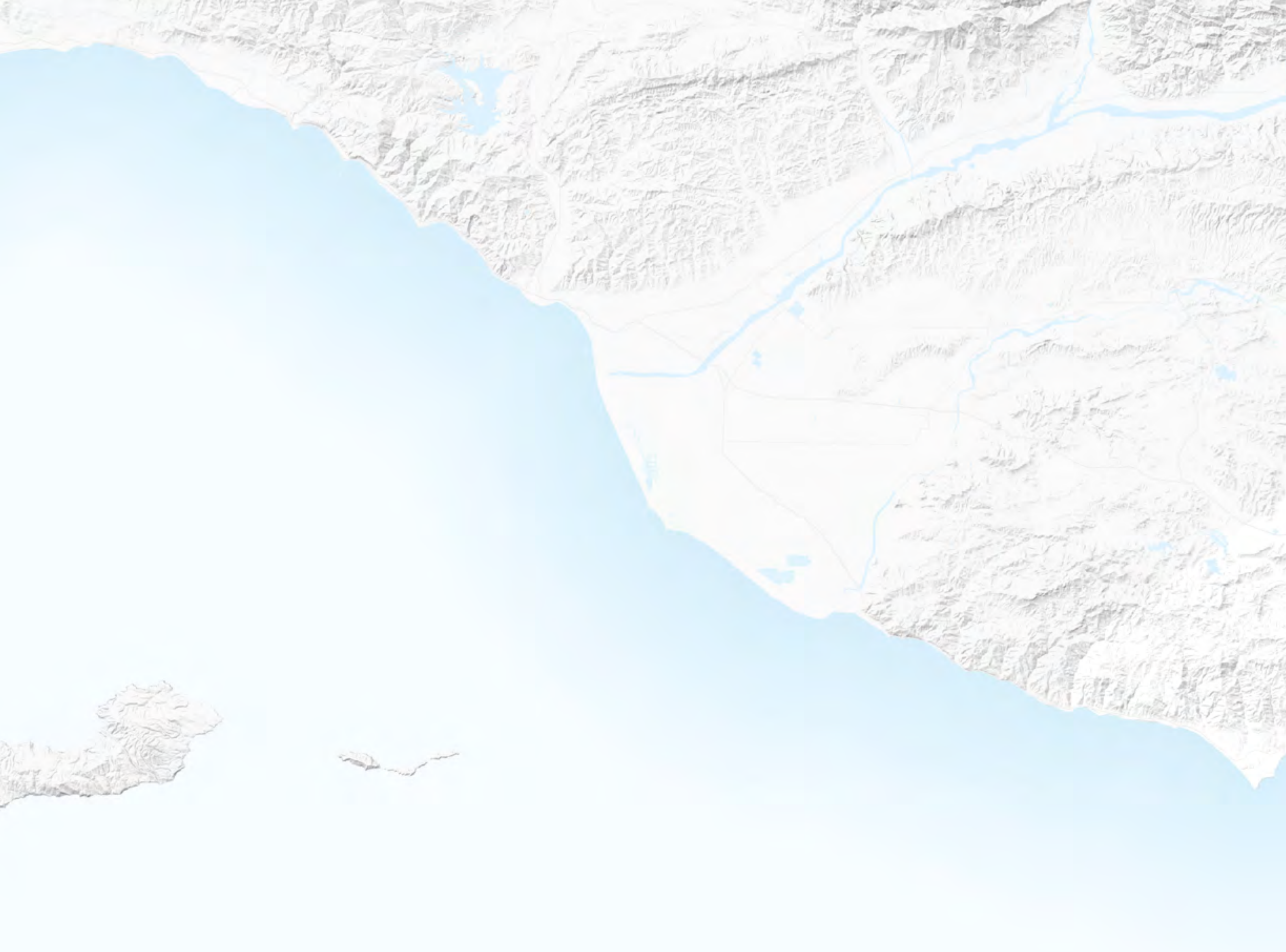
LA RIVER MASTER PLAN

PUBLIC DRAFT

JANUARY 2021



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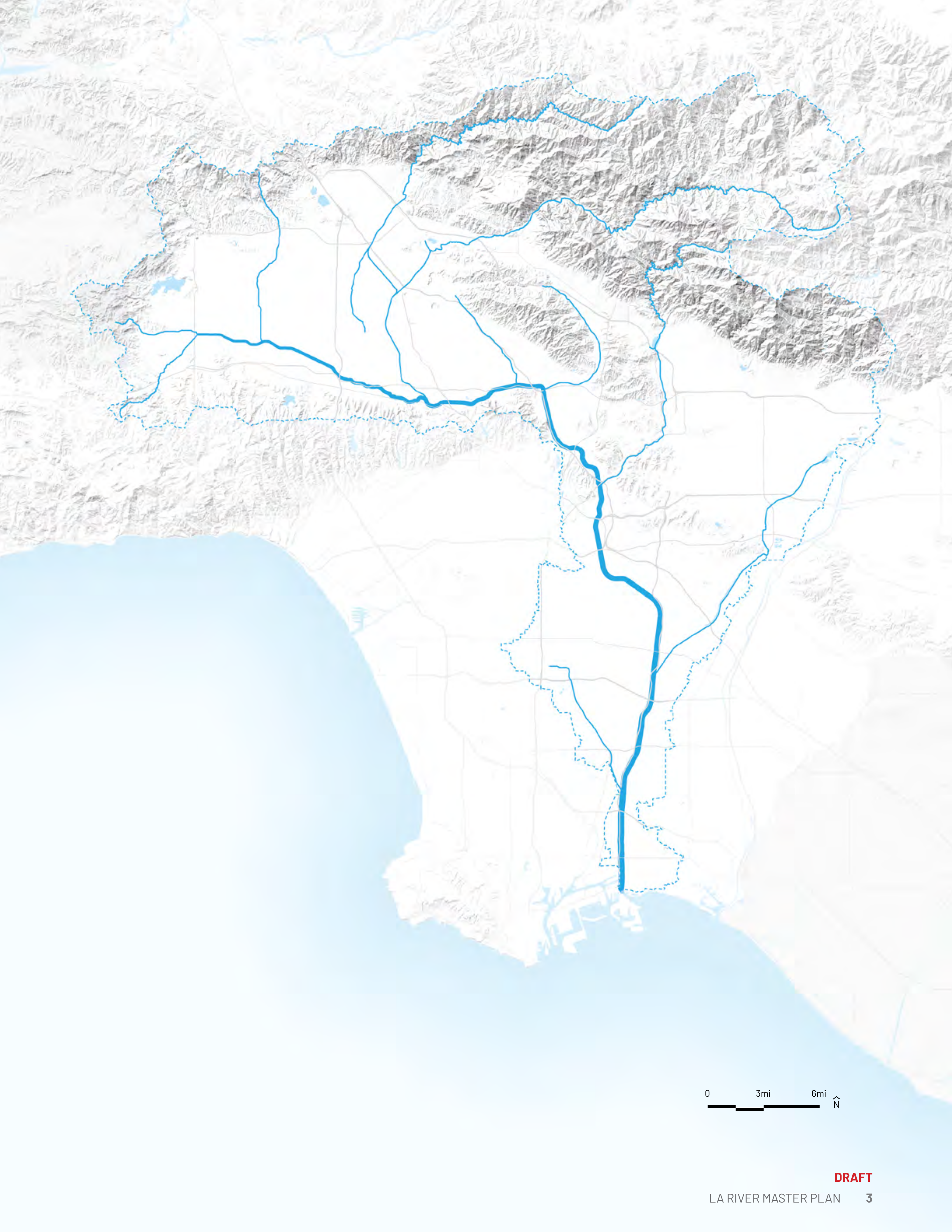

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WATER AND LAND ACKNOWLEDGMENT

We acknowledge that the LA River and its watershed are the traditional, lands of the Fernandeño Tataviam, Gabrieleño Tongva, and Ventureño Chumash. We recognize that Indigenous Peoples have stewarded this land for thousands of years, many of whom still call it home today, and we give thanks for the opportunity to live, work, and learn on their traditional homeland. We recognize our responsibility to include these Tribal Nations in what we do for the river.

PREPARED FOR:
LOS ANGELES COUNTY AND LOS ANGELES COUNTY PUBLIC WORKS

PREPARED BY:

Geosyntec OLIN Gehry Partners, LLP

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LA RIVER

The iconic LA River flows through a 51-mile connected public open space that is seamlessly woven together with neighboring communities. It is an integral part of daily life in LA County—a place to enjoy the outdoors and to get across town, a place to appreciate the serene and to bring all people together, a place to celebrate a thriving urban habitat and understand infrastructure, a place to learn from the past and to shape the future.

Figure 1. Student group along the LA River near Hollydale Park at river mile 11.4. Source: OLIN, 2018.

SECTION I: **INTRODUCTION**

Figure 2. Community members enjoying the ferris wheel at the SELA Arts Festival at river mile 11.7. Source: OLIN, 2019.

1.
EXECUTIVE SUMMARY

THE LA RIVER MASTER PLAN SEEKS TO CREATE AN EQUITABLE FUTURE ALONG THE REIMAGINED RIVER

One million people live within one mile of the LA River, and nearly half of Los Angeles County residents live within the river's watershed. Even more impressively, one out of four Californians lives within a one-hour drive of the river.[1] Channelized to protect lives and property from flooding during the late-19th through mid-20th centuries and continuing to serve flood-risk-management purposes today, the LA River has largely been separated from our social, cultural, and ecological communities. While fragmented jurisdictions, land ownership, and funding present hurdles in rethinking the LA River, the 2020 LA River Master Plan seeks to build on prior planning efforts to continue to reimagine the LA River from a single-use corridor to a tangible, multi-benefit resource for the communities of LA County. The LA River right-of-way includes over 2,300 acres of primarily publicly owned land that can greatly benefit the communities near the river. The 2020 Plan recognizes the need for resilient systems that address the most complex issues facing the Los Angeles region, such as climate change, population growth, resource scarcity, and social inequity. These resilient systems are necessary to create 51-miles of connected open space that supports clean water, native habitat, parks, recreation, multiuse trails, art, and cultural resources to improve human and ecosystem health, equity, access, mobility, and economic opportunity for the diverse communities of LA County, while managing flood risk. The LA River Master Plan seeks to make the reimagined river a reality over the next two and a half decades, connecting people, culture, water, open space, and wildlife across and along this iconic river.

Figure 3. Bicycle trails allow cyclists to utilize the river right-of-way near river mile 10.8. Source: LA County Public Works, 2018.

BACKGROUND

Perhaps no other river captures Southern California's imagination like the LA River. The LA River offers an opportunity to bring 17 municipalities and countless communities together. Unlike highways that divide communities, the river can be a connector, bringing people together across 51 miles. This capacity was recognized in the seminal Olmsted-Bartholomew 1930 regional plan *Parks, Playgrounds, and Beaches for the Los Angeles Region*. That plan, completed at the start of the Great Depression and just before the catastrophic floods of the 1930s, foresaw the rapid urbanization of LA County. Olmsted and Bartholomew recognized that parks, open spaces, and connection to nature would be essential to the health, environment, and economy of the region.

In 1996 LA County rediscovered the ambitions of these past planning efforts and created the first LA River Master Plan. Numerous residents, communities, and advocates have pushed for an inclusive vision of shared public open space and parks, stewardship of precious water resources, improved ecosystem function, and continued flood management during extreme storm events.

The 2020 LA River Master Plan builds on this history of planning and includes over two decades of planning and implementation efforts for the LA River, including efforts by LA County (1996), the City of LA (2007), the LA River Ecosystem Restoration Feasibility Study (also known as the ARBOR Study, 2015), the Lower LA River Working Group (2018), and the Upper LA River and Tributaries Working Group (2019). The research and project database that forms the foundation for this plan covers over 140 planning efforts along the LA River channel, across the LA River watershed, and throughout the region.

The 2020 Master Plan Update process began in 2016 with a motion by the Board of Supervisors to update LA County's 1996 LA River Master Plan. The update process, led by LA County Public Works, was supported by several LA County departments. A steering committee of 41 members representing municipalities, non-profit organizations, or other governmental and non-governmental entities provided input and expertise related to water, people, or the environment. In addition to the technical team and steering committee, the update process included a robust public engagement program designed to provide opportunities for LA County residents to express ideas for the future of the river.

Figure 4. The LA River Trail often follows the top of the levee, especially in the Lower LA River. In this image, the landside of the levee is also fortified at river mile 11.7. Source: LA County Public Works, 2018.

The 2020 Master Plan research and analysis is based on a watershed and community approach. This approach is unique from previous efforts in that analysis work, including ecosystem, demographic, and hydrologic studies were conducted for the 834-square-mile watershed. Recognizing that these systemic and natural elements cannot be studied in isolation, several studies included information for areas outside the watershed. This research is now publicly available and can be utilized for parallel efforts within the watershed.

There is no singular, 51-mile design strategy for the LA River. Projects along the river should reflect the needs and opportunities of specific reaches and provide multiple benefits. Projects should respect the needs of flood risk management while enhancing the environment and strengthening communities through multi-benefit investment and the celebration of local cultures and creation of jobs. While design strategies in the Master Plan focus on elements along or within the river right-of-way,[2] the Master Plan's vision, goals, actions, and methods require an understanding of, and coordination with, communities, the watershed, and parallel efforts such as the Upper LA River and Tributaries Working Group (AB466), the Lower LA River Working Group, Metro, the Regional Water Quality Control Board, the LA County General Plan, the LA County Sustainability Plan, the City of Los Angeles' LA River Revitalization Master Plan, the LA County Comprehensive Parks Needs Assessment, the Department of Arts and Culture Cultural Equity and Inclusion Initiative, and watershed management plans. Additionally, coordination between LA County, municipalities, other governmental entities, and non-profit organizations will be necessary to achieve the robust vision and goals of this Master Plan. The reimagined LA River relies on these collective efforts to shape the future of the LA River, its watershed, and all of LA County.

THE 2020 MASTER PLAN RESEARCH AND ANALYSIS IS BASED ON A WATERSHED AND COMMUNITY APPROACH

VISION: THE REIMAGINED RIVER

The iconic LA River flows through a 51-mile connected public open space that is seamlessly woven together with neighboring communities. It is an integral part of daily life in LA County—a place to enjoy the outdoors and to get across town, a place to appreciate the serene and to bring all people together, a place to celebrate a thriving urban habitat and understand infrastructure, a place to learn from the past and to shape the future.

51 miles

The LA River is 51 miles in length, running from Canoga Park to Long Beach.

2,300 acres

There are 2,300 acres of primarily publicly owned land within the right-of-way, including the river channel.

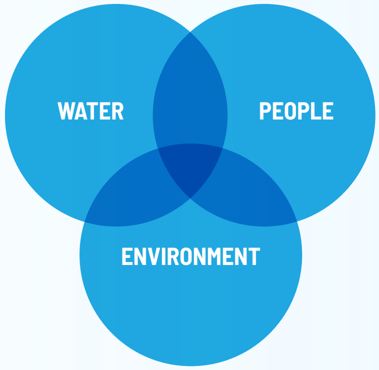
1,000,000 people

There are one million people that live within one mile of the LA River.

PROJECT THEMES

The Master Plan process was guided by three overarching and coequal themes—water, people, and environment. At the heart of this plan is the realization that infrastructure planning cannot be isolated from social and environmental needs. The full integration of the three themes is fundamental to the LA River's success.

The three themes proved both broad and robust enough to capture the key issues from the 1996 plan as well as from related plans that were part of a literature review for the update. They ensured that the Master Plan balanced but did not isolate hydrological, social, and environmental needs.



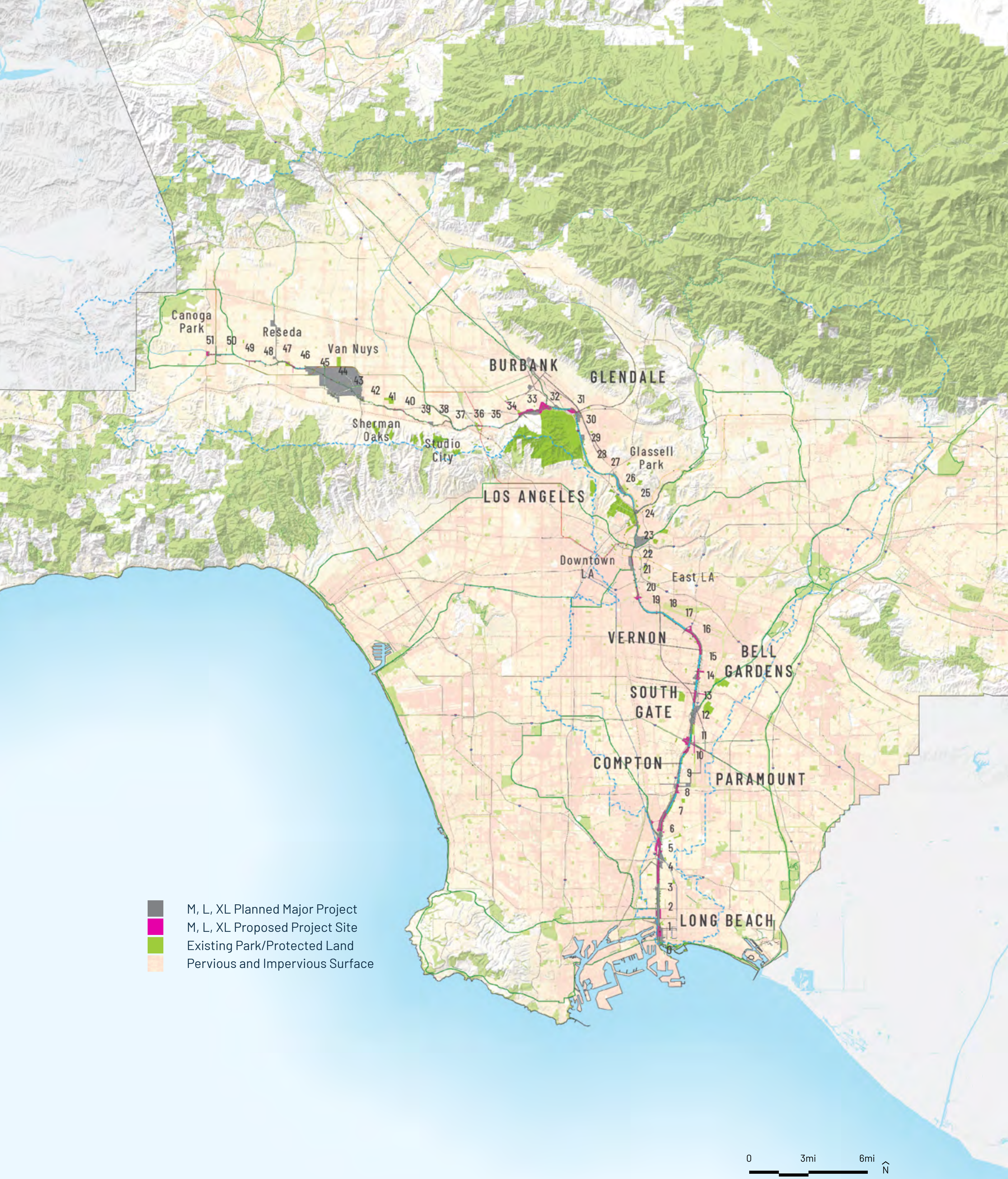


Figure 5. The LA River Master Plan builds on over two decades of planning to reimagine the LA River. Source: OLIN, Gehry Partners, Geosyntec, 2019.

FIND MORE INFORMATION ABOUT THE HYDROLOGY AND HYDRAULICS OF THE LA RIVER WATERSHED IN APPENDIX VOLUME II: TECHNICAL BACKUP DOCUMENT

QUESTIONS ABOUT THE LA RIVER AND WATERSHED

Why is the LA River concrete?

The LA River has a long history of flooding, even before extensive settlement. When it rains, large amounts of water flow out of the mountains into the flat areas where present day cities are located. Historically this water spread out in large areas that would sometimes be miles wide. As more people settled in these areas, moving water away from homes, business, and communities became important.

To better describe the relationship between flooding and the LA River, here is an example of how water flow is measured. Flow is a measure of the velocity, or speed, of the moving water, multiplied by the cross-sectional area (see Figure 6). For any given flow, this relationship holds true - the slower the velocity of the water the greater the cross-sectional area required to convey the flow. Conversely, the faster the velocity the smaller cross-sectional area is required. Water moves much more quickly through channels that have less friction, such as smooth concrete. Because significant development such as transportation corridors, industries, businesses, and housing, has occurred in the LA River's floodplain and right up to it's banks, unfortunately the cross-sectional area remaining to convey flows is very small, so the concrete is there to reduce friction, maintain higher velocities, and better manage floodwaters.

OPEN CHANNEL DIAGRAM

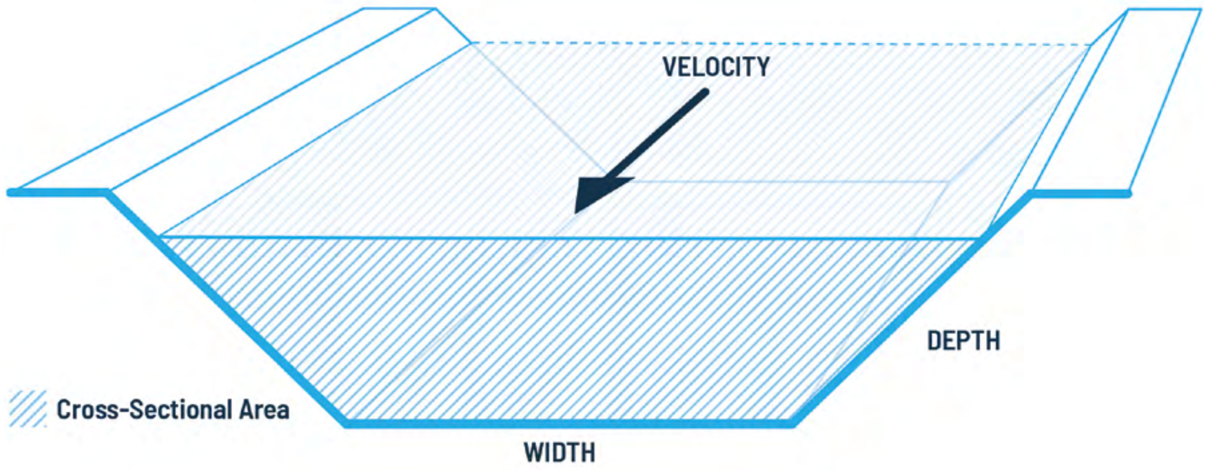


Figure 6. **Open Channel Diagram. Shown here is a stylized section of an open channel representing that total flowrate is a function of velocity multiplied by cross-sectional area.**

Can we remove the concrete?

Many have asked if we can remove the concrete from the LA River to return it to a more naturalized river. Because a more naturalized river requires a much wider flow path than the existing channel allows, it is not feasible to remove the concrete from the LA River without causing significant negative impacts to communities and local culture. Without displacing hundreds of miles of transportation routes and utility corridors, thousands of businesses, and potentially hundreds of thousands of residents, removal of concrete is difficult to accomplish. Additionally, climate change poses future uncertainty, so we need to maintain the existing capacity of the channel while also finding ways to increase capacity where the channel is undersized. As such, the LA River Master Plan does not pursue a strategy of massive concrete removal and community displacement as other goals would be supplanted by this singular strategy. Instead, the Master Plan seeks to find areas where natural ecosystems can exist while maintaining flood risk management and retaining river adjacent communities, culture, infrastructure, and amenities.

What if we put trees in the channel or have more natural areas like the part of the LA River by Griffith Park?

This is a great question, since trees, plants, and areas of native habitat can greatly improve our urban environment. This question is directly related to the discussions about concrete and flow of water. Trees and plants in the channel increase friction which slows the water down. This is why the channel capacity is lowest near the Narrows by Griffith Park. When water moves slowly, it requires the channel to be much larger to carry the same flow. However, there are limited locations where vegetation in the channel may be possible and more importantly, we need to creatively think about adding more open space where we can plant climate appropriate, non-invasive trees and other vegetation along the river, in parks, along greenways, on bridges and buildings, and even in our own yards.

FIND MORE INFORMATION ABOUT THE HYDROLOGY AND HYDRAULICS OF THE LA RIVER WATERSHED IN APPENDIX VOLUME II: TECHNICAL BACKUP DOCUMENT

QUESTIONS ABOUT THE LA RIVER AND WATERSHED (CONTINUED)

If we collect more water upstream in dams or greenstreets can we get rid of the concrete? Like a city of sponges?

This is an important concept to understand as it is critical that we continue to capture, collect, treat, and use rainwater closer to where it falls before it can reach the river. About half of the LA River watershed is undeveloped and exists in the steep mountains that surround our cities, so much of our watershed, and in particular the portions of our watershed that receive the most rain, are already undeveloped. Within the developed watershed, smaller distributed systems such as neighborhood stormwater parks, green streets, and rain gardens and cisterns improve water quality and local water supply during smaller, more frequent storm events. These systems also provide benefits when it is not raining, such as for habitat and recreation. However, these systems quickly fill up during the initial stages of larger storms and are rendered unusable when the bigger storms hit the watershed and therefore do not reduce flows to the river. Interestingly, development over the past 100 years has not caused increases in large flows to the river however development has increased peak flows from smaller storms.

Large dams like Sepulveda Dam do a great job at helping reduce flood risk. Given the density of development along and near the river, there aren't locations left to place new large dams where they would matter most, such as at the bottom of the Burbank and Verdugo Wash channels. Large areas that are available, such as old quarries, aren't located in ideal locations for flood management and are better suited to water conservation needs. The LA River Master Plan proposes a unified strategy of stormwater management that requires distributed systems to help with water quality and conservation and centralized systems, like the LA River, to reduce flood risk.

For more information on the hydrology of the LA River Watershed or LA River hydraulics, refer to Chapter 3 in Appendix Volume II: Technical Backup Document.

WATCH A VIDEO ABOUT STORMWATER MANAGEMENT

Figure 7. Many tools work together to manage and conserve water across LA County, including dams, channels, and best management practices for local stormwater capture and water quality improvement. Visit (https://www.youtube.com/watch?v=_foSAI9IBsQ&ab_channel=LARiverMasterPlan) to watch the video about stormwater management. Source: LA County Public Works, 2019.

But shouldn't we try to save more water?

We should, and we are. In fact, LA County Public Works, the LA County Flood Control District, and their partners such as the Los Angeles Department of Water and Power capture and conserve enough water within the LA River watershed to supply more than 300,000 people with water each year. And, of course, more can be done, which is why significant investments in major dams and spreading grounds is ongoing. Additionally, Measure W was passed by county voters in 2018 creating the Safe, Clean Water Program. The Program includes steady funding for projects to further catch stormwater runoff as a water supply while meeting the Program's primary objective to improve water quality.

Measure W was passed in 2018 and makes

$285M

available to the Safe, Clean Water Program for projects with a focus on stormwater capture, water quality improvements and community benefits.

Learn more at https://safecleanwaterla.org/

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FIND MORE INFORMATION ABOUT THE HYDROLOGY AND HYDRAULICS OF THE LA RIVER WATERSHED IN APPENDIX VOLUME II: TECHNICAL BACKUP DOCUMENT

QUESTIONS ABOUT THE LA RIVER AND WATERSHED (CONTINUED)

What is so complicated about widening and naturalizing the river?

Large-scale widening of the existing LA River channel could provide additional flood conveyance capacity while also potentially allowing for concrete removal, but this strategy is not pursued in this Master Plan due to its serious social implications.

As described in the previous pages, vegetation and flood capacity have an inverse relationship. Adding trees and shrubs increases channel friction and slows down the water so the channel must become wider to maintain the same flood conveyance capacity. A naturalized channel for the LA River would need to be three to seven times the width of the current channel to maintain a 1% (100-year) flood capacity.

The additional space needed for channel widening would require the displacement of people, businesses, and infrastructure adjacent to the LA River. In a 3X widening scenario, this would amount to nearly 22,000 displaced residents and major impacts on government and industrial land. Over 35 miles of freeway, 60 miles of transmission lines, and 20 miles of railroad would be affected (see Figure 9).

In a 5X widening scenario, the number of displaced residents would rise to over 60,000. In a 7X widening scenario, the maximum widening studied, over 106,000 people would be displaced, and nearly 60 miles of freeway, 108 bridges, 90 miles of transmission lines, and 620 critical facilities would need to be relocated (see Figure 9).

Freeway construction in LA County displaced a quarter-million people between the 1940s and 1960s. The burden of this displacement disproportionately impacted poor communities and communities of color. It is important to recognize that some channel modification strategies would disturb communities to a similar extent. The period of urban renewal is a sweeping example of how displacement in the name of "projects for the public good" carries a contentious legacy, nationally as well as locally.

While there may be strategic locations in the LA River watershed where channels can be widened into a right-of-way or an acquired mosaic of parcels, a holistic 51-mile restoration strategy is not realistic, even on a generational timeline.

For more information on the hydrology of the LA River watershed or LA River hydraulics, refer to Chapter 3 in Appendix II: Technical Volume.

VEGETATION AND CHANNEL CAPACITY HAVE AN INVERSE RELATIONSHIP

PLANTING STRATEGY	REMAINING CHANNEL CAPACITY
Planted Banks and Concrete Channel	40-50%
Grassed Banks and Grassed Channel	55%
Grassed Banks and Concrete Channel	75%
Low Flow Channel with Shrubs / Trees and Concrete Channel	80%
Low Flow Channel with Grasses and Concrete Channel	95%

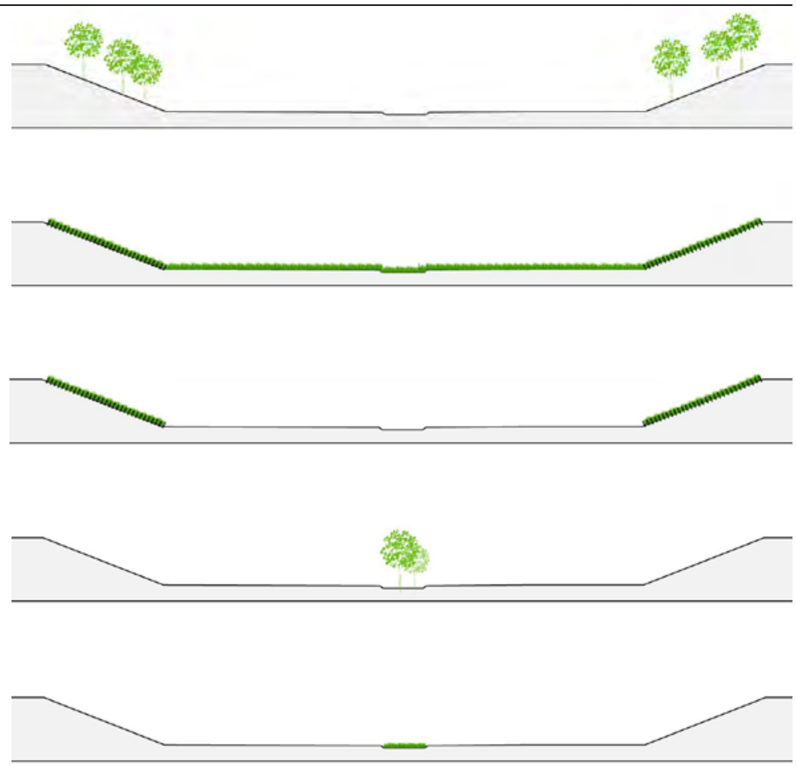

Figure 8. Vegetation and Channel Capacity Have an Inverse Relationship. Different combinations and locations of planting within the LA River channel have particular impacts on channel capacity. Whether the planting consists of grasses or trees and shrubs, and whether the planting is on the banks, on the channel bottom, or in the low flow area, are all factors that alter the channel's ability to convey water effectively. This example shows scenarios for river mile 11.8 near the Rio Hondo Confluence.

WHAT'S AT STAKE WITH RIVER WIDENING

3X WIDENING COULD IMPACT

APPROXIMATELY

22,000 Residents

35 mi. of Freeway
20 mi. of Railroad
60 mi. of Transmission Lines
82 Bridges
169 Critical Facilities

5X WIDENING COULD IMPACT

APPROXIMATELY

60,000 Residents

50 mi. of Freeway
30 mi. of Railroad
75 mi. of Transmission Lines
93 Bridges
385 Critical Facilities

7X WIDENING COULD IMPACT

APPROXIMATELY

106,000 Residents

60 mi. of Freeway
30 mi. of Railroad
90 mi. of Transmission Lines
108 Bridges
620 Critical Facilities

Figure 9. What's at Stake with Holistic River Widening. River widening requires property acquisition that would displace people, businesses, and infrastructure in the communities adjacent to the LA River. Between 22,000 and 106,000 people might be displaced if the river were widened three to seven times its current width. There would also be major consequences for roads, railways, transmission lines, and other public services.

REALIZATION OF THE MASTER PLAN'S GOALS WILL REQUIRE THE COORDINATION AND IMPLEMENTATION OF SITE-SPECIFIC AND SYSTEM-WIDE PROJECTS

GOAL-DRIVEN FRAMEWORK AND PLAN SUMMARY

The 2020 LA River Master Plan is organized by a series of goals, actions, and methods. Each goal represents an equally important active future priority for the LA River. These goals, which include many principles from previous or parallel planning efforts, guide policy and project development throughout the Master Plan.

- **Reduce flood risk and improve resiliency.**
- **Provide equitable, inclusive, and safe parks, open space, and trails.**
- **Support healthy connected ecosystems.**
- **Enhance opportunities for equitable access to the river corridor.**
- **Embrace and enhance opportunities for arts and culture.**
- **Address potential adverse impacts to housing affordability and people experiencing homelessness.**
- **Foster opportunities for continued community engagement, development, and education.**
- **Improve local water supply reliability.**
- **Promote healthy, safe, clean water.**

A series of actions describes steps that should be taken to achieve each goal. Actions include a series of tangible methods that describe specific ways to reach the goals. In many cases, actions are related to specific LA County departments and their missions. The realization of the goals will require collaboration between many LA County departments.

Realization of the Master Plan's goals will require the coordination and implementation of site-specific and system-wide projects. For each goal, a comprehensive, data-driven analysis of existing conditions identified areas of general to very high need.

At a site scale, an overlay of areas of need with land assets determined how much impact each opportunity site could have on achieving the goals of the Master Plan. These potential opportunity sites were then used to fill in gaps where projects currently in development were not already meeting identified needs. In addition, the cadence of projects along the entire 51-mile LA River corridor ensures an equitable and accessible distribution of projects. The ultimate purpose is to create multi-benefit projects that address many needs at a given site. Each site has specific conditions that will be evaluated on a project by project basis as sites are developed. This includes specific research on preservation of social fabric, historic resources, and community character.

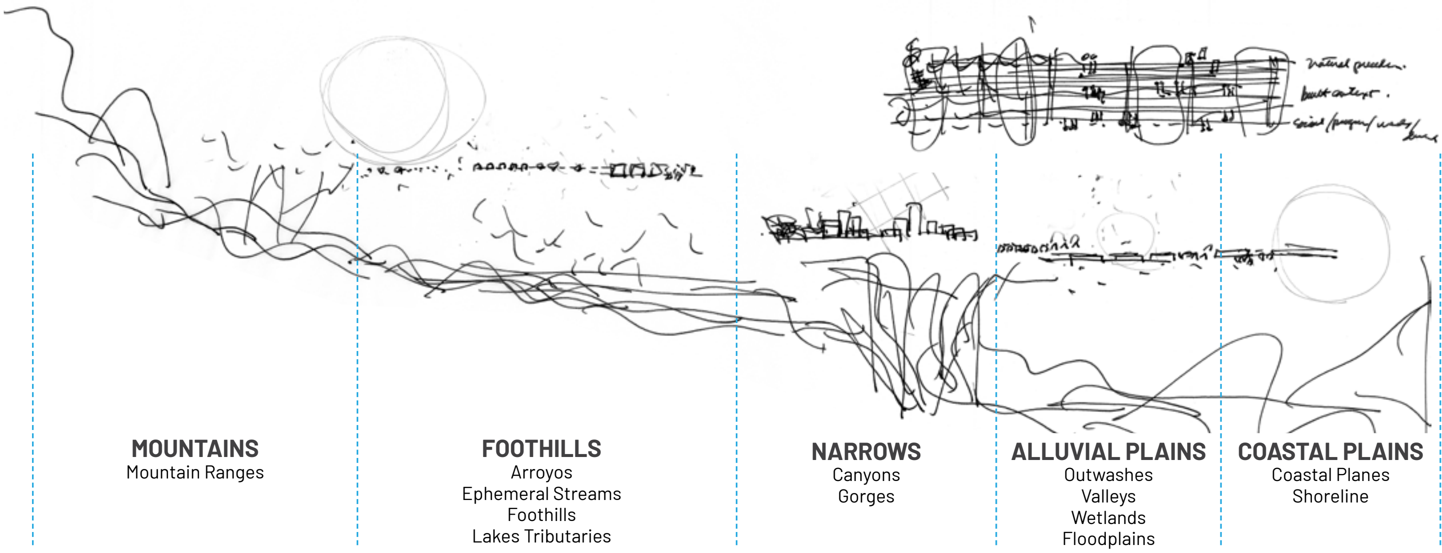

Figure 10. This conceptual sketch shows the varied environments of the LA River from the headwaters in the mountains to the mouth at the coastal plain shown as a longitudinal profile. Over time, each zone of the river has become the location of different types of urban development as seen in the sketch. A successful plan for the river will consider each of these areas in a unique way suited to that particular environment. The design of a successful LA River 51-mile connected open space will bring together these special moments with the overall cadence of consistent amenities along the river much like a musical score brings together a consistent rhythm with moments that are unique and special. Source: OLIN, 2016.

In parallel with the identification of needs and opportunity sites, the Master Plan's "kit of parts" includes urban river design typologies that illustrate the range of possible strategies that LA County and other entities can utilize along the river. Each element in the kit of parts is linked to the needs it can address in the goals. Kit of part components can incorporate ecosystem function in a variety of ways as illustrated in the biodiversity profiles. Common elements, such as river pavilions, stormwater best management practices (BMPs), benches, lighting, and environmental graphics should be used as required by projects to address the overall cadence of amenities and needs. In all cases, arts and culture are important to integrate throughout.

The associated LA River Design Guidelines support the development of specific design and technical solutions for the concepts described herein, including plant communities, soils, materials, environmental graphics, and other common elements.

At the system-wide scale, the Master Plan identifies projects that integrate and, over time, aggregate, numerous sites into a larger network to achieve goals such as water recharge, flood risk reduction, ecological function, and housing affordability.

Through the development of 51-miles of connected public open space for all of LA County, health outcomes along the most environmentally burdened corridor of the county will be significantly improved, reducing incidence of cardiovascular diseases and diabetes and improving air quality and quality of life. The river will be a force for equity and provide natural and recreational open space for millions of people. Biodiversity and native habitat will be enhanced and protected along critical river reaches, with allowances for non-invasive, climate appropriate plant species when necessary. Flood risk management will incorporate planning for climate change, increases in heat, sea level rise, and changes to precipitation and land use patterns. The reimagining of the LA River as a valuable asset will also be paired with strategies that seek to mitigate economic displacement and protect housing affordability in neighboring communities.

VISIT THE MASTER PLAN WEBSITE AT WWW.LARIVERMASTERPLAN.ORG

PUBLIC STEWARDSHIP AND IMPLEMENTATION

The quickest way to achieve a reimagined river is to find common ground and work together to make resources go farther.

As an LA County plan, ultimate responsibility for shepherding implementation of the LA River Master Plan rests with county government. However, everyone must play a role in making the reimagined river a reality. LA County, other government agencies, organizations, advocates, and residents need to work together to achieve this vision.

Dozens of advocacy groups and organizations have passionate and informed members who work tirelessly and provide resources to improve the LA River. Their leaders, staff, and supporters will be integral to a reimagined river.

Residents have a role to play, too. From using less water at home to using the river more to volunteering to letting elected officials know that implementation of the LA River Master Plan is a priority, there are a myriad of opportunities to get involved.

For more information about public stewardship and implementation, see Chapter 11.

Figure 11. **Participants who attended the community meeting at the Friendship Auditorium engaged in an exercise where their thoughts and concerns were written on post-it notes and discussed.** Source: OLIN, 2018.

HOW TO USE THIS DOCUMENT

ORGANIZATION OF THE MASTER PLAN DOCUMENT

This document is organized in four main sections.

Section I INTRODUCTION sets the stage for the Master Plan, explaining why this document is needed, its vision, and how it will be used.

Section II CONTEXT helps understand the past and present of the LA River through historical narrative, current inventory and analysis, and community engagement.

Section III THE FUTURE OF THE LA RIVER describes the goals, actions, and methods of the plan and the needs and opportunities for design.

Section IV IMPLEMENTATION forges a way forward to realize the ideas of the plan through strategic partnerships and ongoing plans for success.

The LA River Master Plan utilizes several specific terms and tools for evaluating and identifying projects within the LA River corridor. Unique terms are defined in the glossary at the end of the document and unique tools, such as the river mile numbering system or river ruler system, are explained on blue callout pages throughout the document.

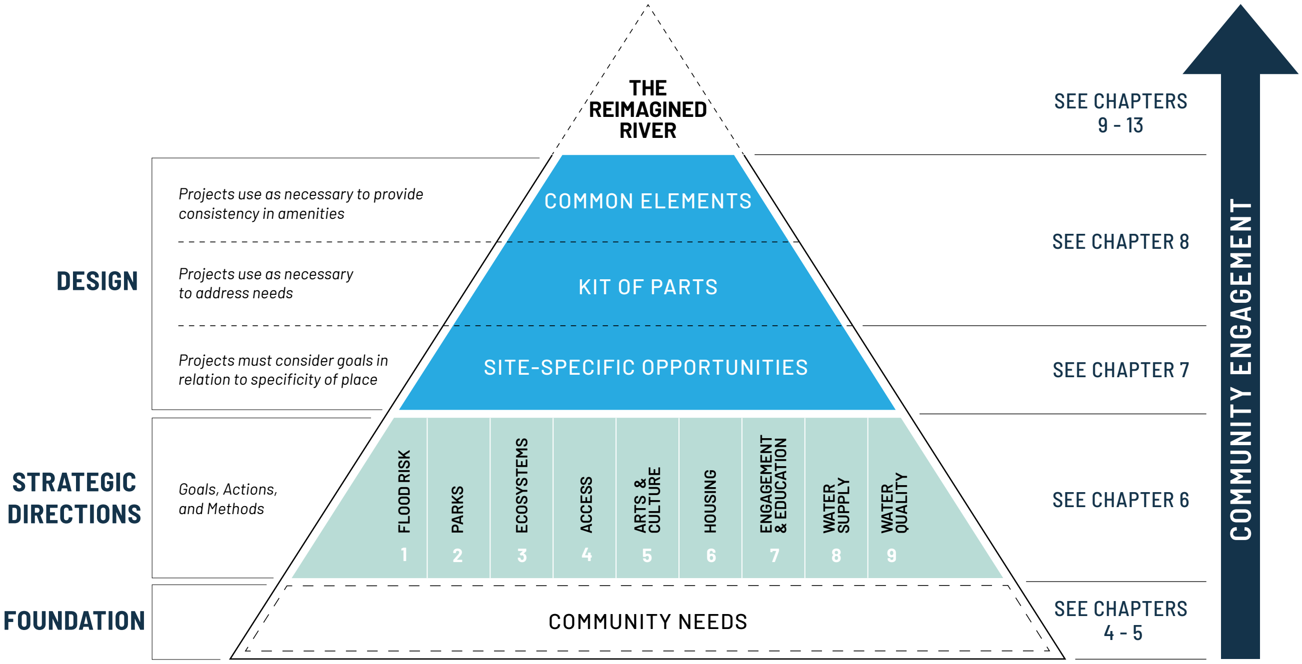

Figure 12. **The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.**

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RIVER MILE SYSTEM

The LA River is 51 miles long, flowing from mile 51 in Canoga Park within the City of LA to mile 0 at Long Beach where the river meets the Pacific Ocean. The river mile system was developed in 2016 to reduce confusion between different jurisdictional reach designations.

Figure 13. The river mile system illustrated here allows all jurisdictions and members of the public to understand the relationship of locations along the 51 miles of the LA River. Reach designations and numbering systems of other agencies can be seen in Appendix Volume I: Design Guidelines, Chapter 2. Source: OLIN, 2019.

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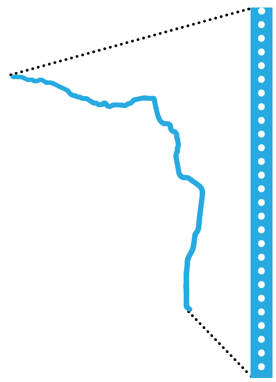
REPRESENTING THE RIVER AS A STRAIGHT LINE ALLOWS THE EYE TO QUICKLY PERCEIVE HOW CONDITIONS ALONG THE RIVER CHANGE FROM ONE RIVER MILE TO THE NEXT

River Ruler



The river ruler is a vertical straight-line representation of the 51 miles of the LA River.

RIVER RULER SYSTEM

The LA River is a complex system with many layers of information and data. To better understand conditions along the river, the LA River Master Plan used over 200 "river rulers" to organize and collect existing data and new data that was created as part of the Master Plan process.

The river ruler is a vertical straight-line diagram that represents and takes measure of the entire 51 miles of the LA River. Representing the river as a straight line allows the eye to quickly perceive how conditions along the river change from one river mile to the next.

The vertical axis (height) of the river ruler represents the 51 miles of the LA River, with river mile 51 at Canoga Park in the West San Fernando Valley at the top of the ruler and river mile zero at Long Beach where the LA River meets the Pacific Ocean at the bottom of the ruler.

Depending on the data being shown, the horizontal axis (width) of each river ruler represents conditions at or immediately adjacent to each side of the river. In some rulers, a division line clearly demarcates conditions sampled immediately along the left and right banks of the river, while other rulers show conditions up to a mile away from each side of the river.

The benefit of the river rulers is that multiple rulers can be aligned on a single page so that multiple categories of data can be assessed easily side by side. Comparing across multiple categories at multiple locations along the river in a single drawing is essential for understanding the river as a complex urban and ecological system and for recognizing where planning and design proposals can achieve multiple benefits at a particular location.

Throughout the LA River Master Plan, river rulers are typically used in tandem with maps that show the same data in the context of the broader LA River watershed. In the inventory and analysis sections, the rulers are commonly used at the conclusion of the chapter so that various datasets can be compared.

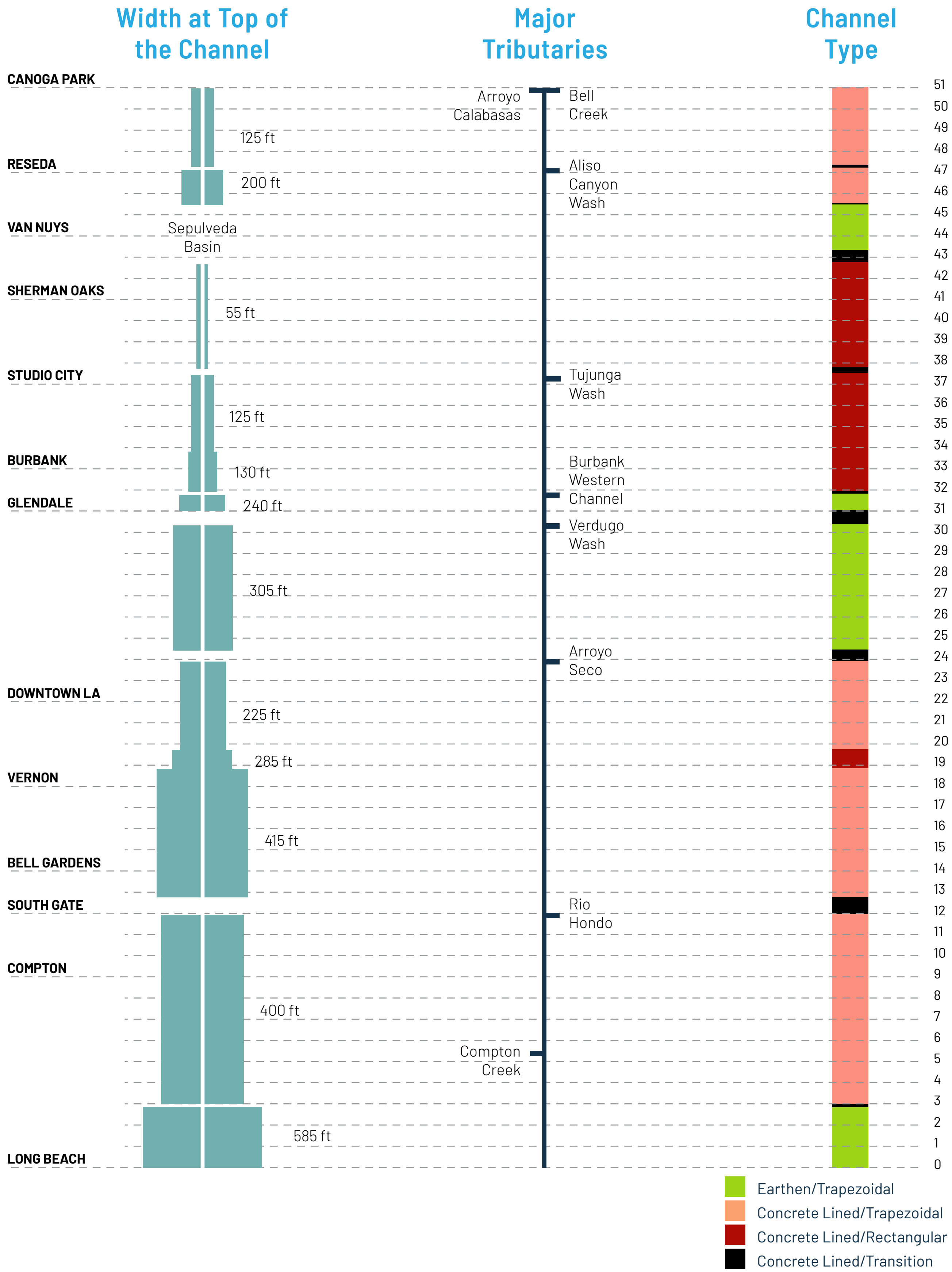
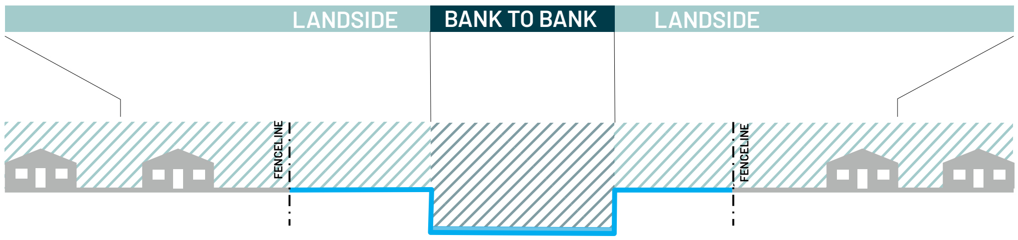


Figure 14. River rulers provide the ability to compare different types of data easily and efficiently.

Rectangular Channel



Trapezoidal Channel

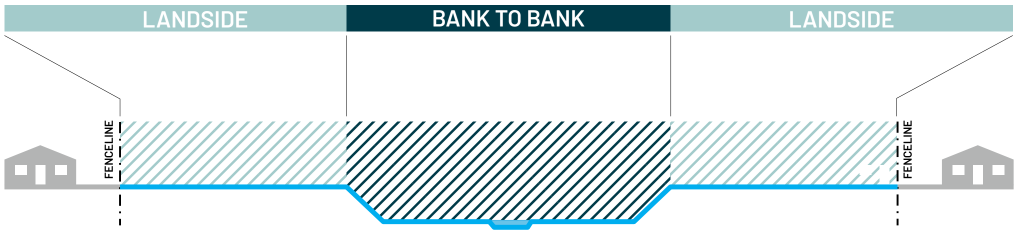


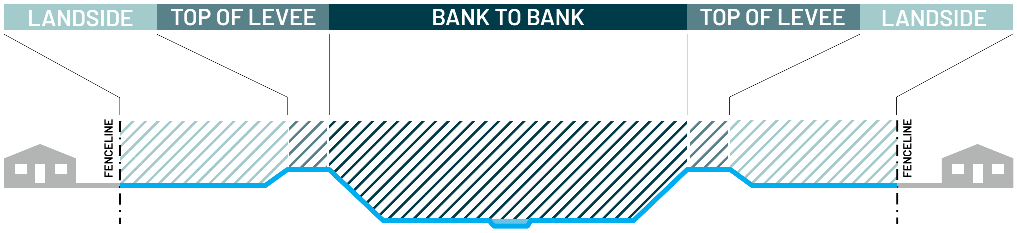
Figure 15. There are two types of channel sections on the LA River: the rectangular box channel and the trapezoidal channel.

FAMILIARIZE YOURSELF WITH THE RIVER

The LA River is a channelized river. Most of the river is lined with concrete along its sides and bottom. Some areas of the river have a "soft bottom" where soil and plants form the bottom of the channel. Other areas have concrete walls forming a rectangular channel, often called a box channel, or a trapezoidal channel formed by levees. In leveed areas, the top of the levee is often used as an access road or recreational trail. The area outside of the river bank is called the "landside" and sometimes includes areas for habitat, recreation, maintenance, or other park amenities. Together the river channel and the landside area make up the river right-of-way. The outside edge of the right-of-way is typically called the fenceline.

Trapezoidal Channel - Soft Bottom Channel

Trapezoidal Channel - Levee and Concrete Bottom Channel



Trapezoidal Channel - Levee and Soft Bottom Channel

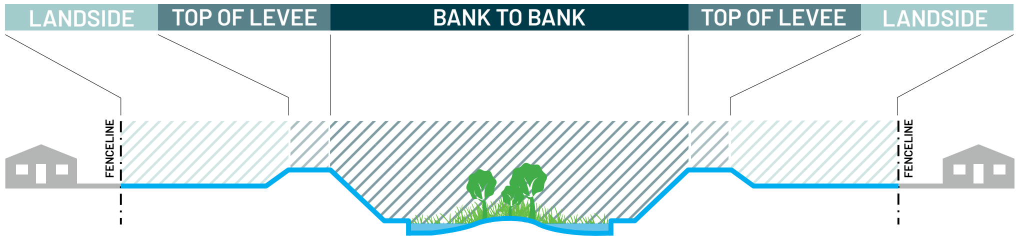


Figure 16. There are a few trapezoidal channel typologies along the LA River. The trapezoidal channel either has a soft or concrete bottom and may or may not have visible levees.

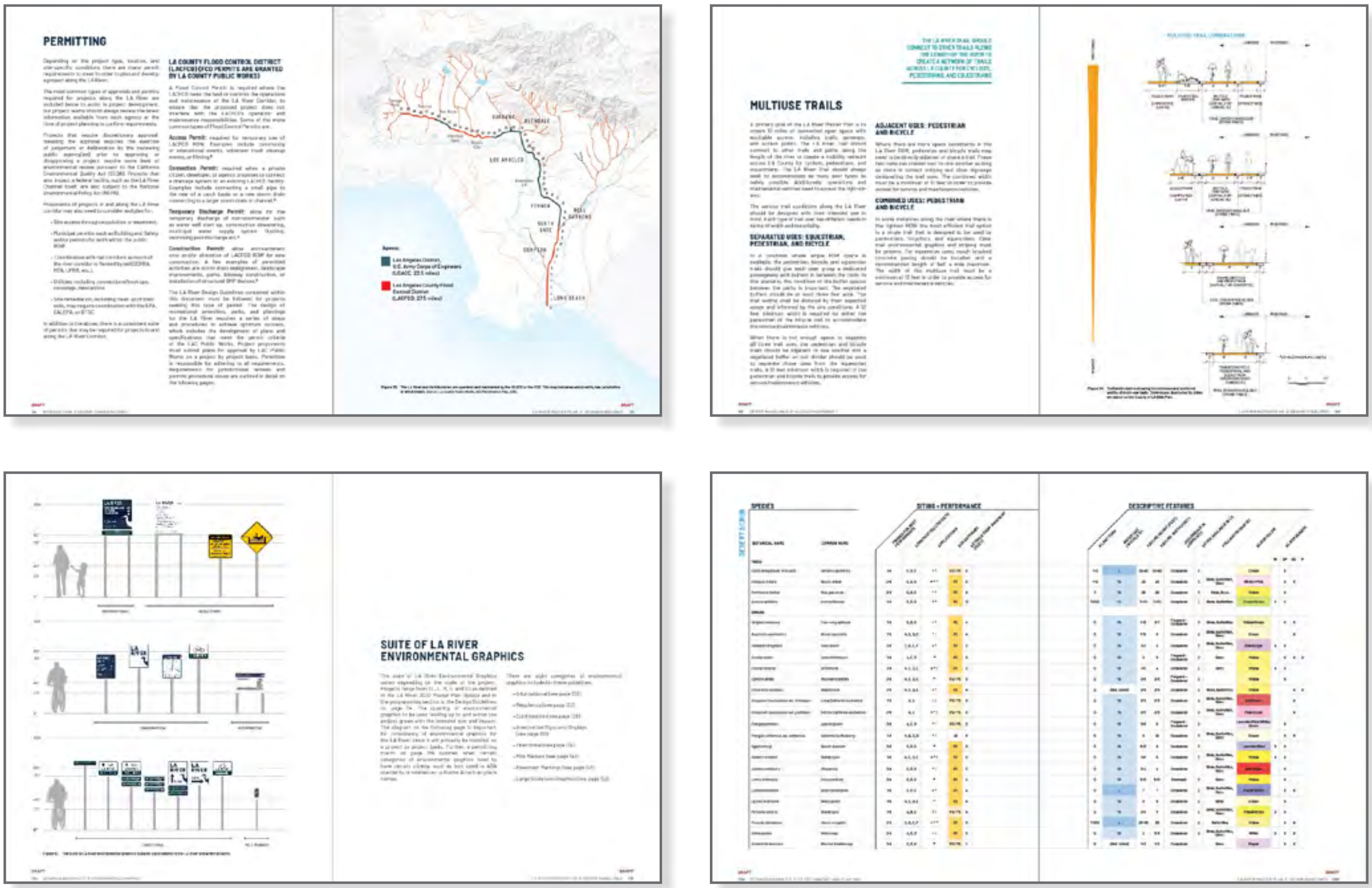


Figure 17. **The Design Guidelines present a unified, cohesive identity while promoting best practices and resiliency for the river corridor. They ensure a standard for design and facilitate decision-making in a multi-jurisdictional context.**

FAMILIARIZE YOURSELF WITH THE APPENDICES

APPENDIX VOLUME I: DESIGN GUIDELINES

The Design Guidelines are organized into five main chapters, focusing on elements ranging from trails to environmental graphics to habitat to facilities. These guidelines will aid designers and engineers in the establishment of a 51-mile connected open space that is a well-organized, functional, and accessible environment reflecting the diverse and shared identities of LA County. To facilitate decision-making and ensure a standard for design, the guidelines present a unified, cohesive identity while promoting best practices and resiliency for the river corridor. Equally important, the guidelines provide flexibility for site-specific needs and expressions of neighboring communities' cultural identities. Elements such as environmental graphics, access points, and lighting should be unified to ensure connectivity, wayfinding, and equitable access.

Design guidelines are not a 'cookbook' for the design process for sites, rather they are the frame for good project development. The knowledge and experience of landscape architects, engineers, architects, ecologists, and artists are invaluable in creating spaces that enhance life along the river. The LA River Design Guidelines are a tool for these professionals and reflect the baseline of values for promoting smart design along the river corridor.

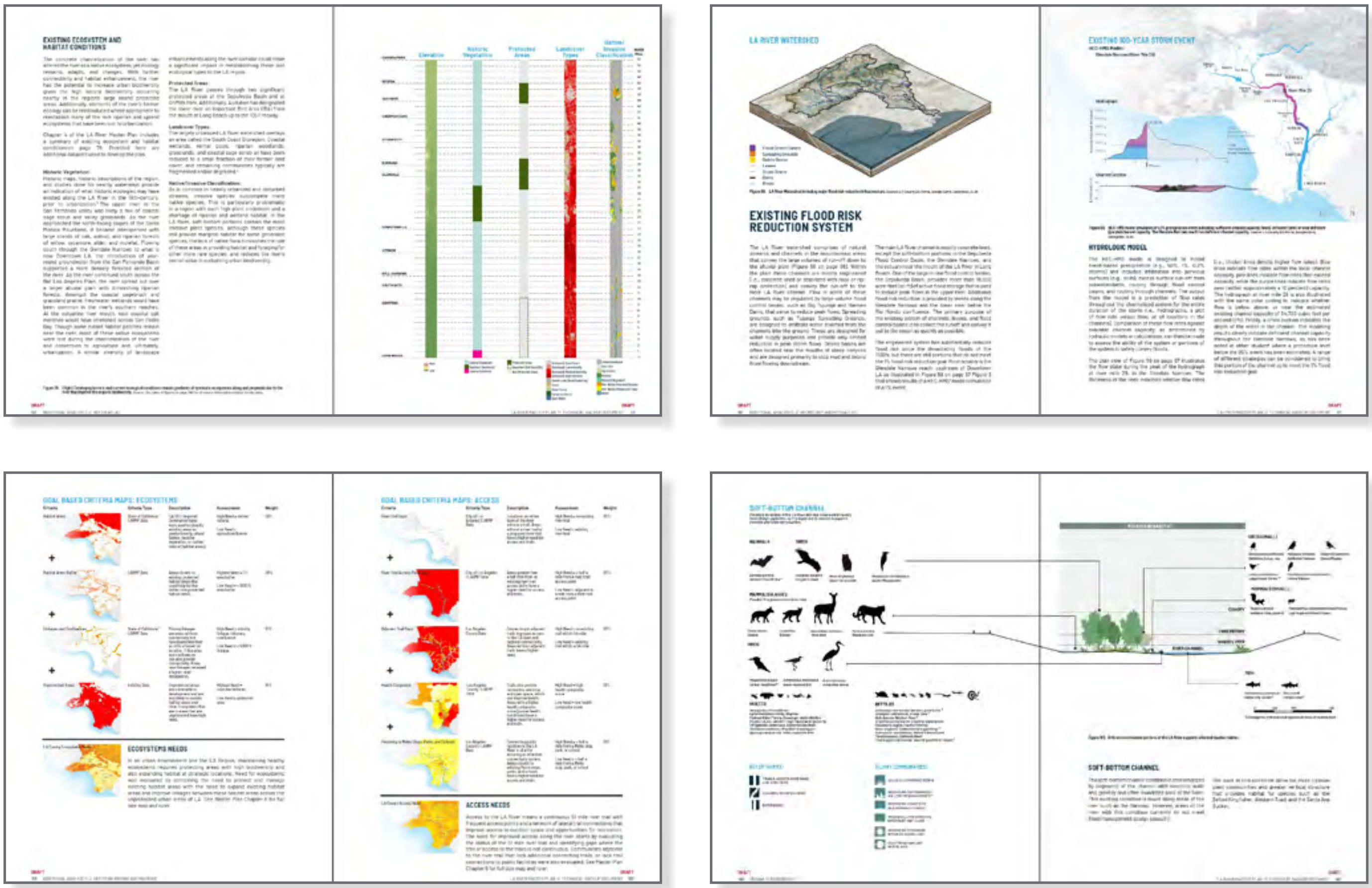


Figure 18. **The Technical Backup Document provides additional references, supplemental information, and expanded explanations of the data and analysis that was used to draft the LA River Master Plan.**

APPENDIX VOLUME II: TECHNICAL BACKUP DOCUMENT

This Technical Backup Document provides additional references for the data-based goal-driven framework of the LA River Master Plan

The inventory, analysis, and research completed as part of the development process is unprecedented in its depth. Over 140 existing related planning documents were reviewed, over 210 datasets were analyzed, and over 40 new datasets were created. Entire analysis efforts around housing, flooding, homelessness, water supply, ecology, water quality, access, arts and culture, community demographics, and education were undertaken as part of this plan.

While the high level summaries of these topics are included in the main volume of the plan, additional information in the appendix can inform decision making for community leaders, technical professionals, and organizations engaged in plan implementation.

THE LA RIVER MASTER PLAN HAS TWO APPENDICES THAT ACCOMPANY THIS DOCUMENT

Figure 19. In the Elysian Valley, near river mile 26.3, the activation of the LA River Trail can bring communities closer together.
Source: LA County Public Works, 2018.

2.
MASTER PLAN 2020

DATA-BASED METHODOLOGY
GOAL-DRIVEN FRAMEWORK

The 2020 LA River Master Plan is an update of the LA County 1996 LA River Master Plan.

Since 1996 several plans have been completed that reference the LA River. While it is common for infrastructure plans to exist within a similarly robust goal-driven context as this plan, there is no plan that is exactly parallel in context and scope to the LA River Master Plan. LA County and the LA River are unique. No other county in the country has as large a population, as robust a set of resources, and as much administrative capacity as LA County. Other rivers that impact as many people as the LA River are not contained within a single county and have a different character than the LA River. This plan addresses a wide range of social and environmental aspects of the LA River, the watershed, and the communities along the river through a data driven methodology.

THE 2020 LA RIVER MASTER PLAN IS AN UPDATE OF THE LA COUNTY 1996 LA RIVER MASTER PLAN

LA RIVER 1996 MASTER PLAN SUMMARY

In July 1991, the LA County Board of Supervisors directed the Departments of Public Works, Parks and Recreation, and Regional Planning to coordinate all public and private parties interested in the planning, financing, and implementation of a master plan for the LA River. The planning team consisted of an advisory committee comprised of cities, agencies, and citizen group representatives in addition to advisory subcommittees which were tasked with developing objectives. In February 1995, an implementation team consisting of members of the advisory committee was formed to help develop strategies for implementing recommended projects among cities, agencies, and community groups.

The 1996 Master Plan organized key issues under six general topics and eight goals. The 1996 Master Plan went on to develop a list of objectives, recommendations, and suggested policy changes for each of the six topics and their related goals. The topics and related goals were:

Aesthetics:

- Improve the appearance of the river and the pride of the local communities in it.

Economic Development:

- Promote the river as an economic asset to the surrounding communities.

Environmental Quality:

- Preserve, enhance, and restore environmental resources in and along the river.

Flood Management and Water Conservation:

- Ensure that flood control and public safety needs are met.
- Consider stormwater management alternatives.

Jurisdiction and Public Involvement:

- Ensure public involvement and coordination during Master Plan development and implementation among jurisdictions.

Recreation:

- Provide a safe environment and a variety of recreational opportunities along the river.
- Ensure safe access to and compatibility between the river and other activity centers.

1996 PLANNING FRAMES

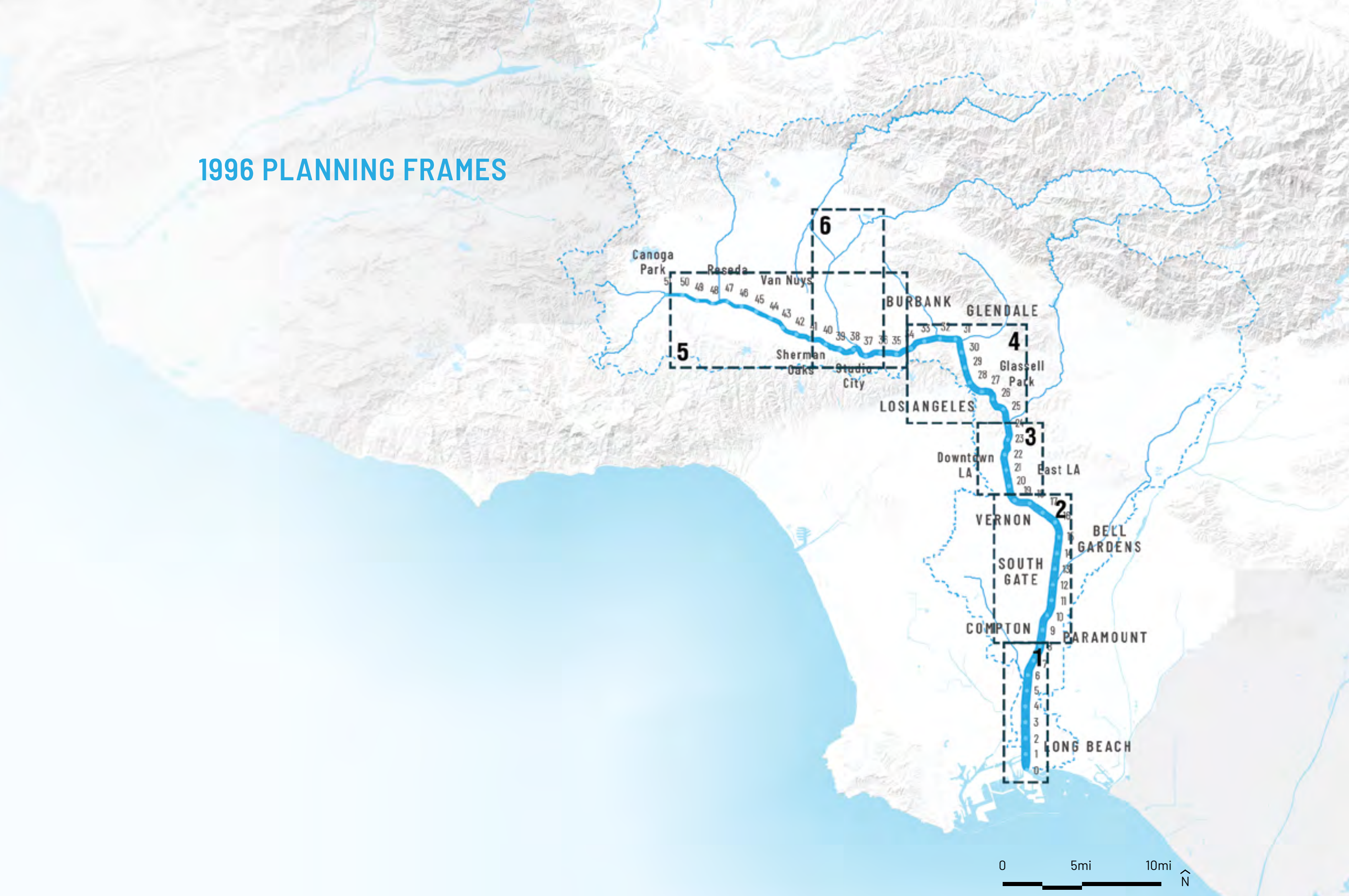


Figure 20. The 1996 LA River Master Plan had six planning frames. Source: LA County Public Works, 1996 LA River Master Plan.

The 1996 Master Plan mapped existing facilities and recommended improvements along the entire 51-mile length of the LA River and 9-mile length of Tujunga Wash. The rivers were divided into six reaches, beginning at the river mouth in Long Beach and continuing upstream through Downtown LA to the San Fernando Valley. The Master Plan Advisory Committee recommended improvements varying in size and specificity along each reach, with input from the respective communities. Each reach included a description of that reach, a summary of issues, recommendations for cities within the reach, and a list of other previously planned projects.

In addition to the reach recommendations, the 1996 Master Plan developed a list of 17 potential demonstration projects. The purpose of these demonstration projects was to implement short-term projects that deliver the long-term goals of the Master Plan, while revealing potential problems that might be encountered in future projects. The 17 demonstration projects were ranked by site availability, availability of funding, community support, number of Master Plan goals the project would meet, project implementation timeframe, and willingness of a jurisdiction to maintain.

THE 1996 PLAN INCLUDED FOUR DEMONSTRATION PROJECTS

Two demonstration projects from the 1996 plan have been completed thus far:

LOS FELIZ RIVERWALK

North East Trees, in partnership with the City of LA Recreation and Parks Department and the Mountains Recreation and Conservation Authority, received funding from the 1992 LA County Safe Neighborhood Parks Proposition to construct the Los Feliz Riverwalk from Chevy Chase Drive to the Sunnynook Drive footbridge in Los Feliz. Completed in September 1999, improvements included walking trails, native planting, picnic areas, river rock walls, and Anza Trail signage. The project also involved the installation of a steel gate designed and fabricated by local artist Michael Amescua at Los Feliz Boulevard and the river.

DOMINGUEZ GAP ENVIRONMENTAL ENHANCEMENT

Eventually named the Dominguez Gap Wetlands, the project converted an existing, 37-acre spreading basin into multi-benefit wetlands. Since completion of the $7.1 million project in 2008, flows from the LA River and local urban runoff are routed through the basin to sustain a year-round habitat for plants and native wildlife. The open space provides increased opportunities for public recreational amenities, such as an equestrian trail, bike paths, and walkways.

Two demonstration projects are currently in development:

TUJUNGA WASH/HANSEN DAM INTERPRETIVE SITE

Located at Hansen Dam, where the Big and Little Tujunga Washes meet in the San Fernando Valley, this project would develop a series of interpretive signs at the crest of Hansen Dam, which is owned and operated by the US Army Corps of Engineers (USACE). The signs would educate and inform the public on various water conservation resources. This location is included within the Design Area of the Upper LA River and Tributaries Revitalization Plan that has proceeded from AB 466, which may advance the concepts proposed by this project.

WRIGLEY GREENBELT TRAIL ENHANCEMENT

This project, which is currently in development, comprises the excess land owned by Los Angeles County Flood Control District (LACFCD) outside the LA River levees between Wardlow Road and Willow Street in Long Beach. The project is designed to improve the trail along the LA River with signs and fencing, as well as connect to the LA River Improvement Overlay District (LARIO) trails. The Port of Long Beach and LA County Public Works implemented the northern section of the improvements in 2007.

In addition to the four demonstration projects that moved forward, the 1996 LA River Master Plan's Advisory Committee continued to convene into the early 2000s to develop additional LA River projects—large and small scale—that aligned with the goals of the plan.

Figure 21. View looking north across the Dominguez Gap Wetlands, one of the 1996 LA River Master Plan Demonstration Projects at river mile 4.9.
Source: OLIN, 2018.

LITERATURE REVIEW

LA County has a rich tradition of planning, as evidenced by the over 140 relevant adopted plans (See the Appendix Volume II: Technical Backup Document) that were reviewed as context for updating the LA River Master Plan. These plans span different geographic scales and topics and are the result of community-influenced processes. The LA River Master Plan leveraged the information from these plans as a foundation for understanding the river today and how it can be reimagined in the future (see Appendix Volume II, Technical Backup Document for full list of reviewed plans).

In addition to the 1996 LA River Master Plan, 11 other documents provided the most guidance for the LA River Master Plan update. The LA River Master Plan does not replace these plans. Rather, it incorporates the recommendations of these plans and provides an organizing framework within which LA County can comprehensively address the future of the LA River.

Common Ground from the Mountains to the Sea: Watershed and Open Space Plan San Gabriel and Los Angeles Rivers (2001)

Common Ground from the Mountains to the Sea imagines strategies and opportunities for creating a new public amenity along the LA River corridor, the San Gabriel River, and their tributaries. It proposes a continuous ribbon of open space, trails, active and passive recreation areas, and wildlife habitat.

Los Angeles River Revitalization Master Plan (2007)

The Los Angeles River Revitalization Master Plan (LARRMP) provides a bold vision for transforming the LA River within the City of Los Angeles over the next several generations. The plan acknowledges that great and transformative change may not be accomplished in one lifetime; it must remain in the minds of the people who will carry it forward. The plan for this stretch of the river includes four core principles: revitalize the river, green the neighborhoods, capture community opportunities, and create value.

Long Beach Riverlink (2007)

The Long Beach Riverlink aims to provide residents with 1,100 acres of recreational open space, including pedestrian- and bike-friendly pathways, along the LA River while also restoring segments of the river back to native habitats and improving the aesthetics of the river and the city.

Stormwater Capture Master Plan (2015)

The LA County Flood Control District Stormwater Capture Master Plan (SCMP) inventoried existing and planned actions by LA Department of Water and Power, the City of LA, other city, county, regional, and federal agencies, and local non-governmental entities that impact stormwater. The SCMP is organized around the goals of quantifying stormwater capture potential and identifying new projects, programs, and policies to significantly increase stormwater capture for water supply within a 20-year planning period (2016-2035).

Los Angeles River Ecosystem Restoration Integrated Feasibility Report (also known as the ARBOR Study) and its Recommended Plan (2015)

The Los Angeles River Ecosystem Restoration Integrated Feasibility Report and its Recommended Plan present potential alternatives for environmental restoration of 11 miles of the LA River that include the soft-bottom Glendale Narrows. The study analyzes the environmental impacts of implementing those alternatives, reviews the process for selecting the best alternative, and concludes with recommendations for project implementation.

Los Angeles Countywide Comprehensive Parks and Recreation Needs Assessment (2016)

The Los Angeles Countywide Comprehensive Parks and Recreation Needs Assessment recognizes the importance of parks in contributing to public health and well-being, creating a sense of place, increasing community cohesion, improving the environment, and boosting the economy. The assessment inventoried and identified needed parks and recreation facilities in cities and unincorporated communities in LA County.

Los Angeles Sustainable Water Project: Los Angeles River Watershed (2017)

The Los Angeles Sustainable Water Project: Los Angeles River Watershed study demonstrates the complex interrelationships of projects designed to achieve different objectives within urban water management. The study models the impacts of implementing integrated water management practices in the LA River watershed, which address water quality and supply. The study also investigates the historical hydrology of the LA River and the impact of best management practices (BMPs) on runoff ratios.

One Water 2040 LA Plan Volume 4 – Los Angeles River Flow Study (2017)

One Water 2040 LA Plan employs a holistic and collaborative approach to managing water resources, which includes surface water, groundwater, potable water, gray water, wastewater, recycled water, and stormwater. One Water 2040 LA Plan Volume 4 is a study on low flow in the LA River. The study includes five water management concepts that optimize the amount of flow needed to support potential future water-dependent uses and satisfy regulatory requirements.[3]

Lower Los Angeles River Revitalization Plan (2017)

The Lower Los Angeles River Revitalization Plan (LLARRP) describes opportunities for improving the environment and residents' quality of life along a reimagined and revitalized river from Vernon south, and identifies and designs multi-benefit projects and policies to implement in the area around the river. The LLARRP addressed three broad goals: community economics, health, and equity; public realm; and water and environment.

Los Angeles County Annual Affordable Housing Outcomes Report (2019)

The Affordable Housing Outcomes Report provides a foundational understanding of affordable housing needs and investments in the county. The report assesses housing affordability based on housing and population characteristics and highlights the county's 517,000 shortfall in affordable housing units. It also summarizes public expenditures on affordable housing over time and offers recommendations to support the production and preservation of affordable homes.

Upper Los Angeles River & Tributaries Working Group - AB466 (2020)

The mission of the Upper Los Angeles River and Tributaries Revitalization Plan is to develop prioritized opportunities with the following components: Nature based and watershed management; Open space; Multiple benefits; Safe access; Alignment with community needs and feedback; Alignment with funding sources; Reduction and management of existing flood risks to communities; Culture, arts, and education; Reconciliation with previous efforts. From the lens of two subcommittees, People & Recreation and Water & Environment, prioritized opportunities have been identified to enhance the quality of life for communities within the upper watershed.

THE LA RIVER MASTER PLAN LEVERAGED THE INFORMATION FROM THESE PLANS AS A FOUNDATION FOR UNDERSTANDING THE RIVER TODAY AND HOW IT CAN BE REIMAGINED IN THE FUTURE

JURISDICTIONS, OWNERSHIP, AND RIGHTS

The typical LA River right-of-way includes flood management structures such as the channel, levees, and access roads, which are primarily maintained by the Los Angeles County Flood Control District (LACFCD) and the United States Army Corps of Engineers (USACE). Currently, the USACE and the LACFCD each maintain approximately half of the LA River. Permits for projects along the LA River are issued by these two entities depending on project typology and location.

In some reaches, various recreational amenities such as bike paths, parks, and trails are found within the right-of-way of the LA River. In other areas, recreational amenities are outside of the right-of-way but directly adjacent. Recreational amenities are maintained by municipal entities, LA County Department of Parks and Recreation, and other special interest groups.

Ownership of the approximately 2,300 acres of land within the LA River right-of-way varies. The LACFCD owns the largest portion of the right-of-way, but the USACE, municipalities, and private owners also own portions of the right-of-way. Where municipal or private interests own parcels within the channel, easements for operations and maintenance exist to allow the LACFCD and USACE to operate and maintain LA River facilities.

There are 17 municipalities, including very large cities like LA and Long Beach and smaller cities like Cudahy and Bell, located within one mile of the LA River and 45 municipalities within the LA River Watershed. Municipalities control land use policies within their limits and are often the primary leaders of projects within or near the LA River ROW.

The LA River is one of the "Waters of the United States" according to the Code of Federal Regulations, and is, therefore, a protected water body under the jurisdiction of the State Water Resources Control Board and the LA Regional Water Quality Control Board (Region 4) for compliance with the Clean Water Act. Additional regulatory oversight pertaining to water quality is provided by the USACE through the Section 404 program (dredge and fill) and the State of California Department of Fish and Wildlife (CDFW) through the Section 1600 program (Lake and Streambed Alteration).

Two state of California conservancies have leadership roles related to the LA River, including the Santa Monica Mountains Conservancy and the San Gabriel and Lower LA Rivers and Mountains Conservancy.

Water rights within the LA River watershed are governed by California water law and cover both surface and groundwater use. The types of water rights that govern in the LA River watershed include

- Pueblo water rights recognize settlements under the Spanish and Mexican governments and grant these pueblo water rights to the streams and rivers flowing through these original Pueblos. For the Upper Los Angeles River above the confluence with the Arroyo Seco, these rights pertain to the City of Los Angeles' surface water rights and the native groundwater contained within the San Fernando Basin.

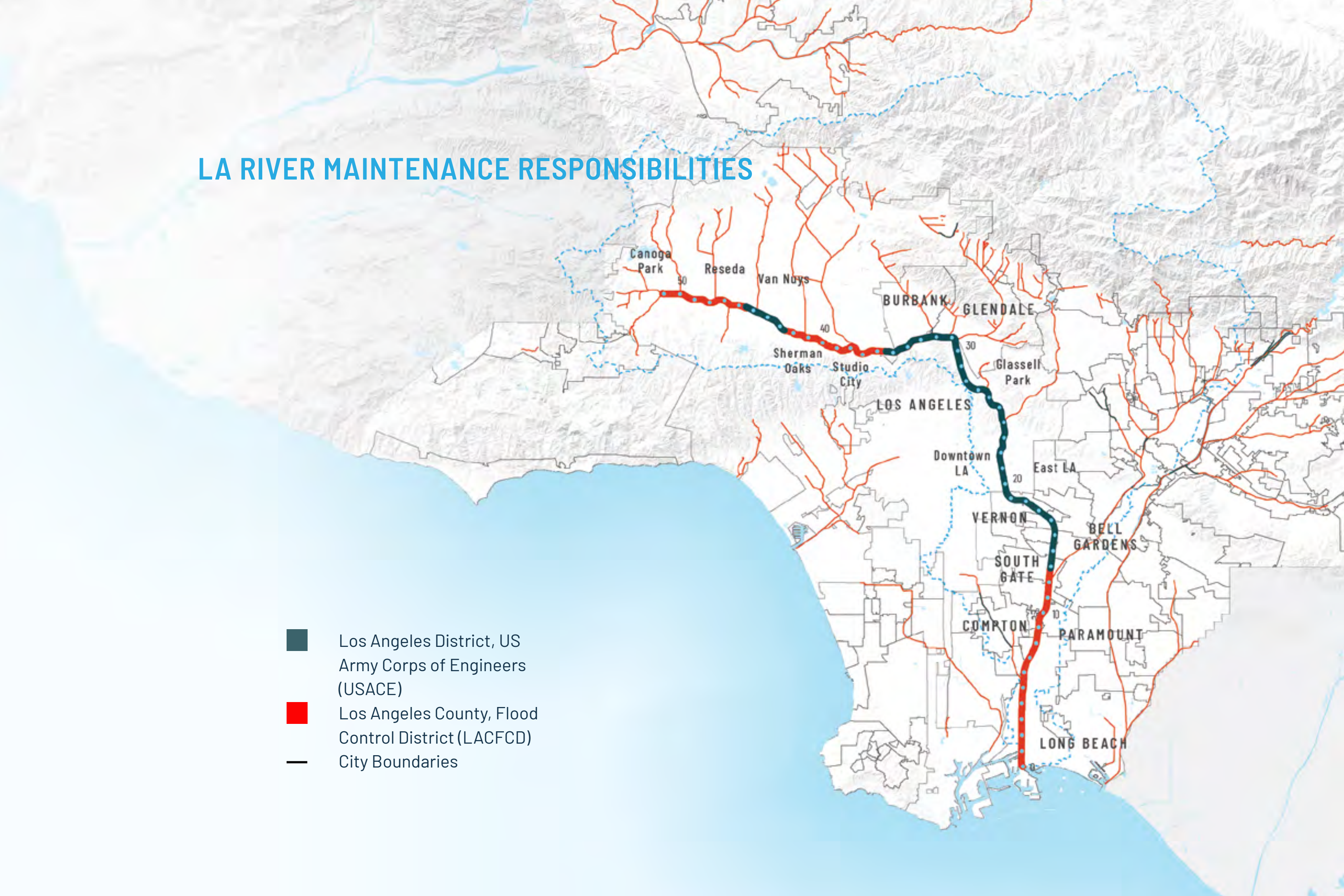


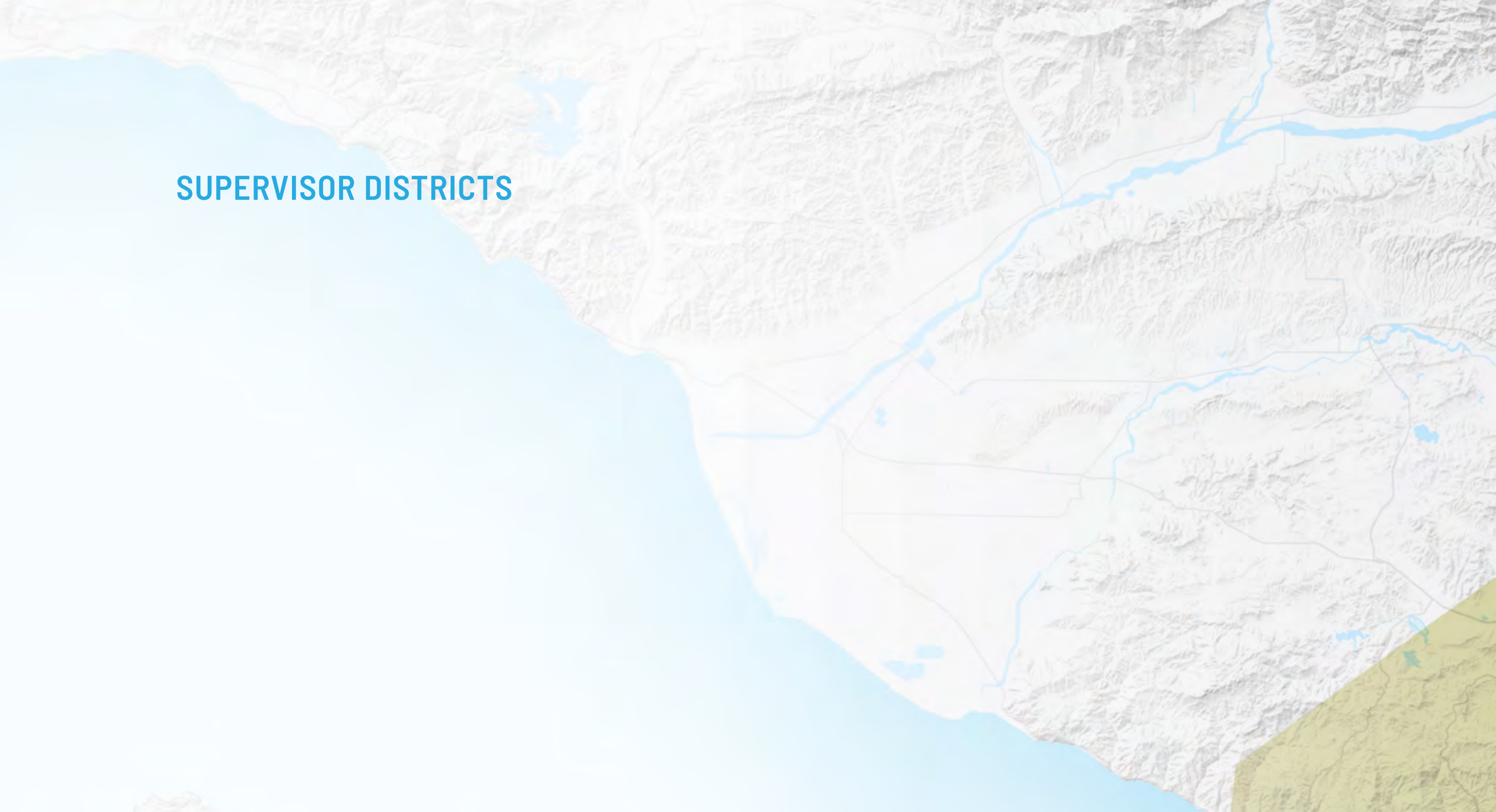
Figure 22. LA River Maintenance Responsibilities: Currently, the operations and maintenance of the LA River and its tributaries is shared by the LA County Flood Control District and the US Army Corps of Engineers. Source: LA County GIS Data Portal, City Boundaries and Annexations, 2016, & LA City Communities and Planning Areas, 2014.

- Appropriative water rights are given for diversion and beneficial use of water to users away from the water body. These rights are applied for, and granted by, the California State Water Resources Control Board.

- Riparian water rights grant landowners of land adjacent to surface waters the right to divert enough water for use on the adjacent property. If not specifically disassociated through a sales or other agreement or decree, properties adjacent to a stream have the potential to divert water for beneficial use on that property.

- Adjudicated groundwater rights cover the groundwater basins under the LA River watershed, namely the Upper Los Angeles River Area groundwater basins (San Fernando, Sylmar, Verdugo, and Eagle Rock basins), the Central Basin, and the West Coast Basin, which are covered under adjudication rules. Adjudication refers to the distribution of groundwater rights to pumpers and users. Under common law, landowners can extract as much groundwater from beneath their property as they can put to beneficial use. However, in these basins, adjudications serve to establish how much water is appropriate based on the hydrogeology and area of each owner's land and the attainment of beneficial uses.

SUPERVISOR DISTRICTS



THE ROLE OF THE COUNTY

Similar to the 1996 LA River Master Plan, the 2020 Plan will guide all LA County departments in decision making for LA River projects and facilities owned, operated, funded, permitted, and/or maintained by the County. Other agencies and municipalities are encouraged to adopt the LA River Master Plan for their jurisdictions and communities and partner with LA County in making the reimagined river a reality.

The LA River Master Plan will help ensure a reimagined LA River by:

- Establishing a comprehensive long-term vision for the river that is based on robust community engagement and data.
- Utilizing a goal-based framework for policy and design.
- Identifying goals, actions, and methods that will be undertaken by LA County along the LA River corridor and throughout the watershed to achieve the vision for the river.
- Identifying strategic partnerships between LA County and other entities that will be needed to meet the full realization of the goals, actions, and methods.
- Identifying how LA County can support other entities in meeting the goals, actions, and methods.
- Promoting design excellence.

LA County Public Works shall establish an implementation team responsible for ongoing coordination after the completion of the Master Plan.

Figure 23. **LA County Supervisor Districts. The LA River flows through all five LA County Supervisor Districts.**
Source: LA County GIS Data Portal, 2018.

LA River Master Plan: Planning Context

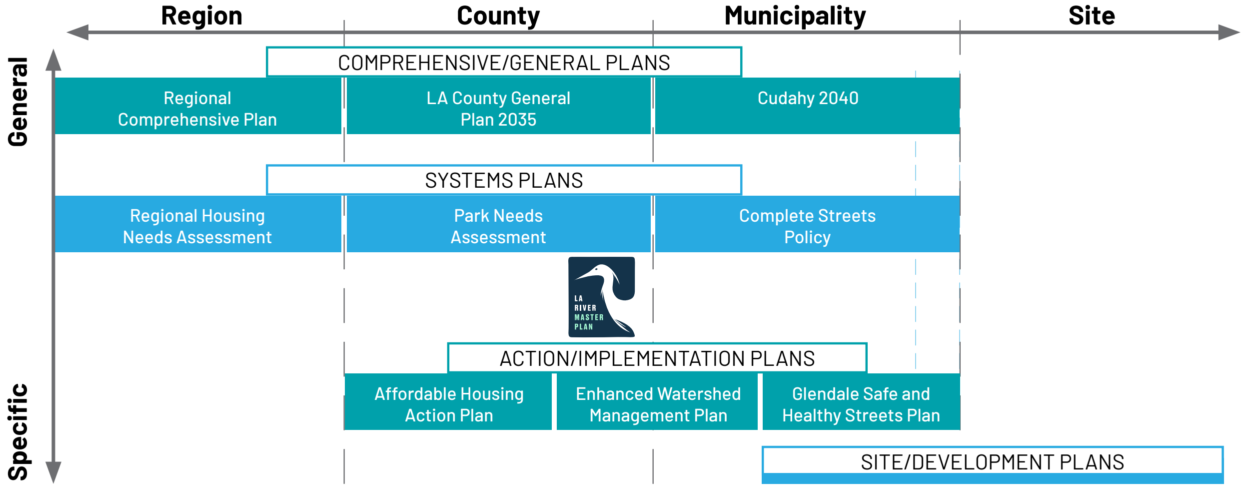


Figure 24. The goal-driven framework of the LA River Master Plan supports the goals of other plans. It provides more detail than a system plan but does not reach the specific design level of action or development plans.

PLANNING CONTEXT AND PROCESS

PLANNING CONTEXT

The 1996 LA River Master Plan and other documents related to planning along the LA River are not the only source of policy and planning that affect the river. Policy exists at every scale of governance—from national and state policy to municipal and site-level policy. The literature review and existing conditions analysis identified the planning context within which the 2020 LA River Master Plan will be completed and provided a foundation for the plan to set strategic directions for the river.

While setting these strategic directions for the LA River, the plan relies on, but does not replicate or supersede, goals set forth in other plans, such as the LA County General Plan, the OurCounty Sustainability Plan, or the Safe, Clean Water Program. All of these plans are interrelated and envision the future of LA County. The goal-driven framework of the LA River Master Plan provides more detail than a system plan, but does not reach the specific design level of action or development plans. Individual project development and implementation will build from this Master Plan.

PROCESS

The Master Plan was developed over four phases beginning in early 2018 and extending to 2020: Analysis of existing plans and regional context; Proposing changes for the future; Drafting the update; and Final plan update.

To complete the Master Plan, three main groups provided input:

- Members of the public through the public engagement process.
- The Steering Committee appointed by the Board of Supervisors made up of 41 organizations in the LA Region with expertise across all the plan's themes.
- The technical team led by LA County Public Works that included representatives of various county departments and a consultant team that included Geosyntec, OLIN, Gehry Partners, River LA, engagement and facilitation partners, technical specialists, and experts in housing policies and displacement.

LA River Master Plan: Schedule

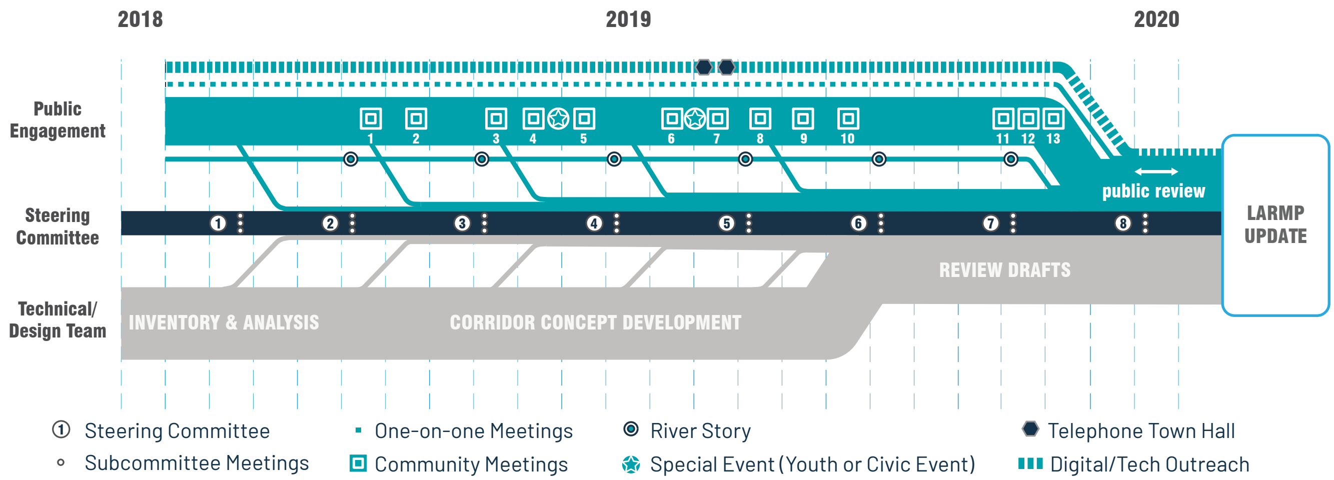


Figure 25. The LA River Master Plan began in February 2018 and included three main input groups.

Existing plans were reviewed through a literature review, and additional research was conducted by the technical team to understand current conditions in the region related to water, environment, and people. The Steering Committee identified a need for a deeper understanding of both housing and homelessness as well as hydrology and hydraulics, prompting a day-long workshop for each and supplementary analysis prepared by experts within these fields along with the technical team. Additionally, through the process, the development of a vision statement and goals grew into the goal-driven planning framework that makes the LA River Master Plan an implementable plan.

Steering Committee Subcommittees were organized around the three plan themes of water, people, and environment, with members self-selecting based on individual expertise and diverse organizational missions. Initially, the water subcommittee focused on flood risk, water quality, and water supply; the people subcommittee focused on public health, housing, recreation, access, and homelessness; and the environment subcommittee focused on open space, habitat, nature, and native ecosystems.

The Subcommittees would meet following each Steering Committee meeting in a series of three subcommittee meetings (per Steering Committee meeting for a total of 24 additional meetings). These Subcommittee meetings were held at various locations to delve further into the subject deemed critical by the Steering Committee. Additionally, three focused workshops were conducted for the subcommittee members which included housing, hydrology, and a special session to review the draft Master Plan.

LA River Master Plan: Timeline

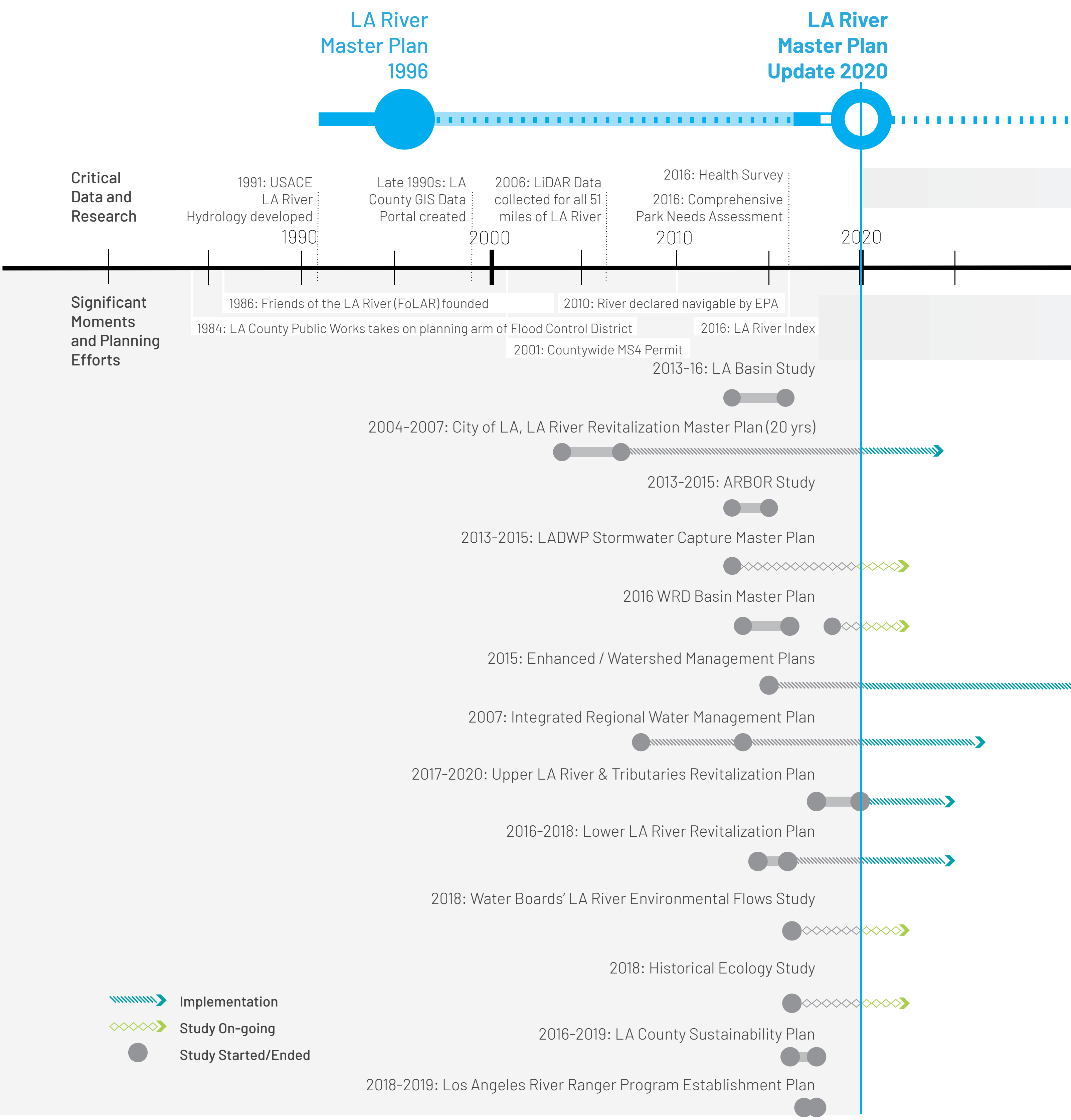
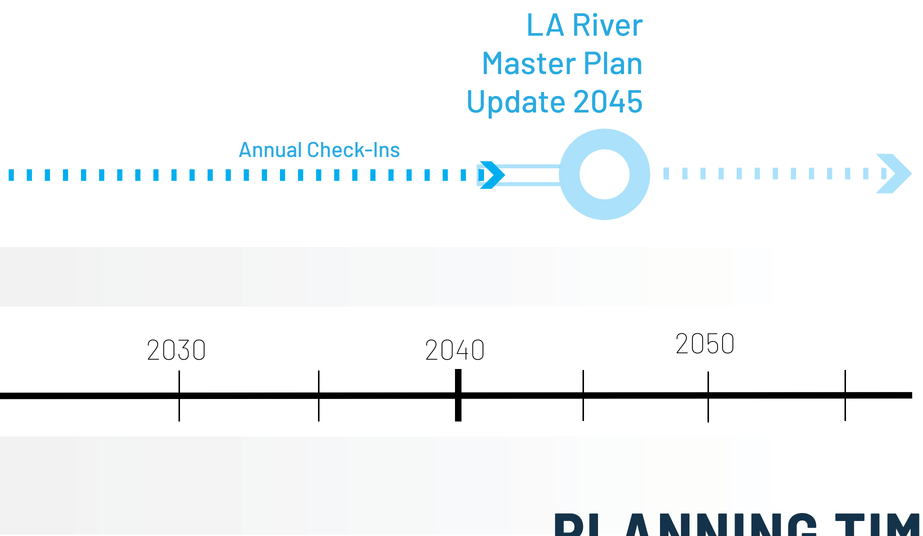


Figure 26. The LA River Master Plan is part of an ongoing series of planning efforts related to the LA River.

THE LA RIVER MASTER PLAN SHOULD BE UPDATED IN 20-25 YEARS



PLANNING TIMELINE

The 2020 LA River Master Plan is part of a larger sequence of planning for the LA River. Between LA County's 1996 LA River Master Plan and the City of LA's 2007 LA River Revitalization Plan, technological advances, GIS, and new data sources enabled the City of LA to advance thinking. Similarly, the 2020 LA River Master Plan process benefited from additional climate information, advanced mapping and scripting technologies, and a series of studies that have been completed, such as the 2016 LA Countywide Comprehensive Parks and Recreation Needs Assessment and the 2016 LA County Health Survey, which were not available in 1996 or 2007. Since these efforts LA County has also completed the OurCounty Sustainability Plan which outlines ambitious goals for resilience and climate change mitigation initiatives.

The goals and projects of the 2020 LA River Master Plan are expected to take approximately 25 years to implement. As such, the 2020 LA River Master Plan is intended to be a living document. Progress reports on the status of Master Plan implementation should be completed. An interim review and partial update should be completed in 10-12 years, and the plan should be more comprehensively updated again in 20-25 years.

Many studies related to the LA River are ongoing, such as the LA River Environmental Flows Study being carried out by the State Water Resources Control Board and the Regional Water Quality Control Board. The planning continuum of the LA River is ongoing and does not end with the 2020 LA River Master Plan. The goals, actions, and methods of this plan recommend additional studies that should be carried out in the coming decade to augment existing knowledge and data related to the LA River, the watershed, and the social fabric of the communities along the river. For more information regarding the Implementation Matrix, see Chapter 14. The 2020 LA River Master Plan design strategy is a data-based methodology that can be updated if and when new data becomes available.

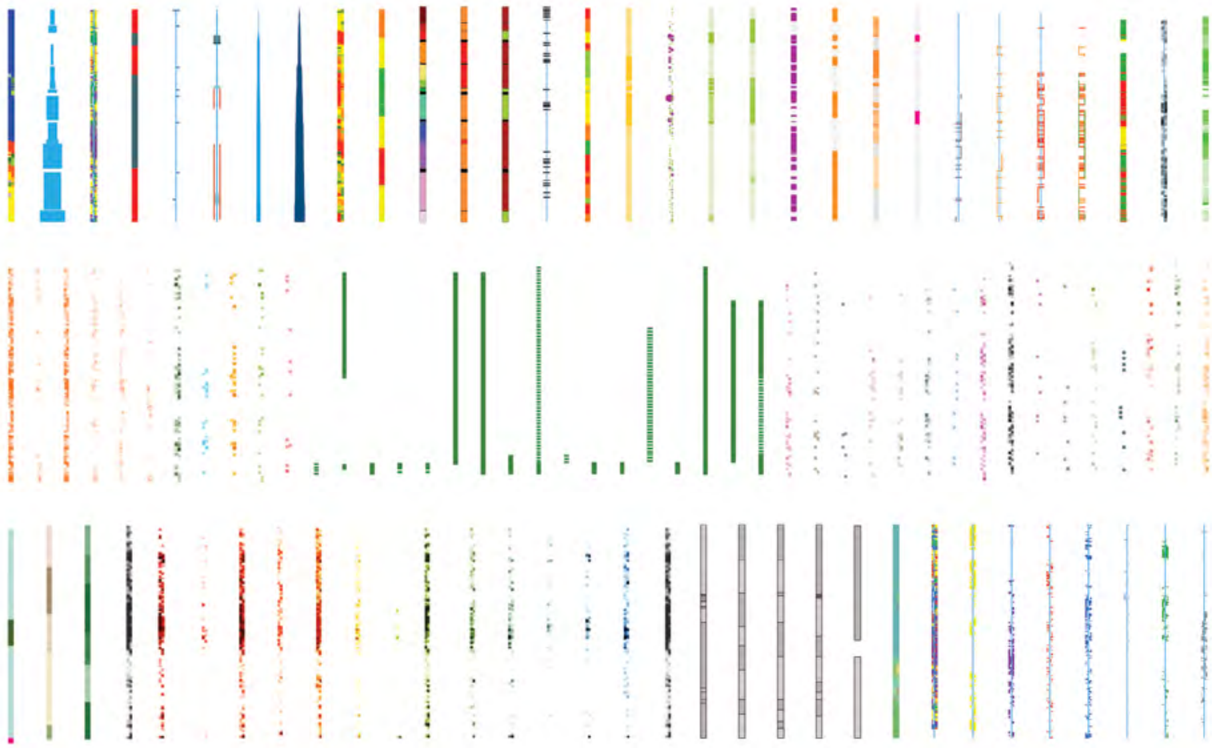


Figure 27. Over 200 river rulers were created from hundreds of datasets throughout the development of the Master Plan. The full set of river rulers is located in Appendix Volume II: Technical Backup Document.

DATA-BASED METHODOLOGY

The LA River Master Plan is based on the interpretation of a rich collection of data describing the physical, social, and cultural attributes of the LA River, its surroundings, its watershed, and LA County. This data-based methodology is designed to facilitate decision making, building a defensible basis for funding and policy.

Hundreds of datasets informed the LA River Master Plan. Several datasets were created for the first time during this planning process, such as a comprehensive mapping of the river right-of-way, a database of planned projects, an operations and maintenance assessment, a comprehensive 51-mile mapping of access points, and digitized versions of key historic maps. Additionally, the community engagement process (see Chapter 5) led to a wealth of new data generated from the people of LA County.

The datasets compiled for this update were mapped and illustrated using river rulers (See the Appendix Volume II: Technical Backup Document). The rulers illustrate complex information about communities, flood infrastructure, dry and wet weather flows, recreation, parks and open space, arts and culture, wildlife, ecological communities, water quality, and geophysical characteristics and relate the data to the river mile and the left

or right bank of the river. This representation facilitates the comparison of data across categories. The rulers are incredibly useful for representing complex, dense information and comparing data across communities with varied cultural and demographic fabrics along the river. When several rulers are aligned, a rich cross-section of data emerges, allowing comparison of factors that might not have previously been considered side by side and revealing physical patterns and thematic connections. This allows for cross-disciplinary communication between the typically engineering-based aspects of the river and the rich cultural and social fabrics, histories, and ecologies of the river (see Appendix II, Technical Volume for the full river ruler atlas compiling rulers from all of the LA River Master Plan analysis datasets).

Some datasets assembled for this Master Plan became critical to understanding community needs and were used in the needs mapping for specific goals (see Chapter 6).

Ultimately, the data-based methodology of the LA River Master Plan allows for a better understanding of the existing conditions of the LA River to inform the future of the reimagined river.

THE ABILITY TO INTEGRATE FUTURE DATA ALLOWS THE MASTER PLAN TO BECOME STRONGER AS NEW DATA BECOMES AVAILABLE

INTEGRATING FUTURE DATA

The data-based methodology of the Master Plan is specifically designed to be updated as new data becomes available in coming years. The standardized river ruler format allows new data to be easily compared with other data in river projects.

This adaptable methodology will allow the Master Plan to be valuable even as new research on climate change, LA County assets, and ecosystems becomes available in coming decades. The Master Plan goals, actions, and methods outline studies that should be undertaken, including asset mapping for arts and culture (Action 5.2), ecosystem (Action 3.2), updated hydrology modeling (Action 1.8), continued climate change research (Action 1.4). Also, studies currently underway, such as the LA River Environmental Flows Study, will provide additional data in coming years.

As quantitative and scientific datasets become more robust, this data should not negate LA River residents' lived experiences of displacement, pollution, racism, and other injustices. Even within large datasets there can be gaps of information. Qualitative narratives from LA River-adjacent communities will continue to be needed to contribute to filling these gaps of information.

ECOSYSTEMS

Data for ecosystems in LA County and along the LA River range in scale, extent, resolution, and time of study, but compiled together paint a picture of the region's unique biodiversity and the role the LA River can play in enhancing urban ecology. While some portions of the river have been studied in great detail, future data produced through a more comprehensive and consistent analysis of species diversity and habitat conditions along the full 51 miles of the river would provide a more detailed and updated picture of the river corridor's habitat areas than existing CALVEG landcover vegetation data. As data on existing habitats improves, tools and policies like the City of LA's Biodiversity Index and ecotype classifications can help further guide the effective management of the region's urban biodiversity. In addition to new data mapping and classifying habitat areas at finer resolution, critical linkages for habitat connectivity may also change as habitat areas expand and as new studies such as the National Parks Service's LA River Wildlife Camera Project reveal how wildlife use the LA River corridor for habitat and connectivity. Additionally, as the State Water Resources Control Board and the Regional Water Quality Control Board's LA River Environmental Flows Study advances, and dry season instream flow requirements are established, this data can feed back into the Master Plan database allowing project proponents to better understand available instream flows for project design.

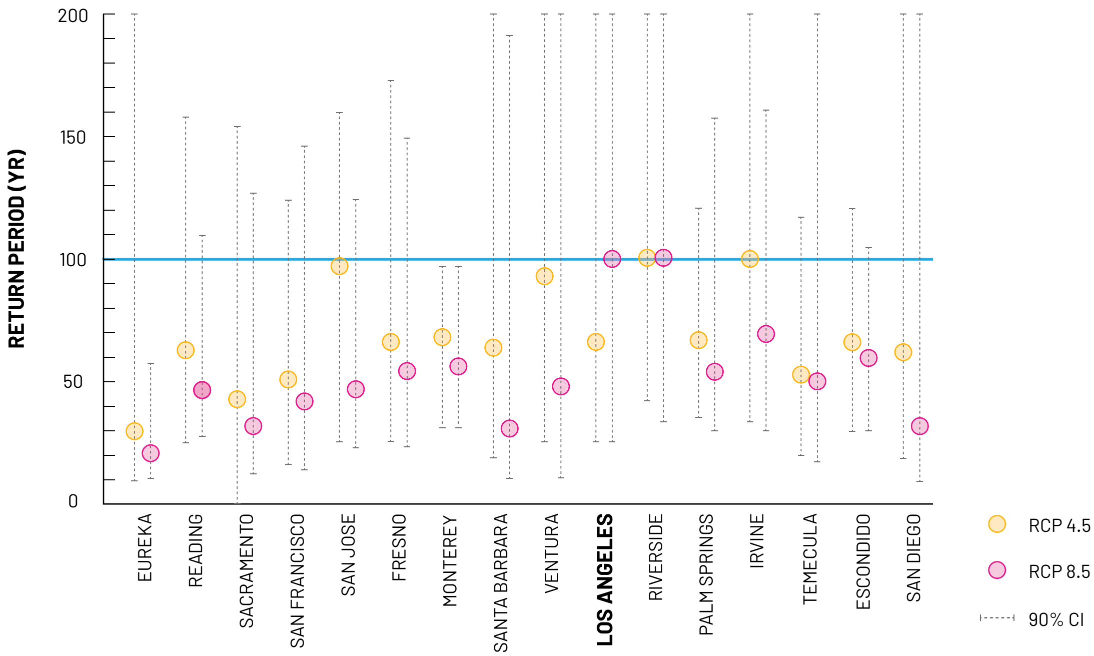


Figure 28. Projected future return periods for a current 1% (100-year) storm event for Representative Concentration Pathway (RCP) 4.5 ("Stabilization") and RCP8.5 ("Business-as-usual") scenarios across California. Most locations indicate that the current 1% (100-year) storm event will become more frequent (i.e., shorter return periods). Source: Modified from AghaKouchak, Amir, Elisa Ragno, Charlotte Love, and Hamed Moftakhari. (University of California, Irvine). 2018. Projected changes in California's precipitation intensity-duration-frequency curves. California's Fourth Climate Change Assessment, California Energy Commission. Publication Number: CCCA4-CEC-2018-005.

In addition to current ecological system data, researchers at the University of Southern California and the University of California Los Angeles are developing a historical ecology database, preliminarily referred to as HELAR (Historical Ecology of the LA River).[4]

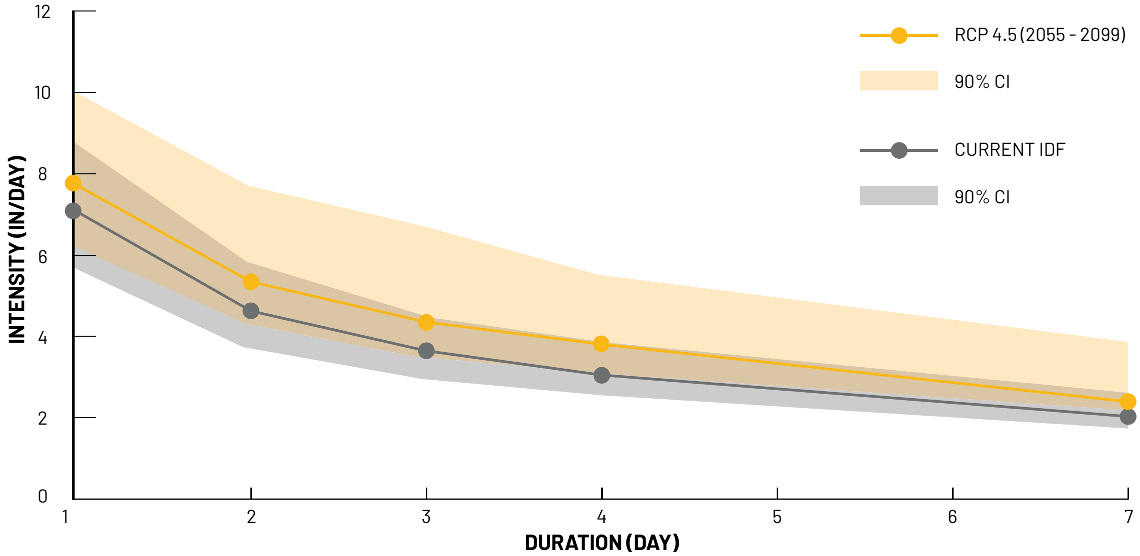
CLIMATE CHANGE

While climate change is projected to increase extreme heat events in the LA Region, there is greater uncertainty around how future climate conditions may increase or decrease the region's annual precipitation. However, it is generally accepted that warmer temperatures will result in more moisture in the air and lead to more intense storms. Some climate change projections indicate a "threefold increase in sub-seasonal (extreme precipitation) events comparable to California's Great Flood of 1862" by 2100.[5] Other research indicates under certain emission scenarios that the 1% storm event (i.e., 100-year storm) 24-hour rainfall total in LA may increase by approximately 20%, and the 1% storm event of today will become the 1.5% (i.e., 67-year storm) event in the future.[6]

As research continues, new and improved climate projections should be used to update the Master Plan. In addition to climate change research being led by LA County Public Works in coordination with academic institutions, the LA County Sustainability Plan, "Our County," will be working to develop vulnerability data for LA County. The work of the LA River Master Plan and the Sustainability Plan should continue to be coordinated as both plans are implemented.

GLOBAL MODELS

Agencies around the world contribute to climate change modeling. For example, since 1995, the World Climate Research Programme's (WCRP) Coupled Model Intercomparison Project (CMIP)[7] has utilized a set of widely referenced collaborative climate models to anticipate climate change under assumed different greenhouse gas emission scenarios. The CMIP has undergone several iterations and is now on its sixth phase. Accuracy increases as each iteration draws on new technological and computational advances.



RCP = Representative Concentration Pathways IDF = Intensity-Duration-Frequency CI = Confidence Interval
RCP4.5 = Greenhouse gas concentration continue upward until about mid-2040s and then plateau

Figure 29. This graph shows the comparison between current 1% (100-year) precipitation intensity-duration-frequency (IDF) curve and projected IDF for RCP 4.5 scenario in LA. Projections indicate larger storm events are likely in the future. Fro example, the 1-day (24 hour) storm total may increase from 7 inches to almost 8 inches. Source: Modified from AghaKouchak, Amir, Elisa Ragno, Charlotte Love, and Hamed Moftakhari. (University of California, Irvine). 2018. Projected changes in California's precipitation intensity-duration-frequency curves. California's Fourth Climate Change Assessment, California Energy Commission. Publication Number: CCCA4-CEC-2018-005.

LOCAL EFFECTS

Results of global climate change models must be downscaled to adequately address localized effects. In Southern California, diverse topography and small-scale climate variations can make storm conditions difficult to capture accurately in global climate models[8]. Additionally, it is important to develop an understanding of certain phenomena, like atmospheric rivers, that have been responsible for many extreme historical flooding events in California. These long bands of water vapor originating over the Pacific Ocean are predicted to increase in strength as warming continues. Increased temperatures are known to lead to increased moisture retention and ultimately to increased rainfall intensity.

IT IS IMPERATIVE THAT THE HYDROLOGY BE UPDATED SO THAT PROJECT INVESTMENT DECISIONS ARE INFORMED BY THE MOST RECENT FLOOD FREQUENCY INFORMATION

UPDATED HYDROLOGIC MODELING

A key factor in managing flood risk along the LA River is having an accurate understanding of the hydrology. The hydrology of the LA River statistically evaluates how much rainfall runoff from various sized storm events (i.e., 50% through 0.2% storm events) will flow into and along the LA River. The Master Plan is based on the best available hydrologic study of the entire LA River watershed, much of which was developed nearly 30 years ago by the US Army Corps of Engineers.[9]

Since then, there are 30 years of additional rainfall data to base statistical hydrologic analyses on, in addition to improved modeling capabilities. With the strategic directions in mind, to advance projects that meet the Master Plan goals, it is imperative that the hydrology be updated in the near future so that project investment decisions are informed by and incorporate the most recent flood frequency information.

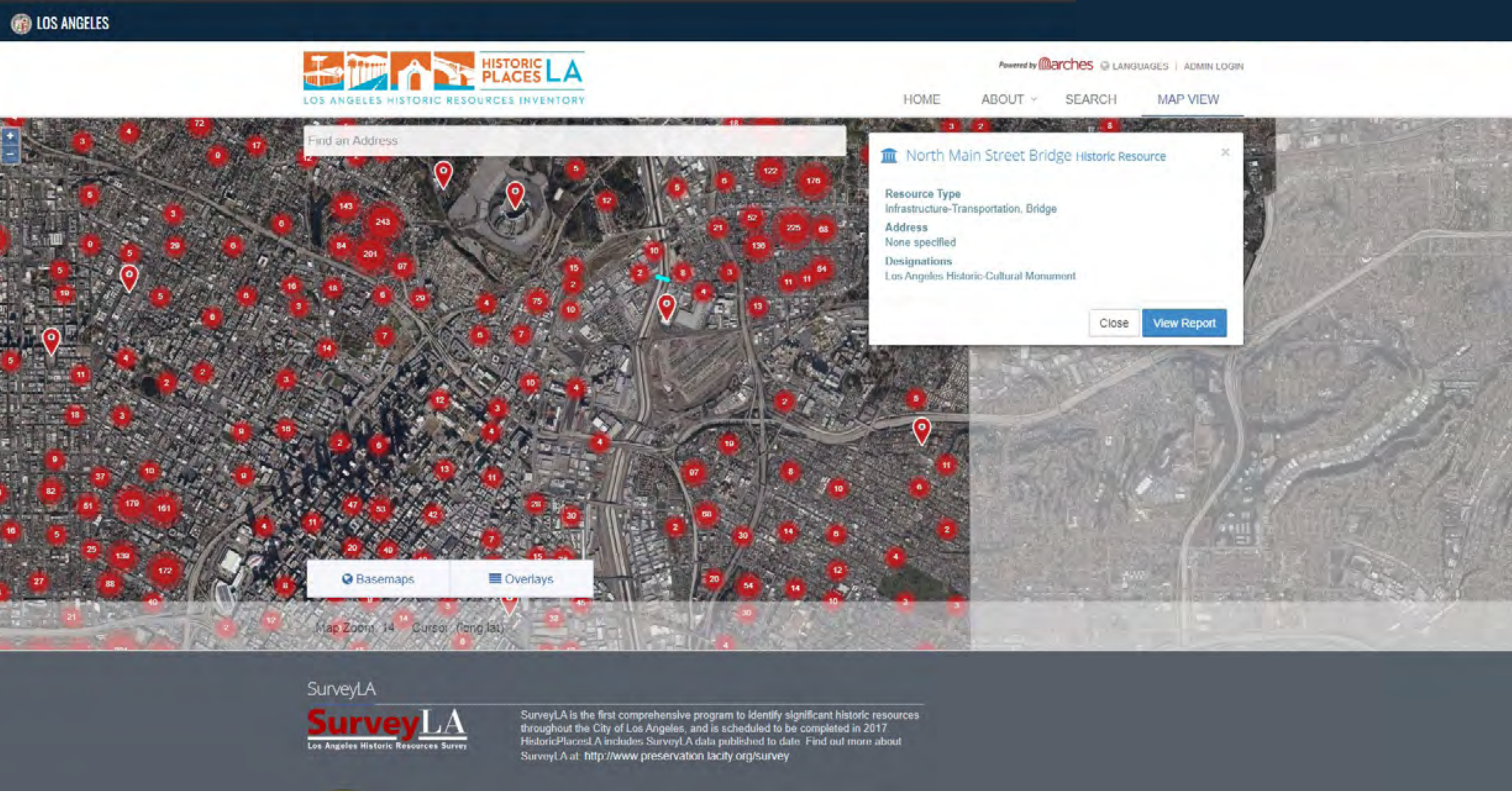


Figure 30. SurveyLA is the first comprehensive program created to identify significant historic resources throughout the City of LA.
Source: SurveyLA, http://historicplacesla.org/map, 2020.

ARTS AND CULTURE ASSETS

The existing datasets for arts and culture include features such as major art institutions and standard community facilities, but are far from capturing the full breadth of community assets the LA River has to offer and the rich cultural heritage of the LA River. In order to realize a 51-mile arts and culture corridor for the LA River and to understand where gaps in these assets are, a methodology should be developed for the inclusive mapping of arts and culture in neighborhoods adjacent to the river. This methodology should be participatory and include informal and improvisational community spaces and groups, as well as temporary art installations and recurring community events and festivals. Mapped assets should also include places, people, and events that convey the cultural heritage of riverside communities. An example of comprehensive field mapping is the City of LA Department of Planning's SurveyLA Program, which was completed from 2010 to 2017 and identified historic resources for each community plan area of the city.[10]

The LA County Department of Arts and Culture, along with LA River artists and arts organizations, local Indigenous Peoples culture bearers, and other community partners, will be undertaking the creation of the mapping methodology and the reporting of the asset data itself. Given the dynamic nature of arts and culture, this mapping would ideally live in an online platform and include self-reported vetted data that would capture the most current state of community assets. When executed, this more thorough data on arts and culture could be used to update the Master Plan, better identify neighborhoods along the LA River with the greatest need for arts and culture spaces and programming, and ensure social and cultural preservation of sites and stories of historical significance. As development and construction takes place along the river, cultural historic resources need to be safeguarded. Mapping these sites is an important way to ensure the historic and social fabric is not lost or if it is threatened, mitigation is provided.

Figure 31. Looking south (downstream) over the LA River channel from the Union Pacific Railroad Bridge just north of the confluence with the Rio Hondo tributary at river mile 12.6. Source: OLIN, 2019.

SECTION II: **CONTEXT**

HISTORICAL FLOODING AND RIVER PATHS

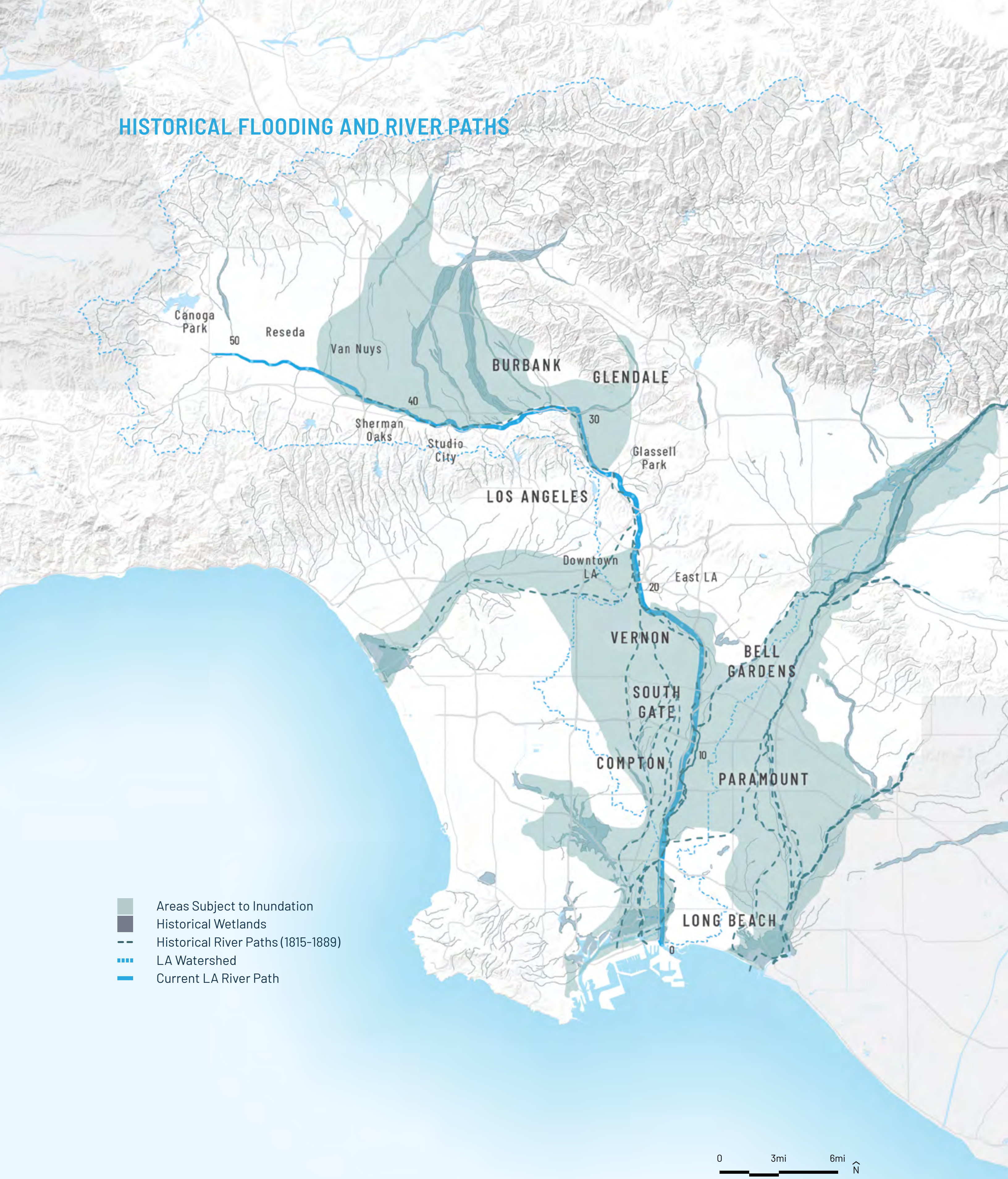


Figure 32. Historical Flooding and River Paths. Before channelization the LA River Basin was a dynamic system of floodplains and wetlands and the LA River would often shift around after major flooding events. Source: Geosyntec, OLIN, 2018. Based on Blake Gumprecht, *The Los Angeles River: Its Life, Death, and Possible Rebirth*, 2001; California State University, Northridge Environmental Geography Lab, Historical Ecology, 2008; Charles Rairdan, "Regional Restoration Goals for Wetland Resources in Greater Los Angeles Drainage Area," 1998.

DRAFT

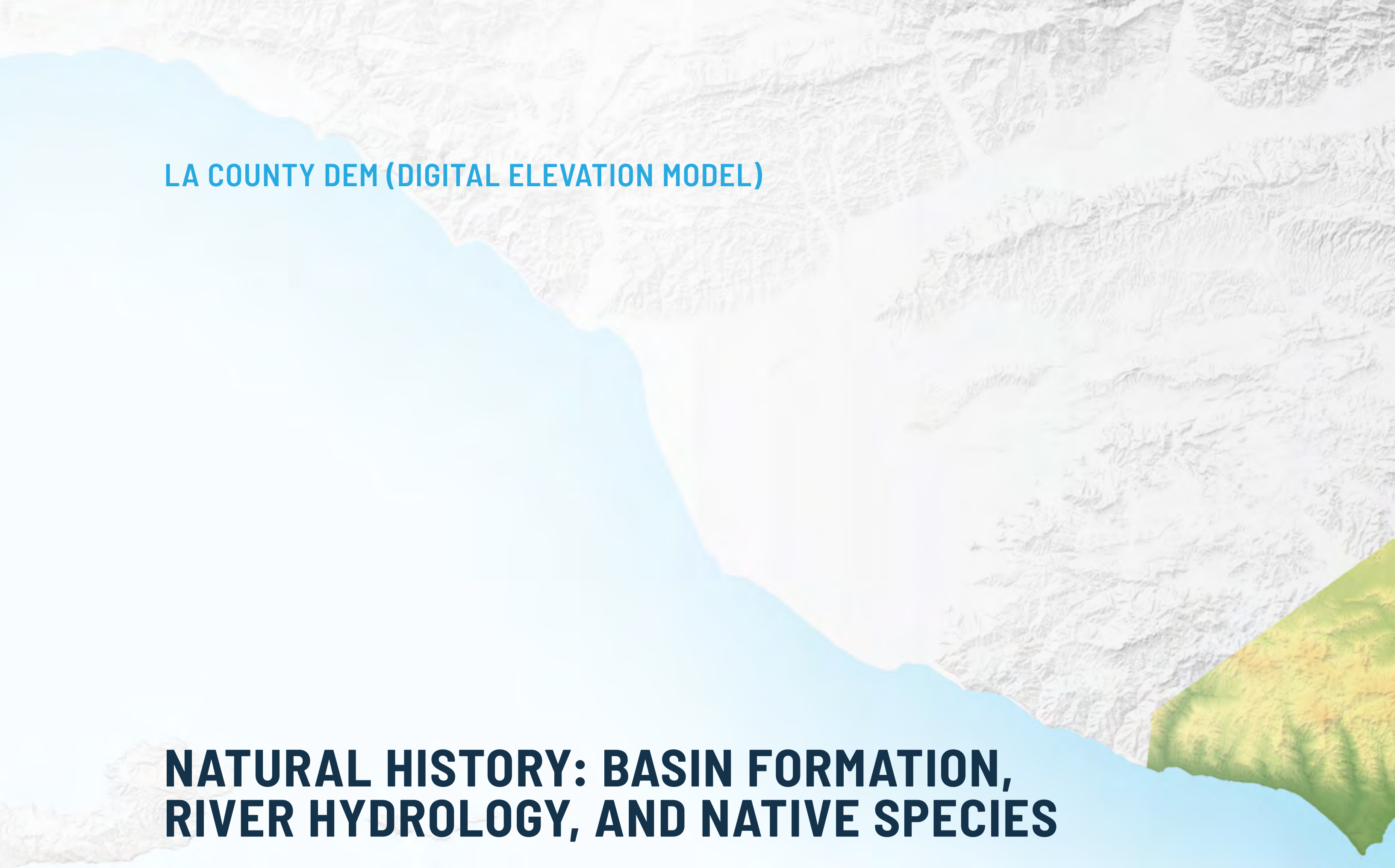
3.
HISTORY OF THE RIVER

MULTIPLE CULTURAL AND HYDROLOGICAL NARRATIVES

Many histories of the LA River focus on two central narratives: the devastating floods of the 1930s, and the rapid development in the first half of the 20th century that led the United States Army Corps of Engineers and the LA County Flood Control District to channelize and line LA's main inland waterway. Though the latter was an effort to protect people and property from flooding, the cultural and social narratives of those whose lives have been impacted by the river have not been consistently woven into the river's infrastructural history. River-related projects and planning have suffered as a result, tending to perpetuate the river solely as single-benefit infrastructure instead of exploring how it might evolve—operationally as well as culturally—if it were better integrated with the communities along its banks. Indeed, cultural histories, such as those of the First Peoples who learned to live in harmony with a sometimes dry and sometimes flooded river, are integral to the story of the LA River and the LA River Master Plan.

Conceiving a more holistic and environmentally just future along the reimagined river begins by looking back. This historical overview is intended to summarize key events that have directly informed the planning and development of the LA River as it is understood today. It is not comprehensive; instead, it identifies significant transformations in the relationships between water, people, and the environment along the LA River and within the LA basin more broadly, from 10 million years ago to the present.

LA COUNTY DEM (DIGITAL ELEVATION MODEL)



NATURAL HISTORY: BASIN FORMATION, RIVER HYDROLOGY, AND NATIVE SPECIES

Written histories of the LA River typically begin when the LA basin was still an ocean, up to 10 million years ago. With seismic uplift, the ocean receded, leaving the Santa Susana, Santa Monica, and San Gabriel mountain ranges in its place. The LA River traversed the lowest passages. In the following millennia, the continued erosion of soils from these mountains created massive alluvial plains, into which vast quantities of snowmelt and runoff from the mountains were stored, creating the groundwater basins that would become an essential resource of future ecosystems and human societies.[11] The steep mountains surrounding the LA River create a very "flashy" river system, meaning that as precipitation falls, the amount of water in streams and channels swells far beyond the amount of water in dry conditions. These streams and channels bring water to the LA River, which drops almost 800 feet in elevation over its 51-mile course. Although the LA River today looks very different than it did prior to development, the tendency for flash flooding always existed due to these geophysical characteristics.

In the earliest accounts, the river flowed above ground—either through the Elysian Valley, where shallow bedrock forced groundwater toward the surface, providing a year-round base flow, or in other locations that, during rains, fed a continuous flow draining into the ocean. Where bedrock lay much deeper and soils were most conducive to drainage, such as the rockier, more porous soils that erode from the San Gabriel Mountains, above-ground flow was more ephemeral. Below the surface, the river guided runoff from the mountains to the basin, where the water then percolated into aquifers. When they did appear, visible channels in these areas were often shallow and poorly defined; only during extreme rain events would streams materialize above saturated topsoils.[12] Periodically, massive floods converted the wide, flat floodplains of the lower LA River into raging torrents.[13] The 1916 soil map of LA County shows floodplain soils across a vast territory of the Los Angeles plain, indicating the extent of this flooding historically, even before the urban sprawl of the 20th century.[14]

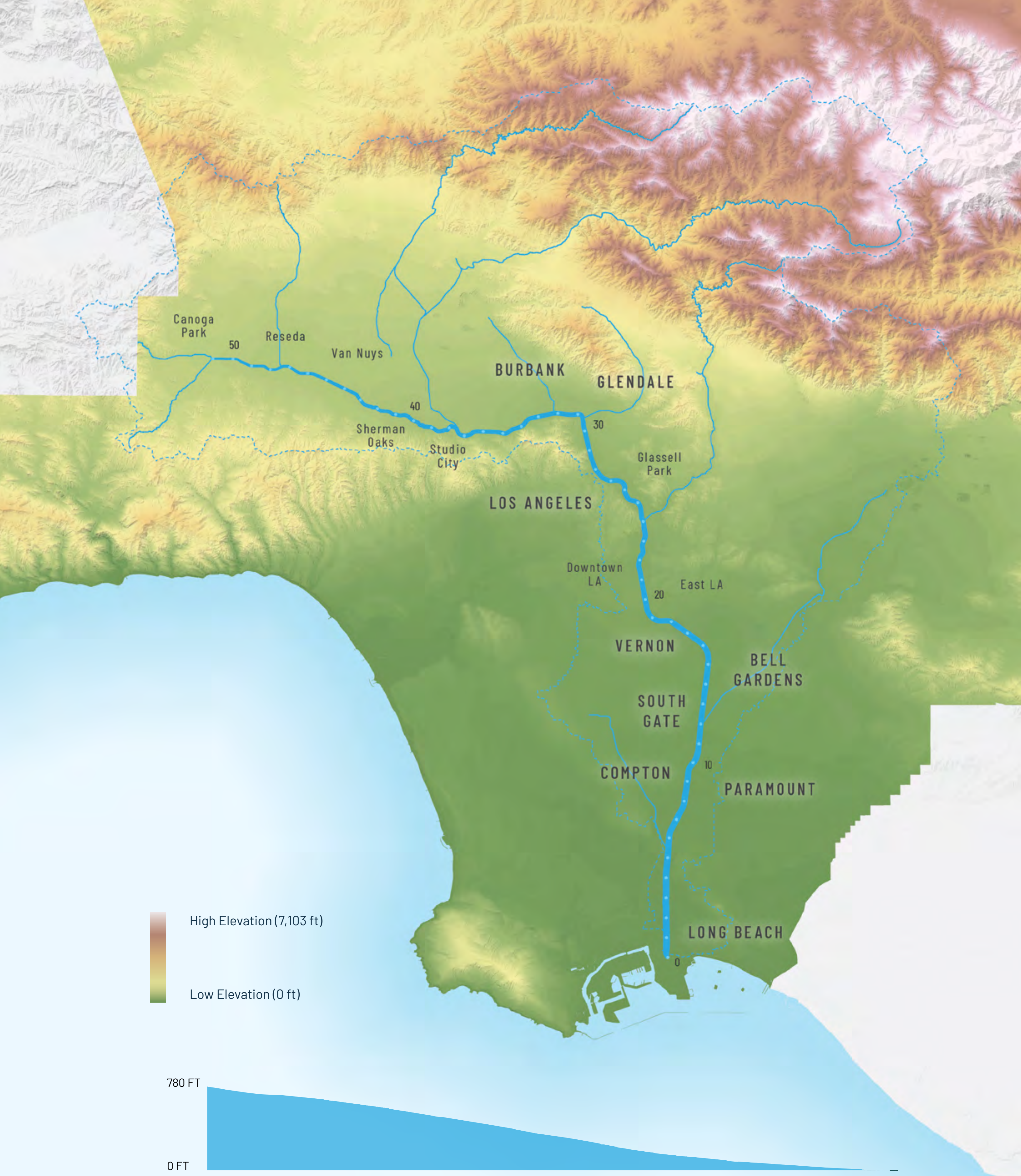


Figure 33. LA County DEM (Digital Elevation Model). The LA River drops 780 feet in just 51 miles. Source: U.S. Geological Survey, 2013, USGS NED 1 arc-second 2013.

LA COUNTY BASE GEOLOGY

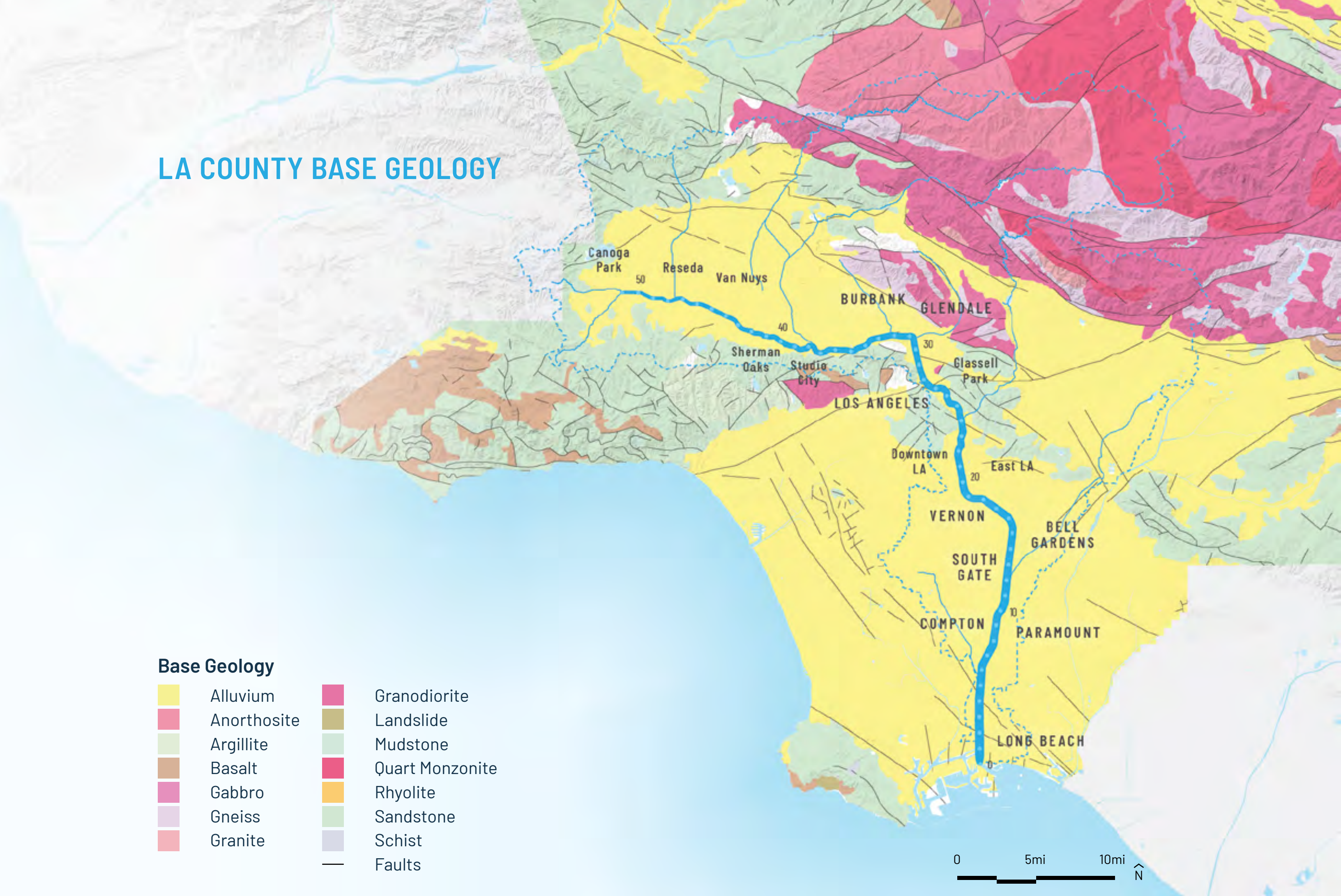


Figure 34. LA County Base Geology. The LA River geology is alluvium and can be over 20,000 feet deep in places. Source: California Geologic Map Data, USGS, 2005.

The river system frequently migrated. Some years, south of present-day Downtown LA, the main channel headed west and entered Santa Monica Bay through what is now Ballona Creek. Other years, the river stretched towards the ocean between present-day Downtown LA and Long Beach as a broad floodplain of intermittent streams, with dense trees and wetlands.[15] Early Spanish settlers noted that it could be difficult to discern the location of the mouth of the river. In this area, the river was “a small gentle stream flowing through a broad, sandy bed most of the year and a large, turbulent, unpredictable river for a few days every winter.”[16] The general course of the LA River as it is known today, starting in the San Fernando Valley and discharging into the Pacific Ocean at Long Beach, emerged in 1825 when a massive flood cut a channel across the existing plain of wetlands and forests.[17]

Before development, the LA basin was likely characterized by a mix of coastal sage scrub, valley grasslands, swaths of Southern California oak, and seasonal wetlands.[18] These habitats hosted abundant wildlife such as deer, antelope, coyotes, gray foxes, mountain lions, grizzly bears, steelhead, countless birds and rodents, turtles, gophers, badgers, shrews, moles, cuckoos, owls, vireos, woodpeckers, and Pacific Lamprey.[19] To better understand the historical ecology of the LA basin,studies are now underway at the University of Southern California and other institutions, where researchers are assembling a more holistic interpretation of written diaries, images, and other early narratives that describe the native plant communities, wetlands, and riparian areas of the river. Similar studies have been completed for adjacent watersheds such as Ballona Creek and the San Gabriel River.[20 21]

Historical Vegetation

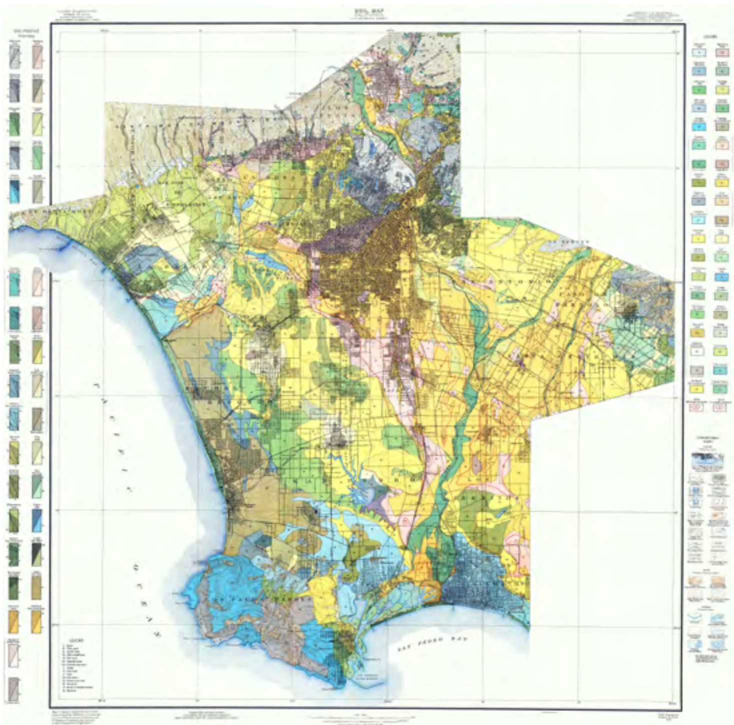
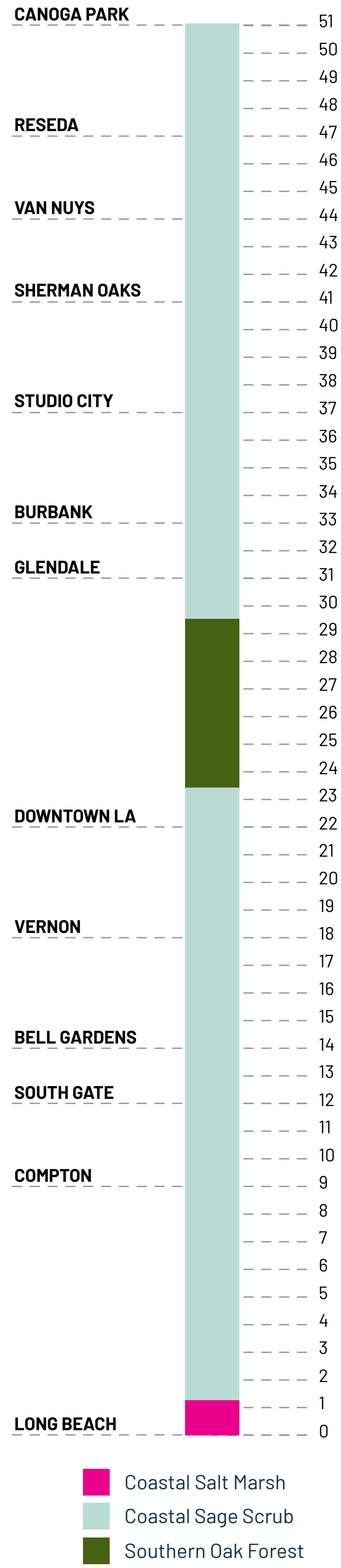


Figure 35. **(Above) The prevalence of particular Chino, Hanford, Oakley, and Tujunga soils in this 1916 United States Geological Survey map indicate the historical breadth of the LA River's floodplain.** Source: USDA.

Figure 36. **(Right) Historical Vegetation. Though historical ecological maps are laking, plant communities along the LA River corridor likely included Southern coast live oak riparian forest, Coast live oak woodland, Southern cottonwood-willow riparian forest, Perennial freshwater emergent wetland, California walnut woodland, Valley oak woodland, Southern sycamore riparian woodland and Alluvial fan sage scrub though not mapped in detail historically, were likely common plant communities found along the LA River corridor.** Source: OLIN, 2019. Based on Kuchler, Natural Vegetation of California, 1977.



INDIGENOUS TRIBES, SITES, AND VILLAGES ALONG THE LA RIVER

Figure 37. Indigenous Tribes, Sites, and Villages Along the LA River. There were once dozens of multi-ethnic indigenous villages along the LA River. Source: Fernandeño Tataviam Band of Mission Indians, LA County Villages map, 2015.

FIRST PEOPLES UNTIL THE ARRIVAL OF THE SPANISH

A growing body of data obtained from archaeological research indicates that a fully "maritime-adapted, seafaring culture existed in Southern California at least ten thousand years ago". During a period between approximately 2,000 B.C.E. and 700 C.E., the Uto-Aztecan (formerly known as Shoshonean) peoples entered the LA basin, either absorbing or displacing the previous Hokan-speaking peoples. These peoples lived in the LA basin through the arrival of the first European explorers in the mid-1500s and the settlement of the first Spanish colonies in 1769.[22]

The Uto-Aztecans lived in many different villages, from which multiple distinct nations, lineages, dialects, and identities emerged. Among others, these included the Ventureño Chumash, Fernandeño Tataviam, and Gabrielino Tongva, who lived and continue to live in close relationship with the land and its natural processes. The presence of nomadic communities—and eventually more permanent villages—ebbed and flowed with the basin's environmental conditions. Although each village operated as its own tribe with distinct leadership and governance, complex intermarriage practices nurtured a tight kinship between villages.[23]

By 1500, dozens of tribal villages had become established in the area of present-day LA County.[24] They were often positioned near streams and springs, as wetlands served as an important resource for the plants and animals that provided subsistence and raw materials.[25] Willow bark, cottonwood bark, and yucca were used to fashion clothing. Baskets,a celebrated artistic legacy of the Ventureño

Chumash, Fernandeño Tataviam, and Gabrielino Tongva,[26] were woven from rushes, grasses, and squawbush.[27] The attunement to and reciprocity with the land that underpinned all of these communities has been carried forward today in place names, as the modern words for certain cities, neighborhoods, and waterways are derived from Indigenous ones that themselves often refer to landmarks or important natural features. One example is "Pakoinga", a Fernandeño village meaning the place of "the entrance," which is now known as Pacoima.[28] The Tataviam referred to the LA River as "Wanüt" or "Orít." For the Tongva, the river was known as "Paayme Paxaayt," meaning "west river".[29] The living descendants of the Indigenous Peoples of LA County continue to express a close relationship with the land through contemporary cultural, spiritual, and medicinal practices, as well as through climate activism.

Figure 38. An elderly Gabrielino (Tongva) woman works dough on a tone metate (1840). Source: Southwest Museum.

Many of the Indigenous communities were brought into and enslaved at the missions that the Spanish settlers established in California throughout the 18th century to promote Catholicism and loyalty to Spain and thus help fortify the Spanish claim to California.[30] They adopted new tribal names based on the missions into which they were absorbed. Those at the Mission San Gabriel became the Gabrielino, whereas those living in the region surrounding the Mission San Fernando became the Fernandeño. Many descendants of the Gabrielinos now identify as Tongva, a traditional name that speculatively refers to a village in the San Gabriel Mission area. A coalition of the Fernandeño refers to their traditional name, Tataviam, but operate along their traditional village system identification.[31]

Over generations, the Gabrielino lineages split and reorganized when a population became too large for the surrounding territory to support them, or when resources became limited due to environmental change.[32] When groups departed, some changed their speech and customs, becoming distinct nations upon their newly inhabited land. Language itself was an important indicator of lineage and identity, though linguistic differences among lineages also fostered harmony. Each dialect possessed only a portion of the components for rituals and ceremonies, which meant two or more lineages needed to come together to perform them successfully.[33]

Separately, the Fernandeño coalition exercised power over territory, self-government, a judicial system, and upheld a network of social, economic, and political ties to other lineages over an extensive area. Traditionally, there was no collective tribal entity above the lineage. Before the founding of Mission San Fernando, autonomous and self-governing lineages lived within independent villages, held their own territory, and maintained political and economic sovereignty over their local areas. They remained linked to neighboring lineages through social exchange. The lineage system continued as the major form of social and political organization through the Spanish Period and is the primary form of indigenous organization among the present-day Fernandeños. Today, the Fernandeño lineage coalition is known as Fernandeño Tataviam Band of Mission Indians (FTBMI).

Figure 39. The Mission San Gabriel is one of many missions whose founding by Spanish priests went hand-in-hand with the displacement of Indigenous Peoples from their villages and their forced conversion to Catholicism. Source: Beinecke Rare Book & Manuscript Library, Yale University. "Mission San Gabriel". A photochrom postcard published by the Detroit Photographic Company, 1899.

SPANISH COLONIZATION, MEXICAN CALIFORNIA, AND CALIFORNIA STATEHOOD (1850)

Between 1769 and 1850, the year the United States seized control of California, the landscape and inhabitants of the LA basin changed more than within the prior thousand years.

The arrival of the Spanish into the LA basin began as sporadic expeditions in the 16th and 17th centuries and culminated in 1769 with the official colonization of the "Alta California" territory through the establishment of three types of settlement: Catholic missions of the Franciscan order; military presidios and outposts; and the Pueblo de Los Ángeles, a civilian center founded in 1781 at the confluence of the LA River and Arroyo Seco. Together, these institutions colonized land and people under the Spanish Crown. Missions, though religious institutions, aimed to provide food and serve as economic hubs within this landscape. The first mission established in the LA County area was the Mission San Gabriel in 1771, followed by the Mission San Fernando in 1797.

Spanish colonization and the Mexican regime that followed (1821-1846) catalyzed a period of unprecedented regional transformation characterized by the enslavement and displacement of Indigenous Peoples and alteration of the natural ecosystems and habitat. The missions, for example, orchestrated the construction of a network of ditches through Indigenous and Mexican labor beginning in 1781. Referred to as "zanjas", these notably affected the quantity of flow within the LA River and its floodplain as they channeled water from the river to the growing pueblo and its agricultural fields.[34] Initially the zanjas diverted water where surface flow was present, but in the following decades water was channeled from the underlying soils. During this time, the LA River basin was the sole water supply source for the settlement; the river and zanjas existed as a collective resource.

When Mexico gained independence from Spain and, in 1822, assumed jurisdiction of what is now Los Angeles, changes to legislative systems and social structures were matched by additional changes in land use. Mexican governors began secularizing the Spanish missions starting in 1833 and redistributed mission lands to prominent families and individuals through land grants. The emergent rancho system enabled the rise of a gentry class of landowners, rancheros, that included European immigrants as well as Californios, or individuals of Mexican or Spanish descent who had been born in Alta California. Land development patterns and place names in today's Los Angeles indicate the deep legacy of the rancho system; some of the most notable ranchos, for instance, include Los Feliz, Los Cerritos, Los Encinos, Cahuenga, and Dominguez. Several of the ranchos helped establish Mexican families whose names, like Jose Dolores Sepulveda of Rancho San Pedro, also resonate today. Through land grants, the government required that ranchos be used toward agricultural purposes, and ranching became a widespread practice where lands were conducive to grazing. The labor was often carried out by Indigenous Peoples who operated as vaqueros herding cattle. Despite having been freed from the mission system, they continued to exist in a system of servitude; a landscape transformed by agriculture and development, together with the threat of disease, had diminished their populations and means of sustenance, leaving them with few pathways for survival.

By 1836, the pueblo government also began enacting measures to control the quantity and quality of waters carried by the rapidly growing zanja system, restricting the use of zanjas for bathing and washing clothes. Under US rule, which began in 1850, strict fines were imposed for improper use of the zanja waters. These proved ineffective, and soon sources of trash and sewage began discharging into the zanjas. More affluent residents began to purchase their water and have it sourced directly from the LA River instead of from the increasingly polluted ditches.[35] The water of the LA River, thus, became increasingly privatized, available only to those who could afford it.

Indigenous Peoples have endured an ongoing fight for access and title to their lands and water. In 1842, 41 Fernandeño leaders organized an election of native Joachim as the First Alcalde[36] and petitioned the Mexican Governor for land. Importantly, the Fernandeño petitioners of 1843 were not a collective political entity with a name, but rather headpersons that represented separate lineages of the FTBMI. The 41 Fernandeño petitioners together received a square league of land, while three natives received land at Rancho El Encino, three natives received land at Rancho Escorpion, and one native received land at Rancho Cahuenga The separate land grants of Rancho El Encino, Rancho Escorpion, and Rancho Cahuenga were all occupied by Fernandeño lineages and were incredibly valuable due to their natural water supplies and ties to the "orit", or LA River. The three Fernandeño villages that these Ranchos occupied that are linked directly to the LA River are Jucjauyanga (Chatsworth), Suitcanga (Encino), and Kawenga (Burbank).

While the Supreme Court upheld the land grant of Rancho El Encino (Siutcanga),[37] the local state courts ruled against Fernandeño claims to the land, which made it impossible for the San Fernando Mission Indian defendants to affirm rights to land that would have formed the foundation for a reservation. "As a result of the mass dispossession of lands, Indigenous Peoples lacked access to water, including the LA River. Without water access, it became increasingly difficult to gather necessary plants to make significant items, such as regalia, thereby negatively impacting the ability to hold ceremony, facilitate healing, and continue spiritual practices. The lack of access to the LA River, and the contamination to waterways, continues today," says Pamela Villasenor, Tribal Citizen of the FTBMI.

HISTORICAL FLASH RAIN AND FLOOD EVENTS

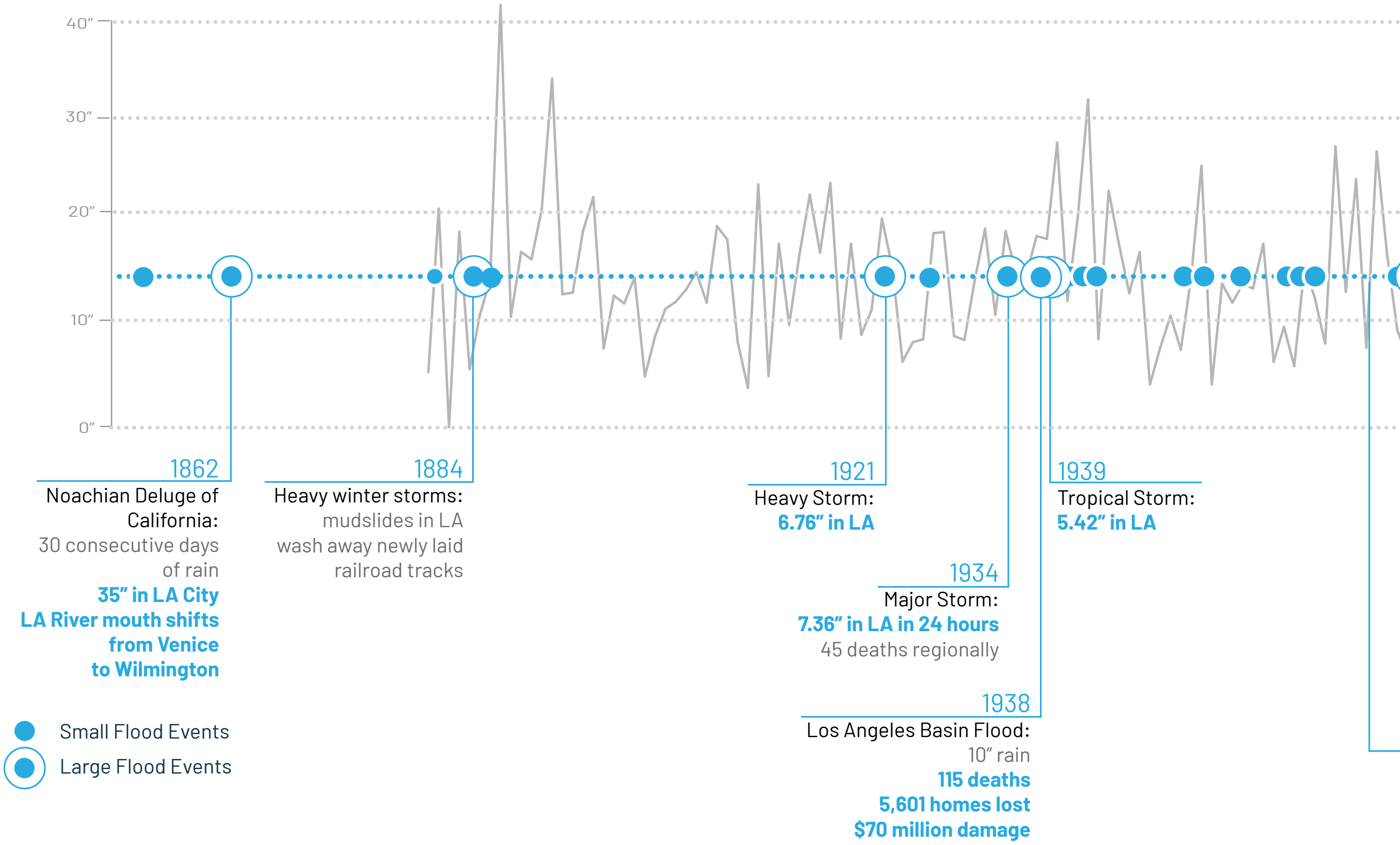
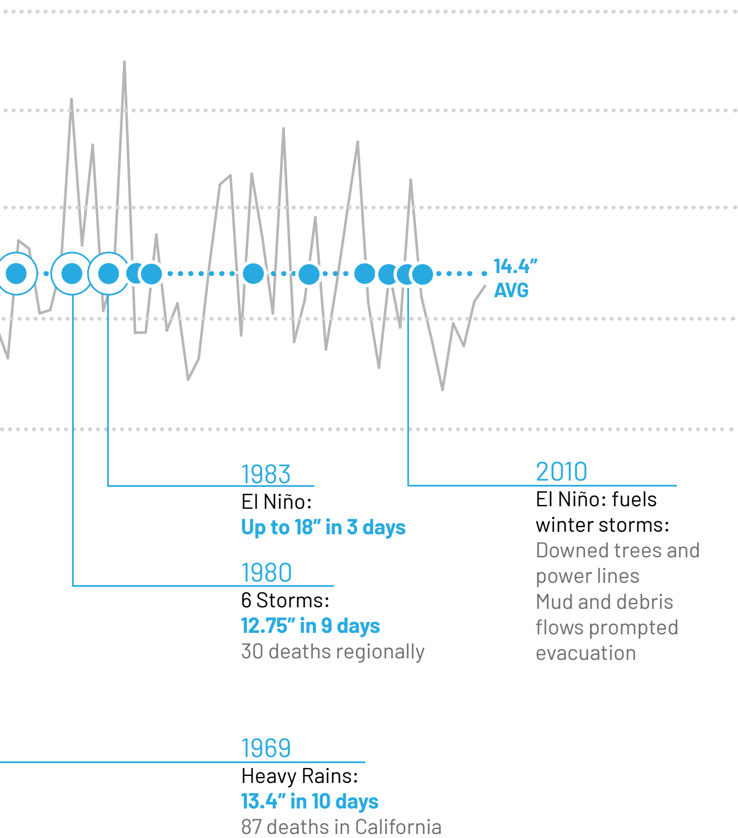


Figure 40. **Timeline of selected historical major rainfall and flood events in LA and California.**

INDUSTRIAL REVOLUTION AND RAPID POPULATION EXPANSION UNTIL 1938

In 1850, the United States took control of California. Prior to that, descriptions of the river's behavior, particularly its flooding patterns, existed primarily as "local lore". When the publication of LA's first newspaper La Estrella (The Star) began in 1851, however, it infused the historical record with detail.[38] Written accounts from the last half of the 19th century show that LA County experienced floods that overtopped the banks of rivers and streams once every 4.5 years, with the LA River itself flooding 11 times.[39]

The damage caused by flooding progressively increased as real estate speculators such as the LA Suburban Homes Company subdivided agricultural lands near the river for urban development. Industrial development also introduced new challenges to flood risk management. Flood damages intensified, for example, when the Southern Pacific Railroad (Transcontinental) connected to the City of LA in 1876. The tracks ran adjacent to, and sometimes bridged over, the river, constricting flows. The construction of ports near the river's outflow into the Pacific Ocean in the early decades of the 20th century established the LA River as an armature for goods movement infrastructure including additional rail lines and eventually highways.



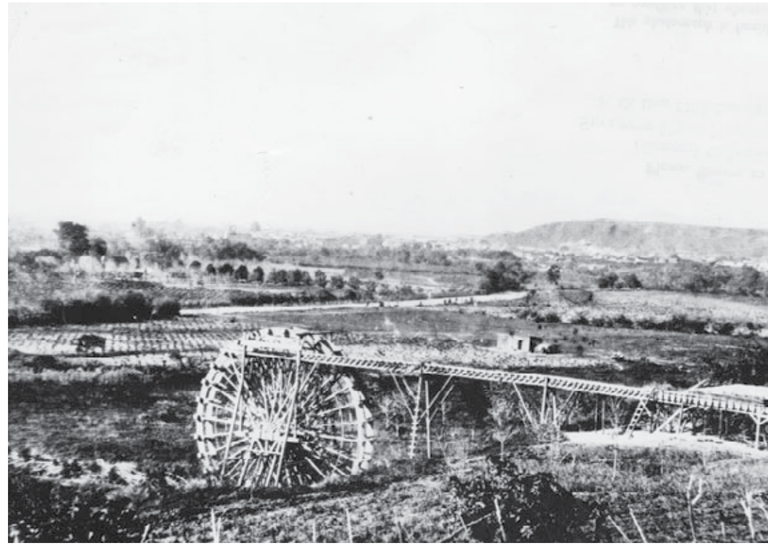
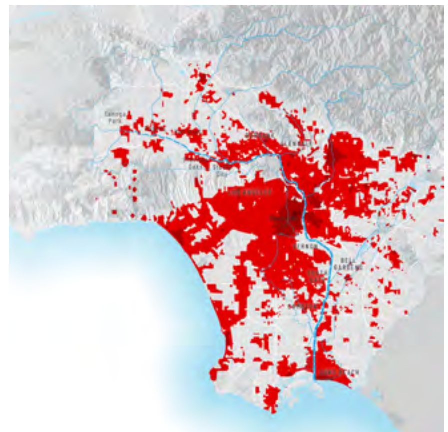


Figure 41. (Top) The LA water wheel lifted water from Zanja Madre to a brick reservoir, built in 1858. Source: LA Public Library.

Figure 42. (Middle) Pigeons from a pigeon ranch congregate along the bank of the LA River in Glassell Park, c. 1900. Source: University of Southern California. Libraries & California Historical Society. Pigeons in the Los Angeles River on a pigeon ranch, ca.1900.

Figure 43. (Bottom) Some irrigation ditches (zanjas) remained in use until 1900. Source: University of Southern California. Libraries & California Historical Society. Man standing near a water ditch at the bank of Los Angeles River, north side of Griffith Park, ca.1900.

1877 | 1907 | 1937



The population and development boom catalyzed by the introduction of the railroad in LA County also hindered any efforts to stabilize the use of water from the LA River. By this point, the LA City Water Company (later to become LA Department of Water and Power) had developed strategies to tap the river during dry weather, harvesting water before it could reach the surface (except in the Glendale Narrows, where water continued to be tapped above ground). Between 1870 and 1880, the population of LA County nearly doubled. It then tripled between 1880-1890.[40] The continued urban development within the floodplain of the river, with both farms and industry drawing water, ensured that segments of the river became so dry that they could serve as reliable sources of sand and gravel for construction crews. Devoid of visible flowing water, the LA River became the city's dump.

But water still arrived in the channel from time to time, especially when it rained. Occasional large floods significantly damaged new development within the river's natural floodplain. In 1914, a massive flood prompted LA County to create an official flood control program, which became the LA County Flood Control District (LACFCD) in 1915. The LACFCD proceeded with a variety of engineering projects to provide permanent pathways for runoff, slow flow, and collect and filter out debris, eventually aspiring toward a regional plan to address both flood management and water conservation. In March 1938, however, the largest and most damaging flood experienced by modern LA to-date propelled the US Army Corps of Engineers to channelize and concretize the LA River.

1950 1970 2010

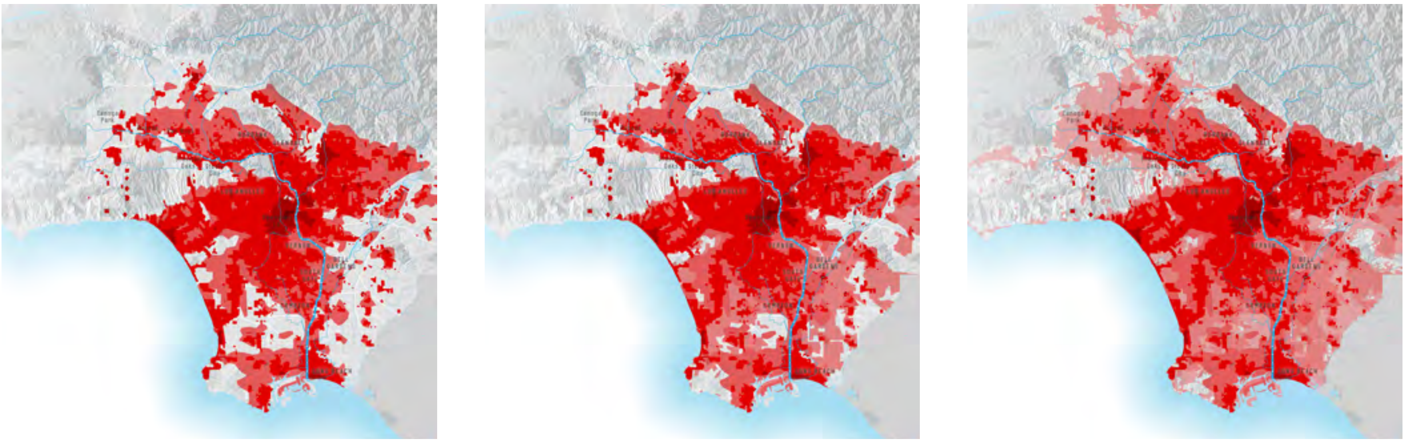


Figure 44. Urbanization Patterns in LA County from 1877 to 2010. While the Lincoln Institute of Land Policy's Atlas of Urban Expansion identifies areas that are currently urbanized based on urban land cover (impervious surface), density, fragmentation, and compactness, the historical mapping represented here is a composite of digitized and georeferenced maps of the built-up areas as depicted at the time of mapping. Source: Angel, S., J. Parent, D. L. Civco and A. M. Blei, 2010. Atlas of Urban Expansion, Cambridge MA: Lincoln Institute of Land Policy.

THE 1938 FLOOD WAS LA COUNTY'S LARGEST AND MOST DAMAGING FLOOD EXPERIENCED TO-DATE

Figure 45. **(Left) This aerial view of the 1938 flood from above Victory Blvd, shows breaches in paved levees in and below a sharp curve in channel alignment.** Source: USACE, 1938.

Figure 46. **(Right) A construction crew installs the vertical walls of a box channel, c. 1948-1951.** Source: LA Public Library.

1938 UNTIL THE PRESENT

The concretization of the river was the pinnacle of a transformative flood management project that continued well into the second half of the 20th century and has functioned successfully for decades. It marks the Army Corps' conversion of the river into single-benefit infrastructure designed for one job: to quickly funnel storm flows to the ocean and spare surrounding areas from flooding. In the context of New Deal America, the presence of structured channels and dams represented the ability of human engineering to defend communities against the river's "vagrant waters".[41] Yet, at the same time, they shifted both the function and public perception of the river. New homes and businesses built their backs to the channel. By the middle of the 20th century, the majority of the low-lying areas of the LA River watershed were urbanized. The river was spoken of almost exclusively in terms of its flood management functions, and its role in the greater ecosystem began to wane. The vast majority of plants and fauna that had existed for millennia along the LA River suffered.

Many communities have faced hardship due to the extensive modifications that people have made to the river and natural watershed. For Indigenous Peoples, this comes in the form of multiple generations of displacement and cultural erasure. For others who underpinned the burgeoning citrus industry in the early 20th century and the Mexican, Chinese, and Japanese truck farmers who initially settled in the Elysian Valley,[42] the urbanized river divided and segregated communities, facilitating "barrioization" through formal and informal zoning.

By the 1930s, redlining maps published by the Home Owners' Loan Corporation subjected river-adjacent neighborhoods to overt discrimination along racial and ethnic lines; areas off the river's east bank near Downtown LA, for example, were described as "hopelessly heterogenous" and "honeycombed with diverse and subversive racial elements." This classification established major barriers for residents seeking home loans and stalled their upward economic mobility. Neighborhoods bypassed by this grading exercise tended to have more affluent and homogenous populations and were, by contrast, set up as white suburbs. Redlining produced landscapes of segregation that both created and reinforced ethnic and racial "enclaves" along the river including Chinatown, Bronzeville (formerly Little Tokyo), and Sonoratown. The legacy endures: particularly in the San Fernando Valley and south of Downtown LA, some Latino and Asian communities today are disproportionately challenged by deteriorating social, economic, and environmental conditions.[43]

In more recent decades, the marginalization of certain neighborhoods within the LA River corridor has taken the form of forced displacement. The freeway system, while providing much needed regional mobility, displaced close to a quarter-million people in LA County while being constructed during the 1950s and 1960s, the period of Urban Renewal. The 710 Freeway, which runs adjacent to the lower LA

Figure 47. (Left) A Union Pacific locomotive is pulls a train of containers southbound, just north of Union Station in LA. Source: Wikimedia Commons, 2012.

Figure 48. (Right) The low-flow channel carries water down the center of an otherwise dry trapezoidal section of the LA River. Source: OLIN, 2018.

River, has also posed issues of environmental injustice; it has contributed to poor air quality and heightened disease rates of residents in adjacent neighborhoods. Due to rising housing costs and a limited housing supply, the displacement of populations continues to be at the forefront of issues facing river communities.

Channelization of the river was completed in the 1960s, and two particularly severe rainfalls in the coming years put the system to the test. In 1969, over a week of heavy rain caused $4.5 million in damages.[44] Despite the destruction, however, the flood management measures were considered successful. The amount of rainfall that had reached LA—thirteen and a half inches in nine days—was record-breaking, more intense than what had befallen the less developed city in 1938. The river infrastructure was estimated to have prevented over a billion dollars in damages.[45] Another major weather event in 1980 again reinforced the river's ability to contend with severe rainfall and runoff, yet $375 million in damages indicated that the system could still be improved.[46]Water rose to five feet below the top of the gates at Sepulveda Dam,[47] splashed against 20-foot-tall levees,[48] and filled approximately 86% of the channel's capacity.[49]

Starting in the 1980s and carrying into the 1990s, visions of restoring and improving the LA River back to a more naturalized form slowly began to enter the mainstream with the emergence of influential organizations like Friends of the Los Angeles River (FoLAR), which was formed in 1986. At this same time, in the early 1990s, the US Army Corps of Engineers began its LA County Drainage Area (LACDA) project to make sweeping structural improvements to the flood channel capacity of the LA River. The LACDA project improved flood risk reduction significantly along the lower LA River. Plans such as the City of LA's LA River Revitalization Master Plan (2007) and the Lower LA River Revitalization Plan (2017) have since continued to retune both cultural perceptions of and practical roles for the LA River.

Today in 2020, with one million people living near the river, the need to balance water, people, and environmental goals along the LA River while maintaining its flood risk reduction purpose is greater than ever. With the implementation of this Master Plan, the LA River can enter the sixth key period of its history as a multi-benefit waterway: the reimagined river.

Figure 49. Two black-necked stilt's in the LA River channel adjacent to Dominguez Gap Wetlands at river mile 5. Source: LA County Public Works, 2018.

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4.
EXISTING CONDITIONS SUMMARY

UNDERSTANDING THE ECOLOGICAL, HYDROLOGICAL, PHYSICAL, AND SOCIAL CONDITIONS OF THE LA RIVER

The LA River Master Plan, which was developed using a watershed and community approach to research and analysis, explores existing conditions through a data-based methodology. This differs from previous efforts in that analytical studies of systemic and natural elements were conducted for the entire 834-square-mile watershed and communicated through comparable formats for ease of understanding. Recognizing that these systemic and natural elements cannot be studied in isolation, several studies also included information for areas outside the watershed.

INVENTORY AND ANALYSIS

The LA River Master Plan's existing conditions inventory and analysis reveals that conditions in and along the LA River vary widely, with some areas containing a variety of desirable assets and others experiencing unique vulnerabilities. Research was organized into analysis of existing:

- Flood Risk Reduction
- Water Quality
- Water Supply
- Ecosystem and Habitat Conditions
- Open Space, Recreation, and Trails
- Community, Art, and Culture
- Access
- Demographics
- Sustainability and Resiliency
- Operations and Maintenance

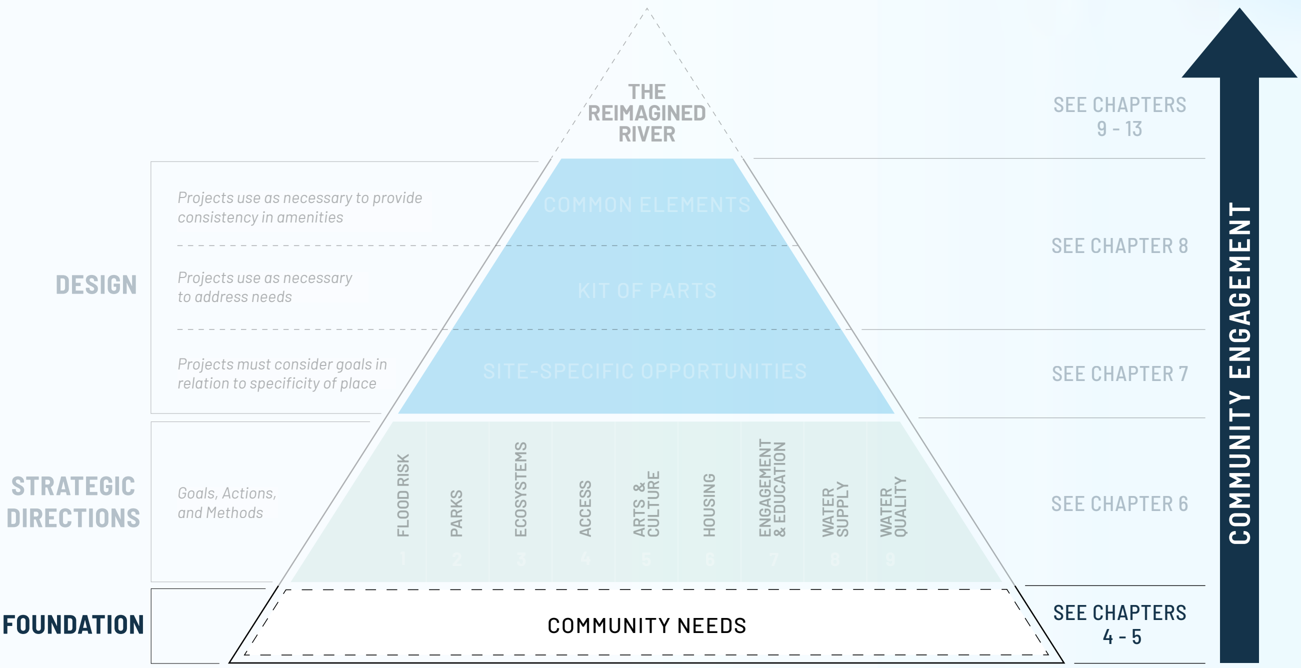


Figure 50. The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.

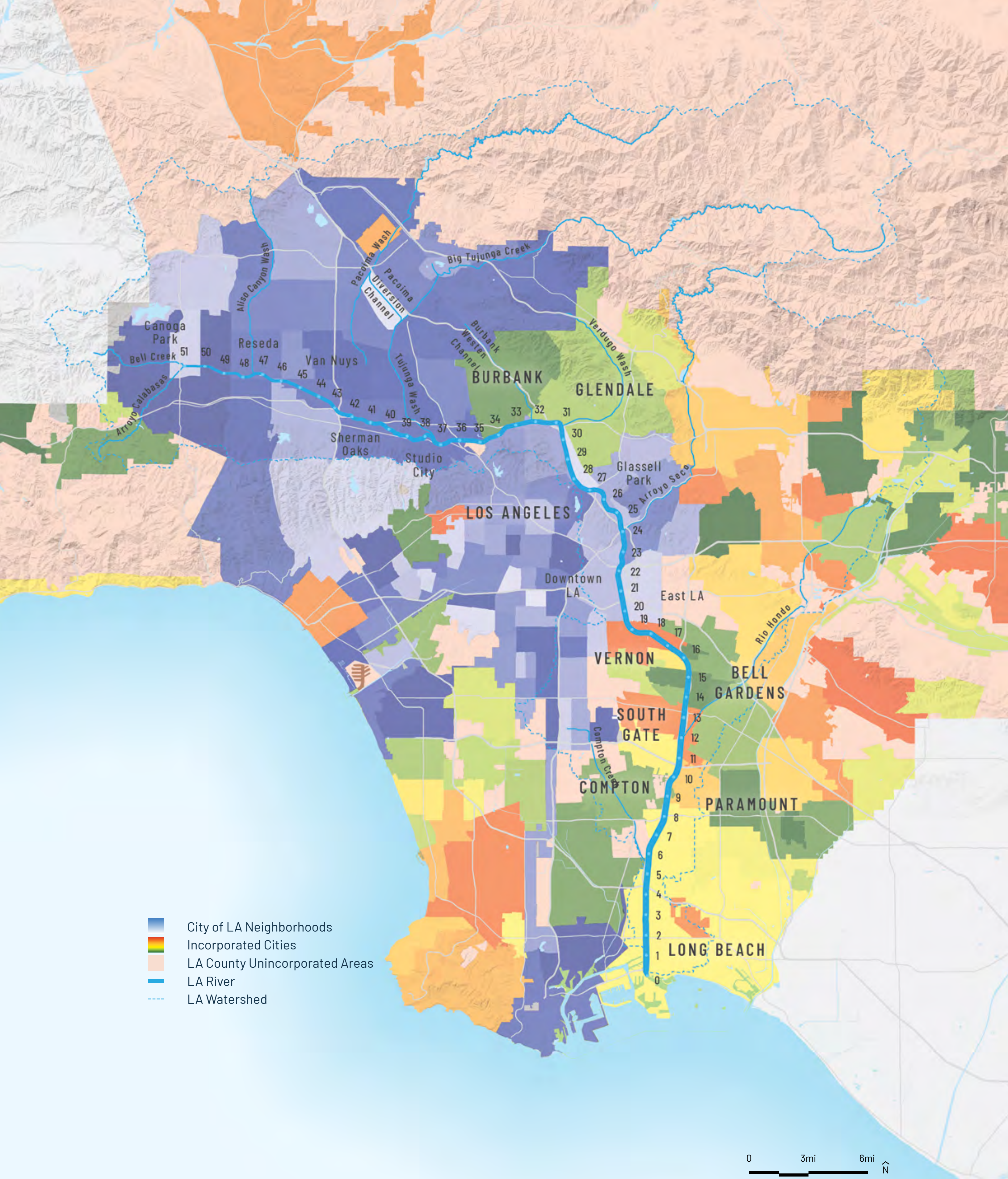
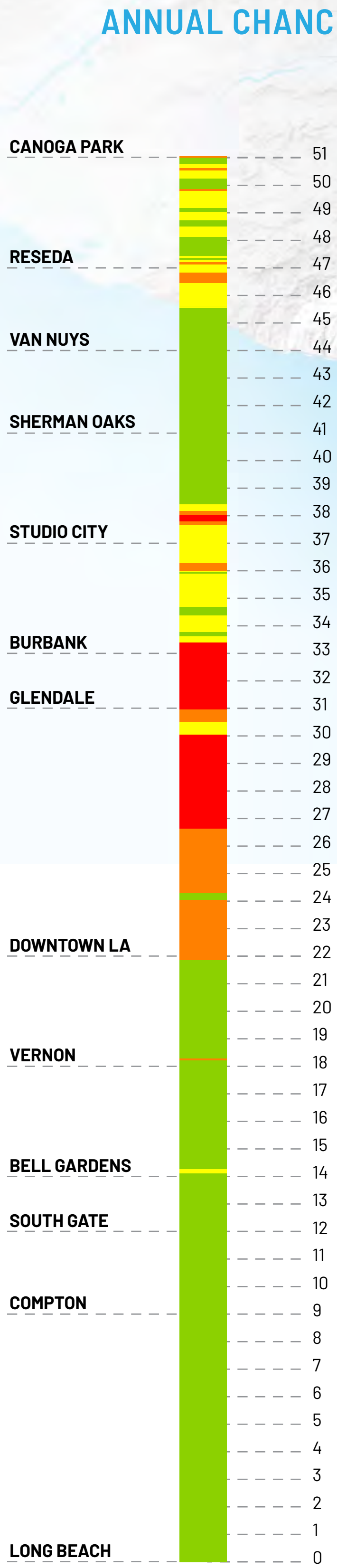


Figure 51. Communities Within LA County. Today there are 17 cities, 23 City of LA neighborhoods, and four unincorporated communities within one mile of the LA River. Source: LA County GIS Data Portal, City Boundaries and Annexations, 2016 & LA City Communities and Planning Areas, 2014.



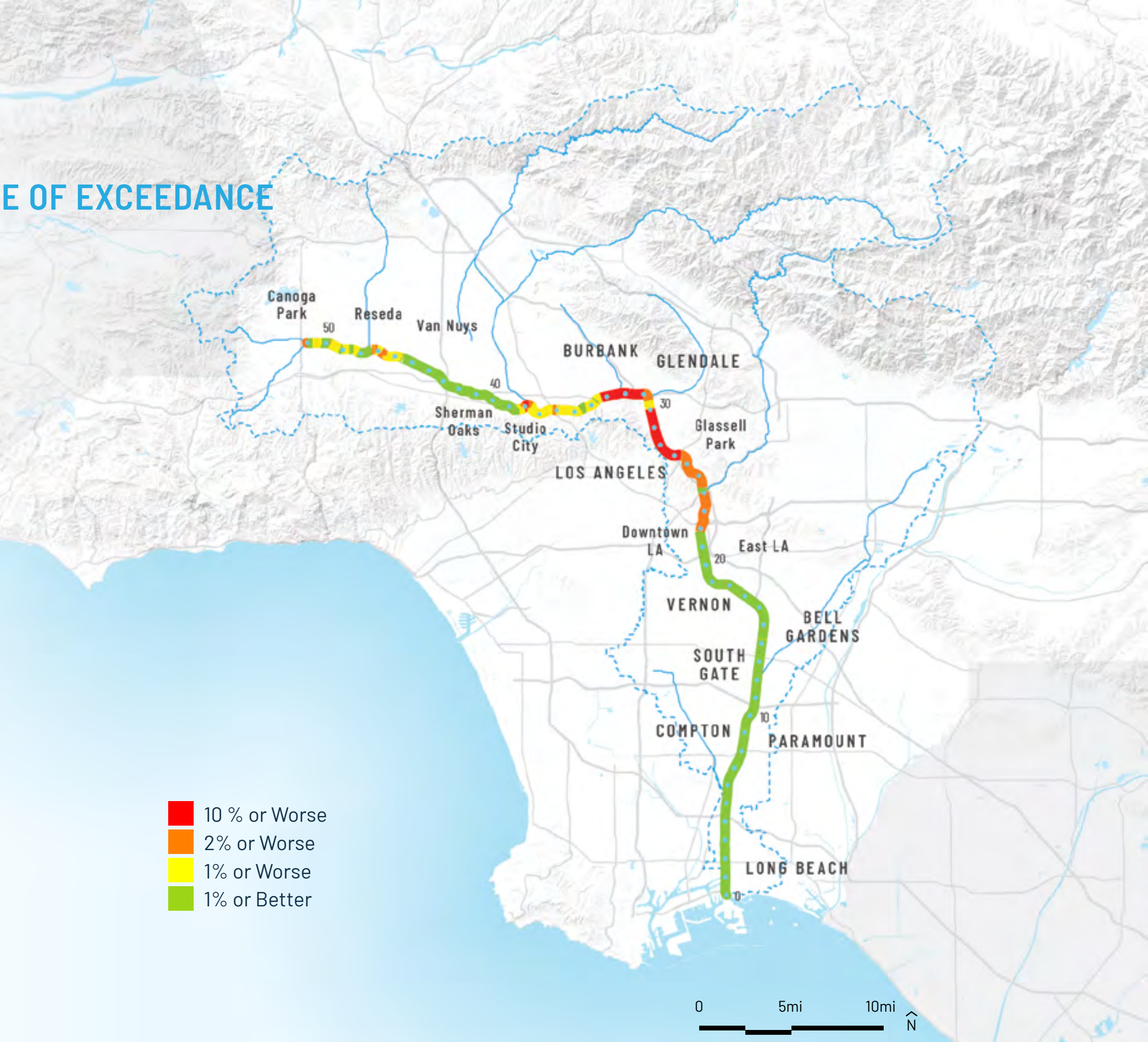


Figure 52. Annual Chance of Exceedance. Map and ruler of estimated current channel capacity. Source: 1. US Army Corps of Engineers (USACE) LA District. 1996a, 1996b, 1997a, 1997b, and 1999. LA County Drainage Area Improvement Projects. Design Analysis Report and Design Memoranda; USACE LA District. 1991. LA County Drainage Area (LACDA): Review, Part I Hydrology Technical Report: Base Conditions; USACE: LA District. 2015. LA River Ecosystem Restoration Integrated Feasibility Report, Final Feasibility Report and Environmental Impact Statement/Environmental Impact Report, Appendix E. Table 17: Original Design Discharge and Existing Channel Capacity; USACE. 1953. Design Memorandum No. 1 Hydrology for LA River Channel, Owensmouth Avenue to Sepulveda Flood Control Basin; Geosyntec analysis using HEC-RAS models (USACE LA District. 2005. LA County Drainage Area Upper LA River and Tujunga Wash HEC-RAS Hydraulic Models).

EXISTING FLOOD RISK REDUCTION

Although channelization of the LA River began as early as the 1800's, the channelization of the LA River as we know it today that occurred under the direction of the US Army Corps of Engineers (USACE) and began in 1936 with the passage of the Flood Control Act following destructive flood events in the late 1930s. Additional phases of construction continued up until 1959. Motivated by the February 1980 flood, channel improvements on the lower LA River were implemented in the late 1990s to early 2000s as part of the LA County Drainage Area (LACDA) project[50 51 52 53 54 55] to increase the channel capacity in the lower 12 miles of the river. These efforts have been largely successful in managing flood risk, but there are problematic reaches along the river and flooding remains a threat.

RIVER MILE 51: CANOGA PARK

RIVER MILE 43: SEPULVEDA BASIN

RIVER MILE 39: STUDIO CITY

RIVER MILE 29: ATWATER VILLAGE

RIVER MILE 24: ELYSIAN PARK

RIVER MILE 22: DOWNTOWN LA

RIVER MILE 12: SOUTH GATE

RIVER MILE 2: LONG BEACH

RIVER MILE 0: RIVER MOUTH

Figure 53. Images of the LA River from river mile 51 in Canoga Park (top left) to river mile 0 in Long Beach (bottom right). Source: OLIN, 2018.

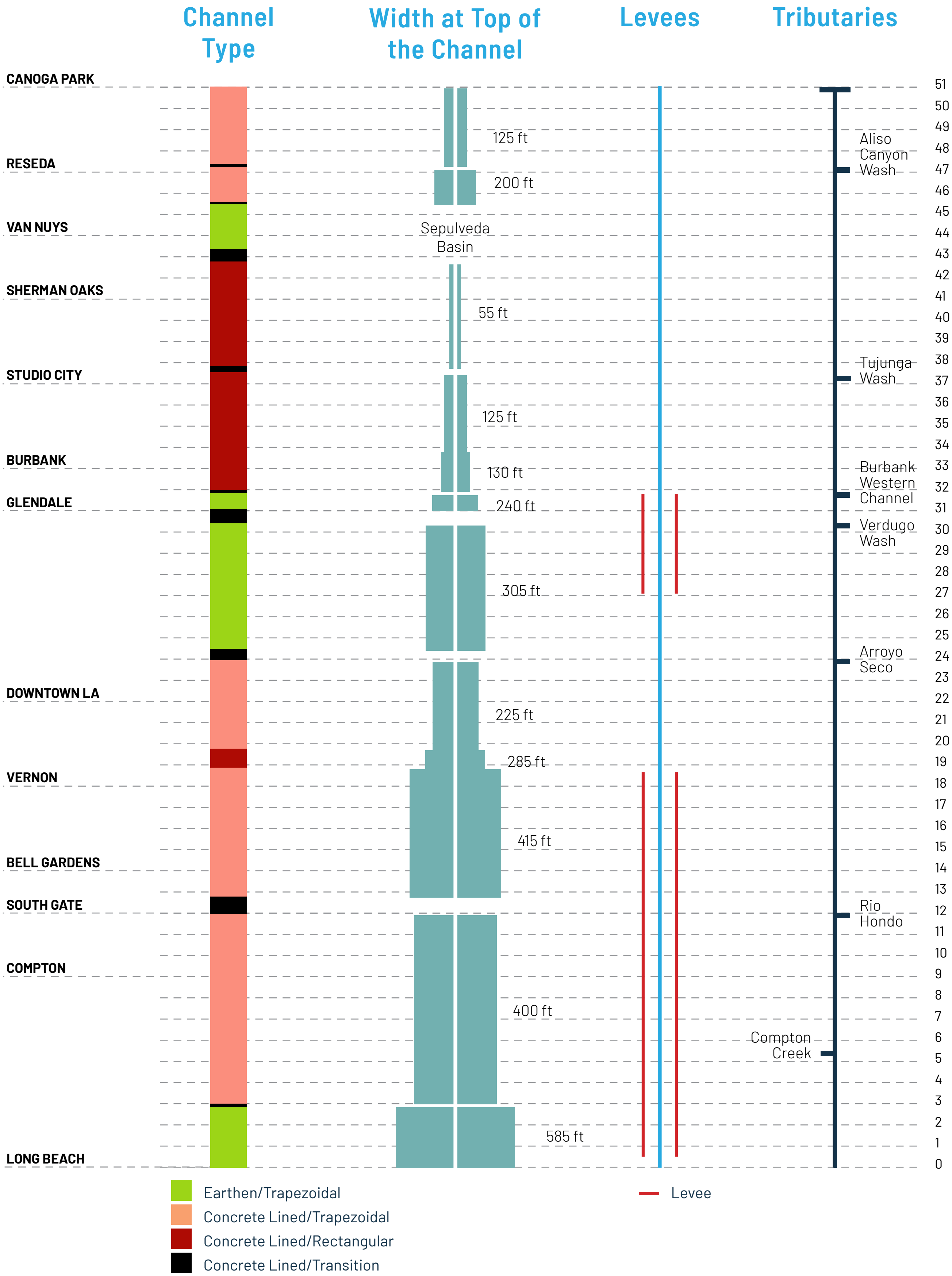


Figure 54. Channel conditions change as you move from river mile 51 in Canoga Park to river mile 0 in Long Beach.

THE ANNUAL CHANCE OF EXCEEDANCE IS THE PROBABILITY THAT THE CHANNEL CAPACITY WILL BE EXCEEDED IN A SINGLE YEAR

The level of flood capacity of the LA River indicates the size of the flood in terms of annual exceedance probability, at which the LA River can safely convey flows. Figure 52 presents the estimated current level of flood capacity along the LA River in terms of the annual chance of exceedance, and shows that in general, capacities in the lower river are greater than those throughout the City of Los Angeles. The annual chance of exceedance is the probability that the channel capacity will be exceeded in a single year. For example, a flood event with an annual chance of exceedance of 1% has a 1 in 100 probability of being exceeded in any given year and a flood event with a 2% annual chance of exceedance has a probability of 1 in 50. On average, the return period for a 1% event is 100 years, and as such the 1% event is often referred to as a "100-year flood event".

Figure 52 was developed using the most current models and information available, and there are recommendations to update the hydrologic and hydraulic models in the master plan (see Chapter 2). Figure 52 indicates the channel upstream of Sepulveda Basin (RM 51 to RM 46) mostly has a mixture of 2% (yellow) and 1% (green) flood capacity levels, with a few locations with worse than 2% (orange) channel capacity level, likely due to local constrictions from bridges. The channel in this reach is concrete-lined, trapezoidal in shape, and increases in width from 125 ft to 200 ft (Figure 54).

Figure 55. Sepulveda Basin's roughly 17,000 acre feet of storage provides significant flood risk management to downstream reaches. Source: OLIN, 2018.

Figure 56. Sediment and invasive vegetation in the soft bottom reaches, such as this area at river mile 31.2 near Glendale, inhibits flows and increases flood risk. Source: OLIN, 2018.

From Sepulveda Basin to Tujunga confluence (RM 38), the channel generally has better than 1% flood capacity with a short segment upstream of the Tujunga confluence, where worse than 10% (red) flood capacity level is estimated. This may be caused by additional inflows, but it is noted that the hydrologic analysis used to derive the inflows may be at a coarser scale than the hydraulic model (i.e., more detailed analysis may be warranted in this region). The channel in this reach is concrete-lined and rectangular. Notably, the channel width is only 50 ft, compared with 200 ft above Sepulveda Basin, indicating the effectiveness of Sepulveda Basin in attenuating peak flows in the river.

From Tujunga confluence to the Narrows (RM 33), the level of flood capacity is generally better than 2%. The channel is concrete-lined and rectangular, with widths ranging from 125 ft to 130 ft.

The Narrows reach (RM 33 to RM 22) has known deficiencies that are exacerbated by the heavy vegetation that has established itself in the soft bottom of the trapezoidal channel. Despite the presence of levees along portions of this reach, the flood capacity level is worse than 2%, with many regions having worse than 10% flood capacity and as low as 25% flood capacity.

Figure 57. The lower river's parapet walls, such as these shown at river mile 10.1, were installed in the late 1990's in order to increase the channel capacity to greater than the 1% event. Source: OLIN, 2019.

Further downstream, between the Arroyo Seco (RM 24) and Rio Hondo confluences (RM 12), the flood capacity level is mostly better than 1%, although just downstream from Arroyo Seco and in Vernon (RM 18), the flood capacity level is worse than 2%. The channel in this reach is concrete-lined, mostly trapezoidal, and has top width varying from 225 ft to 415 ft.

Following the LACDA improvements, where the levees (Figure 57) were raised and parapet walls were added, the river downstream of Rio Hondo confluence has better than 0.75% (133-year) flood capacity. Flows greater than the 0.75% event are designed to overtop two weirs located downstream of Imperial Highway on the east bank (near RM 11.4) and near the 105 Freeway on the west bank (near RM 10.7). The channel in this reach is concrete-lined (apart from the lower 3 miles in the tidally influenced portion of the river), trapezoidal, leveed, and with top width varying from 400 ft to 585 ft.

CRITICAL FACILITIES WITHIN FLOOD HAZARD AREA

FACILITY DESCRIPTIONS	WITHIN FLOOD HAZARD AREA					TOTAL FACILITIES
	FEMA 100-YR FLOODPLAIN	FEMA 500-YR FLOODPLAIN	TSUNAMI INUNDATION	1.41-METER SEA LEVEL RISE WITH 100-YR STORM EVENT	ANY OF THE 4 FLOOD HAZARD AREAS	
EMERGENCY OPERATIONS FACILITIES	2	12	1	1	**12**	105
POLICE STATIONS	1	14	1	0	**15**	119
FIRE STATIONS	10	72	18	10	**79**	451
MEDICAL CARE FACILITIES	37	752	16	12	**757**	5,754
SCHOOLS	43	673	6	5	**673**	4,745
HAZARDOUS MATERIAL SITES	311	2,836	243	210	**2,910**	18,667
TOTALS	**404**	**4,359**	**285**	**238**	**4,446**	**29,841**

Figure 58. Critical facilities within flood hazards zones. Note: not all infrastructure and facilities in the flood hazard areas are directly impacted by flooding from the LA River and some facilities are exposed to multiple sources of flood hazards. Source: Geosyntec; Calculated from: LA County GIS Data Portal, Points of Interest, 2016 & LA County GIS Data Portal, Disaster Routes, 1998 & California Department of Transportation, California Rail Network, 2013 & EPA, FRS Geospatial Data, 2018 & State of California Energy Commission, California Electric Transmission Line, 2018 & LA County GIS Data Portal, Flood Zones; The Flood Insurance Study (FIS) for LA County was issued by FEMA in 2008 and revised in 2016 & USACE, Floodplain Management Services Special Study LA River Floodplain Analysis, October 2016; Mapping limited to area from Barham Boulevard to First Street), & State of California, 2009, Tsunami Inundation Map for Emergency Planning, produced by California Emergency Management Agency, California Geological Survey, and University of Southern California –Tsunami Research Center Cal-Adapt, Sea Level Rise Tool, 1.41 meters Sea Level Rise Scenario, 2018, http://keystone.gisc.berkeley.edu/cec_gas_study_layers/South_coast.

Additional information is available to indicate the extent to which the water may inundate surrounding neighborhoods. Figure 59 shows the 1% (100-year) and 0.2% (500-year) floodplains as determined by the Federal Emergency Management Agency (FEMA) and USACE and areas near the coast that are at risk of inundation due to tsunami and sea level rise.

The extents of the floodplains vary considerably due to differences in surrounding topology. The 1% floodplain along the Narrows (RM33 to RM22) is confined within a relatively narrow corridor near the river due to the terrain rising to the east and the west of the Elysian Valley. It is estimated that approximately 3,300 parcels will be impacted by a 1% flood event.[56] By contrast, the alluvial floodplain in the lower river (RM16 to RM0) covers a vast expanse due to the largely flat terrain formed by deposition of sediment along the LA, Rio Hondo, and San Gabriel Rivers over a long period of time. The floodplain also includes water from the San Gabriel River to the east. This larger floodplain corresponds to a 0.2% event with the risk level being reduced to better than 1% by the LACDA efforts in the late 1990's and early 2000's.

The 1% floodplain that would be expected along the channel in the upper river (e.g., intermittently between RM51 and RM45 and between RM38 and RM33) is not mapped, but would be anticipated to remain relatively close to the main river channel.

Residents and infrastructure within the floodplains may be substantially impacted by flood events. Of paramount importance during such emergencies are critical facilities where emergency operations are conducted, including police and fire stations, medical care facilities, and schools that may be used as evacuation centers. Also of importance are hazardous materials sites, that may pose a significant threat to public safety and health and the environment should they become inundated with water. Analysis of critical facilities and hazardous material sites indicates that there are 404 total facilities/sites within the 100-year floodplain, and 4,359 total facilities/sites within the 500-year floodplain.

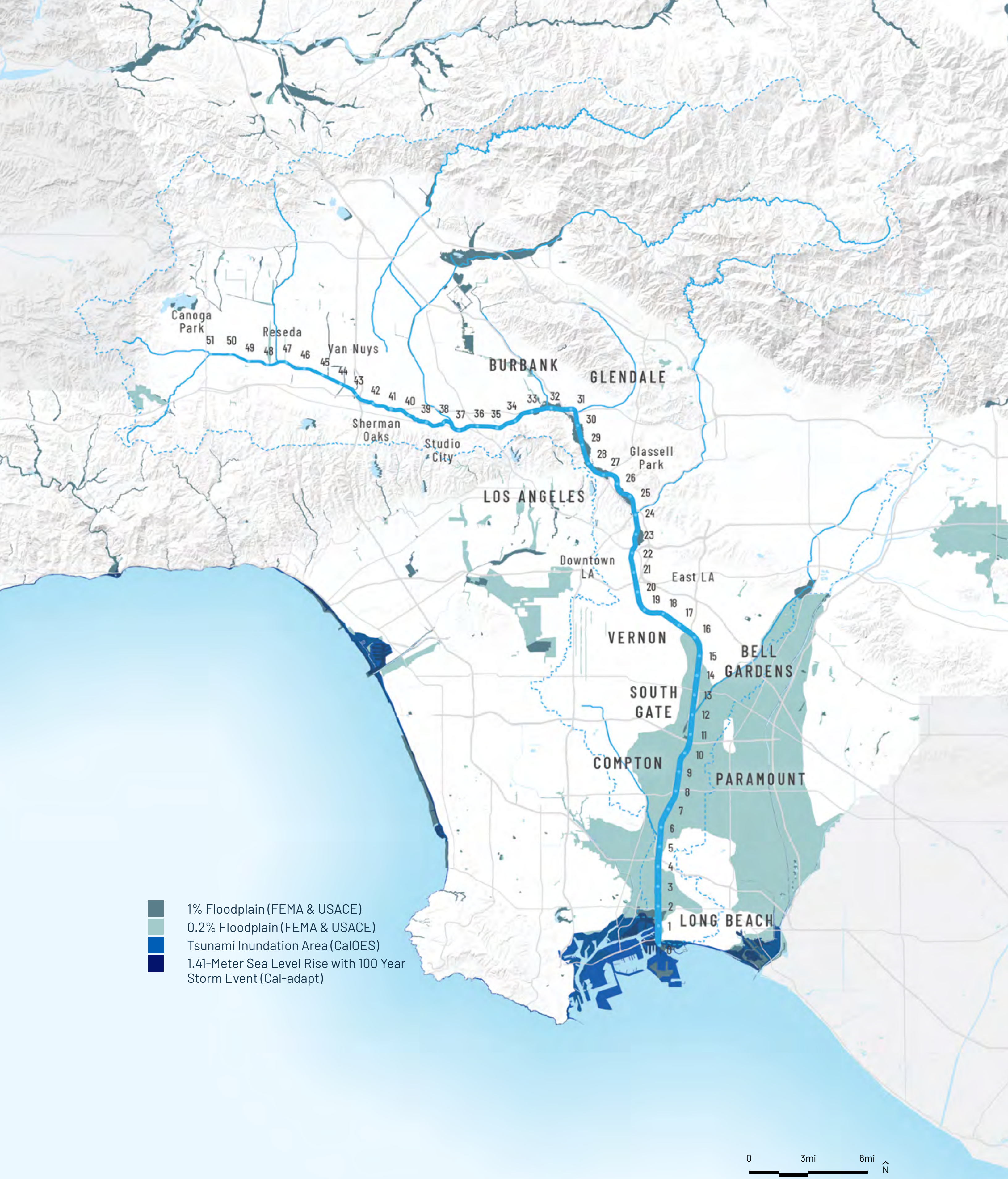


Figure 59. Combined Flood Hazards. Source: LA County GIS Data Portal, Flood Zones; The Flood Insurance Study (FIS) for LA County was issued by FEMA in 2008 and revised in 2016 & USACE, Floodplain Management Services Special Study LA River Floodplain Analysis, October 2016; Mapping limited to area from Barham Boulevard to First Street), & State of California, 2009, Tsunami Inundation Map for Emergency Planning, produced by California Emergency Management Agency, California Geological Survey, and University of Southern California – Tsunami Research Center Cal-Adapt, Sea Level Rise Tool, 1.41 meters Sea Level Rise Scenario, 2018, http://keystone.gisc.berkeley.edu/cec_gas_study_layers/South_coast.

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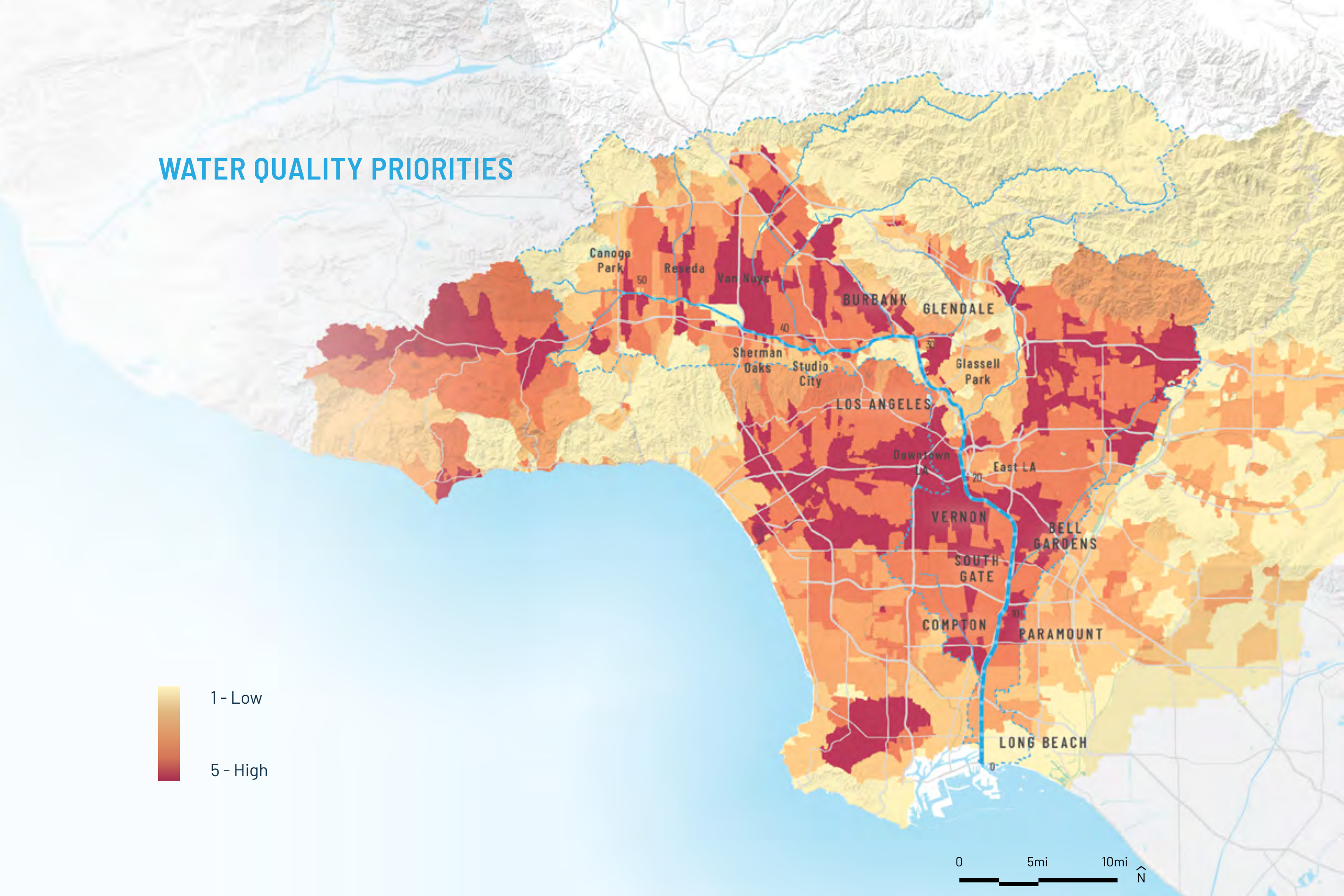


Figure 60. Water Quality Priorities. Land uses within the watershed can contribute various pollutants in the river during wet and dry weather conditions. Areas labeled "higher priority" generally contribute more pollutants of concern that impact the defined beneficial uses within the river. Source: LA County Public Works LSPC Model Input, 2012, http://dpw.lacounty.gov/wmd/irwmp/; Geosyntec, 2018.

EXISTING WATER QUALITY

The LA River watershed (watershed) encompasses 834-square-miles. Of those, 207 square miles drain directly into the mainstem of the river without first entering into major regulated tributary rivers[57] (herein referred to as "Direct Subwatershed"). The LA Regional Water Quality Control Board Basin Plan (Basin Plan)[58]established 24 designated beneficial uses of waterbodies in the watershed. Water quality objectives were subsequently established to ensure the protection of such beneficial uses. The presence of these beneficial uses throughout the length of the 51-miles of the LA River is shown in detail in Appendix Volume II: Technical Backup Document, Chapter 2.

Approximately 62% of the watershed is developed with mixed land uses. Pollutants including bacteria, nutrients, oil and grease, trash, and trace metals,typically generated from land use activities, can be mobilized by dry and wet weather runoff and transported into the LA River, leading to degraded water quality and creating negative impacts on the aquatic ecosystem as well as human use of the waterway. Many waterbodies in the watershed, including the LA River itself are classified as impaired waters by the Clean Water Act[59] and require "treatment" to support their designated beneficial uses established in the Basin Plan.

In an effort to restore impaired water bodies in accordance with Section 303(d) of the Clean Water Act, the State Water Resources Control Board, and the Regional Water Quality Control Board established Total Daily Maximum Loads (TMDLs), a regulatory level that sets the maximum pollutant amounts allowed to be discharged into an impaired water body. The LA River is subject to five TMDLs that collectively regulate wet and dry weather discharges of 13 pollutants including ammonia, bacteria, cadmium, copper, nitrate, nitrite, lead, selenium trash, and zinc. TMDL targets are established based on pollutant source assessments as well as human health and ecosystem toxicity analyses. As a result, TMDL targets vary spatially and temporally throughout the river. Water quality modeling and priority mapping in Figure 60 represents an integrated evaluation of dry and wet weather runoff quality compared to impaired receiving water bodies, their identified beneficial uses and impairments, and land use-based pollutant loading rates.[60]

Considerable resources from the public and private sectors have been dedicated to improving the water quality within impaired waterbodies in the watershed. One Enhanced Watershed Management Program (EWMP) and two Watershed Management Programs (WMPs) have been developed under the 2012 LA County Municipal Separate Storm Sewer Systems Permit (MS4 Permit) to facilitate watershed-wide implementation and strategies for TMDL compliance. The EWMP/WMP capacity targets and capacity achieved within the Direct Subwatersheds were aggregated to create the EWMP/WMP target ruler. Although it can be shown that planned and/or completed projects help to nearly meet the requirements set forth in the 2012 MS4 permit, there is much uncertainty in the funding and implementation of these plans to keep pace with the approved planned milestones.

As a participating agency of all three EWMP/WMPs in the LA River watershed, LA County has and will continuously work with other EWMP/WMP agencies to identify and develop water quality improvement projects or programs along the LA River to capture stormwater and urban runoff for treatment, infiltration, or direct use, and support the designated beneficial uses of the LA River.

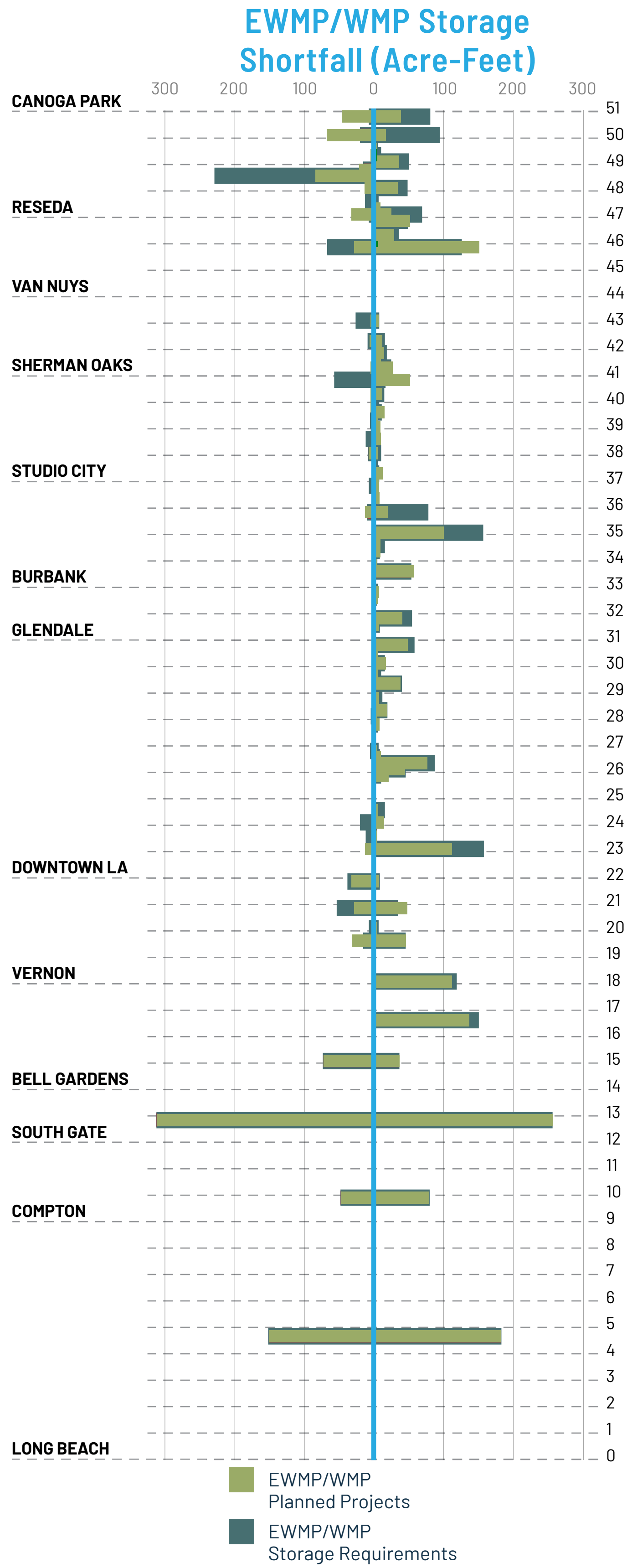


Figure 61. Water quality plans within the watershed prescribe storage requirements (shown in blue) and also recommended projects to meet those requirements (shown in green). Source: ULAR EWMP (2016), https://bit.ly/2mChgAp.

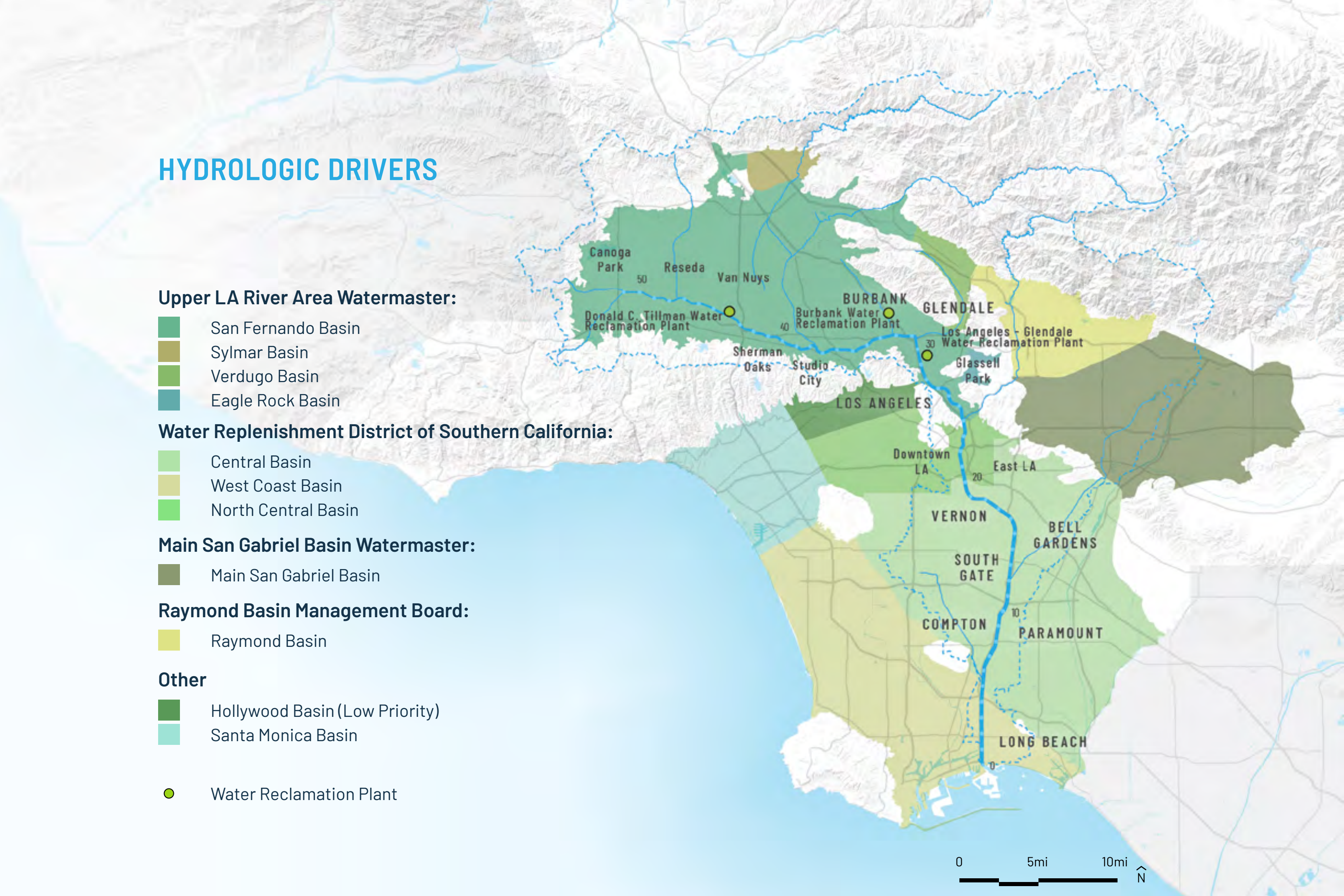


Figure 62. **Hydrologic Drivers. There are many physical and regulatory drivers impacting hydrology in the LA River.** Source: LACDPW GIS Data Portal; Geosyntec, 2018.

EXISTING WATER SUPPLY

The primary sources of water in the LA River are wet weather (stormwater) runoff originating from direct precipitation on the watershed, and dry weather inputs from the watershed including incidental urban runoff, and groundwater upwelling. The dominant source of dry weather flow is recycled water discharge from the Donald C. Tillman Water Reclamation Plant (DCTWRP), LA Glendale Water Reclamation Plant (LAGWRP), and Burbank Water Reclamation Plant (BWRP) and much of this flow originates from waters that are imported from outside the watershed of the LA River. Imported water is generally referred to as water brought into the region from the Colorado River, Sacramento-San Joaquin River Delta, and the Eastern Sierras. Water uses/ losses along the river consist of evaporation, evapotranspiration, limited infiltration that recharges underlying groundwater basins, and discharge into the Pacific Ocean.

Most beneficial uses along the river system derive from groundwater pumping from the underlying groundwater basins, namely the groundwater basins managed by the Upper LA River Area (ULARA) Watermaster and the Water Replenishment District of Southern California (WRD). Beneficial uses of the surface flows of the river include habitat in the Glendale Narrows region, significant bird habitat in the lower reaches between river miles 9 and 3, and recreation in several locations including the Sepulveda Basin and Glendale Narrows.

Water Supply Portfolio

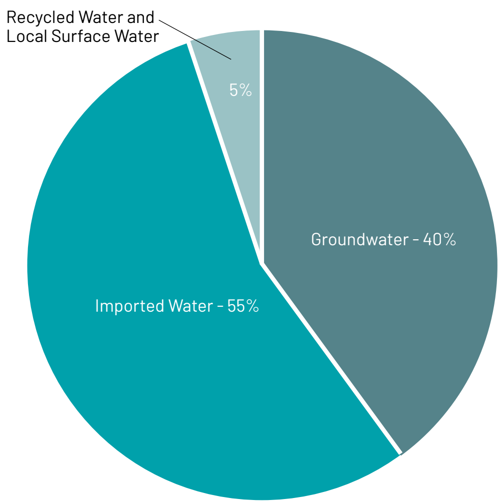


Figure 63. Less than 50% of the region's water supply is from local sources. Source: US Department of the Interior Bureau of Reclamation, County of LA Public Works, LA County Flood Control District, November 2016, LA Basin Study. Geosyntec, 2018.

Water is a scarce and valuable resource in drought-prone Southern California. In the greater LA basin (composed of the LA River, San Gabriel River, South Santa Monica Bay, Ballona Creek, Malibu Creek, and Dominguez Channel/ LA Harbor watersheds), water supply consists of approximately 55% imported water, 40% groundwater, and 5% sourced from recycled water and local surface water.[61] There is an urgent need and regional desire by the major water suppliers in the greater Los Angeles Basin to increase reliability by improving local water supply.[62,63,64,65,66] The LA River presents an opportunity to develop and diversify local water resources through capture of wet and dry weather flows and recharging local groundwater basins for extraction at a future time.

Groundwater Basins

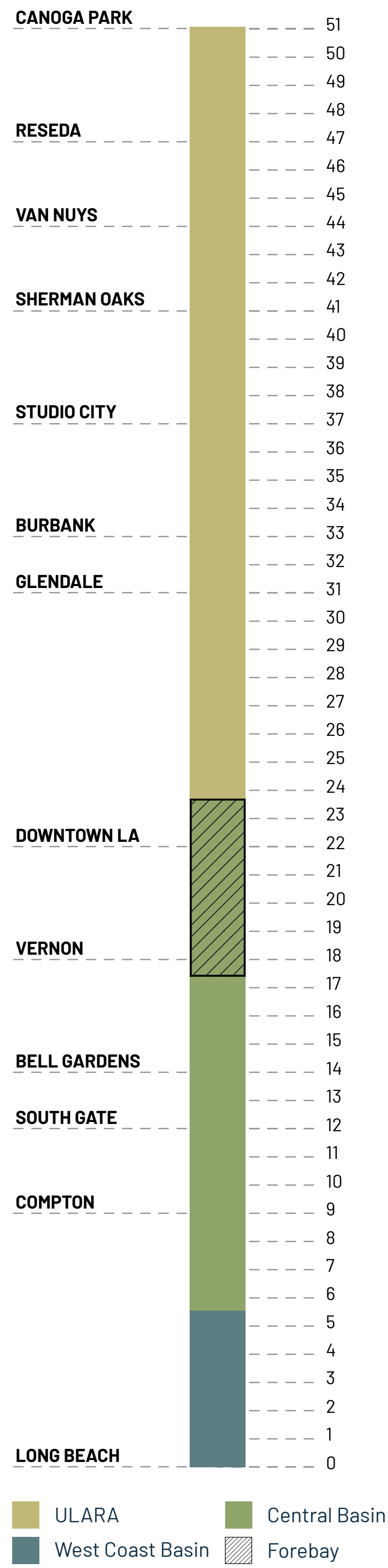


Figure 64. The LA River flows over three groundwater basins. Source: OLIN, 2019.

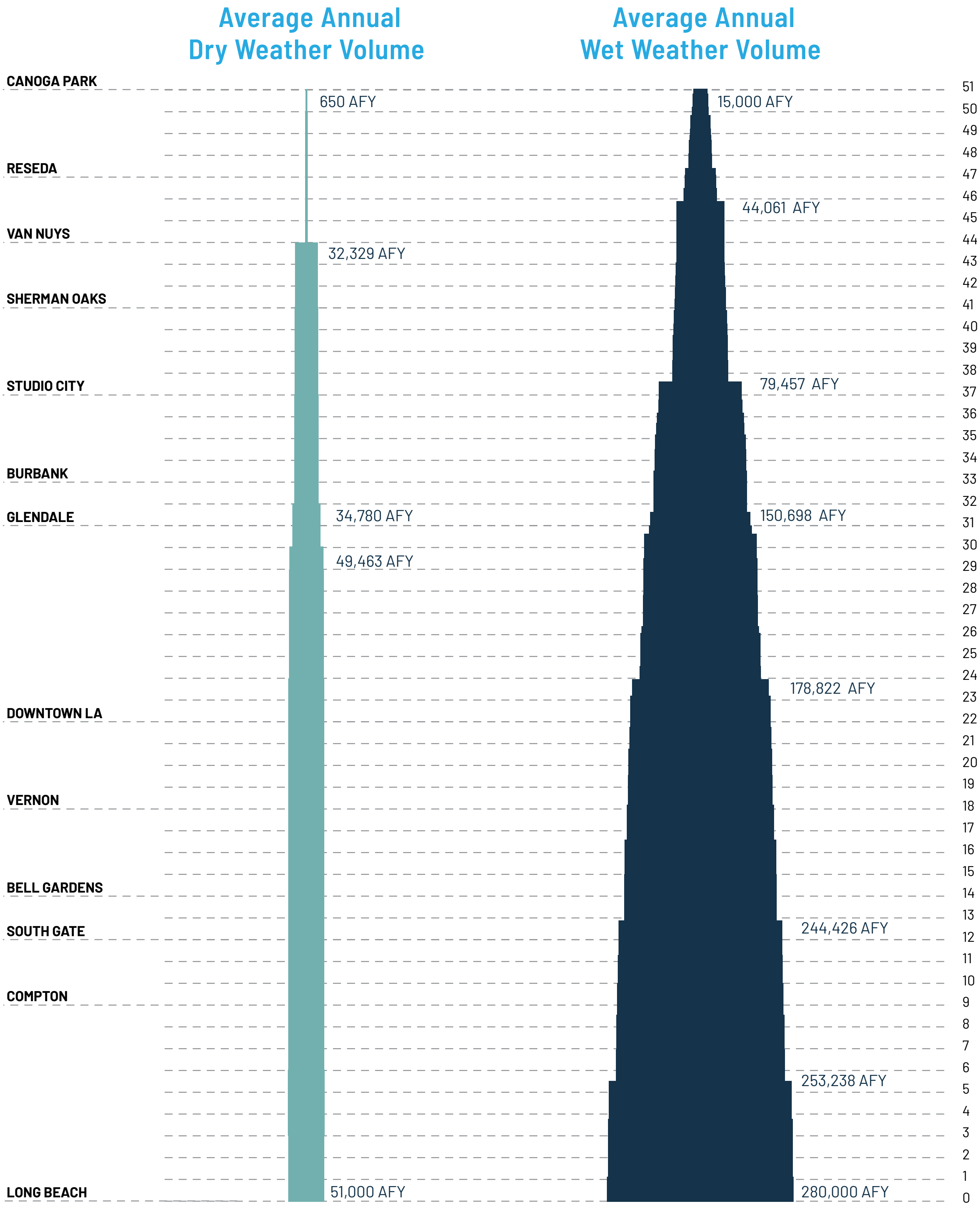
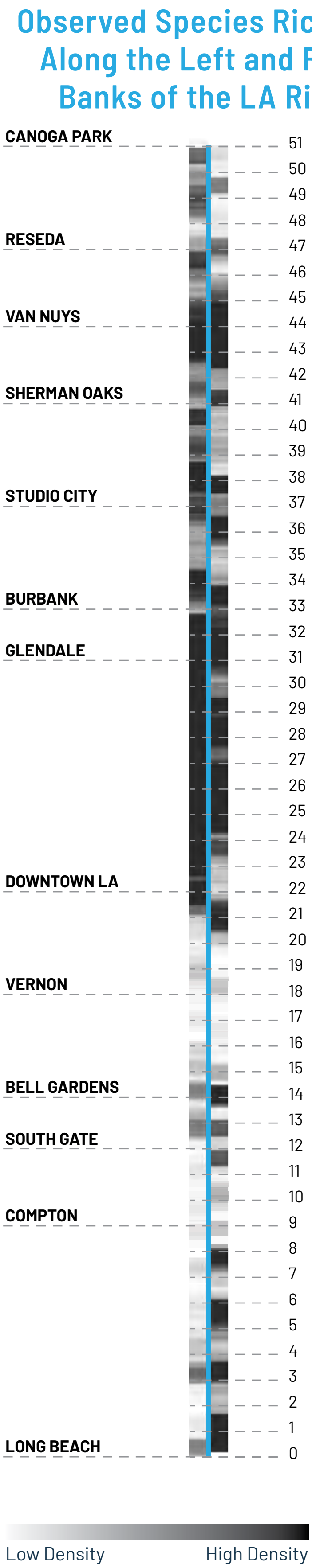


Figure 65. **Significant amounts of water drain to the Pacific Ocean both during rainy and non-rainy periods of time.** Source: Total Discharge Annual Dry/Wet-Weather Volume, Geosyntec, 2018., OLIN, 2019.

Figure 66. Our local groundwater basins are recharged using different techniques, such as spreading grounds like this one in Pacoima. Source: LA County Public Works, 2018.

The water flowing in the LA River may be developed for multiple uses, including public trust needs (i.e., for public use and enjoyment). It can be developed to further enhance habitat and recreation along the river system and can be used as a source water for municipal and industrial uses integrated into the portfolio of existing source waters. Use of the river flows for groundwater recharge is particularly attractive because the basins have reliable water storage that allows use of the LA River supplies not when they occur, but when they are most needed. Dry weather flow is attractive as source water because facilities built to use the supply would be operated at a relatively consistent and manageable rate resulting in a high use factor for capital investment.

However, the consistent rate of these dry weather flows makes them suitable for sustaining a large number of competing uses including public trust needs and thus, the suitability of dry weather flow as a groundwater recharge supply is uncertain. Wet weather flow diversions show promise as these flows that are largely wasted today have a much lower potential for alternative uses. Wet weather diversions require overcoming the technical challenges associated with temporary detention of large water volumes, water treatment under fluctuating flow conditions, and river diversions under flow conditions greater than baseflow. However, these technical challenges may be overcome, resulting in high use potential of the water once it is recharged into the groundwater aquifers.



EXISTING ECOSYSTEM AND HABITAT CONDITIONS

Despite being highly urbanized, the LA River watershed sits within one of the world's biodiversity hotspots, the California Floristic Province, one of only 5 Mediterranean climate regions in the world. Globally, Mediterranean climate regions make up only 2% of the Earth's land surface but contain a remarkable 20% of the world's plant species.[67]

Historically, the river has been both periodically dry and, at times, prone to severe flooding.[68] These seasonal natural disturbances supported habitat and water for numerous endemic plants and animals, as well as migratory birds resting as they traveled the Pacific Flyway.[69] Historic maps of the region along with studies done for nearby waterways indicate that the historic flora and fauna of the LA River were likely a mix of coastal sage scrub and valley grassland ecosystems, with swaths of Southern California oak and walnut forests as the river approached the Santa Monica Mountains. As the river continued south it spread out over the alluvial LA plain through a patchwork of riparian forests, wetlands and coastal sagebrush.[70]

Today, 48 of the 51 miles of the river are within heavily developed areas and the near complete concrete channelization of the river for flood control has significantly altered the river as a native ecosystem. Within this altered context, the river's capacity to support biological life is determined by hydrological conditions, channel geometry, and connectivity across and along the river to adjacent patches and habitat areas . The 11.3 miles of soft bottom (portions of the channel with an earthen bottom) at Sepulveda Basin, the Glendale Narrows, and the tidal estuary are the most ecologically healthy; however, much of the river corridor continues to support algae, insects, fish, and local and migratory birds.[71]

Figure 67. Observed Species Richness Along the Left and Right Banks of the LA River. Data is a cummulation of all available non-private observations at the time of download from inaturalists.org. Source: iNaturalist.org, accessed 18 April 2018.

EXISTING AND POTENTIAL HABITAT PATCHES AND CORRIDORS

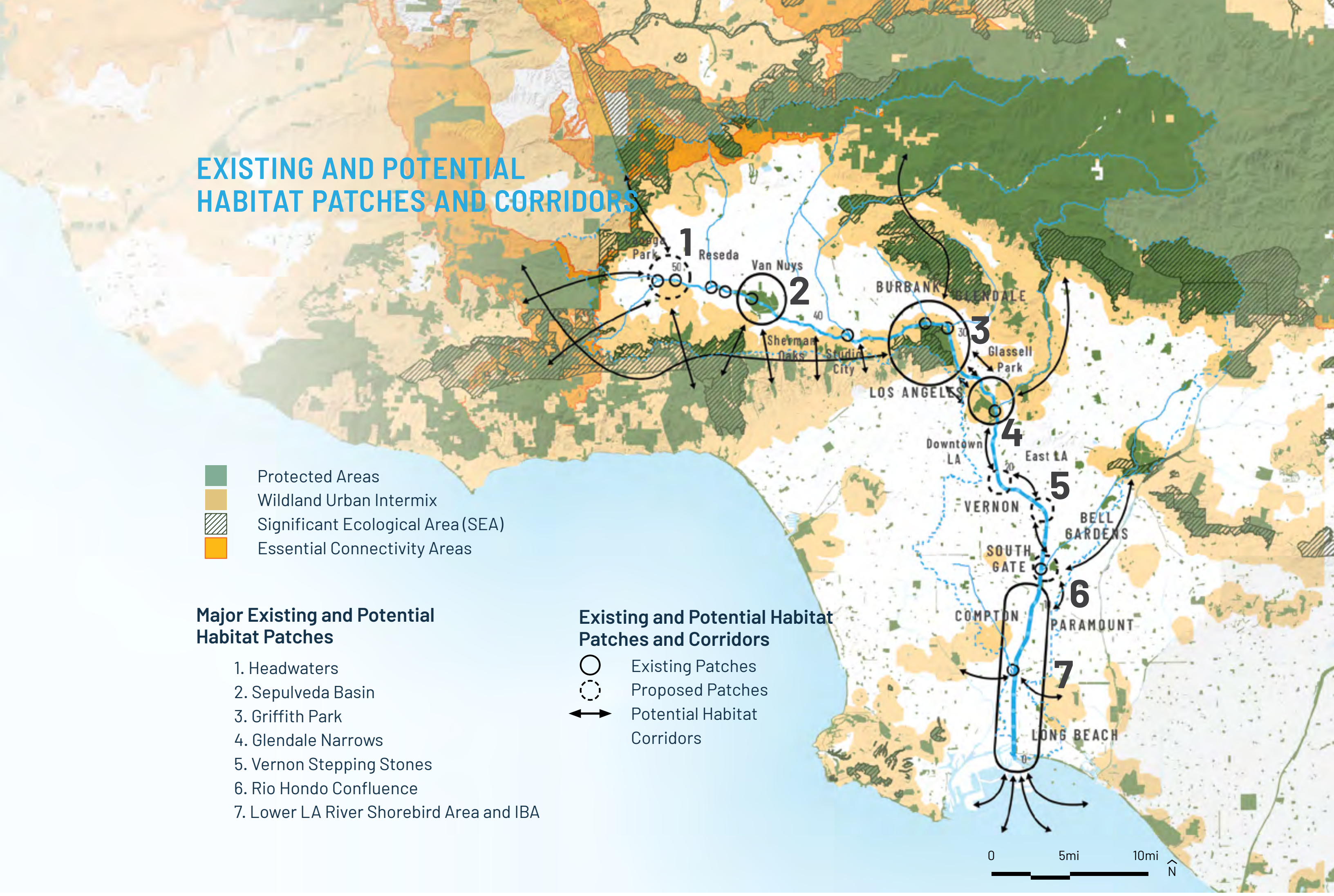


Figure 68. Existing and Potential Ecological Hotspots. The LA River is a patchwork of interconnected habitat areas. Source: CDFW and CalTrans, California Essential Habitat Connectivity Project, 2010 & Remote Sensing Lab, Region 5, USDA Forest Service, CA: Wildland Urban Intermix, 2006.

Figure 69. (Left) Soft bottom sections of the river adjacent to Griffith Park provide in-channel species habitat, river mile 30.1. Source: OLIN, 2018.

Figure 70. (Middle) The Black-crowned Night-Heron is one of 132 rare and threatened species that lives near the river. Source: California Department of Fish and Wildlife. California Natural Diversity Database, October 2016.

Figure 71. (Right) Invasive arundo removal in the soft bottom section of the LA River. Source: US Army Corps of Engineers, LA River Arundo Removal, 2004.

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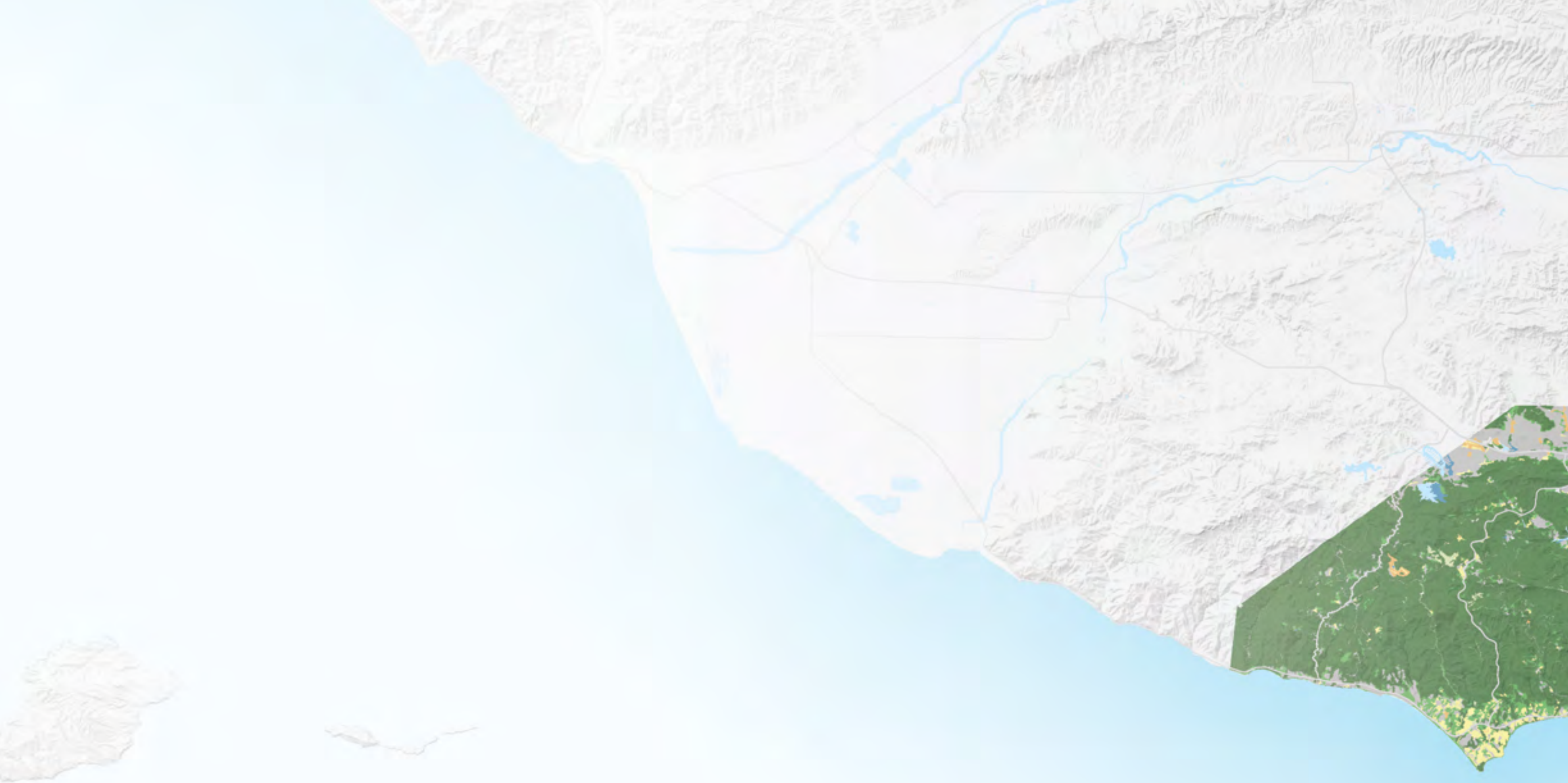
VEGETATION CLASSIFICATION



The soft bottom portions of the river also contain the most problematic invasive plant species, such as Arundo (*Arundo donax*). These invasive species outcompete native species that might otherwise flourish in the soft bottom areas. Despite the current dominance of invasive species in the river channel, over 132 rare or threatened species (such as the Bell's vireo) are associated with the river channel and adjacent areas. According to the California Natural Diversity Database (CNDDB), maintaining and enhancing habitat areas, improved connectivity through tributaries and to adjacent upland habitat areas has the potential to increase overall urban biodiversity given the high natural biodiversity occurring nearby in the region's large inland protected areas.[72] Additionally, elements of the river's former ecology can be reintroduced where appropriate to reestablish many of the rare riparian and upland ecosystems that have been lost to urbanization. It is recommended that environmental planning efforts along the river focus on creating habitat areas large enough to support native ecosystems, interconnectivity of these habitat areas, and active monitoring and management of these areas over time against the compounding stresses of urbanization, climate change, hydrologic change, and continued competition from invasive species.

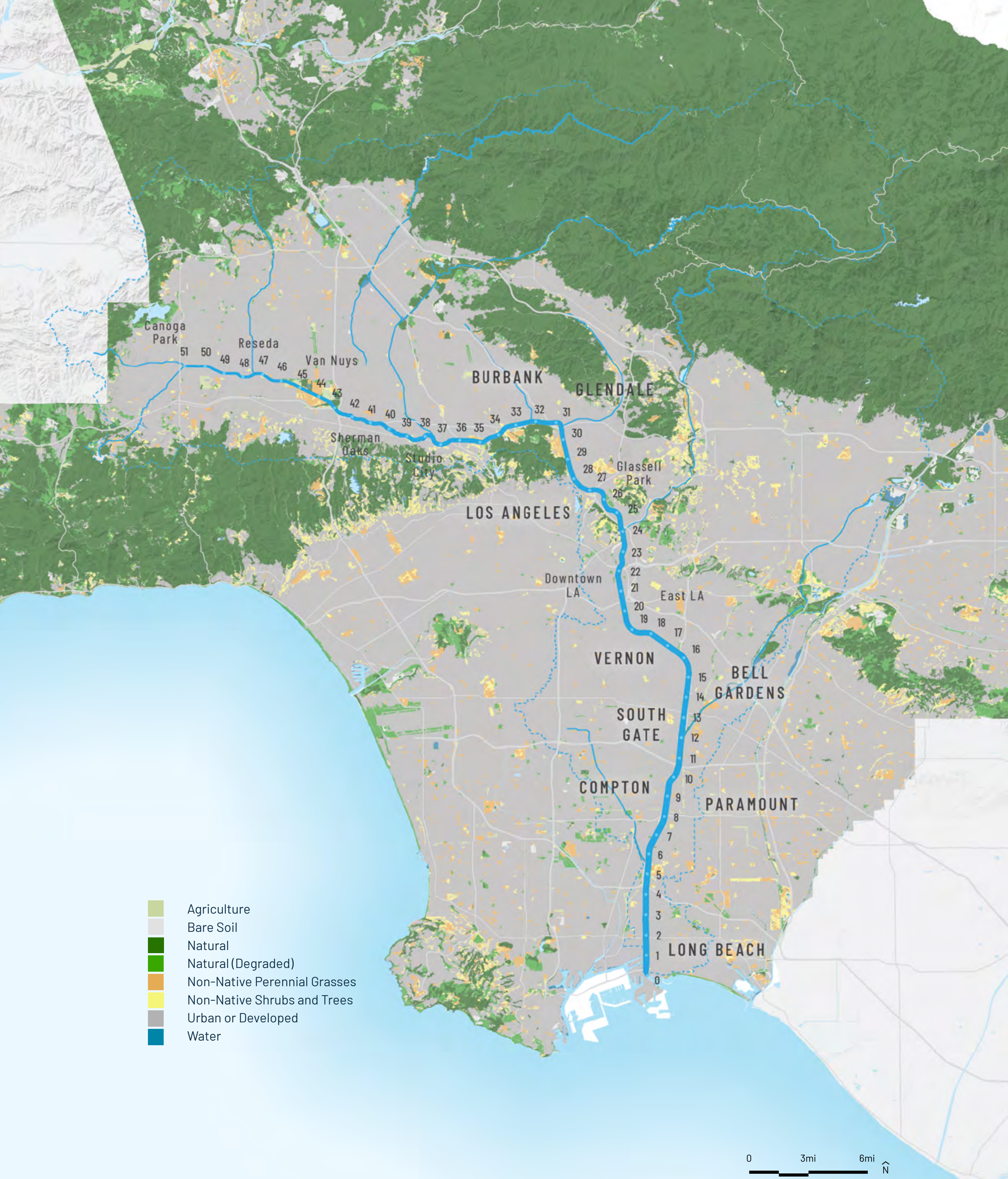
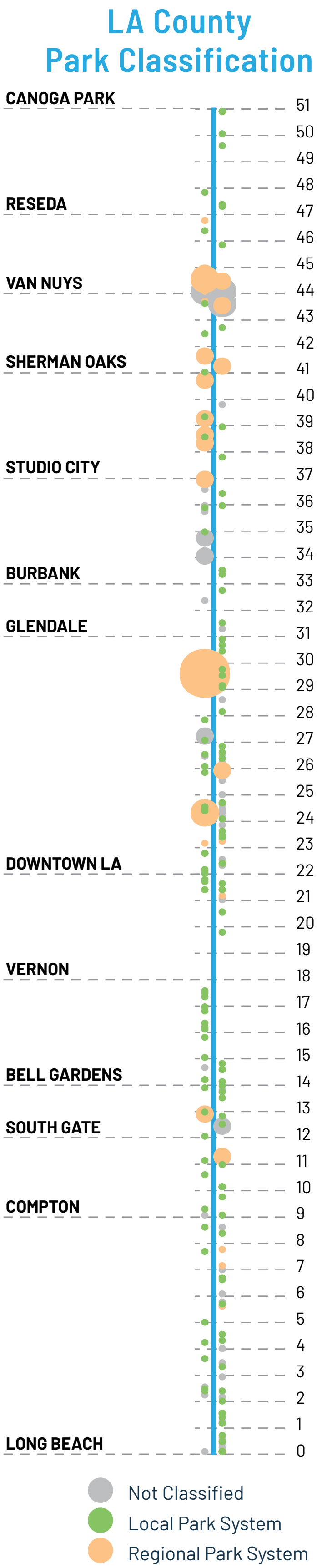


Figure 72. Vegetation Classification. Much of the vegetation around the LA River is degraded or mostly comprised of non-native plant species.
Source: LA River Master Plan, 2020.



EXISTING OPEN SPACE, RECREATION, AND TRAILS

Having equitable, safe, inclusive, connective, and accessible parks is critical for public health and social equity.[73][74][75] Increasing overall acres of park land and access to parks positively benefit communities such as by reducing rates of preventable diseases like diabetes and obesity.

Existing open space along the LA River corridor is fragmented and limited. Twelve of fourteen communities directly adjacent to the river do not meet LA County's adopted goal of four acres of local parkland per 1000 people. Furthermore, twelve of seventeen cities within a mile of the river do not meet the World Health Organization's recommended minimum of 2.22 acres per 1000 people. Many of the municipalities within a mile of the river also have goals for park space that are higher than the overall LA County goals. Several new parks that are planned along the river corridor, such as Taylor Yard, a 41.6 acre park project being implemented by the City of LA at river mile 25.6, will improve the quantity of parkland and access for adjacent neighborhoods. These parks are critical for creating 51 miles of connected open space along the river corridor.

The LA County Department of Parks and Recreation (DPR) completed a Comprehensive Park Needs Assessment in 2016 that catalogs park amenities as well as walkability to parks and is a critical tool in prioritizing investments in new parks and park improvements, such as the Safe, Clean Neighborhood Parks and Beaches funding (Measure A). The assessment demonstrated a lack of walkable access to local parks along the LA River corridor. Large parks over 20 acres are lacking in the western San Fernando Valley and lower LA River. In many neighborhoods, open space near the river is difficult to access due to obstructions such as freeways, elevation changes, infrastructural easements, or lack of connectivity across the river corridor for pedestrians and bicyclists.

DPR works with numerous city parks and recreation departments and provides park and recreation opportunities in unincorporated communities. DPR also works across jurisdictions toward a goal of developing a regional network of connected multiuse trails for users including cyclists, pedestrians, and equestrians. DPR currently operates and maintains over 200 miles of multiuse trails throughout LA County, including 9 miles along the LA River. DPR has proposed hundreds of miles of additional trails throughout the region, including 16 additional miles along the LA River. Trails along the river should meet both recreation and active transport needs and be robustly planned to ensure an adaptable, yet consistent experience along the river's 51 miles.

Figure 73. While there are 26 community and regional parks within one mile of the river, over 80% of those parks are confined to river miles 21 through 47. Source: LA County Department of Parks and Recreation Countywide Parks and Open Space, 2016; LA County Department of Regional Planning General Plan 2035 Parks and Recreation Element, 2015.

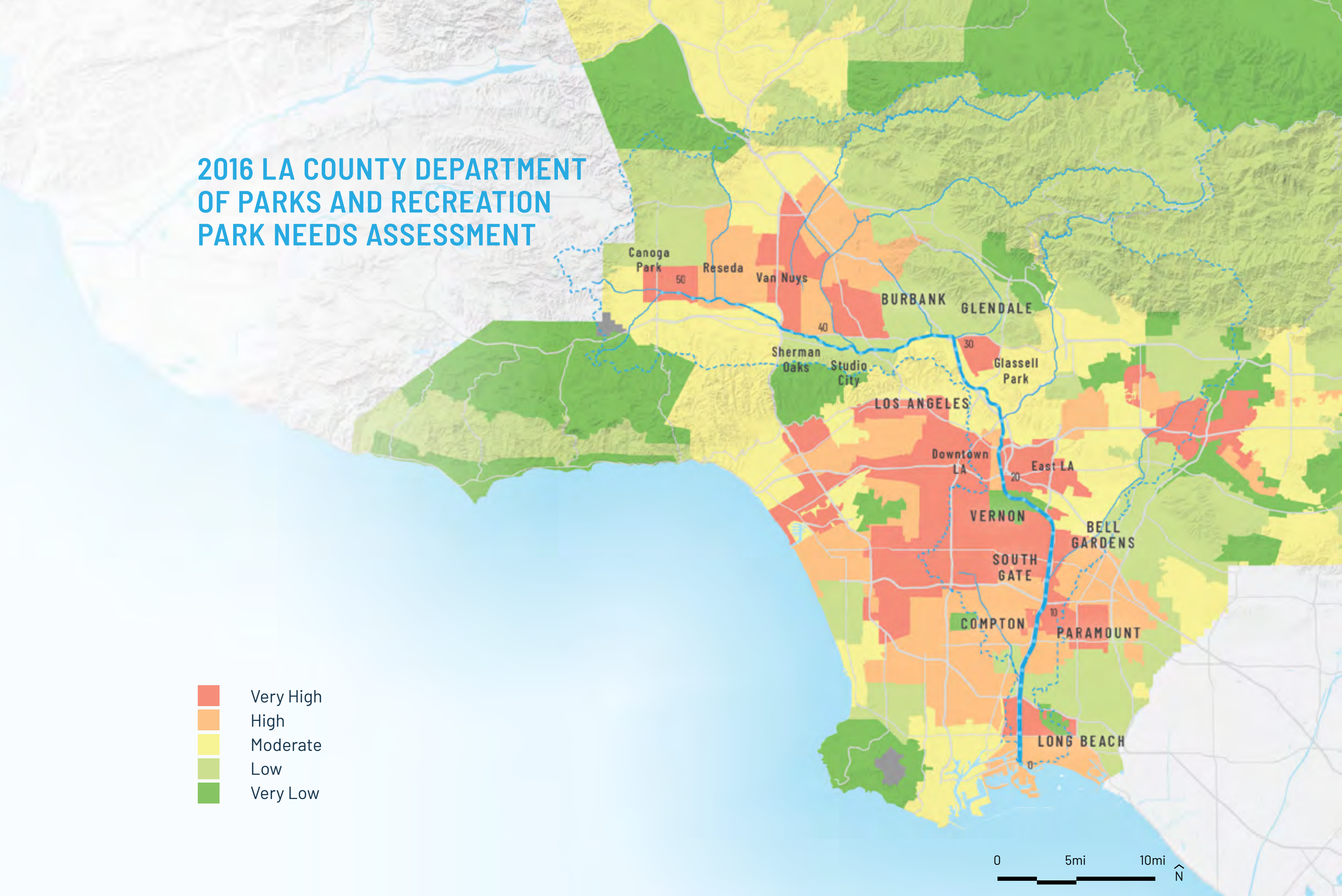


Figure 74. **2016 LA County Department of Parks and Recreation Park Needs Assessment. Park need is in accordance with the 2016 LA County Parks and Recreation Comprehensive Needs Assessment, which took into account park size, proximity to parks, and population density, the highest existing park need in LA County is located in South LA.** Source: LA Countywide Comprehensive Parks and Recreation Needs Assessment, Parks and Recreation, 2016.

Figure 75. **(Left) Kayaking in the Sepulveda Basin LA River Recreation Zone provides a new perspective of the LA River.** Source: Jay Field via US Army Corps of Engineers, https://bit.ly/2Z41zzK, 2017.

Figure 76. **(Middle) Equestrians have a unique ability to wade through and cross the river at the soft bottom sections.** Source: Jeff Houze via Play the LA River, https://bit.ly/2WrfK52, 2014.

Figure 77. **(Right) Much of the river is flanked by multiuse trails.** Source: Scott Lowe, LA River Ride, https://bit.ly/2wCUKZM, 2009.

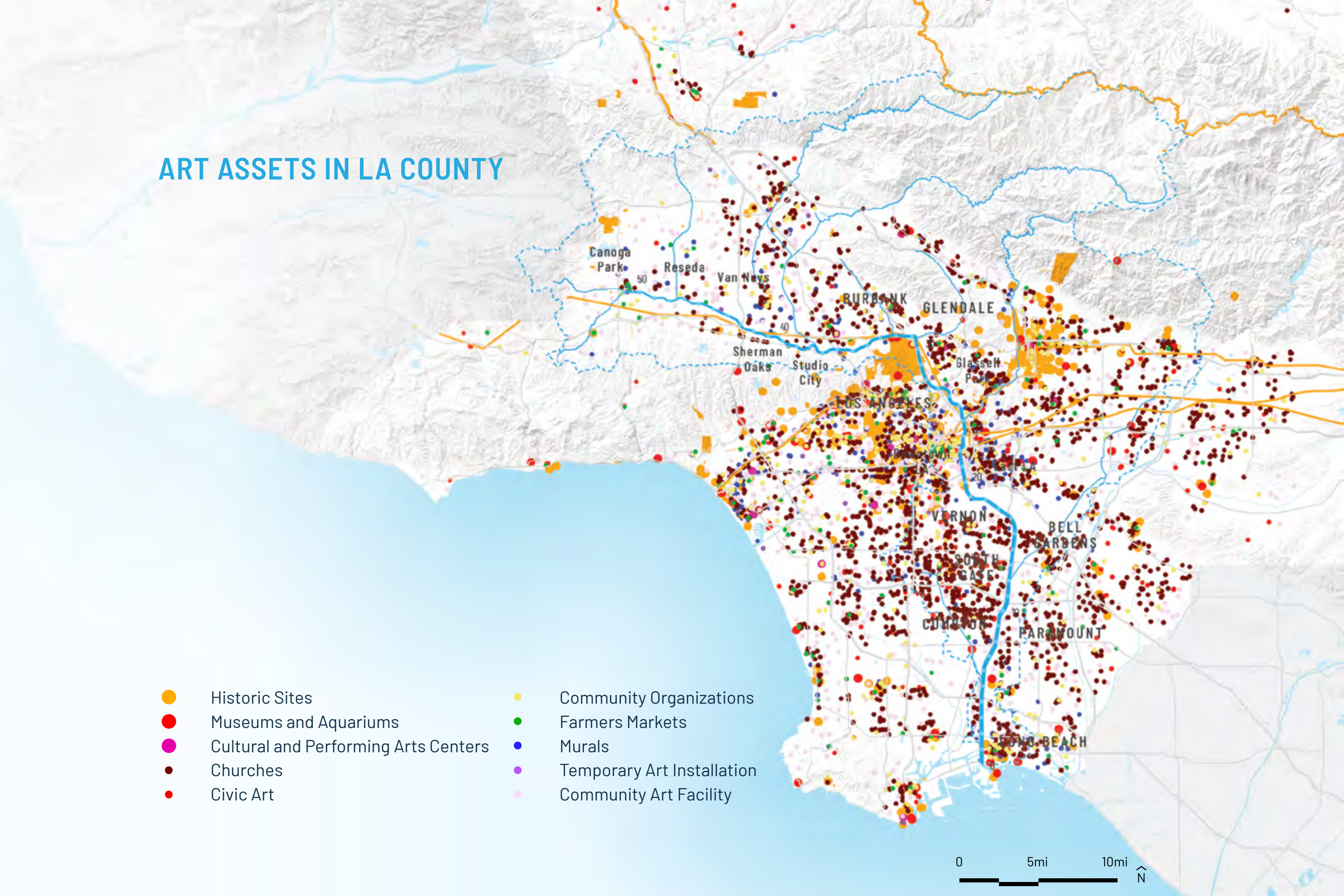


Figure 78. Art Assets in LA County. Assets mapped from current available datasets. Community organizations, institutions, and historic sites listed in 2016 LA County Datasets as well as national and regional historic data sources. Civic art collections and arts events listed in a crowd-sourced online database, river related 2016 arts festival, and LA County Datasets including the Department of Arts & Culture's Arts Datathon, which provides datasets sourced from current community partners (e.g. arts nonprofits) as well as collections research from national and academic institutions. Murals listed from LA County Datasets including the Department of Arts & Culture's Arts Datathon and UCLA Digital Collection. Source: Curate.LA, 2017; Current: LA Public Art Biennial, 2016; LA County GIS Data Portal, LA County Points of Interest Data, 2016; LA County GIS Data Portal, Historical Resources, 2015; LA County Open Data, LA County Civic Art Collection, 2017; LA County Open Data, Free Concerts in Public Sites, 2017; LA County Open Data, Community Arts Partners, 2012; National Register of Historic Places, 2014; LA Geohub, Historic Preservation Overlay Zones, 2019; LA Geohub, Historic Cultural Monuments, 2019; UCLA Digital Collections: Nancy Toval Murals of East L.A. Collection, 2018.

EXISTING COMMUNITY, ART, AND CULTURE

The LA River has been at the cultural and historical heart of LA. For millennia, it sustained Indigenous Peoples. At its confluence with the Arroyo Seco, Spanish colonists named the city of Los Angeles in 1781. Rancho-era vaquero culture persisted along the river among Californios and Indigenous Peoples, continued by recent generations of Latinx residents. As the metropolis has grown, the river has remained a community resource and source of water for its increasingly diverse population, 34% of which is now foreign born.

For the last half century, this major public space has captured the imagination of Angelenos. It has been a backdrop for dozens of feature films and countless videos, photo shoots, paintings, novels, poetry, musical scores, and more. Its banks have served as a projection screen and canvas and as a stage for spoken word, music, dance, and other collaborative practice performances. The LA River has been home to graffiti and street art for half a century that has enabled numerous at risk youth and gang members to develop their artistic skills into a pliable trade and professional career. The river

Figure 79. The LA River is a stage for dance and other performances. Source: Clockshop, evereachmore, https://clockshop.org/project/bowtie-aa/evereachmore/, 2015.

has been a conduit for foodways - a shared space for local food vendors, families picnicking, and small businesses. It has hosted ceremonial practices: Middle Eastern, Asian, and Native American cultures, for instance, go to moving waters for various celebrations. And, it has supported the functional arts, for example in Native American use of native seeds for musical instruments, plants for health, and materials for baskets. Riverside activities are numerous and continue to support myriad living cultural traditions. Though it is impossible to capture all of the intangible cultural events, practices, and community resources surrounding the LA River on one map, the figure above represents available data for tangible arts and culture assets in LA County, including cultural and performing arts centers, historic sites and bridges, places of worships, and civic art installations.

LA County Department of Arts and Culture is the primary countywide department that leads arts and cultural initiatives. In 2017, Arts and Culture published a report on their Cultural Equity and Inclusion Initiative, which focuses on inclusive cultural and arts programs for all residents of LA County.

While many jurisdictions have a "percent for art" policy that requires private construction or development projects to invest in public art, there is no single arts policy for the river and it is sometimes a complex process to get permits for art projects within the LA River right-of-way. Data for existing arts and culture is incomplete and would benefit from an updated approach to its inventory. While many of the municipalities along the LA River and LA County have historic preservation ordinances, most do not have active programs or staff to conduct surveys and landmark properties.

Among the hundreds of community and arts groups that are present along the river, there are over three dozen organizations and initiatives that focus on the river itself. These groups would benefit from better data and processes surrounding art and culture along the LA River. International and national organizations such as the National Resources Defense Council and The Nature Conservancy, along with regional institutions such as UCLA Luskin School of Public Affairs and UCLA's Sustainable LA Grand Challenges, Mountains Recreation & Conservation Authority (MRCA), and Heal the Bay, all have missions that intersect with the LA River. Organizations that focus on the entirety of the LA River include River LA and Friends of the LA River (FoLAR). Several groups focus on arts programming and community building along or around the LA River, such as Clockshop, ArtworkxLA, and Turnaround Arts. There are also grassroots organizations with an interest in environmental and social justice issues, such as Urban Semillas and Mujeres de la Tierra.

EXISTING ACCESS

Access, security, and safety are the preconditions for successful public use of the LA River. Currently, conditions reflect the legacy of development that historically turned its back to the river and the fragmented nature of investments that have begun to incrementally change this.

Trails along the LA River currently provide access to 32 of the 51 river miles. The county has hundreds of miles of proposed multiuse trails throughout LA County. This includes the closure of gaps in the bike paths along the LA River and Compton Creek. The longest continuous segments of the LA County River Bike Path are a 12-mile stretch between Imperial Highway and the mouth of the LA River at Long Beach and a 7-mile stretch along the Glendale Narrows.

The trails vary substantially in width and material as well, from a 17-foot-wide gravel path to an 8-foot-wide striped asphalt bikeway. This variability accentuates the lack of continuity in the river corridor. Users experience many paths rather than one. Therefore, as trail usage increases, it is possible that there may be more conflicts between users due to differences in speed and skill level—particularly where trails are narrow. Consistent visual and material surface cues, such as consistent paving materials and widths per each trail use, can help achieve a continuous, legible river corridor that serves a diverse set of users.

Along the LA River, access points take on many different forms. Following the advocacy that led to the LA River's designation as a federally protected waterway in 2010, there are now two sections of the river designated as River Recreation Zones created to allow access into the river for kayaking, canoeing, and fishin. One segment is a 1.7-mile section in the Narrows and the other a 2-mile section in Sepulveda Basin. One-hundred and five access points that allow the public to access the river were identified. These access points vary from well-signed trailheads to holes cut in the fence that runs adjacent to the river. Access points, like the path, tend to be located on one side of the river at a time, although 45% connect to the opposite bank via pedestrian-accessible bridges. Moreover, access points are not always connected by the street grid, which often becomes sparse or fragmented as it approaches the river. The issue affects users arriving by all modes: pedestrians, cyclists, motorists, or transit riders traveling the "last mile" between the nearest station and the access point. A continuous 51-mile trail along the LA River with improved and increased access points can help the river serve as an active and alternative transit mode for communities adjacent to the river and throughout LA County.

Access Along the LA River

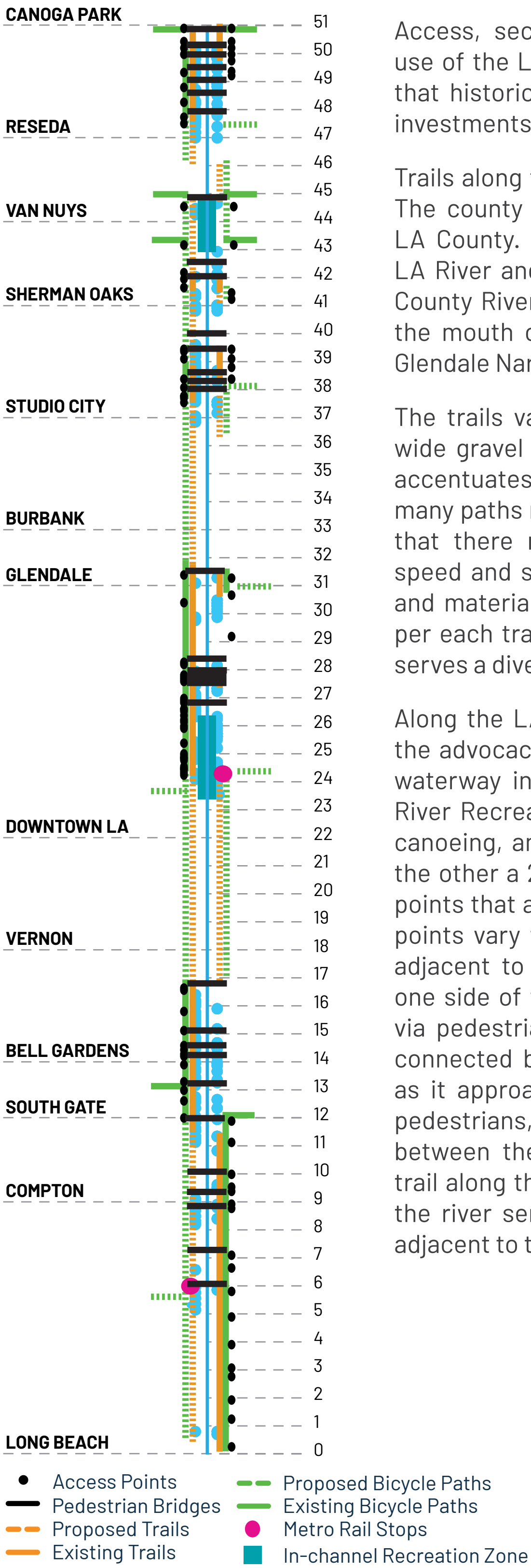


Figure 80. LA River Accessibility Composite. Source: Access Points, OLIN, 2018., Department of Parks and Recreation Trails, LA County Department of Parks and Recreation, https://egis3.lacounty.gov/dataportal/2015/12/30/department-of-parks-and-recreation-trails-2015/, 2015., DPR Trail Access Points, LA County Department of Parks and Recreation, https://egis3.lacounty.gov/dataportal/2016/06/06/dpr-trail-access-points/, 2016.

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BIKE AND MULTIUSE TRAILS ALONG THE LA RIVER

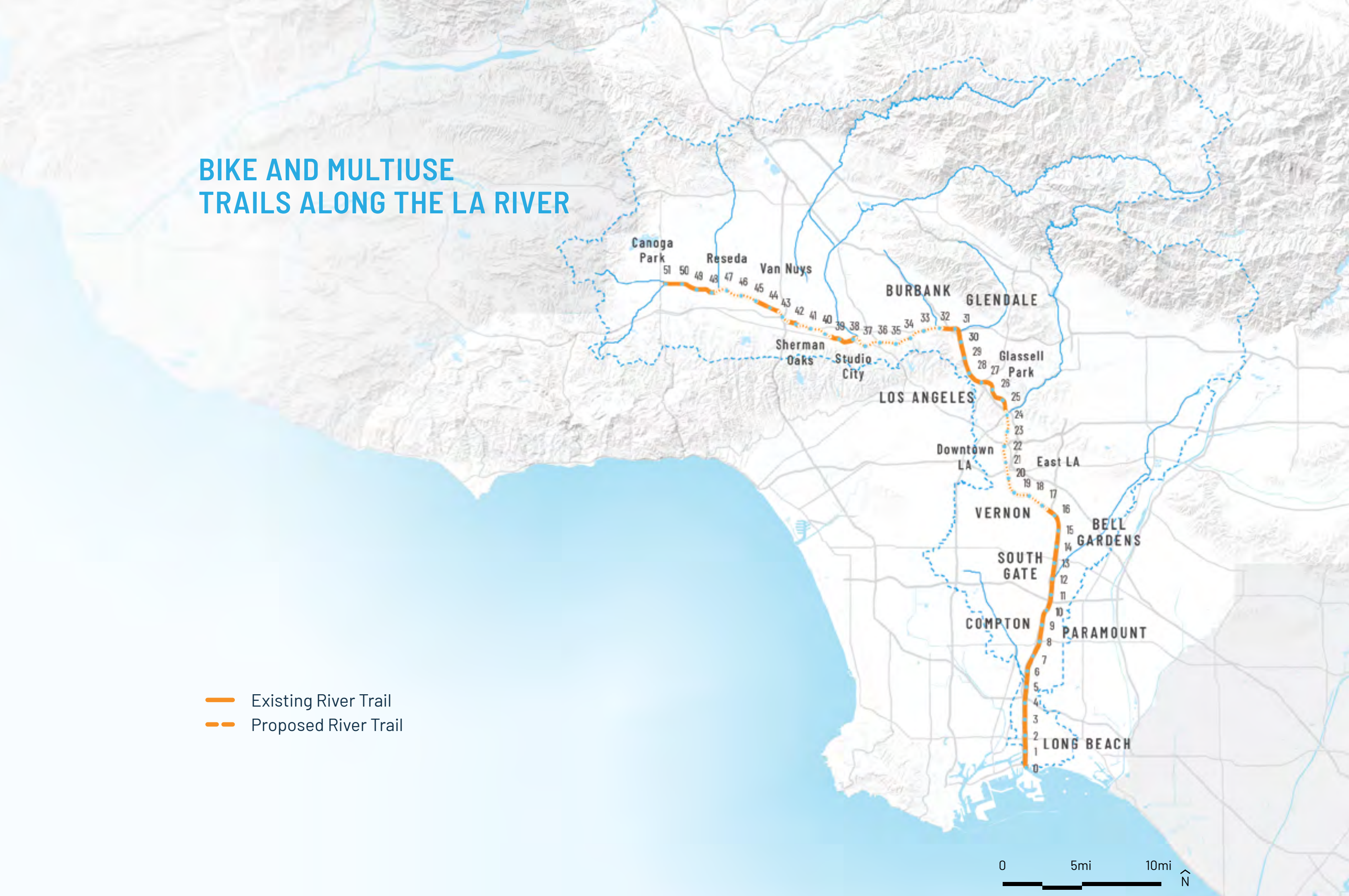

Figure 81. Bike and Multiuse Trails Along the LA River. Existing bikeways and multiuse trails provide access to 32 of the 51 river miles. Sources: City of LA, LA River Greenway, LA River Access and Points of Interest; OLIN, 2018.

Figure 82. (Left) Large lengths of the river are accessible via bike trails. Source: LA County Public Works, 2018.

Figure 83. (Middle) The LA River Trail can be a catalyst for local businesses along the river and in the adjacent communities. Spoke Bicycle Cafe, river mile 26.3. Source: OLIN, 2019.

Figure 84. (Right) Pedestrians often frequent the LA River trail for leisure, exercise, and during community events. SELA Cultural Arts Festival, River Mile 12.3 Source: LA County Public Works, 2018.

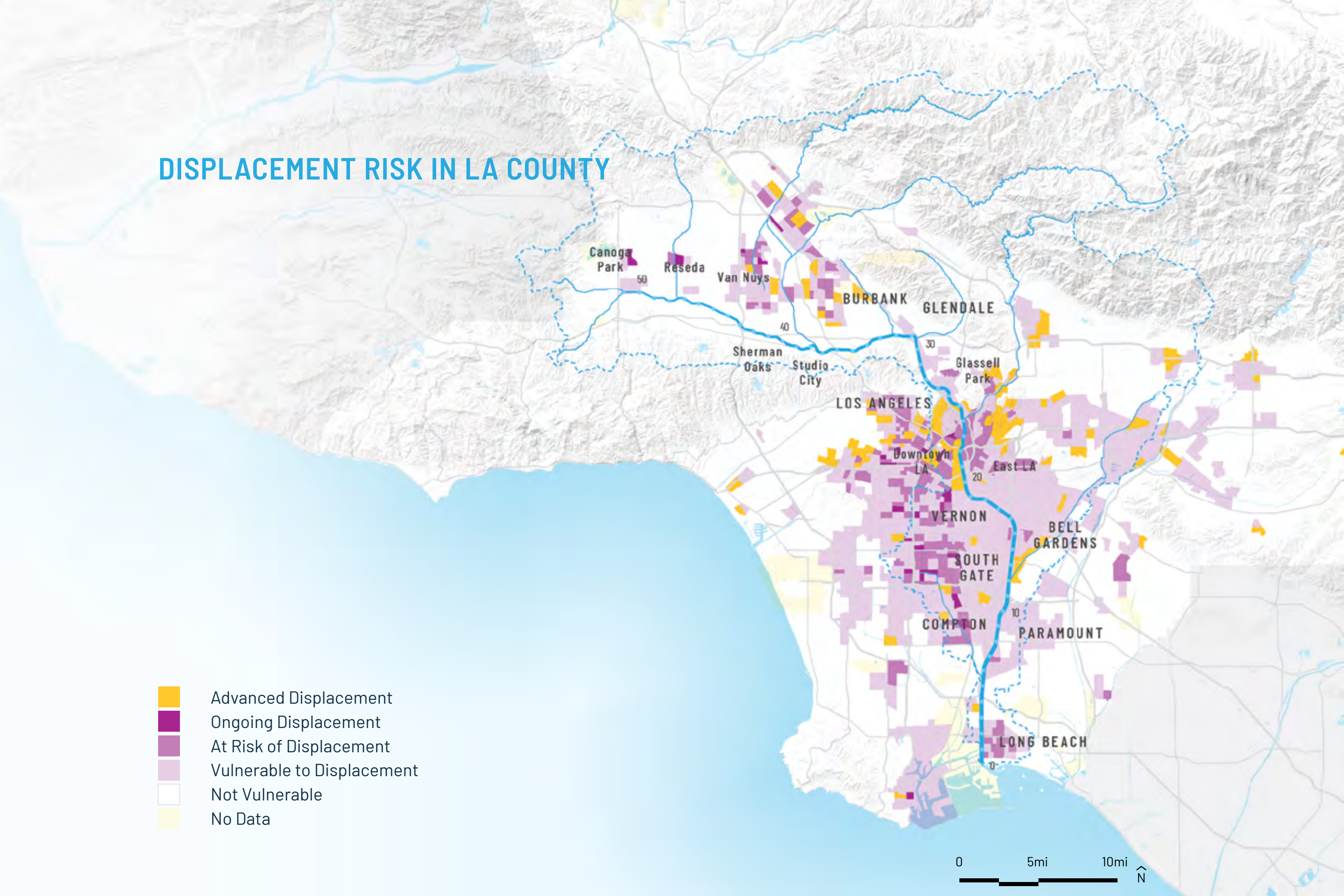

Figure 85. Displacement Risk in LA County. Displacement risk is most pervasive between Downtown LA and Long Beach. This map was developed based on research by the Urban Displacement Project. Source: Chapple, K., Loukaitou-Sideris, A., Waddell, P., Chatman, D., & Ong, P. (2017). Developing a New Methodology for Analyzing Potential Displacement.

EXISTING DEMOGRAPHICS

The most populous county in the country, LA County is a patchwork of diverse communities. The socioeconomic characteristics of the people who live in neighborhoods along the LA River vary greatly in terms of race and ethnicity, income, health, and education. Implementation of this plan must be context-sensitive and respectful of local conditions.

Between 2000 and 2016, the Hispanic population in the county inched closer to making up half the population, and the median age of residents increased from 32 to 36 years.[76][77] The average household in the county is made up of 3 people, and the median household income is about $57,900, down about 2% since 2000.[78][79] Households in communities along the LA River between Downtown LA and Compton tend to be larger (about 3.7 people per household) and have lower household incomes (around $43,000) than those along other parts of the river (about 3 people per household and around $67,000).[80]

While household incomes are decreasing, housing prices are going up. Since 2000, the median owner-occupied home value in LA County has risen by more than 50%, and the share of income that renters spend on housing has increased from 28% to 35%.[81][82] Even with rent control, about a third of renters in LA County are severely rent burdened, meaning they spend more than half of their income on rent.[83]

VULNERABLE TO DISPLACEMENT

AREAS WITH A HIGH SHARE OF VULNERABLE HOUSEHOLDS

High percentages of three of the following:

- Low-Income Households
- Non-College-Educated Adults
- Renters
- Non-White Households

AT RISK OF DISPLACEMENT

LOW INCOME AREAS WITH PROVEN RISK FACTORS

Vulnerable plus two of the following:

- Nearby Rail Station
- High % Pre-1950 Buildings
- High Employment Density
- Rents Rising Faster than County Average

ONGOING DISPLACEMENT

LOW INCOME AREAS THAT ARE CHANGING QUICKLY

- Low Income Area
- Growing Population
- Loss of Lower Income Population
- Rents Rising Faster than County Average

ADVANCED DISPLACEMENT

NOT CURRENTLY LOW INCOME BUT GETTING WHITER AND MORE EXPENSIVE

NOT a low income area plus above average growth in:

- College-Educated Adults
- White Population
- Median Income
- Rents

Figure 86. The mapping of displacement risk in LA County is broken down into four categories - areas vulnerable to displacement, areas at risk of displacement, areas ongoing displacement, and areas that are experiencing advanced displacement.

Figure 87. **In under-served communities, playgrounds and shade structures are infrequent.** Source: LA County Public Works, 2018.

Figure 88. **Artistic expression is one way that communities celebrate cultural identity.** Source: LA County Public Works, 2018.

Using a methodology developed by the University of California, Berkeley, available data was used to map displacement risk based on past and current conditions. Many communities along the river between Downtown LA and Compton are vulnerable to displacement, while others are already in a state of advanced displacement.

Affordable housing makes up 6% of housing units in LA County, yet the county would need more than 568,000 additional affordable homes to meet current demand. Despite a comprehensive set of programs, nearly 59,000 people in LA County are homeless.[84] [85] About three-quarters of this population is unsheltered, meaning they are not in traditional shelters, emergency shelters, or safe haven housing.

About $25 billion is spent on addressing chronic disease in LA County every year, and about 60% of adults in the county are either obese or overweight.[86] [87] Chronic health conditions, including obesity and diabetes, are more acute between Compton and Long Beach.

The California Office of Environmental Health Hazard Assessment's CalEnviroScreen 3.0 ranks the burden of and vulnerability to pollution across California. Communities along the LA River in Canoga Park and from Burbank south are more burdened than 90% of communities across the state.

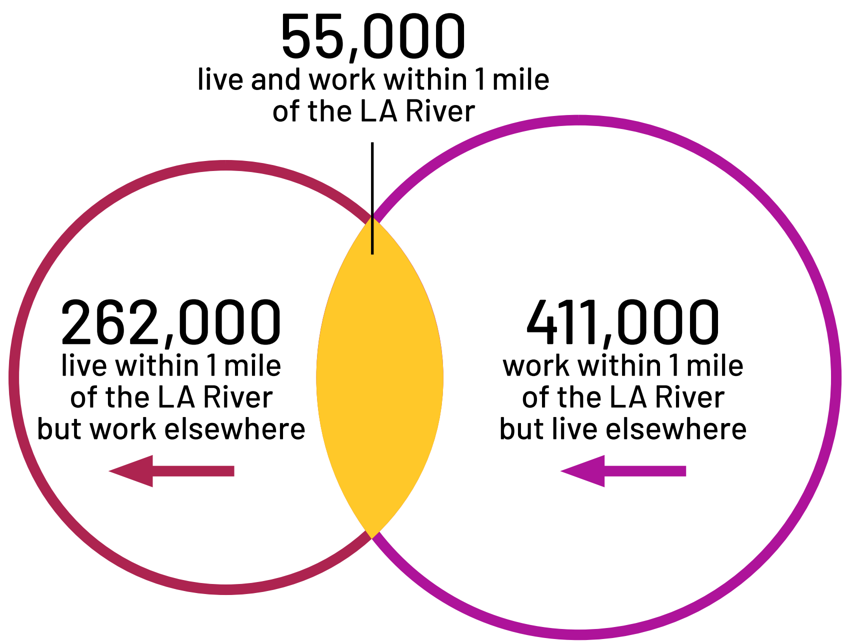

Figure 89. There are 55,000 people that live and work within 1 mile of the LA River. Source: OLIN, 2019.

Between 2002 and 2015, the largest job sectors within one mile of the river have shifted. Jobs in manufacturing declined 35%.[88] More than making up for this decline were the rise in jobs in public administration and jobs in health care and social assistance, which went up by 116% and 81%, respectively.[89] Within one mile of the river, there are larger shares of jobs in information, public administration, and transportation and warehousing and smaller shares of jobs in retail, accommodation and food services, and educational services compared to all of LA County.[90]

Over 466,000 people work within one mile of the LA River. Most (88%) of the people who have these jobs commute to the river from other parts of LA County, Orange County, and beyond.[91] Similarly, of the 317,000 working people who live within one mile of the LA River, most (83%) work elsewhere—the largest job destinations being Downtown LA, the Bob Hope Airport, and the various studios along the river. Few people both live and work within one mile of the river.[92]

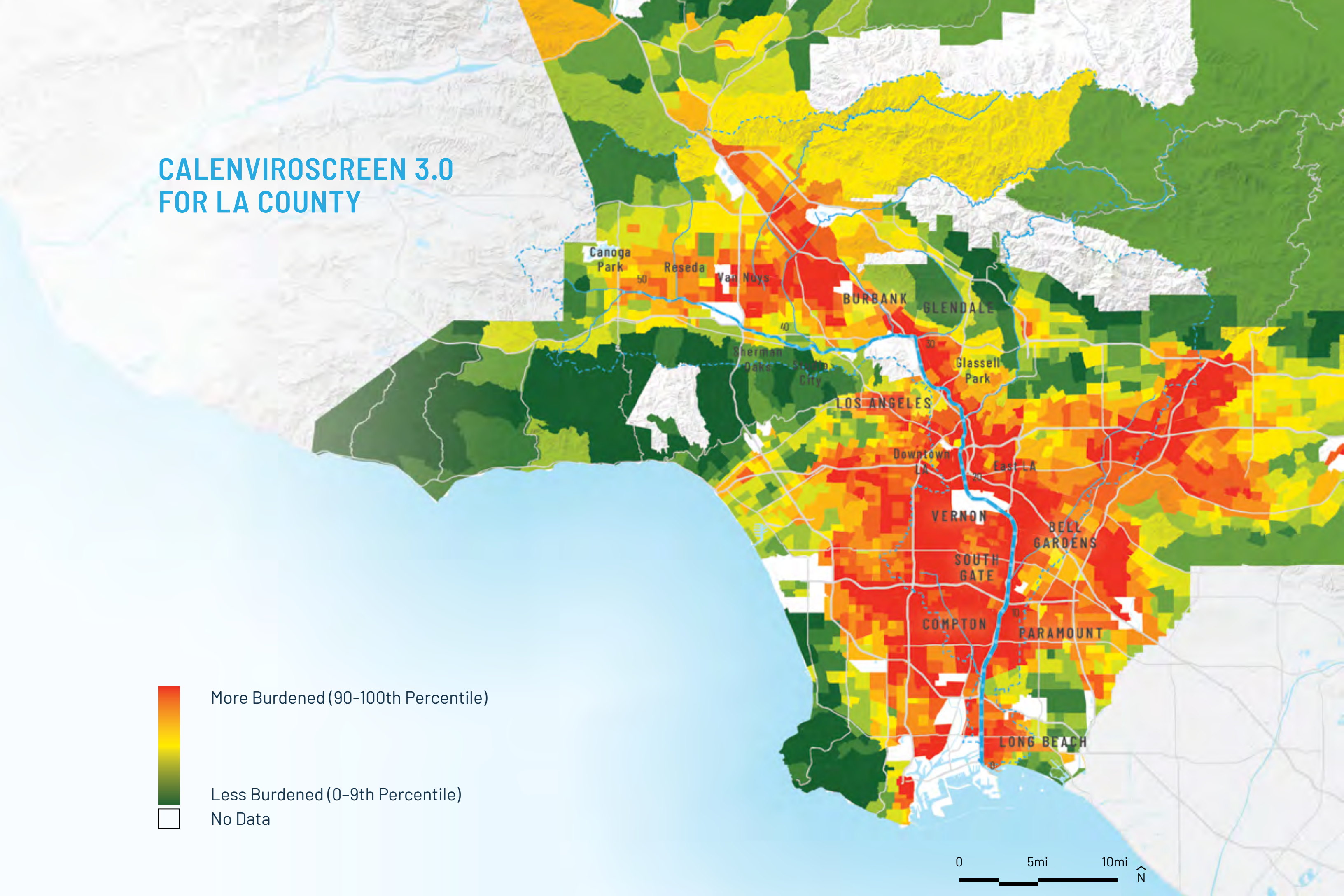

Figure 90. **CalEnviroScreen 3.0 for LA County. The southern half of the river is more highly burdened by environmental and health hazards.**
Source: Social Vulnerability to Climate Change, Pacific Institute, https://pacinst.org/reports/climate_vulnerability_ca/maps/, 2012.

EXISTING SUSTAINABILITY AND RESILIENCY

The related topics of resilience and sustainability encapsulates a fundamental duality that is the LA River: a vital resource to sustain and a dynamic risk to manage. Excess land in the right-of-way as well as adjacent vacant and publicly owned lots offer opportunities for resource generation and community services. However, the river as a resource must be balanced by acknowledging the river as a risk. Currently some portions of the river channel do not privide 1% flood capacity, and large swaths of land and critical infrastructure and facilities along the river remain susceptible to flooding.[93]

The LA region is categorized as a Mediterranean climate, with ample sunshine and hot and dry summers and relatively cool and wet winters. The same elements responsible for this temperate mean climate also contribute to large annual fluctuations in extreme precipitation, prolonged drought, and extreme heat.[94] The channelization of the LA River has been largely successful in managing the risk of extreme flooding events; however, climate change projections indicate a "threefold increase in sub-seasonal (extreme precipitation) events comparable to California's Great Flood of 1862" by 2100.[95]

Additionally, increases in extreme heat due to climate change combined with the rising impacts of the urban heat island effect could mean that many portions of the LA River will see substantial increases in the number of days with temperatures above 95°F.[96] Studies have indicated there are an estimated 19-25 deaths a year and over 2000 emergency room visits in LA County linked to extreme heat. Providing ample shade structures, sites for cooling and potable water, and connecting communities to the river beneath an increased urban tree canopy will all help in making a more sustainable and resilient public open space along the river.

As potential public open space, the LA River channel and right-of-way consist of over 2,396 acres.[97] While much of this is within the banks of the channel, barren and underutilized lands outside the channel in the right-of-way can be part of a network of parks, stormwater wetlands, and habitat areas, but also intermixed with sites for power generation, urban agriculture, and new community facilities.

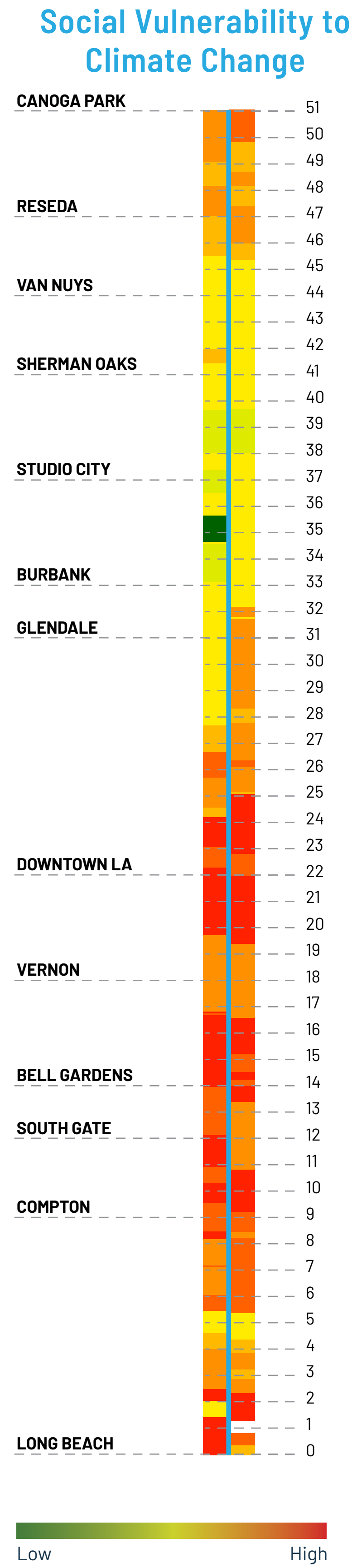

Figure 91. (Right) Social vulnerability to climate change is greatest on the lower half of the LA River. Source: Social Vulnerability to Climate Change, Pacific Institute, https://pacinst.org/reports/climate_vulnerability_ca/maps/, 2012.

URBAN HEAT ISLAND IN LA COUNTY

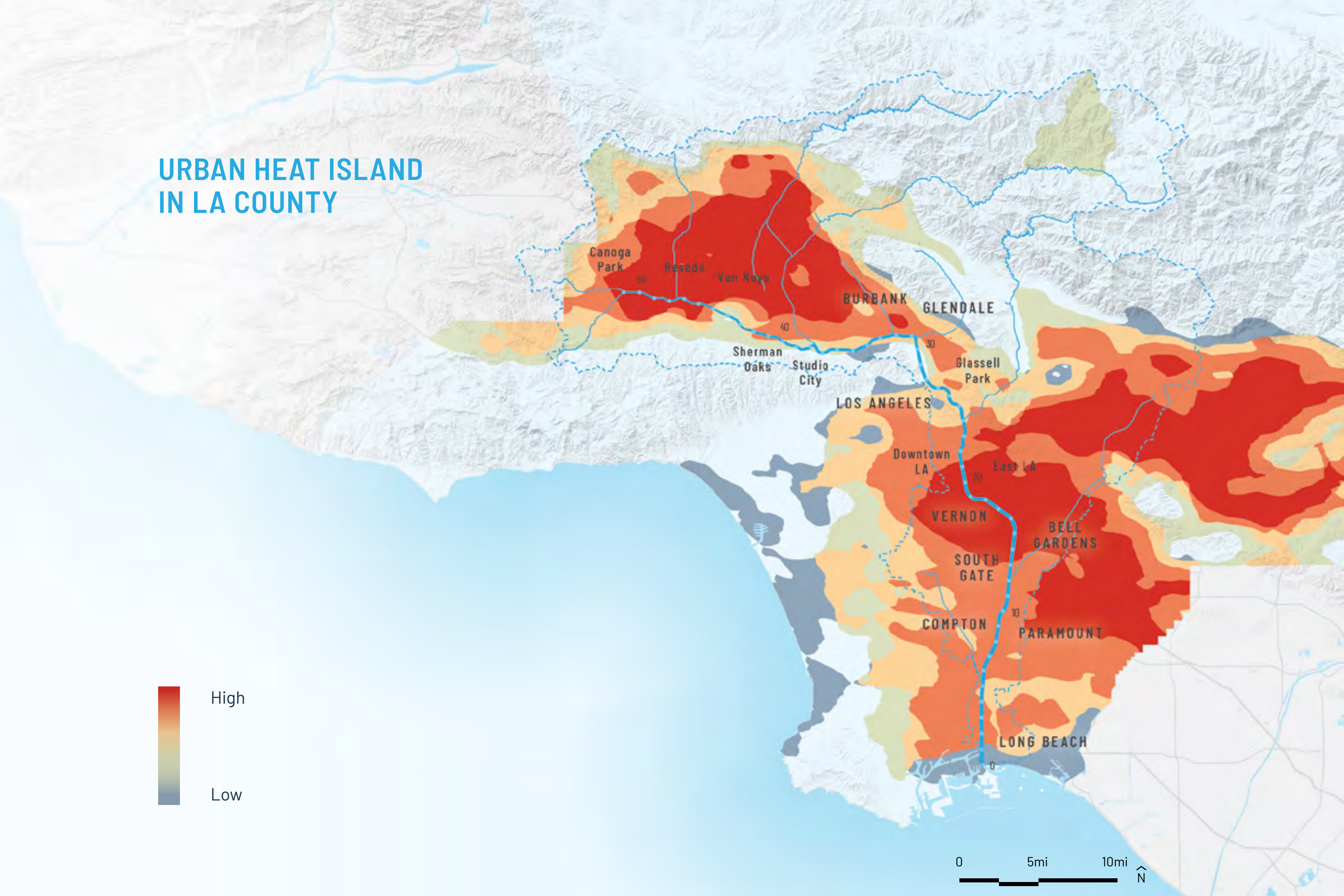

Figure 92. Urban Heat Island in LA County. Urban heat islands within LA city limits are determined by having elevated daytime land surface temperatures (LST) that average at least 1.25 degrees Fahrenheit above the mean daily temperature during July and August of 2015. Source: Trust for Public Land, Climate Smart Cities Los Angeles, 2016.

Recently, sustainability and resilience planning in the county has been addressed through the Los Angeles Countywide Sustainability Plan, "Our County" (adopted 2019), Los Angeles County Community Climate Action Plan (2015, currently being updated), Los Angeles County Office of Emergency Management, and the All Hazard Mitigation Plan (2014). These county efforts are joined by resiliency planning, climate action plans, and sustainability plans at the municipal level. Collectively, these resilience and sustainability planning efforts help collect and implement policies and projects that will ensure the long-term vitality of the region, and therefore should be integrated with planning efforts along the LA River where appropriate.

The resources in and around the LA River should be sustained to guarantee welfare and promote equity for current and future generations. In a region that is both arid and increasingly short on available land, an underutilized 51-mile river corridor presents an incredible opportunity to create new multi-benefit uses that enhance resiliency and quality of life of river adjacent-communities and the region as a whole.

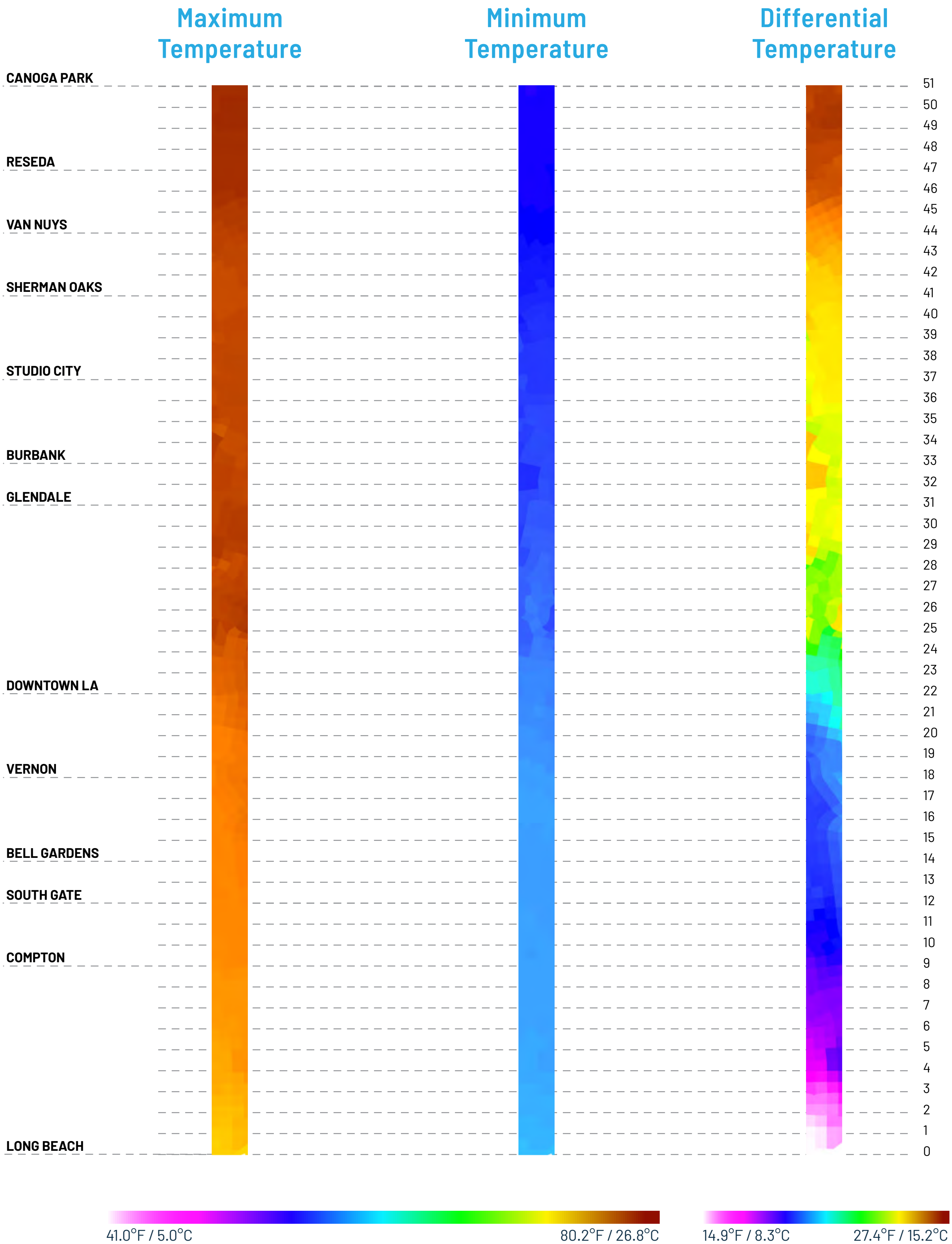

Figure 93. Temperature varies throughout the LA River corridor with the most extreme range of temperatures occurring in the San Fernando Valley.
Source: PRISM Climate Group, Oregon State University, 30-yr Normal Maximum Temperature: Annual, 2015.

SOFT BOTTOM MAINTENANCE: INVASIVE SPECIES

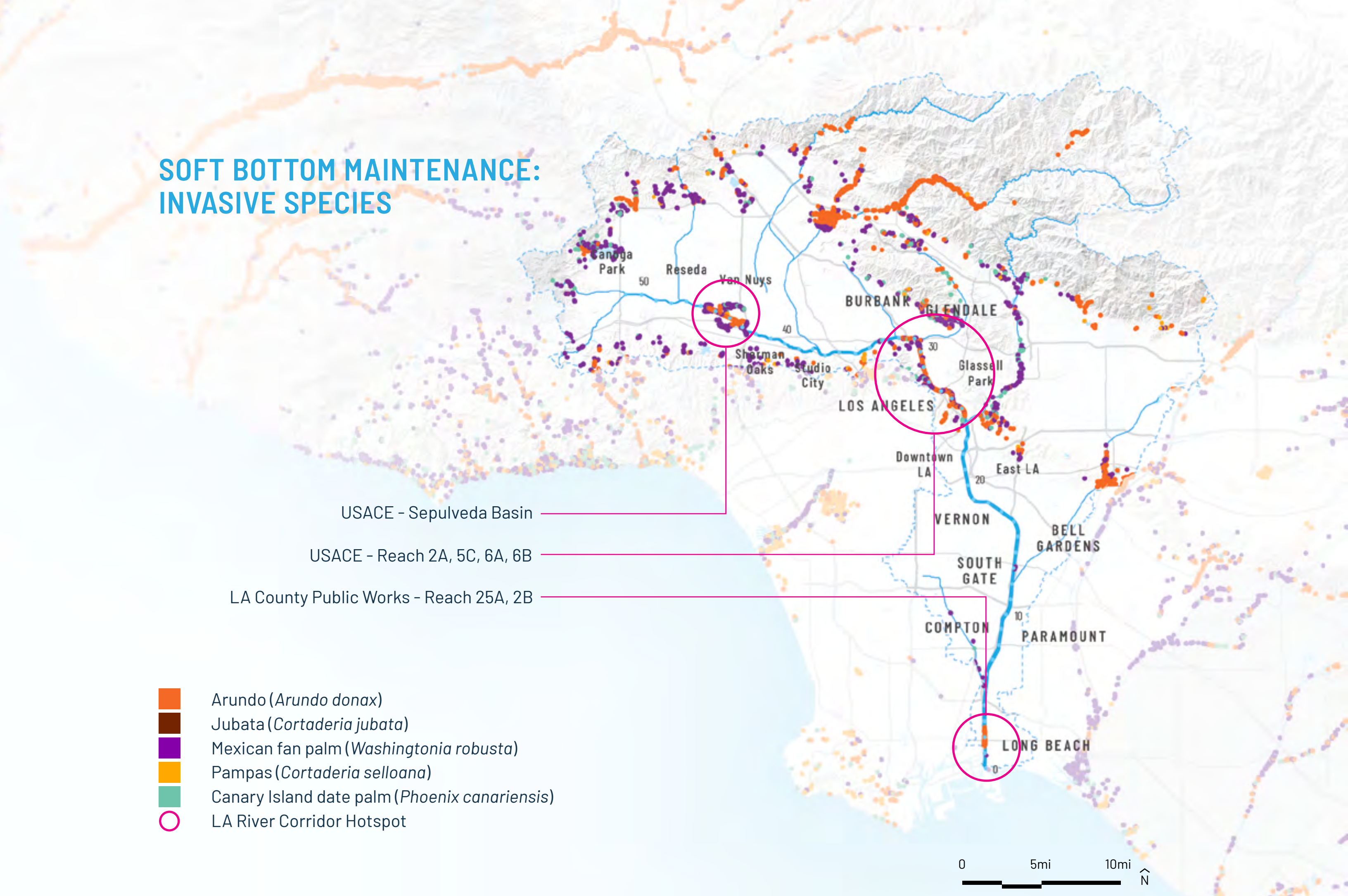

Figure 94. Soft Bottom Maintenance - Invasive Species. Invasive species management is targeted in these three locations, but is an ongoing issue across all 51 miles of the LA River. Source: State of California, Invasive Plants (Species) - Central and So. Cal Coastal Watersheds [ds645], 2009.

EXISTING OPERATIONS AND MAINTENANCE

Although channelization began in the 1800's, the LA River as we see it today was modified to serve as a flood management system in the 1930s after multiple serious flood events resulted in loss of life and excessive damage to the channel, surrounding infrastructure, neighborhoods, and cities. To accomplish this, Congress granted authority to the US Army Corps of Engineers (USACE) and the LA County Flood Control District (LACFCD) to construct and maintain flood management structures consisting of dams, debris basins, levees, and channels. The resulting LA River consists of 51 miles of concrete-lined and earthen sections. Currently, the USACE maintains approximately half of the LA River, while the LACFCD maintains the other half. In addition to the channel, the typical LA River right-of-way includes flood management structures such as levees and access roads. In some sections, various recreational amenities such as bike paths, parks, and trails are found within the right-of-way, while in other areas these amenities are directly adjacent to the right-of-way. Recreational amenities are primarily maintained by municipal and other public entities and/or other special interest groups through flood permits and right-of-way use agreements. The current operations and maintenance (O&M) activities implemented by entities along the river were evaluated by reviewing available O&M documentation, meetings with the USACE and LACFCD personnel, and performing visual assessments of the LA River.

The LACFCD and the USACE primarily maintain channel linings, outfalls, subdrain systems, levees, vegetation, and access within the limits of the embankments. These two agencies also oversee various entities with O&M obligations, primarily for recreational amenities, within the LA River right-of-way. In general, the O&M activities are managed by both agencies during routine, as-needed, or emergency basis. O&M along concrete-lined channels primarily focuses on the structural integrity of the channel. Soft-bottom (earthen-channel) O&M primarily focuses on the structural integrity of the channel walls and on channel flood capacity through invasive vegetation (such as Arundo donax) and sediment management and removal. In total, there are approximately 36 miles of concrete-lined channels and 15 miles of earthen channels.

The primary O&M challenges noted by both agencies consist of obstructed channel access, encampments of persons experiencing homelessness, encroachment issues, and regulatory hurdles (e.g., permitting from environmental resource agencies). In addition, insufficient funding, sedimentation, and vegetation management were stated as primary challenges for the USACE, and fence maintenance was stated as another primary challenge for the LACFCD. The results of this assessment, above all, illustrate the immense scale and complexity of the O&M responsibilities of the LA River. All projects proposed by the LA River Master Plan Update should be planned with clear long-term O&M strategies to ensure the physical feasibility and future success of projects along the river.

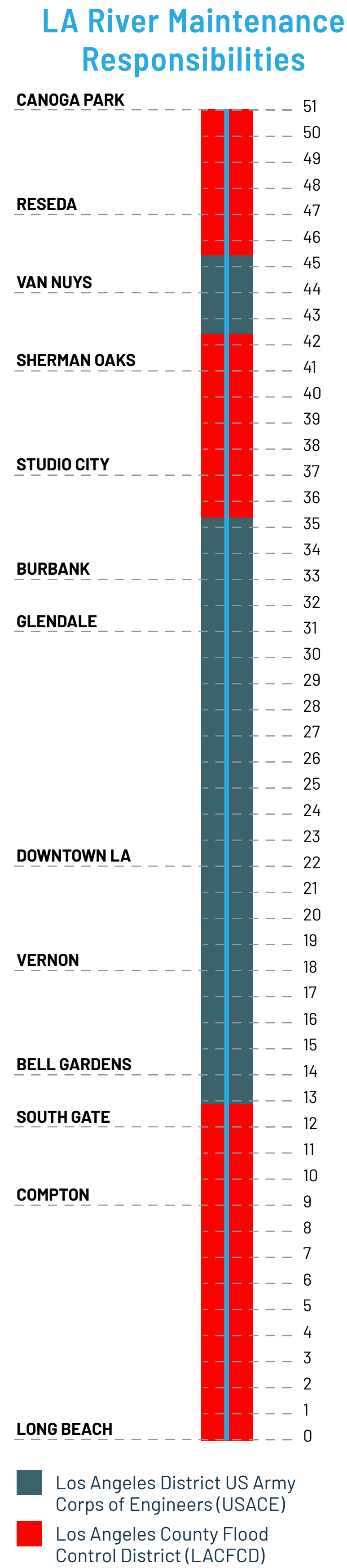

Figure 95. (Right) Major maintenance responsibilities are split between LACFCD and USACE. Source: LA County Public Works, GIS Maintenance Map, 2016.

Figure 96. Visitors to the SELA Arts Festival enjoy the views of the LA River at river mile 11.8. Source: LA County Public Works, 2019.

5.
ENGAGEMENT SUMMARY

THE LA RIVER MASTER PLAN USED A VARIETY OF METHODS TO ENGAGE PEOPLE ACROSS THE COUNTY

At every step of the process to update the LA River Master Plan, LA County provided opportunities to inform and engage the public. This two-way communication strategy employed a variety of media and activities across the county to ensure that resident concerns and aspirations across geographic, language, and accessibility spectrums were recognized and reflected in the plan.

ENGAGEMENT PROCESS

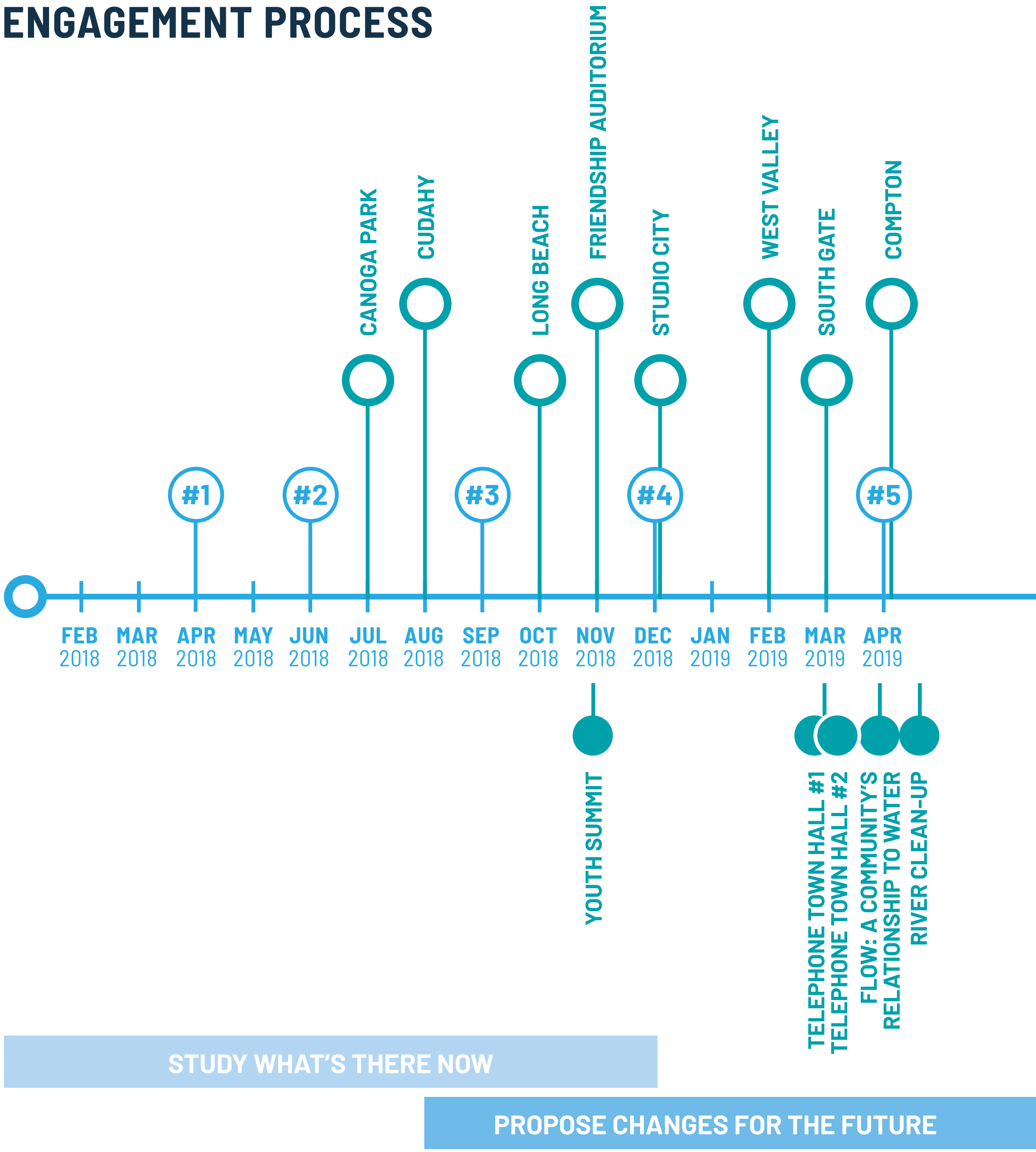

Figure 97. Community meetings, Steering Committee meetings, and other events provided opportunities for engagement throughout the planning process.

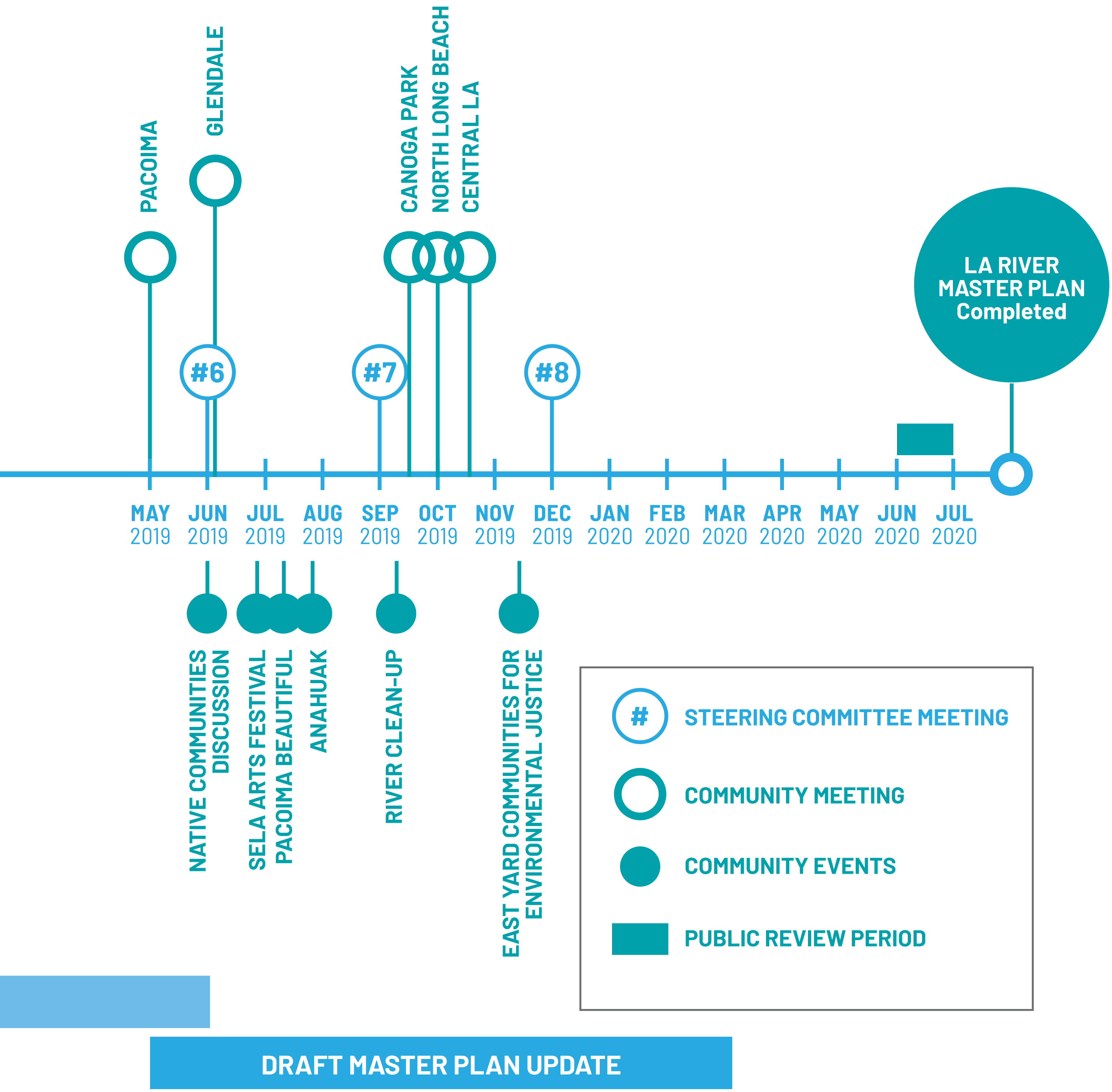
PACOIMA
GLENDALE
CANOGA PARK
NORTH LONG BEACH
CENTRAL LA
LA RIVER MASTER PLAN Completed
#6
#7
#8
MAY 2019
JUN 2019
JUL 2019
AUG 2019
SEP 2019
OCT 2019
NOV 2019
DEC 2019
JAN 2020
FEB 2020
MAR 2020
APR 2020
MAY 2020
JUN 2020
JUL 2020
NATIVE COMMUNITIES DISCUSSION
SELA ARTS FESTIVAL
PACOIMA BEAUTIFUL
ANAHUAK
RIVER CLEAN-UP
EAST YARD COMMUNITIES FOR ENVIRONMENTAL JUSTICE
#
STEERING COMMITTEE MEETING
COMMUNITY MEETING
COMMUNITY EVENTS
PUBLIC REVIEW PERIOD
DRAFT MASTER PLAN UPDATE

Figure 98. Opportunities for community members to provide input were instrumental to community meetings. Source: LA County Public Works, 2018.

COMMUNITY MEETINGS AND SURVEYS

A cornerstone of the engagement strategy was community meetings and surveys. The meetings and surveys were split into three rounds of engagement:

- Round 1 focused on presenting current conditions along the river and gathering feedback on issues of concern
- Round 2 focused on following up on key issues that emerged at previous meetings, prioritizing goals, and getting location-specific input about current and aspirational connections to the river to help fine-tune recommendations
- Round 3 focused on presenting cumulative input from the first two rounds and providing an immersive walk-through of the Master Plan components

Each community meeting started with a brief presentation, followed by an open house. The open house included various informational and feedback stations. This format allowed participants to review materials and offered opportunities for them to have one-on-one conversations with LA County staff and members of the consultant team as well as representatives from local elected offices, who were in attendance at many of the meetings. All materials were presented in English and Spanish.

Figure 99. **Each community meeting began with a presentation on plan progress.** Source: LA County Public Works, 2018.

Figure 100. **Community meeting participants were asked to record where they live on a large map that traveled from one meeting to the next.** Source: LA County Public Works, 2018.

1,306

Community Participants Across 13 Community Meetings

1,650

Completed Online and In-Person Surveys

Figure 101. At the LA River Youth Summit, high school students wove together a map of the LA River that was cut into vertical and horizontal strips.
Source: LA County Public Works, 2018.

YOUTH SUMMIT

The youth in LA County are our communities' future leaders, and transformation of the LA River must include their perspectives. Eight hundred students from high schools along the river attended a Youth Summit, where they had an opportunity to network and learn from their peers while they discovered how their everyday life experiences relate to the LA River Master Plan. The goal was to have students learn about opportunities for civic action within their communities through the following topics: access and mobility, art, community science, hydrology, LA River watershed, Native Peoples, planning and design, and recreation and safety.

Students took a survey before and after the event to gauge changes in knowledge about and interest in the LA River. Before the summit, 71% of students were interested or somewhat interested in the future of the LA River, and 80% were interested or somewhat interested in helping make the river better. After the summit, these numbers rose to 91% and 90%, respectively.

800

Youth Summit Participants

Before the Youth Summit

71%

of students were interested in the future of the LA River

After the Youth Summit

91%

of students were interested in the future of the LA River

TELEPHONE TOWN HALLS

Two telephone town halls were conducted to expand outreach to those who were unable to attend community meetings and are less likely to see digital ads, particularly older populations. Speakers and a moderator guided the discussion in English with prepared remarks and answered questions and comments from the audience. Polling questions were used to gauge audience priorities. One telephone town hall covered the southern portion of the river from Downtown LA to Long Beach, and one covered the north and west from Downtown LA to Canoga Park. Nearly 5,600 people participated, with over 500 participants on the line at any given time.

542

Participants on the line at one time

5,592

Total participants

36,946

Households called within a half mile of the river

MARCH 12, 2019

Long Beach to Downtown LA

MARCH 13, 2019

Downtown LA to Canoga Park

90% OF TELEPHONE TOWN HALL PARTICIPANTS WERE OVER THE AGE OF 40

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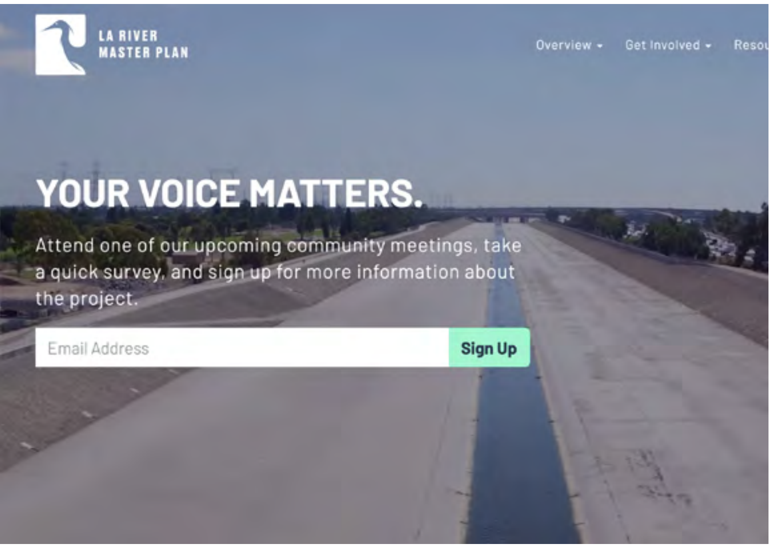


WEBSITE

The LA River Master Plan website functioned as a digital archive for the master planning process, a bulletin board for upcoming meetings and events, and a portal to digital surveys. The website provided access to all public presentations, digital mapping, technical memos, research, and drafts of the Master Plan document. Moving forward, the website will be home to an interactive version of the Master Plan. Visit the Master Plan website at www.larivermasterplan.org.

DIGITAL ENGAGEMENT

Social media posts, social media ads, and a monthly email communicated the breadth of river-related issues, the planning process, and engagement opportunities to a wide, diverse audience.

981,898

Digital Ad Impressions

RIVER STORIES

Stakeholders ranging in age and level of involvement with river-related advocacy were interviewed about their personal connections to the river. Videos of these interviews, called River Stories, were posted on the Master Plan website and screened at community meetings and events.

Figure 102. **(Top) The Master Plan website provided similar opportunities to provide input as those available at community meetings.** Source: OLIN, 2018.

Figure 103. **(Middle) The Youth Summit provided the opportunity to hear from students from around the county.** Source: OLIN, 2018.

Figure 104. **(Bottom) Indigenous community elders and leaders spoke of the importance of the river to their histories and cultures.** Source: LA County Public Works, 2019.

Figure 105. Residents, advocates, and community leaders spoke about their connections to the LA River in their own words in a series of eight filmed River Stories. Source: LA County Public Works, 2018-2019.

COMMUNITY PARTNERS

In addition to the various means of engagement that LA County organized directly, the County also involved regional and local community partners to personalize stakeholder and neighborhood engagement events and to reach additional residents who are part of their networks. The community partners' unique events included pop-up sidewalk and park activations, educational activities, data gathering, and other events. The following community partners led events, a selection of which are summarized below.

- Resource Conservation District of the Santa Monica Mountains
- Pacoima Beautiful
- Fernandeños Tataviam Band of Mission Indians
- Gabrielino-Tongva Tribe
- Anahuak
- From Lot to Spot
- East Yard Communities for Environmental Justice
- Friends of the LA River
- Las Fotos Project
- Weaving the River

Flow: A Community's Relationship to Water

Las Fotos Project is a program that helps teenage girls from communities of color express themselves through photography. In connection with the LA River Master Plan, Las Fotos participants investigated connections between the LA River, surrounding communities, and the LA region's relationship with water. Traveling up and down the river and examining their own as well as community connections to water, the participants interviewed key stakeholders and chronicled historical lessons and cultural stories through their camera lenses, journals, and an online map of each of the locations they visited. The culmination of their work was an exhibition titled "Flow: A Community's Relationship to Water."

Native Communities Discussion

The history of Indigenous Peoples and Tribes in LA County was largely lost due to Spanish missions and, later, American settlers who took over the land, changed place names, stifled cultural practices, and overwrote the history. Much of this history is not written. The contemporary issues facing tribes today and their current work to address these issues, which include cultural practices that involve the LA River and the larger watershed, are either unknown or ignored by the general public. The Native Communities Discussion offered an opportunity to hear directly from tribal elders and leaders about the failures of previous planning efforts to practice deep engagement with their communities. They recommended ways to practice deep engagement as well as how to build relationships, collaborate, and provide spaces for tribal ceremonies and religious practices along the river.

Anahuak Community Event

Organized by the Anahuak Youth Sports Federation, this community meeting reached elders, young families, and high school students who participate in the federation's youth sporting events. The meeting was conducted entirely in Spanish and facilitated input on access, cultural events, and a vision for the LA River. Despite the many time-consuming commitments to the recreational activities already organized by Anahuak each year and even earlier that day, attendees filled the community meeting room where the meeting was held to discuss opportunities to engage with the LA River. Common themes included safety, programming for youth, housing advocacy, and opportunities to highlight Mexican culture.

Pacoima Beautiful Community Event

Pacoima Beautiful is a grassroots environmental justice organization that provides education, impacts public policy, and supports local arts and culture in order to promote a healthy and sustainable San Fernando Valley. The organization hosted a community meeting that was well attended by high school students who were participating in a 3-week leadership academy. Following the memorable activities involved in their leadership academy, many of the students expressed a continued desire to engage with the LA River through Pacoima Beautiful by developing programs at their high schools or attending future events and programs along the river. Across the breakout group discussion, common themes included addressing safety, incorporating art and food along the river, and organizing river cleanups.

East Yard Communities for Environmental Justice Community Event

East Yard Communities for Environmental Justice is a community-based organization that advocates for and prepares community members in East LA, Southeast LA, and Long Beach to engage in decision-making processes that impact their health and quality of life. The organization led a community meeting attended by seniors, young families, and high school students to learn about the LA River Master Plan and brainstorm about impacts of the plan on their communities. East Yard facilitated group discussions organized by geography to discuss housing stability and community stabilization.

Figure 106. (Top) The Las Fotos Project's "Flow: A Community's Relationship to Water" exhibit showcased photography by teenage girls from communities of color.
Source: OLIN, 2019.

Figure 107. (Middle) The East Yard Communities for Environmental Justice Community Event featured a presentation on plan goals, actions, and methods including housing stability.
Source: OLIN, 2019.

Figure 108. (Bottom) Breakout sessions with high school student participants of Anahuak Youth Sports brainstormed about how they can connect their communities to the LA River.
Source: OLIN, 2019.

Figure 109. Steering Committee meetings provided a forum for the County to receive feedback from representatives from cities and organizations along the river throughout the planning process. Source: LA County Public Works, 2018.

STEERING COMMITTEE MEETINGS

Eight Steering Committee meetings were held at LA County Public Works headquarters in Alhambra and were open to the public and promoted on the home page of the Master Plan website. Attendees included staff and volunteers from the organizations represented on the Steering Committee, staff from LA County's other departments, and the general public. Time was set aside at the end of each meeting for questions and comments from the public. Attendee comments ranged from specific topics presented at each meeting, such as wording for the goals to broader attitudes about the LA River—for example,its responsibility to improve ecology within the watershed. Comment cards were also available for written feedback and shared with all members and the technical team.

Figure 110. The second annual SELA Arts Festival, located at river mile 10.7, used the LA River as a stage and backdrop for music, food, activities, and exhibits. Source: LA County Public Works, 2019.

Figure 111. Attendees of the SELA Arts Festival had an opportunity to fill out a paper version of the survey available on the Master Plan website. Source: LA County Public Works, 2018.

CULTURAL AND COMMUNITY CONNECTIONS THRIVE ALONG THE LA RIVER

Figure 112. (Left) The Cudahy Park Community Meeting open house encouraged participants to explore the analysis phase of the LA River Master Plan. Source: OLIN, 2018.
Figure 113. (Middle) The Youth Summit included workshops organized by leadership from Indigenous Communities along the LA River. Source: OLIN, 2018.
Figure 114. (Right) The SELA Arts Festival invited thousands of people into the river channel for a unique opportunity to experience the river while interacting with local artists, community organizations, and municipal departments. Source: OLIN, 2019.

KEY PUBLIC ENGAGEMENT TAKEAWAYS

Across the various methods of engagement, common themes and sentiments emerged. The following are key takeaways from the engagement process.

MOST IMPORTANT ISSUES

When asked to rank various issues related to the LA River, participants identified the following five issues as most important:

- **protecting vulnerable plants and animals**
- **supplementing water supply**
- **creating healthy, socially connected communities**
- **addressing homelessness**
- **access to arts, culture, education, and recreation**

Figure 115. (Left) The South Gate Community Meeting, from round two of the engagement process, featured results from round one and follow-up questions during the open house. Source: OLIN, 2019.
Figure 116. (Middle) The Native Communities discussion opened with a traditional blessing, song, offering, and land acknowledgment. Source: OLIN, 2019.
Figure 117. (Right) The Glendale Community Meeting asked attendees to locate where they would prefer river access points and to identify existing flood risks near their community's stretch of the LA River. Source: OLIN, 2019.

ACTIVITIES ALONG THE LA RIVER

Along the river, the most common activities people participate in are walking and biking, with participation 2-3 times as much as the next most common activities, which include nature watching/citizen science, community gatherings/events, and river clean-ups.

WHAT KEEPS PEOPLE FROM THE LA RIVER

Safety concerns were identified by 61% of participants as a reason they do not visit the LA River. The specific types of safety concerns community members elaborated on ranged from encountering persons experiencing homelessness to absence of lighting to lack of a visible presence of people patrolling the river. Other widely shared reasons participants cited for not visiting the LA River include that it is not well maintained, it lacks restrooms and activities, people do not know where to access the river, and people don't know what is at the river channel.

FLOODING

More than half of participants have seen the LA River channel at least halfway full. Only 6% of participants have ever seen the water overtopping the banks/levees.

CONNECTIVITY AND ACCESS PRIORITIES

Not surprisingly, as many participants responded that their most common activity along the LA River is walking and biking, they also expressed a desire to connect existing trails and increase access on both sides of the river channel with additional bridges. This corresponds with two-thirds of access points being unsigned and only 70% connected to sidewalks.

HOUSING PRIORITIES

While participants expressed a desire for more parks as well as greater amenities along the river for recreation, they also wanted to know how the improvements would impact housing affordability, which is a serious and deeply felt concern for all communities in LA County.

EDUCATION PRIORITIES

Survey participants felt it was most important for people to learn about how the river benefits and supports the environment (38%); ecology, habitat, and vegetation (33%); and current hydrology and uses of the river (21%). `

Figure 118. This aerial view at approximately river mile 20.5 looks downstream toward Vernon, with the 10 Interstate crossing the LA River.
Source: Geosyntec, 2012.

SECTION III: **THE FUTURE OF THE LA RIVER**

DRAFT

Figure 119. Users at night are welcomed by unique lighting and events. Source: LA County Public Works, 2018.

DRAFT

6. GOALS, ACTIONS, AND METHODS

NINE GOALS ARE SUPPORTED BY ACTIONS AND METHODS TO SET THE STRATEGIC DIRECTIONS FOR THE LA RIVER

The 2020 LA River Master Plan is based on a goal-driven framework which ensures that the plan's recommendations are closely tied to their potential to achieve the broader Master Plan's nine goals. The needs analysis was developed through a comprehensive evaluation of criteria identified in the plan's existing conditions inventory and analysis for assessing each goal along the 51 miles of the LA River. This identified areas of general to very high need relative to each goal. The plan's strategic directions are a framework built around the plan's nine goals, each of which is an active priority for the future of the river and is explained by rationale that weaves together analysis and community input gathered throughout the Master Plan process.

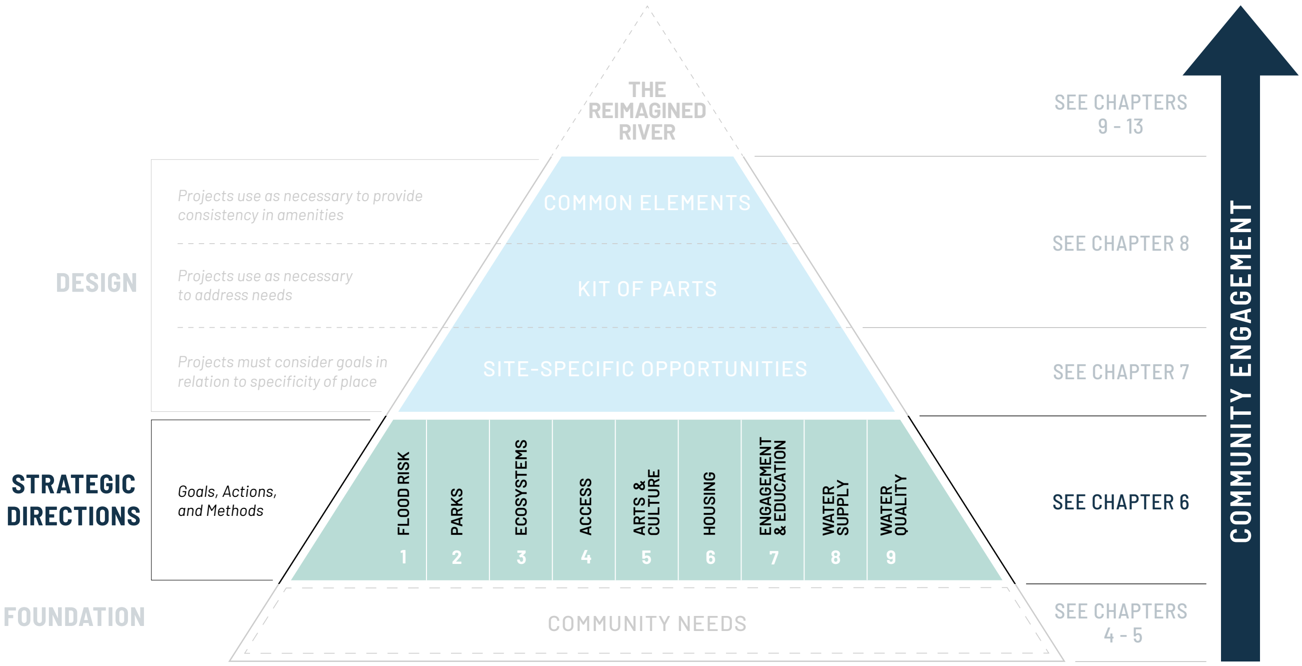


Figure 120. The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.

STRATEGIC DIRECTIONS

The Master Plan's strategic directions are built around nine goals. Each goal is an active priority for the future of the river and is explained by a rationale that weaves together technical analysis and community input. Each goal is supported by a set of actions that work towards achieving each goal. Each action is, in turn, supported by a set of methods that provide specific, tangible implementation steps. Together, the goals, actions, and methods form the strategic directions of the LA River Master Plan. By adopting this plan, the County will indicate that it intends to work to achieve these strategic directions for the LA River.

The realization of the goals, actions, and methods will require collaboration among many LA County departments and collaboration between the County and external public, private, and institutional partners. See Chapter 14 for the implementation matrix, which indicates which departments and agencies can partner to implement each action as well as related actions and geographies.

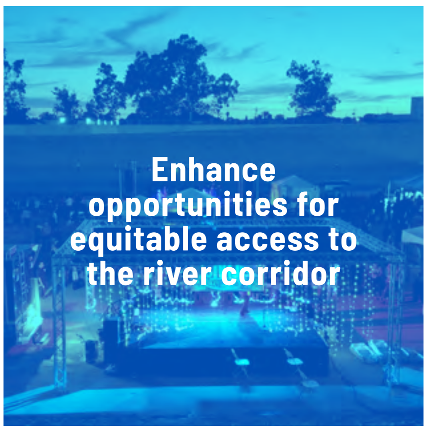


Figure 121. (Top Left) Not all areas of the river have equal conveyance capacity, looking downstream at river mile 28. Source: https://bit.ly/2mmAIGS, 2015.

Figure 122. (Top Middle) The availability of parks creates a healthier and more cohesive community. Source: LA County Public Works, 2018.

Figure 123. (Top Right) The river is an important ecosystem that supports a variety of plant and animal life throughout the highly urbanized landscape of LA County. Source: KCET Departures, South L.A. Willow Street, https://bit.ly/2BbmsPT, 2010.

Figure 124. (Middle Left) The SELA Arts Festival brings people and communities together at river mile 11.7. Source: OLIN, 2018

Figure 125. (Middle) The river should reflect the diversity of its neighboring cultures, communities, and organizations. Source: LA County Public Works, 2018.

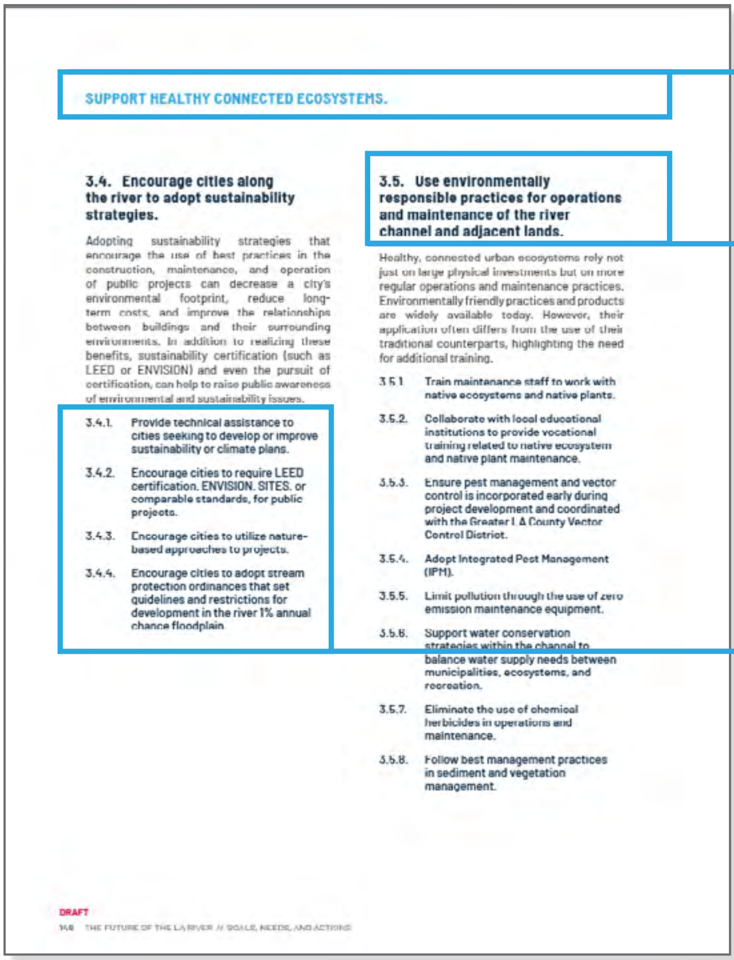
Figure 126. (Middle Right) As housing costs have increased in LA County, so too has the number of persons experiencing homelessness. The LA River has become a home for some unsheltered residents. Source: Flickr, https://bit.ly/2IDFIBg.

Figure 127. (Bottom Left) Engaging all members of the community leads to broader stewardship of the LA River and can support growth in communities adjacent to the river. Source: LA County Public Works, 2018.

Figure 128. (Bottom Middle) The need for local water supply depends greatly on the end use and access to other sources of water. Shown here is the Sepulveda Dam at river mile 43.1. Source: OLIN, 2018.

Figure 129. (Bottom Right) The mouth of the LA River in Long Beach at river mile 0. Source: OLIN, 2018.

HOW TO READ THE GOALS, ACTIONS, AND METHODS



SUPPORT HEALTHY CONNECTED ECOSYSTEMS.

3.4. Encourage cities along the river to adopt sustainability strategies.

Adopting sustainability strategies that encourage the use of best practices in the construction, maintenance, and operation of public projects can decrease a city's environmental footprint, reduce long-term costs, and improve the relationships between buildings and their surrounding environments. In addition to realizing these benefits, sustainability certification (such as LEED or ENVISION) and even the pursuit of certification, can help to raise public awareness of environmental and sustainability issues.

3.4.1. Provide technical assistance to cities seeking to develop or improve sustainability or climate plans.

3.4.2. Encourage cities to require LEED certification. ENVISION. SITES. or comparable standards, for public projects.

3.4.3. Encourage cities to utilize nature-based approaches to projects.

3.4.4. Encourage cities to adopt stream protection ordinances that set guidelines and restrictions for development in the river 1% annual chance floodplain.

3.5. Use environmentally responsible practices for operations and maintenance of the river channel and adjacent lands.

Healthy, connected urban ecosystems rely not just on large physical investments but on more regular operations and maintenance practices. Environmentally friendly practices and products are widely available today. However, their application often differs from the use of their traditional counterparts, highlighting the need for additional training.

3.5.1 Train maintenance staff to work with native ecosystems and native plants.

3.5.2. Collaborate with local educational institutions to provide vocational training related to native ecosystem and native plant maintenance.

3.5.3. Ensure pest management and vector control is incorporated early during project development and coordinated with the Greater L.A County Vector Control District.

3.5.4. Adopt Integrated Pest Management (IPM).

3.5.5. Limit pollution through the use of zero emission maintenance equipment.

3.5.6. Support water conservation strategies within the channel to balance water supply needs between municipalities, ecosystems, and recreation.

3.5.7. Eliminate the use of chemical herbicides in operations and maintenance.

3.5.8. Follow best management practices in sediment and vegetation management.

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148 THE FUTURE OF THE LA RIVER // GOALS, NEEDS, AND ACTIONS

GOAL

One of the nine goals of the Master Plan, each of which is an active priority for the future of the river.

ACTION

Action that the County can take towards the ideal state described by the goal.

METHODS

Specific implementation steps to achieve each action.

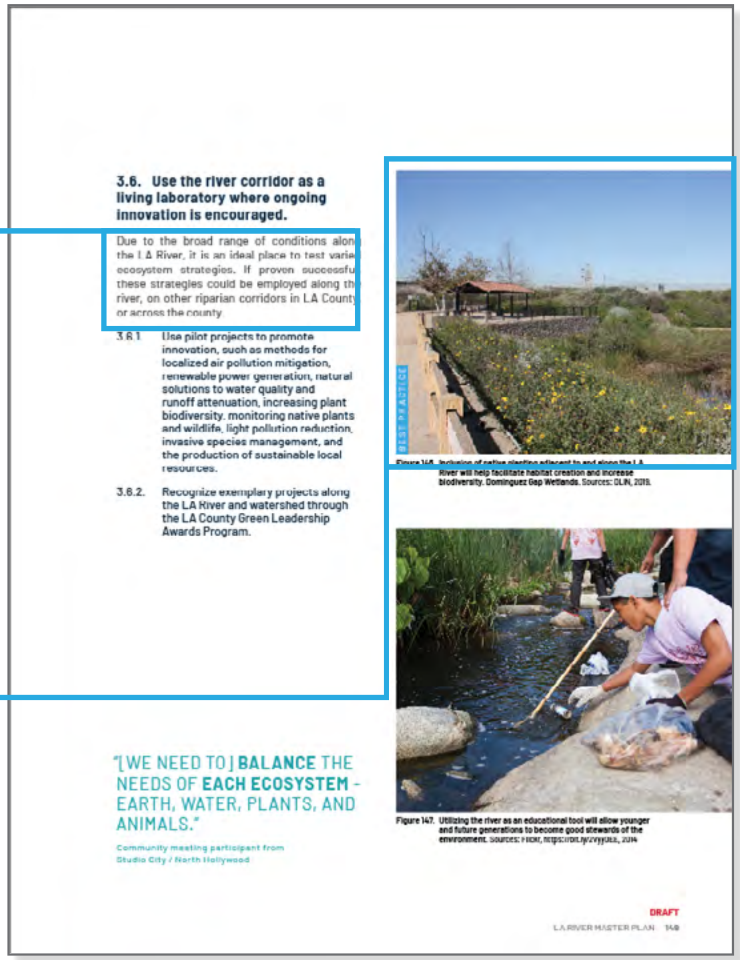
FOR MORE INFORMATION REGARDING IMPLEMENTATION OF THE LA RIVER MASTER PLAN, SEE THE IMPLEMENTATION AND FUNDING MATRIX IN CHAPTER 14

ACTION RATIONALE

Justification for taking the action, including how it supports achieving the goal, existing conditions, or expressed or observed needs.

BEST PRACTICE

A successful demonstration of how a technique stated in the actions and methods was implemented.



3.6. Use the river corridor as a living laboratory where ongoing innovation is encouraged.

Due to the broad range of conditions along the LA River, it is an ideal place to test varied ecosystem strategies. If proven successful, these strategies could be employed along the river, on other riparian corridors in LA County, or across the county.

3.6.1. Use pilot projects to promote innovation, such as methods for localized air pollution mitigation, renewable power generation, natural solutions to water quality and runoff attenuation, increasing plant biodiversity, monitoring native plants and wildlife, light pollution reduction, invasive species management, and the production of sustainable local resources.

3.6.2. Recognize exemplary projects along the LA River and watershed through the LA County Green Leadership Awards Program.

"[WE NEED TO] **BALANCE** THE NEEDS OF **EACH ECOSYSTEM** – EARTH, WATER, PLANTS, AND ANIMALS."

Community meeting participant from Studio City / North Hollywood

BEST PRACTICE

Figure 146. Inclusion of native planting adjacent to and along the LA River will help facilitate habitat creation and increase biodiversity. Dominguez Gap Wetlands. Sources: OLIN, 2019.

Figure 147. Utilizing the river as an educational tool will allow younger and future generations to become good stewards of the environment. Sources: Flickr, [illegible], 2014

DRAFT

LA RIVER MASTER PLAN 140

OVER 200 DATASETS WERE INTEGRATED INTO A NEED ASSESSMENT THAT RANKS CONDITIONS ACROSS THE COUNTY

NEEDS ANALYSIS

The LA River Master Plan's existing conditions inventory and analysis revealed that conditions in and along the LA River vary widely, with some areas experiencing unique vulnerabilities and others containing a variety of desirable assets. To evaluate which portions of the LA River are most in need when it comes to fulfilling the goals of the Master Plan, a GIS-based needs analysis was conducted for each goal.

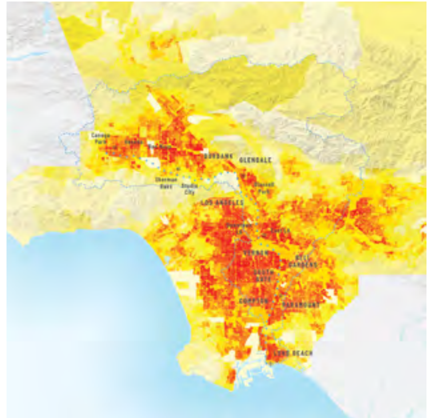
For each LA River Master Plan goal, criteria for evaluating the magnitude and spatial distribution of need were established using the most applicable datasets collected as part of the existing conditions analysis phase. Individual datasets were rasterized to a common 1-acre grid cell, reclassified on a scale from general need to very high need, and then weighted and combined to produce a relative need assessment for each goal.

Datasets were converted into a need assessment based on either score, density, or proximity that rank conditions across the county. A scale of general need to very high need was assigned based on the relevant goal. For example, for flood risk reduction need, areas not in a floodplain were assigned no need, areas in the 0.2% floodplain were assigned general need, and areas in the 1% floodplain were assigned very high need. Existing score-based datasets were reclassified to match the same general to very high need scale. For example, CalEnviroScreen scores were reclassified so that areas with better environmental conditions had general need and areas with worse environmental conditions had very high need. For some datasets, a density or proximity analysis was used for assessing need. A density analysis evaluated the number of positive or negative assets in an area relative to LA County as a whole. Proximity was used for datasets where need was relative to an area's distance from a particular asset.

For more information beyond what is in this chapter on the weighting of data in relation to the needs maps, see Appendix Volume II: Technical Backup Document.

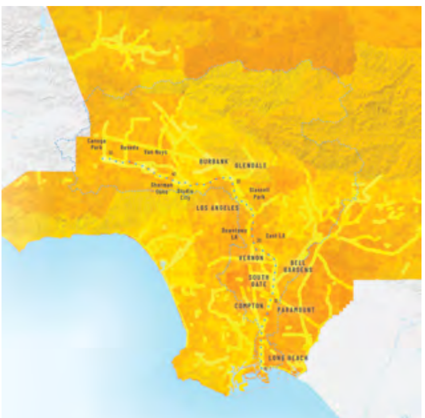
FLOOD RISK REDUCTION NEED

PARKS NEED

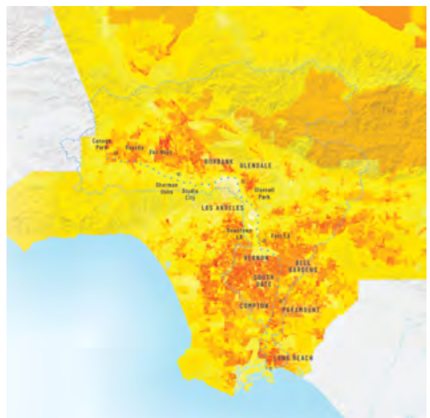


ECOSYSTEMS NEED

ACCESS NEED

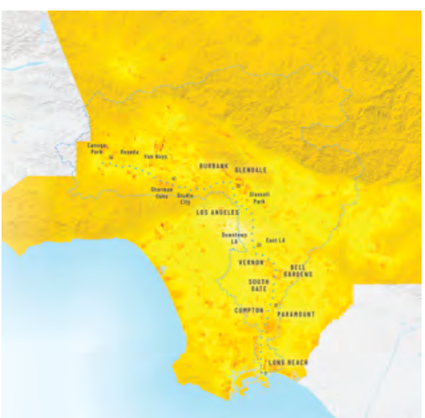


ARTS AND CULTURE NEED

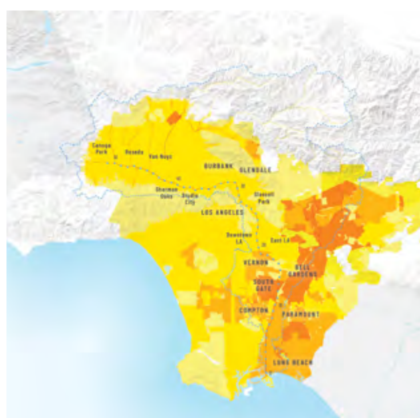


HOUSING AFFORDABILITY NEED

ENGAGEMENT AND EDUCATION NEED



LA BASIN WATER SUPPLY NEED



LA RIVER WATERSHED WATER QUALITY NEED

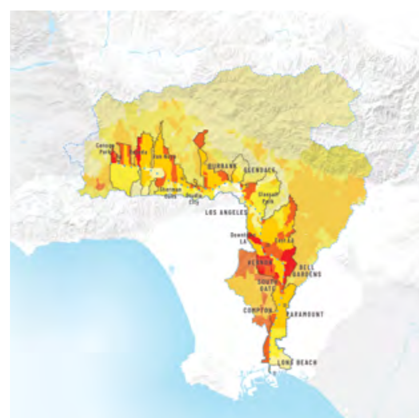


Figure 130. (Top Left) LA County Flood Risk Reduction Need.
Figure 131. (Top Middle) LA County Park Need.
Figure 132. (Top Right) LA County Ecosystem Need.
Figure 133. (Middle Left) LA County Access Need.
Figure 134. (Middle) LA County Arts and Culture Need.
Figure 135. (Middle Right) LA County Housing Affordability Need.
Figure 136. (Bottom Left) LA County Engagement and Education Need.
Figure 137. (Bottom Middle) LA Basin Water Supply Need.
Figure 138. (Bottom Right) LA River Watershed Water Quality Need.

Very High Need

General Need

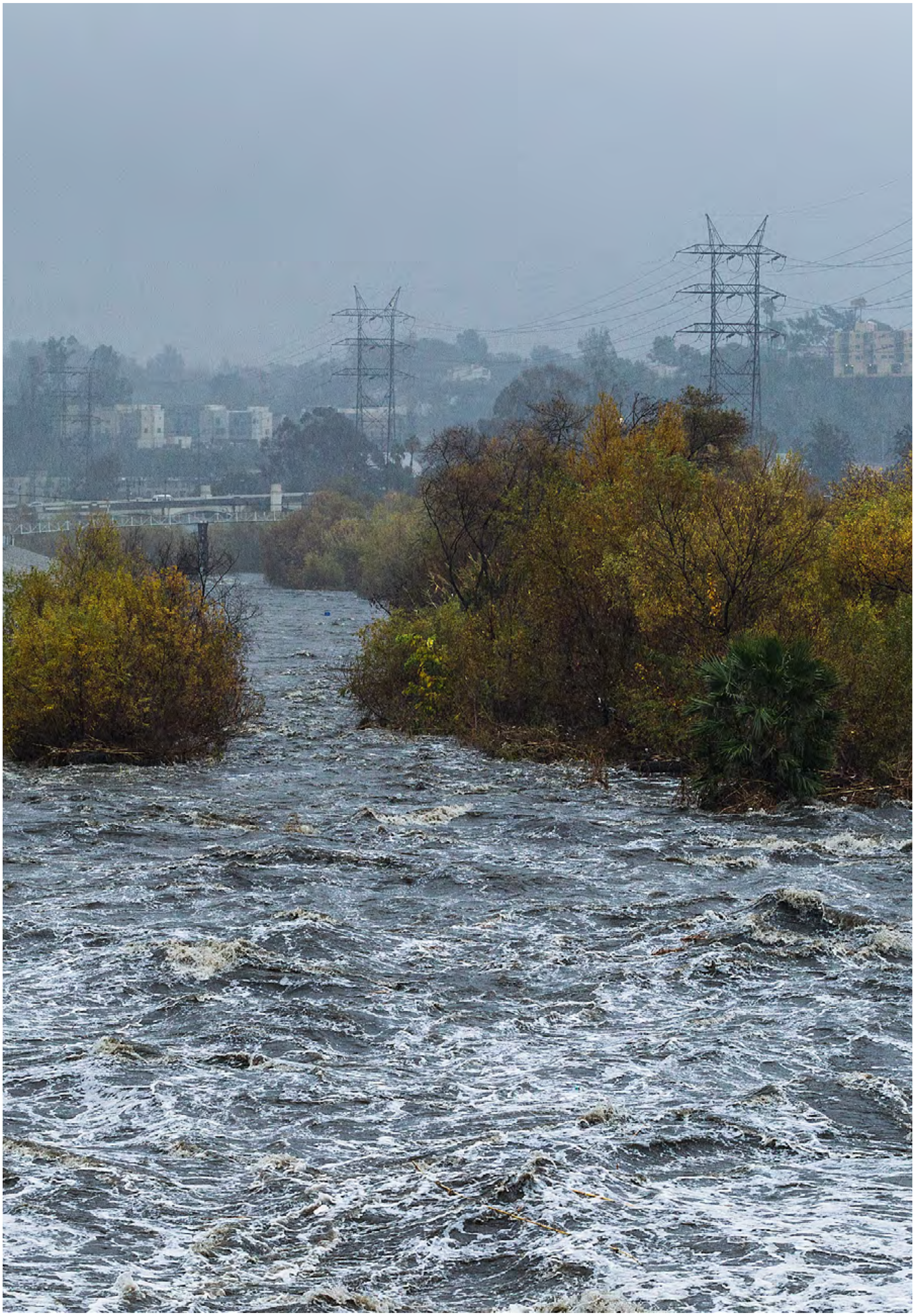


Figure 139. Not all areas of the river have equal conveyance capacity. Raging flood waters fill the river channel near river mile 28. Source: https://bit.ly/2mmAIGS, 2015.

GOAL ONE

REDUCE FLOOD RISK AND IMPROVE RESILIENCY

The LA River did not always look like it does today. In the mid 1800's, the LA River was a braided stream that, during wet weather events, spread out over vast amounts of flat land. As agricultural diversions, transportation infrastructure, and cities grew around the river, this vast floodplain was encroached upon by buildings and roads. After increasingly devastating floods, it was engineered into a concrete channel with basins, dams, levees, and floodwalls to move stormwater as quickly as possible to the Pacific Ocean to reduce flood risk to these communities. Not all areas of the river have equal conveyance capacity. In some areas, low channel capacity makes the probability of flooding of the river adjacent communities in any given year as high as 25 percent. There will always be financial and physical limits to flood risk infrastructure. Therefore, we must strive for resilient communities that can respond to extreme flood events that exceed the river channel's capacity. With the threat of a changing climate, the importance of reducing flood risk increases as the frequency and intensity of extreme storms change.

LA COUNTY FLOOD RISK REDUCTION NEED

Figure 140. LA County Flood Risk Need. Source: Geosyntec, OLIN, 2019. Floodplain data from the LA County GIS Data Portal Flood Zones dataset, which is based on the Federal Emergency Management Agency (FEMA) flood hazard layers. More recent floodplain mapping was used between river miles 22 and 34 based on the US Army Corps of Engineers (USACE), October 2016, Floodplain Management Services Special Study LA River Floodplain Analysis. The Cal-Adapt Sea Level Rise Tool was used to identify 1.41 meters (4.6 feet) as the likely maximum increase in sea level rise by the end of the century. Though there is some uncertainty, a 1.41 meter maximum conforms with California's Climate Change Assessments to date, which are estimated for California under the A1B and A2 emission scenarios. Areas with a maximum 1.41 meters of inundation were categorized as high need, areas with the least inundation low need, and areas with no inundation as no need. Channel capacity data was compiled from various sources including: US Army Corps of Engineers (USACE) Los Angeles District. 1996a, 1996b, 1997a, 1997b, and 1999. Los Angeles County Drainage Area Improvement Projects. Design Analysis Report and Design Memoranda; USACE Los Angeles District. 1991. Los Angeles County Drainage Area (LACDA): Review, Part I Hydrology Technical Report: Base Conditions; USACE: Los Angeles District. 2015. Los Angeles River Ecosystem Restoration Integrated Feasibility Report, Final Feasibility Report and Environmental Impact Statement/Environmental Impact Report, Appendix E. Table 17: Original Design Discharge and Existing Channel Capacity; USACE. 1953. Design Memorandum No. 1 Hydrology for Los Angeles River Channel, Owensmouth Avenue to Sepulveda Flood Control Basin; Geosyntec analysis using HEC-RAS models (USACE Los Angeles District. 2005. Los Angeles County Drainage Area Upper Los Angeles River and Tujunga Wash HEC-RAS Hydraulic Models).

FLOOD RISK REDUCTION NEED

Flood risk is related to both the capacity of the LA River channel to convey water in large storms and the area outside of the channel impacted by flooding.

To evaluate need related to flooding along the LA River corridor, the level of existing channel capacity was analyzed and combined with the floodplains directly associated with the LA River. Areas that may be subjected to sea level rise inundation and areas with high amounts of critical infrastructure and facilities in the floodplain were also assessed.

LA River Channel Capacity

The "Level of Channel Capacity" refers to the statistical return period that channel capacity is exceeded. Locations in the river with capacities to convey storm events with a greater than the 1% (100-year) flood event should be assessed for improvements. Areas with a very high need have capacity to convey no more than a 10% (10-year) flood event. Areas with a general need fall between the 10% (10-year) and 1% (100-year) conveyance capacities.

Floodplains

Floodplains are the lowland areas that border a river and though usually dry are subject to flooding. Floodplains are most commonly mapped where models indicate a 1% annual chance of flooding (100-year floodplain) or a 0.2% annual chance of flooding (500-year floodplain) in any given year (i.e. areas with a flooding recurrence interval of 500 years, on average). Areas within the 1% floodplain were identified as very high need and require flood management improvements. A degree of risk should be considered for the 0.2% floodplain, which was identified as general need. Areas not in a 1% or 0.2% floodplain were considered to have no need.

Sea Level Rise

Areas subject to sea level rise, including approximately the lower 3 miles of the channel, have a higher need for flood risk reduction.

Critical Infrastructure and Facility Density

Critical infrastructure and facility types such as emergency facilities, evacuation routes, and wastewater treatment plants were included based on facility types identified in the 2016 LA County Comprehensive Floodplain Management Plan, and were collected from various sources. Given the lack of detail about the size of specific facilities, the relative density of facilities was used. Areas that had the highest density qualified as very high need, and areas with the lowest density qualified as general need. All areas outside of the floodplain were considered to have no need.

LA River Flood Risk Reduction Need

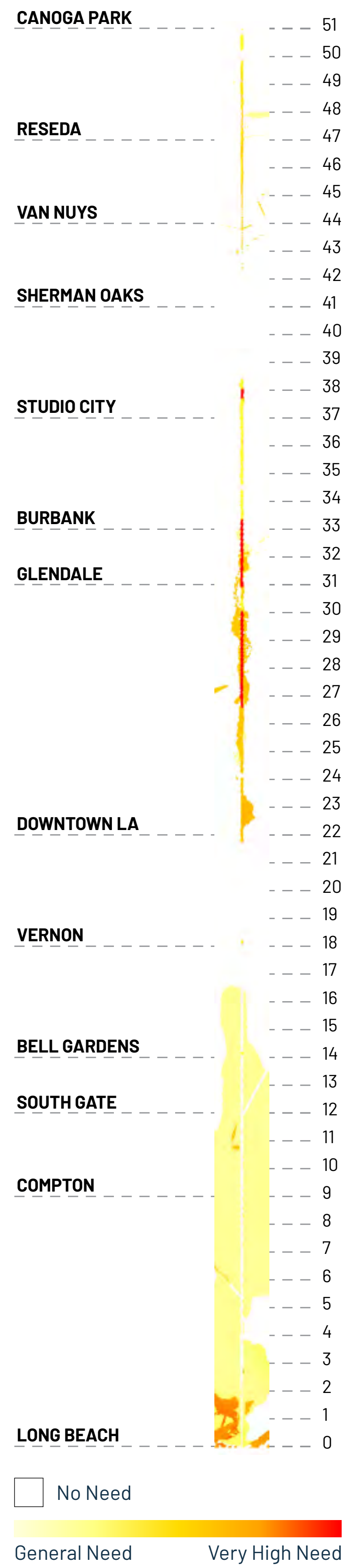


Figure 141. LA River Flood Risk Needs Ruler.

ACTIONS

1.1. Maintain existing flood carrying capacity of all reaches of the LA River channel.

Because existing development gets close to the channel, it is critical to maintain the existing flood carrying capacity of all reaches of the river to manage flood risk for people and property during storm events.

1.1.1. Review new projects within and along the LA River to ensure that flood risk is not increased.

1.1.2. Review new projects with in-channel components to ensure the flood carrying capacity of the river is not reduced.

1.2. Increase capacity of the river in high risk areas to provide flood risk reduction to at least the 1% (100-year) annual chance flood event or to a level recommended by a risk assessment.

Levels of flood risk management vary along the 51-mile channel. The 1% (100-year) event is used as a target in this plan because it is the standard for the National Flood Insurance Program (NFIP) and studies show that using this standard provides a benefit cost ratio of 7:1, on average, for riverine environments.[98] Future local risk assessments may indicate that capacities should be increased. One way to reduce flood risk in communities near the LA River is to increase the conveyance capacity of the river, so that it can safely pass larger storm flows to the Pacific Ocean.

1.2.1. Implement capacity increasing measures as appropriate, such as modifying the channel, deepening the channel, raising levees, building bypass channels or tunnels, removing invasive plants, or removing sediment from the channel.

1.2.2. Manage sediment and invasive plants using best practices before they accumulate in the river channel.

1.2.3. Manage dry-weather flows to discourage the growth of invasive and non-native vegetation within the flood channel.

1.2.4. Retrofit infrastructure and other obstructions, such as bridges, to remove hydraulic constrictions.

1.2.5. Prioritize natural features and processes for flood risk reduction.

1.3. Reduce peak flood flows into the river.

In addition to increasing capacity of the river, flood risk can also be improved by reducing the amount of water that enters the LA River at peak flows. Upstream storage or detention facilities, such as dams, help to store runoff during large storm events and slowly release the water so as not to exceed the downstream channel capacity. Groundwater recharge facilities direct stormwater to spreading grounds, where the water can percolate into the groundwater basins for later use.

1.3.1. Evaluate regional scale upstream dams and detention basins for opportunities to reduce flood risk downstream.

1.3.2. Increase capacity of existing dams and detention basins through measures such as clearing debris, deepening basins, increasing dam and levee heights, and improving real-time controls.

1.4. Include climate change research in the planning process for new projects along the river.

Current infrastructure in and along the LA River was designed based on historic climate data. However, a changing climate is likely to increase the frequency of extreme precipitation events that result in flows that may exceed the channel's current capacity. New projects along the LA River must consider the long-term impacts of climate change and the need to incorporate resilient infrastructure to handle these extreme events.

1.4.1. Conduct an inter-institutional study on climate change impacts in the LA Basin and how they impact hydrology and sea level rise.

1.4.2. Apply the latest accepted climate change prediction models in flood risk reduction planning.

Figure 142. Sepulveda Basin is an important asset to reduce peak flows on the LA River. Source: OLIN, 2019.

Figure 143. A worker removes invasive plant material from the channel near the Glendale Narrows, a maintenance practice that helps to increase the flood capacity of the LA River. Source: US Army Corps of Engineers, LA River Arundo Removal, 2004.

1.5. Update and improve emergency preparedness.

Although flood infrastructure is in place to protect life and property, flooding can still pose a threat to communities within the floodplain during an extreme storm event. These communities, which are protected from routine floods, must still be prepared. The LA River is flashy, meaning water levels in the river can rise rapidly in a matter of hours. Having emergency action plans in place, exercising those plans, and installing effective communication protocols can expedite response times and save lives.

1.5.1. Evaluate, update, or develop appropriate Emergency Action Plans that cover specific areas of the river where needed, including the dams and levees along the mainstem and the tributaries.

1.5.2. Conduct emergency preparedness exercises that test Emergency Action Plans.

1.5.3. Improve flood forecasting capabilities and monitoring for the river corridor.

1.5.4. Update and improve flood inundation maps.

1.5.5. Develop appropriate warning systems such as sirens, lights, or geo-targeted text message alerts to inform users of impending rain or rising water.

1.5.6. Evaluate critical infrastructure and facilities located in the floodplain, and encourage the use of best practices to reduce vulnerability to flood hazards.

1.5.7. Review and revise policies regarding closing the river trail during storms.

1.5.8. Assist emergency managers, local law enforcement, and emergency responders in developing emergency response and evacuation plans for river adjacent communities, river users, and special needs populations.

1.6. Increase public awareness of flood hazards and river safety.

Although flooding is the most common type of natural disaster in the country, the threats of flooding are often discounted by residents of Los Angeles County. The lack of recent floods coupled with severe droughts have rendered most people living adjacent to the LA River unaware of potential flood risk. People who understand their own flood risk are more likely to take actions to reduce their risk and stay safe during a flood.

1.6.1. Develop a website to assist in educating other agencies, cities, and the general public on river issues, including flood risk management and dangers posed by the river during heavy rainfall events.

1.6.2. Post consistent signage and communication about flood risk and river safety on bridges and access points.

1.6.3. Develop and implement an educational program on flood and river safety.

1.6.4. Encourage river adjacent residents and businesses to develop tailored emergency and evacuation plans.

1.6.5. Encourage residents and businesses in the floodplain consider purchasing flood insurance, and provide them with information on flood risk, available resources, and flood insurance.

1.6.6. Encourage public awareness campaigns include translation to languages spoken in local communities and are coordinated with a network of local leaders that can help lead different groups based on culture, age, and other community factors.

1.7. Improve flood facility operations and maintenance.

Dams, levees, channels, and other flood management projects, like all infrastructure, require proper operations and maintenance. Increased investment in operations and maintenance of LA River infrastructure can increase its effectiveness and lengthen its useful life, providing a greater return on initial capital outlays.

1.7.1. Expand coordination between responsible flood management agencies including the US Army Corps of Engineers and the LA County Flood Control District and consolidate responsibilities under the LA County Flood Control District Flood Control District through divestiture or deauthorization to streamline operations and maintenance, facility management, funding, and permitting.

1.7.2. Manage sediment and invasive vegetation in the river channel using best management practices.

1.7.3. Implement new technologies such as real-time monitoring, reporting, and controls.

1.7.4. Update the flood risk and pumping plant telemetry systems.

1.7.5. Update and improve the mapping of the watershed's storm drains, channels, access, and jurisdictional ownership.

1.7.6. Continue to implement, review, and improve dam and levee safety programs that ensure the flood management infrastructure delivers intended benefits while reducing risks to people, property, and the environment through continuous assessment, communication, and management.

1.8. Implement consistent floodplain management practices across the region.

Floodplain management is fundamental to reducing losses from floods. Adopting regionally consistent floodplain management practices, such as managing development in the floodplain, will help to reduce potential catastrophic flood damage and improve community resilience to flooding.

1.8.1. Update and improve hydrologic data and models for the LA River watershed.

1.8.2. Update and improve flood inundation mapping, and consider local assessments for flood risk.

1.8.3. Manage floodplain development and support community activities in coordination with the National Flood Insurance Program (NFIP).

1.8.4. Support communities in maintaining and improving their Community Rating System scores.

1.8.5. Work to ensure the levees along the LA River are certified by FEMA.

1.8.6. Encourage flood resilient projects in the 1% (100-year) floodplain.

1.8.7. Encourage and prioritize resilient retrofits of existing critical infrastructure in the 1% (100-year) and consider for the 0.2% (500-year) floodplains.

Figure 144. The availability of parks creates a healthier and more cohesive community. Source: LA County Public Works, 2018.

61 PERCENT

OF **SURVEY AND COMMUNITY** MEETING PARTICIPANTS SAID THAT THEY DO NOT USE THE LA RIVER DUE TO **SAFETY**

DRAFT

GOAL TWO

PROVIDE EQUITABLE, INCLUSIVE, AND SAFE PARKS, OPEN SPACE, AND TRAILS

Members of the community identified walking and bicycling as the top two activities they participate in along the river—with participation in these two activities together greater than the participation in all other activities combined. Yet, 61% said they do not use the river due to safety concerns. Along the LA River, 12 of 17 cities do not meet the World Health Organization's minimum standards of 2.2 acres of parks per thousand people, and only 32 of the river's 51 miles have trails alongside them. By aiming to provide 51 miles of safe, connected open space, the LA River can be a valued recreational resource for the surrounding communities in LA County.

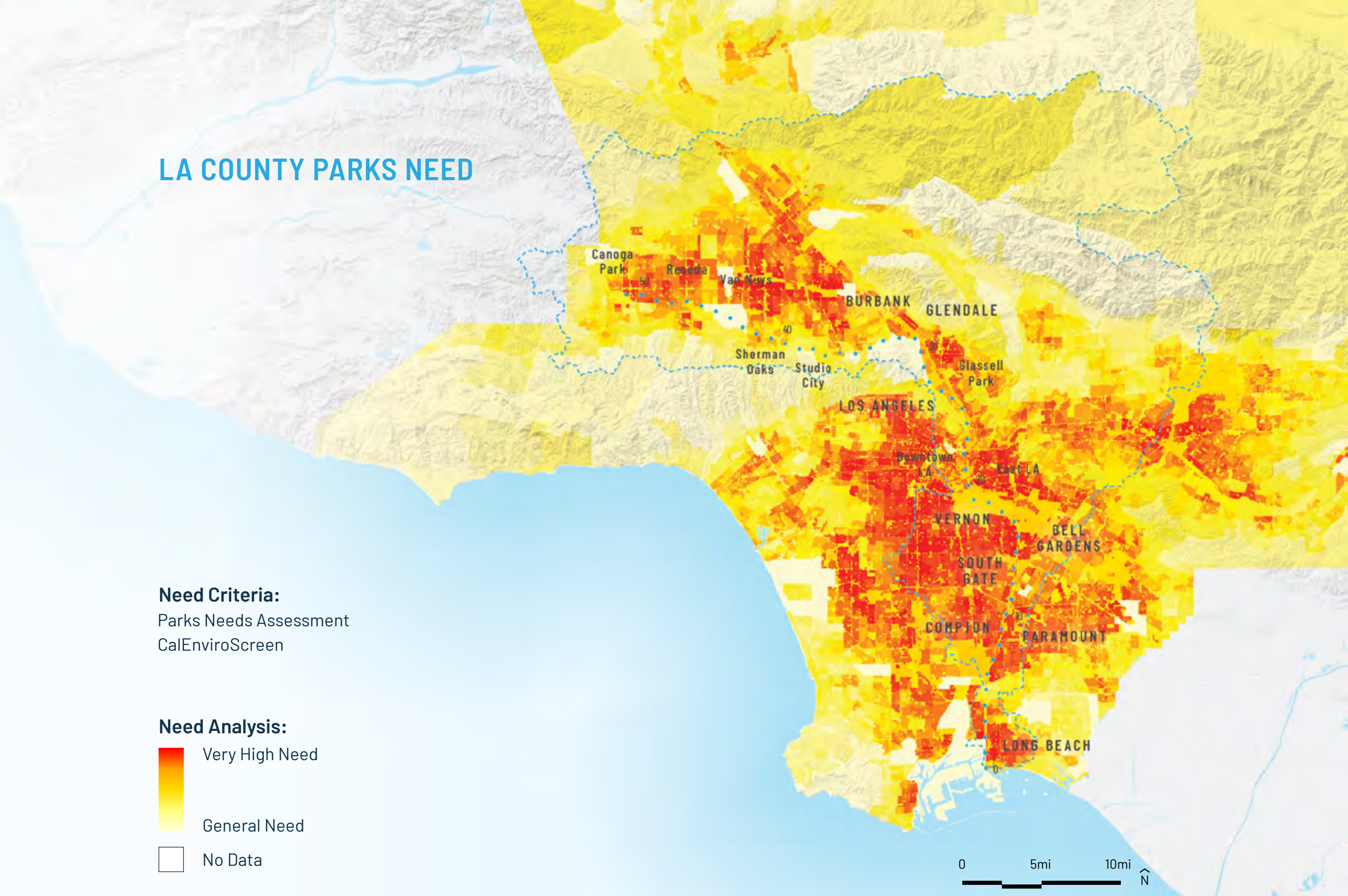


Figure 145. LA County Parks Need.

PARKS NEED

The LA River Master Plan evaluates park need based on park access and availability, but also by considering an area's level of exposure to poor environmental conditions where access to open space and recreation can have the greatest impact on multiple needs.

The LA County Department of Parks and Recreation's Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment was combined with the California Office of Environmental Health Hazard Assessment's CalEnviroScreen 3.0 to assess both where park need was highest, and where communities would benefit most from environmental and recreational improvements.

Parks Needs Assessment

In the LA County Department of Parks and Recreation's Los Angeles Countywide Comprehensive Parks and Recreation Needs Assessment completed in May 2016, park need was evaluated on an acre by acre basis and scored based on a weighted combination of: population density, park pressure (amount of park land available to residents around each park), park access (percent of population living within 1/2 mile of a park), and park acre need (acres of park per 1,000 people). In the assessment, numeric scores were then categorized into five park need categories: very low, low, moderate, high, and very high need. For the LA River Master Plan park need analysis a higher park need assessment resulted in a higher park need.

DRAFT

CalEnviroScreen 3.0

CalEnviroScreen 3.0, released in 2017 is a science-based mapping tool created by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Environmental Protection Agency (EPA) that helps identify California communities that are most affected by multiple sources of pollution, and are often especially vulnerable to pollution's effects. CalEnviroScreen uses environmental, health, and socioeconomic information to produce a numerical score for each census tract in the state.

CalEnviroScreen was used in addition to Park Need to further prioritize the potential impact of new parks and open space on existing pollution levels and to provide recreation and health amenities and services to communities most vulnerable to pollution's harmful health effects. Areas with very high need had a score near 100%, meaning they had the worst environmental conditions in the state of California relative to other census tracts in the state. Areas with general need had a 0% score, meaning they had the best environmental conditions in the state, and areas with no data were categorized as having general need.

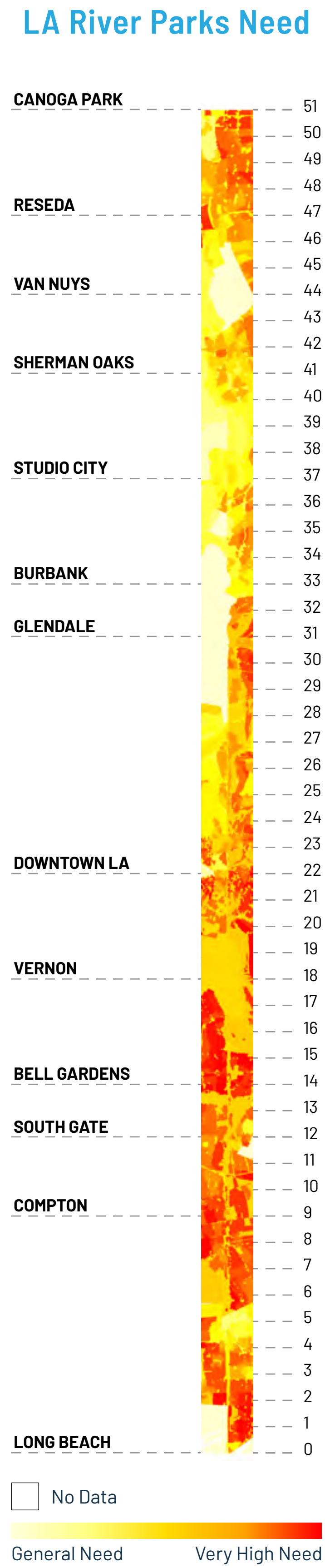


Figure 146. LA River Parks Needs Ruler.

ACTIONS

2.1. Create 51 miles of connected open space along the river.

The LA River has great potential to serve as the backbone of an open space network across LA County. This 51-mile backbone would be unique within the county, providing park space to underserved adjacent communities, offering a variety of experiences from one mile to the next, and serving as a destination for the entire county and beyond.

2.1.1. Create a park setting along the entire river that is integrated with native ecology, utilizing this plan's design guidelines (LA River Design Guidelines).

2.1.2. Utilize river channel right-of-way and adjacent areas to increase park space.

2.1.3. Promote the river as a central greenway in the larger LA County network of regional parks, multi-use trails, habitat, and open space.

2.1.4. Use river channel right-of-way and adjacent areas to assist in ensuring all LA County residents live within a half mile of a park.

2.1.5. Provide river-oriented and other amenities and experiences in existing and new park spaces that are not currently available at nearby parks, and increase unique programming along the river corridor.

2.1.6. Preserve and create viewsheds along the river, to the river, and from bridges over the river.

2.1.7. Secure ongoing and long-term funding for land acquisition, construction, and maintenance of additional parks and recreational facilities.

2.1.8. Increase recreation uses within the corridor where compatible with ecological function, safety, and maintenance.

2.1.9. Encourage clean-up of brownfield and toxic sites along the river for use as parkland and habitat areas.

2.1.10. Encourage active programming of park spaces along the LA River, and pilot interim programming uses of underutilized areas.

2.2. Complete the LA River Trail so that there is a continuous route along the entire river, and encourage future routes on both sides where feasible.

As a recreation and transportation route, the LA River Trail serves multiple purposes. However, it has yet to live up to its full potential because it is fragmented. A continuous route along the entire river would serve as a major bicycle and pedestrian artery through LA County, offering short- and long-distance routes for cyclists and pedestrians that are protected from vehicular traffic. Not only would the trail itself provide a new experience, but the connections it would make between parks, trails, job centers, and other destinations would make an abundance of nearby experiences more accessible to those who could access the river.

2.2.1. In places where right-of-way is too narrow for a river trail, pursue easements on adjacent property or utilize bridges, platforms, or cantilevers to complete the trail.

2.2.2. Increase the extent of multi-use trails parallel to the river with separate paths for active transport, pedestrians, and equestrians, especially in areas of high traffic.

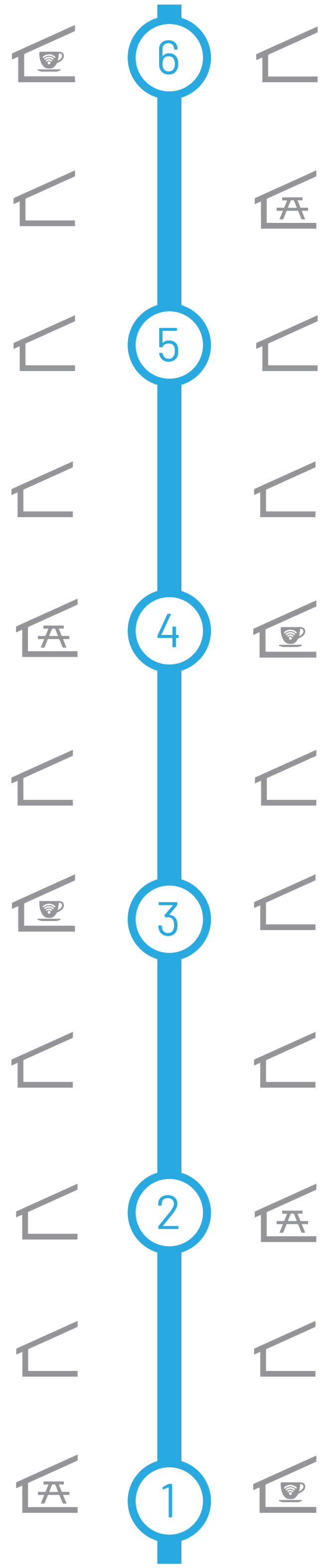
2.2.3. Provide bicycle parking and encourage bicycle rental facilities and bike share along the river.

2.2.4. Develop signage and curriculum that promotes the benefits of using the river trail for recreation and improved health.

2.2.5. Increase shade along the trail, where possible using shade trees (LA River Design Guidelines).

2.2.6. Design the LA River Trail to minimize negative effects on adjacent sensitive habitat areas.

2.2.7. Provide consistent, wildlife and dark-sky friendly lighting along the LA River Trail.



PAVILION CADENCE

Shade Pavilion
Tier I (every 0.4 - 0.6 miles)

Rest Pavilion
Tier II (every 0.8 - 1.2 miles)

Gathering Pavilion
Tier III (every 2 - 3 miles)

Figure 147. Varying in size and range of amenities, three tiers of pavilions will provide opportunities for shade, rest, and gathering at regular intervals along the length of the river.

2.3. Provide support facilities at a regular cadence along the length of the river, on both sides where feasible.

Basic amenities, such as signage, benches, and water fountains, make casual and experienced users more comfortable. In addition, the climate in LA County makes for many hot days throughout the year that can negatively affect usage. Shade and water can mitigate these effects.

2.3.1. Ensure there is a shaded place to rest every half mile, on average, along the river.

2.3.2. Ensure access to well maintained and operable public restrooms and water fountains every mile, on average, along the river.

2.3.3. Ensure there is wayfinding information at river access points and every half mile, on average, along the river (LA River Environmental Graphics Guidelines within the LA River Design Guidelines).

2.3.4. Investigate opportunities to supplement County facilities and services with concessionaire agreements for food, convenience item sales, recreation equipment rentals, recreation instruction, and guided tours.

2.3.5. Ensure there are trash receptacles, bicycle repair stations, and other common elements at a regular cadence along the river on both sides (LA River Design Guidelines).

2.4. Ensure design excellence within and along the river corridor.

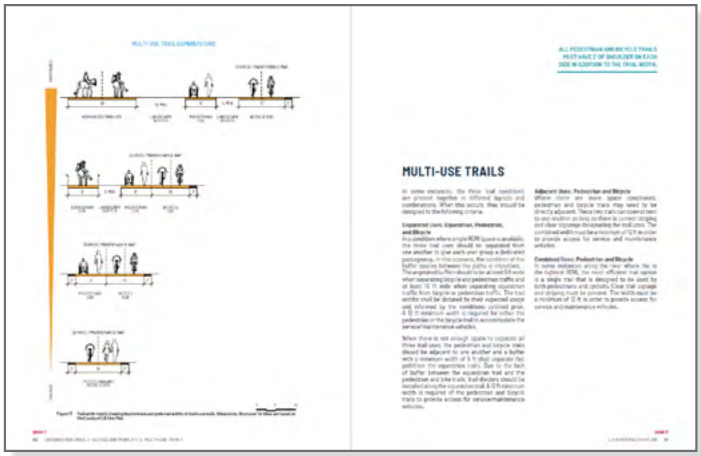
Excellence in design enhances function. From the earliest stages of project development, it is important to consider how a project can be beautiful while addressing multiple needs of adjacent communities. Design excellence requires an attention to quality of built structures, the landscape, the way buildings and landscapes interact with each other, and how projects interface with the river and surrounding communities. Integrating artists and designers early in the process can help lead to design excellence. Elevating the quality of design along the LA River will also serve to elevate the level of design across LA County.

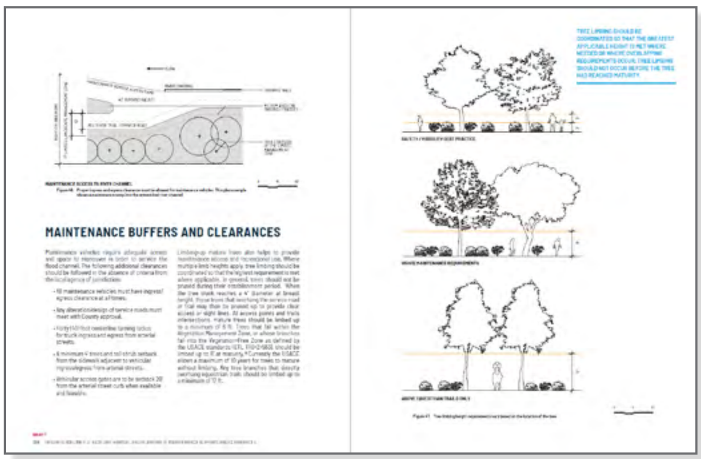
2.4.1. Utilize unified design guidelines for adjacent parks and river amenities that are flexible enough to reflect the diversity of local communities (LA River Design Guidelines).

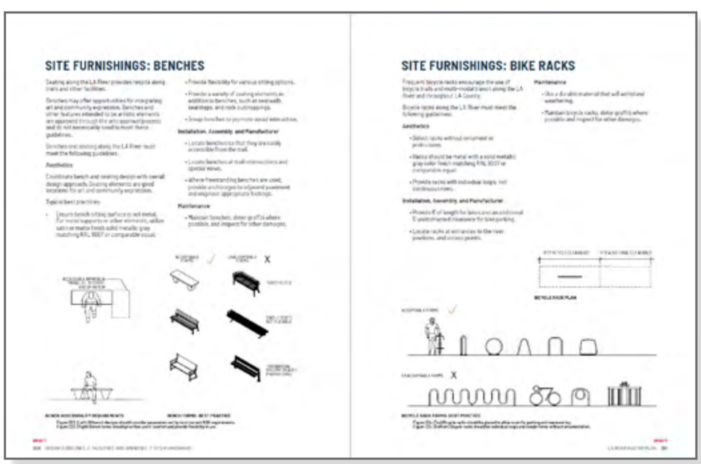
2.4.2. Encourage local jurisdictions to adopt this plan's design guidelines (LA River Design Guidelines).

2.4.3. Require this plan's guidelines (LA River Design Guidelines) be followed for all projects along the river that are permitted by the County, constructed on County property, or funded by the County.

32 OF 51 RIVER **MILES** ARE **ACCESSIBLE** BY TRAILS







ABOUT THE DESIGN GUIDELINES

The document is organized into five chapters, focusing on elements ranging from trails to signage to habitat to facilities. Rather than requiring one set of fixed solutions for all 51 miles, these guidelines promote the idea of a consistent approach with reach-specific identity within the greater whole. Ecology, habitat, and art should all reflect the physiography or culture of a specific reach of the river. Other elements, such as signage, access points, and lighting should be unified to ensure connectivity, wayfinding, and equitable access. In all cases, the adjacent communities should be involved in the design process in order for improvements along the river corridor to have the appropriate scale and feel for the neighborhood.

To address the need for site-specific approaches, the design guidelines have been organized through the nine planning frames established in the 2020 Master Plan. The beginning of every chapter has a key map which functions as a visual index for the reader to link to applicable guidelines for each frame of the river. These context-based guidelines will allow the reader to quickly identify key areas or topics of concern related to the reach. Lists, references, and sources that cover the entire river are located at the end of this document.

Design guidelines are not a 'cookbook' for the design process for sites; rather they are the frame for good project development. The knowledge and experience of landscape architects, engineers, architects, botanists and ecologists is invaluable in creating spaces that enhance life along the river. The 2020 LA River Master Plan Design Guidelines are a tool for these professionals and reflect the baseline of values for promoting smart design along the river corridor

Figure 148. The Design Guidelines aid designers and engineers in the establishment of a 51-mile connected open space that is a well-organized, functional, and accessible environment reflecting the diverse and shared identities of LA County. The entire Design Guidelines document are in Appendix Volume I.

2.5. Encourage compatibility of the river and adjacent land uses.

The appeal of the LA River corridor can be undercut by adjacent uses that are off-putting due to safety, smell, pollution, or noise. Large blocks of incompatible adjacent uses could act as or be perceived to be a barrier to access to the river. Conversely, complementary land uses can be mutually beneficial. For example, adjacent open spaces, restaurants, or retail that connect with the river could encourage patrons to use the river trail, and users of the river trail could increase patronage of those adjacent uses.

2.5.1. Encourage optimizing open space along the river channel and corridor.

2.5.2. Develop buffering strategies to mitigate air quality and other impacts of incompatible uses, such as industrial uses, that are expected to remain adjacent to the river.

2.5.3. Encourage County and local development and zoning review processes to ensure compatibility of land uses and, where feasible, add new river-adjacent amenities.

2.5.4. Consider the use of sound barriers or other elements such as berms to mitigate noise from adjacent freeways.

2.6. Repurpose single-use spaces, such as power-line easements, rail rights-of-way, or flood infrastructure, to serve multiple functions such as multi-use trails or habitat.

With little vacant land and relatively high property values and construction costs, LA County cannot afford to have spaces that serve only a single purpose. Multiple uses of space are necessary to ensure benefits outweigh costs.

2.6.1. Develop master agreements with utilities for easements to maximize use of ground space under overhead or above buried utility lines for parks, open space, and trails.

2.6.2. Discuss options to create multi-use space with private rail companies.

2.6.3. Foster opportunities for urban agriculture to encourage access to local healthy foods.

2.7. Promote life safety along the river.

A reimagined river is intended to draw more people to use the river corridor. With increased usage comes a responsibility to provide for the safety of those users through increased awareness, hazard mitigation, and emergency response.

2.7.1. Improve safety signage, including what to do in an emergency.

2.7.2. Utilize this plan's consistent 51-mile marker system (0 at Long Beach, 51 at Canoga Park) to assist response teams in locating emergencies along the river.

2.7.3. Provide anchor points for swift water rescue teams.

2.7.4. Remove hazards and dangerous objects, such as old fencing, metal, or debris, from the river corridor.

2.8. Promote public safety along the river.

Community members named safety as the top reason they do not use the LA River. Improving the perception of safety means addressing physical and perceptual factors. Physical factors include having appropriately scaled railings and a path that is clear of debris. Perceptual factors include adequate lighting and "eyes on the river" by other users, security officials, or adjacent uses.

2.8.1. Coordinate with river staff programs on responsibilities related to implementation of safety measures.

2.8.2. Consider opportunities to provide adequate and consistent lighting along the river trail that complies with guidelines to reduce light pollution and minimize impact to wildlife and habitat areas.

2.8.3. Provide emergency phones that are located along the river trail at frequent intervals.

2.8.4. Utilize CPTED (Crime Prevention Through Environmental Design) principles in projects.

2.8.5. Encourage adjacent neighborhood watch groups to include the river in their areas of influence.

2.8.6. Consider the use of video monitoring systems in isolated locations.

2.8.7. Encourage safe passage programs across and along the LA River, in which community volunteers escort youth and other vulnerable populations along the river.

2.8.8. Encourage local police departments to employ community policing best practices along the river.

Figure 149. South Platte River Greenway through downtown Denver. Source: Flickr User: BeerAndLoathing, https://www.flickr.com/photos/beerandloathing/6000585637/, 2011.

CASE STUDY - PARKS AND OPEN SPACE

SOUTH PLATTE RIVER GREENWAY DENVER, CO

The 10-mile stretch of the South Platte River Greenway that runs through Denver, Colorado is a part of the larger planning effort for the South Platte River. The planning effort came about following a large period of rainfall in June of 1965. The resulting planning effort has brought about over 100 miles of riverside trails and over 100 acres of riverside parks and natural areas along the South Platte River in Metro Denver.[99]

Lessons Learned

- Re-imagining a river corridor to include continuous trails and parkland happens incrementally with persistence.
- Multiple objectives can be met if management is integrated and balanced.
- Various departments have responsibilities and work together along the corridor to achieve a complete vision.

Figure 150. Waterloo Greenway through Austin. Source: William Beutler, https://www.flickr.com/photos/washingtoncanard/4475090428/.

CASE STUDY - PARKS AND OPEN SPACE

WATERLOO GREENWAY AUSTIN, TX

The Waterloo Greenway is a plan for a 1.5-mile park system that incorporates 35 acres of connected park space along Waller Creek in Austin, TX. The plan for the greenway is made possible by the construction of an extensive flood mitigation strategy that takes excessive flood waters, previously transported by Waller Creek, through a tunnel to Lady Bird Lake.[100] The Waterloo Greenway is being constructed in three phases, allowing the community to utilize the parts of the park system throughout the construction process.

Lessons Learned

- The revival of urban waterways was powerful in spawning public and economic interest
- A bypass and tunnel solution to flood risk created opportunities along the river that would not exist otherwise
- Project phasing allowed for parts of the project to be opened and generate revenue for future sections

Figure 151. The river is an important ecosystem that supports a variety of plant and animal life throughout the highly urbanized landscape of LA County. Source: KCET Departures, South L.A. Willow Street, https://bit.ly/2BbmsPT, 2010.

52 PERCENT

OF SURVEY AND COMMUNITY MEETING PARTICIPANTS IDENTIFIED **PROTECTING VULNERABLE PLANTS AND ANIMALS** AS THEIR TOP PRIORITY

GOAL THREE

SUPPORT HEALTHY, CONNECTED ECOSYSTEMS

The LA River watershed sits within one of the world's most diverse Mediterranean biodiversity hotspots and along the Pacific Flyway. Due to urbanization, the region has the largest number of endangered and threatened species and species of special concern in the contiguous 48 states. The river ecosystem has been altered from its historic state, first through agriculture and irrigation and later through channelization. In community meetings and surveys, 52% of participants said the issue most important was protecting vulnerable plants and animals. Planning and development efforts along the river must create habitat areas large enough to support native functioning ecosystems.

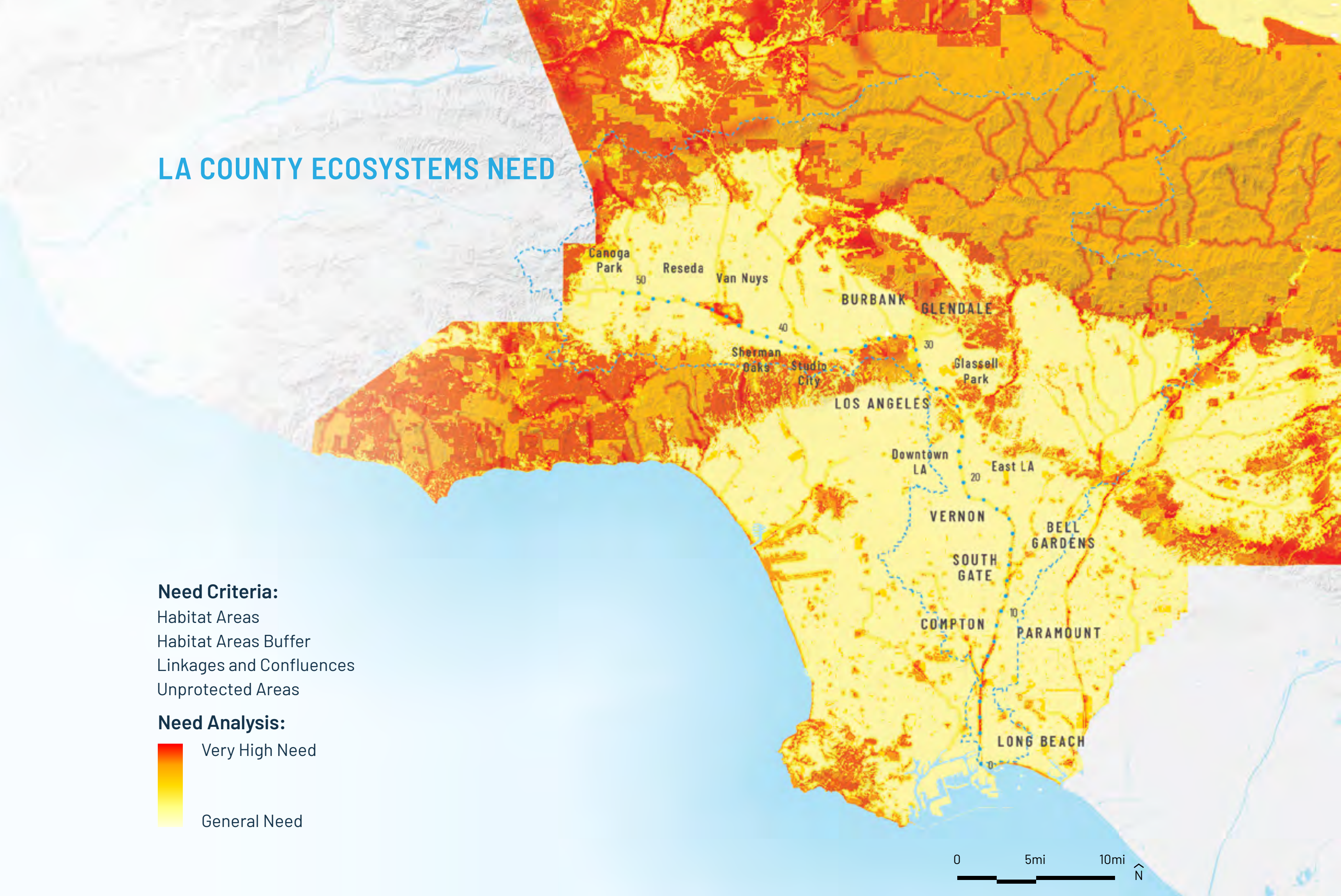


Figure 152. LA County Ecosystem Need.

ECOSYSTEMS NEED

In an urban environment like LA, maintaining healthy ecosystems requires protecting areas with high biodiversity; enhancing and expanding habitat in strategic locations; and creating linkages between habitat areas.

Need for ecosystems was evaluated by combining the need to protect and manage existing habitat areas, large areas with remaining native vegetation, with the need to expand these habitat areas through habitat buffers. Linkages, potential connections between habitat areas, such as LA River tributaries and confluences were also used to evaluate the need for ecosystem improvements. Like ecosystems themselves, data on existing habitats is always evolving and other areas may also be of high importance. Additional data should be included as it becomes available and site-by-site evaluation is needed to confirm existing ecological conditions. As the map shows, all areas have need in LA County for healthy, functioning ecosystems.

Habitat Areas

CALVEG Regional Dominance types from the USDA Forest Service were used to classify existing areas as predominantly urban or barren, native or natural, or invasive vegetation. Areas with native or natural landcover were considered habitat areas and were designated as very high need due to the importance of managing these few remaining areas of native plant habitat. Areas that were agricultural or barren were categorized as general need and areas that were predominantly urban were categorized as having no need.

Areas not categorized as habitat may still have an overall very high need if they are near a strategic location such as an existing habitat area buffer, linkage or confluence, or are unprotected. More locally, communities known to have less access to nature and a high potential for ecosystem improvements should be prioritized.

Habitat Areas Buffer

Areas closest to existing protected habitat areas (within 1,000 feet) that could help further buffer core protected habitat areas were categorized as having very high need. Areas further than 1,000 feet were categorized as general need.

Linkages and Confluences

Missing linkages are areas without connectivity, but based on their location, are critical to improving ecosystem connectivity. These linkages were identified by the 2008 South Coast Missing Linkages Project. Tributaries and confluences can also provide opportunities for species to move throughout the LA Basin. Areas closest to a missing linkage, tributary, or confluence were categorized as very high need. Areas up to 5,000 feet were categorized as general need and areas further than 5,000 feet away no need.

Unprotected Areas

Unprotected areas are vulnerable to development and are less likely to sustain habitat areas over time. Ecosystems that are in areas that are unprotected have very high need. Protected areas, which were categorized as general need, were identified based on the California Protected Areas Database.

LA River Ecosystems Need

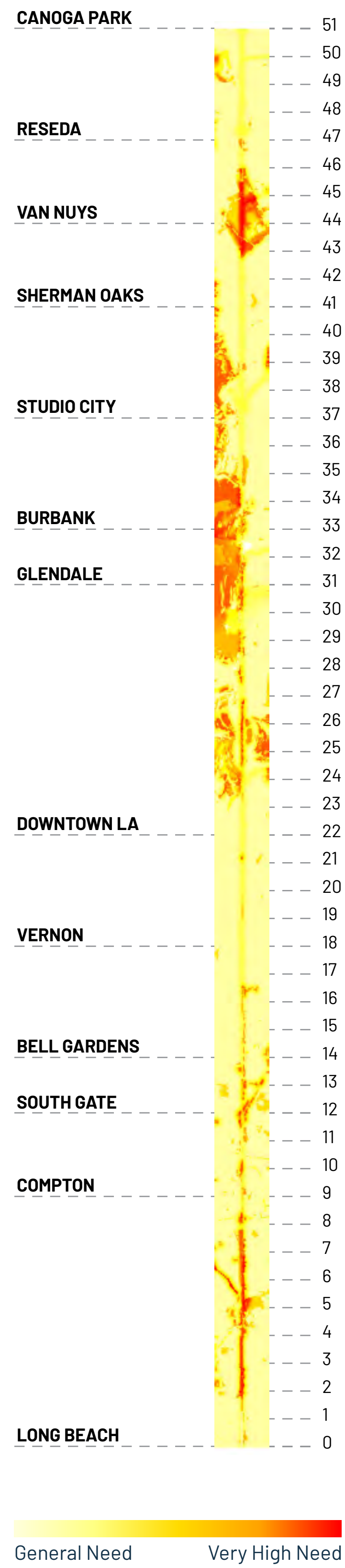


Figure 153. LA River Ecosystem Needs Ruler.

SUPPORT HEALTHY CONNECTED ECOSYSTEMS.

ACTIONS

3.1. Increase habitat and ecosystem function along the river corridor.

Intact ecosystems perform multiple critical services beyond providing habitat for wildlife and providing public enjoyment. They make air more breathable, water more drinkable, and climate more stable. They help mitigate the negative effects of urban development by filtering and absorbing stormwater, dampening noise pollution, and reducing greenhouse gases. Reports such as The Trust for Public Land's Conservation: An Investment that Pays (2009) have shown that all of these ecological services have economic value, which would be costly for LA County to replace.[101]

3.1.1. Prioritize projects that create and improve habitat and ecosystem function.

3.1.2. Collaborate with academic institutions and non-governmental organizations to collect data on ecosystem function within the LA River watershed and along the LA River corridor.

3.1.3. Collaborate with scientific research teams to increase the knowledge available about wildlife along and in the LA River and to create species profiles for different sectional conditions along the river.

3.1.4. Continue to collaborate with the Regional Water Quality Control Board's environmental flows study to determine habitat opportunities.

3.1.5. Consider findings of the LA River Ecosystem Restoration Project (US Army Corps of Engineers/City of Los Angeles) in determining habitat opportunities.

3.1.6. Where natural soils are degraded, remediate soils to support healthy ecosystems and the development of soil systems that can improve soil moisture retention and plant health.

3.1.7. Support opportunities to acquire land in the corridor for projects that increase habitat and ecosystem function along the river.

3.2. Increase plant species biodiversity, and focus on the use of local California native plants in and around the river corridor.

Individual plants do not exist in isolation. They exist within the context of other plant species, soils, microclimates, and wildlife, and each has a specific function within the larger ecosystem. The more diversity within an ecosystem, the more robust and resilient it is to changes that affect any individual species. Local native plants are best adapted to local climate and soil conditions, though these conditions may change over time. The Southern California Coastal Water Research Project estimates that up to 95% of Southern California's riparian ecosystems have been destroyed or degraded. Therefore, it is important to increase appropriate plant species along the river corridor.

3.2.1. Develop reach specific plant species guidelines related to ecological zones in and around the river with keystone and indicator species to create native, resilient, and biodiverse ecosystems.

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3.2.2. Consider long-term trends, such as population growth, climate change, future water regimes, resiliency, and sustainability, to create adaptive and dynamic biodiversity plans that are resilient to the urban context.

3.2.3. Incentivize the creation of nurseries along the river that can supply native plants for new, large river parks.

3.2.4. Use the LA River Design Guidelines' plant palettes to make the river a planned reserve for plant biodiversity as climate changes.

3.2.5. Actively manage and remove invasive species from the river corridor and adjacent areas utilizing best management practices.

3.2.6. Utilize locally sourced native seed on projects as recommended in the LA River Design Guidelines.

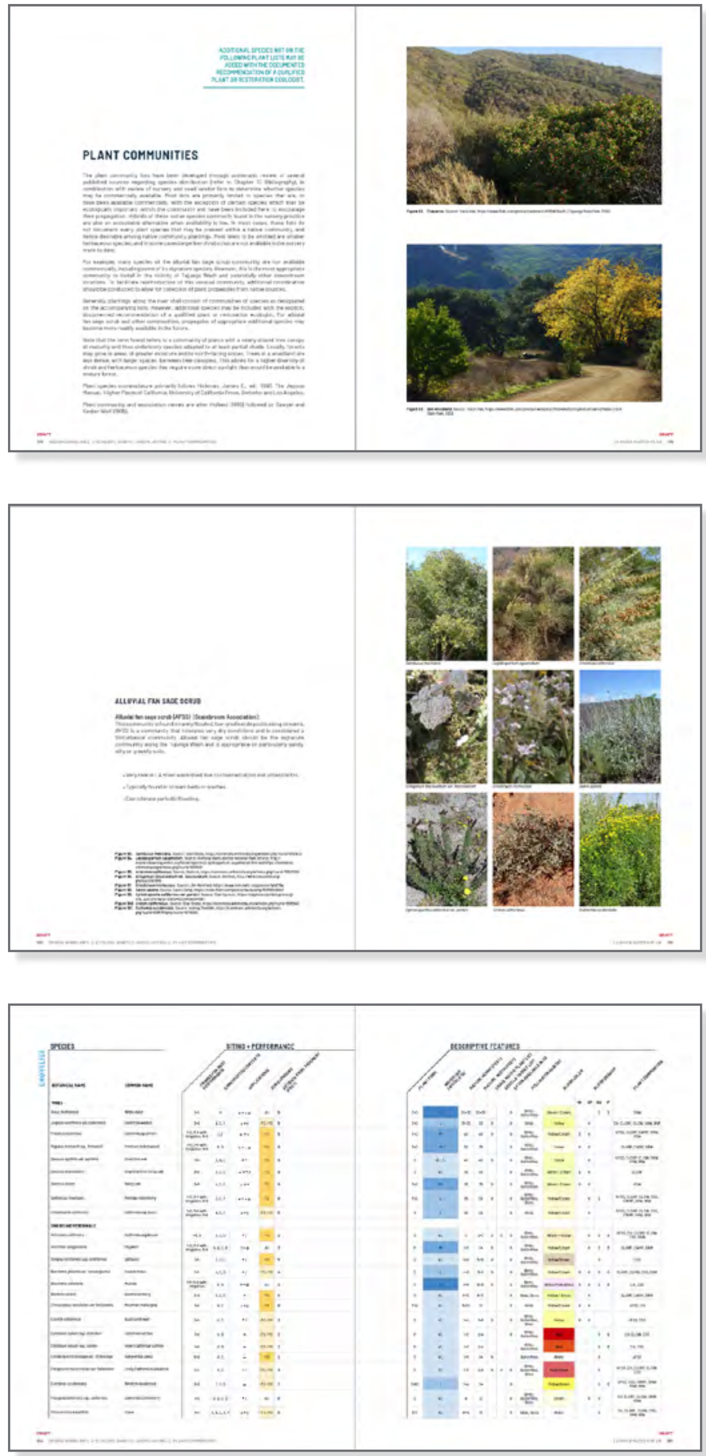

Figure 154. The LA River Design Guidelines (Appendix Volume I) include native plant communities for projects along the LA River.

3.3. Create a connective network of habitat patches and corridors to facilitate the movement of wildlife and support a diverse ecological community.

Habitat patches are discrete areas, whereas habitat corridors are linear linkages that ensure connectivity between patches. While patches are valuable and important for birds and insect species, enhancing and interconnecting urban habitat patches with larger habitat areas beyond the LA River increases biodiversity and resilience to changing conditions. Connectivity of habitat systems allows for wildlife movement, which allows for long term gene flow between populations to prevent inbreeding, seasonal migration that enables species to complete their life cycles, and the movement of individuals to find food, shelter, and mates. With changes in climate, some species may need to move to find more suitable habitat. It is possible that wildlife will need to relocate from hotter, more arid regions to the east and south, and that species found in lower elevations will need to migrate up slope. It is likely that wildlife will need to migrate from the northern North Mexicoan deserts to the California Floristic Province, and the LA River watershed is at the hinge point in this connection.

3.3.1. Utilize the river right-of-way to increase habitat areas.

3.3.2. Foster opportunities for and create habitat “stepping stone” patches in areas that are densely developed and do not have existing significant ecosystem functions.

3.3.3. Promote the creation of linkages between upland and riparian ecosystems and between the river and its tributaries.

3.3.4. Promote the creation of vegetated buffers at the edges of existing significant habitat areas as well as between habitat areas and vehicular areas.

3.3.5. Protect and enhance existing native, resilient, and biodiverse ecosystems. (Plant communities are defined in the LA River Design Guidelines).

3.3.6. Support, in parallel with regional efforts, a reach specific regime for low flows in the river that contributes to ecological function.

3.3.7. Where possible, plant a continuous greenway of native trees and appropriate vegetation for increased cooling, forage, and roosting and nesting habitat along the LA River and its tributaries.

3.4. Encourage cities along the river to adopt sustainability strategies.

Adopting sustainability strategies that encourage the use of best practices in the construction, maintenance, and operation of public projects can decrease a city's environmental footprint, reduce long-term costs, and improve the relationships between buildings and their surrounding environments. In addition to realizing these benefits, sustainability certification (such as LEED or ENVISION), and even the pursuit of certification, can help to raise public awareness of environmental and sustainability issues.

3.4.1. **Provide technical assistance to cities seeking to develop or improve sustainability or climate plans.**

3.4.2. **Encourage cities to require SITES, LEED, ENVISION, or comparable certification standards, for public projects, and encourage National Wildlife Federation and Audubon or similar certification for private habitat areas.**

3.4.3. **Encourage, prioritize, and incentivize cities to utilize nature-based approaches to projects.**

"[WE NEED TO] **BALANCE** THE NEEDS OF **EACH ECOSYSTEM** - EARTH, WATER, PLANTS, AND ANIMALS"

Participant in the Studio City / North Hollywood community meeting

BEST PRACTICE

Figure 155. Inclusion of native planting adjacent to and along the LA River will help facilitate habitat creation and increase biodiversity. The Dominguez Gap Wetlands, located at river mile 4.9, is a good existing example of this being done. Source: OLIN, 2019.

Figure 156. Utilizing the river as an educational tool will allow younger and future generations to become good stewards of the environment. Source: Flickr, https://bit.ly/2Vyy0EE, 2014.

3.5. Use environmentally responsible practices for operations and maintenance of the river channel and adjacent lands.

Healthy, connected urban ecosystems rely not just on large physical investments but on more regular operations and maintenance practices. Environmentally friendly practices and products are widely available today. However, their application often differs from the use of their traditional counterparts, highlighting the need for additional training.

3.5.1. Train maintenance staff to work with native ecosystems and native plants.

3.5.2. Collaborate with local educational institutions to provide vocational training related to native ecosystem and native plant maintenance.

3.5.3. Ensure pest management and vector control is incorporated early in project development and coordinated with the Greater LA County Vector Control District.

3.5.4. Adopt Integrated Pest Management (IPM) best practices.

3.5.5. Limit pollution through the use of zero emission maintenance equipment.

3.5.6. Support water conservation strategies within the river right-of-way to balance water supply needs between municipalities, ecosystems, and recreation.

3.5.7. Conduct operations and maintenance in accordance with the Countywide Integrated Pest Management Program and its integrated vegetation management strategy.

3.5.8. Follow best management practices in sediment and vegetation management.

3.6. Use the river corridor as a living laboratory where ongoing innovation is encouraged.

Due to the broad range of conditions along the LA River, it is an ideal place to test varied ecosystem strategies. A living laboratory also provides opportunities for education and community participation in various strategies. Several organizations and schools have already taken advantage of using the river in this capacity.

3.6.1. Use pilot projects to promote innovation, such as methods for localized air pollution mitigation, renewable power generation, natural solutions to water quality and runoff attenuation, increasing plant biodiversity, monitoring native plants and wildlife, light pollution reduction, invasive species management, and the production of sustainable local resources.

3.6.2. Recognize exemplary projects along the LA River and watershed through the LA County Green Leadership Awards Program.

Figure 157. Atlantic Park de Las Llamas is comprised of multiple trails that meander through the different ecological pools where users can experience design elements that bolster ecosystem functions. Source: Tiia Monto, Wikimedia Commons, 2016.

CASE STUDY - ECOSYSTEMS

ATLANTIC PARK DE LAS LLAMAS SANTANDER, SPAIN

Atlantic Park de Las Llamas is located in the center of Santander, Spain. This park space transformed a former trash dump site into an ecologically rich urban park. The park utilizes a three tier design strategy to create different habitat types throughout the project. These tiered ecosystems remove pollutants from the runoff and provide infiltration opportunities in the heart of the city.

Lessons Learned

- Success came from the project's ability to blend the public and urban uses with the necessary ecosystem functions
- Highly designed public space has proven to operate successfully in terms of ecosystem functions
- Providing access from all points of the surrounding neighborhoods and communities maximized its urban potential
- The park successfully utilized geometric forms for waterway/waterfront design of public space

Figure 158. The SELA Arts Festival brings people and communities together at river mile 11.7. Source: OLIN, 2018.

AROUND 100 ACCESS POINTS CONNECT PEOPLE TO THE LA RIVER TRAILS. ONLY ONE-THIRD OF THESE ACCESS POINTS HAVE SIGNS, AND ONLY 70% CONNECT TO SIDEWALKS

GOAL FOUR

ENHANCE OPPORTUNITIES FOR EQUITABLE ACCESS TO THE RIVER CORRIDOR

Today, ease and availability of access to trails along the LA River is highly variable. About 90 access points connect people to trails that serve 32 of the river's 51 miles. Yet, only one-third of these access points have signs and only 70% connect to sidewalks. Many access points are well served by bus, but only two Metro rail stops fall within a half mile of an access point to the river. It is therefore not surprising that one of the top five reasons community residents cited for not visiting the LA River is simply not knowing where to go. The LA River is intended to be a resource for use by all of LA County, and to be a resource the river must be accessible and usable.

Figure 159. LA County Access Need.

ACCESS NEED

Public access to the LA River means a continuous 51-mile river trail with frequent access points and a network of lateral trail connections that improve access to outdoor space and opportunities for recreation

The need for improved access along the river starts by evaluating the status of the 51-mile river trail and identifying gaps where the trail or access to the trails is not continuous. Communities adjacent to the river trail that lack additional connecting trails, or lack trail connections to public facilities were also evaluated. The need analysis also included data from The Los Angeles County Health Survey which was used to identify areas that have a higher need for the positive health outcomes associated with recreation.

River Trail Access Point Gaps
Areas greater than a half mile (5 min walk) from an existing river trail access point have a higher need for access and trails, while areas adjacent to an access point were categorized as general need. Access points were based on the City of LA, LA River Greenway map, but were then modified and updated for the Master Plan based on site observations and meetings with various stakeholders.

River Trail Gaps
Locations on either bank of the LA River that do not currently have a continuous trail were identified as having a higher need for access and trails. Areas with an existing river trail had general need, while areas beyond the LA River corridor were categorized as having no need. The LA River Trail delineation was based on the City of LA, LA River Greenway map, but was then modified and updated for the Master Plan based on site observations and meetings with various stakeholders.

Adjacent Trail Gaps
Connecting to adjacent trails improves access to the LA River and regional connectivity. Areas without existing or planned adjacent trails have a very high need for improvements, while areas within a quarter mile of an existing trail have a general need. The location of existing and proposed trails was based on trails data from the LA County GIS Data Portal, Department of Parks and Recreation Trails, and the LA Metro Active Transportation Strategic Plan.

Health Composite
Trails also provide recreation, exercise, and open space, which can improve both physical and mental health outcomes. Areas with a higher health composite score (poorer health conditions) have a very high need for access and trails, while areas with a relatively low health composite score were categorized as general need. Health data was compiled from the 2015, Los Angeles County Health Survey conducted by the LA County Department of Public Health.

Proximity to Metro Stops, Parks, and Schools
Connecting important public facilities to the LA River is vital for ensuring an effective community connectivity system. Areas greater than a half mile from an existing Metro stop, park, or school have a general need for access and trails connections. Areas more adjacent to these facilities were categorized as very high need. Metro stops were sourced from the LA Metro's Active Transportation Strategic Plan Online Data Portal, parks from the LA County GIS Data Portal 2016 Countywide Parks and Open Space layer, and schools from the LA County GIS Data Portal, 2016 Point of Interest Data.

LA River Access Need

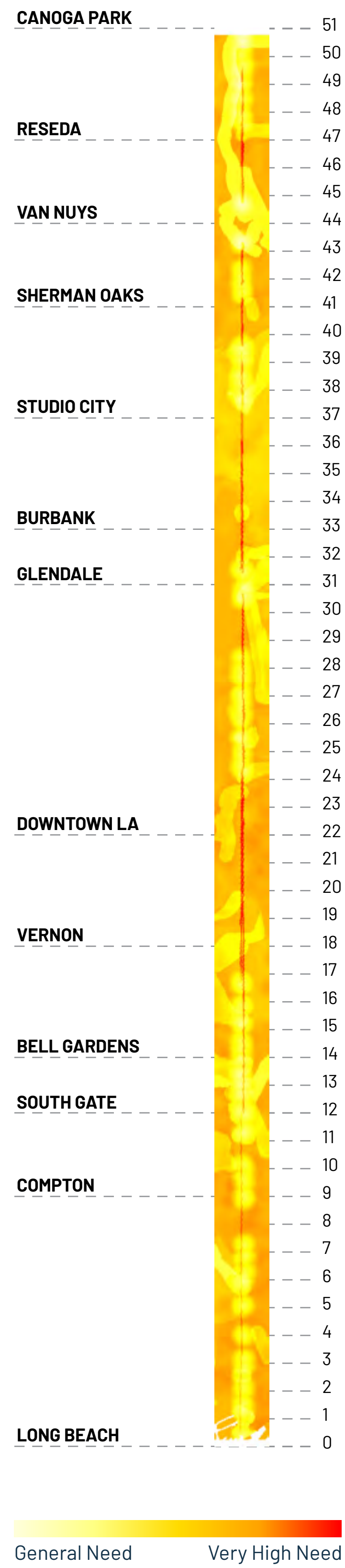

Figure 160. LA River Access Needs Ruler.

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ACTIONS

4.1. Create welcoming access points and gateways to the LA River and LA River Trail to optimize physical access along its length, on both sides.

Along parts of the river that currently have trails, only about a third of access points have signs, less than two thirds appear to be clearly accessible by persons with disabilities, less than half connect to bridges that allow access to both sides of the river, and one in ten are just user-created holes in fences. Together, these conditions obscure, limit, and impede access to the LA River Trail. All access points should be welcoming so that potential users are drawn to and feel welcome to use the river.

4.1.1. Make the river trail and gateways as accessible and inclusive as possible.

4.1.2. Prioritize access for areas with limited access or areas that need improvements to existing access points.

4.1.3. Prioritize access near major destinations, including schools, libraries, parks, transit stops, and job centers.

4.1.4. Obtain easements adjacent to the river to create access.

4.1.5. Use the Environmental Graphics Guidelines from the LA River Design Guidelines to create a cohesive wayfinding system along the LA River.

4.1.6. Remove existing signage prohibiting access to the river as projects and trails are developed along the river.

4.2. Increase safe transportation routes to the river.

Ensuring that there are clear, safe, direct connections from neighborhoods to the LA River makes nearby neighbors more likely to use the river and, by extension, the broader LA County network of parks and trails that the river connects to. The ease and quality of these connections is important because impressions of traveling to and from the river can influence the entire river experience. This is especially important where physical barriers currently hinder access to the river. Current research by scholars such as Dr. Richard Jackson of the University of California at Los Angeles and Dr. William Sullivan of the University of Illinois at Urbana-Champaign indicates a favorable relationship between parks and health.[102][103][104] Increasing overall acres of parkland and access to parks can positively benefit communities by reducing rates of preventable diseases such as diabetes and obesity.

4.2.1. Coordinate with LA County transportation plans, including Vision Zero, the Bicycle Master Plan, Metro plans, municipally adopted transportation plans, and the Step by Step Pedestrian Plan.

4.2.2. Encourage pedestrian and bicycle connections across the river approximately every half mile to mile.

4.2.3. Encourage all new pedestrian or road bridges over the river to provide pedestrian and bicycle access to the river trail.

4.2.4. Provide continuous pathways between the river and nearby recreation spaces.

4.2.5. Encourage cities to adopt complete streets policies to better connect neighborhoods to the river.

4.2.6. Increase the extent of multi-use trails that connect to the river with separate paths for active transport, pedestrians, and equestrians.

4.2.7. Coordinate with transportation agencies to enhance public transit to and along the river.

4.2.8. Coordinate with transportation planning to encourage transit lines that cross the river to have stops that provide access to the river trail.

4.2.9. Promote the use of public transportation to get to and from the river trail.

4.2.10. Develop informational materials and signage that highlight the river trail as a transportation route to major job centers and destinations.

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COMMUNITY MEMBERS CITED **SAFETY CONCERNS** AS THE REASON THAT KEEPS THEM FROM VISITING THE LA RIVER

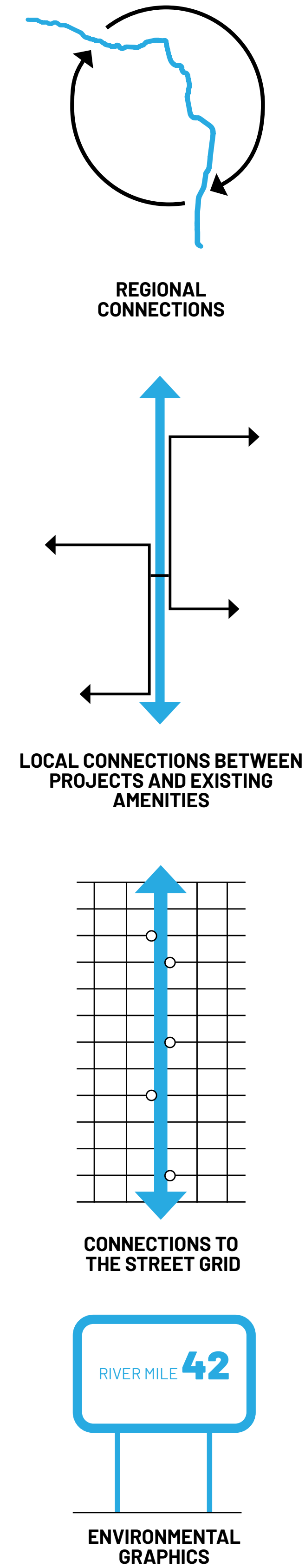

Figure 161. Highlighting regional connections, neighborhood connections, infrastructural connections, and wayfinding creates a more accessible and welcoming river trail.

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Figure 162. The river should reflect the diversity of its neighboring cultures, communities, and organizations. Source: LA County Public Works, 2019.

GOAL FIVE

EMBRACE AND ENHANCE OPPORTUNITIES FOR ARTS AND CULTURE

The LA River has long been at the cultural and historical heart of Los Angeles. From its first Indigenous Peoples to the many neighborhoods it runs through, engages, and enhances today, the river has always been a valued community resource. LA County has the opportunity to advance culture, arts, creativity, and community pride throughout the county and to inspire by recognizing, fostering, and preserving the rich tangible and lived cultural heritage along the LA River corridor. The river presents an opportunity to recognize and incubate new ideas and talent among the next generation of cultural practitioners, offering new cultural opportunities, experiences, and spaces where the arts can flourish and be shared. Interventions that are permanent or temporary, or reflect socially based practices of art, design, and gathering are all waiting to be realized. As a notorious local cultural resource with global influence and stature, the LA River corridor can be a major destination that draws residents and tourists alike, that promotes the equitable inclusion of LA County's diverse people, and that is responsive to the needs and aspirations of the local communities through which it flows.

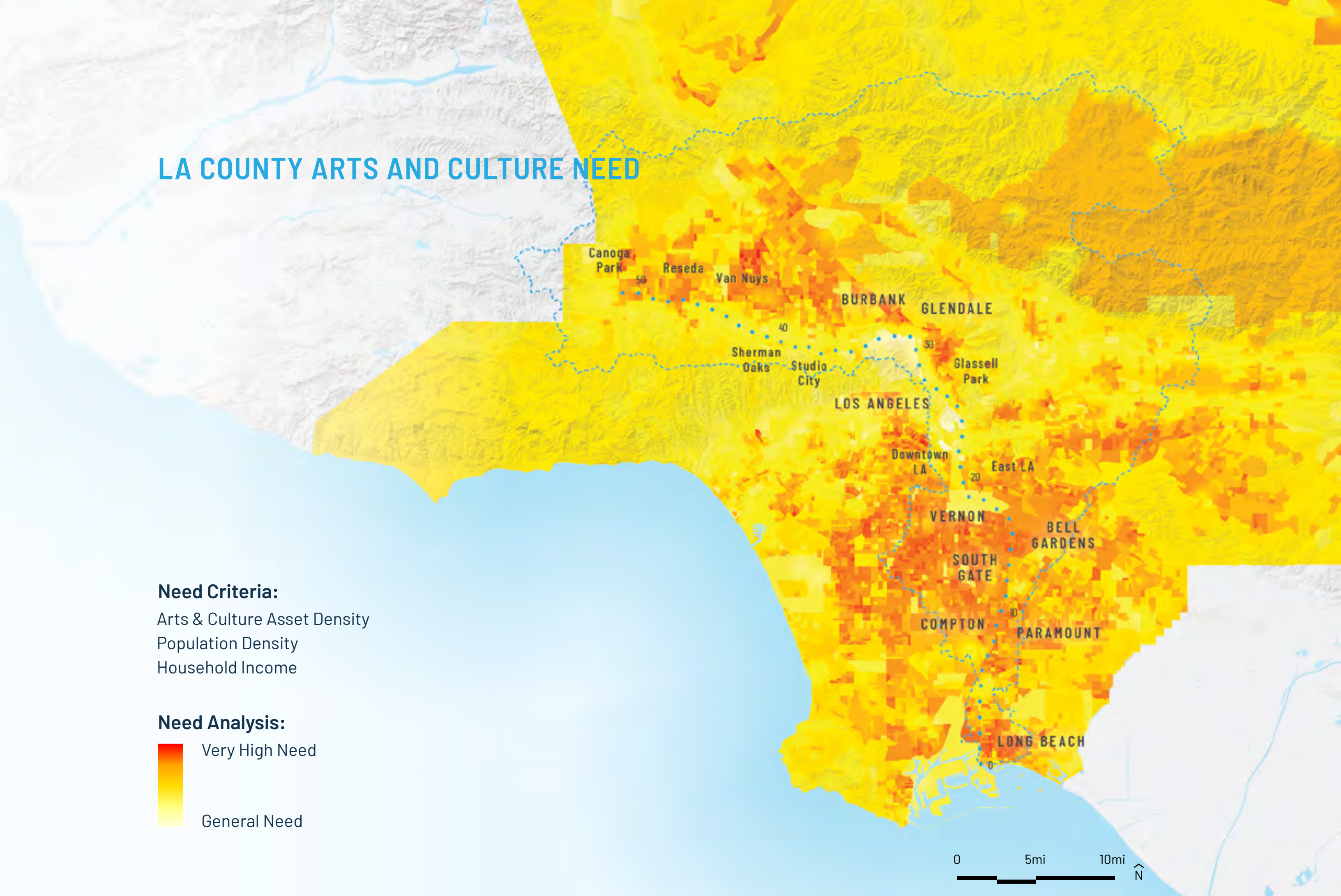

Figure 163. LA County Arts and Culture Need.

ARTS AND CULTURE NEED

Communities should have arts and cultural facilities proportional to their population size.

Arts and culture need was evaluated by comparing the number of known arts and culture assets at a given location with population density and household income to assess a community's relative access to art and cultural facilities.

Arts and Culture Asset Density
Asset mapping is a tool that begins with a belief in asset-based community development, i.e, that things of value already exist in communities and can be encouraged to advance those communities. For the LA River Master Plan, asset mapping consisted of data collection from various sources including facilities and sites such as museums, art and cultural centers, churches, historical facilities, significant architectural sites and landscapes, and sites for public art and free concerts.

Asset mapping was primarily derived from 2016 LA County GIS Data Portal: LA County Points of Interest Data which identifies a variety of facilities throughout LA, however other LA County and City of Los Angeles open datasets were also included. Asset mapping in LA County, however, is acknowledged to be incomplete based on the limitations of currently available sources of data.

Future efforts are recommended in the Master Plan Goals, Actions, and Methods to create a more robust database of arts and cultural resources going forward. Given the lack of detail about the size or significance of specific assets, the relative density of assets was used for evaluating need. Areas with a higher density of cultural assets were categorized as general need, while areas with a low density of assets were categorized as very high need.

Population Density
Population density was used to compare the relative number of assets in a given location to the number of people at that location. Population data was derived from the U.S. Census Bureau 2012–2016 American Community Survey 5-Year Estimates. Areas with a high population density were categorized as very high need, while areas with a low density, general need.

Household Income
Household income was used to identify areas where a household's financial constraints may limit access to art and cultural facilities. Household income was derived from the U.S. Census Bureau 2012–2016 American Community Survey 5-Year Estimates. Areas with a low household income were categorized as very high need, while areas with a high household income, general need.

LA River Arts and Culture Need

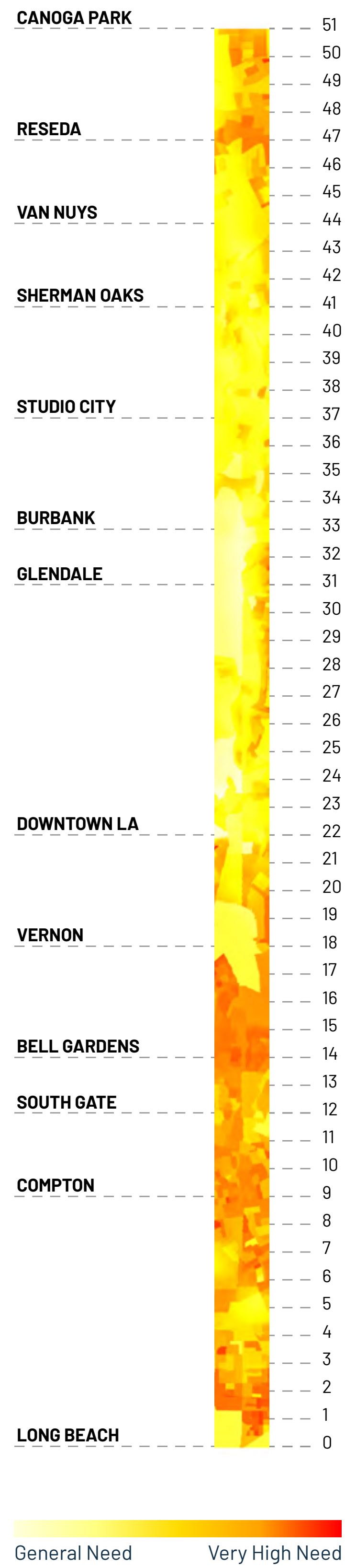

Figure 164. LA River Arts and Culture Needs Ruler.

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EMBRACE AND ENHANCE OPPORTUNITIES FOR ARTS AND CULTURE.

ACTIONS

5.1. Develop a globally significant, comprehensive 51-mile arts and culture corridor along the river that is place-based, community-driven, and reflective of the cultural diversity of the County.

The LA River corridor offers a unique opportunity to create the longest continuous corridor of arts and culture in LA County. Not only does this 51-mile corridor provide a place to reflect each unique community along its banks through arts and culture, it provides a place to bring these diverse communities together and celebrate their similarities and differences. The corridor has potential to be a major cultural destination that is also locally rooted in equitable access to cultural infrastructure, architecture, and landscapes.

5.1.1. Site permanent civic art, temporary art installations, cultural amenities, and cultural facilities along the river that are responsive to community strengths, needs, and identity.

5.1.2. Encourage incubation of diverse talent through commissions for local as well as regional, national, and international artists and cultural organizations.

5.1.3. Secure reliable funding for civic art and cultural projects along the river, encourage local projects to adopt the LA River Design Guidelines, encourage coordination of municipal public art programs, and encourage percent for art programs where they are not in place.

5.1.4. Support operations and maintenance of existing cultural and arts assets along the LA River corridor to ensure optimal long-term viability of assets, and provide workforce training to maintain culture and arts-based assets where possible.

5.1.5. Prioritize the use of historically accurate and culturally competent art and storytelling of past and present in interpretive materials, including signage, environmental graphics, functional art, curricula, cultural markers, and educational displays.

5.1.6. Require that all permanent art within the LA County Flood Control District right-of-way be deeded to the LA County Flood Control District.

5.1.7. Encourage opportunities for cultural and creative uses in community development such as space for artists to live/or work in proximity to the river.

5.2. Identify and activate cultural assets along the LA River corridor.

A community's cultural assets contribute to its creativity, traditions, robustness, and vitality and can act as both resources and opportunities. Cultural assets can be material, ephemeral, and even spiritual. They include buildings, sites, and objects holding local and national cultural significance; people, places, events, and organizations recognized as cultural anchors within a specific community; and stories that are powerful enough to bind people together in a place over time. Making cultural assets visible and acknowledging them is a key element in sustaining livable communities.

5.2.1. Create a methodology for understanding existing cultural assets in collaboration with community members.

5.2.2. Work with community partners and creative strategists on cultural asset mapping activities in neighborhoods where there is limited existing data.

5.2.3. Continue asset mapping along the 51 miles of the LA River corridor after pilot project completion.

5.2.4. Conduct community training in the tools and strategies for documenting cultural assets through methods including interviews, photography, mapping, and video.

5.2.5. Share ongoing asset mapping on the LA County Department of Arts and Culture website, and help reaffirm and build the LA River community as a vital and growing county resource.

5.2.6. Work with County, municipal, and state historic preservation offices or similar agencies to incorporate existing resources and protocols for identifying and landmarking historically significant resources as components of asset mapping, and encourage preservation in municipalities where no ordinance or preservation program is active.

5.2.7. Identify and interpret culturally significant historic resources, including buildings, landscapes, and objects that convey the layered histories of places and people.

5.3. Integrate artists, cultural organizations, and community members in planning processes and project development along the river.

The most effective way to integrate more local arts and culture into the LA River corridor is to have meaningful, ongoing engagement with those who are already deeply embedded in the arts and culture communities. Their voices help create and shape new opportunities along the river with a view toward cultural equity and inclusion.

5.3.1. Engage artists at the beginning of planning processes, and allow for open-ended exploration to determine how design, arts, and culture can be fully integrated into projects.

Figure 165. Local artists and vendors display crafts at SELA Arts Festival. Source: OLIN, 2019.

Figure 166. The LA River Campout is one if the most popular programs at the Bowtie Project, river mile 26.2. Source: Clockshop, https://bit.ly/2KelS9t.

5.3.2. Use both quantitative and qualitative data in planning arts and cultural activities along the river.

5.3.3. Incorporate artists and cultural practitioners in design processes, including signage, interpretive materials, and street furniture.

5.3.4. Incentivize projects that acknowledge, represent, and preserve cultural heritage and cultural assets and that include local craftspersons, artisans, and Indigenous Peoples in riverside projects.

5.3.5. Prioritize cultural equity and inclusion in decision-making, investments, and strategies for implementation.

5.4. Galvanize and activate the LA River cultural identity through arts and culture.

Raising awareness of existing and potential uses of the river for arts and culture will make the LA River a more vibrant part of LA County's cultural experiences. Providing a platform for arts and cultural activities will activate the civic space, provide opportunities for local communities and visitors to engage with the river, and support participation in cultural life, which is a hallmark of thriving communities.

5.4.1. Activate the LA River by providing resources, grants, and other ongoing opportunities for cultural activities, gatherings, festivals, art, and performances along the river.

5.4.2. Support community-based cultural and arts organizations along the river, and actively promote river spaces to local groups and communities as available for their use.

5.4.3. Integrate civic art commissions and community engagement into the design criteria of the river corridor, including interpretive signage, cultural markers, interactive displays and other media, functional art, cultural amenities, and cultural facilities.

5.4.4. Engage with artists and cultural organizations to provide programming for all ages, arts education for youth, free concerts, and cultural engagement at the river pavilions and other locations along the river.

5.5. Streamline permitting processes for artwork and cultural activities along the river.

Since the US Army Corps of Engineers and the LA County Flood Control District each have different permitting requirements, permit seekers today must be knowledgeable about the governance and regulations along the river to obtain a permit. Where one of these public entities holds an easement on otherwise publicly or privately-owned property in the corridor, the permit seeker must also seek permission from the property owner. A streamlined permitting process will encourage more widespread use of the river as a location for artwork and cultural activities.

5.5.1. Streamline permitting for proposed art along the river.

5.5.2. Streamline permitting for holding events and performances along the river.

5.5.3. Encourage the creation of an affordable permitting pathway, which allows for community-based participants to more easily access the river.

Figure 167. The concept for the Waterfront Seattle Art Plan outlines continuous elements that extend the length of the waterfront. These elements range from promenades to thematic pieces to create a cohesive waterfront. Source: Ronincmc, Wikimedia Commons, 2008.

CASE STUDY - ARTS AND CULTURE

WATERFRONT SEATTLE ART PLAN SEATTLE, WASHINGTON

The Waterfront Seattle Art Plan was created as part of the Concept Design and Framework plan for Seattle's Central Waterfront. This masterplan was developed, in conjunction with artists, to transform the industrial Central Seattle waterfront into a dynamic pubic space with art at the forefront. The plan is an advocates for the oversight and funding of public art along the waterfront.

Lessons Learned

- Plan advocates for a dynamic framework for funding, oversight, and implementation of public art
- Plan identifies unique opportunities along "continuous elements"of waterfront like promenades and tide lines as well as nodes that connect the site to existing urban grid
- The process involved artists early on for successful identification of locations and strategies for public art as well as implementation

Figure 168. As housing costs have increased in LA County, so too has the number of persons experiencing homelessness. The LA River has become a home for some unsheltered residents. Source: Flickr, https://bit.ly/2lDFIBg.

SHELTERED

2,433 people*

→ 8,809 PERSONS EXPERIENCING HOMELESSNESS ALONG THE RIVER* ←

UNSHELTERED

6,376 people*

*Numbers based on Los Angeles Homeless Services Authority - Greater Los Angeles Homeless Count Presentation (2019), City of Glendale - Homelessness Count Report (2019), Long Beach Homeless Count Comparison (2019)

GOAL SIX

ADDRESS POTENTIAL ADVERSE IMPACTS TO HOUSING AFFORDABILITY AND PEOPLE EXPERIENCING HOMELESSNESS

Housing costs for LA County residents have been steadily increasing for decades. The median owner-occupied home value has gone up by over 50%, from $298,800 to $465,900 between 2000 and 2016 (in 2016 dollars). Among renters, the percentage of household income spent on housing went up from 28 to 35% in the same time period. About a third (32%) of renters in the county are severely rent burdened, meaning they spend more than half of their income on rent. As housing costs have risen, so has the number of people experiencing homelessness, which now exceeds 50,000 people across LA County. Approximately 8,800 persons experiencing homelessness are living in neighborhoods adjacent to the river.

As the LA River moves toward the vision of becoming 51 miles of connected open space, it is critical to consider how this vision will impact housing and homelessness. With the goal of increasing parks and open space, there is potential to negatively impact housing affordability. To improve neighborhoods without causing negative effects of displacement, a proactive approach is imperative. The Master Plan is committed to considering issues of housing in parallel with planned and proposed multi-benefit projects, including parks and infrastructure improvements. Projects can be strengthened on this front through collaborations with agencies and non-profits with displacement prevention policies in place. Partnerships with research institutions working to better understand displacement trends are equally critical; constantly re-evaluating how and why connections between displacement and improvements such as new parks exist can inform strategies for serving communities of high need that do not, in fact, put those communities at further risk.

Figure 169. LA County Housing Affordability Need.

HOUSING AFFORDABILITY NEED

Areas with a high displacement risk have a high need for tools to address housing affordability.

While affordable housing is needed through LA County, the need for affordable housing at a given location was evaluated by analyzing that community's existing risk of displacement. The mapping of housing affordability need should only be used as a reference to determine appropriate housing strategies after sites for new infrastructure or parks projects are known.

Displacement Risk

The Displacement Index combines a variety of socioeconomic indicators to measure the risk of displacement based on 2017 research by the Urban Displacement Project, an initiative of the University of California at Berkeley. Areas with a high risk of displacement have a very high need for affordable housing, while areas that have already experienced displacement or have a low risk of displacement have a general need.

The displacement risk analysis groups census tracts into the following categories based on demographic, economic, and housing characteristics:

- Vulnerable to Displacement: might be at risk of being priced out if changes caused prices to rise.
- At Risk of Displacement: there are vulnerable populations and physical and economic conditions that elevate the risk of displacement.
- Ongoing Displacement: were low income in 2000 and have seen changes in demographic makeup between 2000 and 2016.
- Advanced Displacement: community demographics and home values have already changed significantly.
- Not Vulnerable: not in any of the above categories

Because areas experiencing advanced displacement have already changed significantly, there is little opportunity for new affordable housing to stem the tide of displacement. The need for affordable housing goes up through the categories of vulnerable to displacement, at risk of displacement, and ongoing displacement.

This need analysis is intended to focus the majority of the proposed affordable housing in areas that have been identified as being at the greatest risk for displacement. However, affordable housing units do not necessarily need to fall exactly into tracts of each displacement category. Instead, housing should be targeted to sub-areas (or frames) of the river. Exact unit placement will depend on land availability. Increasing the number of affordable units in a particular frame of the river reduces competition for existing low-cost units, which benefits everyone in that segment of the housing market in that area.

LA River Housing Affordability Need

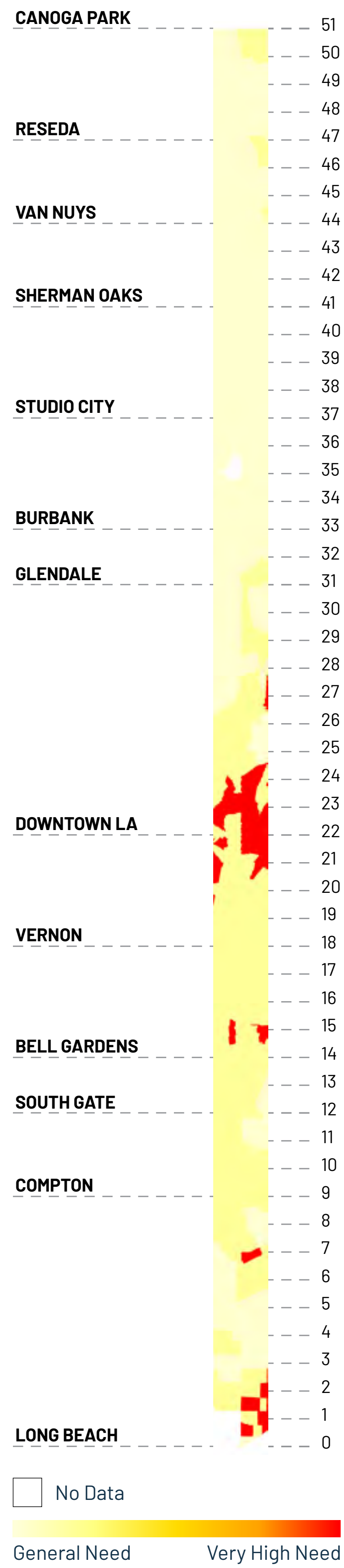

Figure 170. LA River Housing Affordability Needs Ruler.

ADDRESS POTENTIAL ADVERSE IMPACTS TO HOUSING AFFORDABILITY AND PEOPLE EXPERIENCING HOMELESSNESS.

ACTIONS

6.1. Utilize the County's Affordable Housing Coordinating Committee to review and advise on housing and community stabilization strategies along the river.

Ensuring that river improvements strengthen communities without contributing to housing affordability challenges requires a complex balancing act and the best strategies are likely to change. Ongoing input from impacted communities will help guide the evolution of this strategy over time.

6.1.1. Invite additional stakeholders that may include representatives from the County and river adjacent cities, as well as key community stakeholders, such as affordable housing advocates and representatives of communities directly experiencing displacement. Explore the need for funding for staffing or consultants to support the effort, if necessary.

6.2. Develop mapping and assessment planning tools to identify areas at risk for displacement around the LA River in order to prioritize affordable housing projects.

Understanding where along the river new projects might impact housing affordability starts with understanding what areas are at the greatest risk of displacement. Using mapping and assessment planning tools to identify these areas, proactive steps can be taken in proportion to the size of a potential river project and its projected impact to mitigate adverse effects on housing affordability and the risk of displacement.

6.2.1. Develop and maintain a displacement risk map taking into account demographic, housing, market changes, and economic investments.

6.2.2. Require completion of a housing assessment for large river projects funded or supported by LA County in areas of high displacement risk to identify recommended anti-displacement strategies.

6.3. Increase units of affordable housing within one mile of the river.

The most effective way to mitigate adverse effects on housing affordability is to increase the supply of affordable housing or preserve existing affordable housing. Investing in more housing units with restricted rents near the river can help ensure that river adjacent communities remain income diverse even as the river improves.

6.3.1. Encourage a mix of supportive housing, affordable rental, and affordable homeownership units in both new construction and preservation buildings.

6.3.2. Expand the LA County Community Development Authority's Home Ownership Program (HOP) to provide additional affordable homeownership opportunities in river adjacent communities.

6.3.3. Designate river adjacent communities at risk of increased displacement as priority areas for County affordable housing investment.

6.3.4. Publicly report on the progress toward this goal annually through the Affordable Housing Coordinating Committee.

AFFORDABILITY HOUSING NEEDS ASSESSMENT (SEE 6.2)

Assessment tool may include:

- Analysis of the potential impact of the proposed project on housing affordability and displacement.
- Summary of existing affordable housing programs and projects serving the community including any existing affordable housing developments with affordability restrictions scheduled to expire.
- Analysis of local barriers to approval of supportive housing in the surrounding community.
- Summary of currently existing unsubsidized but affordable market rate rental housing in the area surrounding the project
- List of specific sites which could be appropriate for development of supportive housing for persons experiencing homelessness.

LAND BANK OR SIMILAR ENTITY (SEE 6.4)

- Coordinate site acquisition and financing river-wide.
- Initially target land acquisition efforts largely (but not exclusively) in areas identified as facing the greatest risk of displacement.
- Work with the County Assessor and municipalities to identify properties with repeated code violations or tax delinquencies that could be acquired.
- Partner with local agencies and community-based organizations to manage community planning processes to identify local priorities for development in each area.
- Manage RFPs or other public process for selecting housing developers for disposition or joint development projects.
- Transfer ownership of land to local nonprofit housing providers, or other long-term owners when sufficient local capacity exists.
- Recapture land purchase funds for reuse in future sites to the extent possible.
- Develop and record affordability restrictions to ensure perpetual affordability of assisted projects.

ADDRESS POTENTIAL ADVERSE IMPACTS TO HOUSING AFFORDABILITY AND PEOPLE EXPERIENCING HOMELESSNESS. (CONTINUED)

6.4. Identify funding necessary to create an affordable housing land bank, land acquisition loan fund, or similar strategy to purchase land in proximity to the river and hold it for future development as affordable housing or permanent supportive housing.

The primary obstacle to building new affordable housing and permanent supportive housing is the lack of available land on which to build it. LA County is largely built out, with few vacant properties and relatively high property values. A land bank or similar organization that is specifically tasked with assembling development parcels could lower the barrier to creating new affordable housing. See the affordable housing system project pages for additional considerations related to siting affordable housing.

6.4.1. As part of the Affordable Housing Acquisition Fund study, identify all viable land for affordable housing, including public agency owned land within one mile of the LA River and surplus or underutilized sites appropriate for development of affordable or supportive housing, including sites where housing could be collocated with other uses.

6.4.2. Identify funding for a single land bank or similar strategy within county government or an outside partner.

6.5. Secure funding for affordable housing in parallel with funding for river projects.

With the understanding that housing affordability is a priority concern throughout LA County, it is imperative that, in conjunction with the results of a housing impact assessment, any projected adverse effects on housing affordability caused by a planned river project be mitigated in lock step with the project's progression. Waiting until a project is in progress or complete to address housing affordability would mean confronting an exacerbated problem, which is likely to be even more costly in the long term. Funding for housing should be made available up front, when steps can still be taken to preserve affordability.

6.5.1. As new financing tools are created to fund river improvements, set aside a portion of funding to support land acquisition and permanently affordable housing whenever possible. While many infrastructure financing sources will not allow use for affordable housing, using a portion of river specific funding for housing, when possible, can leverage additional affordable housing financing and expand the amount of affordable housing built adjacent to the river.

6.5.2. Consider commissioning a study of the potential for an affordable housing specific tax increment financing tool as a means of significantly expanding funding for affordable housing along the river by capturing a small share of future growth in property tax revenue exclusively for affordable housing.

6.5.3. Leverage existing housing subsidies to finance permanent supportive housing for people formerly experiencing homelessness on key sites adjacent to the river.

6.5.4. Consistent with the County's Community Benefits Policy, require residential projects receiving commitments of more than $10 million of County resources (including land) to set aside at least 20% of the units to be affordable to extremely low, very low, and low income households.

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DISPLACEMENT RISK IN LA COUNTY

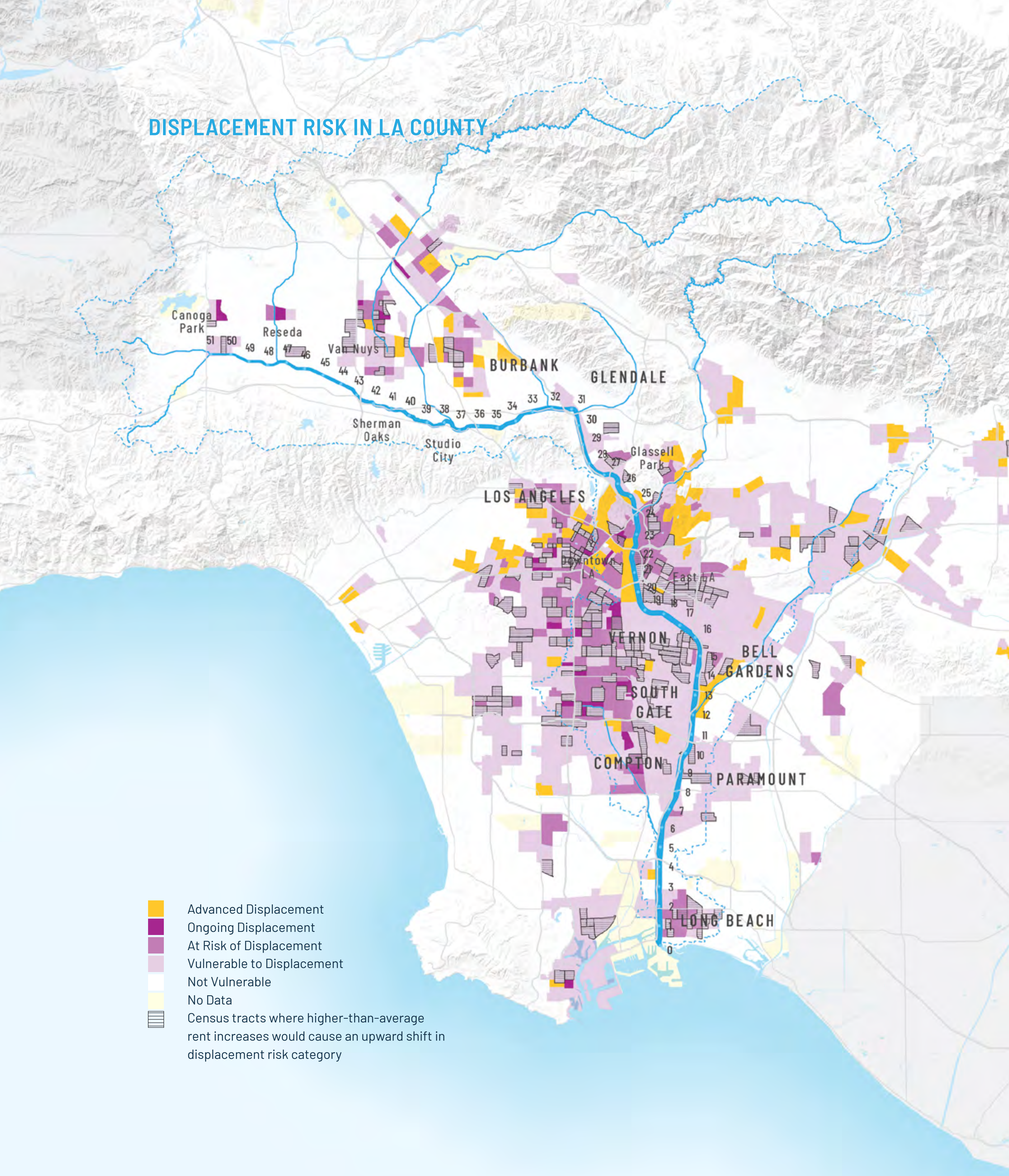

Figure 171. Displacement Risk in LA County. In some areas, if rents were to start to increase faster than they are across the county as a whole, the risk of displacement would increase. These areas are marked as "rent tipping points." Source: Map developed based on research by the Urban Displacement Project: Chapple, K., Loukaitou-Sideris, A., Waddell, P., Chatman, D., & Ong, P. (2017). Developing a New Methodology for Analyzing Potential Displacement.

ADDRESS POTENTIAL ADVERSE IMPACTS TO HOUSING AFFORDABILITY AND PEOPLE EXPERIENCING HOMELESSNESS. (CONTINUED)

6.6. Incentivize stronger resident equity building tools and tenant protection policies along the river.

While many river adjacent communities operate affordable housing programs, few communities have strong tenant protections. When low-income families are evicted, they often have no other options and it is common for people to experience homelessness. Tenant protection policies seek to prevent tenants from being evicted outright or through unaffordable rent increases.

6.6.1. Develop resources to expand tenant education and counseling, and inform tenants living adjacent to river improvement projects about the availability of counseling services, including those available through the LA County Department of Consumer and Business Affairs.

6.6.2. Develop resources and provide technical assistance to encourage cities to adopt stronger tenant protection policies, including rent stabilization and just cause for evictions.

6.6.3. Fund a grant program to provide staffing support to community-based organizations in high-risk communities to conduct direct outreach and counseling to tenants at risk of displacement.

6.6.4. Expand County funding for eviction legal defense services for tenants, and target this resource to areas of the county, including many river adjacent communities, likely to experience concentrated displacement.

6.6.5. Prioritize river investment programs in communities that have established tenant protections.

6.7. Support persons experiencing homelessness along the river by coordinating outreach and by building new permanent supportive housing.

Permanent supportive housing is housing coupled with a range of supportive services, with no time limit as long as tenants meet certain basic obligations, such as paying rent. LA County has a coordinated entry system that serves as a single point of entry to connect people with housing needs to a variety of housing providers. Continued coordination among the web of organizations that perform outreach or provide permanent supportive housing is paramount.

6.7.1. Identify sites for permanent supportive housing within one mile of the river.

6.7.2. Coordinate and support existing efforts to provide temporary and interim supportive housing until the implementation of permanent solutions.

6.7.3. Coordinate and support existing efforts of the County's coordinated homeless outreach system and their work along the LA River.

6.7.4. Connect persons living in or near the river to the coordinated entry system for access to housing opportunities for which they are eligible.

6.7.5. Build on the platform provided through Measure H to support more local cities in developing proactive homeless support programs and policies.

6.8. Integrate best practices for working with persons experiencing homelessness utilizing the river corridor.

Many unsheltered residents live in homeless encampments alongside the LA River. Encampments can impede operations and maintenance efforts and often pose challenges to both environmental and public health, particularly water quality. The provision of permanent sanitation and hygiene facilities, coupled with a centralized set of guidelines for the management and clearing of encampments based on compassionate practices, when necessary, will ensure that the river corridor is a space where all people feel safe, have access to basic needs such as restrooms, and are treated with dignity.

6.8.1. Review and update guidelines for clearing of encampments along the river to optimize notification timelines, use compassionate practices, and coordinate with outreach teams.

6.8.2. Continue and optimize the LA County Public Works temporary sanitation stations program while developing more robust sanitation facilities.

6.8.3. Provide, at a regular cadence of approximately every mile, permanent facilities for sanitation that are regularly maintained, staffed, and coordinated with river amenities.

6.8.4. Coordinate with river staff programs to train staff to interact with persons experiencing homelessness.

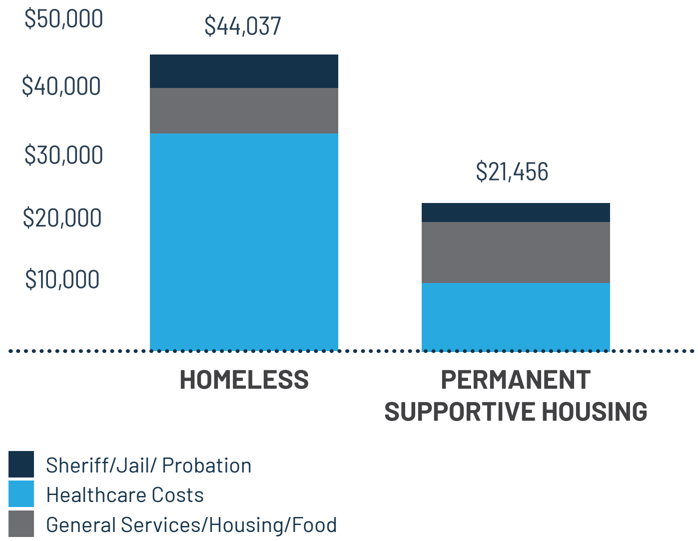

Figure 172. **Permanent supportive housing is less expensive than homelessness.** Source: LA Family Housing: https://lafh.org/causes-solutions/, Economic Roundtable "Where We Sleep" (2009).

Figure 173. **Public hygiene facilities currently operate in 4 cities in California, including LA.** Source: https://bit.ly/2MVuAep.

Figure 174. Engaging all members of the community leads to broader stewardship of the LA River and can support growth in communities adjacent to the river. Source: LA County Public Works, 2019.

OVER THREE DOZEN ORGANIZATIONS AND INITIATIVES FOCUS ON THE RIVER ITSELF

GOAL SEVEN

FOSTER OPPORTUNITIES FOR CONTINUED COMMUNITY ENGAGEMENT, DEVELOPMENT, AND EDUCATION

Among the hundreds of community groups that are present along the river, there are over three dozen organizations and initiatives that focus on the river itself, some of which have been active for over three decades. Healthier, more socially connected communities were the third most important river-related issue for community members. The LA River's connection to the region's history, ecology, and culture makes it a prime venue and tool for both community engagement and education. Community members felt it was most important for people to learn how the river benefits and supports the environment (38%); ecology, habitat, and vegetation (33%); and current hydrology and uses of the river (21%). Though some adjacent communities currently take advantage of the river, a reimagined river with increased activity could serve as a platform and front door for all surrounding communities.

Figure 175. LA County Engagement and Education Need.

ENGAGEMENT AND EDUCATION NEED

Neighborhoods should have educational opportunities proportional to their population size.

Engagement and Education need was evaluated by comparing the number of education assets at a given location such as schools, libraries, and adult education programs with that location's population density to evaluate the number of educational assets relative to the number of people in the surrounding community.

Engagement and Education Asset Density
Asset mapping was primarily derived from 2016 LA County GIS Data Portal: LA County Points of Interest Data which identifies educational facilities throughout LA County. Given the lack of detail about the size and services of specific assets, the relative density of assets was measured. Areas with a higher density of educational assets was categorized as general need, while areas with a low density of assets was categorized as very high need.

Population Density

Population density was used to compare the relative number of assets in a given location to the number of people at that location. Population data was derived from the U.S. Census Bureau 2012–2016 American Community Survey 5-Year Estimates. Areas with a high population density were categorized as very high need, while areas with a low density, general need.

LA River Engagement and Education Need

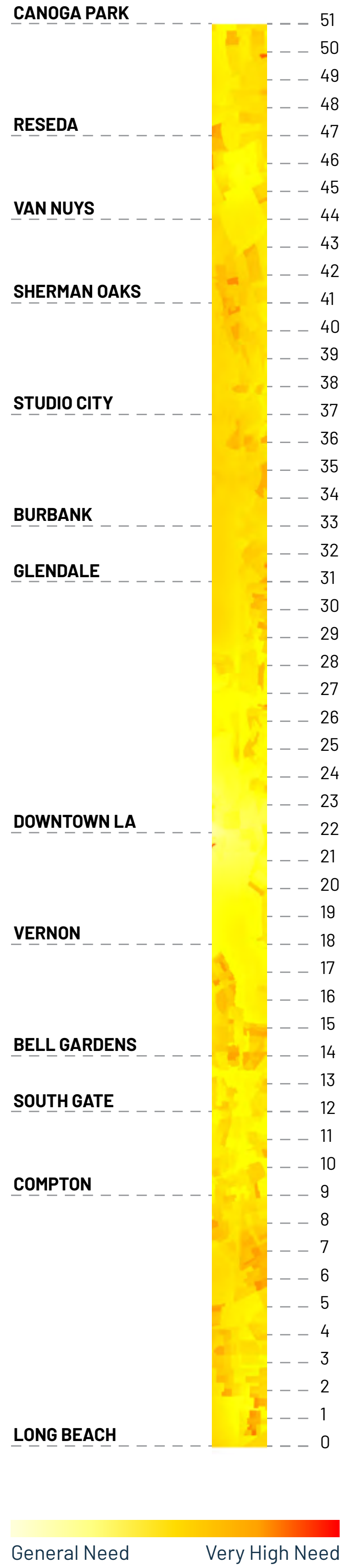

Figure 176. LA River Engagement and Education Needs Ruler.

FOSTER OPPORTUNITIES FOR CONTINUED COMMUNITY ENGAGEMENT, DEVELOPMENT, AND EDUCATION.

ACTIONS

7.1. Provide spaces for people of all ages and abilities to learn about the ecology, hydrology, engineering, and cultural and natural history of the river and its watershed.

The LA River and its watershed have been in a constant state of change throughout human history—from the way the river used to naturally change course to its channelization, from native plant and animal communities to dense urbanization, from native peoples' use of the river as a water source to its current use as flood risk reduction infrastructure. Some artifacts of this evolution of the river are still visible today, but much of this history is not readily apparent. Providing spaces for learning can allow people to connect with this history in a tangible way that can only happen in person along the river.

7.1.1. Install interpretive signage, cultural markers, interactive displays, or other media that reflect community input and local culture.

7.1.2. Create outdoor classroom spaces that can be used by schools and other educational organizations to provide hands-on educational opportunities for community members, and encourage river adjacent schools to plan field trips to the LA River.

7.1.3. Prioritize connectivity to the river from schools, cultural centers, and other education facilities.

7.1.4. Collaborate with arts and culture organizations and academic institutions to understand cultural heritage and historical markers along the LA River and include them in asset mapping.

7.1.5. Support the creation of informal and formal spaces for education in cultural traditions and the arts, such as culinary arts, design, media, architecture, and other genres of artistic production.

7.2. Develop educational materials for people of all ages to learn more about the past, present, and future of the river corridor; natural resource protection; and the wildlife and water of the LA River.

People learn in different ways. Some are more visual or aural learners, while others are more physical or verbal learners. Some learn through individual explorations, others through directed group experiences. Ensuring people of all ages can fully embrace the deep history and vibrant present of the LA River will require acknowledging and addressing various learning styles, paces, and forums.

7.2.1. Develop sample curricula for teachers of students of different ages to use when bringing their classes to the river or to learn about the LA River in their classrooms.

7.2.2. Develop self-guided educational tours that engage and educate in cultural heritage, the arts, architecture, and the history of the built and natural environment.

7.2.3. Increase public understanding of ecosystem function and awareness of habitat and ecosystem health along the LA River.

7.2.4. Develop and implement an educational program on river water quality.

7.2.5. Coordinate with river staff programs to provide educational tours that feature traditional ecological knowledge.

7.2.6. Consult with local Native American Tribal governments and work with Native American communities to develop a curriculum telling the history of the local Tribes and Indigenous Peoples whose lives and traditions depend on the LA River.

7.2.7. Collaborate with local artists and cultural historians on the development of education materials and initiatives.

7.2.8. Coordinate with public information and participation program managers to provide educational materials on stormwater, water quality, multi-use projects, and other topics.

7.2.9. Use curriculum, tours, and discussions to improve environmental literacy and foster cultural understanding of the interconnectedness of historical, present, and future narratives.

7.3. Engage the Indigenous Peoples of the region to document and celebrate the importance of the indigenous cultures of the LA River, past and present.

Nations of native peoples have lived in the LA River region for millennia, making their history, traditions, and practices critical to painting a full picture of the river. There is still much to learn about and document from present-day Tribal communities, including historical interactions and future visions regarding the importance of physical access to the river, choice of language in narratives surrounding the river, and traditional approaches to managing and adapting to flooding.

7.3.1. Foster and expand an ongoing conversation and collaboration with local Tribal governments and local Native American communities about advancing the LA River Master Plan.

Figure 177. Working with educational institutions allow for community members to engage with and learn from one another. Source: LACMA Sketchbook Class, Brant Brogran, 2015.

Figure 178. Pairing educational materials with pavilions and access points, like here at the North Valleyheart Riverwalk located at river mile 29.4, allows users to gain knowledge of the river and their environment. Source: OLIN, 2019.

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7.3.2. Streamline the permitting process for local Tribal governments to access traditional religious, cultural, and ceremonial spaces and materials along the LA River corridor.

7.3.3. Advance the creation of informal spaces for gatherings in consultation with Native American organizations.

7.3.4. Utilize place names from Native American languages in signage along the LA River, as recommended by the Tribe whose territory encompasses that section of the river.

7.3.5. Integrate Native American knowledge of native plants and wildlife.

7.4. Promote the river and natural ecosystem as an economic asset to surrounding communities.

The LA River provides economic value, not just for its irreplaceable utility functions but for its ecosystem and community services. Transforming the river as it is today into the river it is envisioned to be will increase its value as a recreation amenity, as a living laboratory, as an active transportation corridor, as a place to display and celebrate art and culture. To advocate for, build, and maintain the reimagined river will require the coordinated work of designers, engineers, artists, skilled tradespeople, and others. This presents an opportunity to train and hire a cadre of river-related workers, create local jobs programs, and encourage youth internships—ensuring that existing residents receive economic benefits from a reimagined river.

7.4.1. Utilize local resources and workforce to design, build, operate, and maintain projects, art, and amenities along the river, where possible.

7.4.2. Encourage service provider and concessionaire contracts with local businesses as a means to promote regional workforce development and economic expansion.

7.4.3. Provide workforce training to maintain river-related and nature-based projects.

7.4.4. Encourage fair-chance policies in hiring for river-related jobs.

7.4.5. Use local resident hiring practices for people living near the river.

7.4.6. Use targeted worker hiring practices for apprenticeship and employment opportunities, including, but not limited to veterans, persons experiencing homelessness, individuals with a history of involvement with the criminal justice system, older persons (55+), and persons with physical, cognitive, psychiatric, communicative, and developmental disabilities.

7.4.7. Work with veterans affairs to identify opportunities to train and match veterans with jobs or other vocational training related to the river.

7.4.8. Work with homeless service providers to identify opportunities to train and match individuals experiencing homelessness with jobs or other vocational training.

7.4.9. Encourage local businesses and river-related groups to engage youth, individuals under community supervision (probation and parole), and reentering populations in internships related to the river.

7.4.10. Encourage local business and river-related groups to engage residents, such as youth, student groups, social clubs, retirees, and individuals under community supervision (probation and parole) in volunteer and stewardship opportunities related to the river.

7.4.11. Promote recreation and river-related enterprises activities as an economic resource.

7.5. Improve the interface between the river corridor and adjacent communities.

A 51-mile corridor of connected public open space, arts, and culture along the LA River can only be an asset if it has strong personal and physical connections with adjacent communities. Both personal and physical connections with the river provide mutual benefits—for example in the form of community voices shaping the river experience and becoming a greater community asset, or in the form of increased patronage of the river and compatible adjacent land uses.

7.5.1. Visually enhance river right-of-way boundaries, including with fencing and vegetation.

7.5.2. Encourage existing river-adjacent development to orient its “front door” toward the river and public transportation.

7.5.3. Integrate cultural markers into signage and environmental graphics.

7.5.4. Continue to solicit input from communities along the river throughout implementation of this plan, and hold community meetings to update residents on the progress of plan implementation.

7.5.5. Require that County-funded infrastructure and open space projects engage local residents and community stakeholders in planning.

7.5.6. Foster community involvement in and ownership of projects.

7.5.7. Reflect the physical and social character of each neighboring community in the physical design of river improvements.

7.5.8. Identify community vulnerabilities, such as displacement risk, flood risk, or climate vulnerability, and investigate potential impacts associated with river improvement projects.

7.5.9. Develop a strategy to address identified threats by projects to community and resident stability, particularly forces of economic displacement, flood risk, and climate risk.

7.5.10. Encourage cultural organizations, small businesses, and artisans working or based along the LA River corridor to engage youth in internships offering arts training.

Figure 179. The need for local water supply depends greatly on the end use and access to other sources of water. Shown here is the Sepulveda Dam at river mile 43.1. Source: OLIN, 2018.

57 PERCENT

OF THE WATER SUPPLIED IN THE LA BASIN IS IMPORTED FROM FARAWAY PLACES

GOAL EIGHT

IMPROVE LOCAL WATER SUPPLY RELIABILITY

More than half of the region's water supply is imported from the Colorado River, the Sacramento-San Joaquin River Delta, and the Eastern Sierras. In the Los Angeles Basin, 57% of water is imported, 34% comes from groundwater, and 9% is sourced from recycled water, water conservation measures, and local surface water diversions. In community meetings and surveys, supplementing water supply was the second most important issue related to the LA River for participants, identified by 48% of participants. Increasing population, regulatory requirements, natural disasters, and demands on the water system accentuate decreasing reliability in the sources of imported water supplies that is caused by cyclical droughts and climate change. Dry weather and wet weather flows in the LA River present opportunities to develop and diversify local water resources to reduce dependence on imported water and increase the reliability and resiliency of the region's water supply.

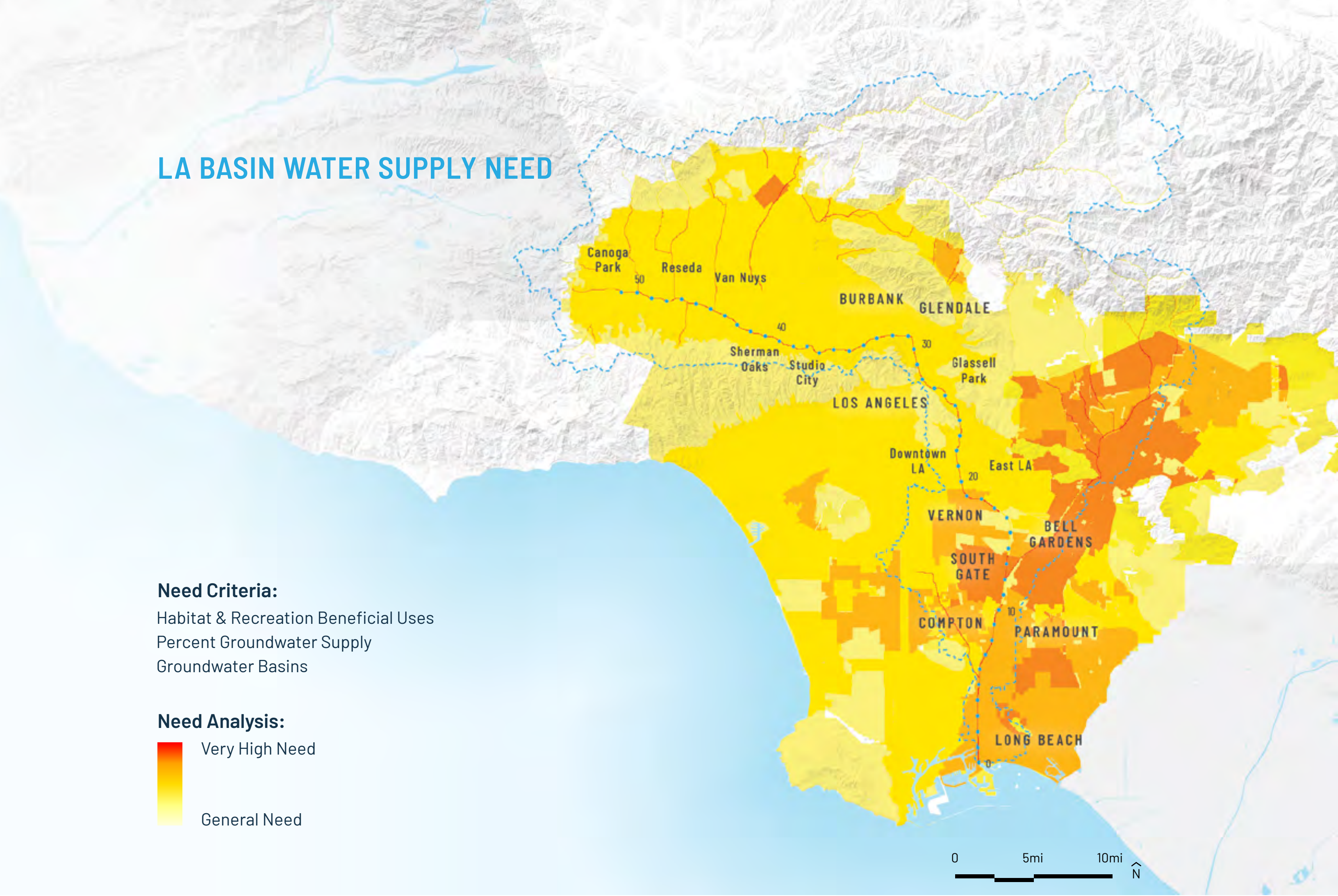


Figure 180. LA Basin Water Supply Need.

WATER SUPPLY NEED

Water in the LA River provides important uses for recreation and habitat, but also plays a role in recharging regional groundwater basins and reducing the demand for imported water.

The need for water supply reliability was assessed by evaluating the need to maintain water in streams for particular beneficial uses and through evaluating areas where municipal water supply overlays and is most dependent on groundwater replenishment.

Habitat and Recreation Beneficial Uses
The occurrences of Beneficial Uses (as identified by the Regional Water Quality Control Board) related to Recreation or Habitat were identified within streams in the LA River watershed, including the mainstem, to indicate where in-channel water supply is needed to maintain those uses. Areas with both recreation and habitat uses were identified as having a high need, while channels and streams with no recreation or habitat uses were categorized as general need.

Percent Groundwater Supply
Urban Water Management Plans prepared by water purveyors in LA County report the sources of water supplied, including groundwater. Areas with groundwater sourcing a significant portion of water supply are in high need of consistent replenishment of groundwater rsupply. Areas with greater than 90% dependence on groundwater supply were categorized as very high need, while areas with less than 10% dependence on groundwater supply were categorized as general need.

Groundwater Basins
Locations overlying groundwater basins have need for additional replenishment of groundwater\to enhance municipal water supply throughout the basin. Areas lying directly over groundwater basins were identified as having very high need while areas not lying over groundwater basins were identified as having general need.

LA River Water Supply Need

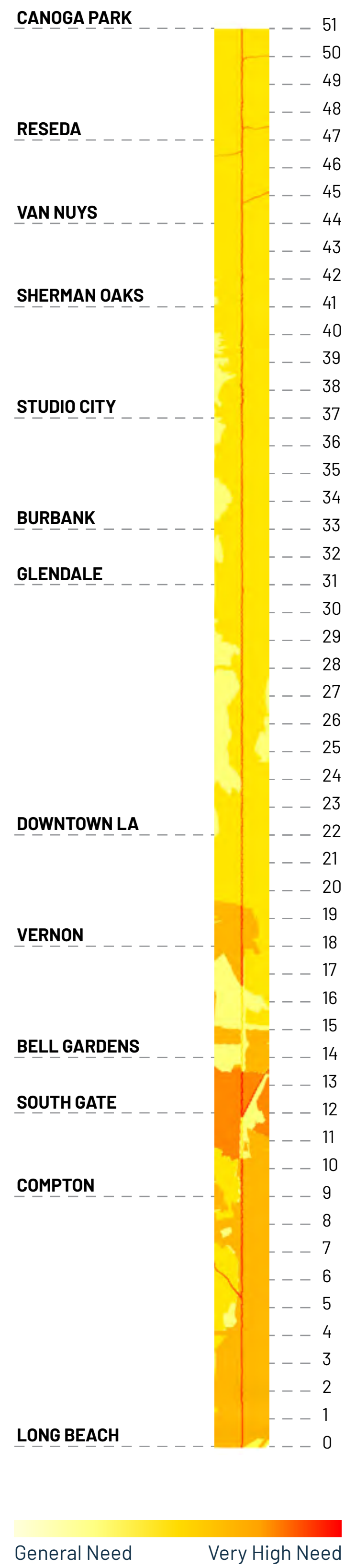


Figure 181. LA River Water Supply Needs Ruler.

IMPROVE LOCAL WATER SUPPLY RELIABILITY.

ACTIONS

8.1. Capture and treat stormwater and dry weather flows before they reach the river channel for groundwater recharge, direct use, water recycling, or release for downstream beneficial uses.

The primary sources of water flowing into the LA River are wet weather (stormwater) runoff originating from precipitation on the watershed and dry weather inputs from the watershed, including incidental urban runoff and groundwater upwelling. The dominant source of dry-weather flow is recycled water discharge from the Donald C. Tillman Water Reclamation Plant (DCTWRP), the Los Angeles Glendale Water Reclamation Plant (LAGWRP), and the Burbank Water Reclamation Plant (BWRP). Much of this flow originates from waters imported from outside the LA River watershed. Projects that strategically capture and treat these flows before they reach the river would expand water supply opportunities and improve water quality in the watershed and along the river corridor.

8.1.1. Encourage and incentivize water capture and direct use on public and private properties.

8.1.2. Encourage private property owners to capture and treat stormwater on site and consider incentive programs.

8.1.3. Coordinate dry-weather flow management, such as stormwater and dry-weather flow capture, groundwater management, and water recycling, among jurisdictions and along the tributaries and other sub-watersheds.

8.1.4. Implement stormwater and dry-weather runoff capture projects throughout the watershed and along the main stem and tributaries of the LA River.

8.1.5. Coordinate flow changes with ongoing instream flow studies.

8.2. Divert and treat stormwater and dry weather flows within the river channel for groundwater recharge, direct use as recycled water, and to supply water for parks and ecological areas.

Water diverted from the LA River could become another source in a portfolio of regional water sources. Diverted water could be used to enhance habitat, support recreation, or supply water for municipal and industrial uses. Storing diverted water in basins through groundwater recharge is particularly attractive because the water does not have to be used immediately. It can be stored until a later time when it is most needed.

8.2.1. Implement direct diversion and treatment projects for recharge in the Central Basin and the San Fernando Basin.

8.2.2. Implement direct diversion and treatment projects for use as recycled water where cost effective.

8.2.3. Consider direct diversions and treatment projects for use in river adjacent parks and ecological areas.

8.3. Employ and encourage efficient water use.

In addition to capturing and reusing water that flows to the LA River, perhaps the most direct method of improving local water supply reliability is to simply use less. Water conservation and efficient water use—from using more efficient fixtures and appliances to using native, less water thirsty plants—can offset demand for imported water and increase local water supply reliability.

8.3.1. Encourage an inter-institutional study on climate change impacts to water supply planning in the LA Basin.

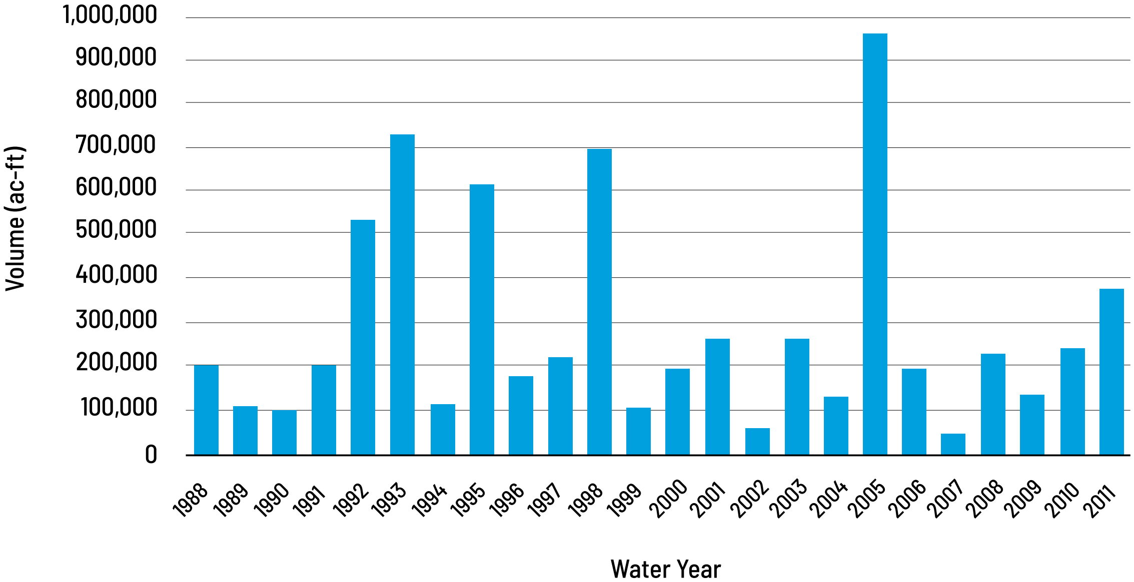
8.3.2. Apply the latest accepted climate change prediction models to water conservation and water supply planning.

8.3.3. Encourage and incentivize households and neighborhoods to adopt best practices in water management.

8.3.4. Provide incentives for parks and other projects to utilize best practices for water conservation.

8.3.5. Encourage water conservation, water use efficiency measures, and the use of recycled or on-site collected water for irrigation in new developments, retrofit projects, parks, and ecological areas.

Figure 182. Large spreading grounds, like this one in Pacoima, significantly contribute to the region's local water supply. Source: LA County Public Works, 2018.



Note: Flow volumes are calculated from LA County Watershed Model. Comparison of modeled flow volumes with USGS gage 11103000 at LA River above Long Beach for the period of available overlapping record (WY1989 - WY1992) indicates modeled annual flow volumes are typically within approximately 1% of measured annual flow volumes (LACDPW, 2010, Figure 84).

Figure 183. Average annual wet weather flows entering the Pacific Ocean at the mouth of the river during one water year (October 1st - September 30th). Source: LACDPW, 2010, LA County Watershed Model Configuration and Calibration --Part I: Hydrology, LADWP, 2015, Stormwater Capture Master Plan, August 2015. Prepared by Geosyntec.

8.4. Improve water supply and recycling facility operations and maintenance.

Water supply projects, like all other infrastructure, require proper operations and maintenance to help maximize long-term viability of the projects. Sufficient funding and maintenance procedures are necessary to effectively deliver proper water supply benefits and to lengthen the lifespan of infrastructure.

8.4.1. Expand coordination between responsible water management agencies to streamline operations and maintenance, facility management, funding, and permitting.

8.4.2. Review and update water conservation, water supply, and water recycling operations and maintenance protocols and best practices as they pertain to the river.

8.4.3. Implement new technologies such as real-time monitoring, reporting, and controls.

8.5. Continue measures to clean up the regional groundwater aquifers.

If water is diverted from the LA River to recharge groundwater, it could be used by municipal water suppliers during periods of greatest need. Identifying and cleaning contaminated groundwater aquifers is therefore crucial for augmenting local water supply.

8.5.1. Explore state legislation to empower local agencies, and provide technical and financial support for improvement of water quality and reduction of regional groundwater threats.

8.5.2. Coordinate with the Upper Los Angeles River Area (ULARA) Watermaster, the water purveyors, and the responsible parties to advance groundwater remediation and improve the management and use of the San Fernando Groundwater Basins.

8.5.3. Coordinate with the Water Replenishment District, the water purveyors, and the responsible parties to advance groundwater remediation and improve the management and use of the Central and West Coast Groundwater Basins.

WATER PURVEYORS

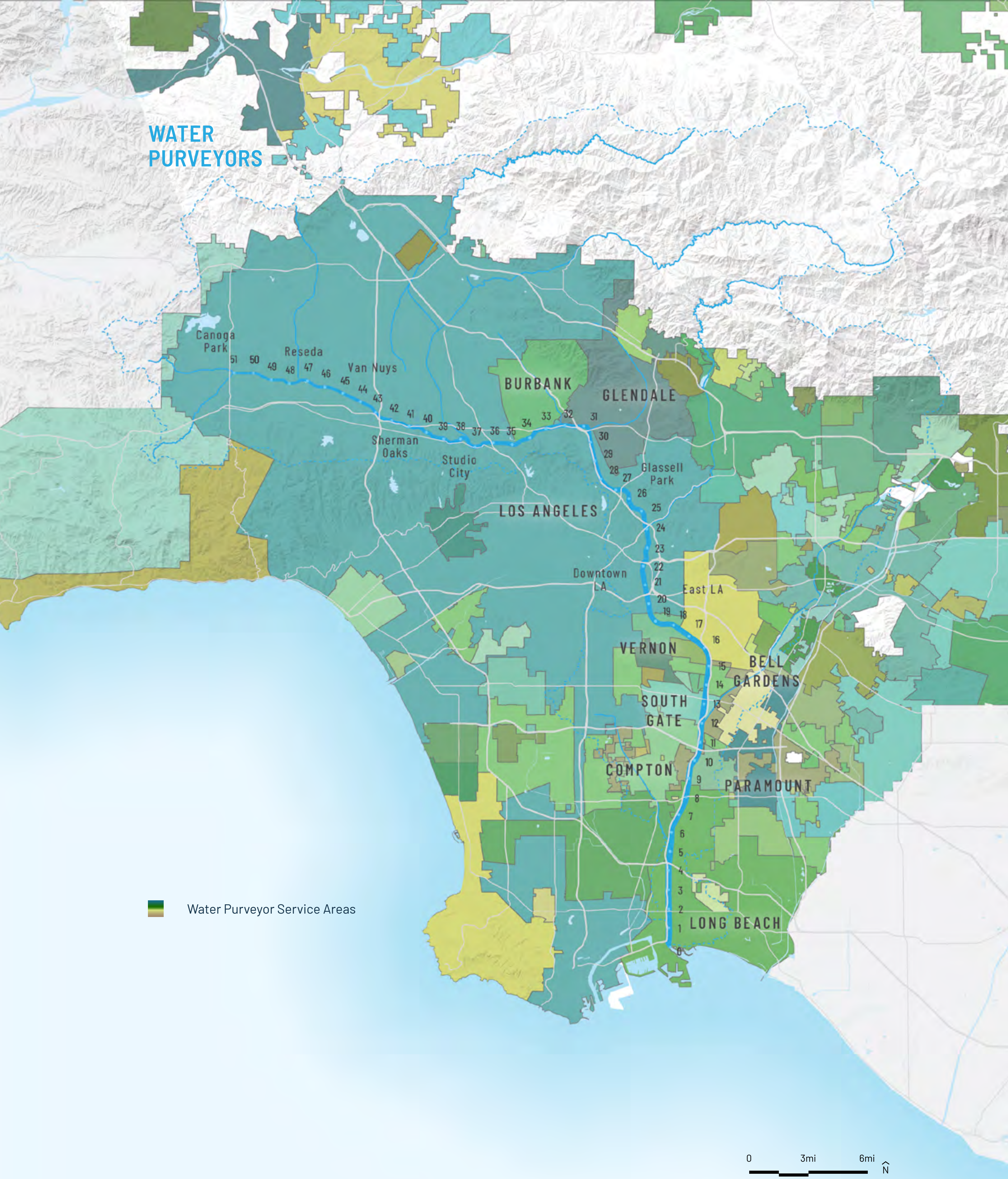


Figure 184. Water Purveyors. There are many different water purveyors within the LA Basin. Source: LA County GIS Data Portal, Water Purveyor Service Areas, 2009.

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Figure 185. The mouth of the LA River in Long Beach at river mile 0. Source: OLIN, 2018.

GOAL NINE

PROMOTE HEALTHY, SAFE, CLEAN WATER

The LA River is a water body with multiple beneficial uses, impairments, and regulated pollutants. While over 800 water quality improvement projects are planned, in development, or have been completed within the river's watershed, additional efforts are needed to meet established water quality targets. In many locations there are projects proposed or constructed to meet the river's water quality requirements. However, there is much uncertainty in the funding and implementation of the proposed projects to keep pace with approved regulatory milestones. In 2018, the County passed Measure W, the Safe Clean Water Program, to provide a new source of funding to help implement local and regional water quality projects.

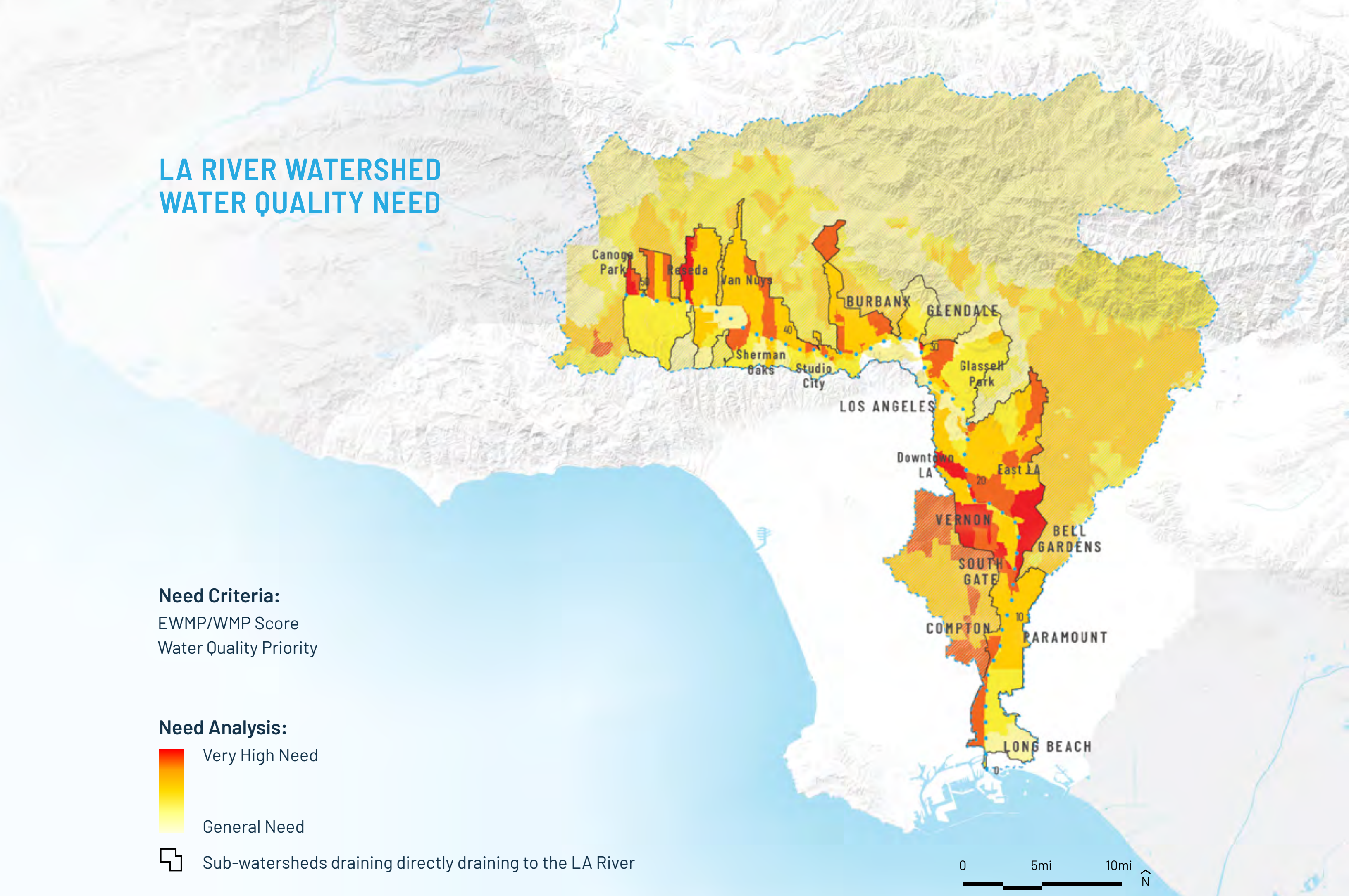

Figure 186. LA River Watershed Water Quality Need.

WATER QUALITY NEED

Water picks up pollutants and absorbs heat as it drains more impervious paved areas on its way to the LA River, impairing water quality and adversely impacting the beneficial uses water provides.

The LA River is an impaired water body with multiple pollutants concentrations detected above federally established water quality standards. In an effort to restore impaired water bodies, Section 303(d) of the Clean Water Act established Total Daily Maximum Loads (TMDLs), a regulatory item that sets the maximum pollutant allowed to be discharged into an impaired water body. The LA River is subject to five TMDLs that collectively regulate discharges of 13 pollutants.

Planned BMP volumes can be achieved through a combination of water quality improvement projects with varying sizes, target pollutants and treatment methods. They range from local bioretention planters sized to capture and treat stormwater generated on a single parcel to regional stormwater retention facilities that divert from existing culverts, storm drains and can treat up to hundreds of acres of tributary area. , to local bioretention planters that are sized to capture and treat stormwater generated on a single parcel.

The need for water quality improvements were evaluated for sub-watersheds within the LA River watershed that directly drain to the LA River (not its tributaries). The current water quality conditions at the sub-watersheds were compared with planned efforts to identify additional improvements needed to comply with water quality regulations.

LA River Water Quality Need

EWMP/WMP Score
The EWMP/WMP score reflects the weighted difference of target BMP volume (75% weight) versus planned BMP volume (25% weight) for areas in the Upper LA River EWMP (2016), LA River Upper Reach 2 WMP (2015), and Lower LA River WMP (2017) to comply with water quality regulations. The percentage weighting of the data accounts for uncertainty in future implementation. Areas with high EWMP/WMP scores were considered to have a very high need for water quality improvements while areas with a low score were considered to have a general need.

Water Quality Priority
Water quality priority represents an integrated evaluation of dry- and wet weather runoff quality based on receiving water body impairments, identified beneficial uses, and land-use-based pollutant loading within the direct drainage. A higher score indicates a higher water quality need.

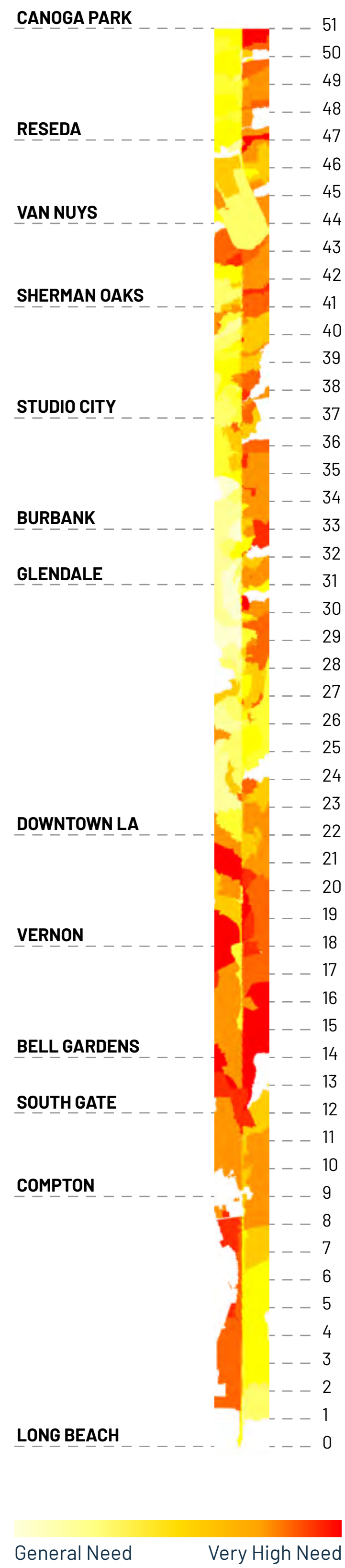

Figure 187. LA River Water Quality Needs Ruler.

ACTIONS

9.1. Improve water quality and contribute to the attainment of water quality requirements to protect public and environmental health.

In addition to protecting public and environmental health, improved water quality in the LA River is important for the implementation of projects along the LA River corridor that seek to use water from within the channel. Water diverted from the LA River could become another source in a portfolio of regional water sources. Diverted water could be used to enhance habitat, support recreation, or supply water for municipal and industrial uses. The quality of water in the LA River affects the ability for it to be used for these purposes.

9.1.1. Develop corridor-based water quality projects and programs, leading to implementation and operations and maintenance.

9.1.2. Support, encourage, and incentivize watershed water quality projects and program development, implementation, operations and maintenance, adaptive management, and planning refinements of the WMPs and EWMPs.

9.2. Coordinate water quality improvements with the Safe, Clean Water Program.

The Safe, Clean Water Program continues LA County's tradition of protecting water quality within communities and providing new sources of water for current and future generations. Modernizing the 100-year-old water system can better protect public health and the environment, and maximize a cleaner, locally controlled water supply. Starting in 2020, the Safe, Clean Water Program will provide up to $285 million annually for a broad range of water quality projects in LA County.

9.2.1. Follow prescriptive watershed planning along with adaptive management practices as detailed in the regional Watershed Management Programs and Enhanced Watershed Management Programs (WMPs and EWMPs).

9.2.2. Assist with establishing procedures for a credit program to assist property owners as identified in the Safe, Clean Water Program.

9.2.3. Provide technical and financial support for feasibility studies; water quality planning; resilience planning; real property acquisition for project development; pilot projects to test new technologies or methodologies focused on water quality, local water supply, and community investments; and retrofit programs.

9.3. Coordinate with the Watershed Management Program and Enhanced Watershed Management Program (WMP and EWMP) Groups.

There are four WMP or EWMP groups along the LA River that have adopted programs through which participating cities and agencies meet their water quality requirements. LA County will continue to coordinate with these groups to implement projects from these programs and to develop additional water quality projects within their respective areas.

9.3.1. Ensure development within the watershed incorporates low impact development techniques to increase infiltration and capture throughout the built watershed.

9.3.2. Expand stormwater capture for groundwater recharge, increase distributed stormwater capture, and reduce effective imperviousness in the watershed, prioritizing nature-based solutions where possible.

9.3.3. Actively coordinate with the Upper Los Angeles River, Los Angeles River Upper Reach 2, Rio Hondo, and Lower Los Angeles River watershed management groups to develop regional and distributed projects and programs that contribute to meeting goals for regional water quality improvement.

9.3.4. Prioritize the removal of pollutants of concern according to timelines contained within the WMP and EWMP plans and the Clean Water Act permits.

9.3.5. Prioritize catchments where needs are greater than can be met with planned or developed projects.

9.3.6. Continue to implement and enforce regional policies for green streets, low impact development, and other watershed improvement initiatives.

9.3.7. Prioritize nature-based solutions to improve water quality.

9.3.8. Publicize the progress of projects and water quality metrics and monitoring results.

Figure 188. Stormwater runoff is cleaned through various processes. Ed P. Reyes River Greenway, near river mile 23.8. Source: LA Sanitation, https://bit.ly/2natEYF.

Figure 189. Promote water as a recreational resource. Source: Flickr User LA District, LA River, 2013.

9.4. Increase public awareness of river water quality and watershed health.

There is a common misperception that the water in the LA River is always unclean in all locations. While all rivers are subject to sporadic events where water quality dips below normal, the majority of water in the river during dry weather comes from the three water reclamation plants that treat it to a very high standard of quality. This water is typically clean enough for people to kayak in the soft-bottom parts of the river. Particularly in areas where polluted runoff discharges into the LA River, water can become polluted. Education can help improve public awareness of safe and unsafe conditions and teach communities how to improve the quality of their runoff.

9.4.1. Develop a website to coordinate information, provide consistency in water quality reporting, and assist in educating other agencies, cities, and the general public on river issues such as water quality.

9.4.2. Post consistent and inclusive signage and communication about water quality on bridges, access points, and along the river, coordinating with LA County Public Works, the LA County Flood Control District, and other entities, when warranted.

9.5. Improve water quality facility operations and maintenance.

Water quality projects, like all other infrastructure, require proper operations and maintenance to help maximize long-term viability of the projects. Insufficient funding and maintenance procedures can decrease the effectiveness in delivering proper water quality benefits, as well as shorten the lifespan of the infrastructure.

9.5.1. Expand coordination between responsible water quality agencies to streamline operations and maintenance, facility management, funding, and permitting.

9.5.2. Review and update operations and maintenance protocols and best practices.

9.5.3. Implement new technologies such as real-time monitoring, reporting, and controls.

Figure 190. Events, such as this cleanup event at Haskell Creek in Sepulveda Basin, can increase the public's awareness to river health and may aid in improving water quality. Source: OLIN, 2019.

Figure 191. Trails and boardwalks at DeForest Park in Long Beach provide access to a wetland habitat at river mile 7.0. Source: LA County Public Works, 2018.

7.
SITES

POTENTIAL SITE LOCATIONS ARE BASED ON AN OVERLAP OF NEED AND OPPORTUNITY

Opportunities along the LA River corridor are either people-based, driven by politics, program, and community partnerships, or are place-based, derived from land assets and underlying geophysical conditions. While people-based opportunities are critical for implementation (see Section IV), place-based opportunities were used to identify potential locations for sites and projects. Many of the sites in this Master Plan draw upon previous planning efforts and the community desires voiced therein. To fill gaps between these projects and ensure a consistent distribution of amenities and facilities throughout the river corridor, the Master Plan includes several newly proposed sites. In such cases, site extents were determined through an in-depth analysis of the LA River right-of-way and available adjacent land assets using publicly available parcel and land use data for LA County.

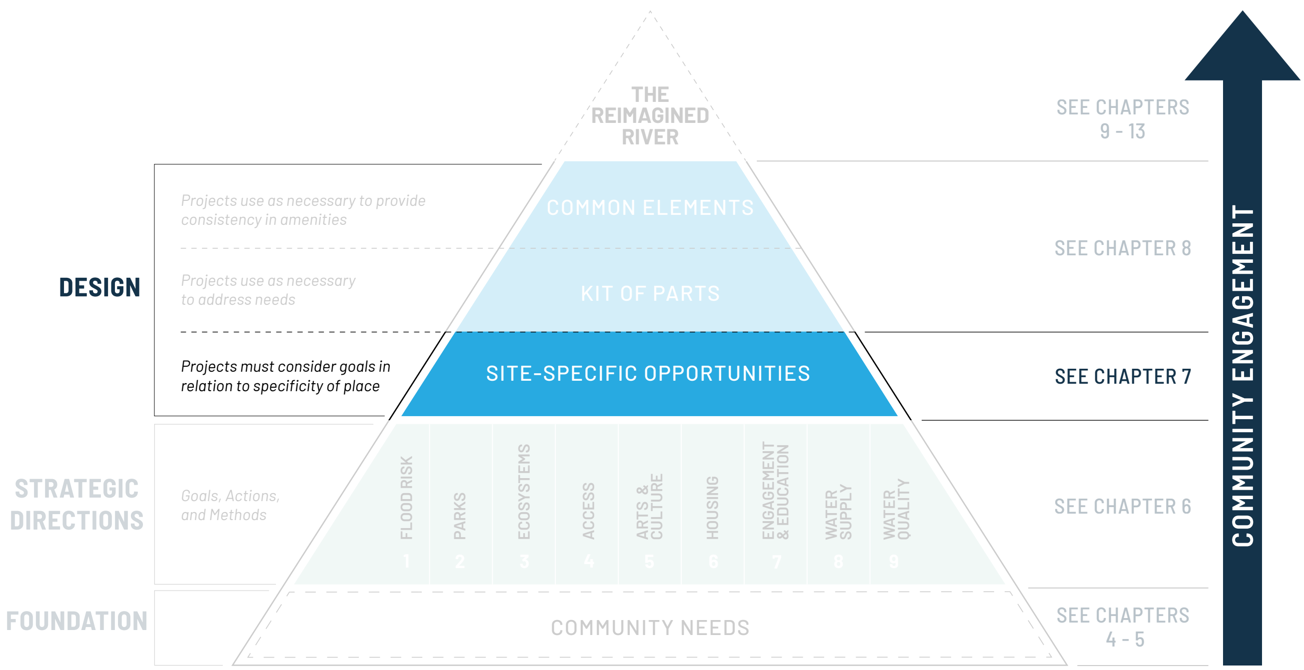

Figure 192. **The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.**

SITE-SPECIFIC OPPORTUNITIES

The previous chapter outlined needs along the LA River related to each of the Master Plan's nine goals. After understanding the needs, it is important to identify opportunity areas where those needs can be met. In some areas, existing planned major projects can meet needs, but in other areas gaps exist and new sites need to be identified. The sites of the Master Plan identify opportunity areas to create multi-benefit projects at an equitable cadence along all 51 miles of the river.

Identify Areas of High Need

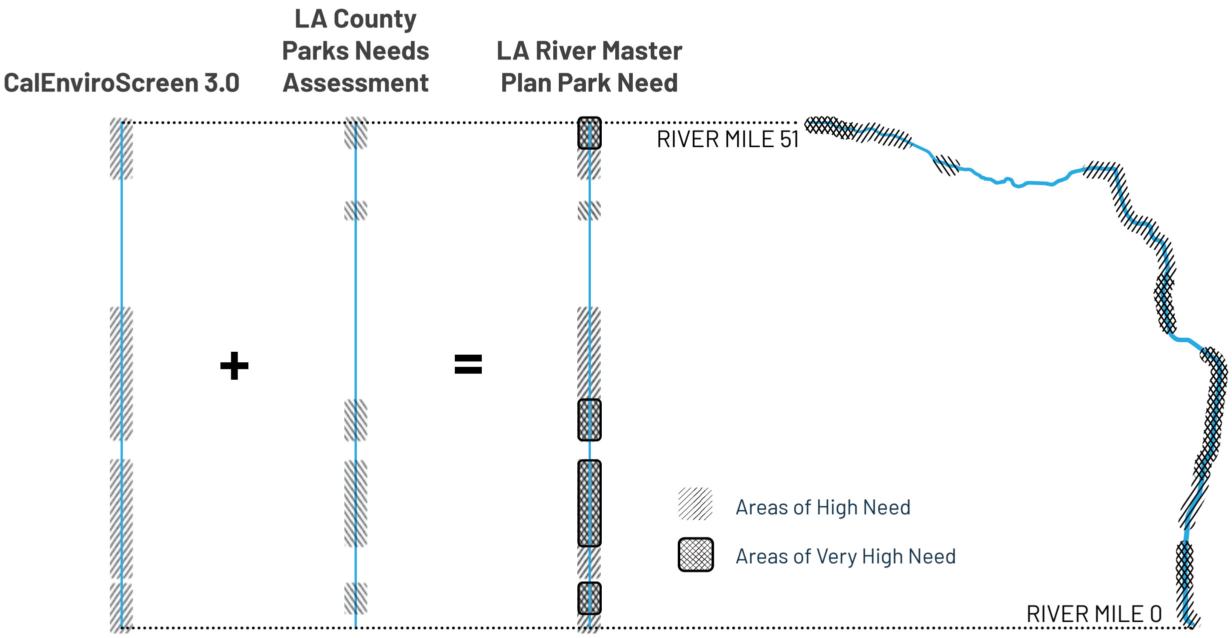

Figure 193. The LA River Master Plan data-based methodology identifies areas of high need along the LA River. The river rulers allow data to be easily compared laterally across various datasets. This simplified example of the process shows CalEnviroScreen3.0 and the LA County Regional Parks Needs Assessment (2016), the two datasets that form the basis for defining park need for the LA River Master Plan. Using the data-based methodology, areas with high needs or many overlapping needs can be determined.

Compare Areas of Highest Need and Opportunity

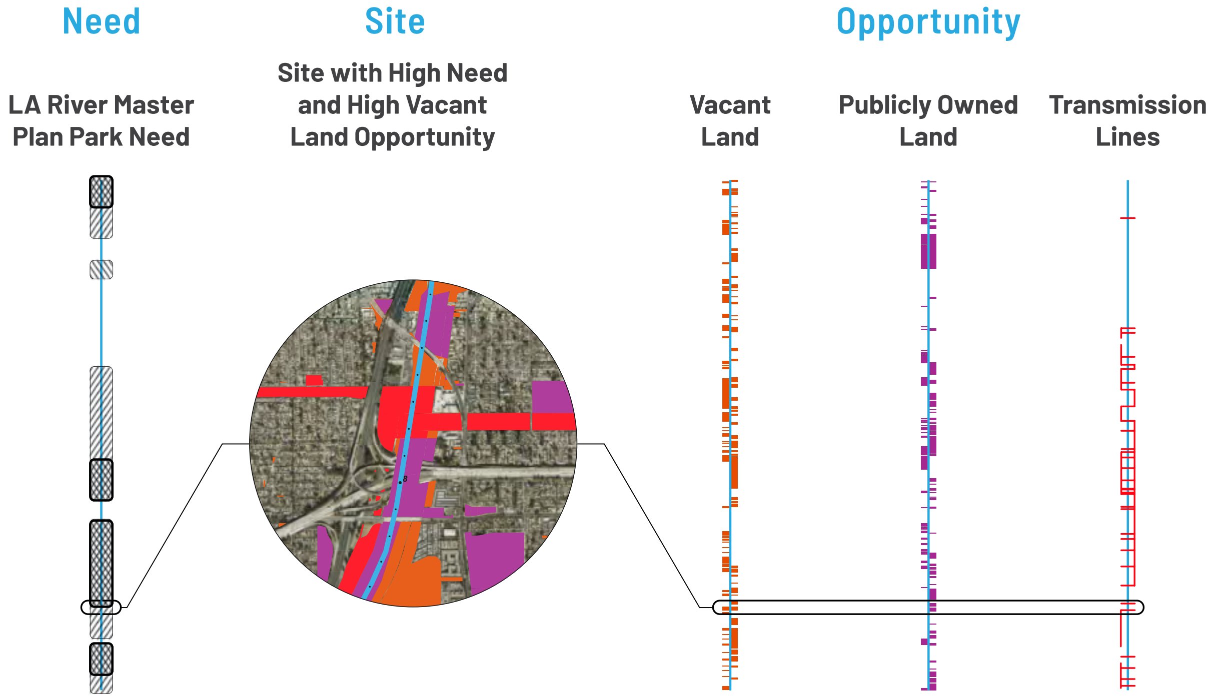

Figure 194. After understanding needs along the LA River, opportunity sites in several ownership and land use categories were identified (three examples are shown here). Areas of the highest needs were compared with existing planned major projects and opportunity parcels to determine where multi-benefit projects might be located along the LA River at an equitable cadence.

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Figure 195. This opportunity parcel sits adjacent to the lower LA River levee. Source: OLIN, 2019.

OPPORTUNITY: LAND ASSETS

LA RIVER RIGHT-OF-WAY

The LA River right-of-way includes the entirety of the river channel as well as landside areas immediately adjacent to the channel banks that facilitate continuous operations and maintenance access by the LA County Flood Control District (LACFCD).

LA COUNTY OWNED PARCELS

LA County owned parcels include those owned by any department or agency of LA County, or by the independent Los Angeles County Metropolitan Transportation Authority (Metro). Though certain existing parks are built upon county-owned parcels, parks were excluded from this land opportunity study in order to shift emphasis toward the creation of additional parks and open space. Schools were also excluded.

OTHER PUBLICLY OWNED PARCELS

Other publicly owned parcels include land owned by public entities that are not LA County. Examples of such entities are municipalities, state agencies, and the federal government. Parks, though often publicly owned, were excluded from this land opportunity study in order to shift emphasis toward the creation of additional parks and open space. Schools were also excluded.

UNDERUTILIZED RIGHTS-OF-WAY

Underutilized rights-of-way include parcels owned by private entities that have a "miscellaneous" land use according to the LA County Assessor. An aerial analysis and a comparison to rail lines and transmission lines datasets was used to confirm that most parcels categorized as "miscellaneous" were, in fact, single-use rights-of-way.

TYPICAL CONDITIONS ALONG THE LA RIVER CORRIDOR

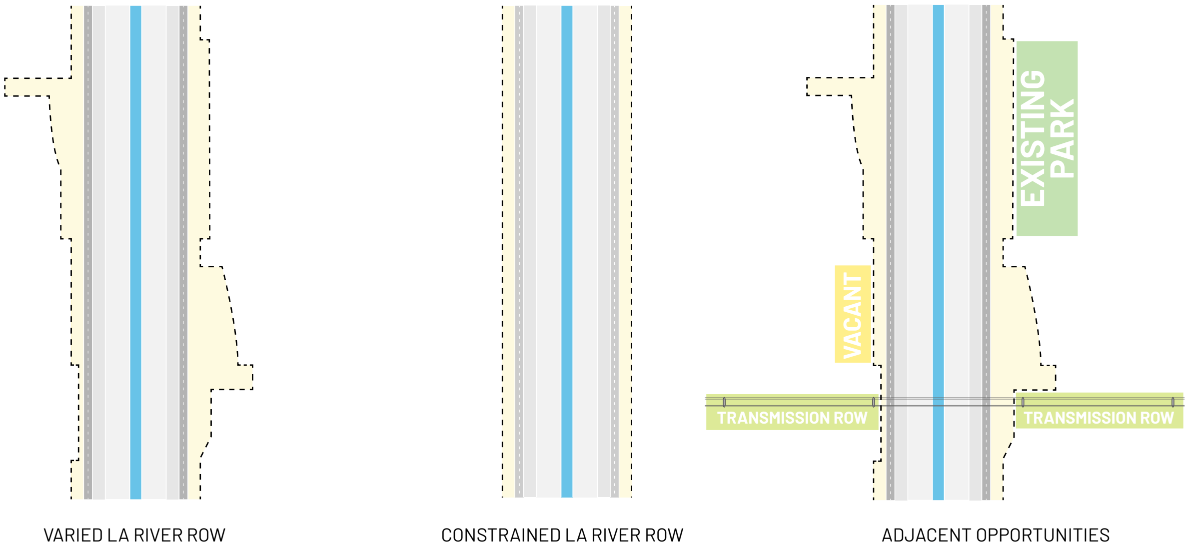


Figure 196. Conditions along the LA River vary. The right-of-way expands and contracts, narrows in some areas and more spacious in others. Certain types of land, when adjacent to the right-of-way, can significantly increase opportunity areas where space is limited.

VACANT PARCELS

These parcels are owned by private entities but are currently identified as vacant by the LA County Assessor. Vacant parcels are not currently used and have no structures.

UNDERUTILIZED PRIVATE PARCELS

Underutilized private parcels have higher land values than improvement values, as determined by data available through the LA County Assessor. Properties where land is more valuable than its improvements (such as built structures) are generally more likely to be redeveloped. Underutilized private parcels were only considered as opportunities for future housing.

EXISTING PEDESTRIAN STREET NETWORK

While not identified in the parcel system, the publicly owned street network provides opportunities for improving pedestrian infrastructure that connects other opportunity areas to each other and to the LA River.

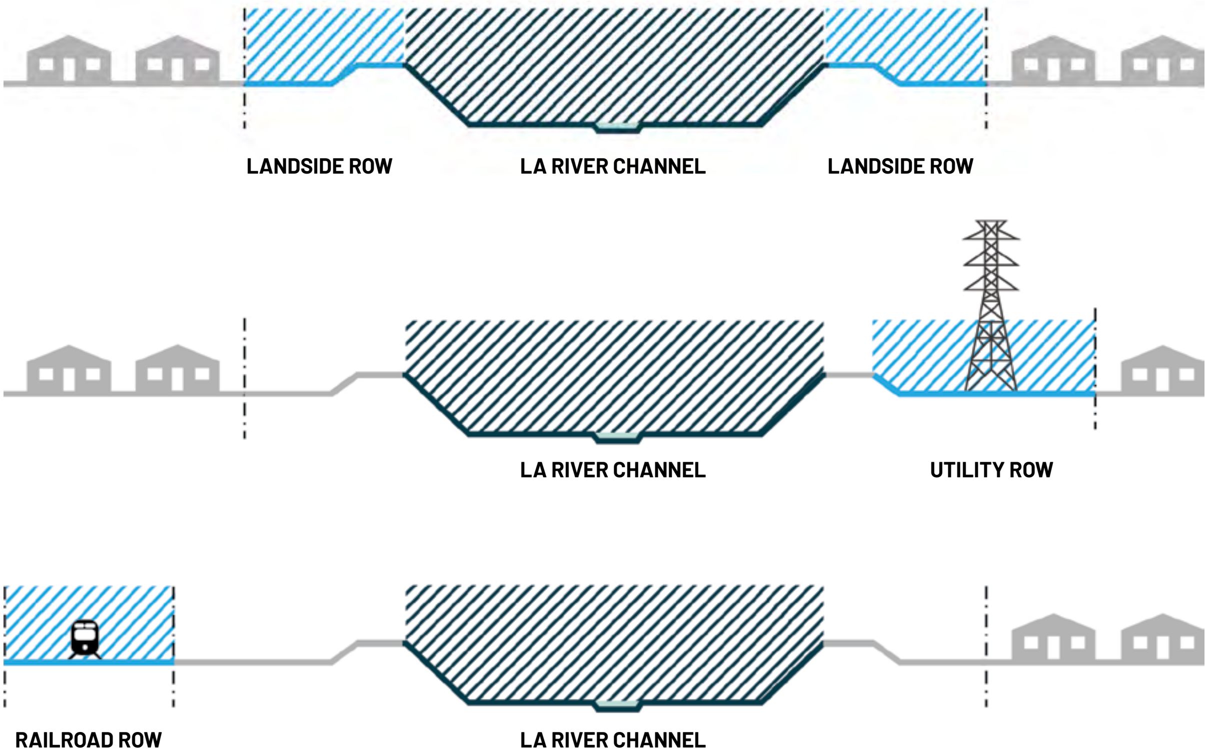


Figure 197. **In addition to LACFCD-controlled land adjacent to the river, utility and railroad rights-of-way are potentially underutilized spaces whose repurposing could increase access, connectivity, and park space.**

LA RIVER RIGHT-OF-WAY

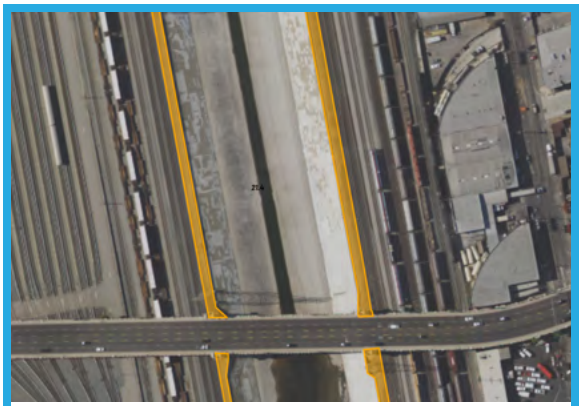
The LA River right-of-way facilitates access by the LA County Flood Control District (LACFCD) and the US Army Corps of Engineers (USACE) to operate and maintain the river channel. It includes the entirety of the LA River channel as well as areas immediately adjacent to the channel banks. These adjacent areas are called "landside". As part of the process to update the LA River Master Plan, the right-of-way was mapped in greater detail using aerial photography and parcel ownership records. There are over 2,300 acres of land in the right-of-way, including over 550 acres of landside area, and 1,740 acres within the river channel. Along the river, the width of the right-of-way varies. Nearly three quarters of the river has a landside area greater than 12 feet wide. However, about 16.5% of the river has no landside area, which makes access to the channel difficult in those areas. While it is essential that maintenance remain uninhibited, in certain areas open space in the right of way could be redesigned to also provide trails, access, recreation, or habitat.

LANDSIDE > 12 FT (RM 35.9)

Total: 74 mi / 72.6%

Right Bank: 41.8 mi / 82.0%

Left Bank: 32.2 mi / 63.1%



LANDSIDE = 12 FT (RM 21.4)

Total: 6.7 mi / 6.6%

Right Bank: 0.9 mi / 1.76%

Left Bank: 5.8 mi / 11.4%

LANDSIDE < 12 FT (RM 19.4)

Total: 4.5 mi / 4.4%

Right Bank: 0.7 mi / 1.4%

Left Bank: 3.8 mi / 7.5%

NO LANDSIDE (RM 34.4)

Total: 16.8 mi / 16.5%

Right Bank: 7.6 mi / 14.9 %

Left Bank: 9.2 mi / 18.0%

Figure 198. The LA River landside takes many forms. Though discontinuous along the river's two banks, the landside includes over 550 acres that can potentially be used for corridor projects, including trails.

GROUNDWATER RECHARGE

Figure 199. There are three main potable aquifers under the LA River. Source: Geosyntec, OLIN, based on Groundwater Basin Boundaries, California Department of Water Resources, 2015.

THE GROUNDWATER BASINS WITHIN THE LA RIVER WATERSHED ARE SOME OF OUR GREATEST ASSETS WHEN IT COMES TO WATER SUPPLY

OPPORTUNITY: GEOPHYSICAL CONDITIONS

In addition to land assets, underlying geophysical conditions also impact place-based opportunities. For example, groundwater recharge projects not only require available land, but also must be located above groundwater basins and areas with soils that readily accept water.

Figure 200. Opportunity Parcels. Source: OLIN, based on LA County Assessor Parcels Data, 2016.

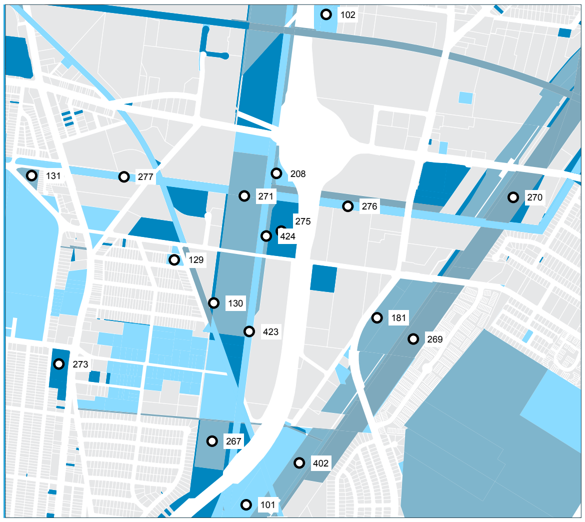


Figure 201. Parcels from Desktop Analysis. Source: OLIN, based on LA County Assessor Parcels Data, 2016.

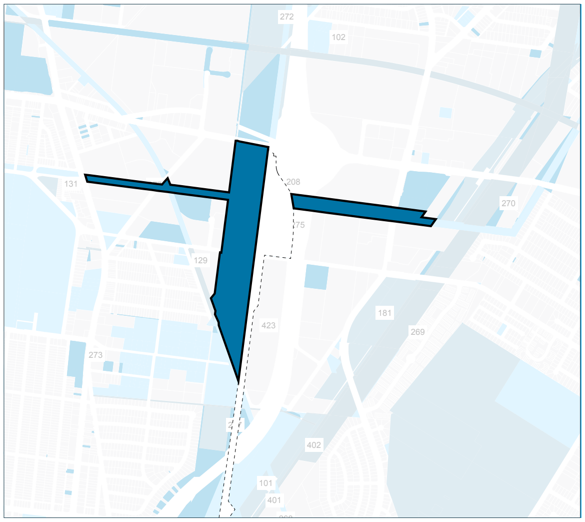
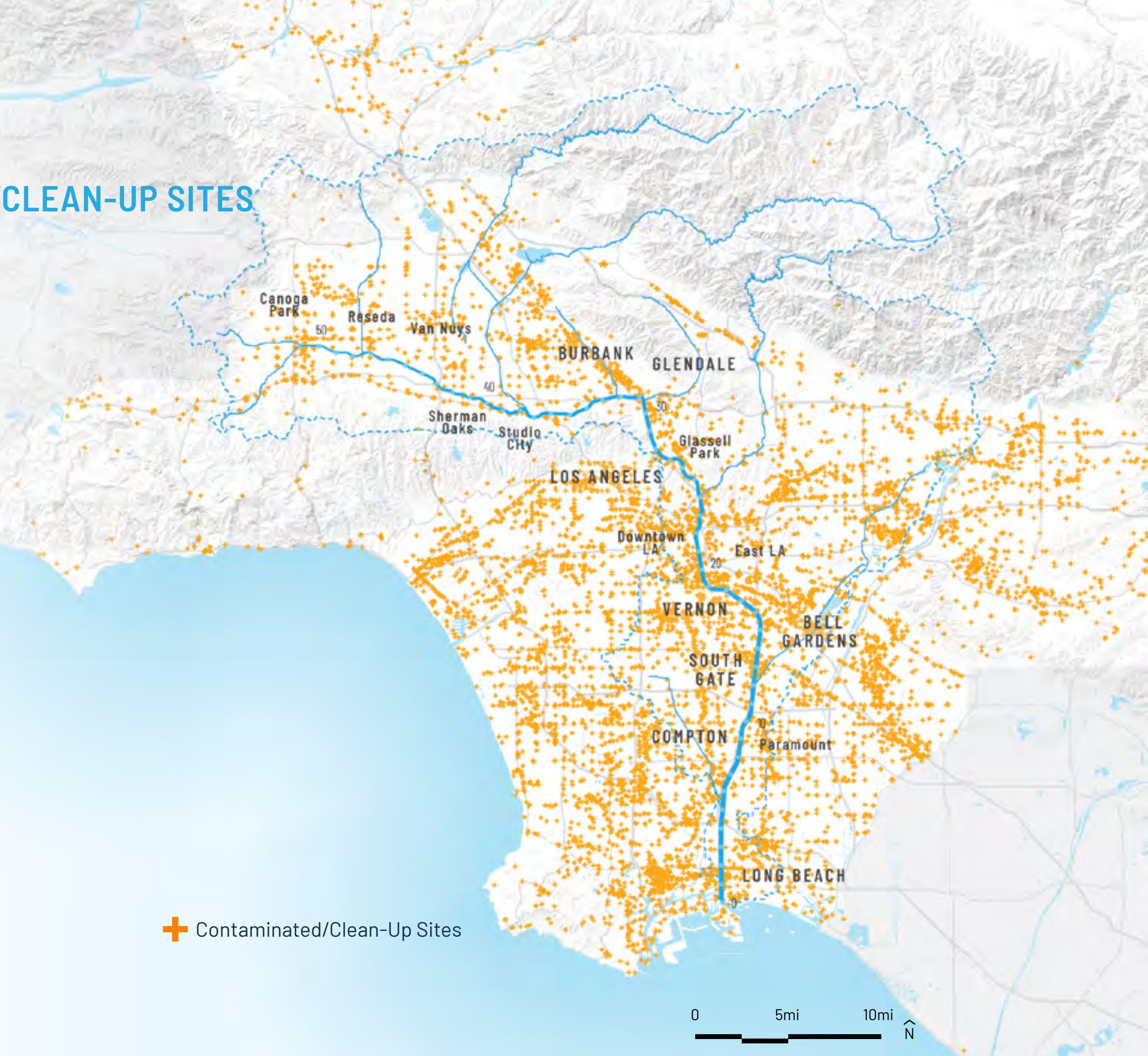


Figure 202. Potential Project Site. Source: OLIN, based on LA County Assessor Parcels Data, 2016.

DESKTOP ANALYSIS

Potential opportunity land assets identified within the LA River right-of-way or adjacent rights-of-way or parcels within one mile of the LA River were then assessed through a desktop analysis using the most recent imagery from Google Earth Pro and Google Street View, as well as online searches for parcel-related information. In some cases, additional on-site reconnaissance was used to evaluate parcels. A spreadsheet was used to track the status of each land asset, and sites observed to no longer be vacant or underutilized were removed. Out of 450 initial opportunity sites, ninety-eight parcels were deemed most viable for future projects; adjacent parcels within this subset were combined to produce a final list of proposed project sites. Known brownfield and superfund sites were eliminated from the opportunity study, though parcels with a history of industrial use may require further evaluation to see if remediation is necessary.

OUT OF 450 OPPORTUNITY PARCELS, 98 WERE SELECTED AND COMBINED INTO POTENTIAL PROJECT SITES



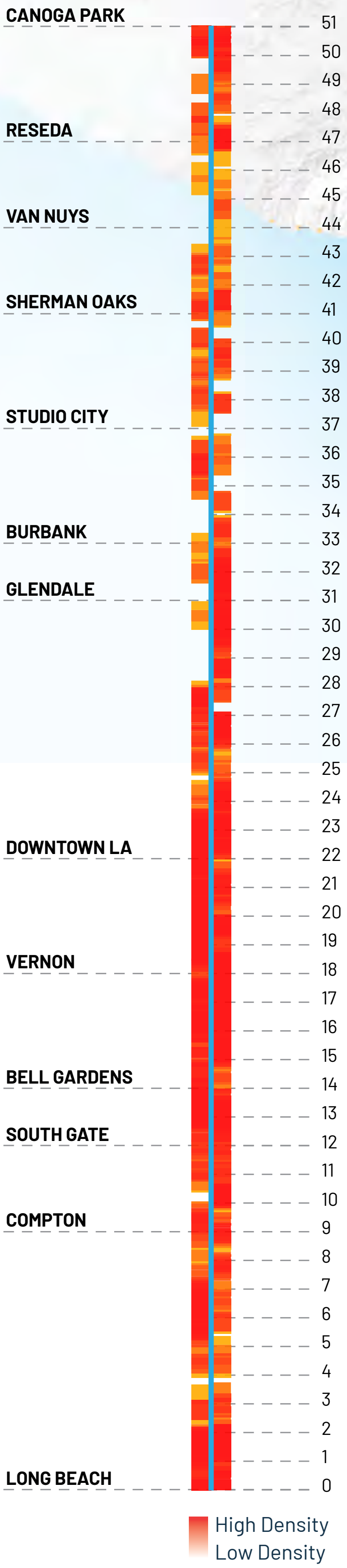


Figure 203. Contaminated Sites: Map and ruler showing listed contaminated/clean-up sites as of March 2020. Source: Regional Water Quality Control Board Geotracker online database (www.geotracker.waterboards.ca.gov) DTSC Environstor online database (www.Envirostor.com).

INDUSTRIAL LAND AND CONTAMINATION

Land within the LA River watershed has historically been occupied by industrial and commercial businesses. These businesses have historically introduced contaminants into the soil and groundwater beneath many of the properties. In some cases, the original businesses and/or owners no longer exist.

Prior to revitalization, industrial/commercial properties will have to be assessed and evaluated by current landowners to determine if they are contaminated. If contaminated, they will require cleanup to make them safe for the intended land use (e.g., parks, public facilities, affordable housing, etc.). Assessment, evaluation, and clean-up will be coordinated through one of the federal, state, or county environmental agencies, such as the United States Environmental Protection Agency (EPA), State Department of Toxic Substances Control (DTSC), State Water Quality Control Board (RWQCB), or LA County Department of Environmental Health.

FUNDING SOURCES AND STREAMS FOR REDEVELOPMENT OF CONTAMINATED PROPERTIES

Funding to assess, safely clean up, and sustainably reuse contaminated properties is available through various local and federal agencies. The type of funding available is dependent on the project stage, site conditions, and parties involved in the redevelopment project (e.g., public, private, non-profit).

Funding is not guaranteed. A site's eligibility for funding is evaluated through an application process overseen by the given funding agency. A list of potentially available funding sources is provided below in Figure 204.

ENVIRONMENTAL PROCESS

ASSESSMENT EVALUATION	ENVIRONMENTAL DESKTOP REVIEW SITE RECONNAISSANCE AND INTERVIEWS INTRUSIVE SAMPLING AND CHEMICAL TESTING DATA EVALUATION AND REPORTING
CLEAN-UP	EXCAVATION/REMOVAL TREATMENT IN PLACE CONTAINMENT/MITIGATION
CLOSURE	UNRESTRICTED USE RESTRICTED USE WITH LAND USE COVENANT LONG-TERM MONITORING AND MAINTENANCE

Figure 205. Typical environmental process of assessing and cleaning up contaminated land. Source: Geosyntec, 2020. Brownfield grant funding analysis for LA River Master Plan.

Agency	Fund Name	Max Funding	Who	Assessment		Clean-up		Applied Across Multiple Sites?
				Grants	Loans	Grants	Loans	
EPA	Site-Specific Assessment	$350k	1,3	X				
	Community-Wide Assessment	$300k	1,3	X				X
	Assessment Coalition	$600k	1,3	X				X
	Clean-up	$500k	1,3			X		X
	Revolving Loan	$1m	1,3				X	
	Multi-purpose	$800k	1,3	X		X		X
DTSC	Targeted Site Investigation Program	$200k	1,3	X				
	Investigating Site Contamination Program	$100k	1,2,3		X			
	Revolving Loan Fund	$200k	1,2,3			X	X	
	CLEAN Program (for assessments)	$100k	1,2,3		X			
	CLEAN Program (for Clean-up)	$2.5M	1,2,3				X	
CAWQCB	Site Clean-up Subaccount	NL	1,2,3	X		X		
	Groundwater Grant	$50M	1,3			X		
	Groundwater Treatment and Remediation	$20M	1,3			X		X
	Underground Storage Tank Clean-up	NL	2	X		X		
	Orphan Site Clean-up Fund	$1m	2	X		X		
Cal-Recycle	Illegal Disposal Site Abatement	$500k	1			X		
	Legacy Disposal Site Abatement	$750k	1			X		

NOTE:
1. Public Entities
2. Private Businesses and Individuals
3. Non-Profit Organizations

$k: Thousands of dollars
$M: Millions of dollars
NL: Not Listed

Figure 204. Example funding sources for clean-up of contaminated sites. Source: www.dtsc.ca.gov/brownfields-funding/ www.waterboards.ca.gov/water_issues/programs/brownfields/, www.epa.gov/brownfields-and-land-revitalization-california-arizona-nevada-and-hawaii/.

PROJECTS AND OVERLAYS FROM PREVIOUS PLANS

KNOWN PROJECTS DATABASE

In addition to opportunity mapping, the Master Plan includes the Known Projects Database, a survey of constructed, in-development, and planned projects within LA County. More than 1,800 projects were aggregated from over 140 plans. Planned and in-development projects within a quarter-mile of the LA River were assessed in terms of scale and goals, and 56 of these—including 13 linear projects such as trails and bikeways—were brought forward as "planned major projects" for the LA River Master Plan. More detail about these individual projects can be found in Appendix Volume II: Technical Backup Document.

OVERLAYS

Four planning "overlays" were also identified through the Known Projects Database. Given their geographic breadth, they operate within the Master Plan by providing guiding principles rather than existing as discrete projects. Each overlay originates from significant river-specific planning efforts and is thus grounded in knowledge that can inform the development of future projects:

LA River Revitalization Master Plan - River Improvement Overlay Zone (2007)
The City of LA River Improvement Overlay (RIO) was developed out of the LA River Revitalization Master Plan. It is a 32-mile zoning overlay that establishes an area in which new projects must comply with certain design standards related to three categories: watershed, urban design, and mobility. The RIO is intended to help the city coordinate land use development along the river, enhance the unique qualities of the river, and better serve adjacent communities within the city's boundaries.

ARBOR Study - Habitat Restoration Zone (2015)
The City of LA River Ecosystem Restoration Integrated Feasibility Report and its Recommended Plan (also known as the ARBOR Study) present potential alternatives for environmental restoration of an 11-mile stretch of the LA River that includes the soft-bottomed Glendale Narrows. The study analyzes the environmental impacts of implementing those alternatives, reviews the process for selecting the best alternative, and concludes with recommendations for project implementation.

Lower LA River Revitalization Plan - Opportunity Zones (2017)
Opportunity zones are comprised of publicly-owned open spaces and other areas with revitalization potential, as determined through the Lower LA River Revitalization Plan. Each opportunity zone is associated with a set of objectives based on existing conditions and context, as well as strategies for achieving those objectives. The LLARRP also details the "opportunity potential" of each zone to address various focus areas of the overall plan, such as water and environment.

Upper Los Angeles River Tributaries Revitalization Plan Opportunity Areas (2020)
In 2017, the California Governor approved Assembly Bill No. 466 (AB 466), which established the Upper Los Angeles River and Tributaries Working Group within the Santa Monica Mountains Conservancy. The bill tasked the Working Group with watershed-based planning and community engagement efforts that resulted in the Upper Los Angeles Tributaries (ULART) Revitalization Plan. The plan identifies over 300 proposed opportunities to protect, enhance, and restore the Upper Los Angeles River and its tributaries, including Pacoima Wash, Tujunga Wash, Verdugo Wash, and Arroyo Seco. It focuses on multi-benefit projects that prioritize the restoration of natural habitats, increase green areas and open space, and engage underserved communities. The LA River Master Plan and ULART teams coordinated data and site locations during the 2020 Master Plan process.

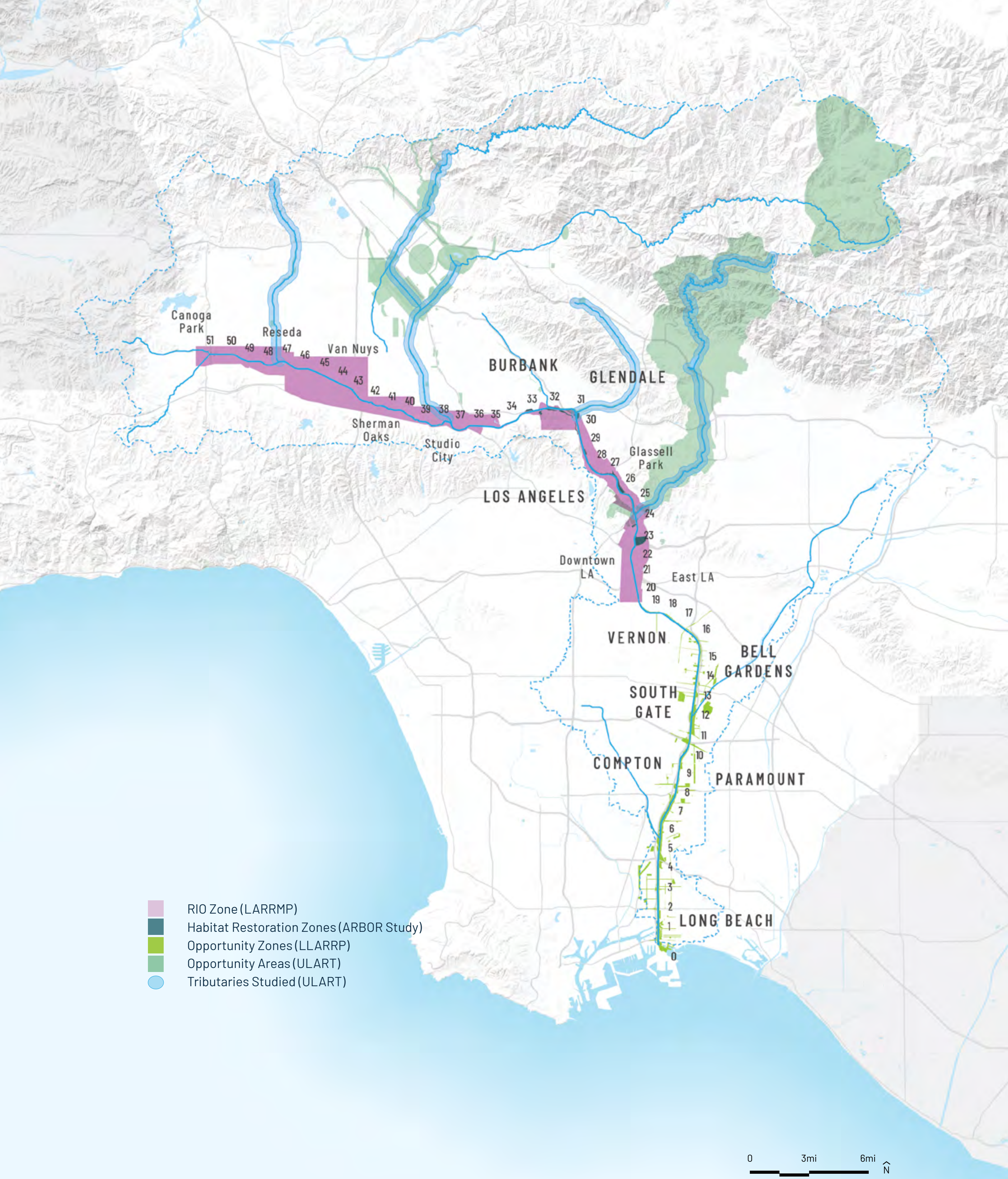
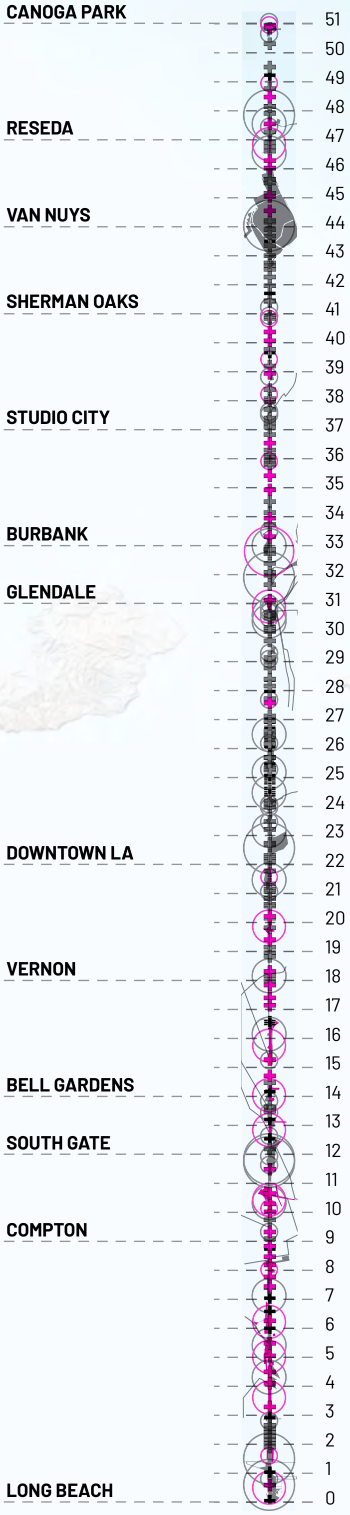


Figure 206. Planning Overlays. The LA River Revitalization Master Plan, ARBOR Study, Lower LA River Revitalization Plan, and Upper LA River and Tributaries Revitalization Plan provide strategies that will inform all future projects along the LA River. Source: OLIN, 2020.

Master Plan Ruler

THERE ARE A TOTAL OF 56 PLANNED, 22 PROPOSED, AND 208 XS AND S SITES



Impact
M, L, XL Proposed Project Sites
M, L, XL Planned Major Projects
XS, S Proposed Site
XS, S Proposed Site from Plans
XS, S Proposed Site from Existing Access Point

Figure 207. Cadence of Sites and Impact along the LA River. Source: OLIN, 2019.

SITES

The site selection methodology identified, a total of 78 significant projects. Fifty-six of these are planned major projects derived from previously published plans. Twenty-two are newly proposed project sites based on the LA River Master Plan's opportunity parcel analysis. Collectively, this suite of projects will provide a foundation for the Master Plan's implementation.

CADENCE

To make the 51 miles of the river accessible and useful to the communities of LA County, reliable access to amenities, services, and destination uses should be established. The planning framework prescribes that these elements occur at regular intervals, a cadence.

In addition to the 78 site-based projects described above, the Master Plan has identified 208 smaller sites, designated as XS or S, for improvements such as pavilions—publicly accessible structures offering a range of facilities (see Chapter 8 and Appendix Volume I: Design Guidelines Chapter 6)—that will help ensure the equitable distribution of facilities along the river and help to improve access and safety. One-hundred and twenty-three of these sites were informed by projects proposed in the Lower LA River Revitalization Plan, the LA River Revitalization Master Plan, and Metro's LA River Path Project. Forty-two sites correspond to existing access points along the river that, due to location or condition, warrant improvements. The remaining 43 sites are newly proposed to close gaps. These establish an opportunity for river improvements every quarter mile, on average.

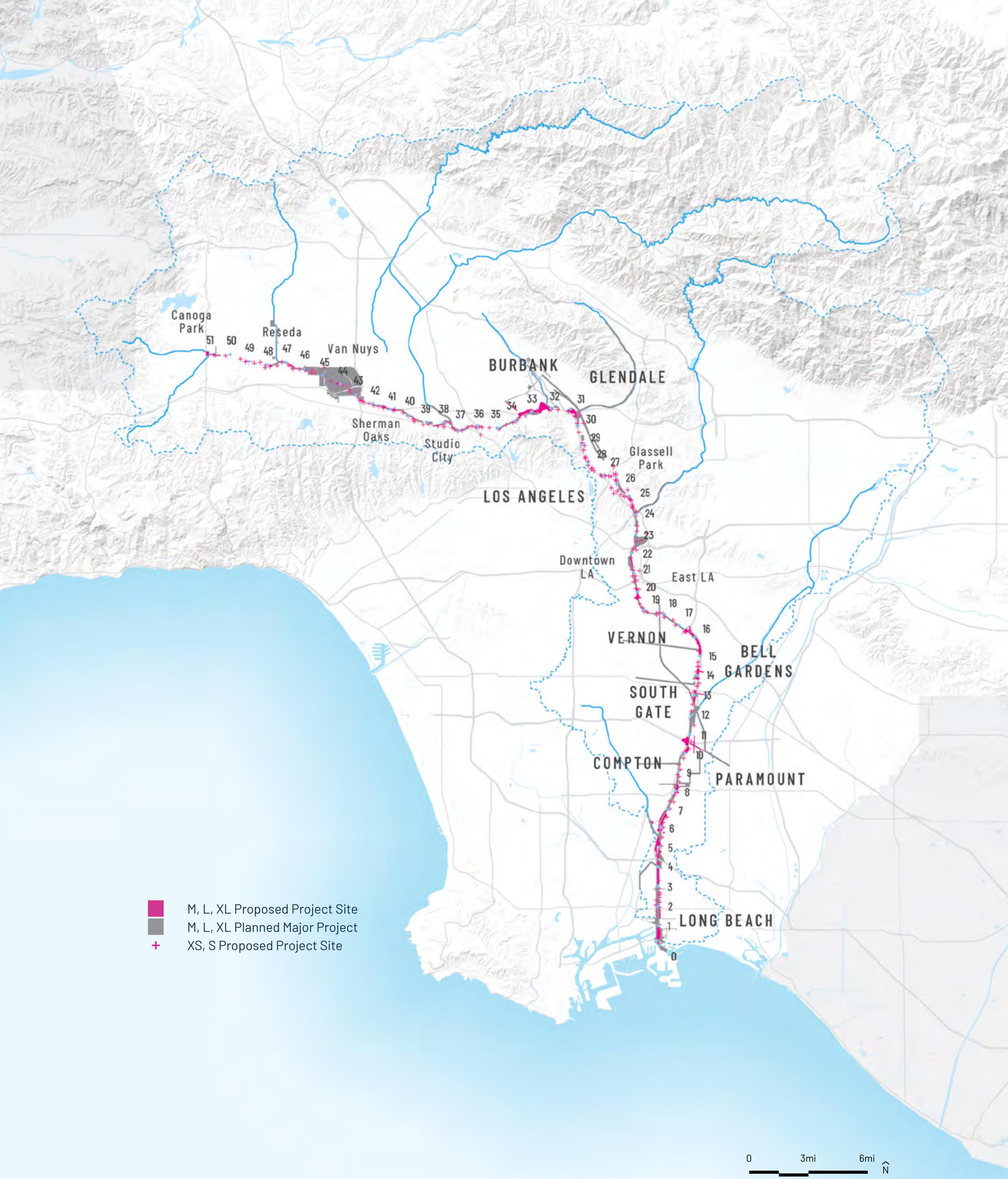


Figure 208. Proposed Project Sites and Planned Major Projects. The Master Plan identifies a total of 78 site-based projects. Fifty-six are planned major projects, or projects that have originated from previously published plans. Twenty-two are newly proposed project sites. Source: OLIN, 2019.

IMPACT FOR SITE-BASED PROJECTS

ACREAGE / LENGTH	IMPACT	PROPOSED PROJECT SITES	PLANNED MAJOR PROJECTS
150+ acres / 10+ miles	XL	1	8
40 - 150 acres / 5-10 miles	L	11	16
< 40 acres / < 5 miles	M	10	32
1 - 3 acres / 1 - 5 miles	S	42	41
< 1 acre / < 1 mile	XS	43	82

Figure 209. Impact for Site-Based Projects. Impact is based on a project's size (measured by acreage or length) and ability to address multiple high-level needs.

IMPACT

As projects come to fruition, they can affect positive change in communities by addressing needs related to the nine goals outlined in Chapter 6. Where access to parks is significantly lacking, for example, projects can prioritize adding acres of open space; where flood risk is a concern, projects can respond with pinpointed strategies to protect adjacent neighborhoods. A project's potential to fulfill these needs—whether one or many—is measured as "impact." The Master Plan organizes sites into five categories of impact: extra small (XS), small (S), medium (M), large (L), and extra-large (XL).

Impact is inherently tied to a project's acreage, with larger sites generally having the potential to address more needs and affect greater change than smaller project sites. M, L, and XL impact projects will likely be uniquely designed and require the most capital and planning, while XS and S projects will likely involve applying design guidelines to a new access point or seating area.

In addition to acreage, the level of need at a particular project site may increase the project's impact. If a M or L project site has an opportunity to address multiple relatively high needs near the river, its impact may increase. In this case, a project site must have at least two need scores within the top 2% of need scores within one mile of the river. Extra-large impact is the highest possible impact classification.

PROJECT LIST BY IMPACT

XL IMPACT

RM 47.8	LA River Valley Bikeway and Greenway
RM 44.0	Sepulveda Basin
RM 32.8	Headworks Connector
RM 31.9	Burbank Western Green Network
RM 22.6	Piggyback Yard
RM 11.9	Western LA River Levee Bike Path
RM 11.8	Rio Hondo Confluence
RM 1.6	South of Willow Street
RM 0.7	Shoemaker Bridge Replacement

L IMPACT

RM 47.5	Southern Aliso Green Network
RM 46.8	Reseda Expansion
RM 46.5	Caballero Creek Confluence Park
RM 33.0	Headworks Park
RM 30.9	Ferraro Fields Side Channel
RM 30.65	San Fernando Path
RM 30.6	Verdugo Wash
RM 30.4	River Glen Wetlands
RM 25.6	G2 Taylor Yard
RM 25.2	Taylor Yard Non-Motorized Bridge
RM 24.5	Metro Path
RM 23.2	Main Street Terrace
RM 21.5	First Street to Sixth Street River Loop
RM 19.9	East Washington Blvd
RM 18.2	West Santa Ana Branch Bikeway
RM 16.2	Upper Segment Multiuse Easement and Atlantic Blvd Area
RM 15.8	Maywood Park Bend
RM 14.1	Clara Street
RM 12.9	Firestone Blvd
RM 10.5	Highway 105
RM 10.4	Terminal Island to Rio Hondo
RM 7.2	Middle Segment Multi-use Easement and Crossover
RM 6.3	Sutter Bend at Del Amo Blvd
RM 5.5	Compton Creek Confluence Area
RM 5.1	W 47th St / Rancho Los Cerritos
RM 4.4	Wrigley Heights River Park
RM 3.7	W 28th St to 405 Freeway
RM 0.6	Cesar Chavez Park Connector

M IMPACT

RM 51.0	River Origin Park
RM 50.9	Canoga Park High School
RM 50.6	Canoga Park River Park
RM 48.9	Pierce College Connector
RM 47.4	Aliso Creek Confluence Park / Reseda River Loop
RM 41.2	Hazeltine River Edge Park
RM 40.9	Hazeltine Avenue
RM 40.8	Van Nuys Blvd
RM 39.4	West of Coldwater
RM 38.8	Harvard Westlake River Park
RM 38.2	Upstream from Tujunga Confluence - Laurel Canyon Blvd
RM 37.6	Tujunga Wash Confluence Park
RM 37.5	Tujunga Wash Path
RM 35.9	101 Freeway Crossing
RM 33.5	Sennett Creek
RM 31.0	Glendale Riverwalk Non-Motorized Bridge
RM 30.8	Glendale Narrows Riverwalk
RM 30.7	San Fernando Railroad
RM 30.5	River Glen Wetlands
RM 29.3	Central Service Yard
RM 29.1	North Atwater Crossing
RM 27.7	Red Car Bridge
RM 26.2	G1 Bowtie
RM 25.3	Dorris Place Sanitation Yard
RM 24.1	Arroyo Seco Confluence
RM 24.0	Arroyo Seco Greenway
RM 23.5	Bending the River Back into the City
RM 21.6	Downtown Train Yard
RM 21.1	6th Street Viaduct
RM 15.3	Randolph Street
RM 13.9	Cudahy River Park
RM 13.5	U.P.R.R. Spur Line
RM 12.7	South Gate Orchard
RM 12.0	Parque Dos Rios
RM 11.7	SELA Cultural Center
RM 10.2	E Rosecrans Ave
RM 9.4	Compton Blvd
RM 8.1	Compton - Paramount Connectivity Corridor
RM 2.9	Willow Street
RM 1.7	Middle Long Beach
RM 0.9	Long Beach Municipal Urban Stormwater Treatment

Figure 210. Site-Based Projects by Impact. Planned major projects (grey) and proposed project sites (pink) fall into three scales of impact. More information about individual projects and sites can be found in Appendix Volume II: Technical Backup Document.

PLANNED MAJOR PROJECTS IMPACT

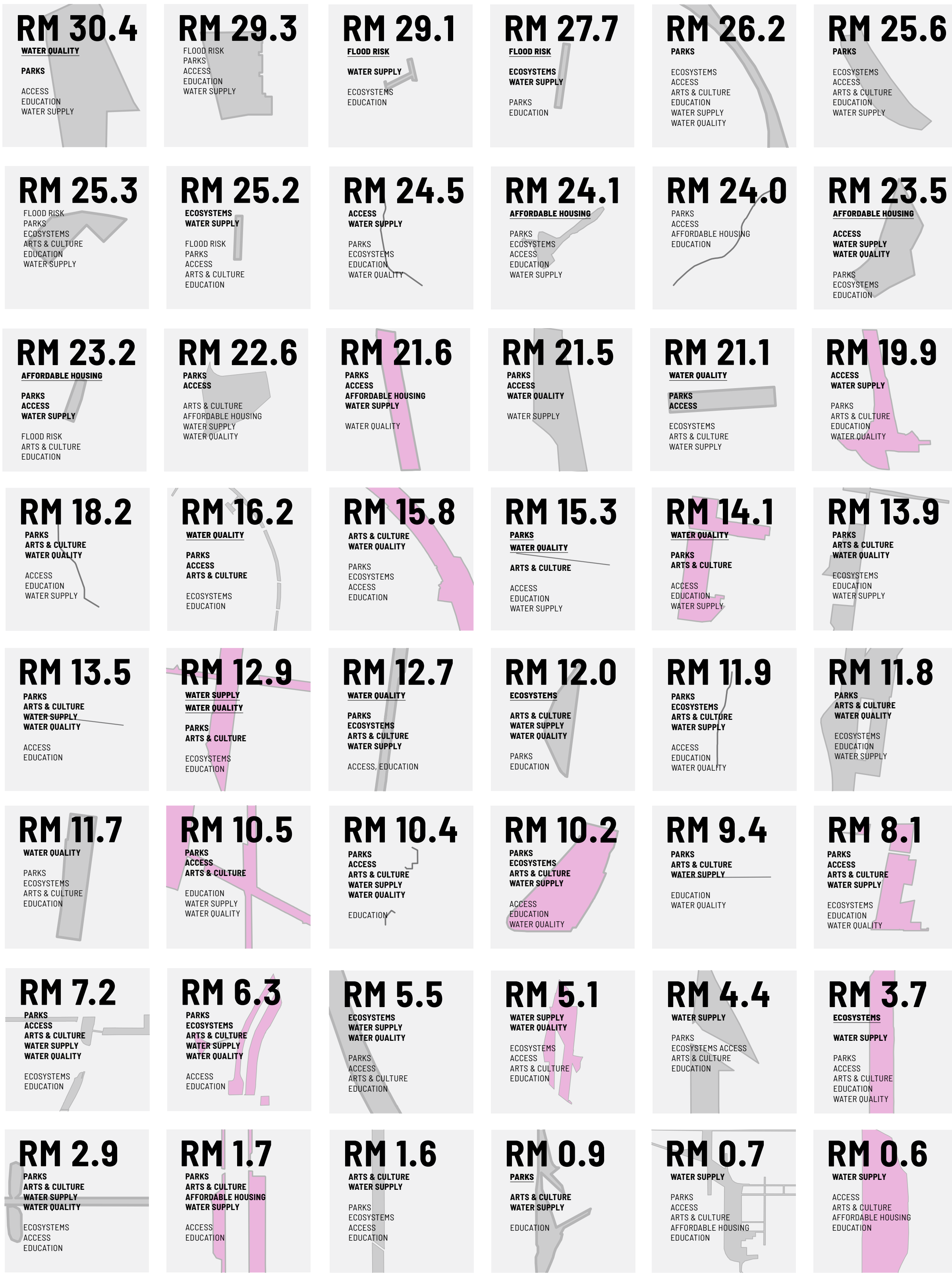
Similar to how opportunity sites were assessed based on their scale and expected ability to positively address local needs, existing projects were also categorized by impact. Existing planned major projects were reviewed to determine if prior planning efforts have targeted the current needs established by the Master Plan. In situations where current needs are not being met, further coordination with the project's planning organization is recommended.

56 EXISTING PLANNED OR IN-DEVELOPMENT PROJECTS WERE CATEGORIZED AS BEING EITHER M, L, OR XL, AND 208 SITES AS XS OR S

Figure 211. Based on a watershed-wide needs mapping analysis, each site has been assigned a level of need, from "general" to "very high," for each Master Plan goal. Any goals not listed for a site can be considered to meet the criteria for "general" need.

SITES AND NEED

Each site has undergone an assessment to determine the level at which it demonstrates need in relation to each of the nine Master Plan goals. As introduced in Chapter 5 and described in further detail in Appendix Volume II: Technical Backup Document, a need score falls within a range of "general" to "very high". For sites, the need score for each goal is determined by averaging all goal-based need scores within a site boundary. Need is derived from a watershed-wide analysis, thus a site's need score indicates a future project's ability to address regional shortfalls for certain Master Plan goals.



Proposed Project Sites

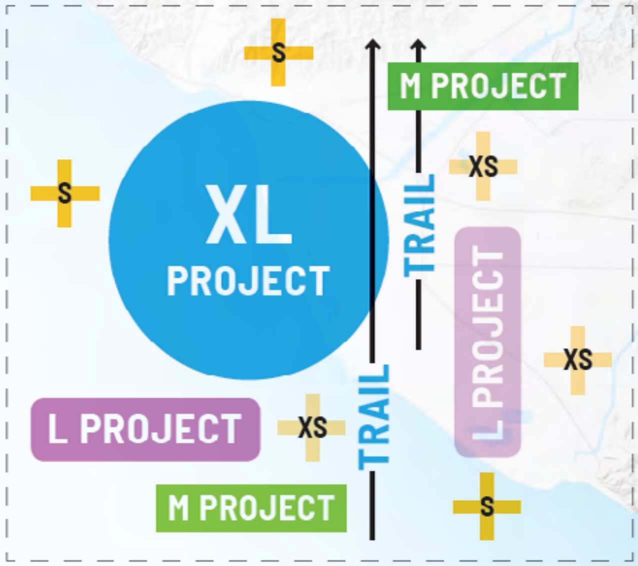
Planned Major Projects

VERY HIGH NEED

HIGH NEED

MODERATE NEED

* Any categories not listed for a project are assumed to have "general" need.



MAJOR PROJECT ZONE

MAJOR PROJECT ZONES

In some areas along the LA River corridor, several planned major projects or proposed project sites occur in an area of higher need. In these cases, the grouping of projects may be identified as a Major Project Zone. Major Project Zones, which are typically two to three miles in length, are areas where large investments could help address significant needs related to the LA River Master Plan goals. In some cases, a lack of investment in these areas in the past decades led to a sincere need for amenities. Five major project zones have been identified including zones centered on Canoga Park, Headworks, Taylor Yard, the Rio Hondo Confluence, and North Long Beach.

Figure 212. Major Project Zones. Major project zones are clusters of projects whose development should take first priority. In some cases, this is due to decades of disinvestment that have left areas along the river with an especially high need for amenities. Source: OLIN, 2019.

Figure 213. In this aerial view looking north from river mile 12 toward the confluence of the Rio Hondo and the LA River, several bridges are visible including Imperial Highway, the 710 Interstate, and the Union Pacific Railroad bridge.. Source: Geosyntec, 2019.

8.
DESIGN COMPONENTS

THE LA RIVER MASTER PLAN DESIGN APPROACH IS BASED ON A SERIES OF INTERVENTIONS THAT CAN BE DEPLOYED WITHIN AND ADJACENT TO THE RIVER CORRIDOR

The LA River Master Plan utilizes a kit of parts that includes possible design typologies for sites along the LA River. Each typology is associated with certain Master Plan goals (outlined in Chapter 6).

The Master Plan also developed a list of common elements, such as restrooms, environmental graphics, and lighting, that can work in tandem with the kit of parts to ensure an equitable distribution of amenities among project sites and along the entire LA River Trail.

Several site design examples are included in the next chapter to show how the kit of parts and common elements may be applied in site-specific contexts or in system designs.

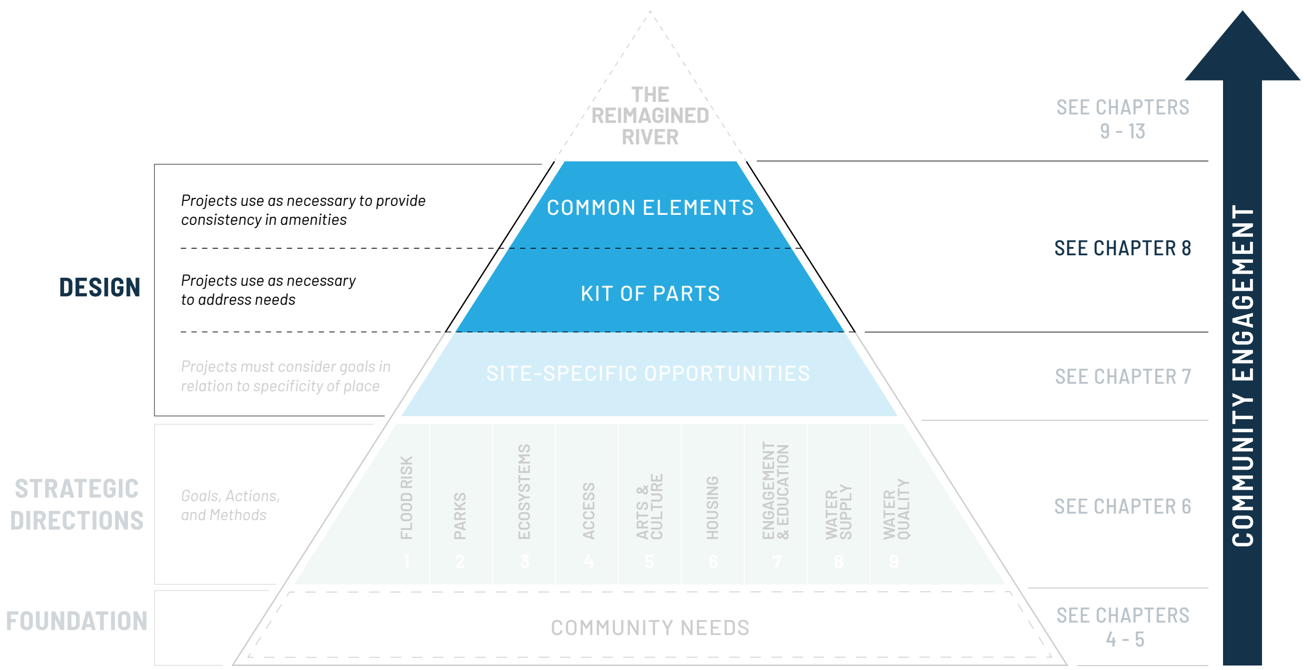


Figure 214. The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.

KIT OF PARTS: INFRASTRUCTURE AND URBAN RIVER TYPOLOGIES

Within the LA River Master Plan, the kit of parts is a recommended collection of multiuse design components organized within six major infrastructure and urban river typologies. These include: trails and access gateways, channel modifications, crossings and platforms, diversions, floodplain reclamation, and off-channel land assets. The components from the kit of parts are intended to be used in various combinations. Some sites may use several components that support each other.

A kit of parts matrix connects design components to the Master Plan goals and their associated spatial needs, identifying the design components that are most appropriate for a given site's needs. For example, for a 15-acre site with a very high need for flood risk reduction (i.e. the site itself is subject to flooding), water quality, and ecosystems, a natural treatment wetland system may be the most appropriate component at this location to address this specific combination of needs and opportunity.

Each typology in the kit of parts can support different habitat conditions, thereby supporting different species. These biodiversity profiles are essential to understand in the application of the kit of parts.

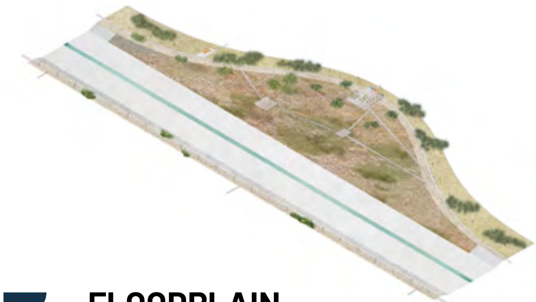
Kit of Parts Typologies

TRAILS AND ACCESS GATEWAYS

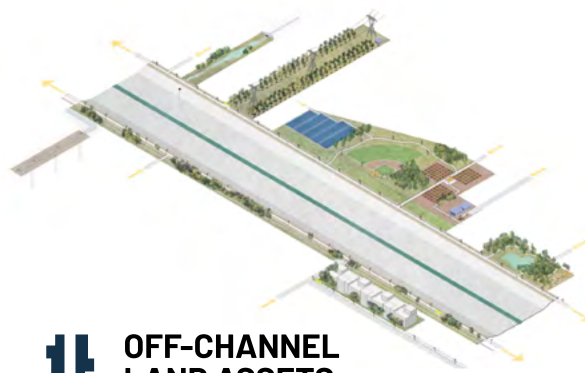
CHANNEL MODIFICATIONS

CROSSINGS AND PLATFORMS

DIVERSIONS



FLOODPLAIN RECLAMATION

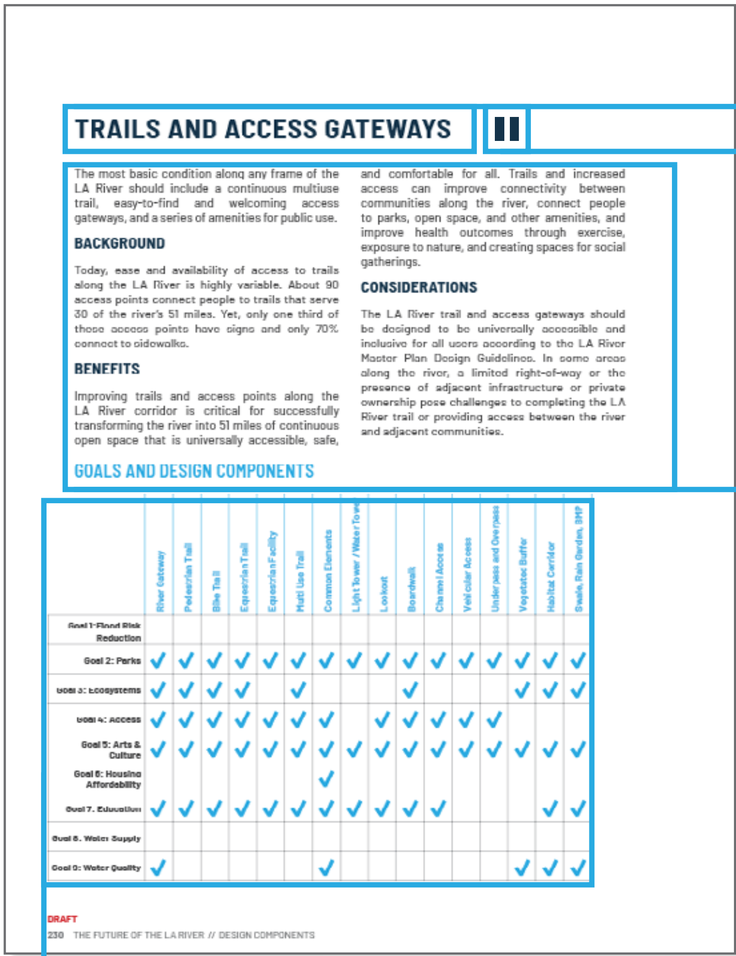


OFF-CHANNEL LAND ASSETS

Figure 215. Kit of parts design components can be categorized into six infrastructure and urban river typologies. These drawings illustrate a selection of these components applied to a typical trapezoidal channel.

THE KIT OF PARTS MATRIX CONNECTS DESIGN COMPONENTS TO THE NINE MASTER PLAN GOALS

KIT OF PARTS KEY



TRAILS AND ACCESS GATEWAYS

The most basic condition along any frame of the LA River should include a continuous multiuse trail, easy-to-find and welcoming access gateways, and a series of amenities for public use.

BACKGROUND

Today, ease and availability of access to trails along the LA River is highly variable. About 90 access points connect people to trails that serve 30 of the river's 51 miles. Yet, only one third of those access points have signs and only 70% connect to sidewalks.

BENEFITS

Improving trails and access points along the LA River corridor is critical for successfully transforming the river into 51 miles of continuous open space that is universally accessible, safe, and comfortable for all. Trails and increased access can improve connectivity between communities along the river, connect people to parks, open space, and other amenities, and improve health outcomes through exercise, exposure to nature, and creating spaces for social gatherings.

CONSIDERATIONS

The LA River trail and access gateways should be designed to be universally accessible and inclusive for all users according to the LA River Master Plan Design Guidelines. In some areas along the river, a limited right-of-way or the presence of adjacent infrastructure or private ownership pose challenges to completing the LA River trail or providing access between the river and adjacent communities.

GOALS AND DESIGN COMPONENTS

	River Gateway	Pedestrian Trail	Bike Trail	Equestrian Trail	Equestrian Facility	Multi Use Trail	Common Elements	Light Tower / Water Tower	Lookout	Boardwalk	Channel Access	Vehicular Access	Underpass and Overpass	Vegetated Buffer	Habitat Corridor	Swale, Rain Garden, BMP
Goal 1: Flood Risk Reduction																
Goal 2: Parks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Goal 3: Ecosystems	✓	✓	✓	✓		✓				✓				✓	✓	✓
Goal 4: Access	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			
Goal 5: Arts & Culture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Goal 6: Housing Affordability							✓									
Goal 7: Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓
Goal 8: Water Supply																
Goal 9: Water Quality	✓						✓							✓	✓	✓

DRAFT

230 THE FUTURE OF THE LA RIVER // DESIGN COMPONENTS

TYPOLOGY

Identifies kit of part typology that the spread refers to

ICON

Representative typology symbol

ABOUT THE PART

BACKGROUND

Information about the kit typology and how it relates to the context and conditions of the LA River

BENEFITS

Further explanation of how the kit typology affects the river, ecologies, people, and communities

CONSIDERATION

Information stating where the kit typology is appropriate for usage on the LA River

GOALS AND DESIGN COMPONENTS

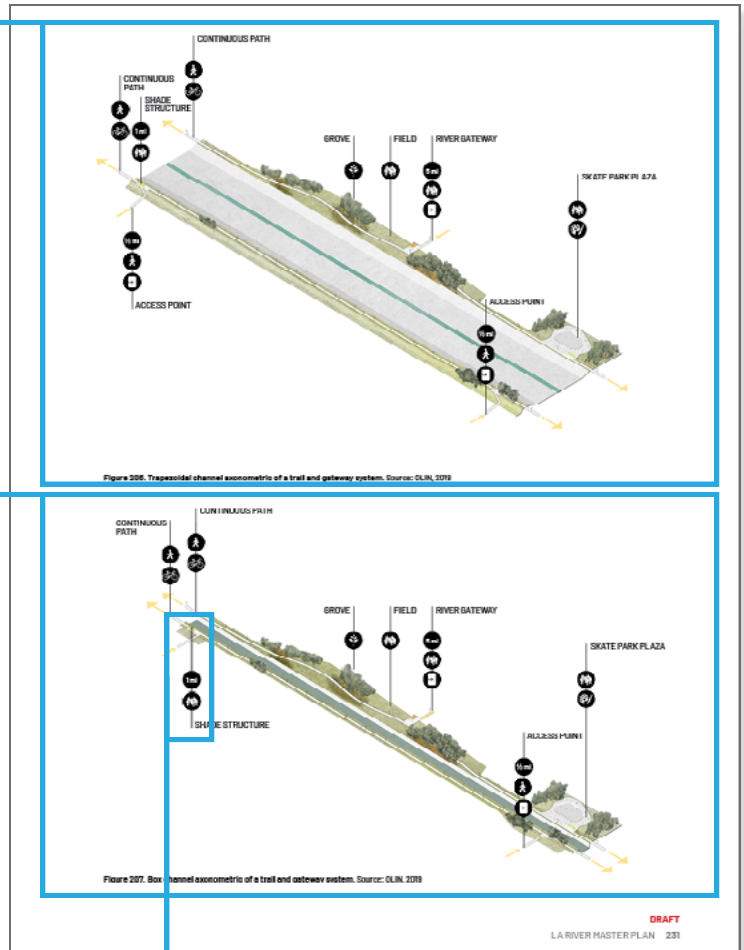
Each kit of part typology is associated with a set of design components, which are listed at the top of the chart. A blue check indicates that a component can be used to address a particular goal. The nine goals are listed on the left of the chart.

TRAPEZOIDAL CHANNEL

Type of channel and an example of how the associated kit can be deployed

BOX CHANNEL

Type of channel and an example of how the associated kit can be deployed



COMPONENTS

Icons denote the main goals addressed by the named design intervention

TRAILS AND ACCESS GATEWAYS

The most basic condition along any frame of the LA River should include a continuous multiuse trail, easy-to-find and welcoming access gateways, and a series of amenities for public use. For additional information, see Appendix Volume I: Design Guidelines, Chapter 3.

BACKGROUND

Today, ease and availability of access to trails along the LA River is highly variable. Close to 100 access points connect people to trails that serve 32 of the river's 51 miles. Yet, only one-third of these access points have signs and only 70% connect to sidewalks.

BENEFITS

Improving trails and access points along the LA River corridor is critical for successfully transforming the river into 51 miles of continuous open space that is universally accessible, safe, and comfortable for all. Trails and increased access can improve connectivity between communities along the river, connect people to parks, open space, and other amenities, and improve health outcomes through exercise, exposure to nature, and creating spaces for social gatherings.

CONSIDERATIONS

The LA River trail and access gateways should be designed to be as universally accessible as possible and inclusive for all users according to the LA River Master Plan Design Guidelines. In some areas along the river, a limited right-of-way or the presence of adjacent infrastructure or private ownership pose challenges to completing the LA River trail or providing access between the river and adjacent communities.

GOALS AND DESIGN COMPONENTS

	River Gateway	Pedestrian Trail	Bike Trail	Equestrian Trail	Equestrian Facility	Multi Use Trail	Light Tower / Water Tower	Lookout	Boardwalk	Channel Access	Vehicular Access	Underpass and Overpass	Vegetated Buffer	Habitat Corridor
Flood Risk Reduction														
Parks and Trails	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ecosystems	✓	✓	✓	✓		✓			✓				✓	✓
River Access	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		
Arts & Culture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Housing Affordability														
Engagement and Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓
Water Supply														
Water Quality	✓												✓	✓

Figure 216. Goals and Design Components: Trails and Gateways.

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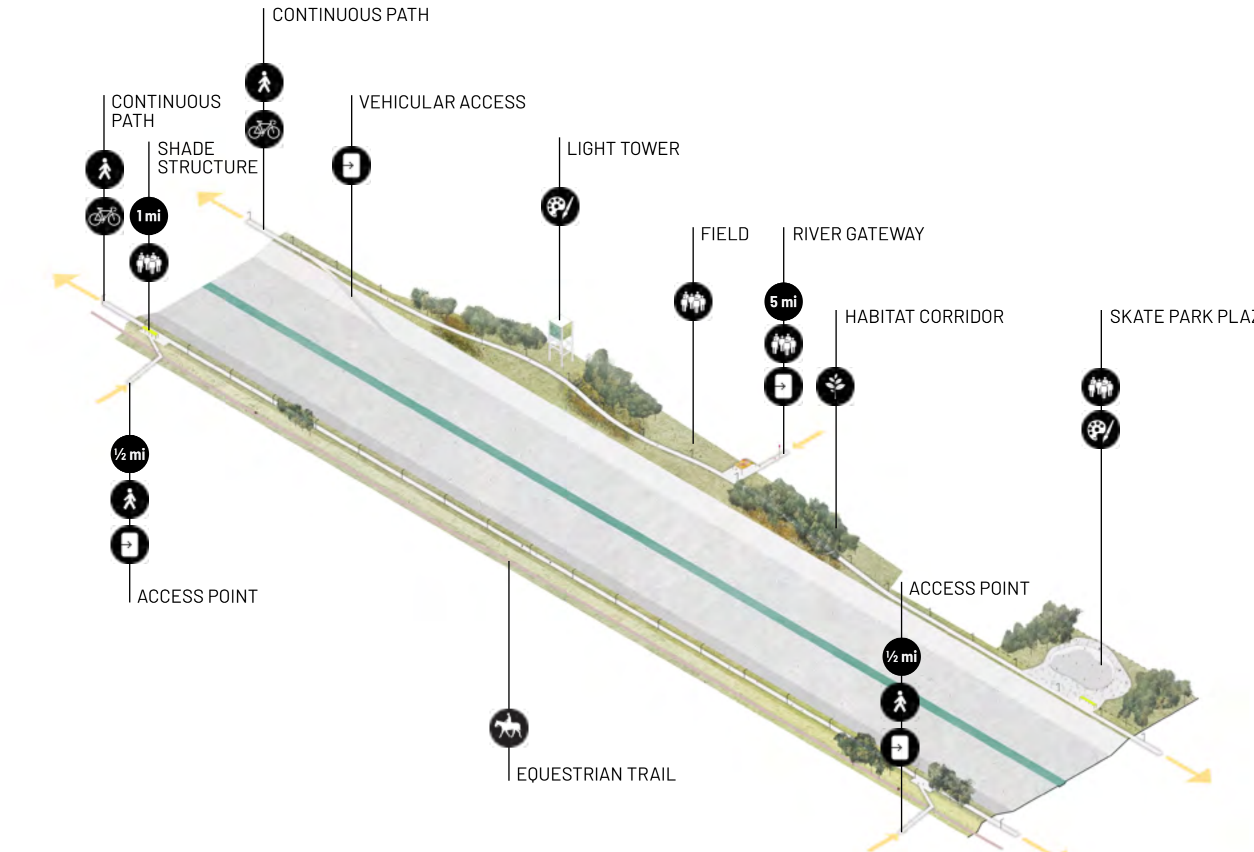

Figure 217. Trapezoidal Channel: Trails and Gateways.

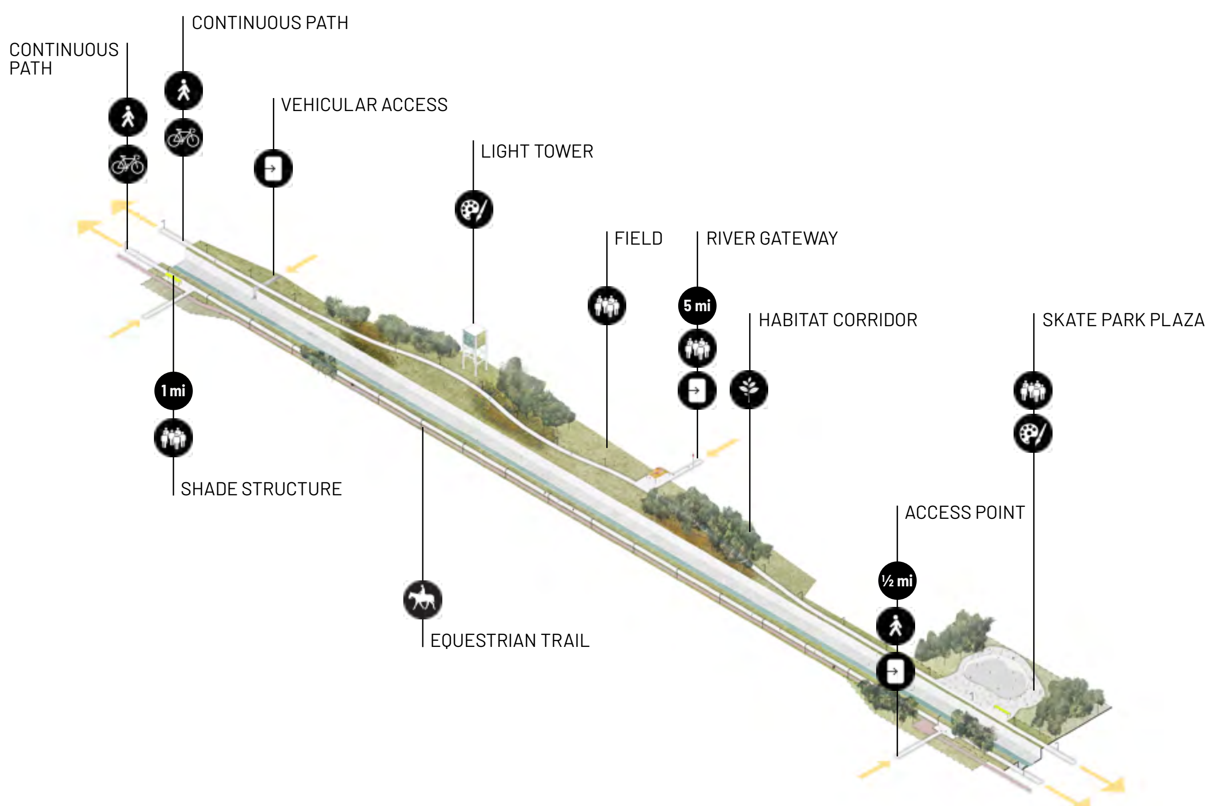

Figure 218. Box Channel: Trails and Gateways.

CHANNEL MODIFICATIONS

In some areas of the LA River, modifying the existing channel is advantageous for flood risk reduction, access, and/or ecological function. Channel modifications may include terracing the banks that can serve as stairs, amphitheaters, or small planting trays. Other channel modifications include changing the materiality or shape of the channel, for example, adding or removing concrete, deepening or widening the channel or going from trapezoidal to vertical wall, depending on capacity requirements. For additional information, see Appendix Volume I: Design Guidelines, Chapter 5.

BACKGROUND

The existing LA River channel is comprised of 13 different channel configurations which vary in shape, width, and depth. Some sections have a rectangular section with vertical sides, while other segments are trapezoidal with tapered sides. Historically modifications to the channel have primarily been made to increase the capacity of the channel.

BENEFITS

Depending on the channel modification implemented, benefits might include improved access and safety, making places for people and habitat, and improving channel capacity to reduce flood risk.

CONSIDERATIONS

Any channel modification requires hydraulic analysis to ensure flood risk is not increased. Additionally an analysis of existing ecological functions associated with the channel is important to assess potential impacts brought about by the modification.

GOALS AND DESIGN COMPONENTS

	Terraced Bank	Check Dam	Deployable Barrier	Levee	Armored Channel	Storm Drain Daylighting	Vertical Wall	Reshape Low Flow	Channel Smoothing	Texturizing or Grooving	Concrete Bottom	Soft Bottom/ Concrete Removal	Sediment Removal	Bridge Pier Modification	Access Ramp
Flood Risk Reduction	✓		✓	✓	✓		✓	✓	✓		✓		✓	✓	
Parks and Trails	✓	✓	✓	✓		✓		✓				✓			✓
Ecosystems	✓	✓	✓	✓		✓		✓		✓		✓	✓		✓
River Access	✓		✓	✓		✓									✓
Arts & Culture	✓					✓	✓	✓		✓		✓			✓
Housing Affordability															
Engagement and Education	✓	✓	✓	✓		✓		✓		✓		✓			✓
Water Supply		✓	✓												
Water Quality	✓	✓	✓			✓						✓	✓		

Figure 219. Goals and Design Components: Channel Modifications.

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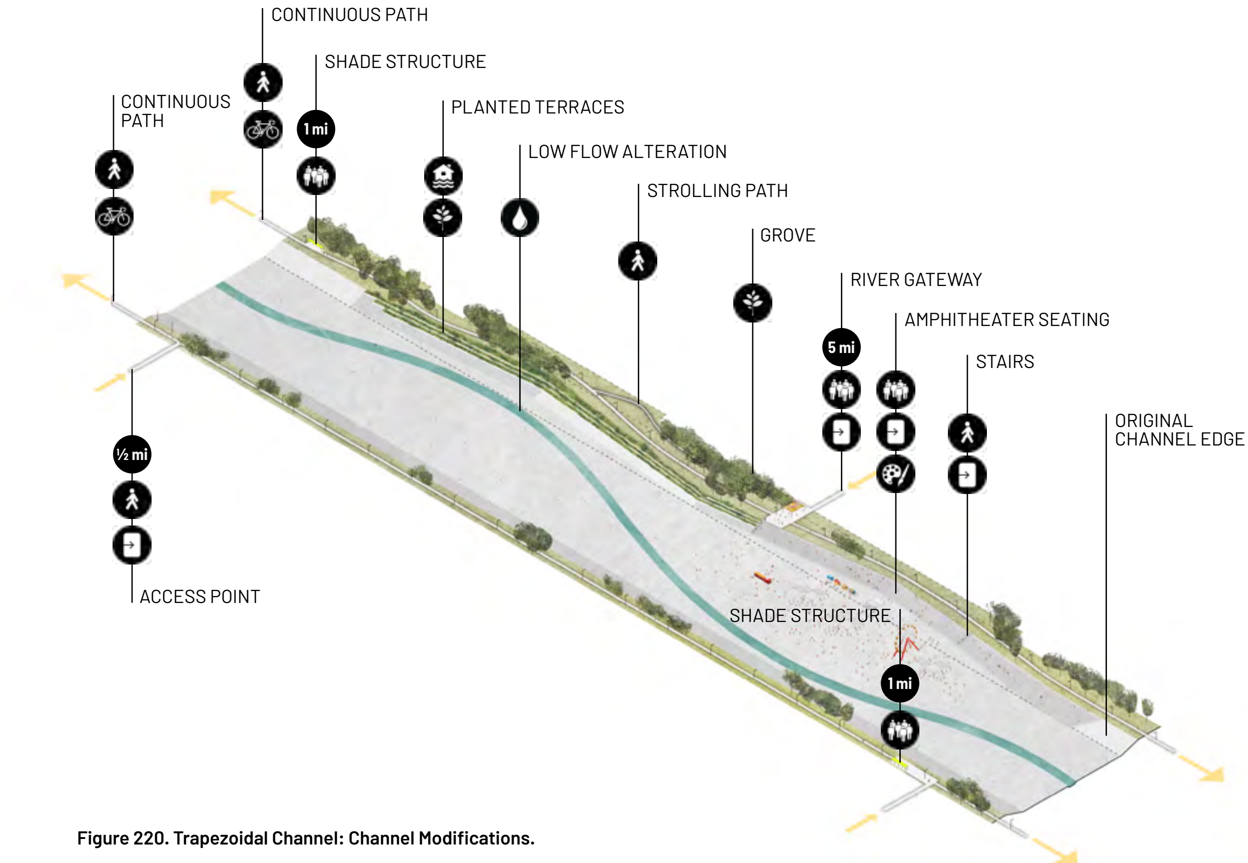

Figure 220. Trapezoidal Channel: Channel Modifications.

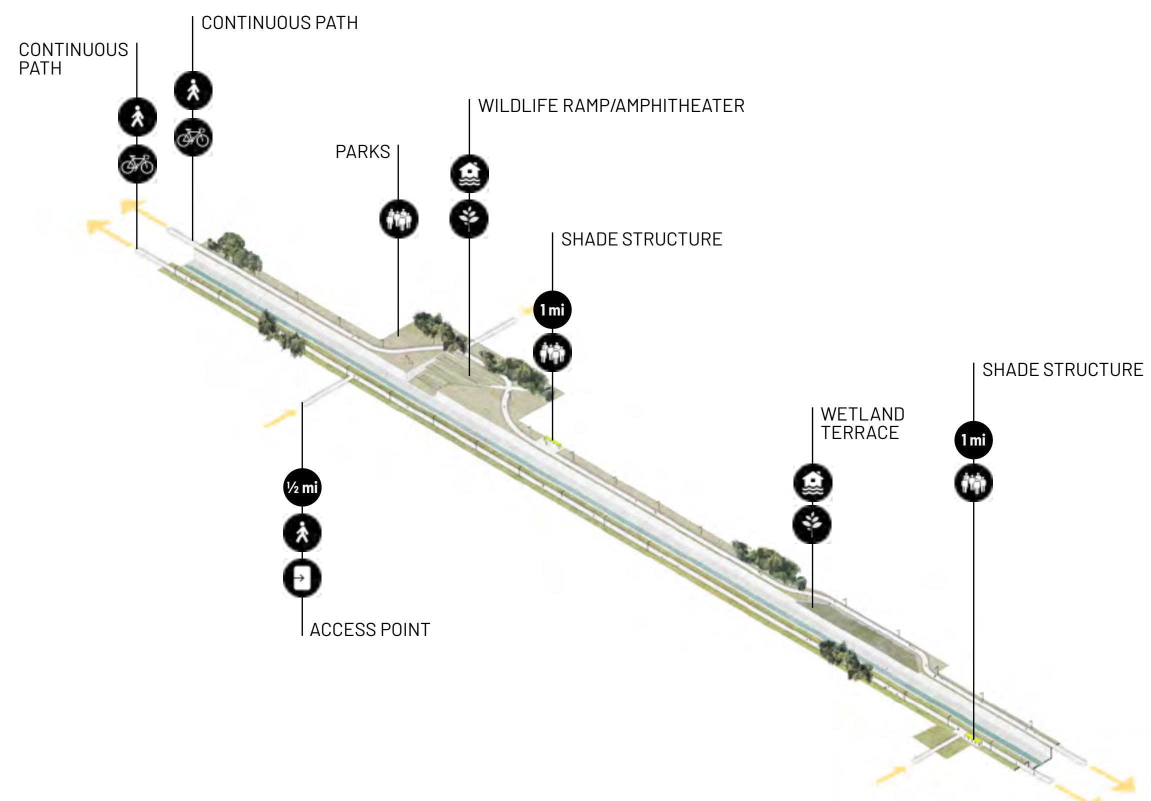

Figure 221. Box Channel: Channel Modifications.

CROSSINGS AND PLATFORMS

While the LA River has many bridges, few offer safe crossings for bikes or pedestrians. Additionally many areas along the channel have a narrow right-of-way in the densest communities where space for parks, ecosystems, access, arts and culture, and education are often most greatly needed. While crossings can connect communities to close but otherwise inaccessible parks, community facilities, and each other, wider platforms can create space for parks and habitat in addition to cross-river connectivity. Crossings and platforms can also connect people to the river, creating new spaces for gathering and reflection with panoramic views of the river and surroundings. For additional information, see Appendix Volume I: Design Guidelines, Chapters 3 and 5.

BACKGROUND

Given its width, length, and configuration, the LA River channel is often hidden or not visible to passers nearby and can separate communities and be an obstacle for connectivity.

GOALS AND DESIGN COMPONENTS

	Pedestrian Bridge	Bike Bridge	Equestrian Bridge	Multiuse Bridge	Cantilever	Platform	Habitat/Wildlife Bridge
Flood Risk Reduction							
Parks and Trails	✓	✓	✓	✓	✓	✓	✓
Ecosystems				✓	✓	✓	✓
River Access	✓	✓	✓	✓	✓	✓	
Arts & Culture	✓	✓	✓	✓	✓	✓	
Housing Affordability							
Engagement and Education	✓	✓	✓	✓	✓	✓	
Water Supply							
Water Quality				✓	✓	✓	

Figure 222. Goals and Design Components: Crossings and Platforms.

BENEFITS

Crossings can connect existing or proposed communities or assets on one side of the river with existing or proposed communities or assets on the other side of the river. In addition to providing connections, platforms can increase park space in areas with limited or nonexistent landside right-of-way. Platforms can also host a range of habitat typologies, including riparian and upland conditions and allow for wildlife migration. If combined with appropriate channel modifications, shade from crossing and platforms can help cool water temperatures locally and create areas for fish cover and habitat.

CONSIDERATIONS

All crossings and platforms must be publicly owned and managed as publicly accessible open space. Private development, housing, and parking are not appropriate uses for platform areas. When considering a crossing or platform, potential impacts to other beneficial uses such as habitat or recreation should be considered. Crossings and platforms may limit access to the channel itself, so in areas where access is critical, this must be a design consideration. Any channel modifications required for crossing and platforms require hydraulic analysis to ensure flood risk is not increased.

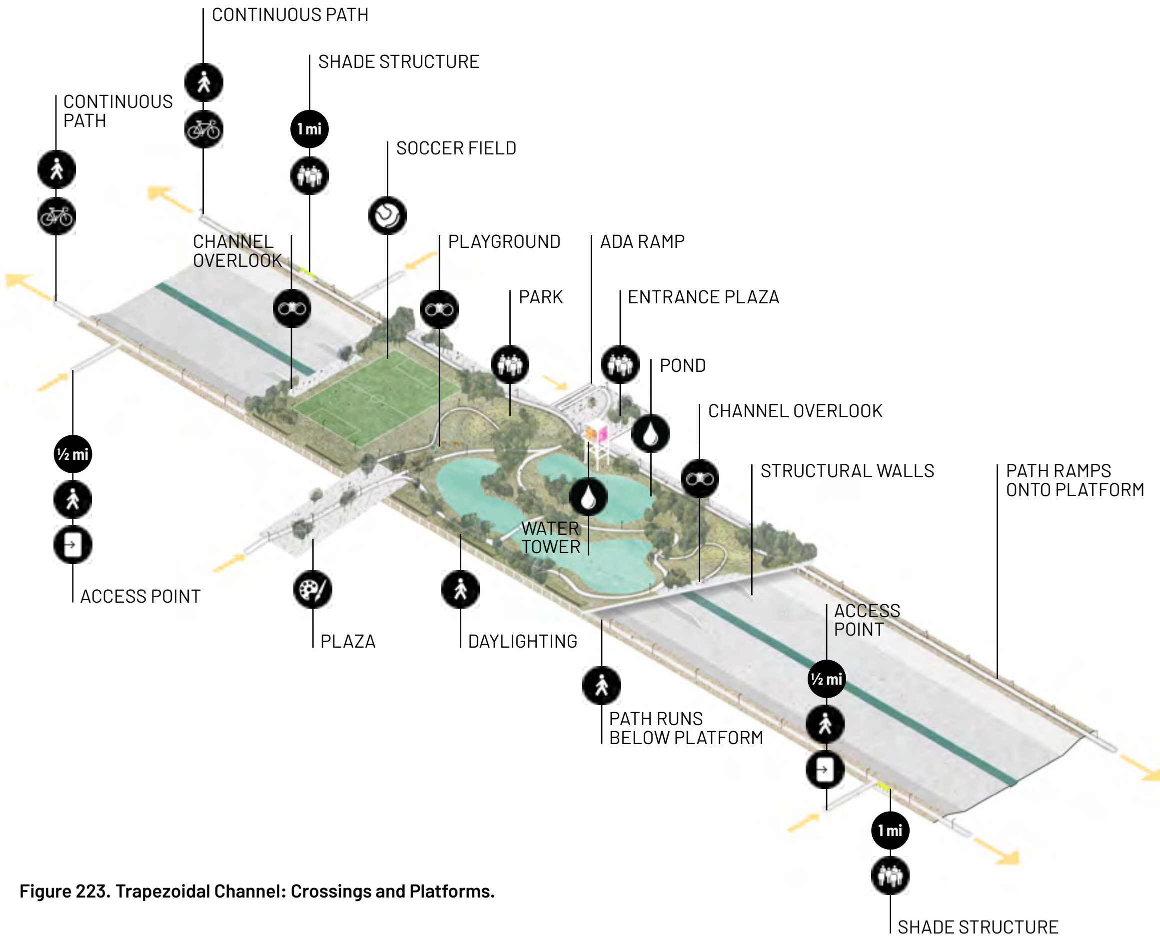

Figure 223. Trapezoidal Channel: Crossings and Platforms.

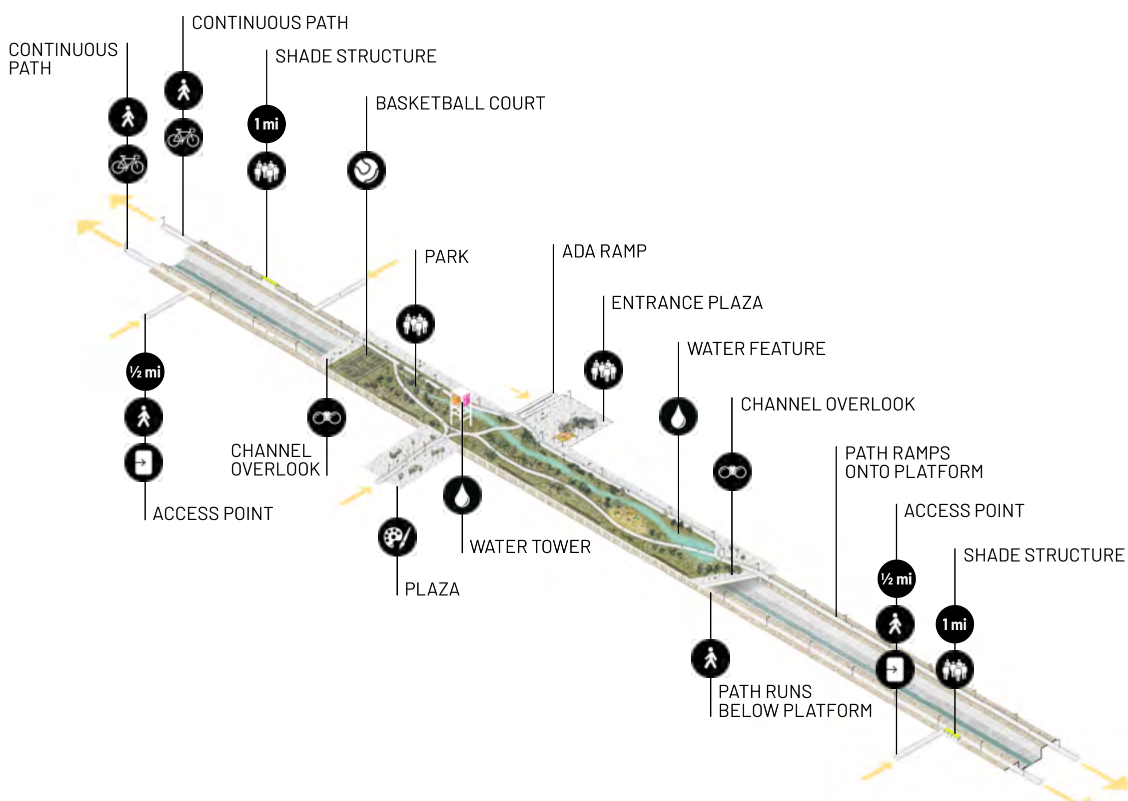

Figure 224. Box Channel: Crossings and Platforms.

DIVERSIONS

Diversions include elements such as tunnels, pipes, pumps, and weirs. These components remove wet or dry weather flows from the river to increase overall system capacity during larger storm events when flows are reduced and/or composed with treated wastewater and/or other non-stormwater urban flows. These diversions can also be used to treat and reuse water for other benefits.

BACKGROUND

Historically, water flow in the LA River has varied greatly based on seasonal rainfall and groundwater conditions, and diversions for flooding and irrigation were common. Today, water flows in the LA River are highly engineered with dams, reservoirs, and spreading grounds regulating wet weather events, while dry weather flows consist mostly of treated wastewater discharged from water reclamation plants.

GOALS AND DESIGN COMPONENTS

	Pump	Diversion Pipe/Tunnel	Diversion Channel	Overflow Weir	Underground Gallery	Side Channel	Stormrain Interceptors	Wetland
Flood Risk Reduction	✓	✓	✓	✓		✓		
Parks and Trails			✓			✓		✓
Ecosystems	✓	✓	✓	✓		✓	✓	✓
River Access			✓			✓		✓
Arts & Culture			✓			✓		✓
Housing Affordability								
Engagement and Education			✓			✓		✓
Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Water Quality	✓	✓	✓	✓	✓	✓	✓	✓

Figure 225. Goals and Design Components: Diversions.

BENEFITS

In addition to reducing flood risk and benefiting local water supply reliability, diversions can also provide opportunities for treatment and reuse of water for groundwater recharge, habitat features, or recreational opportunities during smaller storm events, or in the dry season when flows are reduced.

CONSIDERATIONS

Any modification to the LA River channel or its water flow requires hydraulic analysis to ensure flood risk is not increased and to consider the impacts of altering the flow rate on other uses of the water such as ecosystem function. Diversions that can utilize nature-based solutions, such as a vegetated side channel, are ideal. Where gray infrastructure, such as pipes or tunnels, are needed to meet needs, designs should balance the negative impacts of adding concrete or underground infrastructure with the benefits afforded by the design. In some cases, such as the Narrows, a pipe or tunnel may allow a section of the river to have riparian vegetation while larger flood flows bypass the area in a pipe and manage flood risk.

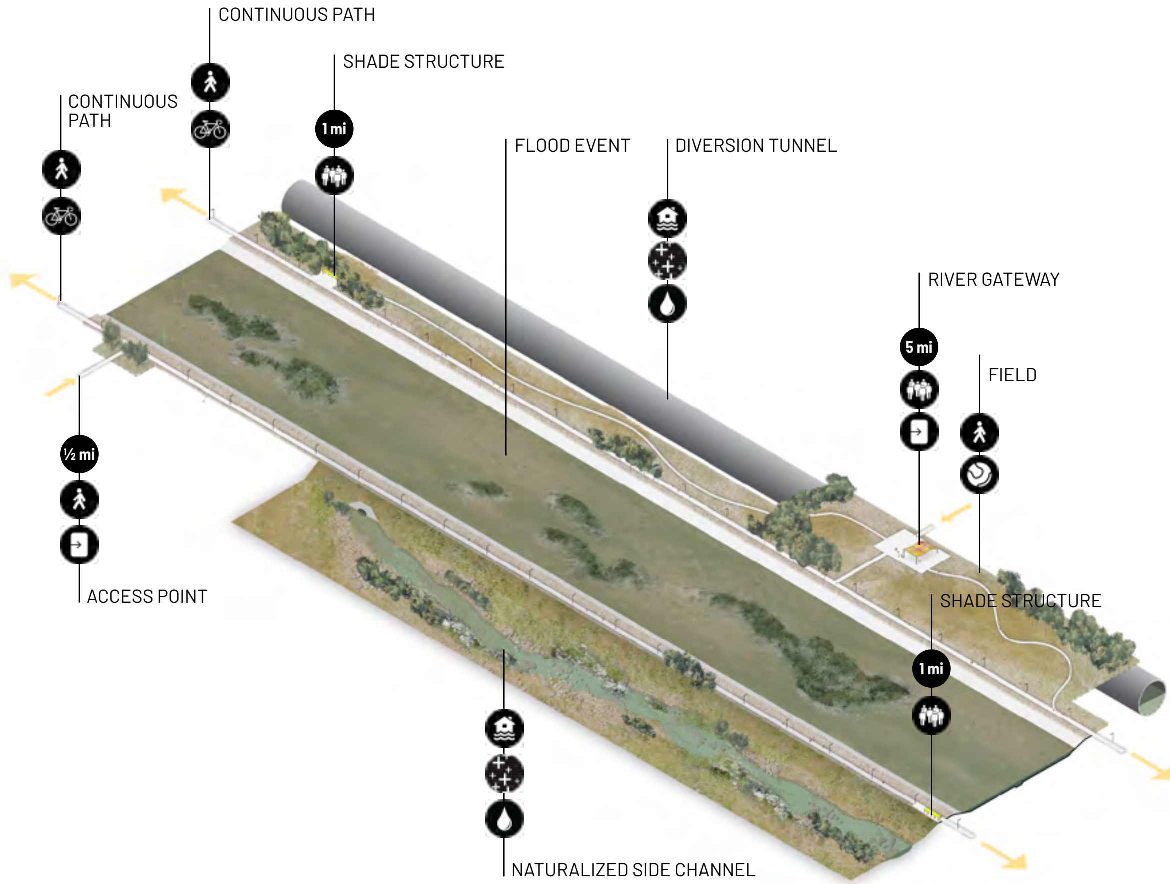

Figure 226. Trapezoidal Channel: Diversions.

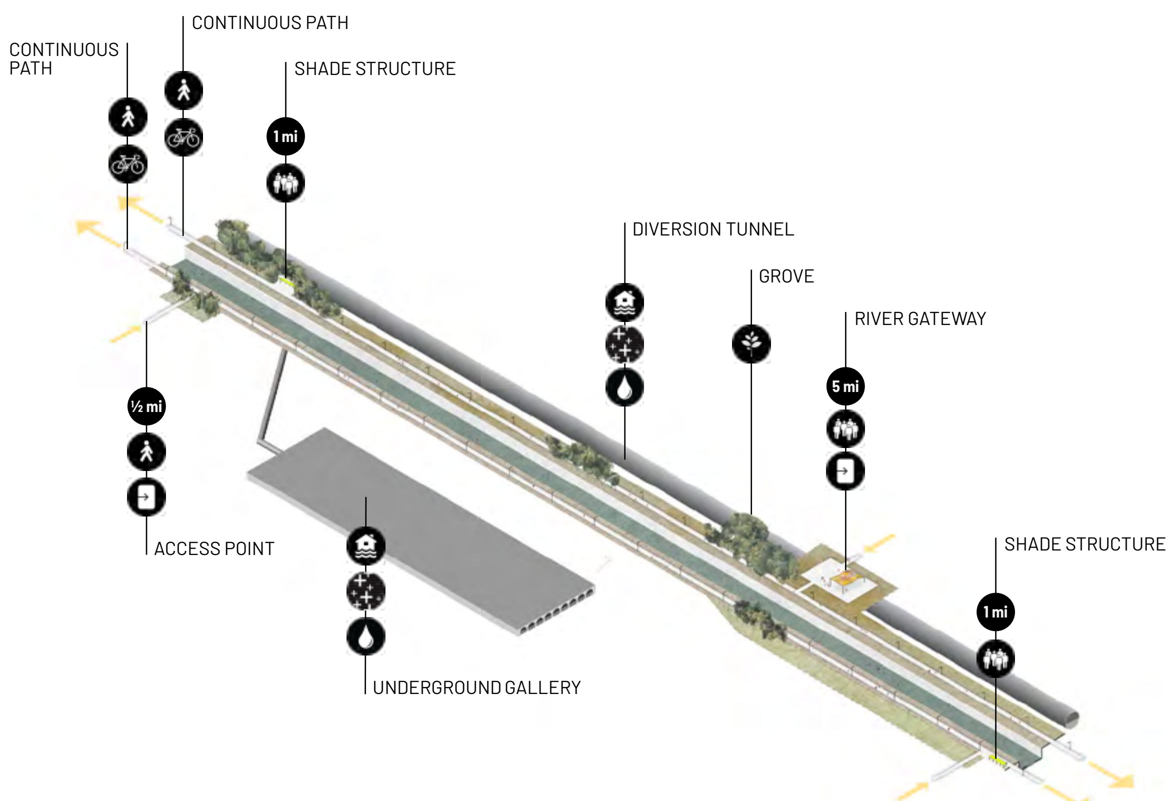

Figure 227. Box Channel: Diversions.

FLOODPLAIN RECLAMATION

Reclaiming the floodplain can create space for the river where the hydrologic relationship between a river and its floodplain can be reconnected. Strategic and opportunistic buyback of parcels within the floodplain or transitioning adjacent rights-of-ways or public lands into floodable areas can begin to allow for this reconnection. For additional information, see Appendix Volume I: Design Guidelines, Chapter 5.

BACKGROUND

Historically, the LA River had a vast floodplain and the river would commonly shift its course after major floods. As the area's population grew, these floods increasingly caused damage to life and property. The LA River was being manipulated as early as the mid-19th-century, and likely long before that. In the 1930s, a decision was made by the US Army Corp of Engineers to channelize the river and replace the shifting floodplain in order to prevent existing communities from further flooding. This ultimately allowed for future development and urbanization. Currently, in 2020, the historic floodplain of the LA River is almost entirely developed.

GOALS AND DESIGN COMPONENTS

	Wetland	Naturalized Bank	Braided Channel	Field	Recreation Field	Surface Storage	Side Channel
Flood Risk Reduction							
Parks and Trails	✓	✓	✓	✓	✓	✓	✓
Ecosystems	✓	✓	✓	✓		✓	✓
River Access	✓	✓		✓	✓		
Arts & Culture	✓	✓	✓	✓	✓	✓	✓
Housing Affordability							
Engagement and Education	✓	✓	✓	✓	✓	✓	✓
Water Supply	✓					✓	✓
Water Quality	✓	✓	✓	✓		✓	✓

Figure 228. Goals and Design Components: Floodplain Reclamation.

BENEFITS

Reclaiming the floodplain will reconnect the hydrologic relationship between the river and its floodplain, which has the potential to enhance ecological function, promote biodiversity, create park space, and improve water quality among other benefits.

CONSIDERATIONS

As a response, floodplain reclamation, if completed at very large scales, could contribute to the overall flood risk reduction system. It should be noted that reclamation of singular parcels or short channel lengths typically does not help reduce flood risk, and, in fact, has the potential to increase flood risk in localized areas. One exception is that the reclaimed parcel itself, which through intentional design to be floodable, is no longer a flood risk. Currently, there are a limited number of opportunities along the LA River for floodplain reclamation at any scale, and all the opportunities identified in the opportunity analysis only allow for small scale reclamation that will not have a role in flood risk reduction but could have significant benefits for ecosystem function. Due to development and urbanization in the watershed, large scale floodplain reclamation is not currently feasible without significant impacts to existing residents, businesses, transportation corridors, and other vital infrastructure. It is therefore not a recommended action at this time to address flood risk. Any floodplain modification requires hydraulic analysis to ensure flood risk is not increased.

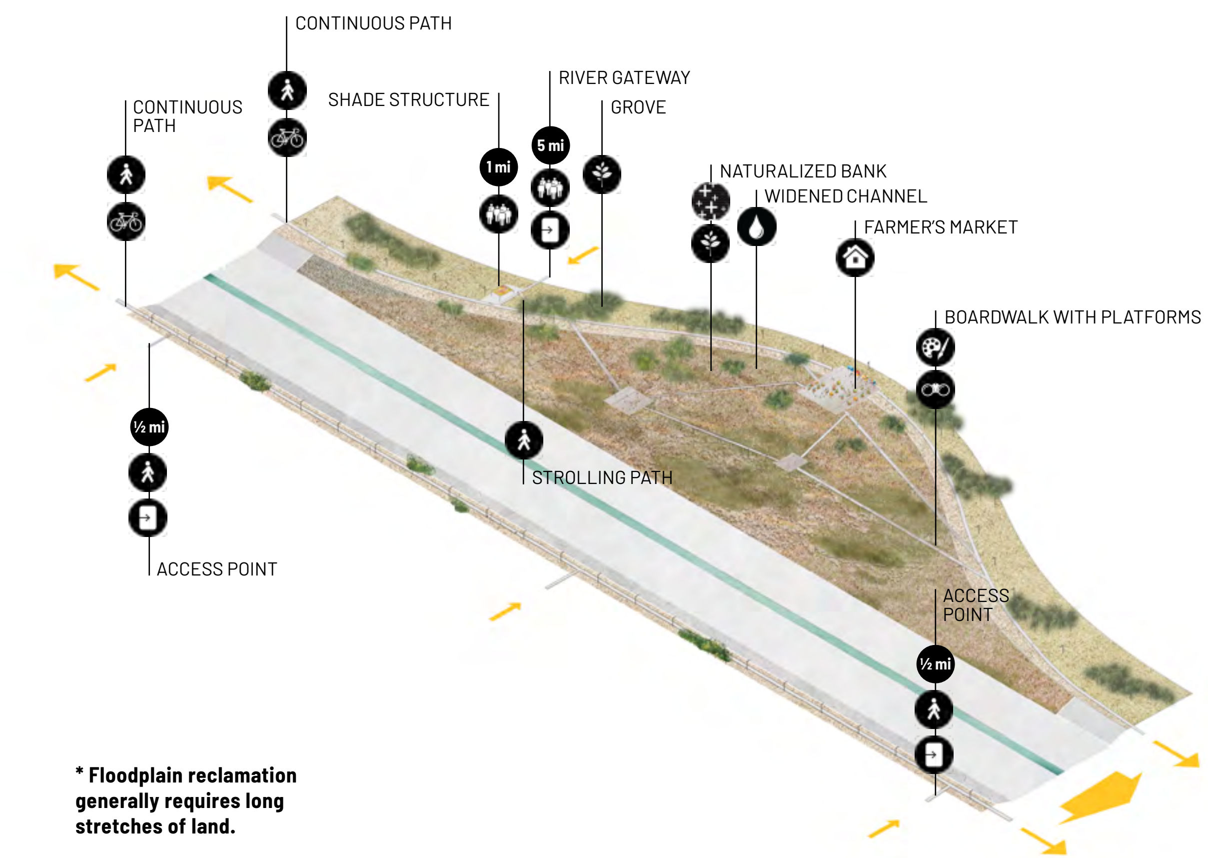

Figure 229. Trapezoidal Channel: Floodplain Reclamation.

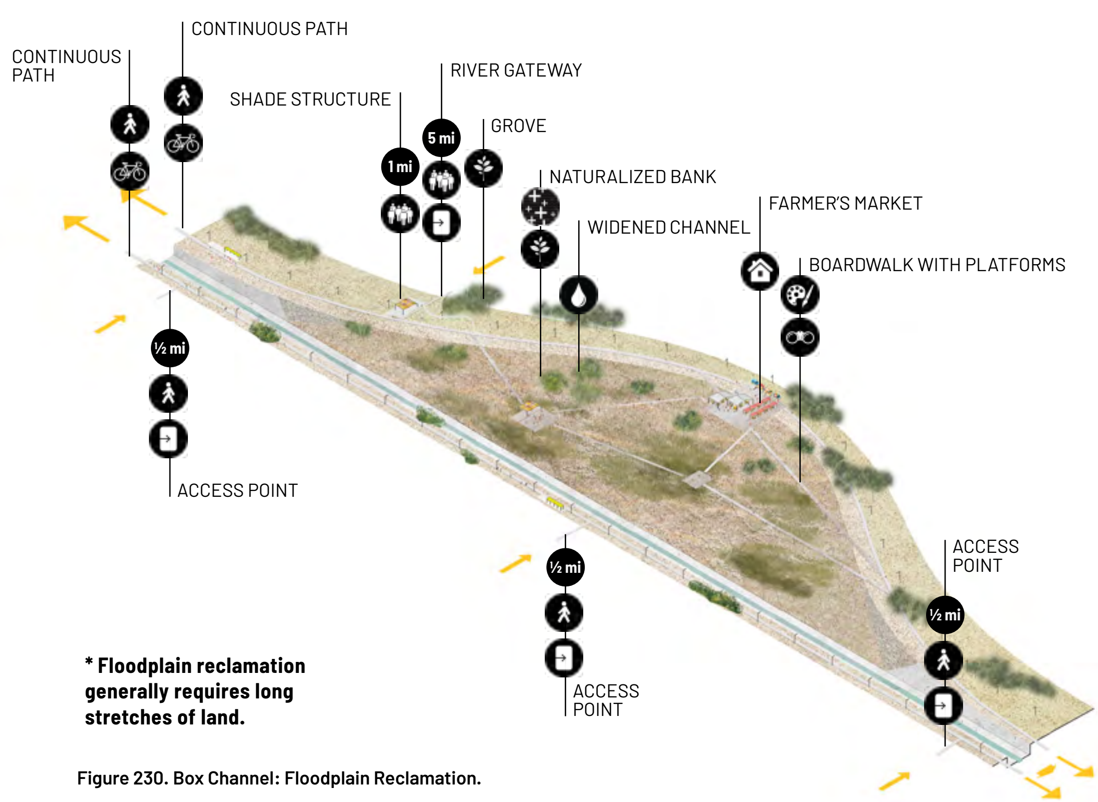

Figure 230. Box Channel: Floodplain Reclamation.

OFF-CHANNEL LAND ASSETS

In addition to elements within the LA River right-of-way, off-channel land assets can be used for a series of projects that are essential to support the success of the LA River Master Plan. Affordable housing, cultural centers, plant nurseries, water storage, water treatment facilities, groundwater recharge spreading grounds, injection well fields, and parks are just a few of the types of elements that can exist within this category. For additional information, see Appendix Volume I: Design Guidelines, Chapter 5.

BACKGROUND

Given some of the limitations of what can be located within the LA River channel and right-of-way, off-channel land assets can be used for projects that are essential to the LA River Master Plan, but that cannot otherwise be located in the channel or adjacent right-of-way.

BENEFITS

Off-channel land assets combined with in-channel and right-of-way improvements can further ensure projects are multi-benefit, addressing multiple needs.

CONSIDERATIONS

While some land assets adjacent to the LA River channel and right-of-way are owned by LA County or other public agencies and are vacant, most parcels are in use or otherwise privately owned. Development of any off-channel land asset, regardless of ownership, should account for localized flood risk.

GOALS AND DESIGN COMPONENTS

	Urban Agriculture	Solar Power	Composting	Natural Treatment System	Wetland	Recreation Field	Surface Storage	Subsurface Storage	Injection Well	Water Treatment Facility	Purple Pipe Connection	Dry Well	Spreading Ground	Storm Drain Daylighting	Affordable Housing	Art and Culture Facility
Flood Risk Reduction																
Parks and Trails	✓		✓	✓	✓	✓	✓						✓	✓		✓
Ecosystems	✓	✓	✓	✓	✓		✓						✓	✓		
River Access	✓				✓	✓	✓									✓
Arts & Culture	✓	✓	✓	✓	✓	✓	✓			✓			✓	✓	✓	✓
Housing Affordability	✓														✓	
Engagement and Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Water Supply				✓	✓		✓	✓	✓	✓	✓	✓	✓			
Water Quality				✓	✓		✓	✓		✓		✓	✓	✓		

Figure 231. Goals and Design Components: Off Chanel Land Assets.

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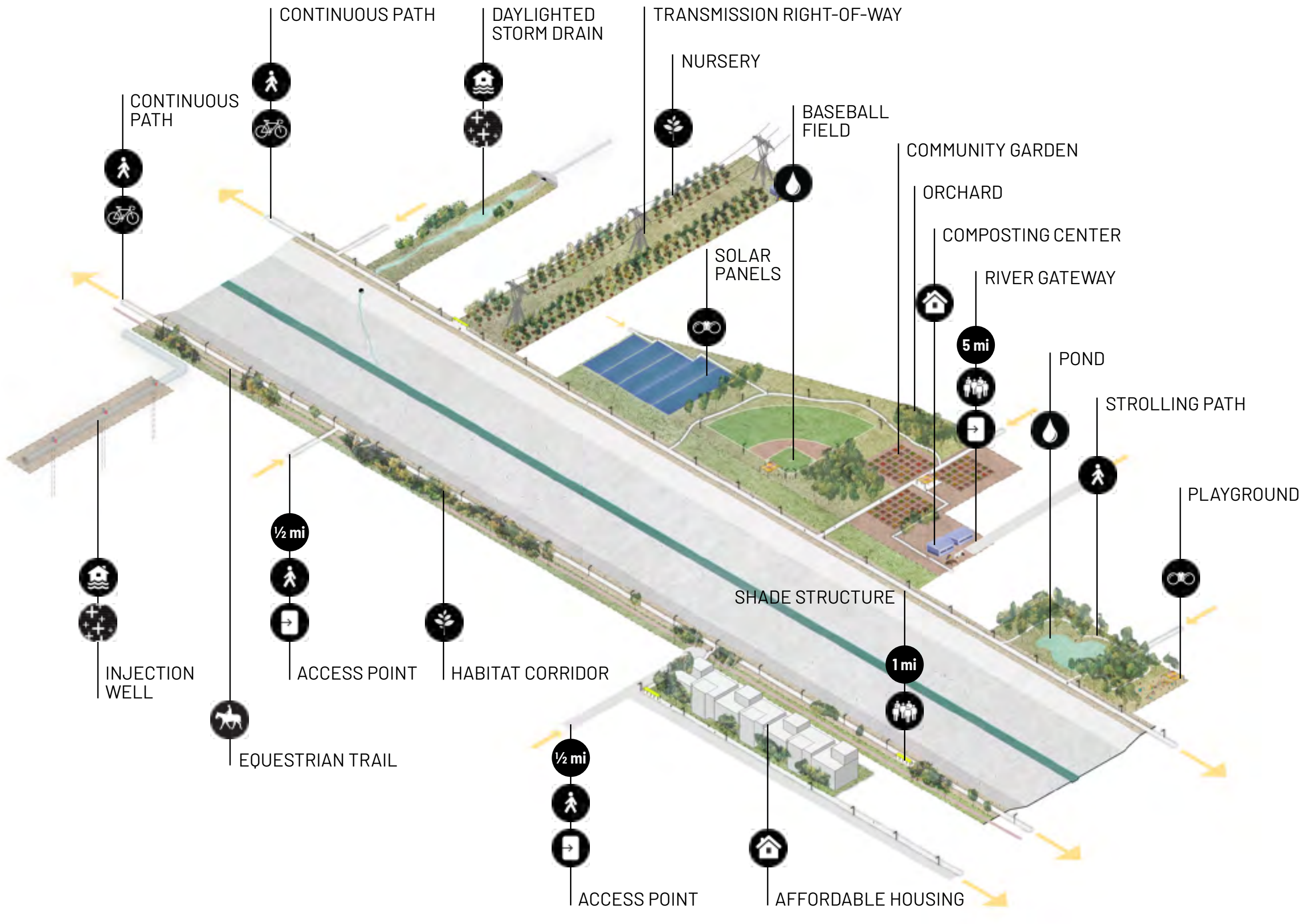


Figure 232. Trapezoidal Channel: Off-Channel Land Assets.

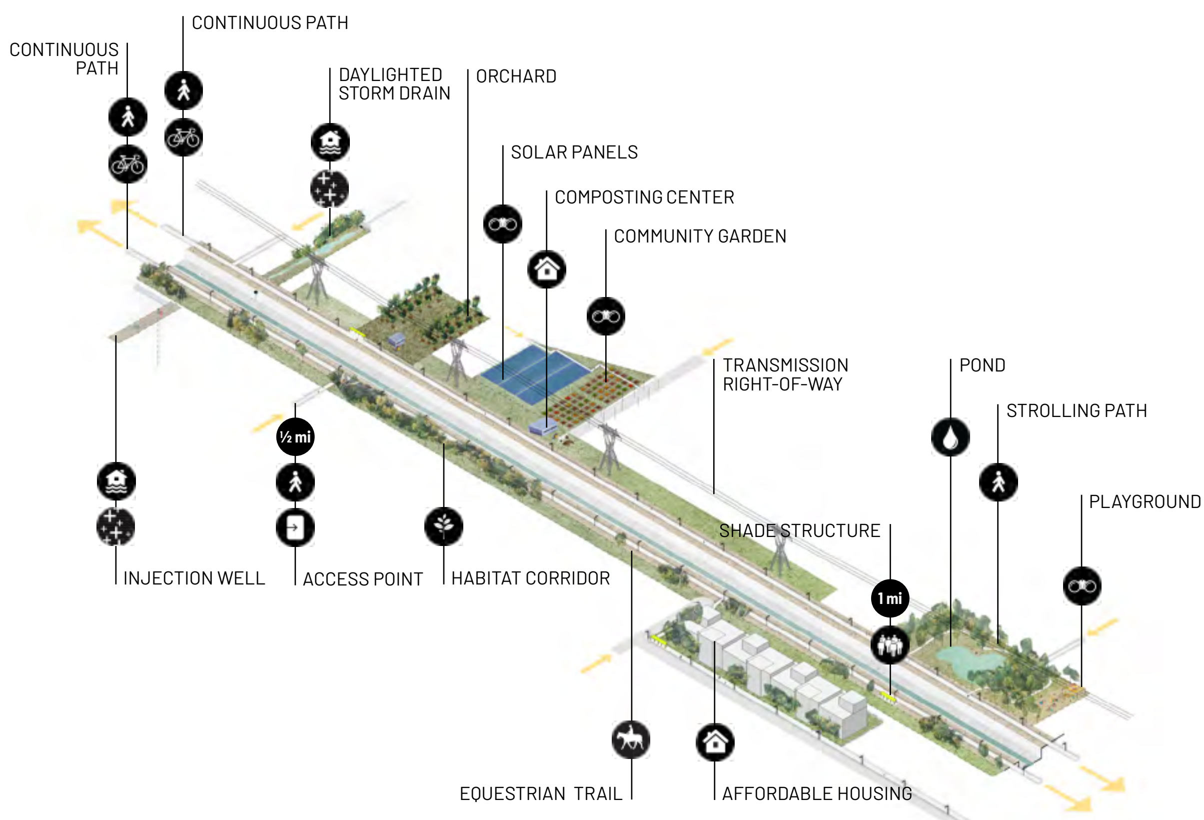


Figure 233. Box Channel: Off-Channel Land Assets.

Sediment Basin Riparian Edge

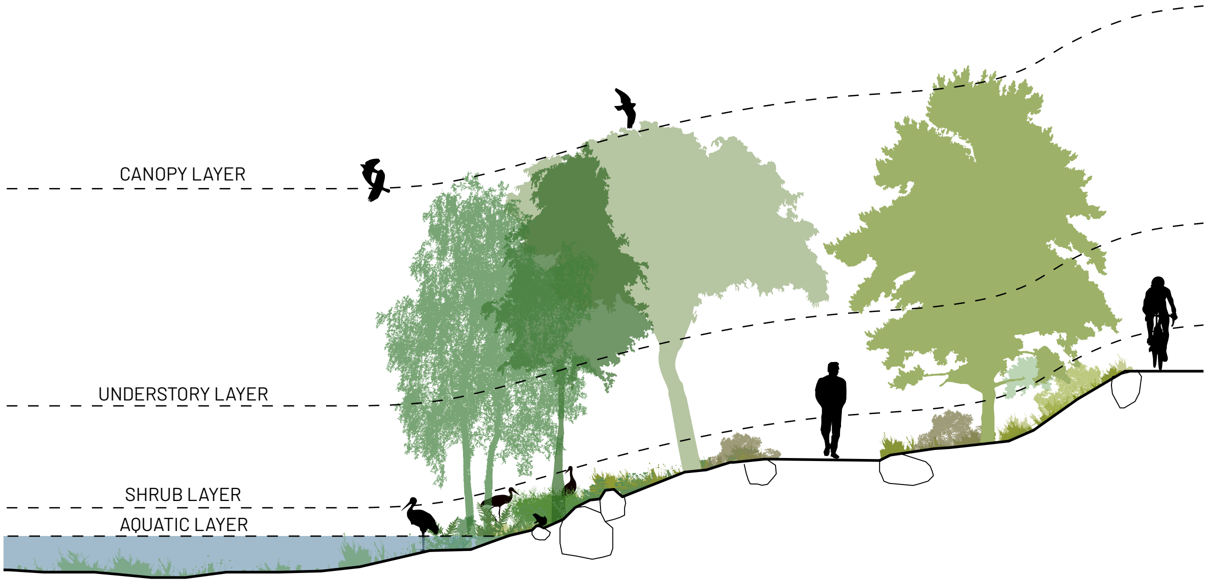


Figure 234. Sediment Basin Riparian Edge. Biodiversity profiles illustrate the plant communities, mammals, birds, reptiles, amphibians, and insects that can be sustained through the range of existing or built conditions along the LA River. The above is an example of a sediment basin riparian edge, and is not appropriate for all 51 miles of the LA River. See the Appendix Volume II: Technical Backup Document for more information regarding the biodiversity profiles.

KIT OF PARTS: BIODIVERSITY PROFILES

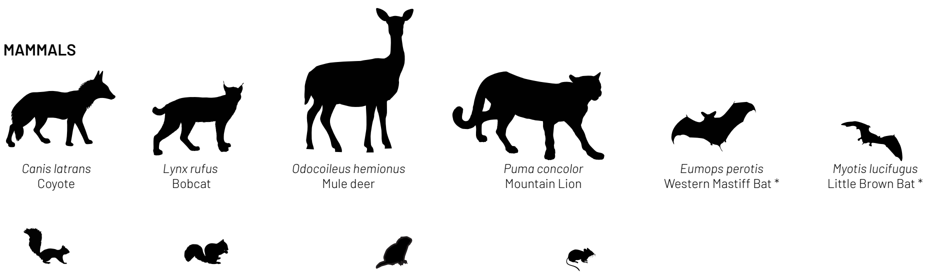
Opportunities for biodiversity and the creation of functioning ecosystems should be considered across all of the design components in the kit of parts. Each project should create its own biodiversity profile of existing and goal key indicator wildlife species. This should be created in partnership with qualified professionals such as botanists or ecologists. These profiles are not a substitute for good ecological design led by ecologists, landscape architects, and engineers. Biodiversity profiles illustrate the plant communities, mammals, birds, reptiles, amphibians, and insects that can be sustained through the range of built conditions along the LA River. These profiles can be used to describe both existing and proposed future conditions, from algae mats in the concrete channel to a riparian soft-bottom basin, and are examples of how biodiversity must be present throughout all proposed projects. This is a useful tool for project implementers to assess whether a proposed project supports a diverse ecological community.

Sample Indicator Species List

BIRDS

Accipiter cooperii Cooper's Hawk
Falco peregrinus anatum Peregrine Falcon *
Pandion haliaetus Western Osprey
Bubo virginianus Great Horned Owl
Melanerpes formicivorus Acorn woodpecker
Aphelocoma californica California Scrub-Jay
Dendroica petechia brewsteri Yellow Warbler
Empidonax traillii Willow Flycatcher *
Lanius ludovicianus Loggerhead Shrike *
Melozone crissalis California Towhee
Psaltriparus minimus Bushtit
Sayornis nigricans Black Phoebe
Ardea herodias Great Blue Heron
Chlidonias niger Black tern *
Megaceryle alcyon Belted Kingfisher *
Anas cyanoptera Cinnamon teal
Himantopus mexicanus Black-necked Stilt
Sternula antillarum browni California Least Tern *
Vireo bellii pulsillus Least Bell's Vireo *
Sturnella neglecta Western Meadowlar

MAMMALS



Canis latrans Coyote
Lynx rufus Bobcat
Odocoileus hemionus Mule deer
Puma concolor Mountain Lion
Eumops perotis Western Mastiff Bat *
Myotis lucifugus Little Brown Bat *
Sciurus griseus Western Gray Squirrel
Otospermophilus beecheyi California Ground Squirrel
Thomomys bottae Botta's Pocket Gopher
Perognathus longimembris brevinasus Los Angeles Pocket Mouse *

REPTILES AND AMPHIBIANS

Actinemys marmorata; Western Pond Turtle *
Anaxyrus californicus; Arroyo Toad *
Bufo boreas; Western Toad *
Crotalus oreganus; Western Rattlesnake
Ensatina eschscholtzii; Ensatina Salamander
Lampropeltis getula californiae; California Kingsnake
Phrynosoma blainvillii; Blainville's Horned Lizard *
Pseudacris regilla; Pacific Treefrog
Rana draytonii; California Red-legged Frog *
Sceloporus occidentalis; Western Fence Lizard
Taricha torosa; California Newt
Thamnophis hammondii; Two-Striped Garter Snake *
Uta stansburiana; Side-blotched Lizard

FISH

Catostomus santaanae Santa Ana Sucker *
Gila orcutti Arroyo Chub *

INSECTS

Acroneuria Family; Stonefly
Anax junius; Green Darner
Callibaetis ferrugineus; Speckled Spinner Mayfly
Coenagrionidae Family; Damselfly
Danaus plexippus; Monarch Butterfly
Dasymutilla sackenii; Golden Velvet Ant
Epeorus Family; Mayfly
Ephemeroptera Family; Spiny Crawler Mayfly
Glaucopsyche lygdamus palosverdesensis; Palos Verdes Blue Butterfly *
Hydrophilidae Family; Scavenger Water Beetles
Leptotes marina; Marine Blue Butterfly
Nemoura Family; Spring Stonefly
Neoscona crucifera; Spotted Orbweaver Spider
Papilio rutulus; Western Tiger Swallowtail Butterfly
Phryganidia californica; California Oak Moth
Pogonomyrmex californicus; California Harvester Ant
Pteronarcys californica; Giant Salmonfly
Schistocerca nitens; Gray Bird Grasshopper
Tenebrionidae Family; Darkling Beetle
Xylocopa varipuncta; Valley Carpenter Bee

* Endangered or threatened species at state or federal level

PLANT COMMUNITIES

ALLUVIAL FAN SAGE SCRUB
COASTAL SAGE SCRUB
CHAPARRAL
DESERT SCRUB
SOUTHERN COAST LIVE OAK RIPARIAN FOREST
PERENNIAL FRESHWATER EMERGENT WETLAND
VALLEY OAK WOODLAND
SOUTHERN SYCAMORE RIPARIAN WOODLAND
CALIFORNIA WALNUT WOODLAND
COAST LIVE OAK WOODLAND
SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST
CLIMATE ADAPTED TREES

Figure 235. Sample Indicator Species List. Numerous types of birds, mammals, fish, reptiles, amphibians, insects, and plants call the LA River and its adjacent ecosystems home. For a full list of individual plant species within each plant community, see Appendix Volume I: Design Guidelines, Chapter 5.

Sample Existing or Proposed Profile Sections

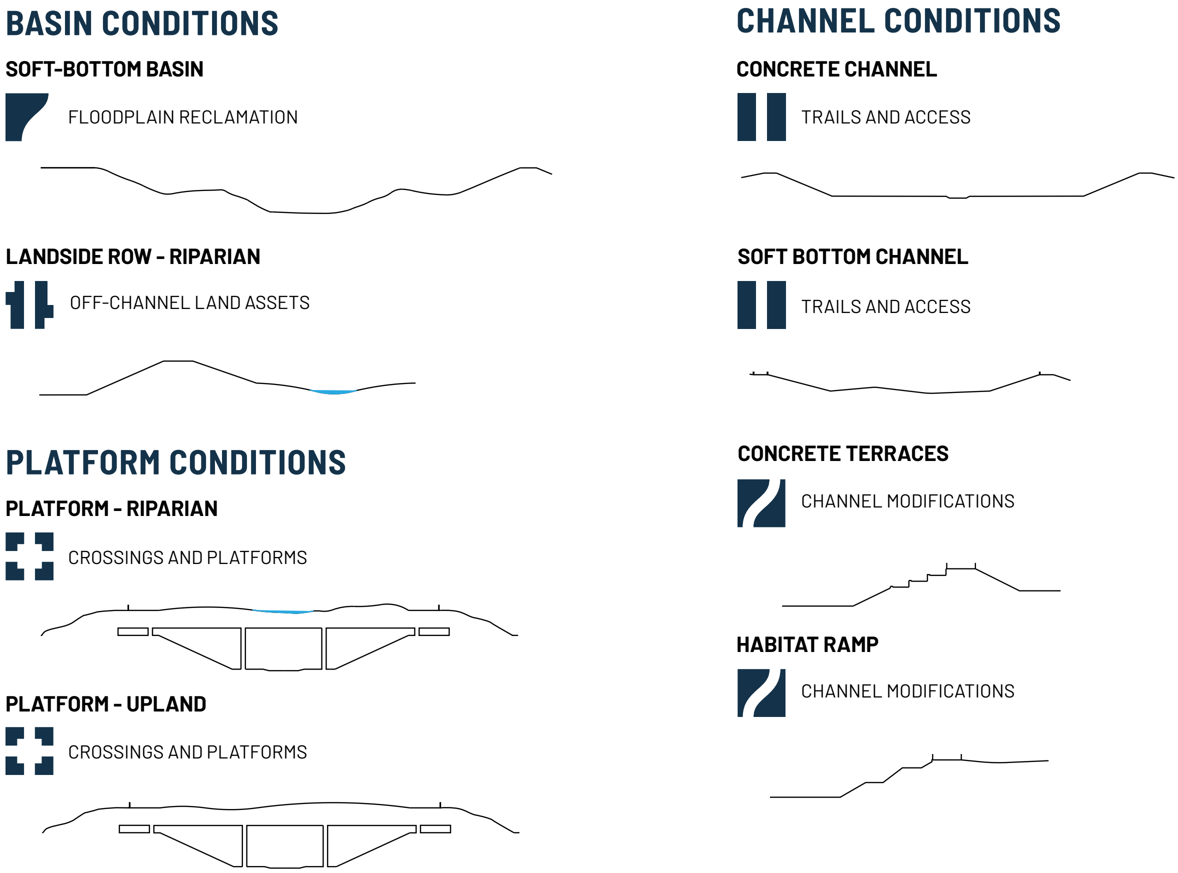


Figure 236. Sample Existing or Proposed Profile Sections. The different conditions that exist along the LA River allow for different habitat types to exist. These varying biodiversity profiles reflect both existing conditions and potential projects as outlined in the Kit of Parts. See the Appendix Volume II: Technical Backup Document for more information regarding the biodiversity profiles.

In Appendix Volume II: Technical Backup Document, examples of potential biodiversity profiles are fully detailed. They include section profile conditions of current existing conditions and proposed potential projects as outlined in the kit of parts. The wildlife species listed in these examples are potential key indicator species and are not meant to be a comprehensive list, since wildlife is found in a variety of contexts given specific site conditions. It is important to include a range of wildlife types in the biodiversity profiles, from native mammals and birds to benthic macroinvertebrate insects such as mayflies, stoneflies, and damselflies that often indicate water quality and riparian habitat health. Individual plant species have specific habitat considerations and ecological interactions that are crucial for the establishment of habitat for the diversity of wildlife as shown in the biodiversity profiles. Specific plant species for the plant communities shown in the biodiversity profiles are listed in detail in Appendix Volume I: Design Guidelines Chapter 5. The biodiversity profiles also assume smart design and appropriate adaptive management and maintenance for the ecosystems to function as drawn. Responding to the geophysical context, creating vertical vegetation structure, and shade connectivity are all important considerations in ensuring biodiversity along the LA River. The use of biodiversity profiles while further engaging qualified ecologists and scientists in projects can help to add additional ecological data on a project-by-project basis.

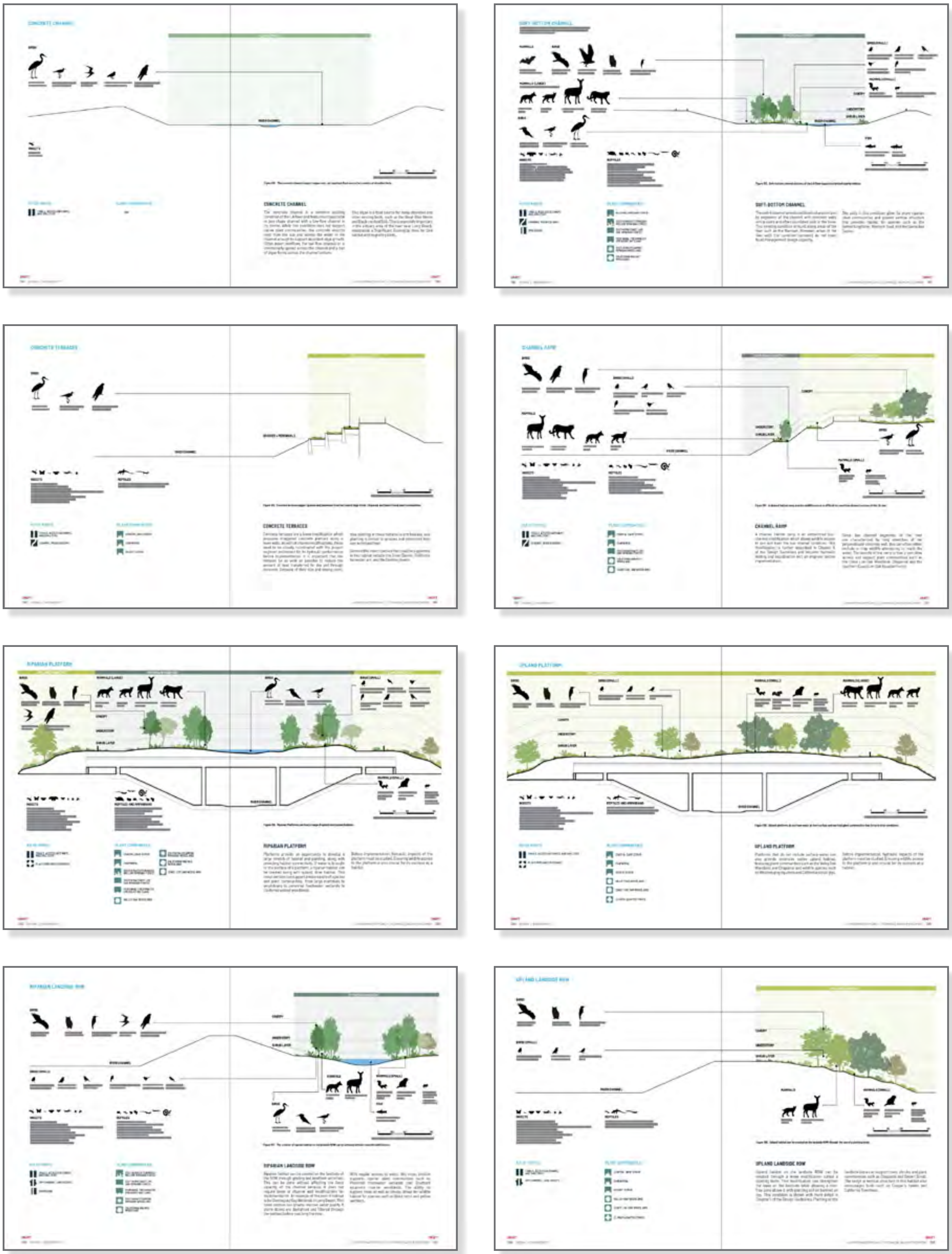


Figure 237. The Biodiversity Profiles describe both existing and potential future conditions, from algae mats in the concrete channel to a riparian soft-bottom basin, and are examples of how biodiversity must be present throughout all projects. See the Appendix Volume II: Technical Backup Document for more information regarding the biodiversity profiles.

COMMON ELEMENTS ARE ADDRESSED IN GREATER DETAIL IN APPENDIX VOLUME I: DESIGN GUIDELINES

COMMON ELEMENTS

In addition to the project-scaled design components in the kit of parts, smaller common design elements include pavilions, access stairs and ramps, and site furnishings such as lights, hygiene facilities, seating, trash and recycling, water fountains, guardrails, gates, bike racks, environmental graphics, emergency call boxes, and art. While recommended kit of part design components are mostly determined by a site's need, common elements are more driven by cadence, either required at all project sites, or at set intervals along the LA River Trail to provide safety, comfort, and wayfinding. Common elements are addressed in greater detail in Appendix Volume I: Design Guidelines.

1. **PAVILION** 0.5-3 MILES
2. **CAFE** 2-3 MILES
3. **HYGIENE FACILITIES** 2-3 MILES
4. **RESTROOM** 1 MILE
5. **BENCHES** 0.5 MILES
6. **EMERGENCY CALL BOX** 0.5 MILES
7. **WATER FOUNTAIN** 0.5 MILES
8. **TRASH & RECYCLING** 0.5 MILES
9. **BIKE RACK** 0.5 MILES
10. **ENVIRONMENTAL GRAPHICS** CONTINUOUS
11. **LIGHTING** CONTINUOUS
12. **PLANTING** CONTINUOUS
13. **STAIRS / RAMPS** AS NEEDED
14. **GUARDRAILS** AS NEEDED
15. **FENCES AND GATES** AS NEEDED
16. **STORMWATER BMPS** AS NEEDED
17. **ART / PERFORMANCE SPACE** WHEREVER POSSIBLE

Figure 238. Common elements provide a base level of amenities for projects along the LA River. Many of these common elements provide an opportunity to integrate artistic expression.

Figure 239. Pavilions along the river, such as this one at Lewis McAdams Riverfront Park near river mile 26.6, allow users to seek refuge from the sun and provide community spaces to utilize. Source: OLIN, 2019.

PAVILIONS

One of the most critical common elements is the LA River pavilion. Pavilions situated along the LA River will house numerous facilities and amenities and will form a network of programs and activities to support a continuous and unified experience along the river trail. Pavilions serve as an asset for river users and river-adjacent communities. They should complement existing community assets, such as parks, schools, community facilities, and public transit, to form enriched nodes of interest. Other master plans and site plans have already identified several sites for facilities and amenities, but additional pavilions are necessary to establish a regular and equitable cadence for all river users.

The architecture of the river pavilions should meet the highest standard of design excellence. All pavilions should have a finished floor elevation above the 1% storm level event, or be developed in such a way as to be resilient during flood events. The maintenance planning for the pavilions is critical.

The river pavilions have been organized into three tiers based on the number of amenities that are provided. Pavilions with baseline amenities will occur more frequently in the cadence along the river, while pavilions with added amenities occur more intermittently at an appropriate cadence. Tier I pavilions, the baseline, include seating, shade structures, drinking fountains, waste disposal, and an emergency call box. Tier II pavilions include the baseline amenities of Tier I pavilions plus restrooms, bike racks, picnic tables, charging stations, and vending machines, with optional barbecues and outdoor showers. Tier III pavilions include all Tier I and II amenities in addition to a cafe, indoor showers, lockers, public safety station, and bike rental and repair. Sports equipment rental, multi-purpose rooms, and community kitchens can further enhance Tier III pavilions. Larger pavilions, in particular, operate as destinations in themselves attracting visitors to the river. Within each tier, pavilions can adjust in scale, configuration, and specific programming to respond to local site conditions, community needs, and complement amenities that may already exist.

TIER I = A

TIER II = A + B

TIER III = A + B + C

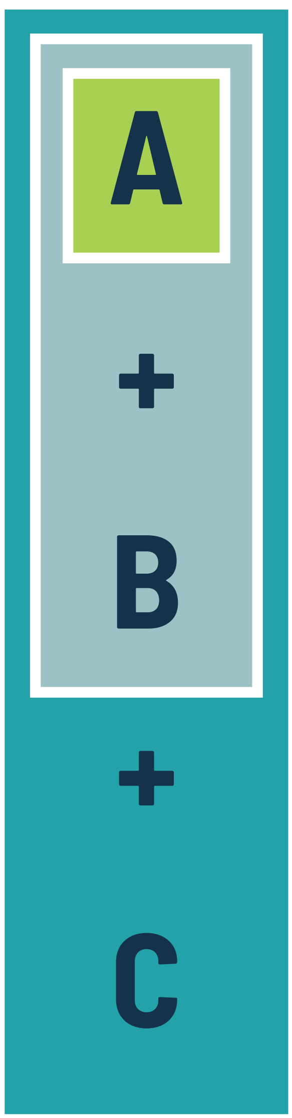


Figure 240. Each tier of pavilion is made up of components from different categories.

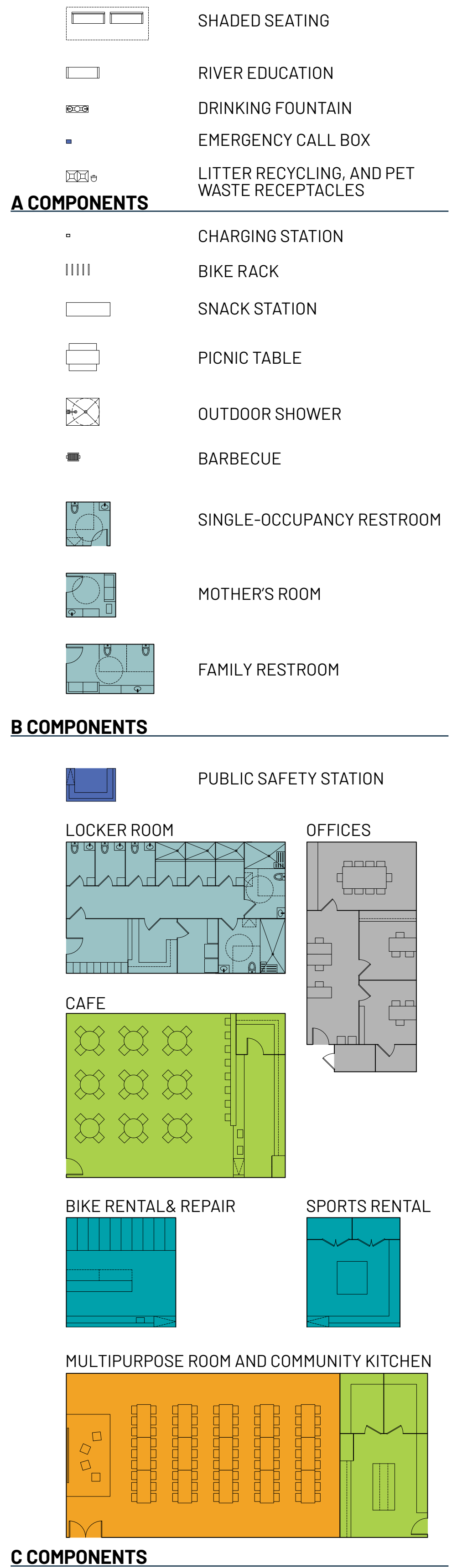


Figure 241. Pavilion A, B, and C Components.

Environmental Graphics Example Templates

Figure 242. Environmental Graphics Example Templates. A suite of eight different LA River Environmental Graphics lead people to the river and provide important information at access points and along trails. See Chapter 4 in Appendix Volume I: Design Guidelines for more information.

ENVIRONMENTAL GRAPHICS

The Environmental Graphics Guidelines for the LA River are outlined in detail in Appendix Volume I: Design Guidelines, Chapter 4. These guidelines are an update to the 2003 LA River Signage Guidelines, and were developed through extensive outreach and input from LA Metro, the City of LA, the LA River Master Plan Steering Committee, and the Native American community.

Environmental graphics and wayfinding are an important part of the identity and use of the LA River. They guide people towards the LA River and help identify locations along the river trails. All design components in the kit of parts will have some level of environmental graphics as part of the project.

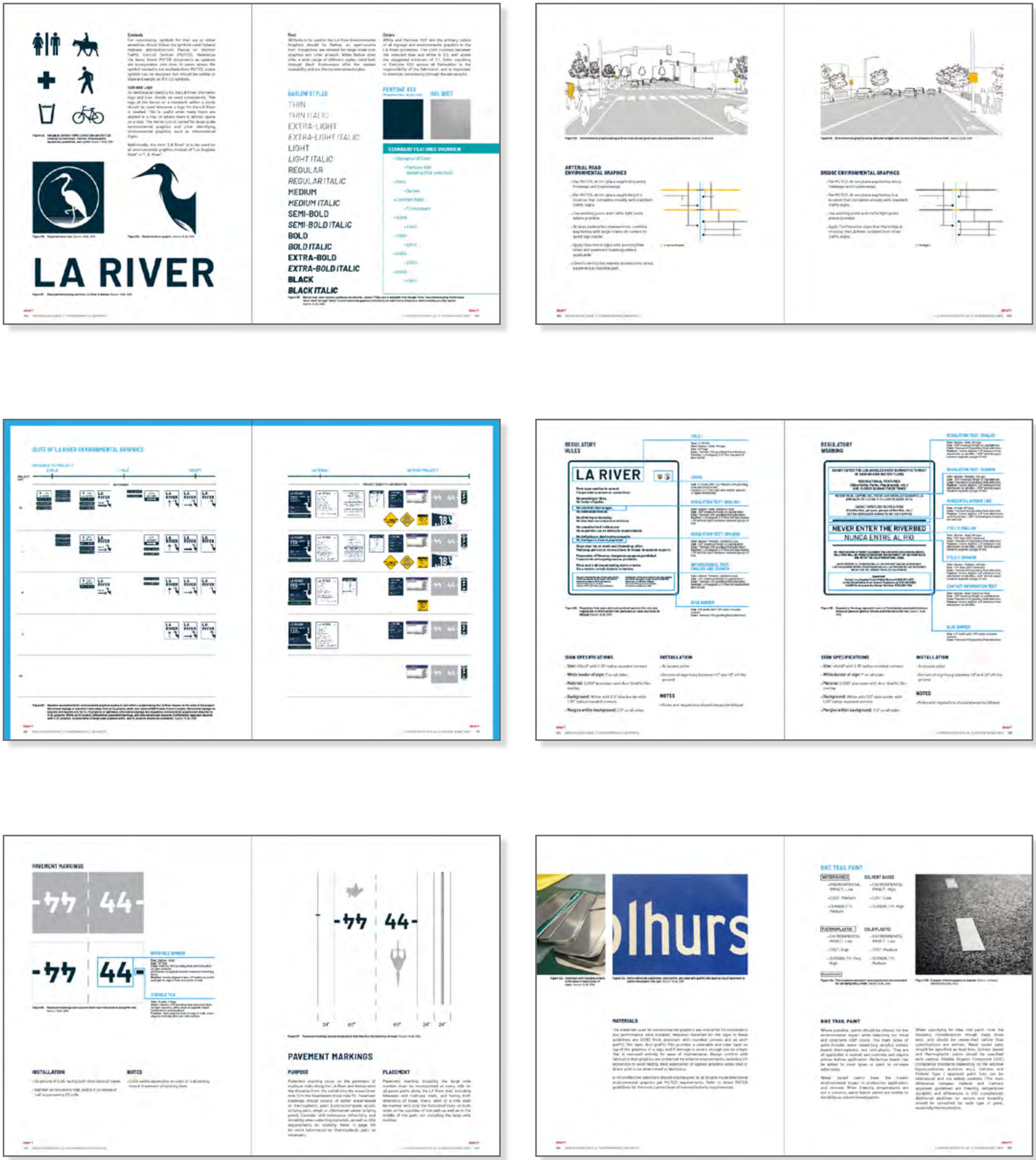


Figure 243. Best practices for environmental graphics design standards, placement, and materiality are detailed in Appendix Volume I: Design Guidelines, Chapter 4.

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Environmental Graphics Sign Elevations

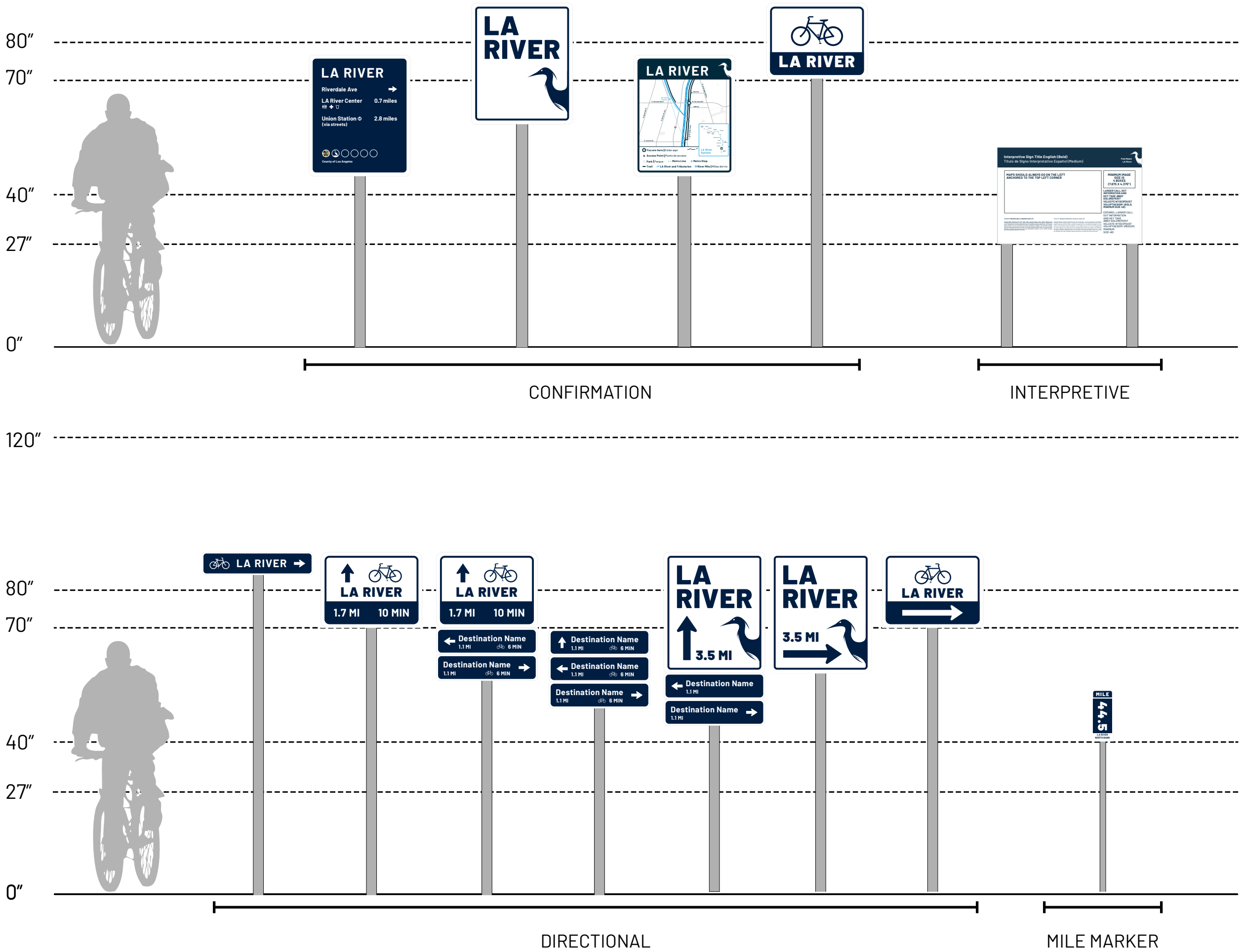


Figure 244. Environmental Graphics Sign Elevations. The suite of LA River environmental graphics includes signs leading to the LA River and within projects. These are examples of four out of the eight environmental graphics categories.

There are eight categories of environmental graphics: informational, regulatory, confirmation, interpretive signs and displays, directional, mile markers, pavement markings, and large scale icon graphics. All categories of environmental graphics share common design elements and standards. They aim to be accessible to all and include bilingual signs that would reflect the languages spoken by the diverse communities along the LA River. Legibility and clarity are also important, and, in most cases, environmental graphics should follow ADA requirements for type size and sign height as a best practice. All environmental graphics should use the term "LA River", not "Los Angeles River" or "L.A. River". Other standards include using the heron both as a logo for signs or as an icon for large scale graphics. Environmental graphics and wayfinding signage should be constructed of materials that are durable and vandal-resistant. All mile marker signs will use the 51-mile river numbering system with river mile 0 at the mouth of the river in Long Beach and river mile 51 at the headwaters in Canoga Park. Opportunities should be identified for walls, fences, and underpasses to become art, and community expression related to the LA River. The placement and sequence of environmental graphics should strive to avoid sign clutter at access points.

Best Practices for Placement and Sequence of Environmental Graphics

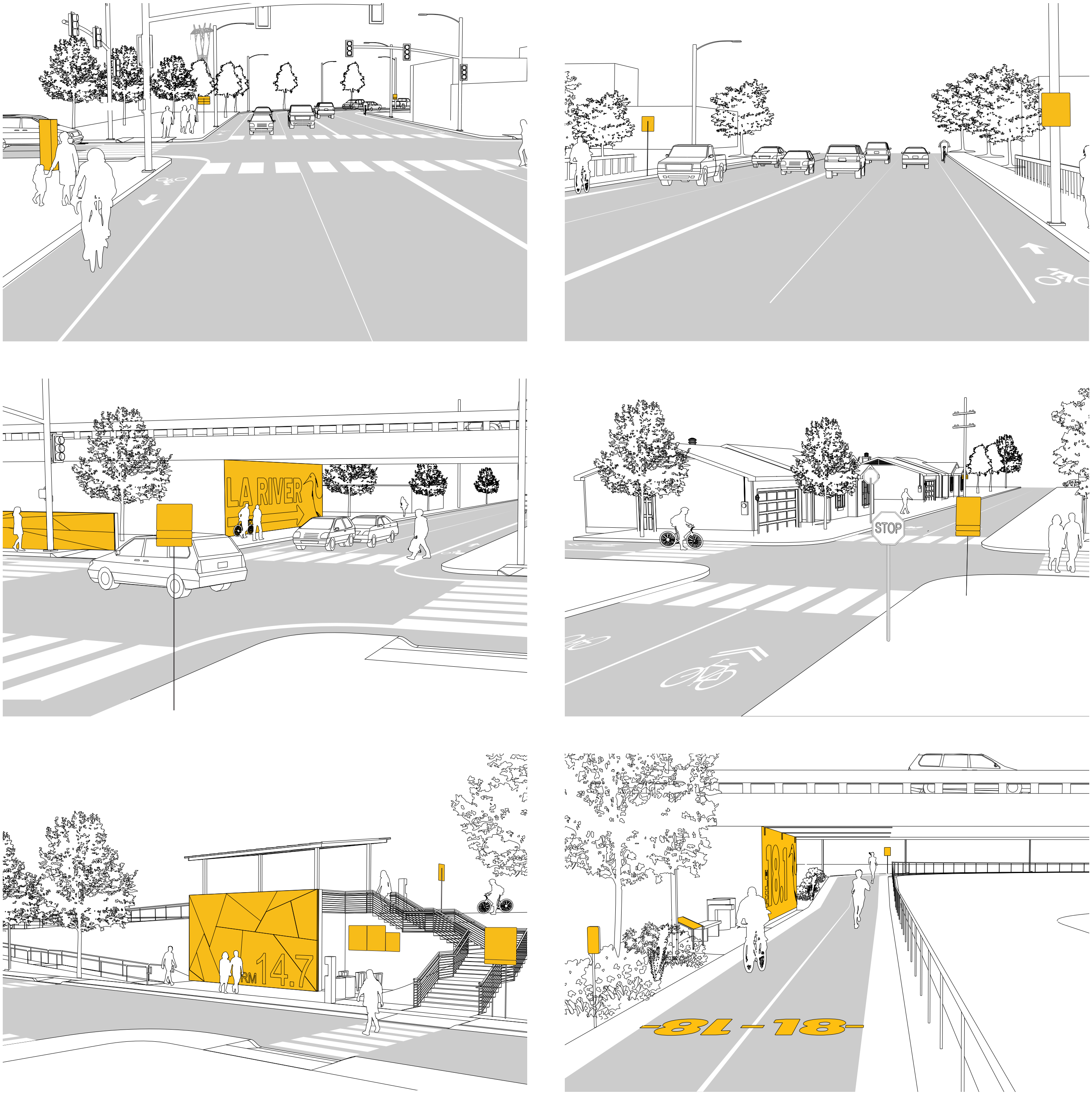


Figure 245. Best Practices for Placement and Sequence of Environmental Graphics. Placement and sequence of environmental graphics (highlighted in yellow above) varies depending on context and distance from the LA River. Sign clutter should be avoided, and signs should be hung visibly along pedestrian and bicycle routes to the river. See Chapter 4 in Appendix Volume I: Design Guidelines for more information regarding environmental graphics.

Figure 246. Metro wayfinding and environmental graphics in downtown LA. Source: OLIN, 2017.

CASE STUDIES - ENVIRONMENTAL GRAPHICS

LA METRO WAYFINDING
LOS ANGELES, CALIFORNIA

The Los Angeles County Metropolitan Transportation Authority's (Metro's) First Last Mile Strategic Plan[105] developed in 2014 outlines useful strategies for lateral wayfinding. The First Last Mile Strategic Plan outlines a toolbox for creating a county-wide transit access network, consisting of: crossing enhancements and connections, signage and wayfinding (Metro signage and maps, medallion signage, time to station signage, real-time signage adjacent to station), smart technologies, safety and comfort, allocation of street space, and plug-in components. Metro's approach to environmental graphics also utilizes a strong visual identity with expressions beyond signs themselves, including murals and shade structures.

LEGIBLE LONDON
LONDON, ENGLAND

Legible London was developed in 2006 through research commissioned by the Mayor of London to make the city more navigable on foot.[106] This included the installation of very clear maps, icons, and street names to guide pedestrians along city streets. The signs and totems had a recognizable branding, and used clear, sans serif font to increase legibility.

NYC BEACHES
NEW YORK, NEW YORK

A new suite of environmental graphics was developed for NYC Parks and Recreation after Hurricane Sandy in 2013 for use on NYC beaches and boardwalks at entrance points.[107] A unique graphic identity established a sense of place for each block with beach access. In addition to appearing on signs, the graphics also appeared on beach pavilions and restroom facilities. Regulatory signs were also rebranding to fit into the suite and were consolidated into one long panel, reducing sign clutter.

SYRACUSE CONNECTIVE CORRIDOR
SYRACUSE, NEW YORK

The Syracuse Connective Corridor was developed in 2010 to engage institutions and businesses with the pedestrian realm.[108] This approach used a strong visual identity and allowed for versatile expression, meaning that the environmental graphics were integrated into everything from the facades of surrounding buildings to site furnishings. Designers also were able to employ many low-cost options into the environmental graphics suite.

Figure 247. Legible London totem signage provides clear maps and direction for pedestrians. Source: Flickr User: Tom Page, 2014. https://bit.ly/3c7d4go.

Figure 248. The NYC Beaches environmental graphics suite includes regulatory signage that is legible and aims to reduce sign clutter. Source: Flickr User: Shinya Suzuki, 2015. https://bit.ly/2UV5dNo.

Figure 249. The Syracuse Connective Corridor uses creative and inexpensive ways to incorporate a strong visual identity. Source: OLIN / Sahar Coston-Hardy, 2013.

Figure 250. The Ferraro Fields Side Channel design example at river mile 30.9 is bounded by the LA River to the north and interweaving freeways to the south.

9.
PROJECT EXAMPLES

SITE-BASED AND SYSTEM-BASED PROJECTS USE THE KIT OF PARTS TYPOLOGIES AND COMMON ELEMENTS TO MEET NEEDS

LA River Master Plan projects can be site-based or system-based. The project examples on the following pages use the kit of parts and the common elements to create site specific designs. All the designs are goal-driven, meaning that the needs mapping completed for the nine goals informs design priorities.

Several system proposals require many sites working together to address a need, such as strategies for affordable or permanent supportive housing, 1% flood risk reduction areas, and groundwater recharge.

All proposed projects would be required to go through a community engagement process during further project development as outlined in Chapter 6.

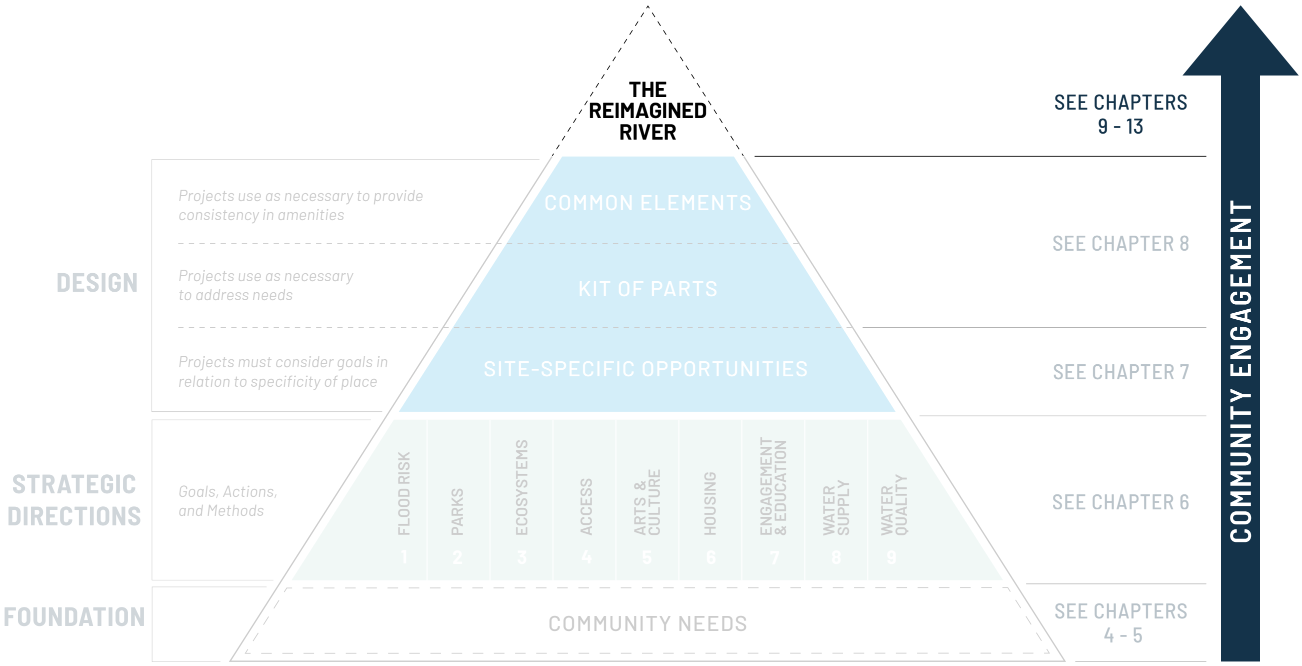


Figure 251. **The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.**

POTENTIAL PROJECTS AND SYSTEMS

Projects within the LA River Master Plan are site-based and frequently also part of a larger network or system. Site-based projects are either site-specific, meaning that they are a byproduct of the conditions and needs local to a given site, or are derived from cadence. (For example, certain opportunity sites may not have had a specific high need but are well-suited to provide access and/or facilities for those using the LA River Trail.) Site-based projects may be comprised of multiple contiguous parcels. System-based projects are also a byproduct of the needs analysis; however, they typically operate at a much larger scale, requiring coordination between multiple opportunity sites. In some cases, system-based projects may not require an opportunity site at all, instead relying on underground interventions or taking place outside of the LA River corridor.

The LA River Master Plan identified 43 new XS and S proposed projects in addition to 123 XS and S projects from other planning efforts. Having inventoried the conditions of existing access facilities along the LA River Trail, 42 existing access points were also recommended for improvements. M, L, and XL site-based projects include 22 proposed projects in addition to 56 planned major projects identified from other on-going planning efforts. Systems along the river, comprised of multiple projects of varying location and scale, operate together to achieve a given need. Systems can operate as linear connectors and networks or on a series of distributed sites.

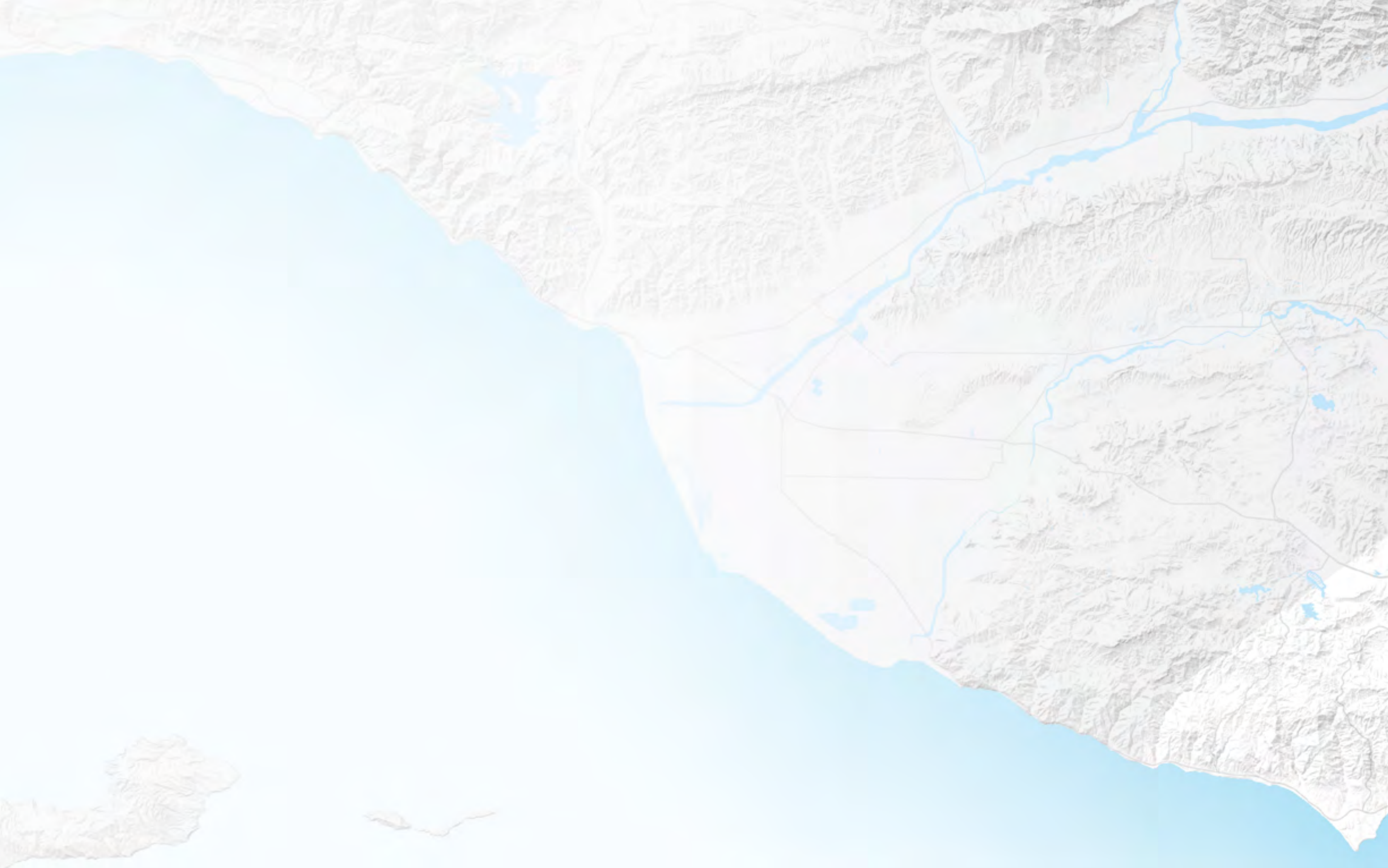
Figure 252. Projects within the LA River Master Plan are site-based and frequently also part of a larger network or system.

PROJECTS

SYSTEM-BASED

• LA River Trail on page 281 • Regional Connectivity Loops on page 285 • Flood Risk Reduction on page 287 • Flood Risk Reduction in the Narrows on pages 298 - 309 • Regional Groundwater Recharge on page 310 • Land Banking for Affordable and Permanent Supportive Housing on page 315 • Dry Weather Low Flow Adjustments on page 320	XL
SITE-BASED EXAMPLES	
• Ferraro Fields Side Channel on page 341	L
• Compton - Paramount Connectivity Corridor on page 351	M
• Gathering Pavilion (Tier III) on page 334 • Rest Pavilion (Tier II) on page 330	S
• Shade Pavilion (Tier I) on page 326	XS
PLANNED MAJOR PROJECTS SPOTLIGHTS	
• LA River Valley Bikeway and Greenway on page 282 • Rio Hondo Confluence on page 356	XL
• G2 Taylor Yard on page 349	L

DRAFT



LA RIVER TRAIL

Consistent access along the entire river is foundational to the vision of the reimagined river. Projects are already underway to ensure a continuous pedestrian and bike trail along the river. As of 2020, the City of LA is working to secure funding to complete trails in the San Fernando Valley that will connect existing LA River trails. Additionally, Metro is leading a study to close the gap through the downtown of the City of LA. When these projects are complete, the entire 51-mile trail will be connected. Funding will be needed to complete both projects.

When possible, the river trail should be multiuse, accommodating bicycles, pedestrians, and equestrian users as it does currently along much of the Lower LA River. The LA River Master Plan Appendix Volume I: Design Guidelines outline requirements for access and mobility along the LA River.

After the completion of the 51-mile river trail along one bank, further efforts to have continuous access along both sides of the river, though important, will take many more decades given the spatial restrictions along the right-of-way.

Figure 253. LA River Trail Existing Conditions. Gaps should be closed to provide continuous trail and access points along the 51 miles of the LA River. Source: Based on City of LA, LA River Greenway, LA River Access and Points of Interest, 2018.

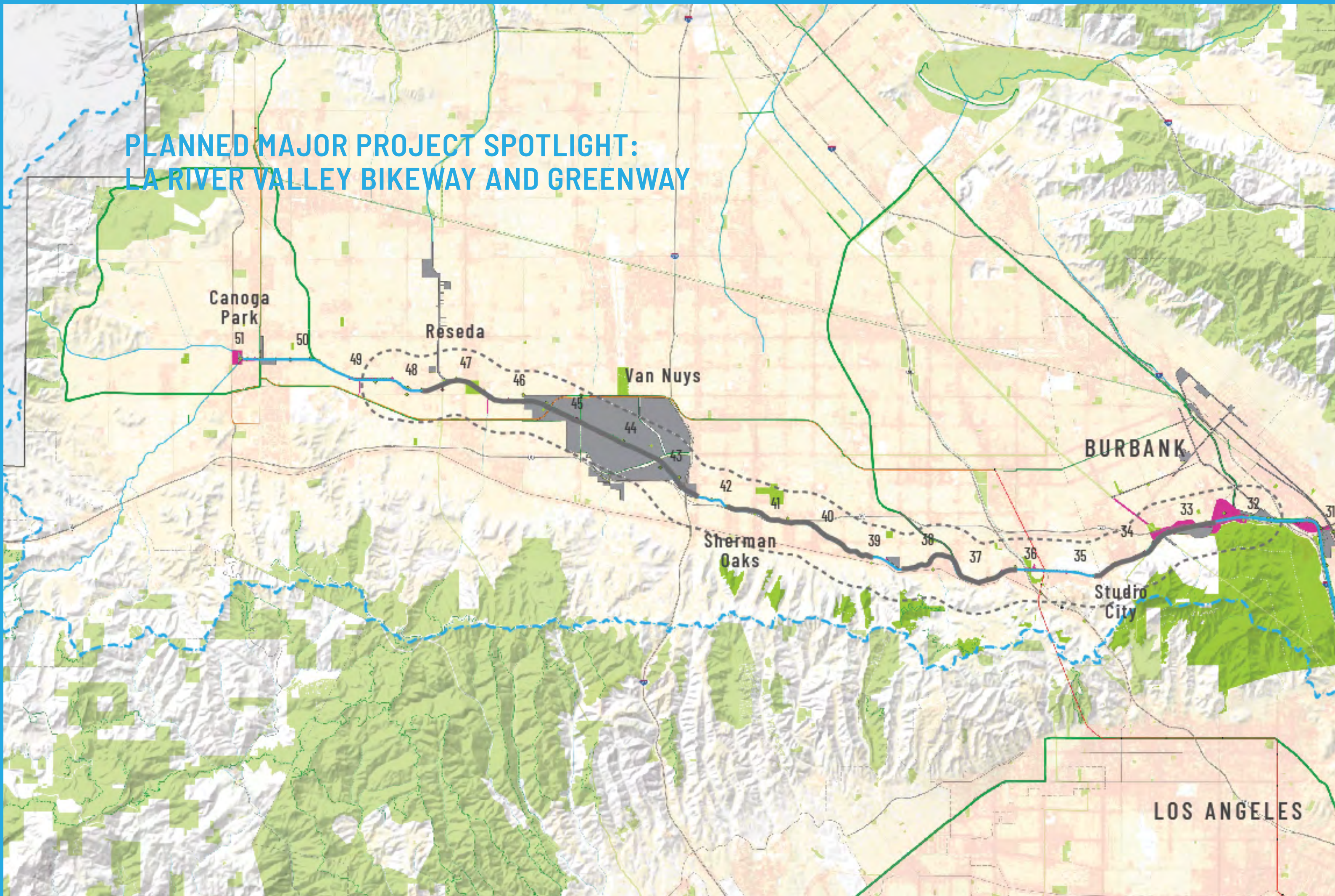


Figure 254. The LA RIver Valley Bikeway and Greenway is a 12.8-mile project in the San Fernando Valley.

EXISTING PROJECT SPOTLIGHT: LA RIVER VALLEY BIKEWAY AND GREENWAY

SIZE: 12.8 miles

IMPACT: XL

CITY: Los Angeles
(some sections will border Burbank)

NEEDS:

Flood Risk - General
Parks -General
Ecosystems - Moderate
Access - **High**
Arts & Culture - Moderate
Affordable Housing - General
Education - Moderate
Water Supply - **High**
Water Quality - General

LED BY: City of LA Bureau of Engineering

RELATED PLANS/PROPONENTS:
LA River Revitalization Master Plan

KIT OF PARTS COMPONENTS (UNDER CONSIDERATION):

Trails and Access Gateways

DRAFT

PLANNED MAJOR PROJECT SPOTLIGHT

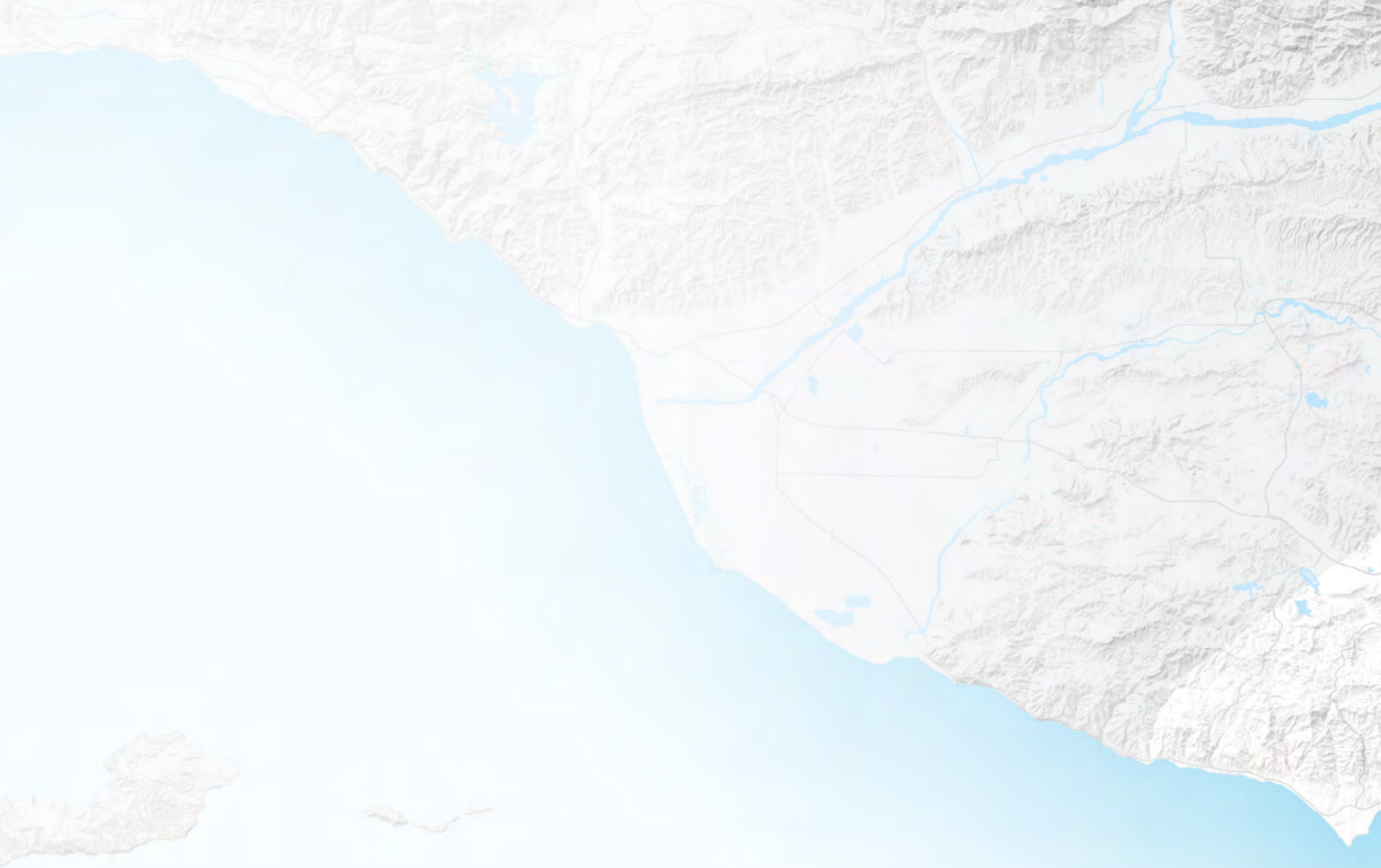
The Master Plan identifies 56 planned major projects along the river that are currently being led by various entities ranging from LA County to municipalities to state conservancies to NGOs (full details are available in Appendix Volume II: Technical Backup Document). The projects are each at a different level of development, and some are highlighted in the Master Plan as Planned Major Project Spotlights given their momentum and illustration of meeting community needs associated with the LA River Master Plan goals and needs mapping.

ABOUT THE PROJECT

The LA River Valley Bikeway and Greenway project, orchestrated by the City of LA Bureau of Engineering, will provide nearly 13 miles of new bike path and greenway facilities in the San Fernando Valley. The project will consist of nine segments that close gaps in the existing riverside trail system, directly addressing the high need for access improvements along this stretch of the LA River. River-adjacent communities from Canoga Park to Elysian Valley will be connected to one another by way of the project's new class I bicycle path and pedestrian trail. For LA County more broadly, these facilities will significantly bolster regional active transportation networks. The project will include wayfinding, interpretive elements, and site furnishings such as benches and water fountains. It will also integrate habitat areas and stormwater BMPs for stormwater capture and treatment.

Figure 255. The existing trail dips below street level at the Mason Ave undercrossing near river mile 49.8. Source: OLIN, 2019.

Figure 256. An existing segment in the Valley between Tampa Ave and Corbin Ave includes a bi-directional bike path and interpretive signage near river mile 48.6. Source: http://lariver.org/.



REGIONAL CONNECTIVITY LOOPS

The LA River has the potential to serve as an armature for regional active transit and recreation networks. These aspirational loops create connections between trails that have been proposed in other plans or are already existing, with minor exceptions. The loops combine different types of trails—multiuse trails and class I, II, and IV bike paths—but, through coordination, would ideally be unified by on-the-ground features that could include bike and pedestrian infrastructure. Existing multiuse trails and class I bikeways have been prioritized where possible. As drawn, the loops unify 300 miles of trail, envisioning a robust system that reaches far beyond the LA River corridor.

For more information regarding Regional Connectivity Loops, see Appendix Volume II: Technical Backup Document.

Name	Length
Basin Loop	60 miles
Lost River Loop	45 miles
Palos Verdes Loop	36 miles
Marina Loop	30 miles
Waterways Loop	30 miles
Highlands Loop	29 miles
Rio Hondo Loop	28 miles
Valley Loop	22 miles
Reservoir Loop	15 miles

Figure 257. Regional connectivity loops vary from 15 to 60 miles in length.

Figure 258. These conceptual regional connectivity loops, anchored by the LA River and its tributaries, consist primarily of existing and proposed bikeways and multiuse trails. Source: OLIN, based on LA County GIS Data Portal, Countywide Multiuse Trails, 2019; LA County GIS Data Portal, Bike Ways, 2017; LA Metro Active Transportation Strategic Plan, 2016.

THE 1% EVENT IS USED AS A TARGET IN THIS PLAN BECAUSE IT IS TIED TO THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP), AND STUDIES SHOW USING THIS STANDARD PROVIDES A BENEFIT COST RATIO OF 7:1 FOR RIVERINE ENVIRONMENTS ON AVERAGE. FUTURE LOCAL RISK ASSESSMENTS MAY INDICATE THAT LEVELS SHOULD BE INCREASED

FLOOD RISK REDUCTION

The LA River Master Plan is a guiding document for the LA River for the next 25 years and will likely affect the river for at least the next 50 to 100 years and beyond. Therefore, consideration of how the LA River channel continues to reduce flood risk while supporting the multi-benefit goals of the LA River Master Plan is critical. The Master Plan's strategic directions recommend several key factors for flood risk and resilience, such as continuing climate change research, considering flood risk to critical infrastructure, developing emergency action plans (EAP) to improve preparedness, and updating the existing LA River watershed hydrology.

Implementation of the Master Plan will increase multiuse spaces within and along the LA River including park space, ecosystems, cultural amenities, connectivity, and water quality improvements. While continuing the development of these multiuse efforts, projects should, at a minimum, maintain existing flood conveyance capacity, increase capacity in deficient reaches, and advance community resilience following extreme events, all while accounting for climate change. Additionally, an adaptation and mitigation plan should be developed to expand regional resiliency under an uncertain future. This adaptation and mitigation plan would be developed to guide recovery efforts through a "rethink before rebuild" approach following a catastrophic flood event.

System approaches for flood risk reduction include various watershed, channel, and floodplain strategies, and upstream and downstream impacts should be evaluated. Over the next century it is statistically probable that the LA River will flood and overtop its banks and levees. When this time comes, it's important that community resilience and strategic adaptation approaches are planned well in advance. There are significant cost considerations for the flood risk reduction strategies described in this section, including channel modifications/ rehabilitation, bridge modifications, and bypass tunnels, that should be balanced with the benefits of such programs.

FLOOD RISK REDUCTION ALONG THE 51 MILES

Strategies to reduce flood risk can focus on the channel, by looking for areas to increase capacity, or on the floodplain, by providing measures for improved emergency response and resilience. Within the watershed, facilities that can capture and retain large quantities of water during peak flows when it matters most, could also reduce flood risk, however, specific studies within the LA River watershed show that limited opportunities exist for large basins in the appropriate locations to make a significant impact on reducing peak flows. Distributed watershed approaches were also investigated, and although watershed measures greatly assist with water quality and supply during the smaller, more frequent storm events, they provide little attenuation of flows during larger peak storm events.

XL

SYSTEM-BASED FRAME 1-9, RM 0-51

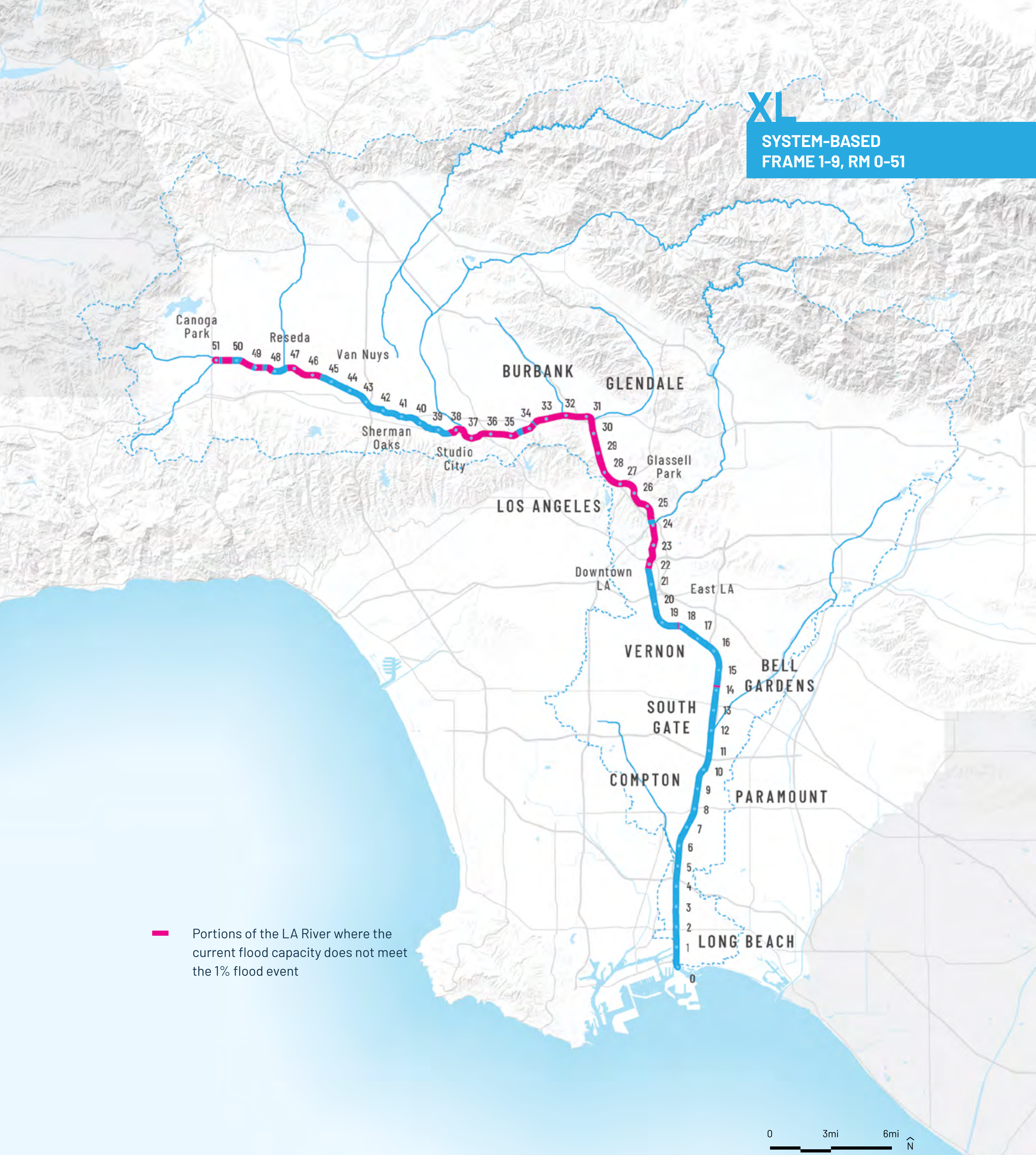


Figure 259. Portions of the LA River meet or exceed the 1% flood risk goal (shown in blue). Other portions (shown in pink) do not meet the 1% goal.
Source: OLIN, Geosyntec, 2019.

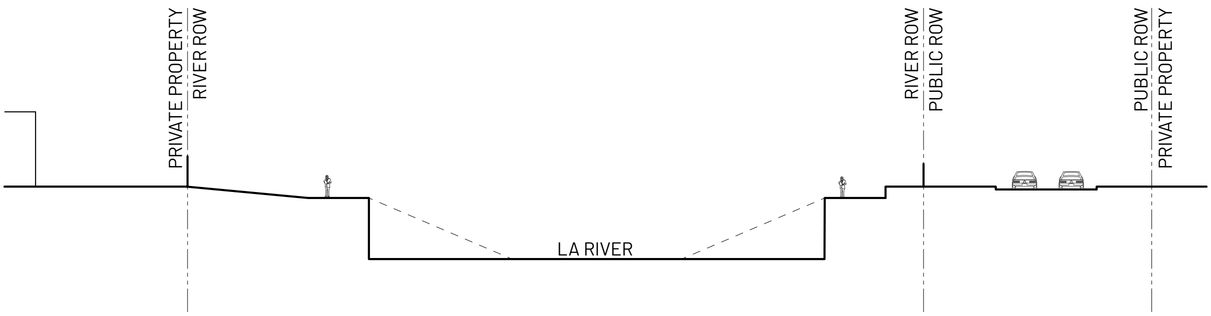


Figure 260. Converting an existing trapezoidal channel into a rectangular channel can result in a substantial increase in channel capacity; however, this strategy should always be combined with other multi-benefit components.

CHANNEL-BASED STRATEGIES FOR CONVEYANCE

Channel-based strategies should focus on improving the deficient areas of the channel that do not meet the 1% flood event capacity goal. Notable areas include intermittent locations in the West Valley between Canoga Park and Van Nuys, the Mid Valley between Studio City and Burbank, and the Glendale Narrows (Narrows). There are a range of strategies, or combinations of strategies, that may be used to improve channel conveyance capacity, including channel modifications, bridge modifications, bypass systems, and channel rehabilitation. These strategies should be assessed on a site-specific basis, while also considering system-wide flood risk reduction.

Trapezoidal to Rectangular Channel Modification:
Increasing channel capacity, such as converting an existing trapezoidal channel into a rectangular channel, can result in a substantial increase in channel capacity (Figure 260). This approach may be suitable in the West Valley. Advantages of this approach are that the flood risk reduction goal may be achieved within the existing channel right-of-way without the need to acquire additional land. A drawback of the approach may be decreased access to the channel and the associated decreased connectivity for wildlife. Given the multi-beneficial approach of the Master Plan, this approach should not be proposed without other multi-benefit additions such as terraces, park bridges, stairs, and/or wildlife access ramps.

Transitions between trapezoidal to rectangular cross sections need to be designed to minimize hydraulic impacts, which can be achieved using standard hydraulic design transitions. Examples of these transitions in the LA River include either side of the rectangular channel below the 5 and 110 Freeways near Downtown LA.

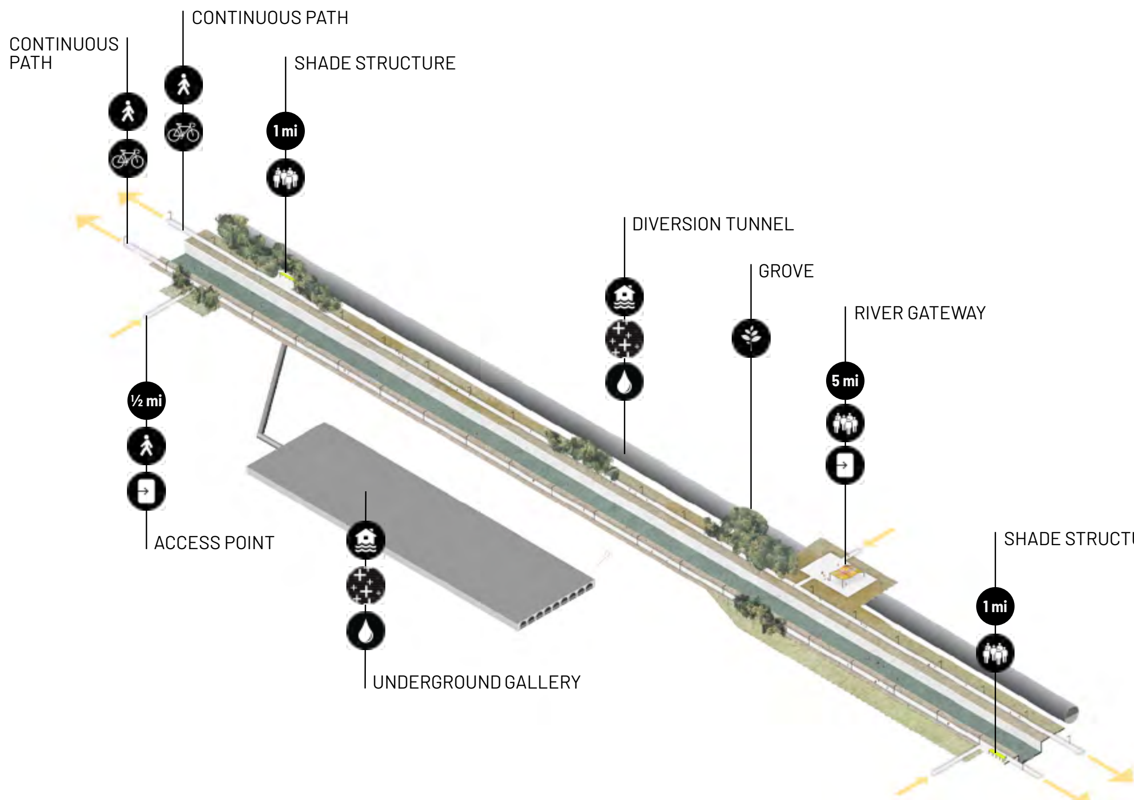


Figure 261. Box Channel: Diversions Kit of Parts. See Chapter 8 for more detail.

Bypass Channels/Tunnels

Bypass channels or tunnels with diversions from the LA River may also be considered to increase system capacity. To be effective, these would need to be large-scale infrastructures capable of conveying a significant portion of the channel flow. The diversions could be constructed as open channels running parallel to the main channel, which would require additional land availability or acquisition. Tunnels beneath the ground may instead be used (Figure 261), which would enable existing land-use to be maintained. Tunnels and side-channels could also be used for temporary storage of stormwater for water supply and/or water quality benefits during non-peak flood events. In some cases, by removing flow from the main channel, a bypass channel or tunnel may allow a section of the river to have riparian vegetation or instream habitat while larger flood flows bypass the area in a pipe or channel helping reduce flood risk while maintaining other multi-benefits.

Channel Rehabilitation

Channel conveyance could also be increased by rehabilitating soft-bottom portions where invasive species have become established. This approach cannot be applied system-wide but is an important strategy where applicable. This is discussed in more detail in the following system-based example below focusing specifically on the Narrows portion of the LA River.

BRIDGE CONDITIONS

Figure 262. Bridges that cross the LA River as depicted in the National Bridge Inventory. Source: US Department of Transportation Federal Highway Administration, National Bridge Inventory, 2017 & US Department of Homeland Security, Homeland Infrastructure Foundation-Level Data (HIFLD), Railroad Bridges, 2009.

Bridge Modifications

More than 80 bridges cross the LA River, providing essential connectivity for cars, trains, pedestrians, cyclists, and horses. In general, bridges may cause a restriction of flow capacity due to placement of piers within the flow, banks contracting due to bridge abutments, and bridge decks being too low. These localized constrictions may lead to flow backing up and overtopping the channel walls, potentially causing wide-spread flooding.

Many bridges were designed, or have since been modified, to enable conveyance of the 1% flood event. For example, multiple bridges in the lower river were modified as part of the LA County Drainage Area (LACDA) project in the early 2000's to convey the 0.75% (133-year) flood event. In that effort, bridge pier extensions were added to several bridges to force the flow velocity to increase and the flow depth to decrease (i.e., change the flow from 'subcritical' to 'supercritical') thereby passing under the existing bridge deck. This approach obviated the costly need to raise bridge decks. However, this approach only works where hydraulic conditions permit.

Other bridges, such as some in the Narrows and West Valley, do not provide enough capacity to convey the 1% event, and hydraulic retrofits are needed to meet the flood risk reduction goal of the Master Plan. This may include bridge pier extensions if hydraulic conditions permit, completely removing bridge piers and reconstructing the deck to 'clear span' the river (Figure 262) and/or raising the bridge deck. Some of these options may require vertical realignment of the roadway.

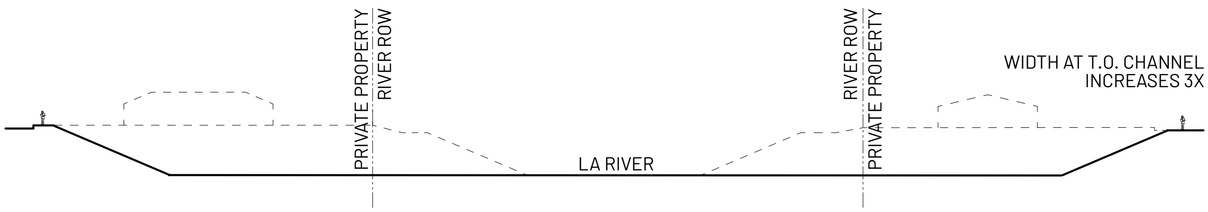


Figure 263. Widening the existing channel may require additional land acquisition outside of the current channel right-of-way, which is a challenge in the heavily urbanized and developed environment.

Ideally, bridge retrofits or reconstructions can be carried out during other projects. An excellent example of this is the 6th Street Bridge replacement project that was initiated due to deterioration of the concrete bridge structure. The replacement design is a viaduct that clear spans the channel and enabled the large central pier to be removed, substantially improving the channel's hydraulic performance. An inventory of existing bridge conditions could be cross-referenced with hydraulic performance to help prioritize which bridges should be rebuilt.

Opportunities for improving the hydraulics while leveraging other efforts may be during bridge seismic retrofits, bridge expansion to add traffic lanes (e.g., recently completed Spring Street Bridge), and/or bridge realignment (e.g., recently completed Riverside Drive Bridge).

In addition to the retrofit of existing bridges it is imperative that any new bridges being proposed are evaluated for capacity issues at least at the 1% flood event level.

Channel Widening

Widening the existing channel is another way to provide additional flood conveyance capacity while also potentially allowing for concrete removal. This may require additional land acquisition outside of the current channel right-of-way, which is a challenge in the heavily urbanized and developed environment. A benefit of this approach would be maintaining access to the channel and the associated connectivity for wildlife. If enough land is available, it may also be possible to convert concrete sections of the existing channel into soft-bottom portions to improve opportunities for native habitat and wildlife. This approach would still require hardened channel sides to prevent the river channel from meandering into developed areas and would also require large amounts of land outside the current river right-of-way to be obtained. For example, estimates in the West Valley indicate that the channel width of a naturalized channel would need to be increased approximately threefold to contain the 1% event (Figure 263). This represents a significant encroachment into residential and commercial properties resulting in displacement of residents, businesses and local infrastructure. Such actions would have significant impacts to communities and are generally not aligned with other Master Plan objective.

SYSTEMATICALLY REMOVING INVASIVE VEGETATION AND SEDIMENT PILES, WHILE ALSO MAINTAINING REFUGE HABITAT, WILL INCREASE CHANNEL CAPACITY AND SPECIES DIVERSITY

FLOOD RISK REDUCTION IN THE NARROWS

The Narrows planning frame of the LA River presents a specific set of issues because the channel has limited capacity to convey flows greater than the 2% event (50-year), and in some locations the levels are as low as the 10% (10-year) or even the 25% (4-year) events.[112] At the same time, the Narrows offers multiuse opportunities not found elsewhere along the LA River, including ecosystems (although degraded) and recreational attributes such as kayaking and birdwatching. There are several strategies available to improve the flood conditions in the Narrows that have the capability to increase conveyance to as high as the 2% (50-year) or even the 1% (100-year) flood events. Depending on the goals, these strategies need to be explored in concert to develop the best project available for the LA River system.

CHANNEL REHABILITATION AT THE NARROWS

In addition to documented areas of willow, cottonwood, and other native vegetation,[113] large woody and invasive species, along with mass sediment accumulation in the soft bottom reaches of the LA River, specifically in the Narrows, restrict flows during larger events (2%, 1%, and 0.2%), which would cause the river to overtop its banks. The larger, non-native and invasive species (*Arundo donax*, Jubata [*Cortaderia jubata*], Mexican fan palm [*Washingtonia robusta*], Canary Island date palm [*Phoenix canariensis*]) have become overgrown with only intermittent maintenance for the past several decades, and in combination with the sediment buildup along the channel bottom, flood risk has increased significantly. Rhizomatic root systems of species such as *Arundo* trap sediment and create large hummocks within the channel, often 10 feet high, restricting flows and creating low value habitat when compared to native plant species. Invasive species such as *Arundo* also thrive in the year-round dry weather flows in the Narrows which is rich in nitrogen from treated effluent from upstream wastewater treatment facilities that discharge into the LA River.

A channel rehabilitation program could reduce flood risk in several stretches along the Narrows. If the rehabilitation removes sediment and replaces existing vegetation with native grasses, capacities in some reaches may increase from below 35,000 cubic feet per second (cfs) to the original design discharge of 78,000 cfs, more than doubling the carrying capacity of the current channel itself, from the 25% (4-year) event to greater than the 2% (50-year) event.[114] A combination of this approach with other flood risk reduction strategies, including bridge modifications and a bypass tunnel, could potentially bring the LA River in the Narrows up to the 1% flood event capacity goal.

However, given the range of needs in this area of the river, a more strategic, multi-beneficial channel rehabilitation program that would still significantly reduce flood risk within the Narrows while also providing the added benefits of increasing native vegetation along the channel

DRAFT

CHANNEL REHABILITATION

XL

SYSTEM-BASED
FRAME 5-7, RM 24.5-32

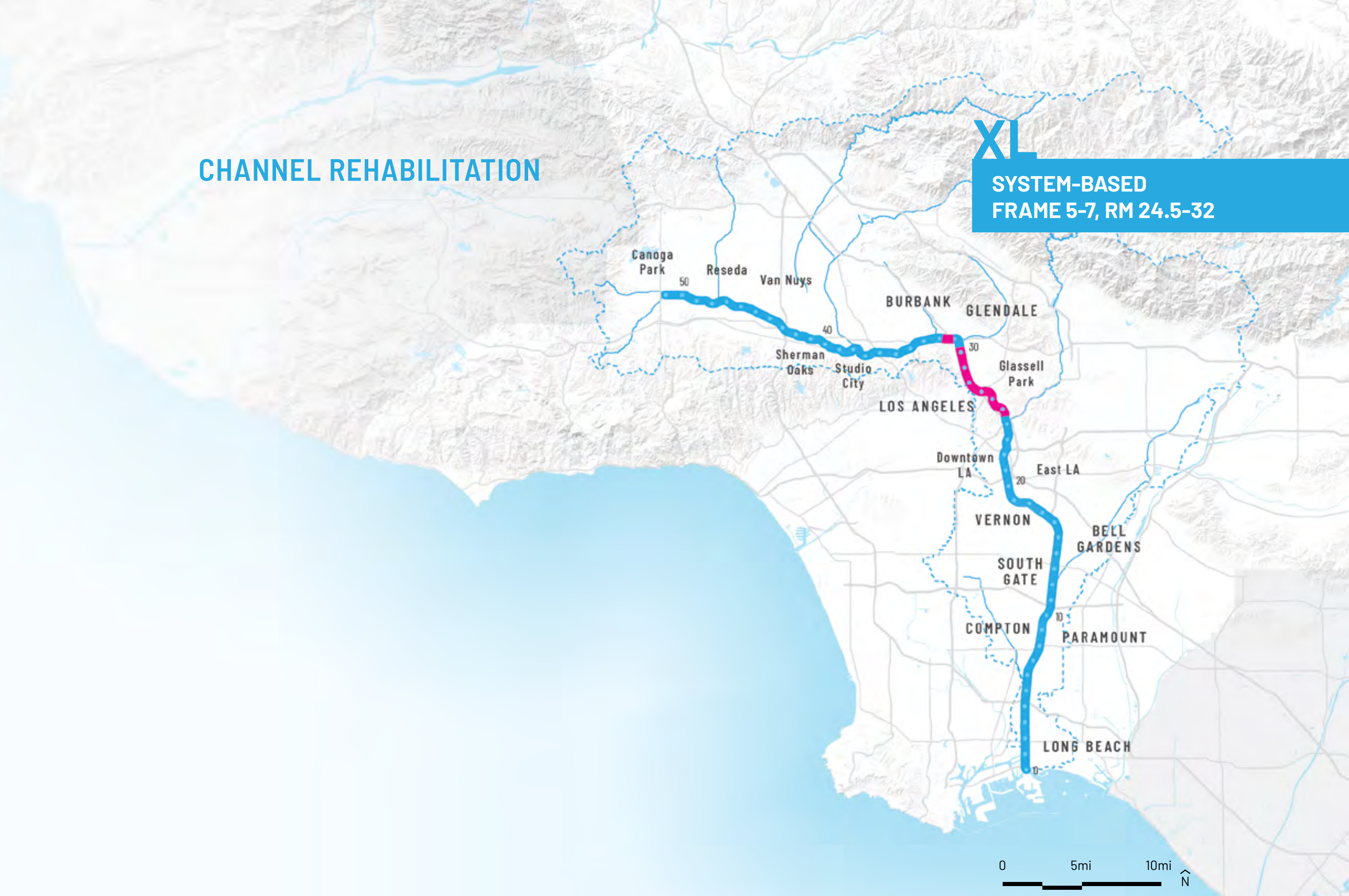


Figure 264. Soft-bottom sections of the river within the Narrows. Source: OLIN, Geosyntec, 2019.

could be followed. Through this approach, biodiversity of native mammals, avian, and insect species that rely on native vegetation would be increased. There would also be a decreased need for the installation of unsightly temporary flood barriers, which are often installed by jurisdictional agencies to reduce flood risk and block access to the river. This approach, while not strictly meeting the freeboard requirements[115] throughout the Narrows, could enable the 4% (25-year) event to be mostly contained within the channel, except for a few locations where overtopping may be expected.

In a multi-beneficial channel rehabilitation program, the ideal resulting river cross section would include native grasses, species such as willows that "lay down" during flood events (such as, but not limited to, Arroyo willow [*Salix lasiolepis*], Black willow [*Salix gooddingii*], Red willow [*Salix laevigata*], Sandbar willow [*Salix exigua*]), and some native riparian trees (such as, but not limited to, Fremont cottonwood [*Populus fremontii*], Coast live oak [*Quercus agrifolia*], California sycamore [*Platanus racemosa*], California walnut [*Juglans californica*]) along with a reduction of sediment mounding on the channel bottom. Further detail on recommended native species and plant communities can be found in Appendix Volume I: Design Guidelines, Chapter 5. Natural sediment transport processes will still allow some accumulation of sediment, and the removal of the large piles of sediment and the *Arundo* rhizome root hummocks will reduce the large piles that exist within the flood channel. Considering that smaller and larger storm events will continue, the implementation of a long-term adaptive management approach is important. Future storm events will continue to shape and contour the channel, and maintenance will help support a healthy viable ecosystem that can co-exist with decreased flood risk to the community.

Refuge Habitat Identification and Patchwork Removal Process

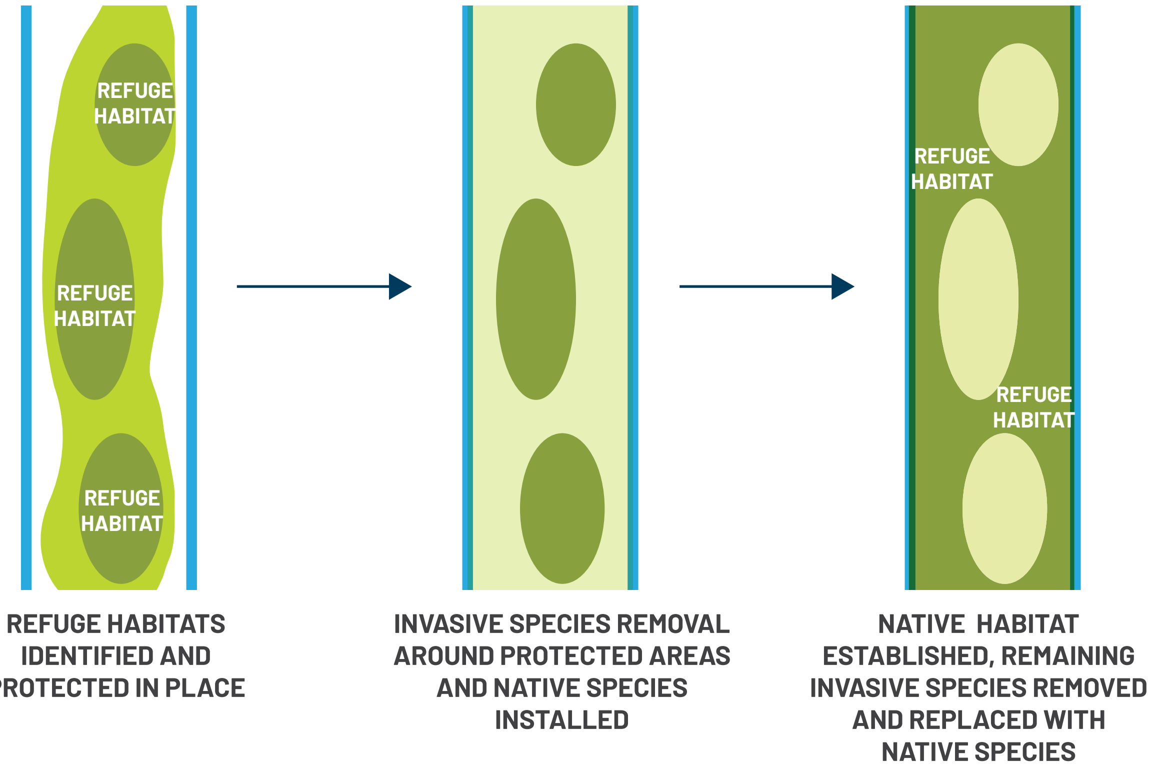


Figure 265. Refuge Habitat Identification and Patchwork Removal Process. The patchwork removal process for invasive species first identifies refuge habitats to be protected in place based on the range of the key species established by ecologists and an ecological survey. Then, invasive species are removed from the areas outside of the refuge habitat zones and native species such as willows and grasses are installed. Once this installed native habitat is established, the remaining invasive species are carefully removed from the original refuge habitat areas. Adaptive management by qualified professionals is crucial for the success of this strategy. Source: OLIN, 2019.

Process

Despite the advantages of channel rehabilitation for flood risk reduction, it is critical that this type of project be implemented in an environmentally responsible way that identifies, creates and maintains refuge habitats for keystone species during periods of invasive species and sediment removal. Invasive species removal must be carried out by a trained team of landscape maintenance workers with specialized heavy equipment that can identify species and selectively remove invasive vegetation and their root systems. This method would be a patchwork removal process by first identifying and protecting critical habitat zones, then sequentially removing invasive species in the areas outside of the protected zones and installing native plant species. Only once the installed native habitat is established should the careful removal of the invasive species in the protected zones be completed. Ecologists, arborists, and other vegetation specialists should consult and supervise the patchwork removal process. All native plant species should be installed and maintained through establishment, following requirements set forth in Appendix Volume I: Design Guidelines, Chapter 5. The process of channel rehabilitation is not a singular 11-mile process to be carried out once and left alone for 20 years. Instead this will require an ongoing multi-year adaptive management strategy that includes measures such as consistent monitoring and removal of any reintroduced non-native invasive species and native plant species replacement as needed while the habitat becomes established.

IT IS NECESSARY TO IDENTIFY KEYSTONE WILDLIFE, INSECTS, AND INVERTEBRATE SPECIES ALONG THE CHANNEL THAT SHOULD BE MAINTAINED AND DETERMINE THEIR RANGE

Refuge Habitats

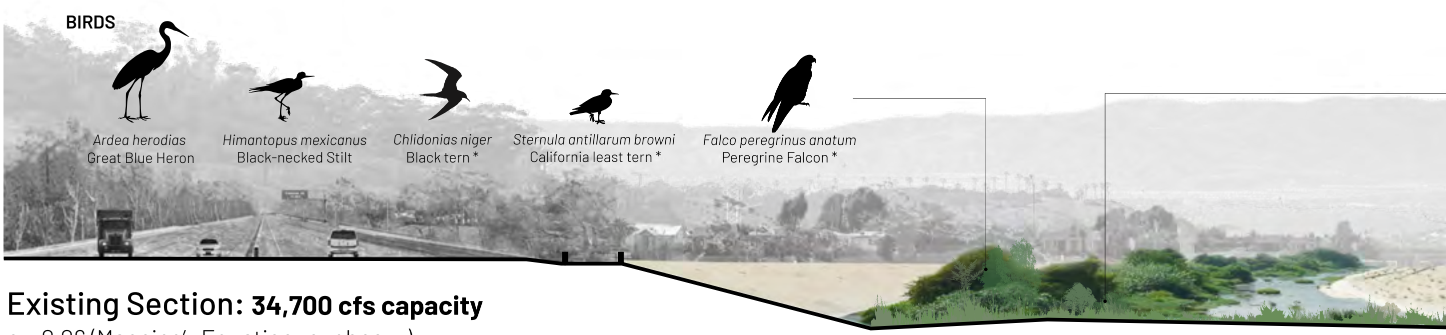
Prior to beginning channel rehabilitation, it is necessary to identify native, endemic keystone wildlife, insects, and invertebrate species along the channel that should be maintained and determine their maximum range of habitation. The LA River Master Plan biodiversity profiles indicate desirable species ranging from large fauna to insects that can guide this process. The LA River Design Guidelines plant lists specify native plant communities and key indicator species within each community. At a minimum, one to two species in each category should be selected to serve as target species to determine an appropriate refuge habitat area.

Overlapping the range of target species will assist in determining the maximum distance that a refuge habitat can be from an area of invasive species and/or sediment removal. This patchwork pattern would define the ongoing process of adaptive vegetation and habitat management. A refuge habitat should not be disturbed until the adjacent rehabilitated area can meet the same habitat needs, allowing wildlife or other species to migrate to the rehabilitated area. It is expected that rehabilitated areas can meet habitat needs within the first few years after rehabilitation, so the process of channel rehabilitation will be ongoing.

Hydraulic Considerations

The process of creating refuge habitats will result in a patchwork pattern of invasive species and sediment removal so each section of channel rehabilitation undertaken would be studied for specific hydraulic effects. As the invasive species and sediment removal process is planned, and the adaptive management program is developed, consideration would be made to create passageways for large volumes of water during times of high flows.

Existing and Alternative Sections of the Narrows Channel Rehabilitation



Existing Section: **34,700 cfs capacity**
n = 0.06 (Manning's Equation roughness)

Alternative Section: **52,000 cfs capacity**
n = 0.045 (Manning's Equation roughness)

Figure 266. Existing and Alternative Sections of the Narrows Channel Rehabilitation. Rehabbing the Narrows lowers the roughness coefficient while also improving habitat and biodiversity in the channel, which includes, but is not limited to, a wide array of bird, mammal, and insect species.

Adaptive Management

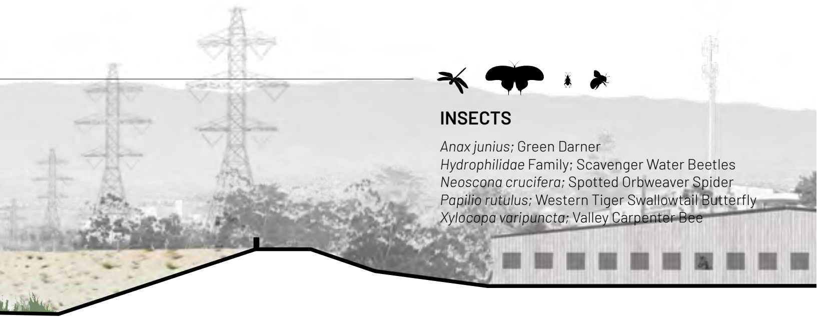
Ongoing observation and management of habitat areas should be continuously carried out over time by a team of specialized scientists, ecologists, plant specialists, and environmental engineers. Wildlife monitoring should begin prior to any channel rehabilitation work. Any changes observed can be compared to the initial baseline ecosystem function.

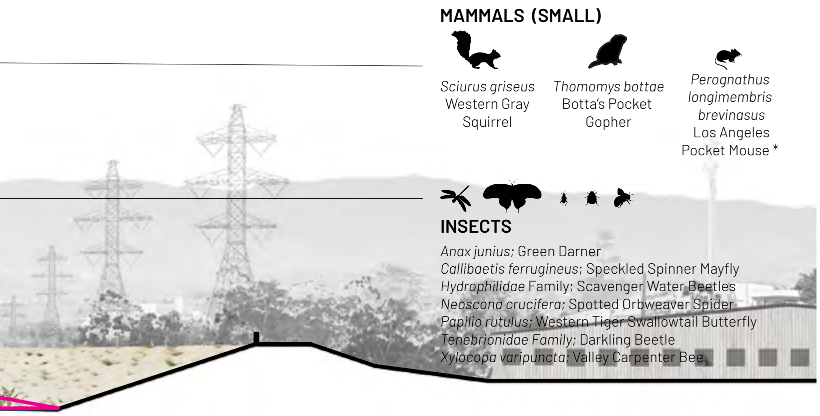
Monitoring of ecosystem function not only includes observations of keystone species but also includes allowances for the dynamic biological, geochemical, and physical processes that occur within the riparian habitat. Ecosystem functions such as nutrient cycling, providing connected shade, or filtering pollutants should be encouraged in the adaptive management work. This requires that a trained team of landscape maintenance workers engage in practices contrary to typical landscape maintenance. For example, organic matter and debris from native vegetation should not be cleared, and refuge habitat should be left undisturbed. As invasive species are removed, constant monitoring and maintenance is required to ensure that invasive species do not encroach into recently cleared areas.

Adaptive management practices should be flexible enough so that they can be adjusted over time as scientific observations are made and the ecosystems themselves change. Practices may also vary throughout different times of the year to best react to the varying conditions of the river.

Hydraulic performance should be monitored over time to determine which species have the greatest impact on the capacity of the channel.

SEVERAL OPTIONS WERE EXPLORED FOR THIS SECTION OF THE RIVER. FOR MORE DETAIL, SEE APPENDIX VOLUME II: TECHNICAL BACKUP DOCUMENT





PLANT COMMUNITIES

ALLUVIAL FAN SAGE SCRUB

SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST

PERENNIAL FRESHWATER EMERGENT WETLAND

Education and Engagement

The Narrows provides a unique opportunity in LA to study, learn, and experience native ecosystems if properly managed and maintained. Local schools as well as colleges and universities could benefit from learning about the adaptive management process, native plants, native wildlife, and hydraulics. School curriculum for nearby elementary or secondary schools could help provide much needed education on the importance of native ecosystem adaptive management, native plant communities, and native wildlife.

Local communities could also be engaged through wildlife monitoring programs that highlight specific native keystone species. Programs might include wildlife cameras, educational exhibits about the adaptive management process, or tours and nature walks.

Green Jobs/Local Jobs/Youth Internship Potential

The labor-intensive process of selective invasive species removal and adaptive management could provide a local jobs opportunity, job training for working with native plant systems, or a teen internship program for local high school students. Another opportunity would be the integration of native plant and ecosystem job training with criminal justice reform initiatives or jobs programs for persons experiencing homelessness.

Planning for workforce development is essential to this process as typical vegetation removal processes will not meet the needs of a nuanced program for invasive species and sediment removal along with strategic adaptive management.

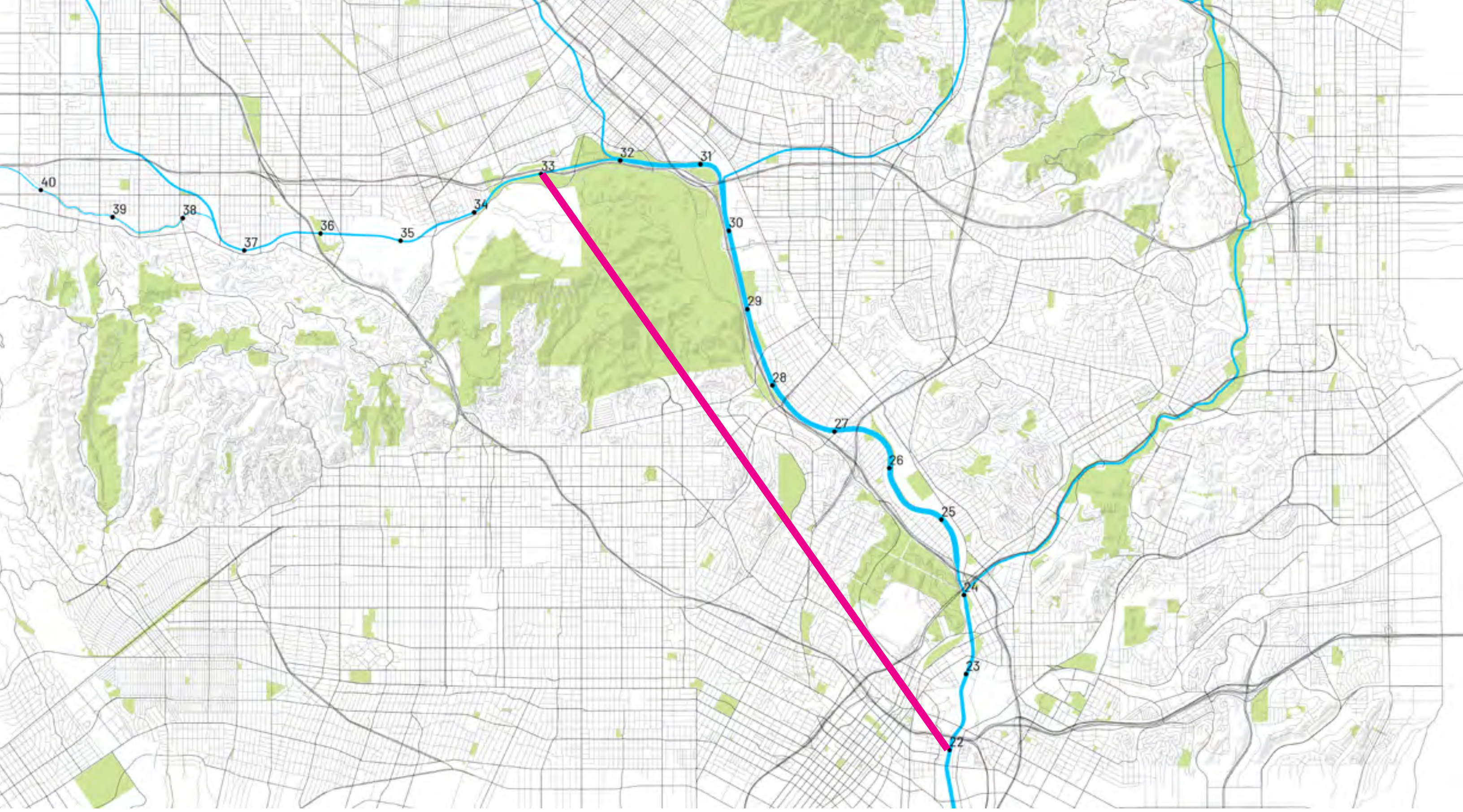


Figure 267. A bypass tunnel would divert water at river mile 33 and return it to the river at river mile 22.

BYPASS TUNNEL

Currently, the 10%, 4%, 2%, 1%, and 0.2% flood events are shown to cause varying levels of flooding along the Narrows. Channel rehabilitation in the Narrows to remove invasive species and replace with a range of native species including grasses and some riparian trees could lower the water surface elevation throughout the Narrows improving capacity. The 4% (25-year) flood event would generally not meet the freeboard requirements, but the flow would be largely contained within the riverbanks, except at a few locations. Addition of a bypass tunnel could further improve the capacity. For example, a large bypass tunnel, diverting water from the channel upstream of the Headworks property at river mile 33 and returning it back into the channel downstream of Piggyback Yard at river mile 22 could provide approximately 20,000 cfs of additional capacity. This could result in the 2% (50-year) flood event being largely contained within the riverbanks, although the freeboard requirements would not be met, and overtopping would be expected in some locations.

The bypass tunnel may enable the 1% (100-year) flood event conveyance goal in the Narrows to be achieved, but this would also require rehabilitation of the channel to add native grasses and modification of several bridges to clear span.

Size, Hydraulic Considerations, and Multi-Benefits

The concrete tunnel would be approximately 40 feet in diameter and nine miles long, with a 0.6% slope. The inlet may consist of a lateral weir on the existing channel approximately 1,000 feet long leading to a forebay and tunnel entrance. Additional hydraulic considerations for the inlet and outlet would have to be evaluated during design. This tunnel could provide some of the needed relief required during very large flood events while also providing much needed storage within the system, allowing for multiple benefits (i.e., water supply and water quality) to be accrued even during smaller storms. Multiple precedents for this type of intervention exist.

Figure 268. Excess rainfall and combined sewage overflow runs through a series of tunnels deep underneath Cook County in Illinois. The water discharges into large reservoirs where it is held until it can be treated and released back into the water system. Source: OLIN, 2019.

CASE STUDY - BYPASS TUNNEL

TUNNEL AND RESERVOIR PLAN CHICAGO, IL

The Tunnel and Reservoir Plan (TARP) is a large-scale engineering project that is designed to reduce flooding and combined sewer overflows in the Chicago River watershed. The regional plan was approved in 1972 and began construction in 1975. Currently, 109 miles of tunnels that are 30ft in diameter and 300 ft below ground have been constructed. The system of tunnels divert excess rainfall and combined stormwater and sewage from local waterways to large holding reservoirs, where it is held to be treated before being released back into the water system. This plan has reduced flooding throughout Cook County and has eliminated a large amount of pollutants being released directly into Lake Michigan during periods of heavy rainfall.[116]

Lessons Learned

- Large investment in engineering and design projects yielded extensive returns for cities and counties and was possible to complete
- Water quality improvements have brought waterside economic drivers and interest throughout the region.

BRIDGES IN THE NARROWS

The following is an overview of the hydraulic impacts of the bridges in the Narrows, assuming channel rehabilitation has been completed. The overview is generalized based on one-dimensional (1-D) hydraulic modeling using different values of hydraulic roughness to represent different levels of channel rehabilitation and a range of different flows. This screening level modeling identifies several bridges that should be prioritized for hydraulic retrofits. In these cases, any design modifications should always consider a bridge's historic significance. In addition to analyzing existing bridges, all new bridges should be assessed from a hydraulic perspective to make sure the 1% flood event level can be met.

Riverside Dr: The bridge deck is close to the top of the channel banks. The four bridge piers result in some backing up of the flow and a slightly raised water surface elevation (WSE). Retrofitting the bridge (e.g., raising and modifying to clear span) will only provide minimal hydraulic benefits due to the low channel capacity.

Interstate 5: The bridge deck is elevated above the channel banks. The two bridge piers result in some backing up of the flow and a slightly raised WSE. Retrofitting the bridge (e.g., modifying to clear span) will only provide minimal hydraulic benefits due to the low channel capacity.

Highway 134: The bridge deck is well elevated above the channel banks. The three sets of piers that span the confluence with Verdugo Wash do not appear to have a substantial impact on the hydraulics.

Colorado St: The bridge deck is close to the top of the channel banks. The two bridge piers result in some backing up of the flow and a slightly raised WSE. Retrofitting the bridge (e.g., raising and modifying to clear span) will only provide minimal hydraulic benefits due to the low channel capacity.

North Atwater Bridge: (Also known as LA Kretz Crossing) This multi-modal bridge was recently constructed and has one large pier within the river. This bridge was not modelled as part of this effort and is in a stretch of the river with generally deficient channel capacity. During design it was determined that 1.5 to 2.0 foot-high flood walls were required along the top of the levee, both upstream and downstream of the bridge, to increase local capacity.

Los Feliz Blvd: This bridge is high priority. See the "High Priority Bridges" section for more details.

Sunnynook Pedestrian Bridge: The deck of this pedestrian bridge is close to the top of the banks. The six bridge piers result in some backing up of the flow and a slightly raised WSE, and sometimes a hydraulic jump depending upon conditions. The bridge does generally meet the 1% event level, provided the Los Feliz bridge (upstream) and Glendale bridge (downstream) are both modified.

Fletcher Dr: This bridge is high priority. See the "High Priority Bridges" section for more details.

Glendale Blvd: This bridge is high priority. See the "High Priority Bridges" section for more details.

Highway 2: The bridge deck is well elevated above the channel bank elevations of the surrounding reaches. The four bridge piers result in some backing up of the flow and a slightly raised WSE. These local increases in WSE are generally contained within the levees within the vicinity of the bridge and as such retrofitting the bridge will only result in minimal improvements in hydraulics.

Taylor Yard Bicycle and Pedestrian Bridge: This pedestrian and bicycle bridge is currently under construction and will have one pier within the river. This bridge was not modeled. This stretch of the river may be able to meet the 1% event level, depending upon the level of rehabilitation.

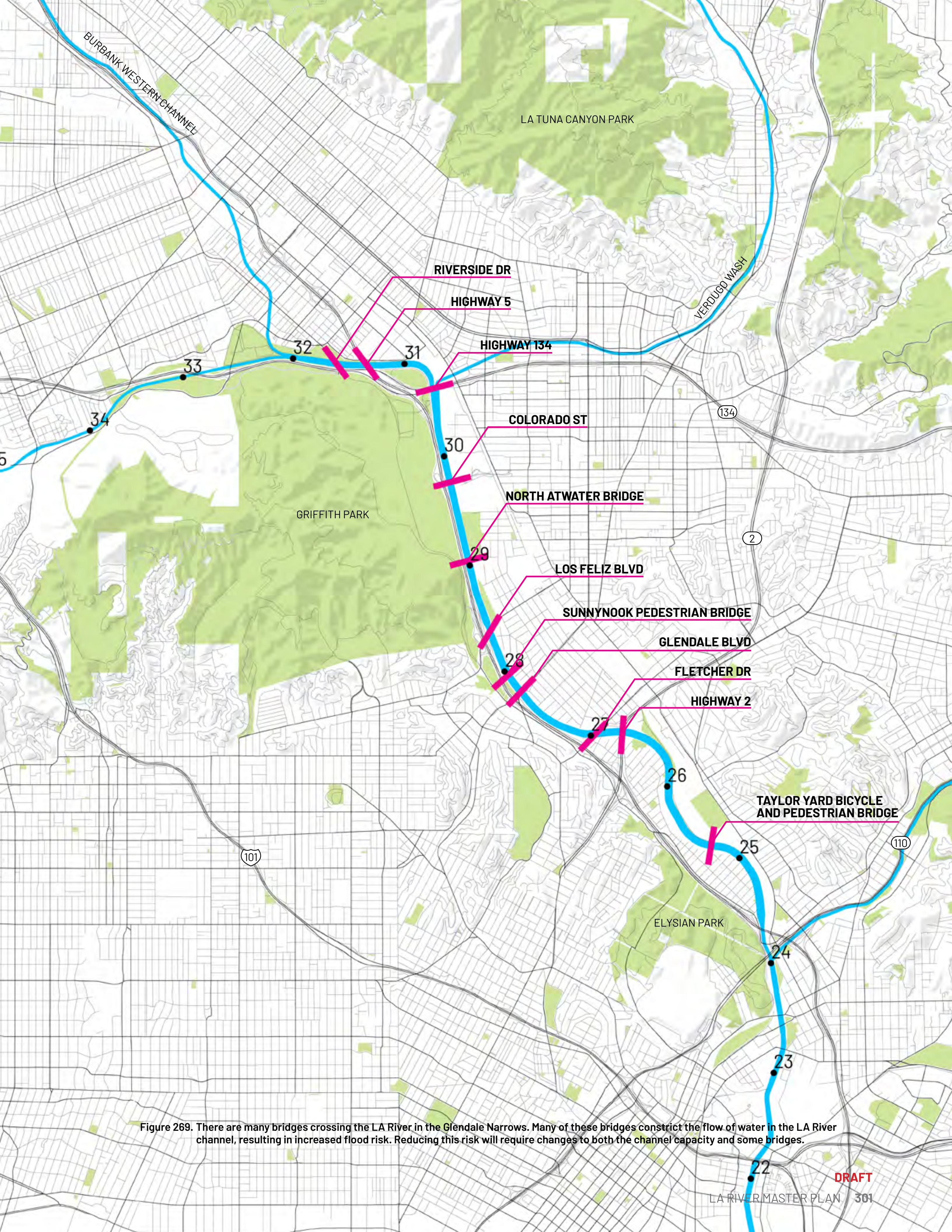


Figure 269. There are many bridges crossing the LA River in the Glendale Narrows. Many of these bridges constrict the flow of water in the LA River channel, resulting in increased flood risk. Reducing this risk will require changes to both the channel capacity and some bridges.

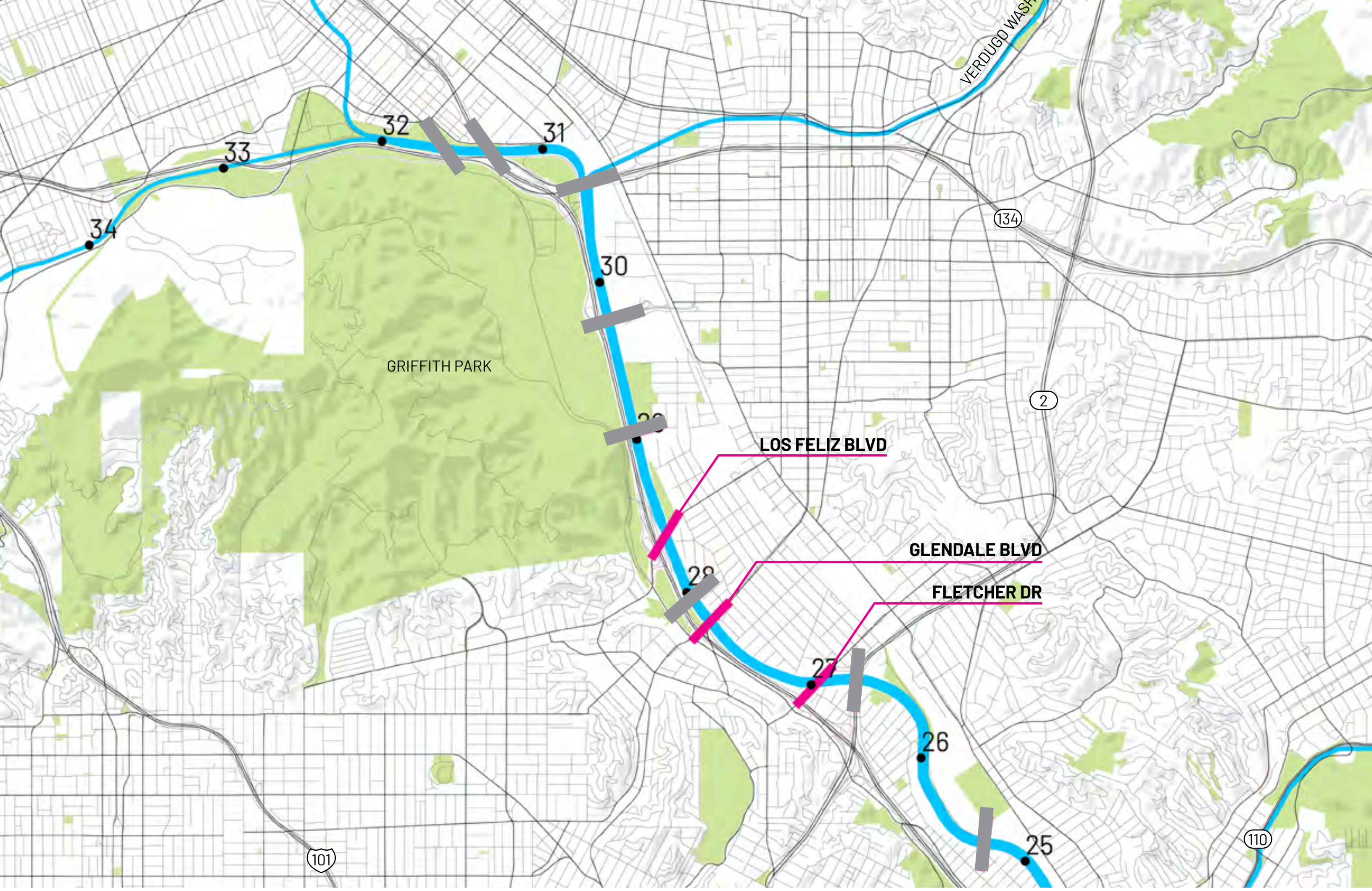


Figure 270. Three specific bridges that were analyzed in the Narrows were the Glendale Boulevard Bridge, Los Feliz Boulevard Bridge, and the Fletcher Drive Bridge.

BRIDGE EXAMPLES

Los Feliz Boulevard

The bridge deck sits low at the top of the banks and is supported by five long bridge piers/walls and is accompanied by a grade break (i.e., local steepening) that were designed to force shallow critical flow under the bridge. The 1-D modeling indicates that the bridge deck will be impacted and possibly overtopped during the 4% flood event, although additional analyses may be needed to confirm this. Modeling indicates that better than 1% flood event capacity can be achieved through modifying the bridge to be clear span, although channel capacity either side of the bridge may not be able to convey the 1% flood. For example, if the channel is rehabilitated with native riparian habitat including trees, then the channel upstream of Los Feliz Boulevard can only convey approximately the 4% flood event without meeting freeboard requirements. The benefit of the bridge modification would primarily be to protect the bridge infrastructure and reduce the flooding localized around the bridge.

The grade break at the bridge location results in locally shallow flow, and as such the bridge soffit (i.e., invert elevation of the bridge) may not need to be raised when modifying to clear span. However, clear span may require thicker deck girders thereby raising the elevation of the roadway.

THESE THREE BRIDGES IN THE NARROWS ARE ONES THAT SHOULD BE PRIORITIZED FOR HYDRAULIC RETROFITS

Glendale Boulevard

The bridge deck is slightly elevated above the top of the banks and is supported by five long bridge piers/walls that are also used to support the Red Car rail trolley and will soon support the new Red Car Pedestrian Bridge. The 1-D modeling indicates that the bridge causes the flow to back up and increase the WSE upstream of the bridge. This may cause the freeboard requirement to be exceeded during the 4% or 2% flood event, depending on the level of channel rehabilitation, and the banks to be overtopped during the 2% or 1% events. Modeling indicates that better than 1% event capacity may be achieved, depending on the level of channel rehabilitation, through modifying the bridge to be clear span. For example, if the channel is rehabilitated with native riparian habitat including trees, then the channel upstream of Glendale Boulevard will be able to convey the 4% flood event, including freeboard requirements, and likely convey the 2% flood event while not meeting freeboard requirements.

The bridge soffit (i.e., invert elevation of the bridge) does not need to be raised when modifying to clear span. However, clear span may require thicker deck girders thereby raising the elevation of the roadway.

Fletcher Drive

The bridge deck is elevated above the top of the banks and is supported by six bridge piers. The 1-D modeling indicates that the bridge causes the flow to back up and increase the WSE upstream of the bridge. This may cause the banks to be overtopped during the 4% or 2% flood event, depending on the level of channel rehabilitation. Modeling indicates that better than 1% flood event capacity may be achieved, depending on the level of channel rehabilitation, through modifying the bridge to be clear span. For example, if the channel is rehabilitated with native riparian habitat including trees, then the channel upstream of Fletcher Drive will be able to convey the 4% flood event and be close to meeting freeboard requirements, and likely convey the 2% flood event while not meeting freeboard requirements.

The clear span may require thicker deck girders, but these are likely able to be accommodated without changes in road elevation through utilizing the vertical space that exists between the bottom of the current bridge deck and the top of banks.

LA COUNTY RESIDENTS AT RISK IN FLOOD EVENTS

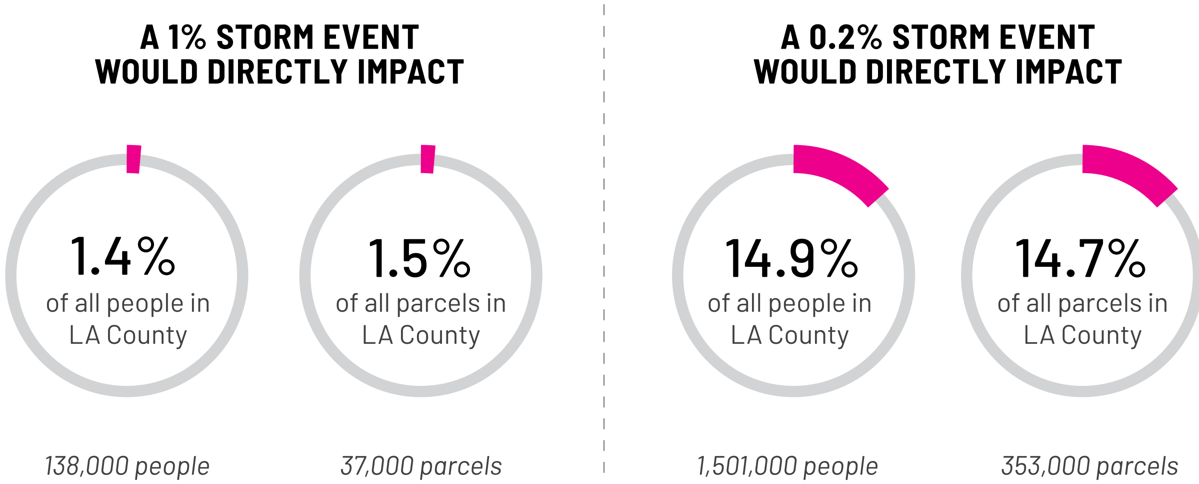


Figure 271. Understanding who is at risk in the event of a major storm event is paramount to building resilience. Within LA County, there are nearly ten times as many people living in the 0.2% (500-year) floodplain as the 1% (100-year) floodplain. Sources: US Census Bureau, 2016 American Community Survey 5-Year Estimates, 2016; US Census Bureau, California Block Groups, 2016; LA County GIS Data Portal, Assessor Parcels, 2016.

FLOODPLAIN-BASED STRATEGIES FOR RESILIENCE

The Master Plan includes nine goals that are based on local and regional needs. One of the goals is to "Reduce flood risk and improve resiliency." Within this goal, several actions and methods outline key steps to help meet this goal, such as increase flood capacity, reduce peak flows, use the latest climate research, improve emergency preparedness, increase public awareness, improve facility operations and maintenance, and implement consistent floodplain management practices. The goals should be considered in concert to develop multi-benefit projects and integrated infrastructure solutions. True resilience can best be achieved when water, environmental, and social priorities are balanced.

In addition to consideration of the 1% event (100-year) discussed in the previous section, populations are at risk in the 0.2% floodplain (500-year) as well. Further, the population of LA County is projected to increase by over 10% by 2050,[109] sea level rise is expected to claim industrial and recreation lands at the periphery, and climate change is leading to more intense storms and a hotter, drier climate. These factors are expected to stress an already at-capacity system, and land development pressures and population densification could make it more difficult in the coming decades to secure space for strategic adaptation of the integrated water systems across LA County. To continue the development of the goals, actions, and methods of the Master Plan in light of these shifting needs, this section outlines key strategies for LA River floodplain resilience and strategic adaptation, including possible strategies for building resilience in advance of, and also in the aftermath of, flood disasters.

UNDERSTANDING WHO IS AT RISK

People living within floodplains are at risk of being directly impacted by flood events. Population analysis of the floodplains indicates that many of the at-risk populations within the LA River watershed are generally poorer and more rent-burdened than the average LA County resident, particularly in the 0.2% floodplain. Unfortunately, this reveals that those most at risk of experiencing a flood event are also the least likely to have the resources to overcome significant disturbances due to flooding.

MEAN HOUSEHOLD INCOME WITHIN THE 1% AND 0.2% FLOODPLAINS

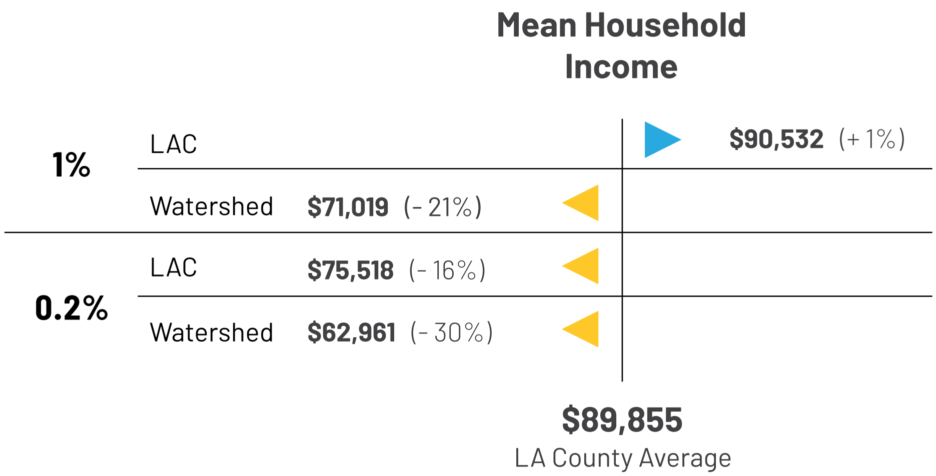


Figure 272. Mean Household Income within the 1% and 0.2% Floodplains. Compared to LA County averages, those living within the floodplains tend to have lower mean household income. This analysis compares demographics across floodplains as well as across geographic boundaries including the LA River watershed ("Watershed") and LA County ("LAC") in its entirety. Sources: US Census Bureau, 2016 American Community Survey 5-Year Estimates, 2016; US Census Bureau, California Block Groups, 2016; LA County GIS Data Portal, Assessor Parcels, 2016.

Within LA County, the 0.2% floodplain is only about 2.5X as large as the 1% floodplain, yet the magnitude of its effects is far greater in terms of the number of people and parcels that could be impacted by a flood. In the 1% floodplain, one-fifth of all land is residential, and there are approximately 37,000 parcels and 138,000 people at risk. These numbers increase tenfold for the 0.2% floodplain, where 30% of land is residential, and over 1.5 million people and over 350,000 parcels could be affected by a flood event. In relation to the population of LA County at large, this amounts to 1.4% at risk in the 1% floodplain and 14.9% at risk in the 0.2% floodplain.

There are a few demographic trends that generally hold true for both the 1% and 0.2% floodplains. Compared to LA County averages, those living within these floodplains are more often homeowners than renters, have much lower mean household incomes, and face financial burdens related to housing. Such is the case for approximately one in five homeowners. Among renters, approximately one in three households in these floodplains spends more than half of its income on rent. For comparison, in LA County, the average number of severely rent-burdened households is one in four. LA County is already facing an ongoing housing crisis characterized by widespread displacement risk and gentrification. Within the LA River floodplains, a severe storm event could further exacerbate these issues.

A 0.2% FLOOD WOULD IMPACT 720 MILES OF EVACUATION ROUTES, 519 MILES OF TRANSMISSION LINES, 159 MILES OF HIGHWAY, AND 94 MILES OF RAILWAY

RESILIENCE FRAMEWORK

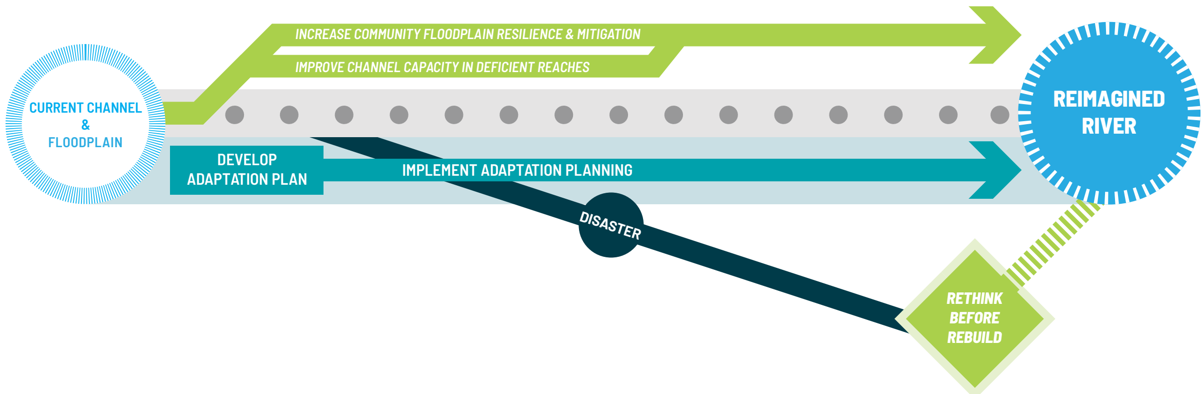


Figure 273. Resilience framework for flood risk reduction and long term adaptation.

TAKING ACTION TOWARD RESILIENCY

Floodplain-based strategies should focus on improving community and critical infrastructure resiliency in the 1% floodplains where the current channel is not capable of carrying the 1% flood event and should be considered in the 0.2% floodplains along the entire river. There are several strategies that can be used separately or in combination to increase flood resiliency including strategic adaptation within the floodplains, resiliency measures for critical infrastructure, and emergency action planning. These strategies should be assessed on a local and regional basis, while also considering system-wide flood risk reduction.

Strategic Adaptation

The global environment is experiencing changes in climate patterns in ways that were not anticipated by the original designers and engineers of our water management systems. Patterns in rainfall intensity and duration have drastically increased the likelihood of stormwater runoff exceeding existing flood management capacities, potentially resulting in flooding. Although there is still much uncertainty, current climate change modeling for LA County indicates that the historical 1% (100-year) storm event may be more frequent, with a 1.5% probability of occurring annually (67-year).[110] Increased flooding and predicted sea level rise could further increase flood risk where our channels meet the ocean. While uncertainty and disasters have occurred historically, the climate has become much more volatile, and the need to adapt is clear. The LA River, which was originally engineered in the early- to mid-20th-century prior to the appreciation of multi-benefit risk reduction strategies, operates in much the same way it did when first constructed nearly a century ago. Over the next century, as watersheds continue to be impacted by catastrophic storm events and sea level rise, strategic adaptation of the system will be required to meet these future challenges.

Each segment of the LA River presents unique constraints and opportunities. Therefore, there is not a single 51-mile solution for the entire river. Strategic adaptation for the LA River involves a proactive understanding of current and future conditions to plan and design now for changes that are expected to occur in the future. Strategic adaptation is a critical component in developing floodplain, community, and infrastructure resiliency.

One of the challenges of addressing climate change for planning and design of the river and its watershed and floodplains is the uncertainty in the magnitude and timing of impacts. This uncertainty makes adaptive approaches imperative to allow for changes in conditions without the often-unmanageable costs associated with designing for the worst-case scenarios. The watershed and floodplains are impacted by catastrophic storm events, effects of sea level rise, and intensive development patterns in which the density and extent of settlements transform the surface of the land. Not all potential scenarios can be mitigated now, so plans and designs seek to lessen these impacts and provide the ability to adapt. Planning infrastructure features to increase capacity, while also identifying locations to leave space for unknown future changes, is a vital strategy.

Strategic adaptation requires a shift in thinking among planners, engineers, and political leaders, as well as in public education. It is a way of making choices to address a changing landscape, to make predictions and prepare for future challenges while continuously reevaluating.

With an eye to the future, strategic adaptation would also work in tandem with existing measures established within LA County. For example, the National Flood Insurance Program (NFIP) was created by the Federal Emergency Management Agency (FEMA) to reduce loss of life and property and meet the rising costs of disaster relief due to flooding. The program is voluntary based on a mutual agreement between the federal government and the local community. LA County entered the NFIP in 1980. Participation in the program makes flood insurance available to LA County unincorporated area residents and allows them to obtain direct federal relief loans following federally declared flood disasters.

LA County has an ongoing Floodplain Management Program, which includes mapping of flood hazard areas, adopting associated ordinances, and regulating and enforcing safe building practices. It is the combination of these activities that promote flood management to our community and maintain LA County's eligibility to participate in the NFIP.

Rethink Before Rebuild

Some of the best ideas for resilience are born from disaster that has already occurred. Precedents on the following pages explore a handful of lessons gleaned from major flood events that have occurred throughout the United States in recent years. However, one key lesson stands out: rebuilding without rethinking will simply result in a repeated history. With changing climate and precipitation patterns leading to more frequent flood events, simply rebuilding in the same manner repeats an endless and costly cycle of rebuild, destruction, and rebuild again. Current insurance norms also may need to be rethought to help prevent rebuilding to the same standards as before, allowing for more innovative thinking before reconstruction begins. Recent studies by the National Institute of Building Sciences show that every $1 spent on mitigation saves $6 on future disaster losses[111] with the greatest benefits realized for riverine flooding disasters. Rethinking involves a shift from reactive to proactive. Recovery begins long before a disaster. Dollars spent in advance of disasters can result in significant cost savings post-disaster and accelerated recovery time.

Extreme environmental events or disasters cause disruption but also provide an opportunity to better understand risk, allowing preparation of better approaches to respond and recover more quickly in the future. Post-disaster conditions allow actions to be taken that would be more difficult and likely not possible otherwise, such as daylighting storm drains, adjusting levees, rebuilding bridges higher or with fewer piers, or rebuilding structures within the floodplains at a higher elevation. Rather than just rebuilding, periods of recovery provide the opportunity to adapt and improve resiliency, reducing damage and recovery times following future events, while also helping meet other regional needs for healthy connected ecosystems, parks, and cleaner water.

Figure 274. Superstorm Sandy. Source: R. Jolliffe, https://flic.kr/p/dpcGmB.

LESSONS LEARNED

Different types of storms and flood events teach different lessons. The scale of the storm, the nature of flooding, the communities and infrastructure impacted, the emergency response, and the rebuilding and adaptation following each event provide insight into better preparedness and approaches for the future. While the climates and contexts of these precedents are not directly the same as the LA River watershed and floodplain, they still demonstrate that unforeseen risks and changes in climate patterns unfortunately result in serious impacts to people, infrastructure, and ecology. As storms rise from unique conditions and pose unique threats, it is not possible to mitigate all risk for every storm. However, by founding mitigation on adaptive, imaginative strategies and by addressing the topic of recovery early—long before a disaster even occurs—responses to disasters like floods can become far more effective.

HURRICANE HARVEY - TEXAS (2017)

After making landfall as a Category 4 hurricane in August 2018, Harvey's movement slowed significantly. Over the course of four days, Harris County and the City of Houston received a record-breaking amount of rainfall totaling 26 to 47 inches. Water released from reservoirs prevented dam failure but further contributed to flooding, especially in Buffalo Bayou.

KEY TAKEAWAYS

- Storm duration is just as important as magnitude when stormwater infrastructure is overwhelmed.
- Engineered and nature-based solutions are equally valuable but must be designed in tandem and scaled appropriately.
- Communication and community awareness of risk must be improved; it is imperative that residents living within a floodplain are aware of the risks.

Figure 275. Hurricane Harvey. Source: https://commons.wikimedia.org/wiki/File:Texas_Army_National_Guard_Hurricane_Harvey_Response.jpg#filelinks.

MONTECITO MUDSLIDES - CALIFORNIA (2018)

A month after wildfires near the coastal town of Montecito had destabilized soils, heavy rainfall carried mud, large boulders, tree branches, and sediment flows from the nearby Santa Ynez Mountains to the coast. Local reservoir releases further overwhelmed the flood management system. Approximately 30,000 people were evacuated, 150 people were hospitalized, and 23 people were killed.

KEY TAKEAWAYS

- Resilient systems prepare for isolated as well as combined threats.
- A USGS assessment conducted after the wildfires estimated debris flows in response to a design storm, yet the storm that occurred was far more severe. Planning for a range of storm intensities and impacts establishes a helpful range of responses.
- Preparation and evacuation communications that are tailored for specific communities based on the degree and type of threat may more effectively initiate responses than widespread warnings and advisories.

Figure 276. Montecito Mudslides. Source: LAFD, https://www.flickr.com/photos/90807129@N00/33993658048.

OROVILLE DAM - CALIFORNIA (2017)

In late 2016-early 2017, atmospheric rivers carried vast quantities of rainfall to California. The Oroville Dam received an entire year's average runoff in two months. Further rainfall taxed the system, requiring use of an unlined emergency spillway that began to erode the hillside. Emergency managers proactively evacuated 180,000 people living in downstream communities in case of a dam breach or residual threats.

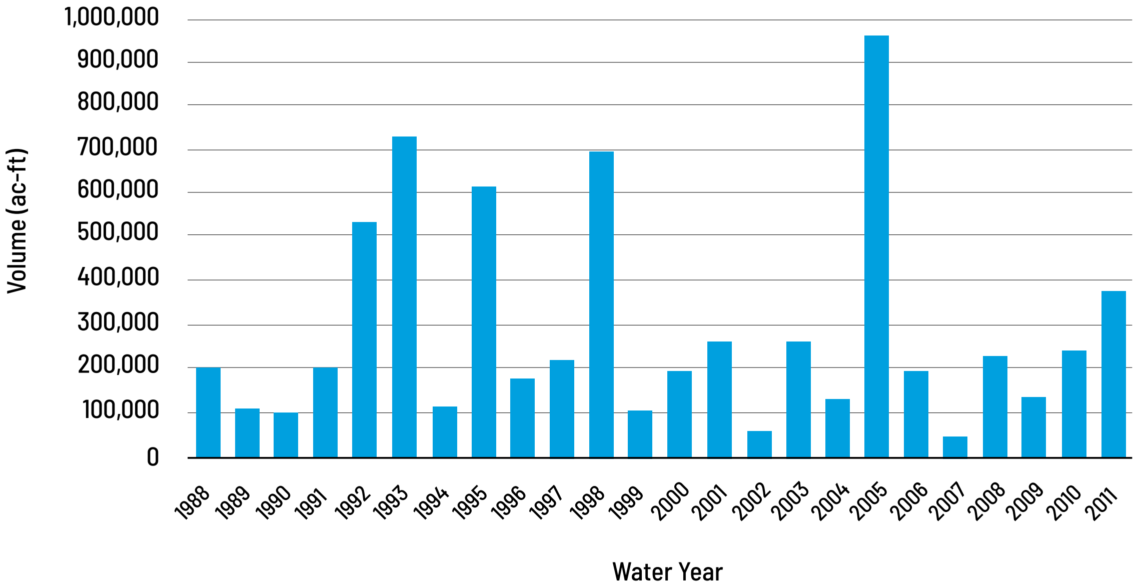
KEY TAKEAWAYS

- Improved climate and operations models will help predict disasters before they occur.
- Periodically updating inundation mapping and contact lists of those within the floodplains and having pre-scripted notifications is crucial to assist in emergency response and notification and allow emergency managers to fast-track emergency decision-making processes that save lives.
- Improved understanding of the failure mechanisms of flood risk infrastructure will allow operations and maintenance routines to focus where the risk is greatest.

Figure 277. Oroville Dam. Source: https://www.caloes.ca.gov/ICESite/Pages/Oroville-Spillway-Incident.aspx.

DRAFT

AVERAGE WET WEATHER VOLUMES AT THE MOUTH OF THE LA RIVER



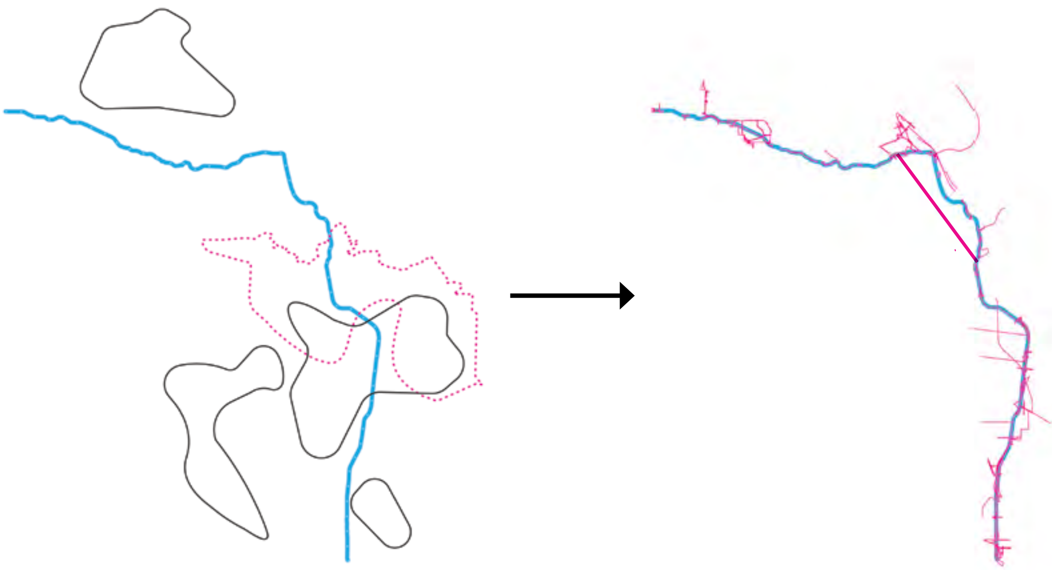
Note: Flow volumes are calculated from LA County Watershed Model. Comparison of modeled flow volumes with USGS gage 11103000 at LA River above Long Beach for the period of available overlapping record (WY1989 - WY1992) indicates modeled annual flow volumes are typically within approximately 1% of measured annual flow volumes (LACDPW, 2010, Figure 84).

Figure 278. Wet weather flow is a certain but highly inconsistent supply source with annual volumes ranging from 50,000 acre feet to nearly 1,000,000 acre feet depending on annual rainfall totals. Source: LACDPW, 2010, LA County Watershed Model Configuration and Calibration—Part I: Hydrology, LADWP, 2015, Stormwater Capture Master Plan, August 2015. Prepared by Geosyntec.

REGIONAL GROUNDWATER RECHARGE

Local water supply reliability is critical to our regional sustainability. The LA River carries water and discharges it to the Pacific Ocean 365 days a year. LA River dry weather flow is a consistent supply source, however, there is uncertainty in its future. In 2020, more than 50,000 acre-feet per year (AFY) of dry weather flow is discharged through the river and into the ocean in Long Beach. Although planning and analyses are underway, it is conservatively estimated that up to 10,000 AFY of dry weather flow can be diverted at one or multiple site locations along the LA River and conveyed for treatment for groundwater recharge or local reuse. Limited beneficial uses have been identified in the river downstream of Downtown LA (RM 24) and, therefore, some level of diversions downstream of river mile 24 potentially cause little to no harm to areas downstream. As well, diversion of dry weather flows prior to the estuary portion would have a beneficial impact on estuary resources as the continuous input of fresh water has diluted the brackish water upon which estuarine species rely for various life stages.

Wet weather flow is a certain but highly inconsistent supply source. Annual wet weather volumes range from 50,000 AF in the driest years to nearly 1,000,000 AF in the wettest years.



RECHARGE OPPORTUNITY AREAS

PROJECTS ALONG THE LA RIVER CAPTURE AND STORE WATER

Figure 279. Recharge opportunity areas are places where water can percolate into the groundwater table. Proposed projects sites and planned major projects (right) can bolster existing recharge opportunity areas (left) in the capture and storage of water through wet and dry seasons. Source: Geosyntec, OLIN, based on Groundwater Basin Boundaries, California Department of Water Resources, 2015.

The temporal variability in rainfall poses some challenges. However, technical solutions exist that can create an efficient process for capturing, diverting, storing, treating, and ultimately recharging our local groundwater aquifers with stormwater. Where possible in the watersheds and along the tributaries, water should be captured and allowed to percolate into the groundwater table. However, once flows reach the mainstem of the LA River, the opportunities for infiltration are mostly lost unless water can be safely diverted from the channel for potential recharge or reuse. Operating a water treatment facility to treat fluctuating flows from sporadic rainfall events can be technically challenging. Figure 280 depicts various scenarios of diversion rates from the LA River with and without temporary storage. It has been estimated that without storage, yields upwards of 30,000 AFY of treated water is available for groundwater recharge. These yields increase significantly with the implementation of centralized and distributed storage projects upstream along the river and in the watershed. Over time, if approximately 5,000 acre-feet of active storage can be developed through upstream surface projects (reoperation of Sepulveda Basin, implementation of river parks, tunnels, detention basins, etc) estimated capture volumes could yield nearly 50,000 AFY of treated water.

WET WEATHER CAPTURE RATES WITH ACTIVE STORAGE

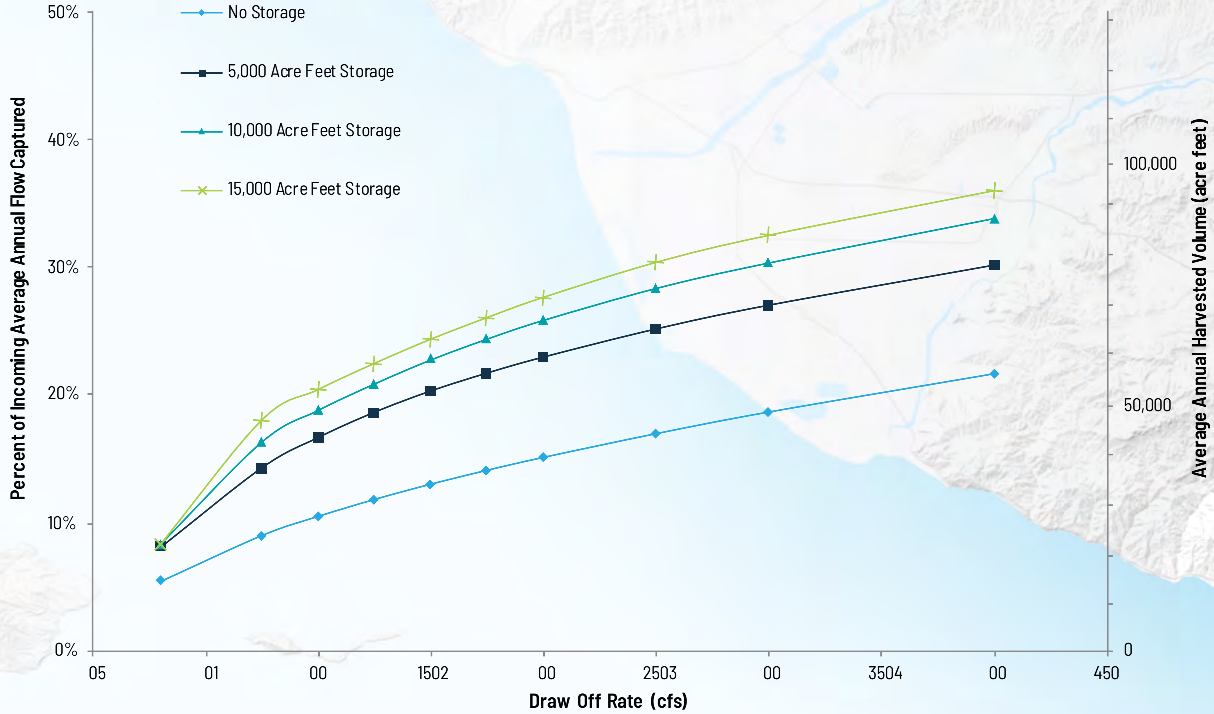


Figure 280. With storage and variable diversion rates, the LA River can reliably provide upwards of 50,000 acre-feet per year of treated water for groundwater recharge.

In the San Fernando Basin, the City of LA Department of Water and Power, LA County Flood Control District, and LA County Public Works are cooperating to increase capture of stormwater for groundwater recharge through projects such as the Tujunga Spreading Grounds Enhancement Project. In the Central and West Coast Basins, continued pressure on imported water may increase pumping in the basins, leading to new needs for recharge. At the Los Angeles and Montebello Forebays, permeable soils are exposed at ground surface allowing groundwater to percolate into the aquifer. Additionally, many areas of the basin may be suitable for recharge via injection wells.

A regional water recharge system concept could include upstream storage using infrastructure and park spaces, a diversion facility downstream of Downtown LA, treatment facilities, a groundwater injection wellfield, and a discharge facility to manage brine from the treatment process. It is envisioned that the brine could be sent directly to the sanitary sewer, yet studies show that there is potential for the brine to be released back into the river to improve habitat conditions in the estuarine reaches of the river below river mile 9.

Figure 281. Groundwater Storage Opportunities. Combining the proposed project sites and planned major projects helps create a stormwater capture and storage system along the river. The black outlines show areas with promising recharge opportunities. Source: Geosyntec, OLIN, 2019.

OPPORTUNITIES FOR AFFORDABLE AND PERMANENT SUPPORTIVE HOUSING

AFFORDABLE AND PERMANENT SUPPORTIVE HOUSING LAND BANKING

Studies of comparable projects to those envisioned in the LA River Master Plan have shown that improvements to the public realm are often accompanied by adjacent increases in land and housing prices. This can potentially increase the risk of displacement of existing residents and can change the composition of communities.

One way that the county can gain the benefits of an improved river corridor while retaining the composition of existing communities is to proactively create more permanently affordable housing along the river – either by preserving existing lower cost housing or by building new affordable housing before improvements to the river are made. Locations of new permanently affordable housing should take into account flood risk, air quality, and other environmental conditions. A clear lesson from other communities is that once parks and other improvements are completed it becomes very difficult to secure sites for affordable housing – both because prices rise dramatically and because competition for these sites increases. In Atlanta,

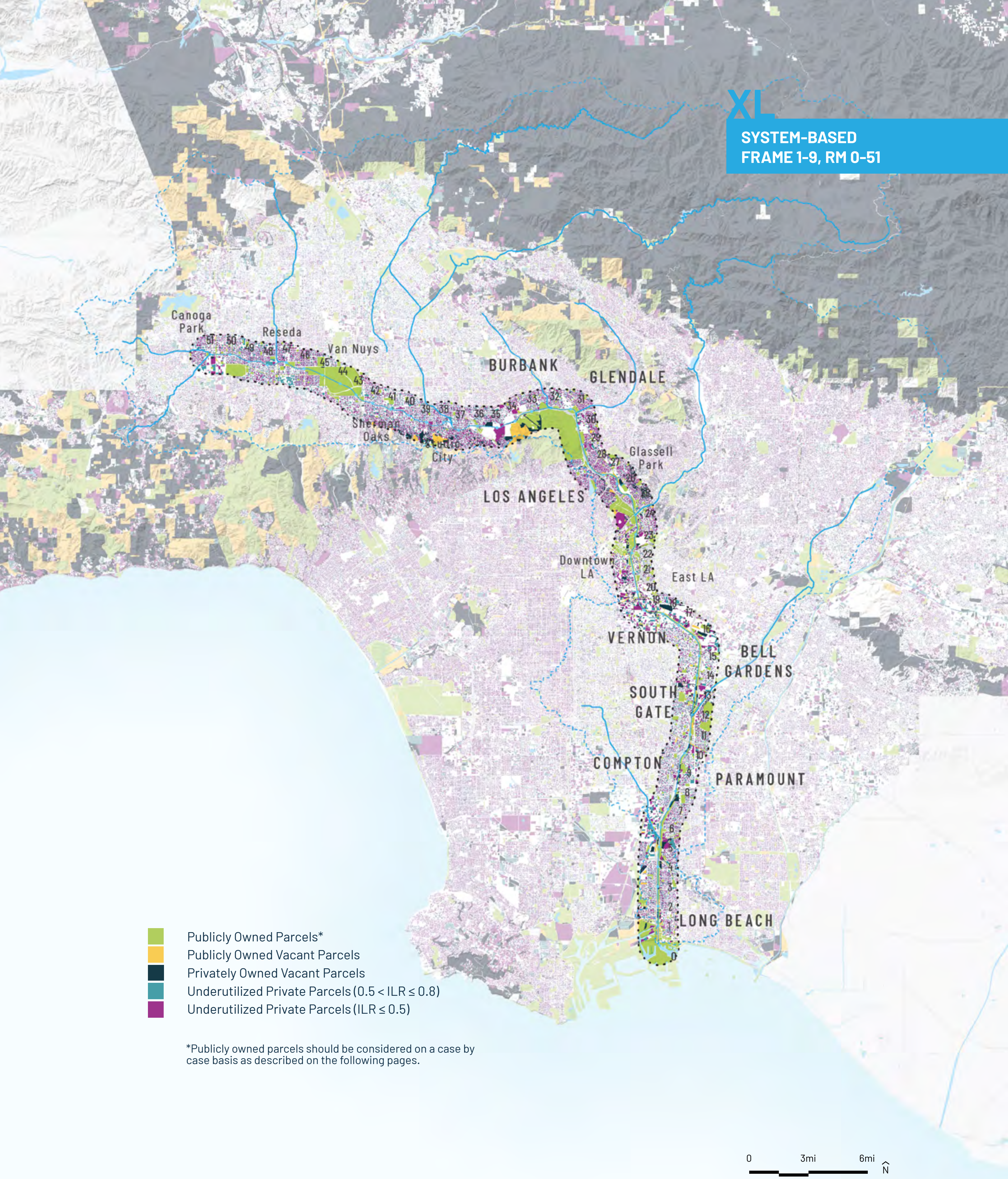


Figure 282. Opportunities for Affordable and Permanent Supportive Housing. Land that presents potential opportunities for future affordable and permanent supportive housing includes publicly owned parcels, vacant parcels, and underutilized parcels. Underutilized parcels are those where the value of improvements on the property are less than the value of the land itself, as measured by an improvement to land value ratio (ILR). Such properties are generally more likely to be redeveloped. Source: OLIN, 2019.

DRAFT

A LAND BANK IS AN ORGANIZATION FORMED TO TEMPORARILY HOLD LAND FOR FUTURE REDEVELOPMENT

Chicago, and Austin, researchers found property values increasing most rapidly in the years before improvements were constructed.

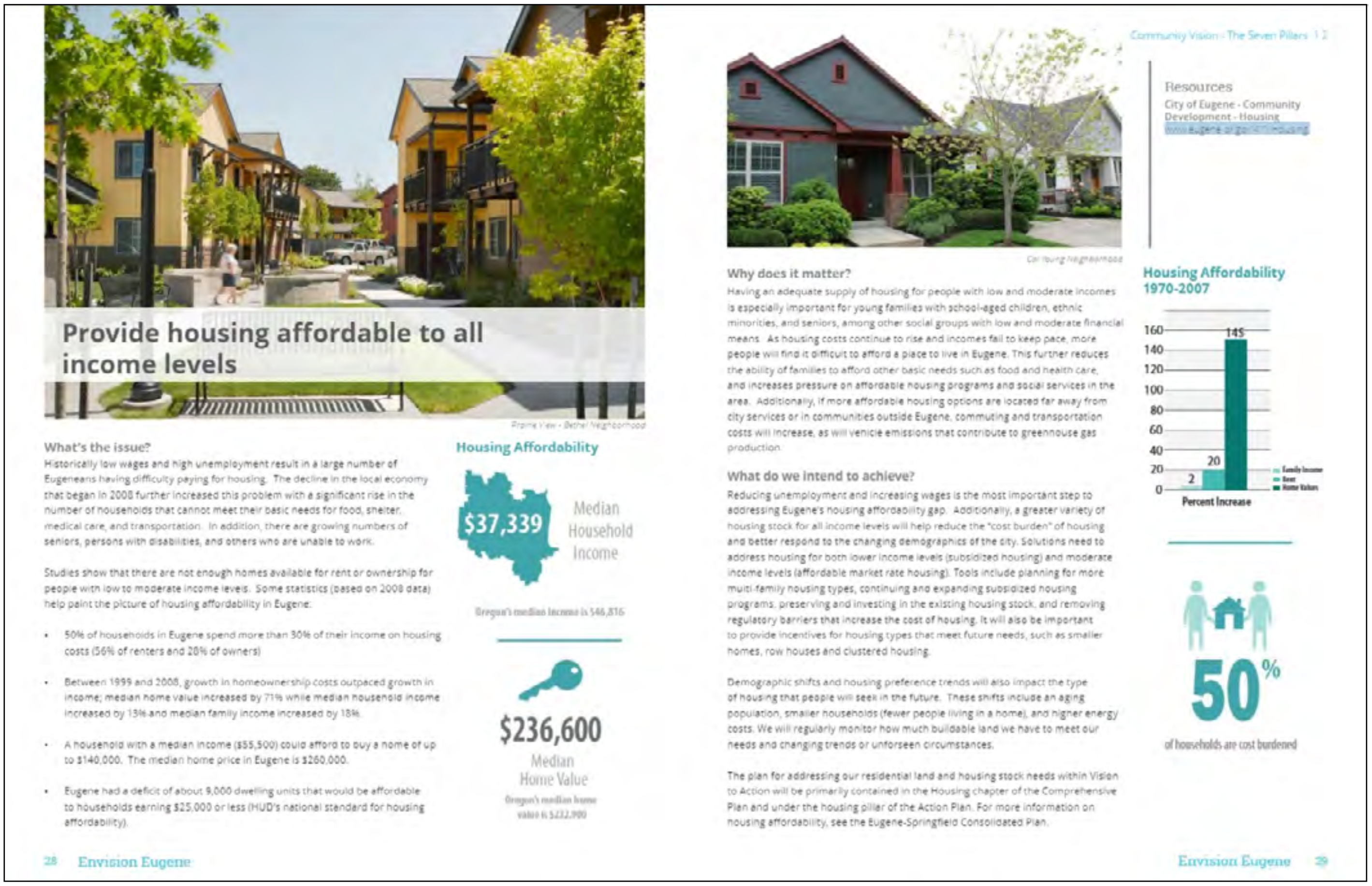
The LA River Master Plan calls for the creation of a land bank or similar entity to purchase land along the river while it is still inexpensive and hold it for eventual sale or lease to developers of affordable housing.

Funding for preserving or building affordable housing and permanent supportive housing is limited. Even if LA County were to earmark a share of its annual affordable housing funding for river-adjacent projects, it would only cover a handful of projects each year. Over time, rising land values along the river could make it more difficult to find and fund projects. An investment today in land banking, on the other hand, could create a pipeline of sites ready for future affordable housing when funding becomes available.

A land bank is an organization formed to temporarily hold land for future redevelopment. Most land banks are quasi-public agencies formed by one or more local government agencies. Some are independent, nonprofit agencies funded by local governments. In communities with a surplus of land, land banks generally receive and hold tax delinquent properties and use public financing to acquire vacant properties. They then hold the properties while working toward eventual redevelopment or sale. Generally, a land bank pays no property tax on land it holds. Some land banks are passive stewards of land that will eventually be sold, while others play a very active role in identifying future uses, engaging communities in planning for reuse, and putting together development deals for sites they hold.

There are over 179 land banks in the United States. Many were formed in postindustrial communities to activate vacant and abandoned properties. But a growing number of communities are now using land banks to reserve land for affordable and supportive housing.

Many land banks have played some role in redeveloping sites for use as affordable housing, but a number of land banks have been formed specifically for that purpose.


Provide housing affordable to all income levels

Prairie View - Bethel Neighborhood

What's the issue?

Historically low wages and high unemployment result in a large number of Eugeneans having difficulty paying for housing. The decline in the local economy that began in 2008 further increased this problem with a significant rise in the number of households that cannot meet their basic needs for food, shelter, medical care, and transportation. In addition, there are growing numbers of seniors, persons with disabilities, and others who are unable to work.

Studies show that there are not enough homes available for rent or ownership for people with low to moderate income levels. Some statistics (based on 2008 data) help paint the picture of housing affordability in Eugene:

- 50% of households in Eugene spend more than 30% of their income on housing costs (56% of renters and 28% of owners)
- Between 1999 and 2008, growth in homeownership costs outpaced growth in income; median home value increased by 71% while median household income increased by 13% and median family income increased by 18%.
- A household with a median income ($55,500) could afford to buy a home of up to $140,000. The median home price in Eugene is $260,000.
- Eugene had a deficit of about 9,000 dwelling units that would be affordable to households earning $25,000 or less (HUD's national standard for housing affordability).

Housing Affordability

$37,339 Median Household Income

Oregon's median income is $46,816

$236,600 Median Home Value

Oregon's median home value is $232,900

Why does it matter?

Having an adequate supply of housing for people with low and moderate incomes is especially important for young families with school-aged children, ethnic minorities, and seniors, among other social groups with low and moderate financial means. As housing costs continue to rise and incomes fail to keep pace, more people will find it difficult to afford a place to live in Eugene. This further reduces the ability of families to afford other basic needs such as food and health care, and increases pressure on affordable housing programs and social services in the area. Additionally, if more affordable housing options are located far away from city services or in communities outside Eugene, commuting and transportation costs will increase, as will vehicle emissions that contribute to greenhouse gas production.

What do we intend to achieve?

Reducing unemployment and increasing wages is the most important step to addressing Eugene's housing affordability gap. Additionally, a greater variety of housing stock for all income levels will help reduce the "cost burden" of housing and better respond to the changing demographics of the city. Solutions need to address housing for both lower income levels (subsidized housing) and moderate income levels (affordable market rate housing). Tools include planning for more multi-family housing types, continuing and expanding subsidized housing programs, preserving and investing in the existing housing stock, and removing regulatory barriers that increase the cost of housing. It will also be important to provide incentives for housing types that meet future needs, such as smaller homes, row houses and clustered housing.

Demographic shifts and housing preference trends will also impact the type of housing that people will seek in the future. These shifts include an aging population, smaller households (fewer people living in a home), and higher energy costs. We will regularly monitor how much buildable land we have to meet our needs and changing trends or unforseen circumstances.

The plan for addressing our residential land and housing stock needs within Vision to Action will be primarily contained in the Housing chapter of the Comprehensive Plan and under the housing pillar of the Action Plan. For more information on housing affordability, see the Eugene-Springfield Consolidated Plan.

Community Vision - The Seven Pillars

Resources

City of Eugene - Community Development - Housing

Housing Affordability 1970-2007

50% of households are cost burdened

28 Envision Eugene

Envision Eugene 29

Figure 283. The Land Aquisition for Affordable Housing program uses city financing to purchase targeted sites. Once sites are acquired, the program evaluated development proposals from affordable housing developers. Source: Envision Eugene, https://www.eugene-or.gov/760/Envision-Eugene.

CASE STUDY - AFFORDABLE HOUSING

AFFORDABLE HOUSING EUGENE, OR

In Eugene, Oregon, the city set up the Land Acquisition for Affordable Housing program to increase the supply of sites for affordable housing development.

Eugene found that their nonprofit housing development partners were disproportionately proposing projects in lower cost parts of town, in part because they could not obtain sites in higher cost neighborhoods. The land bank provides staffing for proactive site search and selection including engaging with communities to identify appropriate locations in all neighborhoods. The program uses city financing to purchase targeted sites. Once the land bank controls a site, it solicits and evaluates development proposals from affordable housing developers. Selected developers have an opportunity to purchase the site and gain access to housing subsidies through the city's existing programs. The goal is to create a steady pipeline of affordable housing in high opportunity locations throughout the city.

LAND BANKING METHODOLOGY

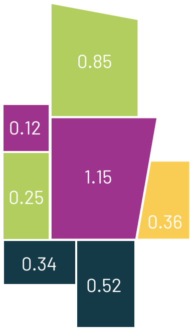
CONSIDERATIONS FOR SITING AFFORDABLE HOUSING

HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	NOT PRIORITY
• Include publicly- and privately-owned parcels • Parcels where improvement values are low compared to land values • Close proximity to public resources, major streets, public transit, future development • Low flood risk	• Parcels where improvement values are low or very low compared to land values • May necessitate environmental remediation but close to points of interest • Periphery of medium- to high-density residential neighborhood • Not currently zoned for redevelopment	• Parcels where improvement values are low compared to land values • Include known Superfund or contaminated sites • Deeply embedded in an industrial area otherwise unlikely to be redeveloped for affordable housing	• Nested within existing residential fabric • Interstitial space of existing developments • Power line right-of-ways • Irregularly-shaped parcel not conducive to development

CONSIDERATIONS FOR SITING PERMANENT SUPPORTIVE HOUSING

	ACCESS	NEARBY USES	RESOURCES	OTHER
BEST PRACTICES	• Near existing and future public transportation • Good pedestrian and bike access (sidewalks, bike lanes, and trails) • Near major streets and intersections • Vehicular access	• Employment opportunities • Commercial and retail • Potential of adjacent or nearby parcels to develop in the future	• Public services • Public health and medical facilities • Religious institutions • Public resources like schools and parks in cases of family or youth supportive housing	• Shape and proportions of site conducive to development
OBSTACLES	• Dead-ends and cul-de-sacs • Direct exposure to major thoroughfares and vehicular intersections	• Nested within a residential neighborhood • Adjacent to multiple residential neighborhoods • Environmental nuisances (power lines, contaminated sites, and noxious smells)		• High Flood risk

SITE SELECTION



Opportunity Assessment

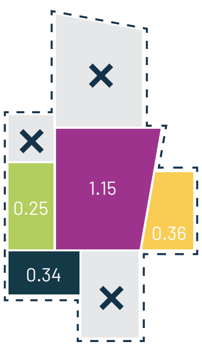
Publicly owned parcels, vacant parcels, and underutilized private parcels were considered potential opportunities for landbanking related to affordable housing and permanent supportive housing.

PUBLIC + **VACANT PUBLIC & PRIVATE** + **UNDERUTILIZED PRIVATE**

Publicly owned parcels should be considered only if they are underutilized (e.g., as surface parking) or their current uses are obsolete.

Clustering Parcels

Single parcels or combinations of adjacent parcels in these categories totaling more than one acre in size prove most viable for future housing. Clusters are prioritized based on location (i.e. whether a cluster is in a residential or industrial area), proportion of public versus private land, and proximity to public resources such as schools and transit, among other factors.



Desktop Analysis

A finer-grained desktop analysis of high-priority clusters reinforces whether specific parcels are appropriate for housing. A combination of LA County Assessor data, Google Earth and Street View imagery, and online searches answer questions such as:

- Is there recent construction on the site, or are there known development plans?
- Is there known contamination or hazardous waste?

On-site Analysis

Parcels that remain viable for housing then undergo an on-site analysis to confirm findings:

- What signs indicate that the site is vacant or underutilized?
- Does the site seem suitable for future development?
- Is the site near public transit, commercial areas, and public resources?
- Do the shape and proportions of the site make it viable?

Final Opportunity Sites

The remaining parcels that aggregate to one or more acres in size are the final opportunity sites to be considered for future affordable and permanent supportive housing. Cities and site tenants can be engaged to determine feasibility, and then a site acquisition plan can be developed.

DRY WEATHER LOW FLOW ADJUSTMENTS

Inflows to the river consist of dry weather and wet weather flows. Dry weather inflows are comprised of incidental urban runoff entering the river through storm drain outfalls, flows from the three water reclamation plants (WRP), and groundwater upwelling that occurs in the soft bottom reaches in the Glendale Narrows (Figure 284). In most reaches of the river, dry weather flows are primarily contained within the low flow channel, a shallow channel typically in the center of the river in concrete sections.

Although dry weather flows provide water for invasive vegetation species to grow with limited control, they also help create recreational and ecological opportunities within the LA River. In recent years, agencies and municipalities have expressed intent to increase reuse of water treated at WRPs that currently discharge effluent into the LA River, as well as to manage groundwater upwelling and urban runoff. Combined, these actions could change the current beneficial uses of the existing dry weather flows within the river due to reductions in the total amount of flow. In response to this challenge, the State Water Resources Control Board along with the LA Regional Water Quality Control Board (together, "the Water Boards"), both of which support maximizing the use of recycled water and protecting beneficial uses, embarked on a multi-year study in 2019, to balance the impact of reuse and instream needs. This study may be completed in 2021 or 2022 when in-stream dry weather flow management will be revisited.

Upon review of the dry weather inputs and their potential for reductions in the future, it is conceivable that future dry weather flows could approach zero. A possible future dry weather flow scenario was estimated by assuming that all three WRPs recycle 100% of their effluent, and groundwater upwelling and urban dry weather runoff are significantly reduced, resulting in a possible future dry weather flow of just a trickle at the mouth of the river (Figure 285).

EXISTING

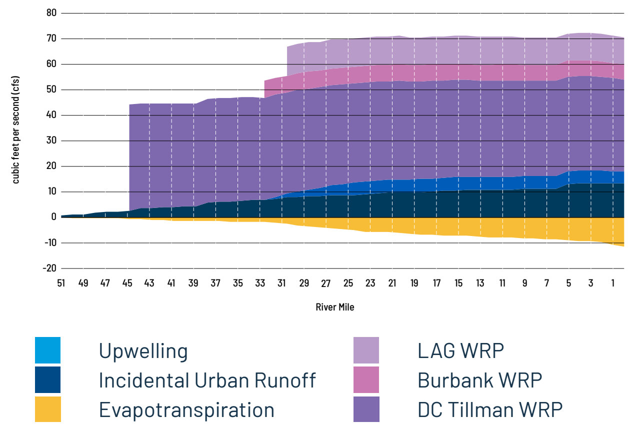


Figure 284. These are the current (2020) dry weather flows by river mile along the LA River. Source: Adapted from OneWater LA 2040 Plan, 2018.

POSSIBLE

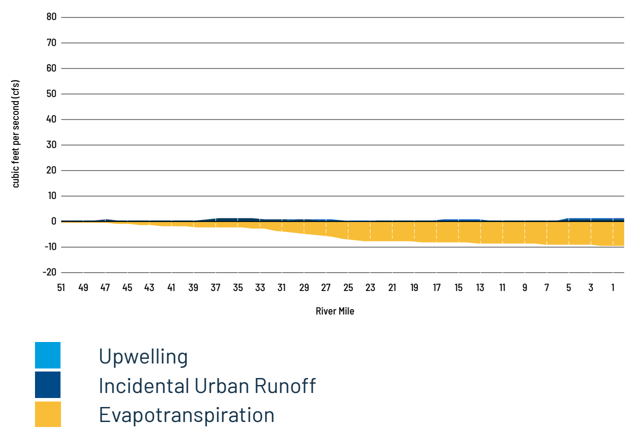


Figure 285. This shows the possible future dry weather flows by river mile along the LA River. Source: Geosyntec, 2018.

PLAUSIBLE

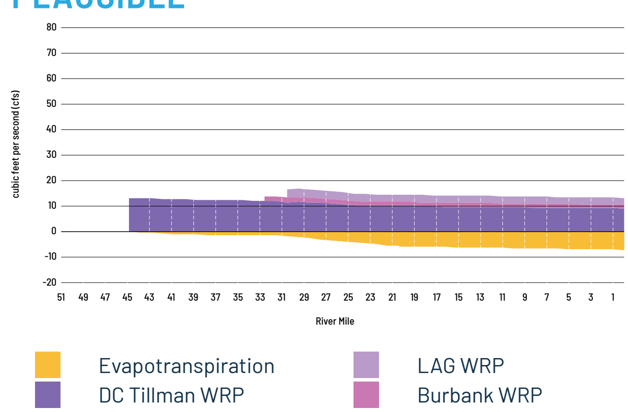


Figure 286. This shows the plausible future dry weather flows by river mile along the LA River. Source: Geosyntec, 2018.

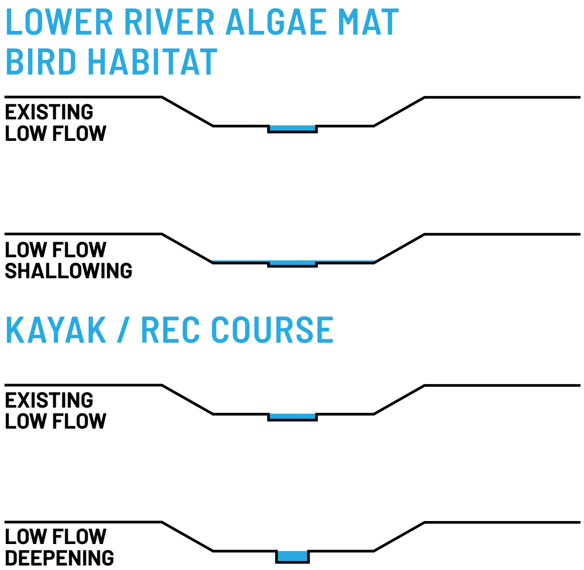


Figure 287. As dry weather flows may decrease in the future, it is desirable to maintain specific beneficial uses along parts of the river. Maintaining beneficial uses during dry weather seasons may require making sections of the low flow channel shallower to allow a smaller volume of water to spread out and maintain habitat, or deeper to maintain recreation opportunities such as kayaking.

However, understanding the Water Boards' process for balancing the future low flow regime in the LA River, a plausible flowrate for future dry weather flows could be about 15 cubic feet per second – an 80% reduction in the estimated existing dry weather flow today (Figure 286).

Based on the plausible future dry weather flow, adjustments to the dimensions or shape of the low flow channel may be needed to maintain recreation or habitat conditions in certain reaches of the river.

In areas where a wider flow is desirable for habitat (such as the lower river algae mat areas), the low flow channel can be partially filled in.

In areas where a deeper flow is desirable for recreation (such as kayaking) a narrower low flow channel or other innovative ideas can provide this beneficial use with less water.

It may also be advantageous to have significantly less dry weather flow in soft bottom reaches in summer months to reduce the presence of invasive species that thrive on a continuous water flow.

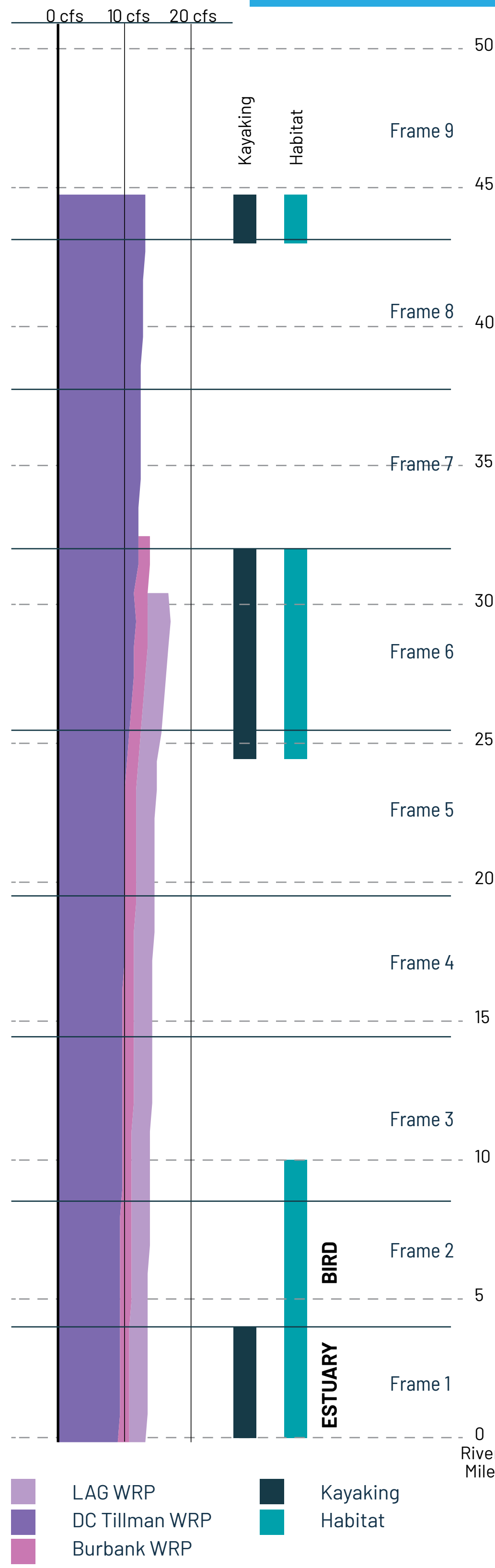


Figure 288. As dry weather flows may decrease in the future, it is desirable to maintain specific beneficial uses along parts of the river. Some stretches of the river can be prioritized for specific beneficial uses.

DRAFT

SITE-BASED PROJECT EXAMPLES

The following project examples are site-based, meaning that they emphasize localized conditions. Whether geophysical or community-oriented, these are the main drivers of design. The projects approach their sites in diverse ways. Projects with large footprints or higher impact (M, L, XL), for example, are open-ended, taking shape in response to broader local trends: Channel Rehabilitation at the Narrows responds to flood risks associated with in-channel vegetation, whereas the Connectivity Corridor rectifies an urban fabric that has been fragmented by the LA River channel and the 710 Interstate. On the other hand, pavilions (XS and S) are intended to increase equity by providing equal access to amenities distributed along the entire length of the river. For this reason, their design begins with a standard set of features but is then flexible, able to shift in form and position relative to the river, based on context. Each pavilion, like all site-based projects, is ultimately unique. River pavilions and project guidance are addressed in greater detail in Appendix Volume I: Design Guidelines.

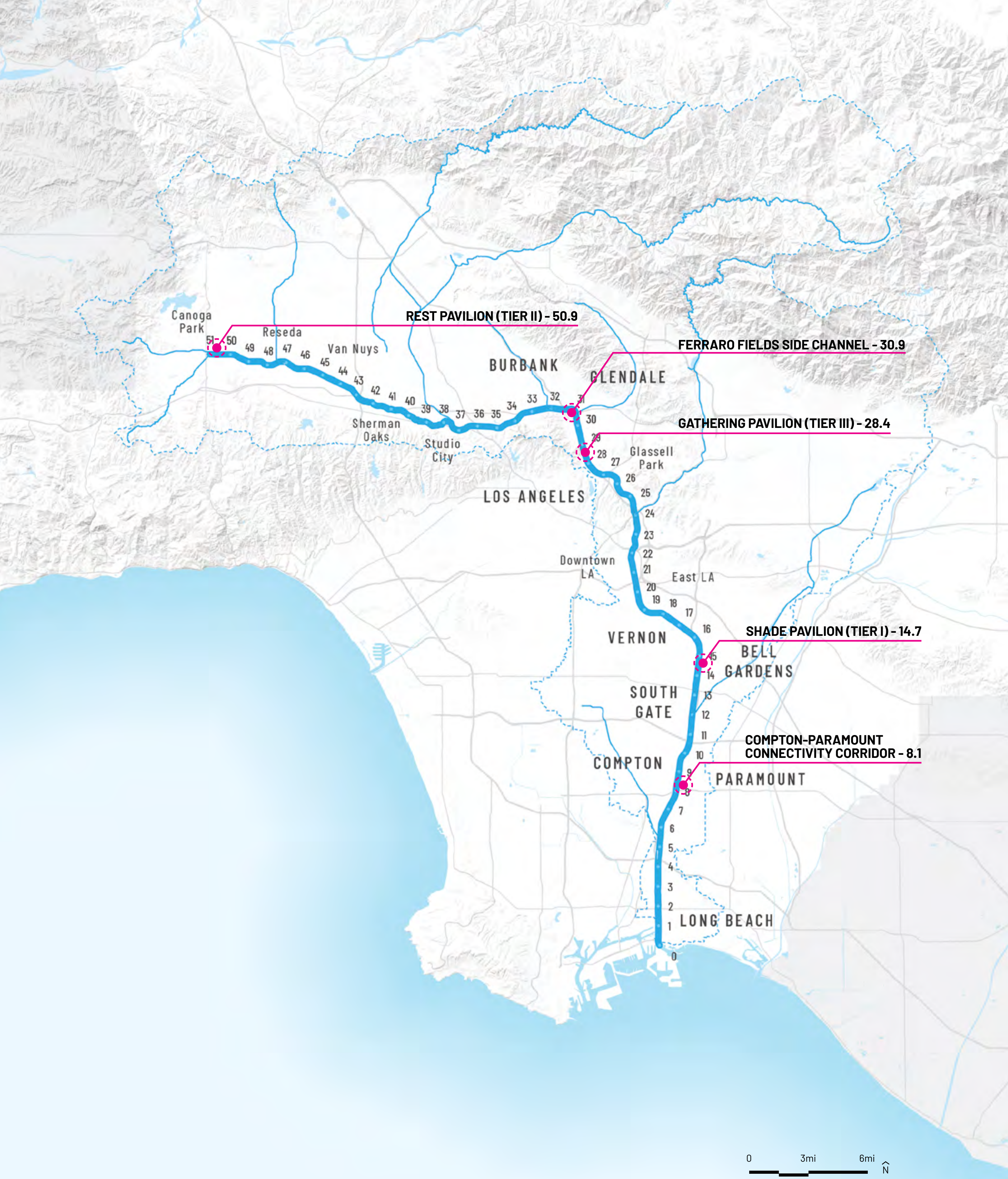


Figure 289. A sampling of site-based projects reflect the broad range of existing conditions that future work along the LA River might address.
Source: OLIN, 2019.

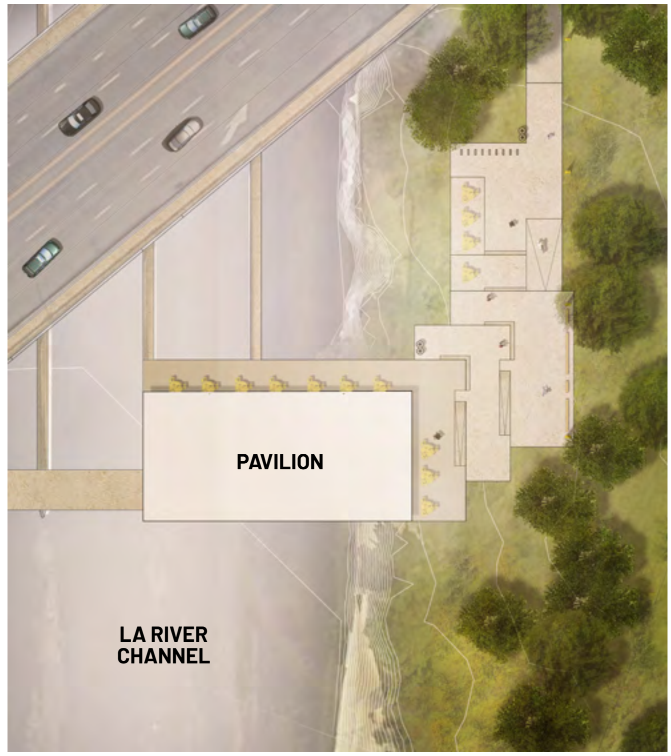
DRAFT

XS AND S PAVILIONS SUPPLEMENT LA RIVER AMENITIES THROUGH UNIQUE SOLUTIONS THAT NEGOTIATE DIVERSE AND COMPLEX SITE CONDITIONS

XS AND S PAVILION PLANS

XS and S pavilions serve LA River visitors as spaces of support, respite, and activity along the river's trails. XS pavilions include Shade (Tier I) and Rest (Tier II) Pavilions, which are largely exterior spaces with a development budget of less than $1 million. S pavilions are the larger Gathering Pavilions (Tier III) with significant indoor and outdoor programming and amenities that require a more substantial development budget of $1-10 million. Each pavilion sits within a distinct location, significantly affecting their design, scale, and orientation. The following plans are examples of how varying pavilions could be developed in relation to the LA River; taking into consideration its trails and adjacent vehicular network as well as the needs and constraints of its sites and adjacent neighborhoods.

The plans represent prototypical site conditions, such as limited and constricted available land, lack of neighborhood access, bifurcated elevations of the adjacent street and the LA River Trail, and proximity to surface overflow weirs, which compromise the river's water quality with poor stormwater management. The resulting plans employ creative solutions, in which they may cantilever above the river, elongate spatial organizations, negotiate disjointed elevations, provide access to the LA River Trail, and improve stormwater management practices. Every pavilion sited along the river requires a customized solution to its site constraints. Although these constraints initially pose as a challenge, they result in diversified pavilions. Instead of replicating three pavilion prototypes along the entire river's length, each pavilion assumes its own character, shape, and presence. The unique identity of XS and S Pavilions reflects the river and adjacent neighborhoods that shape them, instilling pride and ownership among their visitors.



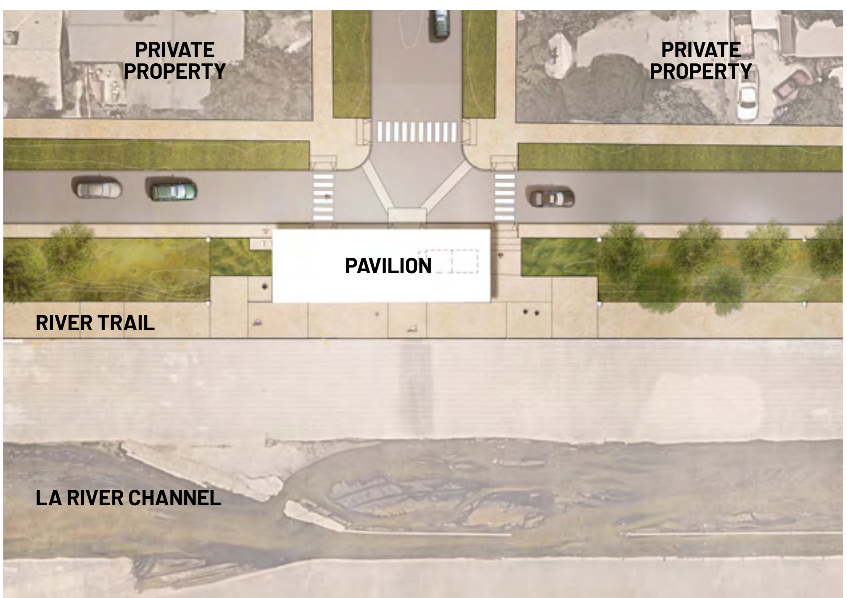


Figure 290. (Top Left) Gathering (Tier III) Pavilion.
Figure 291. (Top Right) Gathering (Tier III) Pavilion.
Figure 292. (Bottom Left) Rest (Tier II) Pavilion.
Figure 293. (Bottom Right) Shade (Tier I) Pavilion.

Figure 294. A typical lower river condition with a bike path on top of the levee and a tight, sloped landside area between a frontage street and the bike path. The proposed design creates a new gateway between the trail and adjacent community while providing essential basic amenities.

SHADE PAVILIONS (TIER I)

This design proposal for a Tier I pavilion is located in the City of Bell, where Southhall Lane currently meets River Drive at the LA River (see page 328). There is currently no access at this point to the LA River Trail. Additionally, there is very little shade and no amenities along this stretch. A pavilion at this site can provide a drinking fountain, shade, and an opportunity for wayfinding and community expression. Shade can be provided by both canopy trees and built structures.

Access stairs and a ramp can be included to provide a way to get onto the levee. Improved native planting and an art wall can provide the opportunity to make this pavilion an asset for the community on the landside of the levee, while a place to rest and get water make this pavilion an asset for users of the LA River Trail that might be on a longer journey or commute.

XS

SITE-BASED
FRAME 4, RM 14.7

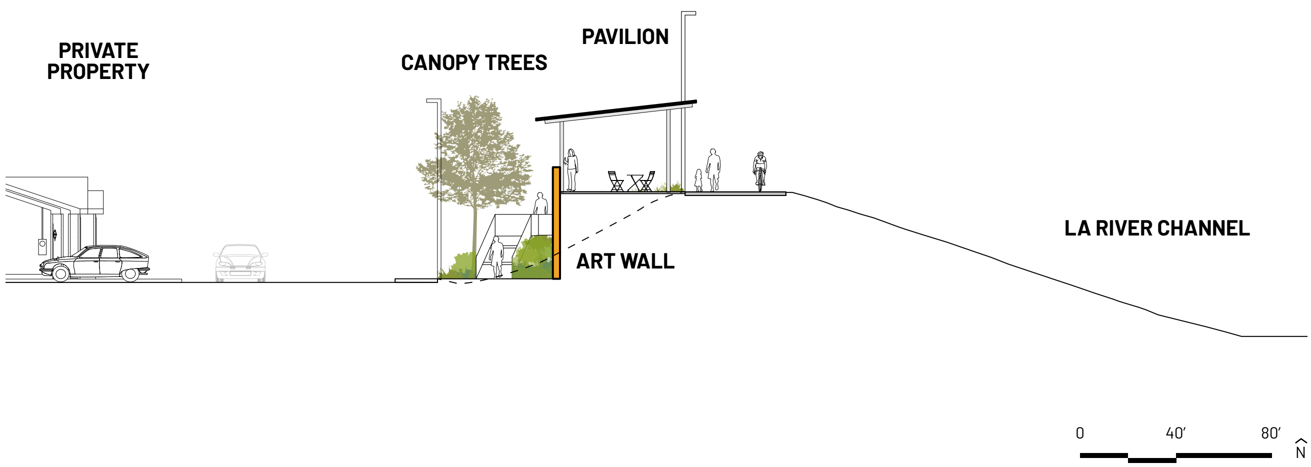
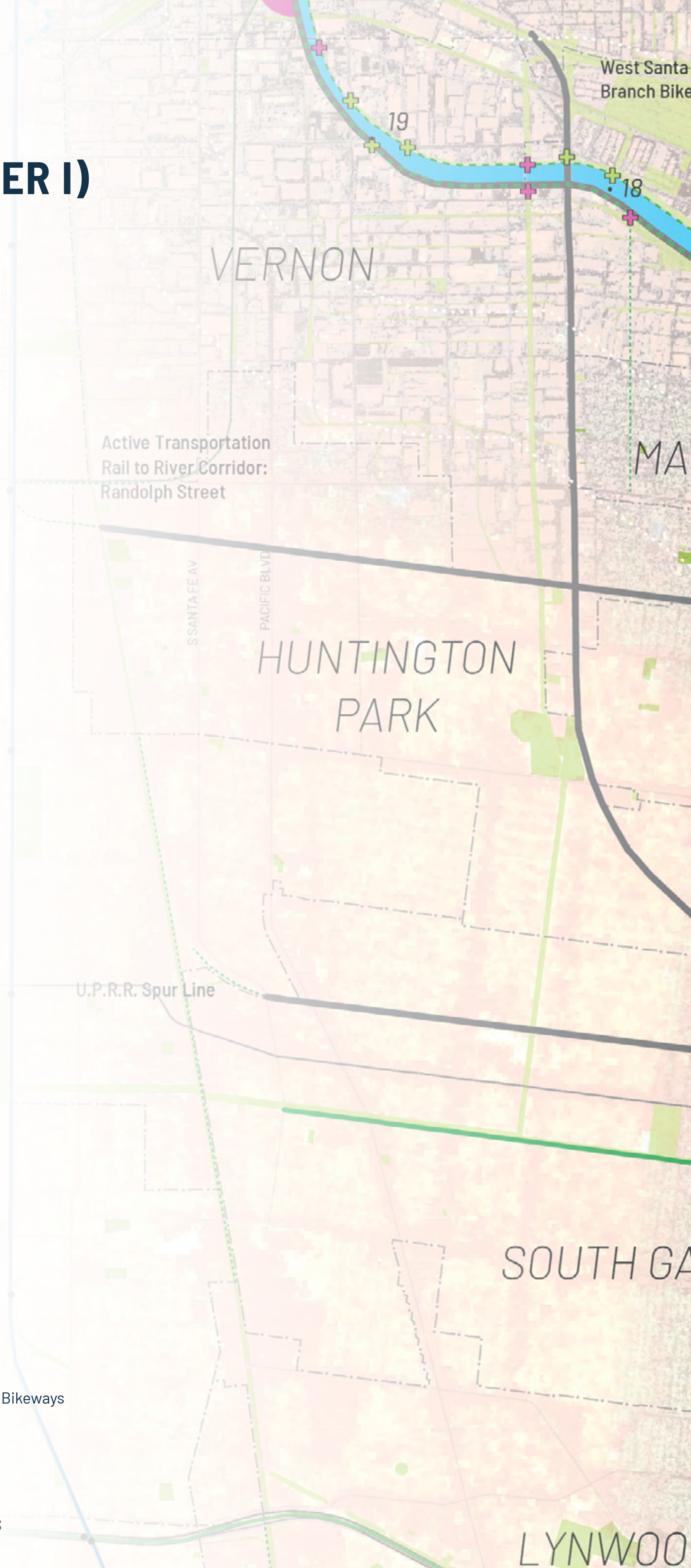


Figure 295. Here is a section view of an access point with parallel single switchback ramps and stairs added to get down to grade from the levee where needed.

SHADE PAVILION (TIER I)



Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops

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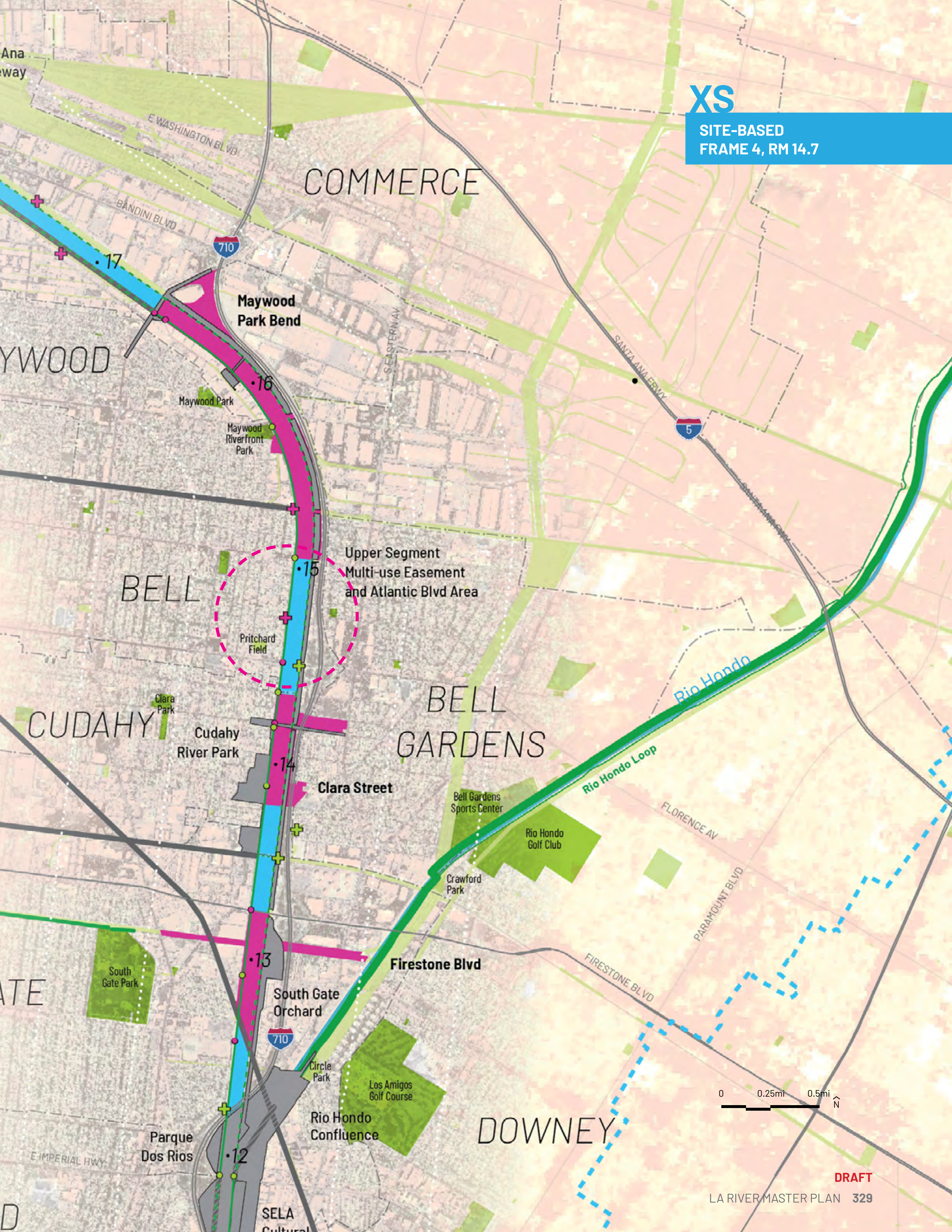
COMMERCE
E WASHINGTON BLVD
BANDINI BLVD
710
17
Maywood
Park Bend
16
Maywood Park
Maywood
Riverfront
Park
S EASTERN AV
SANTA ANA FRWY
5
BELL
15
Upper Segment
Multi-use Easement
and Atlantic Blvd Area
Pritchard
Field
Clara
Park
CUDAHY
Cudahy
River Park
14
Clara Street
BELL
GARDENS
Rio Hondo
Rio Hondo Loop
Bell Gardens
Sports Center
Rio Hondo
Golf Club
FLORENCE AV
Crawford
Park
PARAMOUNT BLVD
13
Firestone Blvd
FIRESTONE BLVD
South
Gate Park
South Gate
Orchard
710
Circle
Park
Los Amigos
Golf Course
Rio Hondo
Confluence
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12
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Figure 296. A street terminating at the river's edge is a typical upper river condition in the San Fernando Valley. The proposed design captures and treats local stormwater flow before it enters the river while also providing access and amenities to the adjacent community.

REST PAVILIONS (TIER II)

The western end of the LA River flows through dense neighborhoods with limited park space and amenities. Many streets along the LA River in the San Fernando Valley drain directly into the LA River through an overflow weir at the end of the street. The intersection of Alabama Street and Bassett Street is an example of this common condition (see page 332). This Tier II pavilion highlights this moment as it integrates best management practices for water quality into the architectural design of the pavilion.

Water from the street is spread into rain gardens before draining to the river. In large rain events, water can bypass the rain gardens and drain into the river. This pavilion would provide restrooms, shade, a space to rest, and other amenities like a drinking fountain. Native planting would further enhance the experience of the pavilion and connection to the LA River Trail.

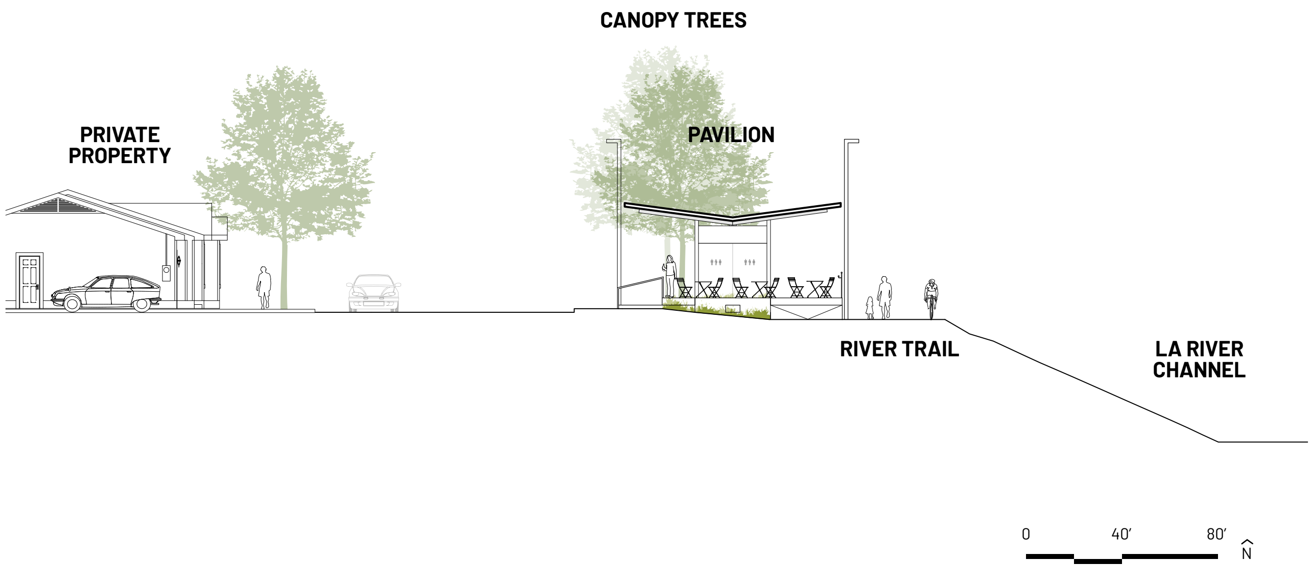
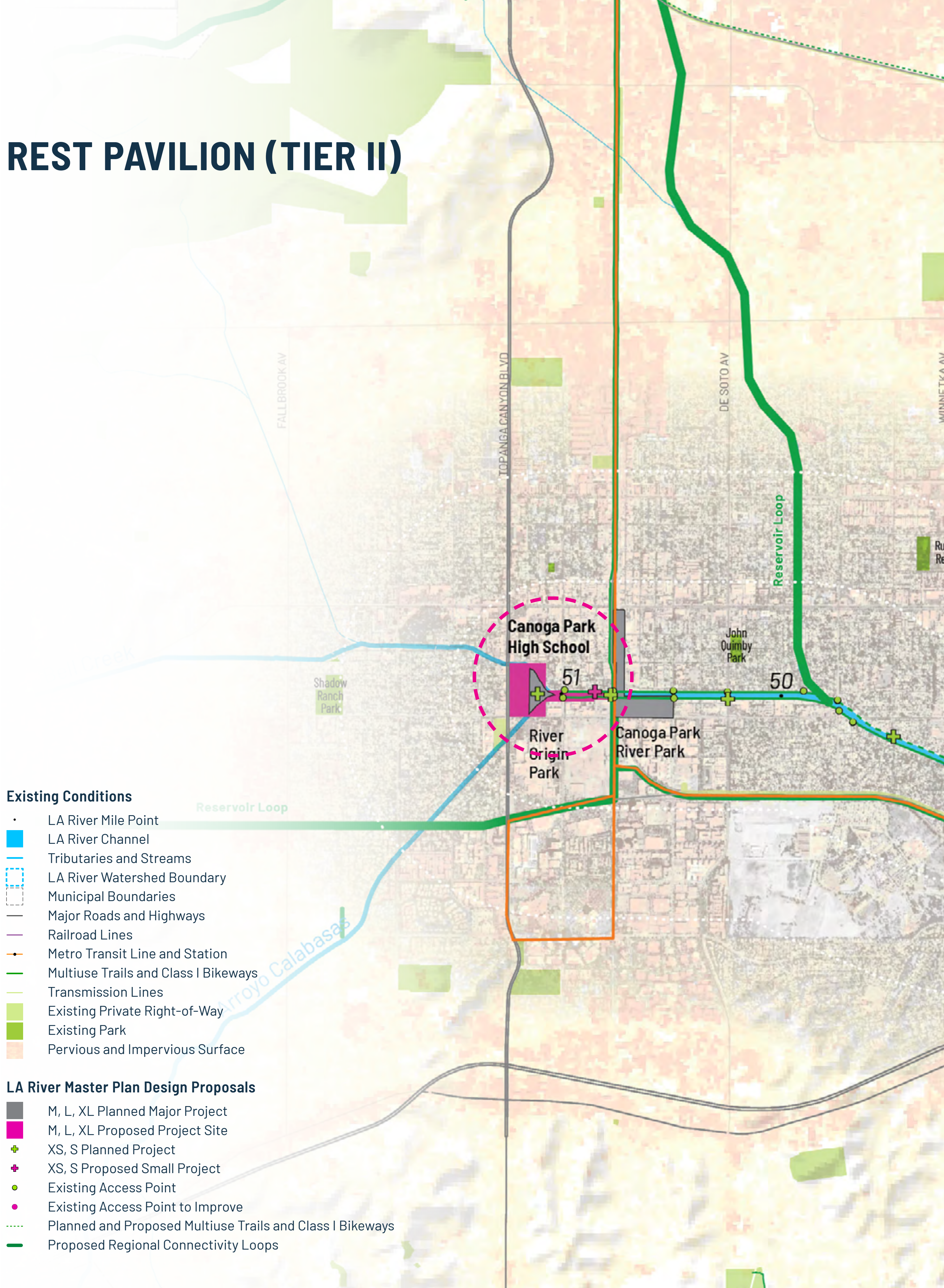


Figure 297. A small grade separation provides a buffer between the bike path and the pavilion.

REST PAVILION (TIER II)



Existing Conditions

- LA River Mile Point
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- Metro Transit Line and Station
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- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

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- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
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- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops

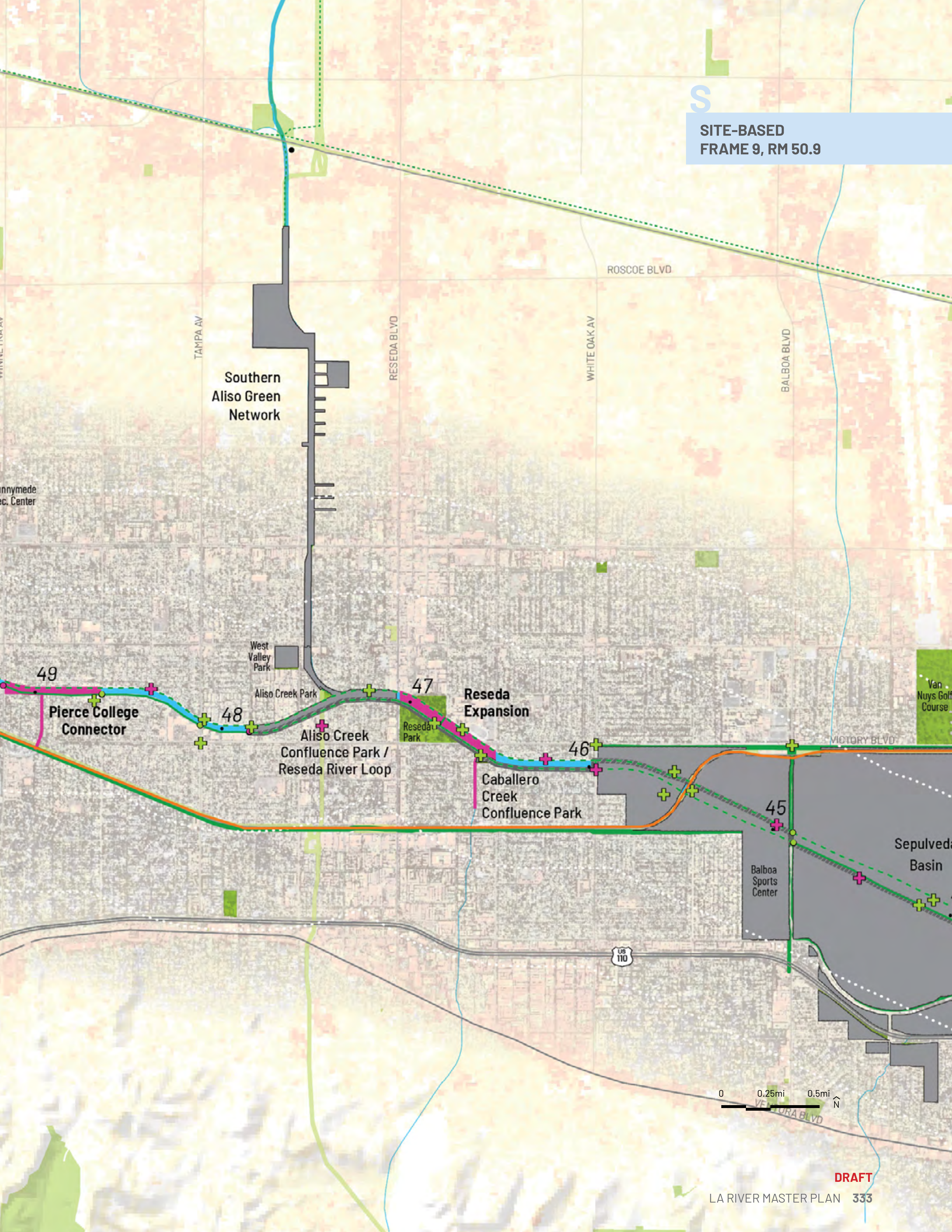

ROSCOE BLVD
TAMPA AV
RESEDA BLVD
WHITE OAK AV
BALBOA BLVD
Southern Aliso Green Network
nnymede
ec. Center
West Valley Park
Aliso Creek Park
49
Pierce College Connector
48
Aliso Creek Confluence Park / Reseda River Loop
47
Reseda Expansion
Reseda Park
46
Caballero Creek Confluence Park
VICTORY BLVD
Van Nuys Golf Course
45
Sepulveda Basin
Balboa Sports Center
US 110
VENTURA BLVD
0
0.25mi
0.5mi
N

Figure 298. The site design consists of multiple pavilions around a central courtyard.

GATHERING PAVILIONS (TIER III)

Located at Los Feliz Boulevard, this Tier III pavilion has left bank and right bank structures (see page 338). The right bank pavilion, which is not in the 1% or 0.2% floodplain, is the main structure, providing numerous services such as a café and restrooms. The left bank facility utilizes the existing bridge piers to create a unique user experience over the channel and connects to the Los Feliz bridge while providing shade, amenities, and community space.

These pavilions would provide much needed services in a stretch of the river that is heavily used by pedestrians and cyclists. This site would also be a good location to provide outdoor or indoor spaces for activities such as traditional ceremonies held by Indigenous communities.

S

SITE-BASED
FRAME 6, RM 28.4

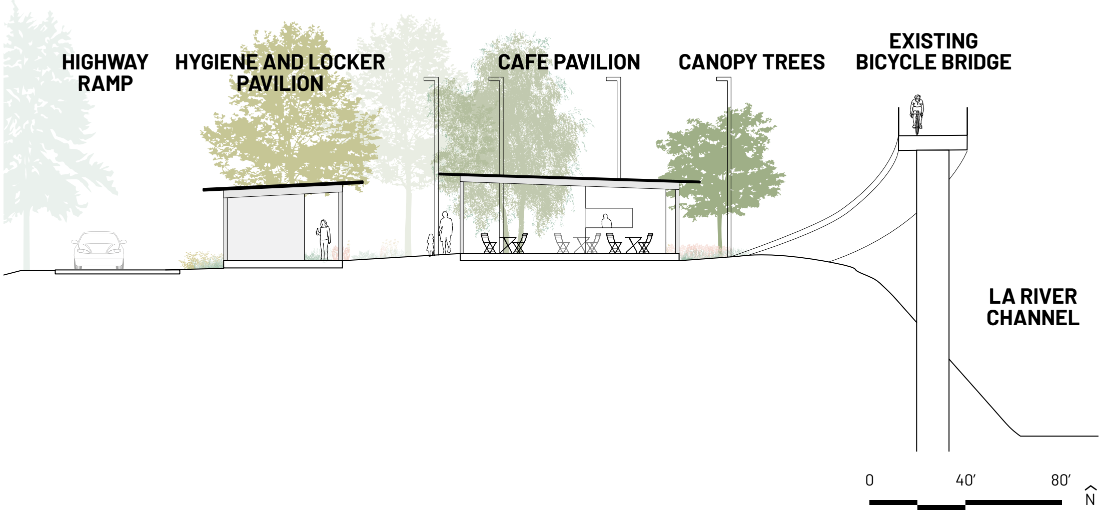


Figure 299. A section through the landside gathering pavilion shows how the buildings shield bike path and courtyard space from adjacent highway on-ramp.

Figure 300. An additional pavilion spans the existing Los Feliz Bridge Piers and the left river bank.

Based on how they are sited, pavilions can create new relationships between people and the river. In this case, the Tier III pavilion cantilevers out over the channel, providing a rare vantage point from which visitors can take in their surroundings. Cafe tables and chairs invite people to gather together with the iconic river as backdrop, or to or sit quietly, watching the water flow by.

S

SITE-BASED
FRAME 6, RM 28.4

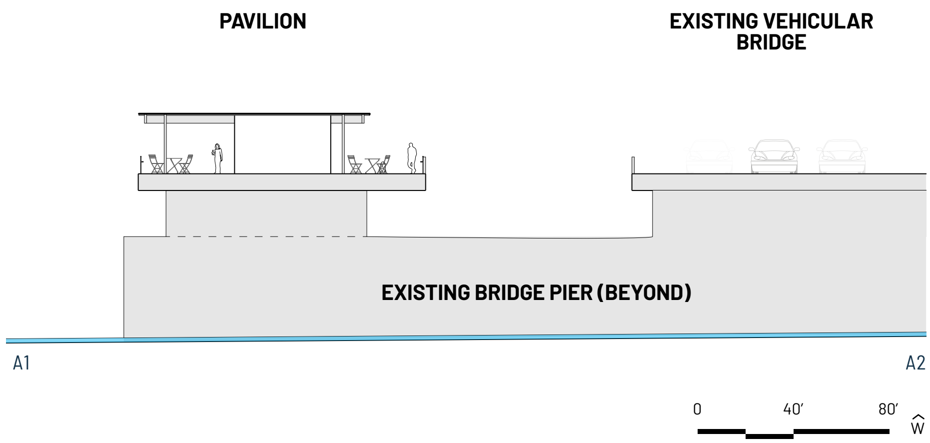
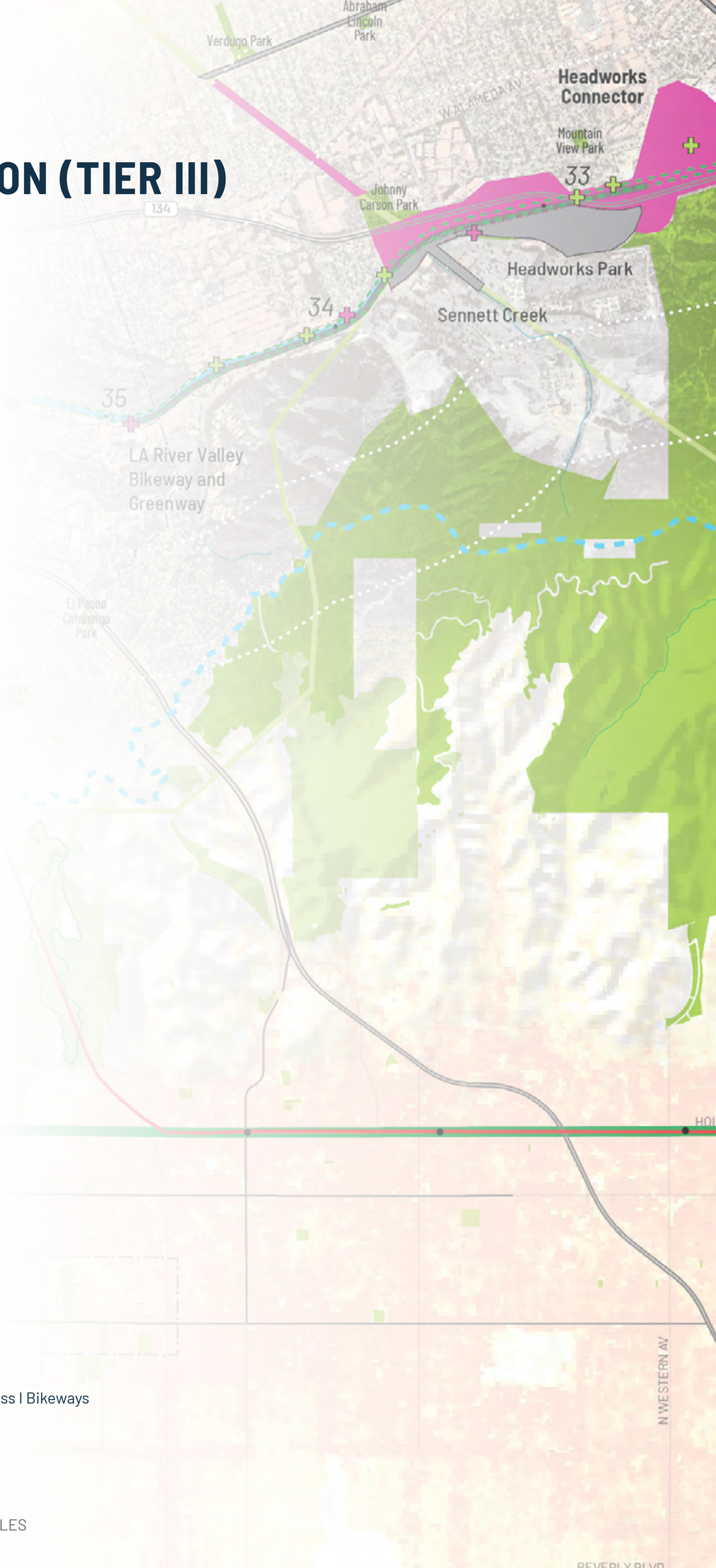


Figure 301. A section through the Los Feliz Bridge shows how an additional pedestrian river crossing created on the existing bridge piers.

GATHERING PAVILION (TIER III)



Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops


GLENDALE
SITE-BASED
FRAME 6, RM 28.4
Griffith Manor Park
Pelanconi Park
Glendale Riverwalk Non-Motorized Bridge
Narrows Riverwalk
Glendale Narrows Riverwalk
Verdugo Wash
Fremont Park
134
32
31
Ferraro Fields Side Channel
River Glen Wetlands
30
5
Pacific Community Pool
North Atwater Park
Chevy Chase Park
S BRAND BLVD
GLENDALE FWY
Griffith Park
North Atwater Crossing
29
2
Los Feliz Golf Course
EAGLE ROCK BLVD
Juntos Park
28
Sunnynook Park
Red Car Bridge
Glassell Park and Rec. Center
27
G1 Bowtie
Marsh Park
LYWOOD BLVD
G2 Taylor Yard
26
Elyria Canyon Park
Silver Lake Meadows Park
Elysian Valley Rec. Center
Rio de Los Angeles SP
Taylor Yard Non-Motorized Bridge
Lost River Loop
N VERMONT AV
5
25
Dorris Place Sanitation Yard
Cypress Recreation Center
0
0.25mi
0.5mi
N
110
2
HOLLYWOOD FWY
GLENDALE BLVD
Elysian Park
24

FERRARO FIELDS SIDE CHANNEL

Recent USACE floodplain modeling (USACE, 2016) shows extensive flooding during the 1% and 0.2% flood events originating upstream of the Ferraro Fields (see page 342) before the river makes its bend to the south. These flows that overtop the channel walls flow overland, along Highway 134 and the 5 Interstate, eventually returning to the channel downstream of the Ferraro Fields. By planning for these overtopping moments and creating room for the river in reaches such as this, the overall capacity of the river system can be increased by possibly 5,000 to 10,000 cfs while keeping a portion of this important emergency transportation route open. Additional benefits from this concept include increased habitat connectivity from the adjacent Griffith Park to the river channel, improved linkages to the Verdugo Wash, and increased educational opportunities while accommodating most of the site's existing recreation areas.

Figure 302. The Ferraro Fields Side Channel is located at river mile 30.9 near Ferraro Fields, nestled in between the park and the 5 Interstate.

FERRARO FIELDS SIDE CHANNEL

SIZE: 52.2 acres

IMPACT: L

NEED: Flood Risk - General
Parks - General
Ecosystems - **High**
Access - General
Arts & Culture - General
Affordable Housing - General
Education - Moderate
Water Supply - **High**
Water Quality - General

KIT OF PARTS COMPONENTS:

- Trails and Access Gateways
- Channel Modifications
- Diversions
- Off Channel Land Assets

ADJACENT PLANNED MAJOR PROJECTS:

RM 31 Glendale Riverwalk Non-Motorized Bridge (LARRMP)

RM 30.8 Glendale Narrows Riverwalk (City of Glendale)

RM 30.5 River Glen Wetlands (LARRMP, ARBOR Study)

RM 30.4 River Glen Wetlands (ULART)

RM 30.65 San Fernando Path (Burbank Bicycle Master Plan)

RM 30.7 San Fernando Railroad (Glendale Bike Plan)

Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops

DRAFT

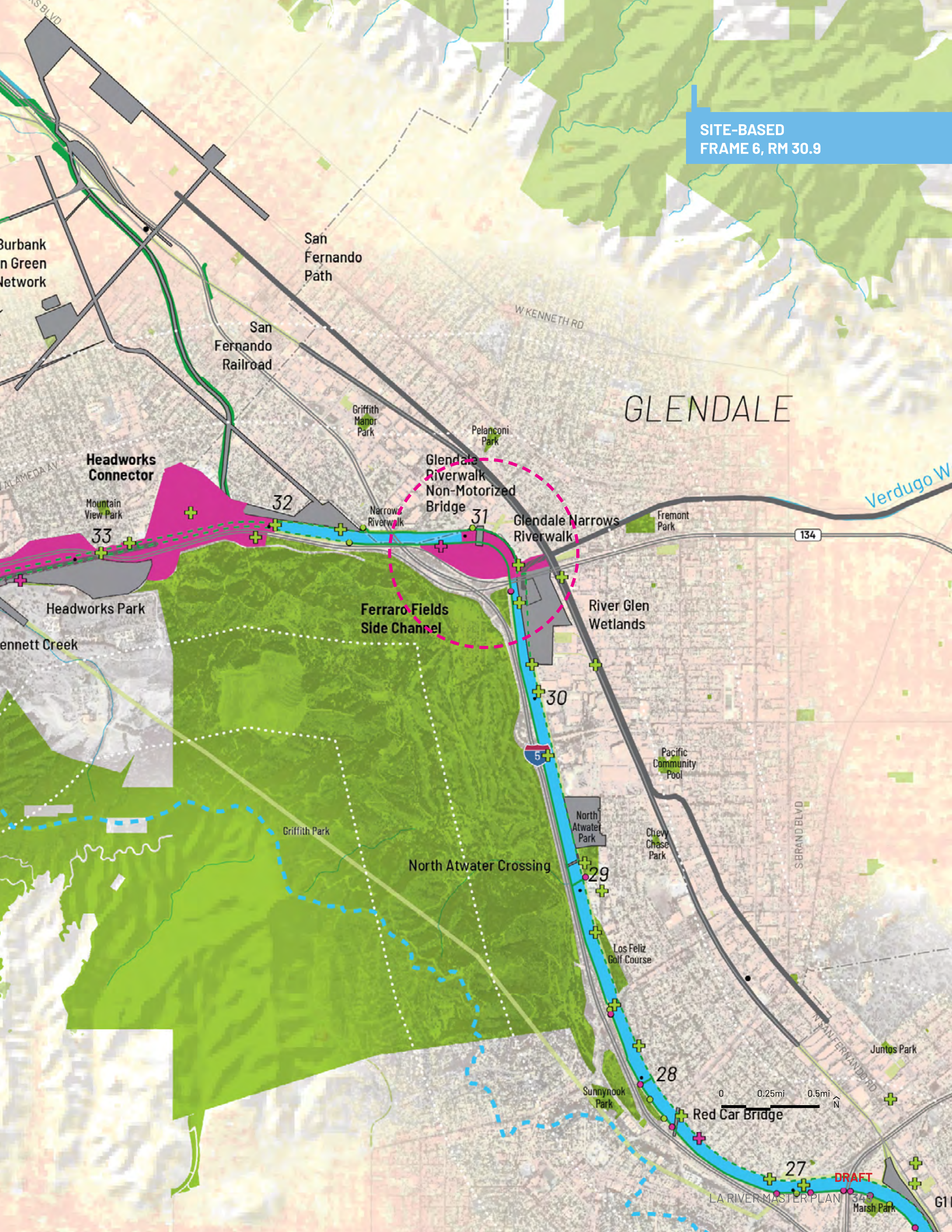
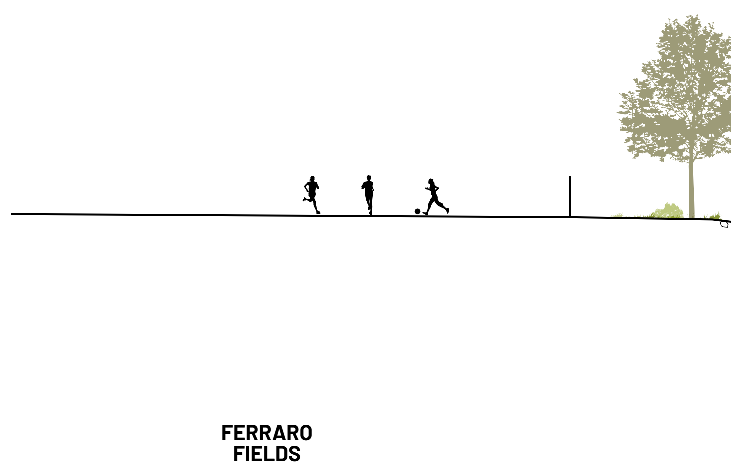

GLENDALE
Burbank
n Green
Network
San
Fernando
Path
San
Fernando
Railroad
W KENNETH RD
Griffith
Manor
Park
Pelanconi
Park
Headworks
Connector
Mountain
View Park
33
32
Glendale
Riverwalk
Non-Motorized
Bridge
31
Narrows
Riverwalk
Glendale Narrows
Riverwalk
Fremont
Park
Verdugo W
134
Headworks Park
Ferraro Fields
Side Channel
River Glen
Wetlands
ennett Creek
30
5
Pacific
Community
Pool
North
Atwater
Park
Chevy
Chase
Park
S BRAND BLVD
Griffith Park
North Atwater Crossing
29
Los Feliz
Golf Course
28
Sunnynook
Park
0
0.25mi
0.5mi
N
Red Car Bridge
Juntos Park
N SAN FERNANDO RD
27
Marsh Park
ALAMEDA AV
DRAFT

Figure 303. The Ferraro Side Channel features native plants and dry stream beds and provides additional trails and open space adjacent to the existing athletic fields.

During the dry season, the existing recreation areas at Ferraro Fields will be hemmed in by an arroyo landscape. Trails for pedestrians and cyclists branch off from the LA River Trail and interweave with dry stream beds, rocks and small boulders marking the ghosted traces of former waterways. The planting celebrates LA's native ecology, including a diversity of drought tolerant species as well as periodic flooding. It is an adaptive and resilient landscape that invites visitors to look closely and interact with their local environment.



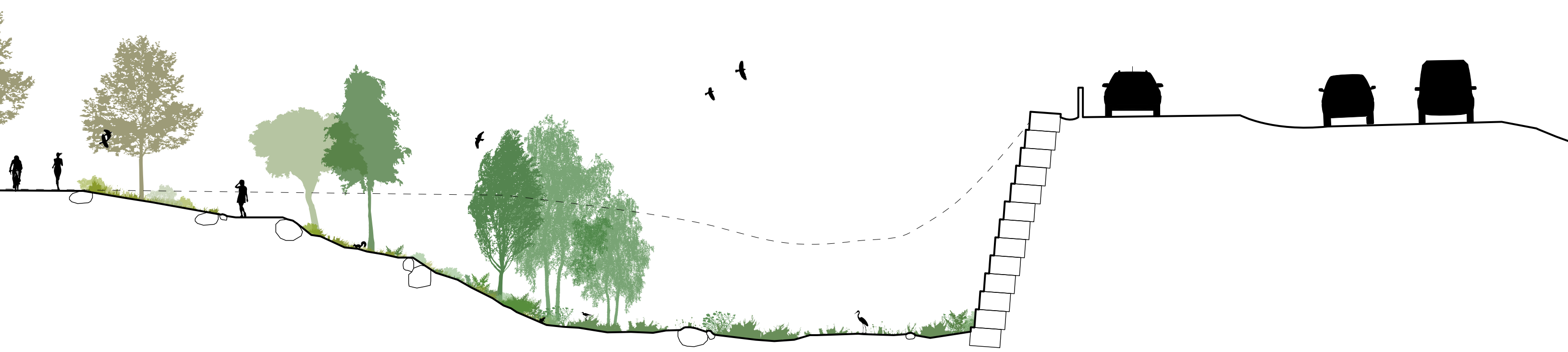
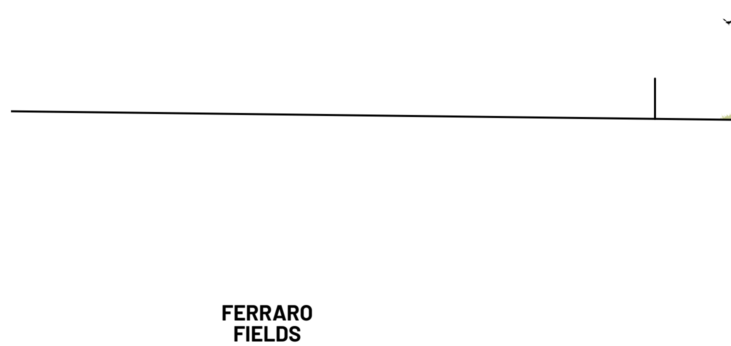


Figure 304. The section shows how a new side channel could be created on underutilized land between the site's existing athletic fields and the 134 Freeway.

Figure 305. During flood events, the Ferraro Side Channel plays an infrastructural role, transporting water downstream around this area of higher flood risk.

With heavy rains, the dry arroyo fills with water—a combination of surface flow and, on occasion, overtopping from the LA River. The side channel helps to convey that water downstream, where it rejoins the river's main flow. Except in extreme events, the site and trails remain accessible to the public.



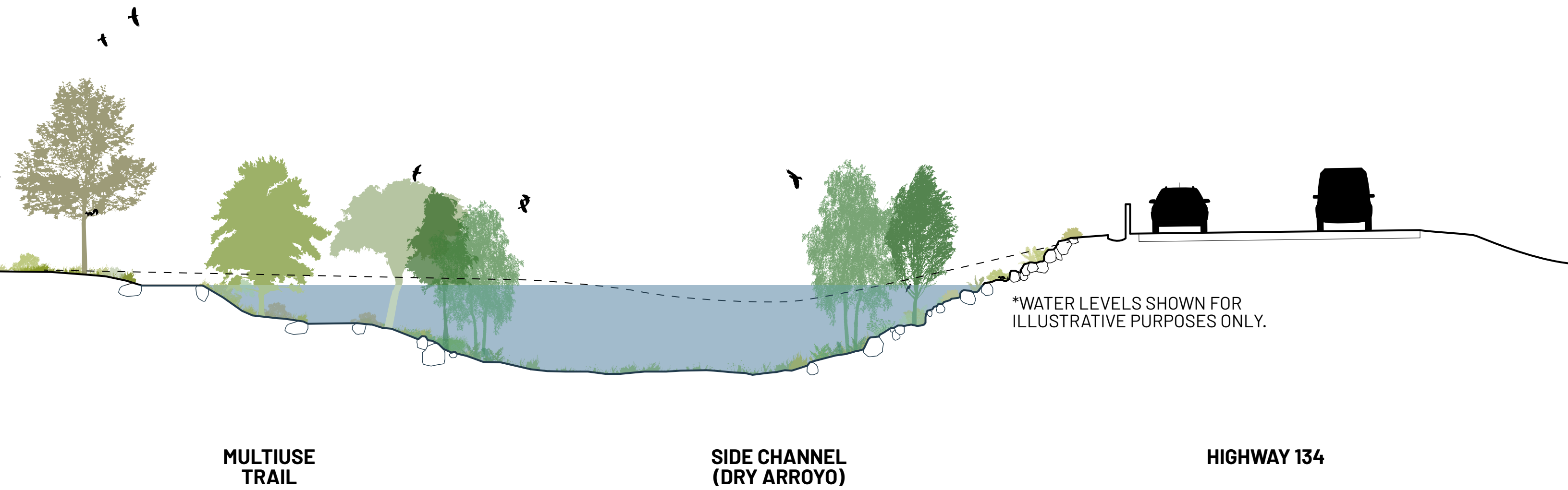


Figure 306. During large, infrequent events the Ferraro Fields Side Channel will fill up and convey flood waters past the bend and back to the LA River downstream.

PLANNED MAJOR PROJECT SPOTLIGHT: G2 TAYLOR YARD

Figure 307. G2 Taylor Yard is a 41.6-acre project in the City of LA.

EXISTING PROJECT SPOTLIGHT: G2 TAYLOR YARD

SIZE: 41.6 acres

IMPACT: L

CITY: Los Angeles

NEED: Flood Risk - General
Parks - **High**
Ecosystems - Moderate
Access - Moderate
Arts & Culture - Moderate
Affordable Housing - General
Education - Moderate
Water Supply - Moderate
Water Quality - General

LED BY: City of LA Bureau of Engineering

RELATED PLANS/PROPONENTS:
LA River Revitalization Master Plan, ARBOR Study, MRCA

KIT OF PARTS COMPONENTS (UNDER CONSIDERATION):

- Trails and Access Gateways
- Channel Modifications
- Off-Channel Land Assets
- Floodplain Reclamation

PLANNED MAJOR PROJECT SPOTLIGHT

The Master Plan identifies 56 planned major projects along the river that are currently being led by various entities ranging from LA County to municipalities to state conservancies to NGOs (full details are available in Appendix Volume II: Technical Backup Document). The projects are each at a different level of development, and some are highlighted in the Master Plan as Planned Major Project Spotlights given their momentum and illustration of meeting community needs associated with the LA River Master Plan goals and needs mapping.

ABOUT THE PROJECT

The G2 Taylor Yard project area was first identified as a priority in the City of LA's LA River Revitalization Master Plan (2007) and is further defined as part of a "Major Project Zone" in this Master Plan. Located in Glassell Park, the project is sited on an approximately 42-acre parcel that was formerly owned and operated as a rail yard by Union Pacific. The site has been identified in multiple planning efforts to date as a large opportunity for open space, access, ecosystem services, and habitat along the LA River. In addition to the City of LA's LA River Revitalization Plan (2007), the project was identified in the USACE ARBOR Study (2016), which focuses on environmental restoration. The parcel was purchased from Union Pacific in 2017 by the City of LA. The City of LA Bureau of Engineering is leading the project, and preliminary design concepts have been completed.

The G2 Taylor Yard site aims to address park need and access to the river through the creation of a publicly accessible open space that also provides native habitat. Supporting biodiversity and connecting to habitat corridors are also major goals of the project. Remediation of contaminated soil is crucial to public health and safety in the park before it is made accessible. The project will remediate soil and install components of the project in phases, with final completion set for 2028.

Figure 308. The G2 Taylor Yard site is adjacent to the LA River between river miles 25.9 and 25.3. Source: OLIN, 2017.

Figure 309. The G2 Taylor Yard site is a key area along the LA River where habitat can be renewed and public park space can be created for the residents of LA. Source: OLIN, 2017.

COMPTON - PARAMOUNT CONNECTIVITY CORRIDOR

Just north of the 91 Freeway, a larger connectivity greenway between Long Beach Boulevard and Orange Avenue was recommended as part of the Lower LA River Revitalization Plan (2017). This opportunity site (see page 352) recommendation was expanded and further developed under this Master Plan as an example project. The proposal transforms a transmission right-of-way into a greenway across the LA River and the 710 Freeway linking communities in Paramount, Compton, and North Long Beach with a platform park and a pedestrian bridge. Additional opportunity parcels are utilized for park space on terra firma on both banks of the channel with space for a plant nursery, a public swimming pool, and habitat areas. The location of the platform over the LA River was determined based on its relationship to the 91 Freeway bridge downstream, and after confirming that this portion of the channel has capacity over the 1% Flood (100-year flood) capacity.

Figure 310. The proposal links the greenway across the LA River and the 710 Interstate with a platform park and a pedestrian bridge.

COMPTON - PARAMOUNT CONNECTIVITY CORRIDOR

SIZE: 37.1 acres

IMPACT: M

NEED: Flood Risk - General
Parks - **High**
Ecosystems - Moderate
Access - **High**
Arts & Culture - **High**
Affordable Housing - General
Education - Moderate
Water Supply - **High**
Water Quality - Moderate

KIT OF PARTS COMPONENTS:

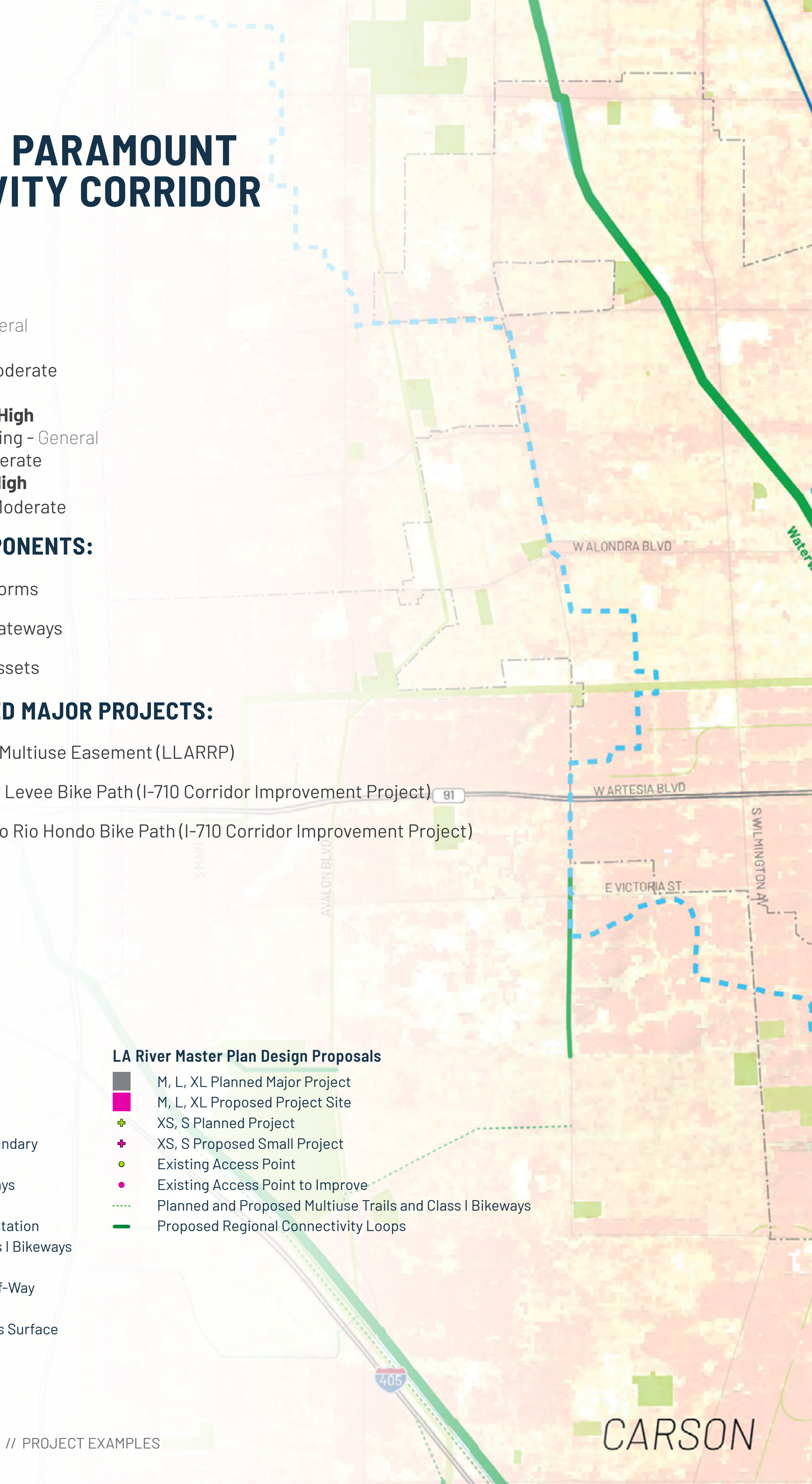
- Crossings and Platforms
- Trails and Access Gateways
- Off Channel Land Assets

ADJACENT PLANNED MAJOR PROJECTS:

RM 16.2 Middle Segment Multiuse Easement (LLARRP)

RM 11.9 Western LA River Levee Bike Path (I-710 Corridor Improvement Project)

RM 10.4 Terminal Island to Rio Hondo Bike Path (I-710 Corridor Improvement Project)



Existing Conditions
- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops

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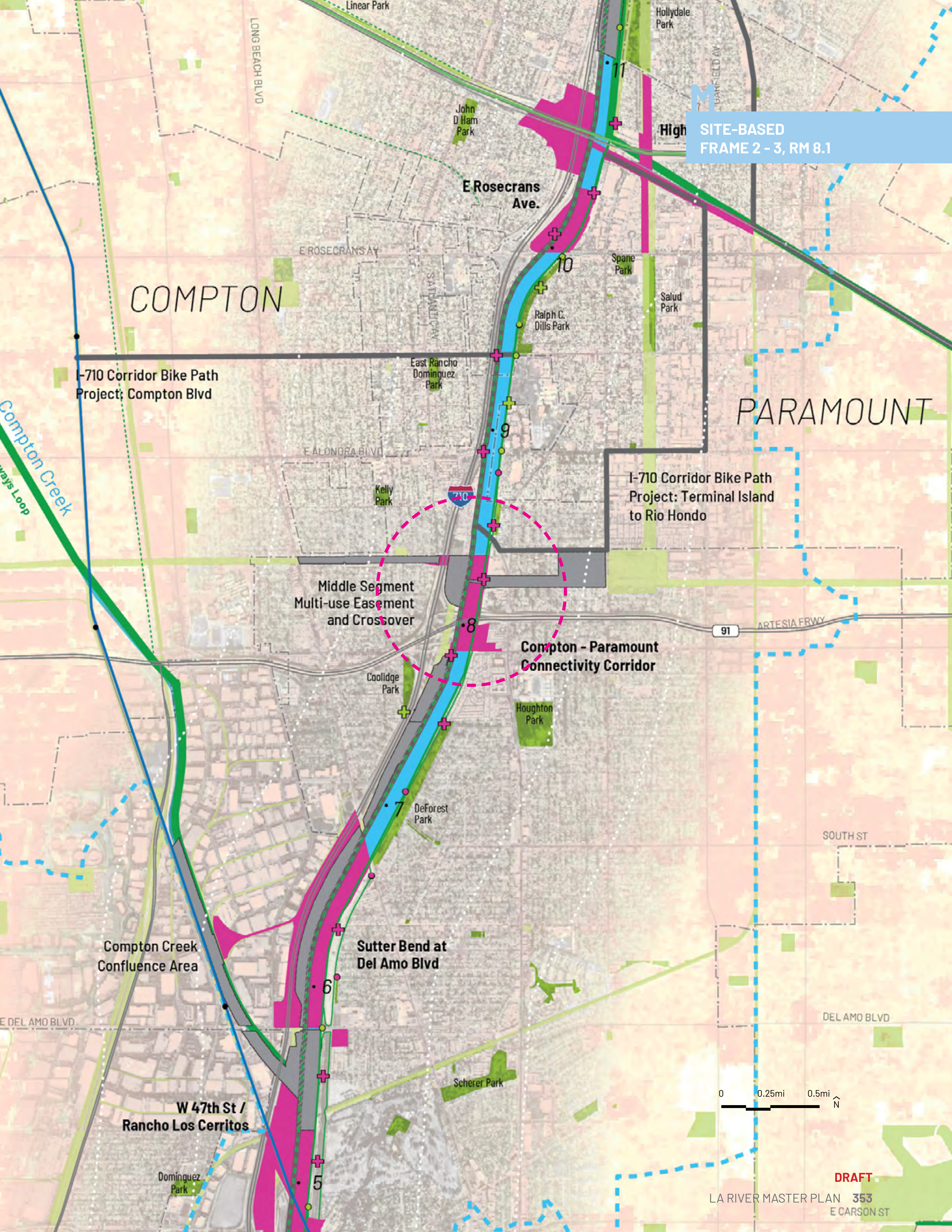
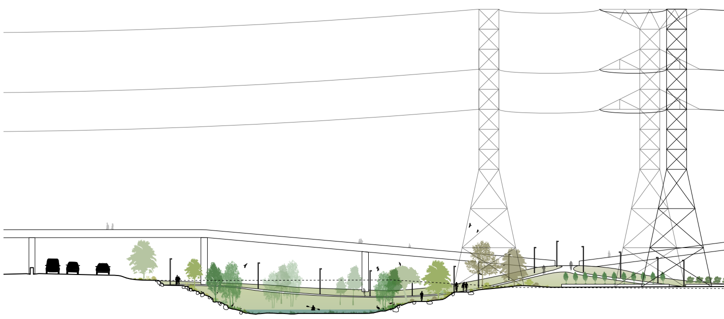

Linear Park
Hollydale Park
LONG BEACH BLVD
John D Ham Park
E Rosecrans Ave.
E ROSECRANS AV
COMPTON
Spane Park
Salud Park
Ralph C. Dills Park
East Rancho Dominguez Park
I-710 Corridor Bike Path Project: Compton Blvd
Compton Creek
PARAMOUNT
E ALONDRA BLVD
Kelly Park
710
I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
Middle Segment Multi-use Easement and Crossover
91
ARTESIA FRWY
Compton - Paramount Connectivity Corridor
Coolidge Park
Houghton Park
DeForest Park
SOUTH ST
Compton Creek Confluence Area
Sutter Bend at Del Amo Blvd
E DEL AMO BLVD
DEL AMO BLVD
Scherer Park
W 47th St / Rancho Los Cerritos
Dominguez Park
E CARSON ST
11
10
9
8
7
6
5
0
0.25mi
0.5mi
N

Figure 311. The platform creates new connections across the LA River while offering users a unique elevated view.

The platform creates a new elevated park space with views up and down the river as well as to the distant San Gabriel Mountains. A moderate size platform allows for a mix of more active uses such as a tier III cafe pavilion, plaza, and a shade grove, in addition to more passive areas designated as upland habitat for the migrating birds. Inclined slopes and ramps connect the platform back down to adjacent terra firma, while a pedestrian bridge crosses over the 710 Interstate.



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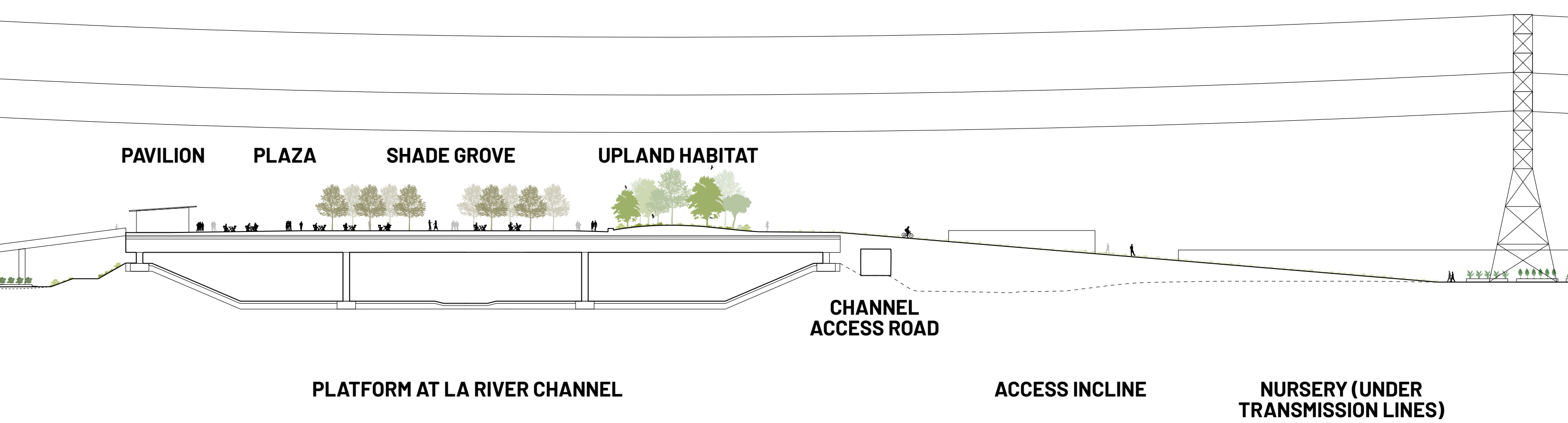


Figure 312. The section through the Compton-Paramount Connectivity Corridor shows how a new multi-use trail and greenway could connect across the LA River and 710 Freeway which stitching together a variety of program and habitat areas.

PLANNED MAJOR PROJECT SPOTLIGHT: RIO HONDO CONFLUENCE

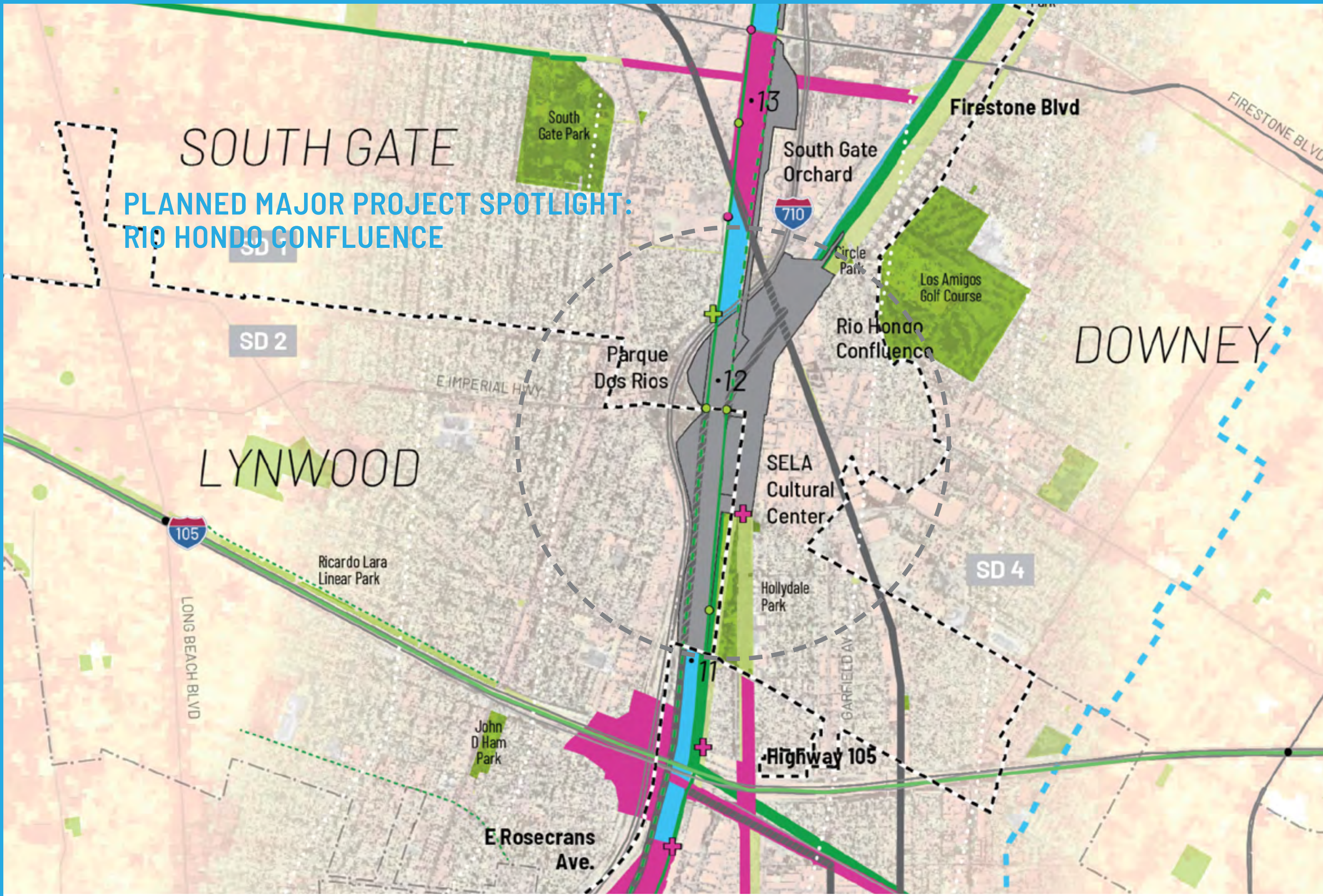


Figure 313. The Rio Hondo Confluence Area Project is over a mile in length, tracing the LA River between river mile 12.1 and river mile 11. It is adjacent to several other planned major projects and proposed project sites, including Parque Dos Rios, SELA Cultural Center, and South Gate Orchard.

EXISTING PROJECT SPOTLIGHT: RIO HONDO CONFLUENCE

SIZE: 164.6 acres

IMPACT: XL

CITY: South Gate, Lynwood

NEED: Flood Risk - General
Parks - **High**
Ecosystems - Moderate
Access - General
Arts & Culture - **High**
Affordable Housing - General
Education - Moderate
Water Supply - Moderate
Water Quality - **High**

LED BY: LA County Public Works

RELATED PLANS/PROPONENTS:
Lower LA River Revitalization Master Plan

KIT OF PARTS COMPONENTS (UNDER CONSIDERATION):

- Trails and Access Gateways
- Channel Modifications
- Crossings and Platforms
- Diversions
- Off-Channel Land Assets

PLANNED MAJOR PROJECT SPOTLIGHT

The Master Plan identifies 56 planned major projects along the river that are currently being led by various entities ranging from LA County to municipalities to state conservancies to NGOs (full details are available in Appendix Volume II: Technical Backup Document). The projects are each at a different level of development, and some are highlighted in the Master Plan as Planned Major Project Spotlights given their momentum and illustration of meeting community needs associated with the LA River Master Plan goals and needs mapping.

ABOUT THE PROJECT

The Rio Hondo Confluence Area Project (RHCAP) is located in Southeast LA, at the confluence of the LA River and Rio Hondo in the cities of South Gate, Lynwood, and Downey. It is comprised of several potential project opportunities that can be phased in accordance with community needs and other planning efforts. The site was first identified as an area of high need in the LA River Index (2016) and was further developed in the Lower LA River Revitalization Plan (2017) where it was one of the highest scoring opportunity areas. The LA River Master Plan needs analysis further validated this area's need for park space, access to art and cultural amenities, and improved environmental conditions and connectivity.

The surrounding area is densely populated (10,000 to 30,000 people per square mile), and, separated by infrastructure, adjacent neighborhoods are some of the most vulnerable to pollution and poor health outcomes in all of LA County. Therefore, the project seeks to create connective park space, water resources, and environmental benefits through combining projects in the channel, adjacent properties, and parallel electrical transmission line rights-of-way (ROW).

Project components could include low-flow modifications for habitat improvement and educational opportunities, wetlands for habitat and water quality improvement, bridges for improved connectivity, multi-benefit parks and trails, and platform parks to create new open space and foster connectivity, ecosystem function, and cultural resources while respecting the very critical need for flood risk management.

Figure 314. The Rio Hondo Confluence Area Project addresses the area's needs for parks, arts and culture, habitat, and water quality. This rendering envisons the confluence working in tandem with other adjacent planned major projects and proposed project sites. Source: LA County Public Works, 2020.

Figure 315. The southwestern portion of the site includes a wetland with an elevated path network that connects Lynwood to the LA River Trail. Source: LA County Public Works, 2020.

Figure 316. Invasive vegetation is a prevelant issue on the LA River at the Blendal Narrows, which is located at river mile 30.
Source: LA County Public Works, 2018.

SECTION IV: **IMPLEMENTATION**

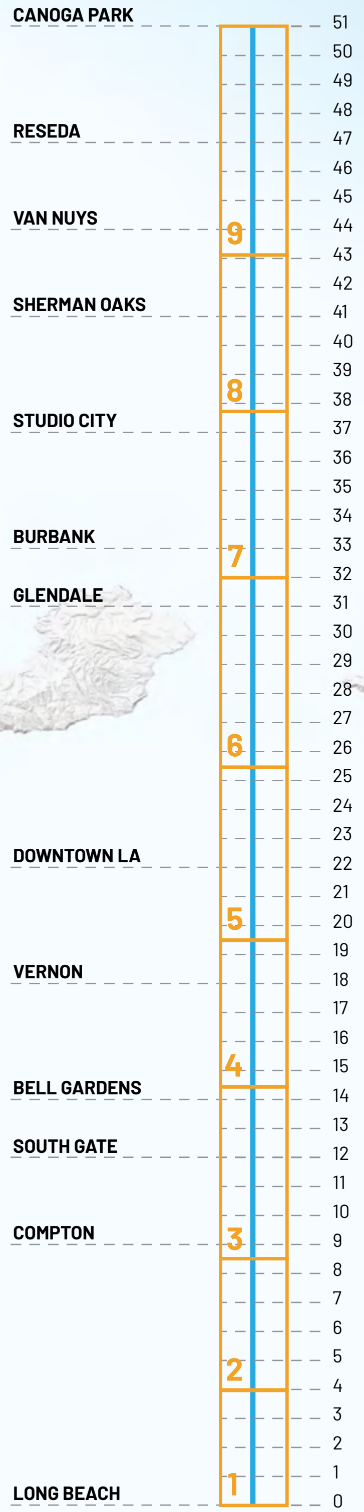
Figure 317. Participants at the South Gate community meeting placed stickers under the Master Plan goals most important to them. Source: LA County Public Works, 2019.

10.
PLANNING FRAMES

IMPLEMENTATION TOOLS FOR THE REIMAGINED RIVER

Implementation of the LA River Master Plan requires champions to lead projects along various stretches of the river. The Master Plan uses nine geographical frames to assist in project implementation. The project sites, ranging from extra-small to extra-large, along with regional and local connectivity opportunities illustrate how the reimagined river can take shape in the next 25 years.

LA River Frames



INTRODUCTION TO FRAMES

A series of nine geographical frames assists in understanding where specific site opportunities are located in relation to municipal, hydraulic, and ecological zones. There is no single design solution that is applicable to all 51-miles of the LA River, therefore, it is critical to understand where a site is located in the larger context of the river as well as its local context. The frames allow river champions to take responsibility for specific sections of the Master Plan implementation and work together to bring them into reality.

The use of the frame is purposeful—it illustrates how the areas adjacent to a river reach are critical to understand in planning and implementing a connected and accessible river corridor. As projects are implemented along the river, the characteristics of each frame are a useful reference for designers. The Design Guidelines illustrate channel characteristics, landside right-of-way characteristics, notable features, and significant design considerations for each frame. The Appendix Volume II: Technical Backup Document includes detailed maps of each frame.

The nine frames are divided as follows:

Frame 9 - West Valley: City of Los Angeles; river mile 51.0 - 43.1

Frame 8 - Mid Valley: City of Los Angeles; river mile 43.1 - 37.8

Frame 7 - East Valley: Cities of Los Angeles & Burbank; river mile 37.8 - 32.0

Frame 6- Narrows: Cities of Los Angeles, Burbank & Glendale; river mile 32.0 - 24.5

Frame 5 - Heights: City of Los Angeles; river mile 24.5 - 19.5

Frame 4 - North Plain: Cities of Bell Gardens, Bell Maywood Vernon, Commerce; river mile 19.5 - 14.14

Frame 3 - Central Plain: Cities of Compton, Paramount, Downey, Lynwood, South Gate, and Cudahy; river mile 14.14 - 8.4

Frame 2 - South Plain: City of Long Beach; river mile 8.4 - 4.0

Frame 1 - Estuary: City of Long Beach; river mile 4.0 - 0.0

Figure 318. LA River Planning Frames.

FRAME 9: WEST VALLEY

Location: City of Los Angeles; river mile 51 - 43.1

Channel Characteristics: The channel in this frame begins as a soft bottom with riparian edges at Sepulveda Basin, and transitions to entrenched trapezoidal concrete channel at mile 45.5. with a typical width of 180 ft. At mile 51, the channel transitions to an entrenched concrete box channel with a typical width of approximately 60 ft.

Average Channel Slope: 0.2%

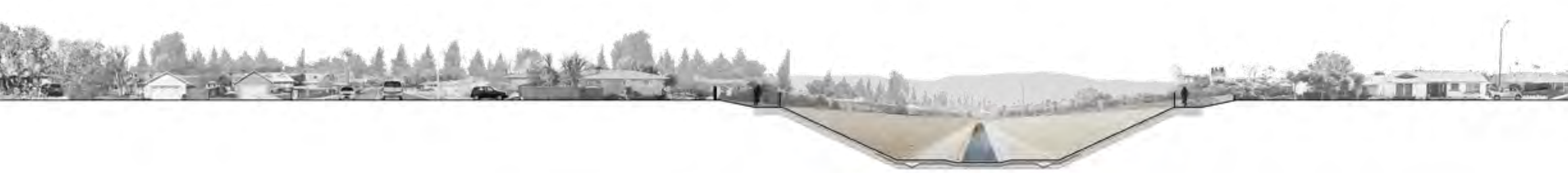
Landside Right-of-Way Characteristics: In this frame, the landside right-of-way ranges from 20-30 ft with a few larger tracts in the western portion of Canoga Park that are closer to 40-50 ft in width. The eastern soft bottom portion of the river channel has no landside right-of-way in Sepulveda Basin for approximately two miles (about 25% of the frame).

Notable Features:

- Dense residential context
- Bell Creek confluence at river mile 51 - also the location of Canoga Park High School
- Browns Canyon Wash confluence at river mile 49.8
- Aliso Canyon Wash confluence at river mile 47.3
- Reseda Park from river mile 46.6 to 47.0 along the right bank
- Sepulveda Basin Recreation Area and Wildlife Reserve from river mile 43.1 to 45.5; a significant ecological area

Significant Design Considerations for this Frame:

- Mile 51 at the Bell Creek confluence marks the headwaters of the LA River and projects nearby should consider the significance of this moment of the LA River.
- Projects in this frame have the opportunity to enhance native habitat and connect to other important habitat area in the region, such as the Santa Monica Mountains.
- Sepulveda Basin occurs in this frame, and as a soft-bottomed sediment basin approximately 2,000 acres large, it provides a tremendous opportunity for native habitat and biodiversity.
- Generally surface water in the channel portions of this frame is insignificant, except during rain events.



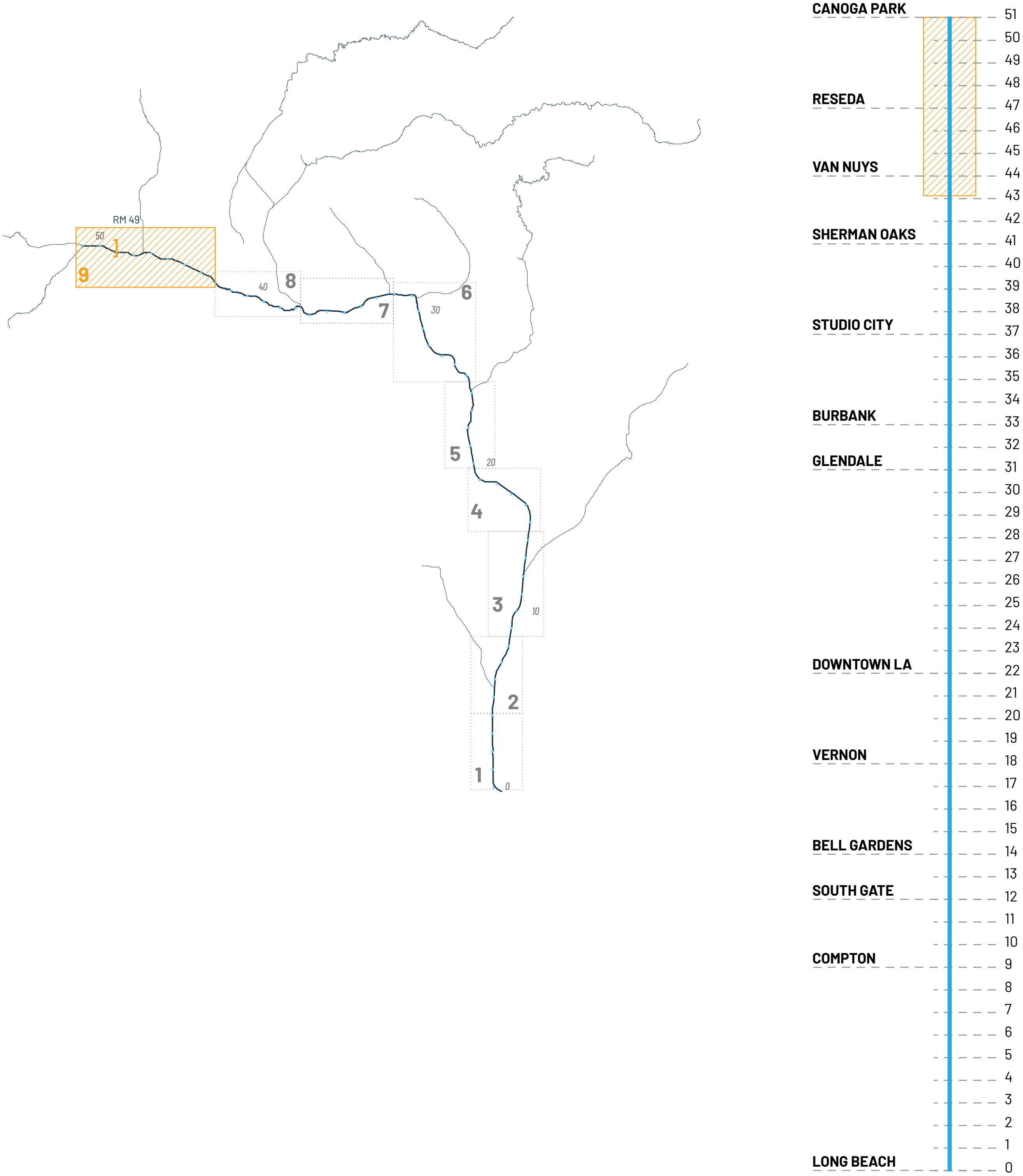
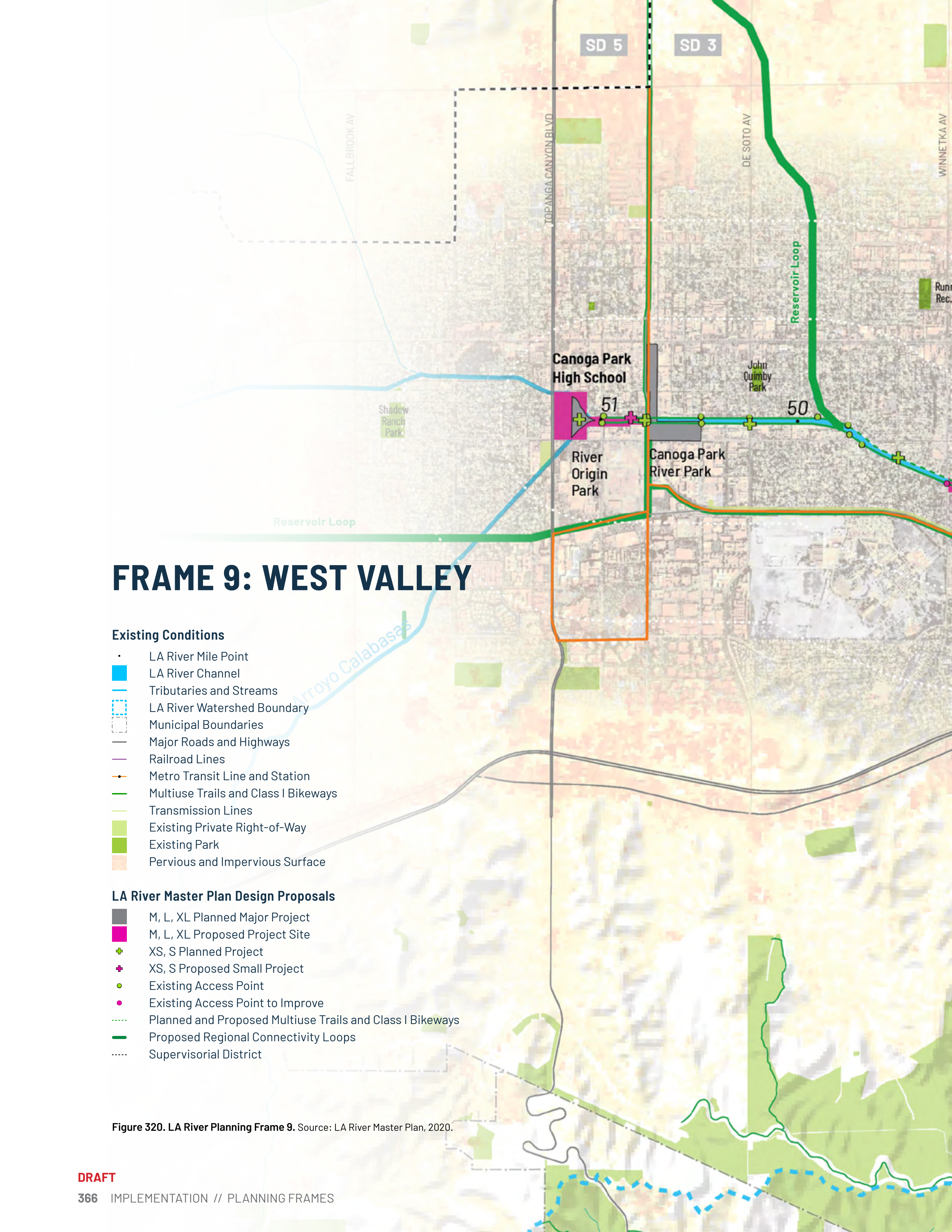


Figure 319. LA River Planning Frame 9. Source: LA River Master Plan, 2020.



FRAME 9: WEST VALLEY

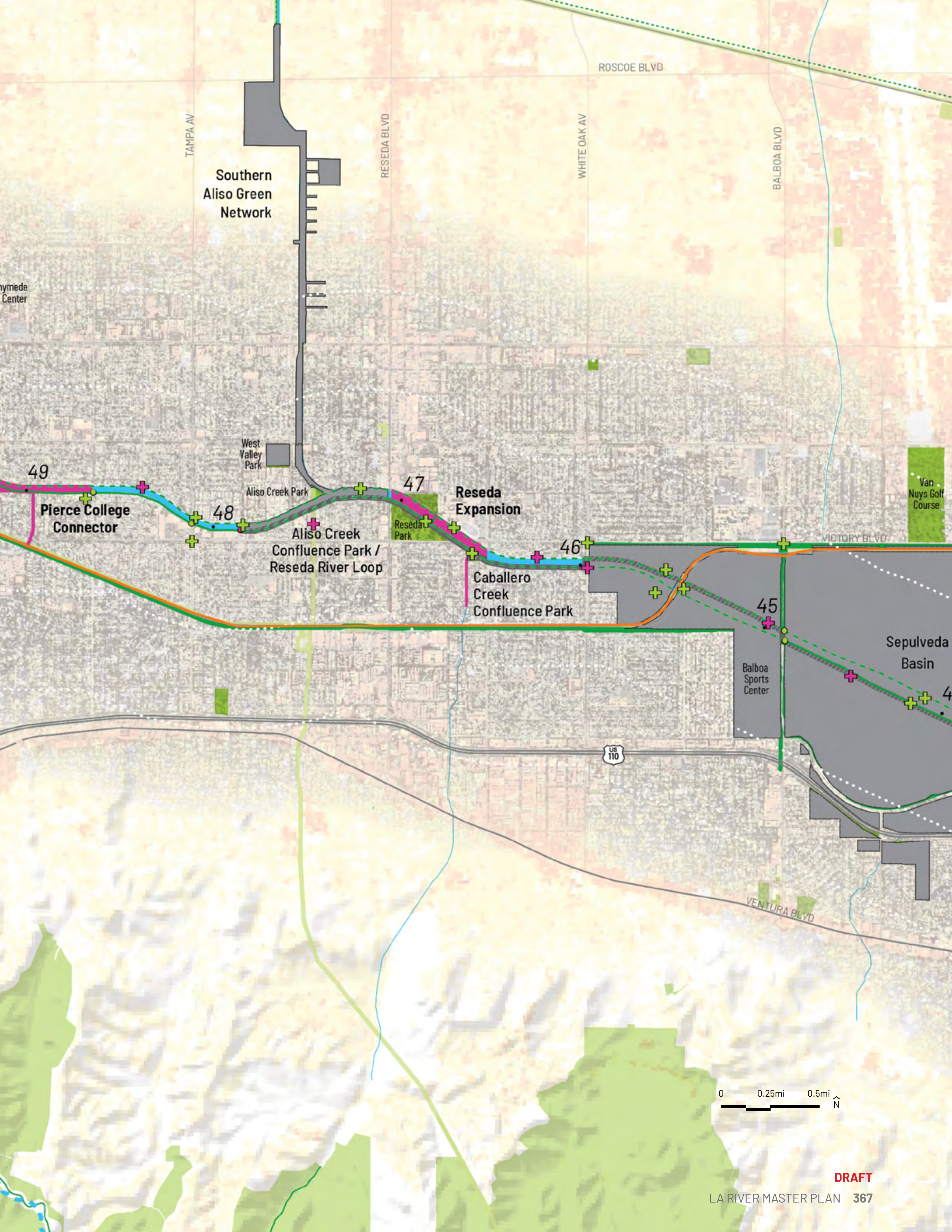
Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 320. LA River Planning Frame 9. Source: LA River Master Plan, 2020.


ROSCOE BLVD
TAMPA AV
RESEDA BLVD
WHITE OAK AV
BALBOA BLVD
Southern Aliso Green Network
West Valley Park
49
48
47
46
45
Pierce College Connector
Aliso Creek Park
Aliso Creek Confluence Park / Reseda River Loop
Reseda Park
Reseda Expansion
Caballero Creek Confluence Park
Van Nuys Golf Course
VICTORY BLVD
Sepulveda Basin
Balboa Sports Center
110
VENTURA BLVD
0
0.25mi
0.5mi
N

DRAFT

FRAME 8: MID VALLEY

Location: City of Los Angeles; river mile 43.1 - 37.8

Channel Characteristics: In this frame, the channel is an entrenched rectangular box concrete channel with a typical width of 60 ft.

Average Channel Slope: 0.3%

Landside Right-of-Way Characteristics: In this frame, the landside right-of-way ranges from 30-60 ft before terminating at the northwestern edge of the frame where Sepulveda Basin begins.

Notable Features:

- Dense residential context
- Several greenways from river mile 37.8 to 38.6 along the right bank, from river mile 38.7 to 39.1 along the left bank, and from river mile 39.2 to 39.7 along both the left and right banks

Significant Design Considerations for this Frame:

- The sections of the frame with a narrower right-of-way may require using the width of the channel or external land acquisition for projects of larger impact.
- Mutltiuse trails and access for wildlife should both be accommodated, even in tighter right-of-way space. Methods such as habitat ramps into the channel may be considered.
- Connections for wildlife could also be made to the multiple creeks of the Santa Monica Mountains in this area.

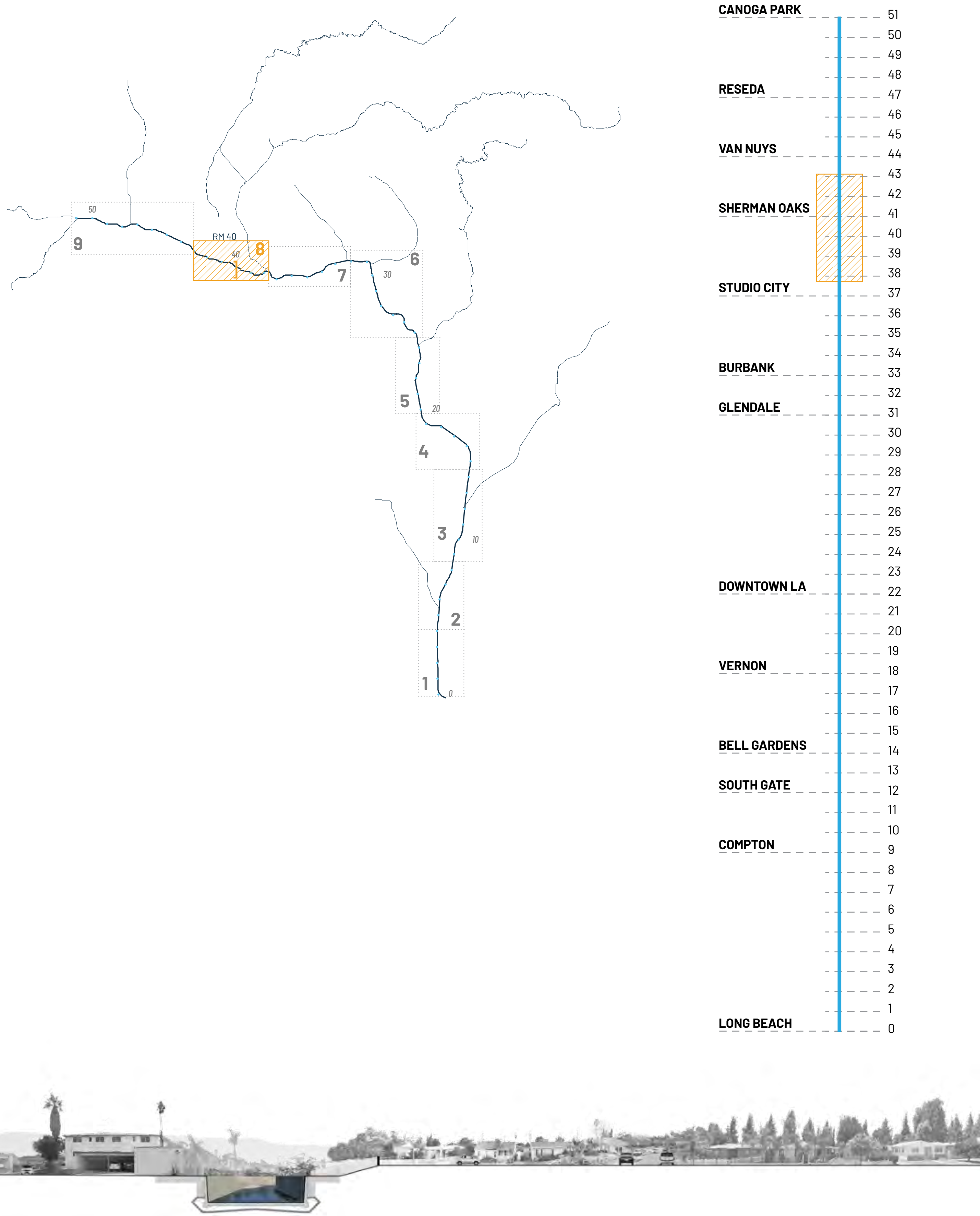
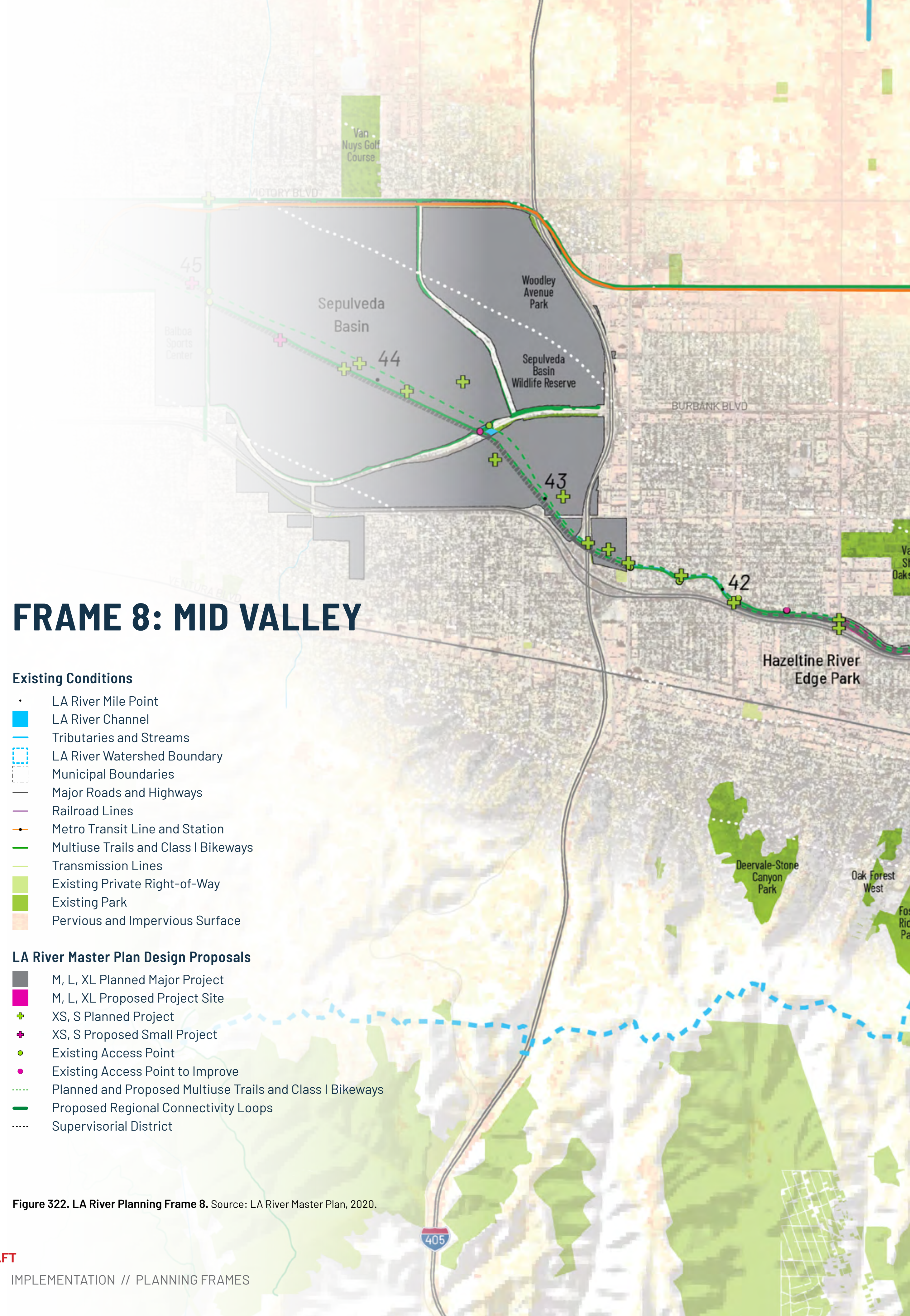


Figure 321. LA River Planning Frame 8. Source: LA River Master Plan, 2020.



FRAME 8: MID VALLEY

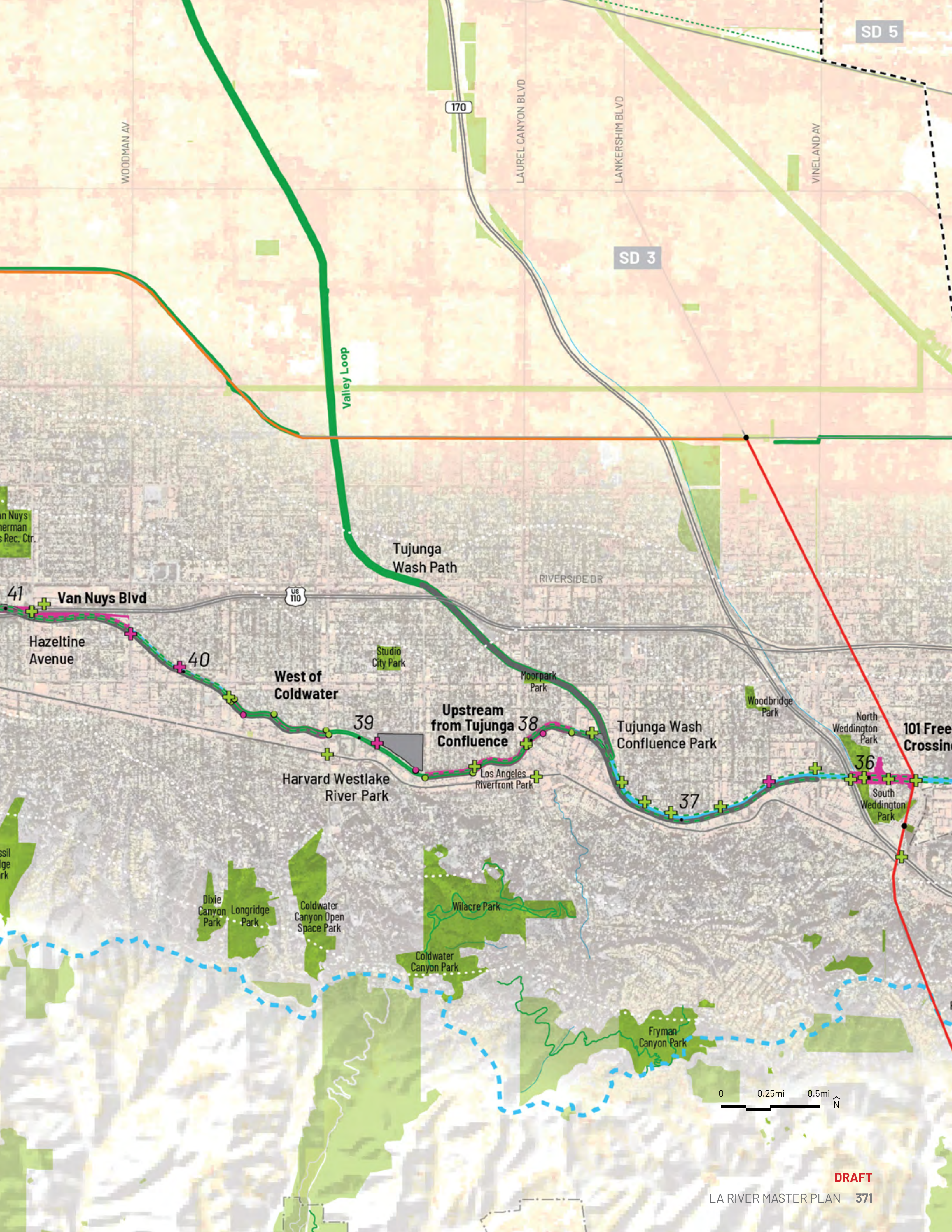
Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 322. LA River Planning Frame 8. Source: LA River Master Plan, 2020.



SD 5
170
WOODMAN AV
LAUREL CANYON BLVD
LANKERSHIM BLVD
VINELAND AV
SD 3
Valley Loop
Tujunga Wash Path
RIVERSIDE DR
41
Van Nuys Blvd
Hazeltine Avenue
40
West of Coldwater
Studio City Park
39
Upstream from Tujunga Confluence
38
Moorpark Park
Tujunga Wash Confluence Park
Woodbridge Park
North Weddington Park
36
South Weddington Park
37
Los Angeles Riverfront Park
Harvard Westlake River Park
Dixie Canyon Park
Longridge Park
Coldwater Canyon Open Space Park
Wilacre Park
Coldwater Canyon Park
Fryman Canyon Park
0
0.25mi
0.5mi
N

DRAFT

FRAME 7: EAST VALLEY

Location: Cities of Los Angeles and Burbank; river mile 37.8 - 32.0

Channel Characteristics: The channel in this frame is an entrenched rectangular box concrete channel, with a typical width of approximately 130 ft.

Average Channel Slope: 0.6%

Landside Right-of-Way Characteristics: As the channel narrows in Frame 7, landside right-of-way increases to 30-50 ft with a couple of large parcels that extend 200-450 ft into adjacent development. However, there is also approximately a mile on each bank (about 20% of the frame) where there is no landside right-of-way due to Warner Brothers and Universal Studios and the Lakeside Golf Course. The landside right-of-way parcels in this frame are both north and south facing, sometimes on slopes.

Notable Features:

- Dense residential context
- Tujunga Wash confluence at river mile 37.5
- Lakeside Golf Club from river mile 34.6 to 35.6 along the left bank, no ROW
- Warner Bros Studios from approximately river mile 34 to 34.5 along the left bank, no ROW
- Adjacent to Griffith Park from approximately river mile 32 to 34.5 along the right bank
- Sennett Canyon and Creek at river mile 33.5 along the right bank
- Burbank Channel confluence at river mile 32

Significant Design Considerations for this Frame:

- Projects in this frame have the opportunity to enhance native habitat and connect to other important habitat corridors in the region, especially the riparian to upland connection along the right bank with Griffith Park.
- Significant equestrian community in this area would utilize an expanded network of equestrian trails.
- The sections of the frame with no ROW may require using the width of the channel or external land acquisition for projects of larger impact.

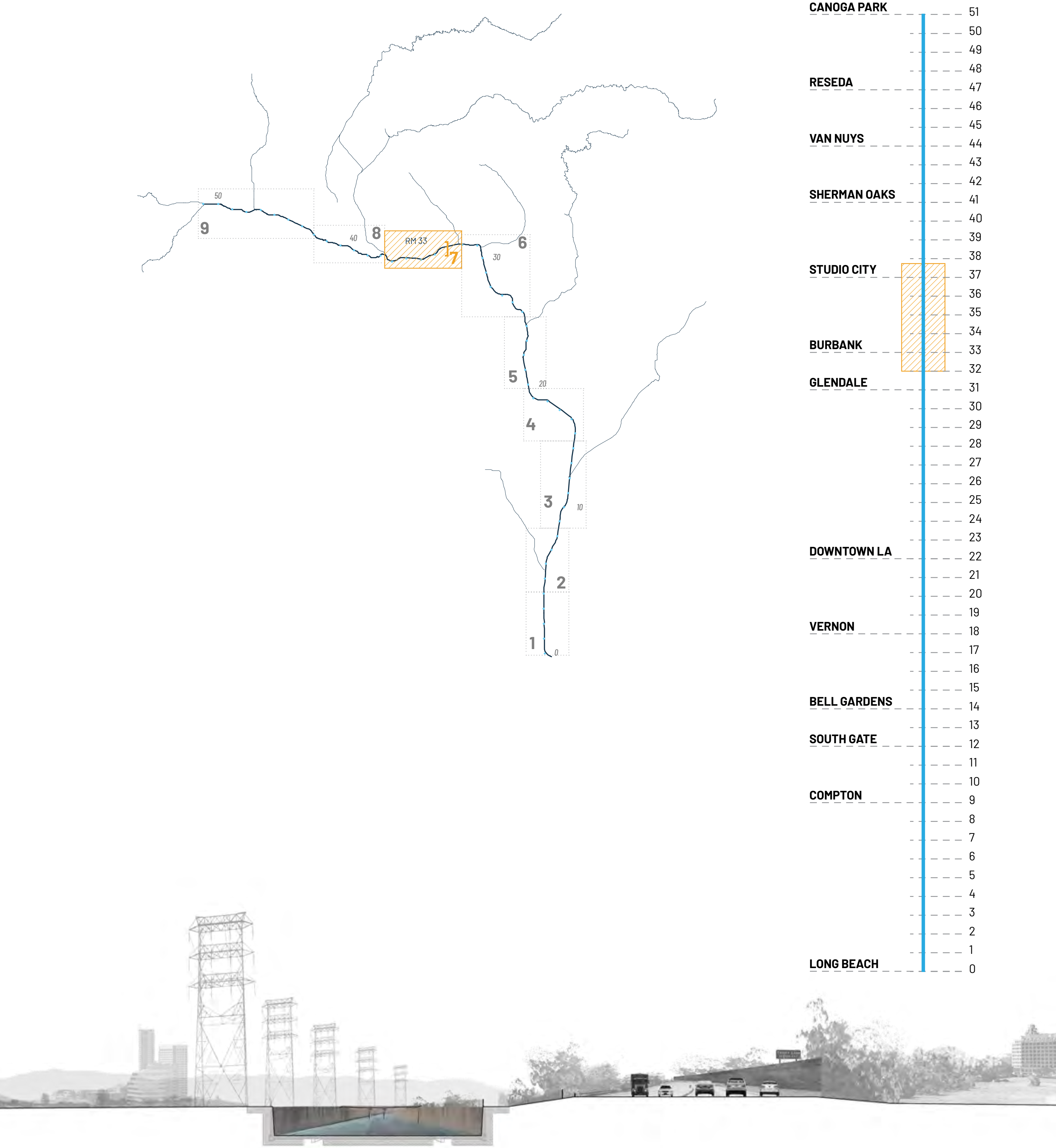
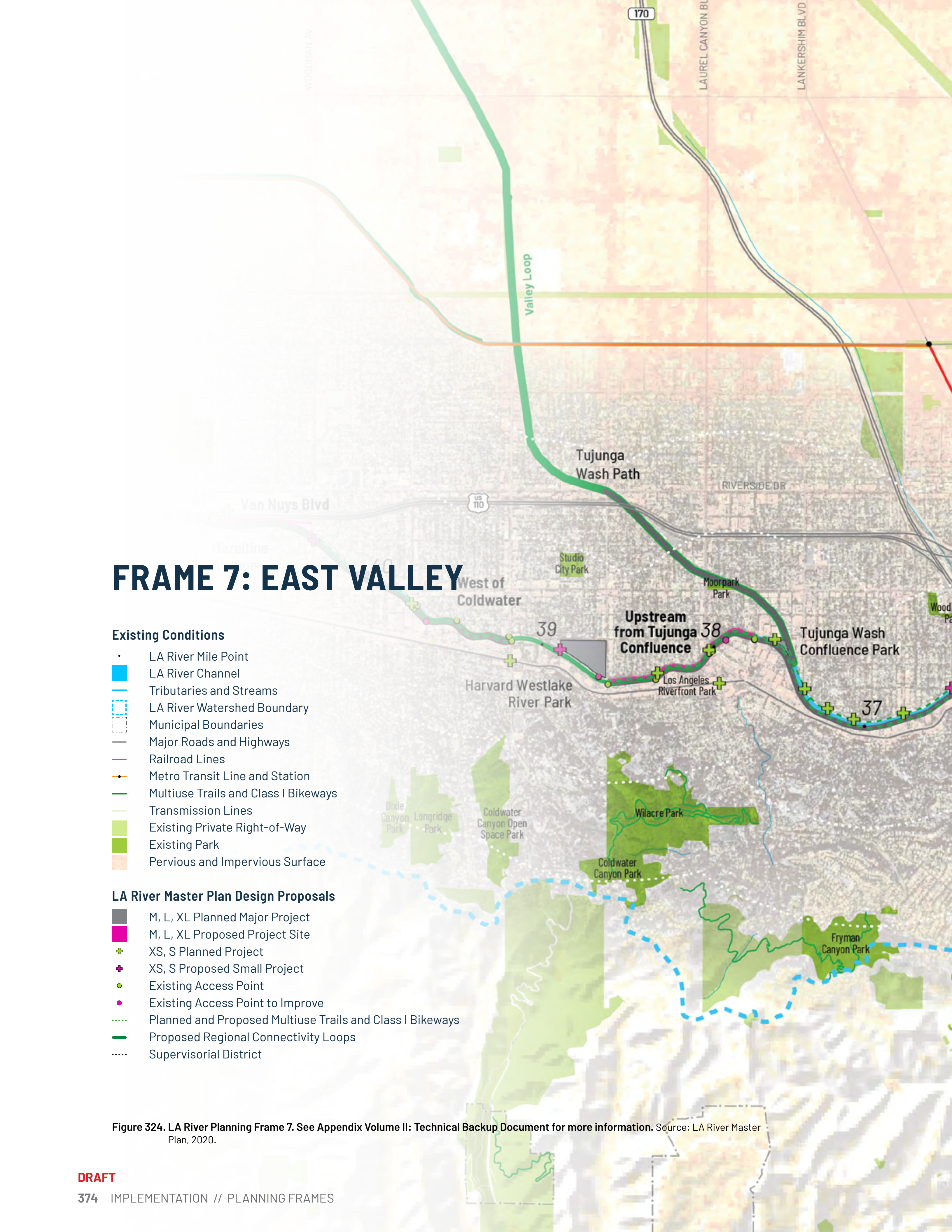


Figure 323. LA River Planning Frame 7. Source: LA River Master Plan, 2020.

FRAME 7: EAST VALLEY



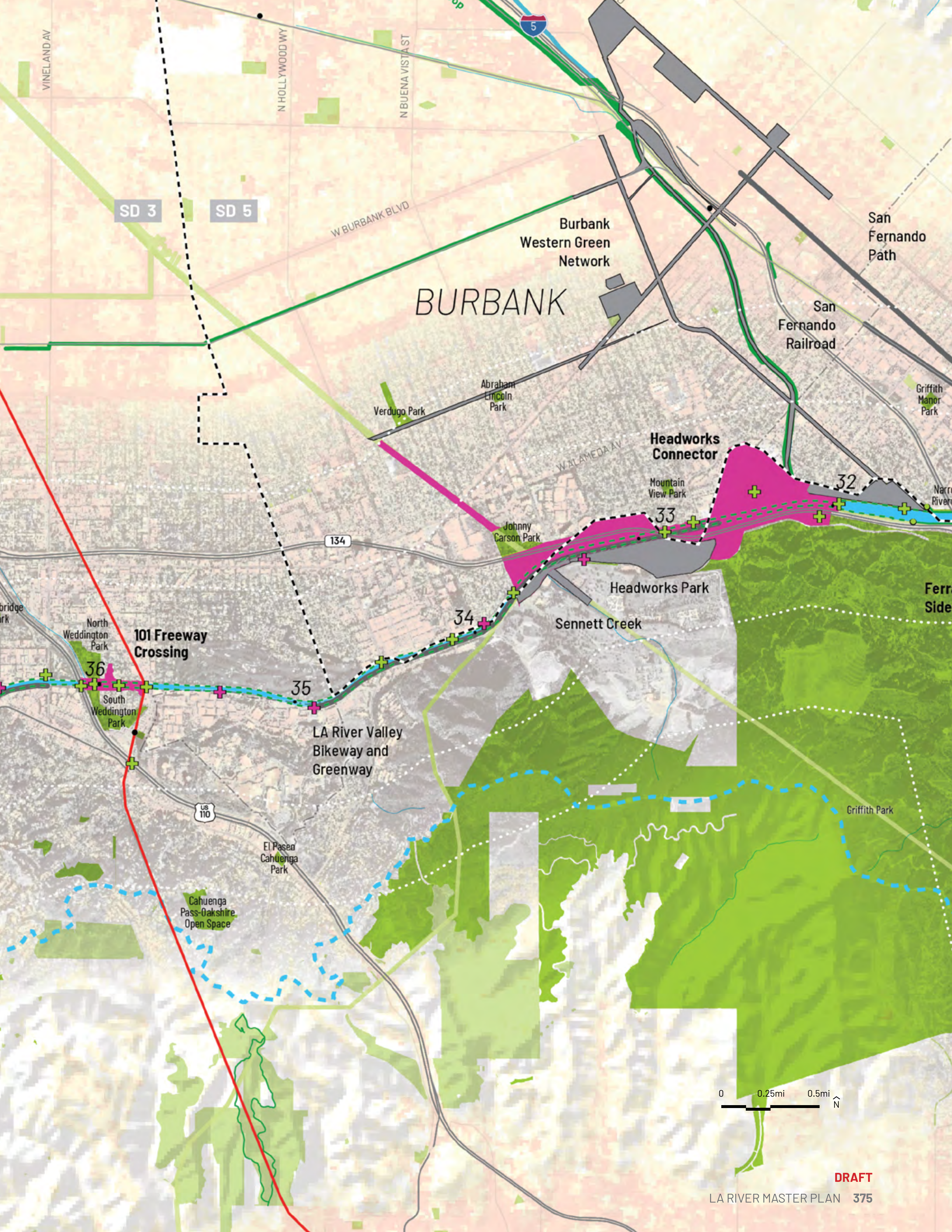
Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 324. LA River Planning Frame 7. See Appendix Volume II: Technical Backup Document for more information. Source: LA River Master Plan, 2020.


VINELAND AV
N HOLLYWOOD WY
N BUENA VISTA ST
SD 3
SD 5
W BURBANK BLVD
Burbank Western Green Network
BURBANK
San Fernando Path
San Fernando Railroad
Verdugo Park
Abraham Lincoln Park
Griffith Manor Park
W ALAMEDA AV
Headworks Connector
Mountain View Park
32
33
Johnny Carson Park
134
Headworks Park
Sennett Creek
34
North Weddington Park
101 Freeway Crossing
36
35
South Weddington Park
LA River Valley Bikeway and Greenway
US 110
El Paseo Cahuenga Park
Cahuenga Pass-Oakshire Open Space
Griffith Park
0
0.25mi
0.5mi
N

DRAFT

FRAME 6: NARROWS

Location: Cities of Los Angeles, Burbank, and Glendale; river mile 32.0 - 24.5

Channel Characteristics: In this frame, the channel is primarily soft bottom with entrenched trapezoid concrete walls. Typical channel width is approximately 300 ft. The channel bottom becomes concrete for about a half mile stretch as the river turns a corner just north of the Verdugo Wash confluence.

Average Channel Slope: 0.4%

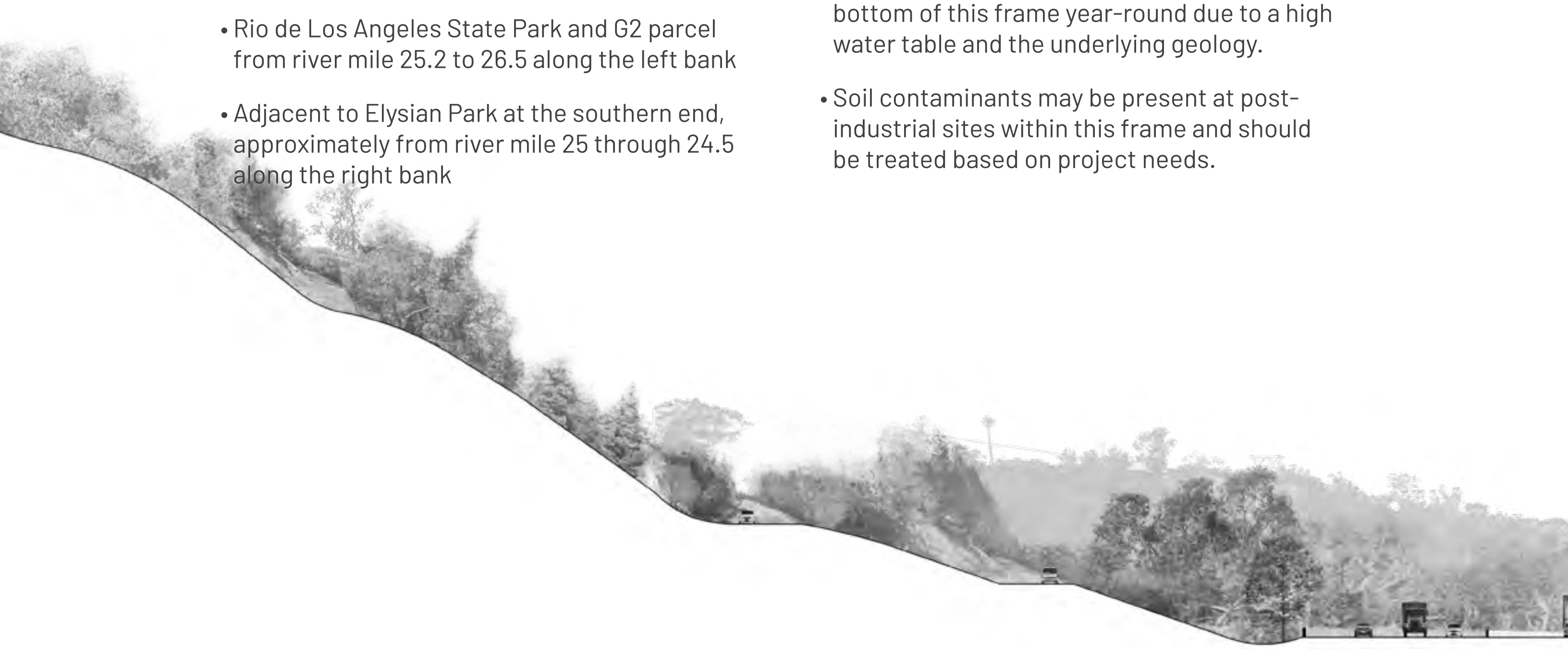
Landside Right-of-Way Characteristics: In this frame, the landside right-of-way ranges between 12-30 ft. There are also some gaps in the landside right-of-way along each bank. It consists of northeast and southwest facing parcels.

Notable Features:

- Significant ecological area with adjacency to Griffith Park from approximately river mile 28.5 through 32 along the right bank
- Barrier between the river and Griffith Park in this frame due to the 5 Freeway and Ventura Freeway
- Heavy sediment and vegetation are present in the channel
- River trail and park improvements
- Verdugo Wash confluence at river mile 30.6 along the left bank
- Rio de Los Angeles State Park and G2 parcel from river mile 25.2 to 26.5 along the left bank
- Adjacent to Elysian Park at the southern end, approximately from river mile 25 through 24.5 along the right bank

Significant Design Considerations for this Frame:

- Projects in this frame have the opportunity to enhance native habitat and connect to other important habitat corridors in the region (Santa Monica Mountains), although freeway barriers have to be considered in these connections.
- Flooding is a particular concern for residents in this community.
- Significant equestrian community in this area would utilize an expanded network of equestrian trails.
- Surface water is present in the channel bottom of this frame year-round due to a high water table and the underlying geology.
- Soil contaminants may be present at post-industrial sites within this frame and should be treated based on project needs.



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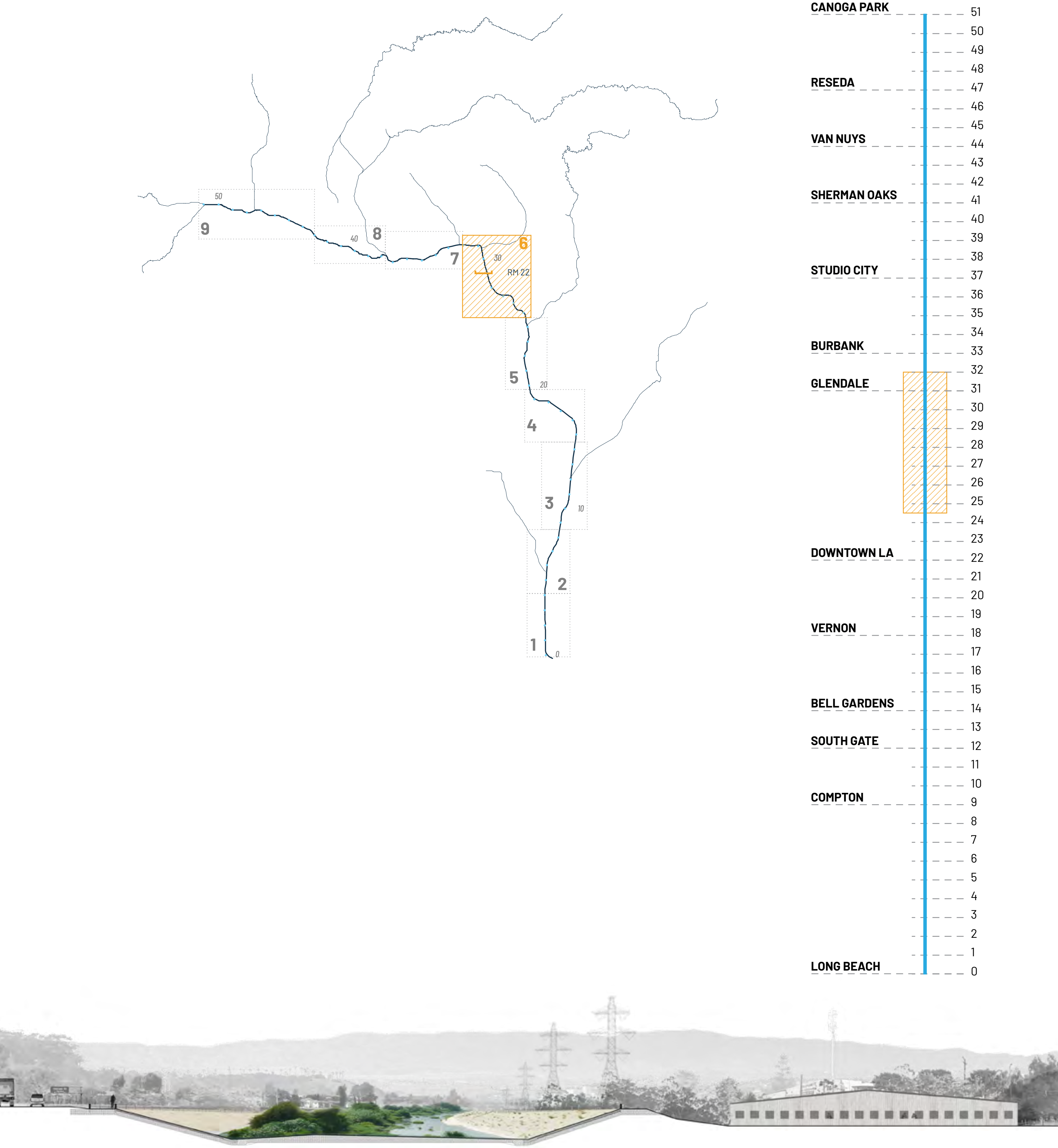
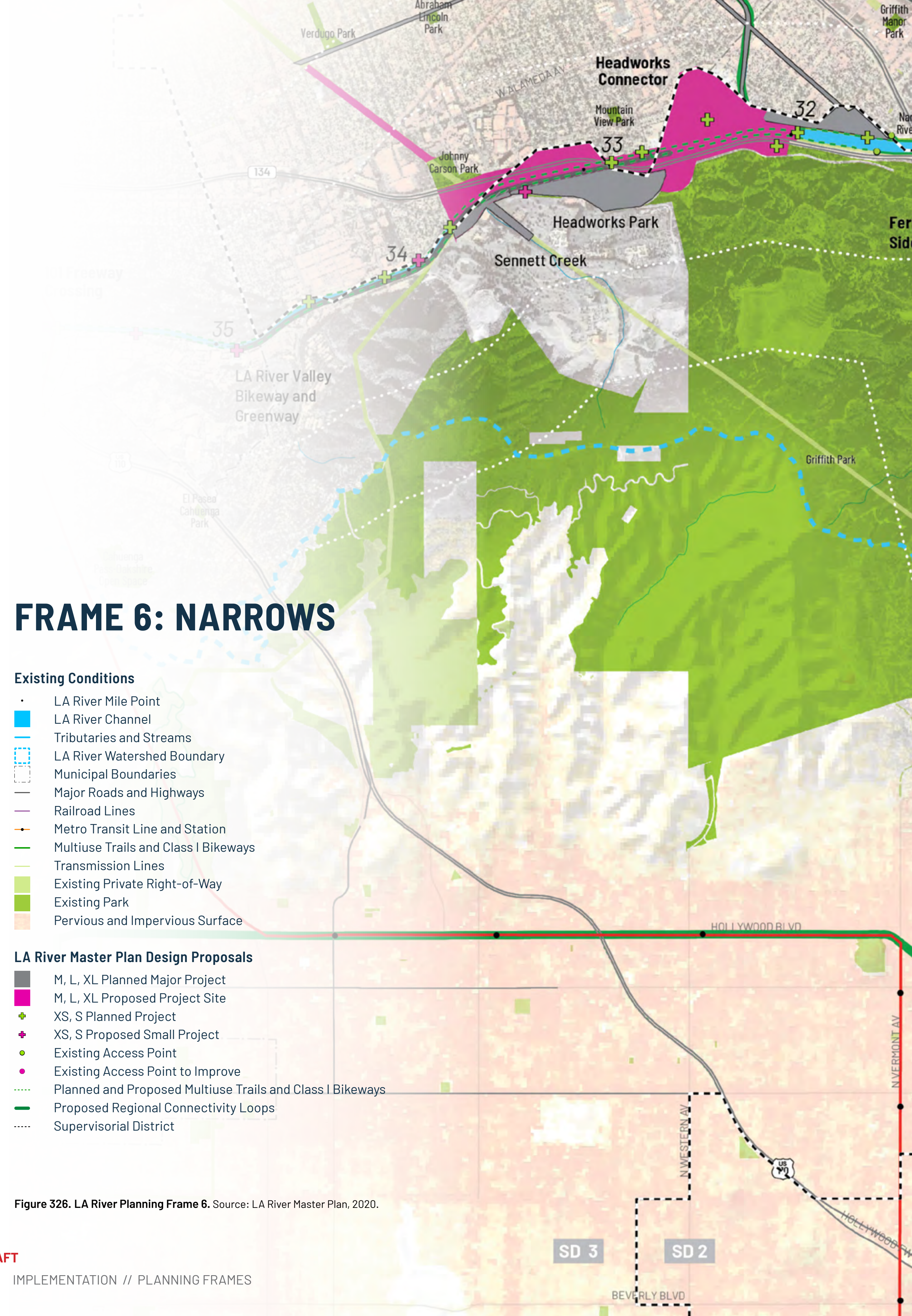


Figure 325. LA River Planning Frame 6. Source: LA River Master Plan, 2020.



FRAME 6: NARROWS

Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 326. LA River Planning Frame 6. Source: LA River Master Plan, 2020.


GLENDALE
Pelanconi Park
Glendale Riverwalk Non-Motorized Bridge
31
Glendale Narrows Riverwalk
Fremont Park
Verdugo Wash
134
River Glen Wetlands
30
Pacific Community Pool
S BRAND BLVD
GLENDALE FWY
North Atwater Park
Chevy Chase Park
North Atwater Crossing
29
2
SD 5
SD 1
Los Feliz Golf Course
EAGLE ROCK BLVD
SAN FERNANDO RD
Juntos Park
Glassell Park and Rec. Center
28
Sunnynook Park
Red Car Bridge
27
Marsh Park
G1 Bowtie
Elyria Canyon Park
G2 Taylor Yard
26
Silver Lake Meadows Park
Elysian Valley Rec. Center
Rio de Los Angeles SP
Taylor Yard Non-Motorized Bridge
Lost River Loop
5
25
Dorris Place Sanitation Yard
Cypress Recreation Center
Los Angeles River Center and Gardens
0
0.25mi
0.5mi
N
Heritage Square
Mount Olympus Park
Elysian Park
GLENDALE BLVD
Arroyo Seco Confluence
24
DRAFT

FRAME 5: HEIGHTS

Location: City of Los Angeles; river mile 24.5 - 19.5

Channel characteristics: The channel in this frame is an entrenched concrete trapezoid section, with a typical width of 225 ft.

Average Channel Slope: 0.4%

Landside Right-of-Way Characteristics: In this frame, the landside right-of-way is typically less than 12 ft wide, widening at the northern edge. It consists of south, east, and west facing parcels.

Notable Features:

- Dense urban context - Downtown Los Angeles adjacent, several notable historic bridges
- High concentration of arts and cultural facilities
- Railroad lines and larger industrial yards along both sides of the river, several former industrial areas
- Los Angeles State Historic Park near river mile 23.5 along the right bank
- Arroyo Seco confluence near river mile 24, where the 110 freeway crosses the LA River

Significant Design Considerations for this Frame:

- Soil contaminants and air pollution mitigation and treatment are especially important in post-industrial sites prevalent in this frame.
- The often narrow right-of-way may require using the width of the channel or external land acquisition for projects of larger impact.
- Railroads and other transportation networks make it challenging to access the river in this frame.
- Surrounding urban development increases the urban heat island effect, so providing shade is critical.

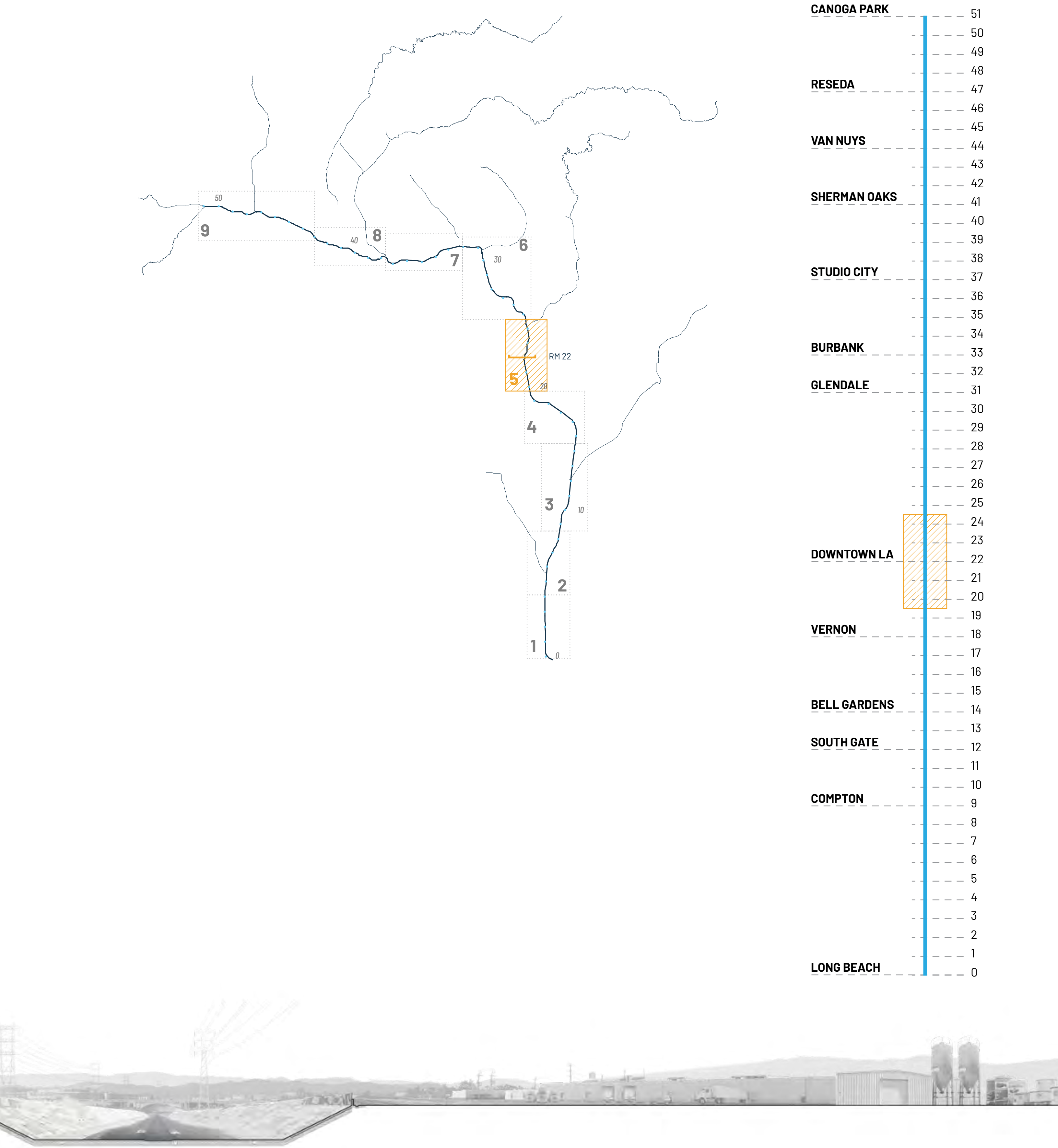


Figure 327. LA River Planning Frame 5. Source: LA River Master Plan, 2020.

FRAME 5: HEIGHTS

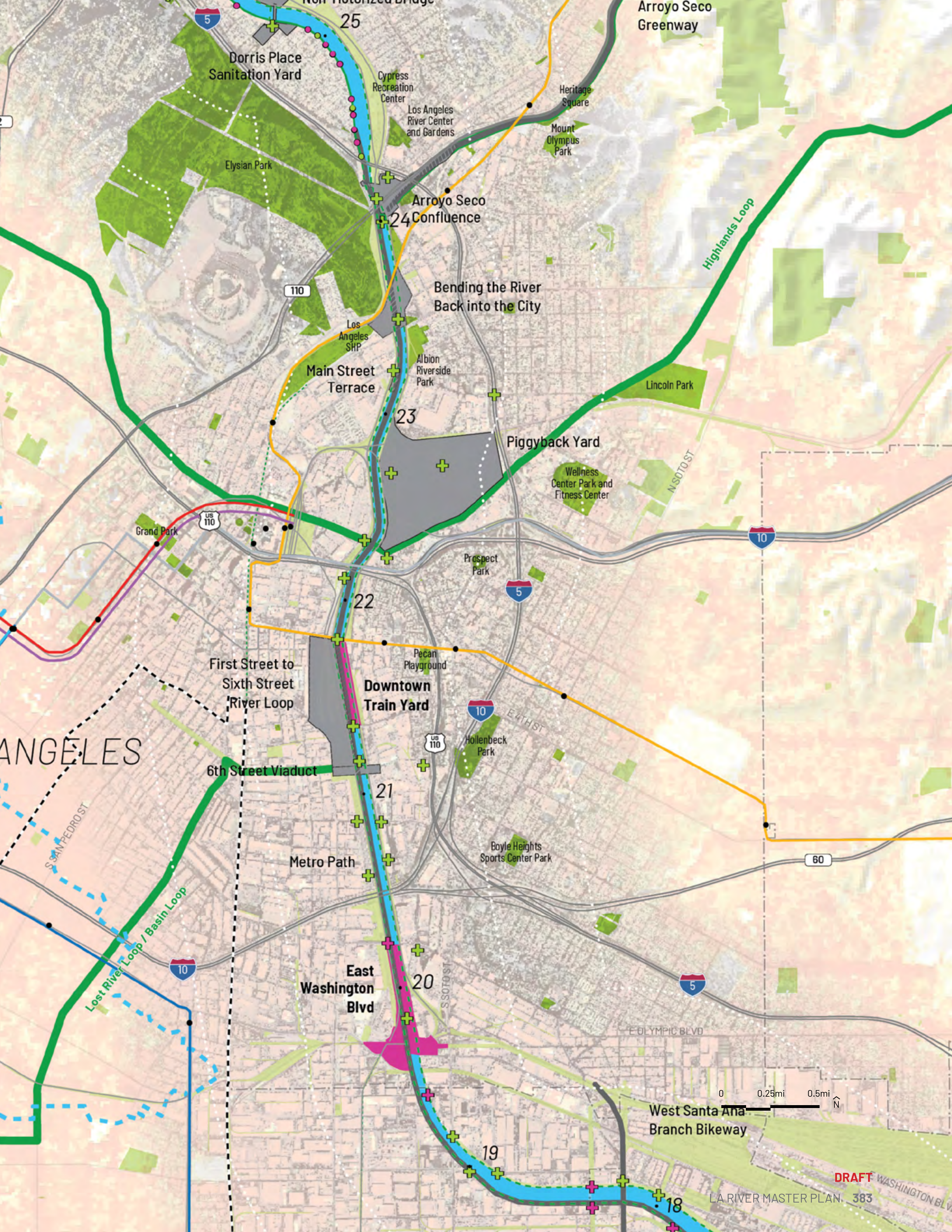
Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 328. LA River Planning Frame 5. Source: LA River Master Plan, 2020.



Non-Motorized Bridge
25
Arroyo Seco Greenway
Dorris Place Sanitation Yard
Cypress Recreation Center
Los Angeles River Center and Gardens
Heritage Square
Mount Olympus Park
Elysian Park
Arroyo Seco Confluence
24
Highlands Loop
110
Bending the River Back into the City
Los Angeles SHP
Main Street Terrace
Albion Riverside Park
Lincoln Park
23
Piggyback Yard
Wellness Center Park and Fitness Center
N SOTO ST
Grand Park
10
Prospect Park
5
22
Pecan Playground
First Street to Sixth Street River Loop
Downtown Train Yard
E 4TH ST
Hollenbeck Park
ANGELES
6th Street Viaduct
21
S SAN PEDRO ST
Boyle Heights Sports Center Park
60
Metro Path
Lost River Loop / Basin Loop
East Washington Blvd
20
S SOTO ST
E OLYMPIC BLVD
0
0.25mi
0.5mi
N
West Santa Ana Branch Bikeway
19
18
WASHINGTON BLVD

FRAME 4: NORTH PLAIN

Location: Cities of Bell Gardens, Bell, Maywood, Vernon, Commerce, Huntington Park; river mile 19.5 - 14.14

Channel Characteristics: The channel in this frame is a concrete leveed trapezoidal section that is approximately 415 ft wide at the southernmost end. It transitions to a concrete entrenched trapezoidal section and then to a concrete entrenched rectangular section at river mile 19 at the northern end, with a width of about 285 ft

Average Channel Slope: 0.2%

Landside Right-of-Way Characteristics: In this frame, industrial development and several adjacent rail lines limit the landside right-of-way to consistently less than 15 ft. In the northern portion of the frame, there is no landside right-of-way along the right bank. Right-of-way parcels in this frame are south, east, and west facing.

Notable Features:

- Dense industrial context
- Pollution and soil contamination present from heavy industry
- Utility rights-of-way and freight yards along both sides of the river
- Maywood Riverfront Park from river mile 15.7 to 15.8 along the right bank

Significant Design Considerations for this Frame:

- Soil contaminant and air pollution mitigation and treatment are especially important in post-industrial sites prevalent in this frame.
- Utility right-of-way projects require further coordination with power companies, but also provide a significant amount of land for corridor connectivity.
- Very high park needs and industrial land uses limit access to the LA River and healthy open space.
- Access to the river is limited by the 710 Interstate so projects may need to consider how barriers to reaching the river can be navigated.

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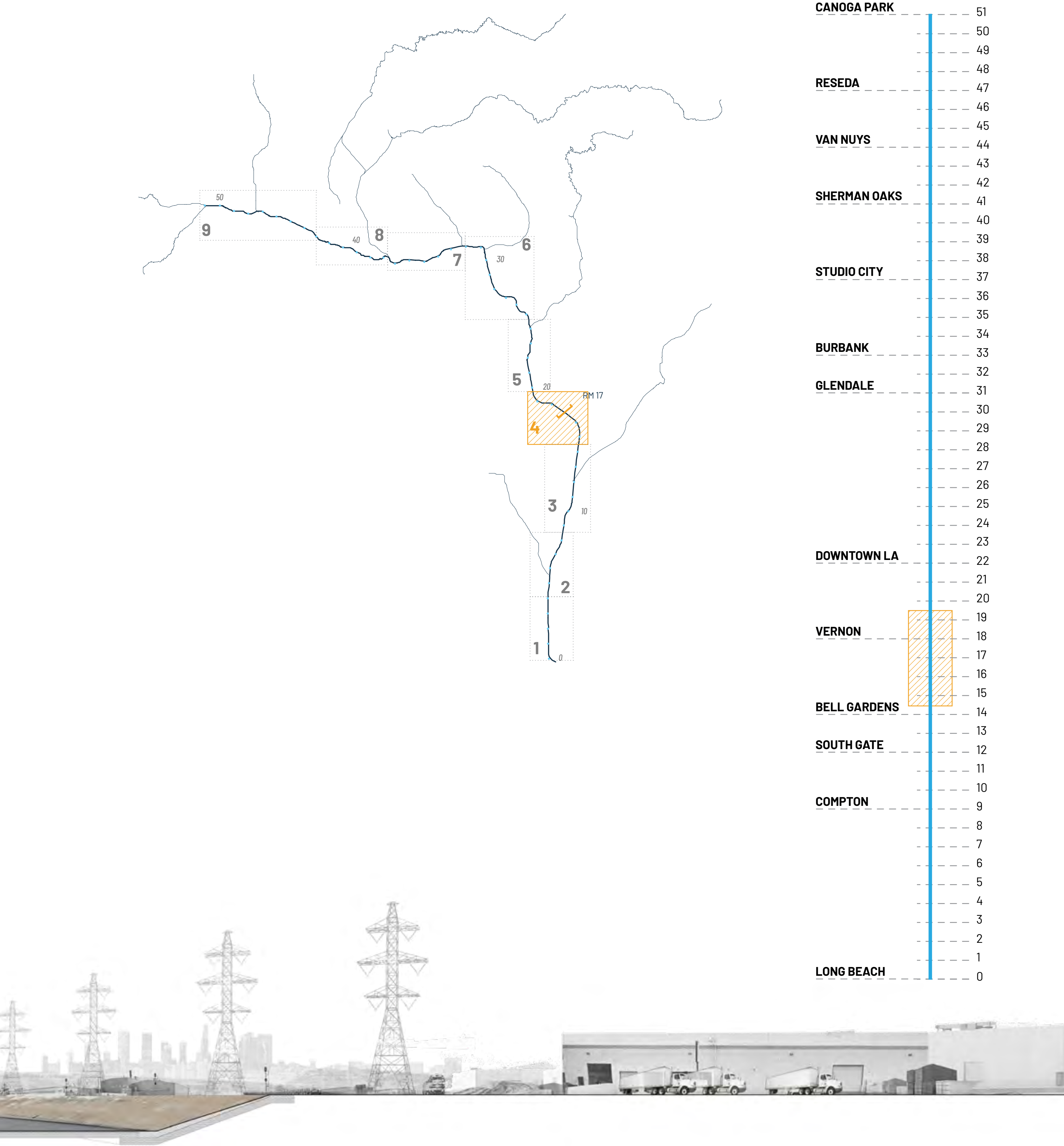
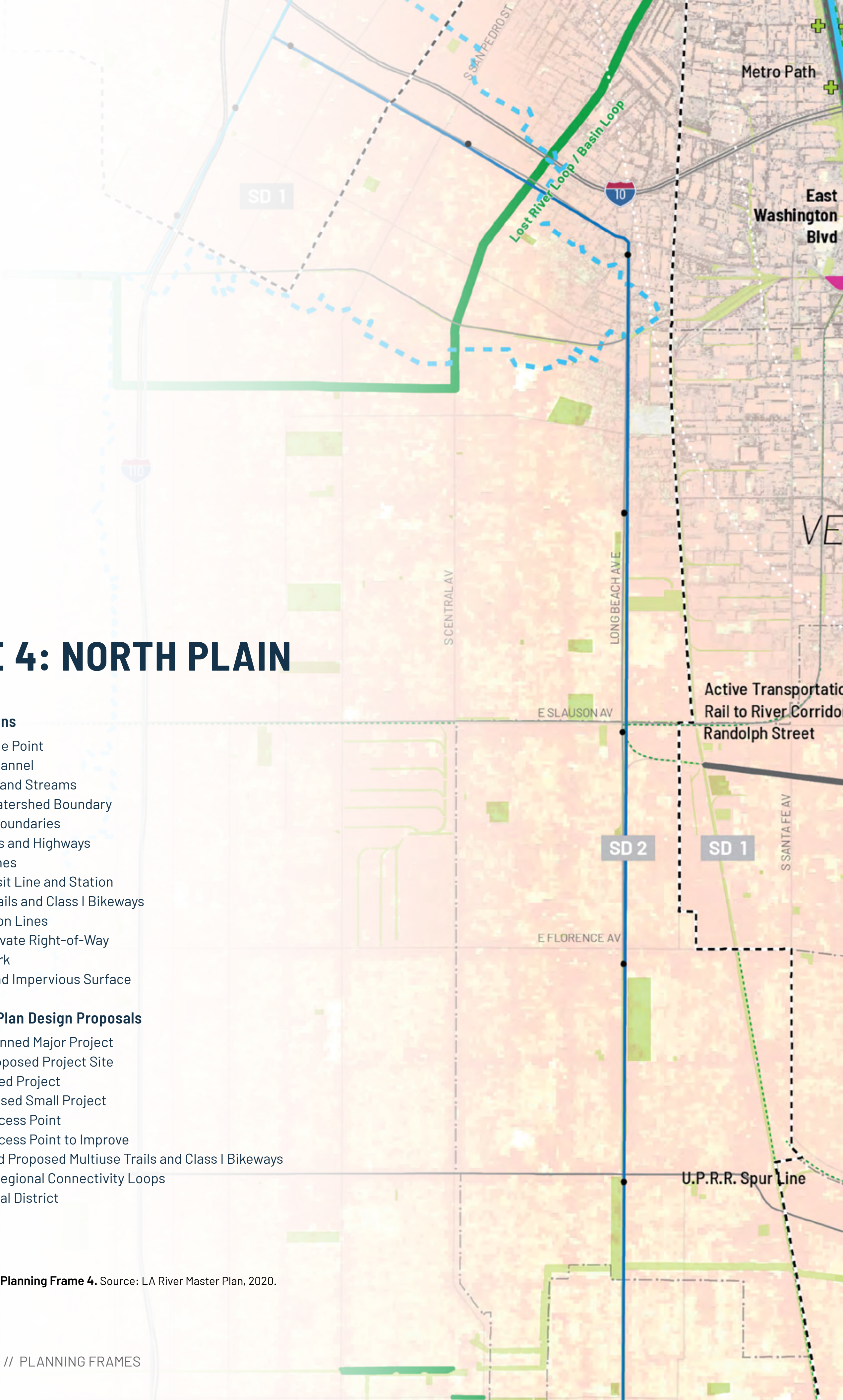


Figure 329. LA River Planning Frame 4. Source: LA River Master Plan, 2020.



FRAME 4: NORTH PLAIN

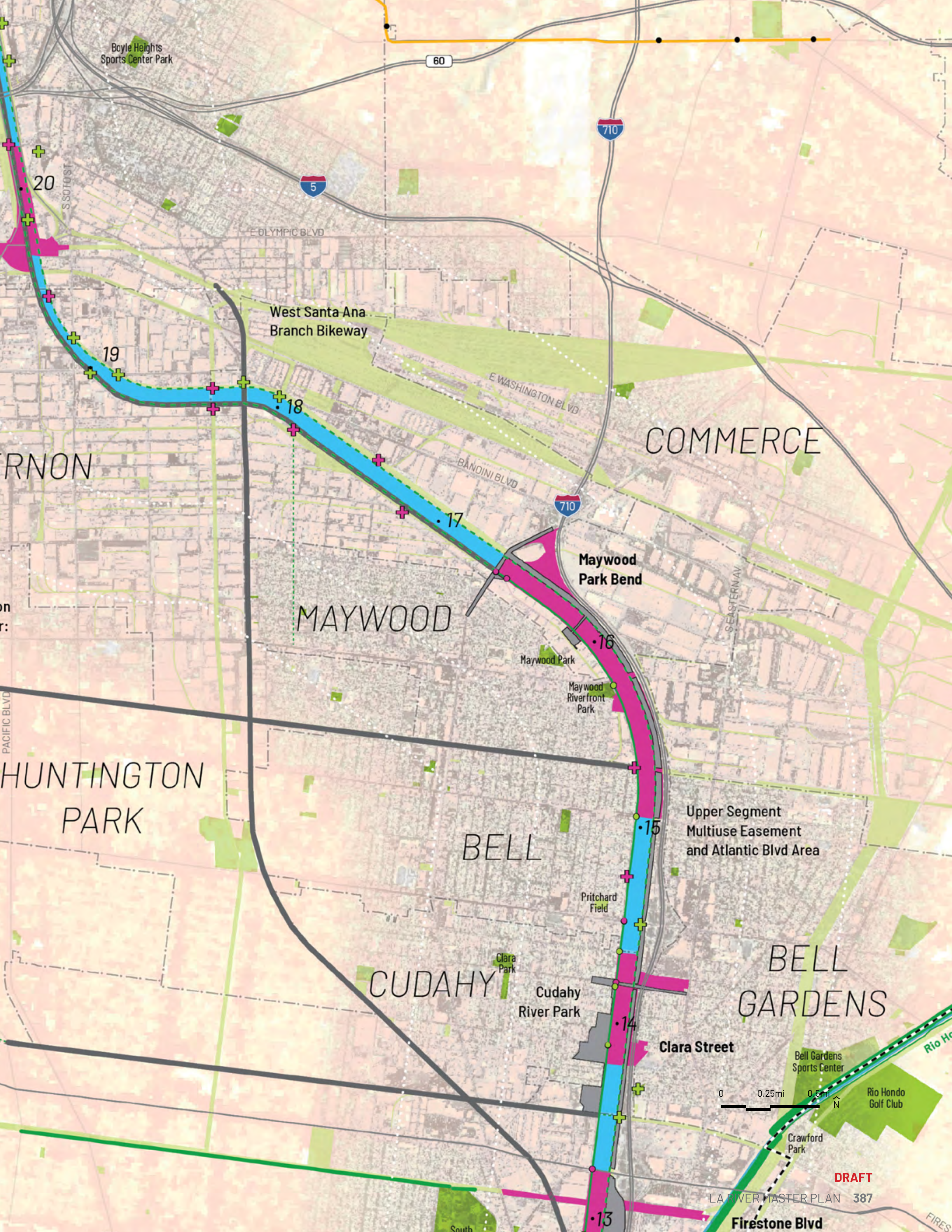
Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 330. LA River Planning Frame 4. Source: LA River Master Plan, 2020.


Boyle Heights Sports Center Park
60
710
5
20
S SOTO ST
E OLYMPIC BLVD
West Santa Ana Branch Bikeway
19
18
E WASHINGTON BLVD
COMMERCE
RNON
BANDINI BLVD
17
710
Maywood Park Bend
MAYWOOD
16
Maywood Park
S EASTERN AV
Maywood Riverfront Park
PACIFIC BLVD
HUNTINGTON PARK
Upper Segment Multiuse Easement and Atlantic Blvd Area
15
BELL
Pritchard Field
Clara Park
CUDAHY
Cudahy River Park
BELL GARDENS
14
Clara Street
Bell Gardens Sports Center
Rio Hondo Golf Club
0
0.25mi
0.5mi
N
Crawford Park
13
Firestone Blvd

FRAME 3: CENTRAL PLAIN

Location: Cities of Compton, Paramount, Downey, Lynwood, South Gate, and Cudahy; river mile 14.14 - 8.4

Channel Characteristics: The channel in this frame is a trapezoidal concrete leveed cross section with an approximate width of 400 ft.

Average Channel Slope: 0.2%

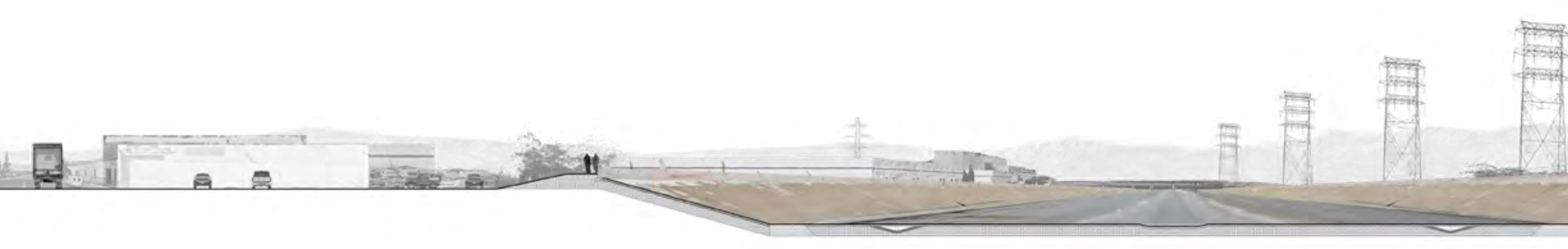
Landside Right-of-Way Characteristics: The landside right-of-way in this frame contains both east and west facing parcels, and is further limited by industrial and residential development, transmission easements, and Interstate 710 and the 105. It exists for extensive lengths at about 15 ft in width. However, there are large 200 ft wide tracts of the right-of-way incorporated into recreational park space (Ralph C. Dills and Hollydale Parks along with portions of the LA River Trail). Dense residential context, east and west facing parcels along levee of varying widths, areas typically 15 ft wide, in addition to utility corridors.

Notable Features:

- Dense residential context
- Utility ROWs along the left bank of the river
- Rio Hondo confluence at river mile 12.0 along the left bank
- Hollydale Park from river mile 11 to 11.5 along the left bank
- Ralph C. Dils Park from river mile 9.5 to 10.0 along the left bank

Significant Design Considerations for this Frame:

- Utility ROW projects require further coordination with power companies, but also provide a significant amount of land for corridor connectivity.



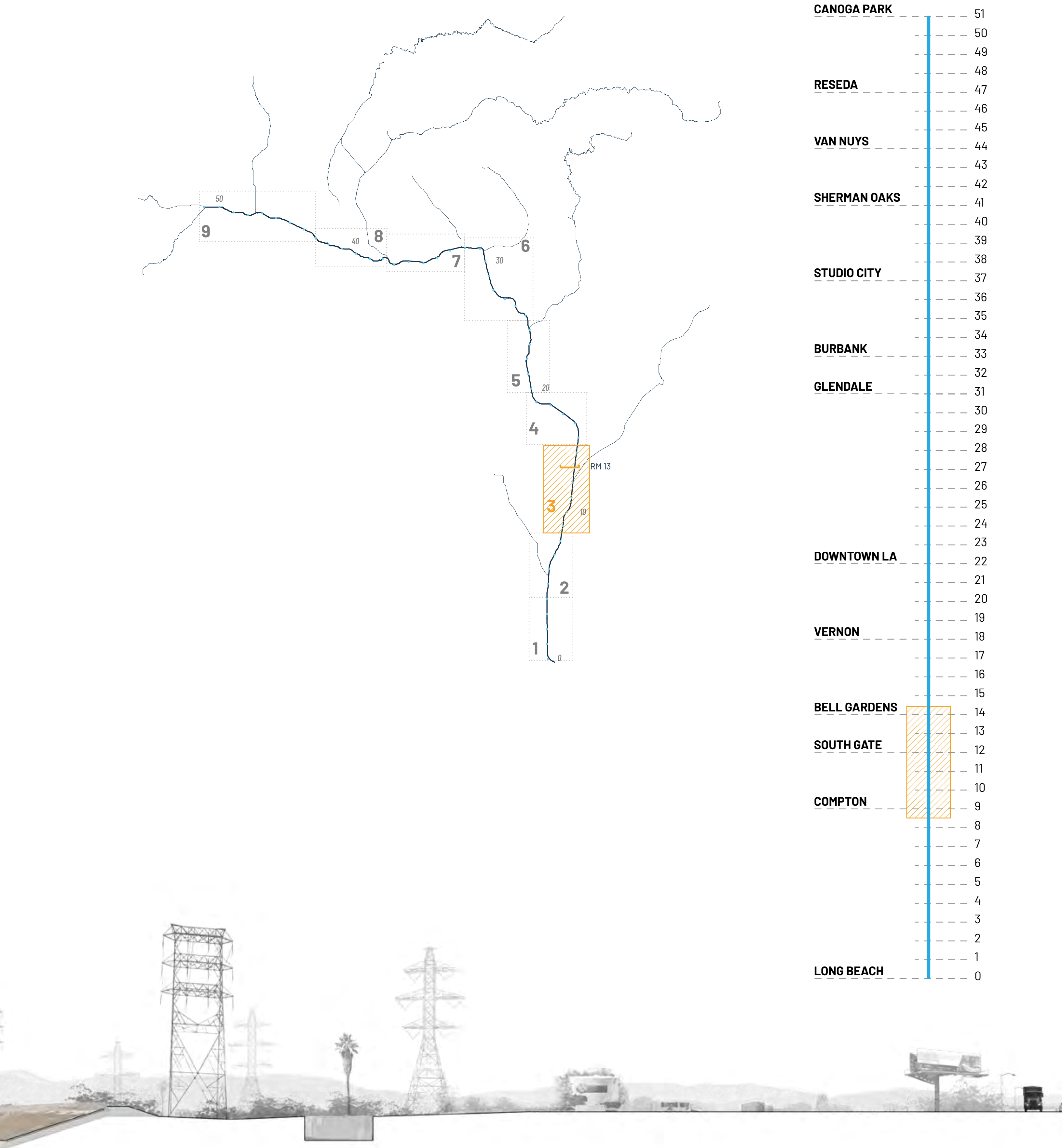


Figure 331. LA River Planning Frame 3. Source: LA River Master Plan, 2020.

FRAME 3: CENTRAL PLAIN

Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

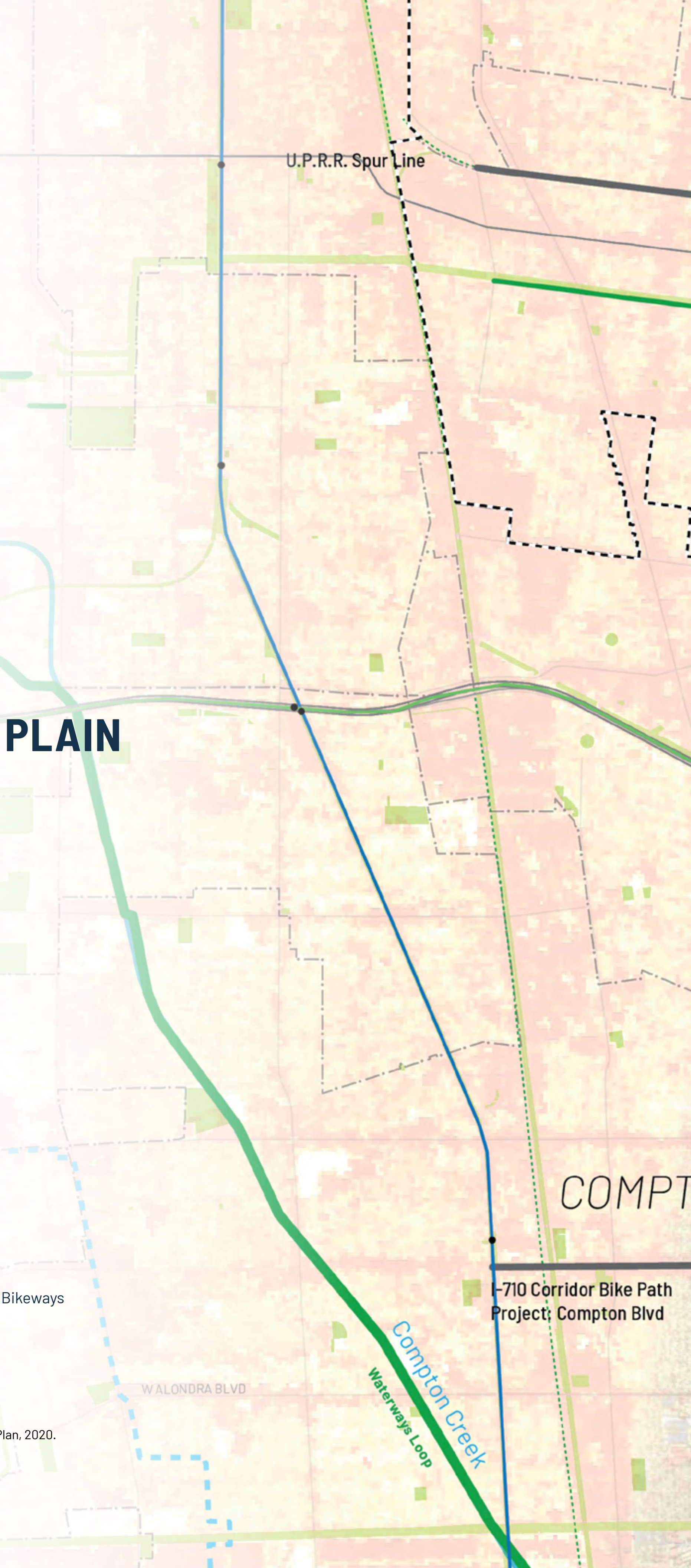
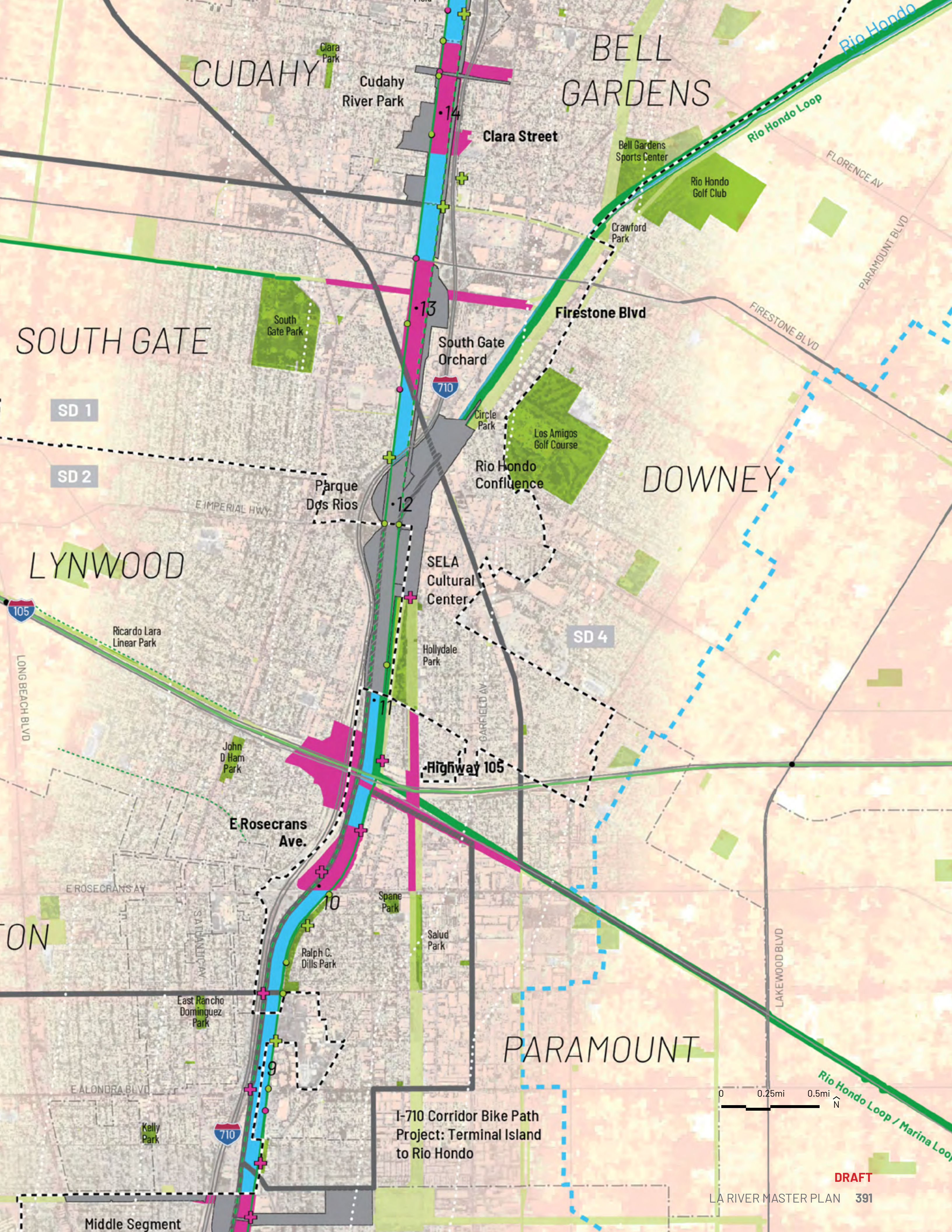


Figure 332. LA River Planning Frame 3. Source: LA River Master Plan, 2020.


CUDAHY
Clara Park
Cudahy River Park
BELL GARDENS
Rio Hondo
Rio Hondo Loop
14
Clara Street
Bell Gardens Sports Center
Rio Hondo Golf Club
FLORENCE AV
Crawford Park
PARAMOUNT BLVD
13
Firestone Blvd
FIRESTONE BLVD
SOUTH GATE
South Gate Park
South Gate Orchard
710
SD 1
Circle Park
Los Amigos Golf Course
SD 2
Rio Hondo Confluence
Parque Dos Rios
12
DOWNEY
E IMPERIAL HWY
LYNWOOD
SELA Cultural Center
105
Ricardo Lara Linear Park
SD 4
Hollydale Park
LONG BEACH BLVD
11
GARFIELD AV
John D Ham Park
Highway 105
E Rosecrans Ave.
E ROSECRANS AV
10
Spane Park
ATLANTIC AV
Salud Park
Ralph C. Dills Park
East Rancho Dominguez Park
LAKEWOOD BLVD
PARAMOUNT
9
E ALONDRA BLVD
0
0.25mi
0.5mi
N
Rio Hondo Loop / Marina Loop
I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
Kelly Park
710
Middle Segment

FRAME 2: SOUTH PLAIN

Location: City of Long Beach; river mile 8.4 - 4.0

Channel Characteristics: The channel in this frame is a trapezoidal concrete leveed cross section with an approximate width of 350 ft.

Average Channel Slope: 0.1%

Landside Right-of-Way Characteristics: This frame has some of the widest right-of-way parcels along the LA River. The parcels are east and west facing parcels along the levee. The landside right-of-way is widest in the southern portion of the frame, at widths of over 200 ft on each bank. Industrial and residential development, transmission easements, and Interstate 710 and the 91 Freeway cut into the landside right-of-way in the northern portion of the frame. The landside right-of-way is on average 50 ft wide.

Notable Features:

- Important bird habitat area
- Freshwater year round
- Utility ROWs along both sides of the river
- De Forest Park from river mile 6.8 to 7.5 along the left bank
- Dominguez Gap Wetlands from river mile 4.8 to 5.8 along the left bank
- Compton Creek confluence at river mile 5.4 along the right bank

Significant Design Considerations for this Frame:

- Significant equestrian community in this area would utilize an expanded network of equestrian trails.
- Algae mats on the concrete channel bottom provide an important food source for migrating birds.
- The widest portions of the landside ROW provides opportunity for significant habitat areas.
- Utility ROW projects require further coordination with power companies, but also provide a significant amount of land for corridor connectivity.

DRAFT

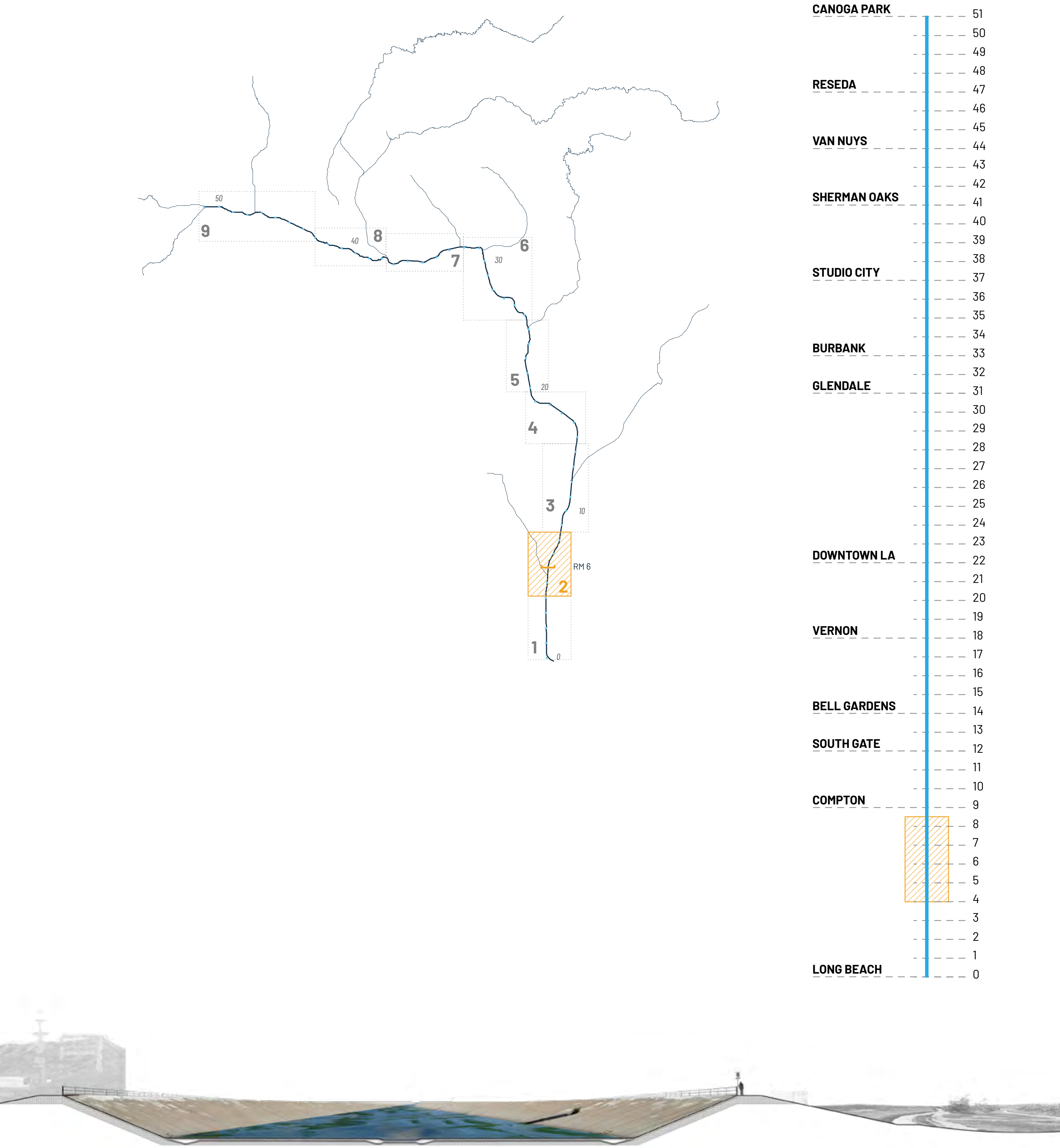
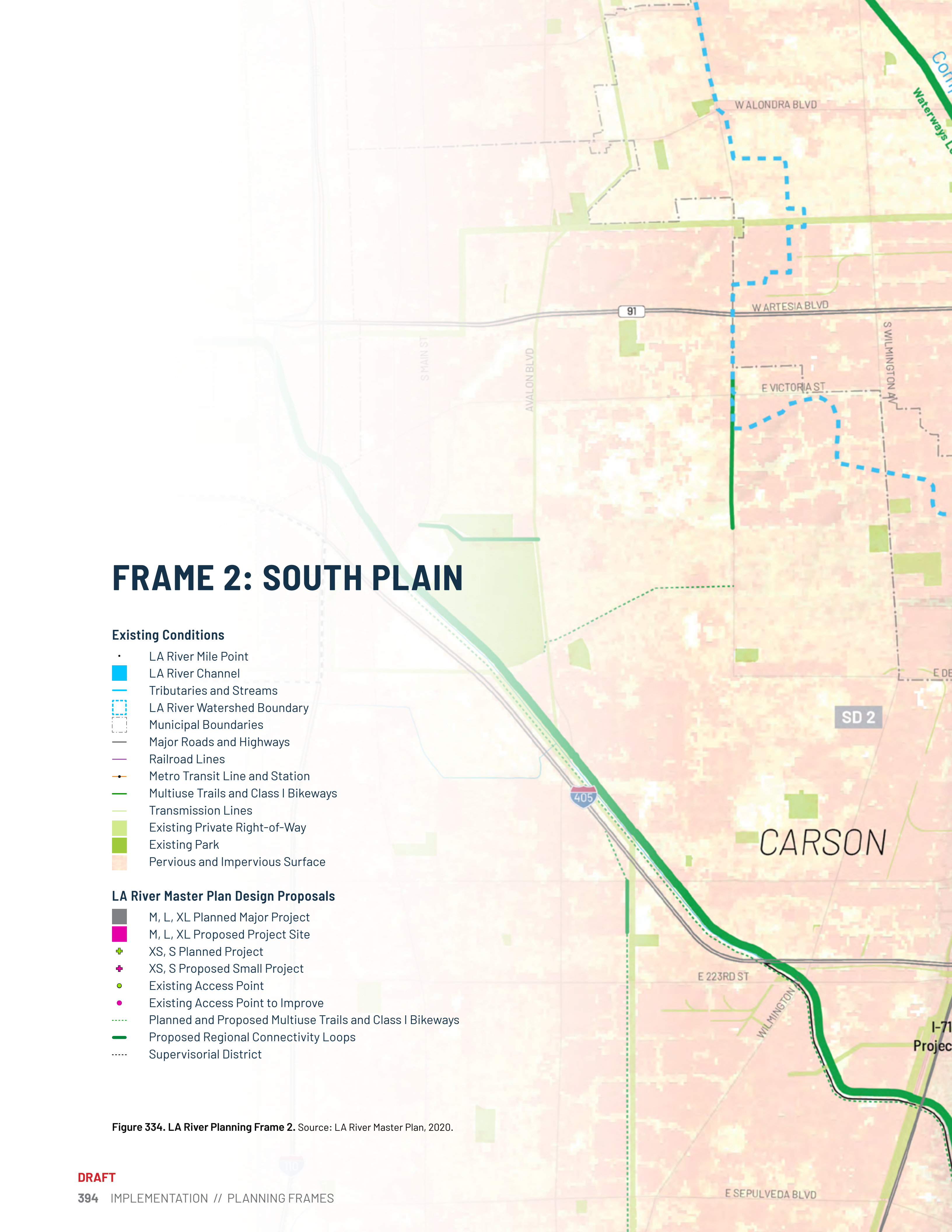


Figure 333. LA River Planning Frame 2. Source: LA River Master Plan, 2020.

FRAME 2: SOUTH PLAIN



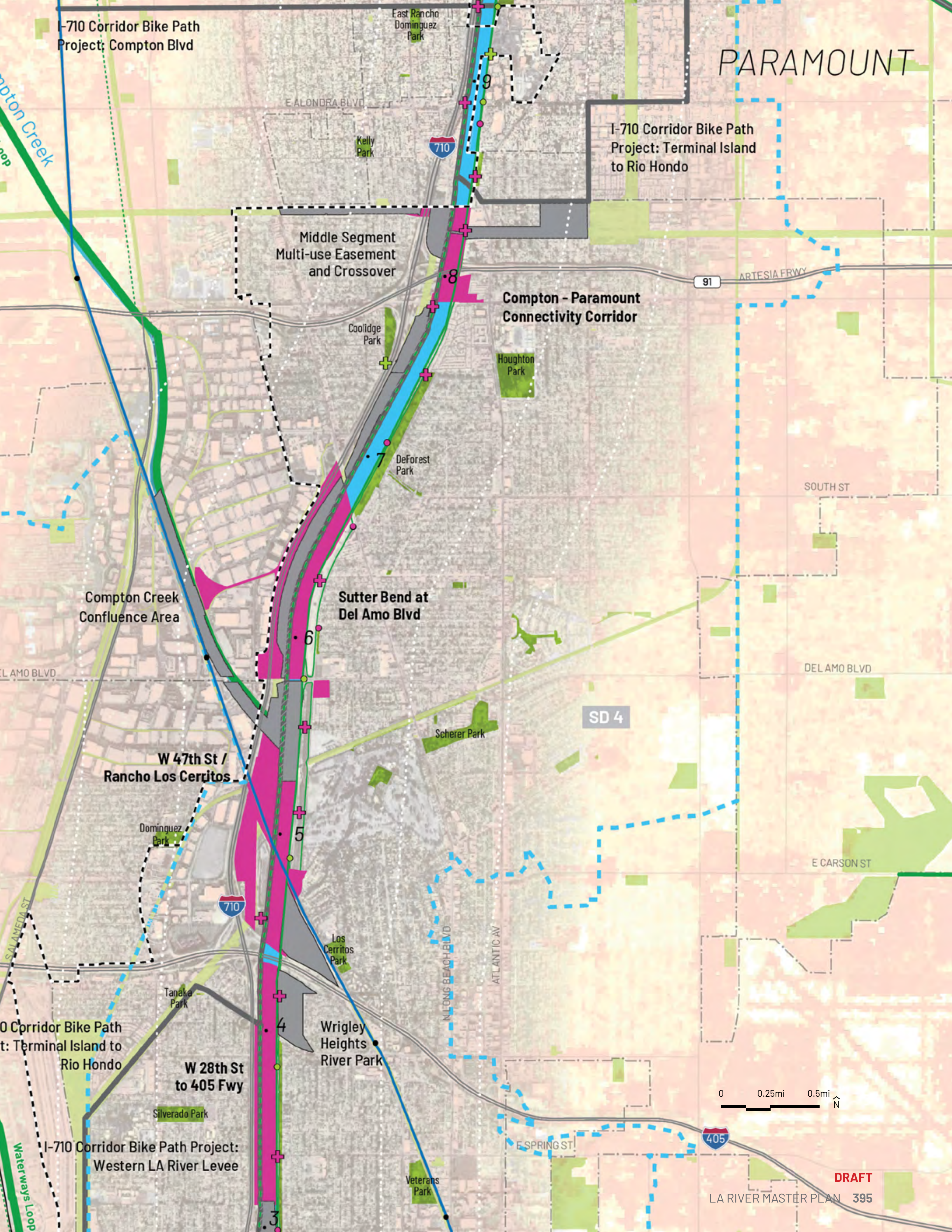
Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

LA River Master Plan Design Proposals

- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 334. LA River Planning Frame 2. Source: LA River Master Plan, 2020.


I-710 Corridor Bike Path Project: Compton Blvd
East Rancho Dominguez Park
PARAMOUNT
E ALONDRA BLVD
Kelly Park
710
9
I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
Compton Creek
Middle Segment Multi-use Easement and Crossover
8
91
ARTESIA FRWY
Compton - Paramount Connectivity Corridor
Coolidge Park
Houghton Park
7
DeForest Park
SOUTH ST
Compton Creek Confluence Area
Sutter Bend at Del Amo Blvd
6
EL AMO BLVD
DEL AMO BLVD
SD 4
Scherer Park
W 47th St / Rancho Los Cerritos
Dominguez Park
5
E CARSON ST
710
S ALAMEDA ST
Los Cerritos Park
N LONG BEACH BLVD
ATLANTIC AV
Tanaka Park
0 Corridor Bike Path
t: Terminal Island to
Rio Hondo
4
Wrigley Heights River Park
W 28th St to 405 Fwy
0
0.25mi
0.5mi
N
Silverado Park
E SPRING ST
405
I-710 Corridor Bike Path Project: Western LA River Levee
Waterways Loop
Veterans Park
3

FRAME 1: ESTUARY

Location: City of Long Beach; river mile 4.0 - 0.0

Channel Characteristics: The channel in this frame is a leveed trapezoidal concrete cross section with a width of approximately 400 ft. The soft channel bottom with year-round water transitions at mile 3 to a concrete bottom section with hard rip-rap sides, with a typical width of 585 ft.

Average Channel Slope: < 0.1%

Landside Right-of-Way Characteristics: This frame contains east and west facing parcels along levee, with areas that vary from approximately 15ft to 100-150ft wide.

Notable Features:

- Estuary (including projections for sea level rise)
- Important bird habitat area
- Brackish water year round
- Present fall line is at Willow Street
- Wrigley Greenbelt from river mile 2.9 to 4.0 along the left bank
- Santa Cruz Park, Golden Park, and Cesar Chavez Park from river mile 0.3 to 0.8 along the left bank, bisected from the river by West Shoreline Drive.
- Shoreline Aquatic Park and the Queen Mary at river mile 0

Significant Design Considerations for this Frame:

- This frame is in closest proximity to the ocean and Port of Long Beach, with unique site conditions for projects along the LA River.
- Projects here are potentially subject to high amounts of salt spray and salt content in the water and soil. Material and plant selections should be able to tolerate these conditions.
- Raised banks along the channel bottom allow for planting and should be managed as to not encourage the spread of invasive species.
- The wide ROW parcels, year-round presence of water, and proximity to the ocean provides opportunities for the creation and enhancement of valuable coastal habitat such as wetlands and nesting grounds.
- Sea level rise may occur in coming decades in this frame.

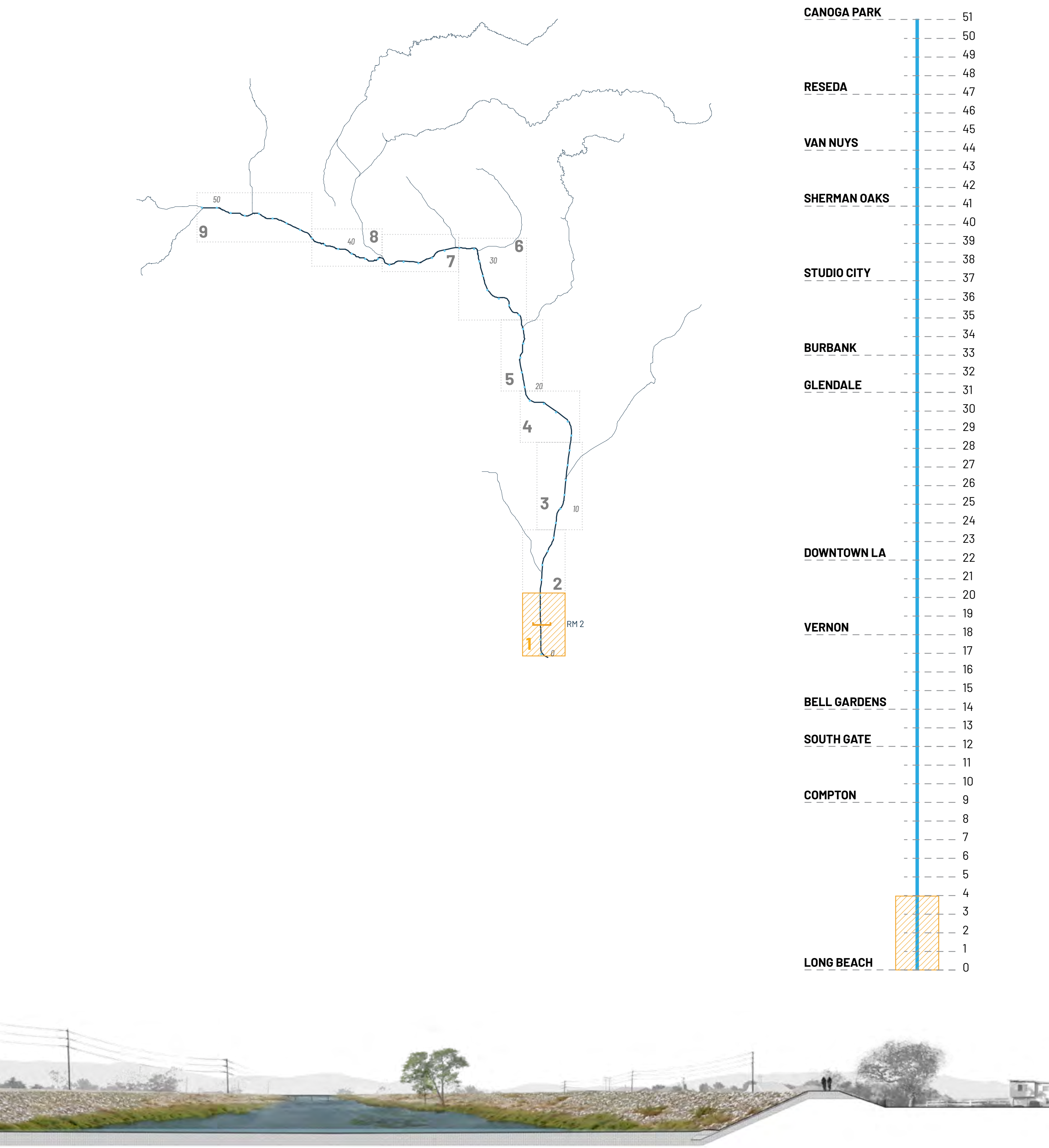
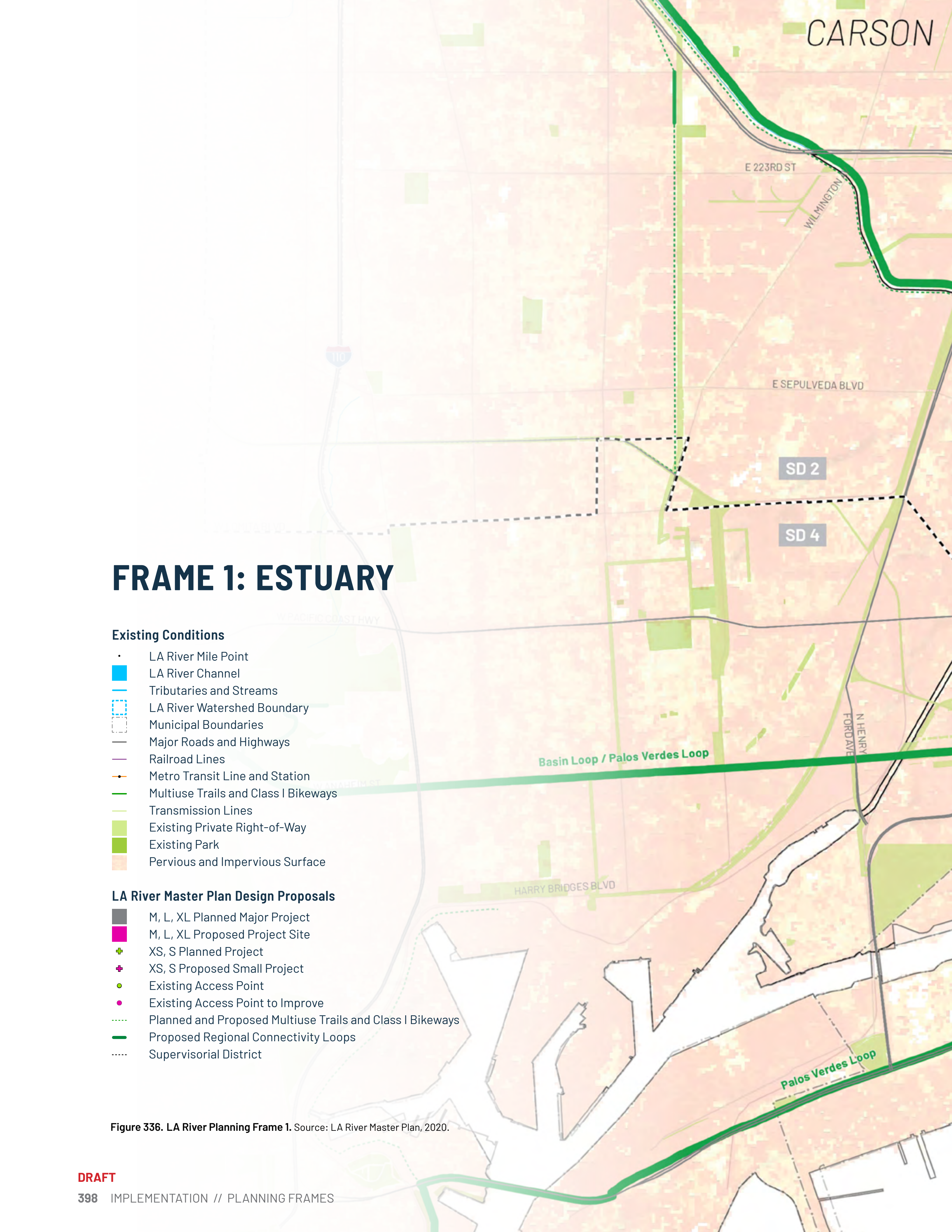


Figure 335. LA River Planning Frame 1. Source: LA River Master Plan, 2020.



FRAME 1: ESTUARY

Existing Conditions

- LA River Mile Point
- LA River Channel
- Tributaries and Streams
- LA River Watershed Boundary
- Municipal Boundaries
- Major Roads and Highways
- Railroad Lines
- Metro Transit Line and Station
- Multiuse Trails and Class I Bikeways
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- Pervious and Impervious Surface

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- M, L, XL Proposed Project Site
- XS, S Planned Project
- XS, S Proposed Small Project
- Existing Access Point
- Existing Access Point to Improve
- Planned and Proposed Multiuse Trails and Class I Bikeways
- Proposed Regional Connectivity Loops
- Supervisorial District

Figure 336. LA River Planning Frame 1. Source: LA River Master Plan, 2020.

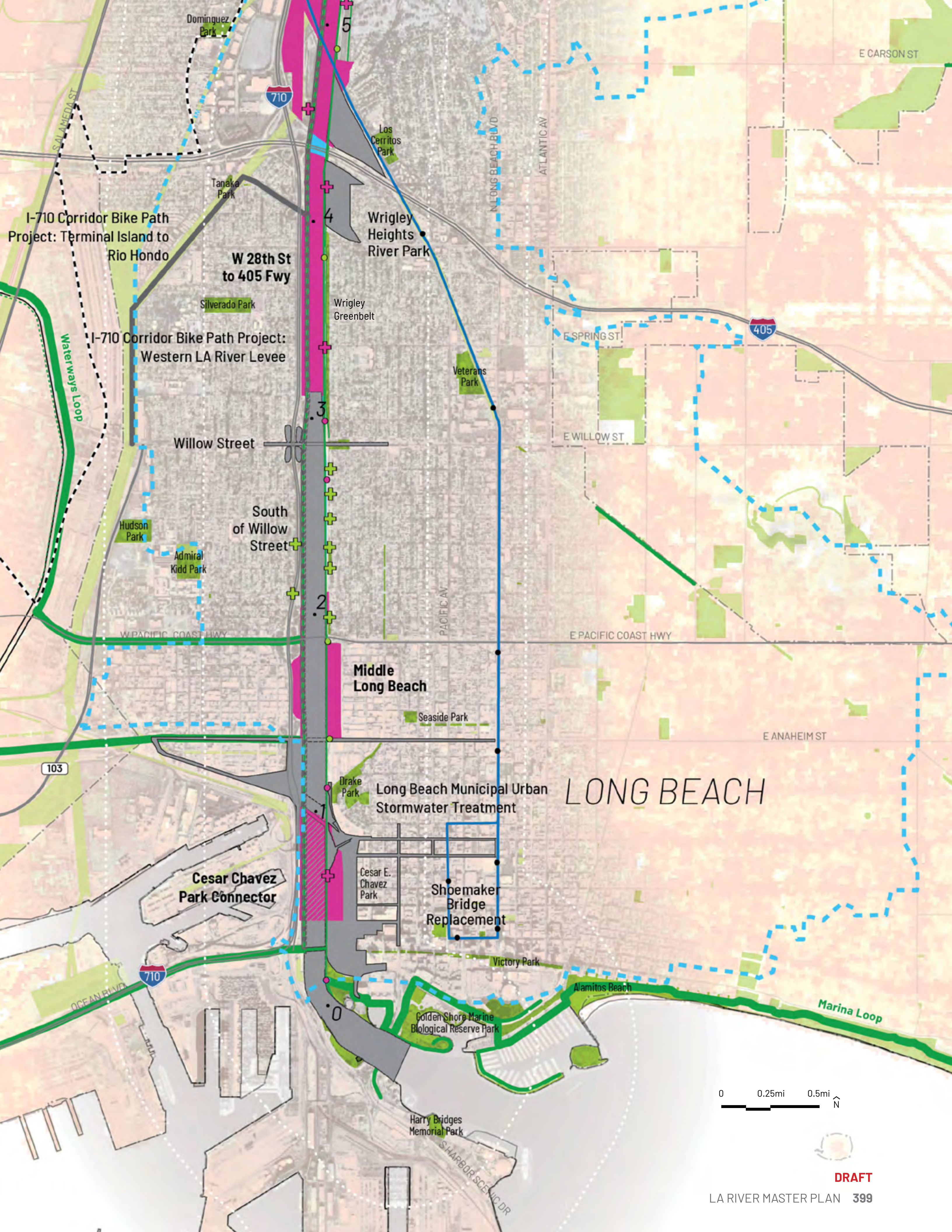
Dominguez Park
5
710
E CARSON ST
SALAMEDA ST
Los Cerritos Park
N LONG BEACH BLVD
ATLANTIC AV
Tanaka Park
4
I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
Wrigley Heights River Park
W 28th St to 405 Fwy
Silverado Park
Wrigley Greenbelt
405
E SPRING ST
I-710 Corridor Bike Path Project: Western LA River Levee
Waterways Loop
Veterans Park
3
Willow Street
E WILLOW ST
South of Willow Street
Hudson Park
Admiral Kidd Park
2
PACIFIC AV
W PACIFIC COAST HWY
E PACIFIC COAST HWY
Middle Long Beach
Seaside Park
E ANAHEIM ST
103
Drake Park
Long Beach Municipal Urban Stormwater Treatment
LONG BEACH
1
Cesar Chavez Park Connector
Cesar E. Chavez Park
Shoemaker Bridge Replacement
Victory Park
710
OCEAN BLVD
Alamitos Beach
0
Golden Shore Marine Biological Reserve Park
Marina Loop
0
0.25mi
0.5mi
N
Harry Bridges Memorial Park
S HARBOR SCENIC DR

Figure 337. Large-scale maps encouraged discussion among participants at a West Valley meeting on February 13, 2019.
Source: LA County Public Works, 2019.

11.
PUBLIC STEWARDSHIP

THE REIMAGINED RIVER REQUIRES BROAD COMMUNITY SUPPORT AND EVERYONE CAN PLAY A ROLE

Public stewardship and collaboration are needed to make the reimagined river a reality. Master Plan documents succeed or fail based upon their political and public support, an understanding of how to implement goals, and access to the capital needed to realize opportunity. Complexity grows with increasing participation across communities and across jurisdictions, and champions are needed for each goal and in each geographic area to make the plan a reality.

Figure 338. The sun sets over the SELA Arts Festival at river mile 11.7. Source: OLIN, 2019.

ADVOCACY ORGANIZATIONS

Just as community partnerships were essential to the engagement process, partnerships with advocacy organizations will play a key role in implementation. Their involvement is necessary to realize the Master Plan's goals across the diverse range of stakeholders and communities along the LA River. Advocacy organizations bring passionate and informed stakeholders to the table in addition to seasoned and effective leaders to engage who can champion the Master Plan's objectives. These partnerships will inform public stewardship through the rich history, experience, and research base of each of these organizations within their respective areas of focus. Furthermore, relying on an abundant set of methods and tools ground-truthed by advocacy organizations based in the region will strengthen the efforts of the Master Plan.

Advocacy organizations include national organizations with broad missions that apply to the LA River, regional institutions, organizations that focus specifically on the LA River, and grassroots organizations that represent the interests of nearby residents. The full list of advocacy organizations can be found in Appendix Volume II: Technical Backup Documents.

ARTS AND CULTURE

Art organizations work to enrich public space with environmental art and by commissioning new projects by artists and writers; promote inclusivity and reflect local culture; inspire civic discourse and deepen connections between people through art; and spark wonder and creativity.

COMMUNITY AND EDUCATION

Community and education organizations advocate for health, equity, and social justice; educate and train community members on social and environmental issues that affect their lives; and build inclusive social networks so that communities are informed, organized, and engaged.

ENVIRONMENT

Environmental organizations work to preserve and enhance habitat and open space; research and implement best management practices; promote sustainability and livability; and grow environmental stewardship.

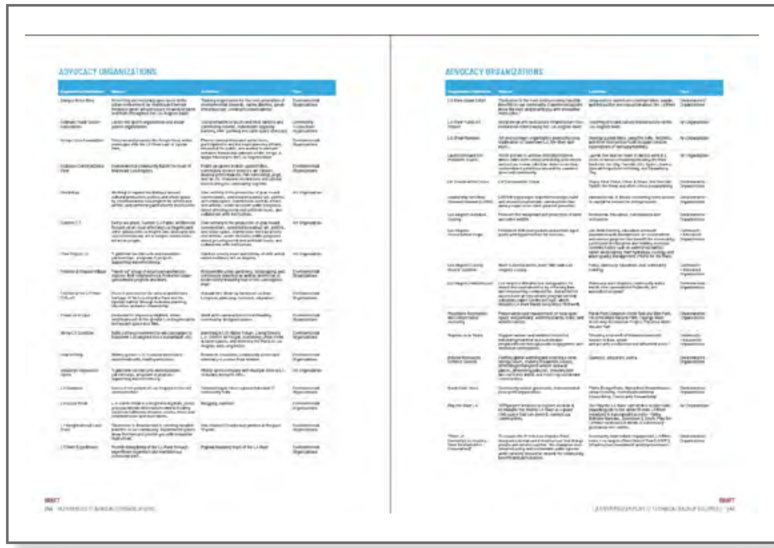

Figure 339. (Top) The full list of advocacy organizations can be found in Appendix Volume II: Technical Backup Document. Source: OLIN, 2019.

Figure 340. (Middle) Teenage girls exhibited photography exploring their relationship to the LA River through the Las Fotos Project. Source: OLIN, 2019.

Figure 341. (Bottom) Learning about and becoming more familiar with the LA River can lead to a better sense of stewardship. Source: Geosyntec, 2019.

Figure 342. West Valley community meeting attendees learning about the LA River Master Plan process. Source: LA County Public Works, 2019.

HOW CAN I GET INVOLVED?

IN THE COMMUNITY

Use the River!
Walk, bike, or paddle along the river with your family and friends. Attend a festival or performance. Go birdwatching or participate in a river-focused community science program. The best way to create momentum for improvements to the LA River is to increase awareness of and advocate for the river.

Talk to River Staff!
Operations and maintenance and safety staff are a direct connection to what is happening along the river. Alert them of any concerns you have and learn about new ways to get involved in your community.

Volunteer!
From participating in a river clean up to working on public policy, there are a myriad of organizations that provide opportunities to take an active role in shaping the future of the LA River.

Prevent Contamination
Everyone can help keep the LA River clean. Be sure to report industrial runoff, illegal dumping, and clogged storm drains to your Storm Water Coordinator.

Contact Your Elected Officials!
Elected officials along the LA River have the influence to promote the LA River and allocate funding to make it the reimagined river envisioned in this plan. Let them know this is a priority for you.

AT HOME

Reduce and Recycle Water
Install a rain barrel to reuse your rainwater for watering your plants. Plant a tree to absorb water. Using water wisely reduces the region's dependence on imported water.

Prevent Contamination
Reduce contaminants that wash into the river. Dispose of trash, pick up pet waste, keep your car maintained to reduce leaks, and dispose of hazardous waste properly. Participate in LA River cleanups.

Use Native Plants
Reduce the amount of lawn in your yard and plant native vegetation to reduce watering and the use of fertilizers.

VISIT THE MASTER
PLAN WEBSITE AT
WWW.LARIVERMASTERPLAN.ORG

HOW CAN MY ORGANIZATION HELP?

PLAN IMPLEMENTATION

Review the plan's implementation matrix. Look for actions, methods, or sites that your organization can assist with and contact the implementation lead to find out how your organization can contribute to future projects.

COMMON GROUND

Find places where your organization's mission aligns not only with elements of this plan but with the missions of other organizations. Elected and appointed officials are more likely to hear advocates who speak with one voice toward achieving a common purpose.

Figure 343. (Top) At the Youth Summit, high school students from various schools in LA County learned about many aspects of the LA River. Source: LA County Public Works, 2018.
Figure 344. (Middle) Community members take advantage of the SELA Arts Festival, which took place at river mile 11.7, to experience the LA River in a new way. Source: OLIN, 2019.
Figure 345. (Bottom) High school students attending the Youth Summit event. Source: OLIN, 2018.

Figure 346. Mark Pestrella, Director of LA County Public Works, speaks at a LA River Master Plan Steering Committee meeting in December of 2018.
Source: LA County Public Works, 2018.

12. SYSTEM MANAGEMENT

MANY GOVERNMENT AGENCIES AND ORGANIZATIONS NEED TO WORK TOGETHER TO MAKE THE REIMAGINED RIVER A REALITY

Almost twenty-five years ago, LA County developed a transformative plan to re-envision the river as an 'urban treasure' and a 'valuable natural asset' that would enrich the quality of life for residents and help to sustain the economy of the region. Since publication, miles of trails have been added for pedestrians and cyclists, and the river has emerged as an iconic presence in Angelenos' minds. Today, new concerns have shifted from what was once aspirational into something that brings tangible value and improvement to all communities along the river and those who travel along its banks. The LA River Master Plan assembled today has been constructed from robust data sets that have provided clear needs for addressing flood risk, water resources, supporting ecosystems and biodiversity, connectivity, and social health and equity.

Figure 347. LA River Master Plan Steering Committee meeting in September of 2019. Source: LA County Public Works, 2019.

The development of the Master Plan rests on the implementation of policies to achieve these goals, requiring continuing partnerships between seventeen river-adjacent municipalities, and the dedicated advocates and institutions that serve the river, communities, and stakeholders. The work embedded in this plan and the accompanying design guidelines considers a broad array of topics from life cycle costs and operations and maintenance requirements to biodiversity, trails construction, and project development. LA County Public Works' administration of river resources will also require inter-county department coordination with LA County Parks and Recreation as well as novel collaborations with the LA Homeless Services Authority and the LA County Development Authority among other agencies and departments. Fortunately, this plan is built with the input and integrative vision from all these constituents, which has enabled Public Works to outline cross departmental aims that are grounded in a realistic framework of goals, actions, and methods.

At the time of this writing, reducing flood risk, increasing equity and access, engaging communities, supporting healthy ecosystems, embracing arts and culture, addressing housing and homelessness, improving water supply, and promoting healthy clean water is very much a work in progress. The necessity for implementing the nine goals is of paramount importance to the future of the LA River and LA County.

Despite significant progress, the communities along the LA River are some of the most underserved and most environmentally burdened in the State of California, as illustrated in the CalEnviroScreen 3.0, analysis which compares environmental conditions and social factors in communities across the state. Industrial land uses, which are often incompatible with river park uses and community health, can cause increased pollution and are common along the river in many neighborhoods. Southern California is experiencing one of the worst housing crises in its history, and, at the same time, as many as 60,000 people are experiencing homelessness, many thousands without any shelter at all. The

Figure 348. Community engagement at the September 2019 community meeting in the City of Compton. Source: LA County Public Works, 2019.

river is a major player in many of these issues. Through the development of a connective 51-mile park for all of LA County, health outcomes along the most environmentally burdened corridor of the county will be significantly improved, reducing incidence of cardiovascular diseases and diabetes.

The river will become a force for equity and provide natural and recreational open space for millions. Biodiversity and meaningful habitat will be enhanced and protected along critical river reaches, and flood risk mitigation measures will incorporate planning for climate change, increases in heat, sea level rise, and changes to precipitation and land use patterns. The creation of this valuable asset will also come with river improvement strategies that seek to mitigate economic displacement and protect the affordable housing stock of communities.

The plan has been fundamentally created on a proposition to create value for all regardless of circumstance. The LA River Master Plan will reach its true potential in the coming years when vision, policy, and funding actualize real projects on the river for Angelenos to experience.

DESPITE SIGNIFICANT PROGRESS, THE COMMUNITIES ALONG THE LA RIVER ARE SOME OF THE MOST UNDERSERVED AND MOST ENVIRONMENTALLY BURDENED IN THE STATE OF CALIFORNIA

MANAGEMENT AUTHORITIES

SUPERVISORY AUTHORITIES

The LA County Flood Control District operates and maintains approximately half of the LA River right-of-way presently; however, actions in the strategic direction of this plan recommend the consolidation of river right-of-way operations and maintenance, as well as permitting under the Flood Control District.

Currently, the US Army Corps of Engineers oversees permitting across the entire river for changes to the river channel and operates and maintains approximately half of the LA River right-of-way.

WORKING AGREEMENTS AND PARTNERSHIPS

Inter-agency collaboration is necessary to realize the goals, actions, and methods of this plan. Working agreements between entities, such as the Flood Control District, municipalities, and state conservancies, may be required to realize the most ambitious multi-benefit projects of the Master Plan.

MANAGEMENT

Within the LA County Flood Control District and LA County Public Works, leaders work to implement projects and manage the flood infrastructure system.

PROCESS TO INITIATE A POTENTIAL PROJECT ALONG THE LA RIVER

1. Before Project Proponent applies for a grant or any type of Flood Control District Permit contact:

Los Angeles County Public Works
Stormwater Planning Division
Los Angeles River Watershed Manager
lariver@dpw.lacounty.gov

2. Submit preliminary project information such as a project description, conceptual renderings, background etc. This step allows for identification of potential project partners, alignment of project goals and objectives with on-going efforts and planning documents, and identification of operation and maintenance requirements and responsibilities.

3. Public Works can assist with permit application and fees and reaching out to other stakeholders.

- For more information on permitting, see Appendix Volume I: Design Guidelines

4. Project proponent will be required to present project concept at the River Cooperation Committee (RCC) or the Implementation Advisory Group (IAG); depending on geographic location.

- Purpose of the presentations is to confirm project scope is consistent with existing planning documents and regulatory requirements
- This process allows project proponents to become familiar with and address regulatory and permitting requirements early in the planning process.

Figure 349. The current operations and maintenance of the LA River and tributaries is shared by the LA County Flood Control District and the US Army Corps of Engineers. Source: LA County GIS Data Portal, City Boundaries and Annexations, 2016, & LA City Communities and Planning Areas, 2014.

TWO MAIN ENTITIES OPERATE AND MAINTAIN THE LA RIVER CHANNEL AND RIGHT-OF-WAY: LACFCD AND USACE

OPERATIONS AND MAINTENANCE

Capital improvements must be accompanied by a robust plan for long-term operations and maintenance to ensure successful river park open space, trails, habitat areas, flood risk reduction infrastructure, water quality BMPs, and environmental graphics and wayfinding. It is never too soon in project development to start thinking about operations and maintenance. Planning for long-term success includes factoring in everyday maintenance and operations, as well as life cycle costs such as replacement costs. Project design components ranging from small river pavilions to large side channels or bridges are recommended in this plan.

To maximize use and promote public safety, a maintenance plan will help ensure projects are kept in good condition, maximizing ecological function while minimizing labor and material resource burdens. Each project should also be evaluated for its consumption of material and energy resources as well as their climate impact. Successful operations and maintenance requires intensive coordination between LA County, the USACE, municipalities, state conservancies, and other entities.

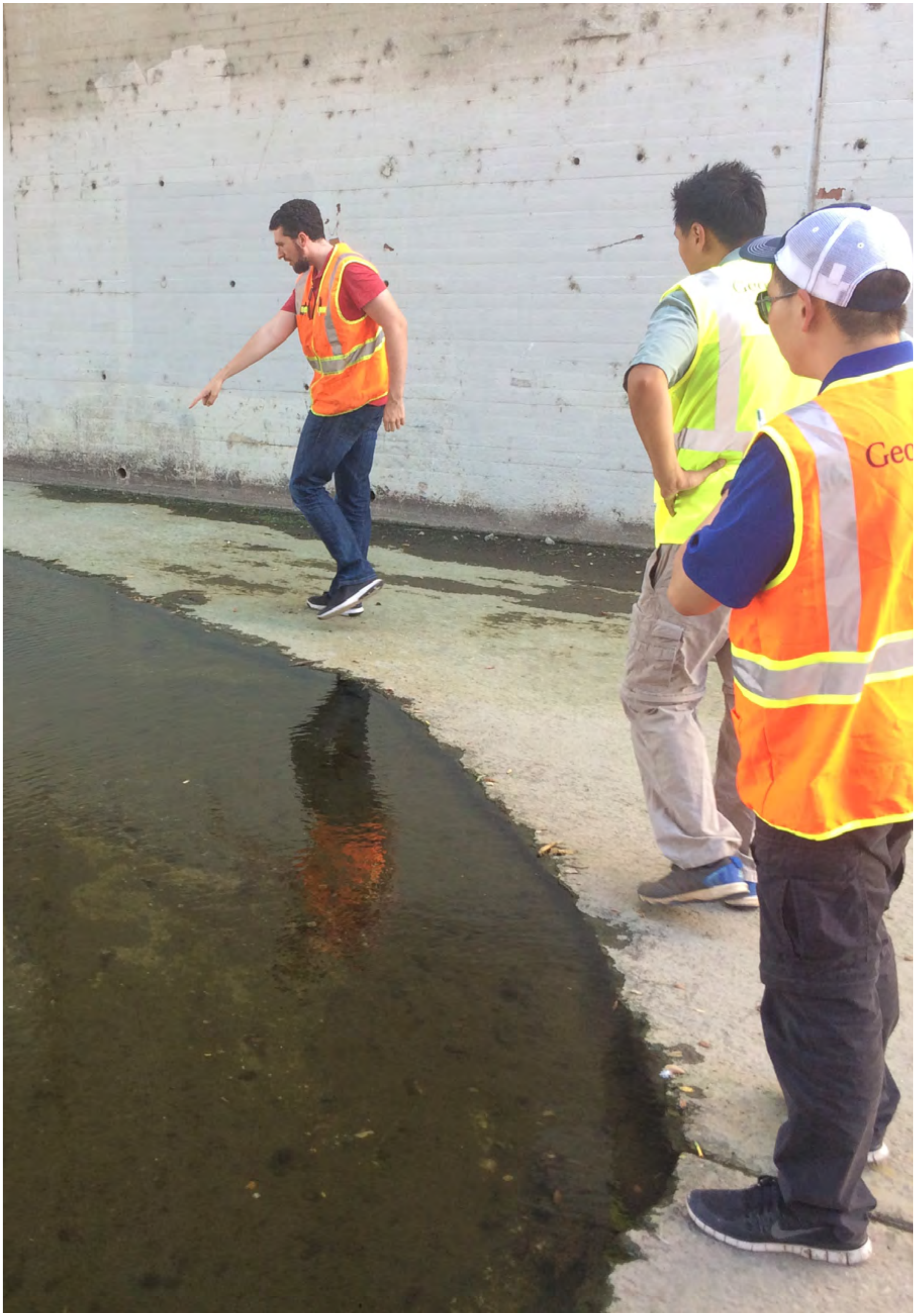

Figure 350. Capital improvements must be accompanied by a robust plan for long term operations and maintenance. Source: OLIN, 2018.

THE DESIGN GUIDELINES AID DESIGNERS AND ENGINEERS IN THE ESTABLISHMENT OF A 51-MILE CONNECTED OPEN SPACE ALONG THE LA RIVER

DESIGN GUIDELINES O&M REQUIREMENTS

The LA River Design Guidelines (Appendix Volume I) outline requirements that all new projects should meet in relation to long-term maintenance planning. Prior to final design approval, a project review of maintenance services and activities should determine the routine, seasonal, and lifecycle replacement needs for proposed project areas or facilities. For LA County Flood Control District Permit approval, every new project must prepare a 3 year extended monitoring and maintenance program for all improvements, including planting, pavilions, and site furnishings. The prepared plan needs to include agencies responsible for maintaining the project, a budget for maintenance, and a written statement of intention to perform and fund maintenance.

DESIGN GUIDELINES

Figure 351. The LA River Design Guidelines contain guidelines for permitting, which include planning for operations and maintenance. See Appendix Volume I: Design Guidelines.

Figure 352. Channel lining, sub-drain hatch, and weep holes along the side of the LA River channel. Source: Geosyntec, 2018.

FLOOD RISK REDUCTION O&M

Planning for the flood risk reduction projects and system proposals in the LA River Master Plan Update is critical for ensuring the physical feasibility and future success of projects along the river. The US Army Corps of Engineers (USACE) and LA County Flood Control District (LACFCD) have a combined responsibility in performing operations and maintenance of flood facilities to manage flood risk along the LA River and its tributaries. Clear delineation, tracking, and enforcement of operations and maintenance responsibilities by other agencies for adjacent and overlapping facilities, such as recreational amenities, are critical for ensuring that crucial operations and maintenance is performed at all pertinent locations. Increased coordination between the operations and maintenance entities along the river could enhance efficiencies in comprehensively maintaining the physical functionality of the flood management systems, especially as projects are proposed along the reimagined river.

Flood facility operations and maintenance includes inspections and repairs to elements such as:

Channel Lining
Primary operations and maintenance concerns for the structural concrete and grouted riprap-lined channels includes cracking, separation of joints, concrete spalling, vegetation, and uplift of invert slabs. These deficiencies can weaken the structure and create a larger operations and maintenance issue if left unaddressed.

Subdrains
Subdrain systems, which consist of networks of pipes, groundwater relief vaults, cleanouts at channel bottoms, and multiple rows of weep holes along channel sides, are typically present to mitigate for potential build-up of water pore pressures underneath and behind channel sides. Making sure these features are maintained and free of debris is critical to the performance of the channels.

Outfalls
There are many side drain outfalls that drain the local sub-watersheds and discharge into the LA River throughout its 51 miles. Oftentimes, they get clogged with debris and vegetation or require structural repairs to the flap gates.

Figure 353. Outfall, soft bottom sediment and vegetation build-up inspection, and concrete bottom build-up. Source: Geosyntec, 2018.

Trash, Sediment, and Non-native Invasive Vegetation Management
The earthen-bottom portion of the LA River typically accumulates large amounts of trash, sediment, and non-native invasive vegetation. Routine removal of the debris and management of non-native invasive vegetation using best practices is critical to the facility in order to maintain the capacity of the channel. Non-native invasive vegetation removal should follow the patchwork process described in detail in the Narrows channel rehabilitation project example in Chapter 9. This process first establishes refuge habitats based on the range of key wildlife species identified by qualified professionals, such as ecologists. Removal of non-native invasive species would occur with specially trained crews in areas outside of the refuge habitat, installing additional native species. Once these species are established the remaining non-native invasive species may be removed. Vegetation along levees that is not properly installed or maintained can be a hindrance to visual inspections, maintenance access, and emergency flood fighting (if needed). All vegetation planted along levees should be in accordance with prevailing USACE guidelines as outlined in chapter 5 of Appendix Volume I: Design Guidelines.

Visual inspections should occur at regular intervals (i.e., semi-annually) in addition to after a large storm event to ensure that the flood risk reduction infrastructure can continue to perform as intended. A visual inspection program is important in order to identify deficiencies and establish operations and maintenance priorities.

Because the current operations and maintenance responsibility for the LA River falls on both the LACFCD as well as the USACE, the operations and maintenance budget for the LA River system comes from multiple sources. In California, studies of various river systems have shown an average annual operations and maintenance cost per urban levee mile to be $54,000 (in 2019). National examples from the US Army Corps of Engineers reach as high as $75,000-$100,000 (in 2019) per mile per year for urban and rural levees. These do not include major replacement costs.

Over time, flood risk reduction infrastructure will require replacement. Additionally, a large storm event that causes significant flooding could alter operations, maintenance, and replacement priorities. In these instances, rather than rebuilding infrastructure in the same way for expediency, current practices should be reviewed and adapted to improve resiliency and provide multiple benefits.

Figure 354. A a maintenance vehicle drives through the LA River channel at river mile 11.2. Source: LA County Public Works, 2018.

WATER QUALITY BEST MANAGEMENT PRACTICES O&M

Regular operations and maintenance are critical for sustained performance of water quality BMPs over their service life. Neglect or inadequate operation and maintenance activity will lead to reduced BMP lifespan, performance, benefits, and potential failure to achieve water quality objectives. Conversely, proper planning and execution of operations and maintenance from upstream pretreatment devices through all other BMP components can significantly improve the lifespan of BMPs and thereby improve the project benefits at the project and watershed scales.

Water quality BMP operation and maintenance includes major elements such as:

Passive/Flow-through BMPs
Passive/flow-through BMP captures debris, trash, and other coarse particles as water flows through the system. Examples of passive/flow-through BMPs include catch basin inlet screens, trash nets, hydrodynamic separators, and sedimentation basins. Captured trash, debris, and coarse particles should be regularly removed from the passive/flow-through BMP to prevent system clogging. These BMPs should conform with the requirements of the LA River Trash TMDLs for full-capture systems to be installed in all catch basins with drainage to the LA River.

Mechanical Systems
Regional-scale infiltration BMPs often include mechanical systems such as diversion pumps to divert water into the BMP. Such mechanical systems require regular preventative maintenance and testing to ensure proper function.

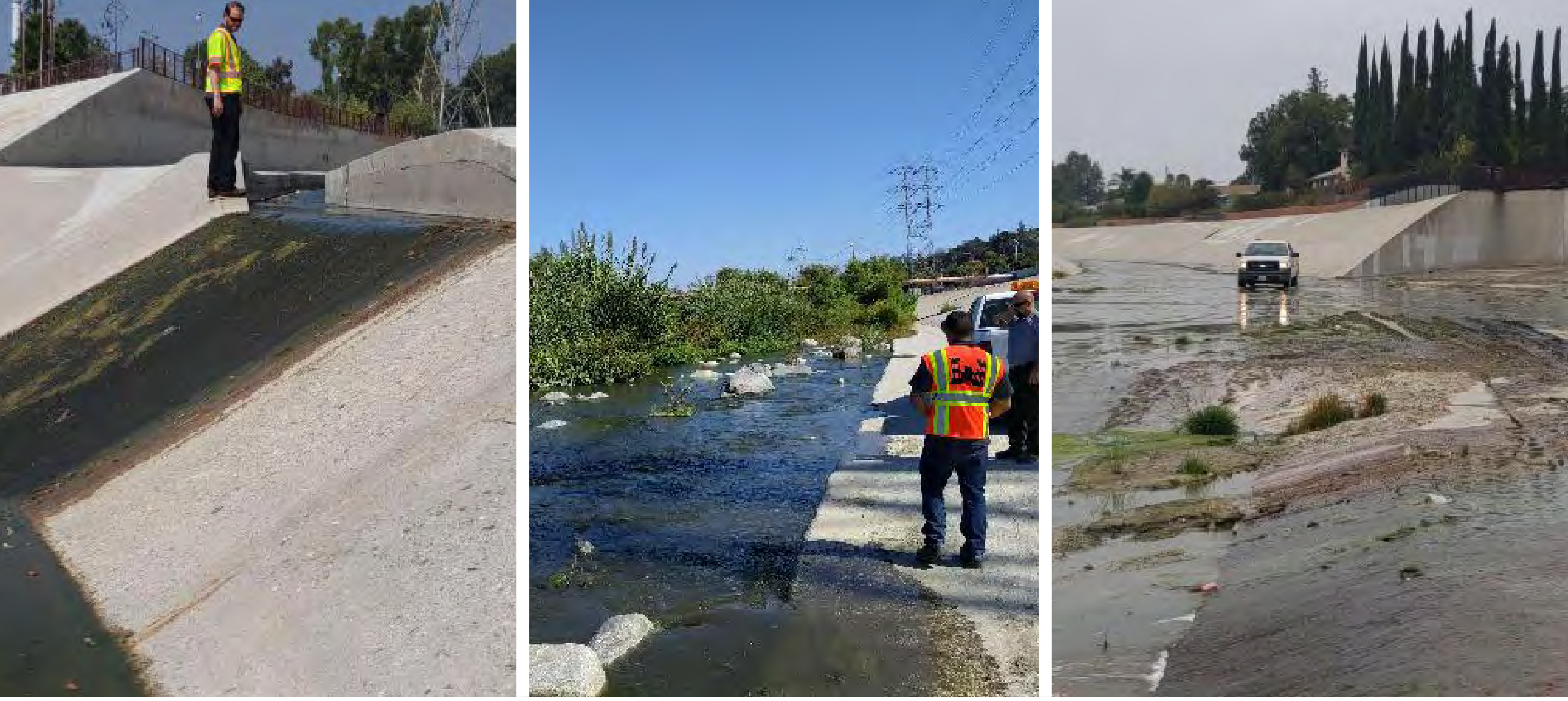

Figure 355. Outfall, soft bottom vegetation, river bottom inspection. Source: Geosyntec, 2018.

Green Infrastructure/Vegetated BMPs

Water quality BMPs such as bioretention basins, bioswales, and constructed wetlands rely on established vegetation to capture and remove pollutants from the influent. Green infrastructure/ vegetated BMP requires regular maintenance activities such as plant maintenance, irrigation, and removal of trash, sediments, and debris.

Water quality BMPs in the LA River watershed are primarily a combination of resources, planning, and collaboration amongst LA County Public Works, LACFCD, USACE, and various cities within the watershed. These BMPs should conform with the requirements of the LA River Trash TMDLs or Statewide Trash Amendments, as applicable for full-capture systems to be installed in all catch basins with drainage to the LA River" in Chapter 13 under 'Water Quality Best Management Practices O&M' Water quality BMP operation and maintenance responsibility is often coordinated amongst agencies through Memorandums of Understanding (MOU) or Memorandums of Agreement (MOA), which are negotiated amongst agencies based on asset ownership, staff availability, resource allocation, and other logistics that are agreed upon amongst different agencies. In addition, any established MOU/MOA is subject to change upon agreement of responsible parties.

At times, public agencies will partner with private organizations or non-profit organizations to collaborate on the operations and maintenance of a water quality project. For example, a private company may agree to pay for a green street project, with the understanding that a public agency will maintain the project after construction. This type of public-private partnership can relieve public agencies of upfront capital costs and also allow them to better focus resources on long-term performance of projects.

Figure 356. Linear recreation, restroom and facilities, and native planting areas along the LA River. Source: LA County Public Works, 2018.

PARKS, TRAILS, AND OPEN SPACE O&M

Parks and open space require a different type of operations and maintenance than single benefit flood infrastructure. Parks and open space are designed for a variety of purposes, and amenities such as lighting, restrooms, and seating are necessary for some uses. Maintaining a park is more expensive than maintaining typical flood infrastructure; however, parks and open space provide multiple benefits to communities and natural systems. The range of skills needed is often varied as well, ranging from native vegetation experts to recreation field care to janitorial staff and facility operators.

Parks, trails, and open space operations and maintenance includes elements such as:

Trails, Bikeways, Paths, and Pavements
Primary operations and maintenance activities for trails and various surfaces includes inspection on a regular schedule and repair as needed. Pavements should be inspected for excessive cracking, uneven settlement, uplift from adjacent tree roots, vandalism, and potholes. Guardrails and fences along trails should be regularly inspected for vandalism and weathering.

Restrooms and Facility Maintenance
The size and type of the River Pavilion or other park facilities will determine the level of operations and maintenance required. For more details about the approximate size and scope of these different types of facilities, refer to the LA River Design Guidelines (Appendix Volume I). Larger facilities such as Rest and Gathering Pavilions should be staffed and under continuous surveillance during open hours and, in some cases, around the clock. These facilities should be regularly surveyed for vandalism and be cleaned on a consistent basis.

Figure 357. Recreation facilities at DeForest Park and environmental graphics along the LA River. Source: OLIN and LA County Public Works, 2018.

Ecology, Habitat, and Planting

Operations and maintenance for native plantings varies from many typical parks or developments. Staff should be trained in the maintenance of LA River native plants and habitats. Overall maintenance for habitats and plantings includes watering, pruning, weeding, trimming, and many other tasks. The suppression of invasive species may require continuous care. Irrigation systems and schedules should be designed and deployed to match the needs of the plants, and irrigation equipment should be routinely inspected for broken and dysfunctional pipes and heads. Replacement planting should be budgeted and installed as needed. Long-term adaptive management practices are needed for the development of functioning ecosystems. Establishing these ecosystems includes practices such as allowing organic matter build-up and dense vegetation where possible. It is critical to monitor installed projects to plan for long-term ecosystem health.

Recreation Amenities

Recreation amenities can vary from sports fields to playgrounds and require specialized maintenance depending on the type of amenity installed. These amenities should be routinely inspected for vandalism and weathering and should be repaired as necessary. Depending on the use and size of the amenity, continuous surveillance during open hours should be provided.

Environmental Graphics and Wayfinding

All projects should provide a schedule of environmental graphics materials for all informational elements on site. Operations and maintenance for environmental graphics includes regularly inspecting for any missing or vandalized signs or other environmental graphics. Clear repair and replacement procedures are needed to ensure legibility of signs and environmental graphics over time.

Figure 358. Students attending the Youth Summit learning about the LA River Master Plan concepts. Source: LA County Public Works, 2018.

OUTREACH STAFF

Given the high numbers of persons experiencing homelessness along the LA River right-of-way, there is routine patrolling and inspection of the LA River for homeless encampments by LA County Public Works, US Army Corps of Engineers, and City of LA Sanitation. There are shared concerns that encampments affect the operation and maintenance of the channel, compromise its water quality, discourage others from using the river's amenities, heighten public health hazards, and pose threats to the physical safety of persons' experiencing homelessness. Following the identification of encampments, outreach staff are deployed as a critical resource in connecting persons experiencing homelessness to the LA County Coordinated Entry System (CES) regulated by independent joint powers authority Los Angeles Homeless Services Authority (LAHSA). LA County, several municipalities, and many non-profit groups compose these numerous outreach teams that work with individuals along the river. The system assists persons experiencing homelessness in entering the CES, accessing emergency housing, interim/temporary or permanent supportive housing, services, and healthcare.

Through Measure H funding, LAHSA, Los Angeles County Healthy Agency, Los Angeles County Health Initiative, and the Los Angeles County Department of Mental Health, have collaborated with the United Way of Greater Los Angeles to sponsor organizations, such as Homeless Health Care Los Angeles, in their recruitment and training of new outreach staff. Outreach staff often have a background in social work, but also have extensive knowledge of first aid, chronic health and mental health concerns, substance abuse, and domestic abuse. Outreach staff are trained to distil individualized needs of persons experiencing homelessness and help them to secure appropriate housing, healthcare, and

RIVER-RELATED PROJECTS MAY NEED ADDITIONAL STAFF TO SUPPLEMENT SPECIFIC NEEDS

other supportive services. They also receive robust training to serve with sound, effective communication and specialize in harm reduction, cultural barriers, and disaster response.

Outreach staff are more heavily deployed along the river before the flood season. Teams identify and visit homeless encampments, encouraging people to relocate outside of the channel for safety reasons while simultaneously informing them of available resources. Additionally, outreach staff visit persons experiencing homelessness at least two weeks in advance of channel maintenance requiring the cleanup of their encampments. Lastly, outreach staff may visit encampments along the river to facilitate their relocation and access to services if community members file a complaint and request a cleanup. During cleanups they may also assist to store personal belongings that would otherwise be discarded.

Outreach staff are an essential asset in assisting jurisdictions in river cleanup, but more importantly, serve the diverse needs of persons experiencing homelessness along the river. Due to the recent influx of persons experiencing homelessness throughout the region and along the river channel, there needs to be increased availability of outreach staff and resources. The river well serves as a conduit for these vital service providers. There should be continued and expanded support of outreach staff through increased training, additional hiring of staffers, new housing options, and more specialized resources to protect the health and safety of some of the county's most vulnerable residents. A bolstered outreach network could help facilitate more effective improvements enhancing the river as a resource for all.

NEW PUBLIC SPACES ALONG AND OVER THE LA RIVER MUST BE DESIGNED TO BE INVITING AND PROMOTE A SAFE ENVIRONMENT

OPERATIONS AND MAINTENANCE AND SAFETY STAFF

A key takeaway from the Master Plan engagement process highlighted safety concerns as the most reported reason for not visiting the river. This was followed closely by poor maintenance along the river, absence of restrooms and activities, not knowing where to access the river, and not knowing enough information about what is at the river channel. Actions and methods across the goals of the Master Plan address these concerns include support facilities at a regular cadence along the length on both sides of the river in addition to safety, outreach, and education/ interpretation coordination with municipalities and state conservancies. This requires designated staff for operations and maintenance and safety, which can be phased in over time to eventually extend along the entire river. Further, river-related projects may need additional staff to supplement specific needs to promote enhanced operation and usability of the varying facilities.

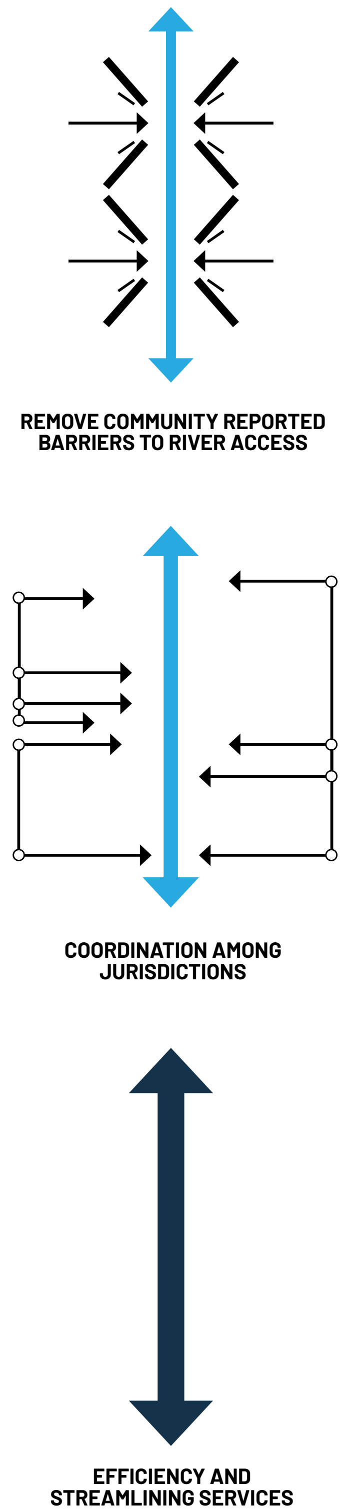

Figure 359. An on-the-ground operations and maintenance and safety team produces multiple benefits along the river.

Figure 360. At the Sepulveda Basin annual clean-up, volunteers and students participated in collecting and clearing debris and trash from the basin. This clean up event was sponsored by the Resource Conservation District of the Santa Monica Mountains and the LA River Master Plan. Source: OLIN, 2019.

PUBLIC SAFETY

Across the length of the LA River and its adjacent River Pavilions and parks, public safety must receive considerable attention. Attention should be paid to urban design and planning and active operations. New open spaces along and over the LA River must be planned in order to be inviting with clear entrance and exit points that will promote the sense of a safe environment. Planning policies along the LA River should encourage public and private landowners to create a more inviting property front that faces the river. More eyes on the LA River's public space will foster a safer environment.

Visitors should feel safe throughout their use of the river and have expedient access to public safety resources as necessary. River staff can supplement local and regional law enforcement to promote public safety along the LA River and its tributaries, while increasing environmental stewardship and public involvement. River staff can also serve as a resource to visitors informing them of the river's amenities, programs, and resources, increasing their comfort along the river. Additionally, emergency call boxes should be consistently sited along the LA River trails to provide a direct call line to 9-1-1 services, supplementing public safety staff at intermediate intervals. However, care should be taken to avoid over-policing and over-surveillance, which may result in residents' unintentional discomfort, especially within communities with high levels of distrust of law enforcement. As such, it is important to employ public safety best practices, such as community policing and neighborhood partnerships. The LA River and its amenities should feel safe and open to all, and the entire community can contribute to this vision.

PAVILIONS

The LA River Master Plan recommends the construction and operation of River Pavilions: Shade (Tier I), Rest (Tier II), and Gathering (Tier III), to serve visitors along the LA River trails. To promote their active usage, they must serve as clean and welcoming environments. All pavilions will require maintenance with a janitorial staff that can routinely empty trash cans, clean water fountains, resupply and sanitize restrooms, and pick up after visitors who use community rooms and outdoor spaces. Staff should follow a schedule of service proportioned to each tier of pavilion, in which those with the most amenities, especially restrooms, receive considerable and continuous attention. Success of the entire network of pavilions is tied to the public's perceived condition of them, and that they do not fall into disrepair. Gathering (Tier III) Pavilions have enhanced sanitation programming, with locker rooms and showers supplementing their restrooms, which compliments other adjacent amenities, such as sports fields and water activities. As such, they require regular staff to distribute toiletries and shower supplies. LA County should explore a pay-per-use model, to help subsidize the cost of extended sanitation programs. Each River Pavilion should stand as a well maintained and friendly retreat along the LA River trails.

In addition to cleanliness, it is critical to staff public safety officials at Gathering (Tier III) Pavilions during their operating hours. These pavilions have public safety stations that should provide continuous security and a recognizable hub for assistance. The stations should provide surveillance within the pavilions and implement best practices of community policing and should not resonate as a punitive presence.

Gathering (Tier III) Pavilions also require pavilion-specific operating staff to supplement activities along the river as they provide robust community facilities and amenities. For example, if they have bike rental and repair stations, they require a staff capable of repairing and distributing the bikes. Additionally, some pavilions may offer low-barrier navigation services for persons experiencing homelessness, requiring their staffing of local homeless services providers. The particular stations could facilitate more extensive first aid assistance, service coordination, and outreach staff. Further, these pavilions require broader oversight and management, such as building operations.

Their on-site administrative offices can also house programming staff to book community events, such as public engagement meetings, local organizations' gatherings, and family parties. The programming staff can also plan pavilion-specific activities and events. River Pavilion staff can be comprised of river operations and maintenance and safety staff and local employees, but it can be supplemented by the employment of river-adjacent communities' youth, persons experiencing homelessness, and system-impacted individuals through future internship and job training programs. Pavilions provide an opportunity for job creation for and by the communities the pavilions reside in.

The construction, operations, maintenance, and use of pavilions will depend on partnerships among the county, individual municipalities they are situated within, land owners, and other organizations that may serve the facilities. There is great potential to leverage varying expertise, local presence, and community-specific needs to form strong partnerships aligned to individualized pavilion identities. For example, a pavilion situated alongside of soccer pitches may be supported through the partnership of a local soccer club, whereas one situated in a neighborhood with a large population of persons experiencing homelessness may stand in partnership with a homeless service provider. Pavilions serve as river-wide assets that unify different stakeholders, while sharing the same aspirations of comfort, safety, amenities,and identity.

Figure 361. (Top) Shade Pavilion (Tier I). See Chapter 9 for more information.

Figure 362. (Middle) Rest Pavilion (Tier II). See Chapter 9 for more information

Figure 363. (Bottom) Gathering Pavilion (Tier III). See Chapter 9 for more information.

PARKS REQUIRE REGULAR MAINTENANCE TO TAKE CARE OF PLANTED AREAS, INSPECT AND REPAIR OUTDOOR EQUIPMENT, AND PRESERVE TRAILS

PARKS

Similar to River Pavilions, parks along the LA River require regular operations and maintenance to promote clean, safe, and well-programmed public resources. Parks will require regular maintenance to plant and take care of vegetated and lawn areas, inspect and repair outdoor equipment and furniture, preserve trails, and repair light fixtures. Additional custodial responsibilities of emptying waste receptacles, picking up liter, cleaning up picnic and BBQ areas, and monitoring the trails for general cleaning needs must be considered for the operations and maintenance staff. Some parks may require extra staffing to supplement additional demand and operational needs, and funding and services provided will vary depending on the project proponent, community, and need. For example, parks with pools and significant water features will require lifeguards to promote visitor safety and those with sport fields will require staff to ensure that fields are prepared for practices and games. Similar to River Pavilions, LA River parks maintenance staff can be supplemented by community internship and job-training programs that will increase community investment in these public assets.

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COMMUNITY MEMBERS CITED **SAFETY CONCERNS** AS THE REASON THAT KEEPS THEM FROM VISITING THE LA RIVER

METROPOLITAN IMPROVEMENT DISTRICT (MID), SEATTLE, WA

Administration: Funded by Downtown Seattle Association property owners and RatePayers' tax Managed by MID property owners and RatePater board

Goals/Services: 1. Cleaning/Maintenance (Est. 2014) 2. Safety (est. 2000) 3. Outreach (est. 2009)

Service Area: ~600 acres

Staff: 120 Employees (Full & Part-time)

Budget: ~5 million/yr (2013/14)
*Cleaning, Safety, Outreach, and Hospitality budget out of overall 7.5 million

Figure 364. Metropolitan Improvement Worker maintains clean streets. Source: Used by permission from Downtown Seattle Association, 2017.

CENTER CITY DISTRICT (CCD), PHILADELPHIA, PA:

Administration: Funded by CCD Business Improvement District (BID) property owners' tax Managed by BID Board

Goals/Services: 1. Cleaning/Maintenance
2. Safety

Service Area: ~500 acres

Staff: 125 Employees (Full & Part-time)

Budget: ~$12 million / yr (2022 projection)
*Cleaning and Public Safety budget out of overall $28.5 million

Figure 365. Center City District Worker provides safety and compliance support. Source: Used by permission from Matt Stanley courtesy of Center City District of Philadelphia, 2016.

PARK RANGERS, DALLAS, TX:

Administration: Funded by municipal taxes Managed by Park & Recreation

Goals/Services: 1. Safety 2. Compliance
3. Education 4. Customer Service/Recreation

Service Area: ~23k park acres / 158 miles of park trails

Staff: 10 Full-time Equivalent

Budget: ~$1 million / yr (2020-21)
* Not including operating costs

Figure 366. Park rangers in Dallas connect with local resources at engagement events. Source: Us by permission from Dallas Park and Recreation, 2017.

Figure 367. Large amounts of trash and debris are common conditions underneath bridges along the LA River. Source: LA County Public Works, 2018.

INITIAL SERVICES

Initial services for river staff should include picking up trash and emptying waste/recycling receptacles, on the ground emergency notification capabilities, wayfinding, providing basic information about the river, and associated administration and coordination duties. This could be piloted in a couple of three to four mile zones in year one at an estimated cost of $225k per mile in year one for staffing this team, operating expenses, and start up and training costs. Although start up and training costs will diminish over time, scaling the program to 51 miles is estimated at $11.7 million in the near and long-term future for initial services.

Additional funding streams could complement initial services in an intermediate phase with the establishment and monitoring of facilities along the river, educational interpretation, safety escorts, and outreach and referrals to health and human services to nearby communities and people experiencing homelessness. These services fall within the realm of outreach and on-the-ground assistance instead of law enforcement, which would require extensive permitting for authorizations, training, and additional resources if not carried out by existing authorized law enforcements with responsibility for river reaches.

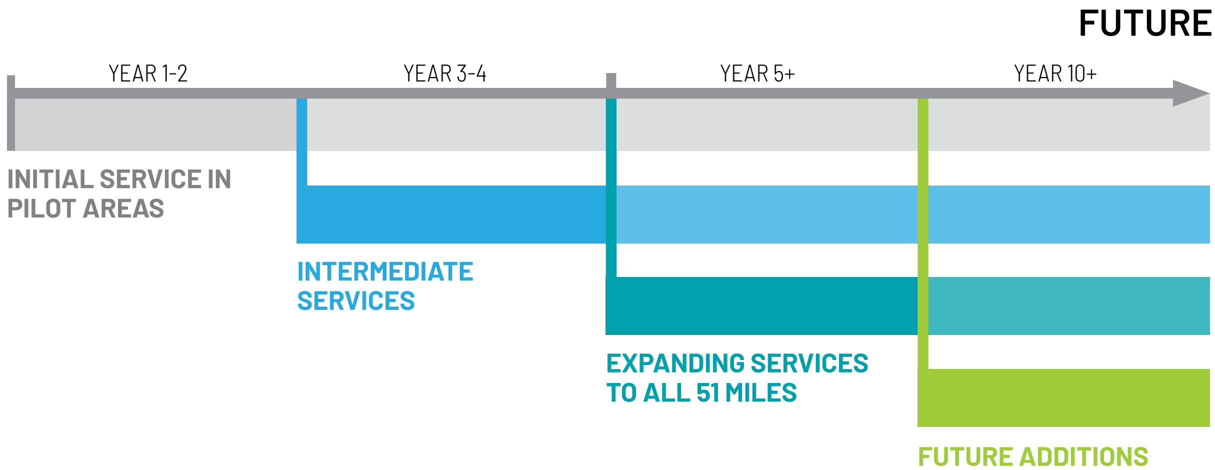

Figure 368. A phased approach to river staff for operations and maintenance, safety, and interpretive programs can help build a safe, inclusive, and well maintained reimagined river.

Future comprehensive programs could include vegetation/native habitat maintenance and monitoring, crime prevention through environmental design resources, and various educational and recreational tours and programs along the river. Varied funding and operations sources would be required at this stage. All initial and future services would rely on increasing public health and neighborhood safety resources as a primary approach instead of deterring and criminalizing people experiencing homelessness or any other targeted populations from using public space along the river. A dedicated on the ground presence of O&M and safety staff would facilitate the strategies employed by the Master Plan to address primary community barriers to access to the river as well as enhancing coordination among jurisdictions and efficiency and streamlining for services along all 51 miles of the river.

434 COMMUNITY MEMBERS REPORTED POOR MAINTENANCE AS THE REASON WHY THEY ARE NOT VISITING THE LA RIVER

LA COUNTY HIRING PRACTICES

The reimagined river requires the collaboration of community members and local residents to succeed as a recreational, ecological, and economic asset. For the river to become an integral part of the community, it will need the support of local workers and small businesses. As the reimagined river creates opportunities for the community to be stewards of the river, so too can the river be a proponent to its community through local hiring practices, business procurement, and job creation for supported workers and small businesses. The river should especially support marginalized communities, such as older persons, persons experiencing homelessness, and system-impacted individuals, that may otherwise fall outside of traditional employment and business opportunities. Building projects, facilities' operation and maintenance, and programming along the LA River can support a robust ecology of economic activity bolstered by diverse people with varying backgrounds, experience, education, and expertise.

LOCAL HIRING PRACTICES

To provide opportunities for the community, river-related projects and new contracts should employ local hiring practices. Local hiring practices currently apply to LA County capital projects, specifically for construction jobs that stipulate hiring Local Residents and Targeted Workers.

Local Residents should make up 30% of a project's workforce. Targeted workers should make up 10% of a project's workforce. Contractors are required to hire a job coordinator to hire workers and prove that the job site meets the required percentages.

Figure 369. (Top) Youth Summit. Source: OLIN, 2018.

Figure 370. (Middle) ASCE Elysian Valley river walk. Source: Geosyntec, 2019.

Figure 371. (Bottom) Workers inspecting a portion of the soft bottom channel on the LA River. Source: Geosyntec, 2018.

LA COUNTY REQUIRES THE EMPLOYMENT OF 30% LOCAL TALENT IN CONSTRUCTION PROJECTS AND ENCOURAGES THE USE OF 25% SMALL BUSINESSES IN CONCESSIONS

LOCAL RESIDENTS

Local Residents are determined by individuals proximity to the construction site. Workers must reside within qualifying zip codes that are within a 5-mile radius of the job site. Residents outside of this range can still qualify as Local Residents if the labor within the desired radius cannot be found or the zip codes outside of the range qualify as a targeted neighborhood.

SUPPORTED WORKERS

Supported workers are workers that are less likely to be hired and are defined by LA County under the umbrella term "Targeted Workers." Targeted Workers are people who identify as one or more of the following designations:

- Has a documented annual income at or below 100 percent of the Federal Poverty Level
- No high school diploma or GED
- A history of involvement with the criminal justice system
- Protracted unemployment
- Is a current recipient of government cash or food assistance benefits
- Is currently in a state of homelessness or has been homeless within the last year
- Is a custodial single parent
- Is a former foster youth
- Is a veteran or is the eligible spouse of a veteran
- Eligible migrant or seasonal farm worker
- Currently an English language learner
- Older than 55
- Disabled
- Individuals with low level of literacy

Figure 372. `The LA River is a place for food culture and local vendors. Source: LA County Public Works, 2018.

LA COUNTY BUSINESS PARTNERSHIPS

CONCESSIONAIRES AND BUSINESS PROCUREMENT

Concessionaire opportunities, such as food vending, bike repair, and sports equipment rental, are acquired through fair trade bidding processes. Business procurement, such as construction services, materials suppliers, and maintenance operators, should apply the same bidding processes. In order to increase concessionaire and business procurement opportunities for Small Businesses, a 15% reduction in bid costs are applied to small business applications.

Small Businesses include Social Enterprises (SEs), Local Small Business Enterprise (LSBEs), Disabled Veterans Business Enterprise (DVBEs).

Community Based Enterprise (CBEs), including Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs), and Disadvantaged Business Enterprises (DBEs), do not qualify for a 15% reduction in bid costs. Alternatively, they can be certified by LA County and listed as a preferred small business vendor. This list qualifies CBEs for preference programs in future LA County capital projects.

QUALIFYING SMALL BUSINESSES	LA COUNTY OPPORTUNITIES
Social Enterprises (SE) Local Small Business Enterprises (LSBME) Disabled Veterans Business Enterprises (DVBE)	**Businesses recieve a 15% reduction in bid costs**
Community Based Enterprises (CBE)	**Businesses are placed on the LA County's list of certified CBEs for preferred hiring**

Figure 373. LA County Benefits for Qualifying Small Business Designation. Existing funding for river related projects includes federal, state, and local sources. Source: LA County Department of Consumer and Business Affairs, 2016.

ARE YOU A SMALL BUSINESS?

RECOMMENDED BUSINESS PRACTICES

LA County expects high quality workplace practices from any contracted vendor. Businesses should follow federal and state regulations on the workplace environment and minimum wage requirements.

In order to support local workers and overall social justice initiatives proposed in the LA River Master Plan, as implementation continues over the next 25 years, further recommendations for businesses include:

- Do not ask job applicants to identify if they have been charged with a felony offense or have an arrest record, except in accordance with the provisions of applicable law.
- Employ targeted workers beyond existing percentage required.
- Employ local talent and pursue diversity reflective of local demographics.
- Implement longer and gender-neutral paid family leave policies.

Figure 374. Attendees at the Canoga Park engagement meeting interact with the large informational boards.
Source: OLIN, 2019.

DRAFT

13.
FUNDING SOURCES

EXISTING AND NEW FUNDING WILL BE NEEDED TO MEET THE MASTER PLAN GOALS

Achieving the goals of the LA River Master Plan will involve coordinated efforts among public, private, and nonprofit entities to implement a myriad of projects over the next 25 years. During that time frame, physical, political, and financial conditions will change. The LA River spans several municipalities and communities that must provide ongoing financial and political support to secure the development, operations, and maintenance of projects within their jurisdictional limits. Moreover, it is critical to establish a framework for project funding beyond individual municipalities to enable support from federal, state, and LA County funding mechanisms. The unification of interests and goals among champions and stakeholders will help to realize the Master Plan's goal-driven implementation framework, ultimately revitalizing the LA River.

THE LA RIVER REPRESENTS ONE OF THE MOST CONTINUOUS, ALMOST ENTIRELY PUBLICLY OWNED OPPORTUNITIES IN LA COUNTY FOR PUBLIC OPEN SPACE

UNDERSTANDING THE SCALE OF THE LA RIVER

To better understand costs associated with the LA River Master Plan and the funding needed, it is important to understand the scale of the LA River. Over one million people live within one mile of the LA River and 25% of Californians live within a 30 minute drive.[117] The number of people who will directly benefit from the implementation of the LA River Master Plan's goals for improved quality of life, functioning ecosystems, parks, arts and culture, housing affordability, supportive housing, education, and improved flood risk management, water quality, and water supply is unprecedented in scale by most urban park or infrastructure projects.

The LA River Master Plan proposes a 51-mile connected open space that functions as a multi-benefit resource that will manage flood waters while also improving ecosystems and health and wellbeing. When comparing the scale of the 2,300 acres of the LA River right-of-way to other public parks around the world, the LA River has significant potential to impact the daily lives of Angelenos and the ecosystems of the LA region. The LA River represents one of the most continuous, almost entirely publicly owned opportunities in LA County for public open space. Even Central Park in New York City is 830 acres pales in comparison to the 2,300 acres of the LA River right-of-way.

Reimagining such a large land area that functions as a piece of critical infrastructure may seem daunting. However, within the context of large infrastructure projects across the United States and particularly in California and the Los Angeles region, the costs associated with the LA River Master Plan are not overly ambitious within the plan's 25 year implementation period.

Large Park Comparisons

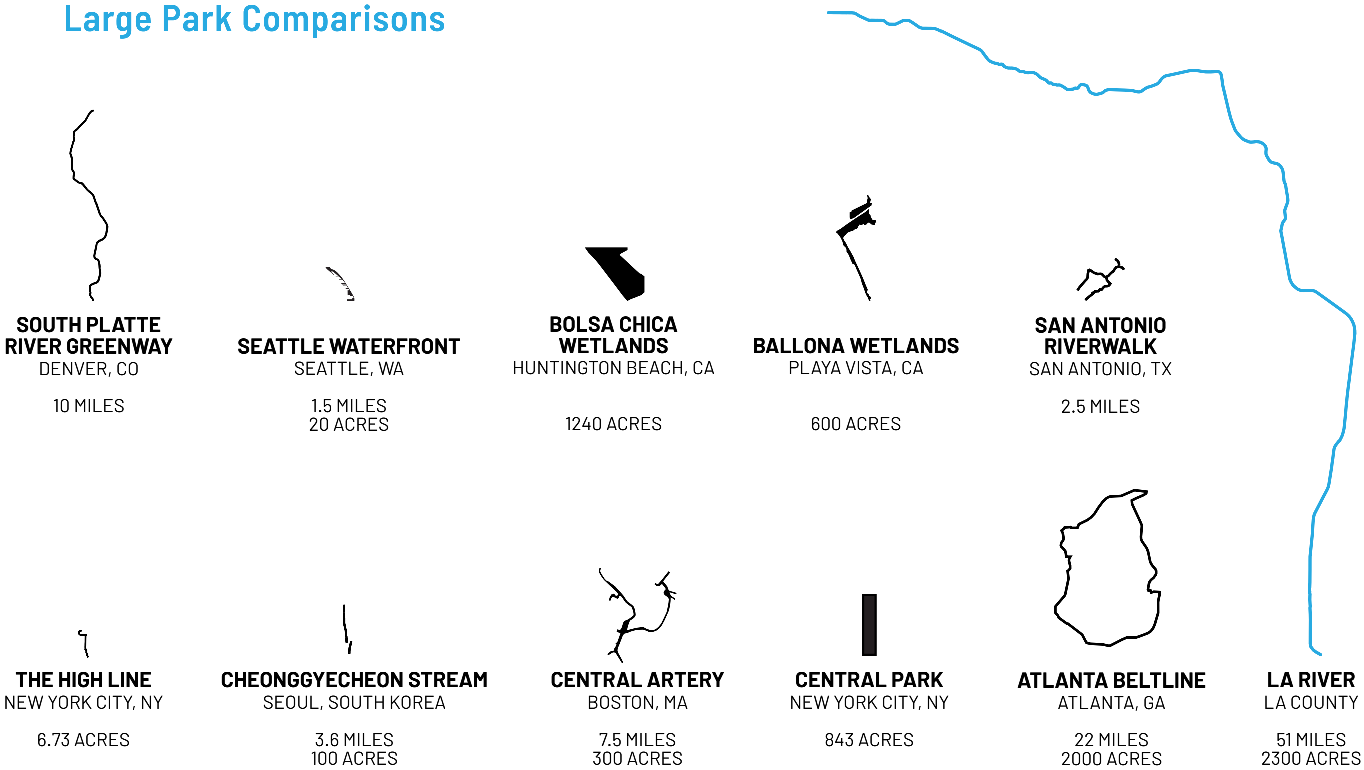

Figure 375. The LA River represents a significant opportunity to create 51 miles of connected public open space within and along the 2,300 acre right-of-way. This to-scale comparison shows other significant public parks and open spaces around the world next to the 51-mile LA River.

Large Infrastructure Comparisons

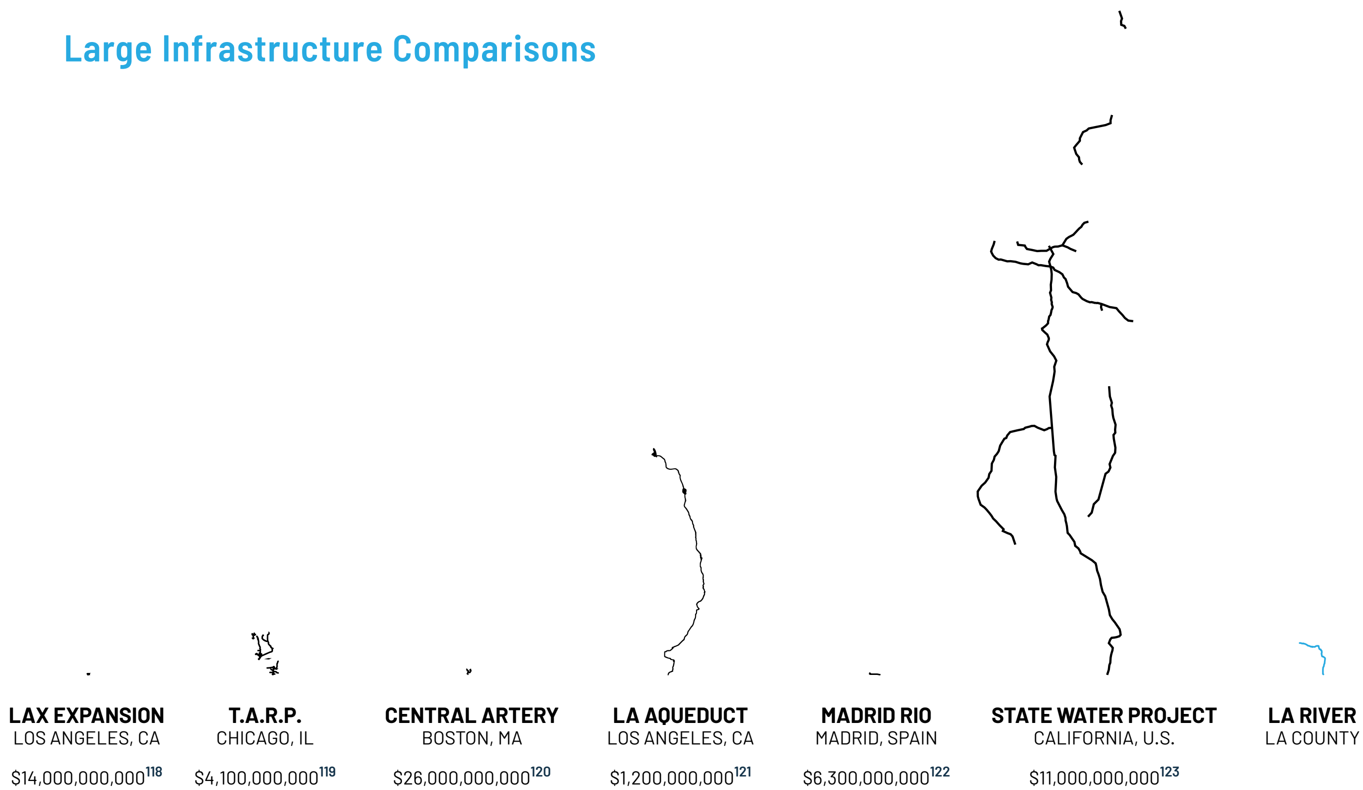

Figure 376. While the goals of the LA River Master Plan are ambitious, the scale of the project is manageable, as evidenced in this to-scale comparison of other significant infrastructure projects. Project costs above have been adjusted to reflect 2020 dollar value.

Estimated Costs per Project Sizes in the LA River Master Plan

ACREAGE / LENGTH	IMPACT	COST
150+ acres / 10+ miles	XL	$200 million - $1.5 billion
40 - 150 acres / 5-10 miles	L	$50 million - $200 million
< 40 acres / < 5 miles	M	$10 million - $50 million
1 - 3 acres / 1 - 5 miles	S	$1 million - $10 million
< 1 acre / < 1 mile	XS	< $1 million

Figure 377. Estimated Costs per Project Sizes in the LA River Master Plan. This table associates project impact levels from XS to XL with estimated cost ranges on a per project basis. Given the range of project typologies, these ranges are understandably broad, but provide a basis for planning.

COSTS

CAPITAL COSTS

Achieving the goals of the LA River Master Plan will involve coordinated efforts among public, private, and nonprofit entities to implement a myriad of projects over the next 25 years. During that time frame, physical, political, and financial conditions will change. However, through research of comparable precedents, an estimated budget range for the implementation of the Master Plan's site- and system-based projects has been developed and could range from 19 billion to 24 billion dollars (2020 dollars)

There are several primary cost considerations with the LA River Master Plan budget. Costs by improved acre could range from 1 million dollars (2019 dollars) per acre for trails and similar basic amenities to 15 million dollars per acre (2019 dollars) for more robust improvements such as bridges or sites requiring remediation. Costs can also be analyzed on a project by project basis (XS, S, M, L, and XL) and estimated budget ranges per project (see chart above for ranges). Given the wide range of project typologies, these ranges are understandably broad, but provide a basis for planning for capital and operational resources.

ONGOING O&M COSTS

In addition to the capital costs of the Master Plan, it is important to consider operations and maintenance costs to ensure ongoing project success. The Design Guidelines (Appendix Volume I) require every project to have a three-year maintenance plan in place, as well as a named entity for on-going maintenance of any proposed project.

Using precedent studies, maintenance costs for the entire LA River right-of-way (51 miles) range from $1.5-3 million dollars (2019 dollars) per river mile annually. This includes a range of costs for flood infrastructure and park space maintenance. Specific improvements will greatly affect the type of maintenance required and many areas along the river already have maintenance funding in place through partnerships between LA County, the USACE, municipalities, state conservancies, and other entities such as non-profits.

In addition to overall operations and maintenance budgets, programs for full time operations and safety staff that could monitor trails and parks along the river right-of-way are important as more of the river becomes a publicly accessible connected open space.

LA River Master Plan Capital Costs Over Time

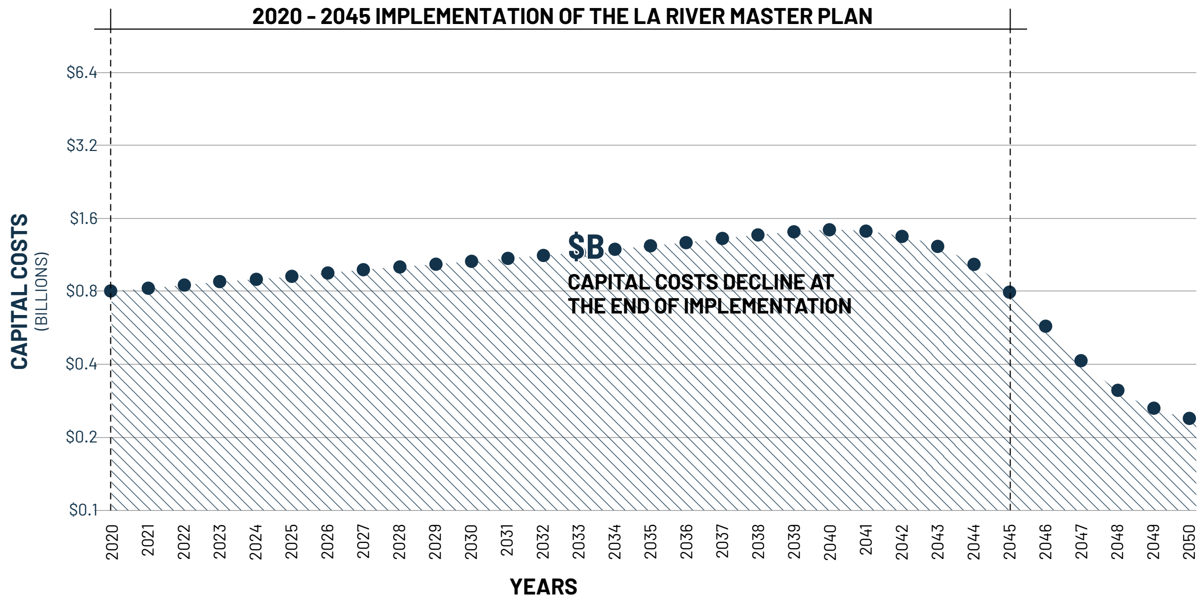

Figure 378. LA River Master Plan Capital Costs Over Time. There are two important patterns to recognize in the allocation of funding resources. Capital improvements are anticipated to be relatively constant with the exception of inflationary and escalation costs over time. As capital projects are completed these costs will decrease.

LA River Master Plan Operations and Maintenance Costs Over Time

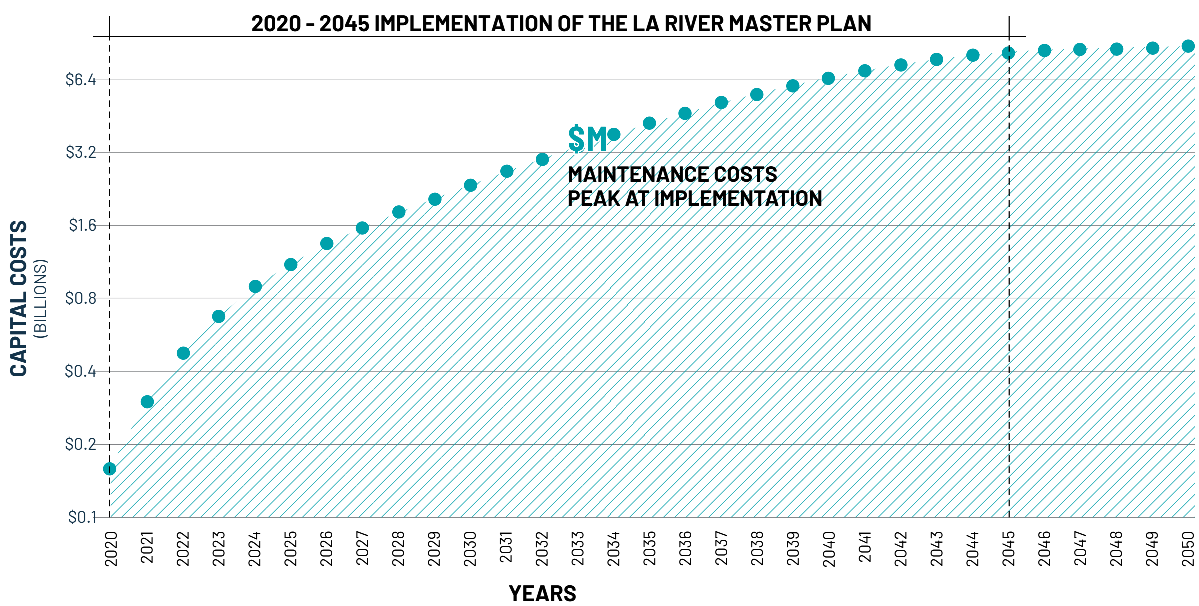

Figure 379. LA River Master Plan Operations and Maintenance Costs Over Time. There are two important patterns to recognize in the allocation of funding resources. Operations and maintenance costs, while significantly lower than capital costs, will rise over time as new amenities come on line. During this time, the river's value as a resource will also increase as the plan achieves the nine goals for water, people, and the environment.

THE WHAM COMMITTEE WAS FORMED TO FACILITATE INTENTIONAL COORDINATION OF FUNDS ASSOCIATED WITH MEASURES W, H, A, AND M

EXISTING LA COUNTY FUNDING SOURCES

Across LA County and the municipalities adjacent to the LA River, several funding sources are in place that could support the work of projects related to this Master Plan. Additionally, state and federal funding can be leveraged toward projects in this plan.

WHAM COMMITTEE

In December 2019, LA County formed the WHAM Committee. The WHAM Committee was formed to facilitate intentional coordination of funds associated with Measures W, H, A, and M. These four measures, passed between 2016 and 2018, include hundreds of millions of dollars for stormwater projects (W), homelessness services and housing (H), parks (A), and transportation (M). The WHAM Committee is coordinating planning to develop multi-benefit projects combining multiple funding sources, while leveraging existing county funds with other funding sources, including local, state, and federal funding opportunities. The WHAM Committee is charged with working collaboratively in a systematic method while engaging municipalities, technical experts, and other stakeholders where needed. Integration of the goals of the OurCounty Sustainability Plan is also a key purpose of the WHAM.

The associated LA County Measures are described below:

- Safe, Clean Water (Measure W): Focused on water quality improvement, Measure W was passed by LA County voters in 2018. The measure makes $285 million available annually for projects with a focus on water quality improvement and specifically prioritizes nature based solutions to stormwater quality challenges. The goals of Measure W are well aligned to many goals in the LA River Master Plan.
- The Los Angeles County Homeless Initiative (Measure H): Approved in 2016, Measure H increases the county's sales tax by ¼ percent to raise an estimated $355 million per year over ten years. Funds are appropriated for rental subsidies and housing to pursue a comprehensive regional approach to combat homelessness. The measure implements 21 strategies that directly strive to prevent homelessness, increase affordable and homeless housing, subsidize housing costs, increase income, provide case management and services, and utilize a coordinated entry system.

Federal	State	Local
WRDA: Stormwater Priorities	Prop 1 (2014): Remaining Monies	Safe, Clean, Neighborhood Parks and Beaches (Measure A): $96 million annually
USACE Continuing Authorities Plan USACE Corps Water Infrastructure Financing Program	Prop 68 (June 2018): $4 billion statewide	LA County Traffic Improvement Plan (Measure M): $860 million annually
USFWS Norh American Wetlands Conservation Act	Prop 84	Safe, Clean Water (Measure W): $285 million annually
NPS Land and Water Conservation Fund	Coastal Conservancy: Lower River/ Estuary	Homeless Initiative (Measure H): $355 million annually
USBR Water SMART	Wildlife Conservation Board: Habitat	

Figure 380. Existing funding for river related projects includes federal, state, and local sources.

- Safe, Clean Neighborhood Parks and Beaches (Measure A): Measure A is a parcel tax first approved by LA County voters in 2016. It provides for safety improvements to existing park, recreation, and beach facilities, as well as the acquisition of new parkland and open space. It can also be used toward the restoration of rivers and streams, graffiti prevention, and tree planting. It generates approximately $96 million annually and could be used to address several Master Plan goals, such as those related to parks and ecosystems.

- LA County Traffic Improvement Plan (Measure M): Approved in 2016 by LA County voters, Measure M is a sales tax initiative that provides funding for new transit and highway projects, enhanced bus and rail operations, and other transportation improvements throughout LA County. It generates approximately $860 million annually and could support access-related Master Plan goals.

FLOOD CONTROL DISTRICT FUNDING

The LA County Flood Control District (FCD) is a special district overseen by the LA County Board of Supervisors. The Flood Control District funds development projects that relate to their mission of flood risk reduction, water conservation, and water quality on lands owned or managed by the District. The FCD mandate also includes the ability to fund passive recreation projects along FCD property and rights-of-way. Several projects in the Master Plan could be partially funded by the Flood Control District.

ADDITIONAL EXISTING FUNDING SOURCES

GRANTS AND OTHER EXISTING FUNDING

While there have been several successful bond measures and programs created in the last few years to support LA River-like work, existing grant and programmatic funding streams are spread out through multiple agencies at different levels of government with varying project scales and timeline requirements. Grants and existing funding are great opportunities for short term funding but unreliable for mid to long term implementation. During implementation analysis of existing programs and available funding at all levels can allow sources to be generally accounted for but specifically matched back to Master Plan goals and projects for short term implementation.

At the state level several bonds exist that relate to the goals of the LA River Master Plan. The Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) authorized $7.545 billion in general obligation bonds to fund ecosystems and watershed protection and restoration, water supply infrastructure projects, including surface and groundwater storage, and drinking water protection. The Parks, Environment, and Water Bond Act of 2018 (Proposition 68) authorized $4 billion in general obligation bonds for state and local parks, environmental protection and restoration projects, water infrastructure projects, and flood protection projects.

Additional sources of state funding could include the Strategic Growth Council, the Department of Water Resources, the Department of Parks and Recreation, the State Water Board, the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, the California Natural Resources Agency, and the Santa Monica Mountains Conservancy Ecosystem.

At the federal level, transportation programs offer potential funding for projects such as bikeways and trails. Additional funding related to resiliency may be available through agencies such as FEMA.

Brownfield funding opportunities are outlined in detail in Chapter 7.

PARALLEL FUNDING SOURCES

In addition to river-specific funding sources, projects along the LA River can leverage funding from parallel efforts within the region. For example, in 2020 the LA County Board of Supervisors approved the "Care First, Jails Last" motion providing 114 recommendation to help decarcerate the county's jails, specifically diverting individuals suffering from poor mental health, drug and alcohol dependency, homelessness, and other underlying conditions into less punitive programs that serves these vulnerabilities. Many of the county's system-impacted communities lie within the same geographic area of those identified by the Master Plan as high-need communities. Many of the recommendations of the motion manifest in similar strategies of those of the Master Plan.

Among the recommendations, there are certain alignments that can work alongside river improvements, such as decentralized service hubs that are similar to the resources provided in Gathering Pavilions (Tier III), including low-barrier navigation centers. Additionally, the motion calls for community-based harm reduction strategies, similar to those called for river staffers. Lastly, several recommendations call for affordable and supportive housing to create secure and safe living environments for system-impacted individuals."Care First, Jails Last" recommends significant funding measures, and as such, recommendations in alignment with the Master Plan's methods can work symbiotically and share these resources.

POTENTIAL NEW FUNDING SOURCES

There are several existing options for large scale financing that should be considered and further researched during the implementation phase of this plan. The framework of the LA River Master Plan allows for key decision-makers including the public, as well as elected officials at all levels of government to creatively build a package of revenue sources over the next 20-25 years in support of the goals and projects outlined in this plan. While the following list includes many existing opportunities for large scale financing, there may be additional opportunities that can be brought to the table with further research and targeted conversations with experts.

- LA River Bond Measure: A bond measure specifically for LA River funding would give the public and policymakers an opportunity to create a dedicated source of revenue over the course of 25 to 30+ years.
- Enhanced Infrastructure Finance District (it should be noted that all EIFD's should be written with affordable housing goals in mind to reserve funding for affordable housing): EIFDs can be used to finance public capital facilities, including affordable housing, by leveraging anticipated future increases in tax revenue due to these investments. Creating an EIFD for the LA River and or specific LA River projects could create long-term revenue for revitalization efforts and provide a great opportunity to directly support the Master Plan's goal for housing. EIFDs have been relatively hard to implement since they generally require sharing tax revenue from county and local municipal partners. However, the Master Plan creates a collective set of goals for all parties to work toward together.
- Appropriations and Direct Funding: State member items, state and municipal budgets, and federal appropriations could be directly leveraged for the LA River. The appropriation of funds at all levels would have to be coordinated individually with policy makers to ensure funding applicability. It would be a great opportunity for short-term funding to jump start Master Plan next steps.

SEVERAL EXISTING FUNDING SOURCES ARE IN PLACE THAT COULD SUPPORT THE WORK OF PROJECTS RELATED TO THIS MASTER PLAN

Figure 381. Plant nurseries along the LA River. Source: LA County Public Works, 2018.

14. IMPLEMENTATION AND FUNDING MATRIX

PROJECT LEADS AND PARTNERS WILL CARRY THE MASTER PLAN FORWARD

The implementation and funding matrix lists every goal, action, and method in Section III and identifies for each action:

- County lead: the LA County department or agency whose responsibilities are most aligned with the action. The County lead will take responsibility for implementing the action within their jurisdiction and liaise with partner agencies to help facilitate implementation outside of their jurisdiction
- Potential partners: agencies and organizations both within LA County government and without that the implementation lead may request
- Geographic boundaries: whether the action applies to the entire county, the LA River watershed, the LA River corridor and surrounding areas, or just the LA River channel
- Potential funding sources: While the plan identifies potential funding sources in the Implementation Matrix, dedicated funding for many of the actions has not yet been identified

The matrix also lists for each action and method other related actions and methods.

HOW TO READ THE IMPLEMENTATION AND FUNDING MATRIX

The Implementation and Funding Matrix is a compilation of every goal, action, and method in Section III, stripped of the narrative text and with specific guidance added about who is responsible for implementation and where. It is meant to serve as a quick reference guide and checklist for those within and outside of LA County government responsible for implementation.

ABBREVIATIONS USED IN THE IMPLEMENTATION AND FUNDING MATRIX

LA COUNTY ABBREVIATIONS

A&C	LA County Department of Arts and Culture
CEO	LA County Chief Executive Office
CSO	LA County Chief Sustainability Office
DCBA	LA County Department of Consumer and Business Affairs
DPH	LA County Department of Public Health
DPR	LA County Department of Parks and Recreation
DPSS	LA County Department of Public Social Services
DRP	LA County Department of Regional Planning
FCD	LA County Flood Control District
LACDA	LA County Development Authority
LACOE	LA County Office of Education
LACMA	LA County Museum of Art
Metro	LA County Metropolitan Transportation Authority
NAIC	LA City/County Native American Indian Commission
NHM	LA County Natural History Museum
OEM	Office of Emergency Management
PW	LA County Public Works

OTHER ABBREVIATIONS

CBO	Community Based Organization
EPA	California Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GLACVCD	Greater Los Angeles County Vector Control District
HUD	US Department of Housing and Urban Development
LADWP	LA Department of Water and Power
LAEDC	LA Economic Development Corporation
LAHSA	LA Homeless Services Authority
LASAN	City of LA Sanitation & Environment
MRCA	Mountains Recreation & Conservation Authority
NGO	Non-Governmental Organization
RMC	Rivers and Mountains Conservancy
RWQCB	LA Regional Water Quality Control Board
SMMC	Santa Monica Mountains Conservancy
SWRCB	California State Water Resources Control Board
USACE	US Army Corps of Engineers
WRD	Water Replenishment District of Southern California

ACTION

Movements that LA County can take towards the ideal state described by the goal.

COUNTY LEAD

The LA County department or agency whose responsibilities are most aligned with the action. The County lead will take responsibility for implementing the action within their jurisdiction and liaise with partner agencies to help facilitate implementation outside of their jurisdiction.

METHOD

Specific implementation steps to achieve each action.

FOR MORE INFORMATION REGARDING COMMUNITY BASED ORGANIZATIONS AND NON-GOVERNMENTAL ORGANIZATIONS WORKING ALONG THE RIVER, SEE APPENDIX VOLUME II: TECHNICAL BACKUP DOCUMENT

GOAL

One of the nine goals of the Master Plan, each of which is an active priority for the future of the river.

GEOGRAPHIC BOUNDARIES

The area in which the action applies, whether the entire county, the LA River watershed, the LA River corridor and surrounding areas, or just the LA River channel.

1. REDUCE FLOOD RISK AND IMPROVE RESILIENCY.

	Action/Methods				Related Actions/Methods
1.6.	**Increase public awareness of flood hazards and river safety.**				**9.3.6.**
	County Lead PW/FCD	**Potential Partners** USACE	**Geographic Boundaries** LA County	**Potential Funding Sources** USACE Floodplain Management Services Program; FEMA Pre-Disaster Mitigation Grants	
1.6.1.	Develop a website to assist in educating other agencies, cities, and the general public on river issues, including flood risk management and dangers posed by the river during heavy rainfall events.				2.4.1., 2.5.1., 2.5.2., 3.4., 4.2.4., 6.6.2., 8.1.3.

POTENTIAL FUNDING SOURCES

Existing or proposed funding sources that may support implementation.

POTENTIAL PARTNERS

Other LA County and outside entities that may spend significant time or resources to aid in implementation.

RELATED ACTIONS/METHODS

Cross-references to other actions or methods from any goal that may be implemented similarly.

DRAFT

1. REDUCE FLOOD RISK AND IMPROVE RESILIENCY.

	Action/Methods				Related Actions/Methods
1.1.	**Maintain existing flood carrying capacity of all reaches of the LA River channel.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	USACE, FEMA	LA River Corridor + Surroundings	FCD	
1.1.1.	Review new projects within and along the LA River to ensure that flood risk is not increased.				
1.1.2.	Review new projects with in-channel components to ensure the flood carrying capacity of the river is not reduced.				
1.2.	**Increase capacity of the river in high risk areas to provide flood risk reduction to at least the 1% (100-year) annual chance flood event or to a level recommended by a risk assessment.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	USACE, FEMA	LA River Corridor + Surroundings	Proposed State Climate Resilience Bond 2020; Congressionally authorized studies and projects through USACE Civil Works Authority; USACE Continuing Authorities Program (Up to $10M); FEMA Flood Mitigation Assistance (FMA) Grant Program, US Army Corps of Engineers Corps Water Infrastructure Financing Program (CWIFP)	
1.2.1.	Implement capacity increasing measures as appropriate, such as modifying the channel, deepening the channel, raising levees, building bypass channels or tunnels, removing invasive plants, or removing sediment from the channel.				8.1., 9.3.5.
1.2.2.	Manage sediment and invasive plants using best practices before they accumulate in the river channel.				
1.2.3.	Manage dry-weather flows to discourage the growth of invasive and non-native vegetation within the flood channel.				
1.2.4.	Retrofit infrastructure and other obstructions, such as bridges, to remove hydraulic constrictions.				1.3.2., 1.7.2., 3.2.5.
1.2.5.	Prioritize natural features and processes for flood risk reduction.				1.3.2., 1.7.2., 3.2.5.
1.3.	**Reduce peak flood flows into the river.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities)	LA River Watershed	Congressionally authorized studies and projects through USACE Civil Works Authority; FEMA Flood Mitigation Assistance (FMA) Grant Program	
1.3.1.	Evaluate regional scale upstream dams and detention basins for opportunities to reduce flood risk downstream.				
1.3.2	Increase capacity of existing dams and detention basins through measures such as clearing debris, deepening basins, increasing dam and levee heights, and improving real-time controls.				1.2.5., 1.7.2., 3.2.5.
1.4.	**Include climate change research in the planning process for new projects along the river.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	CSO, Academia	LA River Watershed	Proposed State Climate Resilience Bond 2020	
1.4.1.	Conduct an inter-institutional study on climate change impacts in the LA Basin and how they impact hydrology and sea level rise.				8.3.1.
1.4.2.	Apply the latest accepted climate change prediction models in flood risk reduction planning.				8.3.2.
1.5.	**Update and improve emergency preparedness.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	USACE, LADWP, CSO, OEM, Sheriff, Fire Department, Health Agency, Municipal Emergency Services	LA River Corridor + Surroundings	Proposed State Climate Resilience Bond 2020; USACE Emergency Preparedness, Response, and Recovery Program (Public Law 84-99); FEMA Pre-Disaster Mitigation Grants; NOAA Advanced Hydrologic Prediction Services; NOAA Coastal Resilience Grants	
1.5.1.	Evaluate, update, or develop appropriate Emergency Action Plans that cover specific areas of the river where needed, including the dams and levees along the mainstem and the tributaries.				
1.5.2.	Conduct emergency preparedness exercises that test Emergency Action Plans.				
1.5.3.	Improve flood forecasting capabilities and monitoring for the river corridor.				
1.5.4.	Update and improve flood inundation maps.				

Action/Methods					Related Actions/Methods
1.5.5.	Develop appropriate warning systems such as sirens, lights, or geo-targeted text message alerts to inform users of impending rain or rising water.				
1.5.6.	Evaluate critical infrastructure and facilities located in the floodplain, and encourage the use of best practices to reduce vulnerability to flood hazards.				
1.5.7.	Review and revise policies regarding closing the river trail during storms.				
1.5.8.	Assist emergency managers, local law enforcement, and emergency responders in developing emergency response and evacuation plans for river adjacent communities, river users, and special needs populations.				1.6., 2.7.1.
1.6.	**Increase public awareness of flood hazards and river safety.**				**9.3.6.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	USACE	LA County	USACE Floodplain Management Services Program; FEMA Pre-Disaster Mitigation Grants	
1.6.1.	Develop a website to assist in educating other agencies, cities, and the general public on river issues, including flood risk management and dangers posed by the river during heavy rainfall events.				2.4.1., 2.5.1., 2.5.2., 3.4., 4.2.4., 6.6.2., 8.1.3.
1.6.2.	Post consistent signage and communication about flood risk and river safety on bridges and access points.				2.7.1.
1.6.3.	Develop and implement an educational program on flood and river safety.				2.2.4., 7.2.
1.6.4.	Encourage river adjacent residents and businesses to develop tailored emergency and evacuation plans.				
1.6.5.	Encourage residents and businesses in the floodplain consider purchasing flood insurance, and provide them with information on flood risk, available resources, and flood insurance.				
1.6.6.	Encourage public awareness campaigns include translation to languages spoken in local communities and are coordinated with a network of local leaders that can help lead different groups based on culture, age, and other community factors.				
1.7.	**Improve flood facility operations and maintenance.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	USACE	LA County	USACE Continuing Authorities Program (Up to $10M); FCD; USACE	
1.7.1.	Expand coordination between responsible flood management agencies including the US Army Corps of Engineers and the LA County Flood Control District and consolidate responsibilities under the LA County Flood Control District Flood Control District through divestiture or deauthorization to streamline operations and maintenance, facility management, funding, and permitting.				
1.7.2.	Manage sediment and invasive vegetation in the river channel using best management practices.				1.2.5., 1.3.2., 3.2.5.
1.7.3.	Implement new technologies such as real-time monitoring, reporting, and controls.				
1.7.4.	Update the flood risk and pumping plant telemetry systems.				
1.7.5.	Update and improve the mapping of the watershed's storm drains, channels, access, and jurisdictional ownership.				
1.7.6.	Continue to implement, review, and improve dam and levee safety programs that ensure the flood management infrastructure delivers intended benefits while reducing risks to people, property, and the environment through continuous assessment, communication, and management.				
1.8.	**Implement consistent floodplain management practices across the region.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	DRP, Municipalities, FEMA, CSO	LA County	USACE Floodplain Management Services Program; NOAA Coastal Resilience Grants, US Army Corps of Engineers Corps Water Infrastructure Financing Program (CWIFP)	
1.8.1.	Update and improve hydrologic data and models for the LA River watershed.				
1.8.2.	Update and improve flood inundation mapping, and consider local assessments for flood risk.				
1.8.3.	Manage floodplain development and support community activities in coordination with the National Flood Insurance Program (NFIP).				
1.8.4.	Support communities in maintaining and improving their Community Rating System scores.				
1.8.5.	Work to ensure the levees along the LA River are certified by FEMA.				
1.8.6.	Encourage flood resilient projects in the 1% (100-year) floodplain.				
1.8.7.	Encourage and prioritize resilient retrofits of existing critical infrastructure in the 1% (100-year) and consider for the 0.2% (500-year) floodplains.				

2. PROVIDE EQUITABLE, INCLUSIVE, AND SAFE PARKS, OPEN SPACE, AND TRAILS.

	Action/Methods	Related Actions/Methods
2.1.	**Create 51 miles of connected, public open space along the river.**	
	County Lead: TBD; **Potential Partners:** PW/FCD, DRP, USACE, SMMC, RMC, MRCA, WCA, Conservation Corps; **Geographic Boundaries:** LA River Corridor + Surroundings; **Potential Funding Sources:** Measure A; Prop 68; Proposed State Climate Resilience Bond 2020	
2.1.1.	Create a park setting along the entire river that is integrated with native ecology, utilizing this plan's design guidelines (LA River Design Guidelines).	2.4.2.
2.1.2.	Utilize river channel right-of-way and adjacent areas to increase park space.	
2.1.3.	Promote the river as a central greenway in the larger LA County network of regional parks, multi-use trails, habitat, and open space.	
2.1.4.	Use river channel right-of-way and adjacent areas to assist in ensuring all LA County residents live within a half mile of a park.	
2.1.5.	Provide river-oriented and other amenities and experiences in existing and new park spaces that are not currently available at nearby parks, and increase unique programming along the river corridor.	
2.1.6.	Preserve and create viewsheds along the river, to the river, and from bridges over the river.	
2.1.7.	Secure ongoing and long-term funding for land acquisition, construction, and maintenance of additional parks and recreational facilities.	
2.1.8.	Increase recreation uses within the corridor where compatible with ecological function, safety, and maintenance.	
2.1.9.	Encourage clean-up of brownfield and toxic sites along the river for use as parkland and habitat areas.	
2.1.10.	Encourage active programming of park spaces along the LA River, and pilot interim programming uses of underutilized areas.	
2.2.	**Complete the LA River Trail so that there is a continuous route along the entire river, and encourage future routes on both sides where feasible.**	
	County Lead: TBD; **Potential Partners:** PW, Municipalities, SMMC, RMC, MRCA, WCA; **Geographic Boundaries:** LA River Corridor + Surroundings; **Potential Funding Sources:** Federal Transportation; Prop 68; Measure A; Measure M; Proposed State Climate Resilience Bond 2020	
2.2.1.	In places where right-of-way is too narrow for a river trail, pursue easements on adjacent property or utilize bridges, platforms, or cantilevers to complete the trail.	
2.2.2.	Increase the extent of multi-use trails parallel to the river with separate paths for active transport, pedestrians, and equestrians, especially in areas of high traffic.	
2.2.3.	Provide bicycle parking and encourage bicycle rental facilities and bike share along the river.	
2.2.4.	Develop signage and curriculum that promotes the benefits of using the river trail for recreation and improved health.	1.6.3., 7.2.
2.2.5.	Increase shade along the trail, where possible using shade trees (LA River Design Guidelines).	2.3.1, 2.4.1, 3.3.7
2.2.6.	Design the LA River Trail to minimize negative effects on adjacent sensitive habitat areas.	
2.2.7.	Provide consistent, wildlife and dark-sky friendly lighting along the LA River Trail.	
2.3.	**Provide support facilities at a regular cadence along the length of the river, on both sides where feasible.**	
	County Lead: PW; **Potential Partners:** DPR, SMMC, RMC, MRCA, WCA, LAHSA, LACDA, Sheriff; **Geographic Boundaries:** LA River Corridor; **Potential Funding Sources:** Measure A; Prop 68; Private Funding	
2.3.1.	Ensure there is a shaded place to rest every half mile, on average, along the river.	2.2.5
2.3.2.	Ensure access to well maintained and operable public restrooms and water fountains every mile, on average, along the river.	
2.3.3.	Ensure there is wayfinding information at river access points and every half mile, on average, along the river (LA River Environmental Graphics Guidelines within the LA River Design Guidelines).	
2.3.4.	Investigate opportunities to supplement County facilities and services with concessionaire agreements for food, convenience item sales, recreation equipment rentals, recreation instruction, and guided tours.	
2.3.5.	Ensure there are trash receptacles, bicycle repair stations, and other common elements at a regular cadence along the river on both sides (LA River Design Guidelines).	

Action/Methods				Related Actions/Methods
2.4. Ensure design excellence within and along the river corridor.				
County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
PW	DPR, Municipalities, SMMC, RMC, MRCA, WCA	LA River Corridor + Surroundings	Measure A	
2.4.1. Utilize unified design guidelines for adjacent parks and river amenities that are flexible enough to reflect the diversity of local communities (LA River Design Guidelines).				
2.4.2. Encourage local jurisdictions to adopt this plan's design guidelines (LA River Design Guidelines).				1.6.1., 2.2.5, 2.5.1., 3.2.6, 3.4., 4.2.4., 6.6.2., 8.1.3.
2.4.3. Require this plan's guidelines (LA River Design Guidelines) be followed for all projects along the river that are permitted by the County, constructed on County property, or funded by the County.				2.1.1.
2.5. Encourage compatibility of the river and adjacent land uses.				**7.5.**
County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
DRP	Municipalities	LA River Corridor + Surroundings	Measure A; Prop 68	
2.5.1. Encourage optimizing open space along the river channel and corridor.				1.6.1., 2.4.1., 3.4., 4.2.4., 6.6.2., 8.1.3.
2.5.2. Develop buffering strategies to mitigate air quality and other impacts of incompatible uses, such as industrial uses, that are expected to remain adjacent to the river.				3.3.4., 3.4.3
2.5.3. Encourage County and local development and zoning review processes to ensure compatibility of land uses and, where feasible, add new river-adjacent amenities.				
2.5.4. Consider the use of sound barriers or other elements such as berms to mitigate noise from adjacent freeways.				
2.6. Repurpose single-use spaces, such as power-line easements, rail rights-of-way, or flood infrastructure, to serve multiple functions such as multi-use trails or habitat.				
County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
DRP	PW, DPR, County Counsel, Utility Providers, CSO, MRCA, RMC, LADWP	LA County	Measure A; Proposed State Climate Resilience Bond 2020	
2.6.1. Develop master agreements with utilities for easements to maximize use of ground space under overhead or above buried utility lines for parks, open space, and trails.				
2.6.2. Discuss options to create multi-use space with private rail companies.				
2.6.3. Foster opportunities for urban agriculture to encourage access to local healthy foods.				
2.7. Promote life safety along the river.				
County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
PW/FCD	DPR, Sheriff, Fire Department, Health Agency, USACE, Municipal Emergency Services, River O and M Safety Staff, RMC, SMMC	LA River Corridor	CBOs	
2.7.1. Improve safety signage, including what to do in an emergency.				1.5.8., 1.6.
2.7.2. Utilize this plan's consistent 51-mile marker system (0 at Long Beach, 51 at Canoga Park) to assist response teams in locating emergencies along the river.				
2.7.3. Provide anchor points for swift water rescue teams.				
2.7.4. Remove hazards and dangerous objects, such as old fencing, metal, or debris, from the river corridor.				

2. PROVIDE EQUITABLE, INCLUSIVE, AND SAFE PARKS, OPEN SPACE, AND TRAILS. (CONTINUED)

	Action/Methods				Related Actions/Methods
2.8.	**Promote public safety along the river.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	DPR, Sheriff, Fire Department, Health Agency, USACE, Municipal Emergency Services, River O and M Safety Staff, RMC, SMMC	LA River Corridor	SCAG ATP; Metro	
2.8.1.	Coordinate with river staff programs on responsibilities related to implementation of safety measures.				6.8.4, 7.2.5.
2.8.2.	Consider opportunities to provide adequate and consistent lighting along the river trail that complies with guidelines to reduce light pollution and minimize impact to wildlife and habitat areas.				
2.8.3.	Provide emergency phones that are located along the river trail at frequent intervals.				
2.8.4.	Utilize CPTED (Crime Prevention Through Environmental Design) principles in projects.				
2.8.5.	Encourage adjacent neighborhood watch groups to include the river in their areas of influence.				
2.8.6.	Consider the use of video monitoring systems in isolated locations.				
2.8.7.	Encourage safe passage programs across and along the LA River, in which community volunteers escort youth and other vulnerable populations along the river.				
2.8.8.	Encourage local police departments to employ community policing best practices along the river.				

3. SUPPORT HEALTHY, CONNECTED ECOSYSTEMS.

	Action/Methods				Related Actions/Methods
3.1.	**Increase habitat and ecosystem function along the river corridor.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	DPR, NHM, NGOs, Academia (e.g. UCLA, USC), Conservation Corps, Marine Conservation Research Institute, SMMC, RMC, MRCA, WCA	LA River Corridor	Measure A; Safe, Clean Water; Proposed Climate State Resilience Bond 2020; Prop 68, US Army Corps of Engineers Corps Water Infrastructure Financing Program (CWIFP)	
3.1.1.	Prioritize projects that create and improve habitat and ecosystem function.				
3.1.2.	Collaborate with academic institutions and non-governmental organizations to collect data on ecosystem function within the LA River watershed and along the LA River corridor.				3.1.3. 3.1.4., 3.3.6.
3.1.3.	Collaborate with scientific research teams to increase the knowledge available about wildlife along and in the LA River and to create species profiles for different sectional conditions along the river.				3.1.2., 3.1.4., 3.3.6.
3.1.4.	Continue to collaborate with the Regional Water Quality Control Board's environmental flows study to determine habitat opportunities.				3.1.2., 3.1.3., 3.3.6
3.1.5.	Consider findings of the LA River Ecosystem Restoration Project (US Army Corps of Engineers/City of Los Angeles) in determining habitat opportunities.				
3.1.6.	Where natural soils are degraded, remediate soils to support healthy ecosystems and the development of soil systems that can improve soil moisture retention and plant health.				
3.1.7.	Support opportunities to acquire land in the corridor for projects that increase habitat and ecosystem function along the river.				

3. SUPPORT HEALTHY, CONNECTED ECOSYSTEMS. (CONTINUED)

	Action/Methods				Related Actions/Methods
3.2.	**Increase plant species biodiversity, and focus on the use of local California native plants in and around the river corridor.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	DPR, NHM, CSO, NAIC, City of LA, Conservation Corps, Marine Conservation Research Institute	LA County	Measure A; Safe, Clean Water, US Army Corps of Engineers Corps Water Infrastructure Financing Program (CWIFP)	
3.2.1.	Develop reach specific plant species guidelines related to ecological zones in and around the river with keystone and indicator species to create native, resilient, and biodiverse ecosystems.				
3.2.2.	Consider long-term trends, such as population growth, climate change, future water regimes, resiliency, and sustainability, to create adaptive and dynamic biodiversity plans that are resilient to the urban context.				3.2.4.
3.2.3.	Incentivize the creation of nurseries along the river that can supply native plants for new, large river parks.				
3.2.4.	Use the LA River Design Guidelines' plant palettes to make the river a planned reserve for plant biodiversity as climate changes.				3.2.2, 3.2.6
3.2.5.	Actively manage and remove invasive species from the river corridor and adjacent areas utilizing best management practices.				1.2.5., 1.3.2., 1.7.2.
3.2.6.	Utilize locally sourced native seed on projects as recommended in the LA River Design Guidelines.				2.4.1, 3.2.4, 3.5.1
3.3.	**Create a connective network of habitat patches and corridors to facilitate the movement of wildlife and support a diverse ecological community.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	DPR, NHM, CSO, Conservation Corps	LA County	Measure A; Safe, Clean Water; Proposed Climate State Resilience Bond 2020; Prop 68	
3.3.1.	Utilize the river right-of-way to increase habitat areas.				
3.3.2.	Foster opportunities for and create habitat "stepping stone" patches in areas that are densely developed and do not have existing significant ecosystem functions.				
3.3.3.	Promote the creation of linkages between upland and riparian ecosystems and between the river and its tributaries.				
3.3.4.	Promote the creation of vegetated buffers at the edges of existing significant habitat areas as well as between habitat areas and vehicular areas.				2.5.2.
3.3.5.	Protect and enhance existing native, resilient, and biodiverse ecosystems. (Plant communities are defined in the LA River Design Guidelines.)				
3.3.6.	Support, in parallel with regional efforts, a reach specific regime for low flows in the river that contributes to ecological function.				3.1.2., 3.1.3., 3.1.4.
3.3.7.	Where possible, plant a continuous greenway of native trees and appropriate vegetation for increased cooling, forage, and roosting and nesting habitat along the LA River and its tributaries.				2.2.5
3.4.	**Encourage cities along the river to adopt sustainability strategies.**				**1.6.1., 2.4.1., 2.5.1., 4.2.4., 6.6.2., 8.1.3.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	CSO	DRP, Municipalities, Conservation Corps, Sierra Club	LA River Corridor + Surroundings	Proposed Climate State Resilience Bond 2020	
3.4.1.	Provide technical assistance to cities seeking to develop or improve sustainability or climate plans.				
3.4.2.	Encourage cities to require SITES, LEED, ENVISION, or comparable certification standards, for public projects, and encourage National Wildlife Federation and Audubon or similar certification for private habitat areas.				3.4.3
3.4.3.	Encourage, prioritize, and incentivize cities to utilize nature-based approaches to projects.				2.1, 2.5.2, 3.4.2, 3.6.2, 9.1

3. SUPPORT HEALTHY, CONNECTED ECOSYSTEMS. (CONTINUED)

	Action/Methods				Related Actions/Methods
3.5.	**Use environmentally responsible practices for operations and maintenance of the river channel and adjacent lands.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	DPR, NHM, GLACVCD, CSO, River O and M Safety Staff, Conservation Corps, Sierra Club	LA River Corridor + Surroundings	Measure A; Safe, Clean Water	
3.5.1.	Train maintenance staff to work with native ecosystems and native plants.				3.2.6
3.5.2.	Collaborate with local educational institutions to provide vocational training related to native ecosystem and native plant maintenance.				
3.5.3.	Ensure pest management and vector control is incorporated early in project development and coordinated with the Greater LA County Vector Control District.				
3.5.4.	Adopt Integrated Pest Management (IPM) best practices.				
3.5.5.	Limit pollution through the use of zero emission maintenance equipment.				
3.5.6.	Support water conservation strategies within the river right-of-way to balance water supply needs between municipalities, ecosystems, and recreation.				8.3.
3.5.7.	Conduct operations and maintenance in accordance with the Countywide Integrated Pest Management Program and its integrated vegetation management strategy.				
3.5.8.	Follow best management practices in sediment and vegetation management.				
3.6.	**Use the river corridor as a living laboratory where ongoing innovation is encouraged.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	NHM, CSO, DPR, Conservation Corps, Marine Research Conservation Institute	LA River Corridor + Surroundings	Measure A; Safe, Clean Water; Prop 68	
3.6.1.	Use pilot projects to promote innovation, such as methods for localized air pollution mitigation, renewable power generation, natural solutions to water quality and runoff attenuation, increasing plant biodiversity, monitoring native plants and wildlife, light pollution reduction, invasive species management, and the production of sustainable local resources.				
3.6.2.	Recognize exemplary projects along the LA River and watershed through the LA County Green Leadership Awards Program.				3.4.3

4. ENHANCE OPPORTUNITIES FOR EQUITABLE ACCESS TO THE RIVER CORRIDOR.

	Action/Methods				Related Actions/Methods
4.1.	**Create welcoming access points and gateways to the LA River and LA River Trail to optimize physical access along its length, on both sides.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	DPR, Municipalities, Conservation Corps	LA River Corridor	Measure A; Measure M	
4.1.1.	Make the river trail and gateways as accessible and inclusive as possible.				
4.1.2.	Prioritize access for areas with limited access or areas that need improvements to existing access points.				
4.1.3.	Prioritize access near major destinations, including schools, libraries, parks, transit stops, and job centers.				7.1.3.
4.1.4.	Obtain easements adjacent to the river to create access.				
4.1.5.	Use the Environmental Graphics Guidelines from the LA River Design Guidelines to create a cohesive wayfinding system along the LA River.				
4.1.6.	Remove existing signage prohibiting access to the river as projects and trails are developed along the river.				

4. ENHANCE OPPORTUNITIES FOR EQUITABLE ACCESS TO THE RIVER CORRIDOR. (CONTINUED)

	Action/Methods	Related Actions/Methods
4.2.	**Increase safe transportation routes to the river.**	
	County Lead: TBD **Potential Partners:** Municipalities, Caltrans, CSO, PW, Metro, Conservation Corps **Geographic Boundaries:** LA County **Potential Funding Sources:** Measure A; Measure M; Proposed State Climate Resilience Bond 2020	
4.2.1.	Coordinate with LA County transportation plans, including Vision Zero, the Bicycle Master Plan, Metro plans, municipally adopted transportation plans, and the Step by Step Pedestrian Plan.	
4.2.2.	Encourage pedestrian and bicycle connections across the river approximately every half mile to mile.	
4.2.3.	Encourage all new pedestrian or road bridges over the river to provide pedestrian and bicycle access to the river trail.	
4.2.4.	Provide continuous pathways between the river and nearby recreation spaces.	
4.2.5.	Encourage cities to adopt complete streets policies to better connect neighborhoods to the river.	1.6.1., 2.4.1., 2.5.1., 3.4., 6.6.2., 8.1.3.
4.2.6.	Increase the extent of multi-use trails that connect to the river with separate paths for active transport, pedestrians, and equestrians.	
4.2.7.	Coordinate with transportation agencies to enhance public transit to and along the river.	
4.2.8.	Coordinate with transportation planning to encourage transit lines that cross the river to have stops that provide access to the river trail.	
4.2.9.	Promote the use of public transportation to get to and from the river trail.	
4.2.10.	Develop informational materials and signage that highlight the river trail as a transportation route to major job centers and destinations.	

5. EMBRACE AND ENHANCE OPPORTUNITIES FOR ARTS AND CULTURE.

	Action/Methods	Related Actions/Methods
5.1.	**Develop a globally significant, comprehensive 51-mile arts and culture corridor along the river that is place-based, community-driven, and reflective of the cultural diversity of the County.**	**7.1.5, 7.5.3.**
	County Lead: A&C **Potential Partners:** PW, LACMA, Municipal Arts Organizations, Sacred Places Institute, LA Conservancy, Metro **Geographic Boundaries:** LA River Corridor + Surroundings **Potential Funding Sources:** Percent for Art Programs	
5.1.1.	Site permanent civic art, temporary art installations, cultural amenities, and cultural facilities along the river that are responsive to community strengths, needs, and identity.	5.1.2, 5.3.1, 5.4.1, 7.1.1
5.1.2.	Encourage incubation of diverse talent through commissions for local as well as regional, national, and international artists and cultural organizations.	5.1.1, 7.5.9
5.1.3.	Secure reliable funding for civic art and cultural projects along the river, encourage local projects to adopt the LA River Design Guidelines, encourage coordination of municipal public art programs, and encourage percent for art programs where they are not in place.	
5.1.4.	Support operations and maintenance of existing cultural and arts assets along the LA River corridor to ensure optimal long-term viability of assets, and provide workforce training to maintain culture and arts-based assets where possible.	
5.1.5.	Prioritize the use of historically accurate and culturally competent art and storytelling of past and present in interpretive materials, including signage, environmental graphics, functional art, curricula, cultural markers, and educational displays.	7.5.6
5.1.6.	Require that all permanent art within the LA County Flood Control District right-of-way be deeded to the LA County Flood Control District.	
5.1.7.	Encourage opportunities for cultural and creative uses in community development such as space for artists to live/or work in proximity to the river.	

5. EMBRACE AND ENHANCE OPPORTUNITIES FOR ARTS AND CULTURE. (CONTINUED)

	Action/Methods				Related Actions/Methods
5.2.	**Identify and activate cultural assets along the LA River corridor.**				**7.1.4**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	A&C	LACMA, Metro, DRP, NAIC, Alliance for California Traditional Arts, Municipal Arts Organizations, Sacred Places Institute, LA Conservancy	LA County	Percent for Art Programs	
5.2.1.	Create a methodology for understanding existing cultural assets in collaboration with community members.				
5.2.2.	Work with community partners and creative strategists on cultural asset mapping activities in neighborhoods where there is limited existing data.				
5.2.3.	Continue asset mapping along the 51 miles of the LA River corridor after pilot project completion.				
5.2.4.	Conduct community training in the tools and strategies for documenting cultural assets through methods including interviews, photography, mapping, and video.				
5.2.5.	Share ongoing asset mapping on the LA County Department of Arts and Culture website, and help reaffirm and build the LA River community as a vital and growing county resource.				5.3.2.
5.2.6.	Work with County, municipal, and state historic preservation offices or similar agencies to incorporate existing resources and protocols for identifying and landmarking historically significant resources as components of asset mapping, and encourage preservation in municipalities where no ordinance or preservation program is active.				
5.2.7.	Identify and interpret culturally significant historic resources, including buildings, landscapes, and objects that convey the layered histories of places and people.				
5.3.	**Integrate artists, cultural organizations, and community members in planning processes and project development along the river.**				**7.3**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	A&C	PW, DRP, LACMA, Municipal Arts Organizations, Sacred Places Institute, LA Conservancy, Metro	LA County	Percent for Art Programs; Prop 63	
5.3.1.	Engage artists at the beginning of planning processes, and allow for open-ended exploration to determine how design, arts, and culture can be fully integrated into projects.				5.1.1.
5.3.2.	Use both quantitative and qualitative data in planning arts and cultural activities along the river.				5.2.5.
5.3.3.	Incorporate artists and cultural practitioners in design processes, including signage, interpretive materials, and street furniture.				
5.3.4.	Incentivize projects that acknowledge, represent, and preserve cultural heritage and cultural assets and that include local craftspersons, artisans, and Indigenous Peoples in riverside projects.				
5.3.5.	Prioritize cultural equity and inclusion in decision-making, investments, and strategies for implementation.				
5.4.	**Galvanize and activate the LA River cultural identity through arts and culture.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	A&C	LACMA, Municipal Arts Organizations, Sacred Places Institute, LA Conservancy, Metro	LA County	Percent for Art Programs	
5.4.1.	Activate the LA River by providing resources, grants, and other ongoing opportunities for cultural activities, gatherings, festivals, art, and performances along the river.				5.1.1
5.4.2.	Support community-based cultural and arts organizations along the river, and actively promote river spaces to local groups and communities as available for their use.				7.1
5.4.3.	Integrate civic art commissions and community engagement into the design criteria of the river corridor, including interpretive signage, cultural markers, interactive displays and other media, functional art, cultural amenities, and cultural facilities.				7.1
5.4.4.	Engage with artists and cultural organizations to provide programming for all ages, arts education for youth, free concerts, and cultural engagement at the river pavilions and other locations along the river.				
5.5.	**Streamline permitting processes for artwork and cultural activities along the river.**				**7.3.2**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	A&C	LA County	FCD	
5.5.1.	Streamline permitting for proposed art along the river.				
5.5.2.	Streamline permitting for holding events and performances along the river.				
5.5.3.	Encourage the creation of an affordable permitting pathway, which allows for community-based participants to more easily access the river.				

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6. ADDRESS POTENTIAL ADVERSE IMPACTS TO HOUSING AFFORDABILITY AND PEOPLE EXPERIENCING HOMELESSNESS.

	Action/Methods				Related Actions/Methods
6.1.	**Utilize the County's Affordable Housing Coordinating Committee to review and advise on housing and community stabilization strategies along the river.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	CEO	DRP, Municipalities, CSO, Tenant Rights Groups	LA River Corridor + Surroundings		
6.1.1.	Invite additional stakeholders that may include representatives from the County and river adjacent cities, as well as key community stakeholders, such as affordable housing advocates and representatives of communities directly experiencing displacement. Explore the need for funding for staffing or consultants to support the effort, if necessary.				
6.2.	**Develop mapping and assessment planning tools to identify areas at risk for displacement around the LA River in order to prioritize affordable housing projects.**				**7.5.8.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	CEO	PW/FCD	LA River Corridor + Surroundings		
6.2.1.	Develop and maintain a displacement risk map taking into account demographic, housing, market changes, and economic investments.				
6.2.2.	Require completion of a housing assessment for large river projects funded or supported by LA County in areas of high displacement risk to identify recommended anti-displacement strategies.				
6.3.	**Increase units of affordable housing within one mile of the river.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	CEO	DRP, Municipalities, LACDA	LA River Corridor + Surroundings	Measure H; LA County Housing Innovation Fund II; HUD Grants; Low Income Housing Tax Credits; CA Affordable Housing and Sustainable Communities Grants; CA Housing and Community Development Grants and Loans	
6.3.1.	Encourage a mix of supportive housing, affordable rental, and affordable homeownership units in both new construction and preservation buildings.				
6.3.2.	Expand the LA County Community Development Authority's Home Ownership Program (HOP) to provide additional affordable homeownership opportunities in river adjacent communities.				
6.3.3.	Designate river adjacent communities at risk of increased displacement as priority areas for County affordable housing investment.				
6.3.4.	Publicly report on the progress toward this goal annually through the Affordable Housing Coordinating Committee.				
6.4.	**Identify funding necessary to create an affordable housing land bank, land acquisition loan fund, or similar strategy to purchase land in proximity to the river and hold it for future development as affordable housing or permanent supportive housing.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	CEO		LA River Corridor + Surroundings	CEOs Housing Land Acquisition Fund	
6.4.1.	As part of the Affordable Housing Acquisition Fund study, identify all viable land for affordable housing, including public agency owned land within one mile of the LA River and surplus or underutilized sites appropriate for development of affordable or supportive housing, including sites where housing could be collocated with other uses.				
6.4.2.	Identify funding for a single land bank or similar strategy within county government or an outside partner.				
6.5.	**Secure funding for affordable housing in parallel with funding for river projects.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	CEO	PW	LA County		
6.5.1.	As new financing tools are created to fund river improvements, set aside a portion of funding to support land acquisition and permanently affordable housing whenever possible. While many infrastructure financing sources will not allow use for affordable housing, using a portion of river specific funding for housing, when possible, can leverage additional affordable housing financing and expand the amount of affordable housing built adjacent to the river.				
6.5.2.	Consider commissioning a study of the potential for an affordable housing specific tax increment financing tool as a means of significantly expanding funding for affordable housing along the river by capturing a small share of future growth in property tax revenue exclusively for affordable housing.				
6.5.3.	Leverage existing housing subsidies to finance permanent supportive housing for people formerly experiencing homelessness on key sites adjacent to the river.				
6.5.4.	Consistent with the County's Community Benefits Policy, require residential projects receiving commitments of more than $10 million of County resources (including land) to set aside at least 20% of the units to be affordable to extremely low, very low, and low income households.				

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6. ADDRESS POTENTIAL ADVERSE IMPACTS TO HOUSING AFFORDABILITY AND PEOPLE EXPERIENCING HOMELESSNESS. (CONTINUED)

	Action/Methods				Related Actions/Methods
6.6.	**Incentivize stronger resident equity building tools and tenant protection policies along the river.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	DCBA	Municipalities, DRP, Tenant Rights Groups	LA River Corridor + Surroundings	HUD Community Development Block Grants; CA Housing and Community Development Grants	
6.6.1.	Develop resources to expand tenant education and counseling, and inform tenants living adjacent to river improvement projects about the availability of counseling services, including those available through the LA County Department of Consumer and Business Affairs.				
6.6.2.	Develop resources and provide technical assistance to encourage cities to adopt stronger tenant protection policies, including rent stabilization and just cause for evictions.				1.6.1., 2.4.1., 2.5.1., 3.4., 4.2.4., 8.1.3.
6.6.3.	Fund a grant program to provide staffing support to community-based organizations in high-risk communities to conduct direct outreach and counseling to tenants at risk of displacement.				
6.6.4.	Expand County funding for eviction legal defense services for tenants, and target this resource to areas of the county, including many river adjacent communities, likely to experience concentrated displacement.				
6.6.5.	Prioritize river investment programs in communities that have established tenant protections.				
6.7.	**Support persons experiencing homelessness along the river by coordinating outreach and by building new permanent supportive housing.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	LAHSA	PW, Municipalities	LA River Corridor + Surroundings	Measure H; HHH; Prop 63; HUD Grants (HOPWA); CA Housing and Community Development Grants (e.g., Emergency Solutions Grants)	
6.7.1.	Identify sites for permanent supportive housing within one mile of the river.				
6.7.2.	Coordinate and support existing efforts to provide temporary and interim supportive housing until the implementation of permanent solutions.				
6.7.3.	Coordinate and support existing efforts of the County's coordinated homeless outreach system and their work along the LA River.				7.4.2.
6.7.4.	Connect persons living in or near the river to the coordinated entry system for access to housing opportunities for which they are eligible.				
6.7.5.	Build on the platform provided through Measure H to support more local cities in developing proactive homeless support programs and policies.				
6.8.	**Integrate best practices for working with persons experiencing homelessness utilizing the river corridor.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	LAHSA, Municipalities	LA River Corridor	Measure H; Prop 63	
6.8.1.	Review and update guidelines for clearing of encampments along the river to optimize notification timelines, use compassionate practices, and coordinate with outreach teams.				
6.8.2.	Continue and optimize the LA County Public Works temporary sanitation stations program while developing more robust sanitation facilities.				
6.8.3.	Provide, at a regular cadence of approximately every mile, permanent facilities for sanitation that are regularly maintained, staffed, and coordinated with river amenities.				2.3
6.8.4.	Coordinate with river staff programs to train staff to interact with persons experiencing homelessness.				2.8.1

7. FOSTER OPPORTUNITIES FOR CONTINUED COMMUNITY ENGAGEMENT, DEVELOPMENT, AND EDUCATION.

	Action/Methods				Related Actions/Methods
7.1.	**Provide spaces for people of all ages and abilities to learn about the ecology, hydrology, engineering, and cultural and natural history of the river and its watershed.**				**5.4.2, 5.4.3, 9.4.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	DPR, LACOE, A&C, NHM	LA River Corridor	Measure A; Prop 68	
7.1.1.	Install interpretive signage, cultural markers, interactive displays, or other media that reflect community input and local culture.				5.1.1
7.1.2.	Create outdoor classroom spaces that can be used by schools and other educational organizations to provide hands-on educational opportunities for community members, and encourage river adjacent schools to plan field trips to the LA River.				
7.1.3.	Prioritize connectivity to the river from schools, cultural centers, and other education facilities.				4.1.3.
7.1.4.	Collaborate with arts and culture organizations and academic institutions to understand cultural heritage and historical markers along the LA River and include them in asset mapping.				5.2
7.1.5.	Support the creation of informal and formal spaces for education in cultural traditions and the arts, such as culinary arts, design, media, architecture, and other genres of artistic production.				5.1
7.2.	**Develop educational materials for people of all ages to learn more about the past, present, and future of the river corridor; natural resource protection; and the wildlife and water of the LA River.**				**1.6.3., 2.2.4., 9.4.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	LACOE, NHM, A&C, State Parks, River O and M Safety Staff, NAIC, Sacred Places Institute, Libraries, Academia (USC, UCLA, etc), CBOs, LA Conservancy, AltaSea	LA County	EPA Environmental Education (EE) Grants; Environmental Education Grant Program (EEGP)	
7.2.1.	Develop sample curricula for teachers of students of different ages to use when bringing their classes to the river or to learn about the LA River in their classrooms.				
7.2.2.	Develop self-guided educational tours that engage and educate in cultural heritage, the arts, architecture, and the history of the built and natural environment.				
7.2.3.	Increase public understanding of ecosystem function and awareness of habitat and ecosystem health along the LA River.				7.2.4
7.2.4.	Develop and implement an educational program on river water quality.				7.2.3
7.2.5.	Coordinate with river staff programs to provide educational tours that feature traditional ecological knowledge.				2.8.1
7.2.6.	Consult with local Native American Tribal governments and work with Native American communities to develop a curriculum telling the history of the local Tribes and Indigenous Peoples whose lives and traditions depend on the LA River.				7.3
7.2.7.	Collaborate with local artists and cultural historians on the development of education materials and initiatives.				
7.2.8.	Coordinate with public information and participation program managers to provide educational materials on stormwater, water quality, multi-use projects, and other topics.				
7.2.9.	Use curriculum, tours, and discussions to improve environmental literacy and foster cultural understanding of the interconnectedness of historical, present, and future narratives.				
7.3.	**Engage the Indigenous Peoples of the region to document and celebrate the importance of the indigenous cultures of the LA River, past and present.**				**5.3, 7.2.6., 7.2.4**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	LACOE, NHM, NAIC, A&C Sacred Places Institute	LA County	Administration for Native Americans (ANA); Prop 68	
7.3.1.	Foster and expand an ongoing conversation and collaboration with local Tribal governments and local Native American communities about advancing the LA River Master Plan.				
7.3.2.	Streamline the permitting process for local Tribal governments to access traditional religious, cultural, and ceremonial spaces and materials along the LA River corridor.				5.5
7.3.3.	Advance the creation of informal spaces for gatherings in consultation with Native American organizations.				
7.3.4.	Utilize place names from Native American languages in signage along the LA River, as recommended by the Tribe whose territory encompasses that section of the river.				
7.3.5.	Integrate Native American knowledge of native plants and wildlife.				

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7. FOSTER OPPORTUNITIES FOR CONTINUED COMMUNITY ENGAGEMENT, DEVELOPMENT, AND EDUCATION. (CONTINUED)

	Action/Methods				Related Actions/Methods
7.4.	**Promote the river and natural ecosystem as an economic asset to surrounding communities.**				**7.2.3**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	DPSS	LACOE, LAHSA, LAEDC, Conservation Corps, LA Conservancy	LA County	Transformative Climate Communities (TCC); Prop 68	
7.4.1.	Utilize local resources and workforce to design, build, operate, and maintain projects, art, and amenities along the river, where possible.				
7.4.2.	Encourage service provider and concessionaire contracts with local businesses as a means to promote regional workforce development and economic expansion.				6.7.3.
7.4.3.	Provide workforce training to maintain river-related and nature-based projects.				
7.4.4.	Encourage fair-chance policies in hiring for river-related jobs.				2.1
7.4.5.	Use local resident hiring practices for people living near the river.				3.5
7.4.6.	Use targeted worker hiring practices for apprenticeship and employment opportunities, including, but not limited to veterans, persons experiencing homelessness, individuals with a history of involvement with the criminal justice system, older persons (55+), and persons with physical, cognitive, psychiatric, communicative, and developmental disabilities.				
7.4.7.	Work with veterans affairs to identify opportunities to train and match veterans with jobs or other vocational training related to the river.				
7.4.8.	Work with homeless service providers to identify opportunities to train and match individuals experiencing homelessness with jobs or other vocational training.				
7.4.9.	Encourage local businesses and river-related groups to engage youth, individuals under community supervision (probation and parole), and reentering populations in internships related to the river.				
7.4.10.	Encourage local business and river-related groups to engage residents, such as youth, student groups, social clubs, retirees, and individuals under community supervision (probation and parole) in volunteer and stewardship opportunities related to the river.				
7.4.11.	Promote recreation and river-related enterprises activities as an economic resource.				
7.5.	**Improve the interface between the river corridor and adjacent communities.**				**2.5.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	DRP	DPR, A&C, Conservation Corps	LA River Corridor + Surroundings	Measure A; Proposed Climate State Resilience Bond 2020	
7.5.1.	Visually enhance river right-of-way boundaries, including with fencing and vegetation.				
7.5.2.	Encourage existing river-adjacent development to orient its "front door" toward the river and public transportation.				
7.5.3.	Integrate cultural markers into signage and environmental graphics.				5.1.
7.5.4.	Continue to solicit input from communities along the river throughout implementation of this plan, and hold community meetings to update residents on the progress of plan implementation.				
7.5.5.	Require that County-funded infrastructure and open space projects engage local residents and community stakeholders in planning.				
7.5.6.	Foster community involvement in and ownership of projects.				5.1.5
7.5.7.	Reflect the physical and social character of each neighboring community in the physical design of river improvements.				
7.5.8.	Identify community vulnerabilities, such as displacement risk, flood risk, or climate vulnerability, and investigate potential impacts associated with river improvement projects.				6.2.
7.5.9.	Develop a strategy to address identified threats by projects to community and resident stability, particularly forces of economic displacement, flood risk, and climate risk.				5.1.2
7.5.10.	Encourage cultural organizations, small businesses, and artisans working or based along the LA River corridor to engage youth in internships offering arts training.				

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8. IMPROVE LOCAL WATER SUPPLY RELIABILITY.

	Action/Methods				Related Actions/Methods
8.1.	**Capture and treat stormwater and dry weather flows before they reach the river channel for groundwater recharge, direct use, water recycling, or release for downstream beneficial uses.**				**1.2.2., 9.3.5.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW	Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities), LADWP, SWRCB/RWQCB, USACE	LA River Watershed	Proposed State Climate Resilience Bond 2020; Drinking Water State Revolving Fund; LADWP Stormwater Capture Master Plan funding; CA Safe and Affordable Drinking Water Fund - 8.5; Safe, Clean Water	
8.1.1.	Encourage and incentivize water capture and direct use on public and private properties.				
8.1.2.	Encourage private property owners to capture and treat stormwater on site and consider incentive programs.				
8.1.3.	Coordinate dry-weather flow management, such as stormwater and dry-weather flow capture, groundwater management, and water recycling, among jurisdictions and along the tributaries and other sub-watersheds.				1.6.1., 2.4.1., 2.5.1., 3.4., 4.2.4., 6.6.2.
8.1.4.	Implement stormwater and dry-weather runoff capture projects throughout the watershed and along the main stem and tributaries of the LA River.				
8.1.5.	Coordinate flow changes with ongoing instream flow studies.				
8.2.	**Divert and treat stormwater and dry weather flows within the river channel for groundwater recharge, direct use as recycled water, and to supply water for parks and ecological areas.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	USACE, LADWP, WRD, Regional Pumpers, LADWP, SWRCB/RWQCB, County and City Sanitation Districts	LA River Corridor + Surroundings	Proposed State Climate Resilience Bond 2020; Drinking Water State Revolving Fund; LADWP Stormwater Capture Master Plan funding; CA Safe and Affordable Drinking Water Fund - 8.5; Safe, Clean Water	
8.2.1.	Implement direct diversion and treatment projects for recharge in the Central Basin and the San Fernando Basin.				
8.2.2.	Implement direct diversion and treatment projects for use as recycled water where cost effective.				
8.2.3.	Consider direct diversions and treatment projects for use in river adjacent parks and ecological areas.				
8.3.	**Employ and encourage efficient water use.**				**3.5.6.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	CSO, Local and Regional Water Suppliers (Purveyors and Districts, such as LADWP, WRD, MWD, LB Water)	LA County	Proposed State Climate Resilience Bond 2020; Drinking Water State Revolving Fund; LADWP Stormwater Capture Master Plan Funding; CA Safe and Affordable Drinking Water Fund - 8.5; Safe, Clean Water	
8.3.1.	Encourage an inter-institutional study on climate change impacts to water supply planning in the LA Basin.				1.4.1.
8.3.2.	Apply the latest accepted climate change prediction models to water conservation and water supply planning.				1.4.2.
8.3.3.	Encourage and incentivize households and neighborhoods to adopt best practices in water management.				
8.3.4.	Provide incentives for parks and other projects to utilize best practices for water conservation..				
8.3.5.	Encourage water conservation, water use efficiency measures, and the use of recycled or on-site collected water for irrigation in new developments, retrofit projects, parks, and ecological areas.				
8.4.	**Improve water supply and recycling facility operations and maintenance.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Water Districs and Purveyors	LA River Corridor	Drinking Water State Revolving Fund; LADWP Stormwater Capture Master Plan funding; CA Safe and Affordable Drinking Water Fund - 8.5; Safe, Clean Water	
8.4.1.	Expand coordination between responsible water management agencies to streamline operations and maintenance, facility management, funding, and permitting.				1.3.7
8.4.2.	Review and update water conservation, water supply and water recycling operations and maintenance protocols and best practices as they pertain to the river.				9.5.2
8.4.3.	Implement new technologies such as real-time monitoring, reporting, and controls.				9.5.3

8. IMPROVE LOCAL WATER SUPPLY RELIABILITY. (CONTINUED)

	Action/Methods				Related Actions/Methods
8.5.	**Continue measures to clean up the regional groundwater aquifers.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Water Purveyors, EPA, SWRCB, RWQCB, WRD, ULARA Watermaster, LADWP	LA County	Proposed State Climate Resilience Bond 2020; Drinking Water State Revolving Fund; LADWP Stormwater Capture Master Plan funding; CA Safe and Affordable Drinking Water Fund - 8.5; Safe, Clean Water	
8.5.1.	Explore state legislation to empower local agencies, and provide technical and financial support for improvement of water quality and reduction of regional groundwater threats.				
8.5.2.	Coordinate with the Upper Los Angeles River Area (ULARA) Watermaster, the water purveyors, and the responsible parties to advance groundwater remediation and improve the management and use of the San Fernando Groundwater Basins.				8.5.3
8.5.3.	Coordinate with the Water Replenishment District, the water purveyors, and the responsible parties to advance groundwater remediation and improve the management and use of the Central and West Coast Groundwater Basins.				8.5.2

9. PROMOTE HEALTHY, SAFE, CLEAN WATER.

	Action/Methods				Related Actions/Methods
9.1.	**Improve water quality and contribute to the attainment of water quality requirements to protect public and environmental health.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities), RWQCB	LA River Watershed	Safe, Clean Water; Proposed State Climate Resilience Bond 2020	
9.1.1.	Develop corridor-based water quality projects and programs, leading to implementation and operations and maintenance.				
9.1.2.	Support, encourage, and incentivize watershed water quality projects and program development, implementation, operations and maintenance, adaptive management, and planning refinements of the WMPs and EWMPs.				
9.2.	**Coordinate water quality improvements with the Safe, Clean Water Program.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities), RWQCB	LA River Watershed	Safe, Clean Water; Proposed State Climate Resilience Bond 2020	
9.2.1.	Follow prescriptive watershed planning along with adaptive management practices as detailed in the regional Watershed Management Programs and Enhanced Watershed Management Programs (WMPs and EWMPs).				
9.2.2.	Assist with establishing procedures for a credit program to assist property owners as identified in the Safe, Clean Water Program.				
9.2.3.	Provide technical and financial support for feasibility studies; water quality planning; resilience planning; real property acquisition for project development; pilot projects to test new technologies or methodologies focused on water quality, local water supply, and community investments; and retrofit programs.				

9. PROMOTE HEALTHY, SAFE, CLEAN WATER. (CONTINUED)

	Action/Methods				Related Actions/Methods
9.3.	**Coordinate with the Watershed Management Program and Enhanced Watershed Management Program (WMP and EWMP) Groups.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities), RWQCB	LA County	Safe, Clean Water; Proposed State Climate Resilience Bond 2020	
9.3.1	Ensure development within the watershed incorporates low impact development techniques to increase infiltration and capture throughout the built watershed.				8.1., 9.3.4.
9.3.2.	Expand stormwater capture for groundwater recharge, increase distributed stormwater capture, and reduce effective imperviousness in the watershed, prioritizing nature-based solutions where possible.				
9.3.3.	Actively coordinate with the Upper Los Angeles River, Los Angeles River Upper Reach 2, Rio Hondo, and Lower Los Angeles River watershed management groups to develop regional and distributed projects and programs that contribute to meeting goals for regional water quality improvement.				
9.3.4.	Prioritize the removal of pollutants of concern according to timelines contained within the WMP and EWMP plans and the Clean Water Act permits.				
9.3.5.	Prioritize catchments where needs are greater than can be met with planned or developed projects.				1.2.2., 8.1.
9.3.6.	Continue to implement and enforce regional policies for green streets, low impact development, and other watershed improvement initiatives.				1.3.1.
9.3.7.	Prioritize nature-based solutions to improve water quality.				1.6.
9.3.8.	Publicize the progress of projects and water quality metrics and monitoring results.				
9.4.	**Increase public awareness of river water quality and watershed health.**				**7.1., 7.2.**
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	DPH	PW/FCD, Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities), RWQCB, Outfitters, Public Health Agencies, River O and M Safety Staff, NHM	LA County	Safe, Clean Water; Clean Water State Revolving Fund	
9.4.1.	Develop a website to coordinate information, provide consistency in water quality reporting, and assist in educating other agencies, cities, and the general public on river issues such as water quality.				7.5
9.4.2.	Post consistent and inclusive signage and communication about water quality on bridges, access points, and along the river, coordinating with LA County Public Works, the LA County Flood Control District, and other entities, when warranted.				
9.5.	**Improve water quality facility operations and maintenance.**				
	County Lead	**Potential Partners**	**Geographic Boundaries**	**Potential Funding Sources**	
	PW/FCD	Municipalities, Entities with Stormwater Responsibilities (e.g., Caltrans, Metro, industrial facilities)	LA County	Safe, Clean Water; Clean Water State Revolving Fund	
9.5.1.	Expand coordination between responsible water quality agencies to streamline operations and maintenance, facility management, funding, and permitting.				1.3.7, 9.5.2
9.5.2.	Review and update operations and maintenance protocols and best practices.				1.3.7, 8.4.2, 9.5.1
9.5.3.	Implement new technologies such as real-time monitoring, reporting, and controls.				8.4.3

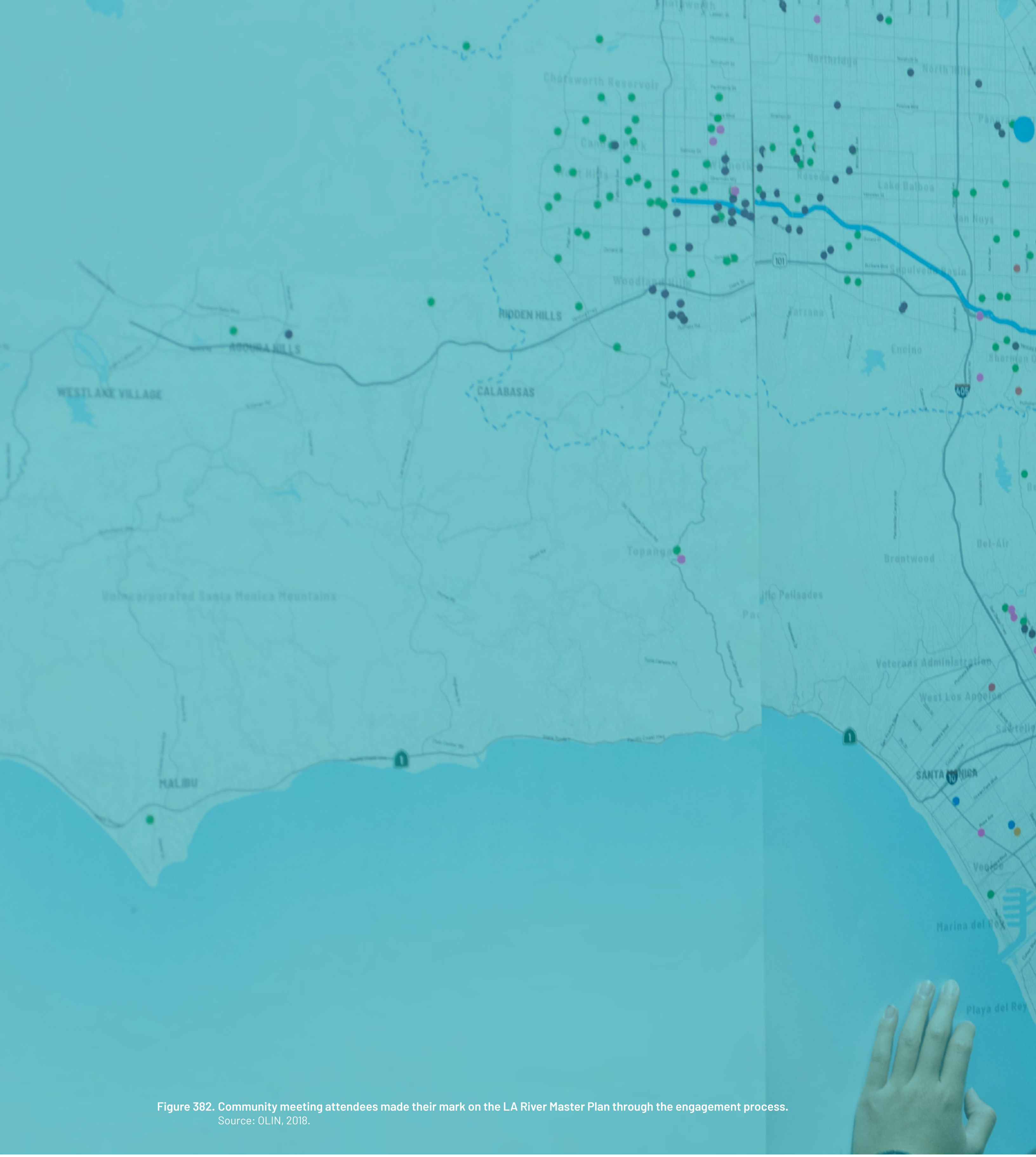

Figure 382. Community meeting attendees made their mark on the LA River Master Plan through the engagement process.
Source: OLIN, 2018.


BURBANK
Studio City
WEST HOLLYWOOD
BEVERLY HILLS
CULVER CITY
PASADENA

RESOURCES

GLOSSARY

1% Flood (100-Year Flood): A flood of a magnitude that has a 1 percent chance of being equaled or exceeded in any given year (i.e. has a recurrence interval of 100 years, on average).

1% Floodplain (100-Year Floodplain): Areas with a 1 percent annual chance of flooding.

0.2% Flood (500-Year Flood): A flood of a magnitude that has a 0.2 percent chance of being equaled or exceeded in any given year (i.e. has a recurrence interval of 500 years, on average).

0.2% Floodplain (500-Year Floodplain): Areas with a 0.2 percent annual chance of flooding.

Active Transport: Modes of transportation that are non-motorized relying on physical activity, such as walking and cycling, in addition to public transportation, which will be understood to require walking or cycling as a part of the whole journey. (Source: Healthy Spaces & Places, Australia)

Aquifer: A natural underground layer of porous, water bearing materials (sand, gravel) usually capable of yielding a large amount or supply of water.

Aquifer Recharge: Aquifer recharge (AR) and aquifer storage and recovery (ASR) are processes that convey water underground. These processes replenish groundwater stored in aquifers for beneficial purposes. Although the terms are often used interchangeably, they are separate processes with distinct objectives. AR is used solely to replenish water in aquifers. ASR is used to store water which is later recovered for reuse. (Source: US EPA)

Area Median Income: The median family income calculated by the US Department of Housing and Urban Development (HUD) for each jurisdiction, in order to determine Fair Market Rents (FMRs) and income limits for HUD programs. Also known as HUD Area Median Family Income.

Aspect: The compass direction of exposure of a site to environmental factors (in particular, sunlight).

Beneficial Use: 1. The uses of water necessary for the survival or well being of man, plants and wildlife. These uses of water serve to promote the tangible and intangible economic, social and environmental goals of mankind. Examples include drinking, swimming, industrial and agricultural water supply, and the support of fresh and saline aquatic habitats. 2. Defines the resources, services, and qualities of aquatic systems that are the ultimate goals of protecting and achieving. For example, Beneficial Use of Estuarine Habitat are uses of water that support estuarine ecosystems, including, but not limited to preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms. (Source: Regional Water Board, Heal the Bay)

Best Management Practice (BMP): In the context of water quality, BMPs are structural, non-structural devices and/or managerial techniques that improve or prevent the pollution contained within dry and wet weather runoff from reaching downstream water ways.

Box Channel: A rectangular-shaped section of a channel, typically made of concrete.

Climate Resourcefulness: An approach to climate resilience and justice that frames resilience in community action and/or activism as well as community self-determination and agency. This framework proposed a re-centering and re-grounding of resilience in communities and progressive, justice movements. (Source: Mackinnon and Derickson, 2013. "From Resilience to Resourcefulness: A Critique of Resilience Policy and Activism." Progress in Human Geography, 37.)

Community Based Process: Varies among communities and project scope but generally includes the following steps: initial community consultation; gathering data, observations, and analysis of primary issues; sharing those issues back to the community for further input; and finally, implementation. (Source: Project for Public Spaces)

Confined Aquifer: An aquifer in which an impermeable layer of soil or rock lays on top and prevents water from seeping into the ground.

Distributed Infiltration: Naturally or artificially allowing rainwater and runoff to percolate into the soil on a widespread basis.

Ecosystem Function: The biological, geochemical and physical processes that take place or occur within an ecosystem.These processes often benefit human needs directly or indirectly. For example: providing shade, carbon sequestration, or filtering pollutants.

Ecosystem Services: The direct or indirect contributions of ecosystems to human well-being that support our survival and quality of life.

Extant Vegetation: The mix of plants and trees present above ground in a vegetated area that still exists from pre-urbanization conditions.

Flood Control Basin: Large, empty basins which hold significant amounts of water during flood conditions to reduce flooding downstream. Examples of flood control basins in LA County include Sepulveda and Hansen.

Flood Channel: Concrete or earthen channels that convey water during large rain events. Flood channels are sometimes built on the courses of waterways as a way to reduce flooding. The LA River and many of its tributaries operate as flood channels.

Flood Control District: The Los Angeles County Flood Control Act (ACT) was adopted by the State Legislature in 1915, after a disastrous regional flood took a heavy toll on lives and property. The Act established the Los Angeles County Flood Control District and empowered it to provide flood protection, water conservation, recreation and aesthetic enhancement within its boundaries. The Flood Control District is governed, as a separate entity, by the County of Los Angeles Board of Supervisors.

Functioning Ecosystem: A dynamic complex of plant, animal, and microorganism communities and their non-living environment that exhibits biological and chemical activities characteristic for its type, regardless of whether the system visually looks like a natural system.

Groundwater Basin: Groundwater stored in an area with permeable materials below the ground, typically capable of storing a significant supply of water.

Habitat Linkage: A connection between large areas of habitat that is typically vegetated. Linkages are critical to provide sufficient habitat for wide-ranging animal species with large home territories as well as for other wildlife species.

Historic Floodplain: Areas subject to inundation by the LA River and its tributaries and distributaries prior significant channelization in the 19th and 20th centuries.

Hydraulic Reach: A reach is a length of stream or river used as a unit of study. It contains a specified feature that is either fairly uniform throughout, such as hydraulic characteristics or flood damages, or that requires special attention in the study, such as a bridge. (Source: USDA)

Hydraulics: Science that focuses on the movement of water through channels, pipes, and rivers.

Hydrology: The study of water, specifically its properties, movement and interaction with land, and how it affects the earth and atmosphere.

Infiltration: The gradual flow or movement of water into and through (to percolate or pass through) the pores of the soil.

Injection: An injection well is a device that places fluid deep underground into porous rock formations, such as sandstone or limestone, or into or below the shallow soil layer.

Invasive Species: An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. (Source: USDA)

LA River ROW: The LA River right-of-way is the "fenceline to fenceline" area of the river channel and typically includes the river, river banks or levees, and LA River Trail. The ROW is owned and maintained by a variety of entities.

Levee: An embankment whose primary purpose is to furnish flood protection from seasonal high water and which is therefore subject to water loading for periods of only a few days or weeks a year.

Local Park: Local parks are under 100 acres and contain active amenities such as athletic courts and fields, playgrounds, and swimming pools. (Source: LA County Parks and Recreation)

Low Flow Channel: In a concrete flood control channel, the low flow channel is a narrow, lowered section within the middle of the channel, designed to concentrate steady, non-wet weather runoff (water treatment flows, irrigation, etc.) by increasing channel velocity and depth.

Low Impact Development (LID): term used to describe a land planning and engineering design approach to manage stormwater runoff as part of green infrastructure. LID emphasizes conservation and use of on-site natural features to protect water quality.

Multiuse Trail: Trails which allow for many user types, such as pedestrians, cyclists, and equestrians.

Native Species: A species that is a part of the balance of nature that has developed over hundreds or thousands of years in a particular region or ecosystem. (Source: USDA)

Nature-based: Nature-based strategies aim to protect, manage, and enhance natural or modified ecosystems through sustainable techniques that produce benefits for society and biodiversity. (Source: International Union for Conservation of Nature)

Perched Aquifer: Localized zone of saturation above the main water table created by a laterally limited layer of underlying impermeable material.

Planning Frame: A series of nine geographical areas used in the LA River Master Plan to assist in the delineation of reach-specific concepts related to jurisdictional, hydraulic, and ecological zones. The planning frames also offer a more detailed local scale to assess project cadence, character, and community connectivity along the varying conditions of the LA River.

Platform Park: A park situated on a structural deck spanning over a space typically unsuitable for parkland, such as a roadway or waterbody.

Potable Water: Water quality that is suitable for drinking.

Receiving Waters: All distinct bodies of water that receive runoff or wastewater discharges, such as streams, rivers, ponds, lakes, and estuaries.

Recharge: Process of addition of water to the saturated zone such as an aquifer. (Source: USGS)

Recharge Area: An area in which water reached the zone of saturation by surface infiltration. (Source: USGS)

Reclaimed Wastewater: Wastewater-treatment plant effluent that has been diverted for beneficial uses such as irrigation, industry, or thermoelectric cooling instead of being released to a natural waterway or aquifer. (Source: USGS)

Regional Detention (Basin): A detention basin which collects stormwater runoff from a relatively large area, and has been designed to use storage as a means of reducing downstream flood peaks, reducing possible flood damage, or reducing downstream channel construction costs. Regional facilities are usually multi-purpose, and normally are the responsibility of a public entity.(Source: Pima County Regional Flood Control District)

Regional Park: Park over 100 acres and contains active amenities such as athletic courts and fields, playgrounds, and swimming pools.(Source: LA County Parks and Recreation)

Resiliency: The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience. (Source: 100 Resilient Cities)

Riparian: Pertaining to the banks of a stream,most often used to describe the hydrophilic (water-loving) vegetation along a stream.

River Mile: A measure of distance along the river centerline from its mouth. The LA River river mile system was developed in 2016 to reduce confusion between different jurisdictional reach designations. This numbering system is used consistently throughout the LA River Master Plan, with mile zero at the river mouth in Long Beach and mile 51 in Canoga Park.

River Ruler: The river ruler is an analysis tool developed for the LA River Master Plan that represents and takes measure of the entire 51 miles of the LA River in a simple vertical straight-line diagram. This approach simplifies and reinforces the river's linearity, allowing the eye to quickly perceive how conditions along the river change from one river mile to the next. This compact abstraction of the river allows for comparing across multiple river ruler categories at multiple locations along the river in a single drawing and is essential for recognizing where planning and design proposals can achieve multiple benefits at a particular location.

Spreading Basin: Basin used to impound water to allow for slow percolation of water into the ground in order to recharge the underlying groundwater aquifer.

Spreading Grounds: A spreading ground is a water conservation facility that retains surface water long enough for it to percolate into the soil where it can be stored and pumped for later use. Spreading grounds must be located within soft bottom channels or adjacent to rivers and flood channels and situated where underlying soils are permeable and in hydraulic connection to a target aquifer.

Stormwater: Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters. (Source: US EPA)

Trapezoidal Section: A section of a channel with a trapezoidal cross-section. This shape is used to efficiently convey flows on a concrete surface.

Tributary: A stream that flows to a larger stream or other body of water.

Unconfined Aquifer: A water table—or unconfined—aquifer is an aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall. Water table aquifers are usually closer to the Earth's surface than confined aquifers are, and as such are impacted by drought conditions sooner than confined aquifers. (Source: USGS)

Upland: Referring to locations elevated above lower-lying locations, often used when discussing two locations within a watershed.

US Army Corps of Engineers: The Army Corps of Engineers provides public engineering services in peace and war to strengthen national security, energize the economy, and reduce risks from disasters.

Water Quality: Surface water conditions suitable for aquatic life and human health.

Water Security: The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. (Source: United Nations Water)

Water Supply: Available water provided to fulfill a particular need. If the need is domestic, industrial, or agricultural, the water must fulfill both quality and quantity requirements. Water supplies can be obtained by numerous types of engineering projects, such as wells, dams, or reservoirs. (Source: Encyclopaedia Britannica)

Water Year: The 12-month period from October 1 through September 30 for any given year. Water years are written as the ending year (i.e., water year 1986-87 is written as 1987).

Watershed: The land area that drains into a river or stream. An area of land that contributes runoff to one specific delivery point. Large watersheds may be composed of several smaller "sub watersheds," each of which contributes runoff to different locations that ultimately combine at a common delivery point. Watersheds are usually bordered and separated from other watersheds by mountain ridges or other naturally elevated areas.

Wetland: Any number of tidal and non-tidal areas characterized by saturated or nearly saturated (wet) soils most of the year that form an interface between terrestrial (land-based) and aquatic environments. These include freshwater marshes around ponds and channels (rivers and streams) and brackish and salt marshes. Other common names include swamps and bogs.

ENDNOTES

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TABLE OF FIGURES

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In addition to the named individuals on these pages, many people committed to the future of the LA River contributed significantly to the plan by sharing ideas, priorities, and goals for the river.

This Master Plan was made possible only through their rich contributions.

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Figure 383. Students at the LA River Master Plan Youth Summit weave a map tapestry of the LA River. Source: OLIN, 2018.

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Figure 384. Steering committee members listen and discuss Master Plan items at the eighth Steering Committee Meeting.
Source: LA County Public Works, 2019.

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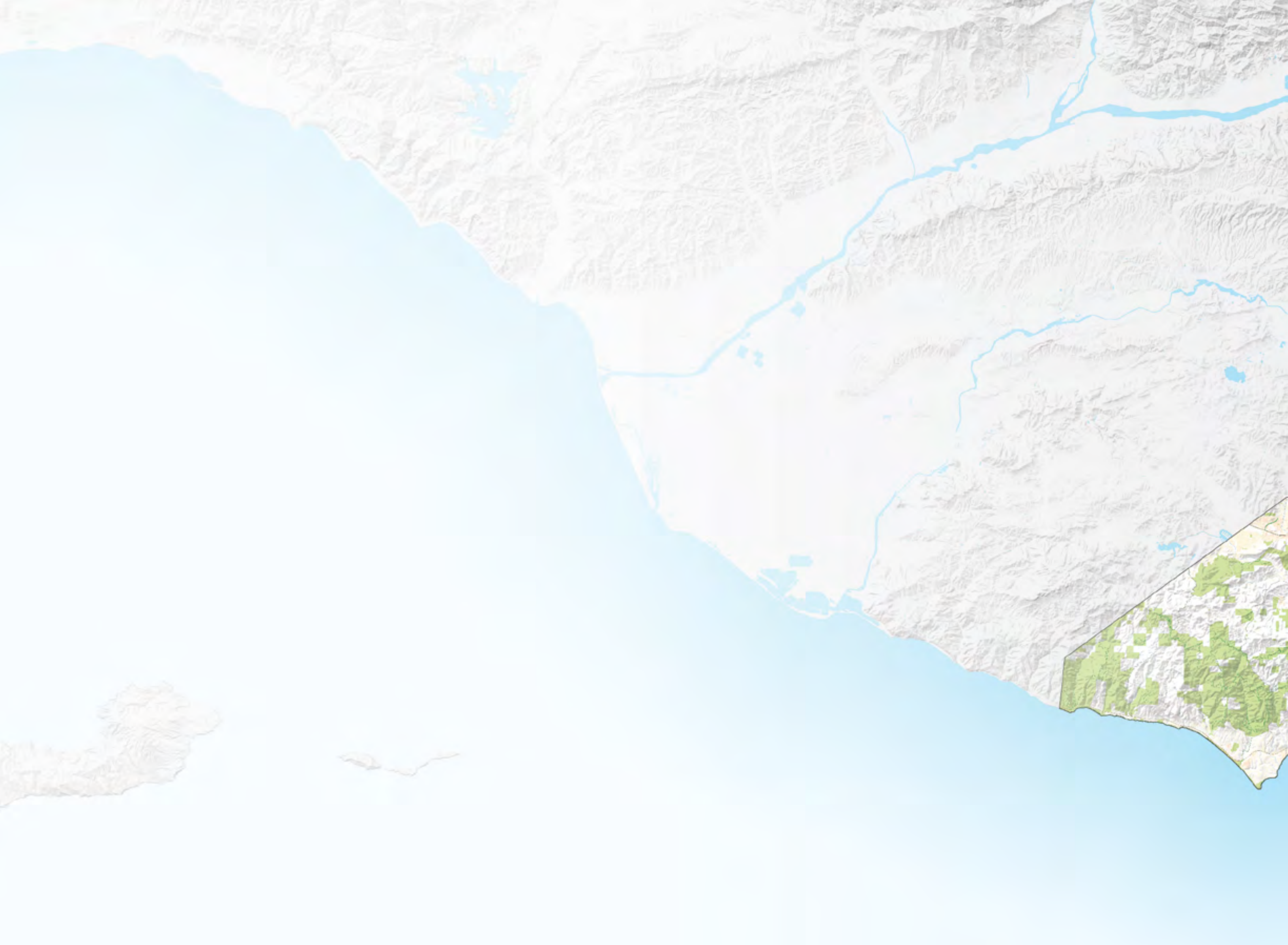
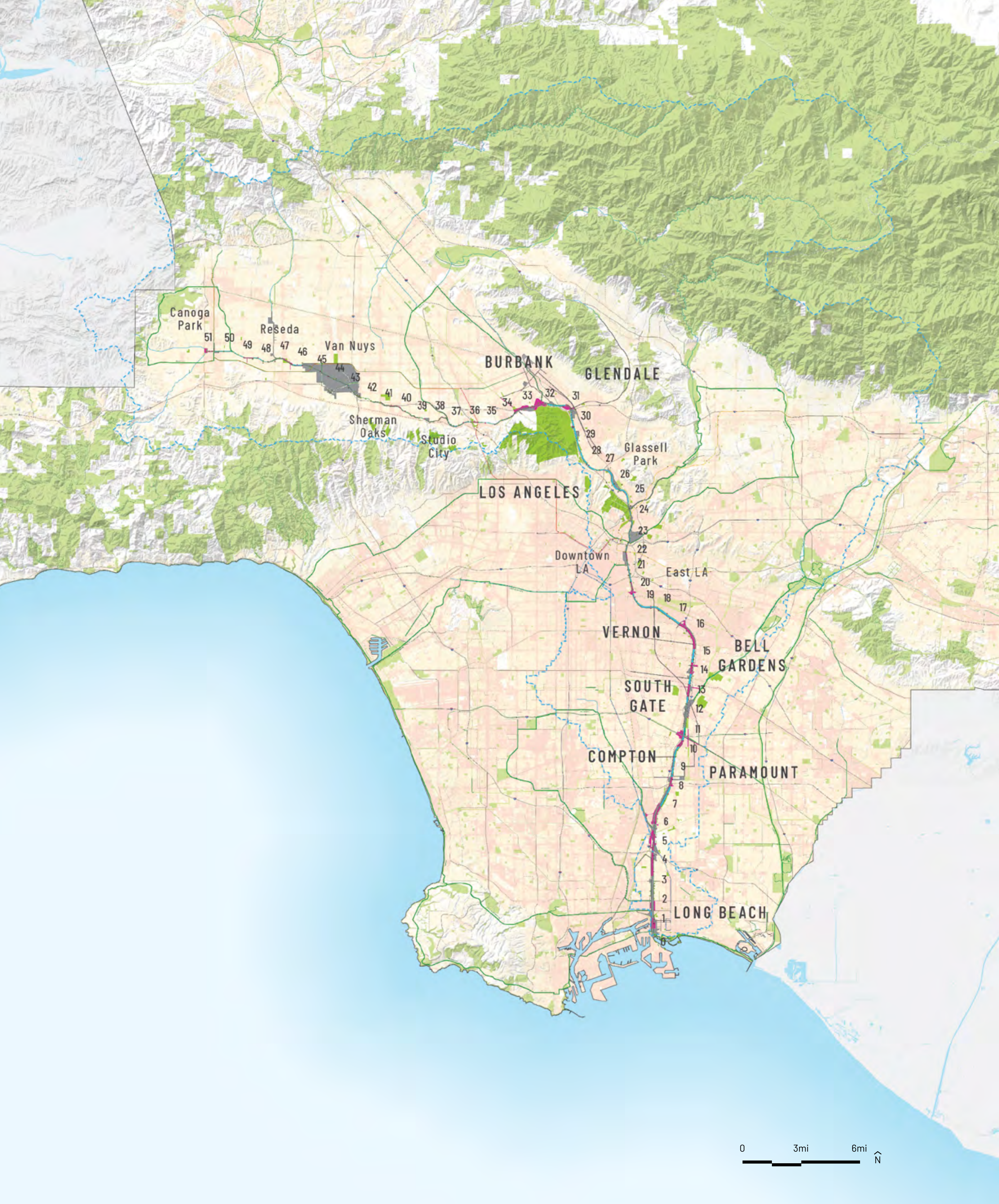
Figure 385. Community members visiting the SELA Arts Festival and participating in painting lessons. Source: OLIN, 2019.





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