CRISPY FIELD
IMPROVEMENT PROJECT

SENIOR PROJECT
Author, Partners, and Acknowledgements

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Giselle
CRISSY FIELD IMPROVEMENT PROJECT

Senior Project
June 2022

CAL POLY
Title: Crissy Airfield Improvement Project

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This senior project report is an exploratory analysis of the National Park Service’s passively-managed lands at Crissy Field. There are always multiple alternatives to a new development project and the priorities established at the beginning of a process can have a major impact on the final outcomes. This senior project report investigates implications of reconnecting the city with the northern waterfront and investigates key recommendations related to transportation, environmental, and historic planning.
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INTRODUCTION

Purpose
The proposed project would improve connectivity between the City/County of San Francisco and the northern waterfront. The project is consistent with the National Park Service’s efforts of improving connectivity and access to parklands they manage.

Background
Access to the northern waterfront at Crissy Field has been limited for several decades by an elevated portion of Highway 101 cutting through the Presidio, isolating transportation approaches, traffic congestion, limited public transit services, and the project site’s former use as a military airfield.

Project
The project has the potential to be a vital chapter in Crissy Field’s ongoing evolution. It is expected to offer a high quality park experience and contribute to ongoing improvements that address access shortcomings (Figure 1).
Figure 1: Aerial image of Crissy Field
Source: San Francisco County Transportation Authority
Improving connectivity to the waterfront is a very large project scope involving the creation of a more user friendly and navigable site. Several specific planning recommendations proposed in this report contribute to this broad goal.

Planning Recommendations/Recommended Commitments for improved connectivity to the waterfront include the following:
1. Improving the alignment of Mason Street by constructing a new bike-pedestrian route parallel to Mason Street,
2. Reducing vulnerability to sea level rise inundation through habitat restoration, and
3. Continued protection, respect, and enhancement of cultural and historic resources.

With constructing a new bike-pedestrian route, habitat restoration, and enhancement of resources, the waterfront can now be reconnected with the Presidio. These actions address current challenges and shortcomings while enhancing the parklands circulation and accessibility.

This report evaluates one Action Alternative- improved connectivity to the waterfront through planning recommendations- and one No-Action alternative. The report describes existing conditions in the project site and analyzes impacts on the human and natural environments.

This report explores existing planning efforts of the Crissy Field Next project, a collaborative planning effort to improve the area. The report contributes to revitalization efforts by providing additional information and input.

The report evaluates the main goal of reconnecting the waterfront and impacts of this alternative on the Airfield and Mason Street.

The NPS is currently trying to overcome the challenge of improving access to the Crissy Field area. The site faces increased visitation and pressure from projects in the surrounding area (e.g. Park Presidio, Tunnel Tops, and Transit Service improvements).

Improving the Mason Street alignment by constructing a proposed, new grade-separated pedestrian and bike path located fifteen feet (15') parallel to Mason Street would improve access and connectivity to the waterfront.

Without action, the existing alignment fails to respond to new, increased visitation demands. Improved transportation planning and the completion of this capital project would improve the overall connectivity and quality of Crissy Airfield and Mason Street.
CHALLENGES TO BE ADDRESSED

The project site under consideration is managed by the National Park Service (NPS) and is located on the northern waterfront of San Francisco (Figures 2 and 3).

The project site is located within the Golden Gate National Recreation Area (GGNRA), the nationally historically significant Presidio of San Francisco, and the recreational parkland Crissy Field (Figure 2).

The NPS passively manages the levels of use visiting Crissy Field to reduce conflicts between activities, ensure that safe conditions are maintained, and park resources are protected (Presidio Trust 2017).
Golden Gate National Recreation Area (Figure 5)
The Golden Gate National Recreation Area is a refuge from urban life. The site’s cultural history is long standing, diverse, and multi-layered. Cultural ties include those with Native American culture, Spanish culture, maritime history, the California Gold Rush, and the growth of urban San Francisco (Golden Gate National Recreation Area n.d.).

Presidio of San Francisco
The Presidio is a nationally significant historic district with abundant natural beauty. The site’s cultural history is military focused as the Presidio served as an army post; however today the Presidio offers forests, creeks, trails, views, architecture, and history for today’s park visitors (Presidio of San Francisco a and b n.d.). Today the Presidio Trust and the National Park Service manage the Presidio of San Francisco.
Crissy Field
Crissy Field is a national recreational parkland managed by the National Park Service. The site’s cultural history is diverse with history associated with the Native Ohlone, military, and recreation.

The site was transformed from a military airfield to a national park; offering abundant recreational uses (Figure 4) (Crissy Field. n.d.). This transformation has made the site more enjoyable and appealing as visitors now enjoy spectacular views of the Golden Gate Bridge, the San Francisco Bay, and the city.

In 1846 the site was used as an active, operating military base where dumping and draining took place (Crissy Field Restoration n.d.). This activity badly damaged shoreline habitat and left hazardous materials and large amounts of debris, resulting in a “derelict” wasteland (Crissy Field Restoration n.d.).

However, spearheaded by the National Park Service, an extensive planning process to restore the site and improvements made thus far have facilitated a now healthy environment, “dynamic public open space,” and historically sensitive site (Figures 6, 7, 8, and 9).

Under the management of the National Park Service, the site has become an urban refuge. Guided by the mission to balance access with preservation of natural and cultural resources in perpetuity, the National Park Service’s planning efforts at Crissy Field have wholeheartedly improved and protected the landscape. Visitors can begin to realize that nature is possible even in this metropolis of nearly one million people (Crissy Field Restoration n.d.).

The Project Site (Figure 3):
The project site encompasses two connected areas:

1. Crissy Airfield. Approximately 1.0 mile South of Fort Point National Historic Site, Crissy Airfield, a restored historic airfield, is 27 acres of grass parkland with a circumference distance of 1.16 miles (Google Maps), and

2. Segment of the Mason Street corridor. Mason Street spans a total distance of 1.27 miles (Google Maps n.d.).

Throughout the discussion, the Crissy Airfield and the segment of Mason Street parallel to the Airfield, totalling 27-acres, is referred to as the “project site” (Google Maps). Crissy Field, totalling 100-acres is referred to as the “project area” (Crissy Field n.d.).
Figure 2

REGIONAL CONTEXT

Legend
- Project Site
- Bay Trail
- Golden Gate Park
- Golden Gate National Recreation Area

San Francisco
MOTIVATION

The motivation of this project is to design a plan to improve connectivity between the City/County of San Francisco with the northern waterfront by implementing several specific planning recommendations proposed in this report.

This opportunity came about as a result of student interest. Ongoing planning efforts came about as a result of available funding from the Infrastructure Investment and Jobs Act; an important act in helping ensure America’s national parks have well-maintained transportation networks to provide visitors with safe access, reliable transportation, and quality experiences.

Mobility, Access, and Connectivity
Reconnect the city with the northern waterfront, grade-separate modes of traffic (separate vehicle from pedestrian and bike), new multi use pathway for pedestrian and bicycle use, provide safe and seamless multimodal transportation connections within the recreation area, install clear crossings and clearly marked pedestrian and bicycle routes, and plan for future public transit (Fehr and Peers 2020).

Visitor Experience
Improve the visitor experience and visitor orientation by providing a safe and sustainable multi-use pathway, create new opportunities for recreation at the airfield, improve the scale and usability of the large field, and ensure capacity for forecasted visitation to the project site is met (Fehr and Peers 2020).

Asset Management and Protection
Enhance the existing low-lying street and reduce storm-surge impact along Mason Street corridor, and

Sustainable Operations
Participate in climate adaptation planning, develop and maintain a financially and environmentally sustainable transportation system that effectively uses resources and incorporates innovative technology as feasible.
DEMAND

The project site has great potential for improvement. There is demand for the project site to build upon existing efforts to improve connectivity with the northern waterfront of San Francisco. There is demand for the project site to address forecasted increases in visitation and traffic volumes, address sea-level rise considerations, and address historic and cultural significance. There is also a need to address existing community concerns about Mason Street.

SCOPE OF THE ANALYSIS

The recommendation made in this report reflects the notion to reconnect the city with the northern waterfront and to improve the overall quality of Mason Street (see the Alternatives Chapter - Chapter 3).

RELATED LAWS/GUIDELINES AND OTHER PLANNING AND MANAGEMENT DOCUMENTS

This document was written with the guidance of a set of regulations and policies. The following is a summary of relevant planning and guidance documents and regulations considered in the preparation of this document.

- National Environmental Policy Act / California Environmental Quality Act
- National Park Service Organic Act
- National Park Service Director’s Orders and Handbook
- National Park Service Mission Statement
- National Park Service Management Policies
- General Management Plan for the Golden Gate National Recreation Area
- 1999 Resource Management Plan, Golden Gate National Recreation Area
- Crissy Corridor Transportation Study
- Crissy Field Plan Next Transportation Analysis
- The Crissy Field Plan and Environmental Assessment
- Crissy Field Sea Level Rise Analysis Report
- Crissy Field Restoration
- The Comprehensive Transportation Management Plan (CTMP)
- Presidio Trust Management Plan
- Presidio Trails and Bikeways Master Plan
- San Francisco Bay Plan
The proposed project would likely facilitate safe and authorized transportation and recreation uses consistent with the National Park Service’s campaign to transform Crissy Field into a recreational parkland (Fehr and Peers 2020).

**SOPING AND ISSUES**

While issues and concerns regarding the proposed project are traditionally identified through input from individuals, organizations, agencies, and public comment in the planning process, scoping efforts were derived from existing outreach efforts, including public comment solicited from Crissy Field Sea Level Rise Analysis Report (Figure 10) (Crissy Field Sea Level Rise Analysis Report 2016). Issues raised during the public comment scoping period likely ranged from very general issues to very specific issues (National Park Service 2007).

**THE SENIOR PROJECT REPORT IS DIVIDED INTO SIX SECTIONS:**

1. A brief discussion substantiating the need for the Crissy Airfield Street Improvements project,
2. A description of the existing conditions,
3. A description of the proposed project and alternatives,
4. A discussion of relevant case studies and best practices for the project site,
5. A summary of current planning efforts by the National Park Service at Crissy Field, and
6. References
EXISTING CONDITIONS

2
2 EXISTING CONDITIONS

Recommended Commitments:
• Reconnection and Visitation,
• Transportation and Visitation, and
• Sea-Level Rise

This senior project encourages projects along the northern waterfront of San Francisco to foster stronger connectivity with the city to improve access for all visitors and engage more diverse communities.

SPECIAL CONSIDERATION ANALYSIS

This section provides a discussion of the existing conditions of special considerations. For each special consideration current conditions are described.

RECONNECTION AND VISITATION

Past transportation approaches have inhibited access to the northern waterfront of San Francisco and isolated landmarks. The elevated Embarcadero Freeway meant to connect the Bay Bridge to the Golden Gate Bridge, came about as a result of available funding from the Interstate Highway Act of 1956; an act in expanding the Federal Highway network (Figure 11) (Removing Freeways Restoring Cities n.d. and US Department of Transportation Federal Highway Administration 1996). Freeway opponents cited various planning issues relating to compromised public health, safety, and welfare as a result of the freeway’s construction.

In 1991, removing the double-decked Embarcadero Freeway opened the city to the waterfront (Removing Freeways Restoring Cities n.d.). This began a theme of reconnecting the city with the Northern waterfront of San Francisco and improving the overall quality of the Embarcadero (Removing Freeways Restoring Cities n.d.). A current effort to improve connectivity to the northern waterfront of San Francisco is found in the recent project “Presidio Tunnel Tops”; this project is expected to increase visitation demand at the project site and the larger Crissy Field area (Presidio Trust 2017).

Figure 11: Embarcadero Freeway
Source: San Francisco Chronicle
TRANSPORTATION AND VISITATION

The purpose of this section is to identify and understand the transportation and visitation levels and trends within the project site and project area.

Pedestrian Circulation
Activity Levels: According to the Crissy Field Next Plan, pedestrian activity levels are “higher during the typical and peak weekend afternoons than during the weekday evening” (Fehr and Peers 2020). This difference is because pedestrian activity is primarily recreational (Presidio Trust 2017).

Crowding: Overall, minor pedestrian crowding and congestion is observed during peak weekend times in the project area (Figure 12) (Presidio Trust 2017).

The Crissy Field Next Transportation Analysis studied six intersections and five pedestrian screenlines to better understand the current use of existing pedestrian routes (Figures 13, 14, and 15).

The following locations listed below are located within the project site (Figure 16). These locations would be most likely affected by increased traffic traveling to and from the project site (Presidio Trust 2017).

See the Crissy Corridor Transportation Study and the Crissy Field Next Transportation Analysis for data on additional intersections in the project area.

A) Crissy Field Promenade (west end)
B) West Bluff Lot Driveway
1) McDowell Avenue / Mason Street
Figure 16

INTERSECTIONS
AND
SCREENLINES

Legend

- Project Site
- Bay Trail
- Presidio Boundary
CRISSY FIELD IMPROVEMENT
SENIOR PROJECT

Figure 13:
Screenline A: Crissy Field Promenade (west end)

Figure 14:
Screenline B: West Bluff Lot Driveway

Figure 15:
Intersection 1: McDowell Avenue / Mason Street
Table 1 summarizes the existing pedestrian activity levels at each location (Table 1). The data sourced from the Crissy Field Next Transportation Analysis provides a technical reference for planning decisions (Fehr and Peers 2020).

Pedestrian counts for typical weekday PM peak hours, typical weekend peak hours, and peak or holiday weekend peak hours are summarized in the following table.

There are lower observed pedestrian volumes within the project site (west Crissy Field) than other portions of Crissy Field. Lower count locations were observed at the McDowell Avenue intersection (location 1) and at the screenline on the west end of the Crissy Field Promenade (location A). The highest pedestrian volumes are observed at the east park entrance, with high pedestrian crossing volumes on typical and peak weekend afternoons (Fehr and Peers 2020).

**Table 1: Project Site Total Peak Hour Pedestrian Volumes by Location and Day**

<table>
<thead>
<tr>
<th>Location</th>
<th>Typical Weekday (5–6 PM)</th>
<th>Typical Weekend (2–3 PM)</th>
<th>Peak Weekend (2–3 PM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screenline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>54 Westbound</td>
<td>191 Westbound</td>
<td>220 Eastbound</td>
</tr>
<tr>
<td>B</td>
<td>54 Eastbound</td>
<td>23 Eastbound</td>
<td>274 Westbound</td>
</tr>
<tr>
<td></td>
<td>30 In</td>
<td>44 In</td>
<td>327 Eastbound</td>
</tr>
<tr>
<td>Intersection Crossing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>McDowell Avenue / Mason Street</td>
<td>35</td>
<td>181</td>
</tr>
</tbody>
</table>

**Bicycle Circulation**

Facilities: According to the Crissy Field Next Plan, bicycle facilities support various bike users including commuters, recreational bicyclists, families, and tourists (Fehr and Peers 2020). Currently Mason Street includes “class II striped bike lanes in both directions and a roadside Class I multi-use path on the north side” (Figure 17) (Presidio Trust 2017). There are one-hundred thirty five (135) public bike racks in Crissy Field (Fehr and Peers 2020).
Activity Levels: Upon observation, bicycle tourism has increased as many visitors travel along the northern waterfront, cross the Golden Gate Bridge, and ride to Sausalito (Fehr and Peers 2015). Bicycle volumes are higher than pedestrian volumes in the project site as evidenced by Tables 1 and 2.

Similar to pedestrian activity, bicycle activity levels are “higher during weekend hours than during weekday hours” (Fehr and Peers 2020). This difference can be attributed to large numbers of recreational cyclists as bicycle tourism primarily occurs during the weekend (Fehr and Peers 2015 and Fehr and Peers 2020). Additionally, bicycle commuters account for significant weekday PM bicycle activity (Fehr and Peers 2020).

Crowding: Overall, minor bicycle crowding and congestion is only observed during peak weekend times in the project area (Figure 18) (Presidio Trust 2017).

The Crissy Field Next Transportation Analysis studied six intersections and five pedestrian bicycle to better understand the current use of existing bicycle routes.

The following locations listed below are located within the project site (Figure 16). These locations would be most likely affected by increased traffic traveling to and from the project site (Presidio Trust 2017). See the Crissy Corridor Transportation Study and the Crissy Field Next Transportation Analysis for data on additional intersections in the project area.

A) Crissy Field Promenade (west end)
B) West Bluff Lot Driveway
1) McDowell Avenue / Mason Street

Table 2 summarizes the existing bicycle activity levels at each location (Table 2). The data sourced from the Crissy Field Next Transportation Analysis provides a technical reference for planning decisions (Fehr and Peers 2020).
Bicycle counts for typical weekday PM peak hours, typical weekend peak hours, and peak or holiday weekend peak hours are summarized in the following table.

Table 2: Project Site Total Peak Hour Bicycle Volumes by Location and Day

<table>
<thead>
<tr>
<th>Location</th>
<th>Typical Weekday (5-6 PM)</th>
<th>Typical Weekend (2-3 PM)</th>
<th>Peak Weekend (2-3 PM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crissy Field Promenade</td>
<td>25 Westbound</td>
<td>32 Eastbound</td>
<td>156 Westbound</td>
</tr>
<tr>
<td>(west end)</td>
<td></td>
<td></td>
<td>51 Eastbound</td>
</tr>
<tr>
<td>West Bluff Lot Driveway</td>
<td>12 In</td>
<td>17 Out</td>
<td>83 In</td>
</tr>
<tr>
<td>McDowell Avenue / Mason Street</td>
<td>191</td>
<td>469</td>
<td>599</td>
</tr>
</tbody>
</table>

There are higher observed bicycle volumes at the count locations on Mason Street (location 1) than along the Promenade (locations A) within the project site.

There is an observed bicycle travel pattern westbound on Mason Street demonstrating the popularity of that bicycle ride, likely due to the large number of riders who access Fort Point, the Battery East Trail, the Golden Gate Bridge, and Sausalito (Fehr and Peers 2015 and Fehr and Peers 2020). In contrast there is not an observed bicycle travel pattern on the Promenade as visitors “travel leisurely in both directions” (Fehr and Peers 2020).

Vehicle Trips and Intersections
The Crissy Field Next Transportation Analysis studied six intersections and additional screenline data was collected to better understand the current use of existing roads (Figure 19).

The following locations listed below are located within the project site (Figure 16). These locations would be most likely affected by increased traffic traveling to and from the project site (Presidio Trust 2017).
See the Crissy Corridor Transportation Study and the Crissy Field Next Transportation Analysis for data on additional intersections in the project area.
B) West Bluff Lot Driveway
1) McDowell Avenue / Mason Street

Table 3 summarizes the existing vehicle screenline activity levels (Table 3). Table 4 summarizes the existing vehicle intersection LOS analysis (Table 4). The data sourced from the Crissy Field Next Transportation Analysis provides a technical reference for planning decisions (Fehr and Peers 2020).

Vehicle counts for typical weekday PM peak hours, typical weekend peak hours, and peak or holiday weekend peak hours are summarized in the following table.

### Table 3: Project Site Total Peak Hour Vehicle Volumes by Location and Day

<table>
<thead>
<tr>
<th>Location</th>
<th>Typical Weekday (4-6 PM)</th>
<th>Typical Weekend (1-6 PM)</th>
<th>Peak Weekend (1-6 PM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screenline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B West Bluff Lot Driveway</td>
<td>140 In</td>
<td>145 Out</td>
<td>554 In</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>548 Out</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>596 In</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>596 Out</td>
</tr>
</tbody>
</table>

### Table 4: Project Site Intersection Level Of Service by Location and Day

Intersection analysis was conducted using the Highway Capacity Manual (HCM) 6th Edition methodology (Fehr and Peers).

Intersection Level Of Service was conducted in September 2018 and October 2018.

Notes: Average control delay expressed in seconds per vehicle. LOS = Level of Service based on average control delay calculations.

**Vehicle Volumes**

**Activity Levels:** Vehicle activity levels are “higher on an average weekend day than an average weekday (Fehr and Peers 2015). This difference was most pronounced at various locations, including West Bluff (Saturday only) (Fehr and Peers 2015). These higher volumes on the weekend can be attributed to weekend “recreational attractors” (Fehr and Peers 2015). However, on Mason Street traffic volumes were fairly consistent throughout the week because it is a “commuter road” (Fehr and Peers 2015). Additionally, vehicular traffic was
An intersection operating at LOS D or better is generally considered to be operating acceptably. Levels of service E and F are generally considered unacceptable (Presidio Trust 2017).

This statement is in accordance with the methodology described in the 2000 Highway Capacity Manual (HCM) (Presidio Tunnel Tops 2017).

generally heavier in the project area during the afternoon and evening (Fehr and Peers 2015).

**Level of Service**

**Delay:** Delay is the lowest during weekday times and highest during peak weekend hours (Fehr and Peers 2020).

**LOS:** Under all three time periods the intersection was found to operate at LOS C or better as evidenced by Table 4. The worst approach operating at LOS F was experienced outside of the project site (Fehr and Peers 2020). This is “largely due to higher volumes on peak weekends (Fehr and Peers 2020). Additional circulation challenges worsening crowding include:

- High volumes of pedestrian and bicycle traffic causing “increased vehicle delay” (Fehr and Peers 2020), and
- Conflicting speed demands for vehicles using the same roadway (i.e. tourists are slower-moving than commuters) (Fehr and Peers 2020).

**Public Transit Service**

Several Muni lines, Golden Gate Transit lines, and the PresidioGo Shuttle are currently operating within or close to the project area (Figure 20) (Fehr and Peers 2015).

Seven Muni bus lines operate within or close to the Crissy Field corridor: 28 19th Avenue, 30 Stockton, 30X Marina Express, 43 Masonic, and 76X Marin Headlands Express (Fehr and Peers 2020).

The bus stops along Mason Street are “on the south side of Mason Street and signed with “yellow pole wraps displaying the PresidiGo logo and schedule” (Fehr and Peers 2020). Two of the four Mason Street stops have benches and none of the stops have shelters or other stop amenities (Fehr and Peers 2020). Nearby transit stops are all about a ten minute walk from Crissy Field (Fehr and Peers 2020).
EXISTING PARK ASSETS POTENTIALLY IMPACTED BY SEA LEVEL RISE

The purpose of this section is to identify and understand existing park assets potentially vulnerable to shoreline erosion, wave runup, and overtopping.

The northern waterfront of San Francisco faces potential for sea level rise, increased flooding and erosion, and changes to the ecosystem and resources as climate change worsens. From a resource management perspective, the greatest threats from sea level rise would likely hinder connectivity throughout the site, facilitate unsafe parkland conditions, and create damage to existing park assets and resources present at the project site.

According to the 2016 Crissy Field Sea Level Rise Analysis Report, various resources present at the project site such as historical, archeological, cultural, and natural resources will be affected when sea levels rise. Park assets such as views, public access, recreation opportunity, public infrastructure, and utilities will likely be affected.

Understanding the existing park assets and history of the site provides valuable information for directing investment decisions to maintain connectivity and protect threatened resources. Preparing the project site for sea level rise and planning for a well connected, safer parkland is best done with an excellent understanding of the site’s existing conditions.
Analysis of Existing Park Assets

Parkland: While coastal zones are some of the most densely populated areas in the world, the project site’s current use is low density parkland (Figure 21). This use is optimal for reducing the number of people exposed to sea level rise and reducing infrastructure exposed to damage. Maintaining the site’s current undeveloped nature is an essential mitigation measure to future damage.

Figure 21: Crissy Airfield
Natural Resources and Restoration: Crissy Field open space underwent restoration efforts to enhance the natural resources supported in the area. Restoration efforts have protected vital connections to the waterfront. The project area was transformed from a hazardous material dumping site to its current use as accessible, vital public open space (Crissy Field Restoration n.d.).

Restoration efforts included establishing an 18 acre tidal marsh inspired by a prior salt marsh system, 16 acres of dune and dune swale habitat, 22 acres of beach, and the historic airfield (Figures 22, 23, 24 and 25) (Crissy Field Restoration n.d. and Crissy Field Sea Level Rise Analysis Report 2016). These “soft” armoring efforts provide current protection from wave action, allowing for safe connectivity and movement throughout the site.

Figures 22 and 23: Marsh
Source: Presidio

Figures 24 and 25: Beach Dunes
Source: National Park Service
However, these natural resources will eventually become affected by sea level rise (Crissy Field Sea Level Rise Analysis Report 2016). Effects of inundation will include shoreline erosion, beach and dune erosion, and effects to the intertidal levels of the marsh (Crissy Field Sea Level Rise Analysis Report 2016).

Combined hazards such as tidal inundation, sea level rise, and wind waves may likely impact the natural shoreline, exacerbate erosion, and lead to undesired outcomes.

**Mason Street:** Mason Street is a current transportation route for all modes of traffic. However, this existing park asset will be affected by sea level rise. The vulnerability assessment in the 2016 Crissy Field Sea Level Rise Analysis Report illustrates inundation in the following scenarios:

- 1 FT SLR above current 100 YR Tide
- 2 FT SLR above current 100 YR Tide
- 3 FT SLR above current King Tide
- 3 FT SLR above current 100 YR Tide
- 6 FT SLR above current Mean Higher High Water (MHHW)
- 6 FT SLR above current King Tide
- 6 FT SLR above current 100 YR Tide

Mason Street is a vital transportation corridor facilitating connection between the city and the waterfront and supporting visitation to the site.
DESCRIPTION OF PROPOSED PROJECT AND ALTERNATIVES
3 DESCRIPTION OF PROPOSED PROJECT AND ALTERNATIVES

INTRODUCTION

This section provides descriptions of the proposed project and the “no-project alternative”.

Both project alternatives consider site characteristics and environmental constraints. Additionally, both alternatives are consistent with the management of natural and historic resources in accordance with the related planning and management documents (see Chapter 1).

ALTERNATIVES DEVELOPMENT PROCESS

The action alternative was developed and refined through an internal planning process that included careful review and analysis of site data. The action alternative resulting from this process is designed to meet the project’s challenges described in Chapter 1. Baseline data needed to develop informed and appropriate alternatives for the project site include:

- Presidio General Management Plan
- Crissy Corridor Transportation Study (Fehr and Peers 2015),
- Crissy Field Transportation Analysis (Fehr and Peers 2020), and
- Crissy Field Vehicular, Bicycle, and Pedestrian Data of Screen Lines (IDAX data collection)
- Crissy Field Sea Level Rise Analysis Report
- Crissy Field Restoration
NO-PROJECT ALTERNATIVE

This alternative represents the future conditions without implementation of the Proposed Action. Under the No-Project Alternative the National Park Service would not proceed with the Crissy Airfield Improvement Project; this alternative would leave the project site in its current condition.

Under this alternative, no efforts to reconnect the city with the northern waterfront to improve the overall quality of Mason Street and Crissy Airfield would be performed. Street use would continue without the necessary upgrades, existing connectivity issues, traffic volumes, and vulnerability to sea level rise inundation would continue.

The No Project Alternative describes the action of continuing the present management operation and condition; it does not imply directly discontinuing the present action or removing existing uses, developments, or facilities. The no-action alternative provides a basis for comparing the management direction and environmental consequences of the Proposed Action.

ACTION ALTERNATIVE (PROPOSED PROJECT) - CRISSY AIRFIELD IMPROVEMENT PROJECT

The Crissy Airfield Improvement Project is the “preferred alternative” developed to reconnect the city with the northern waterfront and improve the overall quality of Mason Street and Crissy Airfield.
The Action Alternative includes recommends the following:

• A 1.27 mile segment of Mason Street would be realigned to include a new grade-separated pedestrian and two-way bike segment located fifteen feet (15') parallel to Mason Street (Figure 26),
• Habitat restoration and soft design strategies for short term adaptation and climate resilience, and
• Continued protection, respect, and enhancement of cultural and historic resources.

Implications of the Action Alternative includes the following:

• Enhance connectivity,
• Support a range of group sizes as well as experiences,
• Reduce vulnerability to sea-level rise inundation, and
• Contribute to existing efforts to make the northern waterfront of San Francisco an exciting destination (Figures 27 and 28).
Figure 26

ACTION
ALTERNATIVE
How does the Mason Street realignment enhance connectivity?

The new alignment would likely enhance connectivity by separating modes of traffic. The action would likely enhance the pedestrian and bicycle experience, make the parkland easier to navigate, safer, comfortable, and appropriately sized and configured to reduce conflict points.

Proposed Actions are grouped as follows:
- Construction of New Street Alignment Actions,
- Habitat Restoration, and
- General Construction Sequencing and Timing

Construction of New Street Alignment Actions
The new Mason Street corridor includes constructing a new, sustainable pedestrian and bicycle route segment. The aligned new segment would be contoured as necessary to lower sea level rise vulnerability and restore the “natural land contours and drainage patterns of the site”. Actions including street improvements, design standards, and considerations for drainage, accessibility, corridor width, and signage would be done where appropriate and sustainable.

Habitat Restoration
A major part of the project is ensuring natural habitats of the surrounding area are restored where appropriate and sustainable. Restoration in a manner that minimizes the vulnerability to sea level rise is crucial (Crissy Field Sea Level Rise Analysis Report 2016). The project site on National Park Service property would be restored and revegetated as necessary.

General Construction Sequencing and Timing
Street realignment proposed under this alternative would begin, and restoration and monitoring would continue afterwards.

Additionally, the National Park Service would need to implement actions before and after street realignment, construction, and restoration begins. These actions include information signage informing users that realignment actions are underway.
SPECIAL CONSIDERATION ANALYSIS

This section provides a discussion of the special considerations of the proposed project.

For each special consideration there is a discussion addressing the reasonably predicted impacts of the project. Then there is a following, separate discussion about long term future impacts.

Reconnection and Visitation

Takeaways:
• A long-standing history to connect the city with the northern waterfront of San Francisco,
• The Embarcadero Freeway teardown catalyzed projects prioritizing enhanced connectivity,
• There are current efforts to improve connectivity, and
• The proposed project would likely contribute to efforts for improving connectivity and increasing visitation.

Future Project Analysis

The project would contribute to existing and on-going efforts to improve connectivity to the northern waterfront of San Francisco. On-going efforts include the project “Presidio Tunnel Tops” slated to open in the Spring of 2022 which replaces a portion of the elevated Embarcadero Freeway “cutting through the Presidio for seven decades” with an at-grade discrete roadway aimed to improve connectivity the waterfront (Figures 29 and 30) (Presidio Trust 2017).

The impacts of the proposed project can be reasonably predicted based on nearby projects similar in scope. The project would likely play a vital role in National Park Service and partnering agencies' ongoing evolution of reconnecting the city at Crissy Field parkland (Presidio Trust 2017 and Fehr and Peers 2020).
Enhanced connectivity for pedestrian and bicycle modes of traffic within the project area would likely increase and substantially improve as a result of the project, connecting more people in the city with the northern waterfront (Presidio Trust 2017 and Fehr and Peers 2020). Based on visitation impacts of the similar Presidio Tunnel Tops project, the project site would likely become a connected place “where people live, work and play” near the water (Presidio Trust 2017).
Transportation and Visitation

Takeaways:
• Mason Street, is a designated multi-use street open to vehicular traffic, bicyclists, and pedestrians,
• Order of modes experiencing the highest volume: vehicle, bicycle, pedestrian,
• There are current efforts to improve connectivity,
• The project would likely contribute to improved connectivity and increased visitation, and
• Future visitor use at the project area, Crissy Field, is only expected to increase.

Future Project Analysis - Pedestrian Circulation (Figures 31 and 31)
Impacts of the project can be reasonably predicted based on nearby projects similar in scope. Similar to the Presidio Tunnel Tops project and the Crissy Field Next project, pedestrian activity within the project site and on adjacent streets would likely increase (Presidio Trust 2017 and Fehr and Peers 2020).
Proposed routes within the project site would likely substantially improve pedestrian circulation, making walking a more safe and viable mode of travel (Presidio Trust 2017). Proposed paths would be appropriately sized and configured to accommodate expected volumes (Presidio Trust 2017).

As implemented by the Presidio Tunnel Tops project, providing pedestrian amenities would likely enhance the pedestrian experience (Presidio Trust 2017). These amenities may include benches, water fountains, route lighting, and pleasant landscaping.

Improved access to pedestrian amenities and proposed new connections within the project site would likely contribute to the comfortable accommodation of all pedestrians “without creating additional restrictions” than under existing conditions (Fehr and Peers 2015 and Fehr and Peers 2020).

Based on the pedestrian walkway proposed in the similar Crissy Field Next project, the proposed pedestrian and bike route would likely improve safety (Fehr and Peers 2020). Predicted impacts of the proposed actions would likely enhance visitor experience and encourage visitors to “park once and walk between Presidio and Crissy Field” (Fehr and Peers 2020).

Based on the clearly established circulation paths proposed in the similar Crissy Field Next project, the proposed pedestrian and bike route would likely “better distribute pedestrian activity throughout the park” than under existing conditions (Fehr and Peers 2020); however, increased pedestrian traffic would “generally be accommodated within the existing and planned surrounding pedestrian network” (Presidio Trust 2017).

Future Project Analysis - Bicycle Circulation (Figure 33)

Similar to pedestrian circulation, bicycle circulation impacts of the project can be reasonably predicted based on nearby projects similar in scope. Bicycle circulation would likely substantially improve as a result of the proposed actions (Fehr and Peers 2015 and Fehr and Peers 2020).
Bicycle improvements would likely reduce bicycle-vehicle conflict points along Mason Street and the Airfield (Fehr and Peers 2020).

Based on bicycle analysis of the similar Presidio Tunnel Tops project, providing bicycle amenities would likely enhance the bicycle experience and reduce conflicts (Presidio Trust 2017). Amenities would likely soften the impact of predicted, increased bicycle volumes (Fehr and Peers 2015 and Presidio Trust 2017).

The proposed bike-pedestrian route would likely support riders of all abilities and afford cyclists with a good level of comfort (Fehr and Peers 2020).

*Future Project Analysis - Vehicle Trips and Intersections (Figure 34)*
Based on vehicle analysis of the similar Presidio Tunnel Tops project and the Crissy Corridor Transportation Study, the proposed project may generate higher vehicle volumes and may even result in unacceptable service levels (LOS E or F) at the project site (Presidio Trust 2017).

Recommended in the Tunnel Tops Environmental Assessment, transportation mitigation measures “would improve the operation of the study intersections to LOS D or better” (Presidio Trust 2017). If the proposed project implements similar mitigation measures, LOS would likely improve.

However, commuters would likely use the Highway 101 Tunnel roadway opposed to cutting through Mason Street to access the Golden Gate Bridge (Fehr and Peers 2015). This would likely alleviate congestion on Mason Street.

*Future Project Analysis - Public Transit Service (Figure 35)*
Impacts of the project can be reasonably predicted based on nearby projects similar in scope. Based on public transit analysis of the similar Presidio Tunnel Tops project, the project would likely generate additional transit riders (Presidio Trust 2017). This increase in ridership would likely support the expansion of several Muni lines being implemented as part of the Muni Forward program.
DESCRIPTION OF PROPOSED PROJECT AND ALTERNATIVES

(Presidio Trust 2017). Additionally, recently expanded MUNI bus service would likely reduce traffic congestion at all study intersections to acceptable levels (Presidio Trust 2017).

**Sea Level Rise**

Takeaways:
- Sea level rise presents challenges and opportunities,
- Reducing vulnerability to sea level rise inundation through habitat restoration and soft design strategies is preferred for short term adaptation and climate resilience, and
- Bolstering natural amenities resilient to sea level rise can protect existing park assets.

**Future Project Analysis - Sea Level Rise Challenges and Opportunities**

Challenges

Sea level rise is a challenge and understanding its interaction with other planning issues is complex. The complex interaction between sea level rise and relevant parkland issues, including access, connectivity, and assets, can easily become difficult to grapple with and challenging to provide solutions for.

Opportunities

Planning tools such as vulnerability analysis and risk assessments identify threats and identify the severity and timeline of threats. These efforts help plan for the future.

Additionally, adapting to sea level rise encourages engagement in climate action planning and the critical assessment of threatened project sites. Designing for resilience and engaging in short term adaptation will affect Crissy Field in a positive way and enhance the parkland’s resilience.
Future Project Analysis - Reducing Short Term Vulnerability to Sea Level Rise Inundation through Habitat Restoration

The purpose of this section is to understand and investigate which adaptation measures are appropriate to protect and enhance existing park assets.

Based on the 2016 Crissy Field Sea Level Rise Analysis Report continued restoration efforts would likely facilitate safe parkland conditions, protect existing park assets at the project site, and support notions of connecting communities with the waterfront and improving access to the parkland.

Efforts to restore and bolster natural shorelines, such as beaches, dunes, and marshes would likely result in greater coastal protection. Preferred soft armoring encourages natural shorelines to evolve in response to increases in sea levels, while hardened shorelines such as seawalls are “static in allowing for increased wave runup and overtopping” (Crissy Field Sea Level Rise Analysis Report 2016).

Additional benefits of continued natural resource restoration include the following (Figure 36):
- Creation of thriving coastal, endangered habitat for wildlife,
- Respect for the historic nature of the site and original coastline,
- Refuge from urban life, and
- Educational opportunity for ecology and history.
Based on the 2016 Crissy Field Sea Level Rise Analysis Report, this soft infrastructure strategy for enhanced protection may involve the following (Figure 37):

- Tidal marsh and wetland expansion,
- Existing dune nourishment, and
- Existing beach nourishment.

In an effort to facilitate safe parkland conditions and protect existing park assets and resources at the project site, there is potential to expand the marsh for greater coastal protection. The natural marshland was filled-in to create Crissy Airfield. Returning the Crissy Field land back to its former, historic configuration by naturalizing the area would likely result in enhanced protection at Hallock Street. Bringing the marsh up to Mason Street would help reduce sea-level rise inundation, connect the city, and improve access to the parkland.

Additionally, nourishing the dunes and beach to further protect the parkland would contribute to habitat restoration and protection efforts. Maintaining the project area as open space parkland also helps mitigate potential damage caused by inundation.

Many additional mitigation measures could be implemented; however, first moving forward with soft armoring as a short term strategy begins to prepare for future land changes and worsened conditions.
LONG TERM FUTURE CONDITIONS

Presidio Tunnel Tops
The project “Presidio Tunnel Tops” slated to open in the Spring of 2022 is a “new area within the Presidio national park site, built on top of the Presidio Parkway Tunnels” (Presidio Trust 2017). This project will influence visitation demand at the project site and project vicinity. The project will contribute to existing efforts to improve connectivity to the northern waterfront of San Francisco. According to the Tunnel Tops Environmental Assessment,

The net impact would be a slight reduction in visitor demand for Crissy Field activities (i.e., Crissy Field visitors that opt to spend more time at the project site and less time at Crissy Field). There would be more visitors from Crissy Field that would reroute their visit through the new parklands than there would be new parklands visitors that go to Crissy Field, so pedestrian/bicyclist traffic volumes for Crissy Field would increase slightly, due to the path connections enabling cross-traffic between Crissy Field and the Main Post, but there would be a shift in traffic patterns from Crissy Field’s main Promenade to the connector paths, which should be a beneficial impact, as the crowded Promenade would be alleviated, and other lower-use Crissy Field paths would be activated. Therefore, a slight reduction in Crissy Field and slight increase in pedestrian/bicyclist traffic volumes (but improved traffic distribution) is expected. On days with large events with viewing areas on Crissy Field (and weekends with exceptional weather), it is likely that some visitors would park at the project site and other Main Post lots and walk through the new parklands to Crissy Field for event viewing. On these days, there would be an increase in Crissy Field pedestrian traffic and use (Presidio Trust 2017).

The “park once” phenomenon may encourage more walk and bike trips originating from the Presidio Tunnel Tops attraction (Presidio Trust 2017).
Public Transit projects at the project area, Crissy Field, include the following:

- Muni 30 Stockton,
- Muni 43 Masonic, and
- PresidiGo Shuttle.

**Quick Facts**

**Muni 30 Stockton**

- Extension of the route to Crissy Field in the Presidio to link communities to parkland and open space,
- Relocation of the daytime terminal to Crissy Field (at the Sports Basement parking lot),
- Provides regional transit access to Crissy Field and the Presidio via direct connections to BART and Caltrain,
- Connects Chinatown, the Tenderloin, SoMa and Civic Center to the Golden Gate National Recreation Area,
- Daily frequency: Every 12 minutes on weekdays, every 20 minutes on weekends, and
- Three additional stops in each direction within the Presidio:
  1. On Mason Street near Marina Boulevard by Crissy Field East Beach.
  2. On Mason at Halleck Street near the Tunnel Tops park and Presidio Main Post.
  3. By the Sports Basement store at Crissy Field.

**Muni 43 Masonic**

- Extension of the route to Crissy Field
- Extension of the route to connect to the Presidio Transit Center within Crissy Field in the Presidio,
- Restore to pre-pandemic alignment. Extend to the Presidio, the Marina, and Fort Mason, and
- Increased frequency.

**PresidiGo Shuttle**

- Enhanced connection provided at the Presidio Transit Center and improved transit access to the central portion of Crissy Field corridor.

The San Francisco Municipal Transportation Agency's Muni Forward project is currently underway (Fehr and Peers 2020).

When the Muni Forward projects and PresidiGo improvements are fully implemented there will likely be improved public transit conditions (Fehr and Peers 2020). These transit changes would likely have some impact on how people travel to and through the project area (Fehr and Peers 2020).

Improvements would likely reduce traffic congestion at all study intersections in the project vicinity below significant levels and encourage pedestrian transport between landmarks (Presidio Trust 2017). However, the Muni Forward and PresidiGo improvements would be “incremental” (Fehr and Peers 2020).

At the project site, of the planned changes the Muni service modification to the 30 Stockton is the most significant. Muni 30 Stockton provides new, direct access to the project site and increases transit use. Note that the Muni 30 Stockton route extension was introduced to remediate prior operational issues and includes an abnormal “off-wire” route segment.

Additional significant changes include the Muni service modification to the 43 Masonic. Muni 43 Masonic would provide direct access to the Presidio Transit Center and would likely influence transit use (Fehr and Peers 2020).

The Muni Forward project is a current and on-going project. Muni staff will begin outreach on “a new round of Muni Forward corridors and hot spot improvements” with outreach for “future priority transit corridors” within the project area tentatively scheduled to begin in 2023 (Muni Forward n.d. and SFMTA n.d.). This project's on-going nature affirms a sense of flexibility and opportunity for contributions and input, including recommendations by this investigative senior project.
Based on the 2016 Crissy Field Sea Level Rise Analysis Report, sea level rise effects related to inundation and flooding are predicted to affect the project area in the late future. Improvements and recommended strategies for climate resilience would likely reduce damage.
CASE STUDIES
INTRODUCTION

To better understand the possible solutions for reconnecting the city with the northern waterfront, this report reviews several different methods. The studies capture a range of perspectives and solutions.

The following case precedent analysis includes Crane Cove Park, Surfer’s Point Managed Shoreline Retreat Project, and Restore Hayward Marsh Project (Figures 40, 41, and 42).

Figure 40 (left): Crane Cove Park
Source: SF Parks Alliance

Figure 41 (right): Surfer’s Point Managed Shoreline Retreat Project
Source: Surfrider

Figure 42: Restore Hayward Marsh Project
Source: San Francisco Bay Restoration Authority
Crane Cove Park is a park with a beach along San Francisco’s Central Waterfront (Crane Cove Park n.d). The 7-acre Bayfront park links two fast-growing neighborhoods and provides a critically important gathering space.

The park is located in a historic district featuring two historic and restored crane tops which are visual reminders of the area’s past (Crane Cove Park n.d).

According to the Port of San Francisco, who manages 7.5 miles of waterfront, the park is designed to sustain up to 28 inches of sea level rise which could occur anytime between 2050 and 2100 (Parks and Open Spaces n.d.). Additional predicted rise will likely overtake the space itself; however, the park acts as a barrier protecting the city and surrounding city assets against flooding (McLean 2020).

**Design Review**
Similar to Crane Cove Park, the previously inaccessible industrial shoreline has been transformed to a park and stunning vista. This activates the parkland and the space can now serve as a refuge from urban life. The addition of park amenities is a solution to create a more user friendly and navigable site. The benefits of park amenities to the project site would likely encourage higher visitation, thereby reconnecting the city with the waterfront.

**SURFER’S POINT MANAGED SHORELINE RETREAT PROJECT**

Surfer’s Point Managed Shoreline Retreat Project is a project in Ventura County, California with a plan for climate resilience and protection through natural infrastructure strategies and managed retreat. The project aims to protect the local environment and meet the current needs of recreation while contributing to the area’s beautification (Surfer’s Point Managed Retreat n.d).

**Design Review**
Crissy Field shares similar goals to what was accomplished at Surfer’s Point in Ventura. Similar to Ventura, the pedestrian path and bikeway path was proposed to move away from the tideline. The commitment to managed retreat could ensure community resilience to sea level rise.

**RESTORE HAYWARD MARSH PROJECT**

Restore Hayward Marsh Project is a 145-acre on-going project along the Hayward Regional Shoreline in Hayward, California (East Bay) with a plan for sea-level rise and shoreline resilience, wildlife habitat resiliency, and enhanced public access (Restore Hayward Marsh Project n.d.).

This complex redesign project involving CEQA analysis is managed by the East Bay Regional Park District (EBRPD).

**Design Review**

Similar to the Restore Hayward Marsh Project, the Crissy Field marsh is a protective asset to surrounding infrastructure and an important consideration in adapting to sea level rise. Balancing near term naturalization and long term resilience increases habitat value and offers protection from sea level rise, coastal flooding, and erosion.

**BEST PRACTICES FOR THE PROJECT SITE**

The existing parkland may be improved to reach the goal of reconnecting the city with the northern waterfront. Improving connectivity and access to the project site through specific planning recommendations would likely help plan for enhanced open space.

Improving pedestrian amenities, engaging in managed retreat, and planning for sea level rise would likely foster a better visitor experience and encourage a vibrant, healthy, and safe parkland.
5 CURRENT PLANNING EFFORTS
INTRODUCTION

This is a summary of current planning efforts by the National Park Service to improve Crissy Field.

A current project “Crissy Field Next” aims to revitalize the parkland, enhance current uses, and improve gathering spaces (Crissy Field Next n.d.).

Participate now and learn about updates and upcoming events related to Crissy Field Next by closely following the National Park Service, the Golden Gate National Parks Conservancy, and the Presidio Trust.

I. TRANSPORTATION PLANNING

- Mason Street, Long Street, West Bluff circulation

II. ENVIRONMENTAL AND CLIMATE RESILIENCE PLANNING

- $8 million requested for Marsh Expansion to address short-term sea level rise

III. HISTORIC PRESERVATION PLANNING

- Focus on the preservation and rehabilitation of historic buildings, reinvest in old infrastructure

IV. ONGOING CONSIDERATIONS

- Prioritization of climate projects along coastline
- Pinnacle of immediate needs
REFERENCES

6
6 REFERENCES


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CRISSY FIELD

IMPROVEMENT PROJECT

SENIOR PROJECT