Housing on Merit:
Stakeholder Mapping of Affordable Housing Development in Los Angeles County

February 2020
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Acknowledgements

This report is prepared for Housing on Merit ("HOM") to identify, research, interview, and map out the entire housing production ecosystem for California's Los Angeles county and how stakeholders fit along the supply chain. This report is a joint effort between the Cornell Institute for Public Affairs ("CIPA") and HOM. Yun Soo Kim and Lintong Li would like to thank Professor Laurie Miller and Sarah Brown at CIPA, as well as Charly Ligety, Jennifer Litwak, and Scott Alter at HOM, who have provided invaluable support and guidance throughout this project. We would also like to thank Helmi Hisserich, Alan Greenlee, Marcella Ayala, Matt Glesne, Jeff Jaeger, Lila Wiggs, Sucheta Arora, Vijay Sehgal, and Michael Perez, for their time, valuable insights, and suggestions to the project.

Executive Summary

Los Angeles county is suffering from a serious affordable housing crisis, with almost a million people (1 in 10 people) living in precarious living situations, on the verge of homelessness. In fall and winter 2019, we - a capstone team of two students from Cornell Institute for Public Affairs, Cornell University's MPA program - interviewed key stakeholders involved in the affordable housing production ecosystem to identify bottlenecks, inefficiencies, and potential opportunities and solutions to the crisis. Ultimately with the information collected, we plotted the relationships and bottlenecks into a semi-interactive flowchart to allow various stakeholders to better understand their roles related to others and to facilitate a comprehensive view of the affordable housing production supply chain. Our findings from a literature review and interviews allowed us to develop recommendations. However, further research into the affordable housing problem, and increased efforts for better communication among stakeholder in the affordable housing supply chain is mandatory to addressing this crisis.

In order to better understand and help local stakeholders address the affordable housing crisis, the CIPA duo set two objectives for this project:

1. Research and identify a supply chain for affordable housing in Los Angeles county, California;
2. Map out the diverse and fragmented housing production ecosystem in Los Angeles county, California to increase stakeholder collaboration and improve inefficiencies.

The methodology included data collection through phone/video calls with our 10 stakeholders and follow up questions via e-mails. The collected data was categorized, with emphasis on developing a picture of the supply chain and potential bottlenecks to affordable housing development, and a bottleneck evaluation matrix was constructed according to frequency and pattern of interview responses. Through the matrix analysis and supply chain diagram, a final online (semi-interactive) deliverable — the affordable housing development stakeholder flowchart — was created.

We identified five recommendations based on our data collection which are: Align funds, modular housing, increase interdepartmental communication, avoid CEQA projects/properties, and address affordable housing before the production supply chain.

By understanding the affordable housing development flowchart, stakeholders can hopefully better understand their roles and the roles of other stakeholders in affordable housing supply chain, as well as opportunities to better address this crisis. The flowchart conceptualizes the entire supply chain and gleans insights into solving each stakeholder's joint or unique challenges, and reducing inefficiencies and roadblocks through collaboration in the affordable housing ecosystem in Los Angeles county.

Introduction

The state of California, particularly Los Angeles county, has seen a surge of incoming population leading to an affordable housing crisis where the demand exceeds the supply of affordable units (1.4 million units needed) (California Housing Partnership Corporation, 2018). There is a clear need to address and produce affordable housing units for the growing affordable housing population.

In the fall of 2019, a two-person team of Cornell Institute for Public Affairs ("CIPA") fellows were led by our client, HOM director of Housing Innovation, Charly Ligety, and capstone instructor, Laurie Miller, to map out the diverse and fragmented housing industry in Los Angeles county to better understand how to increase collaboration among stakeholders and improve inefficiencies in the housing production system. In order to address affordable housing needs, we conducted research by assembling secondary data from desk studies drawing from various housing reports and case studies, and primary data from interviewing field experts and professionals directly involved in the housing supply chain to gain practical insights into the affordable housing production supply chain. In order to better understand and guide our project, we set two research questions:

- What is the supply chain for creating permanent, sustainable affordable housing in Los Angeles county?
- How do we map out the diverse and fragmented housing industry in Los Angeles county to increase collaboration among stakeholders and improve inefficiencies?

We conducted a literature review and interviews to answer these questions.

Literature Review

Our literature review mainly focused on recently published reports from the public and private sectors. For example, we identified bottlenecks from McKinsey Global Institute reports, "Affordable Housing in Los Angeles" and "A Tool Kit to Close California's Housing Gap: 3.5 Million Homes by 2025," researched advantages and disadvantages from "Modular Construction: From Projects to Products," and gained insights from the fast fashion consumer goods supply chain based on a Zara case study.

1. Background

According to a McKinsey Global Institute report (2019), the California housing gap has risen to over 1.9 million households in LA county and would increase to 3.5 million households by 2025, mainly caused by housing prices and rents that have increased more than wage growth. The city of Los Angeles is a leader in the county's housing production, producing more than 88,000 affordable housing units since 2010. Despite the surge in housing production, only 9 percent of new units were available for families in the past five years to afford income below the median earning in the region. McKinsey also estimated that the cost of housing can reduce GDP across all of LA county by up to four to five percent which costs around $43 billion to $36 billion every year. Furthermore, 10,000 units in LA city will expire before the end of 2023. Therefore, affordable housing availability would be further reduced if no action is taken.

A. Los Angeles County Affordable Housing Funding

Affordable housing funding sources range from federal tax credits to city-funded rental assistance (Appendix B). Usually, the types of funding sources for developing affordable housing units are bond financing, conventional loans, state funds, linkage fees, county funds, acquisition and pre-development funds, measure HHH, tax credits, and federal funds (CPHC, 2018). Due to changes in federal and state housing capital investments, the county lost approximately 64% of funds for affordable housing production and preservation from over $700 million in 2008 to around $255 million in 2016 (CPHC, 2018). The challenge in funding sources include the changing amount of public funds available, the administration of these funds for specific needs including producing new housing units, preserving at-risk properties (from turning to market-rate housing), and adjusting for the increasing gaps between public funds and increasing housing production costs and potential affordable housing recipients.

B. Legislation on Affordable Housing in Los Angeles County

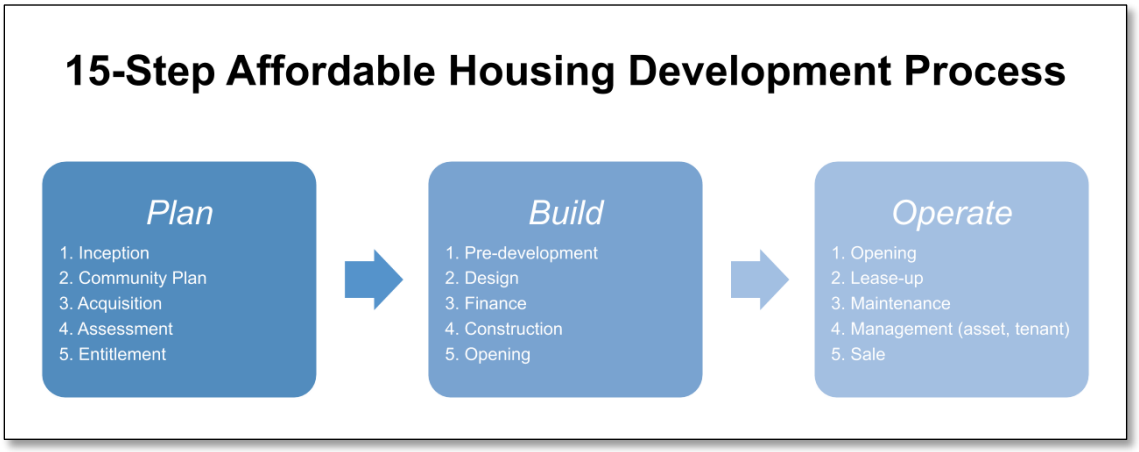
Currently there are over 20,000 affordable housing (for moderate income households) rentals and almost 40,000 rental subsidies administered through Los Angeles county (Appendix E). There is a streamlined approval process (SB 35) for affordable housing development which was enacted in 2017. Additionally, another contentious planning and zoning bill (SB 50), which is currently slated for 2020, attempts to override local zoning laws prohibiting higher-density housing construction in residential areas. The current requirements in 80 percent of California prohibit building anything other than single-family housing. The bill is intended to allow developers to build taller buildings with more units, and open higher-density residential construction in areas near major transit hubs, job clusters, and schools (Matthew, 2019).

2. Supply Chain in Affordable Housing

A. Development of Affordable Housing Production Supply Chains

The 15-step supply chain below (Diagram 1) was created using the corporate real estate housing development flowchart (Peiser and Hamilton, 2012) and the affordable housing flowchart our HOM client provided us with (Appendix C). We also researched the supply chain in Emergency Housing (Appendix G) as a possible option to incorporate for our affordable housing production supply chain.

Diagram 1: Affordable housing development flowchart



Through further research and interviews, 'Financing' was added to the flowchart (Diagram 1). Due to the importance and complexity of affordable housing funds in the supply chain, we decided to incorporate this phase into our initial 15 step process flowchart. The table below explains in further detail about each of the four phases the affordable housing development process entails.

The production of physical housing unit is based on the culmination of the following steps:

Table 1. Four-phase affordable housing development flowchart

Phases	Description of Steps
1. Planning	- Policy and advocacy work - Create an inclusive budget factoring land and excavation, house size and shape, number of stories, type of roof, fixtures, home design features and home appliances
2. Financing	- Identify funding sources (private and public) - Identify, acquire and prepare land for physical development
3. Building	- Choose a construction method - Develop building plans with architect - Contract with project contractor - Obtain building permits and inspections (submit plans and complete a permit application at a LA County Dept. of Public Works, Building and Safety office and await plan approval and issuance of permit) - Purchase construction insurance - Construct projects - Request inspection (Final inspection performed, and a 'Certificate of Occupancy' is issued)
4. Operating	- Occupy, sell or allocate housing units - Run facilities, management and operations, and maintain occupancy

B. Complexities in Affordable Housing Production Supply Chain

There are five bottlenecks identified by the 2016 McKinsey Global Institute report: long land-use approval, low construction productivity, high construction cost, lengthy construction permitting process, and high operation cost.

The reason land-use approval was prolonged was mainly due to the discretionary and decentralized power in government. For example, coupled with community-based politics and the California Environmental Quality Act ("CEQA") requirements made entitlement very complex. CEQA includes 18 subject areas, leading up to a project often delay the timeline due to findings concerning potential risks to the environment or to the health of potential building inhabitants, and the associated threat of lawsuits and other legal actions (Appendix J).

Table 2. Land-use approval timeline for housing in California

Key focus area

		Single family				Multifamily			
		Sample projects[1]		Average entitlement process		Sample projects[1]		Average entitlement process	
		Number of units	Site size Acres	Duration Months	Number of continuances[2]	Number of units	Site size Acres	Duration Months	Number of continuances[2]
Easier	No rezoning or general plan amendment	108	42	6	3	62	5	7	3
Entitlement complexity	Compliant with specific plan (streamlined process)	249	61	9	7	219	13	9	4
	Zoning change or general plan amendment, but no EIR[3]	132	52	9	5	187	7	9	6
	EIR with no litigation	124	34	21	8	118	6	15	5
Harder	EIR with litigation	124	34	39	n/a	118	6	33	n/a

1 Based on 2000 report from California Department of Housing and Community Development (see below).
2 Defined as a delay or postponement in the process.
3 Environmental impact report.

Source: McKinsey Global Institute (2016)

For more basic projects (no rezoning or general plan amendment), the land-use approval processes typically take six to 39 months for simple to complex projects, respectively, in California (Woetzel et al., 2016). However, the time for building manufactured housing or modular housing only takes around three months (CIPA, 2018). The state could streamline CEQA laws for certain projects that provide affordable housing which could both save costs and encourage developers to build as many as projects to address some of California's housing problems. However, attention should be paid on how laws could be streamlined while still ensuring that building, safety, and environmental requirements are met.

While many industries have improved productivity through innovation, construction productivity in the U.S. has not only stagnated, but has also decreased by 1.3 percent over the past 40 years. Furthermore, construction productivity dropped by 7 percent from 2007 to 2012 in California. As labor accounts for approximately half of construction costs, opportunities for improvement and innovation may exist (Woetzel et al., 2016).

Additionally, high construction costs are mainly attributed due to rising wages. Decreasing skilled construction workforce, increased demand for labor, construction delays, and the state's wage requirement for projects financed by public funds are more factors that push construction costs up. Construction delays increase land holding cost, labor cost and loan cost, which means small to middle developers are exposed to higher risk in these delays.

Lengthy permitting process can take up to 9 months in Los Angeles. The lengthy permitting process is perhaps related to limited capacity within public institutions. Another driver for this prolonged process is the complexity of approvals from different agencies, which include inspections by LA City planning, fire department, department of water and power, which adds a significant time burden.

The fifth bottleneck is the high costs in operation and maintenance. Operation and maintenance costs are key expenses for landlords. According to Woetzel (2016), the annual upkeep cost for each affordable unit is between $4,500 and $6,500. The biggest challenge for affordable housing landlords is that their rent is below the market price, but its operations and maintenance expenditure is mainly market price.

Limited public funding sources has emerged as an important bottleneck to addressing the affordable housing problem (Woetzel et al, 2019). According to the California Housing Partnership (2019), federal funds and state funds in affordable housing have decreased by more than $496 million each year in Los Angeles county since 2008, which is a 70 percent drop.

3. Supply Chain Ideas from outside industry

Inspiration for addressing bottlenecks and inefficiencies in the affordable housing development supply chain can be drawn from other industries such as fast fashion. A Zara case study from Columbia Business School (2018) presents a different way to view the strengths and weaknesses of supply chains relying on quick turnaround of product delivery. Inditex's Zara is a well-known fast fashion apparel company in a fast-moving retail industry. There are two relevant factors for the affordable housing supply chain: 1) scheduling, and 2) product sourcing.

A. Scheduling

To streamline scheduling, following initial collection approval, Zara begins related production and procurement planning, and commitments for completing production six months before the actual store sales. Similar to the Zara production process, to streamline the schedule, the affordable housing timeline could also include the budget by targeting land, house size, number of floors, materials, home appliances and home design features to provide references for funding and the design process. From the interview with a stakeholder, while the data on cost and best practices for affordable housing is currently unclear, if these data points were available early on in the production process, it could help speed up the budgeting information for affordable housing.

B. Production Sourcing

Zara outsourced the production process to save cost and time. Similarly, with modular housing, housing construction can be outsourced to third parties specializing in this housing technology to speed up the housing supply chain. Especially because construction costs are mainly driven by high labor costs and construction delay costs. Modular buildings could reduce construction costs as well as time to delivery. 'Marea Alta' in the Bay Area city of San Leandro is a modular project developed by BRIDGE Housing (short term, transitional housing) which estimates to have reduced

the project's building costs by 10 to 15 percent and development time by 25 percent (Woetzel et al., 2016)

4. Modular Housing as a Potential Solution

From our interview responses, modular houses were suggested as a popular housing typology to improve inefficiencies, especially in the construction/building phase. Modular housing projects generally refer to modular units that can be manufactured at a lower cost (in labor and materials) by leveraging economies of scale and outsourced to countries with more affordable production methods and shipped directly to the construction site (Woetzel et al., 2019). The first advantage of modular housing is efficiency in time. According to McKinsey (2019), recent modular projects have typically accelerated project schedules by 20 to 50 percent. The second advantage is cost saving, especially material costs. From our primary data collection, it was noted that construction cost per unit is around $600 dollars (Appendix H).

Furthermore, the quick turnaround time of modular housing construction could also decrease land holding cost as it would take approximately 7 days to build 40 units, and the whole process would be no more than six weeks — typically saving three to four months in the housing production supply chain. Furthermore, quality control is the last advantage of modular housing. In a factory environment, quality control is much easier than traditional construction sites that have a significant need for rework. Below is the quantitative analysis on cost/resource savings from deploying modular construction to transform and optimize for scale.

In addition to the advantages, there are also some concerns with modular housing projects. One disadvantage is the time to designing the modular unit compared to traditional construction due to the newness of the modular market and designers in the learning phase to align with the whole supply chain process. Furthermore, there is currently a shortage of skilled labor in construction and even less skilled workers in modular housing, with labor costs accounting for roughly half of construction costs.

Table 2. Modular construction time and cost breakdown

Deploy modular construction

Parameter	Assumption
Average multifamily build time	20 months
Percentage of time saved with modular construction	20
Interest rate on construction loan	5%
Percentage of construction financed at start time	100
Labor as a proportion of construction costs	40%
Construction cost per square foot	$175 (multifamily)
Standard unit size	970 square feet
Percentage of construction cost savings	15
Number of multifamily housing units needed per year to close California housing gap	87,500 units
Percentage of multifamily projects >50 units	60
Conservative discount on savings	10%
Adoption rate of modular construction technology	Likely uptake: 10%
	Optimistic uptake: 50%

Source: McKinsey Global Institute (2016)

Data Collection and Methodology

The main data collection and methodology would be 5-10 phone/video call interviews with various stakeholders from each affordable housing development process. We will conduct interviews with each stakeholder to learn where each fit along the production chain of creating a new unit of housing. Data from or about representatives from various departments at the city and county, developers, capital providers, architects, community advocates, non-providers, and property managers is ideal in developing recommendations for the client.

Our client provided us with 8 contacts for stakeholder interviews. We categorized each stakeholder into advocacy, public, funding, developer, design, and consultant to cover important stakeholders involved in the process. After all interviews were conducted, we grouped the responses into four stages we developed for the supply chain of affordable housing (Table 1). Throughout the data collection process, two stakeholders connected us with each additional contact to interview for a more comprehensive coverage of the affordable housing development supply chain. We conducted 10 interviews in total.

Stakeholder Questions

Stakeholder questions (general and individual) are the basic and essential questions we are interested in, with the goal to further generate follow up questions and areas to pursue according to the direction of the interviewees' responses.

	General Questions
All	1. What is your role in the housing development process? -**Who** do you usually work with? (order of priority/frequency) -How long is your **involvement**? 2. What and how has the affordable housing development industry **changed** over the years? 3. What are some **challenges** for your organization/department, in the affordable housing development process? 4. Where in the housing process do you see **potential for change**? 5. Who do you think **needs to be included** in that change that might not be involved already?

	Name-Affiliation	Individual Questions
Advocacy	**Alan Greenlee** President of Southern California Association of Non-Profit Housing (SCANPH)	1. How is SCANPH supporting the housing supply chain? (Acc to the website, ability is measured by securing public subsidy funds for affordable housing development) 2. What types of public funds are available for affordable housing development currently?
Public	**Helmi Hisserich** Director of housing strategy at Los Angeles Housing + Community Investment Department (HCIDLA, City Housing Dept.)	1. How are you involved in the policy processes within HCIDLA, and the affordable housing supply chain? 2. What are some feasible and effective strategies for streamlining the affordable housing development process?
Public	**Kishani De Silva** Los Angeles County Development Authority	1. Could you give us some background on the research you have focused on for the housing development process? - Has your research focused on mainly housing developers or the complete process? 2. What are some bottlenecks you have discovered? 3. Of the bottlenecks you have discovered, which are the most difficult to resolve?

Public	**Matt Glesne** Head of Housing Policy team at Los Angeles City Planning	1. What are the different policies and processes for developing affordable housing generally used? 2. How do you believe the process can be streamlined? (decrease time) 3. What are some alternative policies/housing options that can be pursued? 4. What are the different policies and processes for developing affordable housing generally used? 5. How do you believe the process can be streamlined to develop affordable housing more quickly? 6. What are some alternative policies/housing options that can be pursued to develop housing more quickly? What policies would need to be changed to speed up the development process? 7. What different types of housing could help to increase the supply of affordable housing more quickly?
Funding	**Lila Wiggs** Consultant and Affordable Housing Developer	1. Funding sources for affordable housing? 2. Is the process different for affordable housing? 3. Incentives for funding affordable housing projects? 4. Trends in public sector funding? 5. What can be done to improve the process for financing affordable housing? 6. How do you incentivize private funding?
Developer	**Jeff Jaeger** Co-founder of Standard Companies, Los Angeles developer specializing in affordable housing	1. What are some characteristics you look for in a housing project? 2. What are some Incentives for developing affordable housing projects? -Public/private incentives? -Which incentives are most useful? 3. What are some public bottlenecks* in building permanent supportive housing? (i.e. regulations, administrative issues) 4. What are some private bottlenecks* in building permanent supportive housing? (i.e. community pushback, demands by capital providers) * bottlenecks in the public sector (government) vs. private sector (citizen, private-owned entities)

Developer	**Andi Israel** Developer specialized in building permanent supportive housing project in Los Angeles	1. What are some characteristics you look for in a housing project? 2. What are some Incentives for developing affordable housing projects? - Public/private incentives? -Which incentives are most useful? 3. What are some public bottlenecks* in building permanent supportive housing? (i.e. regulations, administrative issues) 4. What are some private bottlenecks* in building permanent supportive housing? (i.e. community pushback, demands by capital providers) * bottlenecks in the public sector (government) vs. private sector (citizen, private-owned entities)
Design	**Vijay Sehgal** Partner at FSY architects, specialized in affordable housing	1. What are some options for building affordable housing in response to an emergency? What are the best designs for building emergency housing quickly? 2. What are some design solutions for affordable housing? 3. What are some building/construction solutions for affordable housing? 4. What are some policies and regulations that can be put in place to make building affordable housing and emergency housing more feasible for developers? More feasible for city planning departments? More feasible for neighborhoods/community members? 5. What supportive services are needed in emergency and affordable housing?
Consultant	**Sucheta Arora** Engagement manager, McKinsey & Company	1. What are some new trends, findings of the LA housing crisis? 2. What do you believe are the challenges, bottlenecks in the affordable housing development process in Los Angeles?

Findings

Throughout the interview process, some initial interviewees were unavailable and thus, replaced with others in similar stakeholder organizations (i.e. public sector, funding). The final list of interviews conducted and summarized can be found in Appendix H.

1. Interviews and Analysis

An initial interview was conducted, in-person, with Josh Lower, a developer specializing in the college town region of Ithaca, New York. The meeting was a critical opportunity to understand the general process of housing development. The developer emphasized the importance of "by right," "variance," and "zoning laws," with regards to streamlining the housing development timeline. The interviews were subsequently scheduled as our client introduced us to willing experts and professionals in the field via e-mails.

The bottleneck matrix was created by categorizing the interviewees' responses to six different issues. Details on explanations for each category are noted below. Based on the bottleneck matrix, the most referenced bottlenecks are the funding layers, operations, and regulations.

Table 3. Categorized Bottlenecks Matrix

	Name	Funding (Layers)	Admin/ Operations	Construction	Resource Shortage	Regulations/ Policy/CEQA	Housing Technology
Public	Helmi Hisserich	✓✓	✓✓	✓	✓	✓	
	Matt Glesne	✓	✓		✓✓	✓✓	
	Michael Perez		✓✓		✓		
Advocacy	Alan Greenlee	✓✓			✓✓✓	✓✓✓✓✓	✓
Funding	Lila Wiggs	✓			✓✓	✓✓	✓✓
Developer	Jeff Jaeger	✓	✓			✓	
	Josh Lower	✓		✓		✓	
Construction	Marcella Ayala			✓		✓	
Architecture	Vijay Sehgal		✓✓			✓	
Consultant	Sucheta Arora		✓	✓		✓	✓✓
Total (Out of 10)		6	6	4	5	9	3

Funding (Layers)
Issues in funding include the complications in the multiple rounds and source of applications (Notice of Funding Availability),

Admin/Operations
The most notable bottleneck response in administration and operations was the bureaucratic process complicating the approval/permitting and funding administration process. Public sector interviewees noted that various public departments between city, county, and state were not clearly

aligned. The miscommunication and misinterpretation of approval documents, misalignment of regulations or variance orders are some common sources of delays and confusion. Additionally, stakeholders in development, construction, and design, who are directly involved in this process, have also suggested the source of the complexity and delays as public sector bureaucracy.

Construction

The issue with construction stem from material and labor costs, which was also mentioned in the literature review. Dynamic material costs during the construction period due to trade/tariffs which are recently affected by the political economy. Furthermore, due to a shortage in skilled construction labor, and increasing wages, the construction cost increases. Landholding cost and construction delays are also important bottlenecks that were discussed as contributing factors to rising construction costs.

Resource Shortage

In addition to a shortage in public affordable housing funds, public sector housing departments are understaffed, according to public sector stakeholders.

Regulations/Policy/CEQA

With public affordable housing funds, there are various financing requirements and deadlines depending on the funding source. These include housing covenants, affordable housing recipient ratio, construction labor wages, unit types/sizes, etc. In addition to demands by the public funds, there are regulatory restrictions placed by the housing and planning authorities with the requirement for parking space viewed a difficult bottleneck. According to the developers, in addition to the costly construction of parking lots compared to creating new units of housing, new parking space generally do not service the tenants of the affordable housing property. Currently the parking lot requirement is generally “2 covered parking spaces per single family residence” (LA County Planning). Almost all stakeholders involved in the development process of the housing have emphasized CEQA as the most important bottleneck in delaying, shutting down, or complicating progress and/or development of housing. Stakeholders noted that community members or other outside stakeholders tend to utilize CEQA as a method to halt housing developments. The CEQA statute requires “requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.” However, the main frustration communicated in the interviews seems to be that the CEQA process occurs later in the approval process. After the housing projects are approved by the public funding entities and planning, which have their own delays, the environmental approval is sought. If the CEQA statute has a bearing on the project, an Environmental Impact Report is prepared, setting the project back by at least one year. In other cases, CEQA lawsuits are filed, resulting in lengthy trials.

Housing Technology

According to Sucheta Arora, McKinsey consultant, there is a lack of data on effective affordable housing projects. In particular, with regards to various housing typologies and their effectiveness in the specified social, economic, environmental, state/county/city regulatory context. While modular housing has many cost and time saving elements that would improve inefficiencies in affordable housing development, there are various supply chain issues that would result in higher costs or delays. For example, due to the smaller sizes of affordable housing units (developers favoring <49 units due to lack of required community meetings), mass producing modular houses may not result in cost savings as the housing typology leverages economics of scale to cost save. Additionally, due to lack modular housing companies and factories near the LA county region, the logistics cost of delivering the units from out of state or internationally (with customs, tariff costs) may currently result in more loss than gains.

2. Bottlenecks

Based on the interviews with stakeholders and the Bottleneck Matrix (Table 3), three main issues emerged as important bottlenecks in the affordable housing development process. These three issues were further categorized and transformed into a table with bottlenecks and corresponding solutions (Appendix I). Funding and operations/administration from Table 3 were merged due to similarities and overlapping features.

Operations/Administration

- Too many layers of financing
- Too many different (format, style) loan documents
- Federal, state, local funding delay/change (decrease)
- Government funding approved on project-bid basis
    - Many applications = prolonged approval process
- Main incentive is subsidies/tax credits
- Land for affordable housing is scarce (due to regulations, lack of affordable land/properties, etc.)
- Current affordable housing development system discourages new entrants ("insider game")
- Political process for approval — housing council usually unanimous (need approval)

Construction

- High labor costs
- Low supply of labor (less immigrant/skilled labor)
- Prolonged time to build
- Unanticipated natural hazard impact (i.e. fires especially in North California)

Regulation & Policy

- Community pushback (at public meetings)
    - Various public meetings required for >49 units
- Many regulations, requirements for affordable housing projects
- CEQA and production of Environmental Impact Reports

3. Discussion

In the methodology and data collection section, we mentioned that we expected stakeholders to lead the conversation on the affordable housing production process from their perspective. Therefore, many of our interviewees answered our questions with their own supply chain in mind and their respective bottlenecks, which was what we anticipated. Much of the interview information reiterated information from our secondary sources such as the various state housing policies and initiatives, and housing typologies that would be generally beneficial such as modular homes. However, the interviewees candid discussion on their roles and inefficiencies in the system helped us understand the specific pain points of the affordable housing ecosystem. For example, within the public department interviews (HCIDLA, Planning, and Building and Safety), the responses reaffirmed each stakeholder's roles and challenges in the various layers of financing and approval processes. This was further supported with developer and construction/architecture stakeholders who discussed the various loopholes they had to address with regards to layered financing and permitting/clearances. These different responses to the same issues between stakeholders allowed us to better understand each department's joint and unique issues/bottlenecks with regards to the affordable housing supply chain. While the City Planning department discussed the Transit Oriented Communities ("TOC") incentives and various housing policies' successes, developers

expressed some limitations to the initiatives such as strict regulation on labor and limited land property (in urban TOC areas) for pursuing the initiative.

4. Final Deliverable: Affordable Housing Development Stakeholder Flowchart

We created an affordable housing development stakeholder flowchart using draw.io for its online accessible Google platform and the interactive and easily editable feature. The interactive feature is an important part of this flowchart given the housing production chain's complex nature. By clicking on the various organization/affiliations, the user/viewer is able to clearly identify the various relationships along the specific supply line (and phases). Based on our 15-step affordable housing production flow chart (Diagram 1), we created this four-phase flow chart (Table 1) including, adding a "financing" phase to incorporate the most important or complex stage in the affordable housing ecosystem due in part to the challenges in regulatory and permitting process.

(Please refer to this link for semi-interactive flowchart.)

Diagram 2. Los Angeles County Affordable Housing Development Stakeholder Flowchart

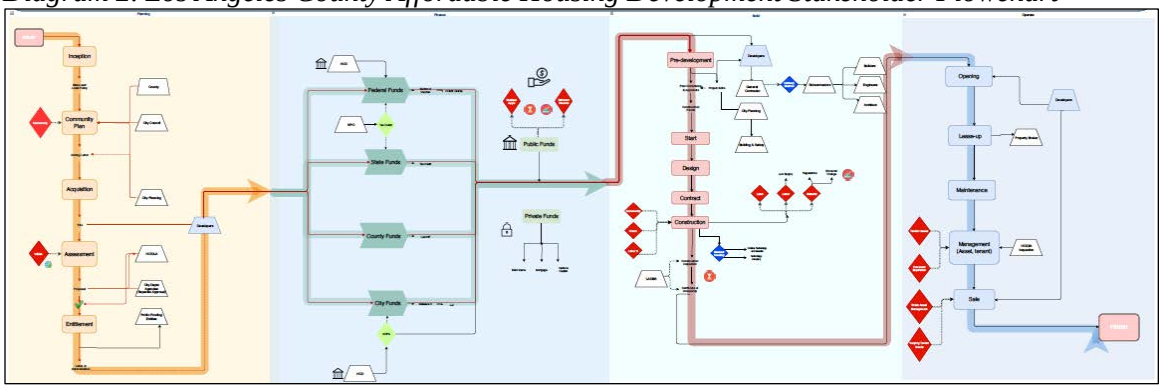
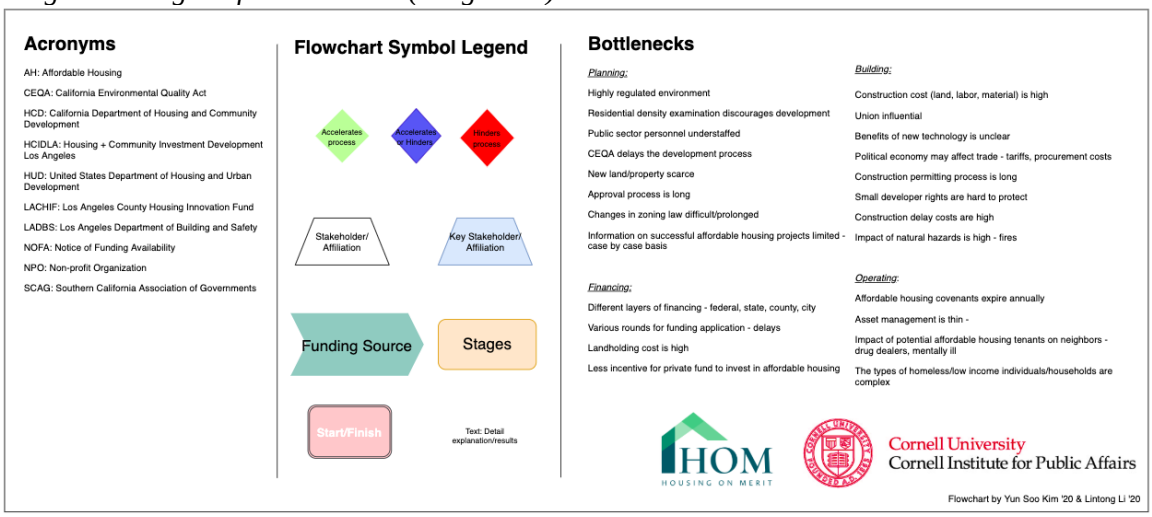


Diagram 3. Legend for Flowchart (Diagram 2)



Planning

- Highly regulated environment
- Residential density examination discourage work in affordable housing development
- Shortage in affordable housing public sector staff
- CEQA causes some of the longest delays in the development process
- Difficult to acquire land for development
- Long approval process throughout development
- Zoning laws difficult to change
- Information lacking on successful affordable housing developments

Financing

- Multiple layers of financing
- Various rounds, sources for funding application
- High landholding cost
- Incentive for private fund is low

Building

- High construction costs (land, labor, material)
- Material cost dynamic due to trade tariffs (economy, politics)
- Strong union (labor source is regulated for affordable housing)
- Housing technology is unclear
- Long construction permitting time
- Difficult to protect small developer's rights
- Delay costs are high
- High risk and impact due to natural hazard

Operating

- Affordable housing covenants expire annually
- Low asset management
- Complex affordable housing recipients - drug dealing, low income households

5. Limitations

The final deliverable (Diagram 2) was based on evaluation of interview responses from ten stakeholders directly involved in the affordable housing production supply chain and the supply chain flowchart provided by the client. However, there were some stakeholders in this supply chain that were not interviewed due to limited contacts and time such as the California Natural Resources Agency who were responsible for preparing CEQA impact reports, policymakers, and potential affordable housing tenants. These stakeholders may have helped us better understand how to improve inefficiencies in the affordable housing production ecosystem, or how to best improve stakeholder collaboration. Furthermore, additional follow up interviews may have helped with the data collection process as new information (internal or external) emerged with each interview we conducted. The interviews were conducted during a three-week period between mid-November and early December 2019. Some stakeholders in the public sector noted that there were some inefficiencies that were in the process of addressing such as the miscommunication between public departments through interdepartmental meetings. Additionally, our main objectives for this project were mapping the affordable housing supply chain as it relates to stakeholders and thus, may be relatively limited in its depth of expertise into the county's affordable housing development process.

Recommendations

While the interviews were conducted to identify the bottlenecks and inefficiencies for each stakeholder in the housing production process, we recognized that this would result in a relatively narrow view on the overall production flow. Therefore, we summarized recurring issues noted by multiple stakeholders (Table 3. Bottleneck Matrix), and those that were reiterated as an important bottleneck for their department/affiliation for our recommendation for increasing efficiencies and stakeholder collaboration in the affordable housing production ecosystem.

1. Funding issues

Align funding source application and reduce the rounds for funding applications. In the funding stages, there are mainly two steps to streamline the process. First, merge all sources of public funding in applications, regardless of city, county, state or federal funds. For example, it would be more convenient to upload all the materials to one platform, and all parties could overview it at same time — implementing a universal NOFA. Second, if developers cannot acquire funding from the first round, they need to participate in the second round, which would add another several months' delay, resulting in landholding costs. Implementing a shared affordable housing public fund would allow the city to manage county funds, or vice versa, which could increase capital management efficiencies by decreasing delays and increasing the investment pool. Furthermore, more efforts to incentivize private investment to affordable housing is necessary to address the budget cuts that have occurred in the past decade (Woetzel et al. 2019).

2. Modular housing

While modular housing has many cost and time saving advantages, many stakeholders are still not familiar and inexperienced with this housing type. However, it still remains an important solution to further explore and pursue for larger scale construction projects. Another recommendation to decrease costs in modular housing is the create policy incentives for modular housing businesses to relocate or establish their business in regions in or near the county.

3. Bureaucratic process causing delays

The multiple government departments for financing, approval, and inspections have caused multiple delays and disorganization for the stakeholders interviewed. The lack of communication between different public departments and additional re-checks to reaching a consensus due the conflicting non-compliance (i.e. unstandardized interpretation of regulations and documents) have been "frustrating" for development stakeholders leading affordable housing projects. Some public stakeholders are recently beginning to engage in interdepartmental meetings to address these issues.

4. California Environmental Quality Act

Most developers have noted that CEQA properties/related projects are to be generally avoided either through by-right projects or acquiring pre-approved properties.

5. Broader view of affordable housing crisis

While the focus of the affordable housing crisis has been creating more units, it is unclear whether it is the best solution. Issues of affordable housing and homelessness are complex and difficult for determining one specific housing typology and process for each individual and stakeholder. In order to truly address the crisis, problem solving may require analysis of the root of the problem within its respective context (Table 3 – Housing Technology) before addressing the need for building new affordable housing units.

Conclusion

The highlights of the affordable housing research project have been identifying the weak points and opportunities for improvements. The interviewees and their willingness to candidly speak to us was very helpful to our understanding of the relationship and the complexities of the housing flowchart. While the focus of the project was to determine the challenges and inefficiencies in affordable housing production in Los Angeles county, the plethora of ideas and various information that interviewees provided us with further drove us to the core of the problem, which is to taking a multi-disciplinary approach to the problem of homelessness/affordable housing needs. Therefore, with the final deliverable stakeholder flowchart in place as a broad view of the complex housing supply chain, this alerts us to the more important issue at hand which is to solve the demand for affordable housing earlier, before reaching the housing production supply chain.

Suggestions for Future Research

The objectives of this project are to identify and map the stakeholders in the complex affordable housing production supply chain of LA county, with the goal of improving any inefficiencies and increase stakeholder collaboration. However, throughout the research project, we noticed that while our goal is to better understand this process for stakeholders, there were critical areas of affordable housing that could be further explored. First, identifying and matching the different types of homeless individuals and affordable housing needs are necessary to truly solve the core of the affordable housing crisis. Approaching this issue from the ultimate tenant's perspective (last potential stakeholders) through the coordinate entry process and prioritizing housing for homelessness may be an important and necessary step to addressing these development projects (HUD, 2015). Second, we were unable to interview any stakeholders directly involved in the policymaking process such as governors, legislators (or their aides), which would have been very helpful in better understanding their perspective, challenges, and involvement in addressing this crisis that is a high priority agenda for the county and state. Lastly, we would have liked to further explore unions, the Natural Resources Agency's CEQA division, and various community hearings/meetings and their impacts on affordable housing and how to mitigate certain negative local impacts or effects. As communication has been noted as the single biggest source of or hindrance to most bottlenecks throughout this housing production ecosystem, hearing first-hand the issues of each necessary stakeholder would help to better address the core issue and improve the experience for all involved in the affordable housing crisis.

Appendices

Appendix A

Glossary of terms, abbreviations, and acronyms

Following is a glossary of terms used in this report, including abbreviation and acronyms commonly used. Most abbreviations will be spelled out at first use and abbreviated for following use throughout the report.

AHSC: The Affordable Housing and Sustainable Communities
CDC: Community and Development Commission
CEQA: California Environmental Quality Act
CIPA: Cornell Institute for Public Affairs:
DMH: Department of Mental Health
DRP: Department of Regional Planning
GDP: Gross Domestic Product
HACLA: Housing Authority of the City of Los Angeles
HACoLA: Housing Authority of the County of Los Angeles
HCIDLA: Los Angeles Housing + Community Investment Department
HOM: Housing on Merit
HUD: Housing and Urban Development
IIG: Infill Infrastructure Grant
LADBS: Los Angeles Department of Building and Safety
LIHTC: Low Income Housing Tax Credits
MHSA: Mental Health Service Act
NOFA: Notices of Funding Availability
SB: Senate Bill
SCANPH: Southern California Association of Nonprofit Housing
SNHP: Special Needs Housing Program

Appendix B

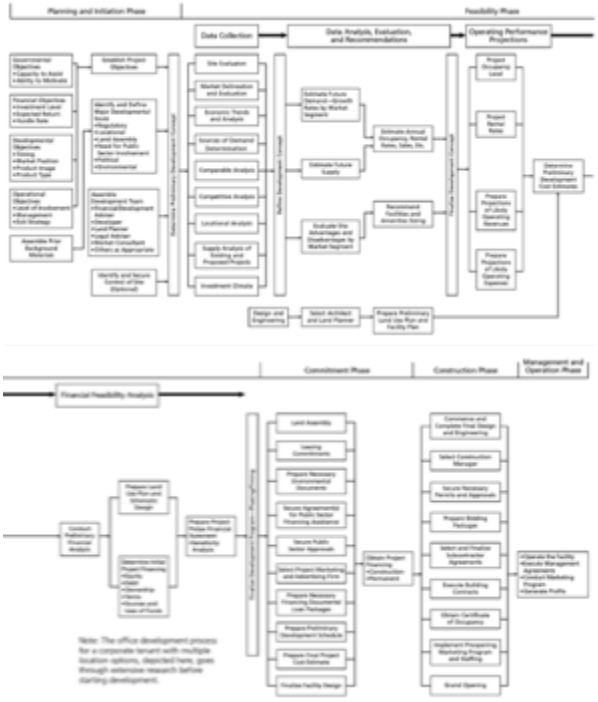
California Housing Partnership Corporation Report (2018)

Affordable housing funding inventory:

- Low Income Housing Tax Credits (LIHTC), federal and State 17;
- Project-based rental assistance contracts, grants, and subsidized loans issued directly by the U.S. Departments of Housing and Urban Development (HUD);
- Public housing operating and Annual Contributions Contract with HUD, including those owned by the Housing Authority of the County of Los Angeles (HACoLA);
- Los Angeles County Community and Development Commission (CDC) capital resources awarded through the Notices of Funding Availability (NOFA);
- Department of Mental Health (DMH) resources such as Mental Health Service Act (MHSA) and Special Needs Housing Program (SNHP) and Federal Housing Subsidy Program;
- Land use policies and Housing Successor Agency properties monitored by the Department of Regional Planning (DRP); and
- Tax-exempt bond financing.
- County of Los Angeles under their Measure H-funded programs, and with Section 8 rental assistance from the Housing Authority of the City of Los Angeles (HACLA).

Appendix C

Stakeholder map from *Professional Real Estate* (Peiser and Hamilton, 2012)



Appendix D

Stakeholders Integrated into Housing Supply Chain

(based on textbook stakeholder map, and HOM Innovation Lab slide deck)

		Planning and Initiation	Feasibility	Commitment	Construction	Management and Operation
Public Agencies	City of Los Angeles					
	County of Los Angeles					
	LA DWP					
	Housing and Community Development					
	LA housing community investment department					
Affordable Housing Developers	Thomas Safran & Associates					
	Neighborhood Works					
	abode communities					
	FlyawayHomes					
Community Advocates/Organizations	SCANPH					
	Enterprise					
	Urban Design Center					
	SAJE					
	United Way - Greater LA					
Capital Providers	Genesis LA					
	Century	A				
	Wellls Fargo					
	USC LA					
	Patch Homes					
	Citi					
Operators, Service Providers	HOM					
	The People Concern					
	Brilliant Corners					
	Clifford Beers					
Prefab/Modular Manufacturer	Cover					
	Blokable					
	Plant Prefab					
	Factory OS					
	Untied Dwelling					
Transaction Services	Chicago Title					
	CBRE					
	Spruce					
	Keller Williams					
Design+Builders	Zillow					
	Gensler					
	Morley Builders					
	Modative					
Academic Institutions	LATTC					
	USC					
	Citylab					
	UCLA Ziman					
Media	Shelterforce					
	Curbed LA					
	Dwell on design					
	Urban Land Institute					
Construction Suppliers	Jeldwen					
	Caterpillar					
	Procore					
	Kohler					
Other	Google Sidewalk labs					

Appendix E

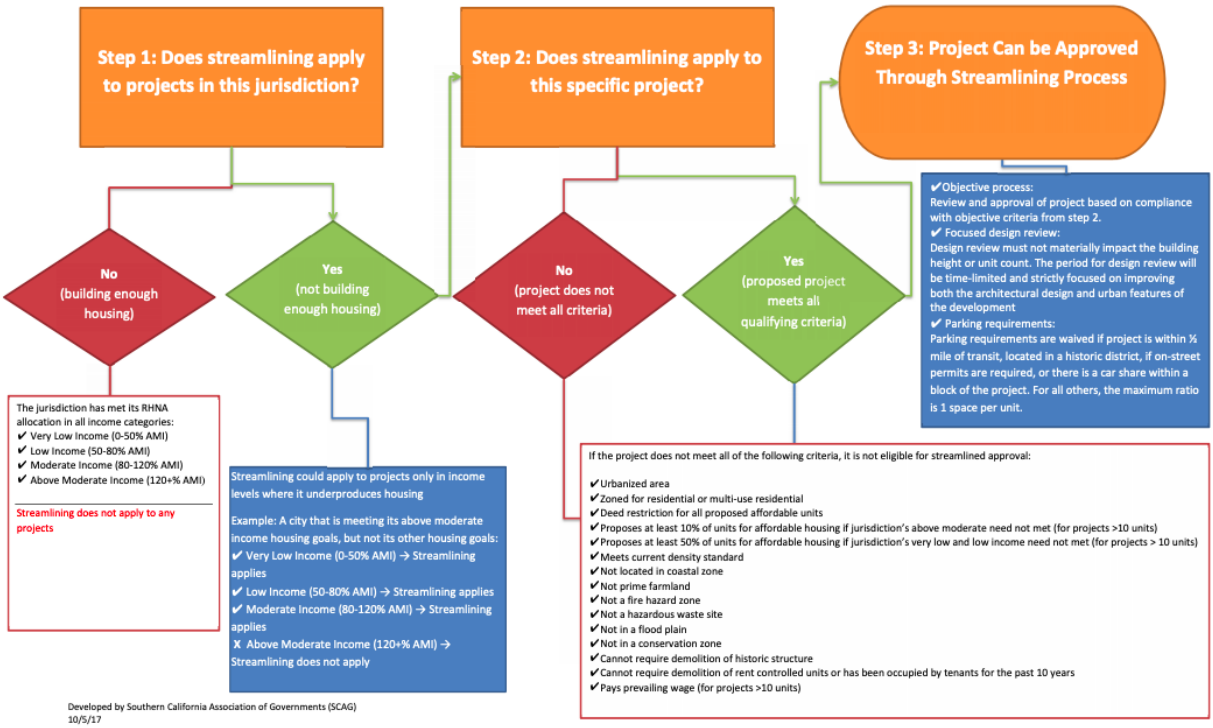
Summary of County-Administered Affordable Rental Housing and Subsidies

Table 16: Summary of County-Administered Affordable Rental Housing and Subsidies*			
	Developments	Affordable Homes**	Rental Subsidies***
SD 1	113	5,903	N/A
SD 2	129	5,615	N/A
SD 3	48	2,612	N/A
SD 4	37	3,213	N/A
SD 5	47	2,799	N/A
County	374	20,142	38,924

*Reflects de-duplicated totals among County sources. May overlap with federal and state financing shown in Section 2.
**Affordable up to moderate income households (<120% AMI).
***Reflects number of households served by County department rental programs.

Appendix F

SB 35 - Affordable housing streamlining approval process (enacted 2017)



http://www.scag.ca.gov/Documents/SB35flowchart.pdf

Appendix G

Supply Chain in Emergency Housing

1. Form an emergency housing planning team, including representatives from communities, government agencies, local developers, non-profit organizations and so on

2. Conduct research and analysis on the damages and risks in disaster, understand the local regulations and laws for emergency housing

3. Determine the objectives and goals for emergency housing, such as what type of emergency housing would be best, ensuring utilities

4. Develop emerging housing plan, including but not limit to projected timeline, responsibilities for each organization, resources needed

5. Review and approval for emergency housing plan

6. Implementation and maintenance of emergency housing, typically state emergency operations center will implement emergency housing solution

Appendix H

Interview Responses: Bottlenecks and Potential Solutions

1. Public: Helmi Hisserich, Director of Housing Strategy, HCIDLA

Potential bottlenecks addressed based on our meeting with director of housing strategy at HCIDLA, Helmi Hisserich:

- Tax credit cap and schedule
- Multiple layers of financing
- High construction costs
- Highly regulated environment
- High labor cost, low supply
- Affordable housing status expiring and thus decreasing units, mostly due to management failure of owner or switch to private rental housing
    - Covenant is 30-55years, re-financing occurs after 30-40 years (many properties switch to market rate after covenant expiration)
- City, state and federal funds are running differently
- Timeline for affordable housing:
    - Phase 1 (6 mos): Issuing + project proposal to City
    - Phase 2 (6-12mos): Entitlements, project reqs
    - Phase 3 (12mos): Final financing
    - Phase 4 (12-18mos): Construction (Required to start construction in 180 days)

      Total: 2.5-3 years

Potential actions to take to reduce the bottlenecks based on our meeting with director of housing strategy at HCIDLA, Helmi Hisserich:

- Find a nonprofit organization to partner with to obtain tax credit
- Fund projects with fewer layers of financing
- Align funding sources (i.e. developers can apply for multiple funds through the same application, time) -- Universal NOFA
    - Funds directly given to cities might help
- Innovate to reduce cost of construction, especially focus on modular housing
- Build more affordable housing when the economy is relatively weak (i.e. contractors and construction workers are available, willing to invest in affordable projects)
- Outsource the construction to third parties (i.e. lower labor cost, readymade housing)
- Allow the county to run and manage the federal fund directly (i.e. direct funds from federal to county for selection and allocation by county/local)

2. Advocacy: Alan Greenlee, President of SCANPH

Potential bottlenecks addressed based on our meeting with president of SCANPH affordable housing industry association, Alan Greenlee:

- Residential density is limited to 49 dwelling units.
- Approval each deal for fund

- State funds cannot take up beyond 50% of the project, some city does not have local fund source
- Land, material, labor cost
- Union is strong
- Building technology is not clear
- Public sector stuff in affordable housing is thin
- Asset management is weak
- The trend of public fund source is decreasing
- Over parking lots construction
- California environmental quality act slow down the process

Potential actions to take to reduce the bottlenecks based on our meeting with president of SCANPH affordable housing industry association, Alan Greenlee:

- California SB50 (planning and zoning) would encourage denser housing
- Allow developers to access and apply for all the sources in one platform
- Create local land trust, allow acquisition for land to lower land cost
- Government could release policy to attract big high tech company to locate close where building happen
- Hire more staff to help
- Monitor operations according rules
- Attract money from private sector
- Reduce affordable housing parking lots
- Obtain build pass sign from governor for affordable housing
- Case study: Abode Communities' successful expansion of affordable housing from 48 to 140 units, near transit hub after property sold to private developers) with bifurcated financing

3. Construction: Marcella Ayala, General Contractor

Potential bottlenecks addressed based on our meeting with Marcella Ayala:

- California environmental quality act slows down the process
- 6 pricing items affect affordable housing (political factor like trade war push prices up)

Potential actions to take to reduce the bottlenecks based on our meeting with Marcella Ayala:

- Standardized delivery method for efficiency

4. Public: Matt Glesne, Head of housing policy team at LA City planning

Potential bottlenecks addressed based on our meeting with head of housing policy team at LA City planning, Matt Glesne:

- Government departments are lack of capacity
- JJJ makes hard to zoning changes, required prevailing wages and certain findings
- Too competitive to get land to build multi-family housing by right, TOC or density bonus, land does not turn over very often, also push the price up

- Developers are scared of appeals
- The time to get electronic service and water service to approve

Potential actions to take to reduce the bottlenecks based on our meeting with head of housing policy team at LA City planning, Matt Glesne:

- Allow doing zoning review based on raw materials before the final plans for construction-ready plan
- Create more capacity, zoning for multiple housing for next 5 years
- Go by right to take out CEQA

5. Developer: Jeff Jaeger, Standard Companies (preservation/reconstruction - affordable housing specialist)

Potential bottlenecks addressed:

- CEQA delays
- Multiple layers of financing/programs
    - Additional layers within each program - in federal, state, city
- Too many approval processes (entitlement process)

Potential solutions:

- Address funding, application process
- Public-Private partnerships - incentivize private funding

6. Funding: Lila Wiggs, Consultant and developer in the space, insights on the funding process and property management

Potential bottlenecks addressed based on our meeting with Lila Wiggs:

- Landholding cost
- Different rounds for funds application
- Little acknowledge for modular housing
- Union is holding up towards modular housing
- It takes a long time for regulation to change
- The complexity of homeless people, cannot look for one solution for all
- Drug dealer problem
- Losing affordable housing each year, not required or incentive to refinance

Potential actions to take to reduce the bottlenecks based on our meeting with Lila Wiggs:

- Acquire private funds
- Category different types of homeless people to develop different affordable housing solution and operation plan
- Have an actual commander assigned a property to take care of drugs problem
- Have a standard plan for refinancing the affordable housing

7. Consultant: Sucheta Arora, McKinsey Engagement Manager, “Closing CA Housing Gap” report in 2016

Potential bottlenecks addressed based on our meeting with Sucheta:

- Data for affordable housing is not transparent
- Lack of affordable housing best practices for reference
- Modular housing needs large scales to be cost-saving
- The housing ecosystem is fragmented
- Small developers’ rights are hard to protect

Potential actions to take to reduce the bottlenecks based on our meeting with Sucheta:

- Set up an alliance to provide a forum for conversations on difficult decisions that need to be made and collaborate to solve bottlenecks

8. Architecture: Vijay Sehgal, Partner at FSY Architects

Potential bottlenecks addressed:

- CEQA delays
- Bureaucratic process delays, lack of communication among government departments
- Too many departments to communicate with
    - 13 government departments to coordinate with (not streamlined)

Potential solutions:

- Fewer departments
- Application process consolidated
- Aligning application/funding - few entities for developers to communicate with

9. Public: Michael Perez, Engineering associate, LA Building and Safety

Potential bottlenecks addressed:

- Permitting, clearance approval processes may be confusing
- Short staffed in many public departments
- Different definitions/interpretations of each permit/approval process may cause delays
    - Miscommunication/lack of understanding between each department

Potential solutions:

- Better communication between public departments
    - Currently participation meetings between various permitting bodies in place to discuss best practices and address these miscommunication issues

Appendix I

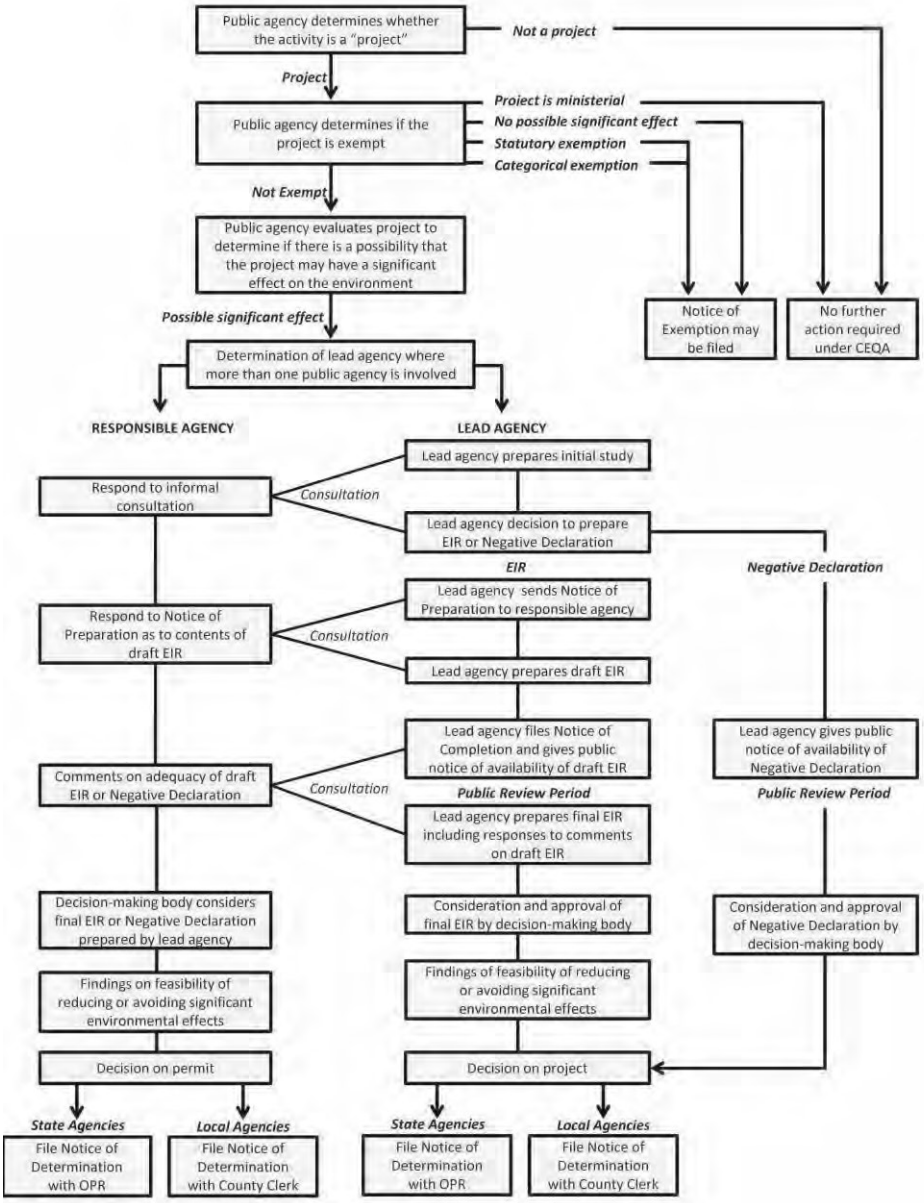
Bottlenecks & Solutions (from Appendix H) Categorized

	Bottleneck	**Solution(s)**
Operational	Too many layers of financing	Merge all sources of public funding (in application, administering) Sometimes fewer sources of financing is more efficient (fewer demands, timeline, approvals)
	Too many different (format, style) loan documents	Settle on one simple structure and standardize
	Federal, state, local funding delay/change	Incentivize private sector investments
	Government funding approved on project bid basis -- many applications= prolonged approval process	Change to approve based on developer/organization/enterprise's "strategy" -- in addition to project to streamlining
	Main incentive is subsidies/tax credits	Find alternatives to tax credits/subsidies
	Land for affordable housing is scarce (due to regulations, most land owned, etc.)	Find opportunities to acquire land
	Current affordable housing development system prevents new entrants ("insider game")	
	Political process - housing council usually all agree, need approval	
Construction	High labor costs Low supply of labor -- now less immigrants labor	Build housing requiring less labor (i.e. prefab housing, 3D printing) Improve supply of labor
	Prolonged time to build	Opt for prefab housing, manufactured housing
	Unanticipated natural hazard impact (Fires esp. in NorCal)	
	Trade war, economic/political impact on material/labor costs	Seek more efficient/low risk housing typologies, delivery

Regulatory/Policy	Community pushback (at public meetings) - Various public meetings required for >49 units	
	Many regulations, requirements for affordable housing projects	Abode Communities case study: Bifurcated funding application - **two housing applications to increase finances** from LIHTC tax credits, AHD funds, city loan, HRI funding (transportation), AHSC funds, IIG grants, and equity, debt offers
	CEQA delays	Avoid CEQA properties, regions

Appendix J

CEQA process flowchart



Source: Association of Environmental Professionals, 2019 California Environmental Quality Act (CEQA) Statute and Guidelines book

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