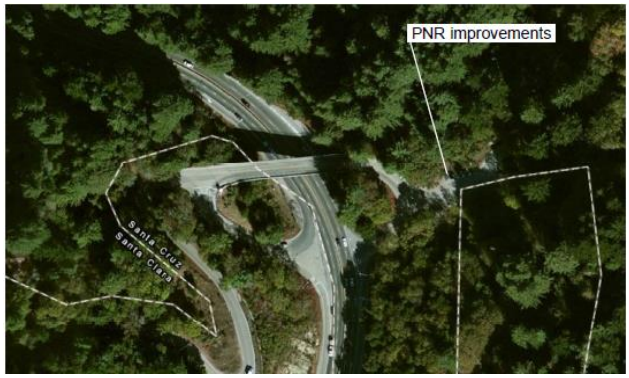
Benefit: Ensure efficient use of facility.

Description: Formalize existing park and ride lot to ensure efficient use of facility. Outreach documented potential issues and opportunities including inefficient use of space due to user parking techniques, use of parking area as a turning lane, desire for express transit stop, and desire for potential expansion of lot in the area south of Summit Road.

Location map:



Location aerial:



Location streetview:

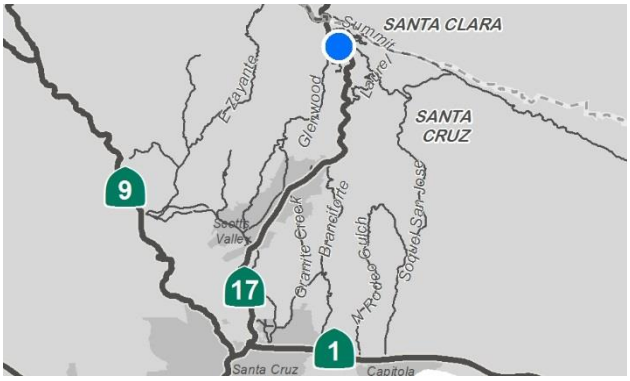
OLD SANTA CRUZ HIGHWAY AREA EXPRESS TRANSIT STATION

Cost Estimate: $5 to $10 million

Benefit: Travel demand reduction.

Description: In partnership with Santa Cruz Metro, Santa Clara Valley Transportation Authority, SCCRTC, other stakeholders and the Santa Cruz County community, evaluate potential for new transit stop serving the Hwy 17 Express route. Caltrans is not responsible for transit facility construction or maintenance.

Location map:



Location aerial:

Location streetview:

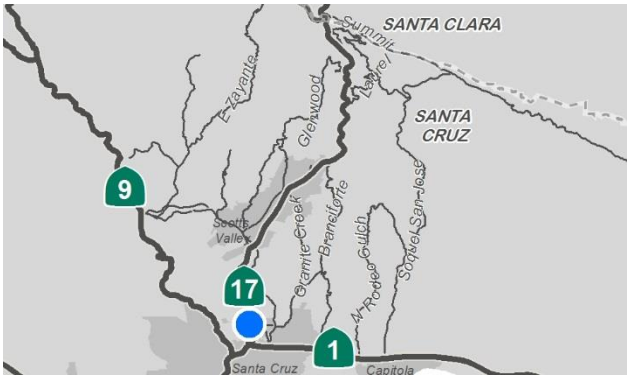
PASATIEMPO PARK AND RIDE IMPROVEMENTS

Cost Estimate: $1 to $5 million

Benefit: Multimodal improvement.

Description: Formalize existing park and ride lot to ensure efficient use of facility. Outreach documented potential issues and opportunities including inefficient use of space due to user parking techniques, and pedestrian connectivity between the lot and the northbound bus stop.

Location map:



Location aerial:

Location streetview:

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CHAPTER 4: NEXT STEPS & IMPLEMENTATION

NEXT STEPS & IMPLEMENTATION

The 17 AMP represents an early planning effort intended to set the stage for further project development of the concept recommendations. The intention is for this plan to serve as a standing policy and action guide for developing projects that will advance access management goals. This section outlines the next steps that will be important for initiating project-level phases for individual concepts.

17 AMP PRODUCTS

Caltrans produced this plan to reflect the shared vision of all stakeholders. Specifically, Santa Cruz County, SCCRTC, and Scotts Valley were involved in managing this plan at all key milestones and decision points. There is tremendous value in having a documented plan that can be referenced by applicable agencies at all levels of government. Upon Caltrans finalization, the plan will continue as a resource to help guide the regional transportation planning process.

In addition to the final report, there are multiple supplemental products available for additional reference. For example, the 17 AMP Community Guide presents a summary of the planning outcomes and proposed improvements that reflect the results of the public engagement process. A narrated presentation summarizing the plan is available on the District 5 and project web site.

INPUT TO CALTRANS SYSTEM PLANNING

The principles and concepts included within the 17 AMP are intended to be reflected in future Caltrans plans and processes. This plan will provide a useful resource for corridor planning as well as long-term management for the transportation system at a regional scale.

REGIONAL TRANSPORTATION PLAN INTEGRATION

The Santa Cruz County Regional Transportation Plan (RTP) is the guiding document for transportation policy and investment decisions in the county. SCCRTC prepares the RTP every four years to plan how the region will meet its transportation needs over a 20-year period. The RTP programs estimated transportation funding available to the region over the course of the long-term planning horizon.

Similarly, the 17 AMP concepts are intended to meet the goals established in the AMBAG Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS). Concepts in the RTP will be carried forward into the MTP/SCS, also scheduled for adoption in 2018.

PRIORITIZE FOR FUNDING

Ultimately, all transportation projects that are implemented within the county are included within the RTP. Integration within future RTPs will be essential for bringing 17 AMP concepts into further project phases.

The next RTP update – RTP 2040 – is scheduled for finalization in 2018. To move forward with individual projects, future updates to the RTP will need to prioritize individual projects. The individual project listings will need to include specific costs for construction and support, escalated to year of construction.

EXPLORE CONCEPT DETAILS

The variables of cost and benefit included in this plan meet the needs of a comprehensive corridorwide plan, but are not detailed at the project level. This plan provides cost at an *order of magnitude* level, assigning approximate cost ranges based on concept scale. The 17 AMP also discusses benefits in terms of conflict point reduction or qualitative improvements that can be reasonably expected with each concept.

Additional, detailed review of individual concepts will help facilitate the process of incorporating concepts into the constrained RTP. Future efforts should explore concept analysis using the following methodologies to provide a better understanding of concept value:

- **Sustainable Transportation Analysis and Rating System (STARS):** SCCRTC uses the STARS framework to gauge a project's ability to meet regional goals and policies. Caltrans and SCCRTC will work together to analyze 17 AMP concepts within this framework as individual concepts are included in the project list.
- **Life-Cycle Benefit-Cost Model (Cal-B/C):** This Caltrans tool is used to conduct cost/benefit analyses for proposed state highway projects. This analysis should be conducted in the future for concepts recognized as high priority by Caltrans and SCCRTC.