Canal Oriented Development as an Urban Waterfront

Development Mechanism

by

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ABSTRACT

Canal oriented development (COD) is a placemaking concept that aims to create mixed use developments along canal banks using the image and utility of the waterfront as a natural attraction for social and economic activity. COD has the potential to for landlocked cities, which are lacking a traditional harbor, to pursue waterfront development which has become an important economic development source in the post-industrial city.

This dissertation examines how COD as a placemaking technique can and has been used in creating urban development. This topic is analyzed via three separate yet interconnecting papers. The first paper explores the historical notion of canals as an urban economic development tool with particular attention paid to the Erie Canal. The second paper explores the feasibility of what it would take for canal development to occur in the Phoenix region. The third and final paper explores the importance of place in urban design and the success or nonsuccess of COD as a place maker through the examination of three different CODs.
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CHAPTER 1
Introduction

1.1 Introduction

This dissertation adds to a growing body of literature on water’s impact on the built form, particularly the role of Canal Oriented Development (COD) as a place based development technique. Secondly the three separate papers in this dissertation will further add to a body of literature on economic and urban development as it relates to water, fleshing out issues of water’s place within the urban fabric as an economic development tool.

The papers that are presented in this dissertation examine water and the built environment via canal oriented development through three levels of inquiry: historical, survey and placemaking. Each of three papers in this dissertation are separate papers that rest on their own individual merits, yet the arguments presented throughout each paper builds on each other with the common theme of COD interwoven.

1.2 Problem Statement

As continued research has shown (Robertson, 1995; Grogan and Proscio, 2000; Florida, 2002) city governments and urban elites look to build up urban areas to create density within their cores. It is especially important for attracting post-industrial knowledge based workers, particularly those of the Creative Class, who aspire to live in areas with cultural, economic and urban density (Florida, 2002). In recreating urban density city officials and elites are looking at their waterfronts and the inherent pull that water has for attracting people, as an important resource (Kotval and Mullin, 2001). While many cities are not blessed with an extensive waterfront, some often have urban
waterways such as rivers and canals that cut through their urban fabric, but habitually have been underutilized or neglected.

For such sites, canal oriented development (COD) may present an option for reinventing forgotten waterways. By taking advantage of these under-utilized leisure and economic development resources as well as playing on people’s attraction to water (Millspaugh, 2001; Kotval and Mullin, 2001; Martin, 2003; Hecksher, 1977) COD looks to build mixed use developments on canal banks, creating nodes of activity. The nodes create a space for mixed use work and play enhancing urban economic development and increasing urban density. It is important to understand the processes and how CODs create nodal density as CODs could present an important piece of a larger economic and urban development agenda.

1.3 Research Questions

In this dissertation I aim to answer one overarching research question and three sub questions which will be examined in three separate papers. Specifically, I ask:

*How and to what extend does canal oriented development represent a viable form of urban development for increasing density and urban economic development?*

1. **Historically and in its present context how has water been used as an economic and urban development mechanism?**

2. **How can CODs be used as an urban development strategy for creating nodal density along canals in the arid American Southwest and what measures would be needed for nodal development to occur?**
3. What are the impacts of COD design elements on the urban environment in creating a “successful” place?

In analyzing CODs I show that canal oriented development represents another important form of nodal development for increasing density and economic development. Furthermore through this dissertation I further define what is meant by canal oriented development and how it differs from other forms of waterfront/waterside development building on the work of both Ellin (2010) and Bartman (2010), who helped to define what is meant by COD.

1.4 Dissertation Structure

Taking into account the role that water plays in the development process and the renewed growth of the urban core this dissertation looks at canal oriented development as an economic development and placemaking technique for urban development. The question of: How and to what extent does canal oriented development represent a viable form of development for increasing density and economic and cultural amenities?, is answered via three separate yet interrelated papers present here in the form of chapters.

In chapter 3 (paper 1) I present a historical analysis of how waterfront development has been used to create nodes of activity within the city, especially as it pertains to canal development. Under the umbrella of the natural pull that water has on the human condition and the further commodification of water (Kaika, 2005), particular attention is paid in historical terms to the Erie Canal as an economic development source and as a builder of cities. The chapter further examines how cities are rediscovering their forgotten canal banks as an economic development source.
Chapter 4 (paper 2) builds upon the first paper by taking the major themes of historical and present day waterfront development and seeing how they play out within an arid environment. The use of water in an arid environment is of particular interest in that it glorifies the commodification of water and further heightens the physiological pull of water creating an oasis within the desert. To understand this I present the results of a survey that was administered to key players within development in the Phoenix area: government officials, consultants, developers, land use attorneys, planners, commercial realtors, and urban activists. The survey asked their views on the pros/cons/feasibility and what it would take for them to undertake COD.

Chapter 5 (paper 3) examines the impact that the built environment has on creating a successful place. Specifically I look at how the built environment of three separate CODs affects placemaking. The three sites: Bricktown in Oklahoma City, Oklahoma, the Scottsdale Waterfront in Scottsdale Arizona, and the Mandalay Canal in Las Colinas, Texas were chosen to represent CODs of varying levels of perceived success in creating a successful place for recreation, business and living. Using the well developed matrix of “What Makes a Successful Place?” from the Project for Public Spaces I determined how the physical design of each COD impacted key design concepts.

The final conclusion section synthesizes the three main parts into one discernable answer posed towards the main overarching research question. This section will also state issues for further research as well as highlight how this research and continued research into CODs as a whole could have implications for policy as well as real estate development.
1.5 Methods

This dissertation encompasses a mixed methods approach employing both quantitative and qualitative research. The mixed methods approach I undertook is a sequential approach which builds on the information that preceded it. Recognizing that all methods have limitations, by using a mixed methods approach I hope to limit or cancel the biases proposed by other methods (Creswell, 2003). This approach has employed census data analysis, survey, historical analysis and participatory ethnographic observation.

1.5.1 Paper 1

The methodological process employed is a qualitative historical analysis based on archival research. This type of historical analyses allows the author to look at historical events on waterfront development and discusses them in present terms, by employing archival research that entails the use of historical records to build a picture of present day events.

Examination of the past to inform understanding of the present is the central research idea within this chapter. It is to be understood that the present canal developments are based often on what has come before in economic and cultural aspects of canal development. As the present circumstances of canal development are different in regards to its importance to the overall urban area it does hold many similar notions of the attraction of water, as an economic and cultural driving force of urban development can prosper and expand the overall community. Because of this it is important to understand the historical ramifications which made canals a driving force for urban growth.
1.5.2 *Paper 2*

Paper 2 analyzes the pros/cons/feasibility and the measures it would take to undertake COD. To examine this a mixed methods survey was administered to key players in the Phoenix development community. Government officials, consultants, developers, land use attorneys, planners, commercial realtors, and urban activists were solicited for their input. The survey was sent to 50 participants of whom 17 surveys were returned for analysis. The survey was administered via email and consisted of 11 multiple choice questions, 5 Likert scale oriented questions and 6 open-ended questions that asked to clarify and add to their responses in the multiple choice and Likert driven questions. Cross-tabulations using SPSS statistical software were performed, allowing statistical comparisons between different groups of respondents for certain survey questions.

While the number of surveys that was returned does not present an appropriate sample size required for certain-traditional statistical procedures (i.e., chi-square tests, comparison of means tests, etc) it does supply rich qualitative data that helps to highlight key factors and development trends that are important to COD in the Phoenix region. To further clarify these trends and the ideas of the survey participants an interview was conducted with SRP to understand if the views of the development community and Salt River Project were aligned.

1.5.3 *Paper 3*

To answer the question of COD as a place maker and its impact on walkability three separate COD sites were examined: Scottsdale Waterfront, Oklahoma City Bricktown, and Mandalay Canal at Las Colinas. Using the well developed matrix of
“What Makes a Successful Place?” from the Project for Public Spaces I determined how the physical design of each COD impacted four key design concepts. These critical concepts are: access and linkages, comfort and image, uses and activities, and sociability.

**Access and Linkages:** a successful public space is easy to get to and get through; it is visible from both distance and up close.

**Comfort and Image:** includes the perceptions about safety, cleanliness, and availability of places to sit.

**Uses and Activities:** something to do gives people a reason to come to a place – and return.

**Sociability:** when people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community. (Project for Public Spaces, 2013).

The process of analyzing these concepts included walking each site both during the day and at night using the “success matrix” which asked questions about the perception of place under each of these categories to determine how the physical design affects human interaction. Each COD was looked at during the day, at night and on weekends (Fridays and Saturdays).

### 1.6 Summary

The topics and impacts measured in the three chapters represent only a small sample of impact that canal oriented development has on urban development. The theoretical framework, historical background, survey analysis, and case studies of the
individual sites chosen provide a starting point for considering the various methods used to create more sustainable cities.

As cities look to become more sustainable in the way their inhabitants live the built form will play a key role in that process. As many cities have areas that have been neglected especially forgotten canal banks, COD can present an option to revitalize these forgotten areas and in turn encourage density along the canal. With density comes less reliance on the car as means of transport and encourages walkability which not only benefits efforts of environmental sustainability but also encourages social interaction and community efficacy, which become key underling aspects of a truly sustainable urban environment.
CHAPTER 2
COD as Waterfront Development:
An overview of key ideas

2.1 Introduction

This section presents a brief overview of the main ideas in relation to waterfront and canal oriented development that will be covered in this dissertation with particular attention being given to placemaking. The ideas in this section will be the basis of much of the literature review for each of the three papers presented in this dissertation.

2.2 The Post-Industrial Waterfront

The post-industrial economy represented by service sector industries and just-in-time production has meant new challenges and economic and cultural roles for the waterfront. As much of the remaining industrial waterfront activity became centralized becoming a much more mechanized operation, many waterfront sites became empty. These forgotten sites presented the opportunity for the waterfront development to be driven by a “theme park” (Sorkin, 1992) atmosphere of consumption and cultural reification. Highlighting this, the new waterfront has capitalized on its historical significance in cultural and economic terms.

As the waterfront is becoming a key economic development source, this viewpoint has not always been the norm. According to Breen and Rigby (1994: 12) “American cities have neglected the opportunities of their waterfronts with a regularity equaled by which European cities have accepted theirs.” Setting aside past views of neglect, the current shift in how the waterfront is represented has become a driving force for cities in their attempts to revitalize their downtowns (Kotval and Mullin, 2001) and
other forgotten urban areas. Attempts at revitalization via the waterfront has meant that in conjunction with other post-industrial urban design the waterfront is no longer home to heavy “blue collar” activity, rather it is now home to the theme park persona of cute shops and eateries creating an illusion of urban vitality (Kostof, 1992).

The post-industrial waterfront as well as being a place for commerce has also become a community resource. Waterfronts in many communities function as community gathering places presenting ideal sites for festivals and events (Breen and Rigby, 1994). This position of the waterfront as a festival arena was a prominent idea in the 1970s during the urban planning fad of the festival marketplace. While the festival marketplace fad was short lived as an economic development idea, it did help to open the eyes of the public to the power of the waterfront as an economic development and cultural tool and place maker. Hence the redevelopment of the waterfront has become an important planning doctrine for waterfront cities that wish to not only create an economic development source but a community asset (Hecksher, 1977).

Though waterfront development is an important planning tool, it is not without its challenges. As being a place based development each COD and waterfront will vary in perception and outcomes based on issues of geography, business leadership, heritage, timing, political establishments and pure change (Breen and Rigby, 1994).

2.3 Place and Placemaking

The notion of place is an important concept in the creation of a successful COD. Place becomes difficult to clearly define, but what can be agreed is that it presents itself to us as a condition of human experience (Entrikin, 199; Relph 1976; Tuan, 1975, 1979)
of which it is organized in a world of meaning (Tuan, 1975) that is created through social practice on a daily basis (Cresswell, 2002). Place is developed by humans for human purposes (Tuan, 1975) that are made to suit themselves and often others like themselves (Smith et al, 1998). As people live and work in a place, they modify and adjust each place to suit their needs and values (Knox, 2005).

The idea of place as an identity can be looked at via three lenses: local (social relations), location (economic fix transactions) and sense of place (ties and attachments to their places) (Agnew and Duncan, 1989). Sense of place has the greatest impact in creating themed districts such as COD in that it typically manifests itself in historic preservation projects which glorify national, regional or local identity (Areghi, 2007). The act of creating a sense of place is created through an interconnected process that includes the act of making the place, the act of naming and the act of narration (Smith et al, 1998) all of which instill the conditions of placemaking as it gives place significance.

Placemaking is an important aspect to any successful COD as it transforms the development into a space that has normative meaning, creating a sense of attachment. Shcneekloth and Shibley (1995:1) have described placemaking as “the way all of us human beings transform the places in which we find ourselves into places in which we live.” Any construction of place then is intimately bound to the practice of placemaking (Smith et al, 1998).

The placemaking qualities of CODs are constructed via a pedestrian oriented urban design that includes a combination of open spaces, walkways, parks and public buildings that bring people into closer proximity. Increasing pedestrian interaction has been shown to increase resident interaction with others and increase social capital and
their emotional wellbeing (Jackson, 2002) as well as physical activity which offsets many of the health issues associated with urban sprawl such as obesity and heart disease (Frank, 2006). This mixture of uses should promote as Speck (2012) has shown, a General Theory of Walkability that creates a walkable space that satisfies four key conditions: it must be useful, safe, comfortable and interesting.

Places of this nature should not only promote walkability but also a reason for pedestrians to remain in the area. A place that promotes both ideally achieves an engaging environment that is alive with many people using it. In designing places in this way the area “can be influenced qualitatively by inviting more people to come and quantitatively by inviting them to stay longer” (Gehl, 2010: 73). Inviting people to stay in a place increases the chances that people will engage with the space which gives it its meaning (Carmona et al, 2010). This engagement is a byproduct of people’s interaction with a space, as Whyte (1980) has shown what attracts people is other people who together bring life and activity to that place. As discussed places are essentially then centers of meaning constructed through lived experiences of people interacting with the space and each other (Relph, 1976).

Successful places are a product of an urban design that has manipulated a location via placemaking to instill meaning based on lived experiences that encourages pedestrians to use that place. In creating successful places designers must validate and celebrate a new sense of place at the same time being true to an area’s history. In this way urban designers employ place based development that involves deliberately shaping and creating a place around images of a particular theme (Carmona, et al, 2010). For many urban areas with a harbor, the waterfront has presented an ideal basis for place based
development. This type of theme inspired development is not lost on landlocked urban areas which can implement this through COD.

2.4 Water’s Natural Attraction

For cities with waterfront property and canals, waterfront placemaking has become an important mechanism for urban leaders in reshaping their city to a post-industrial structured environment, which is centered on service oriented and image based economy. Large cities throughout the U.S. have rediscovered their waterfronts as areas that can revitalize their downtowns and create centers of activity. The principal purpose of waterfront redevelopment includes increased public access, improvement of derelict areas, urban image alteration and economic stimulation (Kotval and Mullin, 2001).

The perception of the waterfront has gone through drastic changes over the last few decades. No longer are cities purely looking at their waterfront as industrial and utilitarian centers, rather waterfronts are appreciated as entertainment and leisure sites, in addition to their role as working harbors. Many waterfront cities have followed the trend of other post-industrial cities in that their waterfront, in conjunction with a larger economic ideal has taken on what Sorkin (1992) describes as a “theme park” atmosphere. As Kostof (1992: 45-46) furthers iterates “there is now hardly any American city on the water that does not have its converted warehouse district with cute eateries and clever things to buy, and a kind of dogged amusement park mood that brings in tourists and creates the illusion of urban vitality.”

The post-industrial waterfront trend is structured on a service based and leisure activity economy which presents the opposite of its traditional function of waterfront as a
place for industrial activity (Fagence, 1995). The post-industrial image glorifies an economic ideal that attempts to replace the old image of the city as an industrial hub into one that is centered on a white-collar service based ideology. With this shift many waterfront cities have relocated most industrial waterfront activities away from the central business district (CBD), thus enabling waterside space to be redeveloped into an image that is in concert with the post-industrial ideal.

The list of waterfront redevelopment projects over the last 25-30 years continues to grow. Examples can be seen from the $2.5 billion, 95 acre, Inner Harbor redevelopment in Baltimore to the $2.5 billion, 148 acre, Darling Harbor redevelopment in Sydney (Breen & Rigby: 1996). Furthermore, developments of this magnitude show that the waterfront is a key factor in remaking the image of the post-industrial city (Breen & Rigby: 1996).

The shift in portside activity away from the CBD offers cities the opportunity for large-scale redevelopment of areas that were previously considered areas of blight (Millspaugh, 2001). Furthermore, this type of waterfront redevelopment, the new use of blighted and abandoned property, are centered on four prominent locational issues that encourage development: geographic, unoccupied property, neighborhood centrality, and water (Millspaugh, 2001), with the notion of water being the most significant as it has a magical and nostalgic quality that attracts people (Millspaugh, 2001; Kotval and Mullin, 2001; Martin, 2003; Hecksher, 1977).

While traditional harbor cities such as Baltimore’s Inner Harbor have been the traditional image we have of water redevelopment within an urban setting, waterfront development has also been an important mechanism in redeveloping communities in
landlocked areas inland from the harbor. Since industrialization these waterways have ebbed and flowed in their importance. For instance the Minneapolis riverfront was once a working industrial waterway only to fall into disrepair with the onslaught of deindustrialization in the 1960s. Through an effort of a strong private/partnership the riverfront is now one of city’s hottest residential neighborhoods becoming a citywide and regional asset (Martin, 2003).

Along with rivers, canals are important sites for waterfront development. Historically canals in the U.S have been seen as “river highways” (Kostof, 1987) and ways to move water for farming, industrial, and other urban purposes (Kaika, 2005; Kapsch, 2004; Simon, 2002). Canals were important mechanisms for the development of the US in the late eighteenth century as it provided transportation for agricultural and raw materials to the lands beyond the Appalachians (Kapsch, 2004). By the 1820s canals were supplementing and extending the idea of river highways (Kostof, 1987) thus creating a canal building boom in the early 1800s (Kapsch, 2004). In conjunction with a building boom of canals, towns sprung up along the canal banks to cater to the movement of goods (Kapsch, 2004).

Canals continued to play an important role as a mover of goods and materials until the middle of the nineteenth century when they were supplanted by the railroad (Kapsch, 2004). Even with the takeover by the railroad canals continued to be an important mechanism for the movement of water as resource in urban environments allowing for urban expansion and increased accessibility to water in the home and workplace (Kaika, 2005; Simon, 2002). Yet this utilitarian shift helped to divorce people from the day-to-day life of the canal (Kaika, 2005), in that they were no longer using the
canal for transportation of goods and people as well as sites for leisure. The divorcing of people from the canal bank has resulted in many cases, especially in Phoenix, of canal banks being forgotten sources of leisure and recreation (Fifield et al., 1990; Simon, 2002). Yet canals represent a latent opportunity to create nodes of activity reestablishing them as places for leisure and recreation as well as areas for economic growth and environmental stewardship.

The places that can be created or heightened by urban canal development while being environmentally desirable are also desirable for economic development (Blakely and Bradshaw, 2002; Koch and Sander, 2007; Portnov et al., 2001; Smyth, 1994). Adherents of mixed-use living, that include everyone from young creative driven professionals to baby boomers, are becoming an important financial force that is drawn to large urban areas with a variety of economic and leisure opportunities, within close proximity to each other (Florida, 2002; Jacobs, 1989; Landry, 2000). Thus creating nodes of activity within the urban fabric becomes an economic as well as an environmental necessity.

2.5 Canal Oriented Development

Much like the traditional harbor waterfront post-industrial canal sites also present a rich template for redevelopment as many former working canal sites have old underused or abandoned buildings which are ripe for redevelopment. Even canal sites that are blank slates offer a prime form of real estate development as a water source.

While harbor sites are situated in one large area, canal sites offer the advantage of multiple potential sites where development can take place, creating various hubs of
activity that vary in size and function based on the community, transportation network, and type of canal. Canal types vary in size and form from bypass canal to canalized rivers which will impact what type of COD can take place (Bartman, 2010). Thus canal development must be malleable in regards to its development type and structure.

In regards to malleability four primary goals must be looked at which were evident in the redevelopment of Minneapolis waterfront. These goals include: first to remove barriers to development, second to convert the waterfront from a practical utility to a public amenity, third to preserve and interpret the area’s history, and fourth to develop a mixed-use community (Martin, 2003). Each COD along the canal will be augmented and personalized for that location.

As the aim of most CODs needs to be towards infill and redevelopment these area of development are much more difficult to build on than new growth areas posing some inherent problems:

- Community’s openness to the canal;
- Municipality’s and Water Agency’s commitment to assisting development around the canal;
- Flexibility of building codes and regulations as it pertains to mixed-use development;
- Financing assistance and flexibility; and
- The degree to which district design standards, planning guidelines, and planned public investments create walkable environments (adapted from Dunphy, 2004).

As each site is personalized for its location it will continue to follow a set of guidelines and strategies that constitute COD.
2.6 COD Guidelines: Using TOD as a base

The guidelines that will drive COD are based on the guidelines that drive Transit Oriented Development (TOD) thus COD will borrow much of its structure from TOD, replacing rail lines with the canal. In defining TOD Calthorpe states that the concept of a TOD\(^1\) is simple: “moderate and high-density housing, along with complimentary public uses, jobs and services, are concentrated in mixed-use developments along strategic points along the regional transit system” (1993: 41). Further definitions of TOD and the transit village take off from Calthorpe’s but add greater dimensions of walking distances (Lund, 2006), building heights (Trumlin, 2003), and scale to the adjacent community (Dittmar et al, 2004a). While there are various definitions to what constitutes a TOD all these share some key design principles\(^2\) and size requirements. Particular principles include:

- Comfortable walking distances to a transit stop, 2000 feet-quarter mile radius-10 minute walk;
- Balanced mix of 24 hour activity;
- Average block perimeter is limited to 1350 feet; and
- Bike paths and stations (Calthorpe, 1993; Dunphy, 2004; Trumliin, 2003).

With these specific principles a secondary area needs to be planned that provides support which would include parking, less dense housing and larger retail centers (Calthorpe, 1993). Furthermore, specific goals need to be in place strengthening a functional

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\(^1\)“A Transit-Oriented Development (TOD) is a mixed-use community within an average 2,000 foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car” (Calthorpe, 1993: 56).

\(^2\)The principles of TOD development according to Calthorpe are to: “organize growth on the regional level to be compact and transit supportive; place commercial, housing, jobs, parks, and civic uses within walking distance of transit stops; create pedestrian friendly street networks which directly connect local destinations; provide a mix of housing types, densities, and costs; preserve sensitive habitat, riparian zones, and high quality open space; make public spaces the focus of building orientation and neighborhood activity; and encourage infill and redevelopment along transit corridors within existing neighborhoods” (1993: 43).
definition which includes: location efficiency, mixed-use choice, value capture/financial return, placemaking and the resolution of tension between place and node. In relation to COD each goal will vary in its importance depending on the canal type being advocated and the neighborhood in which it is being built.

First and foremost location efficiency needs to be taken into account. Location efficiency emphasizes the minimization of the automobile by “maximizing the potential synergies between, on the one hand, different land uses and, on the other hand, development and transit (Belzer et al, 2004). According to Dittmar and Poticha “the conscious placement of homes in proximity to transit systems, is crucial to building a region that is both equitable and efficient” (2004b: 23). This type of design increases the ability of lower income individuals to fully participate in the economic society.

A second key goal is that of choice. This entails creating a community with a mixture of choices in which numerous activities could be accomplished in one errand thus limiting the use and dependency of the automobile (Dittmar et al, 2004b). For Belzer and Autler choice in housing, mobility and shopping means “a land use program that generates synergies so that more daily needs can be fulfilled close to home and a range of housing types, from single-family houses to apartments, to accommodate diverse incomes and family structures (2002: 55).

Connecting with both choice and location efficiency it is necessary for there to be financial gain or value capture from the development. This means that the COD creates economic and financial value for developers, the government, communities and households. The value gained for each entity is different from the next. For local governments this entails increased tax revenues from sales and property taxes; for
households this means increased property values and decreases in household expenditures towards transportation, for the community this entails a decrease on money spent towards crime prevention and traffic calming as there would be more pedestrians on the street and lastly for the developer the decrease in parking requirements results in higher profit land uses (Belzer et al, 2002; Dittmar et al 2004a).

An important goal for COD, much like TOD, is to highlight place over node, COD must be more than just a stop along the canal but rather a destination within itself. The role of highlighting place over node lies on the developer to ensure that a proper development is built that reflects the values of the community and increase pedestrian activity through a mixed-use environment. It becomes the onus of the community to make sure that these steps are followed by the developer. Without proper placemaking by the developer a COD will ultimately fail in its attempt to not simply be a node but a destination that increases value for the developer, city and the community.

2.7 COD Site Determination

In developing a COD for economic development and as a place based development various factors become necessary to take into account and will invariably determine the success of the development. Factors for analysis include the site to be developed and the type of COD to be developed. These issues can be based the four Ds of development: distance, density, diversity and design.

Distance is not only the process of building a development that has a ten minute walk to the center but also must be determined is the distance from one COD to another. It becomes important not to overlap services and activity with a COD nearby, which
enables the greater place making capabilities. This allows a site to market itself as a destination and not just a node.

Secondly, density of any COD must be taken into account. As stated ideally it should be densest at the canal bank and decrease as it expands out. In relation to TOD, which holds true for COD, Trumlin (2003:15) states that the best functioning TODs “focus high density immediately around the station.” Building height drops rapidly and housing forms change from attached to detached as they approach the existing single-family neighborhoods that surround many stations or in the case of a COD, that surround the canals.

Diversity constitutes yet another important factor in any COD. There must be diverse uses included in every COD. These uses need to include commercial, retail and residential, as well as open spaces all within close proximity to a transit stop (Calthorpe, 1993). Diversity is import in that it allows for the development to function as its own community.

Lastly and taking into account the first three Ds design becomes the overarching factor. Without the correct design the development will be destined to fail. The proper design of the development must not only be pedestrian friendly, dense enough for walking and biking to and from the transit stop, and must have a centrally located transit stop it must also take into account the neighborhood in which it is located (Dittmar et al, 2004a). The design of any COD will vary depending on not only what type of canal is prominent but also the type of area it is located in.

As a site for development is chosen and the four Ds of development are instituted, constructing a well designed place becomes an important factor for the success of COD.
Creating a successful place based development should also include an urban design that takes into account: is the place easy to get to and does it have good visibility, is it comfortable, is there something to do in the place and does it allow for people to meet and interact with each other (Project for Public Spaces, 2013). All of these factors become key to the success of any place-based development, COD included.

2.8 Conclusion

As an economic development driver and as a place maker COD has positioned itself well to be a component of a non-harbor city’s development strategy. COD enables non-harbor cities to tap into the impact that water has as an economic development tool and as a place maker. As COD becomes more popular as a development technique, there promises to be a growing body of literature composed of case studies and best practices that will help guide practitioners and academics alike.
CHAPTER 3
Impact of Canals on Urban Development:
A U.S. historical perspective

About this Chapter

This chapter is the first of three papers that make up the analysis portion of the dissertation. The chapter is discussing the historical impact that COD has had on U.S. urban developments. With its historical premise this paper will be submitted to the Historical Geographer for publication.

3.1 Introduction

The taming and manipulation of water has historically enabled society to prosper and grow in locations unthinkable before water was controlled. In pursuit of a ‘civilized society’ humankind has manipulated and harnessed water to suit their whims and desires. In turn the idea of water has impacted the psyche of man, which has resulted in water having a natural pull (Millspaugh, 2001; Kotval and Mullin, 2001; Martin, 2003; Heckster, 1977) as a source of physical, emotional and economic life.

The control and manipulation of water has become one of society’s great triumphs allowing for the urbanization of places near and far from natural water sources. This process has not only resulted in a life giving force but also an economic one creating economic hubs of activity along waterways such as ports and byways. The urban environments that sprang from these locations harnessed natural ports and harbors to create major hubs of commerce resulting in pockets of economic development along waterways.
In conjunction with activity in and among harbors, the goods and products that were being processed through harbor cities needed a way to reach consumers within the country’s interior in the most efficient and economic manner. An important technology used for this purpose was the building of canal networks and the development of canalized rivers\(^1\) creating points of economic activity along the canal, similar to the impact of harbors, resulting in the development of cities for commerce and transportation.

Traditionally waterfront activity along canals and in harbors has been driven by industrial activity. The second half of the twentieth century saw a shift in waterfront activity, especially along canals, which experienced a decrease in industrial activity resulting in many underused or unused spaces of urban activity. The deindustrialization of the waterfront as a result of the postindustrial economy has resulted in areas ripe for reinvestment, which includes a plethora of historical building stock. This rich building stock and the lack of industrial activity has transformed many post-industrial waterfronts into theme park atmospheres based on entertainment, highline housing and consumption. (Sorkin, 1992).

This paper examines the historical context and present phenomena of waterfront development along canals with particular interest given to the Erie Canal which initiated the first wave of U.S. urban development along canals and the cities that grew from this growth. First, I will look at the manipulation and taming of water and the idea that there is an inherently natural pull of water. Second, I will examine the history of and present role of waterfront development within the urban context. The third and fourth parts of the paper will examine the history and the present role, specifically of canals, in terms of

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\(^1\) Canalized rivers constitute a controlled river that has been channelized, dredged and artificially improved so system may come to resemble an artificial waterway (Bartman, 2010).
economic and social processes and the impact that canals have had and continue to have on urban development patterns. In conclusion, this paper examines the current context in historical terms of the impact of canals on urban patterns as a present day development technique.

3.2 Methods

The methodological process employed in this paper is a qualitative historical analysis based on archival research. This type of historical analyses allows the author to look at historical events on waterfront development and discusses them in present terms, by employing archival research that entails the use of historical records to the build a picture of present day events. While historical analysis is often used as an introductory basis for research it is also as The Sage Dictionary of Social Research Methods (2006:135) highlights “a pervasive and necessary technique in its own right, without which no account of phenomena in the present may be properly understood.”

Examination of the past to inform understanding of the present is the central research idea within this paper. It is to be understood that the present canal developments are based often on what has come before in economic and cultural aspects of canal development. Because of this it is important to understand the historical ramifications which made canals a driving force for urban growth.

3.3 Water Tamed and Idealized

The control and manipulation of water can be argued to be the basis of civilization and a key part of the process of modernity. As Swyngedow (2004:17) states “whereas
pre-modernity was subject to the consequences of nature, modernity attacked nature by
transforming it.” In that nature and water become part of the production process that
affirms and reaffirms its place within the capitalist system, our ideas reflect what that
place holds within the system.

The production and reproduction of water is itself an ongoing process of how
water and its components are viewed. Hence our transforming “knowledge about water
and the waterscape can only be gauged from reconstructing the processes of its
production” (Swyngedow, 2004:22). Similar to other natural elements of economic
commerce (oil, gas, etc) through the production process, water is purified, standardized
and, most importantly in terms of wealth creation; commodified (Kaika, 2005).

Throughout history whether under the aegis of the public good or explicitly for
the purpose of private enterprise, the use of water as a development tool has served
private enterprise. The private sector through the commodification of water itself, and the
geographic space that abuts water sources, presents water as embodied within a deep
social meaning and cultural value while at the same time internalizing powerful socio-
economic and physical relations that create a material and physical geographic landscape
as well as a symbolic one (Swyngedow, 2004). This symbolic economic landscape has
been and continues to be the basis of waterfront development in both an industrial and
post-industrial economic landscape.

3.4 Waterfront Development: Canals as an urban development engine

The urban waterfront historically has been the nexus for the cultural and
economic symbolism for many urban environments. These urban settlements existed in
harmony with the water’s edge (Mann, 1973) establishing an economic and cultural connection with the water in such that waterfronts functioned as much as a community gathering spot as they did as an economic engine (Breen & Rigby, 1994). The waterfronts we traditionally think of are scale harbors and ports yet waterfront development has also occurred and continued to occur along rivers and canals which were often the routes at which goods were shipped from the harbor to the interior.

Canals present a case in point of a key form of transportation to the country’s interior. The use of canals as an economic source and as a means to move water dates back to 3000 BC in Egypt and quickly spread throughout the globe becoming important transportation, irrigation and economic mechanisms for ancient Rome, China and throughout Europe. For instance, canals became important in Europe, starting mainly with the first summit level canal, called the Stecknitz, which opened in the late fourteenth century, enabling Europeans to have a controlled and tamed water source for the movement of goods which rivers could not be entrusted to supply (Hadfield, 1986). Canals in Europe owed much too Renaissance princes who had visions of economic development. During this time frame, canals in the low countries were developed with four main objectives in mind: improve the communications of inland towns to the sea, which fostered economic growth in the interior; complete a waterline within the coast free of maritime dangers; transport coal; and to build up passenger service (Hadfield, 1986). These objectives helped to foster the European Canal Era of eighteenth and early nineteenth centuries, which resulted in the growth of towns inland and the movement of goods internally within the European confinement.
While Europe had been active in the use of canals as a source of transportation and economic growth, the United States was slow to follow, not initiating their own Canal Era until the first half of the nineteenth century. Even though the U.S. was late to look at canals, the effect was dramatic when they did so. For instance, while Britain saw the creation of a number of canal villages and towns, the American effect was multiplied in space and time with numerous new towns appearing on the landscape (Hadfield, 1986).

Before the advent and dominance of the railroad in the United States, canals were the main source of shipping goods from harbor cities to landlocked cities. According to Metz (1994:11) “the construction of canals brought about the creation of the first commercially viable interregional transportation system for bulk commodities.” By creating an interregional transportation system canals helped to develop the interior of the country from the east coast outward (Kemp, 1994), acting as a catalyst of the transportation revolution of the nineteenth century (Shaw, 1990).

As canals spread from the east coast to the west, cities and towns sprung up along the canal. These represented places and hubs of commerce, often stimulating urban economic growth directly and indirectly, and setting the stage for urban industrialization (Carlisle, 1994). As Shaw (1990) has shown, early and mid nineteenth century urban development was shaped by canals as canal basins became the train stations of the late nineteenth and early twentieth century; canal bridges determined the lines between neighborhoods; vertical grain elevators were built against the horizontal line of the canal; and wherever canals were rebuilt, enlarged or repaired, communities and neighborhoods experienced either growth or displacement. The growth of canals as a transportation
source and as an urban development mechanism helped to mark the first half of the
nineteenth century (1790-1860) as the “Canal Era” in the United States.

The Canal Era helped to spearhead the transportation revolution in the United
States which was first driven by canal construction and later by the railroad. Canals
fostered in the era by connecting distant lands to the west via water sources allowing for
the quicker movement of goods. As a result, canal construction increased in New York,
Pennsylvania, Maryland, Virginia, Illinois and numerous other Northeast and Midwest
states, with the Erie Canal being the most important of all the canals built in this time
frame. Of the canals being built, three main types dominated the landscape. According
to Taylor (1958) these types included: those that improved the transportation between the
upcountry and tidewater in states bordering on the Atlantic from Maine to Virginia; those
designed to link Atlantic states with the Ohio River Valley (Erie Canal); and those in the
west which were planned to connect the Ohio-Mississippi River systems with the Great
Lakes. Of these aforementioned canals, no other canal than the Erie had the power to
change the way the country viewed canals (See Table 3.1).

3.5 Erie Canal

With the United States well behind Europe in its use of canals as an economic and
transportation force, the decision was made to build a canal that would open up the west
connecting New York harbor with the Great Lakes. As the nation stood in 1812 no boom
in canal construction had developed as did in Great Britain. This lack of development
would change with the subsequent development and success of the Erie Canal sparking a
nationwide canal building craze (Taylor, 1958). The Erie Canal would prove to be a
transportation and economic revolutionary force for the United States by not only sparking canal building, but also establishing and forming cities, which in turn changed the American ideals of expansion.

In 1816 with the pressing need to move goods and to connect the west, the New York state legislature approved the construction of the Erie Canal. The plan for the construction of the canal called for it to be 350 miles long (end result was 363 miles long), 40 feet wide at water level, 28 feet wide at the bottom and 4 feet deep at a cost of 5 million dollars (63 million dollars in 2010) (Kapsch, 2004). This massive undertaking not only helped to usher in the “Canal Era” in the United States but also marked the beginning of American civil engineering (Kapsch, 2004). When completed in 1825 the Erie Canal would represent the marvel of its age, proving as Bernstein (2005:27) has stated that Americans perceived the “canal as an expression of faith in the potential of a free society; a message of hope for a great young nation.” More than anything the Erie Canal represented the transformation in the ideas of what Americans viewed as possible. The canal was not only an engineering feat for an infant nation but also a psychological feat that represented the country’s ability to transform itself.

The force of the canal changed the landscape of the United States from New York City to Chicago and created a growth explosion. The population of the west grew from 2.5 million people when the canal was finished in 1825 to 7.5 million twenty five years later in 1850 (Bernstein, 2005). Along with a population explosion in the west, the canal also industrialized and educated the west as towns that sprung up along the canal began to mirror harbor cities becoming “veritable seaports with piers, cargo forwarding, mercantile and grog shops” (Bernstein 2005: 337). Furthermore the west’s education
system improved through higher school attendance along the canal cities, as opposed to the rural areas, and more college students lived in these areas than in neighboring states (Bernstein, 2005).

The Erie Canal became the dividing point between the periods of the “frontier without the factory and the frontier with the factory” (Berstein, 2005: 358). This point of industrializing and educating the frontier did not go unnoticed to the rest of the country which looked to copy the success of the Erie.

In conjunction with the expansion in the West, New York City exploded in in population and property value. By 1850 New York City had become one of the major metropolitan centers in the world with a population of 700,000; quadruple the amount it had in 1825, the year the Erie Canal opened. As population increased, property values rose in tandem. According to Bernstein (2005), between 1825-1835, the value of real and personal property in New York City tripled from $101 million to $310 million and from 38%-48% of the total for New York state.

After the success and completion of the Erie major, other canals followed in the region, which included tidewater, mid-Atlantic, and western canals. The major tidewater canals in the New England region included: the Cumberland and Oxford, Blackstone, and the New Haven and North Hampton while the major mid-Atlantic canals included the Delaware and Hudson as well as the Lehigh and Morris canals. The western canals included the Miami and Erie as well as the Ohio and Erie canals which would be a powerful source in rivaling the New York end of the Erie. This was especially true of the Ohio/Erie which completed in 1833 at over 300 miles long and a cost of 8 million dollars (104 million dollars in 2010 dollars) connecting Cleveland in the north to Portsmouth on
the Ohio river creating towns and commercial centers along the way (Taylor, 1958), helping to move Ohio toward a modern industrial economy (Shaw, 1990).

Invariably it was canals, and the Erie Canal in particular, that shaped the United States by linking the states economically and empowering the nation politically. As Bourne (1992:15) has stated, “The transcendent function of the canal, the transcendent event of the canal uniting our inland seas with our ocean ports, was powerful enough to inspire a generation of realized Americans, whose inspired works can be seen in architecture, religion, engineering, politics, painting; suddenly an advanced civilization appeared in the wilds of North America.” No other environment or way of living was altered as much as the towns which abutted major canals, especially the Erie Canal, which changed the urban fabric of Upstate and Central New York.

### 3.6 Canal Era in the US

The Canal Era in the US was a clear example of a public/private partnership with each entity understanding the importance of a canal system to commerce and growth. The private sector envisioned the canal system as a way to increase their ability to efficiently ship goods and increase profits. While the private sector saw the growth of canals as a form of profit maximization, the public sector (federal and state governments) saw the canals as a way to further populate the interior via the growth of cities along the canal and the increase of commerce within the nation’s interior.

The combination of public and private sector interest in the canal resulted in an array of funding mechanisms for canal development. While initially most canals were privately built they received corporate privileges, lotteries and banking assistance from
state and federal governments (Shaw, 1990). Following the lead of the private sector states joined in the canal building hysteria such as Ohio, Pennsylvania, and New York, funding their own canals through land grants and other federal assistance programs, in turn making canals into an instrument for economic development. The growth of canals became both a private sector and public sector enterprise.

This combination of funding sources ignited an explosion of canal building in the first half of the nineteenth century. The increase in canal development was significant as privately and publically constructed canals reached 3326 miles by 1840 and 4254 miles by 1860. Yet also by 1860 the dismal future of canal development became evident as roughly 350 miles of canal were already abandoned (Shaw, 1990).

The abandonment of canals by 1860 foreshadowed the rapid decline of the importance of canals as an economic development tool as well as a source of shipping goods into the nation’s interior. Innovation the very thing that initially spurred on the canal era also became its downfall. By the middle of the nineteenth century the railroad increased in prominence setting the stage to quickly overtake the canal as the dominant source of transportation for goods as they were cheaper and quicker to build as well as covering much more ground. The growth of the railroad resulted in canals rapidly decreasing in importance by the end of the century and becoming seemingly nonexistent as a transportation source by the middle of the twentieth century (Shaw, 1990) (See Table 3.2). Thus canals were either abandoned completely or became mechanisms of water transportation for consumption via agriculture or human consumption.

As the industrial nature of the canal decreased so did the importance of towns along the canal. For those towns that survived the decline of the Canal Era; the canal lost
importance becoming derelict and forgotten. In some cases the canal was wiped off the urban map altogether as in the case of Syracuse, NY which paved over the section of the Erie Canal that ran through the middle of town. Invariably canal cities felt much of the same strains as harbor cities in having to reposition themselves within the post-industrial U.S. economy.

### 3.7 Canal Cities

The canal building craze in the United States, while initially representing an economic and political force to open the west to expansion, also became a driver for urban development. The United States modeled their canals after the British Canal Era a century earlier which carried Britain to great heights of industrial power (Bourne, 1992) and in turn created canal towns along the way. Following this example, the United States canal era also resulted in the growth of cities along major canal corridors. While the British saw the creation of numerous canal villages and towns, the American effect was multiplied in time and space (Hadfield, 1996).

In the United States urban growth during the nineteenth century was intimately linked to the canal system and the decay of those same canal cities, especially in the Northeast, would be linked to the decrease of importance of the canal system as an economic force. As Shaw (1990) has shown the process of urbanity in the United States was shaped by canals, and their progress was inseparable from that of the canal cities they served. No other canal best represented this phenomenon than the Erie.

As touched upon the building of the Erie Canal resulted in an explosion of urban growth, transforming small rural hamlets into bustling centers of commerce, trade and
culture. In expanding the cities of Syracuse, Rochester, Albany, and Buffalo the Erie Canal earned the title of “Mother of Cities” (Shaw, 1990). With the population explosion that resulted from canal development these newly formed cities were the benefactors of a population growth that resulted in the shift of industrialization of canal cities in which canal towns developed into major hubs of commerce and trade.

Cities that were once urban backwaters became urban industrial power centers. Along with Syracuse, Rochester, Albany, and Buffalo experienced population explosions. In 1817 for instance Rochester and Syracuse combined had fewer than 3000 people. With the combination of newly formed Lockport by 1825 the three towns saw a growth in population to 6000. By 1850 the population of the three towns had tripled, and as a result the land values along this route of Erie increased by 91% from 1820-1846 (Bernstein, 2005). The Erie also allowed Rochester to have a reliable transportation source for its flour mills, in turn becoming the center for the West’s grain industry thus being named the “Young Lion of the West” (Bourne, 1992). Albany presents a further example of this transformation being the nexus of the waterways, in that the population of Albany County doubled to 28,000 over the ten years after the opening of the Erie Canal in 1825 and by 1850 it had grown to 90,000 residents (Bernstein, 2005).

The major benefactor in the West of the Erie Canal became the city of Buffalo. Due to the economic expansion of the canal cities, the city grew into the greatest inland port in the United States. As transfer station of the canal and Lake Erie, the port of Buffalo became the most active grain transfer port in the world (Bourne, 1992). With a strategic location almost equidistant from Chicago, New York City, and Boston, significant development beyond grain transferring occurred allowing the city to become a
major rival to Pittsburgh for steel and by 1900 playing a major role in the development in the auto industry (Bernstein, 2005).

Beyond the cities of the Erie Canal other canals such as the Ohio helped to create urban pillars. The Ohio/Erie Canal created and further grew the cities of Akron, Toledo, and Cincinnati, as well as helping to solidly the city of Chicago as a canal city well before it was a railroad city (Shaw, 1990).

### 3.8 Syracuse, NY

Arguably no other city during the Canal Era was as greatly affected by the canal system – or turned its back on the very structure that served them well in the past - than Syracuse NY. Salt City USA, as Syracuse was nicknamed, was nothing short of a muddy unwelcoming hamlet before the canal, yet with the development of the canal it would become an industrial power.

The city reflected Mann’s (1973:14) notion that “it is on the land – the riversides and watershed areas – of the urban river that man’s farms, cities, industries and utilities have patterned themselves throughout history.” While not possessing a great river to build upon, through infrastructure marvels and the thirst for commerce in the West it was endowed with a waterway, the Erie Canal, built for the movement of goods and the need for new cities to transfer those goods in turn opening the hinterland to economic expansion. Taking on the role as major hub along the canal, Syracuse not only became a point of transfer, but the canal also enabled the city to grow its own enterprise of salt production whose growth as an industry had been historically hampered by the inability to ship its product to market.
The Canal’s impact in Syracuse and the surrounding three Salt Spring Villages (Salina, Geddes and Liverpool) in terms of economic expansion and population growth was staggering. Syracuse and the three Salt Spring Villages grew in population by two hundred eighty two percent in the 1820s (Miller, 1979). The combination of the Erie Canal and the salt deposits that surrounded Syracuse created a large industrial center out of what had been described by one 1820 visitor to the area as “so desolate it would make an owl weep to fly over it” (quoted in Bernstein 2005:361). By 1830, this muddy hamlet that would make an “owl weep to fly over it” had a population of 2565 which represented an increase of nine hundred twenty six percent from its population in 1820 (Miller, 1979).

After the opening of the Erie Canal in 1825 and its initial population explosion, the city of Syracuse continued to grow and establish itself as an economic and industrial power in Central New York. The canal opened new avenues for commerce and invited enterprises and activity (Miller, 1979) which resulted in the city growing in population from 2565 in 1830 to 22,000 people in 1850 (Bernstein, 2005). The growth was due in large part to immigrant and in-migration from the countryside that originally came to build the canal but stayed and continued to arrive to work in the salt springs. In 1855 for instance only two percent of all heads of households in Syracuse had been born in the city with forty three percent of heads of households being born outside of the United States (Miller, 1979).

The combination of the salt deposits that covered the region and the new-found ability to ship refined salt to major cities were the backbones of the city’s growth. The two worked in tandem as an engine for economic growth of the city and the region. The impact of salt production was not lost on the state of New York which used the increased
production of salt to offset the debt incurred by the building of the canal. During the 1830s and early 1840s the state increased the tax on a bushel of salt from $.04 to $.06 which enabled the state to pay off the canal debts by 1846 and in turn lower the salt bushel tax to $.01. This drop in taxation further increased salt production to the point that the production averaged eight million bushels a year, making New York the nation’s leading salt producer. By the Civil War, an of average sixty percent of all salt produced in United States moved through the Erie Canal (Bourne, 1992).

As salt production boomed in the middle of the nineteenth century, production would wane by the early part of the twentieth century, severing the city’s connection with the canal. By 1914 salt production began to heavily decrease in the region due to two main factors: the increased production of salt in the west and the increased innovation of being able to cool goods, thus replacing the need for salt as a source of curing. This decline would result in the closure of the last major salt production facility in the area the Onondaga Coarse Salt Company in 1926.

With the closure of the Onondaga Coarse Salt Company and increased impact, along with the speed and reduced cost of the railroad, the Erie Canal’s importance to the growth and commerce to the city became counterproductive. Beyond being counterproductive the canal also became a liability and hindrance to intra-urban travel, to the point that in 1925 the city filled in and cemented over the canal creating Erie Boulevard. In turn ending Syracuse’s connection with the object that made it into an industrial power.
3.9 Indianapolis

As Syracuse presents a prominent example of what canals meant to the growth of a city, it is not the only city that has gone through an up and down love affair with their canal. Indianapolis Indiana represents a city that was intimately connected to its canal only to recoil from that connection, yet that recoil has been redirected over the last twenty years to one based on admiration for their forgotten canals as a source of economic growth.

Indianapolis, like Syracuse, was immersed in the ideas and notions of the Canal Era building fad of the nineteenth century. Between 1836-1839 Indiana launched full scale into building a statewide canal network (Central Canal of Indiana) stretching over 296 miles (www.indcanal.org). The idea of a canal network stretching across the state was envisioned to be the next Erie Canal, but short-sighted financial planning caused the project to fall into bankruptcy by 1839 after only watering twenty four miles of the canal, eight of which ran through downtown Indianapolis. As the canal ran through downtown Indianapolis it performed a vital role as a water source for the city which was purchased by the Indiana Water Company and later ceded to the City of Indianapolis (Bartman, 2010). The canal helped to water the city enabling the city to grow.

By the 1960s the city lost its interest in the canal and diverted the water that was for the city underground. Eventually by the end of the 1960s the water company completely stopped its use as a water source leaving behind an empty canal bed above (www.indcanal.org). The old canal sat vacant and fallow for another twenty years until the city began to see the economic impact of what the canal could bring to downtown if

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2 While the Central Canal of Indiana would fall into bankruptcy other canals would follow enabling the state by 1850 to have 214 miles of canal. The importance of the Central Canal of Indiana lies in the fact that it ran through the city of Indianapolis.
the city reinvented the failed canal into an urban amenity that could function as a source of education, recreation, and residence. In 1985, the City of Indianapolis began to redevelop a 1.5 mile downtown portion of the canal by lowering the level of the canal, reinforcing its banks with concrete and lining the canal with buildings and cultural amenities (Bartman, 2010). This redirection toward the canal resulted in the Indianapolis “Canal Walk” and in 2006 through the passing of the Indianapolis Canal District Master Plan establishing a cultural corridor along the Canal Walk.

The results of the redevelopment of the canal by the city have been prominent in attracting cultural amenities, nightlife, recreation and residential activities. Within a two mile radius (which encompasses parts of the CB) Canal Walk the area boasts 8400 businesses, 191,000 employees and 17000 households as well as dining attractions such as TGI Fridays and the Champions Sports bar to cultural amenities which include the NCAA Hall of Champions, Eitelorg Museum of American Indians, and Victory Field to name a few (www.discovercanal.org).

### 3.10 Conclusion

The historical role of canals in the urban growth of the United States cannot be understated. It was the development of canals that initially opened the interior of the west to expansion and fostered the growth of major cities in the interior. Canals helped to shape major cities as navigational and irrigational entities. Even though canals helped to build cities they have in many of these same cities been forgotten as historical entities and brushed aside, such as the case of Syracuse NY.
Mirroring the famous Twain quote “the reports of my death are greatly exaggerated” so has the death of the canal as palcemaking force. As Martin (2003:732) has stated place and process of palcemaking constitutes “both a setting for and situated in the operation of social and economic processes, and it also provides a ‘grounding’ for everyday life and experience.” As cities are once again desirable, canals have become palcemaking engines once again. The strength of canal developments have been the very essence of Martin’s analysis in that they are geared to be places which generate both economic and cultural identities that will help to drive development and urban identity.

In places such as Indianapolis, the canals that helped build them are no longer viewed as derelict foreboding entities but rather as cultural and economic amenities. These amenities have become a source to spur development by tapping into our human instinct to be near water, in turn creating density that begets economic growth beyond the canal bank.

There continues to be an instinctual need to be near water. It is this instinctual need that is being capitalized on in the post industrial economy. While harbors continue to play an important role in the economy of the United States as a port of entry for trade, the canal is no longer needed to perform the purpose of shipping goods to the West in turn creating cities along the way. The industrial nature of the canal has all but dissipated with the ability to ship by tractor trailer and rail, leaving in its wake often a waterfront forgotten as an industrial economic engine. Instead those waterfronts are becoming rediscovered gems.

The post-industrial economy represented by service sector industries and just-in-time production has meant new challenges and economic and cultural roles for the
waterfront. As much of the remaining industrial waterfront activity became centralized becoming a much more mechanized operation, many waterfront sites became empty. These forgotten sites resulted in a waterfront driven by a “theme park” (Sorkin, 1992) atmosphere of consumption and cultural reification.

In the post-industrial economy the new waterfront has capitalized on its historical significance in cultural and economic terms. The commodification of history and culture being a key mechanism for redevelopment of the waterfront embodies the primeval pull of water (Breen and Rigby, 1994) becoming a key source of economic development.

The very nature of the post industrial economy thus is one based not on brawn but on brain, with creativity and service as the new commodity, not steel and grain. With this basis the canal situates itself as an ideal development structure of struggling cities. The new post industrial canal developments much like Indianapolis present the idea of an industrial past without having to delve into that past that would be needed in harbor areas. Instead canal developments create the myth of a waterfront and the history that comes with that myth instead of the dirty reality that the myth is based upon.

In a sense, canal developments with their connection to the water source that is not necessary for water-based trade - yet exploits the history of the trade that was its backbone - are an ideal post-industrial urban development with the cute eateries, bars, museums, and residences without the blue collar activity of the working waterfront. Developments of this nature have commodfied water to the next level, not as tool to used but rather as a tool be admired like a piece of art.

Will canals build cities in the United States? Unlikely, but they may be able to save cities. Canal development may be the silver bullet that revives urban cores and
creates an economic multiplier throughout the community. It is beyond question that the canal front is an untapped resource for many cities. In the end it will depend on how those cities use the canal front as a development mechanism.
<table>
<thead>
<tr>
<th>Table 3.1: Canals of the United States as of January 1835</th>
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<tbody>
<tr>
<td><strong>Length in Miles</strong></td>
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<tr>
<td>Cumberland &amp; Oxford Maine</td>
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<tr>
<td>New Hampshire Canals</td>
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<tr>
<td>Vermont Canals</td>
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<tr>
<td>Middlesex, MA</td>
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<tr>
<td>Pawtucket, MA</td>
</tr>
<tr>
<td>Blackstone, MA &amp; RI</td>
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<tr>
<td>Hampshire &amp; Hampden, MA</td>
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<tr>
<td>South Hadley Canal, MA</td>
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<tr>
<td>Montague Canal, MA</td>
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<tr>
<td>Farmington, Conn</td>
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<tr>
<td>Enfield, Conn</td>
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<tr>
<td>New York State Canals</td>
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<tr>
<td>Delaware &amp; Hudson, NY &amp; PA</td>
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<tr>
<td>Chittenango, NY</td>
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<tr>
<td>Morris, NJ</td>
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<tr>
<td>Delaware &amp; Raritan, NJ</td>
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<tr>
<td>Salem, NJ</td>
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<tr>
<td>Washington, NJ</td>
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<tr>
<td>Pennsylvania State Canals</td>
</tr>
<tr>
<td>Union &amp; Feeder, PA</td>
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<td>Lehigh, PA</td>
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<tr>
<td>Conestoga, PA</td>
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<td>Codorus, PA</td>
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<td>Consuego, PA</td>
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Kapsch, 2004:22
Table 3.2: 19th Century Canal Development vs Railroad Development

<table>
<thead>
<tr>
<th></th>
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<th>1840</th>
<th>1850</th>
<th>1860</th>
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<td>Canals</td>
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<td>Massachusetts</td>
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<tr>
<td>Virginia</td>
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<tr>
<td>Indiana</td>
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<td>Maryland</td>
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</tr>
<tr>
<td>Illinois</td>
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<tr>
<td></td>
<td>1125</td>
<td>73</td>
<td>3071</td>
<td>2190</td>
</tr>
</tbody>
</table>

* The US canal total can be taken as 4254m in 1860, after some 350m had been closed. (Hadfield. 1986: 335).

Map 3.1: Erie Canal Cities 1903

(http://www.eriecanal.org/maps.html)
Image 3.1: Erie Canal and Erie Blvd Downtown Syracuse

Source: www.eriecanal.org

Image 3.2: Indianapolis Canal Walk
CHAPTER 4
Feasibility of COD in the Arid Southwest:
Opinions of key stakeholders

About this Chapter

This chapter is the second of three papers that make up the analysis portion of the dissertation. The chapter is discussing what it would take to get development accomplished along the canals in the Phoenix Arizona area. With its urban development premise this paper will be submitted the *Journal of Urban Affairs* for publication.

4.1 Introduction

The arid United States southwest owes its current form to the commodification and control of water. The cities of the arid southwest mirror Swyngedow’s (2004) notion of water and sustainability: “the very sustainability of cities and the practices of everyday life that constitutes ‘the urban’ are predicated upon and conditioned by the supply, circulation, and elimination of water.” Thus the development and settlement of the southwest is reliant on the management of water (Simon, 2002), without which Phoenix, Las Vegas and Los Angeles would not assume their current form.

The battle over water rights would be the basis of the modern history of the American Southwest. First drafted in 1922, the Colorado River compact allocated 17.5 million acre feet (AF) annually to seven states, split between the Upper Basin (Wyoming, Colorado, Utah, and New Mexico) and a Lower Basin (California, Arizona, and Nevada). This contentious document allocated 7.5 million AF per basin, with an additional 1.5 million AF promised to Mexico. Allocation to individual states though, is not equal. Of the Lower Basin states California received 4.4 million AF, Arizona 2.8 million AF and
Nevada 300,000 AF. While it was considered to be the “Constitution of the West”, and it was agreed upon in 1928 by a decree of Congress, Arizona waited another 35 years to ratify the agreement since it did not view this allocation as equitable or fair (Resiner, 1986). This battle over water in the eyes of the modern southwest showed the real meaning of water “as a commodity that can be claimed, owned, bought and sold” (Simon, 2002).

Through the control of water, cities of the southwest have transformed themselves into economic hubs by constructing an elaborate infrastructure of irrigation networks. These networks transferred water from distant lands to quench the thirst of a thriving metropolis creating landscapes of wealth and habitation. For instance the impact of water commodification and the network of canals in the Phoenix region toward the end of the nineteenth century created a landscape that developed the character of a desert oasis (Simon, 2002). The canals that created this desert oasis were utilitarian by nature but played a much more important role in the nature of the growth of Phoenix than merely being a way to move water. Historically the canals were important sites for culture and recreation up until the mid-twentieth century when the role of canals shifted back to a utilitarian identity.

The strictly functional nature of the canal system would hold true for much of the second half of the twentieth century. In recent years, there has been a renewed interest in the canals as a means to economic development and a cultural amenity, in addition to their utility. An important mechanism towards the use of the canal as a form of economic development and a cultural hub is canal oriented development (COD), which builds
mixed-use neighborhood scaled developments on the canal banks where canals meet the street. These developments create urban nodes that foster cultural and economic hubs.

This paper looks at the viability of COD in the Phoenix region from a development perspective. It examines the pros, cons, and feasibility of COD with particular emphasis on what it would take for developers to undertake COD. Through this analysis, this paper highlights the historical significance of the canal system to the Phoenix region, the importance of urban coalitions to the development process, important design principles for a successful COD and the results of a survey administered to key players within the development community of the region.

4.2 Role of the Canal in the Valley of the Sun

The greater Phoenix area boasts 181 miles of canals that feed the area’s thirst for water, many of which are the original canal basins of the ancient Hohokam Indians. The Hohokam developed an intricate canal system between 1000 and 1400 AD, enabling them to practice agriculture in the arid Salt and Gila River valleys (Simon, 2002). Sometime in the fifteenth century, the Hohokam left the region, leaving behind fallow fields and their canal systems. As settlers resettled the Phoenix Valley in the late nineteenth century the canals that were abandoned by the Hohokam became the basis for civilization and are the basis for the present day 181 miles of canals that cut through the Valley. The canals that the settlers re-dug would not only supply sources of water for the growing region but also become important areas for recreation and cultural life.

Throughout much of Phoenix’s history of the late nineteenth and early twentieth century the canal was not only an important source for the prosperity of the area but also
was a key gathering place. Until the mid-twentieth century the canal system in the Valley was a place where people would picnic and recreate near the canal because of its cooler outside temperatures (Simon, 2002; Yabes et al, 1997). Invariably the residents of the area had a deep connection with the canal: homes were built near the canal and neighborhoods had public access to them (Fiefield et al, 1990). The canal was as much a part of the psyche and the day-to-day life of the community as was the desert. Phoenix thus was a quintessential canal city (Image 4.1).

This community connection with the canal would radically change after World War II. The Second World War was a source of prosperity for the area as the Valley became a key location for the military industrial complex that supported Luke Air Force base and the war effort facilitating a population boom, as many people who came to work in the military factories stayed in the Phoenix area. The influx of new people resulted in a population that did not have a historical connection to the canal (Simon, 2002) and in turn did not understand the intricacies of the canal system.

The lack of societal interaction with the canal, the advent of air conditioning, and suburban tract home development, all relegated the canal system to an afterthought, save for its functional use. With this combination of factors local municipalities, U.S. Bureau of Land Management which owns the canal system and the Salt River Project (major energy supplier and controller of 130 miles of the canal) decided to further distance the community from the canal. SRP which operates large sections of the canal system and never outwardly sanctioned its non-utilitarian water use now capitalized on and labeled the canal as a dangerous place through explicit and implicit means (Fiefield, 1990). Explicitly SRP and local municipalities ran marketing campaigns which discouraged the
use of the canal for recreational purposes and implicitly they created a barren canal environment by cementing the canal banks and destroying over 20,000 trees during the 1950s in turn destroying the riparian environment of the canal system (Simon, 2002). This change in perception altered the urban pattern of area. Houses were built away from the canal and the community had little interaction with the canal except for the occasional jogger and bicyclist (Yabes et al, 1997). Changes in the way the canal was viewed would be the main image of the canal for most of the second half of the 20th century (Image 4.2).

The banal and uninspired view of the canal banks would begin to wane in the late 1990s and early 2000s as organizations and cities rediscovered the canal banks as both a source of recreation and economic development as well as SRP’s willingness to see the recreation potential of the canal system by improving over fifty miles of canal. The Scottsdale Waterfront in Scottsdale, Arizona represents an example of how a community who shunned their canal, one which they once embraced has re-embraced it as an economic and cultural driving force. The city of Scottsdale and the greater Phoenix area, is a community that holds its very existence to the canals that wind their way through the area. The Scottsdale Waterfront development in Old Town Scottsdale would be the driving force behind renewed interest in the canal banks.

The area in which the development was to be built was declared a slum by the City of Scottsdale in 1993 paving the way for the redevelopment of the area over the next decade (Bartman, 2010). After its declaration as a “slum” in 1993 by the city government, the canal redevelopment plans offered hope to an area neglected for years. The redevelopment included a partnership of the city, SRP, business owners, public
leadership and the community. The result has been a mixed use development of upscale condos, shops, restaurants and bars along the waterfront. The Scottsdale Waterfront development in turn has become an important mechanism for commerce and created a new major gathering place for the community. The area has become a high profile venue for festivals and parties. During the Super Bowl in 2008, a large majority of the main gala parties occurred here and ESPN used the Waterfront as its home base, some 30 miles away from the game site at University of Phoenix Stadium in Glendale. (Image 4.3)

The development of any COD must balance competing and cooperating interests, and cannot succeed without assistance of both public and private interests. Key design principles must also be met for a COD to flourish in the Phoenix region.

4.3 Public Private Partnerships

As the Scottsdale Waterfront shows, the building of CODs, are complicated development processes that are not taking place on the urban fringes on open land and waterways but rather are taking place within urban areas, in established neighborhoods and on working utility company owned waterways. By taking place within established communities and structures various “players” must be balanced to have a successful COD (Table 4.1).

The theories of urban regime analysis and the growth machine becomes an important theoretical lens for examining the process of COD. Similar to any major development project its success is based as much on who is developing the project and how they involve the community as it is on the actual urban design. Logan and Molotch (1987: 32) have defined the growth machine as “an apparatus of interlocking pro-growth
associations and governmental units” and according to Judge et al, (1998: 6) urban regime theory can be describe as the process of directing “our attention away from the question of ‘who rules’ to the question of how public purposes are accomplished and, in particular, to how long-term effective governing coalitions to achieve such progress are constructed and sustained.”

Much urban regime analysis is centered on the promotion of place development and the coalitions that are built around this promotion. This is particularly evident in Logan and Molotch’s (1987) idea of the ‘urban growth machine’, which was shown earlier as the inter-locking network of pro-growth governmental and nongovernmental bodies. Molotch (1993) later defined and tied the theory of the ‘urban growth machine’ to the idea that interest groups that share a common ideal such as large property owners, financial institutions, and the local media use the government to promote and pursue their goals, of making money and land development. Invariably these growth machines become growth activists that influence government and public ideologies and set urban agendas. (Molotch, 1993).

These issues of regime and power dynamics within the COD process are particularly prevalent when considering who controls the canal banks. With SRP being the main gate keepers of the canal banks any development on the canal must be funneled through SRP. By having to funnel all development through a quasi public/private organization a strong development regime becomes an important driver for a success development.
4.4 COD Design Principles

Developing on urbanized waterways creates different challenges than greenfield development or standard urban infill development. Not only should neighborhood dynamics be taken into account, but safety, water utility companies’ interests and water infrastructure must be measured. In developing a COD, certain design principles must be acknowledged that highlight issues that are prominent in developing on urbanized waterways.

SRP and many municipalities within the Phoenix region have their own set of canal design guidelines which range from setback allowances, right of ways and ecological impacts. One prevailing principle that runs through all sets of guidelines is the role of diversity in maintaining the uniqueness of the city and neighborhoods that are adjacent to the canal. Fiefield et al (1980) laid out seven key principles to a successful canal development: preservation, integration, accessibility, identity, continuity, diversity, and safety (Table 4.2). While these seven principles are not comprehensive, they represent an important building block for a successful COD.

In instilling these seven key design principles COD adheres too many of the design ideas and guidelines that drive transit oriented development (TOD). In defining TOD Calthorpe states that the concept of a TOD1 constitutes “moderate and high-density housing, along with complimentary public uses, jobs and services that are concentrated in mixed-use developments along strategic points along the regional transit system” (1993: 41). Furthermore, Calthorpe highlights that TOD needs to “place commercial, housing, 

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1 “A Transit-Oriented Development (TOD) is a mixed-use community within an average 2,000 foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car” (Calthorpe, 1993: 56).
jobs, parks, and civic uses within walking distance of transit stops; create pedestrian friendly street networks which directly connect local destinations; provide a mix of housing types, densities, and costs; preserve sensitive habitat, riparian zones, and high quality open space; make public spaces the focus of building orientation and neighborhood activity; and encourage infill and redevelopment along transit corridors within existing neighborhoods” (1993: 43).

While Calthorpe has defined TOD to be based on transportation (vehicular) networks, water based CODs can also be based on transportation (non-vehicular) networks. Similar to TOD, COD will ideally be situated where canals meet significant transportation routes and connections with the community, allowing those who do not use the canal as a point of recreation a way to visit the COD. Furthermore a close connection to transportation networks (bus and light rail) will allow residents of CODs to more easily move between the COD and the larger community without being dependent on private automobiles in turn helping to highlight the sustainability aspects of CODs.

In its most basic case CODs will transform a stark canal landscape into an inviting oasis that will be scaled to and connected with a community, becoming a cultural and recreational amenity (Image 4.4).

4.5 Methods

To examine the pros/cons/feasibility and the measures it would take to undertake COD, a mixed methods survey was administered to key players in the Phoenix development community. Government officials, consultants, developers, land use attorneys, planners, commercial realtors, and urban activists were solicited for their input.
The survey was sent to 50 participants of whom 17 surveys were returned for analysis. The survey was administered via email and consisted of 11 multiple choice questions, 5 Likert scale oriented questions and 6 open-ended questions that asked to clarify and add to their responses in the multiple choice and Likert driven questions. Also cross-tabulations using SPSS statistical software were performed, allowing statistical comparisons between different groups of respondents for certain survey questions.

While the number of surveys that was returned does not present an appropriate sample size required for certain-traditional statistical procedures (i.e., chi-square tests, comparison of means tests, etc) it does supply rich qualitative data that helps to highlight key factors and development trends that are important to COD in the Phoenix region. To further clarify these trends and the ideas of the survey participants an interview was conducted with SRP to understand if the views of the development community and SRP were aligned.

4.6 Survey Results

The survey was delivered to key players within the Phoenix infill development community, including government officials, developers and planners. Of the seventeen (17) respondents one (1) came from the residential development community, three (3) from the commercial development community, one (1) came from mixed-use development community, two (2) from the planning community, two (2) labeled as other, one (1) from the architecture community, two (2) land use attorneys, three (3) local government, and two (2) consultancy. It is important to note that these labels are self
administered by the participant, which could be different than what the general public would view as their area of expertise.

The questions that were administered asked about the participant’s views of the canal as an asset, past proposals, the canal as real estate development, hurdles to development, what constitutes a successful COD, importance of water as a development mechanism, and the success of the Scottsdale Waterfront. In many of these questions the participant was asked to further elaborate on their reasoning for choosing a particular answer via an open ended response.

In examining the responses to the questions a large amount of the respondents saw the canal as either an asset (47%) or an opportunity (52%) with only three of the respondents having not heard or were unaware of proposals to revamp or develop the canal banks. This also resulted in the majority (82%) of the respondents seeing the canal as an “untapped asset” for real estate development with 23.5% seeing it as having very real potential for development.

More nuanced qualitative responses hinted at the notion of potential real estate development along the canals. These centered on the issues of: vision, enhanced landscape, increase of parks and recreation, business development and the idea of increasing social amenities. For instance Kirby Hoyt with Edge Industries saw the need for a proper vision to drive development: “with proper vision and design response, the canals would be a viable asset to development for several reasons – micro-climate, association with water, connectivity/linkage and curb appeal.” The importance of water was further acknowledged by George Pasquel III with Catalyst Development who stated:

“The canals are the most underutilized existing infrastructure asset in the Valley. The view of and sound from the water is a calming and cooling influence,
especially during the torrid AZ summers. The canals present a unique opportunity to take advantage of this. In much the same way that Tempe has chosen to exploit its’ previously (mostly) dry riverbed, the rest of the Valley could do so along the canal ways – likely in smaller scales.”

The connection with the neighborhoods and the canal was further exemplified by Jeremy Stapleton who saw the business impact of COD nodal densities when he said that “orienting business towards the canals would also provide opportunities for direct connections to neighborhoods, offering opportunities for nodal density and the establishment of cores.”

Survey questions also prompted respondents to suggest/acknowledge incentives for development to overcome initial barriers; 47% felt increased assistance from the city was needed to initialize projects, 29.4% saw community support being important, and 17.6% felt financial incentives were important yet none of the respondents considered tax incentives to be important. The most-cited major hindrance to development was the economy (47%) while 27% felt the city and county interference was a hindrance. An additional 17.6% expressed concern with utility companies (who control the canal) and only 5.8% saw community opposition being an issue to development.

While city support was the prevailing factor to making canal development a reality in the closed response question, when asked to expand upon their answer on the open-ended response, community participation was the overwhelming primary response. City support, financial support and SRP support were cited as ancillary drivers. The overreaching idea was that of the community driving the process and that city incentives would follow. This was summed up by Kirby Hoyt who believes that “in this political
climate it seems most likely that strong community support would propel this farther than any governmental agency/policy.” This was further noted by Donald Hadder Sr with the City of Scottsdale who stated there “needs to be a ‘grassroots’ level of awareness of the potential benefits of canal related development that in turn will provide compelling momentum for the political, financial and utility interests to join in support.” Taz Loomans with Blooming Rock Development echoed this sentiment by stating that it is necessary to change the perception of the canal and that once that perception changes, canals will be seen as “a valuable recreation and community asset. Once that shift is made, then development will follow.”

To contrast responses that asked about development hindrances, the survey also asked about what would constitute a success. Questions in this category asked what the most important factor besides financial return on investment would be, most important outcome from a successful development and what use is more important commercial or residential. The respondents felt growth around the development and pedestrian activity (each at 35.2%) were equally important factors and respondents considered neighborhood integration (41%) and the need for mixed-uses (35.2%) as being the most important outcomes of a successful development. Very little importance (each at 5.8%) was placed on either government support or proximity to public transit. A large majority felt that commercial development (58.8%) was more important than residential development (29.4%) to a successful canal development, which was corroborated by the SPSS analysis.

While respondents primarily felt commercial development was the driving force for development, residential development did play into their thoughts. Aaron Kimberlin
formerly with the Phoenix Urban Research Lab (PURLL) felt that “there has to be a driver in these locations. Commercial is the key for these unique locations.” Phillip Weddle with Weddle Gilmore echoed this in that “commercial development is more important as it is more likely to happen in the near term and could drive later residential development.” While commercial was the prevailing development of choice Donald Hadder Sr felt that residential still had a role to play as the linchpin in terms of increasing exposure, stating that “the vast majority of exposure to the canal is by residential neighborhoods – commercial areas can provide focal points and ‘spice’ up canal development but won’t drive major changes.”

Understanding that a major component of canal oriented development was its proximity to the canal, the role of water in the development needed to be understood. The physical access to water did hold much importance, as only 29.4% of the respondents felt that physical access to water was somewhat important and 23.5% saw that access was not important at all. While access to water was not considered to be an overwhelmingly important factor towards success, its mere presence in any development is seen as the important factor (41.1%) highlighting that the presence of water can help to spur excitement for the development.

The Scottsdale Waterfront encapsulates many of the successful themes for a functioning COD within the greater Phoenix study. While an extreme example of what COD proposes the Waterfront does represent a significant real estate development on the Phoenix area’s canal banks. There were mixed views of the water as an asset as 11.7% saw the Waterfront to be very important with the majority 35.2% being indifferent to its impact on development. Even though a small portion of the respondents saw the
Waterfront as an asset; 70.5% felt it was an economic success and 52.9% saw it as a cultural success.

4.7 Cross-Tabulation Results

Cross tabulation within SPSS highlighted survey themes and quantified them in terms of relative importance. The key themes that grew out of the survey results centered on issues of the canal being an asset/opportunity, the importance of water, hindrances to development, what support was important to success and what form of development constituted success. These factors along with core business were cross tabulated with the survey questions resulting in three main themes having the most prominent impacts: what it would take for development to happen; core business; and how the canal is viewed.

4.7.1 What it would take for development to happen on the canals?

The question of what it would take for development to happen on the canal centered on three main areas: assistance from the city (plans review, permitting, etc), financial support from the city, and community support (Table 4.3). Those that felt assistance from the city was the most important factor felt that commercial development was an important aspect for success and that the Scottsdale Waterfront is an economic success implying commercial development and assistance from the city are connected. Those that felt financial support from the city was important leaned towards high development potential of a mixed-development approach to success. This includes growth around the development with a reliance on commercial development as the driving force and the ability to be near water as being important. In contrast those that leaned toward community support not only felt the development potential on the canal to
be low, but also felt that if COD was to be a success, it would be driven primarily by residential development.

4.7.2 Core Business

Core business was bracketed into four areas: government, consultants, developers and other (Table 4.4). Both the government and developers saw commercial development as the key aspect to a successful COD. This idea of success dovetails with the government’s need for increased tax dollars and a developer’s wish for higher returns both of which are greater with a commercial project than a residential project. Government saw the canal as an asset that promised increased pedestrian activity, an important factor for development while consultants saw the canal as an opportunity. Developers were unsurprisingly concerned primarily with financial viability in their responses, citing the importance of commercial development reliance, as well as seeing the Scottsdale Waterfront as somewhat of an asset and believing the greatest hindrance to COD in the valley being the economic climate.

4.7.3 How the canal is viewed

Survey respondents were given the options of the canal being an opportunity, an asset, indifferent or an eyesore. All of the respondents felt it was either an asset or an opportunity (Table 4.5). For those that felt it was an asset, 100% were aware of proposals to revamp the canal while 66.7% of those that saw it as an opportunity were aware of proposals. This hints at the notion that increased exposure to canal development could make these projects more realistic and viable in the minds of stakeholders. Those that saw it as an asset also felt that the Scottsdale Waterfront was both an economic and cultural success and that pedestrian activity would be the driving force for development,
yet interestingly saw the potential for development in the Phoenix region as a whole to be low. On the other hand those that saw it as an opportunity felt the development potential to be high and commercial projects would be the driving force. This shows that those in favor of commercial development foresee a much brighter future towards the canal. This attitude could be attributable to the Scottsdale Waterfront, which over the last few years saw the residential side of the development economically struggle with foreclosures while the commercial component continued to thrive.

4.8 Discussion

The results of the survey show above all else the impact that the community has as a driving force for development to occur and that community integration will be a key factor to its success. Commercial will be a more important development type than residential when integrated with water. Water itself is an important development asset, but the ability to use water (boat, swim, etc) is not as important as the need to be near water. The instinctual human capacity and desire to be near water has been shown by Millspaugh (2001) and Martin (2003) and further is re-established in the views of key players within the Phoenix design community.

The community as a desirable component allows for a smoother development process as COD is dealing with infill development and not greenfield development. As Buckman (2011) has shown it is important to get the community to buy into a project and to work with the community on how the development plan will work. If community buy in is achieved it will open the door to other partnerships with the city, utilities (SRP), and
financial institutions. The inability to obtain community support will entail a bumpy road to success and could doom the project before it gets off the ground.

By garnering community support it will allow for increased integration which is one of the seven design principles stated by Fiefield et al (1990). Furthermore the notion of integration is one of the main principles of COD as it looks to build developments that flow and interconnect with the community at large. COD is not a one size fits all development idea rather it is based on the size and demographics of community. By building to the correct size it will allow for greater integration and accessibility which was echoed by Kirby Hoyt who added that “from a planning and development perspective … it needs to be associated with a larger connectivity concept, such as linear feeder parks and pathways that connect deeper into the fabric of the surrounding neighborhoods.”

The integration of COD into the community also entails bringing beauty back to the canals and allowing for diversity of environment. While there have been proposals put forth such as Canalscape\(^2\) there continues to be a disconnect with how the community perceives the canal; with opinions ranging from a harsh barren landscape to that of it being an untapped asset for development. One way to achieve this change in perception is as Phillip Weddle has pointed out, “reintroducing many of the large trees that once existed along the canal would make a significant difference in the comfort of users and the perception of the space.” This reintroduction of trees would increase the interest and invariably the support for COD as the canal banks would be more inviting spaces.

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\(^2\) Canalscape envisions hubs of mixed use activity connecting paths along Phoenix’s canal system. Originally an academic exercise involving students from Arizona State University and the University of Colorado at Denver, it has now been adopted by the Arizona Forward Association of Phoenix as a test project for sustainable urban development.
As the role of community and the importance of showing the canals in a new light are important aspects in moving forward, creating visible and viable projects are of key importance. For instance William Allison with Gallagher and Kennedy believes that the “successful completion of a few projects that are modest in scale other than the Waterfront will go a long way to realizing the potential.” While there tended to be a theme of the need to get a project off the ground there also tended to be a disregard for the Scottsdale Waterfront among some stakeholders. As there was consensus that the Waterfront was a success, there was also concern with its size and its privatized consumer nature. The privatized nature of the Scottsdale Waterfront discourages a public connection to the development in that according to Phillip Weddle “it pulled pedestrians away from the canal on narrow paths and placed water features in the center of circulation (creating) a dangerous precedence, as the canal circulation should feel like public space… and should have continuity for pedestrians and cyclists that are moving through the area.” As Weddle states, it is not the actual development of the Waterfront that is the problem, rather the nature of the development.

As the Waterfront sets an example of what can be done on the canal banks it clearly is not an example that all respondents felt could/should be done again on other canals. Even though the Waterfront was seen as a “success” it did not and does not connect with the community or allow for smooth integration with the existing built area. Ironically, the Waterfront is a commercially driven development, even though there is a large residential component. The commercial end (bars, restaurants, and retail) has kept the development stable while the residential has suffered through the mortgage crisis.\footnote{The foreclosure rate for the 121 residences at the Scottsdale Waterfront’s two towers as of February 2012 was 20% (Blockshopper Phoenix)}
The most striking outcome of the survey results was the lack of importance and need for partnership with SRP. Since SRP controls canal access, partnerships with developers would seem important to successful canal development. Survey participants seemed to feel that community support and affiliation would be more important instead and that through that connection, cooperation with SRP would follow suit. In general, it would have been assumed to be the reverse as SRP controls what developments and the extent to what developments can be done on the canal banks. This reversal could be due in part to what Jay Hicks with RSP Architects described as “the greatest change in canal development occurred when the State passed legislation limiting SRP’s liability for people using the canal...This limitation has lead to tremendous growth in trail development in the area’s cities.” Invariably the perceived lack of importance of SRP shows that it is first important to win the narrative and that the technical and legal aspects would follow.

4.9 Salt River Project Reaction

As the results of the survey show there is a reliance on the community to be the driving force in any canal development. In the mind of SRP the process of canal development will be a multi faceted course of action involving the community, developers, municipalities and SRP. While all these players work together to get development built and the community can pressure the city into a canal development, the city itself (especially the planning and development services departments) is the key player via financial incentives and document streamlining that will entice a developer to build according to SRP. As Jim Duncan with SRP points out "the community can put
pressure on the city, but on the ground the city will be the most important player in the canal development process due in large part to the fact that developers have not reached a threshold where canal development is a financially beneficial option, as compared to other development options, without city incentives." This is further highlighted by the fact that many developers are unwilling to build directly on the canal due in large part to the restrictions that are in place such as right of way issues and public access restrictions and allowances that take away developable land. As SRP is often unwilling to budge on restrictions in relation to the canal other than beautification projects, the loss of profits from developable land in turn must be offset by the city.

The restrictions that are placed directly on development on the canal bank do not mean that development along the canal will not take place. Rather in the eyes of Jim Duncan the kind of development that will take place will be adjacent to the canal with potential access from the development to the canal, creating nodes near the canal and accessible to the canal but not directly on the canal bank. This type of development entails much less restrictions yet allows the canal to be part of the development.

A prime example of an adjacent canal development is the corner of 40th street and Camelback in the Biltmore area of Phoenix where both Vincent’s Italian restaurant and Chelsea’s Kitchen abut the canal but are not directly on the canal. Both of these restaurants allow access to the canal without blocking right of way on the canal. Along with these destination restaurants a short walk from each is a the Arcadia Village shopping center that houses other high scale restaurants as well as an apartment complex (Capri Apartments) across 40th street from Chelsea’s Kitchen that also abuts the canal (Map 4.1).
As SRP envisions developments adjacent to the canal the growth on canal banks will be in the words of Jim Duncan a "quality of life issue" meaning greater awareness of the canal as an amenity via canal beautification projects (paved paths, low lying shrubs, lighting, street crossings) and education projects. As SRP sees the foreseeable future of the canal to be based on beautification they are not hesitant to believe that as the canal system becomes more important as a recreation and learning arena it may encourage cities to implement incentives piquing the interests of developers.

4.10 Conclusion

With 181 miles of canals that run through the Phoenix region, the canal banks represent an untapped asset for recreation and development in a region that is in need of focal points for nodal density. Historically the canal banks represented the essence of community and cultural activity within the region but through implicit and explicit campaigns by city governments and SRP the canal system no longer holds a crucial role as a cultural nexus. The renaissance of the Phoenix canal system is beginning to come forth through the large scale development at the Scottsdale Waterfront and proposals such as Canalscape and other canal beautification projects. Moving beyond proposals and making COD a reality remains a key barrier for a substantial canal renaissance to occur.

Any discussion of developments along the canal bank needs to include the idea that partnerships enable developments whether led by the community or the city. Partnerships become an important part of any development project especially that of COD, which is primarily an infill development idea that must work with multiple factions to make it a success. The notion from the survey that the partnerships that are necessary
for development to occur along the canal bank would be led by the community and not with the city or with SRP shows the over arching idea that community primarily drives this type of infill development from the development community’s point of view. Without the community backing for an infill development, no matter on the canal banks or in a more traditional location the chances of development success remain minimal.

This reliance on the community over other entities was a surprising component to come out of the survey as well as the notion that commercial development should be the driving force over residential. With SRP in control of the right of way and activity along the canal it could have been assumed that SRP would be the most important player to partner with in the COD process. With the initial hypothesis being that SRP would be the key to development on the canal as they are the gatekeepers to any type of canal development; the fact that they were not considered to be an important entity for development was the most surprising outcome of this survey. Either way it is tackled; partnering with SRP first or last, SRP must still be considered a key player in the process as they continue to control access to the canal bank.

It could have also been assumed that with the community playing a central role that commercial development would have been less important than residential, which would theoretically be more seamlessly worked into the neighboring community. Rather the reliance on both community integration and the commercial development shows the need of developers and government officials to work with the community and the need of profit which has higher returns in commercial than residential. Again this latter push towards commercial may be a byproduct of the success of the Scottsdale Waterfront’s
commercial component as opposed to the residential foreclosures that have plagued the development.

With COD being an ever-evolving process that takes into account the values and mores of the area being developed, doing multiple actors and players will be involved in the development process. The role of the community in the end becomes an important part of the development pie. A major tenet of COD is the integration into the neighboring community, including the idea of building to the proper scale of the community at large. In this regard the input of the community will be invaluable. By working with the community subtle nuances of the area can be better understood that would not otherwise be realized if the developer were to go it alone in creating a commercially vibrant COD. Yet as SRP has shown the city will still need to incentivize development for the development to "pencil out" for the developer to make a profit.

Will Phoenix fully embrace the asset of the canals as a development mechanism? Only time will tell. As the economic climate strengthens and development remerges out of the shadows of the recession, COD may present the opportunity to help change the urban landscape of the Phoenix area by creating hubs of activity which the area is sorely missing. In the end the success of COD in Phoenix will depend on re-representing the canal to the Phoenix population as not a place to be shunned but a place to be embraced. Developments and beautification along the canal will help to bring people into Phoenix’s core by creating dense inviting mixed use environments that are community driven, but at the same time embrace the openness and recreational mindset of the community by being connected by recreational paths along the canal.
Image 4.1: Past Canal Landscapes

Source: Simon, 2002

Image 4.2: Barren Canal Landscape

Source: Canalscape, 2009
Image 4.3: Scottsdale Waterfront

Image 4.4: Canal Transformation

Source: Canalscape, 2009
Table 4.1: Key Players in the COD Process

Utility Water agencies (Salt River Project)
- Control public access to the canal;
- Maintain efficient water movement (undisturbed utility usage);
- Maintain and control needed right of ways along the canal; and
- Be seen as members of the greater community.

Neighbors
- Maintain/increase property values
- Minimize mobility traffic impact;
- Increase mobility choices;
- Improve access to transit, services, and jobs;
- Enhance neighborhood livability; and
- Foster development.

Local Government
- Maximize tax revenues;
- Foster economic development;
- Please constituents; and
- Redevelop underutilized land.

Federal Government
- Protect “public interest” and set limits on how federal investment can be used.

Developers/Lender
- Maximize return on investment;
- Minimize risk; complexity; and
- Ensure value in the long term.

* The structure of the COD is sourced from pieces of Belzer et al., (2004: 44) chart of key players in the TOD process.
Table 4.2: Canal Development Design Principles

<table>
<thead>
<tr>
<th>Preservation</th>
<th>Canals are one of the only open-space systems that is common to all Valley cities and need to be maintained as the “public realm”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Canals need to be integrated (landscape and built environment) into the lives of Valley residents which implies multiple uses</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Includes not only physical but also visual and temporal, with the best uses being for the public</td>
</tr>
<tr>
<td>Identity</td>
<td>The identity of the canal is tied to its primary characteristic and has the potential to promote a popular regional image.</td>
</tr>
<tr>
<td>Continuity</td>
<td>Canal development must keep in mind that the canal is a continuous circulation system thus there must be continuity of design</td>
</tr>
<tr>
<td>Diversity</td>
<td>There must be diversity in the developments, the landscape and its use.</td>
</tr>
<tr>
<td>Safety</td>
<td>A safe canal environment that is accessible, popular and usable requires coordination with individual city standards and practices.</td>
</tr>
</tbody>
</table>

Fiefield 1990
Table 4.3: Cross-tab: What it would take for development to happen on the canals

<table>
<thead>
<tr>
<th>Assistance from the city</th>
<th>Cross-Tab Question</th>
<th>Answer</th>
<th>Percentage assistance &amp; chose answer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development potential</td>
<td>High (1 or 2)</td>
<td>62.5%</td>
</tr>
<tr>
<td></td>
<td>Most important for success</td>
<td>Commercial Development</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Scottsdale Waterfront as an economic success</td>
<td>Yes</td>
<td>87.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial support from city</th>
<th>Cross-Tab Question</th>
<th>Answer</th>
<th>Percentage financial support &amp; chose answer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development potential</td>
<td>High (1or 2)</td>
<td>66.7%</td>
</tr>
<tr>
<td></td>
<td>Major hindrance to success</td>
<td>Economic climate</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>Most important factor for successful development</td>
<td>Growth around development</td>
<td>66.7%</td>
</tr>
<tr>
<td></td>
<td>Most important outcome for successful development</td>
<td>Mixed uses</td>
<td>66.7%</td>
</tr>
<tr>
<td></td>
<td>Most important use for success</td>
<td>Commercial development</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Impact of water being important</td>
<td>Very: 1 (1-5)</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Community support from city</th>
<th>Cross-Tab Question</th>
<th>Answer</th>
<th>Percentage community support &amp; chose answer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development potential</td>
<td>Low (3 or 4)</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>Major hindrance to success</td>
<td>Everything but the economy (utility, city, county, neighborhood)</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Most important use for success</td>
<td>Residential development</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>Importance of access to water</td>
<td>Somewhat: 2 (1-5)</td>
<td>80%</td>
</tr>
</tbody>
</table>
Table 4.4: Cross-tab: Core business

<table>
<thead>
<tr>
<th>Government</th>
<th>Cross-Tab Question</th>
<th>Answer</th>
<th>Percentage government &amp; chose answer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How do you view the canal</td>
<td>Asset</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Most important factor for development</td>
<td>Pedestrian activity</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Most important use for success</td>
<td>Commercial development</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Scottsdale Waterfront as an economic success</td>
<td>Yes</td>
<td>75%</td>
</tr>
<tr>
<td>Consultants</td>
<td>Cross-Tab Question</td>
<td>Answer</td>
<td>Percentage consultants &amp; chose answer</td>
</tr>
<tr>
<td></td>
<td>How do you view the canal?</td>
<td>Opportunity</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>Development potential of the canals</td>
<td>High (1 or 2)</td>
<td>80%</td>
</tr>
<tr>
<td>Developers</td>
<td>Cross-Tab Question</td>
<td>Answer</td>
<td>Percentage developers &amp; chose answer</td>
</tr>
<tr>
<td></td>
<td>Major hindrance to development</td>
<td>Economic climate</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Most important use for success</td>
<td>Commercial development</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>How important are cases studies</td>
<td>Moderate: 3 (1-5)</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Scottsdale Waterfront as an asset</td>
<td>Somewhat: 2 (1-5)</td>
<td>75%</td>
</tr>
<tr>
<td>Other</td>
<td>Cross-Tab Question</td>
<td>Answer</td>
<td>Percentage other &amp; chose answer</td>
</tr>
<tr>
<td></td>
<td>Impact of water on a success development</td>
<td>Very: 1 (1-5)</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Scottsdale Waterfront as an economic success</td>
<td>Yes</td>
<td>75%</td>
</tr>
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Table 4.5: Cross-tab: How do you view the canal?

<table>
<thead>
<tr>
<th>Asset</th>
<th>Cross-Tab Question</th>
<th>Answer</th>
<th>Percentage asset &amp; chose answer</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Aware of proposals</td>
<td>Yes</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Development potential of the canal</td>
<td>Low (3 or 4)</td>
<td>62.5%</td>
</tr>
<tr>
<td></td>
<td>Most important factor for success</td>
<td>Pedestrian activity</td>
<td>62.5%</td>
</tr>
<tr>
<td></td>
<td>Scottsdale waterfront as an economic success</td>
<td>Yes</td>
<td>87.5%</td>
</tr>
<tr>
<td></td>
<td>Scottsdale Waterfront as a cultural success</td>
<td>Yes</td>
<td>62.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Cross-Tab Question</th>
<th>Answer</th>
<th>Percentage opportunity &amp; chose answer</th>
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<tr>
<td></td>
<td>Aware of proposals</td>
<td>Yes</td>
<td>66.7%</td>
</tr>
<tr>
<td></td>
<td>Development potential of the canal</td>
<td>High (1 or 2)</td>
<td>77.8%</td>
</tr>
<tr>
<td></td>
<td>Most important use for success</td>
<td>Commercial development</td>
<td>66.7%</td>
</tr>
</tbody>
</table>
Map 4.1: Adjacent COD - Chelsea’s Kitchen Project Area

Source: Mapquest.com
CHAPTER 5
COD As a “Successful” Urban Place

About this Chapter

This chapter is the last of three papers that make up the analysis portion of the dissertation. The chapter is discussing what makes a successful place. It highlights design techniques that make a good urban place. Using these design techniques three CODs are looked at to determine their success as placed based developments. With its urban design and placemaking premise this paper will be submitted to the Journal of Urban Design for publication.

5.1 Introduction

Many North American cities had forgotten their waterfronts as the industrial economy of the city changed in the second half of the twentieth century. The abandonment of the working waterfront left behind a rich cultural and historical heritage as well as a wealth of building stock that is ripe for redevelopment, which creates the makings for a prototypical themed district rooted in the history and natural pull of water as a gathering source (Millspaugh, 2001; Kotval and Mullin, 2001; Martin, 2003; Hecksher, 1977). As Kostof (1992: 45-46) has highlighted:

“there is now hardly any American city on the water that does not have its converted warehouse district with cute eateries and clever things to buy, and a kind of dogged amusement park mood that brings in tourists and creates the illusion of urban vitality.”

In this notion city governments have promoted their waterfronts as economic and cultural development tools. Even cities without a harbor have found ways to promote waterfront development, via canal oriented development (COD) that seeks to build mixed
use developments on canal banks that encourage walkable pedestrian activity through place based development. COD heightens the redevelopment/development of the waterfront to the next level, fully embracing the post-modernist and post-industrial ideals of the city, through the manipulation and redesign of canal systems and canalized rivers which meets the needs of the post-industrial city through the process of placemaking.

This paper critically examines one example of the impact that the built environment has on creating a successful place. Specifically I look at how the built environment of three separate CODs affect place development, which generally impacts density, health and real estate valuation. The aim of this paper is to address the following research question: What are the impacts of COD design elements on the urban built environment in creating “successful” places? The three sites which were chosen to answer this question and to examine place development include: Bricktown in Oklahoma City, Oklahoma, the Scottsdale Waterfront in Scottsdale, Arizona, and the Mandalay Canal in Las Colinas, Texas.

Structurally, the first third of the paper examines the theory of COD and the literature on place and placemaking through urban design. The second third of the paper examines each development individually examining the role of urban design as a promotion of a successful urban place as defined by the Project for Public Places. The last third of the paper discusses and examines the overall impact of design specifically on CODs and discusses both successful and unsuccessful strategies that create vibrant urban places.
5.2 Rebirth of the Core

The second half of the twentieth century witnessed the transformation of the suburbs into an urban development pattern promising relief from urban social ills. Yet the suburbs generated social ills of their own including: sprawl, health issues, traffic congestion and environmental degradation (Frank, 2006; Frumkin, 2003; Newman, 2001; Roseland et al, 2005). As the ills of the suburbs intensified toward the end of the twentieth century the divested urban core reentered the discussion of urban development. The urban core’s importance increased as retiring Baby Boomers (empty nesters) and the children of the suburbs longed for a different way of living and recreating.

In the wake of changing attitudes toward the urban core, many cities were transforming their “black and blue collar” industrial centers into post-industrial/post-modernist structures based on the service sector and the image of urbanity without the dirt that comes with it. The change in urban structure played on the desires of those that longed for the “urban” especially in those fields of what Florida (2002) has coined as the “Creative Class” of K economies.

In creating this form of urbanity, city development officials have looked to the creation of themed districts, or what Sorkin (1992) has referred to as “theme park” structures, where consumption could be encouraged and controlled through mixed-use developments. Theme park developments of this nature include: entertainment districts, stadium districts, and arts districts, including COD which adheres to a thematic representation of the city. COD design posits a recreation of historical themes of water development by promoting its aesthetic values instead of its industrial past which makes it an ideal component of any urban redevelopment toolkit in the post-industrial city.
5.3 Canal Oriented Development

Waterfront development is generally considered to be centered in cities with harbors and extensive riverfronts, though cities that are not blessed with these natural geographic conditions can also form waterfront development through canal oriented development (COD). Along with rivers and harbors, canals have become important sites of waterfront development. Canals which are prominent in many non-harbor or riverfront cities represent an opportunity to create place based development enabling places for leisure and recreation as well as areas for economic growth and environmental stewardship centered on dense walkable environments.

The areas of development that can be created or heightened by urban canal development while being environmentally desirable are also attractive sites for economic development (Blakely and Bradshaw, 2002; Koch and Sander, 2007; Portnov et al, 2001; Smyth, 1994). Adherents of mixed-use living that include everyone from young creative professionals to retiring Baby Boomers, are becoming an important financial force that is drawn to large urban areas with a variety of economic and leisure opportunities, all within close proximity to each other (Florida, 2002; Jacobs, 1989; Landry, 2000). Creating places of mixed-use activity within the urban fabric becomes an economic and environmental necessity for sustainable urban environments.

While harbor sites are situated in one large area, canal sites offer the advantage of multiple potential sites of development on various scales with various sized footprints depending on the type of canal and community of which the canal is bisecting. These multiple site developments should create hubs of activity that vary in size and function based on the community, transportation network and type of canal (Table 5.1: Canal
Types). COD then presents a design technique that must be malleable to the community and fit within the type of canal and development structure it adheres to.

Constructing and enacting a COD is dependent on the community’s economic development and structural needs. The aim of most CODs should be towards infill and redevelopment. The COD design structure in turn borrows much of its basis from Transit Oriented Development (TOD), replacing rail lines with the canal. In defining TOD Calthorpe (1993:41) states that the concept of a TOD\textsuperscript{1} is simple: “moderate and high-density housing, along with complimentary public uses, jobs and services, are concentrated in mixed-use developments along strategic points along the regional transit system.”

An important goal for COD much like TOD is to highlight place over node. The role of highlighting place over node falls to the designer to ensure that a proper development is built that reflects the values of the community and increases pedestrian activity through a mixed-use environment. The idea of place and the act of placemaking become important qualities in understanding the success or non-success of any COD, as a COD should be expected to enjoy greater success if these qualities are taken into account.

5.4 Place

The notion of place is an important concept in the creation of a successful COD. The term place has often been difficult to theorize because of its confused and intractable qualities (Smith et al, 1998) yet it can be agreed that place presents itself to us as a

\textsuperscript{1}“A Transit-Oriented Development (TOD) is a mixed-use community within an average 2,000 foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car” (Calthorpe, 1993: 56).
condition of human experience (Entrikin, 199; Relph 1976; Tuan, 1975, 1979). Thus place is an organized world of meaning (Tuan, 1975), which is created through social practice constantly being made and remade on a daily basis (Cresswell, 2002). This continuous reshaping shows that places are in the words of Relph (1976:3), “complex integrations of nature and culture that have developed and are developing in particular locations and which are linked by flows of people and goods to other places.”

The linking of flows of people and goods that integrate culture and nature imply a site of human creation. Place is developed by humans for human purposes (Tuan, 1975) that are made to suit themselves and often others like themselves (Smith et al, 1998). As people live and work in a place, they modify and adjust each place to suit their needs and values (Knox, 2005). The idea of place as an identity can be looked at via three lenses: local (social relations), location (economic fixed transactions) and sense of place (ties and attachments to their places) (Agnew and Duncan, 1989). The notion of a sense of place has the greatest impact in creating themed districts such as COD in that it typically manifests itself in historic preservation projects which glorify national, regional or local identity (Arefi, 2007). The creating a sense of place is an interconnected process that includes the act of making the place, the act of naming and the act of narration (Smith et al, 1998) all of which instill the conditions of placemaking as it gives place significance.

Placemaking is a key aspect to any successful COD as it transforms the development into a space that has normative meaning, creating a sense of attachment. Sheneekloth and Shibley (1995:1) have described placemaking as “the way all of us human beings transform the places in which we find ourselves into places in which we live.” Any philosophy of place then is intimately bound to the practice of placemaking.
(Smith et al, 1998). Highlighting this further in terms of the post industrial economy Smith et al (1998:6) explains that “places today are commodities in an international market and they must to an unprecedented degree sell themselves as tourist destinations, industrial sites or bundles of amenities suited to this or that class of prospective residents.”

5.5 Creating “Place” Through Urban Design

The placemaking qualities of CODs are constructed via a pedestrian oriented urban design that includes a combination of open spaces, walkways, parks and public buildings that bring people into closer proximity. Increasing pedestrian interaction has been shown to increase resident interaction with others and increase social capital and their emotional wellbeing (Jackson, 2002) as well as physical activity which offsets many of the health issues associated with urban sprawl such as obesity and heart disease (Frank, 2006). This mixture of uses should promote as Speck (2012) has shown, a General Theory of Walkability that creates a walkable space that satisfies four key conditions: it must be useful, safe, comfortable and interesting.

Places of this nature should not only promote walkability but also a reason for pedestrians to remain in the area. A place that promotes both ideally achieves an engaging environment that is alive with many people using it. In designing places in this way the area “can be influenced qualitatively by inviting more people to come and quantitatively by inviting them to stay longer” (Gehl, 2010: 73). Inviting people to stay in a place increases the chances that people will engage with the space which gives it its meaning (Carmona et al, 2010). This engagement is a byproduct of people’s interaction
with a space. As Whyte (1980) has shown what attracts people are other people who together bring life and activity to that place. As discussed places are essentially centers of meaning constructed through lived experiences of people interacting with the space and each other (Relph, 1976), hence public places are as Carmona et al (2010:206) has stated “essentially discretionary environments; people have to chose to go and use them and conceivably go elsewhere.” This decision is based on various inputs, but most importantly based on comfort which is a result of various factors including: can you see in and out of the space; are there places to sit and congregate and are they well dispersed in areas of shade and sun; is the space well lit; and are the edges of the spaces vibrant.

In establishing a level of comfort for any space the space’s edges must be taken into account as areas of respite and connectivity. “Successful people places may be destinations in their own right; more likely, they are also places on the way to other places” (Carmona, et al, 2010: 202). Few successful places function as sole destinations; they must be connected with a larger pattern of development which makes its edges a key connector. As Alexander (1977) has exemplified, the life of public places forms around its edges to which people gravitate rather than being it the open which decreases levels of comfort and safety. Furthermore places need to accommodate flow and allow for porosity to achieve connectivity with its surroundings (Ellin, 2006).

To allow for flow and connectivity spaces need pathways and building facades that balances the public and private. The correct boundary between the two facades protects both the public and private spheres (Madanipour, 2003). The proper balance between private and public should constitute facades that are "designed so that buildings metaphorically 'reach out' to the street, offering 'active' frontage onto public space adding
interest, life and vitality” (Carmona, et al, 2010: 215). The metaphorical facade 'reach out' and connectivity is often lost in much urban design as designers attempt to make a space all inclusive by enclosing it, which can become an issue in relation to the waterfront especially in linear waterfront developments such as canals. The main fault then of many designers of public places is that they prioritize a sense-of-enclosure within the space over visual permeability into and out of the space which allows for visual and invariably physical connectivity (Hiller, 1996). In creating places urban designers must also as Arefi (2007: 188) states, “validate and celebrate a ‘new sense of place’ and propinquity, yet be faithful to accessibility.”

Successful places are a product of an urban design that takes the issues of comfort, sitting, safety, porosity, and walkability into consideration. While vibrant urban places must address these issues they must also attract people to the place. Urban designers employ place based development, which involves deliberately shaping and creating a place around images of a particular theme (Carmona, et al, 2010). For many urban areas with a harbor, the waterfront has presented an ideal basis for place based development. This type of theme inspired development is not lost on landlocked urban areas which can implement this through COD.

5.6 Methods

To answer the question of: What are the impacts of COD design elements on the urban built environment in creating “successful” places? three separate COD sites were examined: Oklahoma City Bricktown, Mandalay Canal at Las Colinas and the Waterfront in Scottsdale, AZ. Using the well developed matrix of “What Makes a Successful
Place?” (Table 5.2) from the Project for Public Spaces (PPS) I determined how the physical design of each COD impacted key design concepts. The critical criteria from the matrix include:

**Access and Linkages:** a successful public space is easy to get to and get through; it is visible from both distance and up close.

**Comfort and Image:** includes the perceptions about safety, cleanliness, and availability of places to sit.

**Uses and Activities:** something to do gives people a reason to come to a place – and return.

**Sociability:** when people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community. (Project for Public Spaces, 2013).

The process of analyzing these concepts included walking each site both during the day and at night using the “success matrix” which asked questions about the perception of place under each of these categories to determine how the physical design affects human interaction. Site visits of each COD were completed both during the day and at night and on weekends (Fridays and Saturdays). The analysis of each site included observational data which was supported by photographs of each site.

As the set of criteria presented by the PPS was the basis for my analysis, in judging the sites I chose not to include criteria four. The exclusion of criteria four was due in large part to the temporal nature of this analysis. Criteria four on “sociability” is best analyzed over a large span of time to see how individuals use the space over that time frame and to understand if the same individuals are using the space time and time
again. Considering that the analysis presented in this study took place over a two day period for each site, I was unable to conduct a long term temporal study of each site.

5.7 Study Sites

All the sites were built with the aim of creating place based activity and density via differing starting points. Bricktown was built in a former warehouse district adjacent to downtown; the Waterfront was built on a utility canal and land in downtown Scottsdale that was considered to be derelict in an already established area; and Mandalay Canal (Las Colinas) was master planned Greenfield development built from the ground up.

5.7.1 Bricktown: Oklahoma City, OK

The Bricktown area of Oklahoma City sits on the site of a former warehouse district in the heart of the city. Redevelopment of the area was spurred by the opening of a Spaghetti Warehouse restaurant, which ignited interest in the area and pushed the formation of the Metro Areas Project (MAPs) group (Bartman, 2010). MAPs worked as a liaison between the community and businesses encouraging businesses to open in the area with the end goal of creating a regional landmark similar to the Riverwalk in San Antonio, TX. Through strict design guidelines and zoning that regulated a consistent look, Bricktown opened in July of 1999, with immediate success. Today the area is home to numerous bars, restaurants, and retail establishments (30 in all) as well as housing. Amenities in the area include: the Banjo Museum, AT&T Ballpark (minor league baseball stadium), boathouse, water taxi service, civic center and the Coca Cola BT Events Center (Bricktown.com)
The area is composed of an "Upper Bricktown" and "Lower Bricktown". Upper Bricktown is at the heart of older brick buildings that give the area its name. Buildings sit directly on the canal, connecting with the surrounding buildings around the canal. This area is constructed of older established building stock. In contrast the Lower Bricktown area consists of newly built developments that feature large setbacks from the canal infusing much more open space throughout. There is a distinct difference between the two areas but together they combine to create a connected development.

SEE IMAGES 5.1-5.3

5.7.2 Mandalay Canal: Las Colinas, TX

The Mandalay Canal and the subsequent development of Las Colinas were inspired by the developer’s time in Mandalay, Burma. The canal is a manmade canal that runs from Lake Carolyn in Irving TX and is lined with a European inspired emporium of shops and businesses (Bartman, 2010). While the canal is lined with shops and businesses, many of these businesses close after working hours which leaves the area empty in the evening. The original design of the area called for a water taxi service, which fell out of favor giving way to gondolas. To combat the area’s lack of evening activity local merchants have spearheaded events along the canal to bring people to the area. Even with the lack of night time activity the area is home to an arts district, outdoor sculpture garden, pioneer inspired cattle drive plaza, and numerous businesses such as Exxon, GTE, and Sprint as well as housing (city-data.com, 2013).

(SEE IMAGES 5.4-5.6)
5.7.3 The Waterfront: Scottsdale, AZ

The Waterfront in Scottsdale was perceived by many to be nothing more than a derelict area in the heart of the prosperous downtown Scottsdale until the area was declared a slum by the city of Scottsdale in 1993. This paved the way for its redevelopment over the next decade (Bartman, 2010). The redevelopment included a partnership of the city, Salt River Project, business owners, public leadership, the community and developers. The result has been a mixed use 1.1 million square foot development of upscale condos housed in two separate towers, shop, restaurants and bars along the waterfront (scottsdalewaterfrontshopping.com, 2013). The Waterfront development has become a key venue for festivals and parties: for instance during the Super Bowl in 2008 all the main Super Bowl gala parties and the ESPN home base were situated at the Waterfront, some 30 miles away from University of Phoenix stadium in Glendale, where the game was hosted.

(SEE IMAGES 5.7-5.9)

5.7.4 Demographics Comparisons

While all three sites were built with the aim of creating place based development, the demographic makeup of each site varied widely especially in terms of income, racial structure and owner occupancy of housing (see Table 5.3). In examining the table, the differences are the most extreme in terms of income, with Bricktown having the lowest median income, which could be partially explained in that Bricktown abuts downtown Oklahoma City and the two mile buffer around the site would be pulling in lower income downtown areas. The Waterfront on the other hand has a median income and home values that are twice as large as Bricktown. As the demographic characteristics table
shows there is little direct comparison between the three sites in terms of demographic makeup. The lack of shared demographic characteristics implies that the success or non-success of each site is not necessarily the result of demographic variables, rather are more reliant on the built environment of each COD.

5.8 Discussion of Results

The three sites studied have varying levels of success in implementing the key components of the matrix. Bricktown and the Waterfront are best at achieving the goals set forth in the “What Makes a Successful Place?” matrix, while Mandalay fails on most counts.

A further factor to consider when looking at these sites beyond the PPS matrix is their position within the larger urban environment. A figure ground analysis and reverse figure ground for each site is presented to show the relationship of open space and the built environment of area surrounding each development. Open space and density should also be a factor to be considered. Viewing all three sites, various levels of density are exposed. The Waterfront (map 5.1) is centered on a dense area with little open space, while Bricktown (map 5.1) abuts Oklahoma City’s downtown to the development’s west while to the east open space dominates the landscape. Mandalay Canal (map 5.2) and the subsequent development of Las Colinas is mostly surrounded by open space and low density development.

5.8.1 Access and Linkages

In relation to Access and Linkages Bricktown’s design allows for high levels of connectivity to the greater urban fabric as it connects via foot pathways and roadways to
the larger area allowing for the space to flow and be interwoven into the larger urban environment. Even though the area is harmonious with the city at large, it does stand out as a site on its own merits as a place, since it is advertised as a district via signage over entry archways and signage on light poles. Building facades also open to the canal, encouraging a mixing of private and public space and opening linkages between the two. This mixture also helps to highlight the prominent role that the canal plays in the development.

Like Bricktown, the Waterfront allows for connectivity and linkages to the greater area. The canal at the Waterfront, unlike Bricktown and Mandalay, does not weave its way through the development. Instead as a working utility canal it creates a linear path that cuts through the development. It still plays a key role as the gathering spot for the development acting as a border between Fashion Square shopping to the north and Old Town Scottsdale to the south. While there is not the signage that Bricktown has to announce the development except at the main entrance across from Fashion Square, the area is well noticed, especially the canal, via public art infused bridges that bookend the development and the two residential towers of the development that loom over the development and can be seen from afar.

The buildings, especially the restaurant spaces, of the Waterfront, mirror the outdoor lifestyle of the Southwest, by opening to the canal via outdoor patios and balconies. This open environment of the buildings allow for the meshing of public and private space while simultaneously delineating the two. It also encourages stopping and staying in the space which is one spot along the canal system of city.
As both Bricktown and the Waterfront present an urban design that provides for connectivity in and out of the space Mandalay Canal is an insulated space that has little connection to the greater urban area of Las Colinas. There are few noticeable signs or entry ways to the canal from the surrounding street that announce the presence of the canal. While there is a well designed path that runs along the canal there is little connection to the businesses that line the canal. As the canal is split in two, residential and commercial, neither the residential nor the commercial uses really reaches out to the canal. The commercial spaces mostly offices that open to the canal but do not connect with the canal and the restaurants that are on the canal have minimal outdoor space. The residential component (apartments) have balconies that are presented towards the canal but appear to be largely unused. From an urban design perspective in both residential and commercial cases, more care is given to opening and reaching out to the street above the canal than the canal itself.

Furthermore the buildings along the canal are built directly on top of the canal with little open space which allows for very few visual linkages, creating a cavernous feel. The design of the canal and structure lining the canal corresponds with Hiller’s (1996) perspective that many urban designers prioritize a sense-of-enclosure within the space, which creates a claustrophobic feeling within the space.

(SEE TABLE 5.4)

5.8.2 Comfort and Image

All three sites create a welcoming first impression from an aesthetic standpoint once you have entered the site, each embracing their local architectural environments. Beyond the initial impression the comfort level of each site varies.
From a sitting perspective both Bricktown and the Waterfront present multiple seating options with public benches and outdoor restaurant patio spaces that line their canals. Mandalay Canal has few public benches (eight in all) and as noted, little outdoor restaurant space. By having limited outdoor space, pedestrian congregation is discouraged, and the cavernous design of Mandalay Canal’s space does not promote a warm, safe feel that would encourage people to stay in the space.

While Mandalay presents an enclosed feel that has little visual connection to the outer urban environment, the other two sites have varying levels of enclosure. Bricktown combines areas of enclosure and areas of more open urban design. The enclosed areas are part of the older brick building stock while the more open areas are in the newer part of the development and are built with an easement along the canal to allow for landscaping. The Waterfront is built back from the canal due in large part to right of way issues since the utility company (Salt River Project) uses the canal. Even though buildings are set back from the canal the combination of landscaping and building facades that ‘reach out’ creates a comfortable and safe feel to the environment.

(SEE TABLE 5.5)

5.8.3 Uses and Activities

The activities that take place in each COD are highly dependent on issues of access and comfort, which both play important roles in the process. As Camona et al (2010) and Gehl (2010) have shown if a place is comfortable people are more apt to stay in that place and if places have connectivity there will be an increase in pedestrian activity as people will be part of an area that is alive with activity. Both the Waterfront and Bricktown developments support connectivity and comfortable environments while
the design of Mandalay does not allow for connectivity or support high levels of comfort. Invariably, levels of activity are diminished in Mandalay as opposed to Bricktown and the Waterfront.

The Bricktown and the Waterfront developments were each alive with activity during the day and at night. Even though Bricktown has a small residential component in the initial vicinity of the canal it appears the residential dynamic has little impact on the levels of activity on the canal. This is further shown in that Mandalay has a substantial residential component yet has little activity both day and night.

In Bricktown there was a combination of activities taking place that included walking, running, sitting, biking and the use of Segways to tour as well as a water taxi service. Those involved in these activities ranged in ages with older and younger families during the day and couples and the “bar crowd” at night. The activities taking place in the Waterfront were similar in nature to Bricktown except that water activity is prohibited in that space. People were running, walking, biking and sitting and ranged in age depending on the time of day.

While both Bricktown and the Waterfront were alive with activity, Mandalay Canal was lacking pedestrian activity along the canal. Even though the canal was banked by a well structured path throughout and gondola boats were made available, there were few people using the space. The area is known to be more active during the day due to the business clientele, but even then there were low levels of activity, most of which was taking place away from the canal area on the higher street level.

(SEE TABLE 5.6)
5.9 Conclusion

What these case studies show is that COD must adhere to the same traits that make any place successful. Simply being mixed use and being built on water is not enough to make an exciting, vibrant place. There must be a combination of comfort, accessibility, mix of uses and flow for a site to be a success.

These attributes taken from the PPS have allowed for each of these developments to be examined as placemaking entities. The matrix used should be looked at as a starting point for analysis. Beginning from this starting point other variables that could be examined to understand the success of each development for placemaking could include issues of typology which would include: form (degree of heterogeneity, nature of boundaries), function (cost and types of dwellings, transportation connections, and scale of community), composition (types of households and business, demographic characteristics), process (who produces and governs the COD) and meaning (symbolic meaning and history).

All of these issues had and will further have an impact on the success of any COD. As each development used the notion of the canal and the natural pull of water as a driving point for development it was not the only factor to success. Whether the canal was newly built as in the case of Mandalay, redeveloped as in Bricktown, or already in existence as a public utility as in the Waterfront the canal itself needs to be a part of a larger urban design.

Mandalay Canal is the most striking example of the need for integration into the larger urban fabric and that proper urban design needs to be taken into account. At first glance it would appear to be a development that would work: a mixed-use development
with attractive architecture, in a substantial income area, and an aesthetically built canal that winds through the development, featuring a lake that feeds the canal. Beyond the surface, the viewshed and reality are not the same. Mandalay fails at creating a vibrant urban space as it lacks sufficient access and linkages retarding the area’s ability to flow and integrate into a larger system. Due to its canyon-like architecture of having buildings built directly on the canal with limited setback and the lack of commercial spaces that “reach out” to the canal, the space is not warm and inviting, but rather is cold and harsh. This is further exacerbated by the lack of public seating which could encourage people to stay in the place.

Where designers of Mandalay fell short was to have the development fit with the entire Las Colinas area. The canal is more of an afterthought in the design of the entire area than a focal point, which is exemplified by its lack of use.

Though Mandalay failed to integrate itself into a larger urban fabric, both Bricktown and the Waterfront were successfully able to connect. This connection with the larger urban realm allowed for people to move in and out of the space. People pass through the space, facades that were built to “reach out” into the public realm made the space inviting, and public benches and public art encouraged those people moving through to remain. Both of these developments gave pedestrians a reason to be there which, was not the case with Mandalay.

The end result of this analysis is that these developments show the importance of proper urban design and that a successful development cannot just highlight one aspect and hope to drive growth. The one aspect that may be the driving force of the development, in these cases the canal, needs to be one piece in a larger holistic
development initiative that takes access, comfort, uses and sociability into consideration in its design.

By being a place based development COD encourages density and economic growth. But for COD, be successful as shown, like any place based development, must be integrated into the larger built environment. If integrated and built to highlight the successful aspects of place (access and linkages, comfort and image, and uses, activities and sociability) COD proposals hold the potential to be yet another important aspect of any city’s economic development strategy.
Table 5.1: Canal Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bypass</td>
<td>Designed to avoid areas of rapids or otherwise impassible sections of rivers</td>
</tr>
<tr>
<td>Irrigation/Water Supply</td>
<td>Supplies water to otherwise arid regions</td>
</tr>
<tr>
<td>Nautical</td>
<td>Cut into shoreline to maximize private property frontage and boat dock accessibility</td>
</tr>
<tr>
<td>Regional Canal Networks</td>
<td>Links cities together for the transport of raw materials and products manufactured far away</td>
</tr>
<tr>
<td>Recreational</td>
<td>Built specifically to support commercial activity on or near their banks to increase the value of nearby residential areas</td>
</tr>
<tr>
<td>Shipping</td>
<td>Links oceans or cities to oceans to carry heavy cargo and ocean scaled ships</td>
</tr>
<tr>
<td>Storm Water Management</td>
<td>Designed for flood control</td>
</tr>
<tr>
<td>Urban Network</td>
<td>Links internal neighborhoods facilitating local commerce and provides another form of transportation to the population</td>
</tr>
<tr>
<td>Canalized River</td>
<td>Controlling the river through artificial improvements</td>
</tr>
</tbody>
</table>

Source: Bartman, 2010
Table 5.2: Project for Public Places Matrix

Source: www.pps.org
Table 5.3: Demographic Characteristics: Two Mile Radius from Center of COD

<table>
<thead>
<tr>
<th>DEMOGRAPHIC AREA</th>
<th>Bricktown (2mi)</th>
<th>Mandalay (2mi)</th>
<th>Waterfront (2mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (25yrs and older)</td>
<td>14879</td>
<td>8,837</td>
<td>32,674</td>
</tr>
<tr>
<td>Median Age</td>
<td>33</td>
<td>31.7</td>
<td>41.5</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% White (non-Hispanic)</td>
<td>30</td>
<td>26.8</td>
<td>76.8</td>
</tr>
<tr>
<td>% African American</td>
<td>23.9</td>
<td>8.3</td>
<td>1.8</td>
</tr>
<tr>
<td>% Hispanic</td>
<td>25.2</td>
<td>38.3</td>
<td>11.6</td>
</tr>
<tr>
<td>% Asian</td>
<td>3</td>
<td>9.4</td>
<td>2</td>
</tr>
<tr>
<td>% American Indian</td>
<td>4.1</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>% other</td>
<td>9.2</td>
<td>12.8</td>
<td>3.7</td>
</tr>
<tr>
<td>% Hawaiian or Pacific Is.</td>
<td>0.14</td>
<td>0.05</td>
<td>0.1</td>
</tr>
<tr>
<td>Median Income</td>
<td>32,472.76</td>
<td>43,883.50</td>
<td>65,321.67</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% with High School Degree</td>
<td>26.92</td>
<td>22.7</td>
<td>16.9</td>
</tr>
<tr>
<td>% with Some College</td>
<td>20.67</td>
<td>19.8</td>
<td>22.3</td>
</tr>
<tr>
<td>% with Associates degree</td>
<td>4.87</td>
<td>6.1</td>
<td>6.3</td>
</tr>
<tr>
<td>% with Bachelors Degree</td>
<td>8.96</td>
<td>21.3</td>
<td>29.9</td>
</tr>
<tr>
<td>% with Post Grad Degree</td>
<td>9.2</td>
<td>8.35</td>
<td>18</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Wed</td>
<td>32.30</td>
<td>42.2</td>
<td>42.7</td>
</tr>
<tr>
<td>% unwed</td>
<td>67.7</td>
<td>57.8</td>
<td>57.3</td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Owner Occupied</td>
<td>33.56</td>
<td>40.6</td>
<td>68.4</td>
</tr>
<tr>
<td>% Renters</td>
<td>66.43</td>
<td>59.4</td>
<td>31.6</td>
</tr>
<tr>
<td>Median Rental Rate</td>
<td>632</td>
<td>838.75</td>
<td>1,182</td>
</tr>
<tr>
<td>Median Home Value</td>
<td>92,433</td>
<td>144,350</td>
<td>356,125</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Male</td>
<td>53.4</td>
<td>50.03</td>
<td>47.3</td>
</tr>
<tr>
<td>% Female</td>
<td>46.6</td>
<td>49.97</td>
<td>52.7</td>
</tr>
<tr>
<td>Total # of homes</td>
<td>8624</td>
<td>5290</td>
<td>20,831</td>
</tr>
<tr>
<td>% occupied</td>
<td>78.3</td>
<td>90.6</td>
<td>84</td>
</tr>
<tr>
<td>% vacant</td>
<td>21.7</td>
<td>9.4</td>
<td>16</td>
</tr>
<tr>
<td>density (pop25yrs or older/mi2)</td>
<td>1262</td>
<td>3641.2</td>
<td>3,102</td>
</tr>
</tbody>
</table>

* The percent with high school degree is the % of graduates with only a high school degree and did not continue on to college.
* Zero/null values were deleted where there was no data for a census tract as that would affect averages.
* Education percent is based on an average of the total percentages per census tract for education attainment of the area given.
Note: they will not sum up to 100% because they are based on averages of the entire area
*Percentages of race are based on 1 race only; the remainder of the total races is the percentage of more than 1 race
*Source: 2010 census
Table 5.4: Results - Access and Linkages

<table>
<thead>
<tr>
<th>Bricktown</th>
<th>Mandalay</th>
<th>Waterfront</th>
</tr>
</thead>
<tbody>
<tr>
<td>The space is well advertised to the rest of the downtown via signs that announce the area as Bricktown and archways that lead one to the canal in the &quot;Upper Bricktown&quot; area while &quot;Lower Bricktown&quot; is much more open with the canal playing a prominent visual role where both are woven into the urban fabric of downtown Oklahoma City.</td>
<td>There is not a prominent view of where to access the canal. Unless you are looking for it you may not find it. Though the lake that feeds the canal is prominent.</td>
<td>Space is easily seen from the outside of the development as the two residential towers are prominent fixtures and the development along the canal is bookended by art deco bridges. You can easily see into the space from the outside and out of the space as well.</td>
</tr>
<tr>
<td>Buildings connect to the canal in both sections via open spaces and patios that 'reach out' into the public realm. This connection is also prominent with the few offices (Lower) that are in the area, such as the Sonic (fast food) headquarters with steps that lead directly from the canal to its offices.</td>
<td>The buildings surrounding the canal are built directly on the canal. Half of the canal is commercial and the other half is residential. Though both are built right on the canal there is little connection to it. The restaurants and commercial developments do little to &quot;reach out&quot; to the canal. There is little flow between the private and public spaces.</td>
<td>Building facades 'reach out' to the open public space, as buildings have open patios and overhangs that produce a feeling of flowing between private and public spaces.</td>
</tr>
<tr>
<td>Walkways and bridges throughout lead you along the canal and connect with the city at large. There is also good connectivity between the canal area and the city.</td>
<td>The canal does not connect with the businesses and residents well at the canal or street levels. The canal sits below the main streets, thus there is little vehicular interaction. There are also few destinations along the canal.</td>
<td>The space is connected visually and via pathways with Fashion Square to its north and the shops of Old Town Scottsdale to its south.</td>
</tr>
<tr>
<td>The paths along the canal, are used in multiple ways, vehicular, biking, walking, and Segway touring. More importantly, these methods are used in the greater development surrounding the canal.</td>
<td>The space is not functional for those with special needs, as almost all access to the canal is via stairways.</td>
<td>The multi-use pathways for walking, running or biking along the canal connect the visitor to residences, shops, and restaurants along the canal as well as connect to the greater community.</td>
</tr>
<tr>
<td></td>
<td>There is access along the canal path for walking, running, biking and they do have gondola rides along the canal. Public transit is non-existent as the site abuts a freeway.</td>
<td>The site is designed for the pedestrian as parking is outside of the actual development as well as all forms of public transit.</td>
</tr>
</tbody>
</table>
Table 5.5: Results - Comfort and Image

<table>
<thead>
<tr>
<th>Bricktown</th>
<th>Mandalay</th>
<th>Waterfront</th>
</tr>
</thead>
<tbody>
<tr>
<td>The space creates a good impression with a combination of</td>
<td>The site makes a good first impression once you are in the</td>
<td>The space makes a good first impression as it is</td>
</tr>
<tr>
<td>older and newer buildings and how those buildings fit with</td>
<td>site area, built with a Tuscan feel and fairly clean and well</td>
<td>well maintained, with public art projects playing</td>
</tr>
<tr>
<td>the present urban form.</td>
<td>maintained.</td>
<td>a prominent role.</td>
</tr>
<tr>
<td>There are multiple places to sit with both public benches</td>
<td>There are very few places to sit, with only eight public</td>
<td>The architectural design fits with the rest of</td>
</tr>
<tr>
<td>and outdoor seating along the canal via bars and restaurants.</td>
<td>benches along the canal path.</td>
<td>the community at large.</td>
</tr>
<tr>
<td>Outside of the canal path, there are benches situated</td>
<td>The bars and restaurants that line the canal do not have a</td>
<td>The space lends itself well to photographic</td>
</tr>
<tr>
<td>throughout but seating is relegated to businesses.</td>
<td>large outdoor presence thus there is very little outdoor</td>
<td>opportunities.</td>
</tr>
<tr>
<td>Since most areas long the canal open up to the canal the</td>
<td>seating. Lastly the residential units have private sitting</td>
<td>Throughout the space there is ample room to sit</td>
</tr>
<tr>
<td>area has a safe eyes-on-the-street feel. Outside of the</td>
<td>areas which appeared to be unused.</td>
<td>on public benches or in the restaurant and bar</td>
</tr>
<tr>
<td>immediate canal area there is a police presence as well as</td>
<td>There is not a high level of safety. Police presence was</td>
<td>patios that line the canal. The public benches</td>
</tr>
<tr>
<td>activity which lends to a safe feel.</td>
<td>absent, and only 8 people were counted to be out along the</td>
<td>are not well hidden from the sun, though which</td>
</tr>
<tr>
<td>Vehicle traffic is a bit heavy in the general area but there</td>
<td>canal during the day: three smokers, one runner, one</td>
<td>an issue during the summer.</td>
</tr>
<tr>
<td>are multiple crosswalks and with the large pedestrian</td>
<td>homeless person and three people taking pictures of each</td>
<td>Both during the day and at night the space has</td>
</tr>
<tr>
<td>element there seems to be an awareness of pedestrians by</td>
<td>other. Without a great pedestrian presence the area</td>
<td>a safe feeling. Though there was no police/</td>
</tr>
<tr>
<td>cars.</td>
<td>seemed eerie.</td>
<td>security presence with as many bars, restaurants,</td>
</tr>
</tbody>
</table>

The site balances openness and closed in feels. The development is far enough away from the canal to allow the banks to be open and landscaped avoided a closed in canyon feel.
Table 5.6: Results - Uses, Activities and Sociability

<table>
<thead>
<tr>
<th>Bricktown</th>
<th>Mandalay</th>
<th>Waterfront</th>
</tr>
</thead>
<tbody>
<tr>
<td>The overall area is primarily a commercial</td>
<td>There was little use of the space,</td>
<td>The uses are a combination of residential</td>
</tr>
<tr>
<td>and entertainment area. There is a very small</td>
<td>with only 8 people being counted.</td>
<td>and commercial. The commercial end appears</td>
</tr>
<tr>
<td>residential component. The majority of the</td>
<td>There is very little use of the canal area of</td>
<td>to be the dominating land use.</td>
</tr>
<tr>
<td>residences are outside of the immediate</td>
<td>the development.</td>
<td></td>
</tr>
<tr>
<td>Bricktown area, which are a short 5-10</td>
<td>During lunch some of the restaurants came</td>
<td>The space is well used by groups, couples and</td>
</tr>
<tr>
<td>minute walk from the main area.</td>
<td>more alive, but most of the lunch activity was</td>
<td>individuals. Activity in the day is more</td>
</tr>
<tr>
<td>The area is used by all ages, though families</td>
<td>taking place on the main boulevard away from</td>
<td>family oriented while the night is driven by</td>
</tr>
<tr>
<td>and older citizen are more frequent visitors</td>
<td>the canal.</td>
<td>the local bars and restaurants.</td>
</tr>
<tr>
<td>during the day while younger groups and</td>
<td>Little to do in the space, besides a couple</td>
<td>Multiple activities are taking place in the</td>
</tr>
<tr>
<td>couples are using the space at night.</td>
<td>of restaurants which cater to the work crowd.</td>
<td>space: sitting, running, walking and biking</td>
</tr>
<tr>
<td>There are multiple choices of activities</td>
<td>After close of business there was even less</td>
<td>along the paths and eating and drinking in the</td>
</tr>
<tr>
<td>from walking, sitting, biking, and water</td>
<td>activity.</td>
<td>bar restaurant spaces.</td>
</tr>
<tr>
<td>taxis, to baseball, movies, bars and</td>
<td></td>
<td>The space is well designed to meet people</td>
</tr>
<tr>
<td>restaurants.</td>
<td></td>
<td>either in a public setting or in a restaurant</td>
</tr>
<tr>
<td>There is a good combination of public spaces</td>
<td></td>
<td>or bar setting.</td>
</tr>
<tr>
<td>and private spaces throughout the development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with more public spaces being in the newer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>section.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Map 5.1: Bricktown Figure Ground & Reverse (1/2 Mile Radius)
Map 5.2: Mandalay Canal Figure Ground and Reverse (1/2 Mile Radius)
Map 5.3: The Waterfront Figure Ground and Reverse (1/2 Mile Radius)
Image 5.1: Upper Bricktown Canal Portion

![Image 5.1]

Image 5.2: Outdoor Patio

![Image 5.2]
Image 5.3: Lower Bricktown

Image 5.4: Mandalay Canal
Image 5.5: Public Bench Under a Bridge (Mandalay)

Image 5.6: Canal and Defunct Light Rail with Apartments (Mandalay)
Image 5.7: Soleri Bridge: East entrance to Waterfront

Image 5.8: Public Art in the Canal (Waterfront)
Picture 5.9: Outdoor Restaurant (Waterfront)
CHAPTER 6
Conclusions

6.1 Overview

The overarching conclusion that can be drawn from the results of the three set of analyses in chapters three, four and five of this dissertation is that canal oriented development presents a development ideology that it is more than just the presence of water. It is rich in history that is contingent for its success on balancing key development identities to create a sense of place that is interwoven into the community. These various analyses shows that as COD taps into the human need to be near water, it has the potential of being a viable development opportunity for alternative ways to develop on water.

The historical analysis of chapter three shows that while COD may be a newly thought of paradigm for the post-industrial city it has a historical precedent to work from. Canals were once the driving force of much urban development and in turn were the makers of cities like Syracuse, NY, only to be forgotten and pushed aside. Historically canals were the engines that built cities. Harboring back to the Canal Era canals are reshaping forgotten or underused areas and waterways. Canals once again have the ability, not to the extent of the heart of the U.S Canal Era but nonetheless significant, to remake the fortunes of many cities as place based economic development drivers.

As discussed Phoenix Arizona is one of those cities that historically had an intimate connection with its canal system only turn its back and to recently rediscover its significance. As chapter four showed Phoenix has a rich history with its canal system dating back to the eleventh century with Hohokam. Yet this history is one of embracing and pushing aside the canal first with the Hohokam and again with the Phoenicians of the
mid twentieth century. Once again the canal is becoming a point of discussion for
development and recreation in the Phoenix community, especially with the prominence of
the Scottsdale Waterfront.

Beyond a topic of discussion, for development to happen on the canal there must
be a process of balancing the community, city, developers, and utility companies to create
a mixed-use development on the water. What chapter 4 showed is that for development
to happen on the canal or near the canal, as proposed by SRP, it would need to be a
development that is commercially driven that is spearheaded by the community through
incentives from the city. Both financial and non-financial incentives from the city will
make or break any development on the water. As developers have not reached a threshold
where it will be profitable to be build on the canal incentives will help offset the lost
revenue incurred.

As both community support and city incentives will be necessary, among other
factors for a COD to be built in the Phoenix area, for any COD to be a success in Phoenix
or elsewhere it must be a place based development and not just a node. Being a place
based development, COD is tied directly to the notion of place and must adhere to certain
placemaking qualities that give place its meaning through the creation of a space that is
alive and integrated.

As chapter five highlights, making a successful place based development goes
well beyond balancing key players showing that for CODs to be successful they need to
be more than just a “build it and they will come” development based on the canal, CODs
need to be integrated into the community and be an environment that encourages people
to stay in the space. By integrating issues of access and linkages, comfort and image,
uses and activities, and sociability into the urban design of COD, the potential for a successful development increases.

The results of chapter five further shows that both Bricktown and the Waterfront were able to create places that were alive and inviting by highlighting issues of connectivity, comfort and sociability. Even though Mandalay Canal was built in a prosperous area and created an architecturally pleasing design the space ultimately failed because it did not take these key placemaking design ideals into consideration for its urban design.

The analysis in these three chapters shows the interrelated qualities of history, place, urban design and the role development players in making a COD a successful development mechanism. The analysis in these chapters also helps to push forward further discussion of sustainable development on waterways, by presenting an analysis that aids urban policy makers, developers and designers in determining what will and will not work when thinking of COD. It further adds to the literature on place based sustainable development.

6.2 Major Theoretical Conclusion

Traditional views of waterfront development in the post-industrial city, have focused on the development and redevelopment of harbor areas. These have been valuable areas for development in the post-industrial city with its historical building stock which helps to form a place based narrative. COD follows the lead of the harbor development literature and addresses the idea of taking those ideas and bringing waterfront development to areas not blessed with a harbor front. What this research in
turn does is present an alternative form of waterfront development that has not been extensively looked at in the academic literature.

Sustainable development has been the topic of choice in academic and non-academic circles of late and COD adds to this discussion. As a place based development technique that looks to build walkable mixed-use developments on the water, often times reusing old build stock, COD adheres to many of the ideas and trends around sustainable urban development. Thus this dissertation adds to the extensive body of literature on sustainable urban development by expanding on and further introducing the ideas of COD.

6.3 Policy Implications

The analysis in chapter four, which looks at how COD can become a reality in the Phoenix area via incentives, community support and a commercial first development pattern, may be useful to a broad array of urban policy-makers, and planners. As noted chapter four showed that commercial would drive development via city incentives and community support. These results can help inform policy makers when it comes to COD, to devise plans that make it easier for developers to accomplish a streamlined development. The results here point to the need for urban policy makers to formulate COD policy that is a mix of financial and non-financial incentives which could take the form of canal overlay zoning to encourage development along the canals, much the way that TOD overlay zoning has been implemented to encourage development along light rails. The financial side of the equation could include tax abatements to build in derelict canal areas, grants to encourage development and reduction of development fees. On the
non-financial side to encourage building in a canal overlay zone the city could provide streamlining of plan reviews and community liaisons to help developers connect with and integrate their project into the community.

Chapter five can inspire urban planning officials and city development officials to encourage proposals for COD that take placemaking into consideration. By understanding how issues of access and linkages, comfort and image, and uses, activities and sociability affect place within CODs, plans that address these issues can be green lighted for development. On the other hand plans that do not address these issues of placemaking can be referred to these results to see how they can be integrated into their design so has to heighten the development’s chances of success.

6.4 Future Research

The research in this dissertation grew out of an elective class at Arizona State University, Canalscape, taken in spring 2008 and taught by Nan Ellin. The work from that class inspired me to delve into the issues of COD. The work in this dissertation just breaks the surface of research into CODs and will hopefully inspire further research by other students of urban design, economics, real estate development and urban policy.

The theories around COD can be fleshed out further in various capacities, such as demographic impact analysis, placemaking design guidelines, COD typologies, and hedonic COD analysis. My research will continue to examine aspects of COD. I will be conducting further research on the demographic impact of seven COD sites which were built specifically for economic development as well as examining CODs impact on issues of walkability using walkscore.com as a basis. It is my intention these further topics and
the topics covered in this dissertation will be a basis of extensive further research as COD has the potential to be an important development aspect for cities that do not have extensive harbors to tap into the power of waterfront development
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Survey Respondents

William Allison  
Laurel Arndt  
Maureen DeCindis  
Ramzi Georges  
Donald Hadder Sr.  
Jay Hicks  
Kirby Hoyt  
Reed Kempton  
Jhenifer Krutz  
Aaron Kimberlin  
Taz Loomans  
Michael Mehaffey  
George Pasquel III  
Jeremy Stapleton  
Cathy Thuringer  
Jonce Walker  
Phillip Weddle

Gallagher and Kennedy  
ACS Ltd  
Maricopa Association of Governments  
David Evans Associates  
City of Scottsdale  
RSP Architects  
Edge Industries  
City of Scottsdale  
Valley Forward Association  
Phoenix Urban Research Lab (PURL)  
Blooming Rock Development  
ASU Visiting Faculty Associate/Planning Consultant  
Catalyst Development Partners  
Synergy Design Lab  
Trammell Crow Company  
Maricopa County Government  
Weddle Gilmore

Interview

James Duncan  
Salt River Project  
11-19-12
APPENDIX A

SURVEY LETTER
January 5, 2012

Dear Participant,

As part of a doctoral dissertation in the School of Geographical Sciences and Urban Planning at Arizona State University I am asking if you would be able to take a quick on-line survey which should take no more than fifteen minutes to fill out. This survey asks questions about what is important for the implementation of Canal Oriented Development (COD) in the Phoenix region. Phoenix has over 181 miles of canals crossing through the metropolitan area helping to sustain the area’s way of life. The canal system which is designed for the movement of water from reservoir to home also potentially presents the unique opportunity for creating areas of recreation and nodal density, yet much of the canal system in this regard is unused, underused or abused.

How is the survey completed?

- **Go online:** Visit our webpage
  [http://fs23.formsite.com/stbuckman/form3/index.html](http://fs23.formsite.com/stbuckman/form3/index.html); you will be redirected to the survey start page. If you have any problems getting online, send an e-mail to sbuckman@asu.edu and I will send you a link you can click on to take the survey.

All respondents must be at least 18 years old. By filling in and submitting the survey, you are agreeing to participate in the study.

*Your answers are confidential.* This scientific survey has been designed by ASU faculty and a PhD Candidate I can assure you that you will not be asked to purchase anything or for any kind of donation, and your answers will be completely confidential. Data from the study will be grouped together for reports and analysis.

This is purely voluntary survey and if you do not wish to take part in this study, please simply ignore this email.

If you have any questions about your rights as subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU office of Research Integrity and Assurance, at (480) 965-6788. Thank you in advance.
Sincerely,

Stephen Buckman, PhD Candidate
School of Geographical Sciences and Urban Planning
Arizona State University
This survey asks questions about how to and what is important for the implementation of Canal Oriented Development (COD) in the Phoenix region. Phoenix has over 181 miles of canals crossing through the metropolitan area helping to sustain the area’s way of life. The canal system which is designed for the movement of water from reservoir to home also potentially presents the unique opportunity for creating areas of recreation and nodal density, yet much of the canal system in this regard is unused, underused or abused.

Name: _________________________________

Company: ______________________________

1. Your company’s core business?
   a. Development – residential
   b. Development – commercial
   c. Development – mixed use
   d. Government
   e. Utilities
   f. Consultancy
   g. Planning
   h. Other
   i. ________________

2. How do you view the canal?
   a. Eyesore
   b. Asset
   c. Indifferent
   d. Opportunity

3. Are you aware of proposals that have been made to revamp and develop the canal banks?
   a. Yes
   b. No
   - Can you further explain those proposals if you are aware of canal development proposals?

4. As a driver of real estate development how do you see the canals?
   a. Untapped asset
   b. Undevelopable
   c. Indifferent
   - Can you further explain your answer?
5. Do you feel the development potential for canals in valley is:

- Strong
- Minimal
- Weak

1 2 3 4 5

6. What would it take to for development to happen on the canals (most important aspect)
   a. Tax incentives
   b. Increased assistance from the City/County
   c. Community support
   d. Financial support
   - Can you explain why you chose your answer?

7. What do you see as the major hindrance/hurdle to canal development?
   a. SRP
   b. City/County
   c. Community
   d. Economic climate
   e. Neighborhood opposition

8. What would you see as the most important factor for creating a successful canal development project, besides a financial return on investment?
   a. Cultural amenities
   b. Pedestrian activity
   c. Growth around the development
   d. Connection to the water

9. In your opinion what is the most important outcome resulting from a successful canal oriented development?
   a. Neighborhood integration
   b. Proximity of public transit
   c. Government support
   d. Mixed-uses
   e. Better marketability

10. What use is more important to the success of the COD?
a. Residential development  
b. Commercial development

- **Why do you feel one is more important than the other?**

11. How important is actual access to the water for a successful COD
   
<table>
<thead>
<tr>
<th>Very Important</th>
<th>Fairly Important</th>
<th>Not Important at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

12. Even though Phoenix is a unique example is it important to have successful case studies from across the nation?
   
<table>
<thead>
<tr>
<th>Very Important</th>
<th>Fairly Important</th>
<th>Not Important at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
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</tbody>
</table>

13. Is the impact of water an important development mechanism in the Phoenix region as a guide to Phoenix development?
   
<table>
<thead>
<tr>
<th>Very Important</th>
<th>Fairly Important</th>
<th>Not Important at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

14. How important of a asset is the Scottsdale Waterfront to the Valley
   
<table>
<thead>
<tr>
<th>Very Important</th>
<th>Fairly Important</th>
<th>Not Important at all</th>
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</thead>
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<td>1</td>
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<td>3</td>
</tr>
</tbody>
</table>

15. Do you feel the Scottsdale Waterfront is an economic success?
   
   a. Yes  
   b. No  
   c. Indifferent  

16. Do you feel the Scottsdale Waterfront is cultural success
   
   a. Yes  
   b. No  
   c. Indifferent  

17. Depending on your awareness of the Scottsdale Waterfront can tell me what you feel works and doesn’t work in the design of the Waterfront?

18. Is there any additional open ended comments you would like to add:

APPENDIX C
IRB CONSENT
To: Emily Talen
From: Mark Roosa, Chair Soc Beh IRB
Date: 01/03/2012

Committee Action: Exemption Granted

IRB Action Date: 01/03/2012

IRB Protocol #: 1112007237

Study Title: Canal Oriented Development as an Urban Waterfront Development Mechanism

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2).

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects’ financial standing, employability, or reputation.

You should retain a copy of this letter for your records.