



Midpeninsula Regional  
Open Space District

R-14-76  
Meeting 14-11  
April 23, 2014

## AGENDA ITEM 7

### AGENDA ITEM

Harkins Bridge Replacement

### GENERAL MANAGER'S RECOMMENDATION

A handwritten signature in black ink, appearing to be "S. J. ...".

Approve the Planning and Natural Resources Committee's recommendation that a prefabricated truss bridge is the preferred option to replace the Harkins Bridge in Purisima Creek Redwoods Open Space Preserve.

### SUMMARY

As part of the FY2014-15 Action Plan, the Board approved the design, engineering and permitting required to replace the Harkins Bridge in Purisima Creek Open Space Preserve. On April 15, 2014, the Planning and Natural Resources Committee approved a prefabricated truss bridge design and recommended this design for full Board approval prior to contracting with Questa Engineering for the design, engineering and permitting of the bridge. A Board decision early in the design process about the basic type of bridge to be constructed will enable the design process to proceed more efficiently and cost effectively.

### DISCUSSION

The Harkins Bridge is located in the lower portion of the Purisima Creek watershed within a minute's walk from the lower parking lot. It provides an important trail crossing at Purisima Creek that connects two halves of the preserve. It is currently not passable by emergency vehicles due to the condition of the bridge. The choice of a basic design to replace the bridge has fiscal, aesthetic and environmental considerations.

There are four basic options for replacing the Harkins vehicle bridge: railcar, concrete arch, I-beam, and prefabricated truss bridges.

#### Railcar Bridges

*Pros:* Rail car Bridges are a cost effective means to provide a substantial steel bridge. All the other bridges in Purisima are rail car bridges so a new bridge would have a consistent look.

*Cons:* Railcars are not designed as bridges. A principal shortcoming is the thickness of the structural beams (girders). When designing this type of bridge, there is a tradeoff between placing the bottom of the girders too close to the stream, causing rust or potential blockage

during a storm event, or raising the bridge and importing fill to elevate the road approach. While the girders are often rated to 120,000lbs or more, the lateral cross-beams are less durable and subject to rust and failure over time. Railcars are also narrow, typically nine feet, which makes just one railcar unsuitable for new width requirements. The two railcars needed to build the minimum 14 foot wide bridge result in a bridge much wider than necessary. See Attachment A1, Harkins Bridge.

### Concrete Arch Bridges

*Pros:* Concrete arch bridges are commonly used by Caltrans and other public works agencies for their durability and value engineering. The decreased maintenance and increased durability make concrete arches the most cost effective type of bridge over its lifespan.

*Cons:* Concrete bridges are the most expensive option for initial construction. A concrete arch bridge does not fit with the aesthetic of a preserve trail bridge because it has the look of urban roadway infrastructure. In addition, the shorter the span the more the walls of the arch constrain the natural flow of the creek. Permitting is more difficult because the arch tends to constrain creek flow and they are rarely the preferred alternative of regulatory agencies. Longer spans solve this problem but cost more and require additional fill to fit the road approach. See Attachments B and B1, Bridge Alternatives.

### “T” Beam Bridge

*Pros:* “T” beam bridges are made of large “T” beams that are fixed to the abutments and a custom superstructure is built on top. A contractor built a bridge with an “T” beam design below the Red Barn over La Honda Creek in La Honda Creek Preserve. They are cost-effective, easy to construct, and durable.

*Cons:* The profile of the bridge, like a railcar, is very thick, because the entire weight rests on the girders. Since the beams are thick like a rail car it has the same issues, causing either stream blockage or an elevated design. (See Attachments B2-B5)

### Prefabricated Truss Bridges (Recommended)

*Pros:* Truss bridges use the entire structure of the bridge to support the weight of the bridge. They feature an elevated structure, where the railing is normally attached, that braces the bridge for lateral and vertical loads. This minimizes the thickness of the girders and therefore reduces the height of the approach, the need for fill, and the scale of the abutments.

*Cons:* The downside is that the above-deck structure needs modification to meet the requirements for railings and aesthetically fit in with the look of the preserve. A good example of this type of bridge is at the El Corte de Madera Trail. (See Attachments B6-8, C, and C3 for examples for truss bridges.)

## Summary of Design Options

<b>Bridge Type</b>	<b>Pros</b>	<b>Cons</b>
<b>Railcar</b>	Cost Effective	Requires Two Cars for min.14'Width
Estimated Cost: \$500,000	Strong	Vegetation Removal
	Similar Aesthetics	More Imported Fill
	Any Railings	Cross-beam failure may occur in 30 years
<b>Concrete Arch</b>	Extremely Durable	More Imported Fill
Estimated Cost: \$583,000	Strong	Not Aesthetically Pleasing
	Value Engineering	Constrains Creek
	Any Railings	Expensive
<b>Prefabricated Truss</b>	Durable	Above Deck Structure
Estimated Cost: \$544,000	Customizable	Fewer Railing Options
	Less Imported Fill	Upfront Costs
<b>"I" Beam Bridge</b>	Strong	More Imported Fill
Estimated Cost: \$544,000	Any Railings	Thick Profile
		Upfront Costs

Staff recommends pursuing the prefabricated truss bridge for the Harkins Bridge replacement project with Questa Engineering.

The truss style of prefabricated bridge is affordable, easy to construct, and is already used on District lands. It does have some aesthetic limitations. Standard District railing designs will have to be modified to accommodate the style and construction of the trusses. The prefabricated truss bridge has the smallest visual footprint and at this stage in the analysis seems to be the environmentally preferable alternative. For these reasons, staff recommends pursuing the prefabricated truss bridge option.

### **FISCAL IMPACT**

Accounting for all project costs, vehicle bridges of the type under consideration may cost from \$500,000 to \$600,000. These costs break down into roughly 20% design/engineering, 10% permitting, and 70% construction. \$110,000 is budgeted in FY2014-15 for the Harkins bridge replacement. This total includes \$85,000 for design and engineering with Questa Engineering and \$25,000 for permits. The remainder of costs, primarily for construction, are estimated between \$390,000 and \$435,000, and would be carried in FY2015-16.

\$37,540 was spent in FY2013-14 on District-wide bridge site assessments, technical memorandums, and a topographic survey for the Harkins Bridge site.

### **BOARD COMMITTEE REVIEW**

On April 15, 2014, the Planning and Natural Resources Committee approved recommending to the Board that a prefabricated truss bridge is the preferred option to replace the Harkins Bridge in Purisima Creek Redwoods Open Space Preserve (draft minutes provided as Attachment D).

## **PUBLIC NOTICE**

Public notice was provided as required by the Brown Act. Adjoining owners within 500 feet of the Higgins Canyon Road preserve entrance were notified.

## **CEQA COMPLIANCE**

A previous biological assessment, done in 2011 for the proposed parking lot at the same site, will form the basis of an Initial Study. Until a bridge alternative is selected and the Project under CEQA is defined, staff cannot make a CEQA recommendation. Based on what is known today, staff anticipates using a categorical exemption under section 15302 (“Replacement or Reconstruction”).

## **NEXT STEPS**

Following the Board’s approval of the type of bridge, the District will enter into a contract with Questa Engineering under the prior Board authorization to use their services to design, engineer and permit the bridge. Staff and Questa will complete 50% designs, schedule a pre-consultation meeting with the agency stakeholders, and apply for environmental permits. These initial permits do not require specific designs for railings. Staff will return to the Planning and Natural Resource Committee in approximately six months with a recommendation for the type of railing.

Once the project is approved by the regulatory agencies, Questa will complete 90% designs (including railings), apply for building permits, and staff will take the construction out to bid. The contract for construction will go to the Board for approval. Construction is anticipated for the fall of 2015. However, the timeline is highly dependent on the permit process.

### **Attachments**

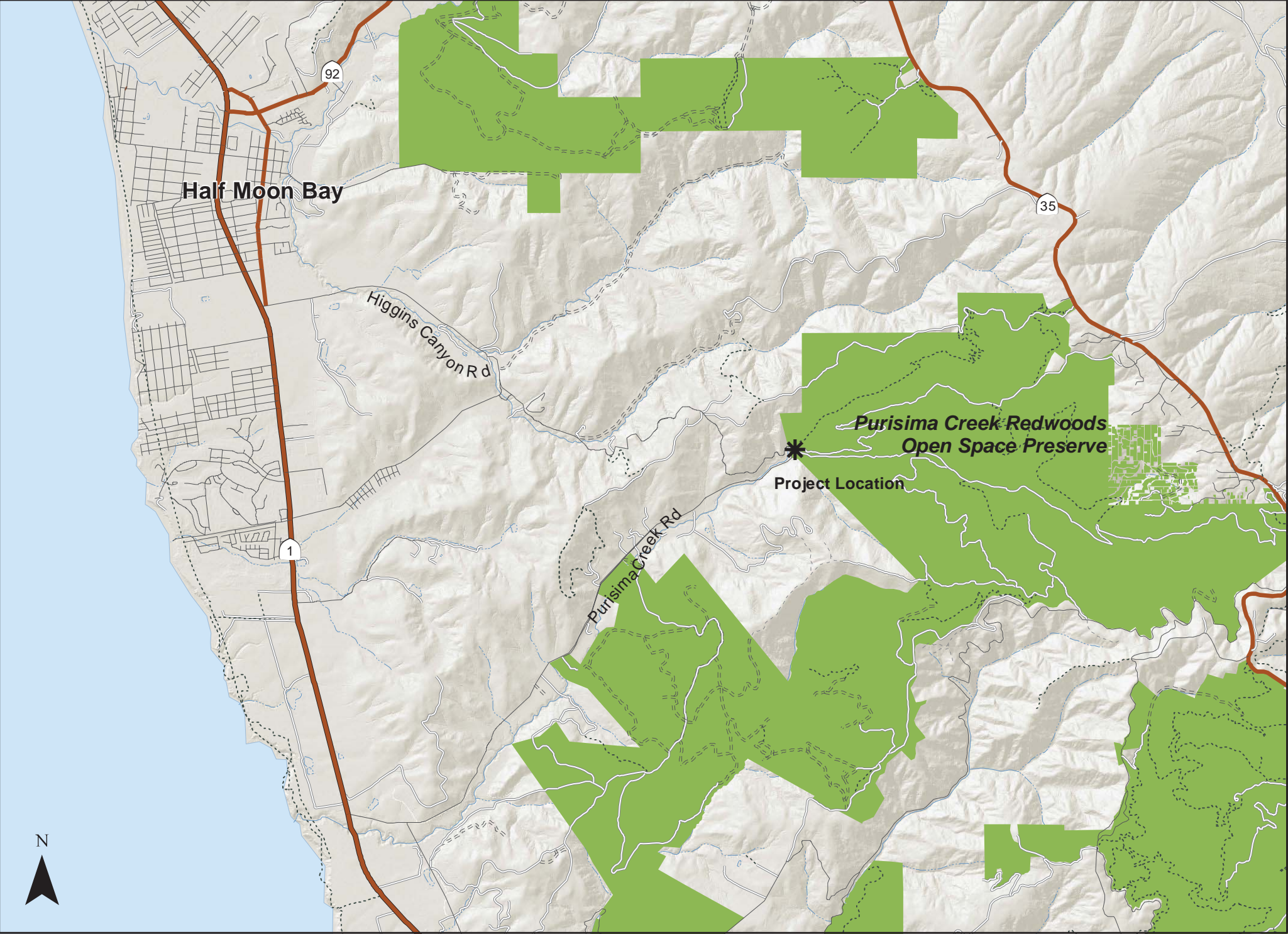
- A. Harkins Site Map and Pictures
- B. Bridge Alternatives
- C. Railings Alternatives
- D. Planning and Natural Resources Committee Meeting Draft Minutes for April 15, 2014

Responsible Department Head:  
Michael Newburn, Acting Operations Manager

Prepared by:  
Aaron Hébert, Contingent Project Manager

Planning and Natural Resource Committee Members:  
Director Yoriko Kishimoto  
Director Jed Cyr  
Director Curt Riffle

# Exhibit A: Project Map and Picture



Half Moon Bay

92

35

1

Higgins Canyon Rd

Purisima Creek Rd

Purisima Creek Redwoods  
Open Space Preserve

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Project Location

N

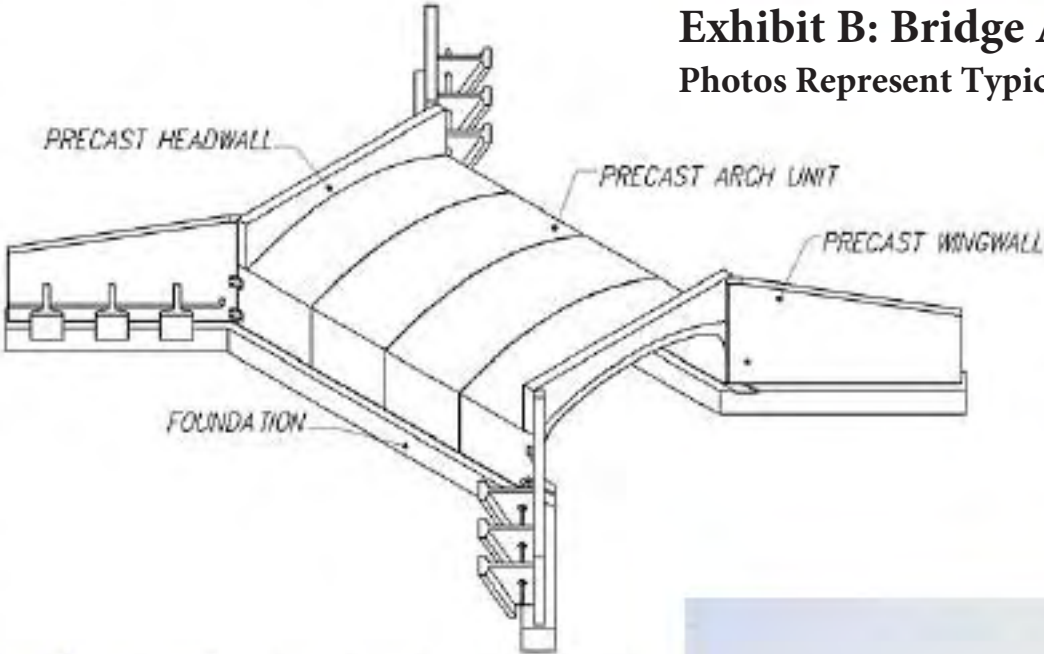


## Exhibit A1: Harkins Bridge and Railcar Typical





**Exhibit B: Bridge Alternatives**  
Photos Represent Typical, Not Actual Site



**Concrete Arch Bridge Typical**





**Exhibit B1: County Arch Bridge 1000' downstream of Harkins**





**Exhibit B2: I-Beam Bridge Typical**



## Exhibit B3: I-Beam Bridge on Cathermole Road in Sierra Azul







**Exhibit B4: MROSD 2000 I-Beam  
Bridge on La Honda Creek**



**Exhibit B5: MROSD 2000 I-Beam Bridge on La Honda Creek**





## Exhibit B6: Vehicle Truss Bridge Typical





Exhibit B7: Prefabricated Vehicle Truss Bridge at Cowell-Purisima Trail (POST)





Exhibit B8: Prefabriacted Vehicle Truss Bridge at Cowell-Purisima Trail (POST)





Exhibit C: Railings Alternatives Non-vehicle truss bridge on ECDM trail





Exhibit C1: New Redwood and Welded Wire Mesh at Alpine Pond





Exhibit C2: Welded Wire Mesh Detail





Exhibit C3: Prefabricated Truss Bridge with Manufacturer Installed Railings





Midpeninsula Regional  
Open Space District

SPECIAL MEETING

PLANNING AND NATURAL RESOURCES COMMITTEE  
**MIDPENINSULA REGIONAL OPEN SPACE DISTRICT**

Administrative Office – Board Room  
330 Distel Circle  
Los Altos, CA 94022

April 15, 2014

DRAFT MINUTES

**I. ROLL CALL**

Chair Cyr called the Special Meeting of the Planning and Natural Resources Committee to order at 2:02 p.m.

**Members Present:** Jed Cyr, Yoriko Kishimoto, and Curt Riffle

**Members Absent:** None

**Staff Present:** Assistant General Manager Kevin Woodhouse, General Counsel Sheryl Schaffner, Acting Operations Manager Michael Newburn, Skyline Superintendent Brian Malone, Operations Project Manager Aaron Hébert, Planner III Gina Coony, and District Clerk Jennifer Woodworth

**II. ORAL COMMUNICATIONS**

There were none.

**III. ADOPTION OF AGENDA**

**Motion:** Director Riffle moved, and Director Kishimoto seconded the motion to adopt the agenda.

VOTE: 3-0-0

**IV. COMMITTEE BUSINESS**

**1. Approval of Minutes**

**August 27, 2013**

**February 18, 2014**

**Motion:** Director Cyr moved, Director Riffle seconded the motion to approve the minutes, as amended.



VOTE: 3-0-0

## **2. Harkins Bridge Replacement (R-14-73)**

Operations Project Manager Aaron Hébert described the current state of the Harkins Bridge, its current uses and location in the Purisima Creek Redwoods Open Space Preserve. Mr. Hébert described various types of bridges the District could use to replace the Harkins Bridge, including concrete arch, railcar, I-beam, and prefabricated truss. Mr. Hébert explained that staff is recommending use of a prefabricated truss bridge due to the location of the Harkins Bridge site and environmental impact.

Assistant General Manager Kevin Woodhouse stated that the Board approved the costs associated with the Harkins Bridge replacement as part of the FY2014-15 Budget.

Director Riffle inquired regarding the lifespan of the recommended bridge type and whether it has the carrying capacity required for emergency vehicles.

Mr. Hébert stated that a prefabricated truss bridge is estimated to last 30-50 years and explained that the recommended bridge type meets all county weight and width requirements to allow for emergency vehicles to pass.

Director Riffle inquired as to whom the primary users of this bridge are to which Mr. Hébert explained that due to its proximity to a parking area, the Harkins Bridge is used by hikers, cyclists, equestrians, District staff, etc.

Director Riffle inquired if the process for replacing District bridges can be streamlined in order to allow staff to move forward with replacements without requiring Committee or Board approval.

Mr. Hébert explained that because each site is unique with unique elevations, locations, and required uses, staff must account for those differences when determining the type of replacement bridge to recommend.

Public hearing opened at 2:28 p.m.

No speakers present.

Public hearing closed at 2:28 p.m.

Director Riffle suggested that an inventory of the District's bridges be completed to determine their current status and potential need for replacement.

Acting Operations Manager Michael Newburn explained that District staff has been trained to inspect the bridges, and an inspection of the District's bridges is underway.

**Motion:** Director Kishimoto moved, and Director Riffle seconded the motion to recommend to the full Board that a prefabricated truss bridge is the preferred option to replace the Harkins Bridge in Purisima Creek Redwoods Open Space Preserve.

VOTE: 3-0-0

Director Kishimoto inquired if staff maintains a list of structures on District properties and whether those structures are prioritized for demolition, such as the Log Cabin at La Honda Creek.

Skyline Area Superintendent Brian Malone stated that the Real Property department does maintain a list of structures on District properties, and additional requests for demolitions will be before the Committee and Board in the future.

Planner III Gina Coony stated that prioritization of structures for demolition, including the Log Cabin at La Honda Creek, was included as part of the Vision Plan and related Vision Plan Implementation Guide, which is currently being created by staff. Prioritization of structure demolition is also included as part of the District's annual Action Plan approved by the Board each fiscal year.

#### **IV. ADJOURNMENT**

Chair Cyr adjourned the Special Meeting of the Planning and Natural Resources Committee of Midpeninsula Regional Open Space District at 2:38 p.m.

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Jennifer Woodworth, CMC  
District Clerk