San Francisco County
Transportation Authority

Doyle Drive Replacement Project

Summary of
Sustainability Program:
Phase I

San Francisco County Transportation Authority

Doyle Drive Replacement Project

Summary of Sustainability Program: Phase I

December 2007

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Job number 131558

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1 Introduction

The Doyle Drive Replacement Project is an ambitious effort to transform an unsafe and deteriorated road into one that is safe and aesthetically reflects its setting within a National Historic Landmark District. Doyle Drive is a portion of Route 101 that runs along the northern edge of San Francisco and provides access to the Golden Gate Bridge. Located within the Presidio of San Francisco, the highway provides access to historic and cultural landmarks including the Golden Gate National Recreation Area, the Presidio, the Golden Gate Bridge and the Palace of Fine Arts.

Doyle Drive was constructed in 1936 with narrow lanes, no median and no shoulders. The highway is structurally deteriorated and is approaching the end of its useful life. It is used by nearly 120,000 vehicles each weekday and serves as both a primary commuter road and recreational route.

Due to its importance within the regional transportation system, the Federal Highway Administration, the California Department of Transportation and the San Francisco County Transportation Authority are collaborating to replace the 1.5 mile Doyle Drive to bring it up to current design and safety standards.

The purpose of the Doyle Drive Replacement Project is to improve the seismic, structural and traffic safety of the roadway within the setting and context of the Presidio of San Francisco and its purpose as a National Park. A preferred alternative for the roadway has been selected based on stakeholder consensus (Figure 1). This alternative respects the natural contours of the site, minimizes the amount of cutting, filling and hauling that would be needed and significantly improves scenic views.

Figure 1: Doyle Drive Preferred Alternative

A sustainability program was developed to incorporate sustainable principles throughout the design and implementation of the Doyle Drive project. This effort supports the interests of the community and the aspiration to ensure the project upholds high standards of environmental stewardship.

The Sustainability Program is consistent with the Caltrans Transportation Plan 2025 Vision for a California. The vision seeks a “a safe, sustainable, world-class transportation system that provides for the mobility and accessibility of people, goods, services and information through an integrated, multimodal network that is developed through collaboration and achieves a prosperous economy, a quality environment and social equity.”

This report provides a summary of the objectives, approach and framework for the sustainability program. It also outlines the development of a sustainability vision, goals, principles and potential strategies for the project that were established through extensive stakeholder engagement in a series of three workshops.

2 Sustainability Program Objectives

The objective of the sustainability program for the Doyle Drive Replacement Project is to deliver a project that is sustainable in design, construction, operations & maintenance of the highway.

The term sustainability was defined by the Brundtland Commission report *Our Common Future* (1987), as "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs."

In the context of a highway, sustainability refers to meeting functional requirements, demonstrating environmental stewardship and being responsive to community concerns.

This definition recognizes that a highway must first and foremost meet safety and technical performance standards. In addition to these functional requirements, sustainable highways can demonstrate stewardship by striving to go beyond regulatory requirements in protecting and enhancing the environment. Employing environmentally-sound practices also means responsibly using natural resources and applying a lifecycle approach in choosing materials. Finally, sustainable highways need to respond to community issues by actively addressing impacts on local neighborhoods and by engaging with communities to identify mutually beneficial solutions.

3 Sustainability Program Phases

The sustainability program for the Doyle Drive Replacement Project is being developed by using a three-phased approach that involves significant participation from stakeholders (Figure 2). The program is aimed at developing and implementing a recommended set of sustainability strategies that will produce the greatest benefits for the community, the environment and the project.

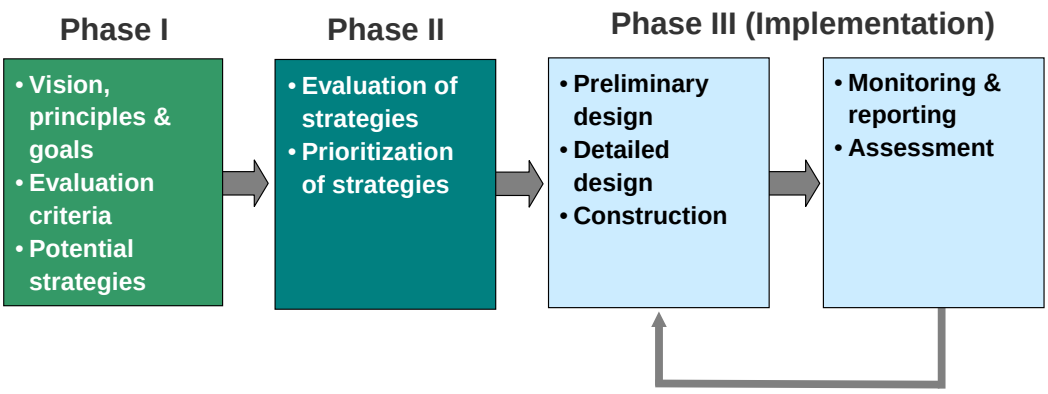
The three phases are:

Phase I: Development of a sustainability vision for the project, along with principles to guide the development of the project and specific goals; establishment of criteria that can be used to evaluate the feasibility of potential sustainability strategies; identification of a long list of potential strategies that could help to achieve the sustainability goals set for the project.

Phase II: The potential sustainability strategies will be carried forward to Phase II for evaluation against the criteria established during Phase I and prioritization of recommended strategies.

Phase III: The selected strategies will then be carried forward to Phase III for detailed design and development, identification of implementation responsibilities and timeline, establishing monitoring mechanisms and reporting of results.

Figure 2: Sustainability Program Phases



The approach to the development of the sustainability program was inspired by policies, frameworks and best practices sourced from the following:

- US Green Building Council Leadership in Energy & Environmental Design (LEED) program
- The Equator Principles for assessing and managing social & environmental risk in project financing
- EPA & Federal Highway Administration (FHWA) Green Highways Partnership (For more information, see Appendix A)
- American Association of State Highway and Transportation Officials Center for Environmental Excellence
- California Department of Transportation policies, plans and guidelines
- National Park Service Management Policies
- Regional and local policies, plans and guidelines (eg, San Francisco Sustainability Plan, Golden Gate National Recreation Area Environmental Management System, Presidio Trust plans)

In addition, a review was undertaken of best practices from highway projects around the world, including:

- Route 113 Highway (Ocean City, Maryland)
- Route 52 Causeway (Cape May, New Jersey)
- I-64 (St. Louis, Missouri)
- M-60 widening (Manchester, UK)
- A-470 Road Improvement (Lledr Valley, Wales)
- Karuah Bypass (Sydney, Australia)
- Tullamarine-Calder Freeway Interchange (Victoria, Australia)
- Elder Amith Road (Adelaide, Australia)

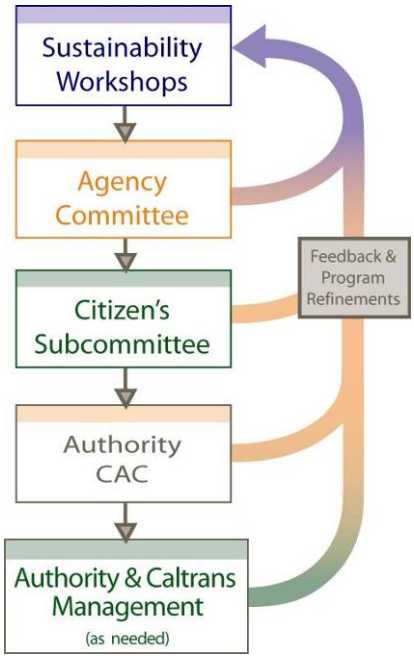
A brief summary of a few of these best practices is provided in Appendix B.

3.1 Stakeholder Engagement

Stakeholder engagement was a key element in the activities undertaken in Phase I in the development of the sustainability program. It was critical that at the outset of the program, stakeholders be involved in defining what sustainability means to the project and which sustainability principles and goals should govern the project development from design through construction, operations and maintenance.

There are a variety of stakeholders whose support is instrumental to the success of the project, including the Agency Committee, the San Francisco County Transportation Authority Citizens Advisory Committee (CAC) and the Doyle Drive Citizen's Subcommittee to

Figure 3: Stakeholder Engagement



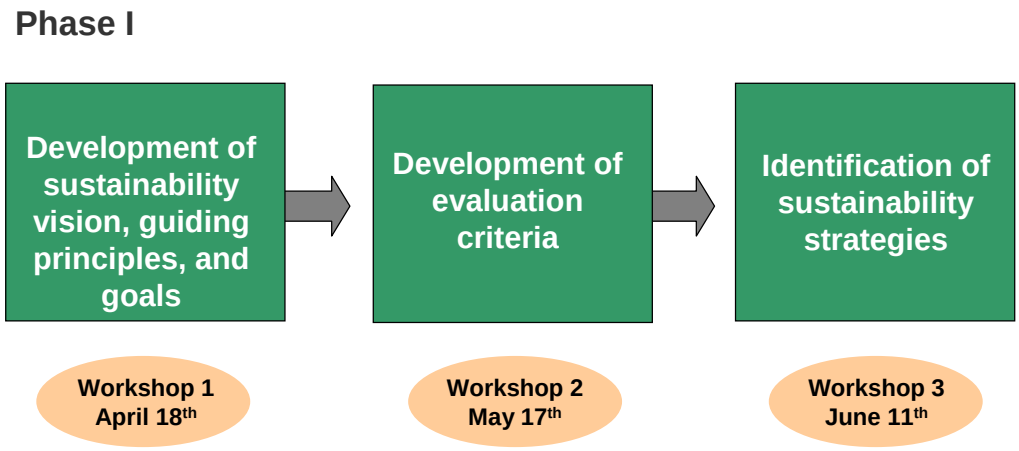
the CAC (Figure 3). The stakeholder engagement approach is designed to give these stakeholders an opportunity to provide input along each major step in the development of the sustainability program. The Agency Committee, Authority's CAC and Subcommittee were invited to the meeting and the workshops were posted on the project website. Over twenty people attended each of the three workshops (See Appendix C).

The public will be kept informed and involved of future phases of the sustainability program through the project website, communication materials and other forums, as needed.

4 Approach – Phase I

Phase I of the development of the sustainability program was completed in June 2007 and is the subject of this report. The activities covered under Phase I were carried out with the input and feedback obtained during the course of three workshops with stakeholders held from April to June 2007 (see Figure 4), as discussed below.

Figure 4: Phase I of Sustainability Program



April 18 Workshop

The focus of this workshop was to introduce participants to the proposed approach for the sustainability program, discuss the historical development of the project and seek stakeholder input on the sustainability vision, principles and goals.

May 17 Workshop

This workshop gave participants the opportunity to comment on the draft vision statement, principles and goals established for the project. Feedback was sought on criteria that could be used to evaluate the strategies under Phase II of the project. A summary was provided of the sustainability strategies that have already been adopted by the project and those that have strong potential. A brainstorming session was held to encourage participants to provide their own strategies and ideas for how the project could meet its sustainability goals. The aim was not to pre-select or evaluate the feasibility of different strategies, but simply to develop a long list of potential strategies that could be evaluated for applicability and feasibility in Phase II.

June 11 Workshop

Prior to the last workshop, a long list of potential sustainability strategies was developed using stakeholder input from the May workshop and research into best practices. Participants provided their final ideas and comments on the vision, principles, goals, evaluation criteria and

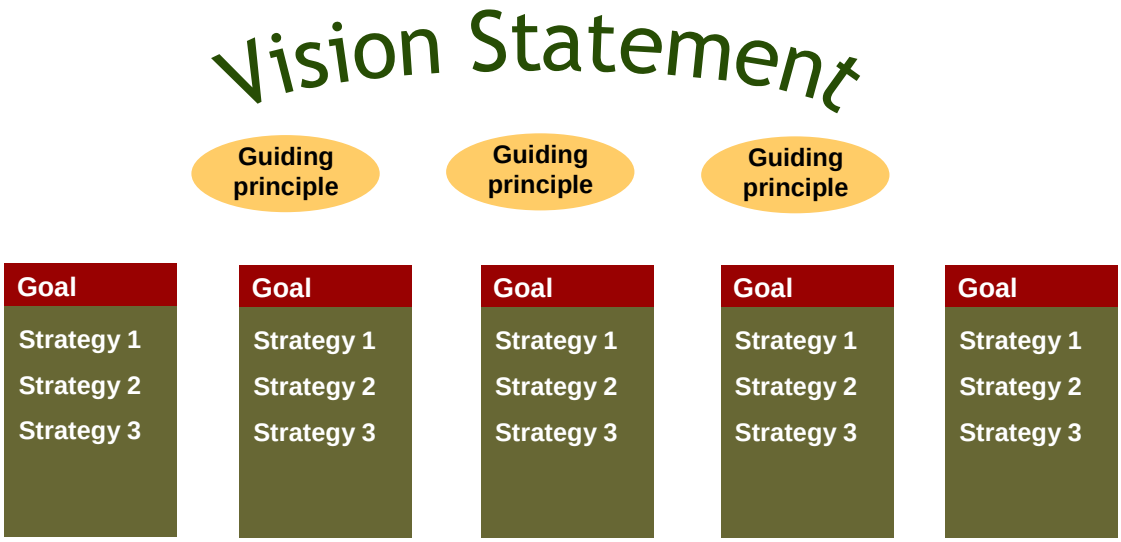
sustainability strategies. In addition, there was a brief presentation of examples of international best practices.

A summary of the minutes from the three workshops is provided in Appendix C.

4.1 Sustainability Framework

To facilitate the development of the sustainability program during Phase I, a framework was created to show the hierarchy and links between the sustainability components (see Figure 5). The vision statement represents the overarching, long-term vision for the project and what it hopes to aspire to achieve. The guiding principles serve to establish the values and considerations that will guide the development of the sustainability approach to the project and steer the development of goals and strategies. The goals identify clearly what the project should achieve, focusing on the ends not the means. Finally, the strategies are specific measures or means to achieving goals.

Figure 5: Sustainability Framework



The objective of the stakeholder workshops was to develop and refine each component of the sustainability framework, as discussed in the next section.

5 Recommendations

For each component of the sustainability program (vision, principles, goals and strategies), recommendations were developed through stakeholder engagement and informed by research on best practices.

5.1 Vision

The vision statement for the project is as follows:

> *Designed as a "Parkway in a Park", the vision for the Doyle Drive Replacement Project is to develop the project as a national model for design, construction and operation of sustainable roadways that is responsive to community needs, sensitive to its unique setting and meets functional requirements.*

5.2 Guiding Principles

The Project will incorporate sustainable solutions that:

- Integrate natural elements, processes and passive design strategies

- Protect and enhance environmental resources and the beauty of the surrounding area
- Ensure the Project will be a “good neighbor” to the local community
- Incorporate a life-cycle approach across the design, construction, operation/maintenance and ultimate decommissioning of the parkway
- Are consistent with the project purpose and local and regional policies

Over the life of the facility, future sustainable design strategies and technologies will be evaluated and incorporated where appropriate.

5.3 Goals

The sustainability goals for the project during design, construction and operation/maintenance are:

Water	Energy
Minimize surface water runoff	Maximize energy efficiency
Improve water quality	Reduce heat island effect
Minimize water use	Minimize greenhouse gas emissions
Minimize construction dewatering to preserve groundwater	

Habitat	Landscape
Protect existing habitat	Foster restoration of native species
Promote creation of new habitat	Minimize construction footprint
Support wildlife corridors	
Minimize light pollution	

Materials and Waste	Community
Seek local material sources	Minimize noise
Maximize use of recycled, sustainable materials with low-embodied energy	Support healthy air quality
Apply life-cycle approach to material selection	Enhance aesthetics and user experience
Maximize recycling and reuse of construction waste	Minimize use of parkland acreage
	Minimize impacts of traffic on neighborhoods
	Improve access to and accommodation of transit

5.4 Evaluation Criteria

A set of evaluation criteria or factors was developed to provide a transparent basis to assess the merits of the proposed sustainability strategies and prioritize the strategies in Phase II. Establishing the criteria up front enables all stakeholders to understand the range of factors that are being considered in evaluating the feasibility and applicability of different strategies.

The evaluation criteria to assess potential strategies under Phase II of the sustainability program are as follow:

1. Project Delivery

- Impact on project timetable or phasing
- Consistency with environmental documentation
- Cost benefit

2. Technical Feasibility

- Availability and reliability of technology
- Impact on safety
- Impact on functionality

3. Sustainability Goals

- Impact on natural resources and the environment
- Impact on operations & maintenance
- Impact on design aesthetic
- Impact on local neighborhoods
- Ability to support multiple goals

5.5 Strategies

Prior to soliciting ideas for strategies from stakeholders, a review was undertaken of some of the sustainable approaches that are already incorporated into the project, including:

- **Roadway Reduction**: The roadway width has been reduced by 16%, equivalent to 3 acres reduction in pavement. The road is narrower: 5 lanes are 11' versus 12' and inside shoulders are 4' versus 10'. The benefit of this includes reduction of the heat island effect and reduction in use of materials (and all the environmental impacts associated with material extraction and transportation).
- **Roadway Shading**: Green roofs will shade 20% of the roadway in the tunnel segments, providing 5 acres of shade and giving open space back to the Presidio. Wide medians will allow for additional planting so that roadway shading could possibly be accomplished from 4 rather than 2 edges. The roadway shading strategies will help to reduce the heat island effect, enhance aesthetics of the design and support local wildlife/habitat.

In addition, several sustainable approaches were presented that have potential, including:

- Natural light and airflow in tunnels
- Solar panels on roadway
- Permeable pavers & bioswales
- Use treated stormwater for irrigation
- Silent piler system for pile installation during construction

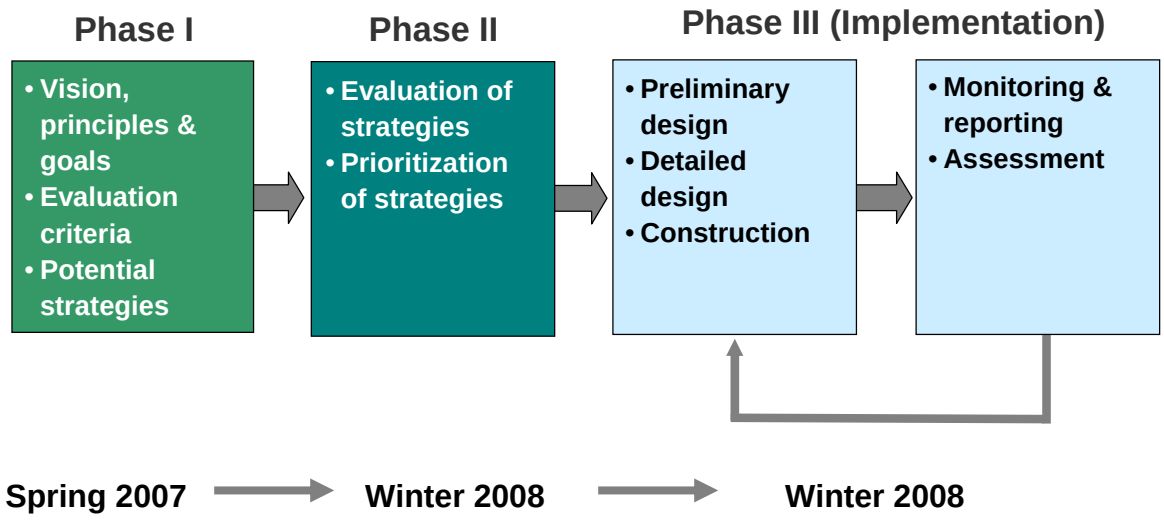
A long list of sustainability strategies was then developed using input from stakeholders, checklists, best practices and lessons learned from other projects. Strategies that apply during the design, construction and operation stages were sought. In this context, the term “strategies” refers to policies, programs, technologies, systems and other initiatives that could be implemented to help make the project more sustainable and contribute to achieving goals.

The long list of strategies is provided in Appendix D and covers each of the 23 goals established for the project. It is recognized that not all of these strategies may be feasible or desirable—the objective at this stage was to identify potential strategies for each goal, without focusing on if and how the strategy could be implemented. The assessment of strategies and screening against evaluation criteria will take place during Phase II in the development of the sustainability program.

6 Next Steps

The next step in the project is to assess the proposed strategies against the evaluation criteria, determine which strategies hold the most promise, identify costs and benefits and prioritize the strategies (Phase II). Once a final list of prioritized strategies is determined, detailed design and development of strategies will be undertaken (Phase III). The timing of each phase is shown in Figure 6.

Figure 6: Timing of Sustainability Program Phases



Appendix A

Green Highways Partnership Program

A1 Overview of Program

The Green Highways Partnership (GHP) is a voluntary, public/private initiative that seeks to incorporate environmental streamlining and stewardship into all aspects of the highway lifecycle and ensure that sustainability becomes the driving force behind infrastructure development. With its extensive network of environmental, industrial and governmental collaborators, GHP believes active cooperation and regulatory progressiveness are critical in moving beyond the current paradigm. By harnessing the power of the marketplace to build better, safer highways, GHP hopes to transform transportation.

The GHP provides resources and seeks to disseminate knowledge about different approaches for green highway design and construction. It promotes and supports pilot and demonstration projects and research initiatives that are considered innovative from a policy and practice perspective, efficient and cost effective and environmentally sound and protective. GHP intends to use these pilot and demonstration projects to inform the application of Green Highways principles to the work of rebuilding and sustaining the nation's highway infrastructure.

The Green Highways Partnership is supported by a growing list of partners, such as the National Asphalt Pavement Association, the Industrial Resources Council, the National Ready Mixed Concrete Association and the Conservation Fund. The three major partners that have been instrumental to the development of the GHP and have provided significant financial and staff support are the Environmental Protection Agency, the Federal Highway Administration and the Maryland State Highway Administration. The GHP is primarily active in the Mid-Atlantic region, but is seeking partners from across the country to expand its network.

A2 Rewards Recognition Program

The Green Highways Partnership is developing a Rewards Program that will recognize individuals and projects that embody the principles that the GHP promotes. The cash award, funded through private sector donations, will be presented to the champions of a featured project that a panel of judges determines to be an outstanding example of GHP characteristics.

GHP is in ongoing discussions with a global energy company that is interested in providing seed money to attract other businesses to fund the award. Close coordination with the AASHTO Center for Environmental Excellence will assure that duplication of effort will be avoided and that awards will be unique, substantive and based on integrated efforts that cross the Federal, State and NGO sectors. Its goal is to recognize collaborative achievements that epitomize the GHP philosophy.

To apply for the Rewards Program, an application form needs to be filled out along with a one page form explaining the project's scope, mission and strategy and a description of how the project embodies the mission of the GHP and is aligned with and promotes the goals of the GHP (http://www.greenhighways.org//how_to_apply.cfm).

Applicants must identify which of the following characteristics are addressed by the project:

- Provides net increase in environmental functions and values of the watershed
- Goes beyond minimum standards set forth by environmental laws and regulations
- Identifies and protects important historical and cultural landmarks
- Maps all resources in the area in order to identify, avoid and protect critical resource areas
- Uses innovative, natural methods to reduce imperviousness and cleanse all runoff within the project area
- Maximizes use of existing transportation infrastructure, provides multi-modal transportation opportunities and promotes ride-sharing / public transportation
- Uses recycled materials to eliminate waste and reduce the energy required to build the highway
- Links regional transportation plans with local land use through partnerships
- Controls populations of invasive species and promotes the growth of native species
- Incorporates post project monitoring to ensure environmental results
- Protects the hydrology of wetlands and streams channels through restoration of natural drainage paths
- Results in a suite of targeted environmental outcomes based upon local environmental needs
- Reduces disruptions to ecological processes by promoting wildlife corridors and passages in areas identified through wildlife conservation plans
- Encourages smart growth by integrating and guiding future growth and capacity building with ecological constraints

Appendix B

Best Practices

Presented below are three short case studies on highway projects that feature sustainability best practices. Much of the information has been obtained from project websites and related project reports.

B1 Case Study: A470 Road Improvement (UK)

The A470 serves as a strategic link between north and south Wales. The road is set within the Snowdonia National Park, a beautiful and environmentally-sensitive area in the Lledr Valley. The objective of the project was to improve safety and travel time by upgrading to modern trunk standards. The 4.5 mile scheme involved road widening and upgrading carried out in 2002 through a design-build contract.

The award-winning roadway has been dubbed the "greenest" road in the UK. To ensure environmental issues were adequately addressed throughout design and construction, an environmental management system (EMS) was developed, including an Environmental Action Plan (EAP) for specific commitments. All components of the plan were monitored daily. Formal audits were conducted to measure compliance against the EMS and continual improvements were implemented on site. The EMS was overseen by an Environmental Coordinator with a dedicated deputy stationed permanently on site to ensure all EAP commitments were implemented and appropriate mitigation measures provided. In addition, all team members signed a partnering charter to ensure they are all working towards the same objectives.

Some examples of sustainable approaches employed include:

Water: drainage designed to protect streams for pollutants; wide culverts to carry for intense storm flows beneath road

Materials/Waste: Used 33,000 tons of recycled aggregate; Retained existing pavement where possible; pavement removed was reused for sub-base of new road; no imported fill

Habitat: Conservation scheme for various species and habitats; bat hotel, otter passage

B2 Case Study: Tullamarine-Calder Freeway Interchange (Australia)

The project involves construction of new lanes and an interchange at the merger of 2 highways in Victoria, Australia. It was planned, designed and constructed under an Alliance agreement between VicRoads, Baulderstone Hornibrook and Parsons Brinckerhoff (TCI Alliance) in order to provide more flexibility in managing works to help reduce construction duration and traffic impacts. It is due for completion by mid-2007.

The project enables safer and easier merging between the two freeways, reduces traffic on local roads, helps to eliminate weaving maneuvers through fast-moving traffic and provides for noise protection from adjacent residents.

Commitment to environmental stewardship and sustainability is a central focus of the project. The Alliance has defined sustainability in its own terms as a means “to use innovation, engineering expertise and quality construction practices to build a safe free flowing freeway that minimizes the potential impact on the environment and local community both now and in the future.”

An ISO 14001 standard Environmental Management System was developed to manage the identification and control of environmental risks and opportunities for the project. An Environmental Policy has also been developed to guide the project[s approach to addressing environmental issues.

The project team has sought to investigate opportunities to minimize potential impacts on the local environment and community now and into the future. A number of environmental studies including flora and fauna, cultural heritage, air quality and noise surveys in order to identify appropriate controls for protection of the local environment.

Sustainability elements of the project include:

Water: Protecting drainage to local ponds and streams; reuse of water on-site

Energy: Solar panels have been incorporated into noise walls. The panels will generate up to 10% of the power demand for freeway lighting and annually offsets the emissions from 6 cars.

Materials/Waste: Targeting recycling 70% of waste; using recycled content construction materials

Habitat: Incorporating 66,000 native indigenous trees, shrubs and ground covers; minimizing removal of native vegetation

Communications: The project has an extensive website with project information, reports, maps, frequently asked questions and updates on construction progress, project news and travel times. Project information is also on display at a nearby shopping center, along with a booth staffed by project personnel. Members of the public can subscribe to receive regular project updates.

B3 Case Study: Karuah Bypass (Australia)

The Karuah Bypass Project is part of the 10-year, $2.2 billion Pacific Highway upgrade program in New South Wales which is aimed at improving the safety of the highway, reducing travel times and improving the amenity of communities along its route. The 6.2 mile, US$110 million freeway features two major interchanges and 11 bridges. The project crosses a mix of sensitive areas, including state forest, a nature reserve, wetlands, a major river, creeks, rural pastures and heritage sites. The environmentally-conscious approach to the project planning, design and construction has won awards including the New South Wales Case Earth Awards for Excellence in Civil Construction and the Banskia Foundation 2004 Winner in Environmental Leadership in Infrastructure & Services.

The project's twin bridges, each 0.5 miles long and weighing over 26 million pounds, were severed in two and incrementally launched across the Karuah River. The benefits of this approach included cost savings, reduced safety risks during construction, minimized environmental impact and construction footprint, increased control over quality and a more aesthetically pleasing bridge design.

An Environmental Management Plan was created for the project that looks at impact on local ecology, water quality, cultural heritage, resource use and waste management. Water quality, noise, dust and blast vibration monitoring was undertaken on a regular basis and summary reports were issued every 6 months.

Key sustainability features of the project included:

Habitat: Identified and protected trees that were potential habitats; replaced hollows with nest boxes; protected threatened flora species; used dedicated wildlife underpasses and fencing to guide wildlife; drainage designed to protect wildlife from storm flows

Water: Reused water on-site during construction; special storage areas for chemicals and oil; used construction techniques to minimize impact to wetlands; 24 drainage culverts built.

Materials/Waste: Reused materials and waste on-site

Cultural preservation: Archaeological sites of significance were salvaged and protected prior to and during construction, in close consultation with the Karuah Local Aboriginal Land Council.

Community Engagement: Given the environmentally-sensitive nature of the project location, it was crucial for the project team to involve the community in the planning, design and construction of the bypass. A Community Involvement Plan was developed to identify mechanisms to effectively disseminate information about the project to the community, encourage broad community support and ensure that key stakeholders were consulted during the project's design and construction. The project team worked with the community to balance a wide range of community and road user needs by

considering the best overall combination of social, ecological, engineering and cost factors. Efforts to communicate with the community included a community display centre at the main office complex which offers information on project design, construction activities, environmental management plans and local history. Other ways of keeping the community informed include an 1800 toll-free number, community liaison group, project website including webcam, progress updates in local newspapers, site tours, presentations to community groups, letterbox drops, community notice boards, liaison with property owners and a project mailing list.

Appendix C

Summary of Stakeholder Workshops

FINAL Workshop #1 Summary

date of meeting: 4/18/2007 ***location:*** San Francisco County Transportation Authority

subject: Doyle Drive Sustainability Workshop #1

attendees: San Francisco County Transportation Authority (the Authority): Lee Saage
Caltrans: Keyhan Moghbel, Nidal Tuqan
Golden Gate National Recreation Area/National Park Service (GGNRA/NPS): Lauren Castellini, Kristen Ward
NPS: Rick Foster
Presidio Trust (PT): Mark Helmbrecht
SPUR: Michael Alexander
Subcommittee Members: Will Alich (Presidio Historic Association), Janette Barroca (At-Large), Joan Girardot (Marina Civic Improvement & Property Owners Association), Norman Rolfe (San Francisco Tomorrow)
TAM: Eric Schatmeyer
Arup: Andrea Fernandez, John Karn
CirclePoint: Molly Graham, Jane Kruse, Ben Strumwasser
MPA Design: Michael Painter
PB: Kwong Chang, Gary Kennerley, Rob Malone

summary:

I. Welcome/Agenda Review

Lee Saage, the Authority, welcomed everyone and reviewed the agenda. The goal of the Sustainability Workshops is to solicit public participation and input in developing means and methods to incorporate sustainable features into the design, construction, and maintenance/operations of Doyle Drive – South Access to the Golden Gate Bridge project.

II. Overview of the Process for Developing a Sustainable Project - INFORMATION

John Karn, Arup, gave a brief overview of the sustainable features of the project to date, and Ben Strumwasser, CirclePoint, discussed the overall process for public input on developing a sustainable project.

III. Sustainability Overview: Developing a Sustainable Project - INFORMATION

Andrea Fernandez, Arup, presented the parameters for developing a sustainable project and provided sample vision statements, guiding principles and goals/objectives to initiate discussion.

IV. Provide Update on Developing a Sustainable Project - ACTION

After the presentation, Ben Strumwasser facilitated a brainstorming session on the vision statement, guiding principles and goals/objectives. The results of the sessions are broken down as follows:

Vision Statement

- Demonstrate that a highway can be safe and functional, while being environmentally-sensitive and responsive to its natural, historic setting
- Serve as a model for environmentally-responsible highway development
- Be developed in an environmentally-sound manner that is responsive to community concerns and meets functional requirements (Group was most in favor of this statement)

Terms to Consider

- Demonstrates long-term vision / aspiration
- Historic parkway
- "Parkway in a Park" concept

- Consider the project purpose while developing the Vision Statement (The purpose of the proposed project is to improve the seismic, structural, and traffic safety of Doyle Drive within the setting and context of the Presidio of San Francisco and its purpose as a National Park.)

Guiding Principles

Design

- Positive impact to the environment through design
- Promote beauty of surrounding area
- Environmental stewardship
- Enhance resources and environmental quality
- Respond to future conditions and opportunities
- Encourage longevity of design – potential future historic resource
- Consider future generations

Community

- Safety
- Cost: environmental and social impacts to the community
- Reduce impact to the community and the park
- Minimize the impact of the project on land and people
- Promote economic and social enhancements – meet future needs
- Consistent with local/regional policy – Presidio Trust / Golden Gate National Recreation Area
- Transparent public participation process

Operations & Maintenance

- Minimize park maintenance impact
- Cost: resources (materials) / operations & maintenance /decommissioning (removing)
- Support economic viability
- Passive maintenance / operations (i.e., passive ventilation vs. active fans)
- Drainage to function after facility is removed
- Assess impacts over time to allow ongoing improvements
- Easy to maintain

Natural Resources

- Decrease depletion of natural resources
- Use natural materials to enhance design
- Decrease impact and depletion on natural resources

Goals & Objectives

Design

- Improve aesthetic experience for park uses, motorists and neighbors
- Maximize lifespan of the facility
- Maximize transit accessibility
- Minimize stormwater runoff
- Primary stormwater treatment before disposing into the Bay
- Minimize noise from facility
- Minimize night sky pollution (fugitive light)
- Maximize green construction
- Maximize use of native plants and landscaping
- Net decrease in pollution
- Work in cooperation with Marin mass transit
- Consider setting measurable goals a certain percentage above the standards in the environmental document
- Passive tunnel ventilation

Construction

- Minimize construction zone / footprint
- Minimize construction impacts to the community and park
- Comprehensive reuse cycle during construction / use recycled materials where appropriate
- Decrease CO2 emissions by material use / choice
- Consider impacts associated with various construction materials
- Use recycled/recyclable materials

Maintenance & Operations

- Minimize maintenance and long-term costs
- Safe maintenance
- Minimize impact of maintenance

Energy

- Zero or positive energy and use / generation of facility
- Maintain or reduce energy consumption from automobiles
- Use energy efficient lighting

Park Setting

- Use minimal parkland acreage
- Create a beautiful roadway that is safe, environmentally correct and offers new views
- Increase visitor experience (use noise dampening)
- Decrease use of parkland from projection in FEIS/R
- Maximize habitat values/riparian corridor
- Maximize function of natural system
- Connect riparian corridor and future opportunities
- Change function of natural systems – find best case scenario
- Maximize natural processes

V. Next Workshops - ACTION

The next workshop is scheduled for Thursday, May 17 from 5 p.m. – 7 p.m. A “save the date” email will be emailed as a reminder.

VI. Adjournment

Distribution: *Meeting Attendees*

Final Workshop #2 Summary

date of meeting: 5/17/2007 ***location:*** San Francisco County Transportation Authority

subject: Doyle Drive Sustainability Workshop #2

attendees: San Francisco County Transportation Authority (the Authority): Lee Saage
Caltrans: Cristin Hallissy
Golden Gate National Recreation Area/National Park Service (GGNRA/NPS): Laura Castellini
Presidio Trust (PT): Mark Helmbrecht
SPUR: Michael Alexander, Chloe Good
Subcommittee Members: Becky Evans (Sierra Club), Gloria Fontanello (Marina Neighborhood Association), Tony Imhof (Cow Hollow Association), Redmond Kernan (At-large), Norman Rolfe (San Francisco Tomorrow), Jackie Sachs (At-large), Patricia Vaughey (At-large)
Arup: Andrea Fernandez, John Karn
CirclePoint: Molly Graham, Jane Kruse, Ben Strumwasser
MPA Design: Michael Painter, Darcie DeLashmutt
PB: Gary Kennerley

summary:

I. Welcome/Agenda Review

Lee Saage, the Authority, welcomed everyone and reviewed the agenda.

One attendee requested that the workshop summary include details of who makes each comment. The attendee voiced concern that this is not a sustainable project if it will increase the capacity of vehicles on the roadway.

The project team will continue with the process that has been implemented for summarizing the workshops.

II. Overview of the Process for Developing a Sustainable Project - INFORMATION

Ben Strumwasser, CirclePoint, gave a brief overview of the sustainable features of the project to date, and discussed the overall process for public input on developing a sustainable project.

III. Review Sustainability Workshop #1 Results - ACTION

Andrea Fernandez, ARUP, reviewed the results from Sustainability Workshop #1.

Comments on the Vision Statement

- Clarify the definition of a “parkway.”
- Concern that the project vision is narrow and does no reflect the past 17 years of work.
- Consider the following: “Develop the project as a model for design, construction and operation of sustainable roadways.”
- The vision statement is missing a timeframe; consider incorporating language detailing how the project must be built with the best product in a timely/cost efficient manner.

Comments on Guiding Principles

- Concern regarding increased automobiles in San Francisco neighborhoods.
- Consider impacts of global warming in developing the project.
- Consider a comprehensive analysis of first-cost versus life-cycle costs. There may be construction materials or methods that are more expensive, but are better for the environment. Consider paying a premium, even though life cycle costs may not be cheaper. If something ultimately achieves a higher level of sustainability, then it can be considered.

- Clarify definition of "cost." Is it in reference to the cost of building the roadway, or the cost of traffic on local neighbors.
- The following principle, the Project will incorporate sustainable solutions that are cost-effective across the design, construction, operation/maintenance and ultimate decommissioning of the parkway, does not adequately address how this project can be a model for other infrastructure projects. Another attendee commented that the project does not need to be a model and that the vision should just address the project.

Comments on Goals/Objectives

- Comments on Water
    - It is difficult to minimize stormwater runoff.
    - Consider changing language to "do the best we can for receiving waters" and strive to achieve a balanced solution.
    - The treatment plan for the stormwater runoff is still being developed.
    - The Regional Water Quality Control Board (RWQCB) supports the idea that the San Francisco sewer system handle the first flush of stormwater runoff, as it minimizes the need/size for a treatment facility within the national park.
    - Clarify RWQCB's position.
    - Consider treating water left over from the first flush on site in a natural and feasible way at project location.
    - Consider changing "Minimize stormwater runoff" to "Minimize water runoff."
    - A water treatment facility on site would cause a negative impact to parkland.

- Comments on Maximizing Energy Efficiency
    - This project will increase energy use with more automobiles on the road.
    - Be careful with the selection of the sustainable materials. Some products originally considered good for the environment are turning out to be harmful.

- Comments on Minimizing Carbon Emissions
    - Change "carbon" to "greenhouse gas."

IV. Provide Input on Developing Evaluation Criteria based on Guiding Principles - ACTION

Andrea Fernandez and Ben Strumwasser provided sample screening criterion:

- Does the strategy support the safety objectives of the project?
- Does the strategy require significant changes to the design?
- Is the technology/material proven and readily available?

The group then brainstormed additional ideas:

- Does the strategy reduce on-going costs and future maintenance efforts?
- Does the strategy distract from the design aesthetic?
- Does the strategy minimize impact on park resources (i.e. natural resources)?
- Is the strategy already covered by mitigation measures in the environmental document?
- Does the strategy align or contradict with what has been accepted in the environmental document?
- Does the strategy support environmental benefits?
- Does the strategy minimize destruction to neighborhoods?
- Does the strategy adversely affect traffic congestion?
- Does the strategy meet multiple goals?
- Does the strategy severely compromise one/multiple goals?
- Is the strategy the best "long-term" solution?
- Does the strategy lengthen the time of construction (and therefore increase the detours) or does it shorten the length of construction?
- Does the strategy have an impact on the phasing of the project?

Factors to consider when ranking criteria:
- How do the evaluation criteria contribute to achieving the sustainability goals?
- How do the evaluation criteria ease operations and maintenance?
- What is the cost effectiveness ratio of implementing this strategy?

V. Provide Initial Input on Sustainable Strategies - ACTION

Andrea Fernandez and Ben Strumwasser then solicited input from the group regarding Sustainability Strategies.

Michael Painter, MPA Design, provided a brief presentation of sustainability strategies to date, including:
- Roadway Reduction - 16% reduction in roadway width
    - 3 acres reduction in pavement
    - Road is narrower: 5 lanes are 11' versus 12' and inside shoulders are 4' versus 10'.
    - Benefits: reduces heat island and reduces material use
- Roadway Shading
    - Green roofs will shade 20% of the roadway in the tunnel segments - 5 acres of shade
    - Wide medians allow for tall trees to be planted so roadway shading can be accomplished from 4 rather than 2 edges. With tree height of 40', creates 8 acres of shade on the roadway
    - Benefits: reduces heat island effect, enhances aesthetics, supports local habitat

Sustainability Strategies to be considered include:
<u>Design</u>
- Minimize the exposing of concrete, steel or other constructed surfaces. Maximize green coverings.
- Minimize material in barriers
- Cover Palace of Fine Arts parking lot with a green/living roof for added park space
- Minimize mass in tunnels so structure exudes feeling of lightness
- Introduce natural light/air flow into tunnels
- Utilize solar panels to light the roadway
- Consider designing structure so it can last much longer than anticipated

<u>Construction</u>
- Consider utilizing a bidding process with incentive for finishing early
- Minimize footprint of construction zone
- Reduce time of construction
- Reuse, as practical, the material generated by deconstruction of existing roadway
- Balance cut and fill; recycle existing roadway
- Utilize permeable pavers and bioswales
- Utilize recycled materials and CO2 reduced cement/asphalt

<u>Traffic</u>
- Consider traffic impacts
- Reduce traffic through balance of bridge tolls and carpool requirements
- Reduce auto traffic in San Francisco
- Utilize bus & HOV lanes
- Facilitate use of public transit
- Develop project in conjunction with Geary BRT and its traffic impacts
- Use traffic calming measures (i.e. curved road)

<u>Noise</u>
- Minimize noise level during construction and after construction
- Lower noise
- Prioritize quiet paving
- Use new paving technologies that use recycled materials and reduce traffic noise
- Use trees as barriers
- Use silent piler system for pile driving during construction

<u>Landscape</u>
- Consider minimal or no use of grass

- Use species that absorb air pollutants/carbon emissions
- Use native plants
- Utilize treated stormwater for irrigation
- Use sand dune and plants below Main Post bluff
- Establish effective maintenance for the facility consistent with national park context

Other

- Video monitoring of entire road may speed emergency response and reduce cost
- Utilize highly directional roadway lighting to reduce light pollution
- Use solutions that achieve multiple purposes … example: solar panels on structural wall which also deflects noise (utilize strategies that serve dual purposes)
- Utilize planned Presidio Gray Water plant
- Work with other transportation officials so that the project can go forward without interference from anything/anyone

VI. Next Workshops - ACTION

The next workshop is scheduled for **Monday, June 11 from 5 p.m. – 7 p.m**. A "save the date" email will be emailed as a reminder.

ACTION ITEMS:

- Provide workshop attendees with a summary list of best practices and emerging technologies.

VII. Adjournment

Distribution: *Meeting Attendees*

Workshop #3 Summary

date of meeting: 6/11/2007 ***location:*** San Francisco County Transportation Authority

subject: Doyle Drive Sustainability Workshop #3

attendees: Golden Gate National Recreation Area/National Park Service (GGNRA/NPS): Laura Castellini, Rick Foster
Mayor's Office of Neighborhood Services: Summer Graham
Greater West Portal Neighborhood Association: Emeric Kalman
SPUR: Lori Armstrong-Mathieu, Michael Alexander
Subcommittee Members: Gloria Fontanello (Marina Neighborhood Association), Redmond Kernan (At-large), Jackie Sachs (At-large), Joan Girardot (Marina Civic Improvement & Property Owners Association)
Arup: Andrea Fernandez, John Karn, Doug Proulx
Caltrans: Cristin Hallissy
CirclePoint: Molly Graham, Jane Kruse, Ben Strumwasser
MPA Design: Michael Painter, Darcie DeLashmutt
PB: Gary Kennerley, Rob Malone

summary:

I. Welcome/Agenda Review

John Karn, Arup, welcomed everyone and reviewed the agenda.

II. Overview of the Process for Developing a Sustainable Project - INFORMATION

Ben Strumwasser, CirclePoint, gave a brief overview of the sustainable features of the project to date, and discussed the overall process for public input on developing a sustainable project.

III. Review Sustainability Workshop #2 Results - ACTION

Andrea Fernandez, Arup, reviewed the results from Sustainability Workshop #2.

Comments on the Vision Statement
- In favor of the revised Vision Statement.

Comments on Guiding Principles
- Clarify the plan for handling run-off.

Evaluation Criteria
- The evaluation criteria are separated into three categories: project delivery, technical feasibility and sustainability goals.
  ACTION: Follow up with information regarding technical studies on water run-off and send it to the group.
  ACTION: Inform the group when strategies are determined and the reasoning behind certain strategies being adopted or dismissed.
  ACTION: Circulate the qualifications/website necessary to qualify for the Green Highways Partnership.

IV. Provide Input on Developing Additional Sustainability Strategies

The group reviewed the draft sustainability strategies and provided the following feedback:

- Clarify the design of the road with respect to drainage and forces of gravity.
- The current design includes ponds that will be dry 24 hours after the end of a storm.
- Strategies to address stormwater pollution prevention and first flush are important elements of the sustainability plan.

Water

Goal #1: Minimize storm water runoff

Strategy: "Use Permeable pavement for shoulders of the road"
- Add language about the "first flush."

Strategy: "Develop response plan for handling spills / accidents"
- Further define the response plan.
- The project team is reviewing the plan for addressing spills/accidents and evaluating if there are ways to improve it.
- The Presidio has a response plan for water quality issues.
- Consider referencing the spill containment plan for Highway 280 by Crystal Springs Reservoir.

Goal #2: Improve water quality
- Consider sending first flush to the water treatment plant.

Goal #3: Minimize water use

Strategy: "Recycle stormwater from roadway for irrigation purposes"
- Minimize potable water use.
- Further define "recycling stormwater."
- Consider the maintenance implications of using recycled stormwater.
- Clarify the plans for a retention basin for stormwater. Reference the Study in Australia that addresses water in a sand dune/gravel area.

Strategy: "Landscape with drought resistant, native or adaptive plants"
- Use native plants.

Goal #4: Minimize construction dewatering to preserve groundwater

Strategy: "Use horizontal well system for dewatering"
- Clarify how a horizontal well system works.

Strategy: "Minimize depth of Girard extension to minimize dewatering and avoid damage to pilings"
- There is a delicate balance between minimizing dewatering and minimizing visual impacts.

Strategy: "Use driven piles (steel or concrete - where appropriate) to minimize groundwater drawdown and contamination"
- This must be evaluated with respect to the environmental document, since the project has already committed to not use pile driving.

Energy Efficiency

Goal #1: Maximize energy efficiency

Strategy: "Use skylights to provide natural daylight to tunnels"
- Spacing of skylights is important; avoid the flicker effect.

Strategy: "Use solar-powered lighting"
- Consider using solar power as a backup and/or combine it with a battery.

Strategy: "Identify area at higher elevation where water can be pumped efficiently for storage and then gravity-fed for irrigation"
- Consider moving to water the water section under Goal #3.

Goal #3: Minimize carbon emissions

Suggested Strategy: Add "Be responsive to congestion to reduce idling"

Strategy: "Purchase green tags (renewable energy certificates) to offset carbon emissions associated with electricity use"
- Renewable energy developers sell credits at 1.5 - 2 cents per kilowatt hour. The Authority should evaluate the potential for this.
- Confirm the project will receive power from the SFPUC.
- Caltrans (most likely) would purchase the green tags.
- Clarify if green tags are available to off-set emissions for uses other than electrical consumption.
- Green tags may not be appropriate for this evaluation.

Strategy: "Establish emissions standards or require electrification of construction equipment"

- Change "electrification" to "alternative fuel sources."

Habitat

Goal #1: Protect existing habitat

- Clarify to what extent the project will be responsible for protecting existing habitat and to what extent the contractor will be tasked with this.
- Clarify who will be responsible for implementation during each phase.

Strategy: "Don't remove trees or other habitat during nesting / breeding season"

- Change this language to: "Remove trees/vegetation prior to the nesting/breeding season."

Goal #2: Promote creation of new habitat

Strategy: "Restore habitat, including Crissy Fields & Tennessee Hollows"

- Change language from "Crissy Fields" to "Crissy Marsh."
- This is a very large scope; Qualify the language and consider: "contribute to" or "assist in the restoration of"
- Consider improving, not just replacing what is damaged. Move beyond the status quo.
- The Presidio nursery plants will be used for new vegetation.

Goal #3: Support wildlife corridors

Strategy: "Route selection to minimize disruption / segregation of wildlife corridors"

- Change "Route" to "Animal route"

Strategy: "Use sensors to determine animal presence and trigger low-voltage, LED-illuminated warning signs that reduce the posted speed limit and alert motorists to the presence of approaching wildlife"

- This does not sound practical.

Goal #4: Minimize light pollution

- Consider using the lowest acceptable level of lighting and providing light/glare shields.
- Avoid "light spots" but have uniform lighting across the road.
- Lighting could have significant effect on national design standards/modifications.
- Screen oncoming headlights.

Landscape

Goal #1: Foster restoration of native species

Strategy: "Consider minimal or no use of grass"

- Change language from "grass" to "non-native" or "turf."
- Request that Caltrans expand their standard planting palette.

Goal #2: Minimize construction footprint

Strategy: "Use systems such as Gilken to minimize area of disturbance"

- Giken is a quiet system that helps create a smaller construction footprint.

Strategy: "Conserve and reuse existing top soil"

- Use or remove existing top soil, depending on proximity to native topsoil.

Materials & Waste

Goal #1: Seek local material sources

Strategy: "Use locally sourced materials (500 mile radius)"

- Change language so it is less restrictive. Consider "seek regionally sourced materials" and delete "500 miles."
- Consider "minimize transportation energy use."
- Test/clean materials before doing backfill.

Goal #3: Apply life-cycle approach to material selection

Consider designing the structure for longer than 100 years, aim for something more like the Romans (thousands of years)

Strategy: "Use high efficiency mechanical ventilation systems that minimize lifetime energy use"

- Clarify "high efficiency;" Consider changing to "energy efficient."
- Mechanical vs. passive ventilation: clarify that the goal is to use passive ventilation, but mechanical systems will be evaluated if passive ventilation is not feasible.

Strategy: "Partner with university researchers to explore lifecycle costs of different construction materials"
- Change "partner" to "apply latest thinking/research" or "evaluate life cycle cost for materials."
- Materials/building techniques are limited, due to the fact that the project is being built in a marine environment. However, these elements should still be considered in the sustainability program.

Strategy: "Use paints, solvents with low volatile organic compounds"
- Think of the maintainability; consider "life-cycle cost of gassing."
- Consider minimizing use of paints that require high maintenance.

Goal #4: Maximize recycling and reuse of construction waste

Clarify location of landfill site(s).

Strategy: "Balance cut and fill on site so there is no off haul"
- Consider rephrasing this to: "Use as much of the material on site as much as possible to reduce off-haul."
- Change language to define it more clearly.

Strategy: "Shred / chip vegetation that is removed as part of construction and use on site for mulch"
- Add "non-native" or "non-invasive" before vegetation.

Community

Goal #2: Support healthy air quality

Strategy: "Filter air emissions coming from tunnel ventilation system"
- Delete this strategy.

Strategy: "Provide bike lanes and sidewalks / pedestrian paths"
- Bike lanes will not be a part of the facility.
- Add "on local streets" to the strategy (and not the main line).
- The Presidio's Bikeway and Trails Master Plan will be adopted.
- Acknowledge the difference between commute vs. recreation cyclists.

Goal #3: Enhance aesthetics and user experience

Strategy: "Use trees as barriers or forest buffer"
- Clarify this since trees will be used trees to screen the facility and in the landscaped median.
- Delete "landscape barriers," as the trees would shade/screen the roadways not be barriers.

Strategy: "Identify opportunities for public art"
- Make this language stronger; Wherever there are retaining walls, there are opportunities for art.
- Identify potential locations for public art.

Goal #5: Minimize impacts of traffic on neighborhoods

Strategy: "Improve pedestrian and bicycle connections"
- Add "on local streets"

Strategy: "Provide BRT/HOV lanes"
- Change language in strategy to "accommodate," or "do not preclude" and do not use "provide."
- Consider deleting "BRT".
- Clarify if Doyle Drive will impact Geary BRT or vice versa? Consider the Geary Transit Task Force Final Report (from 1990).
- Concern regarding 18 wheelers access during construction

Other Strategies

Strategy: "Develop Environmental Management System (accredited to ISO 14001)"
- Emissions— monitoring after construction (ex. dynamic signalization)
- If an environmental management system is used, then that will consider monitoring and maintenance.
- Consider documenting natural sound stage before and after construction.

Strategy: "Seek nomination for "Green Highways Reward" from Green Highways Partnership"
- Expand this. Include additional opportunities for taking a sustainable approach.

V. Next Steps/Implementation

- The project is still seeking additional funding.
- Timeline
  - Start construction in 2009; construction duration: 3.5 years.

VI. Adjournment (7:10PM)

Appendix D

Potential Sustainability Strategies

Appendix D: Potential Sustainability Strategies

WATER
1. Goal: Minimize storm water runoff
Use permeable pavement for shoulders of the road
Use permeable paving for surface parking
Restore and stabilize soil (soil amendments) to increase infiltration and subsurface storage
Map natural flow of water and minimize disruption to natural drainage patterns
Reestablish historic water flow patterns
Design tunnels to allow for subsurface water flows to be reestablished downstream
2. Goal: Improve water quality
Use bioretention, swales and ponding to filter and remove toxins from roadway stormwater, particularly first flush
Consider sending first flush to wastewater treatment facility
Use bioretention systems for surface parking lots
Use wetlands for stormwater treatment
Apply Best Management Practices (BMPs) for highway maintenance activities
Evaluate response plan for handling spills / accidents and strengthen plan as needed
Use best practices for erosion and sedimentation management and control
Develop environmentally-sensitive approach to pest/vegetation management
3. Goal: Minimize potable water use
Recycle stormwater from roadway for irrigation purposes
Use water from the planned Presidio Grey Water plant for irrigation
Landscape with drought-resistant, native or adaptive plants (as at Crissy field)
Use high-efficiency irrigation system
Use irrigation system with advanced irrigation controls (e.g., weather-sensitive)
4. Goal: Minimize construction dewatering to preserve groundwater
Use horizontal well system for dewatering
Minimize depth of Girard extension to minimize dewatering and avoid damage to pilings
Use driven piles (steel or concrete - where appropriate) to minimize groundwater drawdown and contamination
ENERGY
1. Goal: Maximize energy efficiency
Use natural ventilation in tunnels
Use solar panels integrated into berms, light posts, sound barriers, and other constructed elements to light tunnels at night
Use skylights to provide natural daylight to tunnels
Use solar-powered lighting
Use high efficiency fixtures for roadway lighting, such as LEDs or high-output fluorescents
Use day light sensors for lighting of tunnels based on amount of daylight penetration
Identify area at higher elevation where water can be pumped efficiently for storage and then gravity-fed for irrigation
Use high efficiency sump pump for tunnels and seek to minimize areas requiring sump pumps
2. Goal: Reduce heat island effect
Use trees in median with high shading potential
Use cool pavement and reflective materials to reduce heat island effect
Landscape the roofs of tunnels and parking sites (green roofs)

3. Goal: Minimize carbon emissions
Evaluate landscape species based on potential for carbon capture
Purchase green tags (renewable energy certificates) to offset carbon emissions associated with electricity use
Evaluate construction emissions standards or require construction equipment to be electric drive or use alternative fuels
Be responsive to congestion to reduce idling
HABITAT
1. Goal: Protect existing habitat
Remove trees/vegetation prior to the nesting / breeding season
Remove invasive weed species
2. Goal: Promote creation of new habitat
Participate in restoring and improving habitat, including Crissy Marsh & Tennessee Hollows
Maximize growth of vegetation in Tennessee Hollow by using glass blocks in elevated roadway
Use sand dune and plants below Main Post bluff
3. Goal: Support wildlife corridors
Minimize disruption / segregation of wildlife corridors
Use roof of tunnels and underside of bridges to provide wildlife corridors
Provide wildlife crossings (e.g., bridges, culverts, eco-ducts) and erect barriers to protect wildlife as needed
Incorporate landscape species that attract or provide refuge to wildlife
Create a vegetated berm/buffer or other light shield between the roadway and wildlife habitat
Restrict lighting in areas where it could impact wildlife - design to minimize light spill
4. Goal: Minimize light pollution
Use highly directional roadway lighting to reduce light pollution
Restrict lighting in areas where it could impact biodiversity
Utilize full cutoff fixtures to direct light and reduce light trespass
Install improved reflector systems and vertical lamps to direct light more effectively
Shield upwards-facing light fixtures for dark-sky benefits and utilize 100% of lumens for roadway illumination
Space roadway lighting appropriately with uniform height and suitable pole heights
Use lowest acceptable level of lighting and provide light/glare shields
Develop uniform lighting approach that avoids light spots
Screen oncoming headlights
LANDSCAPE
1. Goal: Foster restoration of native species
Use a high percentage of California native plants where possible including plants that are native to the Presidio or which are important components of adjacent existing Presidio.
Ensure all plantings will be compatible with Presidio standards and coastal drought resistant plants
Consider minimal or no use of non-native or turf grass
Use landscape species appropriate to various ecosystems, microclimate, riparian corridors across the site
2. Goal: Minimize construction footprint
Use systems such as Giken to minimize area of disturbance
Limit construction and staging areas to extent possible
Use or remove existing top soil , depending on proximity to native soil

MATERIALS & WASTE
1. Goal: Seek local material sources
Use regionally-sourced materials to minimize energy use associated with transportation
2. Goal: Maximize use of recycled, sustainable materials with low-embodied energy
Maximize use of recycled content (such as slag, fly ash, foundry sand, concrete/asphalt waste, glass cullet, scrap tires, plastic, etc.) in construction materials (fill, sub-base, drainage, concrete aggregate, etc.)
Consider embodied energy emissions in material selection
Use materials from sources that are rapidly renewable when possible
3. Goal: Apply life-cycle approach to material selection
Design structure for long life time
Use energy efficient mechanical ventilation systems that minimize lifetime energy use (if natural ventilation is not feasible)
Evaluate on life cycle basis materials that use energy or require regular repair, replacement and maintenance
Apply latest research on the lifecycle costs of different construction materials
Use paints, solvents and other materials that generate less volatile organic compounds over their lifetime
4. Goal: Maximize recycling and reuse of construction waste
Develop construction waste management plan and establish target for diversion from landfill
Use the material on site as much as possible to reduce off-haul
Shred / chip non-invasive vegetation that is removed as part of construction and use on site for mulch
Develop plan for on-site reuse of materials
COMMUNITY
1. Goal: Minimize noise
Design tunnel surfaces and sections to reduce noise
Use quiet pavement
Design roadway perimeters and barriers to reduce noise
Locate solar panels to serve as noise barriers
Use silent pilers by to reduce noise during construction
Use trees, berms, and green areas as noise barriers
Document current sound levels and use this as a baseline to reduce noise in future
2. Goal: Support healthy air quality
Use landscape species that absorb air pollutants
Provide bike lanes and sidewalks / pedestrian paths on local streets
Limit idle time for diesel engines when not in operation
3. Goal: Enhance aesthetics and user experience
Allow light through roadway as much as possible, for instance with glass blocks in roadway shoulders
Use green (planted) coverings for retaining walls and exposed surfaces
Minimize mass in tunnels so structure exudes feeling of lightness
Maintain low growing vegetation or line up trees to retain desirable views
Identify potential locations for public art
Use appropriate coatings in areas susceptible to vandalism, graffiti
4. Goal: Minimize use of parkland acreage
Refine balance between width of median and overall width of roadway

5. Goal: Minimize impacts of traffic on neighborhoods
Improve access to and accommodation of public transit
Improve pedestrian and bicycle connections on local streets
Design to accommodate (or not preclude) potential use of BRT/HOV lanes in the future
Develop transportation demand management program (e.g., tolls, carpool lanes)
Maintain existing accesses (e.g. access to recreation, side streets etc)
Use traffic calming measures
Use video monitoring of entire roadway to speed emergency response and reduce cost
Minimize disruption to neighborhoods from 18 wheelers accessing site
OTHER STRATEGIES
Design and implement an Environmental Management Plan during both the construction and operational phases
Develop Environmental Management System (accredited to ISO 14001)
Develop Emergency Response Plan
Develop indicators and targets for monitoring performance measurement
Seek nomination for “Green Highways Reward” from Green Highways Partnership or similar programs
Use construction bidding process with early termination reward
Develop plan for communicating and encouraging sustainable practices from design team and contractor
Require contractor to have experience in sustainable construction practices

Appendix E

Meeting Presentations

South Access to the Golden Gate Bridge

Doyle Drive

Sustainability Program

April 18, 2007

Agenda

- Welcome/Agenda Review
- Overview
- Developing a sustainable project
- Input
- Next steps & adjournment

2

Doyle Drive: What Have We Done So Far?

3

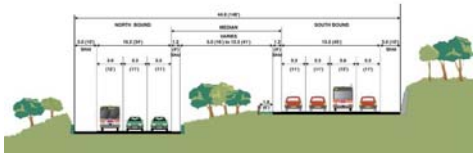
Preferred Alternative

- Identified preferred alternative based on stakeholder consensus

4

Preferred Alternative

- Respects natural contours
- Minimizes cutting, filling, and hauling
- Improves scenic views



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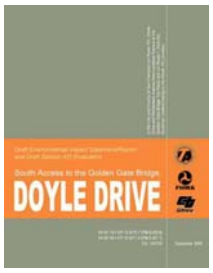
Draft Environmental Impact Statement / Report



Conceptual Mitigation Measures

- Stormwater runoff
- Traffic management plan
- Habitat protection
- Cultural resource protection

6

Doyle Drive Sustainability Program

7

Objective of the Program

To deliver a project that is sustainable in:

- **Design**
- **Construction**
- **Operations & maintenance**

8

Key Program Elements

- **Sustainability vision & goals**
- **Strategies – evaluate & prioritize**
- **Implementation & monitoring**
- **Assessing outcomes**

9

Developing the Program

- Project team will provide feedback at every phase of the process
- Input sought from Agency Committee, DD Citizen's Subcommittee, Transportation Authority CAC
- Approval & feedback from Authority and Caltrans (as needed)
- Public will be kept informed and involved

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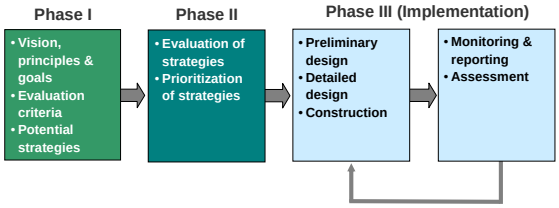
Key Sustainability Program Phases



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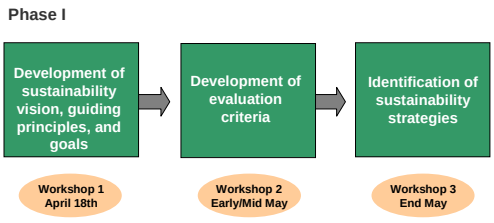
Sustainability Process Overview



12

Workshop No. 1

Purpose:

- **Provide project and sustainability program overview**
- **Describe process to develop sustainability program**
- **Obtain input on: vision, principles and goals**

13

Workshop No. 1

What do we mean by sustainability?

"Meeting the needs of the present generation without compromising the ability of future generations to meet their own needs."

Our Common Future, Brundtland Commission, 1987

14

Sustainable Highways

Meeting functional requirements

+ Environmental stewardship

+ Being responsive to community concerns

= Sustainable Highways

15

Developing a Sustainable Project

Our Inspiration

- Sustainability frameworks: USGBC LEED & Equator Principles
- Federal & State agency plans & policies
- Regional & local plans & policies (eg, SF Sustainability Plan, GGNRA EMS, Presidio Trust plans & goals, etc.)
- International best practices

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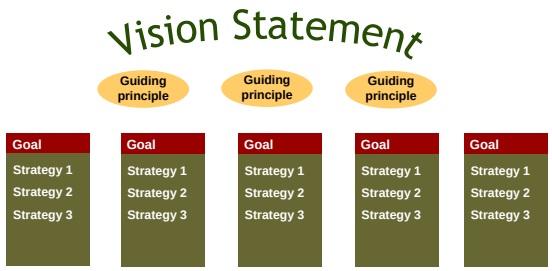
Developing a Sustainable Project



17

Developing a Sustainable Project

Vision Statement

- What is the long term vision for the project?
- What should it aspire to?

18

Developing a Sustainable Project

Guiding Principles

- Provide overarching framework that guide the development of goals and strategies
- What values and considerations should guide the development of the project?

19

Developing a Sustainable Project

Goals

- What do we want to achieve?
- Ends (goals) vs. means (strategies)

20

Developing a Sustainable Project

Discussion

- Vision
- Principles
- Goals

21

Vision

The Doyle Drive Replacement Project will:

- Demonstrate how a highway can be safe and functional, while being environmentally-sensitive and responsive to its natural, historic setting
- Serve as a model for environmentally-responsible highway development
- Be developed in an environmentally-sound manner that is responsive to community concerns and meets functional requirements

22

Guiding Principles

The Project will seek sustainable solutions that:

- ***Economic viability*** – Balance lifecycle approach against need to minimize added costs
- ***Environmental stewardship*** – Responsibly utilize natural resources
- ***Safety*** – Uphold standards of safety

23

Developing a Sustainable Project

The sustainability goals of the project are to:

- Minimize energy consumption and emissions
- Minimize generation of waste

24

Next Steps

- **Next Workshops**
  - Develop evaluation criteria
  - Develop sustainability strategies
- **Report on Workshop No. 1**
  - Vision
  - Principles
  - Goals

25

South Access to the Golden Gate Bridge

Doyle Drive

Sustainability Program

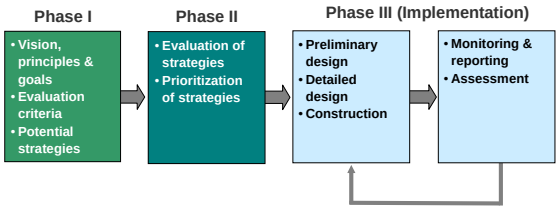
May 17, 2007

Agenda

- Welcome/Agenda Review
- Overview
- Developing a sustainable project
- Review results from Workshop #1
- Obtain input on evaluation criteria & strategies
- Next steps & adjournment

2

Key Sustainability Program Phases



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Sustainability Process Overview

Phase I

Development of sustainability vision, guiding principles, and goals → Development of evaluation criteria → Identification of sustainability strategies

Workshop 1 April 18th | Workshop 2 May 17th | Workshop 3 End May

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Developing a Sustainable Project

Vision Statement

Guiding principle | Guiding principle | Guiding principle

Goal	Goal	Goal	Goal	Goal
Strategy 1	Strategy 1	Strategy 1	Strategy 1	Strategy 1
Strategy 2	Strategy 2	Strategy 2	Strategy 2	Strategy 2
Strategy 3	Strategy 3	Strategy 3	Strategy 3	Strategy 3

5

Workshop No. 1 Results

Sustainability Vision

Designed as a "Parkway in a Park", the vision for the Doyle Drive Replacement is to develop the project in an environmentally-sound manner that is responsive to community concerns and meets functional requirements.

6

Workshop No. 1 Results

Principles

The Project will incorporate sustainable solutions that:

- **Integrate natural elements, processes and passive design strategies**
- **Protect and enhance environmental resources and the beauty of the surrounding area**
- **Ensure the Project will be a "good neighbor" to the local community**

7

Workshop No. 1 Results

Principles *(continued)*

- **Are cost-effective across the design, construction, operation/maintenance and ultimate decommissioning of the parkway**
- **Are consistent with the project purpose and local and regional policies**

Over the life of the facility, future sustainable design strategies and technologies will be evaluated and incorporated where appropriate.

8

Workshop No. 1 Results

Goals

The goals for design, construction, and operation/maintenance are:

Water

- **Minimize stormwater runoff**
- **Improve water quality**
- **Minimize water use**
- **Minimize construction dewatering to preserve groundwater**

Energy

- **Maximize energy efficiency**
- **Reduce heat island effect**
- **Minimize carbon emissions**

9

Workshop No. 1 Results

Goals *(continued)*

Habitat

- Protect existing habitat
- Promote creation of new habitat
- Support wildlife corridors
- Minimize light pollution

Landscape

- Minimize stormwater runoff
- Foster restoration of native species

10

Workshop No. 1 Results

Goals *(continued)*

Materials and Waste

- Seek local material sources
- Maximize use of recycled, sustainable materials with low-embodied energy
- Apply life-cycle approach to material selection
- Maximize recycling and reuse of construction waste

Community

- Minimize noise
- Support healthy air quality
- Enhance aesthetics and user experience
- Minimize use of parkland acreage
- Minimize impacts of traffic on neighborhoods
- Improve access to and accommodation of transit

11

Workshop No. 2

Workshop Purpose:

- Seek input on criteria that will be used to evaluate sustainability strategies
- Brainstorm potential strategies

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Evaluation Criteria

- Objective: Establish the basis upon which sustainability strategies are assessed
- Enables more rationale approach to justify selection of strategies
- Serves to screen and prioritize strategies

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Evaluation Criteria

Screening criteria

- Minimum requirement
- Yes/no (pass/fail) screen

Examples:

Does the strategy support the safety objectives of the project?

Does the strategy require significant changes to the design?

Is the technology/material proven & readily available?

14

Evaluation Criteria

Ranking criteria

- Used to assess merits or impacts of each strategy
- Differentiates strategies relative to the benefits they bring to a project

Examples:

Contribution to achieving goal

Ease of operation & maintenance

Cost effectiveness ratio

15

Evaluation Criteria

Energy

Goal: Maximize energy efficiency	Evaluation
Strategy: Use natural light and air flow through tunnels	
Screening criteria	Yes/No
Criteria 1: Does the strategy support the safety objectives of the project?	Y
Criteria 2: Does the strategy require significant changes to the design?	N
Criteria 3: Is the technology/material proven & readily available?	Y
Ranking criteria:	
Criteria 1: Contribution to achieving goal	Significantly contributes to improving energy efficiency. Estimated energy use reduction of 22%.
Criteria 2: Ease of operation & maintenance	Requires no O&M and reduces overall O&M costs.
Criteria 3: Cost effectiveness ratio	Lifetime energy use reduction of $26 for every dollar invested.

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Evaluation Criteria

Feedback & Input: Screening Criteria

- Does the strategy support the safety objectives of the project?
- Does the strategy require significant changes to the design?
- Is the technology/ material proven & readily available?

17

Evaluation Criteria

Feedback & Input: Ranking Criteria

- Contribution to achieving goal
- Ease of operation & maintenance
- Cost effectiveness ratio

18

Sustainability Strategies

- **What strategies could be implemented to make the project more sustainable?**
- **Strategies could include policies, programs, technologies and other initiatives**
- **Review of strategies implemented to date**

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Sustainability Strategies

Strategies implemented to date

- **Roadway Reduction - 16% reduction in roadway width**
  - 3 acres reduction in pavement
  - Road is narrower: 5 lanes are 11' versus 12' and inside shoulders are 4' versus 10'.
  - Benefits: reduces heat island and reduces material use

20

Sustainability Strategies

Strategies implemented to date

- **Roadway Shading**
  - Green roofs will shade 20% of the roadway in the tunnel segments - 5 acres of shade
  - Wide medians allow for tall trees to be planted so roadway shading can be accomplished from 4 rather than 2 edges. With tree height of 40', creates 8 acres of shade on the roadway
  - Benefits: reduces heat island effect, enhances aesthetics, supports local habitat

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Sustainability Strategies

Promising Strategies

- Natural light and airflow in tunnels
- Solar panels on roadway
- Permeable pavers & bioswales
- Use treated stormwater for irrigation
- Silent piler system for pile driving during construction

22

Sustainability Strategies

Brainstorming

- **Objective is to identify a long list of potential strategies**
- **Don't focus on if and how strategy could be implemented**
- **Think about ideas that apply during design, construction, operation stages**

23

Next Steps

- **Next Workshop**
  - Report on evaluation criteria and initial strategies
  - List and identify further sustainability strategies
  - Set meeting date

24

South Access to the Golden Gate Bridge

Doyle Drive

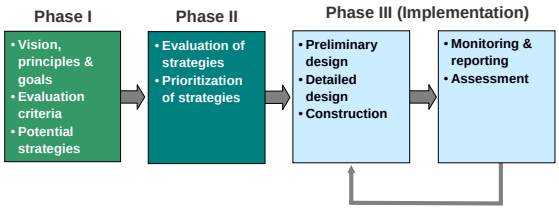
Sustainability Program

June 11, 2007

Agenda

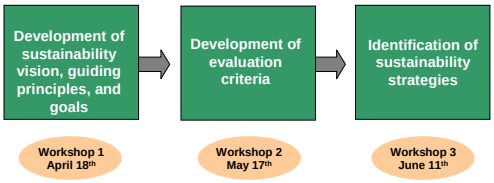
- Welcome/Agenda Review
- Overview
- Review Results from Workshop #2
- Input on Developing Additional Sustainability Strategies
- Next Steps & Adjournment

Key Sustainability Program Phases



Sustainability Process Overview

Phase I



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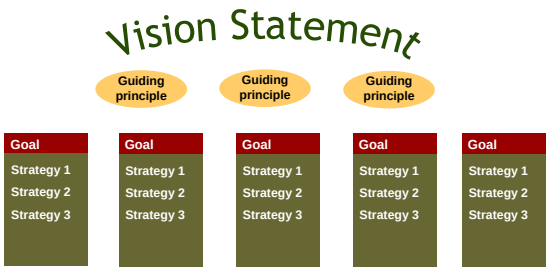
Developing a Sustainable Project



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Workshop No. 2 Results

Sustainability Vision

Designed as a "Parkway in a Park", the vision for the Doyle Drive Replacement Project is to:

Develop the project as a national model for design, construction and operation of sustainable roadways that is responsive to community needs, sensitive to its unique setting, and meets functional requirements.

6

Workshop No. 2 Results

Principles

The Project will incorporate sustainable solutions that:

- Integrate natural elements, processes and passive design strategies
- Protect and enhance environmental resources and the beauty of the surrounding area
- Ensure the Project will be a "good neighbor" to the local community

7

Workshop No. 2 Results

Principles *(continued)*

The Project will incorporate sustainable solutions that:

- Incorporate a life-cycle approach across the design, construction, operation/maintenance and ultimate decommissioning of the parkway
- Are consistent with the project purpose and local and regional policies

Over the life of the facility, future sustainable design strategies and technologies will be evaluated and incorporated where appropriate.

8

Workshop No. 2 Results

Goals

The goals for design, construction, and operation/maintenance are:

Water

- Minimize surface water runoff
- Improve water quality
- Minimize water use
- Minimize construction dewatering to preserve groundwater

Energy

- Maximize energy efficiency
- Reduce heat island effect
- Minimize greenhouse gas emissions

9

Workshop No. 2 Results

Goals *(continued)*

Habitat

- Protect existing habitat
- Promote creation of new habitat
- Support wildlife corridors
- Minimize light pollution

Landscape

- Foster restoration of native species
- Minimize construction footprint

10

Workshop No. 2 Results

Goals *(continued)*

Materials and Waste

- Seek local material sources
- Maximize use of recycled, sustainable materials with low-embodied energy
- Apply life-cycle approach to material selection
- Maximize recycling and reuse of construction waste

Community

- Minimize noise
- Support healthy air quality
- Enhance aesthetics and user experience
- Minimize use of parkland acreage
- Minimize impacts of traffic on neighborhoods
- Improve access to and accommodation of transit

11

Workshop No. 2 Results

Evaluation Criteria Categories:

- Project Delivery
- Technical Feasibility
- Sustainability Goals

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Workshop No. 2 Results

Evaluation Criteria:

Project Delivery

- Impact on Project Timetable or Phasing
- Consistent with Environmental Documentation
- Cost Benefit

13

Workshop No. 2 Results

Evaluation Criteria:

Technical Feasibility

- Availability and Reliability of Technology
- Impact on Safety
- Impact on Functionality

14

Workshop No. 2 Results

Evaluation Criteria:

Sustainability Goals

- Impact on Natural Resources and the Environment
- Impact on Operations & Maintenance
- Impact on Design Aesthetic
- Impact on Local Neighborhoods
- Ability to Support Multiple Goals

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Workshop No. 3

Developing Sustainability Strategies:

- Review Findings from Sector Research
- Review Sustainability Strategies Proposed in Workshop #2
- Provide Additional Definition and Input on Strategies
- Discuss Next Steps & Implementation of the Sustainability Program

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Workshop No. 3

Research Findings:

Green Highways Partnership

- EPA/FHWA joint initiative
- Promote pilot and demonstration projects
- Encourage partnerships & provide recognition
- Disseminate knowledge

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Workshop No. 3

Case Study: A470 Road Improvement

- 4.5 mile road widening in Lledr Valley, Wales
- Award-winning, dubbed "greenest" road in the UK
- Environmental Management System with Action Plan for commitments
- All team members signed partnering charter

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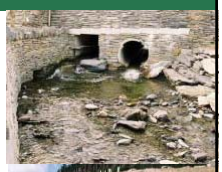
Workshop No. 3

Case Study (continued)

- **Water:** drainage designed to protect streams for pollutants; wide culverts to carry for intense storm flows beneath road
- **Materials/Waste:** Used 33,000 tons of recycled aggregate; Retained existing pavement where possible; pavement removed was reused for sub-base of new road; no imported fill
- **Habitat:** Conservation scheme for various species and habitats; bat hotel, otter passage



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Workshop No. 3

Case Study: Tullamarine-Calder Freeway Interchange

- New lanes and interchange at merger of 2 highways, Victoria, Australia
- Environmental Management System and Policy
- Defined sustainability as a means "to use innovation, engineering expertise, and quality construction practices to build a safe free flowing freeway that minimizes the potential impact on the environment and local community both now and in the future."

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Workshop No. 3

Case Study (continued)

- **Water:** Protecting drainage to local ponds and streams; reuse of water on-site
- **Energy:** Solar panels incorporated into noise wall
- **Materials/Waste:** Targeting recycling 70% of waste; using recycled content construction materials
- **Habitat:** Incorporating 66,000 native indigenous trees, shrubs and ground covers; minimizing removal of native vegetation

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Workshop No. 3

Case Study: Karuah Bypass

- 6.2 mile long freeway project north of Sydney, Australia on the Pacific Highway
- Crosses state forest, nature reserve, wetlands, a major river, creeks and rural pastures
- Environmental Management Strategy looks at impact on local ecology, water quality, cultural heritage, resource use and waste management.

22

Workshop No. 3

Case Study (continued)

- **Water:** Reused on-site during construction; special storage areas for chemicals and oil; used construction techniques to minimize impact to wetlands
- **Materials/Waste:** Reused materials and waste on-site
- **Habitat:** Identified and protected trees that were potential habitats; replaced hollows with nest boxes; dedicated wildlife passages; drainage protects wildlife from storm flows

23

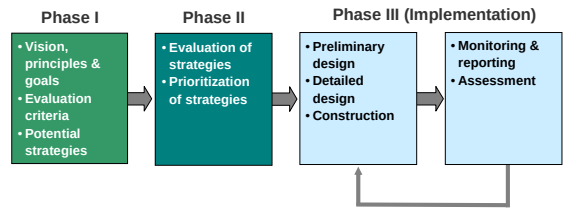
Sustainability Strategies

Discussion

- Water
- Energy
- Habitat
- Landscape
- Materials & Waste
- Community
- Other Strategies

24

Next Steps



Spring 2007 → Summer 2007 → Summer 2007 and beyond

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Workshop No. 3

Thank you for your contribution to the Doyle Drive Project Sustainability Program!

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