

City of Benicia
December 2014



BENICIA INDUSTRIAL PARK MARKET STUDY

Assessing Short & Long-Term Market Competitiveness

Consulting Team:
Chabin Concepts, Inc. and
Keyser Marston Associates

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Chabin Concepts, Inc. and Keyser Marston Associates, Inc. (KMA) conducted interviews and research to determine the current conditions in the market area (e.g. Solano, Napa, and Contra Costa Counties), in the industrial real estate market, and the competitive position of the Benicia Industrial Park (BIP) within the market area. The Chabin/KMA Team appreciates the participation of the following stakeholders.

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JC Investments, San Jose	Tulloch Construction
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McJunkin Corporation	Valero

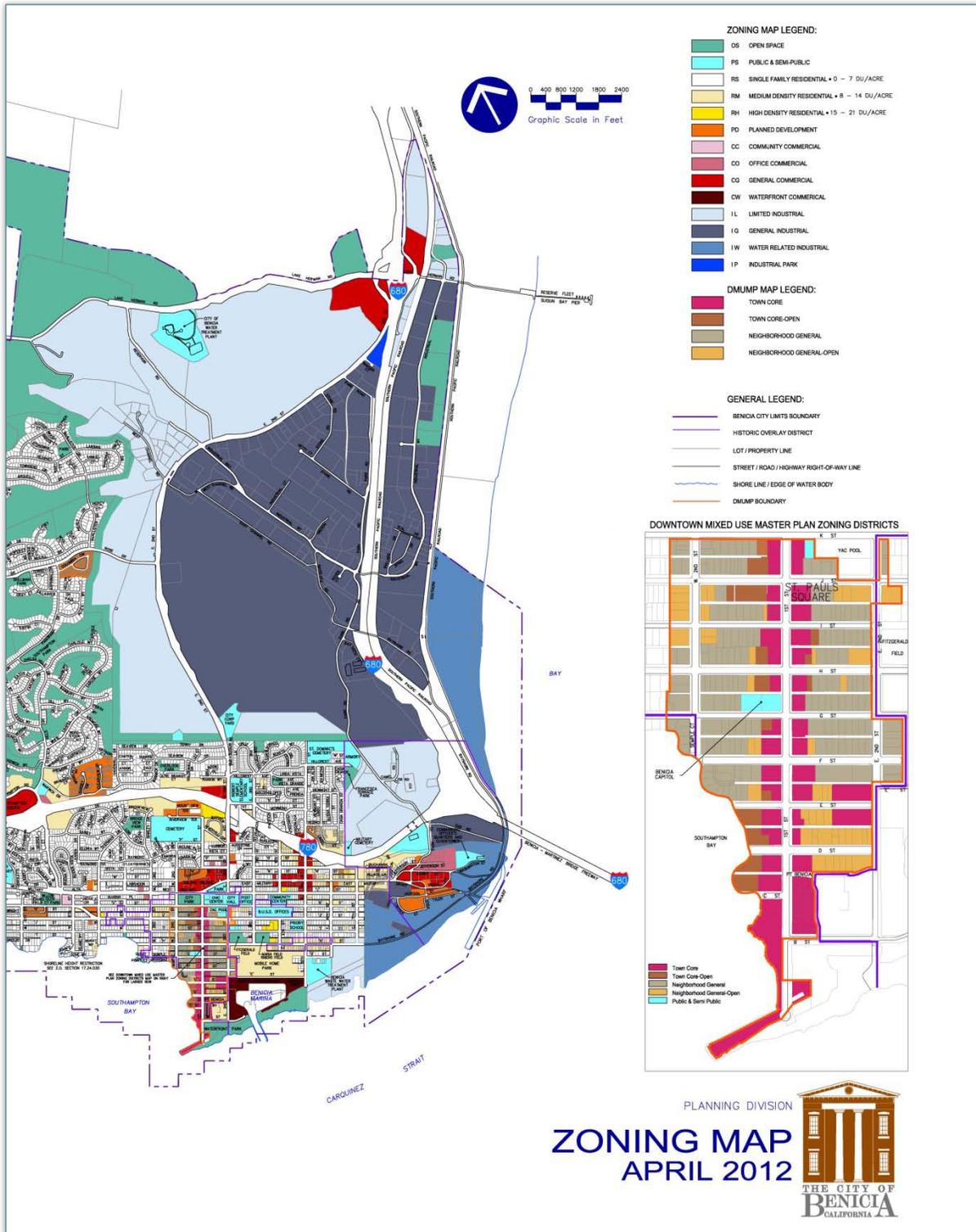


Figure 1 - Benicia Zoning Map, April 2012

Executive Summary

The Benicia Industrial Park (BIP) is an important asset to the City of Benicia particularly as a significant tax-revenue generation driver to the City of Benicia because of the types of companies that are located in the BIP.

Over the past few years Benicia has seen some manufacturers relocate and/or expand to other nearby locations that are beginning to develop new real estate product (industrial parks and buildings). These expansions and relocations have resulted in declining business-to-business sales tax revenue from the BIP. The City has experienced nearly a 20% drop in business sales tax generated by the BIP from its high point, and a 14% drop quarter to quarter 2013 to 2014.

BENICIA INDUSTRIAL PARK (BIP)

- 3,000 acres
- 8.4 million square feet built space
- Rail and Port served
- 7,000 employees

This slow movement is a “red flag” that tax revenue generating businesses located in the BIP may seek other locations, newer buildings or facilities to accommodate their growth, or that tenants may seek “newer product” for current operations. This also raises concerns that vacated facilities will be occupied by non- or minimal-tax revenue generating businesses which will impact the City’s revenue stream.

Given these changes which could possibly be a trend, a market study was initiated to 1) determine BIP’s competitiveness in the marketplace; 2) interview existing employers on potential expansion needs and preferred locations; and 3) identify potential actions to maintain the BIP as an attractive location for job-creating, capital intensive and sales tax revenue generating businesses.

Methodology

The market study included: 1) an assessment of the existing conditions of the BIP; 2) a detailed and in-depth market analysis of the Bay Area and markets surrounding Benicia (Solano, Napa, Contra Costa); 3) interviews with active BIP Real Estate brokers and over fifty BIP business tenants contacted; 4) research on business parks and facility development trends that are attracting users with the latest designs. All research is included in the report and attached appendices.

Following is a brief overview of the existing conditions, market challenges, short-term and long-term market opportunities and actions.

1. Benicia Industrial Park - *Existing Conditions*

The BIP has a strong market niche as a true ***industrial park***, i.e., a designated area located on the outskirts of a city, zoned for a group of industries and businesses, typically light or heavy manufacturing converting, fabricating or assembling materials into products and goods for distribution. These industries, because of the nature of the conversion to finished products, provide the highest economic impact to a community. An industrial park will often have a dominant cluster of industries and related heavy, light manufacturing, warehousing and flex space configured for truck turning radius, highway access and a network of transportation modes.

- The BIP itself is one of the largest parks in Solano County with 3,000 acres and +/-8.4 million square feet. However, there is little land available for new development or expanding businesses, only 23.3 acres and the largest parcel is 9.9 acres. Vacancy rates of existing buildings is relatively low, ranging from 7% to 11%, concentrated in three main buildings which, according to brokers, all or portions are currently being leased short-term for warehousing and storage.
- There is considerably new competition in the market. New industrial parks and buildings along Highway 12 and the I-80 Corridor are attracting wine-related industries and providing alternative locations to the BIP.
- Business in the BIP have, or are beginning to recover, although slowly. Some are starting to project growth and will be looking at a potential expansion over the next few years.
- Many of the BIP tenants interviewed are on short-term leases (three to four years). Fortunately they prefer to stay in the BIP if their growth or consolidation plans can be accommodated.
- There is a lack of land in the BIP to accommodate new development and/or expansion of existing businesses. Existing businesses, that cannot find suitable facilities, are forced to look in other areas.
- Aging infrastructure, particularly streets and broadband access, is a major concern to existing businesses (and a requirement of new businesses). *Note: the City has been working on the broadband access with a contractor, negotiating with different providers. This is a complex project and will require up to a \$3 million investment and is a priority of the City. The recent sales tax measure identified road improvement projects in the BIP.*
- Although brokers like the BIP and feel it is still viable and marketable, they perceive it to be built-out due to very limited building inventory which is primarily suitable for warehousing (not necessarily the types of businesses Benicia would like to attract).

Definition of “Industrial Park”

A portion of a city that is zoned for industrial use (as opposed to residential or commercial use).

Industrial parks may contain oil refineries, ports, warehouses, distribution centers, chemical plants, plastics manufacturers, food and beverage processors, automobile manufacturers, steel manufacturers, metal fabricators and/or advance product manufacturing.

Industrial parks are also known to have good transportation networks.

- Brokers indicate buildings available in the BIP are harder to rent; configurations are not flexible enough to accommodate many uses other than storage. The buildings are antiquated compared to newer buildings coming on the market.
- There are many positive attributes of the park, such as the network of transportation, rail, and port but brokers have found that these are not necessarily decision drivers for the businesses considering the location.
- Lease rates in the BIP are competitive and typically lower than the other submarkets which accounts for low vacancy rates.
- Valero remains a significant influence on the park as an anchor tenant, generating jobs, high tax-revenue, and draws suppliers and other industry-related businesses to the park. Valero's long term presence in the park will be driven by broad business considerations by corporate offices, most of which, such as crude-by-rail access, are largely outside of the control of the BIP. Unlike other tenants, Valero is not being constrained by a lack of land for expansion.
- Amport and access to the port are positive marketing features but not critical for the continued viability of the BIP; it is a very niche market and does not generate the tax-revenue other industries do in the BIP.

2. Market Challenges — *Is the BIP competitive in the marketplace?*

As noted in the existing conditions, there are four main **challenges** for the BIP to remain competitive in the marketplace and continue to be viable for revenue-generating businesses:

- 1) BIP is limited in serving expanding existing businesses or attracting new industries without redevelopment of existing areas, retrofitting existing buildings to modern uses or additional land;
- 2) Limited vacant building inventory and what exists is primarily only suitable for warehousing;
- 3) Aging infrastructure, particularly the condition of streets, traffic circulation, lack of modern communication infrastructure; and
- 4) Increasing competition in the regional market, new parks planned or under-development will result in approximately three million square feet of new development.

Is the BIP competitive in the marketplace?

Without redevelopment, building retrofits and/or additional land to accommodate expanding tenants and new business investment, the BIP is “at risk” of losing quality tenants and being viewed as an obsolete park attractive only for warehousing, non- or minimal tax-revenue generating businesses.

These challenges may force new or expanding businesses to look elsewhere, to the newer industrial parks in the region as they would be able to maintain their current employees and have equivalent market access in these other parks; but it will result in a loss of jobs and sales tax revenue to the City of Benicia. A good example is the wine industry which the BIP served well for many years with bottling, warehousing and distribution operations. However, the Highway 12 widening project improves transportation between the wine country and Fairfield which has now positioned that area to capture and meet the wine industry’s market demands.

A strong market is expected to continue with companies growing, vacancy rates declining and rents increasing causing tight markets in inner cities, such as Oakland, where there is demand for new manufacturing. This is a **positive** for the BIP to take advantage of its existing position and competitiveness to attract light and advanced manufacturing that may be seeking new opportunities close in to their existing location and markets. Positive marketing/selling points to a targeted market:

- BIP is viewed and well-known as an industrial park, zoned for light and heavy manufacturing.
- Lease rates in the BIP are competitive and typically lower, up to 20%, than the other submarkets.
- As noted by brokers, the transportation network in Benicia is a positive feature and needs to be marketed as an attribute, particularly the 680 and 780 Interstate freeways, the UP Rail, and the Port of Benicia.
- Capitalize on Benicia’s high quality of life and schools.
- Valero remains an anchor and attractor of certain types of businesses.

With a tight market for true industrial parks this could be an advantage in the short-term but the long-term requires addressing the challenges of expansion space (building and land), aging and modern infrastructure.

3. Short-Term Market Opportunities — *Given the market challenges, what can the City do in the short-term?*

Short-term actions (two to five years) should focus on: 1) existing tenants with growth potential who will need additional space to accommodate their growth and those tenants with short-term leases over the next two to three years; 2) continuing to aggressively address major infrastructure issues; and 3) aligning potential light manufacturing businesses to existing vacant facilities and implementing focused business attraction campaign (assuming facilities can accommodate uses).

1. Increase business retention/expansion meetings (BREP) and communications with BIP tenants, particularly those identified that will need expansion/consolidation space.
2. Package and deliver to BIP businesses the services and potential incentives the City can bring to assist expanding businesses, such as, financing for equipment or real estate; tax credit application(s); workforce training; utility rates; and potential self-reporting tax sharing agreements (see item 4).
3. The BIP has long-term challenges (infrastructure) that are of concern to some businesses. Communicate with BIP tenants how those challenges are being addressed and projected timelines.
4. Review and monitor existing use tax agreements with businesses and determine if there are additional companies in Benicia that make significant equipment or material purchases. There are incentives used by other cities, Business Cooperation Programs, to encourage businesses to participate in self-reporting of use tax which would increase revenue to the City and also be beneficial to the company.
5. Coordinate with Solano EDC to increase discussions with local and regional brokers on potential target users for vacant spaces, preferably optimal users that will benefit the City.
6. Along with above, discuss, review and identify with brokers areas that might be prime for redevelopment

Given current market challenges, what can the City do now, in the short-term?

- Aggressive BRE program
- Package incentives and assistance
- Identify vacant facilities to market as well as identify potential redevelopment and retrofit building opportunities
- Target marketing by geography and industrial uses
- Target small manufacturers, capital intensive users

Redevelopment: the act or process of redeveloping a blighted or obsolete area.

Retrofit: involves functional renovation and substantial change to modernizing an existing building.

and/or buildings that need to be retrofitted or adaptive reuse to attract the right users. Redevelopment of an area (site, block or multiple blocks) and/or building retrofitting will require further analysis for economic and financial feasibility but are good options to consider when land is constrained. The identification of potential sites or buildings would only be the first step.

7. Marketing should consist of very focused campaigns. Market the existing product (land and buildings) to industrial clients in inner Bay Area locations of Oakland and San Francisco that are experiencing tight markets for manufacturers (industrial) that may be feeling forced out of current locations or in need of a more cost effective location. Prior to marketing, conduct research on manufacturers that would align with the land/building configurations. This effort should be coordinated with Solano EDC and local brokers. The sMaps website, provided with this analysis, will be a great marketing tool for the existing real estate product.
8. Continue to aggressively negotiate for high-speed broadband access.
9. Both the Port and the Arsenal area provide opportunities for niche marketing to specific types of businesses, i.e., the Port specializes in bulk products and motor vehicles and is uniquely situated for distribution. Given the niche markets the Port serves, working with the Port to identify potential users and its own competitiveness with other Ports could lead to a focused marketing effort. The Arsenal could accommodate smaller manufacturing and art-related users. As with the Port it would require a separate focused marketing effort but may not attract tax-revenue generating type companies.

4. Long-Term Strategies — *Creating Market Opportunity and Viability for the BIP*

The ultimate remedy to the space challenge and new competition in the region is to expand the BIP which would call for continued major infrastructure upgrades to make the BIP competitive with new product coming on line, and identify land and buildings (areas for redevelopment, building retrofits or new vacant land) to accommodate new development.

It will be a long-term and time consuming effort to strengthen the BIP's marketability and competitiveness, to maintain its identity as a premier industrial park with unique location attributes and its ability to continue to be a dominant player in the marketplace.

1. Identify potential funding sources to continually invest in and improve the infrastructure of the BIP, this would

What are the long-term strategies the City could execute?

- Invest in infrastructure that maintains the competitiveness of the BIP to newer, emerging real estate products in the region.
- Consider Phase II Analysis to identify feasibility for park expansion.
- Identify funding sources to continuously improve BIP.
- If BIP can achieve redevelopment, land expansion and/or building retrofits, an attraction campaign could potentially target emerging, tech and advance manufacturing to diversify BIP industry mix.

demonstrate the City's commitment to the BIP and existing businesses. Look at these and other financing programs under consideration at the State.¹

- Infrastructure Financing District (IFD)
 - Community Facilities District (CFD)
 - Business Improvement District (BID)
2. As part of the communication messages to businesses and brokers, develop an infrastructure improvement plan with specific project improvement timelines (streets, drainage, traffic flow, and broadband), when funding is expected, when project is started. Regularly report on progress.
 3. As noted, the major long-term challenge for the BIP is land for expansion. Although land is identified for park expansion, it is being considered for other uses. Consider a Phase II Analysis which would evaluate:
 - Feasibility of redeveloping areas and building retrofits identified in short-term actions;
 - Opportunities for additional buildable acreage that could be added to the park;
 - Infrastructure improvements that would be necessary to make it ready for new development;
 - Viability of developing any remaining vacant properties within the BIP;
 - Type of development that will attract tax-revenue generating businesses, aligned with real estate product and existing industry mix, and market opportunity;
 - The applicability of public and private sources of financing.
 4. **If and when** the BIP is improved with expansion land and buildings shovel-ready, begin implementing an aggressive business attraction campaign targeting mix of emerging industrial innovation, tech and advanced industrial tenants (to be review at that point in time with alignment of targets to land and buildings). The priority would be to continue to serve expanding existing tenants and increase business-to-business sales tax revenue. As a long-term strategy, this should be coordinated with existing marketing and business attraction efforts of the Solano EDC.

Conclusion

Without more land, redeveloped land areas or retrofitted buildings to assist current expanding BPI businesses or attract advance industrial businesses, the BIP will fall behind as an obsolete park comparatively and only attract warehouse-type or non-minimal tax-revenue generating businesses.

As noted throughout the report, without more land, redeveloped land areas or retrofitted buildings to assist current expanding BPI businesses or attract advance industrial businesses, the BIP will fall behind as an obsolete park comparatively and only attract warehouse-type or non-minimal tax-revenue generating businesses.

¹ Appendix F: additional information on funding programs.

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1. Introduction

1.A. Market Study Purpose

Over the past few years Benicia has seen some manufacturers relocate and/or expand to other nearby locations that are beginning to develop new real estate product (industrial parks and buildings). These expansions and relocations have resulted in declining business-to-business sales tax-revenue from the BIP. The City has experienced nearly a 20% drop in business sales tax generated by the BIP from its high point and a 14% drop quarter to quarter 2013 to 2014.

This slow movement is a “red flag” that tax-revenue generating businesses located in the Benicia Industrial Park (BIP) may seek other locations, newer buildings or facilities to accommodate their growth, or that tenants may be seeking “newer product” for current operations. This also raises concerns that vacated facilities will be occupied by non- or minimal tax-revenue generating businesses which impact the City’s revenue stream.

Given these changes, which could possibly be a trend, a market study was initiated to 1) determine BIP’s competitiveness in the marketplace; 2) interview existing employers on potential expansion needs and preferred locations; and 3) identify potential actions to maintain the BIP as an attractive location for job-creating, capital intensive and sales tax-revenue generating businesses.

1.B. Methodology

A combination of interviews, market data analysis, and research on business park development trends was used for this study.

- Real estate brokers who are actively engaged in leasing space at the BIP and throughout the market area were interviewed at the outset of this study. Follow-up conversations took place later in the process to verify, clarify and update data and statements. Brokers provided the consulting team with their perception and opinion of the BIP, their experiences in showing, leasing and/or selling in the BIP, and the general trends of the industrial and commercial regional markets. This information has been incorporated throughout the Market Study.
- Approximately fifty tenants were contacted for personal interviews to judge current BIP tenants’ satisfaction and commitment to the park. The consulting team questioned business owners and managers about their business’ recovery from the recent recession; if their current BIP facility is adequate for their operations; if they have any other facilities outside of the BIP; lease terms; and the pros and cons of the BIP and their location within it. Summary results of these interviews are provided in the Market Study Appendix.

- Market data was collected from multiple sources, including Colliers International, CoStar, an on-site visit as well as proprietary data sources. Data collected and analyzed included a combination of the most-current available and/or trends on:
 - vacancies and buildable land in the BIP
 - land use
 - lease rates
 - building activity
 - market outlook
 - new competition
 - supply and demand for the market area served by the BIP which includes Benicia, Solano County, Napa County, Highway 4 corridor, and Richmond
- Competing business parks and trends in new park development were researched through industry journals online and in print, market reports, websites, and interviews. Thirteen business/industrial parks within the Benicia market area were identified as the BIP's most-likely competitors. Profiles of each of these parks is presented within the market study. Additionally, the consulting team conducted additional research to identify the trends and features being incorporated in new park development, particularly those referred to as "innovation parks." Profiles of nine innovation parks from across the country are included in the market study.

1.C. Report Organization

The content of this Market Study Report includes:

- Existing status of the Benicia Industrial Park, property, property availability and pricing;
- The broader regional industrial market conditions including market trends, supply and demand of regional submarkets;
- Benicia Industrial Park's competitive position determined through interviews with brokers and existing tenants, and research of competitor parks;
- Trends in new building designs, traditional business parks and emerging presence of innovation districts in both university and non-university areas that provide background on demand of new users;
- Conclusions, short-term and long-term actions to capture market opportunities and continue to create a viable and competitive BIP.

2. Benicia Industrial Park

The Benicia Industrial Park (BIP) is located on Interstate 680 in the City of Benicia. It is Solano County's oldest and largest industrial park and the largest port-related industrial park in Northern California. The BIP contains over 3,000 acres of land and over eight million square feet of built space. Hundreds of businesses are located in the BIP and employ over 7,000 people—one half of Benicia's total private employment. A wide variety of businesses and industries are located in the BIP including those in: manufacturing, construction, environmental engineering, steel fabrication, petroleum refining, logistics/distribution, warehousing, biotech, and more.

Over the past few years new real estate products (industrial parks and buildings) have been developed in the region. Some Benicia businesses that needed more space to accommodate their growth chose to relocate from Benicia to newer parks or buildings. The loss of employers, jobs, and declining sales tax revenue generated from the BIP is of concern to the City. The purpose of this market study is to help the City determine the marketability of the BIP compared to the newer products coming on the market, and how to attract investment, job-creating and sales tax generating businesses to the BIP.

2.A. Property Availability

The Benicia Industrial Park (BIP) is largely built-out, currently there are only 23 acres of undeveloped space on seven parcels out of the park's total acres. The largest vacant parcel is under 10 acres as shown in Figure 2. The vacant properties range in size from 0.6 to 9.9 acres.

Of these vacant parcels, only one could be identified as available and actively on the market. The 4.5 acres at Highway 680 and Goodyear Road is listed by Jennifer Chen of JC Investment for \$1.5 million. The site is being marketed for highway commercial use.

Although very little vacant property is available, approximately 925,000 square feet of building space in the BIP is vacant and available (Sept 2014). This represents an 11% vacancy rate.² Nearly half (457,245 square feet or less) of the vacancies are concentrated in just three buildings (Figure 3). All or portions of these buildings have been leased short-term for warehousing. As the short-term leases expire and/or storage space is no longer required, the buildings will again be listed and marketed for warehouse/distribution use.

Figure 2 - Undeveloped parcels available in Benicia Industrial Park

Address	Acreage
4563 E. 2 nd Street	1.72
106 Channel Road	0.99
Hwy 680 @ Goodyear Rd	4.50
273 Industrial Way	9.90
500 Industrial Way	0.62
3651 Park Road	3.01
665 Stone Road	1.94
TOTAL	23.30

Source: CoStar, Sept 2014

² Appendix: Detailed property and vacant building inventory.

Figure 3 - Three buildings in Benicia Industrial Park represent one-half of available inventory as of July 2104.



577-635 Indiana Street
244,000 SF / 164,000 SF Available



433-459 Industrial Way
240,000 SF / 160,000 SF Available



4301-4399 Industrial Way
268,245 SF / 133,245 SF Available

If two of these buildings were to lease, the vacancy rate would decline from 11% to approximately 7%. Because of the concentration of vacancy within a very few buildings, leasing brokers do not perceive the BIP to have a high vacancy rate. This perceived built-out condition and the fact that land is not available for existing tenants that need to expand are key constraints for the BIP.

As a result, the BIP is at risk of losing quality tenants when they need to expand if BIP's existing vacant facilities do not meet their needs. There is no room for new investment in BIP and expanding businesses will be forced to look elsewhere. The newer business and industrial parks in the region may be the only option for Benicia's expanding businesses. They may be able to maintain their current employees and enjoy equivalent market access (highways, airports, ports, etc.) in newer, more modern facilities; but it will result in a loss of jobs and sales tax to the City of Benicia.

2.B. Property and Pricing in the Benicia Market

The Benicia industrial market is generally synonymous with the Benicia Industrial Park (BIP). The BIP contains 8.4 million square feet of rentable space (Table 1), which represents over 99% of the total industrial inventory in Benicia (Table 2).

As summarized in Table 1 over 95% of the space is comprised of traditional industrial properties (warehouse, distribution, light and heavy industrial). The next largest segment space is flex space, which accounts for 3% of the inventory. The balance of the park is comprised of office and retail properties.

Warehouse distribution space throughout Benicia totals 4.4 million square feet which represents approximately 52% of Benicia's total inventory (Table 2). The second most prevalent type of space is manufacturing space, totaling 4 million square feet and representing 47% of Benicia's inventory. Most of the buildings were built in the 1980s and 1990s but are generally in marketable condition.

Table 1 - Benicia Industrial Park Summary (Appendix A, Table 1 – Excel)

	Total	General Retail	Office	Industrial	Flex	Land
Parcels in BIP	212	9	6	178	11	8
Land Acres in BIP	1,010	334	18	607	28	23
Total Rentable SF	8,425,599	59,032	62,315	8,051,752	252,500	0
% of Total Rentable Space	100%	1%	1%	96%	3%	
Average Rentable SF	39,743	6,559	10,386	45,235	22,955	0
Total Vacant Available Space	925,194	0	0	913,084	12,110	0
% of Total Rentable Space	11%	0%	0%	11%	5%	NA
Total Available Space (SF)	1,761,204	0	0	1,749,094	12,110	0
% of Total	21%	0%	0%	22%	5%	NA
Weighted Asking Rent/mo.	\$0.60	\$0.00	\$0.00	\$0.57	\$0.90	\$0.00

Source: CoStar, Sept 2104

Table 2 – Composition of all Industrial Space in the City of Benicia (Appendix E, Table 4 – Excel)

	Inventory	% of Inventory	Vacancy Rate	YTD Net Absorption	Space Completed Q214 or Under Construction	Avg Asking Rent	Vacant Space
Manufacturing	3,957,628	47%	8%	10,228	0	\$0.64	300,780
R&D / Flex	156,833	2%	0%	27,694	0	\$0.55	0
Warehouse	4,375,692	52%	16%	-259,139	0	\$0.42	700,111
Benicia Total	8,490,153	100%	12%	-221,217	0	\$0.49	1,000,890

Source: Colliers International; rents presented are based on Costar data reflecting a mix of industrial gross, modified gross, and triple net (NNN) leases. Sept 2104

Asking lease rate for all types of space averages \$.49 per square foot NNN; this is generally lower than any of the submarkets (Table 3). For example, the asking rate for warehouse space averages \$.42 per square foot, compared with the market area average of \$.52 per square foot. Similarly, the asking rent for industrial space averages \$.64 per square foot compared with market area’s average of \$.69 per square foot.

Benicia’s lower price points are a **significant marketing advantage**, particularly with respect to competing with the Highway 4 submarket for industrial tenants. BIP’s average asking rent for industrial space approximates \$.64 per square foot compared with \$.80 per square foot for industrial space along Highway 4.

Table 3 Composition of Market Area Industrial Space by Submarket (Appendix E, Table 5 – Excel)

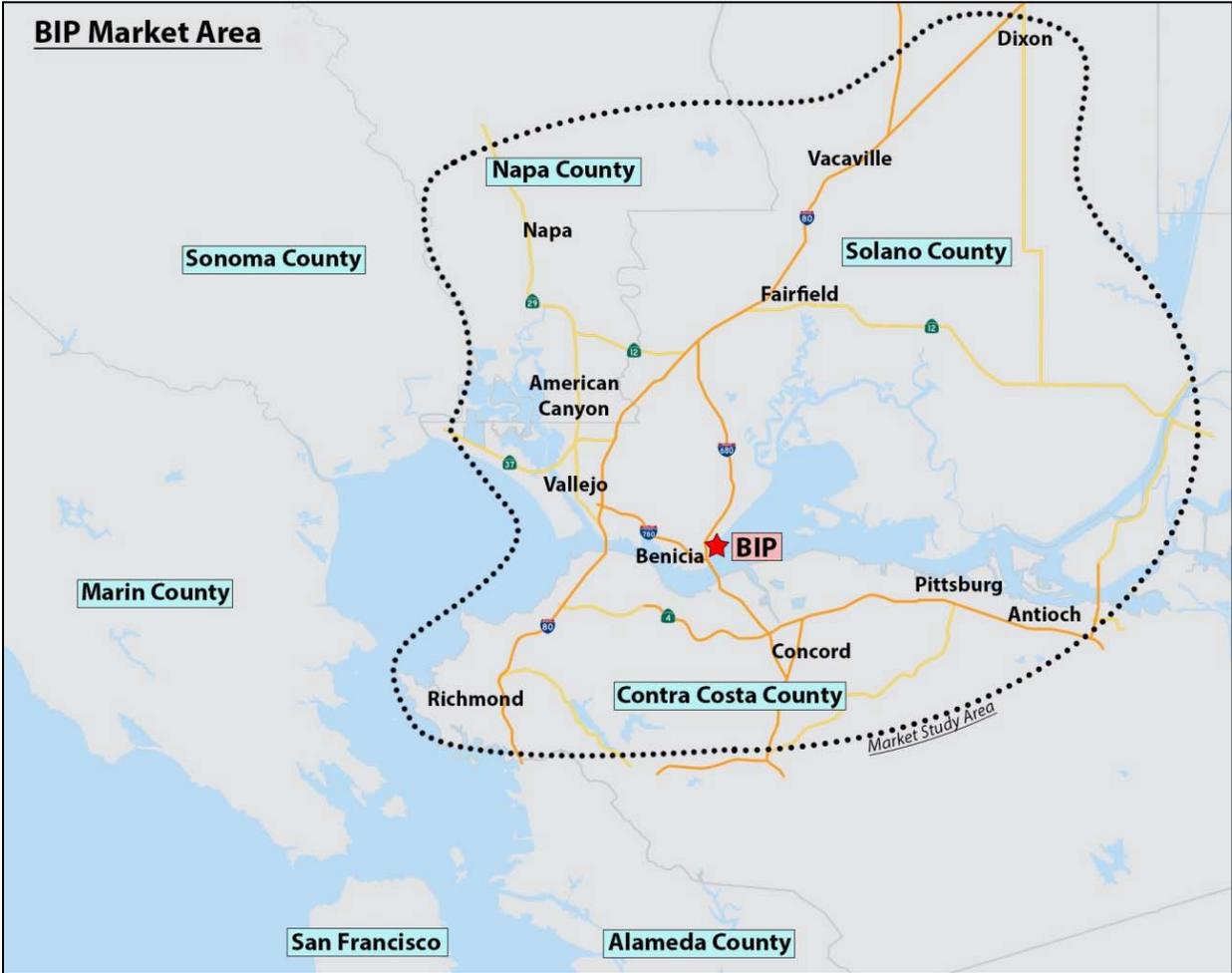
	Inventory	% of Inventory	Vacancy Rate	YTD Net Absorp.	Space Completed Q2 2014	SF Under Construction	Avg. Asking Rent	Vacant Space
Solano County								
Industrial	12,769,990	17%	8.31%	313,551	0	0	\$0.61	1,060,801
Warehouse	20,737,366	27%	8.90%	238,784	0	649,896	\$0.45	1,845,734
R&D/Flex	661,624	1%	5.86%	39,394	0	0	\$0.59	38,795
Total	34,168,980	45%	8.62%	591,729	0	649,896	\$0.51	2,945,330
Napa County								
Industrial	3,112,142	4%	6.03%	6.03%	0	0	\$0.88	187,540
Warehouse	9,003,219	12%	4.29%	4.29%	103,400	287,000	\$0.72	386,087
R&D/Flex	507,641	1%	7.90%	7.90%	0	0	\$0.88	40,104
Total	12,623,002	17%	4.86%	4.86%	103,400	287,000	\$0.77	613,731
Hwy 4 Submkt								
Industrial	12,590,218	17%	5.50%	155,820	0	0	\$0.80	691,980
Warehouse	2,836,293	4%	19.29%	-145,478	0	0	\$0.49	547,082
R&D/Flex	837,204	1%	4.37%	-1,265	0	0	\$1.17	36,579
Total	16,263,715	21%	7.84%	9,077	0	0	\$0.76	1,275,642
Richmond								
Industrial	4,851,386	6%	9.10%	-120,215	0	0	\$0.51	441,476
Warehouse	4,381,181	6%	3.00%	144,195	0	0	\$0.50	131,435
R&D/Flex	3,393,153	4%	8.00%	-9,377	0	0	\$0.79	271,452
Total	12,625,720	17%	6.70%	14,603	0	0	\$0.60	844,364
Market Area	75,681,417	100%	8%	333,506	103,400	936,896	\$0.62	5,679,066

Source: Colliers International, Sept 2014

3. Regional Industrial Market Conditions

The market area served by the Benicia Industrial Park is comprised of Solano County, Napa County, and the northern section of Contra Costa County, shown on the map below (Figure 4). Competing locations include business parks in: Fairfield, Vacaville, and Vallejo in Solano County; Napa and American Canyon in Napa County; Martinez, Concord, Antioch, and Pittsburg along Highway 4 in Contra Costa County; and the City of Richmond.

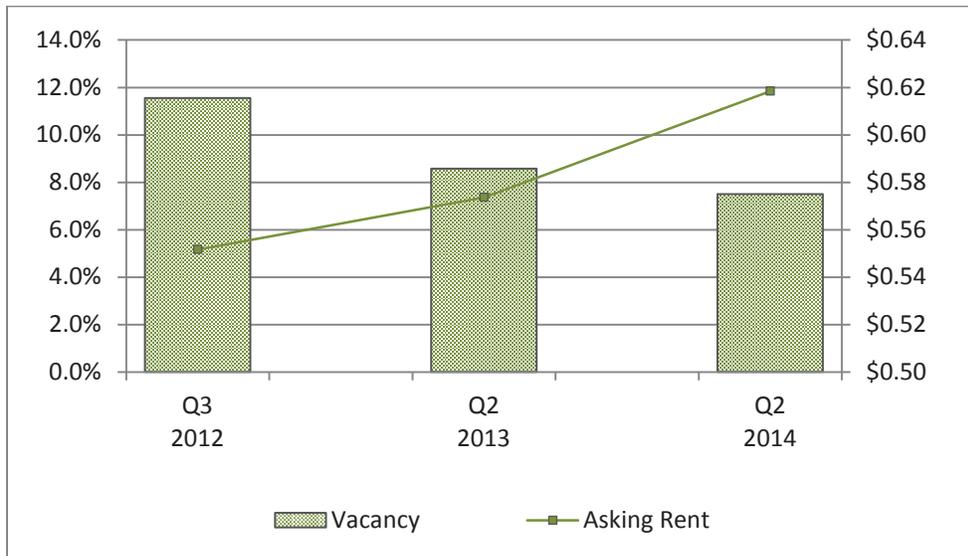
Figure 4 - Benicia Industrial Park Market Area



3.A. Regional Market Trends

The regional industrial market is generally very strong. Vacancy rates have been declining, rents have been increasing, and, for the first time in many years, speculative space is being built. Figure 5 depicts the market area vacancy and rental rates over three years. The market area vacancy rate is currently approximately 7.5%, compared with 8.6% in the second quarter of 2013 and 11.6% in the third quarter of 2012. The average monthly rental rate stands at \$.62 per square foot, NNN, reflecting a \$.05 increase over the past year.

Figure 5 - Market Area Trends, Vacancies vs. Rental Rates



As presented on Table 4 (next page) nearly 334,000 square feet of space have been absorbed during the first and second quarters of 2014, approximately 103,000 square feet of new space has been constructed and over 936,000 square feet is currently under construction.

The market is anticipated to continue to strengthen, with vacancy rates expected to continue to decline, rental rates to increase, and the construction of new space to continue. For the first time in many years, the market’s strength is sufficient to support new construction on a speculative basis.

MARKET AREA OUTLOOK

- VACANCY
 - CONSTRUCTION
 - RENTAL RATE
-

Table 4 Industrial Market Area Conditions, 2Q2014 (Appendix E, Table 2 – Excel)

By Jurisdiction	Inventory	% of Inventory	Vacancy Rate	YTD Net Absorp.	Space Completed Q2 2014	SF Under Construction	Avg. Asking Rent	Vacant Space
Solano County								
Vallejo	4,701,101	6%	14%	229,394	0	0	\$0.38	668,906
Benicia	8,490,153	11%	12%	-221,217	0	0	\$0.49	1,000,890
Fairfield ³	12,486,468	16%	24%	320,449	0	649,896	\$0.57	567,188
Vacaville/Dixon	8,491,258	11%	24%	263,103	0	0	\$0.48	708,346
<i>Total Solano Co.</i>	<i>34,168,980</i>	<i>45%</i>	<i>9%</i>	<i>591,729</i>	<i>0</i>	<i>649,896</i>	<i>\$0.51</i>	<i>2,945,330</i>
Napa County								
Napa	6,257,535	8%	8%	-182,581	103,400	0	\$0.79	474,723
Am. Canyon	6,365,467	8%	2%	-99,322	0	287,000	\$0.75	139,007
<i>Total Napa Co.</i>	<i>12,623,002</i>	<i>17%</i>	<i>5%</i>	<i>-281,903</i>	<i>103,400</i>	<i>287,000</i>	<i>\$0.77</i>	<i>613,731</i>
Hwy 4 Submkt								
Martinez	1,193,509	2%	5%	46,523	0	0	\$0.89	57,634
Pacheco	605,690	1%	3%	3,829	0	0	\$0.94	16,959
Concord	7,175,672	9%	6%	58,423	0	0	\$0.87	400,850
Pittsburg	3,905,916	5%	12%	-103,078	0	0	\$0.41	455,750
Antioch	3,382,928	4%	10%	3,380	0	0	\$0.61	344,449
<i>Total Submarket</i>	<i>16,263,715</i>	<i>21%</i>	<i>8%</i>	<i>9,077</i>	<i>0</i>	<i>0</i>	<i>\$0.76</i>	<i>1,275,642</i>
Richmond	12,625,720	17%	7%	14,603	0	0	\$0.60	844,364
Market Area	75,681,417	100%	8%	333,506	103,400	936,896	\$0.62	5,679,066
By Industry Sector								
Industrial	33,323,736	44%	7%	287,958	0	0	\$0.69	2,381,797
R&D / Flex	5,399,622	7%	7%	44,539	0	0	\$0.83	386,931
Warehouse	36,958,059	49%	8%	1,009	103,400	936,896	\$0.52	2,910,338
Market Area	75,681,417	100%	8%	333,506	103,400	936,896	\$0.62	5,679,066

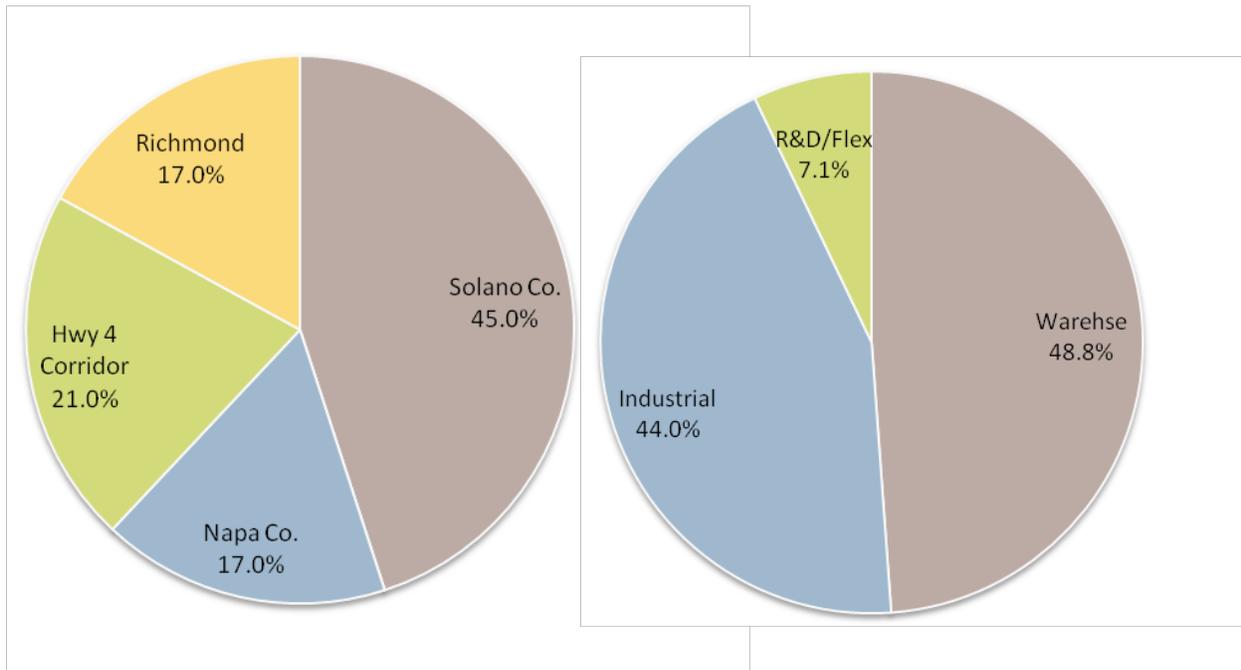
Source: Colliers International, Sept 2014

³ Including Cordelia and Suisun City

3.B. Regional Supply and Demand

There is approximately 75.7 million square of industrial space within the market area (Figure 4). This is comprised of approximately 37 million square feet (48%) of warehouse distribution space, 33.3 million square feet (44%) of industrial space, and 5.4 million square feet (7%) of R&D/Flex space. Figure 6 depicts the distribution of the 75.7 million square feet throughout the market area and by use. The amount and distribution of industrial properties within each of four submarkets is presented later in this section.

Figure 6 - Distribution of the 75.7 MSF within the Market and by Type



The average vacancy rate for warehouse space is slightly higher (8%) than the average 7% vacancy rate for industrial and R&D/Flex space. The light industrial sector has experienced the greatest amount of net absorption during the first six months of 2014 at 288,000 square feet, followed by R&D Flex space at 45,000 square feet, and warehouse space at 1,000 square feet.

The minimal net absorption of warehouse space during the first two quarters of 2014 is not consistent with the significant amount of net absorption over the past two years and the level of gross absorption during the first two quarters, with over 255,000 square feet absorbed in Fairfield and 240,000 square feet in Vacaville. The positive absorption in these areas was off-set by the vacating of space in Benicia, Napa, and American Canyon, Pittsburg, and Antioch.

Distribution

Most of the current demand for construction activity is in the distribution sector. The 103,000 square feet of industrial space that was completed during Q2 2014 (Table 4) was speculative warehouse space in Napa. Approximately 650,000 square feet of new distribution space is under construction at the Solano Logistics Center in Fairfield to be occupied by Saxco Glass, which bottles wine and beer. The remaining 287,000 square feet of space that is currently under construction is comprised of two buildings at the Lombard Crossings Industrial Park in American Canyon. The buildings are currently in escrow.

Much of the demand in the market area and throughout the entire Bay Area is being driven by the need of businesses for well-located distribution facilities. In today's market, there is a strong desire for distribution facilities to be located close to the population centers and transportation hubs. The goal is to expedite the delivery of merchandise. For example, Amazon has a goal to provide "same day delivery." In order to position itself to accomplish this goal, it is securing large distribution facilities in close proximity to population centers, including 575,000 square feet of speculative space in Newark's 29-acre Cherry Logistics Center. Another important speculative development is the Goodman Logistics Center Oakland project near the Port of Oakland and the Oakland International Airport with the recent completion of 345,000 square feet and the lease of 142,000 square feet to Benjamin Moore & Co. According to a Benjamin Moore representative, "proximity to bulk shipping will make it easier and cheaper for Benjamin Moore to move product." Other key users are food distributors, such as Whole Foods, which purchased a newly constructed 117,200 square foot distribution facility in Richmond.

Within the Benicia market area, the wine industry is one of the key drivers. Over 650,000 square feet of space is currently under construction at the Solano Logistics Center in Fairfield to be leased to Saxco International, a leading provider of rigid packaging solutions to the wine, beer, liquor and food industries. Another bottle supplier, Encore Glass, has moved its operations from Benicia to the Solano Logistics Center, where it is occupying 318,000 square feet. Additionally, over 500,000 square feet of speculative space is in the pipeline at Richmond's Pinole Point Business Park. Phase 1 is 100% leased to tenants such as Restoration Hardware, Broadline Medical and Serena & Lily.

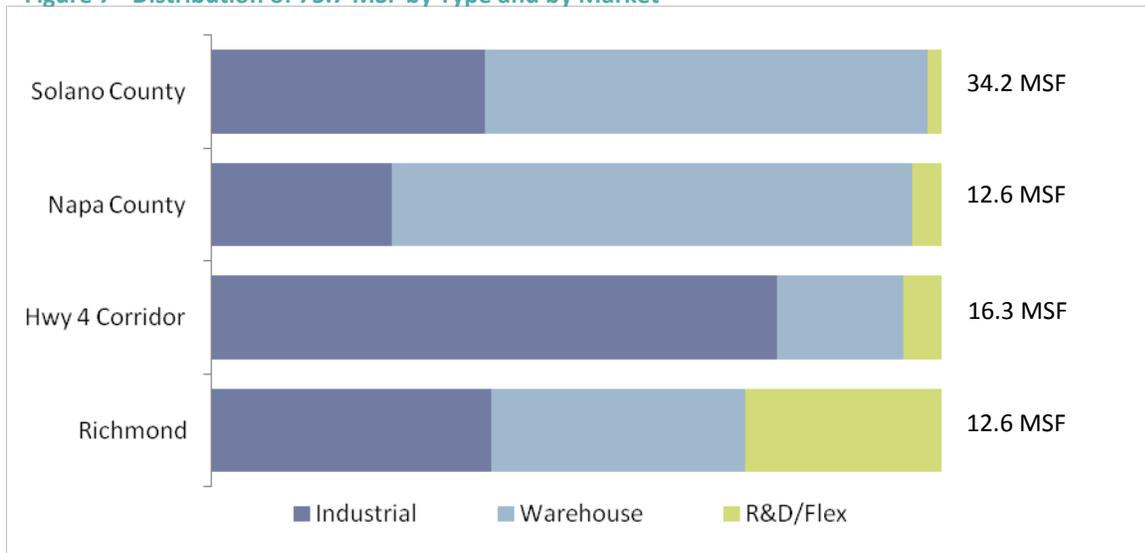
Light Industrial

The demand for light industrial space is also strong. While there has not been as much new construction activity as there has been of distribution space, vacancy rates are in the single digits.

Lease Rates

Asking lease rates for all types of industrial space have increased significantly since 2012. Warehouse rates have increased the most significantly, from \$.43 per square foot, NNN, during Q3 2012 to \$.52 per square foot as of Q2 2014, which represents a 20% increase. During the same period, light industrial asking rents have increased 6% from \$.65 to \$.69 per square foot, and R&D asking rents have also increased 6%, from \$.78 to \$.83 per square foot.

Figure 7 - Distribution of 75.7 MSF by Type and by Market



3.C. Submarket Overview

The section provides a closer look at the region by submarkets served by the Benicia Industrial Park, e.g. Solano County, Napa County, Highway 4 corridor, Richmond, Oakland/I-880.

Solano County Submarket

Solano County’s industrial inventory exceeds 34 million square feet, or about 45% of space within the entire market area. As shown in Figure 7, warehouse space is the largest sector with 20.1 million square feet which represents over 60% of the industrial space in the county. Industrial space is the second largest sector at 12.8 million square feet, followed by R&D/Flex space at 662,000 square feet.

The overall vacancy rate approximates 8.6%, which is slightly higher than the market area average of 8%. The key industrial locations within the county are Fairfield (12.5 million square feet), followed by Benicia and Vacaville/Dixon, each with 8.5 million square feet.

As depicted on Table 4, the highest vacancy rates are found in Vallejo at 14% and Benicia at 12%. While Fairfield has the most industrial space in the submarket, it also enjoys the lowest vacancy rate at 5%.

Solano County rental rates are attractive relative to the market area. Asking rents on warehouse space average \$.45 per square foot compared with \$.52 per square foot throughout the market area. Light industrial asking rents average \$.61 per square foot compared with \$.69 per square foot throughout the market area, and R&D space rates are \$.59 per square foot compared with \$.83 per square foot throughout the market area.

While market trends cooled in Q2 2014, the 8.6% vacancy rate is considered to be very healthy. There is 650,000 square feet of space currently under construction at the Solano Logistics Center in Fairfield to serve the bottling needs of the wine industry.

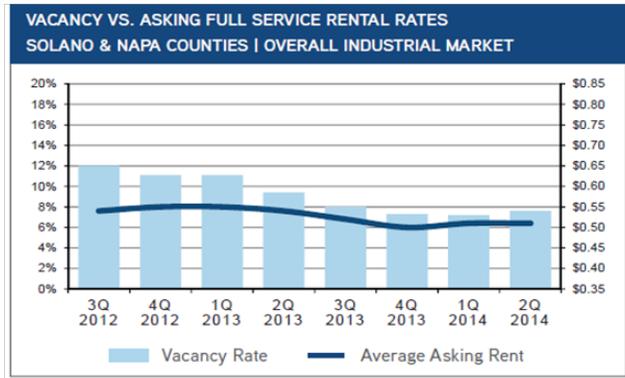
Because the demand for large warehouse space is growing in the Bay Area and few market areas are able to meet the need, significant new future developments are anticipated for both Fairfield and Vacaville. With the completion of the Jameson Canyon/Hwy 12 widening project later this year, the continued growth in demand by the Napa wine industry, and the lack of expansion opportunities in Napa County, Solano County is poised to see significant growth in the coming months. Fairfield is particularly well-positioned to capture the future demand due to the following factors:

- the wine industry is driving the demand for new distribution space;
- the Napa County market does not have sufficient current or future capacity to accommodate the growing demand;
- the completion of the Highway 12 widening project enhances the transportation corridor between the wine country and Fairfield;
- Fairfield has high quality business parks offering a full package of desirable infrastructure;
- Fairfield has sufficient available land to accommodate new development;
- Fairfield is located at a transportation hub; and
- Fairfield has reportedly relatively low water rates.

Napa County Submarket

Napa County's 12.6 million square feet of inventory is dominated by warehouse space at 9 million square feet followed by light industrial space at 3 million square feet. Napa County's current vacancy rate of 5% is the lowest submarket within the market area. Consistent with its low vacancy rates, Napa's asking rents are the highest of any submarket within the market area. Asking rent for warehouse space is \$.72 per square foot, NNN, and asking rent for industrial space is \$.88 per square foot.

Demand is driven by food and beverage companies and is expected to continue to increase. However, there is not sufficient existing space or growth potential to accommodate the demand. As a result, it is expected that rents will continue to rise and demand will be met outside of Napa County, primarily in Fairfield given the direct connection to be provided by the Highway 12 widening project.



MARKET INDICATORS	Q2-14	Projected Q3-14
	VACANCY RATE	↑
RENTAL RATE	↔	↔
NET ABSORPTION	↑	↔
CONSTRUCTION	↑	↑

Source: Colliers International

Highway 4 Submarket

The Highway 4 Submarket contains approximately 16.3 million square feet of industrial space, with light industrial accounting for 12.6 million square feet, followed by 2.8 million square feet of warehouse space and 835,000 square feet of R&D/Flex space. The light industrial market is very strong, with a vacancy rate of only 5.5%; the warehouse market is struggling with a vacancy rate in excess of 19%. Asking rental rates are the second highest within the market area. Asking rents for light industrial space average \$.80 per square foot and asking rents for warehouse space average \$.49 per square foot.

One of the area’s noted deficiencies is a lack of quality large blocks of space. Demand for space from industrial service users and construction companies is expected to increase, which may be met by new space being developed in Fairfield and Vacaville. The Benicia Industrial Park is ideally located to meet this demand if it had sufficient space for new development.



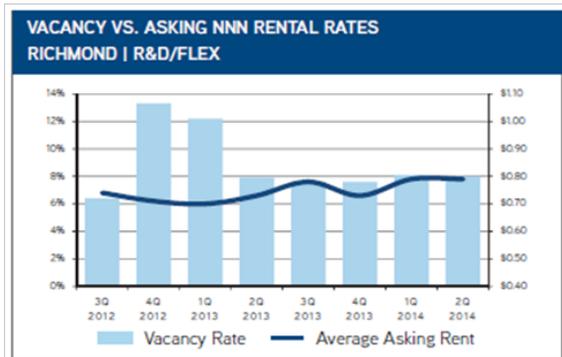
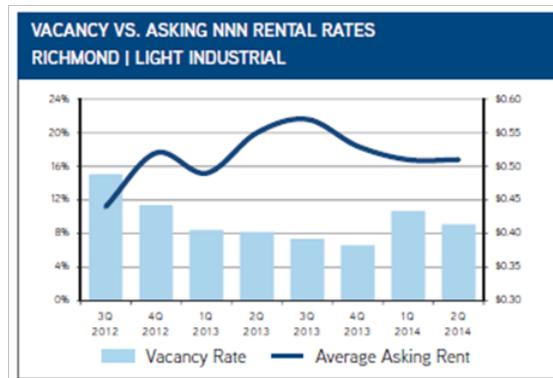
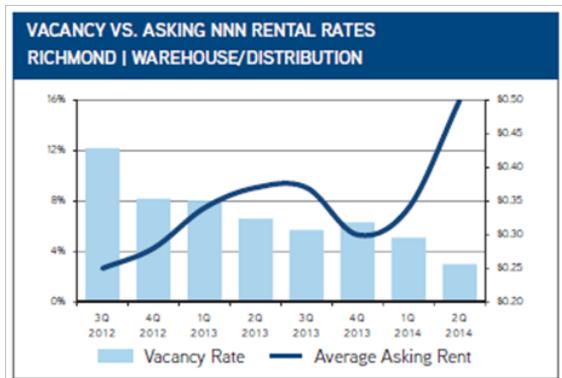
MARKET INDICATORS	Q2	PROJECTED Q3
	VACANCY	↓
NET ABSORPTION	↑	↑
CONSTRUCTION	↔	↔
RENTAL RATE	↑	↑

Source: Colliers International

Richmond Submarket

The Richmond industrial market consists of approximately 12.6 million square feet, with industrial space totaling approximately 4.9 million square feet, warehouse space totaling 4.4 million square feet and R&D/Flex space totaling 3.4 million square feet. The warehouse distribution market is flourishing, the current vacancy rate is 3%, and rental rates are at \$.50 per square foot. In comparison, one year ago, the vacancy rate was 6.5% and asking rents were \$.37 per square foot. Vacancy rates are expected to continue to decline and rents to increase.

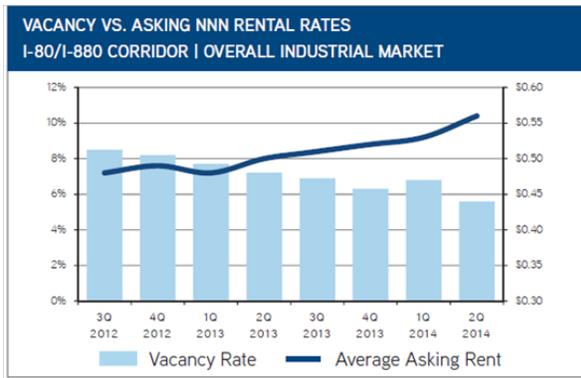
A 700,000 square foot new development is planned for the 42-acre site at 2005 Atlas Avenue, and a 500,000 square foot speculative development is planned for the Pinole Point Business Park. The light industrial sector is anticipated to continue to lag behind the warehouse sector because existing space is largely comprised of older, obsolete space.



Oakland / I-880 Submarket

The I-880 submarket is extremely strong but is being driven by a lack of manufacturing space. There is a severe shortage of physically usable manufacturing space as much of the space is bordering on obsolescence. Most of this demand/shortage is centered in Oakland. There are currently no manufacturing projects under construction in the I-80 corridor, but there is a 330,000 square foot project currently planned for the Hayward Bridge Industrial Park. Until new supply is made available, it is anticipated that rents will continue to rise and vacancy rates will continue to drop.

The completion of the 575,000 square foot warehouse distribution complex in Newark to be occupied by Amazon was the most notable deal of Q2 2014. This lease has reportedly opened the floodgates for additional new development and transactions, including the development of a 173,000 square foot warehouse distribution space in Fremont on a 9.3-acre site that was improved with an obsolete 51,000 square foot R&D building. A 15-year lease with global food distributor JFC International was recently announced for the space.



Source: Colliers International

MARKET INDICATORS		
	Q2-14	Projected Q3-14
VACANCY	↓	↓
NET ABSORPTION	↑	↑
CONSTRUCTION	↑	↑
RENTAL RATE	↑	↑

4. Benicia Industrial Park's Competitive Position

Benicia was the most active submarket in the Solano/Napa County area during the second quarter of 2014. Three of the four largest leases in the region were located in the BIP. The largest lease signed in the quarter was Pro-Form Laboratories, which manufactures powdered nutritional products. Pro-Form will occupy the space to be vacated by Saxco Glass, which is relocating and expanding in Fairfield. The other two large leases are an 80,000 square foot warehouse space to Metropolitan Van & Storage and 27,000 square feet of warehouse space to Kingsum.

As discussed in the previous Market Analysis section, there is demand for new large warehouse distribution buildings as well as manufacturing space, particularly in the Oakland area. The demand is currently either being met by new development in Fairfield or Richmond or not being met at all, resulting in rising rental rates and historically low vacancy rates.

All the brokers interviewed expressed the general opinion that there is a shortage of true industrial parks in the area, parks that are focused on serving light and heavy industrial tenants. Brokers appreciate that the BIP does not try to be everything to everyone, it serves the industrial and warehouse market well, should continue to do so, and that there are opportunities for BIP to build that niche. But in order to build on and improve on its market position, according to the brokers, the BIP needs to be expanded and infrastructure improvements must be made.

These same sentiments were repeated by the tenants. The tenants interviewed like the location and access the BIP affords them, access to market, suppliers, and workers. But when the times comes that they need to expand or the traffic congestion, and/or outdated infrastructure begins to affect their bottom line, a move to another location in the region would not be difficult.

Following is a summary and highlights of the broker and tenant interviews.

4.A. Broker Interviews

Brokers who are actively engaged in leasing space at the BIP and throughout the market area were interviewed. Interestingly, the assessments of the individual brokers were very similar.

- Brokers appreciate that the BIP does not try to be *everything to everyone*. It serves the industrial and warehouse market well and should continue to do so.
- Lease rates are attractive relative to the market area. BIP's lower price points are a significant marketing advantage, particularly with respect to competing with the Highway 4 submarket.

- There is demand for new large warehouse distribution buildings, particularly in the Oakland area. Targeting these industrial tenants that cannot be accommodated by Oakland represents a potential opportunity for the BIP— if the BIP had sufficient land to accommodate new development.
- The wine industry is a key driver of the BIP (bottling and warehouse operations). BIP’s ability to continue to competitively serve the this industry will be impacted by the amount of new construction underway in the market area. Unfortunately for the BIP Fairfield is currently better-positioned to capture the demand because the Highway 12 widening project will enhance transportation between the wine country and Fairfield; and Fairfield has quality business parks with excellent infrastructure and sufficient available land to accommodate new development.
- To improve its competitive position in the market the BIP needs 1) to expand; and 2) make investment in infrastructure (roadways and broadband, in particular). The need for infrastructure investment was also mentioned by several BIP tenants interviewed. The City of Benicia is aware of and working on addressing the upgrades needed. The next chapter (5. Industrial/Business Park Development Trends) provides information on the features of new business parks being built around the nation.

4.B. Tenant Interviews

Approximately fifty businesses located in the BIP were contacted to determine, among other things, why they are located in the BIP, what they like about the BIP, their potential expansion opportunities and continued location in the BIP. Three potential expansions and/or re-locations were identified through the interviews and were referred to the City.⁴

- When asked about their company’s recovery from the economy, the majority of those interviewed are “doing OK,” i.e. maintaining or slowly recovering. A few are starting to see some growth.
- Average length of tenancy in BIP is 22 years; range 3 to 42 years.
- Average age of BIP facilities is 40 years; range is 10 to 75 years old.
- About half of those interviewed have facilities in other locations, e.g. sales offices, affiliates, divisions, regional and global operation locations.
- Those that have facilities outside of the BIP because product was not available (offices, warehouse, or production) would prefer to consolidate and would stay in the BIP. One company in particular started in a 1940’s building, has expanded multiple times and is now in nine different buildings. The company would prefer to be under one roof, and ideally stay in the BIP. Other companies have

“Would like to buy a 10,000 to 20,000 square foot building here but none are available.”

BIP Tenant

⁴ Responses to business interview questions are summarized and included in the Appendix of this report. Interviews were conducted confidentially and responses are not attributed to any specific company.

moved multiple times but always within the BIP. These statements and the average length of occupancy in the BIP are excellent testaments about the BIP. The challenge is in meeting current and future company expansions with the limited building and land inventory.

- About half of the companies interviewed own their facility(ies). Of those that are leasing, most are on short-term leases, three to four years. Fortunately the companies want to stay in the BIP. The pro-business attitude of the City was often mentioned. But if the BIP is not able to accommodate their growth, they may be forced to look elsewhere.
- The most-mentioned reason for being located in the BIP was location. The location is important to them because it is convenient for their current employees, access to a large labor market, customers, and highways. How truly critical those reasons would be when an expansion decision needs to be made is unknown especially as more, newer industrial parks are coming on line within the region. As one company representative said, ***“[BIP is a] good location for our employees and customers. However if we have to, we’ll move and all it will do is add 10 to 15 minutes drive time for our employees and drivers. We can live with that.”***

4.C. Competitor Parks

Table 5 presents a brief profile of thirteen industrial parks within the region that are the most-likely competitors to the BIP. According to interviews and information available, these parks represent a total of approximately 2,300 acres for primarily heavy and light industrial, warehousing. As noted some of the parks have office, commercial and some R&D/Flex space. Similar to BIP, several of these industrial parks have limited acres available, while others are making plans to accommodate new investment; e.g. 350 acres recently annexed by the City of American Canyon, and City of Fairfield.

With the BIP’s limitations in accommodating new and expanding businesses, the developments presented below—particularly new and expanding parks—render it even less competitive.

Table 5 – Brief Profile of Benicia’s Competitor Parks

Busch Corporate Center Fairfield	<ul style="list-style-type: none"> ▪ Location: I-80 and Highway 12 ▪ Size: 250 acres total; 141 acres of available land ▪ Use: light industrial, office and flex; portions are rail-served ▪ Tenants: Anheuser-Busch, Guittard Chocolate Company, Papyrus, Sutter Medical Center, Tricor Braun, Harbinger
Cordelia Business Park Fairfield	<ul style="list-style-type: none"> ▪ Location: Fulton Drive and Lopes Road (between I-80 and I-680) ▪ Size: 102 acres total; 13 acres available ▪ Use: light industrial ▪ Tenants: Glass Pak, Pacific Coast Steel, Dependable Plastics, Scott Lamp Company, Comcast, Bay-Tec Engineering, Munters

Table 5 – Brief Profile of Benicia’s Competitor Parks

<p>Gateway 80 Business Park Fairfield</p>	<ul style="list-style-type: none"> ▪ Location: I-80 at Highway 12 ▪ Size: 52.4 acres; rail-served ▪ Use: industrial, manufacturing, warehousing, R&D ▪ Neighboring Tenants: Anheuser Busch, Amcor PET Packaging, Meyer Cookware, Jelly Belly, Sutter Surgery Center, Marcel Schurman, Northbay Medical, Copart, Abbott Labs, Frank-Lin Distillers Products, Clorox, St. Gobain, Kiewit Construction, Ball Metal Containers
<p>Green Island Industrial Park American Canyon</p>	<ul style="list-style-type: none"> ▪ Location: I-80 and Highway 29 ▪ Size: 265 acres of industrial land; 30 acres recently opened for development; additional 350 acres recently annexed by City for future industrial development ▪ Use: office, warehousing, industrial ▪ Neighboring Tenants: Sutter Home Winery, Mezzetta, Pokka Beverage Co.
<p>Greenwood Business Park Napa</p>	<ul style="list-style-type: none"> ▪ Location: Airport Blvd and Highway 12/29 ▪ Size: 544 acres total ▪ Use: industrial, warehousing ▪ Tenants / Targets: winery, distribution
<p>Napa Valley Business Park (Airport Center) Napa</p>	<ul style="list-style-type: none"> ▪ Location: Airport Blvd and Highway 29 ▪ Size: 17 acres ▪ Use: industrial, warehouse, commercial, office
<p>Mare Island Vallejo</p>	<ul style="list-style-type: none"> ▪ Location: Highway 37 near I-80 ▪ Size: 150 acres ▪ Use: industrial, office, commercial
<p>Phez Park Napa</p>	<ul style="list-style-type: none"> ▪ Location: Highways 29 and 12; near I-80 ▪ Use: industrial, showroom, manufacturing, flex space ▪ Tenants / Targets: wineries
<p>Pinole Point Business Park Richmond</p>	<ul style="list-style-type: none"> ▪ Location: Atlas Road and Giant Highway (near I-80 and 580 interchange) ▪ Size: 80 acres ▪ Sale/Lease: sale, lease, build to suit, land sales ▪ Use: warehousing, distribution, manufacturing ▪ Tenants: Whole Foods, Restoration Hardware, BioRad, Standards of Excellence, Serena & Lilly, Broadline Medical, International Delicacies
<p>Regatta Business Center Richmond</p>	<ul style="list-style-type: none"> ▪ Location: I-580 and Regatta Boulevard ▪ Size: 10 acres ▪ Use: light industrial, R&D, flex ▪ Buildings range from 10,500 to 42,000 square feet

Table 5 – Brief Profile of Benicia’s Competitor Parks

<p>Solano Business Park Fairfield</p>	<ul style="list-style-type: none"> ▪ Location: Chadbourne Road and Beck Avenue ▪ Size: 220 acres; portions are rail-served; 20+/- acres available ▪ Use: office, light industrial, flex space ▪ Tenants: Jelly Belly Candy Company, Calbee America, Engelhart Fine Foods, Pacific Bell Data Center, Abbott Labs/Ross Division, ABCO Laboratories, Professional Hospital Supply, Amcor PET Packaging, and TenCate
<p>Tolenas Industrial Park Fairfield</p>	<ul style="list-style-type: none"> ▪ Location: Air Base Parkway and Peabody Road ▪ Size: 273 acres; 20 +/- acres available ▪ Use: heavy industrial; rail-served ▪ Tenants: Clorox, Duracite, Macro Plastics, Ball Metal, St. Gobain, Frank-Lin Distillers, Ashland Chemicals, Rexam
<p>Vaca Valley Business Park Vacaville</p>	<ul style="list-style-type: none"> ▪ Location: I-80 and 505 ▪ Size: 416 acres; available land ▪ Use: manufacturing, distribution, R&D, office ▪ Tenants: Kaiser Permanente, Genentech
<p>Solano Logistics Center Fairfield (partially complete)</p>	<ul style="list-style-type: none"> ▪ Location: Cordelia and Chadbourne Roads (near I-80 and Highway 12) ▪ Size: 52 acres; 1 million square feet; some rail-served ▪ Use: distribution, manufacturing, light and heavy industrial uses, R&D ▪ Status: street improvements, rough grading, sewer, water and drainage improvements completed ▪ Tenants: Encore Glass and Saxco International
<p>Fairfield Train Station (planned)</p>	<ul style="list-style-type: none"> ▪ Location: between I-80 and Highway 12, north of Travis AFB ▪ Size: 300 acres (100 for light industrial; 200 for heavy industrial) ▪ Use: industrial, manufacturing, R&D, corporate HQ ▪ Status: approximately five years out; build-out 20+ years; infrastructure improvements needed

5. Industrial/Business Park Development Trends

In today’s market, a new model for business park development is quickly taking hold. Emerging products, specifically those referred to as “modern” or “innovation parks” are being created across the nation. Although innovation is often tied to universities or university-related developments, generally speaking what makes a business or industrial park “modern” or “innovative” in today terminology are the features and amenities offered to tenants, which often includes access to university resources but not necessarily close proximity to a university.

This section provides a look at newly built modern parks and older, established parks renovated to attract innovative tenants and the amenities being created to attract tenants. Table 6 contains brief profiles of some of the more progressive innovation parks across the U.S. As the City of Benicia considers expanding and making upgrades to the BIP, some of the features described here may be incorporated.⁵

[Innovation parks] are developing... where underutilized areas (particularly older industrial areas) are being re-imagined and remade.

from *The Rise of Innovation Districts*

5.A. Traditional Industrial Parks

A traditional industrial park is generally a designated area, built away from the city-center, zoned for industrial uses (as opposed to residential, commercial or even business office park). Industrial zoning is generally for a group of industries and businesses, typically light or heavy manufacturing converting, fabricating, or assembling materials into products for distribution. An industrial park will often have a dominant cluster of industries, such as oil refineries, ports, warehouses, distribution centers, chemical plants, plastics manufacturers, food and beverage processors, aviation, automobile manufacturers, steel manufacturers, metal fabricators and advance product manufacturing. Because of the nature of the conversion of raw material to finished product these industries provide the highest economic impact to a community.

Industrial parks typically are large areas with heavy and/or light manufacturing, warehousing and flex space; they are configured to accommodate truck turning radius, easy highway access and a network of transportation modes, as noted in Figure 7.

Some industrial parks transition at their outer boundaries to more light manufacturing and office parks, typically noted by landscaping designs.

⁵ Appendix C: *The Rise of Innovation Districts: A New Geography of Innovation in America*. Appendix D: *Corporate Office Perspectives*.

Figure 8 – Industrial Park Building Types

	Building Type					
	Manufacturing	Warehouse			Flex	
			Distribution			
Primary Type	General Purpose	General Purpose Warehouse	General Purpose Distribution	Truck Terminal	General Purpose Flex	Service Center Showroom
Primary Use	Manufacturing	Storage Distribution	Distribution	Truck Trans-shipment	R&D, Storage, Office, Lab, Light Mfg, High-tech, Data/Call Center	Retail Showroom Storage
Sub-Sets	Heavy, Light Manufacturing	Bulk Warehouse, Cold Storage, Freezer Storage, High Cube	Overnight Delivery Services, Air Cargo	Heavy, Light Manufacturing		
Size(SF)	Any	Any	Any	Any	Any	Any
Clear Height (ft)	10+	16+	16+	12-16	10-24	Any
Loading Docks/Doors	Yes	Yes	Yes	Cross-dock	Yes	Yes
Door-to-SF Ratio	Varies	1:5k-15k	1:3k-10k	1:500-5k	1:15k+	1:10k
Office Percentage	<20%	<15%	<20%	<10%	30-100%	30+%
Vehicle Parking Ratio	Varies	Low	Low	Varies	High	High
Truck Turning Radius (ft)	130	130	120-130	130	110	110

NOTE: This matrix is intended to be an aid in classifying properties between the principal industrial building types, subject to the following considerations:

- These are intended to be TYPICAL characteristics of different properties, actual characteristics may vary.
- In classifying properties, the user should select the classification which most closely fits a given property.
- The most important characteristics of each type are highlighted. While these characteristics are not “acid tests,” they should guide the user in most instances.
- Divisibility varies depending on building size and configuration.
- Truck turning radius is an important consideration and varies by building size. Large pure distribution facilities have a turning radius of 130 feet; medium to large facilities are 120 feet; and smaller facilities are typically 110 feet.

Manufacturing

A facility used for the conversion, fabrication and/or assembly of raw or partly wrought materials into products/goods.

Warehouse

A facility primarily used for the storage and/or distribution of materials, goods and merchandise.

Flex

An industrial building designed to allow its occupants flexibility of alternative uses of the space, usually in an industrial park setting.

Truck Turning Radius

The tightest turn a truck can make depending on several variables of truck configuration, trailer size and location of adjacent objects that obstruct the inner turn radius.

Source: North American Office & Industrial Market (NAIOP) Terms and Definitions, 2012

5.B. Innovation Parks, Centers, and Districts

Why look at Innovation Park Trends?

In addition to the profiles on the competitor parks in the region, and to help the City as it considers the short- and long-term actions it may take regarding improving the marketability of the BIP, additional research was conducted on the latest buzz “innovation parks, centers and districts” that is happening across the nation. The following information presents a summary description of what innovation parks are, amenities typically associated with these districts and design features. Profiles of new innovation parks, redevelopment and retrofits are summarized in Table 6. It is a trend to be watched as it relates to the large regional market trends around Benicia to help shape and meet future demands.

Innovation Park Definition

Innovation parks are built on open systems, tenants may be from disparate sectors and specializations, although there is often a focus on specific types of technology e.g. IT, software development, life sciences, medical, etc. The open systems help to facilitate industry collaboration and knowledge-sharing. A partnership with a university or R&D center is often a feature but not always as some can be renovation of older industrial parks to cool spaces desired by the market (both companies and talent).

Design

With respect to design new developments are introducing sustainable elements, such as clerestory windows and skylights to bring in daylight and efficient building systems. New distribution space features minimum ceiling heights of 30 to 32 feet, dock-high doors (elevated four feet above the truck court surface) and as many doors as the building can accommodate. They also feature large paved areas for parking and maneuvering trucks. These features are designed to expedite the movement of goods. The shift in providing more space for trucks translates into a smaller building footprint.

Physical attributes of an innovation park include: 1) an emphasis on sustainability in building design and materials, energy efficiencies, landscaping, etc.; 2) pedestrian-friendly amenities, close to downtown, housing, transportation centers, e.g. airports, interstates, rail, public transportation; and 3) public spaces for community e.g. meeting rooms, parks, walking/biking trails, etc.

The innovation parks researched for the Benicia Market Study range from 5 to 60,000 acres. Commonly, the parks are +/-200 acres. There is typically a variety of spaces (land and buildings) to accommodate start-ups, small, growing, and mature companies. Buildings are designed with open and shared work spaces, conference rooms, food courts, food trucks, and outdoor spaces. These open systems facilitate collaboration on technologies and/or product development and allow smaller companies to conduct R&D without large capital investment.

Table 6 Profiles of Established Innovation Parks

<p>Sacramento Center for Innovation Specific Plan⁶</p>	<ul style="list-style-type: none"> ▪ In December 2013, the City of Sacramento passed a Specific Plan for the Sacramento Center for Innovation. The City plans to develop 240 acres southwest of the Highway 50 and Howe Avenue intersection; east of downtown and southeast of CSU Sacramento. Nearby is Sacramento Municipal Utility District (SMUD), the Sacramento Area Regional Technology Alliance (SARTA) and UC Davis Medical Center. The planned industry focus is on clean energy, green technology, and bio-medical.
<p>City of Davis</p>	<ul style="list-style-type: none"> ▪ The City of Davis is also exploring the feasibility of developing an innovation park. Studies and background research are available on the city website.⁷
<p>Gwinnett Innovation Park (Norcross, GA) www.gwinnettinnovationpark.com City Population 16,131</p>	<ul style="list-style-type: none"> ▪ Five buildings, 150,000 square feet, flexible lease terms, furnished offices, manufacturing and warehouse space, eight presentation-ready conference rooms, on-site telecom switch and fiber-optic T1 lines, central mail service, business advisors ▪ Amenities: three kitchens, snack bars, free parking, 24-hour secure access; and special events for tenants e.g. CEO roundtables, professional development seminars ▪ Partners and Resources: Intelligent Systems Corporation (sponsor); access to network of attorneys, HR specialists, accountants, financing specialists; presentation planning and feedback ▪ Tenants: software and IT, data storage and analysis
<p>Innovation Park (Oro Valley, AZ) www.innovationparkaz.com City Population 41,600</p>	<ul style="list-style-type: none"> ▪ 565 acres master planned, +/-190 acres for sale, land parcels up to 35 acres, 2.5 million square feet at build-out ▪ Amenities: park and open space, trails and pathways, state park ▪ Partners and Resources: University of Arizona, Arizona Biosphere 2 research complex, University of Arizona Bio5 Institute, Venture West (developer), CBRE ▪ Tenants: pharmaceutical companies, life sciences, medical equipment
<p>Iowa State University Research Park (Ames, IA) www.isupark.org City Population: 61,000</p>	<ul style="list-style-type: none"> ▪ 400 acres, 500,000 square feet of building space, single and multi-tenant buildings from 500 to 21,000 square feet, 8,000 square foot wet-lab, technology incubator ▪ Amenities: running and bike trails, cafeteria, fitness center, public transportation via hybrid buses, solar panel charging stations ▪ Partners and Resources: Iowa State University, Iowa USDA, ISU veterinary program, Pappajohn Center for Entrepreneurship, Small Business Development Center, Nutrition and Wellness Research Center (facilities for human clinical studies), Iowa Start Up Alliance ▪ Tenants: bio-science and bio-technology, ag-related research and commercialization, software development, genetic engineering, medical imaging, data collection technologies, advanced analytical instruments

⁶ <http://portal.cityofsacramento.org/Community-Development/Planning/Long-Range/Specific%20Plans>

⁷ <http://city-council.cityofdavis.org/on-going-committees/innovation-park-task-force/innovation-park-task-force-background-reference-documents>

Table 6 Profiles of Established Innovation Parks

<p>Notre Dame Innovation Park (South Bend, IN) www.innovationparknd.com City Population: 100,900</p>	<ul style="list-style-type: none"> ▪ 12 acres, 55,000 square feet, private offices, shared collaboration space, conference rooms, printing services, wet and dry labs, access to mass spectrometry testing and analysis ▪ Amenities: dark fiber broadband, café, game tables, furnished balcony and patio, catering kitchen, walking distance to Eddy Street Commons ▪ Partners and Resources: University of Notre Dame, Mendoza College of Business, accounting and financial consulting, HR services, law firms ▪ Tenants: multidisciplinary environmental research, sterilization technologies, software and IT, data analytics, healthcare research, pharmaceuticals
<p>Innovation Village at Cal Poly (Pomona, CA) www.innovationvillage.org City Population: 151,000</p>	<ul style="list-style-type: none"> ▪ 65 acres, 1,000 to 10,000 square foot buildings, R&D, light manufacturing, wet labs ▪ Amenities: shared conference rooms, university library, dining and lodging facilities, fitness center, pedestrian trails, outdoor seating ▪ Partners and Resources: Cal Poly University, Center for Training Technology & Incubation, NASA Commercialization Center ▪ Tenants: health technology, biomedical, aerospace, electronics, education, architects, engineering
<p>Innovation Park at Penn State (University Park, PA) www.innovationpark.psu.edu County Population: 155,000</p>	<ul style="list-style-type: none"> ▪ 118 acres, single and multi-tenant facilities, 1,000 to 75,000 square foot buildings, flex space, build to suit ▪ Amenities: special lunch delivery services to park employees, on-site casual and fine dining restaurants, child care, presentation center, labs, conference rooms, fitness center, professional development programs, free bus service, social and networking events for tenants ▪ Partners and Resources: Penn State, Center County Industrial Development Corporation Incubator Program, Penn State Small Business Development Center, mentoring, funding ▪ Tenants: software, IT, Penn State, advanced materials, R&D, biotechnology, communications, engineering, financial, lodging, law

Table 6 Profiles of Established Innovation Parks

<p>Innovation Park of Tallahassee (Tallahassee, FL) City Population: 186,000</p>	<ul style="list-style-type: none"> ▪ 208 acres, research and manufacturing firms ▪ Amenities: furnished and unfurnished office suites, short and long-term leases, shared conference room and kitchen, Farmers’ Market, different food trucks serve the park each day ▪ Events: roundtable discussions, open houses, seminars, conferences focused on student population ▪ Managed by Leon County Research and Development Authority which is governed by a nine-member Board of Governors appointed by county, city, universities, and college ▪ Partners and Resources: Florida State University, Florida A&M University, Tallahassee Community College, Economic Development Council of Tallahassee/Leon County, Small Business Development Center, Centers of Excellence, Florida Institute for Commercialization, and more ▪ Tenants: advanced aero propulsion lab, biotechnology, fuel cell technology, advanced protection materials and armored vehicles
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Offices at Gwinnett Innovation Park are furnished with modular (flexible) work stations



Shared kitchen facilities at Gwinnet Innovation Park



Conference facilities at Notre Dame Innovation Park



Many new business parks provides tenants and employees with an on-site fitness center

6. Market Findings, Opportunities and Recommended Actions

6.A. Market Analysis Findings

- Businesses in the BIP have, or are beginning to recover from the recession. When asked about their company's recovery from the economy, the majority of tenants interviewed are maintaining or slowly recovering. A few are starting to see some growth.
- BIP's lease rates are attractive relative to the market area.
- Over the past two years vacancy rates have declined, rents are increasing, and new construction is underway including speculative space of approximately 2.9 million square feet.
- The City is experiencing declining sales tax revenue.

Benicia Industrial Park Considered Built-Out

- 99% of all industrial space in the City of Benicia is in the BIP.
- Currently there are only 23 acres of undeveloped space in the BIP; the largest vacant parcel is under 10 acres.
- Approximately 925,000 square feet of building space in the BIP is vacant and available, however nearly half of the vacancies are concentrated in just three buildings.
- Because the vacancies are concentrated in a few buildings and there is little undeveloped space, leasing brokers perceive the BIP to have a low vacancy rate. This perceived built-out condition is a key constraint for the BIP.
- Most of the BIP tenants interviewed are on short-term leases (three to four years). Fortunately they prefer to stay in the BIP but if their growth cannot be accommodated, they may be forced to look elsewhere.
- Some BIP tenants already have facilities outside of the BIP because product was not available (offices, warehouse, and production). They would prefer to consolidate under one roof and stay in the BIP. Again, the challenge is in accommodating a consolidation and company expansions with the limited building and land inventory.
- Brokers' general opinion is that there is a shortage of true industrial parks serving light and heavy industrial tenants. They appreciate that the BIP does not try to be everything to everyone. It serves the industrial and warehouse market well and should continue to do so.

Demand

- The trend of locating distribution facilities close to population centers and transportation hubs is driving much of the demand throughout the entire Bay Area. The goal is to expedite the delivery of merchandise.
- The Bay Area and Napa's wine industries have a growing demand for large warehouse space. Much of this demand is driven by food and beverage companies and is expected to continue to increase.
- There is a severe shortage of physically usable manufacturing space particularly in the Oakland area, much of the space is bordering on obsolescence.

Vacancies and Lease Rates

- Solano County — overall vacancy is approximately 8.6% and lease rates are attractive relative to the market area.
- Napa County — overall vacancy is approximately 5%, the lowest submarket within the market area; asking rents are the highest of any submarket within the market area.
- Highway 4 — light industrial has a vacancy rate of only 5.5%; the warehouse market is struggling with a vacancy rate over 19%; lease rates are the second highest in the market area.
- Richmond — warehouse market is doing well, current vacancy rate is 3% and lease rates are at \$0.50/SF; light industrial sector is expected to lag behind warehousing because existing space is older and obsolete.
- Oakland — there is a severe shortage of physically usable manufacturing space, much of the space is bordering on obsolescence.

Advantages and Potential Opportunities

- BIP's average asking rent for industrial space is approximately \$.64 per square foot compared with \$.80 per square foot for industrial space along Highway 4—a significant marketing advantage.
- If the BIP had sufficient land to accommodate new investment, it would be well-positioned to take advantage of the tight real estate market, particular in Oakland where there is demand for new large warehouse and distribution buildings.

Benicia Industrial Park's Competitive Position

Competitive Advantages	Related Challenges
<p>MARKET ► The market is expected to remain strong; BIP tenants reported growth and anticipate expanding. Declining vacancy rates and increasing rents in tight markets (e.g. Oakland) will open up opportunities for the BIP.</p>	<p>There is approximately 3 million square feet of new competition planned to come onto the market. Spec building is occurring for the first time in many years. Without additional land and building inventory, BIP will not be positioned to act on the market opportunities.</p>
<p>IMAGE ► The BIP has a strong image of a true industrial park with generally marketable building stock; brokers do not perceive physical obsolescence as being a significant weakness.</p>	<p>BIP is perceived by brokers to be built-out because of the limited building inventory and lack of land to accommodate new development and expansion of existing businesses.</p>
<p>COST ► Lease rates are attractive relative to the market area.</p>	<p>The infrastructure improvements needed along with the limited inventory could cause new or expanding businesses to look elsewhere regardless of the cost advantage.</p>
<p>INDUSTRY ► The BIP has historically served the wine industry well with bottling, warehousing and distribution operations.</p> <p>The manufacturers currently located in the BIP consider the park and its location favorably and would like to remain.</p>	<p>Fairfield is currently better-positioned to capture the wine industry's increasing demand. The Highway 12 widening project improves transportation between the wine country and Fairfield. New and planned parks have / will have good infrastructure and sufficient land to accommodate new development.</p>
<p>LOCATION ► Location was the most-mentioned reason for current tenant's choice of the BIP. It is convenient for employees, vendors, accessing a large labor market, customers, highways and other transportation facilities.</p>	<p>The BIP is at-risk of losing quality tenants, jobs and sales tax revenue if there is no inventory or room for new investment to accommodate expansions.</p>
<p>DEMAND ► There is demand for new industrial and warehouse distribution buildings, the type of operations that BIP has typically served well. Expanding companies that cannot be accommodated, particularly in Oakland, represent an opportunity for the BIP.</p>	<p>The competition is increasing, new construction is underway and more is planned. The BIP will be positioned to capture opportunities only when there is sufficient land to accommodate new investment.</p>

6.B. Primary Challenges

The City of Benicia is faced with four primary challenges to ensuring the BIP can remain competitive in the marketplace and be a viable revenue-generator for the City. These challenges may force new or expanding businesses to look to the newer industrial parks in the region as they would be able to maintain their current employees and have equivalent market access in these other parks; but it will result in a loss of jobs and sales tax-revenue to the City of Benicia.

- Limitations in serving expanding existing businesses and attracting new industries without redeveloping existing areas, retrofitting existing buildings to modern uses or adding additional land
- Small inventory of vacant buildings and what does exist is primarily suitable for warehousing only;
- Aging infrastructure, particularly the condition of streets, traffic circulation, lack of modern communication infrastructure; and
- Increasing competition in the regional market from new parks planned and under development, approximately three million square feet of new development.

Without redevelopment, building retrofits and/or additional land to accommodate expanding tenants and new business investment, the BIP is at risk of losing quality tenants and being viewed as an obsolete park attractive only for warehousing, non- or minimal tax-revenue generating businesses.

6.C. Short-Term Market Opportunity Recommendations

Short-term actions (two to five years) should focus on: 1) existing tenants with growth potential who will need additional space to accommodate their growth and those tenants with short-term leases over the next two to three years; 2) continuing to aggressively address major infrastructure issues; and 3) aligning potential light manufacturing businesses to existing vacant facilities and implementing focused business attraction campaign (assuming facilities can accommodate uses). Short-term proposed actions are outlined below:

1. Increase business retention/expansion meetings (BREP) and communications with BIP tenants, particularly those identified that will need expansion/consolidation space.
2. Package and deliver to BIP businesses the services and potential incentives the City can bring to assist expanding businesses, such as, financing for equipment or real

Given current market challenges, what can the City do now, in the short-term?

- Aggressive BRE program
- Package incentives and assistance
- Identify vacant facilities to market as well as identify potential redevelopment and retrofit building opportunities
- Target marketing by geography and industrial uses
- Target small manufacturers, capital intensive users

estate; tax credit application(s); workforce training; utility rates; and potential self-reporting tax sharing agreements.

3. The BIP has long term challenges (infrastructure) that are of concern to some businesses, show how those challenges are being addressed with projected timelines.
4. Review and monitor existing use tax agreements with businesses and also determine if there are additional companies in Benicia that make significant purchases of equipment or material. There are incentives used by other cities, Business Cooperation Programs, to encourage businesses to participate in self-reporting of use tax which would increase revenue to the City and also be beneficial to the company.
5. Coordinate with Solano EDC to increase discussions with brokers, local and regional, on potential target users for vacant spaces, preferably optimal users that will benefit the City.
6. Along with above, discuss, review and identify with brokers areas that might be prime for redevelopment and/or buildings that need to be retrofitted or adaptive reuse to attract the right users. Redevelopment of an area (site, block or multiple blocks) and/or building retrofitting will require further analysis for economic and financial feasibility but are good options to consider when land is constrained. The identification of potential sites or buildings would only be the first step.
7. Target marketing should be very focused campaigns, marketing the existing product (land and buildings) to industrial clients in inner Bay Area locations of Oakland and San Francisco where there currently are tight markets for manufacturers (industrial) who may be feeling forced out of current locations or in need of a more cost effective location. Prior to marketing, research on manufacturers who align with the land/building configurations will need to be done. This effort should be coordinated with Solano EDC and local brokers. The sMaps website, provide with this analysis, will be a great marketing tool for the existing real estate product.
8. Continue to aggressively negotiate for high-speed broadband access.
9. Both the Port and the Arsenal area provide opportunities for niche marketing to specific types of businesses, i.e., the Port specializes in bulk products and motor vehicles and is uniquely situated for distribution. Given the niche markets the Port serves, working with the Port to identify potential users and its own competitiveness with other Ports could lead to a focused marketing effort. The Arsenal could accommodate smaller manufacturing and art-related users, as with the Port it would require a separate focused marketing effort but may not attract tax-revenue generating type companies.

Redevelopment: the act or process of redeveloping a blighted or obsolete area.

Retrofit: involves functional renovation and substantial change to modernizing an existing building.

6.D. Long-Term Market Opportunity Recommended Strategies

The ultimate remedy to the space challenge and new competition in the region is to expand the BIP which would call for continued major infrastructure upgrades to make the BIP competitive to new product coming on line and identify land and buildings (areas for redevelopment, building retrofits or new vacant land) to accommodate new development.

This will be a long-term and time consuming effort to strengthen the BIP's marketability and competitiveness to maintain its identity as a premier industrial park with unique location attributes, and ability to continue to be a dominant player in the marketplace.

1. Identify potential funding sources to continual invest in and improve the infrastructure of the BIP, this would demonstrate the City's commitment to the BIP and existing businesses. Look at these and other financing tools under consideration at the State.
 - Infrastructure Financing District (IFD)
 - Community Facilities District (CFD)
 - Business Improvement District (BID)
2. Develop, as part of communication message to businesses and brokers, infrastructure improvement plan with specific project improvement timelines (streets, drainage, traffic flow, and broadband) when projected to be funded, when project is started and report on progress.
3. As noted, the major long-term challenge for the BIP is land for expansion. Although land is identified as expansion land for the park it is being considered for other uses. Consider a Phase II Analysis which would assess and evaluate:
 - Feasibility of redeveloping areas and building retrofits identified in short-term actions;
 - Opportunities for additional buildable acreage that could be added to the park;
 - Infrastructure improvements that would be necessary to make it ready for new development;
 - Viability of developing any remaining vacant properties within the BIP;
 - Type of development that will attract tax-revenue generating businesses, aligned with real estate product and existing industry mix, and market opportunity;
 - The applicability of public and private sources of financing.

What are the long-term strategies the City could execute?

- Invest in infrastructure that maintains the competitiveness of the BIP to newer, emerging real estate products in the region.
- Consider Phase II Analysis to identify feasibility for park expansion.
- Identify funding sources to continuously improve BIP.
- If BIP can achieve redevelopment, land expansion and/or building retrofits, an attraction campaign could potentially target emerging, tech and advance manufacturing to diversify BIP industry mix.

4. If and when the BIP is improved with expansion land and buildings shovel-ready, an aggressive business attraction campaign targeting mix of emerging industrial innovation, tech and advanced industrial tenants (to be review at that point in time with alignment of targets to land and buildings) should be implemented. The priority would be to continue to serve expanding existing tenants and increase business-to-business sales tax revenue. As a long-term strategy, this should be coordinated with existing marketing and business attraction efforts of the Solano EDC.

6.E. Conclusion

As noted throughout this report, without more land, redeveloped land, or retrofitted buildings that will enable current BPI businesses to expand and/or attract advanced industrial businesses, the BIP will fall behind the competition, become known as an obsolete park attractive to only warehouse-type or non-minimal tax-revenue generating businesses.

7. Appendix

Appendices are under separate cover.

- A. Detailed property and vacant building inventory, Benicia Industrial Park
- B. Individual and summary responses to business interviews
- C. Article: *The Rise of Innovation Districts: A New Geography of Innovation in America* by Bruce Katz and Julie Wagner, May 2014; Metropolitan Policy Program at Brookings
- D. Colliers International newsletter, August 2014: *Corporate Office Perspectives*, Jeffrey Weil
- E. Market Trends Data Tables and Charts
- F. Financing Options

About the Consultants



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Chabin's Project Teams delivery strategic solutions, tactics and tools.

Table 3
Undeveloped Land
Benicia Industrial Park

<u>Building Address</u>	<u>Acreage</u>	<u>Asking Price</u>	<u>\$ PSF Land</u>
4563 E 2nd St	1.72		
106 Channel Rd	0.99		
Highway 680 @ Goodyear Road	4.50	\$1,500,000	\$7.65
Industrial Way	0.62		
273 Industrial Way	9.90		
500 Industrial Way	0.62		
3651 Park Rd	3.01		
665 Stone Rd	1.94		
Total Undeveloped Acreage	23.30		

Source: CoStar

Benicia Industrial Park Business Interview Summary (7-24-14)

1. How is the company doing compared to a year or two ago; growing or declining?

Summary: majority are doing OK, maintaining, recovering; a few are starting to grow; a couple are not yet recovering

- Holding our own and starting to move forward
- Maintaining
- About same
- We're doing well
- Better
- We're doing great
- Growing
- About the same as last year. Some return to previous levels anticipated by Q4 2014
- Barely hanging in there
- Compared to a couple of years ago, we're doing well
- Recession killed us and we're emotionally damaged
- Around the same level as per downturn

2. Is your company experiencing growth as the economy is turning around

Even split between growing and maintaining

- Yes – but it's been very rough the past few years.
- Holding our own and growing – we have 16 locations throughout the US
- Yes
- Holding our own
- About the same
- Improving with the residential construction market
- No significant growth at present
- 15 to 20% growth
- Maintaining
- Growth of 20%

3. How long has your business been located in the Benicia Industrial Park?

Average: 22 years / Range: 3 to 42 years

- Three different locations since 1975
- 16 yrs; moved from Emeryville; Did an employee distribution study and the BIP was more central and workable for employees; BIP was roomy; buffer between neighbors; they would have like to pick up two adjoining pieces of properties but not able; so they built on the one they are on.

4. About how old is your facility in the Benicia Industrial Park?

Average: 40 years / Range: 10 to 75 years

- 31 years and we've expanded a number of times since with the latest building about 10 years ago
- 1940's – the original building. We've expanded and now are in 9 different buildings and we'd really like to be in just one building
- WWII era
- About 23 years; some older, some newer
- Moved several time within the BIP

5. Do you have other facilities outside of the Park?

About half do.

- South SF
- Affiliates in Texas and Louisiana
- 16 locations
- Storage facility in Pittsburg that we'd like to move closer
- One small office in LA
- 400 locations worldwide
- Warehouse in Benicia
- Sparks, NV 62,000 SF, 30 employees; primarily manufacturing; since 1979; 1 Mile south just outside the BIP (beyond the golf cart) leasing about 700 SF for prototype shop
- Another warehouse in the Benicia Armory
- Orange, CA
- Alameda and Vernon, CA

Benicia Industrial Park Business Interview Summary (7-24-14)

6. Functions occurring at this facility? i.e. manufacturing, distribution

Primarily manufacturing; then warehouse, distribution and sales; trucking, engineering, testing and prototype

- Sell industrial hoses and rubber parts
- Fabrication of steel building components for our own projects. We are a construction industry subcontractor
- Industrial rotating equipment repair (pumps, turbines)
- Auto parts distributor
- Custom fabrication
- Heavy steel fabrication and machine shop
- Testing
- Guitar supplies
- Plastic and rubber
- Distributor of pipe valves and fittings
- Hazardous waste and industrial cleaning
- Mfg proprietary conveyor components
- Primarily engineering, purchasing, admin
- Pipe supports, seismic bracing, pumps, gas transmission repair and parts
- Pipe organs for concert halls
- Commercial contractor
- Distributor for re-bar support
- Industrial sales, assembly, and service
- Glass glazing for residential market (windows, doors, shower, etc). Supplier and install, no manufacturing

7. What % capacity are you at the facility, i.e., 75%

About half could use more space now or in the future, this includes those who are at 100% but don't need additional space right now. A few are in multiple buildings and would prefer to consolidate;

- Comfortable...just expanded
- Approximately 60 percent
- Maxed out but don't need additional space
- Have room to expand
- Maxed out, interested in expanding if possible
- We're in 9 buildings, would like to be in just one
- Using 40,000 sf; excess space available
- We have enough room, but could use more
- 100% but we picked up other space in the Park
- Okay for the next 5 years
- We could use more physical space

8. Do you own or lease your facility?

9 lease, 10 own

- Lease, but we'd like to buy the building
- Own (except lease one of the nine)
- Rent month to month

9. If lease, how long is left on your lease?

All are short term. 3-4 years

- Open-ended; month/month
- Until 2017

10. At the end of your lease would you be looking to renew your lease, look for larger or to own a building, in Benicia or outside the area?

A couple are or will definitely start looking outside Benicia.

- Would like to buy a 10,000 to 20,000 sq. ft. building here but there are none available. BIP has a lot of very large buildings and very small condo type buildings
- Looking now because building is in such disrepair and landlord (Bayshore Associates) will not make repairs. Roof leaks, building settles and floors cracked, etc. We've tried to work with the building owner and have also talked with City, but so far, no resolution

Benicia Industrial Park Business Interview Summary (7-24-14)

11. What type of space would you need? (manufacturing? warehouse? etc)	
Primarily manufacturing, warehousing.	
<ul style="list-style-type: none"> In 5 years will need more space and we'll keep an eye out to buy the remaining condos in our facility. More office/warehouse 	
12. If own, does your current facility continue to fit your needs?	
Yes	
13. Planning to stay in the existing facility?	
Primarily Yes	
<ul style="list-style-type: none"> for the time being No...we'll move in 2017 unless the building gets renovated Yes; when we need to expand would like to stay as close as possible 	
14. Is there a critical reason for you to be located at the Industrial Park?	
Only a couple indicated customers as "critical" reason to be at BIP. Many said the location is important because it is convenient for their employees or for employee draw, access to highways, etc. How truly critical those reasons would be when an expansion decision needs to be made?	
<ul style="list-style-type: none"> Yes...our customers want us close (Valero and other refineries in the area) Location - for both employees and customers. Our biggest customers are the 5 refineries in the Bay Area Location for employees. It would be hard to move At the time it was affordable. Much more expensive now. For example, the bridge toll was .35 cents, now \$5:00 Good location for our employees and customers (utilities and refineries). However, if we have to we'll move and all it will do is add 10 to 15 minutes drive time for our employees and drivers - we can live with that Perfect location with access to the Freeways Proximity to customers (refineries, terminals) Just employee draw. Raw materials are sourced globally; customer market: 75% US Defense Dept; Navy, aircraft-related; 25% oil & gas export Abundant space at good value. Proximity to our bay area jobsites, and to employees' residences Location to Freeways and customers. Also inexpensive and other small businesses in the building. We all look after each other. It's like a community within a community Yes...attitude of the city is very business friendly and I hope it stays that way. We came from downtown SF, which was not business friendly because I live in Benicia Easy access to 680 	
15. What do you like about the Benicia Industrial Park? Location?	
Location, location, location	
<ul style="list-style-type: none"> Location: proximity to customers, convenient for employees, distribution of products, vendors are located here, easy to get to Initially availability and cost of property and buildings Safe and affordable, given other possible locations Good services and freeway access City does good job. City helped them with IRB, enabled them to build more building for same \$ Nothing special Nothing I like about it...or dislike about it Overhead cranes - unique, don't find that often 	

Benicia Industrial Park Business Interview Summary (7-24-14)

16. What don't you like about the Benicia Industrial Park?

(1) Internet, phone, and power reliability; (2) Road conditions and traffic; (3) Valero expansion/RR; and (4) crime, poor lighting,

- Seems like there are always problems with the phones. Not reliable
- The empty, run down looking buildings, no pride.
- Really poor Internet service, antiquated power infrastructure, brownouts, back lighting
- Nothing...but heard that some people are not happy with the expansion of Valero and the potential extended delays with more trains
- Rash of break-ins
- The businesses in this park are doing all of the heavy lifting for the city (provide jobs and tax revenue) and we get nothing in return. I'm not talking about landscaping...but real investment in infrastructure in the industrial park
- RR stops we're landlocked, our employees and trucks get trapped waiting
- Poor signage and roads are not well marked and people drive all over the place and park where they want.

17. What improvements would you like to see at the Benicia Industrial Park?

same as above.

18. What types of business would be appropriate to locate in existing empty buildings?

- Sand blasting and coating company
- Raw material suppliers (alloy bars, stainless steel)
- Steel supplier, currently get our steel from Sacramento
- Most of our suppliers are already located here
- Truck repair – diesel; truck and trailer washing
- The Deli is good but only restaurant. Would like to see something more appropriate for taking guests; have to go into town or across freeway
- We have what we need here in terms of other suppliers and vendors

19. Any other comments

- We're pretty happy here
- We have looked at other locations like Mare Island, however the buildings were good but the access is terrible
- The park is good, "Benicia is not good for us."
- Customers are all over the world...not local
- Still angry with city for putting a big electronic sign right in front of building without notifying
- Seems like city is trying to help, but also appears that some departments are a bit nit-picky. We'd like to put up a larger awning...but have to get a permit? Also, so many issues with annual fire inspection that seems a bit over the top

The Rise of Innovation Districts: A New Geography of Innovation in America

Bruce Katz and Julie Wagner

Introducing Innovation Districts

As the United States slowly emerges from the Great Recession, a remarkable shift is occurring in the spatial geography of innovation.

For the past 50 years, the landscape of innovation has been dominated by places like Silicon Valley—suburban corridors of spatially isolated corporate campuses, accessible only by car, with little emphasis on the quality of life or on integrating work, housing, and recreation.

A new complementary urban model is now emerging, giving rise to what we and others are calling “innovation districts.” These districts, by our definition, are geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators.¹ They are also physically compact, transit-accessible, and technically-wired and offer mixed-use housing, office, and retail.

Innovation districts are the manifestation of mega-trends altering the location preferences of people and firms and, in the process, re-conceiving the very link between economy shaping, place making and social networking.²

In recent years, a rising number of innovative firms and talented workers are choosing to congregate and co-locate in compact, amenity-rich enclaves in the cores of central cities. Rather than building on green-field sites, marquee companies in knowledge-intensive sectors are locating key facilities close to other firms, research labs, and universities so that they can share ideas and practice “open innovation.”

Instead of inventing on their own in real or metaphorical garages, an array of entrepreneurs are starting their companies in collaborative spaces, where they can mingle with other entrepreneurs and have efficient access to everything from legal advice to sophisticated lab equipment. Rather than submitting to long commutes and daily congestion, a growing share of metropolitan residents are choosing to work and live in places that are walkable, bike-able, and connected by transit and technology.

Led by an eclectic group of institutions and leaders, innovation districts are emerging in dozens of cities and metropolitan areas in the United States and abroad and already reflect distinctive typologies and levels of formal planning. Globally, Barcelona, Berlin, London, Medellin, Montreal, Seoul, Stockholm and Toronto contain examples of evolving districts. In the United States, districts are emerging near anchor institutions in the downtowns and midtowns of cities like Atlanta, Baltimore, Buffalo, Cambridge, Cleveland, Detroit, Houston, Philadelphia, Pittsburgh, St. Louis, and San Diego. They are developing in Boston, Brooklyn, Chicago, Portland, Providence, San Francisco and Seattle where underutilized areas (particularly older industrial areas) are being re-imagined and remade. Still others are taking shape in the transformation of traditional exurban science parks like Research Triangle Park in Raleigh-Durham, which are scrambling to meet demand for more urbanized, vibrant work and living environments.

Innovation districts represent a radical departure from traditional economic development. Unlike customary urban revitalization efforts that have emphasized the commercial aspects of development (e.g., housing, retail, sports stadiums), innovation districts help their city and metropolis move up the value chain of global competitiveness by growing the firms, networks, and traded sectors that drive

“The trend is to nurture living, breathing communities rather than sterile compounds of research silos.”

broad-based prosperity. Instead of building isolated science parks, innovation districts focus extensively on creating a dynamic physical realm that strengthens proximity and knowledge spillovers. Rather than focus on discrete industries, innovation districts represent an intentional effort to create new products, technologies and market solutions through the convergence of disparate sectors and specializations (e.g., information technology and bioscience, energy, or education).

Innovation districts are still an early trend that, because of their multi-dimensional nature, has yet to receive a systematic analysis across the United States and other countries. Yet we believe that they have the unique potential during this pivotal post-recession period to spur productive, inclusive, and sustainable economic development.

Innovation districts help address three of the main challenges of our time: sluggish growth, national austerity and local fiscal challenges, rising social inequality, and extensive sprawl and continued environmental degradation.

They do so by providing a strong foundation for the commercialization of ideas and the creation and expansion of firms and jobs via proximity and collaboration. They are a vehicle for both revenue growth as well as the more efficient use of existing infrastructure. They offer the prospect of expanding employment and educational opportunities for disadvantaged populations given that many districts are close to low- and moderate-income neighborhoods. And, at a time of inefficient land use, they present the potential for denser residential and employment patterns, the leveraging of mass transit, and the repopulation of urban cores.

The purpose of this paper is to capture this emerging trend, explore the large forces and local practices and practitioners that are driving it and provide initial guidance to U.S. city and metropolitan leaders on how best to recognize and extend the growth of their own innovation districts, building on the distinctive assets and potential of their economies.

The next section of this paper defines innovation districts and offers a typology of places where they are developing. Section III then explains why they matter (namely their role in addressing a range of economic, social and environmental challenges our country now faces) while Section IV describes the profound market, demographic, technological, and cultural forces that are propelling this new spatial geography of innovation. Sections V and VI analyze the multiple assets of innovation districts, and provide real-world guidance and insights for cities trying to start or extend this model in their own communities. The paper concludes by exploring the implications of the innovation district trend for large private companies and institutional investors, federal and state government, and the broader field of urban practitioners.

Defining Districts

Innovation districts constitute the ultimate mash up of entrepreneurs and educational institutions, start-ups and schools, mixed-use development and medical innovations, bike-sharing and bankable investments—all connected by transit, powered by clean energy, wired for digital technology, and fueled by caffeine.

They embrace those very attributes of urbanism—what Saskia Sassen calls “cityness”—that were denigrated and often destroyed in the 20th century: complexity, density, diversity of people and cultures, and a layering of the old and the new. As Business Week observed in June 2009, “The trend is to nurture living, breathing communities rather than sterile remote, compounds of research silos.”³

Given the vast distinctions in regional economies, the form and function of innovation districts differ markedly across the United States. Yet all innovation districts contain *economic, physical, and networking assets*. When these three assets combine with a supportive, risk-taking culture they create an *innovation ecosystem*—a synergistic relationship between people, firms, and place (the physical geography of the district) that facilitates idea generation and accelerates commercialization.⁴

Most innovation districts adhere to one of three general models.⁵

The “anchor plus” model, primarily found in the downtowns and mid-towns of central cities, is where large scale mixed-use development is centered around major anchor institutions and a rich base of related firms, entrepreneurs and spin-off companies involved in the commercialization of innovation. “Anchor plus” is best exemplified by Kendall Square in Cambridge (and the explosion of growth around

Innovation is when new or improved ideas, products, services, technologies, or processes create new market demand or cutting-edge solutions to economic, social and environmental challenges.

MIT and other nearby institutions like Mass General Hospital), Philadelphia's University City (anchored by The University of Pennsylvania, Drexel University and the University City Science Center), and St. Louis (flanked by Washington University, Saint Louis University, and Barnes Jewish Hospital). Other emerging districts can be found in the Greater Oakland neighborhood of Pittsburgh (around Carnegie Mellon University and the University of Pittsburgh Medical Center), Midtown Atlanta (around Georgia Tech University), downtown and midtown Detroit (around Quicken Loans, the Henry Ford Health System and Wayne State University) and the Texas Medical Center in Houston, Texas.

The "re-imagined urban areas" model, often found near or along historic waterfronts, is where industrial or warehouse districts are undergoing a physical and economic transformation to chart a new path of innovative growth. This change is powered, in part, by transit access, a historic building stock, and their proximity to downtowns in high rent cities, which is then supplemented with advanced research institutions and anchor companies. The model is exemplified by the remarkable regeneration underway in Boston's South Waterfront, San Francisco's Mission Bay, Seattle's South Lake Union area, and the Brooklyn Navy Yard. The ambitious plans for the Cornell-Technion Campus on Roosevelt Island in New York City and Hunters Point in San Francisco also hold great promise. Many of these areas draw from the experiences of 22@Barcelona, a self-proclaimed innovation district that involved the complete re-make of an older industrial area in the city core.⁶

The third model, "urbanized science park," commonly found in suburban and exurban areas, is where traditionally isolated, sprawling areas of innovation are urbanizing through increased density and an infusion of new activities (including retail and restaurants) that are mixed as opposed to separated. North Carolina's Research Triangle Park, perhaps the 20th century's most iconic research and development campus, is the strongest validation of this model. In November, 2012, after several years of review and outreach, RTP announced a new 50-year master plan to urbanize the quintessential exurban science park, recognizing that its isolated car-dependent environment is no longer optimal for spurring innovation and attracting younger talent. The master plan calls for a greater concentration of buildings and amenities, including the creation of a vibrant central district, the addition of up to 1,400 multi-family housing units, retail, and the possible construction of a light rail transit line to connect the park with the larger Raleigh-Durham region, including the universities.⁷ Other science parks actively engaged in urbanization efforts include the University Research Park at the University of Wisconsin-Madison, the University of Virginia Research Park in Charlottesville and the University of Arizona Tech Park in Tucson.⁸

Unlike convention centers or suburban malls, innovation districts are not cookie cutter developments; rather, they leverage distinct economic strengths in each metropolitan area. Districts vary not only by type but also in size, from 200 acres in St. Louis to 1000 acres in Boston. They have different avenues for growth, with some leading with new fields like "tech/information" (including the burgeoning "app economy"), others leading with life sciences (with clear niches in such fields as nano-technology,

WHO DELIVERS INNOVATION DISTRICTS

The list of institutions and individuals that are driving the growth of innovation districts is as varied as the economic composition of districts themselves. The following list provides a sample of the leaders at the vanguard of this trend in the United States and abroad:

- ▶ **Mayors and local governments**, such as former Mayor Tom Menino of Boston, former Mayor Joan Clos of Barcelona, and the Stockholm city government.
- ▶ **Major real estate developers and major land owners**, such as Vulcan Real Estate in Seattle's South Lake Union and the Brooklyn Navy Yard.
- ▶ **Managers of research campuses**, such as the Research Triangle Park Foundation in Research Triangle Park and the Texas Medical Center in Houston.
- ▶ **Anchor companies**, such as Quicken Loans in Detroit, Comcast in Philadelphia, and Amazon in Seattle's South Lake Union.
- ▶ **Advanced research institutions**, such as Washington University in St. Louis, Carnegie Mellon in Pittsburgh, Drexel University in Philadelphia, and MIT in Cambridge.
- ▶ **Advanced medical campuses**, such as the Henry Ford Health System in Detroit and the University of Pittsburgh Medical Center in Pittsburgh.
- ▶ **Philanthropic investors**, such as the New Economy Initiative and the Kresge Foundation in Detroit and the former Danforth Foundation in St. Louis.
- ▶ **Incubators, accelerators, and other economic cultivators**, such as Barcelona Activa in Barcelona, the Cambridge Innovation Center in Cambridge, and the BioGenerator in St. Louis.
- ▶ **Social networking programmers**, such as Venture Café Foundation in Boston and Cambridge and High Tech Campus Eindhoven.

imaging, and robotics), and others still leading with highly creative industries, such as industrial design, media, and architecture. Further, they vary in their urban form and density, the historic presence of transit (one hundred years in the case of Kendall Square, one year in the case of the Texas Medical Center), the presence of housing and retail, and the extent of collaboration with local schools and community organizations. Finally, they are distinctive in their level of geographic and institutional formality, where some, like Boston, are officially designated and branded, while others, like Kendall Square, are growing more organically in response to market forces. This intense variation in innovation districts requires practitioners to assess assets and liabilities with clear-eyed objectivity, so that growth strategies can be realistic and customized.

Why Innovation Districts Matter

Metropolitan areas in the United States and other mature economies face outsized challenges in the aftermath of the Great Recession. At the most basic level, U.S. cities and metropolitan areas need more and better jobs. According to the March 2014 Brookings Metro Monitor, the number of jobs in 61 of the 100 largest U.S. metro areas are still lower than their pre-recession peak; incredibly, job levels in 23 metros are more than 5 percent below their pre-recession peak figures.⁹ At the same time, the number of people living in poverty and near poverty has grown precipitously in the largest 100 U.S. metros—from 48 million in 2000 to 66 million in 2012—due not only to the recession but broader trends around wage stagnation and economic restructuring.¹⁰ Beyond these economic and social demands, cities are on the front lines of addressing enormous fiscal and environmental challenges given federal gridlock and the absence of leadership in many states.

In the face of these challenges, cities and metropolitan areas are experimenting with new approaches to economic development and sustainable development that focus on growing jobs in productive, innovative, and traded sectors of the economy while concurrently equipping residents with the skills—particularly STEM (science, technology, engineering and math) skills—they need to compete for and succeed in these jobs.¹¹ These new approaches try to build on the distinctive assets and advantages of disparate places rather than merely pursuing heavily subsidized consumption-oriented strategies (e.g., building the next sports stadium, convention center, or performing arts facility) that yield low quality jobs or aspiring to unrealistic economic goals (“becoming the next Silicon Valley”).

Innovation districts are a key part of the new wave of local economic development and advance several critical objectives.

First, innovation districts further the ability of cities and metropolitan areas to grow jobs in ways that both align with disruptive forces in the economy and leverage their distinct economic position. Innovation districts enable companies, entrepreneurs, workers, researchers and investors to work across disparate sectors and institutions to commercialize ideas and co-invent and co-produce new discoveries for the market. They foster innovation across industries by concentrating people with different knowledge and expertise in dense urbanized areas; experts in technology, for example, work closely with experts in bioscience, finance, education, and energy. Innovation districts are, in essence, the vanguard of a new “convergence economy” which is galvanizing the growth of more competitive firms and higher quality jobs and spurring expansion in supportive professional and commercial service sectors.

Second, innovation districts can specifically empower entrepreneurs as a key vehicle for economic growth and job creation. Studies show the important role that entrepreneurs and start-up companies play in urban and metropolitan job growth and innovation districts can support this trend in several ways. The rise of collaborative facilities and spaces can, for instance, reduce overhead costs by offering below rate, low risk work spaces and providing technical spaces where exorbitantly expensive technologies are shared. At the same time, imaginative programming and networking can support idea generation and efficiently link young firms to mentors, advisors with specialized expertise, and potential investors.

Third, innovation districts can grow better and more accessible jobs at a time of rising poverty and social inequality. A substantial number of emerging innovation districts across the United States are close to low- and moderate-income neighborhoods, offering the prospect of expanding

employment and educational opportunities for disadvantaged populations. Leaders in cutting edge innovation districts are already dedicating resources to revitalize neighborhoods directly through investments in affordable housing, education, infrastructure and improved internet connectivity, and indirectly via enhanced tax revenues. Leaders in these districts are particularly focused on increasing labor market participation of local residents through training for jobs in both the STEM sector as well as retail and service firms.

Fourth, innovation districts can reduce carbon emissions and drive denser residential and employment patterns at a time of growing concern with environmentally unsustainable development. Innovation districts are potential engines for sustainable development since they embrace residential and employment density via the strategic use of transit, historic buildings, traditional street grids, and existing infrastructure. Some districts are going further by using renewable energy as their primary power source and by transforming their buildings, streets, and parks into living labs to test cutting edge sustainable projects in concert with technology firms and entrepreneurs.

Finally, innovation districts can help cities and metropolitan areas raise revenues and repair their balance sheets at a time when federal resources are diminishing and many state governments are adrift. Municipal governments generally rely on property, business, and sales taxes for revenue. Innovation districts can generate revenues through increased economic activity, rising housing values and increased demand for goods and services. Increased revenues can then be used to make necessary investments in infrastructure, public safety, affordable housing, local schools, and other necessary services. At time when federal resources are shifting to entitlement programs (e.g., Social Security) and many states are otherwise focused, these types of investments disproportionately fall on local governments.

Why Now—The Evolution of Innovation

The early rise of innovation districts could constitute the next phase of what one observer has called the “architecture of technology.”¹² This architecture was once represented by industrial districts, and later by suburban science parks, both of which were products of the distinctive mix of demographic preferences, cultural norms, and economic imperatives of their times. Similarly, the growth of innovation districts is reflective of forces that are radically altering the requirements and preferences of people and firms that are today engaged in technology driven activities. These shifts are forging new links between economy-shaping, place-making, and network building that were not evident in early models.

A. Industrial Districts to Science Parks

In the 19th century and early 20th century, industrial districts—areas with high concentrations of manufacturing enterprises commonly engaging in similar or complimentary work—emerged in cities like Manchester, Milan, and Stuttgart in Europe and Baltimore, Cleveland, Detroit, New York, and Philadelphia in the United States. In the United States, these districts straddled the temporal boundary between the early mercantile city and turn-of-the-century industrial metropolis, a period marked by new types and organizational forms of manufacturing activity, innovations in energy and transportation, and rapid urbanization.¹³ Many cities in fact had multiple districts, which varied by product type, methods of production, power source, and labor force composition.¹⁴ Such a clustering of like activities facilitated the supply of materials and parts from one firm to another, and also attracted a large and fluid supply of workers, many of whom lived in the surrounding communities and walked to work. Enmeshed in the urban fabric, these “sub-city” areas thus provided not only a high density of employment opportunities, but essential neighborhood services and social amenities.¹⁵

As the 20th century moved forward, the nature of manufacturing activity changed and eventually dispersed—first within regions, and eventually across the globe—and by the mid-1900s production in U.S. and European cities had sharply declined. The foundations of modern technology laid during the preceding decades had, however, enabled the advent of a new era of invention and innovation in science, communications, and information—as well as the rapid suburbanization of housing and commercial activity.

In the United States, technological advancement and geographic dispersion together helped drive the creation of innovative enclaves variably referred to as science parks or research parks. Beginning in the 1950s, collaborations of universities, private developers, and government designed and built these clusters of labs and firms with the aim of increasing the commercialization of research and attracting entrepreneurially-oriented scientists from industry and academia.¹⁶ The model originated with the Stanford Research Park—in what is now Silicon Valley—and was then expanded to include the development of Research Triangle Park in Raleigh Durham, and later the innovation corridors outside Boston, Philadelphia, and Washington D.C. Unlike urban industrial districts, these suburban parks were built as spatially isolated corporate campuses accessible only by car, mirroring the patterns of residential and commercial growth that dominated the post war landscape. They also reflected a research culture and patenting policies that encouraged secrecy. As such, they were generally closed innovation systems in which firms and scientists carefully guarded their ideas, and where interactions between them were limited.

B. A New Geography of Innovation

Innovation districts maintain elements of these earlier models but embody a new interplay of form and function that the modern innovation economy demands, and in turn supports. Like their predecessors, these districts grow out of a powerful set of economic, cultural, and demographic forces that are reshaping both how and where people live and work.

The emergence of innovation districts has been observed by a number of scholars and practitioners, many of whom have offered initial theories for their development. Research led by Thomas Hutton in over seven global cities found a rise of new industrial clusters within the inner city to “constitute important aspects of the spatiality of the New Economy,” making four classifications of specialized production.¹⁷ A research team at MIT’s Department of Urban Studies and Planning likewise identified discrete geographic clusters of creative industries, life sciences, and applied sciences within large-scale real estate development projects. Defined as “New Century City Developments,” these innovative clusters are “driven by inter-organization and cross-industry collaboration, open systems for R&D, and workers who have the aptitudes and skills required by the networked, knowledge economy.”¹⁸

George Bugliarello of Polytechnic University in New York observed the emergence of “urban knowledge parks,” concluding that these urban parks develop around a knowledge institution in a city, provide public space or spaces for community activities, and possess high levels of density.¹⁹ In September, 2013, the American Institute of Architects released a report on Innovation Districts, describing them as “creative, energy-laden ecosystems” that are emerging world-wide.²⁰

Richard Florida has provided important validation for the new geography of innovation. His recent mapping of venture capital activity by ZIP codes and area codes, rather than more expansive metro areas, shows that “high tech development, startup activity, and venture investment have recently begun to shift to urban centers and also to close-in, mixed-use, transit-oriented, walkable suburbs.”²¹

These observations—and ours—recognize a trend that is both multi-dimensional and hyper-local, one reason why market dynamics on the ground have outpaced uniform labeling or analysis. Quantitative assessments, therefore, are still a work in progress. Innovation districts in Boston and St. Louis, for example, are assiduously documenting district-level growth, although not against broader city and metropolitan trends or other cities with similar economic starting points.²² Similarly, studies in New York, Pittsburgh, and San Francisco have documented the growth of leading tech sectors at the city rather than innovation district scale.²³ While the analytics supporting this trend mature, Brookings and a growing number of practitioners are turning to broader economic and demographic research to understand the forces driving this new spatial geography of innovation.

1. The evolution of a knowledge and technology driven economy is altering the value and function of density and proximity.

In the past several decades, the U.S. economy has become increasingly reliant on knowledge and innovation. Today, approximately 20 percent of all U.S. jobs are in science, technology, engineering, or math (STEM) related occupations—a share that has doubled since the Industrial Revolution.²⁴ These occupations can be found in a wide range of fields including the production of advanced goods like pharmaceuticals, medical devices, motor vehicles and aerospace as well as the provision of advanced

services like software, data processing, among many others.²⁵

As the role of these innovative industries and occupations has grown in size and importance, so too, then, has the value of density and agglomeration. The benefits of clustering that produced industrial districts, and then science parks, are intensifying in ways that we are just beginning to understand. A growing body of research shows that employment density not only eases resource, goods, and labor sharing, but also enhances innovation. This happens by enabling a more seamless transfer of knowledge within and across firms, workers, and supporting institutions—in turn facilitating the creation and exchange of new ideas that fuel even greater economic activity and growth. A recent study by the British government captures this latter point well:

“While the marginal cost of transmitting information across geographical space has fallen significantly, the marginal cost of transmitting knowledge still rises with distance Therefore, the knowledge spillover benefits of clustering in cities can be large for high-value, knowledge intensive sectors.”²⁶

The proximity effect is significant. Recent research conducted by Gerald Carlino and Robert Hunt found the clustering of R&D labs to be by far the “most significant” at very small spatial scales, such as distances of about one-quarter of a mile. They also discovered the clustering effect to quickly dissipate with distance, concluding knowledge spillovers to be “highly localized.”²⁷ Isaac Kohane and several colleagues at Harvard Medical School found that even working in the same building on an academic medical campus makes a difference for scientific breakthroughs; “Otherwise, it’s really out of sight, out of mind.”²⁸

Density also matters when it comes to workers. The large number of employers within an urban area allows workers to change jobs more easily, giving them both greater flexibility and stability than employees in non-urban locales. This concentration of employment, which economists refer to as “labor market pooling,” also contributes to labor productivity.²⁹ One seminal study found that doubling employment density increases average productivity by around 6 percent.³⁰

This general research on proximity and density takes on new meaning in what one observer has called the “age of convergence.” In biosciences, digital and biological technologies are co-mingling, opening entirely new possibilities for innovation breakthroughs to be commercialized.³¹ A recent San Francisco analysis coined the term “tech/information” industries to reflect “the convergence between technology and content.”³² The spatial implications of this hybridization of industry are profound.

“[Tech/information] companies thrive in urban environments, where they can connect with other industries, drawing on the culture and diversity of the city. By contrast, the previous generation of tech companies thrived with their headquarters located in suburban areas, located mainly near other tech companies. *There was no possibility of cross-industry diversity.*” [Emphasis added]³³

Recent analysis in New York similarly found tech industries to be less focused on building new technologies but rather “applying technology to traditional industries like advertising, media, fashion, finance, and health care.”³⁴ These shifts reinforce and reinterpret notions of proximity and density.

The early days of technology growth was driven by semiconductors and computer hardware, products that depended on a deep roster of engineering talent and required large amounts of physical space to develop. ... In contrast, today’s growth is being fueled by the Internet and smart phones, and the creation of new ways of taking advantage of these now widely used platforms to deliver content, sell products, deliver services, play games and simplify life for individuals and businesses. ... [In other words], today’s technology revolution is much less about creating the infrastructure and plumbing for the Internet, but about applying technology to traditional industries.³⁵

To be sure, physical proximity alone doesn’t guarantee greater collaboration and idea exchange, nor is it necessarily even required. Silicon Valley, while a huge regional agglomeration of innovative activity, is the quintessential low-density, suburban model of physical development—yet its strength and success is defined by a pervading culture of openness and network building. But urbanization—and

the physical proximity that comes with it—does appear to both grow from, and in turn help smooth, the development of “horizontal” relationships both within and between large firms, smaller subcontractors, vendors, and, importantly, talent. The move to create denser enclaves of innovation thus appears to be a critical shift for communities that are not as “wired” for collaboration as Silicon Valley.

2. An economy increasingly oriented toward open innovation is changing both where firms locate and how buildings and larger districts—from research labs to collaborative spaces to mixed-use developments—are designed.

As the knowledge and technology driven economy grows, it is also becoming increasingly characterized by what Henry Chesbrough and others call “open innovation.” Chesbrough describes this as a process whereby companies and firms more openly generate new ideas and bring them to market by nimbly drawing on both internal and external sources. Under this new modus operandi, external sources can generate the ideas that are then commercialized internally by a firm, while internal ideas can be commercialized by external start-up companies and entrepreneurs. In other words, as Chesbrough observes, “The boundary between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two.”³⁶

What was once a phenomenon for highly specialized fields, the imperative to collaborate has expanded to a broader group of knowledge-intensive sectors, including such science- and technology-heavy fields as chemicals, biotechnology, telecommunications, and semiconductors. McKinsey & Company, for example, has noticed a move from internal R&D labs to new “multichannel R&D models,” which involve partnerships with “academic centers, partners, competitors, customers, venture capital funds, and startups.”³⁷

The rise of smaller companies engaged in research and development has also contributed to the growing movement toward open innovation. A field once dominated exclusively by large corporations, research labs and universities has become increasingly stratified, prompting greater collaborations between firms of disparate sizes to develop and advance innovations. A number of factors contributed to the proliferation of smaller R&D companies, namely the downsizing of larger companies, the passage of the Bayh-Dole Act (which enables university and individual researchers to own their federally-funded research, sparking a new entrepreneurial mind set), and the growth of venture capital funding, from very little funding in 1970 to nearly \$100 billion in 2000.³⁸

The result is that in today’s economic landscape, no one company can master all the knowledge it needs, so companies rely on a network of industry collaborators.³⁹ This, in turn, has led to a shift in where companies and support organizations locate. A recent article, for example, on the growth of Pfizer, Novartis, and other major pharmaceutical companies in Cambridge noted the following:

“Pharmaceutical companies traditionally preferred suburban enclaves where they could protect their intellectual property in more secluded settings and meet their employees’ needs. But in recent years, as the costs of drug development have soared and R&D pipelines slowed, pharmaceutical companies have looked elsewhere for innovation. Much of that novelty is now coming from biotechnology firms and major research universities like MIT and Harvard, just two subway stops away.”⁴⁰

The more open, collaborative nature of the knowledge economy has also altered the design inside and outside the walls of the singular company. A recent *New York Times* piece on the “monuments of tech” refers to this trend as the “aesthetic of disruption”—design which embodies change, flexibility, and openness while at the same time displays the unique character and ethos of the individual company.⁴¹

The early, highly-recognizable model for open and highly networked workplaces is the newspaper newsroom, but these principles have been implemented in places ranging from former New York City Mayor Michael Bloomberg’s “bullpen” in New York City Hall to the campuses of Silicon Valley technology firms. Facebook and Google, for example, have embraced “hackable buildings,” with open floor plans that can be easily reconfigured to create dense, collaborative spaces for new teams and projects.⁴²

Beyond office spaces and individual buildings, the planning and design shifts described above have extended to the public and private realm. When Henderson, NV-based Zappos, the online retail shoe giant, was looking for a new headquarters in 2010, CEO Tony Hsieh decided to create a more dynamic

workplace, with the goal of increasing interaction and collaboration among its workers. That inspired for Hsieh a move toward open floor plans and the provision of greater amenities within the office. More than that, it also led him to embed the new headquarters building (and 2,000 Zappos workers) in Las Vegas' old City Hall, and launch the \$350 million Downtown Project to catalyze growth of a dense, multi-use, and walkable environment. "The idea," Hsieh said, "went from 'let's build a campus' to 'let's build a city.'"⁴³

In short, the phenomenon of open innovation is changing over time: expanding into new industries, altering the design of office spaces, reshaping the relationship between buildings, and now occurring at the district scale. Similar to open innovation between firms, innovation districts are experiencing the breakdown of traditional boundaries, making the process of innovation more porous between the public and private realms. Ideas, for instance, can be brainstormed in wired, public spaces, advanced in shared work spaces, prototyped in private technology labs, and tested on public streets.

3. Shifting demographic and household dynamics are fueling demand for more walkable neighborhoods where housing, work, and amenities intermix.

Recent data show that cities and metropolitan areas are increasing in population faster than the rest of the country, with the largest growth seen in large urban areas. From 2012 to 2013, large metropolitan areas with over 1 million people grew twice as fast as smaller metropolitan areas with populations under 250,000, while nonmetropolitan/micropolitan regions saw a collective decline.⁴⁴ Brookings' demographer William Frey believes that this trend is likely to continue, while the future of non-urban America is far less certain.⁴⁵

Within many large metropolitan areas, the trend becomes more acute as one examines areas in greater proximity to commercial downtowns. The country's 10 largest "live-work" downtowns, as examined by the Philadelphia Center City District for the International Downtown Association, grew 77 percent faster than the country as a whole, and nine of the 10 downtowns increased in population faster from 2000 to 2010 than zones within a half-mile or mile of downtown.⁴⁶

What's driving this revival in cities and their cores?

America's family structure has been altered by the simultaneous aging of the population and the tendency of young adults to delay marriage and have fewer children. As a result, the prototypical family of the suburban era—a married couple with school age children—now represents just under 20 percent of American households, down from 24.1 percent in 2000 and 40.3 percent in 1970.⁴⁷ This trend is only expected to accelerate in coming decades. As Arthur C. Nelson documents in his provocative book, *Reshaping Metropolitan America*, "Between 2010 and 2030, households with children will account for about 13 percent of the total change in households; households without children will represent the rest."⁴⁸

This demographic tumult is sparking a palpable shift in consumer—and worker—preferences toward more urban-oriented environments. Research has documented, for example, that 70 percent of Americans place a high priority on walkability, and similar majorities prioritize proximity to health care, entertainment, recreation, work and school, and social contacts.⁴⁹ Older Americans are increasingly seeking smaller homes and apartments, as well as places with easy access to medical services, shopping, and other daily necessities. Meanwhile, middle-aged couples, whose children have "left the nest," show greater receptivity to urban neighborhoods, cultural amenities, and shorter commutes.⁵⁰

These preferences are particularly prevalent among the millennial generation (Generation Y)—whose young and educated members form the core of our innovation workforce. For many of these young people, especially those that have delayed childrearing, "quality of life" is increasingly understood to mean proximity to urban amenities such as restaurants, retail, cultural, and social venues.⁵¹ This is evidenced in residential choices of this cohort. According to Joseph Cortright, between 2000 and 2009, the number of 25- to 34-year olds with college degrees living in neighborhoods near the central business districts in the nation's 51 largest metropolitan areas increased by 26 percent, double the growth rate of college educated young adults in the rest of the metropolitan area.⁵²

Data from the Urban Land Institute reveals that 63 percent of millennials plan to move in the next five years, and 40 percent of them indicate a preference for living in medium or large cities (compared to only 28 percent of Americans as a whole). Within urban areas, living in close proximity to shopping, dining, and work is preferred by 62 percent of this demographic, along with 60 percent of both singles

and renters.⁵³ A recent *New York Times* article underscored how these shifts in demographics are challenging the New York City housing supply, noting that “there are more single households, thanks to the young urban migration and the silver tsunami, that gathering wave of urban-minded retirees.”⁵⁴

Collectively, these three shifts—a converging knowledge economy, more open innovation ecosystems, and changing demographics—are stirring new demands for density, proximity, collaboration, and walkability, and in so doing are re-working the spatial geography of innovation. With concerted effort, the rise of innovation districts holds the potential to bring numerous benefits to the cities and regions in which they are located, and to the people who live and work there.

Deconstructing Districts

The potential for innovation districts to drive innovative, inclusive, and sustainable growth requires us to understand what drives them and makes them productive and prosperous. Unlike segregated business or residential districts that have for decades populated most cities and suburbs, or even the activity centers that more recently have sprung up around public transit stations, innovation districts uniquely contain three categories of assets: *economic assets*, *physical assets*, and *networking assets*.⁵⁵

- ▶ **Economic assets** are the firms, institutions and organizations that drive, cultivate or support an innovation-rich environment.
- ▶ **Physical assets** are the public and privately-owned spaces—buildings, open spaces, streets and other infrastructure—designed and organized to stimulate new and higher levels of connectivity, collaboration, and innovation.
- ▶ **Networking assets** are the relationships between actors—such as between individuals, firms, and institutions—that have the potential to generate, sharpen, and/or accelerate the advancement of ideas.

The relative strength of these assets in different communities varies considerably. In some places, districts are emerging from a cluster of strong economic assets but lack important physical assets and are initiating a planning process to comprehensively redesign the physical realm. In other cases, districts possess a strong set of physical assets with only a handful of economic assets and networks to build upon.⁵⁶

Innovation districts reach their potential when all three types of assets, combined with a supportive, risk-taking culture, are fully developed, creating an *innovation ecosystem*. As described earlier, an innovation ecosystem is a synergistic relationship between people, firms, and place (the physical geography of the district) that facilitates idea generation and accelerates commercialization.

Both research and interviews suggest that a supportive risk taking culture consistently undergirds highly productive innovation areas. This means, most unconventionally, embracing failure by making risky investments in people, firms, and development projects. It means breaking down the traditional, vertical hierarchies and valuing a diversity of talent, from 20- and 30-year olds to the more experienced leadership class. It means changing conventional rules still found in many inward-focused research institutions and organizations to encourage spin-offs, allow greater idea sharing across firms, and share spaces and technologies. It also means taking the long view and not expecting short-term returns or rewards as innovation processes commonly require consecutive failures before any breakthroughs can be achieved.

In describing these assets it is important to recognize that a number of them may appear to be conventional, if not strikingly rudimentary. While many assets described here have been integral to existing urban economic development efforts, they are being re-engineered to support the innovative, traded sectors that drive metropolitan economies. Research universities, for example, are by definition teaching institutions with research departments. A small, but growing, subset of these universities are now valuing commercialization as a primary objective and are successfully advancing innovations into the market. Moving well beyond their tech transfer offices, these universities are investing resources in accelerators, encouraging and supporting spin-offs, and developing adjacent land to concentrate future economic growth. Many more research universities have not yet expanded their mission to embrace commercialization fully, demonstrating a growth opportunity for these universities and the areas surrounding them.

A. Economic Assets

Economic assets can be separated into three categories: innovation drivers, innovation cultivators, and neighborhood-building amenities.

Innovation drivers are the research and medical institutions, the large firms, SMEs, start-ups, and entrepreneurs focused on developing cutting-edge technologies, products, and services for the market. Due to regional variations in industry strengths, each district is comprised of a unique mix of innovation drivers, contributing significantly to their distinctiveness. The research described below reveals important insights for districts building and assembling these assets.

First, a subset of industries—sensitive to the economic, demographic, and cultural trends described above—distinguishes innovation districts from other models and largely explains their preference for compact, urban-oriented enclaves. These industries are:

- ▶ High-value, research-oriented sectors such as applied sciences (from life and material sciences to energy technology to nanotechnology) and the burgeoning “app economy.”⁵⁷
- ▶ Highly creative fields such as industrial design, graphic arts, media, architecture, and a growing hybrid of industries that merge tech with creative and applied design fields.⁵⁸
- ▶ Highly specialized, small batch manufacturing such as advanced textile production and small artisan-oriented manufacturing.⁵⁹

Large advanced manufacturing facilities are not located within urban innovation districts. These facilities require substantial building or land footprints and require easy access to major highways. This includes fabrication plants, OEMs (original equipment manufacturers) and large suppliers.

Second, the role of universities deserves special consideration given their effects on the local and metropolitan economy, including their role in driving innovation activity at the district scale. Anselin, Varga, and Acs, for example, sought to reconcile conflicting research findings on the role of universities and the local economy, drawing on larger and more geographically precise data sets. Their research found a “positive and significant relationship between university research and innovation activity,” both directly, as well as indirectly through its impact on private sector R&D.⁶⁰ Further, Hausman, in analyzing Census data around universities after the passage of the Bayh-Dole Act in 1980 (an act allowing universities and other researchers the ability to commercialize research funded by federal dollars), found both long-term employment and worker income to rise “in industries more closely related to local university innovative strengths.”⁶¹ In short, universities are particularly helpful drivers for growing districts; for this reason, many districts that did not originally include universities (such as the “re-imagined urban areas” model) have convinced universities to build satellite campuses.

Third, entrepreneurs are another asset worth highlighting. While Edward Glaeser’s research convincingly affirms the role of entrepreneurs in driving city employment growth, interviews with practitioners reveal that entrepreneurs are equally valued at the district-scale.⁶² All innovation districts aspire to support entrepreneurs. Boston’s innovation district, for example, includes an “innovation component” for new office and retail developments, where 15 percent of the space is earmarked for entrepreneurs and start-ups.⁶³

Fourth, while many districts are focused on the cultivation of entrepreneurs, they alone cannot be a growth strategy for districts. Research conducted by Agrawal, Cockburn, Galasso, and others found that a mixing of firms creates the optimal environment for innovation. Larger laboratories, for example, may stimulate spin-offs considered irrelevant to the lab’s overall business objectives, while smaller labs can create demand for specialized services that lower the entry costs for others in the market.⁶⁴

Innovation cultivators are the companies, organizations, or groups that support the growth of individuals, firms, and their ideas. They include incubators, accelerators, proof-of-concept centers, tech transfer offices, shared working spaces (with programs to support idea and firm development), and local high schools, job training firms, and community colleges advancing specific skill sets for the innovation-driven economy. In a small number of districts, legal counsel, patent attorneys, and venture capital firms are scrubbing project concepts to identify their value in moving forward. The rise of technology-driven industries in general is creating demand for supportive industries that employ highly-educated workers, such as advanced business services.⁶⁵

The aggregation of innovation cultivators in districts distinguishes them from standard business and research parks. While cities and suburban areas have cultivators sprinkled across their landscape, district leaders are assembling a critical mass of cultivators within a discrete geographic area. Equally

important, district leaders are “planning for the continuum” by building a range of cultivators to support entrepreneurs and start-ups at each stage of development, keeping them in the district as they mature. There appears to be a tipping point, however, when too many cultivators become counterproductive. “Too many incubators run the risk of spoon-feeding entrepreneurs too much. They need to work hard at achieving success,” shared Ylva Williams of the Stockholm Science City Foundation.⁶⁶

Neighborhood-building amenities provide important services to residents and workers in the district. This includes medical offices, grocery stores, restaurants, coffee bars, small hotels, and local retail (such as bookstores, clothing stores, and sports shops). In his analysis of the “new economy” clusters in the urban core, which include innovation-oriented clusters, Thomas Hutton found restaurants, coffee shops, and bars to “reflect not only contemporary urban consumption patterns but also a distinctive ‘geography of amenity,’ which complements the intensive social interactions of the new economy.”⁶⁸

Amenities activate district streets and public spaces, inviting a mix of people to shop, browse, and mingle. Many cities understand this well, and have heavily invested in corridor or neighborhood revitalization initiatives, often providing tax relief and other incentives for local businesses. District strategies build off these efforts, seeking to not only create a critical mass of amenities but to encourage a compelling design of storefronts and signage.

B. Physical Assets

There are three categories of physical assets, all of which are uniquely applied in each district: physical assets in the public realm, physical assets in the private realm, and physical assets that knit the district together and/or tie it to the broader metro area. Similar to economic assets, physical assets are in the process of being re-imagined to advance an innovation imperative—a process that is transforming the physical landscape into a laboratory of creativity, ingenuity, and invention. Experts in the fields of urban design, architecture, landscape architecture, and planning are experimenting with new concepts that facilitate collaboration and connectivity. This story of testing, trying and evolving was observed by MIT researchers, who in their global work on “New Century Cities” found districts to be “messy, with activities and uses all mixed up and things in a constant state of adjustment and change.”⁶⁹

Physical assets in the public realm are the spaces accessible to the public, such as parks, plazas, and streets that become locales of energy and activity.

In innovation districts, public places are created or re-configured to be digitally-accessible (with high speed internet, wireless networks, computers, and digital displays embedded into spaces) and to encourage networking (where spaces encourage “people to crash into one another”).⁷⁰ “Digital places,” as defined by MIT’s New Century Cities work, are the culmination of ambient technology, digital systems, and the physical form, creating venues for training and education, cultural events, and entertainment.⁷¹

Streets can also be transformed into living labs to flexibly test new innovations. In Boston, Barcelona, Eindhoven, Helsinki, and Seoul, streetscapes and public spaces are testing new innovations in street lighting, waste collection, traffic management solutions, and new digital technologies. Living labs are what 22@Barcelona calls “open innovation at the city-scale.”⁷²

The re-make of physical assets extend far beyond technology-infused places however, as the design and programming of public spaces is equally valued. Small-scale parks and plazas programmed with concerts, innovation expositions, and eateries give reason for people to congregate and mix. District leaders are designing and programming such spaces strategically across their districts in an effort to facilitate the building of networks.

Physical assets in the private realm are privately-owned buildings and spaces that stimulate innovation in new and creative ways. Building from a solid base of traditional assets, such as mixed-income housing, neighborhood-serving retail, and research and office complexes, new assets are designed to support the innovation-driven demographic. Office developments, for example, are increasingly configured with flex work spaces, lab spaces, and smaller, more affordable areas for start-ups.

Micro-housing is another example of a new physical asset. These units offer smaller private spaces (typically 300 to 600 square feet) and access to larger public spaces such as co-working spaces, entertainment spaces, and common eating areas. Often marketed for migrating workers in innovation sectors, local residents, and younger single workers, micro-housing is now found in the districts

of Boston, Barcelona, and Philadelphia (under construction). St. Louis is also planning micro-housing units in their district.

Physical assets that knit the district together and/or tie it to the broader metro area are specific investments aimed to eliminate barriers that hinder relationship-building and connectivity.

Practitioner interviews suggest there is considerable work to be done within districts, particularly in linking anchor institutions (commonly oriented within their own campuses) with the rest of the district. For some districts, knitting together the physical fabric requires remaking the campuses of advanced research institutions to remove fences, walls and other barriers and replace them with connecting elements such as bike paths, sidewalks, pedestrian-oriented streets and activated public spaces. For other districts, strengthening connections requires changes at a much larger-scale, such as entirely re-structuring large areas with smaller, more walkable blocks and pedestrian-scale streets.

Strategies to strengthen connectivity between the district and the broader metro aim to ensure innovation districts do not become islands unto themselves. Investments in infrastructure, such as broadband, transit, bike, and pedestrian paths are natural connectors to be considered. Extending broadband into adjacent, often low-income neighborhoods, for instance, is a valuable strategy in reducing the digital divide. Investments in public transportation—including the Silver Line in Boston, the Red Line in Houston, the future M-1 in Detroit—have been essential, for instance, in increasing accessibility between districts and their surrounding metro areas.

C. Networking Assets

The inclusion of networking as its own asset category is supported by a growing body of research that reveals how networks are increasingly valuable and prolific within innovation-driven economic clusters. Scholars cite numerous advantages of networks: they are important sources of new or critical information for new discoveries; they encourage experimentation and are a testing ground for ideas; they help firms acquire resources; they strengthen trust and collaboration within and across sectors; and they help firms enter new markets including global markets.⁷³

The most famous success story of networking is Silicon Valley, where dense social networks were found to drive both experimentation and entrepreneurship. In her analysis of Silicon Valley, Saxenian observed, “Companies compete intensely while at the same time learning from one another about changing markets and technologies through informal communication and collaborative practices.” She argues that while proximity—in this case, a regional agglomeration—contributes to the development of dense networks, a collaborative culture appears to play a more significant role.⁷⁴

While countless numbers of science parks and tech parks were built on the hopes that Silicon Valley could be easily copied, Bert-Jan Woertman, an enthusiastic connector and creative communicator for High Tech Campus Eindhoven, reflects that “Networks cannot be copied nor can they be easily established.”⁷⁵ A recent *Harvard Business Review* article similarly presented the difficulties in establishing networks, finding that even start-ups and their parent companies “cannot leave knowledge spillovers to chance.”⁷⁶

Districts attempting to cultivate networks are driven by experimentation, creativity, and even a sociological understanding of how networks function. A leading scholar on networks, Granovetter, differentiates networks as either having “strong ties” or “weak ties,” which are determined by factors such as the frequency of contact, the emotional intensity of the relationship, and the reciprocity of commitments between the actors.⁷⁷

Strong ties occur between people or firms with a working or professional history, higher levels of trust, willing to share more detailed information, and more apt to participate in joint problem solving. Weak ties occur between people or firms working within a different economic cluster or context where there is infrequent contact. Weak ties provide access to new information, even novel industry information, new contacts, and new information on business leads that are outside of existing networks.⁷⁸ While it may seem obvious that a dense network of strong ties is the optimal condition for a highly innovation-driven environment, research indicates that both strong ties and weak ties are fundamental to firm success.⁷⁹ Two primary categories of networking assets emerge from this research:

Networking assets that build strong ties focus on strengthening relationships within similar fields. These types of assets include: “tech regulars” (such as Eindhoven’s Tech Regulars, where “techies” discuss problems or advances in their work as a collective), workshops and training sessions for

specific fields or technicians (daily activities along Boston's waterfront), cluster-specific meetings (22@Barcelona), industry-specific conferences and monthly meetings (found in several districts), and industry-specific blogs for local firms and entrepreneurs.

Networking assets that build weak ties focus on building new, often cross-sector, relationships. Examples include: networking breakfasts (such as 22@Barcelona's breakfast where experts and star innovators offer new insights in their fields followed by open time to network), innovation centers (such as Boston's newly constructed 12,000 square foot District Hall), hack-a-thons across industry clusters such as life sciences and tech (Stockholm), tech-jam start-up classes (found in Boston), and even the choreographed open spaces between highly programmed buildings (St. Louis). In this last example, St. Louis will be clustering five innovation centers, with the purpose of generating "collision points" between smart people.⁸⁰

Reflections from Practitioners

As innovation districts take hold, the real challenge is how each community marshals resources in a deliberate and customized way to capitalize on advantages and realize the promise of productive, inclusive, and sustainable growth. To that end, this section summarizes reflections from practitioners spearheading efforts to drive and develop districts. We found their experiences to vary considerably, in part due to the types of local actors, the level of resources at their disposal, and the distinct economic, physical, and networking challenges they set out to address. Even with these and other variations at play, practitioners for the most part offered similar reflections from their work so far.

This section is not meant to be a how-to guide for future districts but is instead intended to illustrate how these practitioners have come to understand and organize the complexities inherent in their work. It draws from interviews with practitioners and researchers working in leading edge innovation districts including University City in Philadelphia, Cortex in St. Louis, Kendall Square in Cambridge, the South Boston Waterfront, downtown and midtown in Detroit, South Lake Union in Seattle, the Texas Medical Center in Houston, 22@Barcelona, two innovation districts in Stockholm (Stockholm Life and Kista Science City), and Eindhoven in the Netherlands.⁸¹

We have consolidated their reflections into the following five strategies, each of which will be discussed in turn:

- Build a collaborative leadership network
- Set a vision for growth
- Pursue talent and technology
- Enhance access to capital
- Promote inclusive growth

1. Build a collaborative leadership network

A collaborative leadership network is a collection of leaders from key institutions, firms, and sectors who regularly and formally cooperate on the design, delivery, marketing, and governance of the district. Practitioners reflected that to bring innovation to scale—i.e. beyond the boundaries of individual organizations and firms—has required leaders from disparate institutions to encourage idea sharing across researchers, firms, universities, and supportive organizations. Likewise, physically remaking a place in the service of innovative growth and expanding employment and educational opportunities for low-income residents has required leaders to think and act in a multi-dimensional fashion, across multiple sectors and communities.

Practitioners in the field underscored the importance of a focused and organized leadership network to super-charge innovation, reshape places, build a culture of trust and collaboration, and steward networks. Interviews identified three key and, in some cases overlapping, models of leadership:

An important share of innovation district leaders found the Triple Helix model of governance to be foundational to their success.⁸² The Triple Helix consists of structured interactions between industry, research universities, and government. Collectively, they design long-range visions and create new

vehicles for innovation, such as research centers and incubators. In the case of 22@Barcelona, St. Louis, Kista Science City (Sweden), and Eindhoven (Netherlands), the Triple Helix model established a clear organizational model of collaboration from the start. Further, Eindhoven and St. Louis are finding real success in a leadership model that includes a powerful development agency to execute strategies.

Practitioners also cited the valuable role of one person, a team of people, or designated entity serving as a “catalyst,” an “integrator, or a “facilitator” throughout the process. This was found to be true even in cases using the Triple Helix model. Integrators or facilitators were found to stitch together disparate efforts, help conflicted leaders reach consensus, and simply kept the process moving along. In St. Louis, Bill Danforth, chancellor emeritus of Washington University, founded the BioSTL Coalition, a regional organization championing the bioscience cluster, which brought together city and regional leaders to forge a vision for growth and innovation.⁸³ In other places like Houston, Research Triangle, and Philadelphia, the powers and activities of an existing entity are rediscovered or reconfigured to fit the new purpose.⁸⁴ In Seattle, Vulcan Real Estate has played a critical role in including local community groups in discussions around the design and location of housing, infrastructure and amenities.

Finally, and of particular importance in the United States, practitioners cited the instrumental role mayors can play in catalyzing the formation and evolution of innovation districts—a role that will likely grow over time. Former Seattle Mayor Greg Nickels played a critical role in the growth of South Lake Union, making key infrastructure decisions around transit, roads, and energy. Former Boston Mayor Tom Menino’s successful effort more recently to designate the South Boston Waterfront as an innovation district and steer its redevelopment in collaboration with a broad network of stakeholders is now being studied by mayors in cities as diverse as Albuquerque, Austin, Chattanooga, Detroit, and Pittsburgh as they seek to build on their strengths.

2. Set a vision for growth

A vision for growth provides actionable guidance for how an innovation district should grow and develop in the short-, medium- and long-term along economic, physical, and social dimensions. 22@Barcelona, for example, envisioned and articulated in forward-looking documents, a “new model of a compact city,” replete with innovation activities, green spaces, advanced industries, a strong industrial heritage, subsidized housing, a new mobility model, and revitalized public spaces.⁸⁵ St. Louis and Stockholm Life also devoted the necessary time and resources to develop a highly visual, long-term vision for their districts. Beyond these examples, most practitioners cited the importance of developing a vision to leverage their distinctive strengths—economic clusters, leading local and regional institutions and companies, physical location and design advantages, and other cultural attributes. Innovation districts that may share the same physical geography (e.g., a downtown or waterfront setting) or similar institutional platforms (e.g., an advanced research institution or medical campus) can have radically different opportunities for growth.⁸⁶

Clarify your competitive advantage

Given the distinctive starting points and strengths of disparate places, many district leaders grounded their visions in evidence, developed through the accumulation of relevant data and information, and accompanied by smart analysis, experience and intuition. Some places conducted analyses to guide areas of industry and entrepreneurial growth. Others instead used a bottom-up process driven by entrepreneurs to identify new and emerging areas of growth.

Many practitioners in the United States explained how detailed analysis helped define which clusters and/or research areas to advance. In the early stages of St. Louis’ conceptual planning, for instance, Battelle was hired to conduct a thorough analysis of the region’s industry clusters in life and plant science. The diagnostic included several areas of study: an assessment of the region’s economic strengths (evaluating their range of strengths within life sciences); a benchmarking exercise (against leading and comparable regions); and a SWOT analysis (a quantitative and qualitative analysis of strengths, weaknesses, opportunities, and threats). This work was an important precursor to the formulation of specific plant and life science strategies for St. Louis to consider.⁸⁷

As the St. Louis example demonstrates, a city’s or metropolitan area’s distinctive economic strengths helped orient actors to the clusters that have the best chance of success rather than rely on a government’s attempt to pick industry winners. In fact, St. Louis’ strength in plant and life sciences,

Philadelphia's strength in health, computing and informatics, and energy, and Eindhoven's strength in precision machinery are the very clusters promoted in their innovation districts. As these places have evolved, new, emerging clusters grew out of R&D and smart commercialization or through surprising synergies between two or more clusters, creating an even more dynamic network of clusters.

Other practitioners have applied a more bottoms-up approach to identify new and emerging areas of growth. Through a methodology known as "smart specialization," Stockholm and Eindhoven encourage entrepreneurs and other economic actors to enter into a process of "entrepreneurial discovery" to collectively determine new innovation projects or new areas of R&D. Rooted in open innovation, firms and entrepreneurs meet in structured settings to brainstorm, analyze, and ultimately test new ideas. Importantly, this approach aims to move the broader collective of firms into new and emerging areas.⁸⁸

Ylva Williams of the Stockholm Science City Foundation described their intricate process of supporting entrepreneurs, larger companies, universities, and health care providers to collectively identify new market opportunities. One successful example is the convergence between Stockholm's strong sectors of life science, tech and ICT sectors (which also builds bridges between the city's two main innovation districts: Stockholm Life and Kista Science City). In an effort to develop new digital health products and services, entrepreneurs, companies, and other public organizations developed the following process:

- ▶ **Ideation workshop.** Patients, healthcare providers, companies and entrepreneurs define challenges or problems and subsequently develop potential solutions. If desired, participants can form teams around a possible solution.
- ▶ **HealthHack.** A 48-hour workshop where teams of experts from tech/ICT and life sciences work together to find solutions to the ideas generated in the ideation workshop. Products in this phase range from sketches and prototypes to software ideas.
- ▶ **Design workshop.** With the support of sector experts, the teams refine and design their prototypes developed during HealthHack.
- ▶ **Pitch workshop.** The teams receive training in how to make successful pitches.
- ▶ **Digital Health Days.** The best teams are selected to give a pitch presentation during the international meeting and the audience will vote for the best team.⁸⁹

Smart specialization, such as this above process, aims to "identify new product segments and further strengthen our competitive advantage," said Williams. Perhaps somewhat similar in philosophy, some U.S. districts, including Boston's innovation district, have opted to be silent on clusters, arguing that the selection process derive from entrepreneurs and the market itself.

Imagine a new mix of institutional assets

Practitioners have come to understand that a future vision of a particular district does not begin and end with an assessment of its existing institutional assets. They are keenly aware of the growing trend of leading edge technology and pharmaceutical companies, private and public universities, and even medical campuses to move advanced research and other critical assets to those locations that generate the largest return on investment for the firm or institution. From this understanding, district leaders have become more deliberate in their efforts to lure major innovation assets to their sites (i.e., to "un-anchor anchors") or to form new institutions whole cloth."

The innovation district in downtown Detroit was catalyzed by the decision of Quicken Loans to move its headquarters from suburban to downtown Detroit. Boston's successful enticement to Babson College and the Fraunhofer Institute to open outposts on the South Boston waterfront is another example of this trend as is the University of Washington's decision to locate an advanced medical research campus in Seattle's South Lake Union. Stockholm's largest technical university, KTH, opened a technical branch within Kista Science City. Lastly, 22@Barcelona successfully lured numerous universities to locate within their district, creating a new gravitational pull in the region and a new location for students, researchers and entrepreneurs to innovate jointly.

Re-imagine your physical landscape

Successful practitioners routinely spoke of the need to transform the physical landscape of their districts to create the favored attributes of complexity, density, and mixed uses and activities. This has been particularly challenging in places that bear the indelible markings of 20th century development.

Heavy infrastructure—highways and exposed railroad tracks—often divide natural districts. Euclidian zoning, originally intended to protect health and safety, segregated uses and isolated housing, office, commercial, and manufacturing activities from each other.⁹⁰

A number of innovation districts have therefore required variances from antiquated land use and zoning ordinances and, in some cases, radical changes to existing infrastructure.

In the “anchor plus” model, practitioners have re-drawn existing lines—tearing down walls, fences and other, even more substantial, barriers between anchor institutions and others, creating new mixed-use neighborhoods, making and creating new public spaces, and activating streets to draw people together, and re-designing corridors to make them more pedestrian-friendly. In both Kendall Square near MIT and St. Louis’ Cortex district, city governments (or their designated agents) revised land use conventions and zoning ordinances to affect this change. One Stockholm innovation district, Stockholm Life, is in the process of covering over (also known as “decking”) two highways that divide their anchor institutions and firms. In doing so, they will have space to build 5,000 units of housing, laboratories, several schools, and open space, effectively stitching the district together.⁹¹

Practitioners involved in re-imagining urban areas have also undertaken (or benefitted from) pronounced changes to the physical infrastructure. 22@Barcelona, for example, was built on the remains of a 494-acre industrial area, scarred and separated from the rest of the city by railroad tracks. Through extensive public planning and investment, 22@Barcelona buried these tracks, increased access via a new public tram, designed walkable streets, and created new public spaces and housing.⁹² Boston’s innovation district was enhanced by the Big Dig, the removal (and submerging) of elevated highways that separated the south waterfront from the rest of the city. Equally important, construction of Boston’s third harbor tunnel markedly increased the level of access to the innovation district for both cars and transit.⁹³

In the few cases of the “urbanized science park,” re-imagining land use is the precursor to realizing any aims of urbanization—density, a mixing of uses, and a concentration of activities. This counters the original design of science and research parks, as exemplified by North Carolina’s Research Triangle Park, which were intended to ensure seclusion, isolation, and the protection of intellectual property, often on their own “research estates,” as the RTP Master Plan puts it.⁹⁴ Today, an outsized portion of RTP’s master plan focuses on its physical redevelopment: specific urban nodes allowing greater density and amenities, the development of a vibrant central district with more retail, and building up to 1,400 multifamily housing units.

Innovation districts relied on a variety of planning tools as they engaged in this work. 22@Barcelona, Cortex in St. Louis, and Cambridge (MA), for example, developed master plans to address the complexity in physically redeveloping their districts. Under existing state statute, the city of St. Louis designated Cortex West Redevelopment Corporation the master developer of the innovation district. Cortex is also responsible for master planning, oversees development, issues tax abatements, and may use eminent domain. MIT experts in their global work on innovation districts found tremendous success using strategic visions, which are more nimble in scope than traditional master plans. Boston, instead, developed design guidelines and development standards to guide changes incrementally as new developments come on-line.

Lastly, a number of district leaders spoke of efforts to physically brand their area in effort to create a clear, undeniable experience when people enter a district. Dennis Frenchman from MIT describes branding as “narrative design” where the physical landscape is enhanced “so they more clearly communicate a particular set of images and stories.”⁹⁵ District branding has included the strategic use of urban design elements (such as building massing, street design, public spaces, materials, and plantings); gateway development (where entrances into the district are pronounced or marked in some unique way); communicative digital displays, lighting, signage and banners (all carrying the district logo) along key corridors, at district gateways, and in public spaces.

3. Pursue talent and technology

Talent and technology appear to be the twin drivers of innovation in these districts. Talent commonly refers to those workers with the specialized education and skills necessary to generate new discoveries, commercialize ideas, design new products or production methods (or tinker with existing ones), and manage, brand, and package the ultimate result for the marketplace. Technology refers to the

tools, machines, infrastructure, and systems that help talented workers engineer industrial breakthroughs, disentangle big data and complex problems, and facilitate the production processes that follow. Both fields of work, practitioners shared, have required systematic planning and execution.

Dedicate efforts to attract, retain and grow talent

Practitioners argue that their ability to attract, retain, and grow talent plays a valuable role in differentiating seemingly identical clusters across U.S. and global cities and regions. Similar to businesses and leaders at the regional- and city-scale, district leaders have developed their own campaigns to lure individuals trained or educated in specific niches and specializations.

Practitioners explained that efforts to attract talent—which includes organized outreach programs, marketing campaigns, and highly tailored scouting techniques—largely target highly educated and skilled workers from other parts of the country, if not other global regions. Barcelona’s aim to become a global hub of innovation required both a local and global workforce, driving efforts to target international professionals as stimulants for local economic activity.⁹⁶ Eindhoven, in their drive to be the “smartest region in the world,” found this necessitated a pooling of talent from across Europe and around the globe.⁹⁷ South Lake Union’s most successful attraction strategy was to entice Amazon to move to the area. As one entrepreneur said: “We love being next to Amazon” They are to South Lake Union and Seattle what Microsoft was to Redmond and the Eastside in the 1990s. They attract a lot of talent. Talent begets talent.”⁹⁸

Efforts to retain talent were found to be similarly critical. Years of growing and assembling a strong pool of talent can quickly lead to paralyzing setbacks with the loss of key researchers and faculty. Eindhoven, for example, has dedicated staff focused on talent retention, offering a pipeline of support including cultivating dual career opportunities, and cultural training for international workers on “how to deal with the Dutch.”⁹⁹ The retention of recent university graduates is equally important, a renewing source of human capital.

Growing talent, while the most time- and resource-intensive of these three categories, is described by practitioners as the very heart of a district’s core mission. On one hand, growing talent means growing entrepreneurial capacity and catalyzing start-ups and spin-offs dedicated to commercializing ideas. All practitioners interviewed underscored the extent to which they designed programs, and even often constructed new buildings, to support the growth process of entrepreneurs. “It’s all about programming: choreographing ‘spontaneous’ opportunities for smart people to interact with each other. This is what separates us from traditional science parks,” shared Dennis Lower of Cortex in St. Louis.¹⁰⁰ On another level, growing talent means developing a feeder system of STEM workers with the general and customized skills necessary for participation in innovative sectors. Recent work and experiences will be highlighted in the section on promoting inclusive growth.

Seamlessly integrate technologies into the landscape

Practitioners emphasized that technology plays two roles across the district landscape.

First, advanced technology provides the platform upon which innovation is conceptualized, advanced in R&D, and developed during prototyping and product formulation. Specializations such as artificial intelligence, next-generation genomics, and software development, rely heavily on advanced technologies, such as robotics, nanotechnology, and sophisticated computer systems.

The extent to which technologies now drive advancements in science and other fields is what propels districts to invest in technology enhanced facilities. A 2012 survey of university research parks in North America—one example of the “anchor plus” typology—reveals that 75 percent of these districts now contain specialized laboratory facilities.¹⁰¹ Innovation districts in Cambridge, St. Louis, and Eindhoven have found real success in sharing many of these cost-prohibitive technologies with firms and entrepreneurs through shared workspaces, shared laboratories, and technology centers. As Johannes Fruehauf, the head of Lab Central in Cambridge says, researchers should focus on “perfecting their science” rather than making substantial capital expenditures and assuming large early risks and liabilities.¹⁰²

Second, practitioners have observed the salutary effect of embedding technology in standard public infrastructure to create a platform for innovation. Installations of fiber optics to create a high quality internet environment are now considered an investment in “the basics.” St. Louis, for instance,

is making substantial upgrades in internet connectivity by adding fiber to the existing sub-street infrastructure, further enhancing the computing power around big data and the potential for the commercialization of innovation.¹⁰³ Barcelona constructed separate tunnels to lay fiber to ensure that upgrades to the system would be easier to meet growing demand.¹⁰⁴ As described in the section describing physical assets, some districts are attempting to reduce the digital divide by extending fiber optics into adjacent, often low-income, neighborhoods. In their global work, MIT researchers focused on New Century Cities observed real growth in the development of digital systems (display and interactive communication systems designed into objects such as bus stop walls and café table tops) and digital places (the nexus of technology, the physical form, and activity creating new ways to teach/train and to entertain). These digital models are particularly pronounced in newer cities and districts in Asia (such as Seoul's Digital Media City) and the United Arab Emirates (Masdar City in Abu Dhabi).¹⁰⁵

4. Promote inclusive growth

Promoting inclusive growth means using innovation districts as a platform to regenerate adjoining distressed neighborhoods as well as creating educational, employment, and other opportunities for low-income residents of the city.

Given broader trends around economic restructuring, anemic job growth, and wage stagnation, many cities and metropolitan areas have experienced substantial increases in the number of people living in poverty and near poverty over the past decade. As described below, innovation districts offer multiple opportunities for neighborhood revitalization, quality employment, and poverty alleviation. Pursuing these opportunities will lessen the tensions between innovative and inclusive growth, which have emerged in many communities.

Pursue comprehensive neighborhood revitalization

As a recent survey of urban-oriented research parks highlights, 45 percent of these parks are adjacent to, or located within, distressed communities.¹⁰⁶ For this very reason, anchor institutions, like the University of Pennsylvania and Drexel University are pursuing the regeneration of adjoining neighborhoods through multiple strategies to improve public safety, provide quality education, enhance digital literacy and connectivity and expand affordable housing and retail opportunities.

As one practitioner explained, quality public schools are central to this multi-layered effort. To that end, several innovation districts are placing their considerable academic, real estate, and tech talent in the service of broader education reforms. This includes creating or adopting area schools, such as STEM charter schools or magnet schools, developing STEM-oriented curriculum, offering teaching assistance, and providing internship opportunities. In Philadelphia, for example, a consortium of institutions led by Drexel University is working with the city to create a K-8 school near its campus in an underserved neighborhood. The middle school program will be created and overseen by such esteemed institutions as the Science Leadership Academy high school in partnership with the Franklin Institute and the Academy of Natural Sciences of Drexel University. The development of the larger site would include a commercial component to yield capital dollars to help fund this school.¹⁰⁷

Increase labor market participation

Innovation districts are likely to grow jobs in multiple sectors such as housing, construction, medical, tech, services, and retail. The districts, therefore, offer ample opportunities to connect residents in high unemployment areas (particularly young residents) to occupations that require disparate sets of skills and work experience. Practitioners noted the need to be purposeful in hiring, training, and supporting local talent, with the ultimate goal of giving low-income workers economically-mobile career paths with family-sustaining wages. Further, by redirecting capital and jobs back into urban cores and urbanizing suburban parks, jobs become increasingly accessible, particularly by transit.

A number of practitioners emphasized the potential for equipping workers with the skills they need to participate in the innovation economy. Tom Andersson of Kista Science City in Stockholm, explained how they view this as their responsibility "in addressing the competence issue for the long-term."¹⁰⁸ One strategy a few practitioners are applying is to focus on the many innovation jobs (e.g., lab technicians) that require customized technical training in high schools or community colleges, rather than a four-year or advanced college degree. In fact, in mature science and research parks, the conventional

wisdom is that 40 percent of the jobs require high school diplomas or associate degrees, 40 percent require bachelor degrees, and only 20 percent require masters and Ph.Ds.¹⁰⁹ This dovetails with Brookings research, which found that half of all STEM occupations are available to workers without a four-year college degree, arguing for an expanded definition of talent.¹¹⁰ The St. Louis and Barcelona districts are particularly focused on this potential, experimenting with school-to-work programs, apprenticeships that teach career-building skills and on-the-job training programs.

The challenges associated with linking low income residents to innovation-oriented jobs should not be underestimated given vast educational disparities. In Philadelphia, district leaders are also looking to connect area residents to job opportunities in the secondary and tertiary sectors (e.g., services, retail) that the innovation district catalyzes.¹¹¹

Stimulate local entrepreneurship

Innovation districts, finally, also offer rich opportunities for local entrepreneurial growth. In some cases, specific programs have been designed to grow or support entrepreneurs from pools of less educated residents and workers. The district in Medellin, Colombia, for example, is growing talent through its fabrication lab (known as Fablab), cultivating innovations developed by people living in informal settlements.¹¹² Free to the public, the Fablab offers state-of-the-art high technology equipment, including the latest in 3-D, digital production.¹¹³ Drexel University and other area anchors in Philadelphia are pursuing entrepreneurial opportunities presented through local procurement.¹¹⁴ As shown by a recent report released by the Philadelphia city controller, purchases made by anchor institutions form a substantial potential market for local firms.¹¹⁵ These anchors are now coordinating efforts to hire local (including minority-, and women-owned) businesses to provide these products and services—essentially creating their own local supply chain. As Lucy Kerman of Drexel observed, “Local businesses tend to hire locally so anchors can effectively partner with local businesses, creating new jobs and new opportunities.”¹¹⁶

5. Ensure Access to Capital

Capital is a necessary ingredient to fuel district growth and expansion. Financing in many forms and from a variety of sources is needed to support basic science and applied research; the commercialization of innovation; entrepreneurial start-ups and expansion (including business incubators and accelerators); urban residential, industrial, and commercial real estate (including new collaborative spaces); place-based infrastructure (e.g., energy, utilities, broadband, and transportation); education and training facilities; and intermediaries to steward the innovation ecosystem. A district-wide integrated strategy, as opposed to compartmentalized efforts, enhances the likelihood that different sources of capital will value the potential of this new form of development, ultimately supporting different kinds of firms, institutions, and activities.

Redeploy and leverage local capital

Many practitioners understand the importance of garnering local capital from disparate public, private, and civic sources to spur innovation district growth, particularly in the early stages. The provision of local capital, particularly at-risk capital, is a market validator and shows that local investors are willing to back the effort. To accomplish these goals, practitioners have been intently focused on redirecting local resources to new innovative purposes and smartly leveraging these resources so that they have full impact.

Practitioners point to early signs that the mixing and leveraging of different sources of local capital is already underway. City governments, for example, are smartly redirecting scarce public resources in ways that garner large private and civic investments. In St. Louis, the city government is using tax increment financing to support infrastructure improvements. The city has also designated Cortex as the master developer for the area, delegating an ample suite of redevelopment powers including the right to exercise eminent domain, abate taxes, and enter into parcel agreements with developers; those decisions have likewise leveraged hundreds of millions of dollars in private and civic sector investment.¹¹⁷ In 2003, for example, the Danforth Foundation announced that St. Louis-based plant and life sciences would be a predominant focus of its grant-making.¹¹⁸ In tandem with the McDonnell Foundation and private corporations, the Danforth Foundation led efforts to establish

the BioGenerator, a sophisticated accelerator with a non-profit seed fund. In the last five years, the BioGenerator helped close the funding gaps challenging many local startups, aiding in the successful launch of over 40 new life science enterprises. Further, this accelerator set its eyes on drawing national and regional capital, with its parent organization BioSTL hiring a dedicated person to increase access to national VCs, angel investors, and others.¹¹⁹

Local institutional capital is also being unlocked to spur urban regeneration. MIT, for example, has used its extensive land holdings in Cambridge to spur the development of research, entrepreneurial, commercial, office and residential space.¹²⁰ In Detroit, meanwhile, philanthropic investments have been a main catalytic force. The Kresge Foundation alone recently committed \$150 million over five years to implement the recommendations and strategies outlined in the Detroit Future City report, doubling down on the investments it has already made along the riverfront, in M1 Rail, in the planning for the Detroit Future City effort, and as part of both the New Economy Initiative and Living Cities.¹²¹ These investments have provided a platform for large-scale federal investments (via FHA, DOT, SBA, HUD, and other sources) as well as other state and private sector commitments.

Provide a roadmap for broader private, civic and public sector investment

Practitioners understand that innovation districts will only reach their full potential when companies and investors outside the city and metropolis either decide to locate facilities in the district or otherwise deploy capital. Practitioners recognize further that innovation districts, by providing both a geographic, economic, and entrepreneurial focus, can bring together, in a disciplined and market-oriented way, the disparate elements required to accelerate city regeneration and metropolitan growth.

The practical implications of these insights: innovation districts must make a compelling case for investment and even create special investment vehicles tailored to disparate kinds of activities. Some innovation districts are experimenting in this regard as an avenue to raise capital. The emerging innovation district in Detroit, for example, is considering an investment prospectus that presents the vision and goals of the district, shows the market momentum to date (including a profile of major investors and investments), and describes current and future market opportunities. The prospectus would both make a general case for investment in the district but also target discrete classes of investors and institutions (real estate developers, equity investors, large firms, venture capital, and others).

The Detroit investment prospectus would cleverly build upon existing activities that have already attracted disparate kinds of investors to distinct opportunities. Invest Detroit, for example, has established a series of funds (e.g., a Predevelopment Loan Fund, an Urban Retail Fund, a Lower Woodward Housing Fund, a New Markets Tax Credit Fund) that try to match the expectations of private and civic investors with the financing needs of small- and medium-sized firms that serve different market functions in the downtown and midtown area.¹²² It is expected that the Detroit investment prospectus and the subsequent hosting of investor forums would educate the investment community about the market momentum in the innovation district and attract more capital to the specialized funds administered by an institution with a proven track record.

Scaling Innovation Districts

The rise of innovation districts—in all three typologies—has, to date, been a local phenomenon. Mayors and corporate, university, and philanthropic leaders, local developers, and intermediaries have largely driven their growth and development in most cities. A few national and global institutions have established a presence, with capital and facilities, in the leading edge districts, but most major companies and institutional investors have yet to acknowledge or adapt to this trend. The federal government has been an important but silent investor. With a few notable exceptions, states have largely acted without focus or purpose. To date, networks of innovation district practitioners and leaders remain nascent and isolated.

If current trends are any indication, innovation districts will continue to grow in size and scale, fuelled by market and demographic dynamics, open innovation, local leadership, and the place based investments of large anchor institutions. But if innovation districts are to realize their full potential across the country, then asset-rich companies, civic entities and financial institutions—with expertise

honed from global experience—need to invest at scale. Higher levels of government also need to act with more predictability and purpose.

A. Scaling Private and Civic Investment

As described previously, local institutions and investors have, to date, played the primary role in powering growth and innovation district development forward, leveraging local institutional assets and sharpening their case for broader investment. A few institutions of national scope—tech giants like Microsoft and Google, big pharmaceutical companies like Pfizer and Novartis, large urban development firms like Forest City Enterprises and life science focused real estate investment trusts like Alexandria Equities—have spotted the emerging trend and moved facilities and capital to the leading edge innovation districts. But, for the most part, large national and global institutions have not participated at scale.

Several things are necessary if that is to happen.

First, innovation districts need to be recognized as a separate sub-metropolitan/sub-urban geography worthy of focused data collection and analysis by companies that follow urban real estate and innovation trends.

Markets are created when risks and returns are made transparent, so that investors can invest in an informed way. Tracking economic trends in innovation districts (e.g., residential growth, real estate value appreciation, business formation and growth, tech transfer activity) will give investors the confidence to enter the market at scale. Companies that invest in innovative firms and start-ups will look at a broader set of cities and metropolitan areas for their investments. Companies with expertise in delivering mixed-use development and urban-oriented retail (e.g., Post Properties, Whole Foods) will see innovation districts as fertile geography for their products and services and locate accordingly. Firms that either provide innovative products and services (or provide legal, accounting, marketing, and other advice to such firms) will shift locations as well.¹²³

Given the potential for job creation in the districts, philanthropies, corporate as well as civic, will see the wisdom of supporting efforts to make innovation more inclusive. And given the entrepreneurial spirit of these new communities, demand for crowd-funding for creative and community projects will grow exponentially. Innovation districts represent, in short, a form of market creation, which will grow in size and scale as data and analytics are sharpened, first mover firms show decent returns on their initial investments and standards and models for more routinized investment are established.

Second, and more aspirational, innovation districts ultimately need to be treated as a unified asset class that recognizes the synergistic effect of disparate investments that strengthen and reinforce each other's value, rather than as a collection of separate and unrelated investments. This is a major challenge to the status quo. Financial institutions, governmental agencies, and philanthropies compartmentalize all aspects of financing (equity investments, debt lending, and grant making just to name a few) even though the focus of these investments (e.g., housing, infrastructure, small business) are physically located in small geographies and interact in a way that enhances value for each of the disparate elements.

Innovation districts, by contrast, offer a possible vehicle for “thinking horizontally across industries and sectors” and overcoming the propensity of investments in cities to come from fragmented sources in “vertical silos.”¹²⁴ As innovation districts evolve, the hope is that this insight will spur new financial innovations and unleash new flows of capital. Large commercial banks might establish special initiatives to bring spatial coherence to their current array of aspatial products and financing vehicles. Other large financial institutions might invest directly in firms and intermediaries at the cutting edge of design, execution, and management of this new development form (Blackstone's investment in the mixed use developer Eden Communities is an early example of this kind of capital shift). The end result of this: an ample supply of early stage venture capital and commercial lending becomes available in innovation districts to support the building and expansion of innovation-related firms, reinforced by real estate, small business, and community lending to create the housing and mixed-use buildings these firms and their workforce need to thrive.

B. Smart Feds, Smart States

The federal government and states, to date, have not intentionally driven the rise of innovation districts and, for the most part, have not even been cognizant of the trend. Their active engagement and involvement could accelerate the growth of districts, provided it respects the organic and differentiated nature of this nascent trend. They have three important roles to play: spurring innovation and entrepreneurial growth, financing land and infrastructure improvements, and boosting human capital.

Spurring Innovation and Entrepreneurial Growth

It is simply impossible to imagine the late 20th century rise of “cities of knowledge” in Silicon Valley, the Research Triangle, or the Boston megalopolis without recognizing the foundational role played by federal investments in basic and applied science and state investments in public universities.¹²⁵ The federal and state governments, in short, have provided the institutional platform for innovation, the base for the generation and commercialization of ideas and the creation and expansion of companies.¹²⁶

The federal and state governments do, however, play disparate roles. For example, the federal government dominates in research funding, with federal actual outlays for R&D in FY 2011 of \$125.7 billion, compared to state (and local) governments which account for only 1 percent of national R&D expenditures, with \$3.8 billion in 2011, most of which is for academic R&D at colleges and universities.¹²⁷ The federal government also supports the start-up, expansion, and trading activity of firms through the lending activity of the Small Business Administration and the Export-Import Bank. The states, by contrast, are major direct investors in public universities, advanced research aligned with state economic clusters and competitive advantages, and tax and spending investments in sophisticated building and equipment.

The general message to both the federal and state governments is to stay the course and continue to provide consistent platform funding and support for innovation. At a time of increasing fiscal austerity, maintaining the status quo would be victory enough. Yet there are several more targeted roles that the federal government and particularly the states should consider.

- **The smart location of advanced research institutions:** Given the shifting spatial geography of innovation, the federal government and states should consider locating new or existing advanced research facilities (or providing incentives for the location of such facilities) in innovation districts. The federal government achieved this when it located the first National Manufacturing Innovation Institute, focused on additive manufacturing, in the downtown of Youngstown, Ohio, close to the existing base of small and medium-size manufacturing firms.¹²⁸ The state of California achieved this when it located the Institute for Regenerative Medicine in the Mission Bay district of San Francisco.¹²⁹ As described earlier, the shifting of public university advanced research facilities to innovation districts (e.g., the location of UW Medicine in the South Lake Union district of Seattle) has become a recognized trend. In the next decade, states in particular would be wise to rethink the location of the research arms of institutions of higher learning to spur market creation and radically increase the return on state investment during a period of fiscal challenges.
- **Targeted research funding:** As federal funds for advanced research become scarcer, states would be wise to dedicate focused capital to advanced research efforts that builds on their special sector niches and competitive advantages. A recent Brookings paper noted the increased use of ballot box referendums for these purposes in California, Massachusetts, New Jersey, New York, and Texas.¹³⁰
- **Catalytic funding:** States are often involved in particular tax and spending transactions that help grow the institutional platform for innovation in cities and metropolitan areas. The state of New York, for example, recently allocated \$45 million to Buffalo to facilitate the expansion of the Columbus, Ohio-based Edison Welding Institute, one of the most advanced shared infrastructure facilities in the United States.¹³¹ The state of Massachusetts, meanwhile, recently made a \$5 million grant to facilitate the building of the LabCentral facility in Cambridge.¹³² These kinds of targeted investments for capital projects complement the more routine funding that is available for basic science and applied research and, if located in strategic places, can promote synergy and rapid commercialization.

Financing/Regulating Land and Infrastructure

The federal government and states have traditionally played a large role in the financing and regulation of the physical realm of cities. To varied degrees, both levels of higher government make direct or indirect investments in transit, roads, other infrastructure, parks, housing, and other capital improvements. States also determine building codes and standards of construction, establish how tax delinquent properties can be foreclosed, and dictate the ground rules for using eminent domain.

As with innovation funding, federal and state funding for major physical assets have been unreliable in recent years, either due to revenue shortfalls in dedicated funds (e.g., the federal Highway Trust Fund) or partisan gridlock (e.g., the failure to reauthorize federal transportation laws on a timely basis). Thus, the first order of business is to make funding more reliable and predictable, and more flexible so that cities and metropolitan areas can apply the funding to the special needs of innovation districts.

But, several other focused engagements should be considered.

- ▶ **Smart removal of infrastructure barriers:** Many innovation districts, particularly those located near waterfronts and downtowns, still bear the scars of mid-20th century freeway construction that often divided communities and disrupted the organic street grid and connectivity of urban places. The removal and reconstruction of such infrastructure provides a means to spur innovative markets. The rise of the innovation district in the Boston Waterfront is, in many respects, a consequence of the Big Dig project to tear down and bury key highways, thereby re-connecting the waterfront to the broader city and metropolis. Similar efforts are underway in cities as diverse as Akron, Detroit, and Syracuse and will have enormous impact on investment and jobs once concluded.
- ▶ **Smart use of tax incentives:** Innovation districts often house properties of historic value, which, if renovated and repurposed, could be a critical component of a district's brand and growth. They also tend to contain land parcels that are still contaminated by prior industrial use and require remediation that costs more than market value can bear. Targeted tax incentives for historic preservation, brownfield remediation, and land assembly have a high return on investment when applied in emerging innovation districts and should be encouraged and expanded. The Cortex district in St. Louis has already taken smart advantage of Missouri tax incentives and is a model in this regard.¹³³
- ▶ **Smart mortgage standards:** Innovation districts thrive when housing, retail, and small-scale innovative activities are co-designed and co-located near transit stops and anchor institutions. In the past, federal government sponsored entities and other federal and state agencies disfavored such mixed-use developments, setting a platform instead for large scale financing of single family homes. As housing reforms take hold in the aftermath of the Great Recession, sensible standards around mixed-use development and multifamily housing would benefit the smart, fiscally prudent growth of innovation districts.

Boosting Human Capital

The federal government and states heavily influence the delivery of basic education and skills training in cities and metropolitan areas. The U.S. Department of Education spent some \$68 billion in FY 2011, on both K-12 and higher education, plus another \$29 billion in tax expenditures related to education. States spent \$261 billion of their own funds for the same purpose, while local governments spent nearly \$600 billion on education.¹³⁴ Relatedly, the U.S. Department of Labor spent \$9.7 billion on employment and training programs in FY 2011.¹³⁵

Innovation districts benefit when these large scale federal and state resources are applied in a way that can be customized to their special education and skills needs. To this end, several models are worth considering:

- ▶ **Apprenticeship Carolina** helps South Carolina firms in a handful of key industry clusters establish apprenticeship programs that provide effective on-the-job training opportunities for prospective employees. It is based out of the South Carolina Technical College System. Consultants from Apprenticeship Carolina provide assistance throughout the development process, working with firms to create apprenticeships that meet the requirements of the national Registered Apprenticeship system.¹³⁶

- ▶ **Oregon's Career Pathways** initiative is focused on increasing the number of Oregonians with post-secondary certificates and degrees to prepare them for employment for jobs requiring more than a high school diploma but less than a Bachelor's degree. It is offered through the state's 17 community colleges and is designed to provide "stackable credentials" of academic certificates (12-44 credits) that can lead either to immediate employment or to the next academic credential within the career pathway, potentially leading to an associate's degree. At Portland Community College, the Career Pathways initiative includes courses and certificates in fields such as accounting, manufacturing, and medical coding.¹³⁷
- ▶ **New York State Pathways in Technology Early College High School (NYS P-TECH)** initiative is an effort to prepare thousands of disadvantaged students for jobs in such sectors as technology, manufacturing, healthcare and finance. The model is a six year, "9-14" program that combines high school, college, and career training and involves close partnerships with core industries.¹³⁸

The Path Forward

The potential for innovation district growth in the United States is exceptionally strong. Virtually every major city in the United States has an "anchor plus" play given the confluence of a strong central business district (mostly for the congregation of government and corporate headquarters, entertainment venues, and cultural functions), a strong midtown area (where advanced research institutions and medical campuses tend to concentrate), and a state-of-the-art transit corridor connecting the two.

Many cities and older suburban communities are also making progress on "re-imagined urban areas," repositioning underutilized sections of their community through investments in infrastructure (or infrastructure removal), brownfield remediation, waterfront reclamation, and transit-oriented development.

Lastly, a handful of "urbanized science parks" (and their adjacent suburban communities) are clustering development, encouraging density, and creating spaces to allow individuals and firms to network openly.

The rise of innovation districts seem perfectly aligned with the disruptive dynamics of our era: "crowd sourced rather than close sourced, entrepreneurial rather than bureaucratic, networked rather than hierarchical."¹³⁹ They also intensify the very essence of cities: an aggregation of talented, driven people assembled in close quarters, who exchange ideas and knowledge in what urban historian Sir Peter Hall calls a "dynamic process of innovation, imitation, and improvement."¹⁴⁰

Innovation districts, in short, represent a clear path forward for cities and metropolitan areas. Local decision makers—elected officials and heads of large and small companies, local universities, philanthropies, community colleges, neighborhood councils and business chambers—would be wise to unleash them. Global companies and capital would be smart to embrace them. States and federal government should support and accelerate them. The result: a step toward building a stronger, more sustainable and more inclusive economy in the early decades of this young century.

Endnotes

1. Anchor institutions are research universities and research-oriented medical hospitals with extensive R&D.
2. Select excerpts in this and future sections came from the recent book, *The Metropolitan Revolution: How Cities and Metros are Fixing our Broken Politics and Economy*, Innovation Districts chapter, co-authored by Bruce Katz and Jennifer Bradley.
3. Pete Engardio, "Research Parks for the Knowledge Economy," *Bloomberg Businessweek*, June 1, 2009.
4. The term 'innovation ecosystem' is commonly defined and described in technology and business development magazines, newspapers, and on blogs. Brookings developed this expanded definition to incorporate a more extensive list of variables observed to contribute to the innovation ecosystem at the district scale.
5. Our observations are based on extensive interviews with practitioners and leaders on-the-ground, visits to more than a dozen districts in both the United States and Europe, reviews of other scholarly research on this trend and specific fields of study (such as the growing field of networking and the changing nature of physical planning), and a roundtable discussion held at the Brookings Institution in April 2013 with nationally-recognized urban development experts.
6. To learn more about 22@Barcelona, refer to the website: www.22barcelona.com. Another source was co-authored by the CEO of 22@Barcelona, Josep Miquel Pique'. Refer to Montserrat Pareja-Eastaway and Josep Miquel Pique', "Urban Regeneration and the Creative Knowledge Economy: the Case of 22@ in Barcelona," *Journal of Urban Regeneration and Renewal* 4 (4) (2011): 1-9.
7. Research Triangle Foundation of North Carolina, "Research Triangle Park: Master Plan" (2011).
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 56. In this paper, assets are neatly bucketed under one of these three categories although several important assets can actually fit under more than one category. Shared workspace provides the best illustration of this interchangeability. While clearly a physical asset, it is also an economic asset (as economic activity is generated there), and a networking asset (as networking with adjacent start-ups often occurs there).
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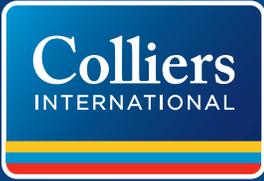
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For the first time since 2007, I am beginning to see signs of cautious corporate expansion in the East Bay, almost like watching the spring blooms begin to emerge after a long, cold winter. Professional organizations and corporations have run lean as long as possible and are now tentatively thinking about expansion ... It's been seven long years and our 15% vacancy rate means plenty of expansion space just waiting for them. In most cases it is modest growth, such as the CPA or financial planner who now has sufficient workload to justify adding one or two new employees, but after being lean and mean for the past seven years, has no extra space for them to work at. In some cases, the firm has already experimented with having employees work from home or hired third-party workers housed elsewhere, but now need to have these new employees in-house. Other firms may have a lease renewal coming up and are at a crossroads – stay at the same size and not be able to grow, or take a more optimistic approach by taking on additional office space either adjacent or through relocation. Then, the next question is how much expansion space. Unlike the tech companies that have budgets and master plans to add hundreds or even thousands of new employees, most 'non-tech' companies are still stinging from the Great Recession and think in terms of cautious, conservative growth. For us in the office leasing trenches any type of growth is a welcome relief for our past seven-year downturn!

More and more companies are designing office space to promote corporate culture, employee collaboration, enhance employee retention, boost morale and increase productivity. It is not x square feet per employee metrics anymore: L. Kershner Design owner, Lorri Kershner, "We were able to incorporate things like walls that could be written all over, walls that had embedded technology and power." Work surfaces that can be raised or lowered, "pink noise" generator that spreads low-level random frequencies across the space, most conference rooms are small for privacy, and the main boardroom has switch glass, which can be made transparent or opaque with the flick of a switch. ([The Registry Bay Area Real Estate 2014 Q2](#))

I'm not sure how much I am sticking my neck out in this prediction, but within 20 years, most office buildings will be energy neutral or will actually produce more energy than used. Roofing material will be solar collectors as

well with exterior glass and sidings, and super efficient small windmills to generate energy. Building systems will keep usage down to amazingly low levels, and technology will be transforming. According to the July 10, 2014 [Bay Area News Group](#), the Lawrence Berkeley Lab has a new facility devoted to cutting-edge research on energy-efficiency in commercial buildings, called FLEXLAB. Buildings account for 40% of all U.S. electricity use. “Many employers have found that improving the energy performance of buildings has a positive impact on employee health and productivity.”

Spike in office building operating expense pass-throughs with office building values in some submarkets space. In some states, the real estate property taxes can double, causing a huge financial hit to the tenant. If a building which was previously valued at \$300/sf sells for \$600/sf, the increase in property taxes could be as much as \$375/year, or a monthly rent spike of \$.31/sf. Few landlords are willing to cap this property tax increase exposure as, using a 6% cap rate as an example, the per square foot value of this \$3.75/rsf year expense is roughly \$67.50 per building foot. Sounds small, but for a 100,000 sf building, the value differential works out to \$6.25 million!

At least out in the suburbs we are seeing a trend with certain industries like title and insurance companies downsizing, often taking half their previous space, as paper goes online, into the clouds or gets processed overseas. Landlords with national tenancies of this type might not get the occupancy stability they have enjoyed during the past 20 years...

Ford Fish, senior vice president at Salesforce.com, is responsible for global real estate and workplace services, supporting more than 13,000 employees in 28 countries. “More and more, we are adding workplace features beyond what the city has to offer – doing things to make life a little easier for our people, like a “Bring Your Dog to Work” program, spaces for relaxation or meditation, and even basic medical services. We’ve gone from 25 percent communal space in our high-rise buildings to more than 50 percent.” ([Gensler Dialogue 25](#))

Open floor plans for offices may lead to more time off due to sickness... Swedish researchers just came out with a new study compared data from 2,000 people in seven different office designs, and those who worked in open floor plans took more time off for sickness. Women took more sick time than men in total open layouts, and in open-plan layouts without individual workstations but with some meeting rooms, men had higher rates of “sick leave.”

More Silicon Valley cutting-edge design concepts – the Comcast Cable Innovation Center in Sunnyvale recently expanded to 70,000 sf and features walls employees are encouraged to write on, lots of natural light, exposed ceiling ductwork, significant green elements, earning a Gold LEED designation, foosball and ping-pong tables, bright colors, lots of open areas as well as work nooks – all designed to foster creativity and collaboration. ([SF Registry 2014 Q2](#))

Deals and Rumors: In **Pleasanton**, Veera Systems bought a 141,000 sf office building for expansion at 4280 Hacienda Drive, North American Title is

relocating to 12,000 sf at 6616 Owens Drive, and Ellie Mae leased 106,000 sf at the Rosewood office complex, just purchased by SwiftPartners. In **Walnut Creek** Liberty Mutual expanded to 35,000 sf at 1340 Treat Blvd, and Verisight leased 13,000 at 1350 Treat Blvd. YapStone will be taking 35,000 sf sublease at 2121 N. California Blvd. In **Concord** FrontLine Mortgage leased 13,000 sf at 1855 Gateway Blvd. Down the Peninsula, Facebook just bought another million-square-foot ten-building complex on 59 acres in **Menlo Park** and in **Palo Alto** Google's Nest labs leased 208,000 sf which was the former Barnes & Noble headquarters at 300 Constitution Ave. CardioDx took 70,000 sf in **Redwood City**. In South San Francisco Portola Pharmaceuticals leased 10,000 sf at 270 E Grand Ave, and in **San Francisco** Credit Karma took 46,000 sf at 760 Market St., Google bought an 88,000 sf office building at 188 Embarcadero and also leased 50,000 sf at One Market Plaza, Pinterest bought a 245,000 warehouse at the SF Showplace Square, NerdWallet leased 46,000 sf at 901 Market St., Lenovo took 17,000 sf and the British Consulate leased 10,000 sf, both deals at One Sansome St.; and Clovis Oncology leased 19,000 sf at 1700 Owens St. In **San Rafael** BioCision signed for 11,000 sf.

"No longer a trend but a standard, the open office has become a symbol of the modern workplace. Building owners can't afford to waste space, so every nook and cranny must be considered a potential work area." ([Buildings, May 2014](#)) I would change the words "building owners" to "office users" as it is usually the office tenant paying the landlord rent who is concerned with maximizing space usage. Benching systems, collaborative spaces, glass walls - increased occupancy while leasing a smaller space - the tradeoff of closer co-worker proximity, smaller desks, but the ability to work in different areas, not chained down but mobile and flexible. Other concepts: the open executive office, with managers seated among their subordinates or using glass walls to foster transparency; floating conference rooms, some just large enough for one or two people; the Café Corner, with a bistro atmosphere conducive to people touching down and collaborating; the benching alternative with long tables, headphones for privacy and densities as low as 70 square feet per person.

San Francisco office growth is not sustainable and there will soon come a time when new office construction will slow down, primarily due to Prop M cap limitations. Every year, San Francisco has 950,000 sf of office allotment, and during The Great Recession unused allotments rolled over to allow the tremendous new building going on today. As of May 2014 there was slightly more than 2 million feet available for allocations with more than 8 million feet in pre-approval. With potentially limited office space supply, rents will go up further, and non-tech companies that aren't dependent on the San Francisco tech labor pool may either move some or all their operations eastward to the suburbs, or lower-expense areas like Texas, or offshore the jobs, or a combination of these. And, it is inevitable that at some point we will have another economic downturn to start the cycle all over again. ([San Francisco Business Times, June 2014](#))

Introverts have issues with open-plan office space and need to be able to access "private space" from time to time. An estimated 35% of the workforce

are introverts. Steelcase surveyed 39,000 workers and found that 95% of them at some point needed access to a private space, whether it be to call their doctor or spouse, or handle a special client. Susan Cain, who in 2012 published her bestseller “Quiet”, teamed up with office furniture designer Steelcase to come out with new sealed room concepts ranging from 48 to 100 square feet. “Flow,” which evokes a library, has a desk and library shelves for focus work. “Mindshare” has two chairs and a wall-embedded computer screen for team brainstorming. “Be Me” and “Studio” allow workers to decompress, meditate or take a company-sanctioned short nap. There is no prediction of any return to private offices, as the open plan, increased workforce in a smaller footprint is here to stay, but a recognition that one size doesn’t necessarily fit all. ([SFGate, June 2014](#))

How might office design and perks for tech companies one day impact traditional companies office space, hiring and retention? Will there be a “silo” effect where tech workers get all the perks, collaborative and supportive office design, no-cost lunches and dinners, be allowed to bring their dogs to the office, and not tell their friends, and not have it affect “traditional” company hiring? I can just hear the HR speech now from the insurance or financial planner, “Well, we don’t pay as much, the office is boring, no foosball, no free food, and you can’t ride your bike to work, but at least you get your office cubicle -- and no, you can’t use your iPad for company business...” Wonder where the creative, excited new millennials are headed?

“Why You Should Take Your Dog to Work” is a terrific article with benefits (and downsides). The author Richard Moran comments, “I doubt that Chevron or Nordstrom are looking at their dog policy in the Employee Manual just yet. But for many in smaller companies, especially startups, “To take or not to take, that is the question”. I would also check your lease to make sure you aren’t violating your contract.

Some of the pros:

- Your dog will introduce you to your coworkers.
- The hours you spend in the office become infinite because you don’t have to race home to let the dog out.

Some of the cons:

- A Saint Barnard or Newfoundland will take up your entire cubicle.
- Some coworkers maybe allergic or hate dogs.

[See the full article here](#)

Five Signs You’d Hate Working From Home:

1. You have work FOMO (fear of missing out), being physically separated from workplace and co-workers
2. You crave social interaction
3. You are easily distracted
4. You are not a self-starter
5. You lack work-life boundaries (work interfering with normal personal life)

[\(Bay Area News Group June 2014\)](#)

According to the San Francisco Colliers office, 51 office lease transactions have occurred within the past 60 days, accounting for more than 1.8 million square feet of office space.

What an awesome summer my two kids are having! I have asked them both if they could trade places with me, as even though I love my job... Madison, who turns 12 on August 23rd, goes to various teen camps where one day they go to Six Flags amusement park, the next day bowling in the morning and roller skating in the afternoon, then Waterworld with outdoor water slides, then Great America, followed by go-karting and indoor rock-climbing. Jordan, who just turned 17, has a full-time summer construction job and is right now collecting new and slightly used shoes for his Boy Scout Eagle project at Troop 36 ([click here](#) for his flyer), assisting an organization called Soles for Souls, so if you are in the Walnut Creek California area and want to donate shoes for a worthy cause, please email me at jeff.weil@colliers.com and I will forward these to Jordan. Thanks! Their latest photos can be viewed [here](#).

It's not what you have, it is what you have ... Sure, all things being equal, it is preferable to have the financial resources to be able to not worry about paying your bills, your children's college, helping them with their first house, being able to go on vacations that are truly a "vacation" (i.e., how many of us are really able to shut off email for a full week or more?), but like I am constantly reminded by the people in my life, on your dying day, your life satisfaction isn't how much money you will be leaving for family or how many endowments you've set up, but how you have personally enriched your family and friends with your soul, spirit and genuine love. When faced with never-ending work deadlines and financial pressures, it is so very hard to contemplate this far out in the future, but everyday words and actions that slowly add up to who you are and what impact you have had on others. Hope I didn't get too deep this time. Enjoy your summer! So you can experience why my clients keep coming back (I strive to always give 150%), please call me with all your commercial real estate needs!

Sincerely,



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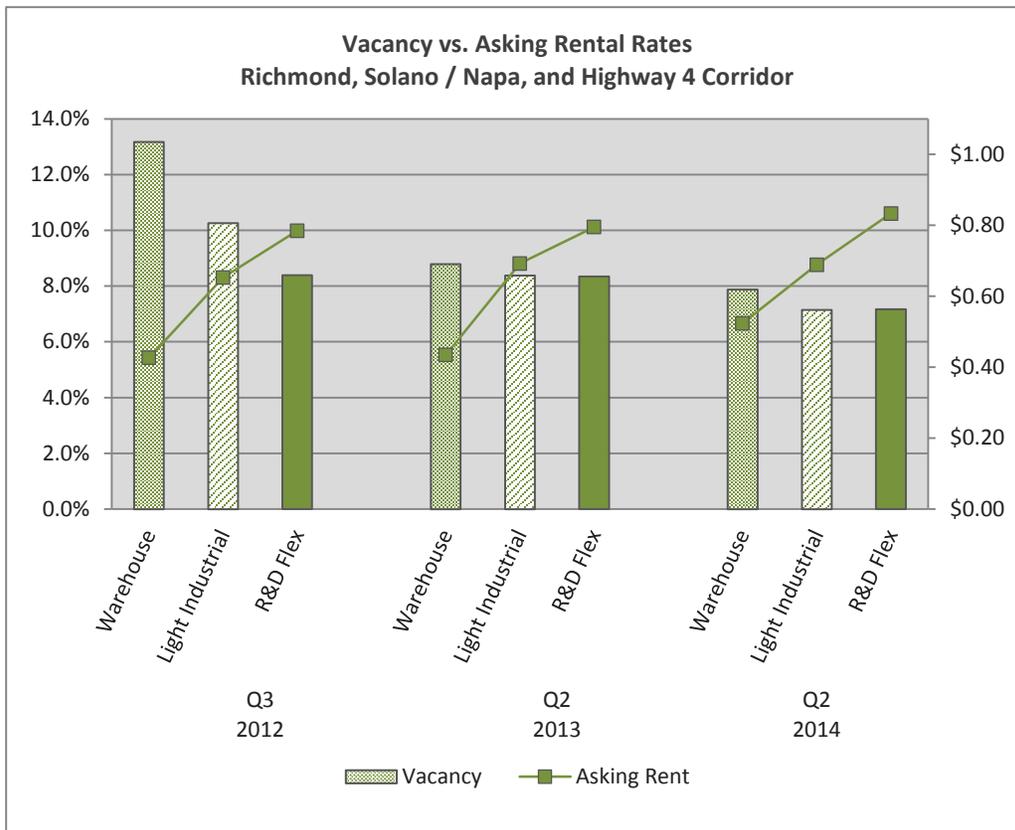
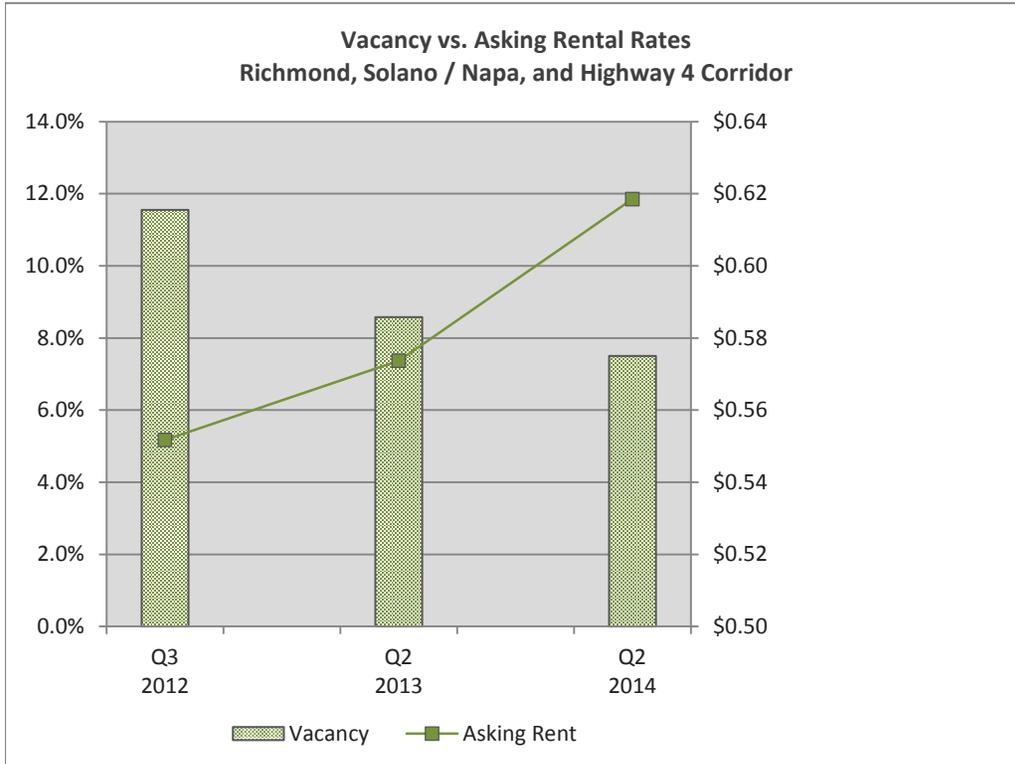
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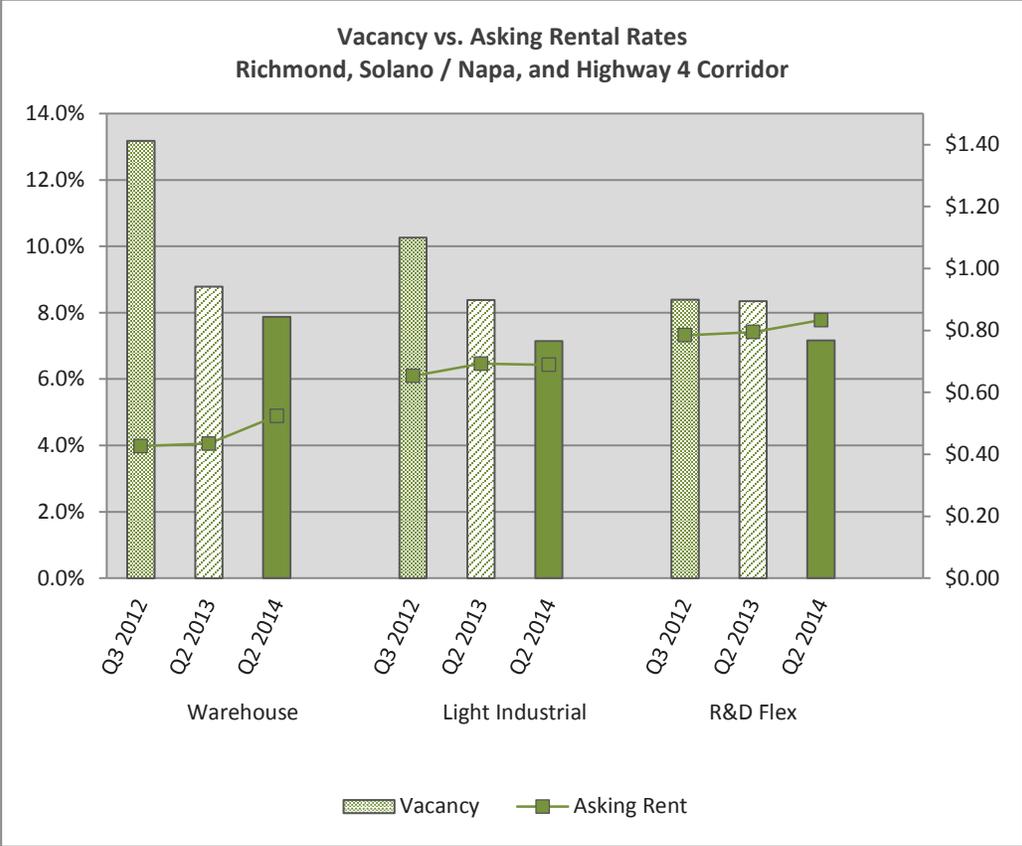
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Vacancy vs. Asking Rental Rates
Benicia Industrial Park Evaluation
Benicia, California

September 15, 2014





Financing Options

There is an array of private and public funding mechanisms that could potentially be employed to fund needed roadway, broadband, and other infrastructure improvements. The following are summaries of commonly used tools. Multiple sources could be employed in-tandem or separately to collectively secure sufficient funding for needed improvements.

Infrastructure Financing District

(IFD) are a public finance tool that permits public agencies to dedicate a portion of property tax increment generated by properties within the district to funding a broad array of public facilities and some private facilities. It is technically similar to Redevelopment financing. The difference is that the establishment of a district is subject to voter approval, the contribution of property taxes from taxing agencies is voluntary, and the diversion of property taxes from school districts is not permissible. To ensure that the City would retain sufficient resources to fund on-going municipal services, the City could explore dedicating a small portion of property tax increment towards funding the needed improvements in the BIP.

Community Facilities District

(CFDs) are special taxes imposed on property owners to fund public infrastructure improvements. Any publicly owned facility with a useful life of five or more years is an eligible use of CFD proceeds. CFDs can also be used to fund ongoing infrastructure maintenance costs. The formation of a district requires a 66% approval by registered voters within the proposed boundaries of the district if there are 12 or more registered voters, or a 66% approval by property owners within the district if there are less than 12 registered voters. The special taxes are levied and collected with ordinary property taxes. The special taxes can be used to secure bond proceeds to fund improvements or to fund improvements on a “pay as you go” basis. Both street and broadband improvements would be eligible for funding with CFD proceeds. The advantage of a CFD over an assessment district is that there does not need to be a nexus between the amount of tax paid by a taxpayer and the level of benefit received by the taxpayer.

The major complexity of establishing a CFD is the voter-approval requirements. The viability of establishing a CFD within the BIP could be tested by estimating the cost of the needed improvements and the magnitude of the required additional property tax rate relative to the overall assessed values of properties within the BIP. If the marginal tax rate would be comparatively minor relative to the benefits received, then the property owners might be willing to support the tax.

Another possible strategy for making a CFD more attractive to property owners would be for the City to fund a portion of the debt service on the CFD bonds. This could be accomplished by the City dedicating a portion of property tax revenues generated by BIP properties to the payment of debt services.

Business Improvement District

(BIDs) are formed by businesses or property owners that share a common interest or need. They are typically formed to fund specific on-going maintenance costs or services. Examples include: joint marketing campaigns; security services beyond the services of the local police force; transportation shuttles; tree and landscaping maintenance within the district, etc.