



Task 5: Feasibility Study Report

Cost-Benefit Analysis and Feasibility Study for
the Acquisition of SR 133 from Coast Highway to
El Toro Road

Laguna Beach, CA
January 8, 2021

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1 Introduction

State Route 133 / Laguna Canyon Road is one of the three gateways to the City of Laguna Beach (“Laguna Beach” or “the City”), providing critical access to the City and adjacent recreational spaces. Laguna Canyon Road is currently owned by the California Department of Transportation (“Caltrans”) and falls under Caltrans rather than City control. The City of Laguna Beach is evaluating the possibility of acquiring Laguna Canyon Road from El Toro Road to Coast Highway through the Caltrans relinquishment process. Before such an acquisition of Laguna Canyon Road is pursued by the City, it is important that the Laguna Beach City Council have as much information as possible to make a fully informed decision on the best course of action for the City.

HDR has conducted an analysis and feasibility study evaluating the potential acquisition of Laguna Canyon Road in order to assist the City in this process. HDR’s analysis considers the costs that may be incurred by the City as a result of taking ownership of Laguna Canyon Road, the benefits that may accrue to the City as a result of improvement projects that could be implemented along the roadway, and the risks associated with both the Caltrans relinquishment process and with assuming ownership of Laguna Canyon Road.

HDR’s analysis references data as available at this time and is intended to help the City make a fully informed decision. The analysis and feasibility study do not, however, provide a conclusive decision as to the best or most appropriate course of action for the City. Rather, they are intended to inform the City Council and other stakeholders in their decision process.

This Feasibility Study Report is the fifth and final document provided as part of HDR’s analysis. Detailed analyses of roadway acquisition costs, potential project benefits, and acquisition risks are provided in the documentation of the following completed tasks:

- Task 1: Cost Analysis
- Task 2: Benefit Identification and Quantification
- Task 3: Cost/Benefit Framework and Synthesis
- Task 4: Risk Identification and Analysis

The purpose of this Feasibility Study Report is to synthesize all of the information provided in the previous tasks and document the findings of HDR’s analysis in order to best assist the City in its decision-making process. An executive summary of the study findings is provided in Section 2 of this document. Section 3 summarizes the results of the Task 1 analysis of roadway ownership costs, while Section 4 summarizes the roadway acquisition benefit identification conducted in Task 2. Results of the benefit-cost analysis (“BCA”) of four potential improvement projects for Laguna Canyon Road can be found in Section 5. Section 6 evaluates roadway acquisition risks, as considered in Task 4. Section 7 interprets the results of this analysis for the City and concludes the Feasibility Study Report.

2 Executive Summary

HDR's analysis of the City of Laguna Beach's potential acquisition of Laguna Canyon Road is intended to inform the City in its decision-making process. This analysis does not provide a conclusive decision as to most appropriate course of action for the City, however, as that decision is dependent on the City's priorities and visions for the Laguna Canyon Road corridor.

The City would incur various costs of roadway ownership through the acquisition of Laguna Canyon Road. These costs fall broadly into three categories: discretionary improvement costs that can be determined by the City, infrequent or non-recurring costs of between approximately \$285 thousand and \$1.7 million per year on average, and annually recurring operations and maintenance expenses of approximately \$193 thousand per year. The City would also incur additional implicit costs in the form of increased demand for and strain on existing City resources.

While the acquisition of Laguna Canyon Road in and of itself is not expected to generate quantifiable benefits for the City, this acquisition would allow the City to implement future roadway improvement projects that would yield societal benefits. If Caltrans continues to own and control Laguna Canyon Road, these future benefit-generating roadway improvement projects are not expected to be implemented. Benefits that could be generated by future roadway improvement projects would be realized by city residents, visitors, and society at large in the form of increased quality of life and social welfare. Benefits include various community development benefits, environmental benefits, congestion and traffic management benefits, and safety benefits.

The City would also face various risks as a result of its acquisition and ownership of Laguna Canyon Road and the future implementation of improvement projects. These include political risks related to the roadway acquisition process; ownership liability, roadway condition, and cost risks related to City ownership of the roadway; design and construction risks related to the implementation of future improvement projects; and improvement project disbenefit and utility risks related to the outcomes of potential future improvement projects.

Ultimately, the relative merits of acquiring Laguna Canyon Road from the City's perspective (*i.e.*, the expected benefits of roadway acquisition and ownership relative to the associated costs and risks) are highly dependent on what the City intends to do with the roadway. HDR has evaluated four hypothetical capital improvement projects that are representative of projects that the City may implement in the future if it acquires the roadway. Each of these alternatives reflects a different vision that the City may have for the future of Laguna Canyon Road:

- Utility Undergrounding
- Corridor Beautification
- Bicycle and Pedestrian Infrastructure
- Roadway Widening

HDR has quantified and monetized the expected future societal benefits and costs of each of these alternatives in order to inform the City as to the potential merits of roadway acquisition and improvement under each alternative “vision.” These benefits and costs have been estimated using the best data available at this time; they rely, in part, on assumptions and parameters that are uncertain.

The results of the benefit-cost analysis for the Utility Undergrounding alternative generally support the conclusion that a utility undergrounding project along Laguna Canyon Road may be economically worthwhile under certain conditions if such a plan fits the City’s vision for the Laguna Canyon Road corridor, but also that such a project is unlikely to generate benefits well in excess of project costs. Generally, if the City does intend to go forward with utility undergrounding, the acquisition of Laguna Canyon Road would greatly facilitate this. The Utility Undergrounding alternative can also be implemented alongside other roadway improvement projects, and this is likely advisable due to right-of-way and cost considerations.

Analysis of the Corridor Beautification alternative shows that, due to safety risks, it would be unadvisable for the City to plant new trees close to the travel lanes of Laguna Canyon Road. Aside from these safety concerns, a corridor beautification vision for Laguna Canyon Road would be achievable at a low cost if that fits the City’s priorities for the corridor, even though such an alternative would not generate monetizable benefits in excess of costs. Many elements of such a corridor beautification alternative fit with Caltrans’ existing plans for the roadway and can be achieved without the City taking ownership of Laguna Canyon Road. Taking this into consideration, it would be unadvisable for the City to incur the costs and risks associated with ownership of Laguna Canyon Road if the City did not intend to implement any significant infrastructure improvement projects along the corridor.

The analyzed Bicycle and Pedestrian Infrastructure alternative is the most cost-beneficial, generating total discounted benefits in excess of discounted costs. These results suggest that, if the City does intend to pursue bicycle and pedestrian infrastructure improvements along Laguna Canyon Road, the acquisition of Laguna Canyon Road and implementation of such a project is expected to be economically justified. Such a bicycle and pedestrian infrastructure improvement project would also be compatible with a potential utility undergrounding improvement project.

The results of the benefit-cost analysis for the Roadway Widening alternative generally support the conclusion that such a project along Laguna Canyon Road could generate benefits not significantly less than the costs of such an alternative. However, the benefit-cost ratio in this alternative is lower than that of the Utility Undergrounding or Bicycle and Pedestrian Infrastructure alternatives. If the City’s vision for the Laguna Canyon Road corridor does include a roadway widening, it is recommended that further engineering study of such an alternative be conducted before proceeding with the acquisition of Laguna Canyon Road.

3 Costs of Roadway Ownership

The City of Laguna Beach is expected to incur various costs as a result of the acquisition of Laguna Canyon Road. These costs fall broadly into three categories:

- **Discretionary Improvement Costs:** These are the one-time or infrequent costs of any roadway improvement projects that the City may choose to undertake along Laguna Canyon Road. As these costs are only incurred as the result of any City-sponsored roadway improvement project, the magnitude and frequency of these costs are at the discretion of the City.
- **Infrequent / Non-Recurring Costs:** These costs, such as roadway closures or legal expenses, will not recur according to any regular fixed schedule, but they are expected to be incurred by the City on an infrequent basis.
- **Annually Recurring Costs:** These costs are expected to regularly be incurred by the City on a year-to-year basis.

The various types of roadway ownership costs that fall in these three categories are explained and quantified below in the following sub-sections. Additional detail on roadway ownership costs beyond that provided below can also be found in the documentation of Task 1: Cost Analysis.

It is important to note that the acquisition of Laguna Canyon Road would also generate increased demand for and strain on existing City resources. For example, the acquisition process would generate additional work for and requirements on the time of City staff and legal counsel. These demands do not necessarily amount to additional out-of-pocket costs to the City to the extent that they can be met by existing resources, but they do represent additional implicit costs of the roadway acquisition.

3.1 Discretionary Improvement Costs

The following cost items are categorized as discretionary improvement costs that would be incurred according to the planning decisions of the City:

- Capital Improvement Projects Along Laguna Canyon Road
 - This considers the cost of any capital improvement project planned along the relevant segment of Laguna Canyon Road in future years. The magnitude and frequency of these costs depend on City decisions regarding scheduled roadway improvement projects.
- Contaminant Remediation
 - This considers the cost associated with the remediation of soil and groundwater contamination along the roadway. Based on an Initial Site Assessment that was prepared in 2018, it does not appear that contaminated soil or groundwater from hazardous waste releases are present along the corridor. However, there are standard issues related to the roadway that would need to be remediated in the process of future roadway improvement projects. The detailed costs to the City for remediation of these issues can be determined after a specific project along the roadway has been identified.

A summary of the capital improvements costs (not directly related to roadway ownership) is provided below in **Table 1**. Note that this table represents the cost of capital improvement projects that are planned to be implemented along Laguna Canyon Road

by Caltrans over the next 10 years. The cost of capital improvement projects that the City may choose to implement can differ substantially from those planned by Caltrans.

Table 1: Capital Improvements-Related Costs

Items	Costs
Capital improvement projects planned along Laguna Canyon Road for the next 10 years	
AC Pavement and drainage systems on Laguna Canyon Road from Pacific Coast Highway to State Route 73	\$12,048,000
Refresh striping on Laguna Canyon Road from Canyon Acres Drive to 0.4 mile north of Canyon Acres Drive	\$182,000
Enhance pedestrian and bicycle circulation, transit access, and roadway safety by undergrounding the existing overhead utilities along Laguna Canyon Road from Canyon Acres Drive to El Toro Road	\$0
Widen the roadway to improve channelization on Laguna Canyon Road from Philips Street to El Toro Road	\$8,096,000
Total	\$20,326,000
Contaminant remediation costs prior to or during construction	
Hazardous materials soil removal/disposal	\$350-\$400 per cubic yard
Contaminated materials soil removal/disposal	\$250-\$300 per cubic yard
Removal/Disposal of yellow-painted traffic stripe (hazardous waste)	\$5-\$6 per linear foot

3.2 Infrequent / Non-Recurring Costs

Infrequent and non-recurring costs of roadway ownership include:

- Road closures
 - This cost element considers the costs associated with unexpected road closures and emergency roadwork caused by events such as rain/flooding, brush fires, and traffic hazards.
- Claims and settlements:
 - This cost element considers the costs associated with claims and settlements for issues along the roadway, such as potholes, roadway debris, and tripping/falling along the sidewalk. These expenses tend to fluctuate from year to year as cases are either settled or dismissed.
- Legal expenses:
 - This cost element considers the legal fees and court costs associated with claims and litigations resulting from issues along the roadway. A range of legal costs is provided for this cost analysis – a low-end estimate assumes legal fees associated with average annual claims and

settlements, while a high-end estimate assumes legal fees associated with the settlement of a casualty claim.¹

Table 2 below provides a summary of the expected magnitudes of these infrequent / non-recurring costs.

Table 2: Infrequent / Non-Recurring Costs of Roadway Ownership

Infrequent / Non-Recurring Cost Items	Special Programs	Legal Claims and Expenses	
Annual average road closures / emergency roadwork costs	\$193,000	-	-
Annual average settlement costs	-	\$10,000	\$10,000
Annual average legal expenses	-	\$58,000	\$1,500,000
Total	\$193,000	Low-end estimate	High-end estimate
		\$68,000	\$1,510,000

3.3 Annually Recurring Costs

Annually recurring costs of roadway ownership are expected to include:

- Roadway operations and maintenance
 - This considers the costs associated with regular maintenance and operations of the roadway, such as repair/replacement of lighting and signals, landscaping, and sidewalk cleaning.
- Roadway accidents²
 - This cost element considers the societal costs³ associated with accidents, including fatal accidents, injury accidents, and property damage only accidents along the roadway.

A summary of annually recurring costs of roadway ownership is provided in **Table 3** below.

Table 3: Annually Recurring Costs of Roadway Ownership

Annually Recurring Cost Items	Maintenance & Operations	Accidents
Annual average operating and maintenance costs	\$193,000	-

¹ Caltrans did not provide information on legal expenses. Estimates were provided by the City of Laguna Beach for the purpose of this study only.

² While vehicle crashes occur every year along the roadway, claims are far less frequent according to data provided by Caltrans. Also, not all claims originate from vehicle crashes. That's why their associated costs are presented separately.

³ They include both economic costs (e.g., property damage costs) and valuation for lost quality-of-life.

Annually Recurring Cost Items	Maintenance & Operations	Accidents
Annual average accident costs	-	\$11,002,000
Total	\$193,000	\$11,002,000

4 Benefits of Roadway Ownership

The underlying motivation behind the City acquisition of Laguna Canyon Road would be to gain control over the roadway and ultimately generate additional benefits for Laguna Beach residents, visitors, and society at large. In economic terms, a benefit is any improvement in society's overall welfare, or any change that results in people being "better-off." Benefits come in many forms, including but not limited to economic, social, and environmental benefits. Benefits of a potential roadway acquisition and subsequent improvement projects by the City of Laguna Beach can extend beyond the City itself and be realized by third-parties unrelated to the acquisition process.

Many forms of benefits can be quantified and monetized in accordance with widely accepted methodologies. For example, both Caltrans and the United States Department of Transportation (USDOT)—as well as many other governmental and non-governmental agencies—publish methodological guidance for benefit quantification and monetization. Not all types of benefits, however, can be accurately quantified or monetized due to data limitations or lack of established methodology.

The acquisition of Laguna Canyon Road by the City of Laguna Beach, in and of itself, is not expected to generate quantifiable benefits. However, with ownership of Laguna Canyon Road, the City would be in the position to implement improvement projects along the roadway that would generate benefits. These benefit-generating roadway improvements are not expected to be completed if Caltrans continues to own and control Laguna Canyon Road. In this sense, the immediate non-quantifiable benefit of the City's acquisition of Laguna Canyon Road would be to allow for roadway improvement projects that generate quantifiable benefits in the future.

Benefits that would be generated by future improvement projects along Laguna Canyon Road fall broadly into four primary categories:

- **Community Development Benefits:** Benefits in this category reflect increased quality of life for the community surrounding Laguna Canyon Road.
- **Environmental Benefits:** These benefits improve the natural environment, leading to cleaner and higher-quality air, water, and natural landscapes.
- **Congestion / Traffic Management Benefits:** This category of benefits relates directly to travel conditions, making travel faster, less expensive, and easier for Laguna Beach residents and visitors.
- **Safety Benefits:** These benefits improve the safety conditions along the roadway, decreasing the risk of crashes and improving emergency response.

Roadway improvement projects with different goals and objectives are expected to generate benefits of different categories. For example, a roadway project that focuses on increasing vehicle throughput and speed may generate significant congestion and traffic management benefits but only minimal (or even negative) community development or safety benefits. Alternatively, a project that focuses on non-automotive modes of travel is unlikely to generate congestion or traffic management benefits but is expected to generate benefits in other categories. The specific benefits that any project may generate are highly dependent on the details, goals, and objectives of the individual project.

The various benefits that fall in each of the four categories described above are summarized in the following sub-sections. Additional detail on potential improvement projects for the Laguna Canyon Road corridor and the benefits that they may generate can be found in the documentation for Task 2: Benefit Identification and Quantification.

4.1 Community Development Benefits

The following community development benefits could be generated by roadway improvement projects along Laguna Canyon Road:

- Increased Property Values
 - Improvement projects that increase the desirability of property in Laguna Beach and along the Laguna Canyon Road corridor would be expected to generate benefits in the form of increased property values in the area.
- Continuity of Utility Services
 - Project improvements that make utility service more reliable, such as the undergrounding of above-ground utility lines, would generate societal benefits in the form of fewer power outages or utility interruptions.
- Improved Ease and Comfort of Travel
 - Changes that make travel along the Laguna Canyon Road easier or more comfortable, such as corridor beautification, are another form of community development benefit. Some benefits in this category could also be considered travel-specific benefits.
- Recreation and Health Benefits
 - Projects that generate improved recreational and exercise opportunities for local residents, such as new or improved bicycle and pedestrian infrastructure, provide community development benefits by making people happier and healthier.

4.2 Environmental Benefits

Environmental benefits include:

- Emissions Reduction
 - Roadway changes that result in fewer vehicle miles travelled or more fuel-efficient driving conditions would be expected to decrease the total amount of harmful pollutants emitted by vehicles, generating emissions reduction benefits and leading to cleaner air.

- Wildfire Mitigation
 - Wildfires can be devastating events in Southern California. Infrastructure changes that reduce the risk of wildfires being ignited generate benefits for the environment, as well as for the economy and local community.
- Carbon Sequestration
 - Just as reduced vehicle emissions can generate benefits in the form of cleaner air, so too can the planting of vegetation that absorbs carbon dioxide from the air and helps to combat climate change.
- Stormwater Runoff Mitigation
 - Stormwater that runs off of paved surfaces can increase flooding risk and contaminate bodies of water. Infrastructure changes that mitigate this stormwater runoff can improve the quality of water and decrease damage caused by floods.

4.3 Congestion / Traffic Management Benefits

Congestion and traffic management benefits include:

- Travel Time Savings
 - Time spent travelling and sitting in traffic represents a significant cost to society. Infrastructure improvements that allow people and goods to arrive at their destinations faster generate travel time savings benefits.
- Reduced Transportation Costs
 - Infrastructure improvements that make it cheaper to travel, either by reducing vehicle operating costs or providing lower cost travel options, save money and resources for travelers and generate societal benefits.

4.4 Safety Benefits

Safety benefits include:

- Crash Reduction Safety Benefits
 - Traffic crashes generate significant societal costs in the form of property damage, injuries, and fatalities. Roadway improvements that decrease the frequency or severity of crashes generate significant societal benefits.
- Improved Emergency Response
 - Infrastructure changes that allow police, fire, and medical services to more quickly respond to emergencies, or allow the general population to more quickly and efficiently evacuate from dangerous situations, also generate societal benefits.

5 Project Alternative Benefit-Cost Analysis

In order to assist the City in its decision-making process, HDR evaluated four hypothetical roadway improvements that are representative of projects that could be implemented along Laguna Canyon Road by the City:

- Alternative 1: Utility Undergrounding
- Alternative 2: Corridor Beautification
- Alternative 3: Bicycle and Pedestrian Infrastructure
- Alternative 4: Roadway Widening

Each of these hypothetical project “alternatives” has a different area of focus and targets different categories of benefits. These alternatives are described in Section 5.1 below. Section 5.2 provides the high-level results of benefit-cost analyses undertaken for these alternatives, which weigh total expected societal benefits against total project costs over a period of 30 years of project operations.

Additional detail on the evaluated project alternatives and benefit-cost analysis results can be found in the documentation for Task 3: Cost/Benefit Framework and Synthesis.

5.1 Alternative Definitions

5.1.1 Utility Undergrounding

The Utility Undergrounding alternative includes the undergrounding of approximately 2.5 miles of electrical transmission and distribution poles and wires along Laguna Canyon Road between El Toro Road and the Southern California Edison (SCE) substation south of Canyon Acres Drive. The project calls for transmission lines along the corridor to be placed in an underground utility trench along the southbound side of the roadway. Distribution lines (as well as communications, telephone, and cable TV lines) will be placed in an underground utility trench along northbound side of roadway, abutting the majority of corridor homes and businesses.

Monetized benefits generated by the Utility Undergrounding alternative include:

- Improved safety conditions from the removal of utility poles that currently pose a roadside hazard;
- Improved aesthetic conditions along the roadway;
- Increased reliability of utility service; and
- Decreased wildfire risk.

5.1.2 Corridor Beautification

The Corridor Beautification alternative maintains and enhances the current rural canyon aesthetic of Laguna Canyon Road. In this alternative, the majority of Laguna Canyon Road is maintained in its current arrangement and aesthetic conditions. Future improvements will include elements that are rustic and rural in nature and small in scale.

These include soft surface pathways of decomposed granite or gravel, wood fencing, seating for bus shelters, lighting, and landscaped plantings (e.g., sycamores) in the median and adjoining properties.

Monetized benefits generated by the Corridor Beautification alternative include:

- Improved aesthetic conditions along the Laguna Canyon Road corridor; and
- Carbon sequestration benefits resulting from new plants removing carbon dioxide from the air.

A “disbenefit” (or negative benefit) of the Corridor Beautification alternative is:

- Increased safety risk resulting from large trees close to the path of moving vehicles.

Additional benefits of this alternative were not monetized due to data or methodological limitations. These benefits include:

- Increased property values along the Laguna Canyon Road corridor; and
- Improved stormwater runoff mitigation resulting from the maintained rural, natural landscape.

5.1.3 Bicycle and Pedestrian Infrastructure

The Bicycle and Pedestrian Infrastructure alternative features a redesign of Laguna Canyon Road to include one motor vehicle travel lane in each direction, a center turning lane, wider shoulders, a sidewalk on the northbound side of the roadway, a two-way separated bikeway (with emergency vehicle access) on the southbound side of the roadway, and reconfigured intersections.

Monetized benefits generated by the Bicycle and Pedestrian Infrastructure alternative include:

- Crash reduction safety benefits for cyclists and pedestrians achieved by separating these modes from traffic mixed with motor vehicles;
- Crash reduction safety benefits for automobiles achieved by reconfiguring intersections to introduce regular breaks in traffic, facilitating left-turn movements;
- Improved journey quality for existing cyclists and pedestrians resulting from the installation of improved bicycle and pedestrian infrastructure;
- Recreation and health benefits for individuals who begin to walk or cycle as a result of the project improvements; and
- Emissions reduction benefits as some portion of automobile users shift to walking or biking, leading to reduced driving and motor vehicle emissions.

Additional non-monetized qualitative benefits of this alternative include:

- Improved ease and comfort of travel for automobile drivers resulting from redesigned intersections that reduce driver stress;

- Improved emergency response time as the designated bikeways will be designed to grant access to emergency vehicles and facilitate evacuation from the City of Laguna Beach in emergency events; and
- Increased property values along the Laguna Canyon Road corridor.

5.1.4 Roadway Widening

The Roadway Widening alternative considers a widening of Laguna Canyon Road to include two travel lanes in each direction, a center turning lane, a sidewalk on the northbound side, and reconfigured intersections. This project alternative will allow for the current roadway configuration that exists immediately south of Canyon Acres Drive and immediately north of El Toro Road to continue between those intersections, expanding the traffic capacity of the corridor.

Monetized benefits generated by the Roadway Widening alternative include:

- Travel time savings as the roadway widening expands the traffic capacity of Laguna Canyon Road;
- Crash reduction safety benefits for automobiles achieved by reconfiguring intersections to introduce regular breaks in traffic, facilitating left-turn movements;
- Crash reduction safety benefits for pedestrians as the new sidewalk separates pedestrians from automobile traffic;
- Improved journey quality for existing pedestrians through the new sidewalk; and
- Emissions reduction benefits as reduced automotive congestion allows for more consistent vehicle speeds and fuel-efficient driving behaviors.

Additional non-monetized qualitative benefits of this alternative include:

- Improved ease and comfort of travel for automobile drivers resulting from redesigned intersections that reduce driver stress; and
- Improved response time for emergency vehicles and facilitated evacuation from the City of Laguna Beach in emergency events.

5.2 Benefit-Cost Analysis Results

Each of the project alternatives described above was evaluated through a benefit-cost analysis (BCA). For each alternative, the total societal benefits that are expected to accrue as a result of the alternative were calculated over a 30-year period and compared to the anticipated costs. Total benefits for each alternative are those beneficial outcomes that differ between the “Build” scenario in which the designated alternative is undertaken and the “No-Build” scenario in which it is not. Costs of each alternative include upfront capital costs of the project as well as incremental operations and maintenance (O&M) costs that are expected to be incurred over time. Each BCA considers all societal benefits and costs, even if those benefits and costs are not realized directly by the City.

The outcomes of each BCA represent high-level estimates of project costs and benefits. The underlying details, data, and assumptions used to calculate BCA outcomes are as

accurate as possible given current information, but the exact specifications of each alternative are still to be determined

Results of these benefit-cost analyses are summarized on the following page in **Table 4**, which shows total benefits and costs over a 30-year period for each alternative. These results represent the “central” estimate of benefits and costs in each case. Additional low- and high-range benefit and cost estimates for each alternative, as well as detailed descriptions of cost and benefit measurement and quantification methodologies, are provided in the documentation for Task 3: Cost/Benefit Framework and Synthesis.

Table 4: Benefit-Cost Analysis Results Summary – Alternative Benefits and Costs

Project Alternative	Total Project Benefits Undiscounted, 30 Years	Total Project Costs Undiscounted, 30 Years
Alt. 1: Utility Undergrounding	\$95.5 Million	\$71.0 Million
Alt. 2: Corridor Beautification	-\$2.4 Million	\$500 Thousand
Alt. 3: Bicycle and Pedestrian Infrastructure	\$83.7 Million	\$43.5 Million
Alt. 4: Roadway Widening	\$178.1 Million	\$108.8 Million

A primary summary statistic calculated in BCA is the benefit-cost ratio, or “BCR,” which represents the overall ratio of project benefits to costs. A BCR greater than one indicates that project benefits exceed costs, while a BCR less than one indicates that benefits do not exceed costs.

Precise measurement of project costs and benefits are highly dependent on the underlying data and assumptions behind each alternative. One such input used in the calculation of BCRs is the discount rate, which represents the (social) opportunity cost of resources and is meant to reflect society’s preference for the present, as well as intergenerational concerns. The application of a discount rate greater than zero reflects the fact that benefits realized today are generally more highly valued than benefits realized years into the future. While the use and applicability of discount rates is widely accepted, no consensus exists as to the “correct” discount rate to apply. Different agencies recommend different discount rates: Caltrans, for example, recommends that a discount rate of 4 percent be used in BCA while USDOT recommends a rate of 7 percent. **Table 5** below shows BCRs for each of the project alternatives calculated using discount rates of zero percent, 4 percent, and 7 percent.

Table 5: Benefit-Cost Analysis Results Summary – Benefit-Cost Ratios

Project Alternative	Benefit-Cost Ratio		
	Undiscounted	Discounted at 4 Percent Rate	Discounted at 7 Percent Rate
Alt. 1: Utility Undergrounding	1.41	0.86	0.63
Alt. 2: Corridor Beautification	-4.85	-2.87	-2.06
Alt. 3: Bicycle and Pedestrian Infrastructure	1.92	1.13	0.81
Alt. 4: Roadway Widening	1.64	0.87	0.57

The results depicted in Table 5 show that, depending on the selected discount rate, total benefits of three of the four project alternatives are approximately equal to total costs over a period of thirty years. The Bicycle and Pedestrian Infrastructure alternative is found to be the most cost-beneficial under any chosen discount rate. Due to significant negative crash safety disbenefits in the Corridor Beautification alternative, benefits of that alternative are not found to exceed costs. It is also important to note that the Utility Undergrounding alternative could be implemented alongside any other alternative, and that the combined BCR of two alternatives implemented together would equal a weighted average of the alternatives' individual BCRs.

6 Evaluation of Roadway Acquisition Risks

In addition to the costs and benefits of roadway ownership, an additional consideration relevant to the potential acquisition of Laguna Canyon Road is that of roadway ownership risks. The City of Laguna Beach, its residents and visitors, and the overall community are all subject to potential risks from the City's acquisition of Laguna Canyon Road and from any improvement projects planned for the corridor. These risks can be grouped into seven primary categories:

- **Political Risks:** These political risks apply the acquisition of the roadway itself, and include risks related to state agency cooperation, community engagement, and City stakeholder agreement. Without cooperation and agreement across all of these relevant parties, the City may not have the ability to acquire Laguna Canyon Road and implement improvement projects along the corridor.
- **Ownership Risks:** Roadway ownership risks represent additional liabilities and costs that may be unexpectedly incurred by the City once it assumes ownership of Laguna Canyon Road. For example, numerous right-of-way encroachments exist along the Laguna Canyon Road right-of-way, and these encroachments would have to be addressed by the City after the acquisition of the roadway. The City could also face ADA compliance liabilities, as current infrastructure does not meet ADA accessibility requirements. These risks are currently faced by Caltrans but would transfer to the City with the transfer of roadway ownership.
- **Roadway Condition Risks:** Roadway condition risks relate to the current condition of the Laguna Canyon Road corridor. If the City assumes ownership of the roadway it would then be responsible for maintaining roadway conditions and addressing shortcomings, including roadway flooding risks, pavement condition liabilities, drainage concerns, and soil or groundwater contamination. Like ownership risks, these risks are currently faced by Caltrans but would transfer to the City with the transfer of roadway ownership.
- **Cost Risks:** Cost risks refer to the costs of roadway ownership discussed in Section 3, including legal liabilities and fees and emergency closure risks.
- **Design and Construction Risks:** Unlike the previous risk categories which are relevant to roadway acquisition and ownership, this category of risk applies to the implementation of planned improvement projects along Laguna Canyon Road. Any infrastructure improvement project is subject to risks of design uncertainties,

permitting delays, construction staging risks, work restrictions, and construction traffic impacts, and these risks would apply to the City upon implementation of any chosen roadway improvement project.

- **Improvement Project Disbenefits:** Improvement project disbenefit risks apply to specific design alternatives, as considered in the alternative benefit-cost analyses. The Corridor Beautification alternative is subject to safety disbenefit risks (large trees close to travel lanes pose a safety hazard), the Bicycle and Pedestrian Infrastructure and Roadway Widening alternatives are subject to potential corridor aesthetic disbenefits (new pavement and roadway area can harm the rural canyon look and feel of the corridor), and the Bicycle and Pedestrian Infrastructure alternative is subject to potential travel time disbenefit risks (reconfigured intersections and roadway segments that are designed for bicycles may slow motor vehicle traffic). These risks are best mitigated by following industry and engineering best practices.
- **Utility Risks:** These risks apply to the Utility Undergrounding alternative and relate to challenges in implementing utility undergrounding in a safe and effective manner. Like the improvement project disbenefits discussed above, these risks are also best mitigated by adhering to industry and engineering best practices.

Additional detail on potential risks to the City's acquisition of Laguna Canyon Road and to improvement projects planned for Laguna Canyon Road can be found in the documentation for Task 4: Risk Identification and Analysis.

7 Feasibility Study Results

This analysis and feasibility study, including the consideration of the costs of roadway ownership and the benefit-cost analyses of potential roadway improvement projects, are intended to help inform the Laguna Beach City Council and other stakeholders in their decision regarding the potential acquisition of Laguna Canyon Road. While they cannot provide a definitive answer as to the best course of action for the City, it is a tool that can be used in the City's decision-making process.

Ultimately, the best course of action for the City of Laguna Beach is highly dependent on the City's priorities with respect to Laguna Canyon Road, and its plans and visions for the corridor. The four alternatives evaluated in the benefit-cost analyses are representative of four different visions that the City may have for Laguna Canyon Road. Each of these alternatives can be informative as to the merits of potential courses of action for the City.

7.1 Utility Undergrounding

The analysis conducted for Alternative 1 evaluated the costs and benefits of a Utility Undergrounding alternative along Laguna Canyon Road. This analysis showed that anticipated benefits for such an alternative exceed project costs on an undiscounted basis, but that benefits are less than costs when a discount rate of 4 or 7 percent is applied. While benefits of utility undergrounding are found to be less than costs, however, they are not substantially so.

Generally, utility undergrounding projects are found to be most cost-beneficial in densely populated and developed areas and are found to be less cost-beneficial in more rural areas with natural landscapes. This is consistent with the findings of the Utility Undergrounding benefit-cost analysis for Laguna Canyon Road.

It is important to note that any monetization of benefits is highly dependent on underlying data and assumptions, and that actual benefits that accrue over time may differ from those anticipated by a forward-looking BCA. This could be especially pronounced in the case of wildfire mitigation benefits. The average expectation of total wildfire mitigation benefits in this alternative was found to be very low (approximately \$1 thousand over 30 years), but wildfire mitigation benefits by their nature are volatile and difficult to predict. While the average expectation of wildfire mitigation benefits may be low, it is possible that these benefits, under certain conditions, could reach into the hundreds of millions of dollars. Considering individuals' natural aversion to risk, it may be appropriate to put additional weight on wildfire mitigation in a decision-making process, which would in effect increase the benefits of the Utility Undergrounding alternative.

The results of the benefit-cost analysis for the Utility Undergrounding alternative generally support the conclusion that a utility undergrounding project along Laguna Canyon Road may be cost-beneficial under certain conditions if such a plan fits the City's vision for the Laguna Canyon Road corridor, but also that such a project is also unlikely to generate benefits well in excess of project costs. The Utility Undergrounding alternative can also be implemented alongside other roadway improvement projects, and this is likely advisable due to right-of-way and cost considerations.

7.2 Corridor Beautification

The benefit-cost analysis conducted for Alternative 2 showed that increased crash risks resulting from planting trees close to vehicle travel lanes generate negative safety disbenefits in excess of any corridor beautification or carbon sequestration benefits. Considering these results, it would be unadvisable for the City to go forward with planting street trees in such a manner.

Aside from these street tree safety disbenefits, total costs and benefits of the Corridor Beautification alternative were both low, with project costs totaling approximately \$500 thousand and non-safety-related benefits totaling approximately \$170 thousand. Even though the monetizable benefits of a Corridor Beautification may be low, such an alternative for Laguna Canyon Road would be achievable at a low cost if it meets the City's vision for the corridor.

It is also important to note that, unlike the other three alternatives, many elements of the Corridor Beautification alternative can be achieved without the City taking ownership of Laguna Canyon Road. Caltrans is unlikely to implement major infrastructure improvements along Laguna Canyon Road, and that general hands-off approach is consistent with the Corridor Beautification alternative. Taking this into consideration, if the City does wish to emphasize the rural canyon aesthetic of Laguna Canyon Road and not implement any significant infrastructure improvement projects along the corridor, it would likely be unadvisable for the City to incur the costs and risks associated with ownership of Laguna Canyon Road.

7.3 Bicycle and Pedestrian Infrastructure

The bicycle- and pedestrian-focused Alternative 3 was found to be the most cost-beneficial of all evaluated alternatives, generating a benefit-cost ratio greater than one when discounted at the Caltrans-recommended 4 percent discount rate. The Bicycle and Pedestrian Infrastructure alternative is also largely consistent with the “Alternative 2” roadway design option analyzed in the Draft Project Study Report (PSR) conducted for Laguna Canyon Road, so this bicycle and pedestrian option has been more thoroughly studied than other alternatives.

These results suggest that, if the City intends to pursue bicycle and pedestrian infrastructure improvements along Laguna Canyon Road, the acquisition of Laguna Canyon Road and implementation of such a project is likely to be net cost-beneficial according to Caltrans benefit-cost analysis guidance. This Bicycle and Pedestrian Infrastructure improvement project is also compatible with the Utility Undergrounding improvements considered as Alternative 1.

7.4 Roadway Widening

The Roadway Widening alternative evaluated in this benefit-cost analysis was shown to provide anticipated benefits exceeding costs on an undiscounted basis but benefits less than costs under a discount rate of 4 or 7 percent. Additionally, this alternative yielded a benefit-cost ratio of 0.87 under a 4 percent discount rate (less than one but not substantially so) and a BCR of 0.57 under a 7 percent discount rate (less than the BCRs of either the Utility Undergrounding or Bicycle and Pedestrian Infrastructure alternatives).

At the time of this economic analysis, engineering analysis of the roadway improvements featured in the Roadway Widening alternative had not yet been as thoroughly developed as those conducted for the other project alternatives. The expected traffic impacts of such an improvement project are, accordingly, subject to significant uncertainty. The benefit-cost analysis conducted for this alternative referenced a central expectation of traffic impacts in the quantification of benefits, but it is possible that restrictions in other parts of the local road network could undercut the time savings achieved by roadway widening in a manner not fully captured in this analysis. Additionally, the right-of-way acquisitions required for roadway widening could be challenging and expensive, and other capital costs could potentially differ from those preliminary engineering estimates referenced in the benefit-cost analysis. Those cost and engineering considerations have not yet been fully evaluated at this time.

The results of the benefit-cost analysis for the Roadway Widening alternative generally support the conclusion that such a project along Laguna Canyon Road could potentially generate benefits not significantly less than the costs of such an alternative. However, the underlying data referenced in the calculation of costs and benefits for this alternative are preliminary and subject to further refinement. If the City’s vision for the Laguna Canyon Road corridor does include a roadway widening, it is recommended that further engineering study of such an alternative be conducted before proceeding with the acquisition of Laguna Canyon Road.