The Estuary Commons: People, Place, and a Path Forward

May 31, 2018

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RESILIENT BY DESIGN
BAY AREA CHALLENGE

“We cannot create cities for everyone, unless we’re first willing to listen to everyone.”

Liz Ogbu, Resilient By Design Jury

San Leandro Bay today

Mapping out community issues and priorities for the Estuary

Acknowledgements

AECOM

Stephen Engblom
Claire Bonham-Carter
George Smyth
Nick Busalacchi
Justin Vandever
Paul Peninger
Blake Sanborn
Abhishek Sharma
Radhya Adityavarman
Tom Sweet
Amir Ehsaei
Kristin Tremain
Diana Edwards
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Community gardening next to a channelized creek in East Oakland

The All Bay Collective

“We are willing to take the responsibility no one wants...because it’s our lives and health at stake.”

Marquita Price, East Oakland Collective

Executive Summary

The Estuary Commons overarching concept plan

The Estuary Commons

San Leandro Bay or the Estuary, as residents have long called it is a microcosm of the Greater San Francisco Bay Area. The complex mix of environmental, social, economic, and political challenges confronting this estuary within an estuary are both confounding and inspiring. Our team, The All Bay Collective (ABC), approached these challenges by drawing on the Estuary s rich ecological past, the vulnerabilities of its present, and the drive of its residents to create an equitable, resilient future. Through listening, learning, and co designing with stakeholders throughout the Resilient by Design Bay Area Challenge, we came to embrace the values of sustained collaboration and community driven resilience. Our unifying idea of the **Estuary Commons** builds on these values to envision a shared, working landscape that is managed for the benefit of all. In this landscape, community priorities are at the heart of important decisions and residents prosper in harmony with rising tides.

The design phase gave our team an opportunity to collaborate more closely and meaningfully with both agency stakeholders and community representatives to co create the Estuary Commons. Our Project Working Group (PWG) series brought these representatives together to foster dialogue about the Estuary s future and identify partnerships going forward. Also, community representatives attended nearly every one of our design phase project meetings, participating side by side with our team to directly influence the design process and outcomes. Our conversations with stakeholders and community members helped us to better understand their priorities, while also revealing that many valuable efforts were already underway to address the Estuary s vulnerabilities.

What resilience work was already happening when we started?

The cities of Oakland, Alameda, and San Leandro are already engaged in planning for resilience, driven by both community activists and agency staff. Well-organized community groups in East Oakland just won a Transformative Climate Communities (TCC) planning grant to develop the East Oakland Neighborhood Initiative. This community-driven effort will educate residents on the environmental vulnerabilities facing their neighborhoods and engage them in the co-creation of local adaptation strategies. Additionally, Alameda recently launched its Climate Action and Adaptation Plan to produce citywide approaches to address the risks of climate change.

Local agencies have also started planning and implementing specific adaptation projects. For example, the Port of Oakland has completed plans to construct a raised levee around the southern edge of the airport, and the East Bay Regional Parks District (EBRPD) is planning multiple improvements to the Bay Trail and nearby open spaces. The San Francisco Bay Conservation and Development Commission (BCDC) already had mapped the areas around the Estuary that will be most affected by sea level rise, and the Metropolitan Transportation Commission had just completed a creek flooding study highlighting impacts in large swaths of our study area. Bay Area Rapid Transit (BART) is actively engaged in its Coliseum Station transit-oriented development program and is in the process of launching a Sea Level Rise and Flooding Resiliency Study. Meanwhile, the City of San Leandro is planning for both a treatment wetland adjacent to its existing wastewater treatment plant and an expansion of the San Leandro Creek Trail. Furthermore, the East Oakland Collective is working with the City of Oakland to update its local bike plan, and the Alameda County Transportation Commission is planning the East Bay Greenway to enhance mobility and access in vicinity of the Estuary.

What did we learn from our community partners?

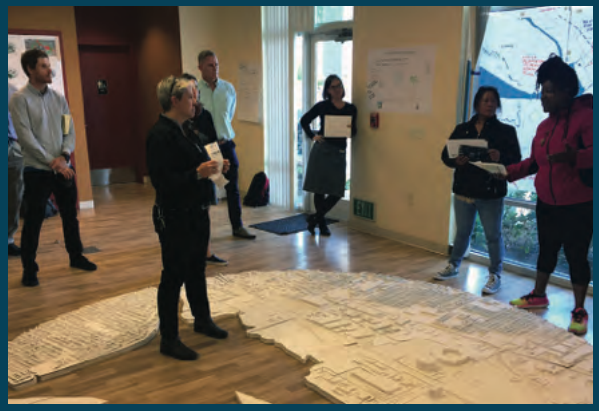
We learned that residents and activists frame the changes affecting their neighborhoods through the everyday threat of losing their homes as rents increase. Historical injustices like redlining—an example of systemic racism by private banks and public institutions—severely affected people's ability to own their own homes and benefit from higher real estate values during the 20th century. Racism has also limited the educational and workforce opportunities available, especially to East Oakland residents. Our team understood urban investment as a benefit, but we became more aware that those benefits are often so unequally shared that they instead accelerate displacement.

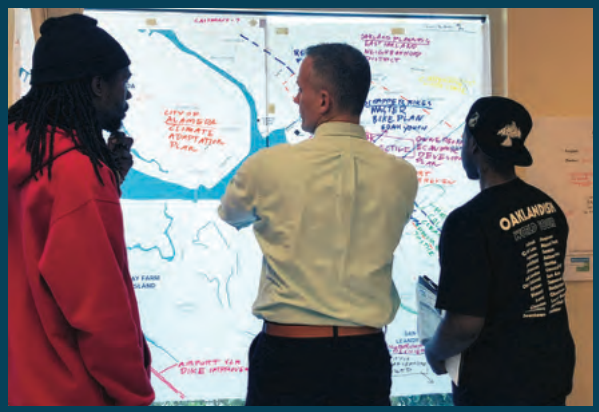
It became clear that this history of injustice could not be remedied through new investments controlled by people outside Estuary communities. New investments in housing, parks, and infrastructure must first and foremost support residents' ability to gain control over their own health, wealth, and stability.

We also learned that local neighborhoods bear unfair environmental burdens. Traffic on Interstate 880 brings goods and mobility to the San Francisco Bay region (and the nation), but it also exacerbates asthma rates for local children. Adding to this impact, emissions from a nearby crematorium and industrial uses intensify air pollution and health stressors.

To guide us in our design process and help to unravel decades of environmental injustices, our community partners recommended a set of principles for community-driven resilience planning developed by the National Association of Climate Resilience Planners. We presented them to our PWG and adopted them into our design visions, both to affirm the values of our community partners and to provide a just foundation for future resilience projects around the Estuary.

The All Bay Collective team at work with the community and stakeholders





What did we add?

To complement the extensive work being done locally to build resilience, our team added in-depth technical research, a range of near- and long-term design concepts, and a platform to foster collaboration on present and future adaptation efforts. One especially valuable contribution during the design phase was our research on the cumulative effects of sea level rise and groundwater emergence. Our maps show that about 23 percent more land will flood around the Estuary if both rising tides and rising groundwater are considered. This double-threat means that traditional protective measures like levees or seawalls will not solve the problem; rather, it emphasizes the need for dynamic, adaptive solutions that enable humans to live with water.

We also expanded social and organizational networks focused on building resilience around the Estuary. Our PWG meetings sparked conversations among community groups, city and county staff, and regional agencies. This opened new lines of communication about local resilience challenges, enhancing social capital and encouraging more coordinated solutions moving forward.

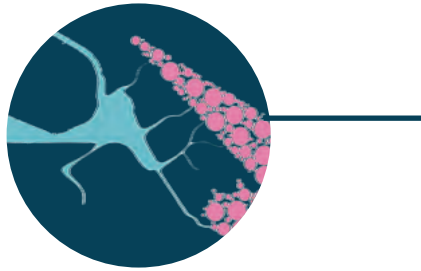
Additionally, our team worked with the PWG and community groups to design and refine our ABC Toolkit, made up of our *In It Together Game*, *Community Resilience Investment Decision-Making Tool*, and Equity Checklist. This toolkit helps project sponsors and residents explore potential adaptation strategies and weigh their trade-offs, with the goal of identifying solutions that produce greater co-benefits and contribute to the health, wealth, and stability of local communities.

Adapted shoreline for The Estuary Commons

Our physical design proposals—co-created with our PWG—were designed not only to complement and catalyze existing near-term resilience efforts, but also to initiate dialogue about long-term adaptation scenarios for the Estuary. We organized our design vision around four interrelated strategies.

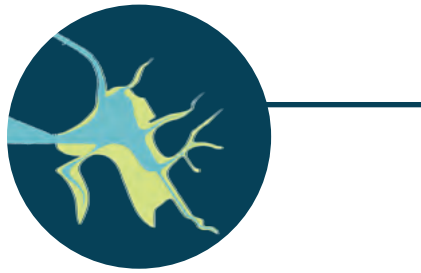
Catalyze

First, our designs **catalyze** existing, on-the-ground actions while helping to establish the conditions necessary to create sustained equity. Vital to this strategy is our Resilient Equity Hubs concept. These hubs wield governmental powers (through special districts and joint authority arrangements) to administer neighborhood-scale resilience actions and support community priorities, like green infrastructure and affordable housing.



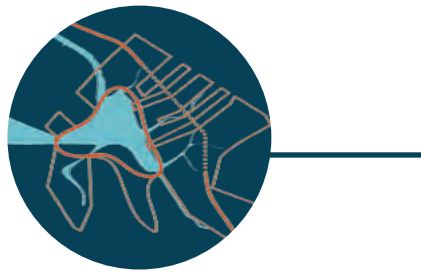
Adapt

Second, our designs **adapt** the MLK Shoreline and surrounding waterways to create an iconic, working landscape. This strategy proposes reshaping waterways to accommodate rising tides; restoring ecosystem function to create additional wildlife habitat; linking adjacent neighborhoods through circulatory pathways; and gathering Estuary residents in new social, cultural, and recreational spaces.



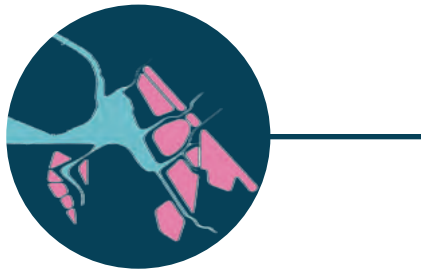
Stitch

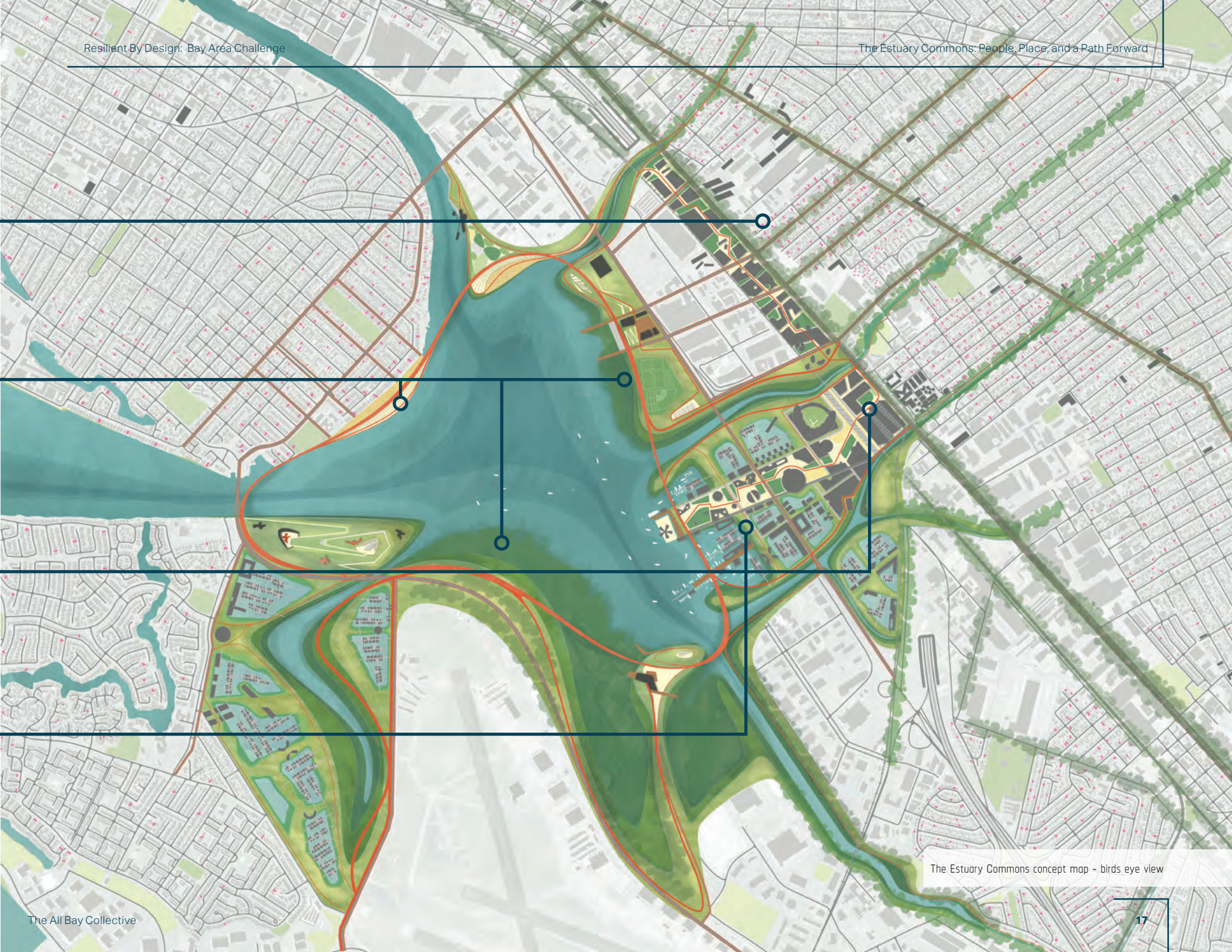
Third, our designs **stitch** neighborhoods to shoreline through potentially transformative long-term transportation scenarios. We propose further studying the possibility of realigning and tunneling Interstate 880 to the east of its current alignment—a move that would both protect this vital asset from sea level rise and provide new, green pathways over the buried highway.



Prosper

Lastly, our long-term design scenarios envision communities that **prosper** in harmony with rising tides. We propose a multi-modal transit hub that integrates the Estuary's existing transportation assets under one roof: BART, Amtrak, Alameda County Transit, and the Oakland International Airport's air train. This hub would be the heart of a new district that includes affordable housing and spaces for community-driven entrepreneurial pathways. As combined sea level rise and groundwater emergence inundate Estuary landscapes many decades from now, we envision dynamic neighborhoods emerging that interweave built and natural environments. These Tidal Cities combine tidal lagoons with floating housing, enabling future residents to live with water.





The Estuary Commons concept map - birds eye view

Path Forward

In this report, we identify numerous near- and long-term design proposals, along with next steps to secure funding and regulatory approvals. In the near term, we have developed several tactics to continue our collaborative dialogue long past the final Bay Area Challenge presentations in May 2018—tactics designed to support the community-driven resilience planning processes already underway.

Educate and inspire local resilience planning with fun and easy tools.

We will host "train the trainer" sessions on our ABC Toolkit with community and agency representatives. Team members will also make themselves available to speak at community meetings and with school groups about local environmental vulnerabilities.

Learn from each other through a peer-to-peer best practice network.

Team members will also hold a series of webinars to share best practices in local resilience, bringing together advocates from communities boldly addressing similar challenges. The first is scheduled with developers of a Hip-Hop Museum in South Bronx.

Put the community first and support developing a Community Benefits District (and beyond) in East Oakland.

We recommend an existing (or new) non-profit organization be identified to administer a Community Benefits District (CBD), which would provide a community-driven framework to implement local resilience strategies and support the health, wealth, and stability of its residents. It would give East Oakland a seat at the table in policy conversations, and could possibly be one layer in a multi-layered community benefits structure. An immediate next step would be to leverage the community-driven planning process for the East Oakland Neighborhood Initiative to further explore this CBD structure.

Teach the next generation of Bay Area leaders through continued academic-community engagements.

To enhance learning outcomes and bring the studio to the street (and vice versa), we look to pursue more direct, community-based educational opportunities. Kristina Hill and Nicholas de Monchaux from the University of California, Berkeley (UCB) and Janette Kim and Neeraj Bhatia from California College of the Arts (CCA) plan to each focus one of their courses next year on local resilience. UCB College of Environmental Design will also explore developing an online portal for Estuary residents to express their ideas, priorities, and challenges pertaining to resilience.

Initiate near-term adaptation actions to build toward an Estuary Commons.

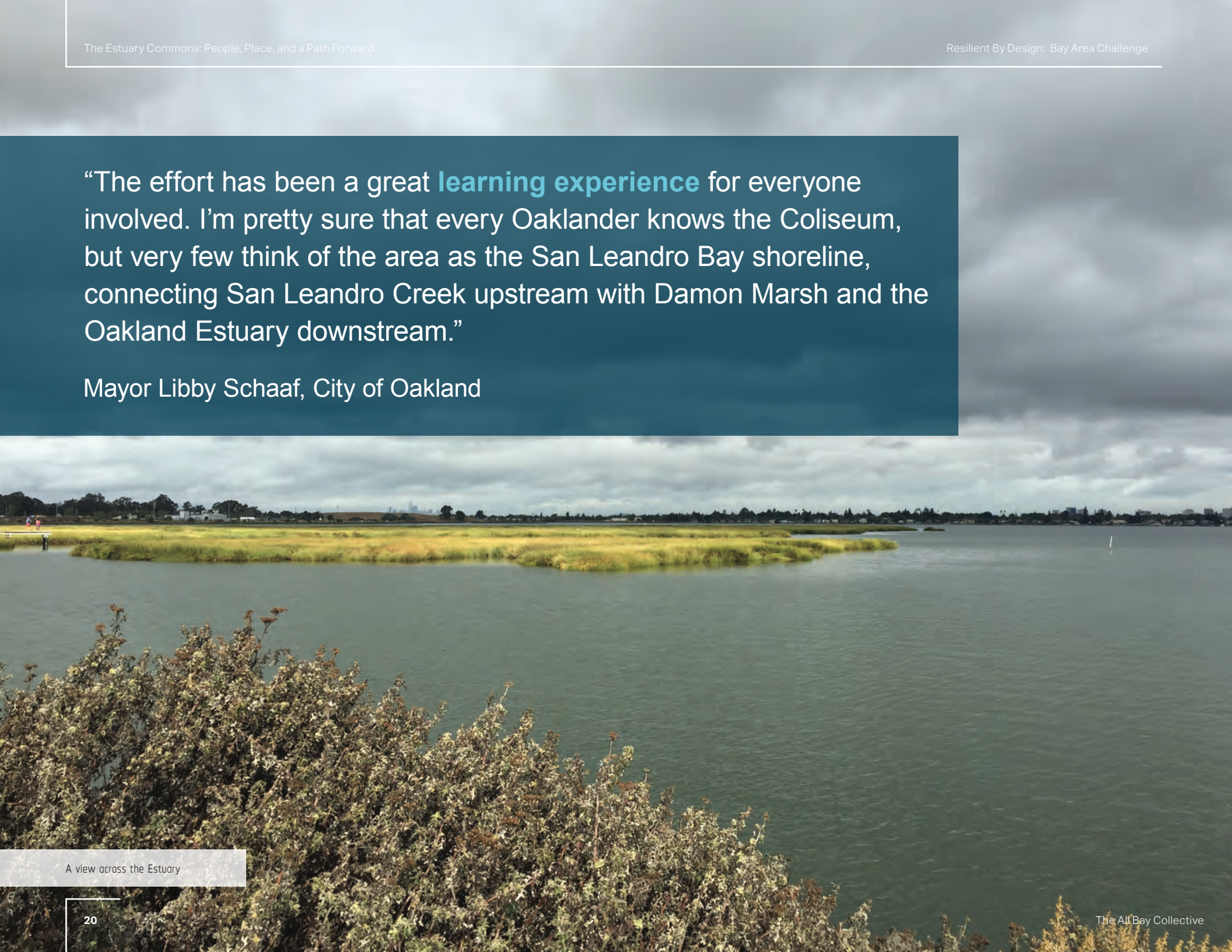
Estuary stakeholders and community groups should take next steps to catalyze near-term adaptation and sustained resilience. Many of these projects can start tomorrow by initiating feasibility studies and environmental review. Projects like the Arroyo Viejo realignment and East Slough Channel expansion would provide immediate benefits to local flood capacity and wildlife habitat. Developing the Hegenberger Greenway and establishing the missing Bay Trail link at High Street would immediately enhance local access to and from the Estuary. Furthermore, a Tidal Cities pilot project could begin exploring the viability and practicality of floating communities, and concept studies could weigh the benefits and costs of realigning and tunneling I-880.

We see our proposals as the continuation of a local dialogue on Estuary resilience that preceded and will long succeed the Resilient By Design Bay Area Challenge. This Challenge has enabled us to make valuable contributions to this conversation, particularly through technical research, social network building, and synergistic physical design concepts. Moving forward, it will be imperative that all proposals, whether derived from Resilient By Design or elsewhere, embrace the community-driven resilience planning processes already underway. By doing so, we can create a shared place and process—an Estuary Commons—that puts community priorities first and manages this vital resource for the benefit of all.

Janette Kim engaging local stakeholders at the BART station with the In It Together Game

"The effort has been a great **learning experience** for everyone involved. I'm pretty sure that every Oaklander knows the Coliseum, but very few think of the area as the San Leandro Bay shoreline, connecting San Leandro Creek upstream with Damon Marsh and the Oakland Estuary downstream."

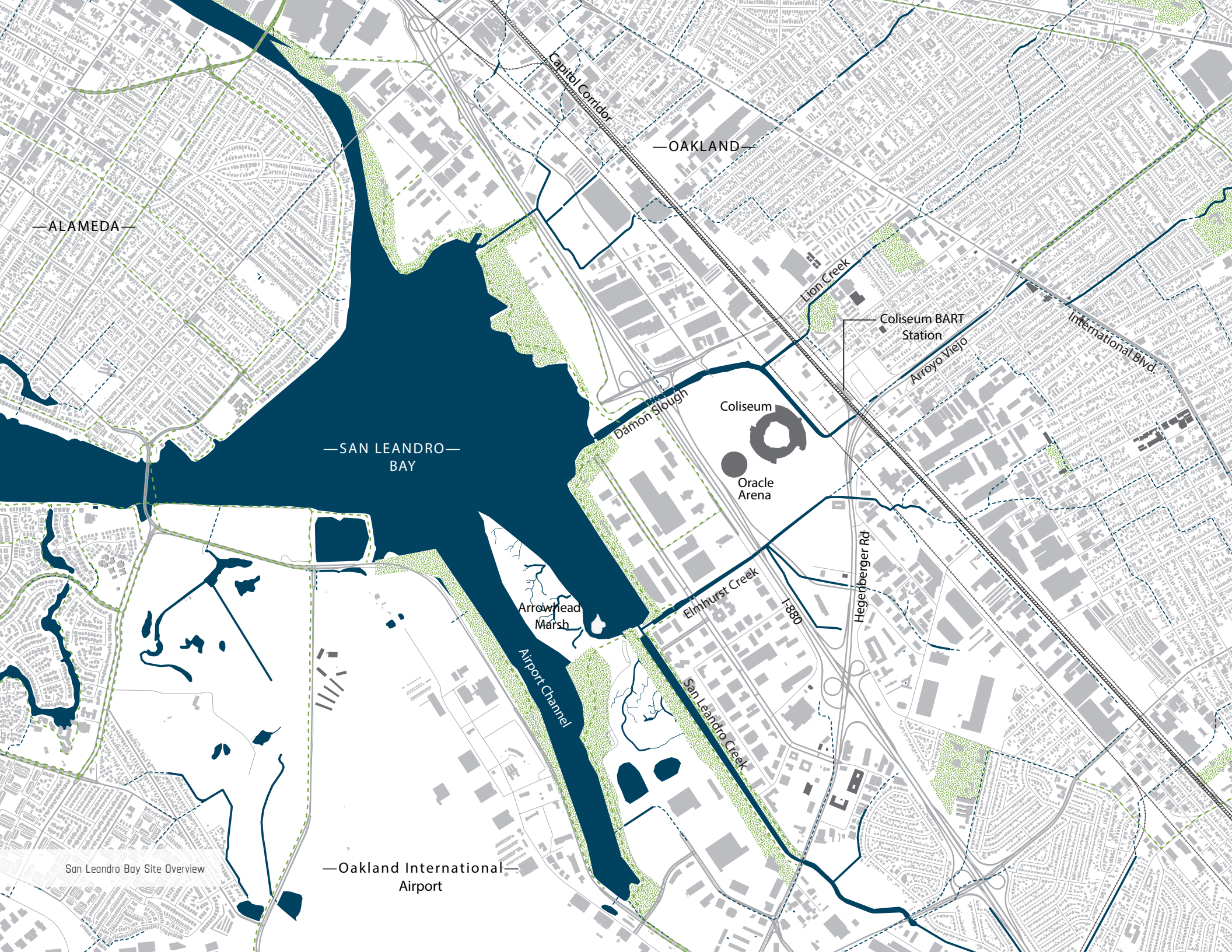
Mayor Libby Schaaf, City of Oakland



A view across the Estuary

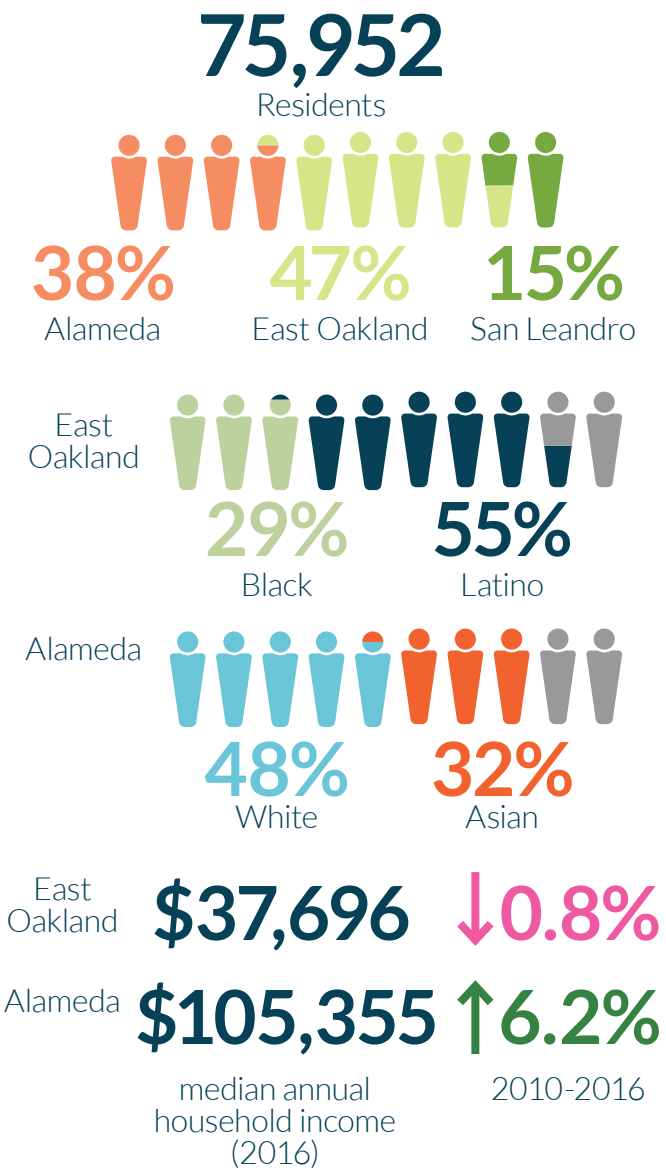
During the design phase, we continued listening, learning, and working with stakeholders to better understand the vulnerabilities facing the Estuary communities. This chapter details our two-level engagement process, which involved Project Working Group meetings with agency and community representatives, as well as community-based events with residents. We identify key issues and priorities facing Estuary neighborhoods, as well as the bold strategies already underway to address them. We also highlight the additional research and analysis we undertook during this phase, including new maps showing the combined effects of sea level rise and groundwater emergence.

1. Site Overview and Due Diligence



San Leandro Bay Site Overview

1.1 Site Location and Description



Our site extends from the center of San Leandro Bay (i.e., the Estuary) to approximately one mile inland from the current shorelines of Oakland and Alameda. The area currently encompasses neighborhoods in the cities of Oakland, Alameda, and San Leandro, and includes numerous major public and private assets as illustrated in the map to the left.

There are 75,952 residents in the study area according to the 2016 US Census 5-year estimates, which is an increase of nearly 5,000 people since 2010. Nearly half reside in East Oakland, with the remaining 38 percent in Alameda and 15 percent in San Leandro. There is a marked difference in both median household income and racial/ethnic composition between the East Oakland and Alameda census tracts for the study area. East Oakland tracts are 29 percent Black and 55 percent Latino, while Alameda tracts are 48 percent White and 32 percent Asian. Households in East Oakland earn a median annual income of $37,696; for Alameda, that figure is $105,355. Relatedly, median household incomes have decreased slightly (0.8 percent) in East Oakland since 2010, while they have increased 6.2 percent in Alameda (compared to an increase of 15.1 percent for Alameda County overall).

This tale of two communities is also reflected in environmental vulnerability. According to the California Environmental Protection Agency's CalEnviroScreen[1], Alameda ranks below the majority of California cities in risk exposure (Alameda's relatively affluent Bay Farm Island ranks below more than 90 percent of these cities). Meanwhile, East Oakland ranks above 90 percent of these cities, bearing a disproportionate burden of environmental impacts.

Historically, the Estuary was once a shallow water bay surrounded by tidal mudflats and marshes. This large marsh complex performed numerous ecological functions: protecting the uplands against flooding, filtering contaminants from the water, minimizing soil erosion, and providing habitat to wildlife and migratory birds. Cutting and filling operations have extensively altered the landscape since at least the 1870s, when a 30-year project carved a tidal canal between the Estuary and the old Oakland Harbor—a gash that isolated Alameda from the mainland. Since then, more than four square miles of coastal wetlands in Oakland and Alameda have been filled with urban rubble and dredged sand. During this filling process, several new creeks were created (Lion Creek and Elmhurst Creek) or relocated (San Leandro Creek).

Additionally, Arrowhead Marsh exists as a result of both human and natural actions. The sediment that formed this marsh began flowing down San Leandro Creek in 1874, when an extreme rainstorm washed out the sand and clay that engineers had placed to form the Lake Chabot Dam. Today, the marsh extends into the Estuary from the mouth of (the relocated) San Leandro Creek, serving as an important habitat for two state- and federally-listed wetland species: the Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*) and Ridgway's Rail (*Rallus obsoletus*).

[1] California Environmental Protection Agency. (2018). CalEnviroScreen 3.0 Results. Retrieved from https://oehha.maps.arcgis.com/apps/webappviewer/index.html?id=4560cfbce7c745c299b2d0cbb07044f5

1.2 Due Diligence and Stakeholder Collaboration

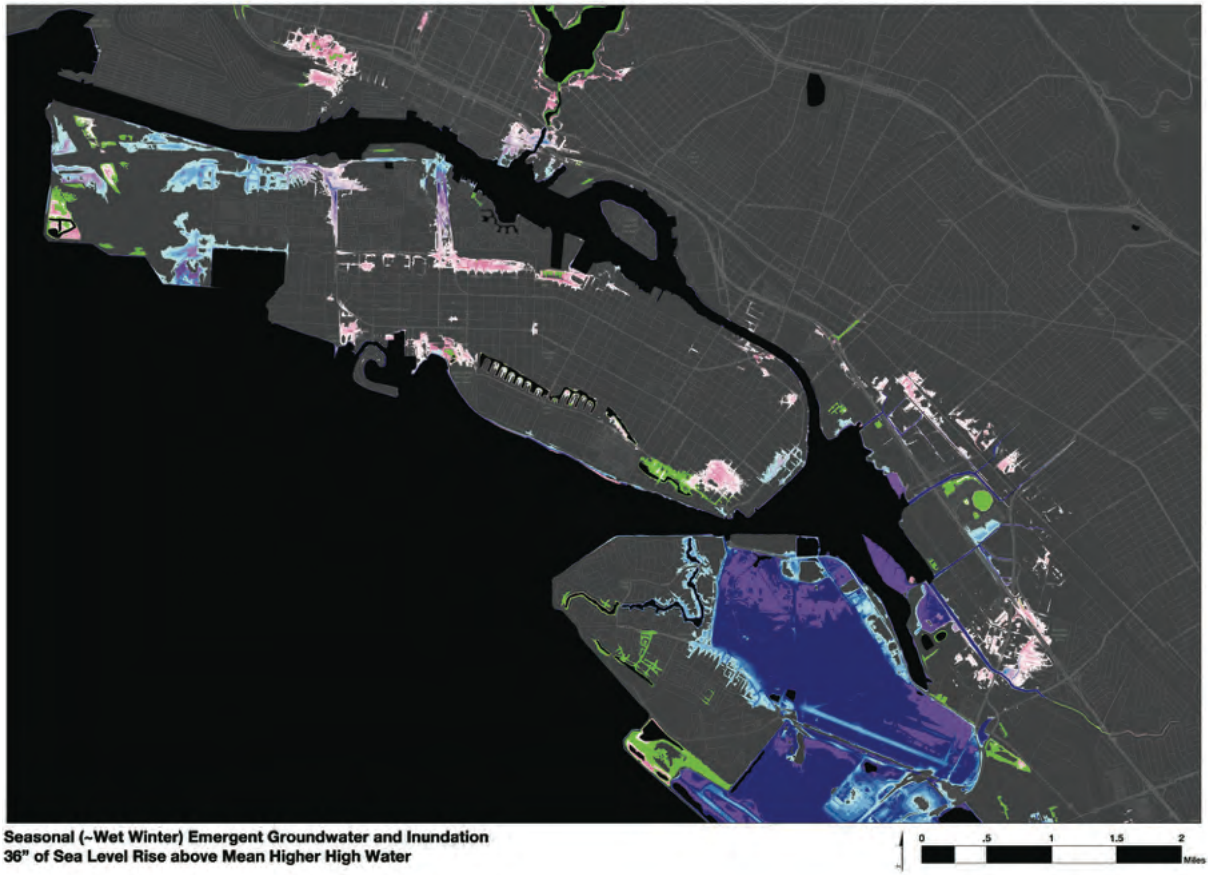
Additional Research and Analysis

During the design phase, our team continued to explore several themes from the research phase and learned much more from agency staff, community representatives, and additional flood mapping work. We also stepped back and learned from the landscape. One of our goals was to establish a nature-based approach that drew inspiration from the natural functions the Estuary had historically provided. By comparing the past landscape with that of today, we were able to better conceptualize a vision for a resilient future.

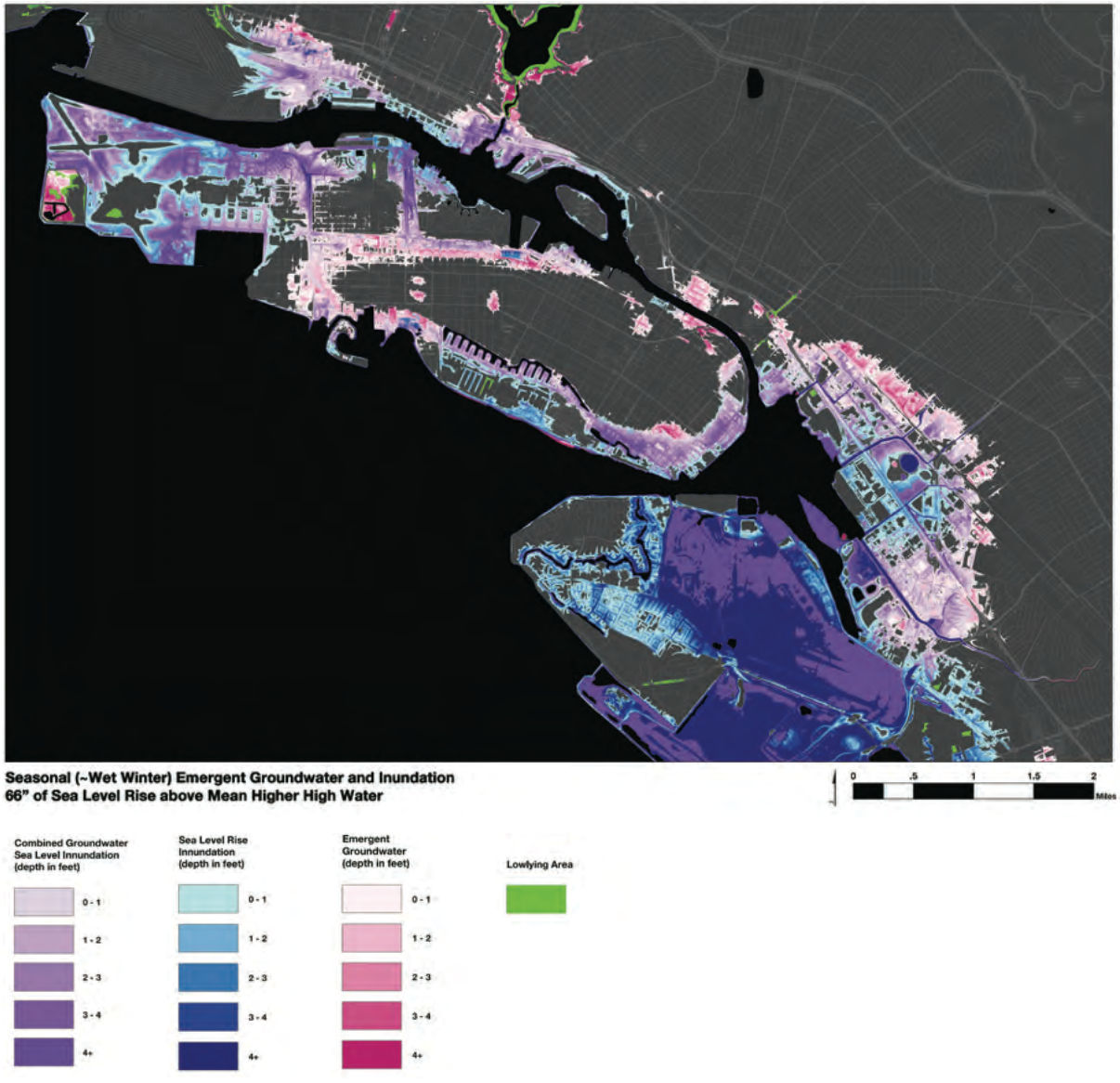
A double-threat: Combined sea level rise and groundwater flooding

An important addition we made during this phase involved investigating how sea level rise will affect groundwater levels—and vice versa. If planners only consider rising tides and overlook the rising water table, flooding may occur despite shoreline protection measures. Also, because a higher water table can intensify liquefaction risks, the region's seismic resilience will decline. Furthermore, underground pipes and basements could fill with contaminated water, and our ability to deal with stormwater will become severely compromised because the "sponge" of the soil will already be saturated.

To get a better picture of groundwater emergence, we mapped surface groundwater projections in tandem with sea level rise estimates. Our maps show that about 23 percent more land will flood in our study area if sea level rise and groundwater are considered cumulatively. This means that building levees or seawalls will not address this double-threat, because groundwater will rise behind and beneath them to cause flooding. Furthermore, in



Combined Threat: Emergent Groundwater and Inundation - 36 inches of Sea Level Rise



Combined Threat: Emergent Groundwater and Inundation - 66 inches of Sea Level Rise

San Jose, the California Delta, and New Orleans where the wetland soil is similar to the soil that underlies the urban areas surrounding San Leandro Bay, pumping away groundwater can cause subsidence.

Combined sea level rise and groundwater flooding will compound health impacts, displacement, and limited access to open space that already characterize East Oakland. All three cities around the Estuary will also face serious challenges to sewer systems, building and roadway stability, and shoreline erosion. Additionally, as flood zones expand, more property owners may be subject to federal regulations that limit new construction and mandate the purchase of flood insurance—requirements that could make housing even less affordable.

Addressing this double-threat demands truly innovative and systematic design solutions. Our Tidal Cities concept (see Sections 2.2 and 4.1) enables humans to live with water, creating floating neighborhoods within tidal lagoons. The ponds and canals of this dynamic urban fabric would better absorb rising tides, drain groundwater, and guide rainwater away from homes.

A history of environmental injustice, a future of community benefits

We learned that past discriminatory practices like redlining and predatory lending have effectively prevented East Oakland residents from building wealth from home ownership. Discrimination in hiring practices and education have also burdened these communities. Air pollution—especially from I-880 and nearby industrial uses—has led to high asthma rates and other health issues. These problems are so extreme that they qualify East Oakland neighborhoods to receive state mitigation funding from cap-and-trade auctions.

We understood from our previous conversations with community representatives that I-880 blocked cyclists and pedestrians from accessing MLK Shoreline Park. In this phase, we discovered that the only two highway overpasses (Hegenberger Road and 66th Avenue) had no bike lanes and sidewalks on only one side—a dangerous condition for children and others trying to get to the Estuary.

To remedy these longstanding environmental injustices, unconventional urban development strategies are needed to promote the health, wealth, and stability of residents around the Estuary—especially in East Oakland. Instead of jumping to the business-as-usual city center mix of housing, parks, and transit, our team recognized that investments like this were just as likely as flooding to accelerate displacement. Instead, new solutions are needed to put residents at the heart of the urban development conversation.

This led us to refine our ideas for Resilient Equity Hubs (see Sections 2.2, 3.2, and 4.1) and propose hyper-local governance frameworks that could fund and implement neighborhood-scale adaptation efforts. Two catalytic, near-term elements of this framework include: (1) local ownership of land and housing stock through a community land trust, like the existing Oakland Community Land Trust; and (2) the formation of an East Oakland Community Benefit District (CBD) to negotiate for and fund community benefits.

We learned that Oakland already has 10 CBDs and Business Improvement Districts (BIDs) that help organize neighborhoods such as Rockridge, Temescal, Lake Merritt, and Fruitvale. These districts have also formed a citywide advocacy alliance. However, no districts of this type exist in East Oakland. To remedy this gap and help residents leverage future investments to achieve community priorities, our team proposes that community groups explore forming a CBD as part of the East Oakland Neighborhood Initiative planning process.

Biking over I-880 on Hegenberger Road...with no sidewalk!

Biking on 66th Avenue at Capitol Corridor Rail Crossing

Community and Stakeholder Collaboration

During the design phase, ABC facilitated a two-tiered approach to community and stakeholder collaboration—first at the Project Working Group (PWG) level and second at the community level. Our team convened a PWG that included representatives from governmental agencies and community-based organizations (see Appendix B for a full list of participants). The PWG met during three intensive working sessions that explored a range of stakeholder goals and physical adaptation strategies. These sessions provided vital networking opportunities to align ongoing resilience efforts and foster future partnerships. Participants also worked with us to co-create our overall design vision, the *Community Resilience Investment Decision-Making Tool*, and the *In It Together Game* (described in more detail below in ABC Toolkit).

Project Working Group Level

PWG 1

ABC held our first PWG meeting (PWG 1) on February 27, 2018 at Schimmick Construction's office in East Oakland, representing the I-880 and industrial corridors of our site. During this meeting, we discussed how sea level rise and groundwater flooding might impact the study area. Our team then gathered input on a range of adaptation strategies including Resilient Corridors, Tidal Cities and Resilient Equity Hubs. Participants shared ideas for how to build on these concepts and requested we "go big" to show how they could be integrated within the existing urban fabric. To help refine the *In It Together Game*, created by Janette Kim and her California College of the Arts (CCA) students, attendees considered the stakeholder interests affected by sea level rise and offered feedback on the game's "stakeholder interest cards".

PWG participant feedback on the In It Together Game

PWG 2

ABC held our second PWG meeting (PWG 2) on March 13, 2018 at the Martin Luther King, Jr. Regional Shoreline Park Visitor Center, representing the ecological corridors of our site. We split the group in two to test out the *In It Together Game*. Participants soon realized that they could get further faster if they collaborated with other players who shared the same goals. Players were engaged and interested, and we received valuable feedback on how to make the game easier to understand and play.

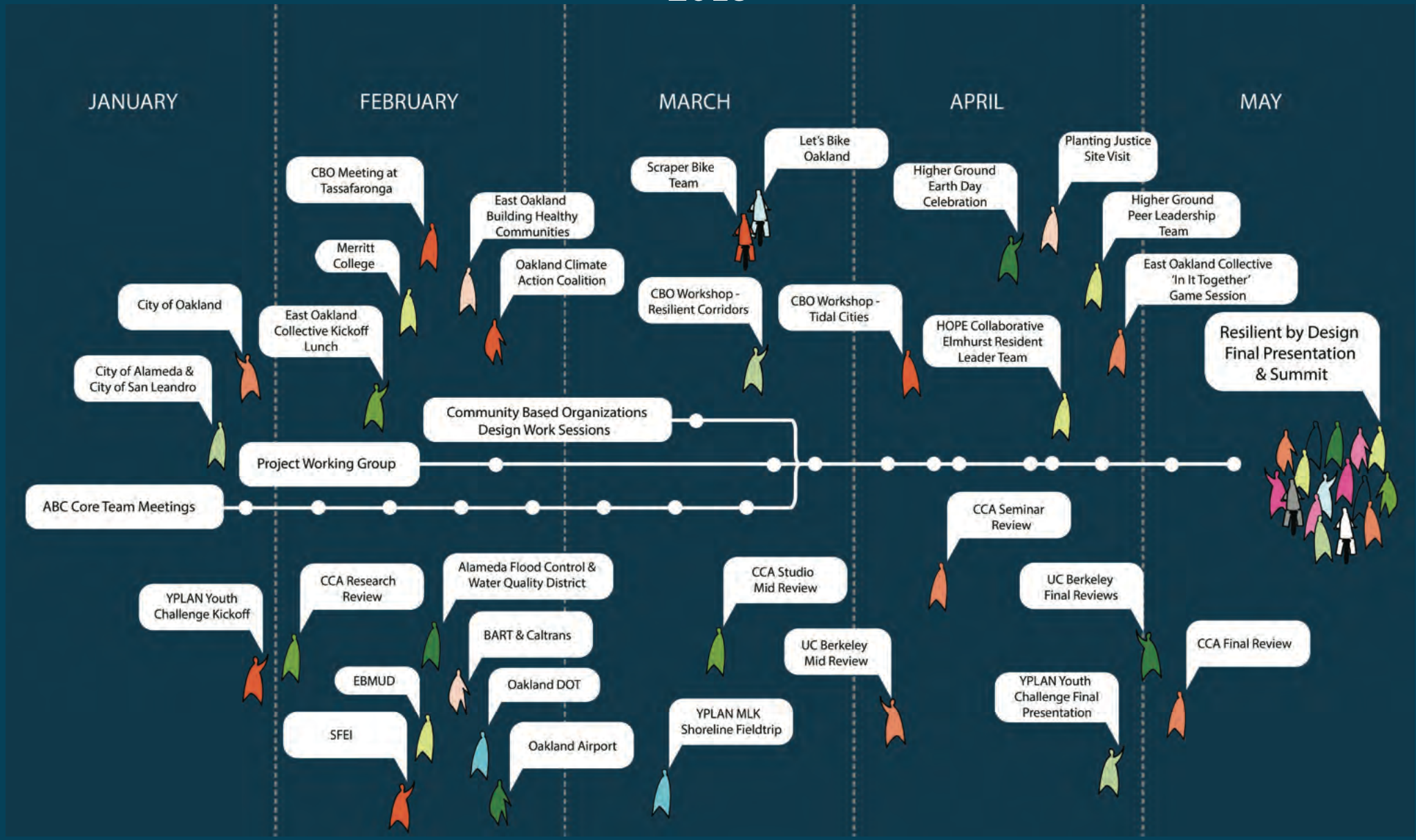
Following gameplay, attendees rotated around to three stations. At the first station, they reviewed and commented on draft criteria for the *Community Resilience Investment Decision-Making Tool*. We challenged them to prioritize criteria, identify any that were missing, and make recommendations for any that could be cut. Participants were reluctant to remove indicators, suggesting that the long list be preserved so community groups or other future users could select the indicators that were most important for their projects.

Marquita Price from East Oakland Collective and Stephen Engblom from ABC play In It Together Game...together!

Jamie Phillips and Chris Guillard from ABC exploring design options for The Estuary Commons

The second station positioned the Estuary as a new sub-regional hub—the next Lake Merritt for Oakland. We revealed concepts for realigning I-880 out of the flood zone and alongside existing BART, Amtrak, and Union Pacific corridors. This scenario received interest from PWG members. Finally, at the third station, we illustrated our landscape design ideas for the Estuary, showing how surrounding communities could be both connected and protected through a series of expanded shorelines and greenways.

2018



ABC's Collaborative Process for the Resilient By Design Bay Area Challenge

PWG 3

ABC held the third PWG meeting (PWG 3) on April 17, 2018 at the Lion Creek Crossing Community Room in East Oakland, representing the residential corridors of our site. The giant 12-foot model of San Leandro Bay made by CCA students in Neeraj Bhatia's architecture studio was the focal point for the meeting. All participants convened around the model for group discussions, jumping into the bay when it was their turn to speak. Community representatives embraced this method, leaping in and out of the model to express their views on our team's big vision for the Estuary Commons. We received passionate feedback urging us to use the local name for the site— the Estuary—given the fear that an outsider-conceived identity could signal future gentrification.

Participants then engaged in a round-robin session where they asked others to collaborate on their projects and identified opportunities for coordination on others' projects (see the results in Table 1). This was a valuable opportunity for PWG members to meet, exchange views, and start a conversation about future engagements. This session laid the groundwork for our team's near-term project suggestions outlined in Chapter 3 of this report.

Finally, participants wrote and drew their own design ideas on a large table map, reflecting the priorities and projects close to their hearts. This exercise sparked many productive discussions between agency and community representatives about how they could collaborate moving forward.

Large table map used by PWG 3 participants to record their key priorities and projects

Tian Feng from BART responding to design ideas presented at PWG 3

Representative from Scraper Bike Team jumps in the "Bay" to express his views on the commons

Table 1: Near-Term Collaborations from PWG3 Round-Robin

Key: O – Owner I – Be Informed G – Provide Guidance PP – Participate PR – Partner CL – Collaborate CB – Combine	BART	Caltrans	Port of Oakland	East Bay Regional Parks District	City of Oakland	City of Alameda	City of San Leandro	Oakland Climate Action Coalition	East Oakland Collective	East Oakland Building Healthy Communities	HOPE Collaborative	Institute for Sustainable Policy Studies & Action	Planting Justice	Repaired Nations	Scraper Bike Team
East Oakland Neighborhood Initiative	I	I, PP	I		O	I	I	O	I, PR	O	O	I, PP, PR	PP, CB	I, PP	I
BART Sea Level Rise Adaptation Study	O	I, PP, CB				I	I, CB		I, CB		I	I, PP, CL		I	
Oakland International Airport Perimeter Dike Improvements			O			I	I, CL		I, PP, CB			I, PR			
San Leandro Water Pollution Control Plant Treatment Wetland			I				O	I, PP				I, PP, CB			
Bay Trail Improvements	I, PP, CB	PP	I	O		I, PP	I, PP		I, PP			I, PP			
San Leandro Creek Greenway	PP			I		I	O		I, PP		I	O	PP, CB		I
"Let's Bike Oakland" Bicycle and Pedestrian Plan	I, G, PP								O			I, PP, CL	I	I, PP	O
Urban Farms and Co-ops							I, CB					CL			

Community Level

At the community level, our team collaborated with community representatives and residents as co-designers. We worked especially closely with eight community-based organizations (CBOs) throughout the design phase: East Oakland Collective, Oakland Climate Action Coalition, Scraper Bike Team, Merritt College Brower Dellums Institute for Sustainable Policy Studies, Planting Justice, HOPE Collaborative, East Oakland Building Health Communities, and Repaired Nations.

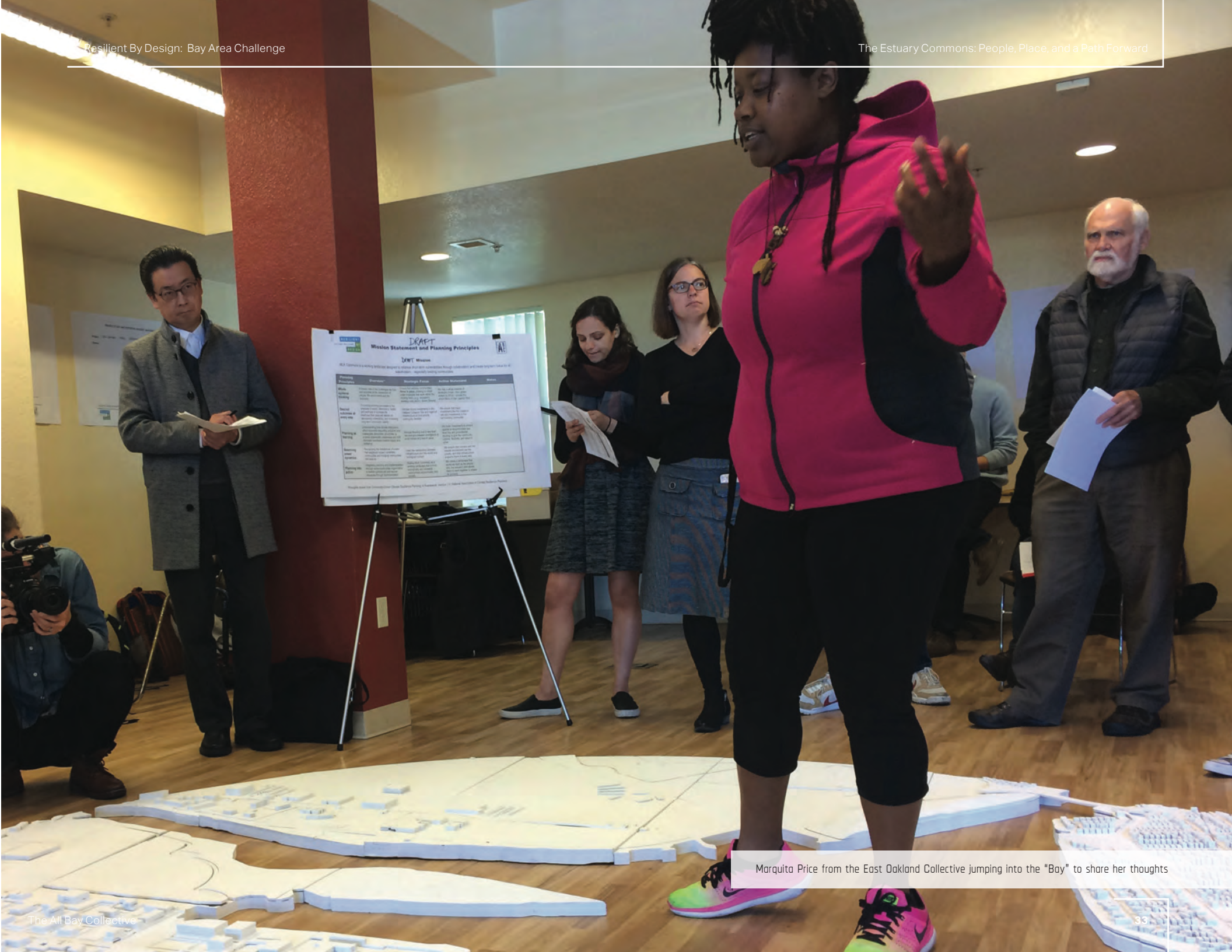
Our collaborative process involved multiple touchpoints for co-creation and dialogue. First, before sharing any design ideas publicly, we held a meet and greet with CBO leadership to listen to their goals, concerns, challenges, and existing efforts. Second, community representatives joined all interviews with agency stakeholders, connecting directly with these staff and better understanding their priorities. This strategy established transparency and built relationships between community and agency representatives—relationships vital to enhancing local resilience that will continue long after the Bay Area Challenge.

Third, community representatives participated side-by-side with our team during weekly design meetings. This reinforced transparency and created opportunities for these advocates to directly influence the design process and outcomes. In addition, we hosted bi-weekly working sessions to more deeply and collaboratively explore design concepts. Finally, rather than asking community members to come to our offices and schools, our team went to the community. At the invitation of our community partners, we attended six community events to listen, share ideas, and facilitate interactive exercises. These events are highlighted in Table 2 below.

The end of the Bay Area Challenge does not mark the end of ABC's engagement with stakeholders and community members. In fact, our team looks forward to furthering the goal of a resilient, equitable, and community-driven Estuary in the months ahead. For more details on our ongoing engagement, please see Chapter 7: Path Forward.

Date	Host	Agenda
April 21, 2018	Higher Ground Earth Day Celebration	Facilitated an interactive discussion on sea level rise and learned about what youth care about in their community
April 24, 2018	HOPE Collaborative Elmhurst Resident Leader Team	Learned about neighborhood priorities, facilitated an interactive exercise focused on sea level rise, and explored potential adaptation strategies
April 25, 2018	Higher Ground Peer Leadership Workforce Development Team	Met with youth to learn about neighborhood priorities, facilitate an interactive exercise focused on sea level rise, and explore potential adaptation strategies
April 25, 2018	East Oakland Collective	Facilitated the cooperative sea level rise adaptation game, *In It Together*, with a group of about 35 and explained the double threat of sea level rise and groundwater flooding
May 5, 2018	Sobrante Park Resident Action Council	Met with community leaders to learn about neighborhood priorities, facilitate an interactive exercise focused on sea level rise, and explore potential adaptation strategies
May 10, 2018	ABC public event hosted at BART Coliseum station	Shared new groundwater emergence and sea level rise maps, and facilitated the cooperative sea level rise adaptation game, *In It Together*

Table 2: ABC participation in community-based events



Marquita Price from the East Oakland Collective jumping into the "Bay" to share her thoughts

ABC Toolkit

To create meaningful and lasting engagement, ABC developed a toolkit with three components: (1) the *In It Together Game*; (2) the *Community Resilience Investment Decision-Making Tool*; and (3) the *ABC Equity Checklist*. This toolkit is designed to help both agency staff and residents evaluate adaptation strategies through the lenses of resilience, equity, and financial feasibility. These tools will live on long past the Bay Area Challenge, continuing to educate residents and spark conversations about solutions to the Estuary's environmental vulnerabilities.

In It Together

The *In It Together Game* is a serious game that brings stakeholders together around a map of the Estuary to cooperatively explore adaptation strategies, weigh their tradeoffs, and achieve greater local resilience. This game was designed by students at CCA, led by Janette Kim.

The aim of the game is to educate and spark conversations about how climate change impacts Estuary neighborhoods. Players represent diverse communities and agencies within the Estuary, each with unique goals to build long-term resilience and meet immediate-term needs. In each round, they take turns placing adaptation pieces (e.g., living levees, tidal ponds, greenways, high-density housing) on the map, paying for these actions with in-game currency. As the rounds advance, so too does flooding, taxing players if flood waters reach unprotected buildings or infrastructure. Players can compete or collaborate to realize a win-lose outcome if they individually accomplish their goals or achieve a win-win solution if they collectively score all available 'Collective Resilience Points.' See Appendix E for the complete set of game instructions.

Higher Ground Leadership Workforce Development Team preparing to play the Game

Throughout the Bay Area Challenge, ABC has co-created, played, and refined *In It Together* with agency and community representatives. We played the game during PWG meetings to help refine the adaptation strategies outlined in this report. We also took it into the field to play with CBOs like East Oakland Collective, Higher Ground, and passersby at the BART Coliseum station. In the coming months, we will continue to fine-tune the game and conduct train-the-trainer sessions to help neighborhood advocates and agency staff incorporate it into their planning processes.

Community Resilience Investment Decision-Making Tool

Communities around the Estuary have limited resources to invest in climate adaptation while also meeting other critical local needs. Recognizing the importance of maximizing not only the financial, but also the social and environmental co-benefits of new infrastructure investments, many places across the country and internationally are using triple bottom line (TBL) approaches. TBL methods measure the tradeoffs between different policy options to maximize scarce resources and realize interrelated financial, social, and environmental goals. City agencies and public utilities have commonly used these tools to help prioritize investment decisions. However, they are less frequently created specifically for community-driven planning or for projects that span jurisdictional boundaries.

Improving on previous TBL examples, our team developed the *Community Resilience Investment Decision-Making Tool*. This adaptable framework helps users evaluate the social, environmental, financial, *and* governance co-benefits of different investment choices. Working with agency and community representatives through our PWG meetings, we co-created a tailored set of criteria and indicators that can be used to evaluate adaptation strategies around the Estuary. These metrics elevate the importance of collaborative governance approaches and, in doing so, encourage a more equitable path forward for decision-making. Furthermore, community groups and public agencies can refine and adapt this tool as their resilience, equity, and environmental goals evolve.

In Section 4.2, we use the *Community Resilience Investment Decision-Making Tool* to evaluate our team's overall design concept for an Estuary Commons. Additionally, Appendix F details the criteria, indicators, and metrics for the tool, along with additional criteria that users can employ based on their unique priorities and goals.

ABC Equity Checklist

During the research phase, we developed our Equity Checklist as a tool to help residents document their investment priorities. This checklist drew on resources such as the Bay Area Regional Health Inequities Framework (built environment indicators related to health outcomes), APEN's "Investment without Displacement" guidelines (anti-displacement and affordable housing), and the Greenlining Framework (equitable transportation investments). We also asked equity advisors from the Resilient By Design Research Advisory Committee to review and refine the checklist. The full *ABC Equity Checklist* can be found in Appendix G.

During the design phase, we learned that East Oakland CBOs had also developed an equity checklist focused on economic equity, social inclusion in decision-making, and community health. An Oakland City Council resolution in June 2015 recognized this checklist as part of its recommendations for adopting Priority Conservation Area Number 35 for Oakland Urban Greening. We see the *ABC Equity Checklist* complementing or being integrated into the checklist produced by East Oakland CBOs. Together, these tools can more extensively capture neighborhood priorities when evaluating future investments and negotiating community benefits.

Stakeholder and Community Issues and Priorities

Through plan review and collaboration with both agency stakeholders and community representatives, our team identified numerous resilience-related issues and priorities (see also Appendices G and H for an inventory of planning documents reviewed and issues identified). Sea level rise and groundwater flooding pose significant risks to assets (and asset owners) surrounding the Estuary, including nearby neighborhoods, industrial zones, and commercial properties. Major shared infrastructure and ecological assets at risk include the following:

- I-880
- BART Coliseum Station and traction power facilities
- Oakland International Airport
- Oakland Coliseum and Oracle Arena Complex
- Amtrak Capitol Corridor
- Union Pacific Railroad mainline
- San Francisco Bay Trail
- East Bay Municipal Utilities District wastewater treatment facility
- Arrowhead Marsh

In addition to flooding risks, planning documents identified environmental vulnerabilities related to liquefaction, drought, extreme heat, and fire. Operational challenges already exist and are expected to become more significant, including traffic congestion on I-880 and long-term land shortages at Oakland International Airport. Our agency stakeholders have been keen to explore systematic solutions to these challenges.

Community representatives and plans also seek to address major vulnerabilities related to environmental health, access, and social equity. There are substantial concerns related to gentrification and displacement, which are exacerbated by housing unaffordability for both owners and renters as illustrated in the displacement map on the next page. Lack of economic opportunity was a key concern voiced by community representatives. The introduction of new economic drivers and community-led investment pathways are seen as focal points for addressing socioeconomic equity, especially when paired with mechanisms for producing community benefits.

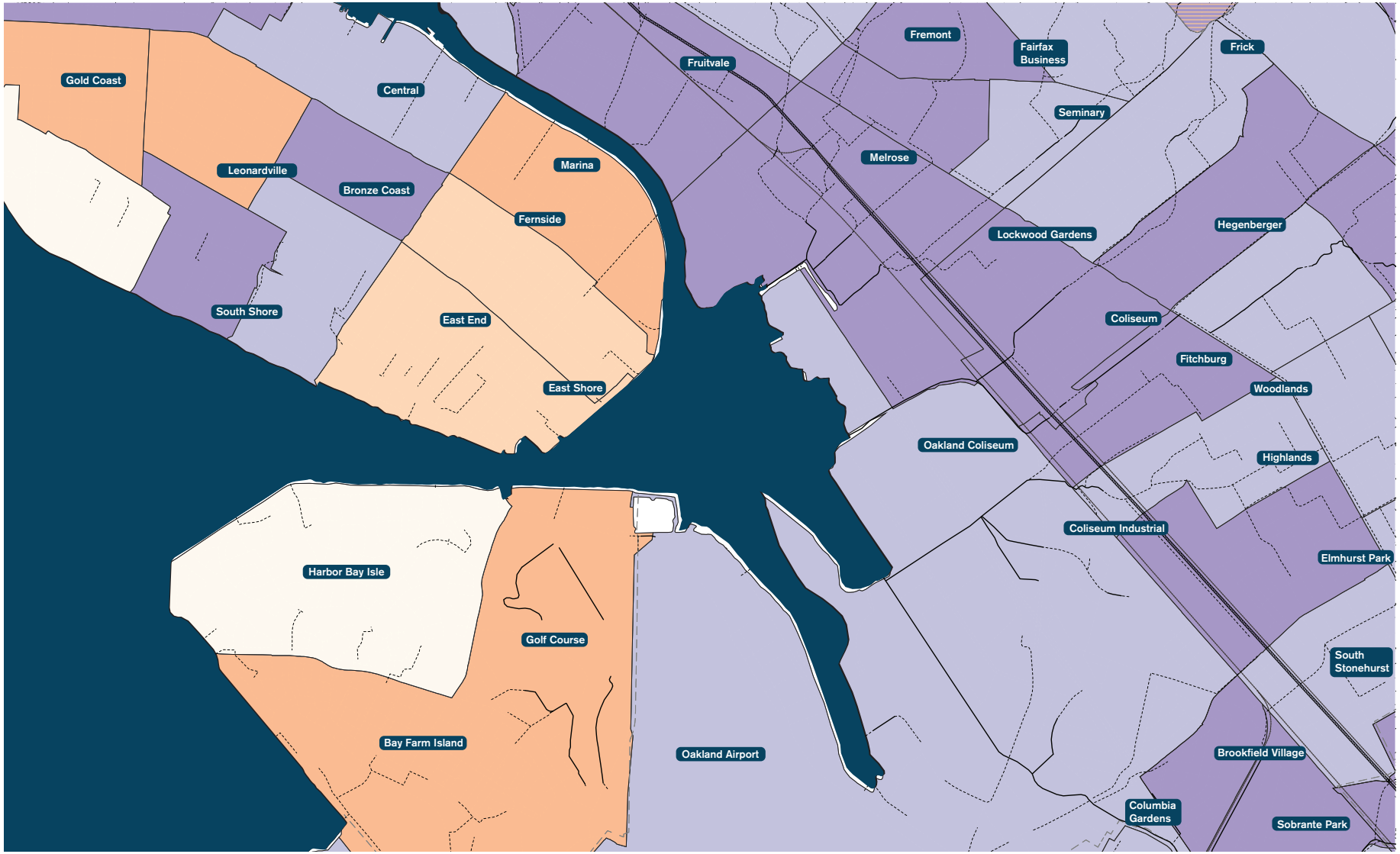
Mobility is a major issue owing to unsafe roadway conditions and limited bicycle and pedestrian connections. Additionally, residential areas are severed from open space and recreation opportunities along the shoreline. Restoring these connections is a major priority for stakeholders, communities, and our team. Likewise, enhancing tree canopy and introducing green infrastructure would help mitigate environmental vulnerabilities and enhance local quality of life.

Our study area includes East Oakland, where residents have long been concerned about environmental health burdens. Data collected by county, regional, and state agencies confirm that East Oakland neighborhoods experience significant disproportionate environmental, economic, and health impacts. This area is also considered a 'Community of Concern' by the Metropolitan Transportation Commission and it ranks in the lowest 5th-25th percentiles in CalEnviroScreen 3.0[2] due to poor air quality, water pollution, underemployment, and extreme poverty. In addition, the Bay Area Air Quality Management District includes East Oakland in the Community Air Risk Evaluation Program for having greater negative public health impacts due to proximity to I-880, industrial corridors, and distribution centers. Alameda County Public Health Department identifies East Oakland as having disproportionately high cumulative health risks and lower average life expectancies.

Local ecological health is also a major concern. San Leandro Bay is on California's list of Toxic Hot Spots for its severe water pollution, which poses a threat to aquatic life, wildlife, and human health. Encroachment of development and rising tides have also resulted in the loss of habitat for two endangered species: the Ridgway's Rail and the Salt Marsh Harvest Mouse.

[2]California Environmental Protection Agency. (2018). CalEnviroScreen 3.0 Results. Retrieved from https://oehha.maps.arcgis.com/apps/webappviewer/index.html?id=4560cfbce7c745c299b2d0cbb07044f5

Urban Displacement and Exclusion



Significant Current and Future Projects


Black Cultural Zone
Phase One Transit Village project, BART
East Oakland Neighborhood Initiative
East Bay Greenway: Lake Merritt BART to South Hayward BART project
Let s Bike Oakland Bike and Ped Plan Update
San Leandro Creek Master Plan Study
Water Pollution Control Plant - San Leandro Treatment Wetland
Arroyo Viejo
Country Club Branch
Lake Chabot

Significant Current and Future Projects

Many independent actions are underway to address the issues and priorities identified in the previous section. In collaboration with stakeholder and community representatives, our team has identified synergies among these efforts and proposed transformative adaptation strategies. Collectively, these new and existing actions will produce a unified approach to Estuary resilience.

The map shown here illustrates some of the ongoing and proposed projects throughout the Estuary.

Alameda Climate Action and Adaptation Plan (CAAP)

Type: Resilience planning

Start date: March 2018

Finish date: June 2019

Cost: $236,375 (grant funding)

CAAP is being developed in support from a Caltrans adaptation planning grant (2017/18 cycle).

East Oakland Neighborhood Initiative

Type: Resilience planning

Start date: 2018

Finish date: 2020

Cost: $170,000 (grant funding)

The City of Oakland and a coalition of CBOs (East Oakland Building Healthy Communities, Oakland Climate Action Coalition, HOPE Collaborative) are leading the Transformative Climate Communities (TCC) grant-funded planning process to develop the East Oakland Neighborhood Initiative.

Caltrans Roadway, Interchange, and Bridge Works (not mapped)

Type: Infrastructure improvements

Caltrans does not currently have plans to address mainline vulnerabilities on I-880, but has various roadway, interchange, and bridge works proposed along the I-880 near San Leandro Bay.

Phase One Transit Village project, BART

Type: Coliseum Station transit-oriented development program (planning, design and construction)

Start date: October 2017

Cost: $36 million (Phase 1)

The project includes 110 workforce apartments (50 percent affordable at 50-60 percent area median income [AMI]; 50 percent workforce at 80-120 percent AMI) with 2000 square feet of retail. BART received a Caltrans Adaptation Grant of $500,000 (2017/2018 cycle) for a Sea Level Rise and Flooding Resiliency Study assessing the vulnerability of four critical systems and developing strategies to adapt to sea level rise and groundwater flooding.

East Bay Regional Parks District (EBRPD) - Doolittle Drive Bay Trail

Type: Active transportation pathways and open space improvements

Phases 1 and 2 of Doolittle Drive Bay Trail project would complete a half-mile gap in the San Francisco Bay Trail, which connects Oakland to the City of Alameda. The project will also include rehabilitating the existing boat launch facility south of the Shoreline Center.

East Bay Regional Parks District (EBRPD) - The Tidewater project

Type: Active transportation pathways and open space improvements

The proposed Tidewater project involves creating a new 8-acre park in East Oakland on a site that was most recently used as a trucking storage yard. The proposed project consists of a regional park with a multi-use lawn, nature play area, picnic spaces, paved and natural trails, an outdoor classroom, boat storage, and parking.

San Leandro Creek Master Plan Study

Type: Greenway and trail master planning

Cost: $21 million ($8.5 million Oakland section; $12.5 million San Leandro section)

Led by the City of San Leandro in collaboration with local community representatives, this proposed project includes a six-mile multi-use creek trail that will provide a continuous green pathway through San Leandro and Oakland to the Martin Luther King, Jr. Regional Shoreline Park. The majority of funding projected to come from the Active Transportation Program and Alameda County Measure BB.

East Bay Greenway: Lake Merritt BART to South Hayward BART project

Type: Greenway and trail master planning

Alameda County Transportation Commission proposes to construct a 16-mile regional trail facility along the BART alignment from Oakland to Hayward. The project would consist of Class I multi-use pathways and Class IV protected bikeways as well as lighting, fencing, barrier railings, intersection improvements and crossing treatments, and other features needed to ensure user safety and security.

Let s Bike Oakland Bike and Ped Plan Update

Type: Bicycle and pedestrian improvements

The East Oakland Collective and Scraper Bike Team are also working with the City of Oakland to produce "Let's Bike Oakland" — the 2017-2018 Oakland bike plan update. Sales tax receipts allocated under the Transportation Development Act, Article 3 are helping fund this update. Priority projects include several BART to bay connections, including at 66th Avenue; Coliseum Station; and High Street Bridge.

Oakland International Airport perimeter dyke improvements

Type: Flood defense

Start date: 2019

Cost: $47 million

Forms part of the airport's 5-year capital improvement plan. The project has received $6.4 million in State Local Levee Assistance Program (LLAP) grants to offset a portion of design, environmental review, and construction expenses.

Water Pollution Control Plant - San Leandro Treatment Wetland

Type: Wastewater treatment

Cost: $539,000 (grant funding)

A treatment wetland is being designed and permitted to reduce pollution, enhance habitat, and shoreline resilience. This project will restore 4.3 acres of transitional wetlands to tidal marsh as a demonstration project.

Black Cultural Zone

Type: Cultural protection program

Working with a coalition of residents, government agencies, churches, and grassroots groups in East Oakland, the EastSide Arts Alliance has advanced the concept of creating a Black Cultural Zone. This zone will support Black-run businesses, promote healthy choices and lifestyles, offer cultural education programs, and lift up Black cultural traditions and innovations — all in an attempt to build a stronger East Oakland and discourage potential displacement.

Estuary Commons Scenario Plan with Tidal Cities

“We’ve turned a few classic ideas upside down. We’re putting creeks over highways instead of under them. We’re putting community in the foreground of the planning process rather than the background. And we’re letting natural systems inform infrastructure planning.”

Chris Guillard, Principal, CMG Landscape Architecture

2. Design Vision

2.1 Design Guiding Principles

ABC worked with its community partners to develop a principles-based approach for our team's design process. We learned from these partners that advocacy groups in East Oakland had adopted a shared set of principles, published by the National Association of Climate Resilience Planners (NACRP)[3], to conduct community-driven resilience planning. Our team reviewed these principles, presented them to our Project Working Group (PWG), and adopted them into our design process. In this section we describe the five key principles, along with associated physical design goals for the Estuary.

The Estuary Commons as seen from above

[3] Community-Driven Climate Resilience Planning: A Framework, Version 2.0. (2017). National Association of Climate Resilience Planners. Retrieved from https://www.nacrp.org/

Whole systems thinking

This principle required us to acknowledge the historical impacts of systemic racism as an influence on neighborhoods in in East Oakland, Alameda, and San Leandro, as well as the interrelated environmental factors that will produce flooding and require adaptation.

Physical design goal: Our design helps communities thrive in place, drawing on small-scale strategies that work within the existing fabric like green pathways to and along the shoreline and a Community Benefits District (CBD). They also systematically address the double threat of sea level rise and groundwater flooding.

Desired outcomes reflected at every step

This principle prompted us to consider how equity (of access, of self-determination, and of exposure to environmental benefits and impacts) can be enhanced at every step—not just expressed as a desired future outcome.

Physical design goal: Our design takes a "kit of (interrelated) parts" approach, rather than presenting a master planned concept. This way, residents can learn from and reflect on individual adaptation actions to incrementally build resilience and equity. Investments in the Coliseum site and regional infrastructure, as major foreseeable steps, will be leveraged to fund priority community benefits.

Planning processes as learning processes

This principle demanded that we approach our design process as a project-based learning process. For our study area, this meant strengthening community capacity to actively engage in decision-making about sea level rise and groundwater emergence.

Physical design goal: Our design incorporates learning into the design process through the *In It Together Game* and *Community Resilience Investment Decision-Making Tool*. These educational tools will help residents manage the double threat of sea level rise and groundwater emergence in flexible and community-centered ways.

Planning into action

This principle required that we tie our designs to near-term actions and active stakeholder organizations to sustain community-driven momentum. These actions must both achieve immediate benefits and increase the capacity of residents to be at the heart of planning processes.

Physical design goal: Our design approach is one of co-creation—where we partner with community and agency representatives to build sustained relationships around Estuary resilience and collaborate to reach near-term objectives. It creates a landscape where the working relationships among stakeholders are just as important as the ecological and infrastructural work to adapt the Estuary.

Balancing power dynamics

This principle made us recognize the differences in power and access between residents and traditional decision-makers like public agencies and private developers.

Physical design goal: Our design inverts the relationship between development and its social and natural context, putting people and ecologies first. This changes the decision-making dynamic and puts local communities (and wildlife) at the heart of planning conversations.

2.2 The Estuary Commons

San Leandro Bay is a microcosm of the greater San Francisco Bay Area. The complex mix of urban, ecological, social, and economic challenges that confront this estuary-within-an-estuary are both confounding and inspiring. ABC's vision is deeply informed by the history of this estuarine environment, the urgent challenges facing the communities that surround it, and the longer-term risks that we can now only glimpse. Designing for resilience requires us to think differently about how resources and places are shared. We also must recalibrate how communities, government agencies, and private entities co-create their socioeconomic and physical environments. Working together with stakeholders and community-based organizations, through a process of learning and co-creation, led us to the Estuary Commons.

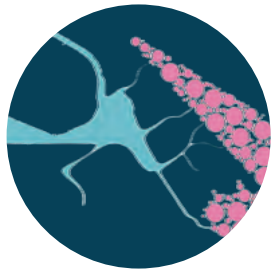
The idea of a commons derives from a rich political and urban history. It joins people and place through shared management of resources for the benefit of all. A commons is at once the public process of governance and civic life, and the spaces that bring us together. We envision the Estuary Commons as a network of communities joined in mutual obligation to share and manage the resources of this working urban landscape. Locals have been referring to San Leandro Bay as "The Estuary" for many years. The Estuary Commons reaffirms this community-conceived identify, while also calling out the need for shared places and processes that forge a path forward and drive resilient outcomes for generations to come.

During the Bay Area Challenge, our goal has been to enhance the health, wealth, and stability of communities and public resources around the Estuary as the area adapts to environmental vulnerabilities. Achieving this goal requires a systematic approach that integrates existing efforts with novel, synergistic strategies to deliver cumulative benefits to all stakeholders. We propose four interrelated approaches, as summarized to the right.

The following sub-sections offer a high-level overview of our team's design vision. Subsequent chapters dive into more detail on specific near-term projects (Chapter 3) and long-term projects (Chapter 4), while also offering funding/financing strategies (Chapter 5) and regulatory pathways (Chapter 6) for select actions.

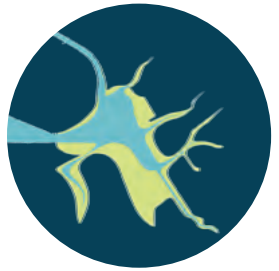
Catalyze

existing, on-the-ground actions while helping establish the conditions for long-term community equity and resilience



Adapt

the estuary to protect against flooding, restore ecosystems, create pathways, and provide gathering space



Stitch

together neighborhood and shoreline through new transportation and ecological corridors

Prosper

by leveraging public resources and private investment through community-driven planning to deliver equitable, environmentally just, and resilient development

Students from Brookfield Elementary in East Oakland planting trees for Earth Day

The Estuary Commons – Catalyze

Catalyze

Building true resilience means starting with existing communities and addressing the challenges impacting their everyday lives. Issues of housing affordability, gentrification and displacement, public health, and access to public resources weigh heavily on residents near the Estuary, particularly in East Oakland. These issues are noted in greater detail in Stakeholder Issues and Priorities in Section 1.2 and Appendix I. These communities already have important initiatives underway to address these challenges, including the community driven East Oakland Neighborhood Initiative and Alameda Climate Action and Adaptation Plan. We seek to further catalyze these vital efforts and help lay the groundwork for sustained equity as adaptation actions take root.

Resilient Equity Hubs

Resilient Equity Hubs (REHBs) are alliances among agencies, community advocates, and residents that can leapfrog jurisdictional and property boundaries to achieve common stewardship and deliver shared benefits. At the strategic level, REHBs wield governmental and financial powers through shared governance arrangements (e.g., Joint Power Authority) and combined special districts (e.g., CBD, Geological Hazard Abatement District) to fund resilience projects and support community priorities, like infrastructure and affordable housing. At the neighborhood level, REHBs establish the networks necessary to deliver near term results in pursuit of shared, systematic goals.

We see REHBs as both a process and a distinct spatial strategy; and as both a near term and long term approach. It is vital that REHBs are implemented early to integrate community priorities into long term financing mechanisms and cross jurisdictional governance frameworks. In other words, these financing and governance strategies exist to produce community benefits and resilient outcomes. For more detail on REHBs, see Sections 3.2 and 4.1.

Affordable Housing

In addition to environmental vulnerabilities, housing affordability is perhaps the greatest threat to the diverse communities surrounding the Estuary. Any proposal to foster local resilience must confront the challenges of gentrification and displacement through a robust approach to housing affordability. We propose four strategies to help the communities of East Oakland, Alameda, and San Leandro meet and exceed their affordable housing goals: (1) streamlining development of accessory dwelling units; (2) dedicating vacant parcels to 100 percent affordable housing; (3) requiring the provision of below market rate units in all new development; and (4) engaging the community land trust model to provide opportunities for affordable ownership. Our strategies for Affordable Housing are discussed in more detail in Section 3.2: ABC Proposed Near Term Projects.

Urban Forestry and Green Infrastructure

At the neighborhood scale, we propose a robust urban forestry program that includes planting street trees and constructing green infrastructure in available right of way to enhance quality of life and improve air and water quality. Green infrastructure strategies include bio retention areas and rain gardens to treat stormwater before contaminants reach the creeks, sloughs, and bay. These measures will also help absorb stormwater upstream to mitigate flooding downstream. One of ABC s partner community based organizations, Planting Justice, could provide the trees and plants for these projects, generating local jobs and community driven investment.

The Estuary Commons - Adapt

Adapt

The expansion and adaptation of MLK Shoreline Park will create an iconic, working landscape that joins communities around the Estuary. The shoreline and associated sloughs, creeks, and channels will be transformed through an incremental process to address both near term and long term flood vulnerabilities, while also providing provide greater social and ecological resilience.

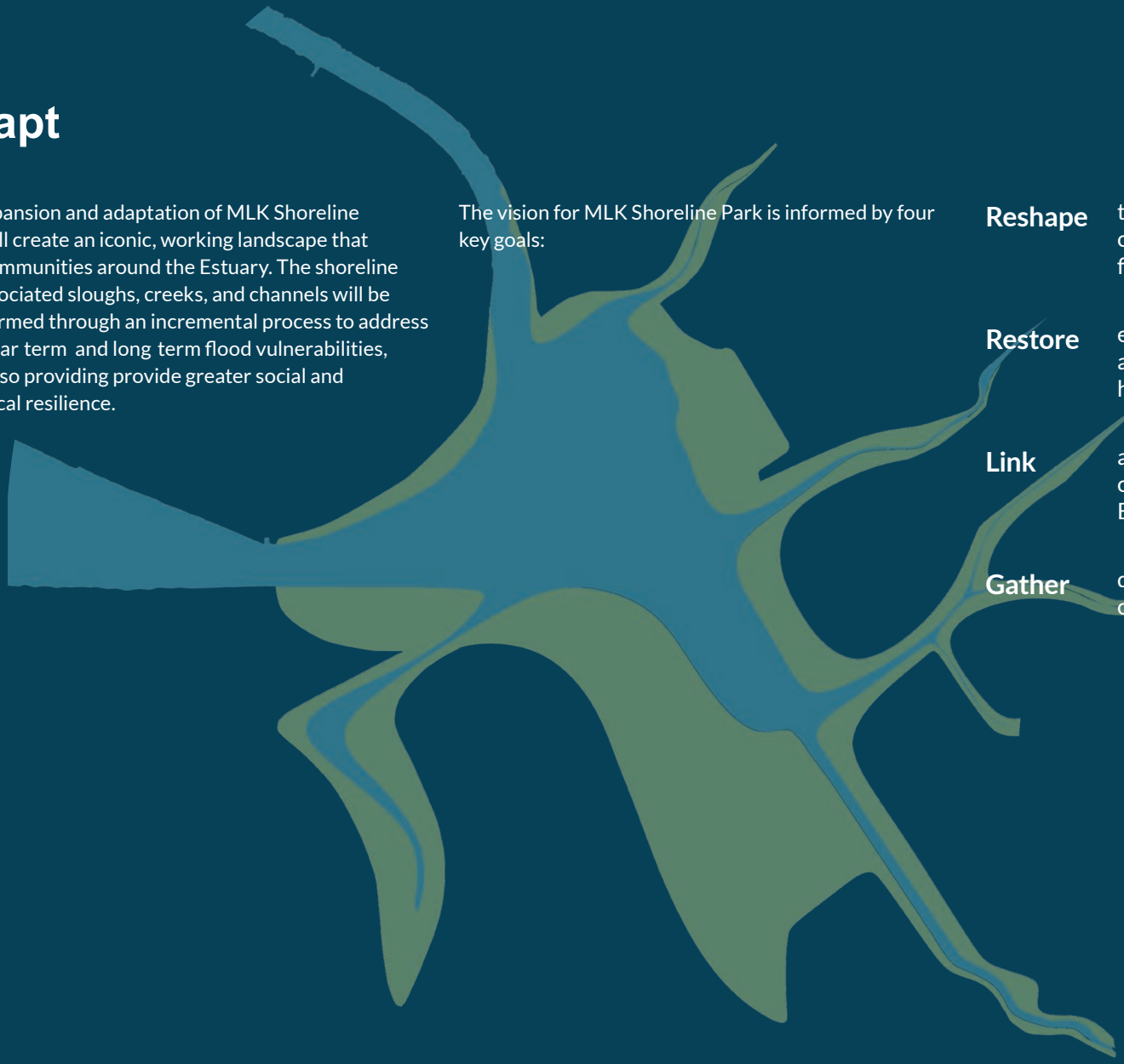
The vision for MLK Shoreline Park is informed by four key goals:

Reshape the shorezone, sloughs, and flood control channels to provide fluvial flood and sea level rise protection

Restore ecosystem function, create additional habitat, and anticipate habitat migration

Link adjacent neighborhoods to circulatory pathways around the Estuary

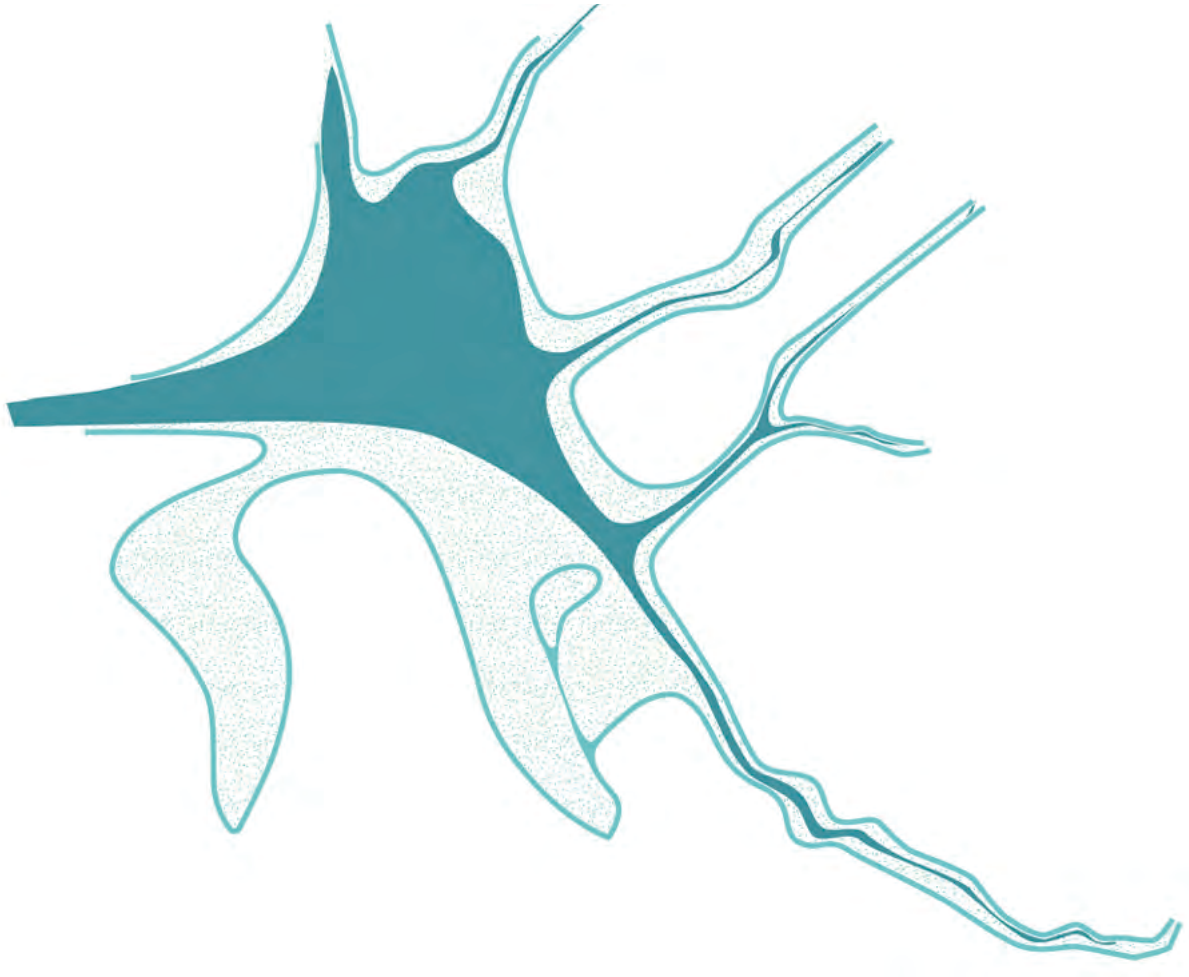
Gather diverse communities in new social, cultural, and recreational spaces



Reshape

Fluvial flood risk is the most urgent vulnerability for both inland and shoreline neighborhoods. The approximately 8.5 miles of sloughs and channels extending inland from the Estuary expose surrounding areas to risks related to both fluvial flooding and sea level rise. According to estimates from the 2009 FEMA maps for East Oakland, storm-related flood vulnerabilities will increase significantly with one-to-six feet of sea level rise. Our designs are based on projections of sea level rise between 1-3 feet by 2050 and 3-6 feet by 2100. We propose a series of integrated strategies throughout the Estuary to mitigate these risks.

Damon Slough currently presents near-term flood risks at both the Amtrak Capitol Corridor and I-880. To reduce this risk, we propose rerouting Arroyo Viejo Creek to connect it with Elmhurst Creek. This will provide additional capacity for Damon Slough and reduce flood risk at constricted locations. It has the added benefit of removing the channel between the Capitol Corridor, thereby allowing for greater connectivity and the potential for more integrated development between the Coliseum site and proposed BART Coliseum Station transit-oriented development.



San Leandro Bay Estuary - reshape

We propose widening, stepping, and elevating each of the sloughs and channels (East Slough, Arroyo Viejo Creek, Elmhurst Creek, Damon Slough—see Section 3.2: ABC Proposed Near-term Projects based on ecological and hydrological parameters. This will provide greater channel capacity, set the stage for habitat restoration, and open up greenways for pedestrian and bicycle access. The widened sloughs and creeks would also be designed to accommodate and protect against sea level rise levels of six feet.

A complex set of shoreline conditions and adjacent land uses defines the seven miles of shorezone surrounding the Estuary, all with varying levels of vulnerability to sea level rise. As part of our planning framework for the park, ABC has established a set of shorezone typologies to address sea level rise:

- Restoration Zones – use dredge and sediment accrual to foster wetland creation
- Migration Zones – allow space for tidal wetlands to migrate inland
- Landforms – establish stages of protection for inland areas
- Urban Edges – constructed edges that provide sea level rise protection and public access
- Tidal Cities – a strategy for resilient development

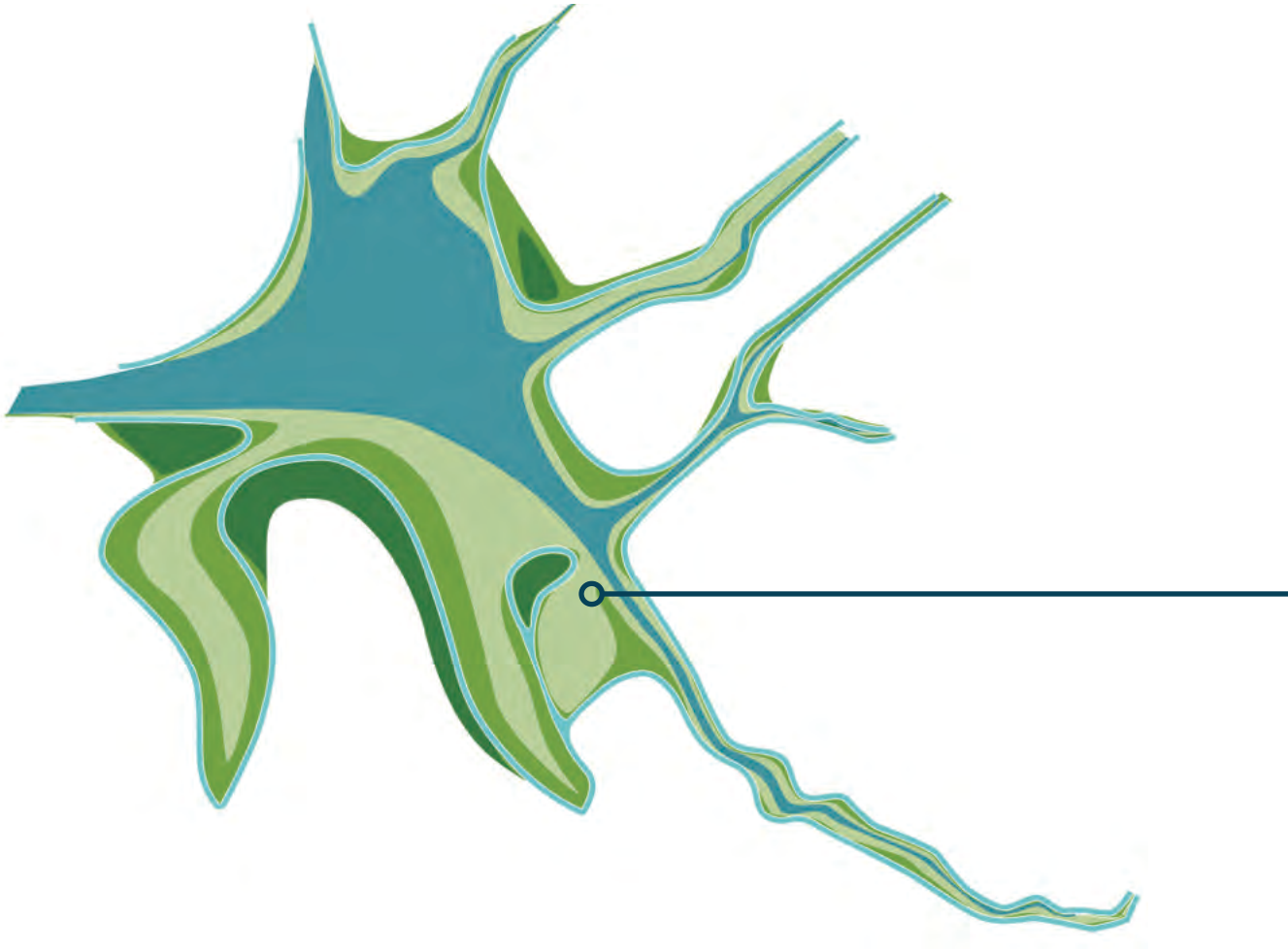
Creating space for adaptation and providing adequate setbacks for development are critical first steps in our proposed earthwork and hydrological strategies—strategies that will set the stage for greater ecological and social connectivity. As an integrated part of the expanded MLK Shoreline Park, our proposed shorezone adaptations will provide nature-based fluvial and sea level rise adaptations at incremental levels of 1, 3, and 6 feet of sea level rise (and everything in between).

Our team considered several alternatives and supplemental strategies in addition to those outlined above. This includes the addition of partial tide gates at the openings between the Estuary and San Francisco Bay, as well as at the channels to reduce the flood risk associated with king tides and storm surges. While these could provide additional sea level rise and fluvial flood mitigation, the environmental impacts associated with tide gates to surrounding communities would be significant.

Restore

The area around the Estuary was once defined by extensive marshlands and estuarine habitats fed by intermittent creeks and laced with meandering sloughs. Urban development and flood control projects radically transformed the landscape, eliminating most of the tidal marshes and channelizing the creeks. Nonetheless, Arrowhead Marsh is widely acknowledged as one of the Bay Area's most vital urban marsh systems and the Estuary is noted for its aquatic, sub-tidal, and fringing marsh habitats—each of which are threatened by sea level rise and poor water quality. Despite its degraded condition, the Estuary holds great potential for restoration of key habitats and ecological function. Our vision harnesses investments required to address sea level rise and fluvial flooding to simultaneously restore and expand habitat.

We completed an inventory of existing ecotypes and special status species, evaluated potential sediment sources and transport, and considered the migration of habitats relative to varying stages of sea level rise using Point Blue's sea models. This analysis informed near-term proposals and long-term strategies for restoration that balance social and cultural uses with ecological function. Among the most significant restoration opportunities we have proposed is the expansion of Arrowhead Marsh into Airport Channel using dredge material from the Port of Oakland's dredging operations (see Section 3.2: ABC Proposed Near-term Projects).



San Leandro Bay Estuary - reshape and restore

In our vision of restoration, existing tidal marshes at the mouth of Damon Slough are preserved and expanded to the north. Fringing marsh areas are placed at suitable locations around the Estuary and within the expanded sloughs. Migration zones are integrated into the design for an expanded MLK Shoreline Park, with grading proposed to enable marsh accretion and habitat migration as sea levels rise. Creeks are restored in concert with fluvial flood adaptions and naturalized channels to provide riparian, saussal, and upland habitats. Lastly, tidal and upland ecotypes are integrated with the golf course (and potential future infill housing) at Chuck Corica Golf Complex on Bay Farm Island, addressing vulnerabilities from groundwater flooding.

Wetland Area

100 Acres

↓

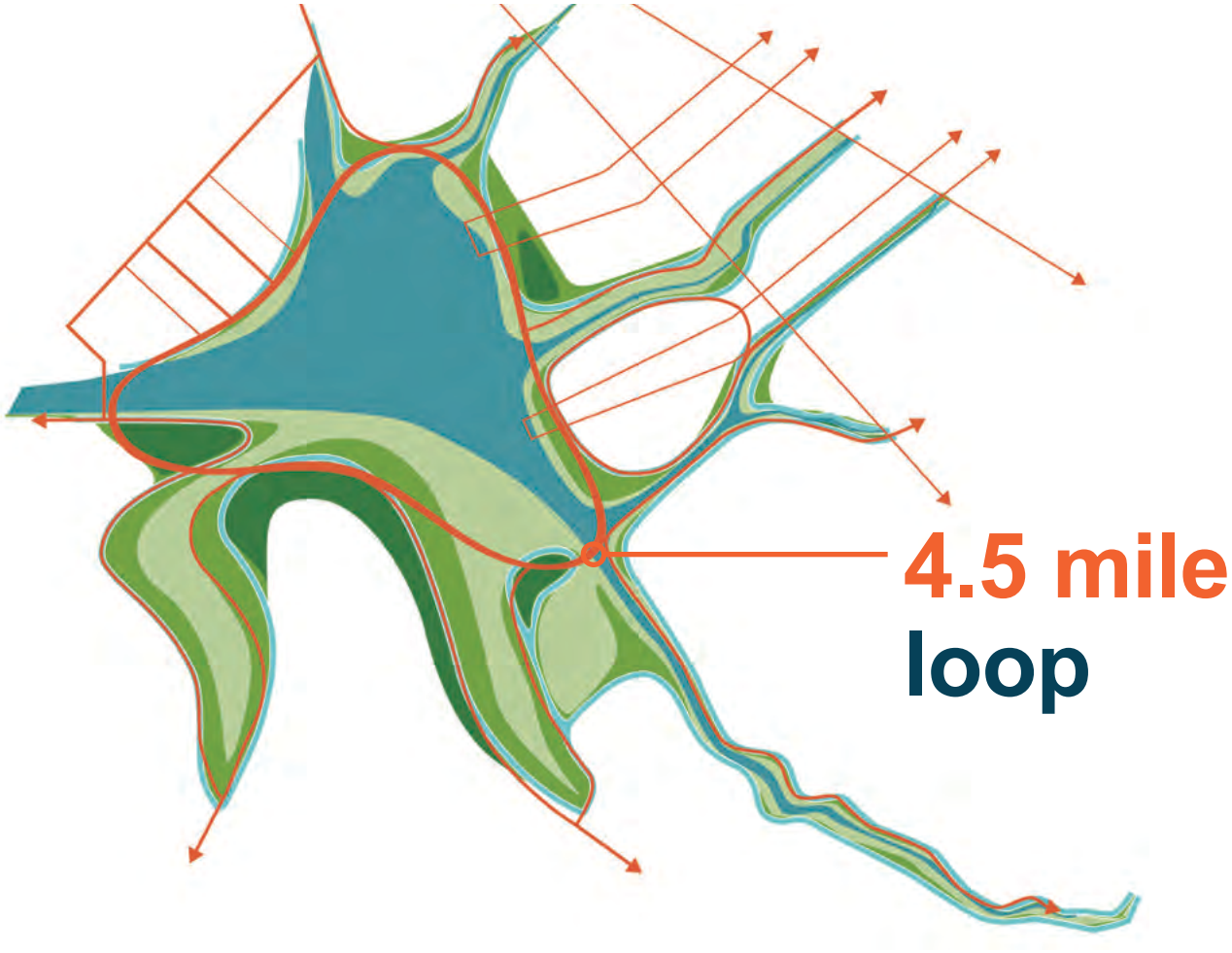
300 Acres

A view across the Estuary

Link

On our very first tour of San Leandro Bay during the research phase, community representatives told us about the need for safe access to and around the Estuary. As a result, our team embraced mobility and access as a central part of our vision. Proposed strategies include a network of multiuse trails and street improvements that will link communities around the bay to the "Estuary Ring." This ring will loop around the bay, defining the heart of MLK Shoreline Park with a sinuous promenade and a series of sweeping bridges. Along with green pathways that extend like fingers inland along the creeks and sloughs, the ring will provide wonderful opportunities to walk, run, bike, and enjoy the Estuary.

As an integral part of proposed shorezone adaptations, the ring will also provide three feet of sea level rise protection for the southwest edge of Alameda and other locations around the Estuary. The new paths and trails within MLK Shoreline Park will link to regional mobility networks including the Bay Trail, the proposed San Leandro Creek Greenway, and the East Bay Greenway. Importantly, all interventions will be coordinated with the community-driven bicycle and pedestrian plans currently underway through Let's Bike Oakland and the East Oakland Neighborhood Initiative planning process.



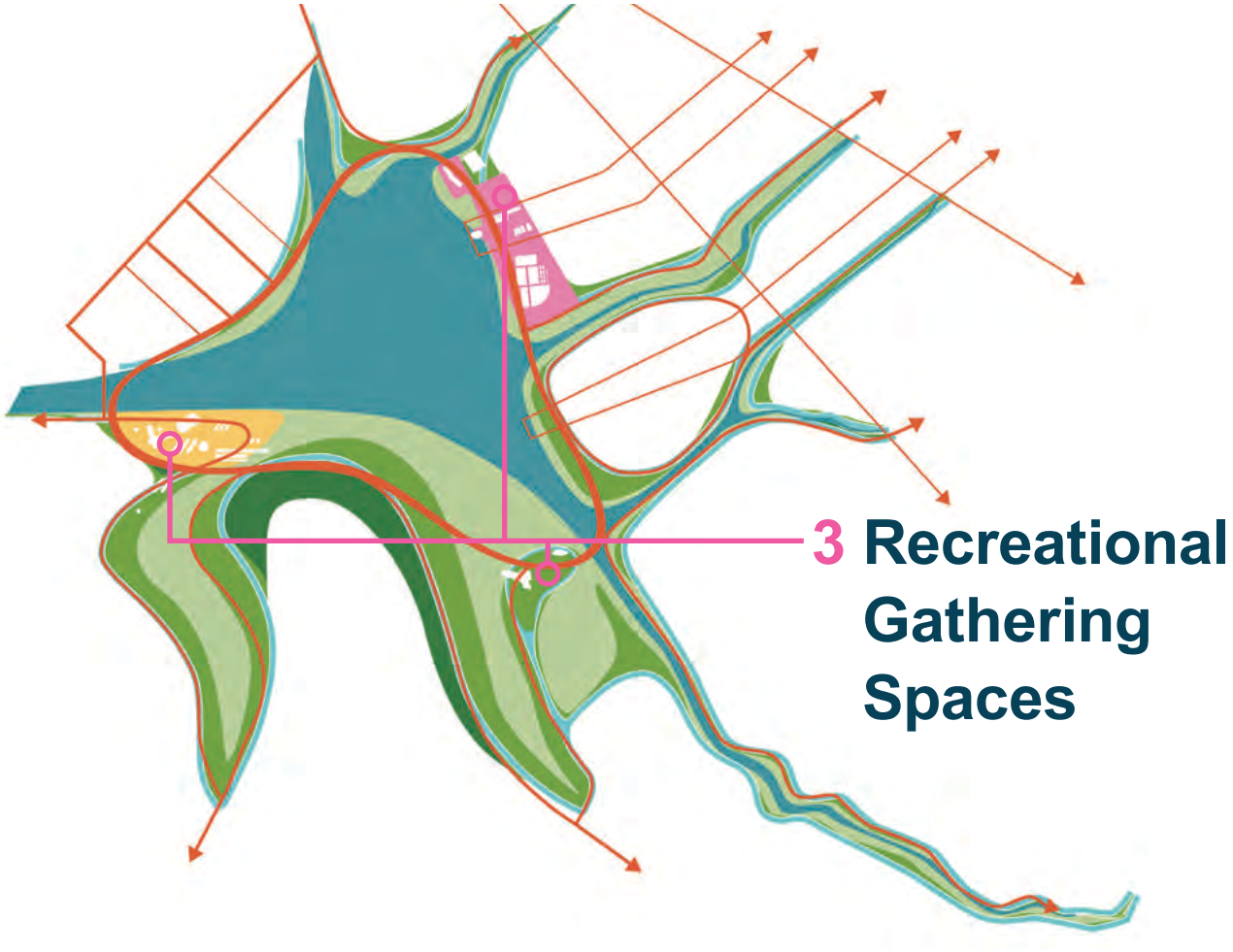
San Leandro Bay Estuary - reshape, restore, and link

A view across the Estuary

Gather

The communities surrounding the Estuary are notably deficient in open space and recreational opportunities. This is particularly true for East Oakland where per capita open space and walking distances to parks perform poorly compared to regional averages and national standards. Our vision will fill this gap by expanding MLK Shoreline Park to create a regional destination that provides civic and recreational gathering spaces. This vision calls for a diversity of experiences and cultural expressions. It is a place where people come together to connect with each other and the land—a place to exercise and play, to socialize and celebrate, to picnic and barbeque, to boat and fish, and perhaps even one day, to take a swim. The aim is to create a thriving public space that will foster social, cultural, and environmental resilience, while also providing recreational, entrepreneurial, and educational opportunities to surrounding neighborhoods.

Our vision for the expanded park includes three major nodes: the Eastside Shore, Arrowhead Environmental Center, and the Alameda Promontory. In keeping with the idea of a commons, the programs and activities that would activate and enliven each node would be developed through a community-driven planning process. To start the conversation, we have developed preliminary ideas for each space.



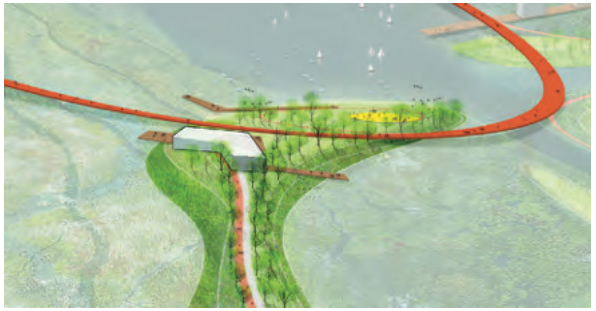
San Leandro Bay Estuary - reshape, restore, link, and gather

Located on the east edge of the Estuary, we envision the Eastside Recreation Area as a recreational and cultural node with space for sports fields and courts; a new water access and boat center; a potential waterfront restaurant and food vending space; and a large, terraced slope overlooking the bay and blocking views of the East Bay Municipal Utility District wastewater treatment plant. The Arrowhead Marsh Overlook builds on the rich ecological diversity of Arrowhead Marsh to create a destination for environmental education and restoration activities. It includes a new environmental education center, a restoration nursery, and picnic areas. The Bay Farm Promontory takes advantage of the existing Doolittle Landfill, expanding public access to a series of overlooks that provide spectacular views of the Estuary and the greater bay area.

A view across the Estuary

Bay Farm Promontory

Eastside Recreation Area



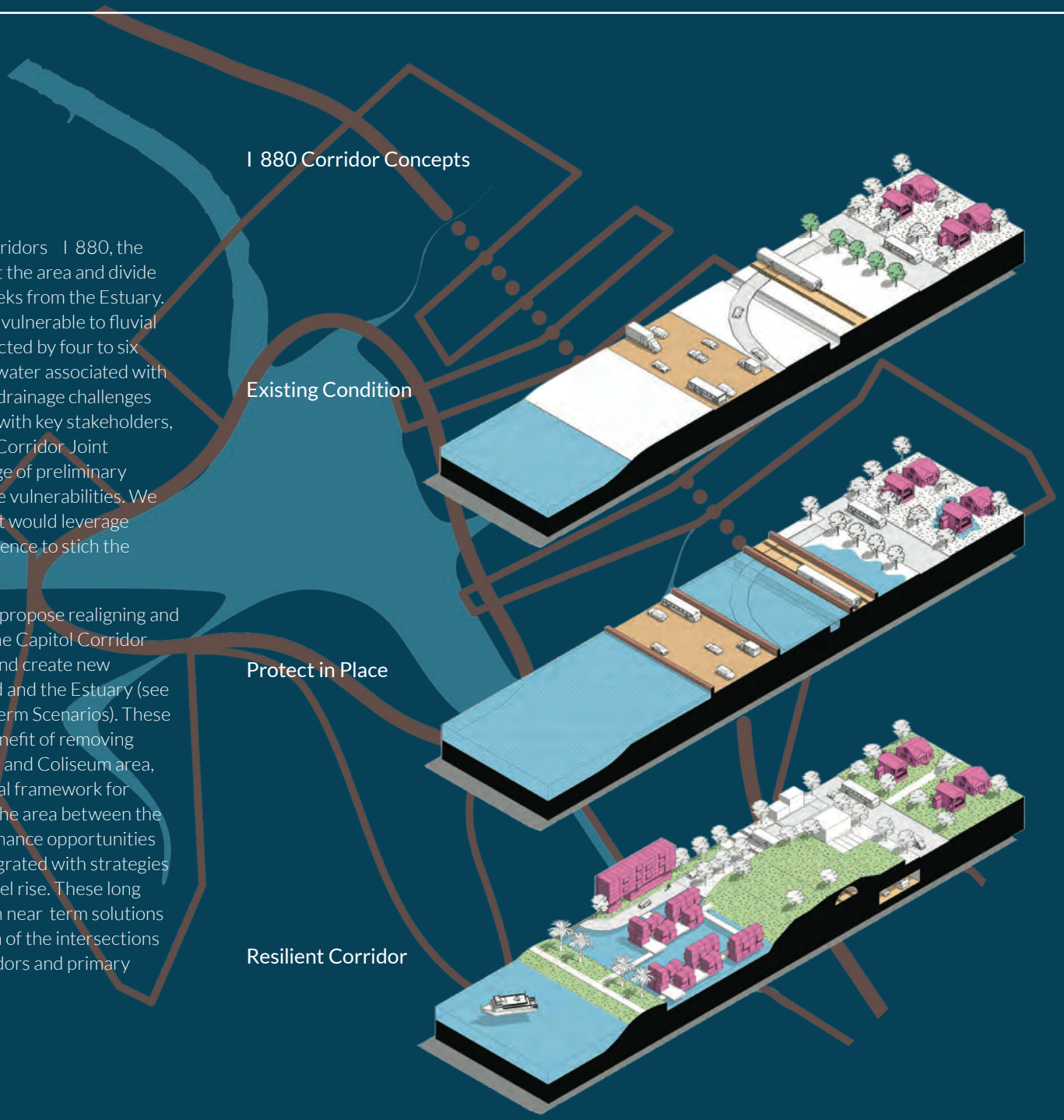
Arrowhead Marsh Overlook

The Estuary Commons - Stitch

Stitch

Several regional transportation corridors I 880, the Capitol Corridor, and BART—bisect the area and divide East Oakland communities and creeks from the Estuary. I 880 and the Capitol Corridor are vulnerable to fluvial flooding and will be adversely impacted by four to six feet of sea level rise. Rising groundwater associated with rising tides will further exacerbate drainage challenges and localized flooding. We worked with key stakeholders, including Caltrans and the Capitol Corridor Joint Powers Authority, to explore a range of preliminary design alternatives to address these vulnerabilities. We have developed a bold strategy that would leverage investments in transportation resilience to stich the community together.

As part of our long term vision, we propose realigning and tunneling I 880 to the east along the Capitol Corridor to mend the severed urban fabric and create new connections between East Oakland and the Estuary (see Section 4.1: ABC Proposed Long Term Scenarios). These connections will have the added benefit of removing barriers between the BART station and Coliseum area, and establish a more unified physical framework for economic development. Rezoning the area between the BART and Capitol corridors will enhance opportunities for value capture and could be integrated with strategies to protect inland areas from sea level rise. These long term strategies will be coupled with near term solutions that address fluvial flooding at each of the intersections between the major transport corridors and primary drainage channels.



The Estuary Commons - Prosper

Prosper

As one of the few large, publicly owned sites around San Francisco Bay, the Coliseum site, and surrounding area represent an unparalleled opportunity for resilient and equitable development. For residents to share in the benefits of new development, an innovative model of community driven planning is required. The process needs to be open and transparent, and it must prioritize measures to improve the health, wealth, and stability of surrounding communities. It must address housing affordability, reduce the risk of gentrification and displacement, generate local workforce and educational opportunities, and reduce environmental impacts.

Building on the Coliseum Area Specific Plan and embracing community driven frameworks like the East Oakland Neighborhood Initiative, our team has developed a series of land use and economic development scenarios that will lead to resilient and equitable transitions. These infill strategies seamlessly interweave built and natural environments, while simultaneously addressing priority community issues and generating local wealth.

BART Transit Oriented Development and Coliseum Multi Modal Transit Hub

The existing BART station provides a near term opportunity for mixed use, transit oriented development. In addition, we see the station becoming a vital multimodal transit hub that serves as the heart of a new district and connects BART, AC Transit, Amtrak, and the Oakland International Airport s Air Train under one roof. The surrounding district could include a mix of housing (including affordable), office, and neighborhood retail uses linked with future development at the Coliseum site. We also envision catalytic long term opportunities for this hub, including serving as a connector for a second BART transbay crossing with potentially expanded off site check in facilities for the airport.

This vision is supported by BART and we recommend advancing it as part of the community driven planning process. This multi modal hub is discussed in more detail in Section 4.1: ABC Proposed Long Term Scenarios.

Tidal Cities

Our Tidal Cities concept envisions a dynamic shoreline landscape that combines tidal ponds with floating mixed use neighborhoods to create a floodable urban fabric. These neighborhoods would be adaptable to sea level rise, be more resilient to earthquakes, and help isolate contaminated soils. The basic concept is to excavate lagoons and canals next to tidal channels to allow high tides in. Then, tide gates would keep tides from flowing out during low tide to maintain a steady water level. Rains and creek water would continuously flush the lagoons to improve water quality.

These tidal lagoons provide an ideal location to build floating mixed use neighborhoods made from prefabricated units craned onto shared decking and supported by pontoons. Floating buildings would be less susceptible to liquefaction and much safer in a large seismic event. Excavating these old industrial soils would allow contaminants to be safely sequestered in contained, dry areas. Tidal Cities are discussed in more detail in Section 4.1: ABC Proposed Long Term Scenarios .

Scenario 1 – Coliseum Area Specific Plan

This scenario offers a framework that is consistent with the existing Coliseum Area Specific Plan and includes the BART Transit Oriented Development and Multi Modal Transit Hub outlined above. It illustrates how Oracle Arena and a new ballpark could be integrated with the Tidal Cities concept to create a dynamic, flood resilient district. This scenario links BART and the Coliseum area to MLK Shoreline Park through a strong civic spine. Tidal cities are located along the sloughs to provide muted tidal connectivity and stormwater treatment. Water access and ferry service is integrated at the end of the spine and the park is expanded to create a more stable and adaptable shoreline. Industrial uses are retained on the higher ground between I 880 and the Estuary.

Scenario 2 – Expanded Tidal Cities

This scenario presents an alternative that addresses the combined long term challenge of sea level rise and groundwater flooding. It proposes rezoning the existing industrial uses west of I 880 and expanding the Tidal Cities mixed use district from the Coliseum to the Estuary, creating a more cohesive and integrated mix of uses. The BART to shoreline civic spine is retained and the Estuary is integrated within the district itself. This scenario more fully illustrates the imperative of “living in the edge with water and working with natural systems in vulnerable bayfront locations.

Taken as a whole, the **Estuary Commons** brings people and place together with a path forward. It identifies urgent steps to **Catalyze** resilience within Estuary communities, **Adapts** the estuarine environment to produce a resilient working landscape and public space, **Stitches** neighborhoods to shoreline by removing barriers and creating connections, and sets the stage for communities around the Estuary to **Prosper.**

In It Together game pieces being placed to respond to sea level rise challenges

This chapter highlights the near-term projects that will contribute to a resilient and equitable Estuary. It captures the existing projects being led by agency and community stakeholders to address key issues like public health, economic development, mobility, housing affordability, and climate-related vulnerabilities. It also describes the new projects proposed by ABC that—in tandem with ongoing efforts—will yield tangible, near-term results and build toward a prosperous Estuary Commons.

3. Near-Term Projects

3.1 Existing Near-Term Projects

Through research and our work sessions with the Project Working Group (PWG), we gathered an understanding of numerous existing and proposed near-term projects designed to address local resilience. Outlined in Table 3 below, these projects framed our overall vision for the Estuary Commons, and we continually sought opportunities during the design phase to add value to these efforts. We also identified three especially catalytic collaborations—the East Oakland Neighborhood Initiative, the Alameda Climate Action and Adaptation Plan, and Bay Area Rapid Transit (BART) Sea Level Rise and Flooding Resilience Study—that will be critical to sustaining momentum long after the Bay Area Challenge concludes.

Project	Project Champion(s)	Primary Issues Addressed	Timeline	ABC Value Add
East Oakland Neighborhood Initiative	CBO coalition (led by East Oakland Building Healthy Communities; Oakland Climate Action Coalition; HOPE Collaborative); City of Oakland	Health, equity, resilience (full range of factors), and sustainability	2018-2020	– New groundwater maps – Training on the *In It Together Game* for use in community meetings – Training on the *Community Resilience Investment Decision-Making Tool* – Presenting at community meetings when technical expertise is needed – Networking with agency stakeholders
Alameda Climate Action and Adaptation Plan	City of Alameda	Full range of climate stressors and greenhouse gas mitigation	March 2018 – June 2019	– New groundwater maps – Long-term design vision for Estuary Commons and tidal cities – Learning, engagement, and project evaluation through *In It Together Game* and *Community Resilience Investment Decision-Making Tool* – Networking
BART Coliseum Station TOD	BART	Economic development and affordable housing	Phase I under construction	– Learning, engagement, and project evaluation through *In It Together Game* and *Community Resilience Investment Decision-Making Tool* – Networking
BART Sea Level Rise and Flooding Resiliency Study	BART	Sea level rise and extreme precipitation	Awarded 2017/18 cycle	– New groundwater maps – Learning, engagement, and project evaluation through *In It Together Game* and *Community Resilience Investment Decision-Making Tool* – Estuary Commons design ideas – Networking

Table 3: ABC Value-Add on Existing and Proposed Near-Term Projects

Project	Project Champion(s)	Primary Issues Addressed	Timeline	ABC Value Add
I-880 Improvements	Caltrans	Mobility and access	Various roadway, interchange, and bridge works	– Networking with community
San Leandro Treatment Wetland for Pollution Reduction, Habitat Enhancement, and Shoreline Resiliency	City of San Leandro	Pollution reduction, habitat enhancement, shoreline resilience	Planning process 2018-2019	– Networking with community and Oakland International Airport
Bay Trail Improvements (Doolittle Drive Trail and Tidewater Day Use Area)	East Bay Regional Parks District; Merritt College Institute for Sustainable Policy Studies	Mobility, access, and active transportation; green connections to shoreline	Planning process 2018-2019	– Incorporated design intent into connectivity studies for Estuary shoreline – Expanded on design intent by including recommendations for sea level rise adaptation
San Leandro Creek Greenway	City of San Leandro	Mobility, access, and active transportation; green connections to shoreline	Study completed and grant funding received; design and construction documentation RFP to be issued soon	– Incorporated design intent into connectivity studies for Estuary shoreline – Expanded on design intent by including recommendations for sea level rise adaptation
East Bay Greenway	Alameda County Transportation Commission	Mobility, access, and active transportation	Planning process 2018	– Networking with community, City of Oakland, City of San Leandro, BART, and Caltrans
"Let's Bike Oakland" Bike and Ped Plan Update	East Oakland Collective; Scraper Bike Team; City of Oakland	Mobility, access, and active transportation	2017-2018	– Networking with agency stakeholders – Held bike connectivity working meeting to bring together expert and local knowledge
Black Cultural Zone	EastSide Arts Alliance	Health, culture, gentrification and displacement	TBD	– Networking with agency stakeholders; increased awareness of proposal

East Oakland Neighborhood Initiative

The East Oakland Neighborhood Initiative (EONI) will be the ultimate, successful realization of the Transformative Climate Communities (TCC) planning grant. This grant was awarded to a coalition led by East Oakland Building Healthy Communities, Oakland Climate Action Coalition (OCAC), and HOPE Collaborative, in partnership with the City of Oakland Planning Department and numerous other local community-based organizations (CBOs). This coalition will use TCC funds to assess the environmental, economic, and social justice priorities of six East Oakland neighborhoods through a community-driven planning process. The end product will include innovative and meaningful programs and practices connecting health, equity, resilience, and sustainability; and will be built on the input and expertise of local and regional public agency staff, CBOs, and neighborhood individuals and groups. The planning process will commence in 2018, with the fully formed vision and framework completed by 2020.

We were fortunate that community representatives with EONI consistently engaged with our team throughout the design phase of the Bay Area Challenge, attending nearly every meeting and ensuring the voice of local neighborhoods was heard. Marquita Price of the East Oakland Collective, Colin Miller of OCAC, and Greg Jackson of OCAC were especially present, amplifying community concerns and invaluably contributing to our design ideas. They emphasized and taught us the importance of embracing community-driven planning processes.

Path Forward

We see EONI as an indispensable and catalytic framework for achieving Estuary resilience. Their newly formed network of capable and motivated CBOs—now better connected with agency staff through our PWG series—is the connective tissue necessary to build a shared, working landscape. Their commitment to community-driven planning also serves as a valuable lens for evaluating future projects, putting equity front and center, and ensuring adaptation strategies deliver health, wealth, and stability to residents. Furthermore, their upcoming planning process affords a unique opportunity to create a comprehensive vision of resilience—one based on a common place and a common process.

In the coming months, our team will run facilitator training sessions with EONI leadership on the *In It Together Game* and *Community Resilience Investment Decision-Making Tool*. The goal is for these tools to be adopted in the EONI planning process to educate residents about local environmental vulnerabilities and evaluate the benefits and costs of adaptation strategies. Team members will continue to make themselves available to speak with community groups about the dual threat of sea level rise and groundwater flooding.

Our team will also help form a coalition of stakeholders (made up primarily of our PWG members) who are working on adaptation-related projects around the Estuary. This group will meet biannually or quarterly to update each other on progress made, identify opportunities for collaboration, and develop meaningful touchpoints with community groups and residents. Coordination between this group and the ongoing EONI planning process will be essential to cohesively link major investment decisions with local priorities.

PWG 3 working session - playing In It Together

Alameda Climate Action and Adaptation Plan

The City of Alameda was one of the first communities in the Bay Area to approve their Local Action Plan for Climate Protection (February 2008) and the city has made considerable progress toward the plan's goals. Recognizing that it must do more to reach its climate goals, Alameda is now developing a Climate Action and Adaptation Plan (CAAP). This plan will chart a path for Alamedans to simultaneously adapt to climate change and reduce greenhouse gas emissions. Plan development started in March 2018 and is scheduled to be complete by mid-2019.

Path Forward

City of Alameda staff were active and engaged participants at each of our PWG meetings and expressed interest in collaborating with other stakeholders to develop their CAAP. They are especially interested in considering the viability of our long-term vision for an Estuary Commons; in particular, to understand how Tidal Cities could enable Alamedans to remain in place longer.

City staff are also interested in learning how to facilitate sessions of the *In It Together Game* so they can play it at community meetings and teach residents about potential adaptation strategies to address sea level rise. In the coming months, they will participate in a "train the trainer" session on using the game, and host game sessions with community groups on both the main island and Bay Farm Island.

BART Sea Level Rise and Flooding Resiliency Study

Through a $500,000 Caltrans Adaptation grant (2017/2018), BART will augment the Federal Transit Agency-funded resilience work they already completed and the Alameda County resilience work they have undertaken since 2011 with the San Francisco Bay Conservation and Development Commission (BCDC), Metropolitan Transportation Commission (MTC), and Caltrans. BART will assess the vulnerability of four critical systems—systems, trackway, train control, and traction power—and develop strategies to adapt to the dual threat of sea level rise and groundwater flooding. BART intends to include Colesium Station in this study. The findings from the project will inform the infrastructure rebuilding work supported by the agency's $3.5 billion bond measure, which was approved by voters last year.

As described in its Caltrans grant application, BART intends to collaborate with local and regional entities including BCDC, MTC, National Oceanic and Atmospheric Administration (NOAA), and San Francisco Municipal Transportation Agency (SFMTA) on this effort. Further coordination will also be necessary to synchronize this with other planning efforts like Plan Bay Area, Connect SF, Adapting to Rising Tides Bay Area Project, and the San Francisco Seawall Resilience Project. In addition to engagement with its internal departments and other agencies, BART plans to work with affected communities through its Title VI/EJC advisory committee and transit-oriented development (TOD) planning process. This engagement will particularly target vulnerable sites with planned TODs and focus on producing high-density development and affordable housing.

Path Forward

BART, through Tian Feng, has been an active and engaged participant at our three PWG meetings. Mr. Feng also facilitated one-on-one meetings with other BART staff, including those managing the second transbay crossing study.

At PWG3, multiple community representatives indicated they wanted to be informed about BART's Sea Level Rise and Flooding Resiliency Study, including some who wished to participate and others who suggested combining this study with their project. Our engagement process has helped enhance community understanding of the combined sea level rise and groundwater flooding challenges facing Coliseum Station, and also introduced some of the benefits development around Coliseum Station may bring. BART can build on these conversations and work with community groups on next steps for resilient site development.

BART is also interested in exploring the larger design move of constructing a multi-modal transit hub at Coliseum Station. ABC team members will continue to engage with BART to conceptualize this hub. This idea is expanded in more detail in Section 4.1: ABC Proposed Long-Term Scenarios.

3.2 ABC Proposed Near-Term Projects

The projects that follow stem from our Design Vision (Chapter 2) and have actionable steps can be taken in the near term to see tangible results within 5-10 years. They include projects to catalyze community capacity and bottom-up resilience; adapt creeks and marshes to address environmental vulnerabilities and restore habitat; and stitch neighborhoods to shoreline through enhancements to mobility and access. Outlined in Table 4, these projects will also be important building blocks towards achieving our longer term vision of the Estuary Commons.

Table 4: ABC Proposed Near-Term Projects

Project	Project Champion(s)	Primary Issues Addressed	Timeline	Key Funding Sources	ABC Next Step
Resilient Equity Hubs	East Oakland Neighborhood Initiative (EONI)	Community benefits; long-term financing; joint governance	Now - Long-term Future	Community benefits district; community facilities district	– Train-the-trainer sessions on *In It Together Game* and *Community Resilience Investment Decision-Making Tool* – Connect community groups to capacity-building initiatives and grant funding opportunities
Housing Affordability	Cities, East Bay Housing Organizations, East Bay Asian Local Development Corporation, and other affordable housing organizations	Housing affordability; gentrification and displacement	Now - Long-term Future	Low-income housing tax credits; city and county gap funding; tax increment financing; cap-and-trade sources	– Promote proactive policies and programs to ensure all new development achieves community affordability goals

Project	Project Champion(s)	Primary Issues Addressed	Timeline	Key Funding Sources	ABC Next Step
East Slough Channel Capacity Improvements	Alameda County Flood Control and Water Conservation District (ACFCWCD); City of Oakland	Sea level rise and flooding; green pathways and mobility	2020 for feasibility study and concept design	Prop. 68 funds (June 2018); social and environmental impact bonds; SFBRA Measure AA; Cal DPR Habitat Conservation Fund; Climate Ready Program grants; Cal Fish and Wildlife GHG Reduction Program; BACF Resilience Challenge Grants	– Conduct feasibility and concept design studies
Hegenberger Greenway	Association of Bay Area Governments (ABAG); Bay Trail; East Bay Regional Parks District (EBRPD)	Sea level rise and flooding; Green pathways and mobility	2020 for feasibility study and concept design	Wetland restoration sources (see funding sources above in East Slough improvements)	– Conduct feasibility and concept design studies
Bay Trail Connection: High Street to Tidewater Boating Center	EBRPD; City of Oakland	Mobility, access, and active transportation; green connections to shoreline	Post-2020 (following completion of planned projects including Doolittle Drive and Tidewater)	State Coastal Conservancy funds; Caltrans Sustainable Transportation Planning Grants	– Conduct feasibility and concept design studies
Doolittle Drive Adaptation and Arrowhead Marsh Accretion	Port of Oakland; EBRPD; Caltrans	Sea level rise; ecosystem restoration; open space	2020 for feasibility study and concept design	Wetland mitigation bank; wetland restoration sources (see funding sources above in East Slough improvements); transportation agency funds	– Conduct feasibility and concept design studies

Resilient Equity Hubs

Our proposal for Resilient Equity Hubs (REHBs) emphasizes and reinforces the capacity of East Oakland communities to champion resilience actions at the neighborhood scale. We see REHBs as both a near- and long-term strategy. In the near term, they help lay the groundwork for residents to integrate their priorities into adaptation investments and shape a comprehensive, community-driven vision of resilience. REHBs will complement the existing planning process for EONI, adding a layer of governmental and financial capacity. This layer could help develop and underwrite projects, coordinate across jurisdictions, and leverage new investments to produce community benefits. In the longer term, REHBs offer a consistent framework and sustained revenue source to steward local communities through transformative adaptation scenarios, like Tidal Cities, I-880 realignment, and major investments at the Coliseum site and Oakland International Airport. Collectively, these strategies will begin to reverse the longstanding structural inequality that has left East Oakland so vulnerable.

Path Forward

Community Benefits Hub

In collaboration with our community partners, we developed an implementation pathway with three strategies that can be deployed now to make REHBs a reality. First, we recommend that residents and local CBOs identify (or establish) a non-profit organization with the institutional capacity to administer a Community Benefits District (CBD) (or an analogous special district with the ability to raise revenue from local businesses and property owners). To do so, capacity could be built within an existing CBO or a new economic development corporation could be formed. This would provide long-term organizational stability to both sponsor near-term projects and seed future adaptation initiatives.

This entity could also administer grants from external sources and engage other non-profits to form a Community Benefits Council, which would prioritize future investments locally. This council could, as needed, determine priorities for Community Benefits Agreements and also administer a fund governed by a participatory budgeting process to support greater self-determination for residents. Through this process, the East Oakland residents could decide to invest in benefits like affordable housing, grants to small businesses, or subsidized day care centers within their neighborhood.

Community Benefits Hub

Eco Hub

Second, we recommend the creation of an eco-district powered by a locally owned micro-grid. This network could provide income for local residents and reduce greenhouse gas emissions. Oakland Climate Action Coalition and the Oakland Clean Energy Initiative are already pursuing this strategy, and a CBD could support these efforts through expanded governmental and financial powers.

Eco Hub

The CBD could also advocate for an environmental overlay zone that would limit new land uses that generate significant air pollution. Another strategy could involve forming a Geologic Hazard Abatement District (GHAD) to help streamline adaptation investments and build long-term resilience to extreme flood and seismic events. A GHAD has governance powers that CBDs do not, including the ability to engage in earthwork and infrastructure development without California Environmental Quality Act (CEQA) approval requirements. These districts also have access to a shared statewide insurance pool for disaster risks and can use eminent domain to acquire vacant or under-utilized parcels.

Cooperative Hub

Third, a CBD (or similar entity) could help establish a community land trust to manage vacant properties, lease collectively owned lands, and maintain a stable stock of affordable housing. See the Housing Affordability section below for more detail on our housing strategies.

To achieve greater cross-jurisdictional collaboration and scale, a Joint Powers Authority (JPA) could be established. This governance framework would enable all three cities around the Estuary, along with other relevant regional jurisdictions, to collaboratively and comprehensively manage adaptation initiatives.

Cooperative Hub

Housing Affordability

In addition to the risks associated with sea level rise and groundwater flooding, high housing prices are perhaps the most salient threat to the diverse communities surrounding the Estuary. As costs of living rise astronomically, unprecedented pressures are being placed on individuals and families. In many neighborhoods, these pressures have the power to unravel the community fabric. Social resilience is, at its core, about cohesion of community. This form of resilience is rooted in the bonds of people and place that develop slowly over time. Therefore, any proposal to build resilience around the Estuary must confront the challenges of gentrification and displacement through a robust approach to housing affordability.

We propose four strategies to assist local municipalities in meeting and exceeding their housing affordability goals for Moderate, Low-Income and Very-Low Income Households:

(1) streamline development of Accessory Dwelling Units (ADUs);

(2) dedicate vacant parcels to 100 percent affordable housing;

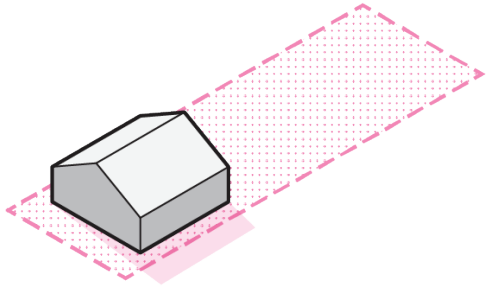
(3) require the provision of below market rate units in new development; and

(4) engage the community land trust model to provide opportunities for affordable ownership.

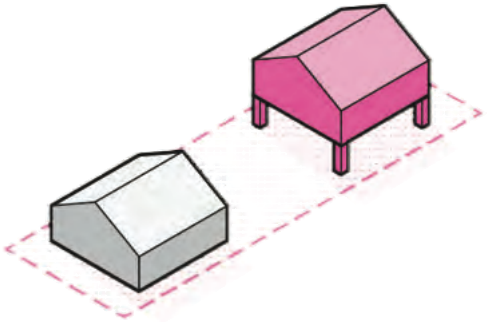
Path Forward

For immediate impact, we look to ADUs as a method of quickly increasing housing supply and density. This bottom-up approach will also provide additional income to existing landowners in Estuary communities. The cities of Oakland, San Leandro, and Alameda all allow ADUs on single-family lots. However, ADU implementation is not as widespread as possible. In part, this is due to extremely high local construction costs and lack of knowledge about the legality of ADUs. We encourage the cities of Oakland, San Leandro, and Alameda to raise awareness about the legality of ADUs, as well as minimize permitting fees and streamline the approval process. Furthermore, ADUs built in areas that are vulnerable to future groundwater rise should be constructed above flood levels or in another manner that addresses this threat. If homeowners in these areas are allowed to charge market rents for their ADUs, we propose they be required to use a portion of their rental revenue to protect their existing homes against flood risks.

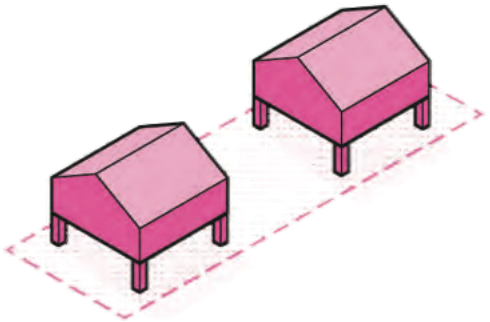
Second, we propose setting aside and rezoning significant areas of underused land for 100 percent affordable housing development. This includes existing vacant parcels or groups of existing vacant parcels large enough to support this type of affordable development. It also includes TODs. In early phases, we would focus on International Boulevard TOD catalyst zones, which have been identified as part of the planning process for the new Bus Rapid Transit (BRT) system. In later phases, we recommend expanding this provision to encompass parcels within Tidal Cities and above the potentially realigned and tunneled I-880 corridor (see Section 4.1: ABC Proposed Long-Term Scenarios).



Identify site to add resilient ADU



Add new resilient ADU - create income source for existing homeowner



Make resilience upgrade to original structure

Resilient ADU Strategy

Third, we suggest that any new market-rate housing development be incentivized to provide a percentage of below market rate (BMR) housing. In TOD zones along International Boulevard and San Leandro Street, higher density makes sense economically and environmentally, so offering additional height is an appropriate means to incentivize additional affordable units. This would yield greater density and housing supply in transit-rich neighborhoods, while also ensuring that a significant portion of that housing supply is set aside for families and individuals with below area median income levels. Both affordable and market-rate TODs offer opportunities to incorporate mixed-use development, community amenities, locally owned businesses, and resilient infrastructure.

Lastly, we propose establishing a Community Land Trust (CLT) (or extending an existing CLT, like the Oakland CLT) to help stabilize local housing stock, acquire and hold vacant parcels for affordable development, and establish collective transaction parameters for CLT housing. CLT residents own buildings individually and their land collectively. When a new resident buys a home within the land trust, they pay a below-market price set by the CLT. When a resident sells the home, it is at a price set by the CLT. This produces modest gains to the owner from the value increase of their home, while maintaining long-term affordability. This model ensures that housing within the CLT stays affordable in the long term while fostering a sense of community and ownership. It also encourages the development of shared amenities and spaces that promote social resilience.

In terms of metrics, we anticipate the following housing density levels:

- Within existing neighborhoods, through the addition of ADUs and new multi-family housing on rezoned vacant lots and TOD zones, we expect to see an increase of density that is appropriately scaled to the existing neighborhood fabric
- Along the corridor between San Leandro Street and Amtrak, we anticipate a mix of low-rise, mid-rise, and high-rise development that would yield a density of approximately 200 dwelling units per acre
- Within Tidal Cities (see Section 4.1), we anticipate a mix of 2-3 story floating walk-up flats averaging 30 dwelling units per acre, as well as low-rise multi-family providing approximately 50 dwelling units per acre

East Creek Slough Channel Capacity Improvements at I-880 and Capitol Corridor

East Creek Slough drains several creek watersheds, including Peralta, Courtland, 54th Avenue, and Seminary Creeks stretching upslope to California State Route 13. The majority of creeks within this watershed are buried culverts. The downstream portions of these creeks daylight at the Capitol Corridor railroad tracks, where they transition to earthen channels with steep banks.

ABC proposes increasing channel capacity and improving habitat along the downstream portions of these channels through widening. Widening the Peralta Creek branch will be difficult due to the presence of an electrical substation at the intersection of Coliseum Way and 50th Avenue; however, the left bank could be widened into the adjacent parking lot. In addition, the 54th Street and Seminary Creek channels could be widened between the railroad tracks and I-880 (adjacent to the Oakland Flea Market), as this area is primarily parking lot or access road.

Benefits of widening this section of creek include the creation of channel edge habitat. This could be achieved by expanding the channel and regrading its banks to lessen the side slopes and form marshplain terraces. Two Coliseum Way creek crossings would need to be adjusted to accommodate the wider channels, either by reconstructing those crossings or extending the existing wing walls to tie into the widened channel banks. A portion of the large parking lot between Peralta and 54th Avenue Creeks (southwest of Coliseum Way) could also be removed and lowered to create a cross-floodplain between the two creek segments. This would also provide transitional habitat for vegetated saltmarsh as sea levels rise in the future.

Path Forward

Near-term actions to accomplish these channel capacity improvements include environmental planning, design, permitting, and land acquisition. A key initial step involves conducting feasibility and concept design studies with the Alameda Flood Control District (AFCD). Chapter 5: Finance Plan and Chapter 6: Environmental Governance and Regulation provide more information on how to underwrite and permit these projects. In the long term, additional flood protection measures will be needed to address sea level rise hazards in adjacent areas.

Damon Slough waterway

3D model of the Estuary produced by CCA students

Arroyo Viejo to Elmhurst Realignment and Widening

Arroyo Viejo Creek drains a 6.2-square-mile watershed extending from the Coliseum site upstream to Skyline Boulevard. Much of the creek in the developed areas of Oakland runs through engineered channels and culverts. The downstream portion of the creek daylights along Hegenberger Road at International Boulevard and continues toward San Leandro Bay, joining Damon Slough at the Coliseum site after crossing under the railroad tracks. Arroyo Viejo Creek joins Lion Creek in Damon Slough, wrapping around the Coliseum site and discharging to the bay. Hydraulic modeling and sea level rise mapping of Damon Slough indicate that this area will be exposed to increased flooding due to rising tides, groundwater emergence, and more intense climate change-related precipitation events.

ABC proposes filling the 1,500-foot reach of Damon Slough along the northeast shoreline of the Coliseum site to eliminate two ninety-degree bends in the channel. We would simultaneously reroute Arroyo Viejo Creek into Elmhurst Creek to the south. This reroute would create a new 1,000-foot connector channel that would meander through the existing Coliseum parking lot and join Elmhurst Creek approximately 3,400 feet upstream from its mouth at San Leandro Bay.

The downstream portion of Elmhurst Creek would need to be widened to accommodate the additional runoff from Arroyo Viejo Creek, which drains an area that is approximately three times as large as Elmhurst Creek. Widening would provide a unique opportunity to create additional tidal and transitional habitat along the downstream reach of Elmhurst Creek, which generally has steep banks (some of which are armored with riprap). The section of the creek between I-880 and Hegenberger Road is particularly constrained and would benefit from the addition of channel edge habitat. This could be achieved by expanding the channel into adjacent parking lots and regrading the channel banks to reduce their side slopes and create marshplain terraces.

The primary challenges to this creek realignment and widening proposal are the multiple bridge crossings at Coliseum Way, I-880, Oakport Street, Edgewater Drive, and the Bay Trail. These bridges would need to be reconstructed or their abutments would have to be hardened to prevent damage from increased flood flows. Hydrodynamic modeling of the creek outlet would also be required to evaluate potential scouring effects on Arrowhead Marsh, as higher flows from Elmhurst Creek could direct high-velocity outflow towards the marsh.

Despite these challenges, creek realignment and widening would provide numerous benefits along the downstream reach of Elmhurst Creek, including restoring natural habitat and ecological corridors, enhancing ecosystem function, and increasing channel capacity. In addition, diversion of Arroyo Viejo Creek flood flows would help mitigate flooding issues along Damon Slough and reduce the length of shoreline in need of sea level rise protection. Filling the existing segment of Damon Slough would also provide better connectivity from inland neighborhoods to the Coliseum site and Estuary shoreline.

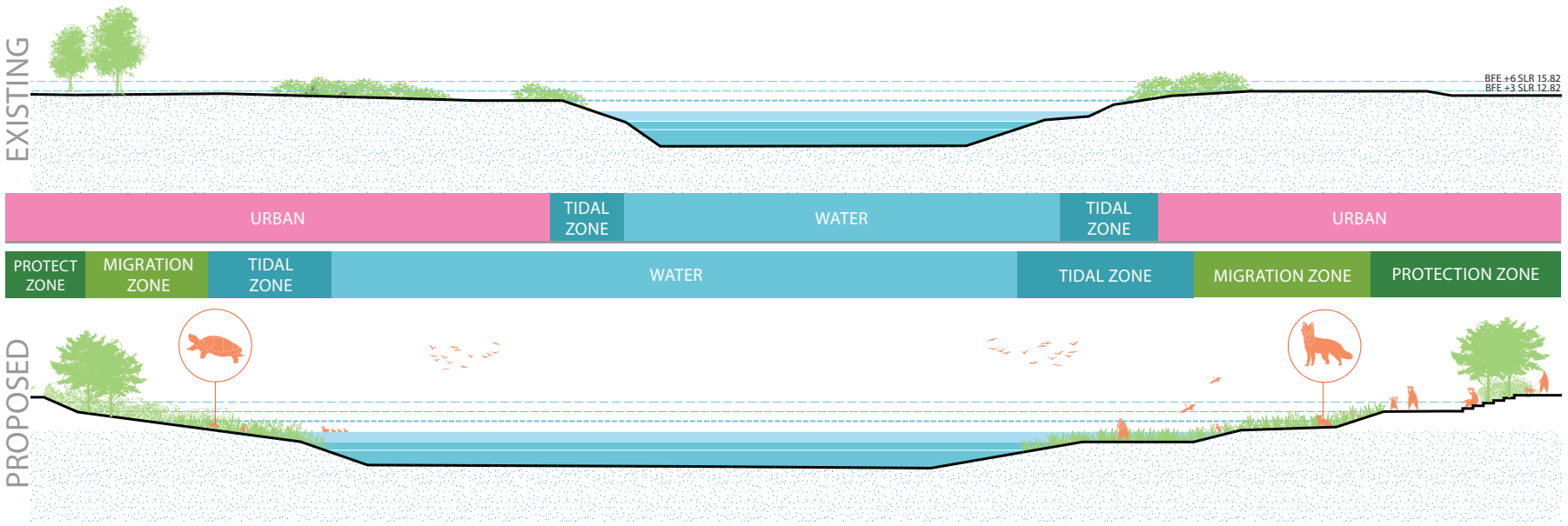
Path Forward

Near-term actions to realign and widen Arroyo Viejo Creek include environmental planning, design, permitting, and land acquisition for the channel widening, bridge protection, and connector channel components of the project. An important early step involves conducting feasibility and concept design studies with AFCD.

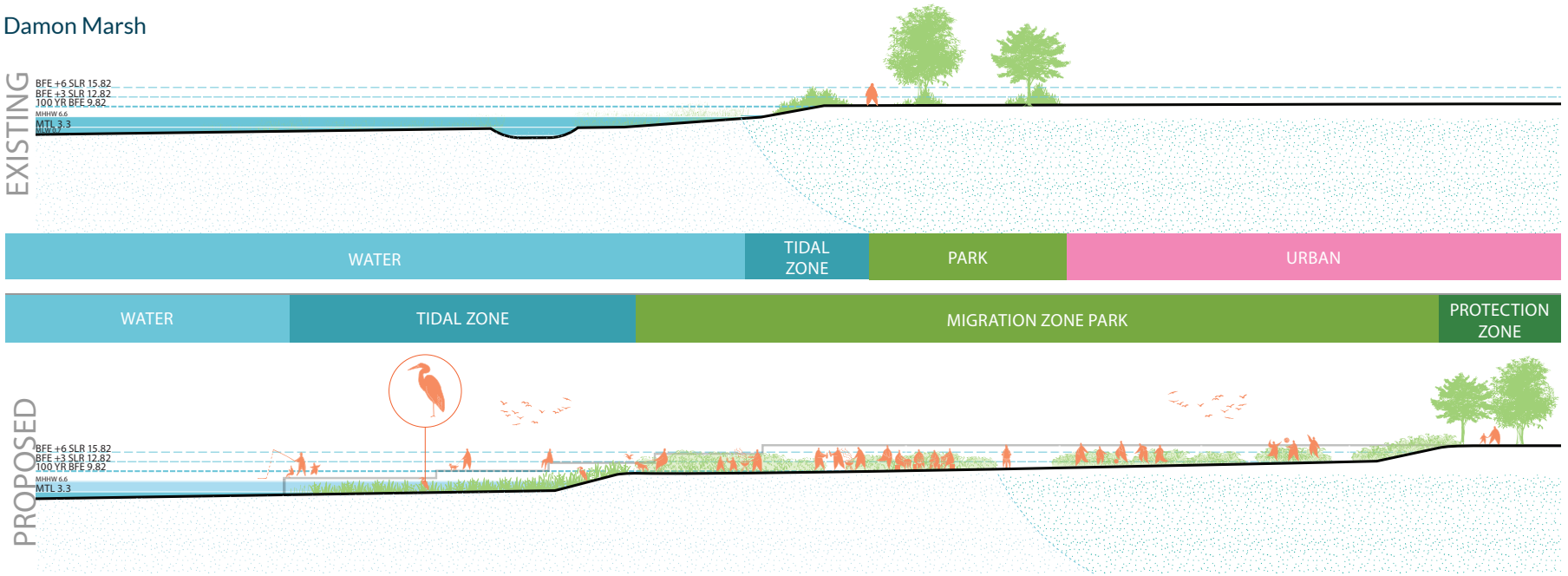
Channel widening and bridge protections would need to be implemented first to facilitate the diversion of Arroyo Viejo Creek into Elmhurst Creek. With these improvements in place, the connector channel could be activated and the existing Arroyo Viejo connection to Damon Slough could be blocked. The reach of Damon Slough between Lion Creek and Arroyo Viejo Creek could be filled or allowed to convert into vegetated tidal marsh.

In the long term, as the existing Elmhurst Creek bridges reach the ends of their service lives, each bridge could be replaced and lengthened to span the increased width of Elmhurst Creek. Alternatively, the existing bridge crossings at Edgewater Drive and Oakport Street could be consolidated into a single new crossing spanning the widened creek.

Damon Slough



Damon Marsh



Damon Slough and Damon Marsh design concepts

Hegenberger Greenway

The segment of Hegenberger Road between San Leandro Street and International Boulevard is the equivalent of an 8-lane highway—vastly oversized for its traffic demand. Our proposed Hegenberger Greenway would reduce the number of vehicular lanes to create a multi-benefit community connector. This greenway would offer a safe new bicycle and pedestrian connection from International Boulevard to San Leandro Street, the Coliseum BART station, and the future East Bay Greenway. As part of this project, the Arroyo Viejo flood channel would be widened and stepped to create a riparian corridor and provide additional flood capacity. Stormwater treatment areas would be integrated within the corridor and the greenway would be planted with a dense canopy of native riparian trees and pollinator species to provide habitat, mitigate noise impacts from the road, and provide air quality benefits.

Hegenberger Rd existing

Hegenberger Rd and Greenway proposed

Path Forward

The first step to implementation would involve coordinating between the City of Oakland Department of Transportation and the ACFCD, with the goal of initiating a joint planning study and feasibility analysis. The study would include detailed traffic analysis to determine existing capacity within the Hegenberger Road right-of-way and to confirm that the proposed lane reductions are viable. Existing channel capacity and flood risk and management benefits would also be further analyzed. An assessment of alternative plans and associated costs would be developed, along with land transfer, joint funding, and operations and maintenance strategies.

Bay Trail Connection – High Street to Tidewater Boating Center

The Bay Trail links much of the open space around the Estuary, traversing the edges of wetlands and meandering through raw landscapes and creeks. Currently, a key link between the Tidewater Boat Center and the High Street Bridge is missing. The Bay Trail Connector would connect the Bay Trail to the High Street Bridge and Alameda, creating a complete loop around the Estuary.

Our team has identified two options to complete this link. The first involves the less intensive option of adding a multi-use path on Tidewater Avenue. The second proposes a more comprehensive solution that would include a terraced sea wall and promenade between Tidewater Boat House and High Street. The latter option would require coordination with current land owners and tenants (who operate bulk soil and aggregate processing facilities) to encourage them to open a public access corridor that could be detoured during their operations. This alternative could serve as a pilot model for integrating existing industrial operations with public access and flooding adaptation elements—a mix needed to address sea level rise vulnerabilities throughout many locations around the Estuary (and greater San Francisco Bay).

Path Forward

Initial steps include feasibility and concept design studies in coordination with East Bay Regional Parks District (EBRPD), San Francisco Bay Trail, City of Oakland, and local businesses and community groups. These studies would include traffic analysis and an assessment of the current and future operational requirements for local businesses. Potential funding options would be explored in partnership with the State Coastal Conservancy, who has played a key role in offering grants to assist in completion of the trail across the greater Bay Area.

Doolittle Drive Adaptation and Arrowhead Marsh Accretion

Arrowhead Marsh is a 50-acre wetland that provides habitat to many plant and wildlife species, including shorebird species such as the state and federally threatened Ridgway's rail. It serves as a stopover point on the Pacific Flyway and is part of the Western Hemisphere Shorebird Reserve Network. Arrowhead Marsh is part of the Martin Luther King Jr. Regional Shoreline Park, and serves as the protected remainder of a once-extensive marshland at San Leandro Bay[4] .

Rising tides are projected to alter the habitat composition of Arrowhead Marsh, causing an increase in mudflats and a decrease in vegetation cover, which will alter the species composition of the marsh[5]. It is essential to restore the ecological transition zone—the elevational zone where low-lying marsh habitat and upland habitat meet—to provide future habitat for species to transition to as sea level rises. An expanded transition zone will also provide a wider barrier of nature-based infrastructure to protect inland assets from flooding.

We propose raising and relocating Doolittle Drive (State Route 61) and simultaneously enhancing Arrowhead Marsh by expanding it southward. This plan would fill in the Sea Plane Channel with dredge spoils from annual dredging operations in the Central Estuary, thereby reconnecting Arrowhead Marsh to the higher elevation landscape adjacent to Doolittle Drive. Currently, dredge spoils are taken by boat and offloaded adjacent to Alcatraz or out beyond the Golden Gate Bridge. This project creates a potentially lower cost solution that would result in increased wetland habitat at an elevational gradient that improves the landscape's resilience to sea level rise.

The Sea Plane Channel would be filled at a shallow sloped gradient to accommodate and expand the ecological transition zone. Based on estimated marsh accretion rates and projected sea level rise, this landscape could remain marsh well into the future through preliminary placement of dredge spoils, followed by natural accretion. To further increase the ecological transition zone and provide additional sea level rise protection, we propose raising and relocating Doolittle Drive westward toward Earhart Road. These strategies would also open the possibility of restoring the industrial landscape adjacent to Doolittle Drive.

Path Forward

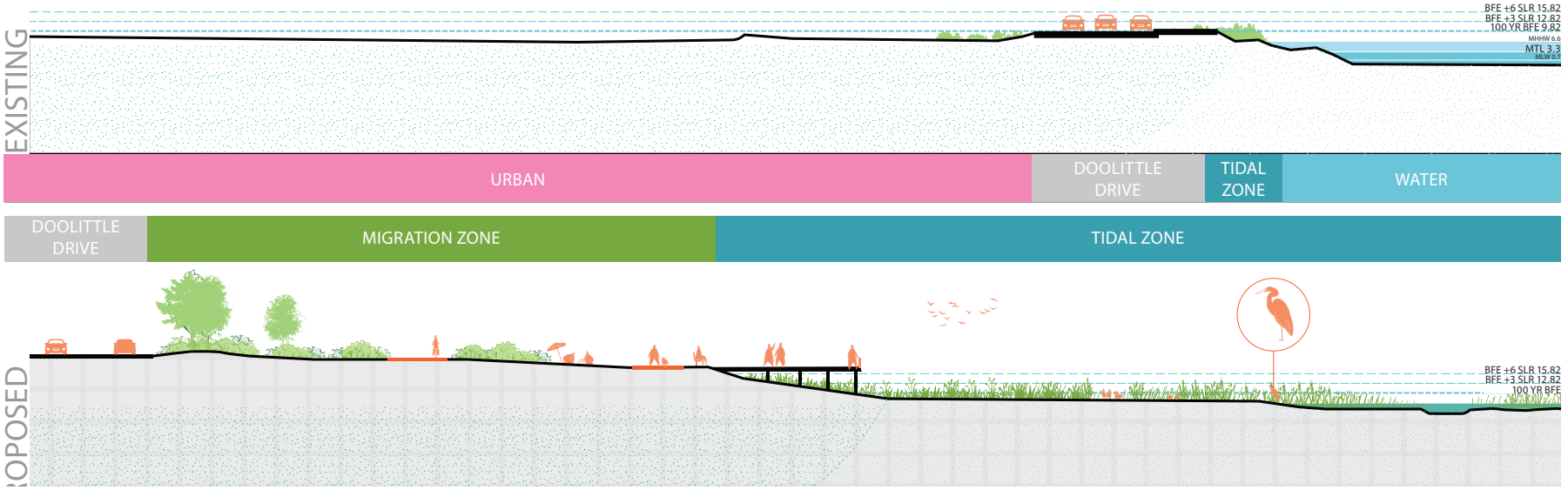
Near-term components of this project involve initiating the environmental planning and permitting processes for (1) allowing dredge spoils to be beneficially reused in the Sea Plane Channel; and (2) raising and relocating Doolittle Drive. As a state highway, this would require Caltrans involvement in the planning and design process. Disposing dredge spoils in the Sea Plane Channel would likely be a cost saver when compared to current offloading practices. Funding for the project could be provided by grants through the U.S. Environmental Protection Agency, and other agencies and non-profits interested in nature-based sea level rise adaptation solutions.

One innovative idea for funding these improvements involves creating a wetland mitigation bank. In this framework, Arrowhead Marsh would earn credits for its ecological and habitat restoration practices and bank them. Proponents of projects that would have an impact on wetlands elsewhere could then purchase these banked credits, effectively funding future resilience activities around the Estuary. As this program gains consistency, we see it potentially providing economic pathways and spillover benefits for local communities.

[4]East Bay Regional Park District, 2018. Martin Luther King Jr. Regional Shoreline. Accessed 5/2/2018. Available: http://www.ebparks.org/parks/martinlking/

[5]Point Blue Conservation Science, 2018. Future Tidal Marshes Interactive Map. Accessed 4/18/2018. Available: http://data.prbo.org/maps/sfbmap_html.php

Doolittle Drive



Doolittle Drive design concept

All Bay Collective team take In It Together to Coliseum BART Station

The scenarios that follow are the “big moves” to realize the overall vision for the Estuary Commons. They bring together the core elements of our design proposal—catalyze, adapt, stitch, prosper—in cohesive and transformative long-term land use proposals. We see these as inspirational starting points for a sustained, community-driven conversation about the future of the Estuary circa 2050 and beyond.

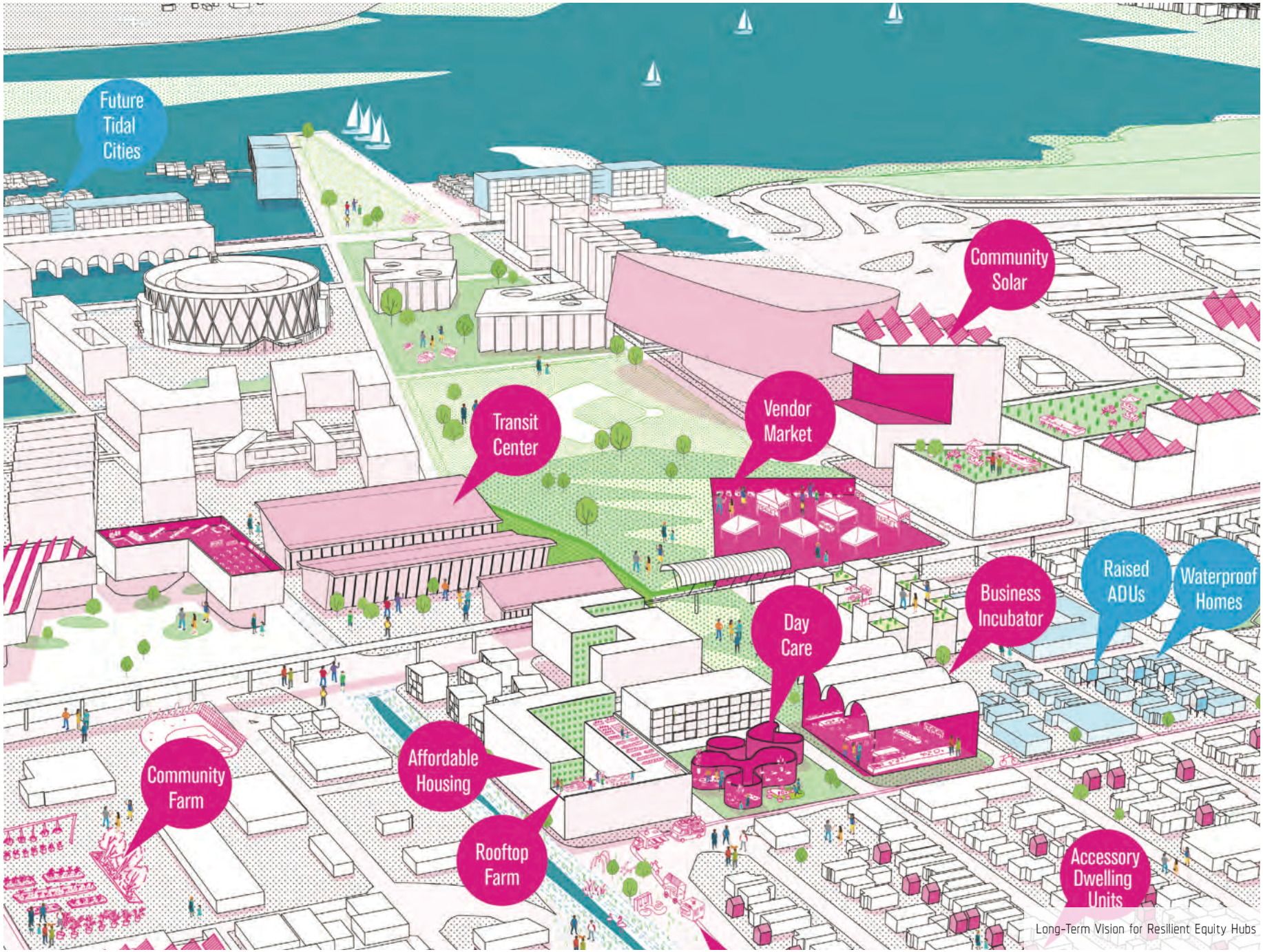
4. Proposed Long-Term Scenarios

4.1 ABC Proposed Long-Term Scenarios

Resilient Equity Hubs

As noted previously in Chapter 3: Near-Term Projects, we view Resilient Equity Hubs (REHBs) as both a near-term strategy to catalyze existing community-led resilience efforts and a long-term strategy for residents to guide transformative adaptation scenarios. In tandem with the community-driven East Oakland Neighborhood Initiative, REHBs will establish the governance and financial capabilities necessary to ensure our proposed long-term projects produce equitable outcomes and valuable community benefits.

> "Resilience isn't just about protecting shorelines. It's also about making sure people can **thrive** in place, in a way that doesn't amplify gentrification trends today. Innovative models of **cooperation** among governments and homeownership can help people find strength in numbers."
>
> Janette Kim, Assistant Professor, CCA and co-Director, Urban Works Agency



Long-Term Vision for Resilient Equity Hubs

Bay Shoreline Restoration and Enhancement

Building on near-term projects like Doolittle Drive Adaptation and Arrowhead Marsh Accretion (see Section 3.2), we envision continued incremental adaptation of the Estuary to enhance the most vulnerable shorezones. This adaptive approach is extended to the Oakland edge of MLK Shoreline Park. Here, we propose the expansion and improvement of the park, along with the sloughs and channels, to provide increased fluvial capacity, sea level rise adaptation, and new connections between East Oakland and the Estuary.

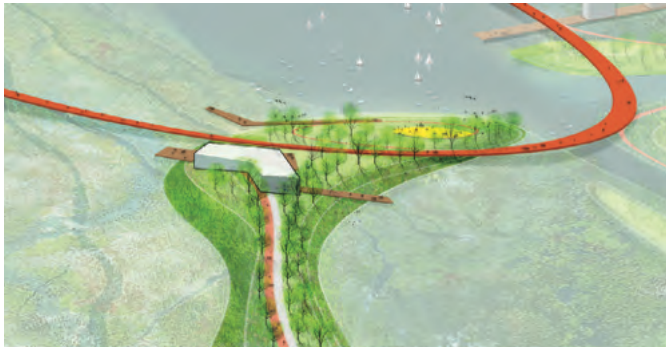
Key moves in this scenario include preserving and expanding existing tidal marshes at the mouth of Damon Slough to the north, and placing new marshland at strategic locations around the Estuary. Migration zones are incorporated into this plan, with grading that supports marsh accretion and enables incremental habitat migration as sea levels rise.

To enhance shoreline mobility and access, we propose a network of multiuse trails and open space improvements that will loop around the bay and feed into existing networks including the Bay Trail. Our vision for the expanded shoreline park includes three major nodes that will be iconic gathering locations of local families and visitors: the Eastside Recreation Area, Arrowhead Marsh Overlook, and the Bay Farm Promontory. Preliminary ideas for new recreational nodes include sports fields, restaurants, environmental education facilities and public access outlooks.

Implementing this longer-term vision would require similar steps to those taken for the Doolittle Drive Adaptation and Arrowhead Marsh Accretion project, but on a larger scale with more stakeholders, regulatory requirements, and funding needs.

Bay Farm Promontory

Eastside Recreation Area



Arrowhead Marsh Overlook

A view across the Estuary

Tidal Cities

Tidal Cities combine tidal lagoons with floating structures to live with rising rides and rising groundwater. These dynamic landscapes interweave built and natural environments to create new communities that can adapt in place and are resilient to various environmental vulnerabilities. The basic concept is to use cut-and-fill techniques to form tidal lagoons, which would be fed by the Estuary's channels and oscillating tides. Tide gates would maintain a stable water table within the lagoons and facilitate periodic hydraulic flows in and out to keep water from becoming stagnant. Building units would be placed on shared decking floated with pontoons. We project that densities of 25-75 units per acre can be achieved.

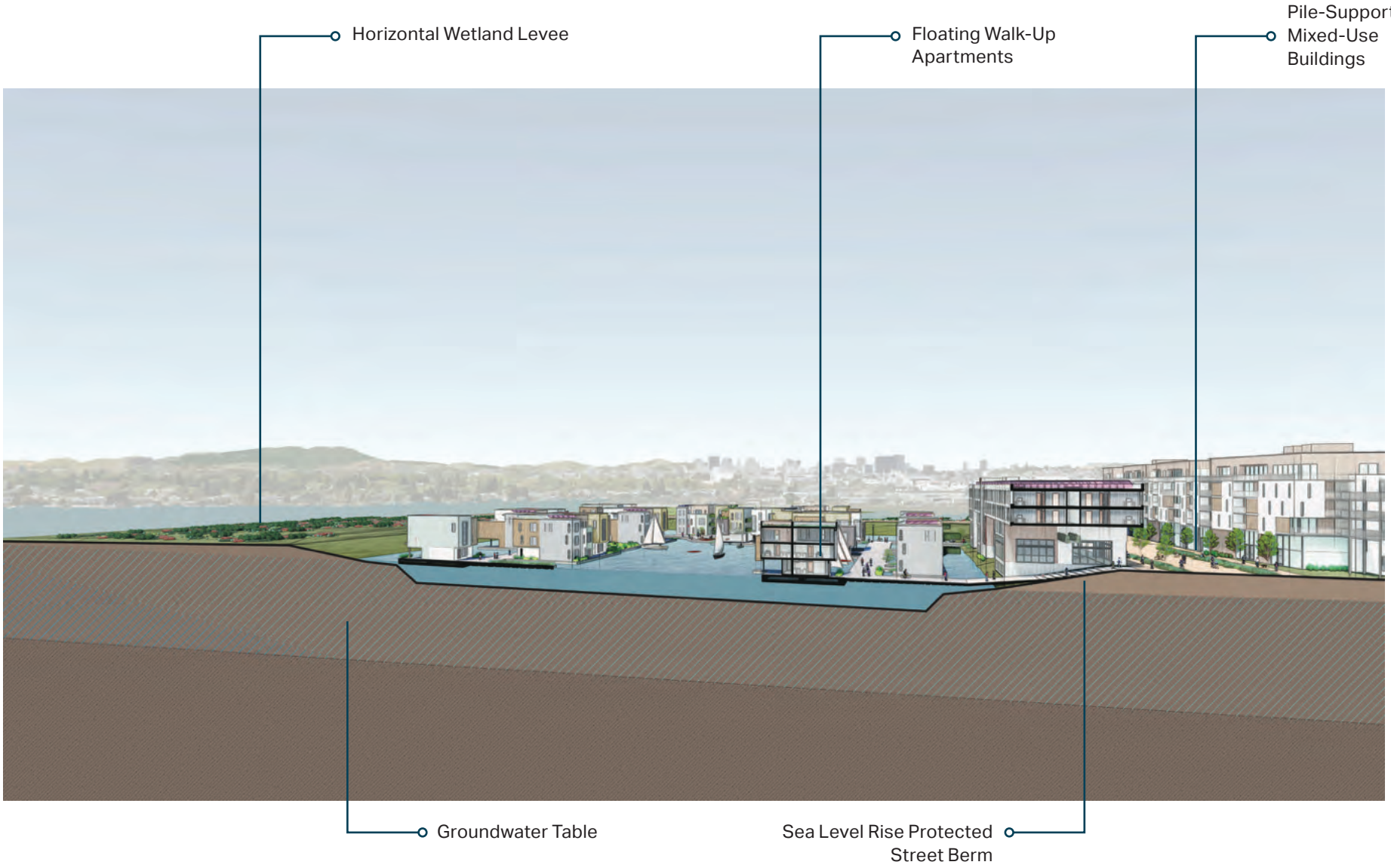
Transitioning coastline landscapes west of the existing Coliseum site into Tidal Cities will take 30-75 years. To test the feasibility of this concept, we propose building a pilot version within the next decade. The Coliseum site (120 acres currently in public ownership) represents a significant opportunity to explore a pilot project. Areas along the creeks, the public land of the Alameda golf course, and any large areas with contaminated soil that will need to be removed and sequestered as groundwater levels rise also represent potential candidate areas for a pilot.

This work can be initiated by either private developers or a public agency that owns land (or both). Private developers and public agencies have long reshaped the land near the Estuary. This concept would add excavation to the site preparation toolkit—a strategy that would better balance cut and fill on site. It would also require construction of small tide gates. An owner or developer would begin by re-grading the site and planning the utility layout with flexible pipes. A stormwater filtration system of green infrastructure, using a new adjacent park or built along streets, would be needed to keep the ponds clean—with the added benefit of sending cleaner water to nearby creeks and the Bay.

Modular housing manufacturers could also supply the structures. For example, FactoryOS has manufactured suitable prefabricated units in the San Francisco Bay Area. Building pontoons and modular decking could be done in East Oakland to produce local jobs, as it was in the Seattle area when the Evergreen Point Floating Bridge was re-built during the past decade.

Massing of potential building/pontoon configurations were evaluated to optimize stability and minimize draft. As a result, 3-story units with surrounding common deck areas were confirmed feasible using traditional construction common in the Bay Area floating home communities. This approach would allow flexibility in water depths, act to protect water quality and provide a robust pontoon design that could support the full building weight in the event of low water conditions.

If the Tidal City lagoon was constructed by a private developer, permits would be needed from a wide range of public agencies at multiple scales. If it was constructed using the authority of a special public district known as a Geologic Hazard Abatement District (GHAD), the site preparation would be exempt from local permitting and the California Environmental Quality Act (CEQA), leaving only federal permits to be acquired. It could take 1-2 years to establish a GHAD, which requires a petition and voting process that involves local property owners. Once the site is prepared by a GHAD, housing development could begin and would be subject to standard permitting processes. Due to the critical need for lower-income housing in East Oakland, it would be necessary to create an ownership model that stabilizes the affordability of the new housing stock. One option may be to form a community land trust covering some or all of the new units.



Tidal Cities design concept

I-880 Realignment Study

The driving surface of I-880 is already inches from flooding during King Tides. As sea level rise threatens operations on this vital artery in the coming decades, the two-mile stretch of I-880 along the Estuary will no longer remain viable without significant modifications. The traditional approach to highway planning may not be sufficient to systematically address the risks posed to I-880. While flood walls, drainage culverts, and incremental improvements to raise the highway may provide some measure of temporary relief, these actions would also likely impose visual and physical barriers, increase noise, and negatively affect surrounding natural habitats.

Instead, we propose an integrated approach that syncronizes I-880 improvements with other resilience actions to deliver cumulative benefits for local communities. This approach integrates the following strategies: (a) using grading to raise ground levels between San Leandro Bay and inland communities; (b) building higher and longer bridge spans to enable floodwaters to pass underneath; (c) widening flow channels to accommodate more water and improve wildlife habitat; and (d) potentially enclosing I-880 and providing green corridors to connect East Oakland neighborhoods to the bay.

As an alternative to protecting I-880 in place, we studied the feasibility of shifting I-880 east away from rising tides and along the existing BART, Union Pacific Railroad (UPRR), and Amtrak Capitol Corridor. We also looked at lowering the realigned highway into underground tunnels to reduce impacts to local homes and businesses, open up new shoreline-to-community connections, reduce noise levels, and enhance aesthetics.

For one alignment, the shift east would begin just south of the Hegenberger Road interchange and drop immediately to be completely underground north of Enterprise Way. The alignment continues northeasterly and passes under UPRR, Hegenberger Road, OAK BART connector and Damon Slough, and then continues northwesterly between UPRR and San Leandro Street. At approximately High Street, the highway curves westerly and rejoins the existing alignment at approximately 37th Avenue.

Going forward, we propose that Caltrans study this new alignment in greater depth, as well as other options (e.g., tunneling in place, causeway) that deliver systematic and cumulative benefits. To initiate these studies, Caltrans could draw on its own funding streams as well as sources from regional and state planning agencies.

Today

Shift

Connect

Develop

Coliseum Multi-Modal Transit Hub

The Oakland Coliseum site has historically served the Bay Area with several vital transit links: BART, Amtrak, AC Transit, and Oakland International Airport's air train. To build on these elements and further position East Oakland to prosper in the future, our team proposes unifying these links within an expanded multi-modal transport hub. In addition to stitching existing transportation modes, this hub could also serve as the end node for a second BART transbay crossing in the longer term and provide secure linkages to the airport, should it consider expanding its passenger facilities off site to free up airside operational capacity.

A fully integrated, multi-modal station at the Coliseum site would stitch together transit connections at all levels: locally, regionally, and even globally. This would enable East Oakland and the broader Bay Area to prosper as an anchor for investment in housing, jobs, and cultural assets. Not only would the hub create new economic opportunities locally, but it would also expand the job shed to put more well-paying, Bay Area jobs within reach for East Oakland residents. Value capture mechanisms—especially the community-driven mechanisms we propose through Resilient Equity Hubs—could leverage the development catalyzed by this proposal to help finance resilience measures.

In the near term, we recommend that BART consider this project in its longer-range general plans. Planning and implementation would need to be evaluated through a community-driven process among the agencies, local communities, and the City of Oakland. An important next step involves establishing a multi-agency study assessing the viability, timeline, and success criteria for creating this hub.

4.2 Assessment of Estuary Commons

As part of the ABC Toolkit (Section 1.2), the *Community Resilience Investment Decision-Making Tool* is a quadruple bottom line framework for measuring the social, environmental, financial, and governance benefits associated with different adaptation strategies. We have applied this tool to evaluate the co-benefits of three different scenarios: (1) the "Before" scenario, where few resilience actions had been pursued; (2) the "Current and Proposed Plans" scenario, where stakeholders are pursuing a variety of independent resilience actions, including adopted plans and strategies; and (3) the "Estuary Commons" scenario, based on the collaborative and comprehensive design vision articulated in this report.

In consultation with agency and community representatives during our Project Working Group (PWG) series, our team developed criteria, indicators, and metrics associated with each bottom line (see Appendix F). The criteria and indicators correspond to issues of importance to local stakeholders. For example, we heard from community groups that community benefits, public health, and housing affordability were key concerns (to name a few), and therefore incorporated them into our framework. Additionally, flood resilience is placed front and center, as the combined threat of sea level rise and groundwater flooding poses a severe threat to Estuary communities.

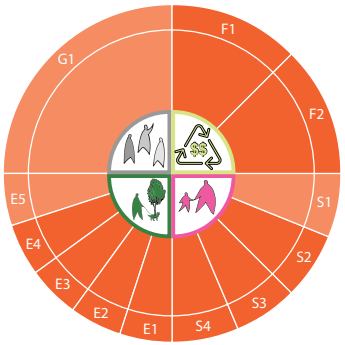
Augmenting triple bottom line models that assess social, environmental, and financial co-benefits, our team added a fourth dimension: governance. Throughout this project, our PWG constantly stressed the importance of multi-stakeholder collaboration and governance structures that put communities at the center of major investment decisions. As a result, Multi-Stakeholder and Community Collaboration is broken out as a distinct indicator—one that was of vital importance to us in developing our design vision for the Estuary Commons.

As shown in the figure to the right, the Estuary Commons will produce considerable positive impacts for all four bottom lines. One of our greatest value-adds is to governance. Our PWG series , ABC Toolkit, and path forward actions (see Chapter 7) will help catalyze and sustain the collaboration necessary to establish a resilient and equitable Estuary. Also, the proposed Community Benefits District will provide an organizing framework for East Oakland communities to pursue neighborhood-scale adaptation actions and work with agencies and private investors going forward.

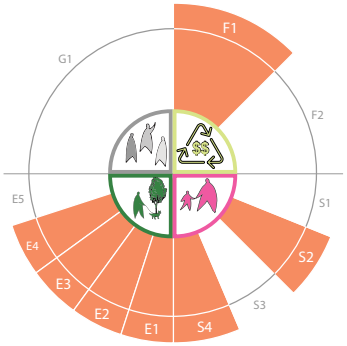
Our recommended watershed restoration and expansion strategies will yield considerable co-benefits across social, environmental, and financial bottom lines. Not only will economic risk for surrounding neighborhoods and public assets be reduced, but new green corridors will improve local mobility and expand wildlife habitat and open space. Importantly, resilience to the combined threat of sea level rise and groundwater flooding will be achieved. When coupled with measures to enhance local access to jobs, affordable housing, and other community benefits, these flood resilience strategies will help residents adapt and prosper in place.

The *Community Resilience Investment Decision-Making Tool* is designed as a dynamic, flexible framework that users can adapt as priorities, realities, and risks change. In Appendix F, we offer a list of additional criteria and indicators (beyond those included here) for users to consider based on their needs and goals.

Current



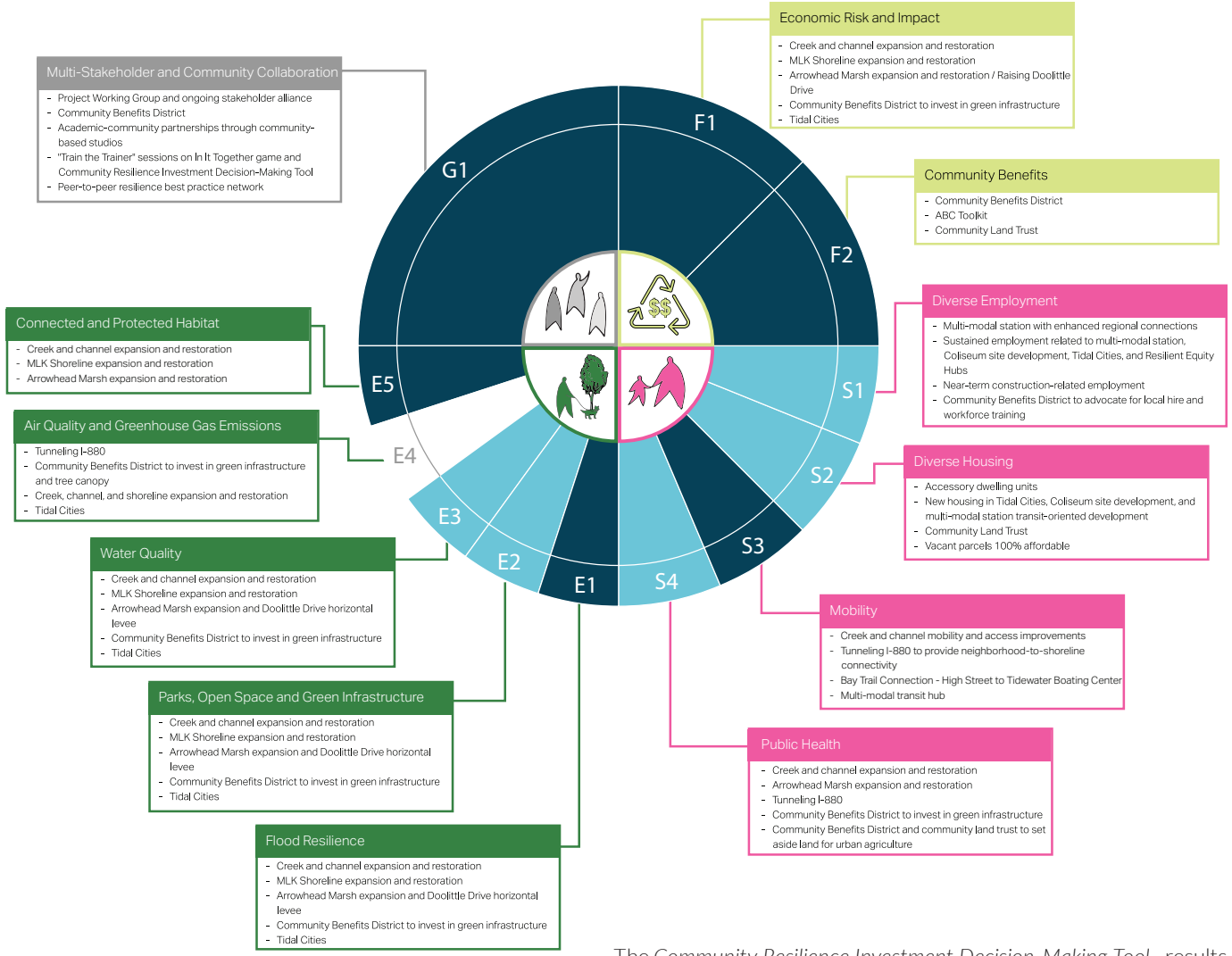
Proposed Individual Plans



Legend

- Significantly Positive (++)
- Positive (+)
- Neutral
- Negative (-)
- Significantly Negative (--)

In It Together - The Estuary Commons



The *Community Resilience Investment Decision-Making Tool* - results

"It may seem crazy to float cities in tidal ponds, but it makes sense in California. Floating foundations can keep us **safer** in dangerous earthquakes and the landforms around ponds can **protect** people from waves."

Professor Kristina Hill, University of California, Berkeley

A view to the Coliseum Stadium

This chapter offers high-level strategies for funding and financing resilience actions around the Estuary. Achieving our overall vision for an Estuary Commons will require a diversified capital stack—one that employs both traditional funding opportunities as well as innovative public and private financing approaches. These mechanisms are highlighted in what follows, along with a mandate to incorporate co-benefit analysis and community priorities into all investment decision-making.

5. Finance Plan

In California as in much of the industrialized world, public finance and governance models do not match the scale of the resilient infrastructure challenge. This is certainly the case around the Estuary, where no one agency or organization has the capacity or resources to build the necessary infrastructure. Importantly, this challenge is not only about addressing environmental vulnerabilities, but also about delivering economic, environmental, and social benefits to surrounding communities.

Our approach to meeting this challenge is grounded in the following principles:

Cooperative, cross jurisdictional, and **community based** approaches to governance are essential to building robust and sustainable financing solutions

New sources of both **traditional** and **alternative finance** will be needed to augment public resources

Evidence based policy tools (like the Community Resilience Investment Decision-Making Tool) are needed to guide investments that maximize scarce resources and deliver multiple co benefits

Community benefits should be clearly articulated and provided as part of all new major investments and infrastructure projects

Financing Sources and Tools

Appendix K provides an up-to-date glossary of common resilient infrastructure financing tools. These include relatively well-established mechanisms like Mello-Roos Community Facilities Districts (CFDs) and Community Benefits Districts (CBDs), as well as innovative new sources like social and environmental impact bonds and multi-jurisdictional revenue sharing and funding pools. The finance strategies listed below for specific near- and long-term projects draw from these strategies, while also recognizing the critical importance of investing in local capacity building. This local capacity element is foundational to our proposal, as reflected in the early establishment of Resilient Equity Hubs to guide future investments.

Community Benefits

Community benefits are goods and services that support community wellbeing. Each investment made in building a resilient Estuary should provide a set of clearly defined community benefits, scaled appropriately to the type of project and driven by participatory decision-making and budgeting processes. Common types of community benefits include, but are not limited to, the following:

- Affordable housing
- Parks, open space, and recreation
- Transit service and enhanced mobility
- Jobs and workforce training
- Programs for youth and seniors
- Community gardens and urban agriculture

The Equity Checklist attached in Appendix G offers a tool to help identify and prioritize community benefits.

5.1 Near-Term Finance Plan

Creek and Floodplain Restoration and Enhancements

Near-term improvement actions (e.g., East Slough channel capacity improvements, Arroyo Viejo to Elmhurst realignment) would cost on the order of $50 million to $100 million, including project costs and land acquisition. These improvements would deliver a variety of benefits, enabling them to compete for funding from current and future grant sources. These include:

- Proposition 68 Program Funds (assuming this ballot initiative passes in June)[6]
- San Francisco Bay Restoration Authority Measure AA (Oakland Priority Creeks and Trails have Priority Conservation Area designation)
- California State Parks Habitat Conservation Fund (for acquisition and development of wildlife corridors and trails)
- California Coastal Conservancy Climate Ready Program grants (from cap-and-trade program)
- California Fish and Wildlife Greenhouse Gas Reduction Program (for restoring wetlands and coastal watershed)
- Bay Area Council Foundation California Resilience Challenge grants (request for proposals anticipated in September 2018)
- Social and environmental impact bonds supported by a local joint powers authority
- Other federal, state, and foundation grant sources

Bicycle and Pedestrian Connectivity Improvements

A variety of existing sources could fund these near-term improvements (e.g., Bay Trail connection – High Street to Tidewater Boating Center, Hegenberger Greenway). These projects would deliver multiple of economic, environmental, and social co-benefits, making them very competitive in funding evaluation processes. Sources include:

- Metropolitan Transportation Commission (MTC) funds
- MTC One Bay Area Grant (priority development area within study area)
- Alameda County Measure BB
- Community Benefit District funds (were one to be formed)
- California State Parks Recreational Trails Program
- Active Transportation Program for new bike and pedestrian facilities (from cap-and-trade program)
- Affordable Housing and Sustainable Communities program (has local mobility component)
- Other federal, state, and foundation grant sources

Near-term projects (1-10 years) would be supported primarily through existing and proposed grant funding sources. These opportunities are typically funded and administered by public agencies, non-profits, and community-based organizations.

[6] http://www.lao.ca.gov/BallotAnalysis/Proposition?number=68&year=2018

5.2 Long-Term Finance Plan

ABC's proposed longer-term actions will require both grant funding and sustained financing sources and tools (e.g., Enhanced Infrastructure Financing Districts [EIFDs] or Community Facilities Districts [CFDs]). These mechanisms will help capture value associated with new development, generating the longer-term revenue streams necessary to build transformative, multi-phase resilient infrastructure projects.

Bay Shoreline Restoration and Enhancement

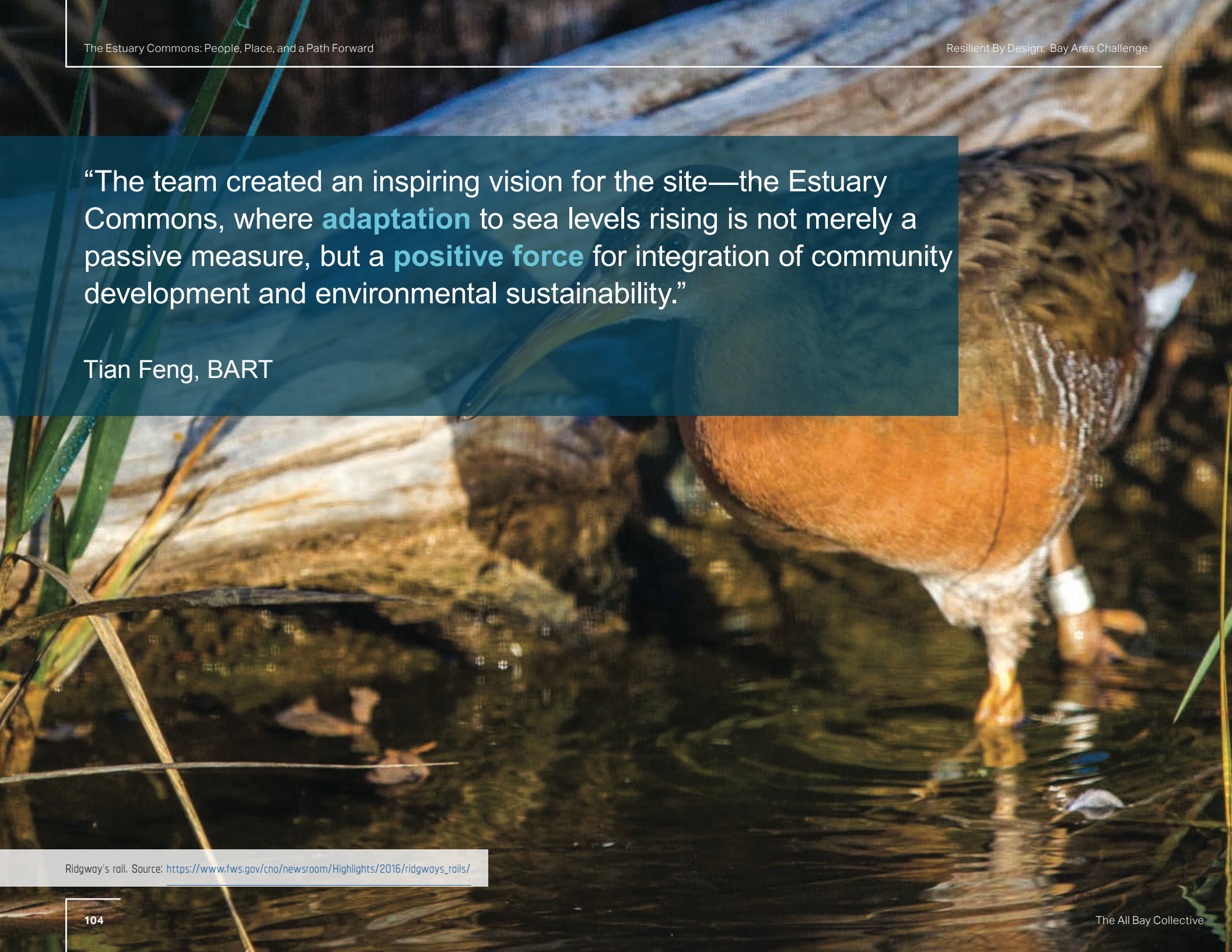
Long-term funding will draw from State of California programs underwritten through future bond issuances, as well as other federal, state, regional, and private grants. Pooled funding/financing could also be secured through the formation of a joint powers authority involving affected agencies and jurisdictions around the Estuary.

Tunnel and/or Realign Interstate 880

In addition to MTC and Federal Department of Transportation funding, we propose the creation of an EIFD or CFD (Mello-Roos District) to capture value from new real estate development made possible (through this proposal) on former I-880 right-of-way. A variety of implementation and financing tools associated with Resilient Equity Hubs should also be deployed over time. These mechanisms should be consistent with community needs and aspirations, including (but not limited to) community land trusts and other forms of cooperative ownership.

Tidal Cities

As with the tunneling and/or realignment of I-880, Tidal Cities development can be largely supported by the value capture opportunities associated with new real estate development. This could include tax increment financing through EIFDs or CFDs. In addition, social and green infrastructure bonds could be used to support infrastructure and development in these innovative floating neighborhoods, as could insurance-related climate adaptation securities like resilience and catastrophe bonds.



"The team created an inspiring vision for the site—the Estuary Commons, where **adaptation** to sea levels rising is not merely a passive measure, but a **positive force** for integration of community development and environmental sustainability."

Tian Feng, BART

Ridgway's rail. Source: https://www.fws.gov/cno/newsroom/Highlights/2016/ridgways_rails/

The natural ecologies and built environments that encompass the Estuary are protected by a complex matrix of laws and regulations. This chapter identifies regulatory considerations and strategies for the big moves proposed in prior sections. Near-term projects evaluated include those related to creek and floodplain restoration and enhancement, as well as bicycle and pedestrian connectivity improvements. Long-term scenarios assessed include bay shoreline restoration and enhancement, Tidal Cities, and tunneling and/or realignment.

6. Environmental Governance and Regulation

6.1 Near-Term Environmental Governance and Regulation

Creek and Floodplain Restoration and Enhancement

Projects related to creek and floodplain restoration and enhancement include: widening creek mouths, restoring creeks and sloughs, enhancing ecosystem functions, and improving water flow capacity at key crossings (e.g., Interstate 880 and Union Pacific Railroad). One major adaptation strategy involves rerouting Arroyo Viejo Creek from Damon Slough to Elmhurst Creek. Naturalizing creeks through the removal of concrete linings and enhancing streambank habitat are primary goals of these improvements.

Habitat types along the mouths of Estuary creeks and floodplains are fed by brackish water and consist of marshland and brackish sloughs. Upstream in the creek channels, beyond the influence of salt water, these creeks could be restored to riparian corridors. The ecological functions of brackish sloughs and riparian corridors are illustrated in the figure to the right —all of which could be enhanced through restoration.

Regulatory Considerations

Project design elements will likely be subject to federal, state, and local regulations that protect environmental quality. Filling Damon Slough east of the Coliseum site and rerouting Arroyo Viejo Creek to flow to Elmhurst Creek may be challenging to permit and gain approval under current regulations because of the following considerations:

- Filling a waterway (Regional Water Quality Control Board [RWQCB], U.S. Army Corps of Engineers [USACE], California Department of Fish and Wildlife [CDFW], and National Marine Fisheries Service [NMFS])
- Bed and bank alterations (CDFW)
- Potential for special-status species (CDFW and U.S. Fish and Wildlife Service [USFWS])
- Essential fish habitat (NMFS)

Each of these waterways is currently of low habitat quality and has previously been straightened and lined with concrete. The Alameda County Flood Control and Water Conservation District was receptive to our proposed channel realignment and would be a critical partner in implementing the project.

Regulatory pathways also currently exist for stream restoration and floodplain enhancement, such as through USACE, RWQCB, and San Francisco Bay Conservation and Development Commission (BCDC). Modification to any wetlands or waterways would likely require mitigation to gain regulatory approval, which can be costly and should be negotiated and planned for up front.

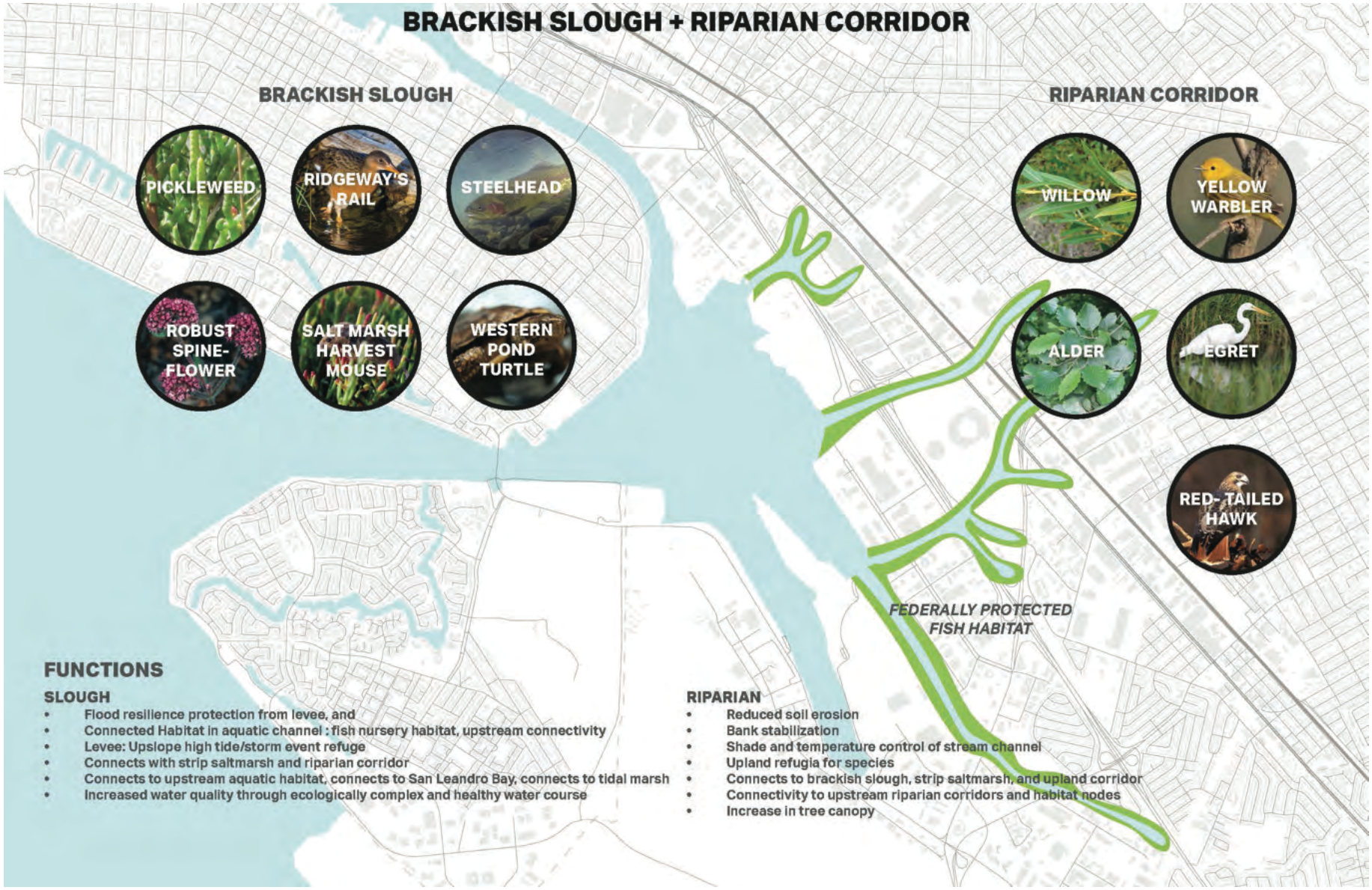
Initial steps in executing these projects include feasibility studies, conceptual design plans, and scoping and analysis for the California Environmental Quality Act (CEQA) environmental review process (as well as for the National Environmental Quality Act [NEPA], should federal funding be provided). The regulatory authorizations that may be required are outlined in Appendix L.

Partnerships

The Alameda County Flood Control and Water Conservation District has existing partnerships with federal organizations including USACE, USFWS, Federal Emergency Management Agency (FEMA), and National Oceanic and Atmospheric Administration (NOAA). State and regional partners include RWQCB, Alameda County Public Works Department, other water districts, and other environmental and community groups. Continued partnerships will be instrumental to executing creek restoration and enhancement design elements, especially the proposed realignment of Arroyo Viejo Creek.

The City of Oakland will be an essential partner to these creek restoration and enhancement projects. Oakland owns much of the stormwater conveyance systems that drain into the flood control channels, but Alameda County Flood Control and Water Conservation District owns the flood control channels. Rerouting any flood control channels will require consideration of how these changes may impact Oakland's stormwater conveyance systems. Opportunity exists for a net positive benefit for both entities, as some of the city's existing flooding issues may be mitigated through the new alignment and additional capacity in Damon Slough.

Other vital partnerships include collaborating with the East Bay Regional Parks District (EBRPD), who owns and operates MLK Shoreline Park, as well as Caltrans, Union Pacific Railroad, and Bay Area Rapid Transit (BART), who have partial jurisdiction over the crossings.



Slough and Riparian Corridor functions map

Bicycle and Pedestrian Connectivity Improvements

Our near-term proposals to enhance bicycle and pedestrian mobility include completing the missing Bay Trail segment between High Street and Tidewater Boating Center, and developing a walkable loop around the perimeter of the Estuary linking Oakland, Bay Farm Island, and Alameda. Federal, state, and local regulations that protect environmental quality may require environmental clearance for these improvements. For a comprehensive list of regulations and potential permit requirements, please see Appendix L.

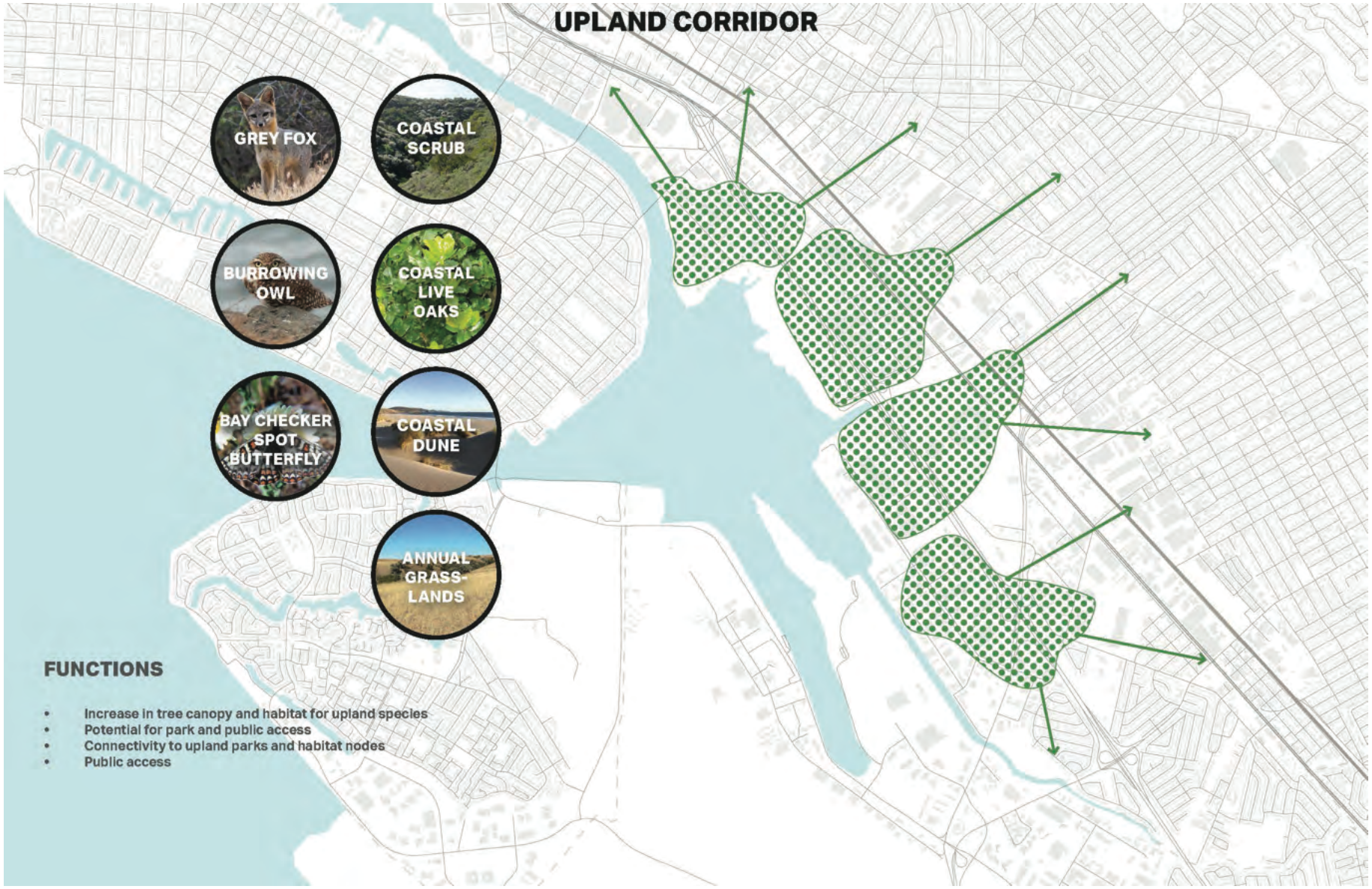
Regulatory Considerations

Should any levee or wetland impacts occur due to bicycle and pedestrian improvements, regulatory authorizations from USACE, CDFW, and USFWS may be necessary. The Oakland Bicycle Master Plan outlines regulatory pathways for gaining these authorizations in its Appendix J: Mitigation and Monitoring Program.

Initial steps in executing these projects include conducting feasibility studies, conceptual design plans, environmental review, and scoping and analysis for CEQA and NEPA (if applicable). Categorical CEQA exemption 18.36.060 Class 4, Section 15304 may be used for this type of project, if the specific project meets the conditions. Class 4 consists of minor public or private alternations to the condition of land, water, and/or vegetation that do not involve removal of mature, scenic trees except for forestry and agricultural purposes, such as for the creation of bicycle lanes on existing rights-of-way.

Partnerships

Partnerships between the City of Oakland, City of Alameda, Caltrans, Alameda County, community groups (including Scraper Bike Club, East Oakland Collective, Bike East Bay, Walk Oakland, Bike Oakland, Safe Routes to Schools), and other local stakeholders should be established to plan, design, and implement bicycle and pedestrian improvements. Partnerships between the cities of Alameda and Oakland will be integral in connecting the two cities in a safe and enjoyable way. Partnerships with the Bay Trail, Association of Bay Area Governments (ABAG), and Metropolitan Transportation Commission (MTC) will also be vital to ensuring new connectivity routes tie into the greater Bay Trail system.



Upland Corridor functions map

6.2 Long-Term Environmental Governance and Regulation

Bay Shoreline Restoration and Enhancement

Shoreline restoration and enhancement around the Estuary will involve several different planning and development activities, including beneficial reuse of dredged sediment and the creation of living levees for wetland creation and enhancement, particularly near Arrowhead Marsh. Shoreline enhancement might also involve roadway raising and realignment, improved parkland spaces, and enhanced public access. The figure to the right, shows native tidal marsh species and the inherent ecological function that bay shoreline marsh provides—functions that could be restored and enhanced in the longer term. Complete restoration of the Estuary shoreline will be implemented over the longer term; however, near-term steps can be taken in the next 10 years including feasibility analysis, scoping, and conceptual planning.

Regulatory Considerations

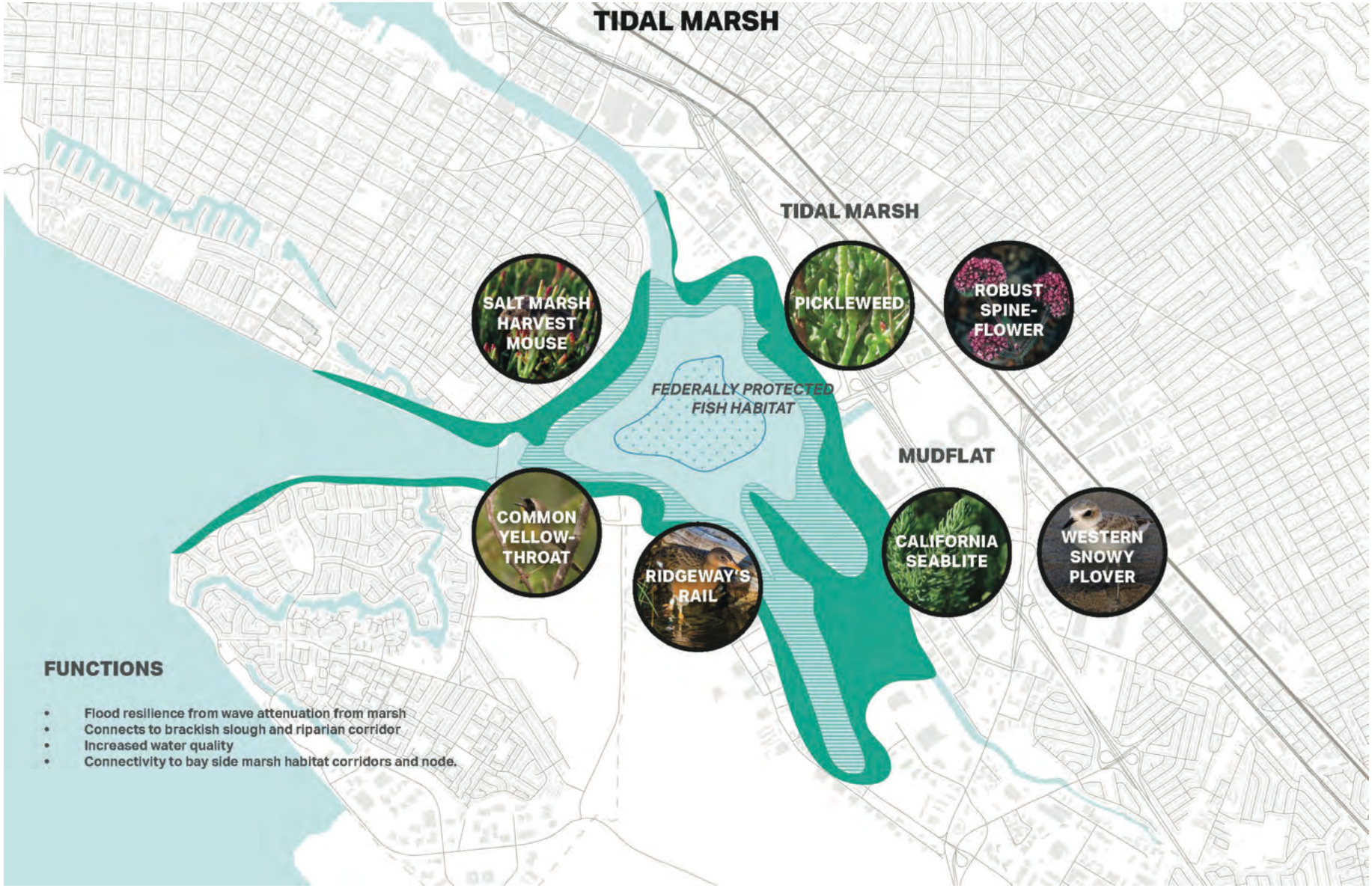
A key component of our vision includes beneficially reusing dredged sediment to further accrete the Estuary shoreline and Arrowhead Marsh, and fill in the Sea Plane Channel adjacent to Oakland International Airport. BCDC administers the Coastal Zone Management Act and The McAteer-Petris Act, which regulate fill placement in San Francisco Bay and its estuaries. These regulations currently act as barriers to habitat creation and restoration in the Estuary (and greater San Francisco Bay). Through the Bay Fill Policy Working Group, BCDC is considering amendments to its Bay Plan to allow filling activities where they support habitat and shoreline resilience.

Appendix L presents a list of agencies that may require consultation and/or regulatory permission for shoreline restoration and enhancement activities around the Estuary.

Partnerships

Partnerships will need to be established with the agencies listed in Appendix L, as well as major landowners and jurisdictions around the Estuary (e.g., City of Oakland, the City of Alameda, EBRPD, the Port of Oakland, Alameda County). Additionally, local environmental and community groups will be critical to implementing shoreline restoration and enhancement activities. Due to the scale of coordination necessary, organizations around the Estuary could be unified under a Joint Powers Authority (JPA) to drive their shared restoration and enhancement goals for the watershed. This could be modelled similarly to the San Francisquito Creek JPA, where three cities and two countywide agencies have united to reduce flood threat and enhance ecosystems[7].

[7] San Francisquito Creek Joint Powers Authority: http://sfcjpa.org/



Tidal marsh functions map

Tidal Cities

The Tidal Cities concept involves excavating tidal ponds that can then be filled with water to support floating inhabitable structures. Both the earthwork associated with these ponds and the construction floating or floodable[8] structures will be subject to various regulatory processes protecting environmental quality. From a regulatory standpoint, permitting considerations for floating structures are similar to other major waterborne development precedents like ferry terminals and off-shore pipelines. The primary difference is conformity with local plans dictating use, scale, massing, scenic corridors, and environmental quality (as discussed below). Appendix L outlines the regulations and authorizations that may be required for planning, developing, and operating Tidal Cities.

Regulatory Considerations

Creating Tidal Cities will require excavating inland areas to expose the existing groundwater table. Depending on the quality of the fill, excavated material could be re-placed strategically to provide flood protection, habitat creation, and other earthwork features. Pond design would include tidal connections to adjacent streams and flood control channels to maintain hydrologic connectivity and improve water quality. Support structures such as piles and retaining walls would likely also be needed to support floodable developments.

As with Estuary shoreline restoration, current BCDC policies restricting beneficial reuse of fill will need to be modified to enable construction of tidal ponds. Should tidal ponds be established within existing highway rights-of-way, then a Caltrans encroachment permit would be required under Section 660 of the California Streets and Highways Code. Tidal ponds may also fall under the jurisdiction of USACE (as a waterway) or NMFS (if fish rearing habitat were included). Cooperative agreements and memorandums of understanding from these agencies may be needed so the intended uses of tidal ponds are not restricted over time.

Geological Hazard Abatement Districts (GHADs) are independent political subdivisions of the state, created in 1979 by the Beverly Act to enable residents to collectively mitigate geological[9] hazards that pose threats to their properties. GHADs are designed to address the prevention, mitigation, abatement, and control of geological hazards on designated land within its boundaries. The City of Oakland GHAD considers flooding to be a geological hazard because it can produce serious geological consequences like erosion or sediment deposition in low-lying areas[10] .

Tidal Cities-related development could qualify as GHAD activities, if led by a GHAD. A key advantage of doing so is GHAD activities are exempt from both county Local Agency Formation Commission (LAFCO) permitting and CEQA review under Section 21080 (b) (4). While state regulatory agencies require CEQA review as part of their approval processes, GHAD activities are statutorily exempt from CEQA and are therefore also exempt from these agency requirements. This exemption could substantially simplify and expedite the environmental planning and permitting process for Tidal Cities[11].

Partnerships

Key players in the entitlement process include the local municipalities and BCDC. For in-water activities, such as the construction and operation of floating structures, coordination will need to be established with USACE, NMFS, USFWS, CDFW, and RWQCB. The location and environmental setting of this project also suggest that there may be tribal cultural properties warranting consideration and review by interested Native American tribes.

[8] Floodable structures may have lower levels that are designed to accommodate floodwaters without sustaining damage to life or property

[9] Geological hazards are defined in California resources Code 26507 as "an actual or threatened landslide, subsidence, soil erosion, earthquake, fault movement or natural or unnatural movement of the earth".

[10] Application Management for Sea Level Rise – Geological Hazard Abatement Districts. Prepared for the California Association of Geologic Hazard Abatement Districts. November 2008. Accessed: May 8, 2018. Available: http://ghad.org/wp-content/uploads/2018/04/Application-Management-for-Sea-Level-Rise_11-2008.pdf

[11] Note that GHAD projects are not exempt from all other regulatory permits and NEPA review (if applicable)

Tidal Cities functions map

Tunnel and/or Realign Interstate 880

Design alternatives for realigning I-880—including burying the highway, burying in the current alignment, or elevating the current alignment—will all require federal, state, and local regulatory authorizations. For a comprehensive list of regulations and potential permit requirements, please see Appendix L.

Regulatory Considerations

Regulatory pathways exist for realigning, tunneling, and/or elevating the highway. Since Caltrans owns and operates I-880, the agency would likely lead the project and seek the necessary authorizations through its planning and development processes. The largest barrier to realignment would be property acquisition along the proposed route. Tunneling or elevating in place also may require property acquisition, though less extreme than realignment. As a lifeline route, the existing I-880 corridor would need to remain open during construction, potentially adding complexity to the design and permitting process.

Partnerships

Partnerships among Caltrans, Union Pacific Railroad, Amtrak, BART, AC Transit, and other local and regional government agencies will need to be formed to implement realignment, tunneling, and/or elevating. Community and stakeholder co-development will be critical to project success. Coordination with landowners in and around the proposed alignment would need to begin early in the planning process and continue robustly throughout implementation.

Estuary Commons Project Design Conclusion

To successfully implement the major design components for the Estuary Commons, multiple interagency partnerships and community collaborations will need to be formed and maintained. In many cases, regulatory pathways are already in place. For example, permitting approvals for creek restoration projects and mobility improvements could begin tomorrow. Also, once all alternatives are thoroughly studied for I-880, the authorization process for tunneling, elevation, and/or realignment could begin.

Full realization of the Estuary Commons—a working landscape truly resilient to rising tides and rising groundwater—will require changes to existing requirements that regulate fill and sediment placement. Beneficial reuse of these materials is vital to the proposed marsh restoration and expansion actions, as well as to Tidal Cities. USACE and RWQCB can currently authorize such works if they provide demonstrable benefits. However, under the current Bay Plan, BCDC has more stringent restrictions on fill placement in San Francisco Bay and its estuaries. Policies will need to evolve to open regulatory pathways for the adaptable landscapes envisioned by our team. Fortunately, BCDC is considering changes to existing regulations—changes that may be more amenable to restoration and sea level rise projects that contribute to the resilience of San Francisco Bay.

“We came to this challenge as a team of technical and academic experts. We leave as committed allies in community-driven planning, enriched by our collaboration with neighborhood and agency representatives. We see the San Leandro Bay Estuary as the dawn of a new era in city-making – an era when community priorities are at the heart of important decisions and residents prosper in harmony with rising water levels.”

ABC Project Director Stephen Engblom,
Global Cities Director, AECOM

7. Path Forward

An Era of Community-Driven Planning

We are at the dawn of a new era of envisioning and implementing infrastructure that builds resilience—an era when these investments not only protect local communities, but also lead to equitable, economically vibrant, and environmentally thriving places. Perhaps nowhere else is better poised to demonstrate this approach than the Estuary. A coalition of community-based organizations and the City of Oakland recently won a Transformative Climate Communities (TCC) grant, setting the groundwork for community-driven resilience planning in and around the Estuary. Their ultimate vision—the East Oakland Neighborhood Initiative—will scaffold collaboration around local adaptation for years to come. Similarly, the City of Alameda just launched its Climate Action and Adaptation Plan, adding further momentum to Estuary resilience planning and providing an additional opportunity for cross-jurisdictional coordination. Many other stakeholders are also engaged in important adaptation projects locally, including BART, Caltrans, East Bay Regional Parks District, the City of San Leandro, and Oakland International Airport, to name a few.

Our Project Working Group helped bring these various groups together in dialog throughout the Bay Area Challenge, with many committing to work together on current and future projects. They were also our co-designers, helping us identify opportunities for collaboration, shape near-term projects, and envision long-term scenarios that will lead to shared prosperity. What follows are high-level, practical next steps. They will help sustain the collaboration we have fostered to date, build additional capacity around resilience planning, and establish a community-based governance framework to steward future adaptation strategies.

In It Together in action!

Educate and inspire local resilience planning with fun and easy tools

One of ABC's key contributions during the Bay Area Challenge was our ABC Toolkit, made up of the *In It Together Game*, *Community Resilience Investment Decision-Making Tool*, and *ABC Equity Checklist*. Our objective is to train project sponsors on facilitating the use of these tools and encourage them to adopt these engagement and evaluation methods in their projects. To date, we have piloted the game with many different neighborhood groups and residents of all ages. In the coming weeks and months, we will continue to host "train the trainer" sessions with community-based organizations and agency stakeholders. This will help these groups to lead future gameplay sessions and quadruple bottom line analyses with confidence, translating into project outcomes that better maximize co-benefits. California College of the Arts (CCA) has also committed to donating one of the fabricated *In It Together* games to the East Oakland Neighborhood Initiative, with the understanding that they also lend it out to (and play it collaboratively with) other local stakeholders.

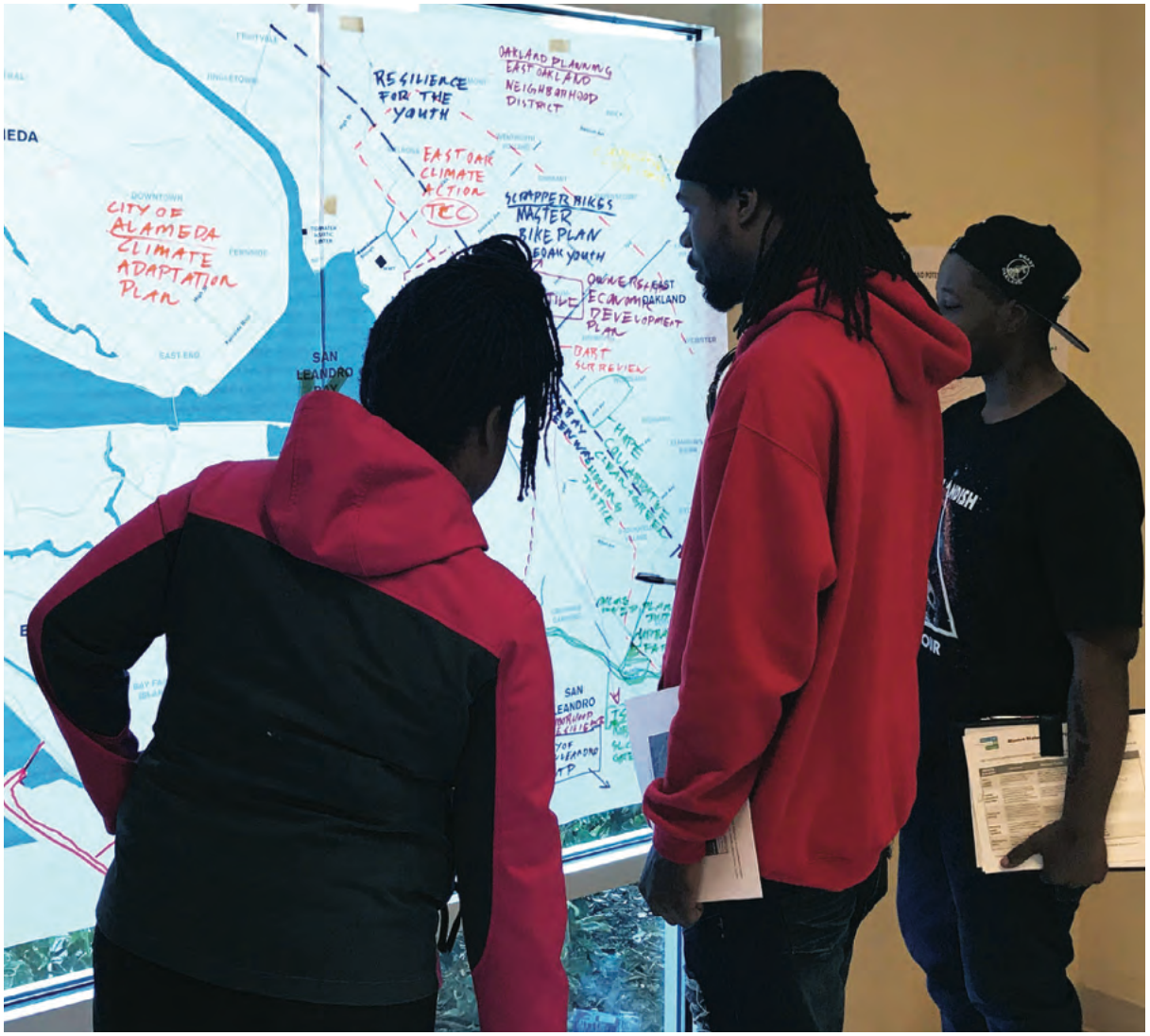
ABC team members will also make themselves available to speak at community meetings and with school groups about these issues, helping to further educate residents about both environmental vulnerabilities and the trade-offs required to address them. This will help build the foundation of local knowledge and adaptation-minded leaders needed to steward a comprehensive vision of resilience.

Playing In It Together with the Project Working Group

Learn from each other through a peer-to-peer best practice network

ABC will also hold a series of webinars to share best practices in community-driven resilience. This peer-to-peer program will bring together advocates from communities facing and boldly addressing similar challenges. The first is with the developers of a Hip-Hop Museum in South Bronx. Additionally, we have already initiated conversations with Bronzeville, the historically black neighborhood in South Chicago, where innovative, community-driven energy programs are being developed in partnership with Com-Edison.

We see the East Oakland Neighborhood Initiative planning process as the key organizing framework to continue the dialogue and collaboration initiated during the Bay Area Challenge. ABC will support this process by participating in meetings at the invitation of community groups and the City of Oakland. We recommend that local and regional agencies also engage in and advocate for the Initiative's ongoing dialogue about resilience and equity for Estuary communities.



Using the wall map at PWG 3 to record key projects happening now and in the future

Teach the next generation of Bay Area leaders through continued academic-community engagements

Universities and colleges occupy a unique position in the networks shaping policy in the San Francisco Bay Area. As the region's largest public university, UC Berkeley (UCB) can help amplify the voices and ideas of East Oakland residents. A mutual, community-based learning partnership between community groups and faculty/student teams in the College of Environmental Design would be a useful place to start. We envision this partnership beginning as an annual workshop course that, if successful, could expand to become an applied research center. From the earliest stage, this partnership could provide an online portal for residents to express their ideas, priorities, and challenges pertaining to resilience in East Oakland. This platform would also offer open access to research on climate change, policies, technologies, and other topics that could shape local futures.

A core part of our team's approach to the challenge involved supporting and incorporating the invaluable contributions of four CCA and UCB studio courses. Students in these studios focused on the resilience-related challenges facing Estuary communities and developed creative and wide-ranging adaptation solutions. To further enhance learning outcomes and bring the studio to the street (and vice versa), we look to pursue more direct, community-based educational opportunities moving forward. Janette Kim and Neeraj Bhatia of CCA and Kristina Hill from UCB plan to each focus one of their courses next academic year on building resilience in East Oakland. They will determine the topics in consultation with local communities, and the courses will provide valuable learning opportunities for both students and residents. In addition, Nicholas de Monchaux from UCB will build on the lessons learned from the Bay Area Challenge in his course on the future of infrastructure and resilience.

Design concept reviews between the ABC team and CCA

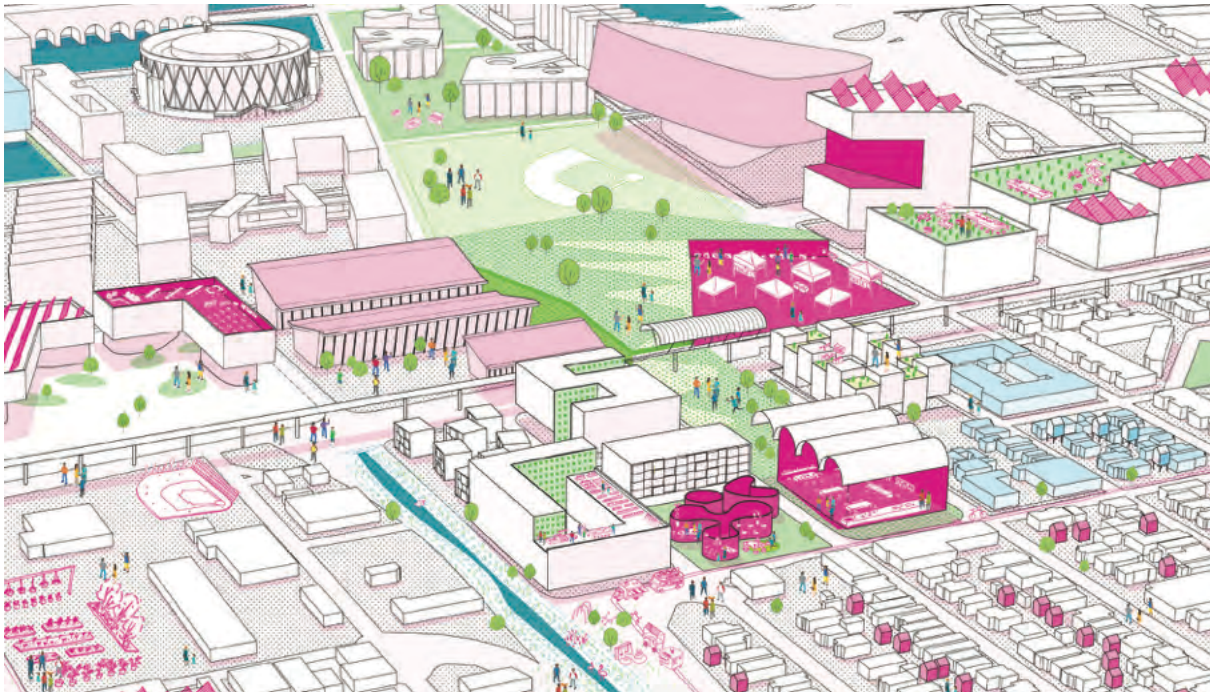
Put the community first and support the development of a Community Benefits District (and beyond) in East Oakland

It will be crucial for residents of East Oakland, Alameda, and San Leandro to develop sustained, locally driven governance and financial frameworks to support the implementation of resilience strategies. This is particularly true for East Oakland, where city funds are often insufficient to remedy decades of disinvestment. Ten different business improvement and community benefits districts have been formed in Oakland to raise funds for neighborhoods to invest locally, each operated by a non-profit community group. East Oakland has no such district.

As part of or an extension to the ongoing East Oakland Neighborhood Initiative planning process, we recommend that community groups identify (or create anew) a non-profit organization to administer a Community Benefits District (CBD). A CBD would establish the administrative capacity to assess a modest fee on property within its boundaries—fees that then could be used to invest in efforts supporting the health, wealth, and stability of local neighborhoods. It would also give East Oakland an additional seat at the table in citywide and regional policy conversations. We see this district encompassing the TCC study area and also including the BART station area and Coliseum site. This extension will put more assessment dollars within reach and help fund more capital-intensive community benefits initiatives.

A CBD could also be one layer in a multi-layered community benefits structure in East Oakland and potentially serve as the catalyst for additional layers. Options might include establishing an environmental overlay zone to limit and reduce air pollution, or forming a Geologic Hazard Abatement District (GHAD) to help streamline the permitting of resilience-related projects. To finance some of the larger investments proposed in our Design Vision (e.g., creek widening and realignment, shoreline expansion, multi-modal station, I-880 adaptation), we recommend adding a Mello-Roos Community Facilities District (CFD) or Enhanced Infrastructure Financing District (EIFD). These districts have the power to bond based on projected increases in property values, enabling them to generate the capital necessary to finance major community infrastructure.

An important component of our vision for a CBD is that investments reflect community resident priorities, such as affordable housing, anti-displacement, jobs and job training, and improved air quality. The Equity Checklist in Appendix G provides a tool for identifying and prioritizing community needs to structure CBD investments.



Resilient Equity Hub with a Community Benefits District

Initiate near-term adaptation actions to build toward an Estuary Commons

The above mentioned organizational, educational, and community-driven planning efforts are essential to catalyze sustained resilience. We also propose some near-term adaptation projects that, with funding, could start tomorrow. Shoreline and creek restoration and expansion projects will have immediate effects on fluvial flooding, with the added benefits of increased wildlife habitat and new green pathways for residents. These projects include East Slough channel capacity improvements, Arroyo Viejo to Elmhurst Creek realignment and widening, and Doolittle Drive horizontal levee with Arrowhead Marsh expansion.

Additionally, our team recommends initiating feasibility studies and environmental review for several projects that will begin stitching neighborhoods to the Estuary. Projects such as the Hegenberger Greenway and Bay Trail connection at High Street will make it safer for kids to cycle to school and easier for residents to enjoy the beautiful shoreline.

Our longer-term concepts can also take big leaps forward in the near term. Caltrans can begin examining alternatives for I-880 in more depth, weighing the costs and benefits associated with realigning, tunneling, and/or elevating the highway. Lastly, to prove Tidal Cities as a viable and practical solution to the Estuary's long-term vulnerabilities, we suggest local stakeholders take the next step of prototyping tidal lagoons and floating structures with a pre-fab housing developer.

Community members and agency stakeholders coming together to collaborate on the future of the Estuary

The 3D model of The Estuary Commons in action!