



Broken Arrow Gateways Creating Sense of Place

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THE UNIVERSITY OF OKLAHOMA
GRADUATE COLLEGE

BROKEN ARROW GATEWAYS: CREATING SENSE OF PLACE

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By

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BROKEN ARROW GATEWAYS: CREATING SENSE OF PLACE

A PROFESSIONAL PROJECT APPROVED FOR THE
URBAN DESIGN STUDIO
CHRISTOPHER C. GIBBS
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BY

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I would also like to thank OU-Tulsa Schusterman Library Staff for giving me access to all the required resources.

Lastly, I thank my husband and my family for putting up with me during this time.

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INTRODUCTION



New York City Skyline (Image Source- robotbutt.com)



Central Park, New York City (Image Source- Agatha Kadar/Shutterstock)



Brooklyn Bridge, New York City (Image Source- onfokus/iStock)



Times Square, New York City (Image Source- Richard Burger/Flickr)

How It All Began..

I moved to the United States with my husband from India in January 2017 after we got married. I was excited to come to the land of opportunities. We landed in New York City early in the morning. I couldn't see anything outside and we were never going to get out of the airport to see the city as we had a connecting flight to Tulsa in a few hours. But just the thought of being in NYC was exhilarating for me. I had seen NYC in TV shows, documentaries, movies, books and photographs. I had also heard some exciting stories about this city. What is it about New York that everyone wants to be here at least once? For me, it is architecture, culture and the identity it brings for the United States. But how important is the identity?

After we arrived in Tulsa from NYC, I could see different part of the country. I was little disappointed that I couldn't see skyscrapers and people walking on streets like NYC. It took me some time to understand different types of development until we did a road trip to California. It was then, I understood that every place was a little different here.

Tulsa has many surrounding suburban cities. Broken Arrow is one of the fastest growing suburban city in the Tulsa Metropolitan Region. It is also the fourth largest city in the state of Oklahoma. Once my husband took me for a drive through Broken Arrow and told me that it is a separate city. I was not ready to believe him. I couldn't see a significant difference from Tulsa in terms of development and street character. At that time, I was completely unaware about American Planning, its history and types of development around the nation.

As I started with my Master of Urban Design program at OU-Tulsa, I learned about the planning history in America and current planning trends. I also learned about suburbanization of American cities leading to several planning issues. It was then, it struck me why I could not recognize Broken Arrow as a different city, especially as an outsider. It did not have a strong identity which would distinguish it from Tulsa. In summer 2018 I was looking for a research topic for my professional project. I contacted the Broken Arrow Planning Department and they let me know about the city's interest in developing gateways to strengthen its identity in the surrounding communities.

I was immediately intrigued by the subject of gateways. I did not know much about gateways at that time and I am still learning about it. But it has definitely taught me one thing that identity is important, be it a place, community or a person! All this process reminded me about the image of NYC in my mind and its importance for the United States. It certainly is a gateway city for the nation which strengthens its identity through architecture, culture and people.

Broken Arrow certainly is a different setting from NYC, but the effort of developing gateways for the city will undeniably create a strong identity for the community of Broken Arrow.



Rose District, Broken Arrow Downtown



Broken Arrow Location (Image Source- Google Maps)

Problem

Suburban population growth in Metropolitan areas in the United States has shown a significant spike in the last few decades than their central cities according to the U.S Census Bureau. Though this trend eased up in the July 2016 population estimate with young professionals, millennials and retirees moving back to the city centers, the overall population growth in the suburban areas was still higher than their central cities.

New development patterns, palatial residential properties and economic growth are significant indicators for this trend. Although it has improved the physical living conditions, it has brought up many challenges in terms of car dependency, urban sprawl, increasing number of highways & roads, and deteriorated health. Urban sprawl is like an unending maze. It is difficult to navigate through streets in the transition areas of the central city and surrounding suburban cities which look identical even when you cross the city limit.

City Gateways were an integral part of the planning for defense, commerce and trade in ancient cities of Rome, Greece, China and India. The idea of developing city gateways or entrances sounds more relevant and promising in the current epoch of suburbanization to create strong sense of identity visually as well as physically. City gateways are crucial transition zones for transportation infrastructure and built environment. These corridors will open doors to responsible urban development and redevelopment within the city creating vibrant, healthy, walkable and people friendly communities. Developing city gateways will create opportunities for sustainable transportation options and they can be used as official toolkits for many facets of public and private development.

The City of Broken Arrow is the fourth largest city in the state of Oklahoma with an estimated population of 108,000 spread over 55 square miles. It started as a settlement by group of Creek Indians which is now an edge city for the City of Tulsa. Broken Arrow has witnessed consistent growth since 1990 and is the third largest manufacturing hub. It offers high quality of life distinguished by low crime rates, affordable housing, better recreational facilities and high performing schools.

The City of Broken Arrow faces development challenges like any other suburban city in the United States. Entry points for Broken Arrow from Tulsa and surrounding cities are somehow lost within the development and car traffic. These corridors have the potential of becoming vibrant urban spaces and transit corridors for people. Developing city gateways for Broken Arrow will allow the city to grow in responsible manner with unique visual experience and strong sense of identity.



Built Environment



Access and Movement



Streets, Public Spaces and Communities



Improving the Visual Experience

Design Model

This project will focus on the development issues related with the Elm-Kenosha gateway corridor. This corridor was identified by the City of Broken Arrow under the recently developed Comprehensive Plan. There are several other gateway corridors identified under the Comprehensive Plan. This corridor was prioritized by the City of Broken Arrow because of its high traffic volume and proximity to various commercial areas. The main goal of the project will be improving this crucial entrance into the community by addressing aesthetic and functional appearance of the city. This will serve as a module or guide for the city to develop other corridors and address different aspects of public and private development within those belts.

Why A Corridor?

A corridor is a linear stretch of an arterial street to which multiple collector and residential streets are connected. The entire network of streets facilitates the transportation infrastructure and access points to different locations. Hence, only one intersection or one access point cannot be considered. Therefore the selected area of study has a linear stretch of an arterial street-Elm Pl, starting from the Broken Arrow Expressway to the Elm-Kenosha intersection.

Four key elements to develop a design policy:

1. Built Environment

This element will mainly focus on the study of the existing built form, its function & character and its value to the city. Addressing the transition from highway to the arterials and from arterials to the city core and surrounding areas is crucial to form a design policy for built structures and landscaped areas.

2. Access and Movement

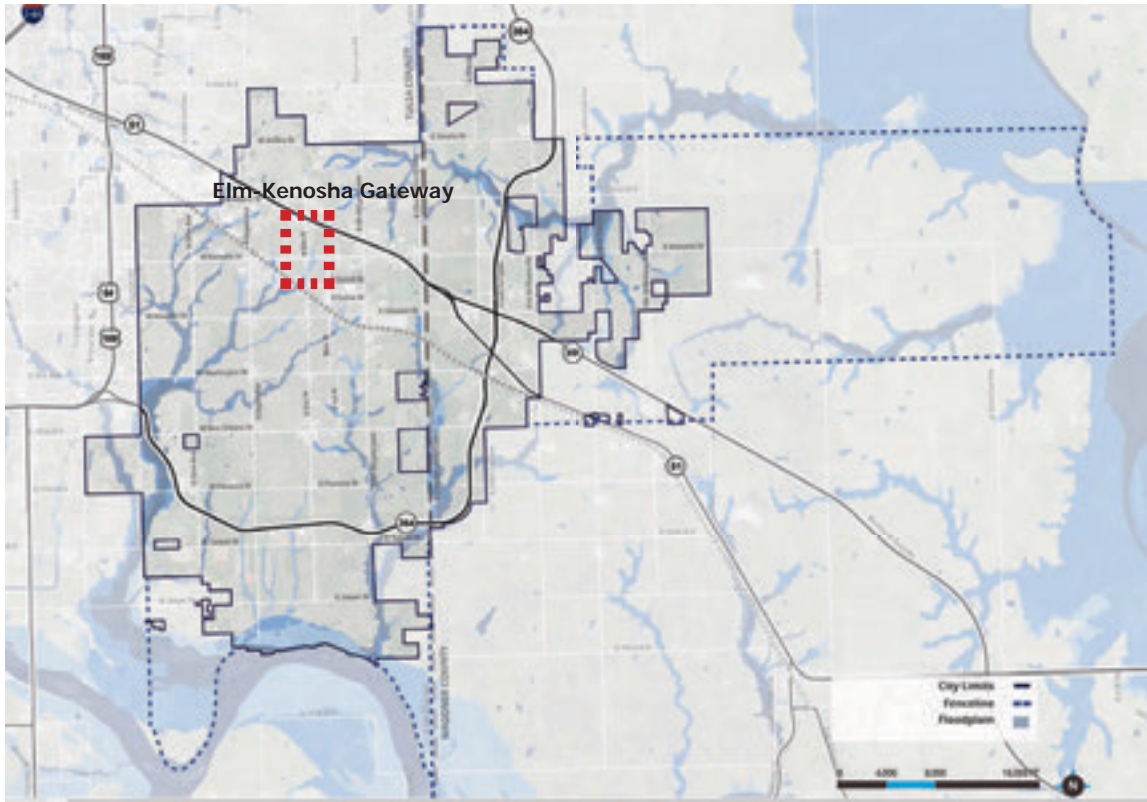
Access and movement are the crucial aspects for developing and providing effective modes of transportation. It will help in developing transportation infrastructure for users of all ages, abilities and modes of transportation. Addressing and developing walkable and bikeable infrastructure for creating people oriented spaces than car oriented spaces will be a deciding factor.

3. Streets, Public Spaces and Communities

Urban Streets are crucial for developing successful public spaces. Safe, walkable, inclusive and inviting streets create healthy and sustainable urban communities. Addressing these urban streets within the corridor will bring in activities necessary for creating vibrant and culturally diverse public spaces.

4. Improving the Visual Experience

Improving the visual experience by creating attractive spaces for people within the corridor is important. This will be addressed by incorporating landscaping strategies, appropriate signage and public art.



Selected Elm-Kenosha Gateway Corridor (Image Source- Broken Arrow Next Comprehensive Plan)



Closeup of the Corridor (Image Source- ESRI)

Methodology

There are several potential corridors identified under the Comprehensive Plan for developing gateways within the City of Broken Arrow. This project will focus on one of the major priority, Elm-Kenosha gateway corridor. This corridor was finalized with the help of city planning department and city engineers. High traffic volume, proximity to various commercial areas & surrounding communities and land suitability for non-residential development were the major reasons why Elm-Kenosha corridor was prioritized. The team of planning professionals led by Halff Associates, the consultancy firm hired for Broken Arrow Comprehensive Plan also contributed in this decision making process. Simulation models for non-residential land suitability developed by the team were helpful in finalizing the selection of Elm-Kenosha gateway corridor.

The steering committee was formed for the Broken Arrow Comprehensive Plan consisting of various stakeholders from the community. Two steering committee meetings were attended in September & November 2018 to understand the process and to gather the input. The Elm-Kenosha gateway corridor was studied using the zoning & land use documents and draft Comprehensive Plan to understand the current and future planning provisions. The corridor was analyzed using the four elements mentioned in the design model. Observational study was conducted at the crucial locations. The findings from this process were used to develop design strategies for the Elm-Kenosha gateway corridor. These strategies involved various renderings specific to intersections, streetscape, active transportation and recreational facilities. These renderings were presented at the last public open house for the Comprehensive Plan to get the community feedback.

Interventions

The main focus of this study is to create a sense of identity for the City of Broken Arrow by means of developing city gateway. The Elm-Kenosha corridor will address the important planning issues regarding built & unbuilt spaces, and act as a guide for it. Improving this corridor and transitioning it into active community and public spaces by addressing the visual and functional aspects is important.

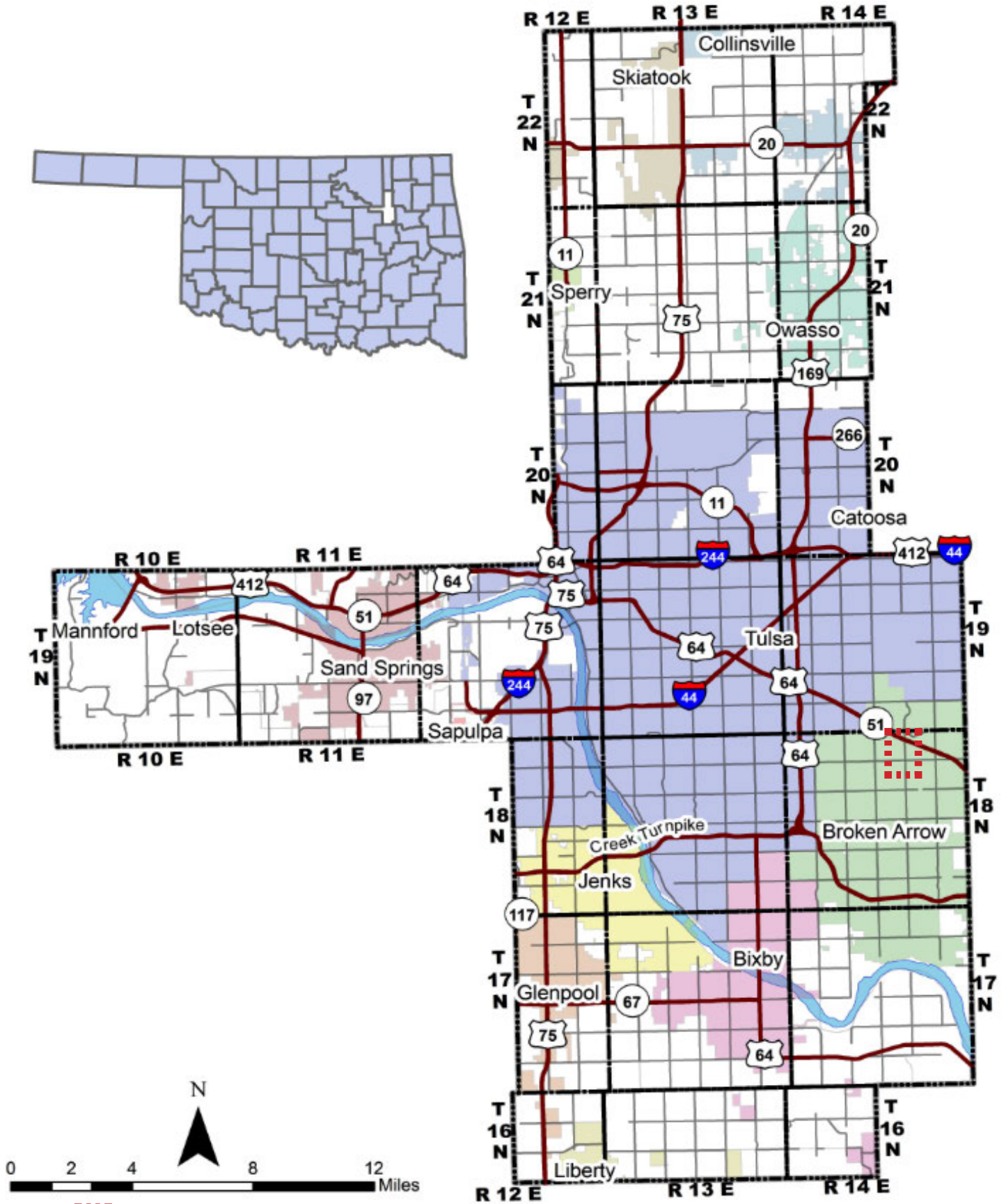
Interventions include:

- A design policy for the Elm-Kenosha corridor
- Retrofitting/improving streets to create more walkable and bikeable environment
- Placemaking efforts by means of tactical urbanism strategies
- Developing/redeveloping public spaces and open spaces
- Developing sustainable landscape strategies, streetscape, signage and public art

Community Partners

1. The City of Broken Arrow- City planners, City engineers, Community Representatives
2. Broken Arrow Comprehensive Plan Steering Committee
3. Oklahoma Department of Transportation

Vicinity Map



 Selected Gateway Corridor

(Image Source- Tulsa County Assessor)

Neighborhood Map

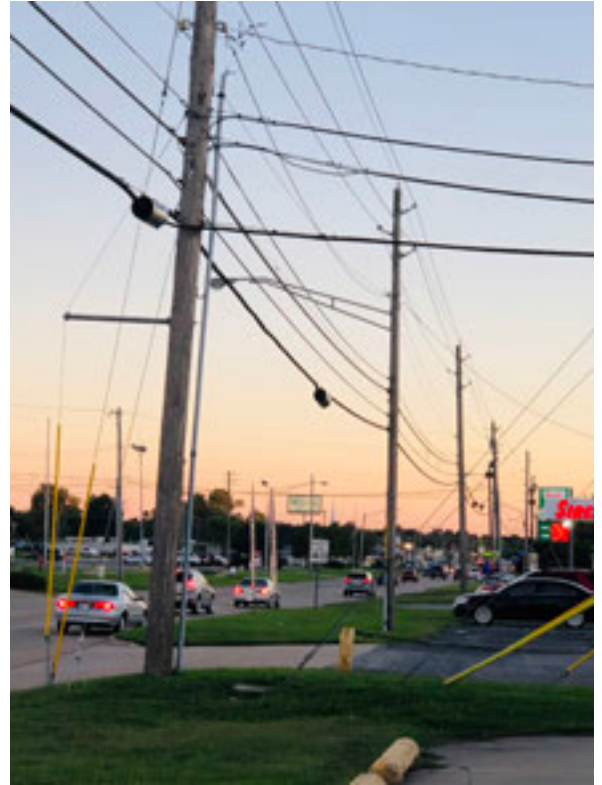


 Natural Water Drainage Area

Elm PI-Kenosha St Existing Surroundings



Elm PI-Kenosha St Intersection



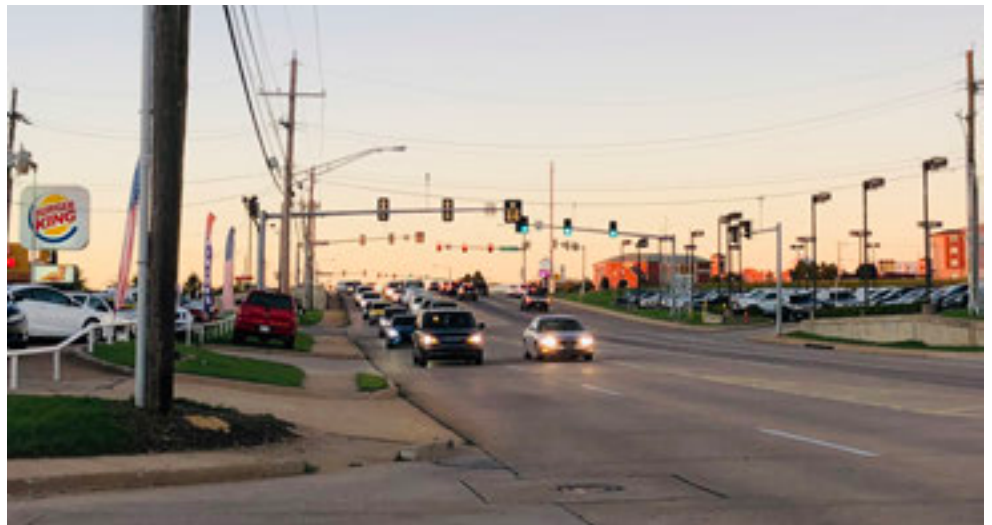
Electricity Poles Along the Corridor



Hotels near Elm PI-Broken Arrow Expressway Intersection



Commercial Strip Centers



Looking Towards Elm PI-Broken Arrow Expressway Intersection

Elm Pl-Kenosha St Existing Surroundings



Commercial Strip Centers and Car Dealerships



Empty Surface Parking Lots



Lansing St



Narrow Sidewalks



Church



Elm Pl-Kenosha St Existing Surroundings



Commercial Strip Center Parking Lot



Auto Dealership



Frequent Curbscuts

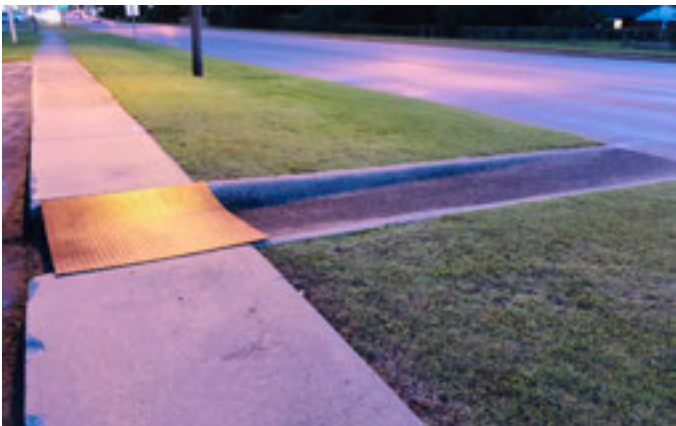


Surface Parking Lots

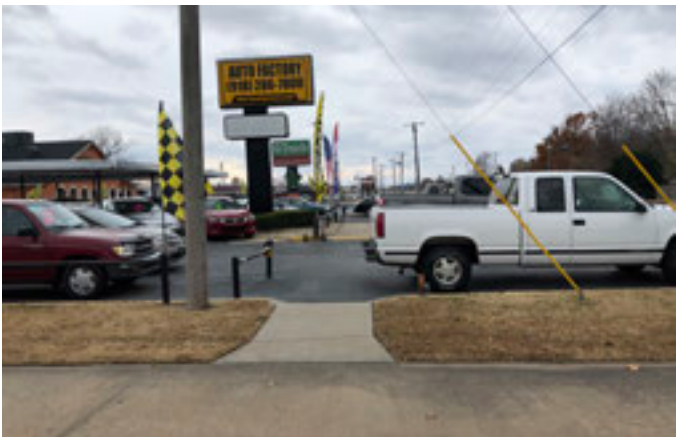


Empty Surface Parking Lots

Elm Pl-Kenosha St Existing Surroundings



Undesirable Walking Conditions



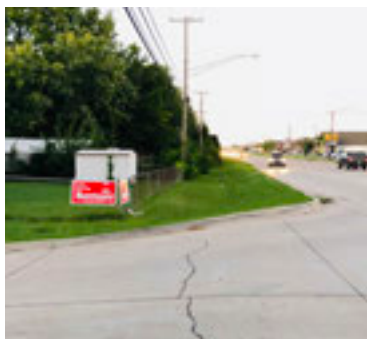
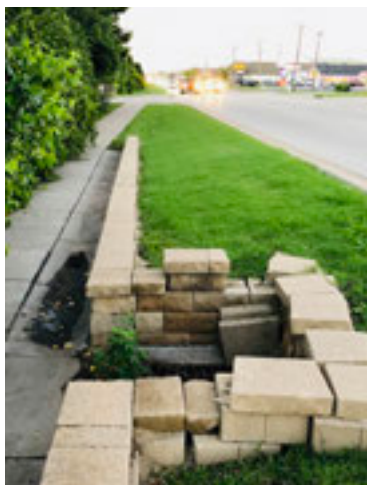
Undesirable Walking Conditions

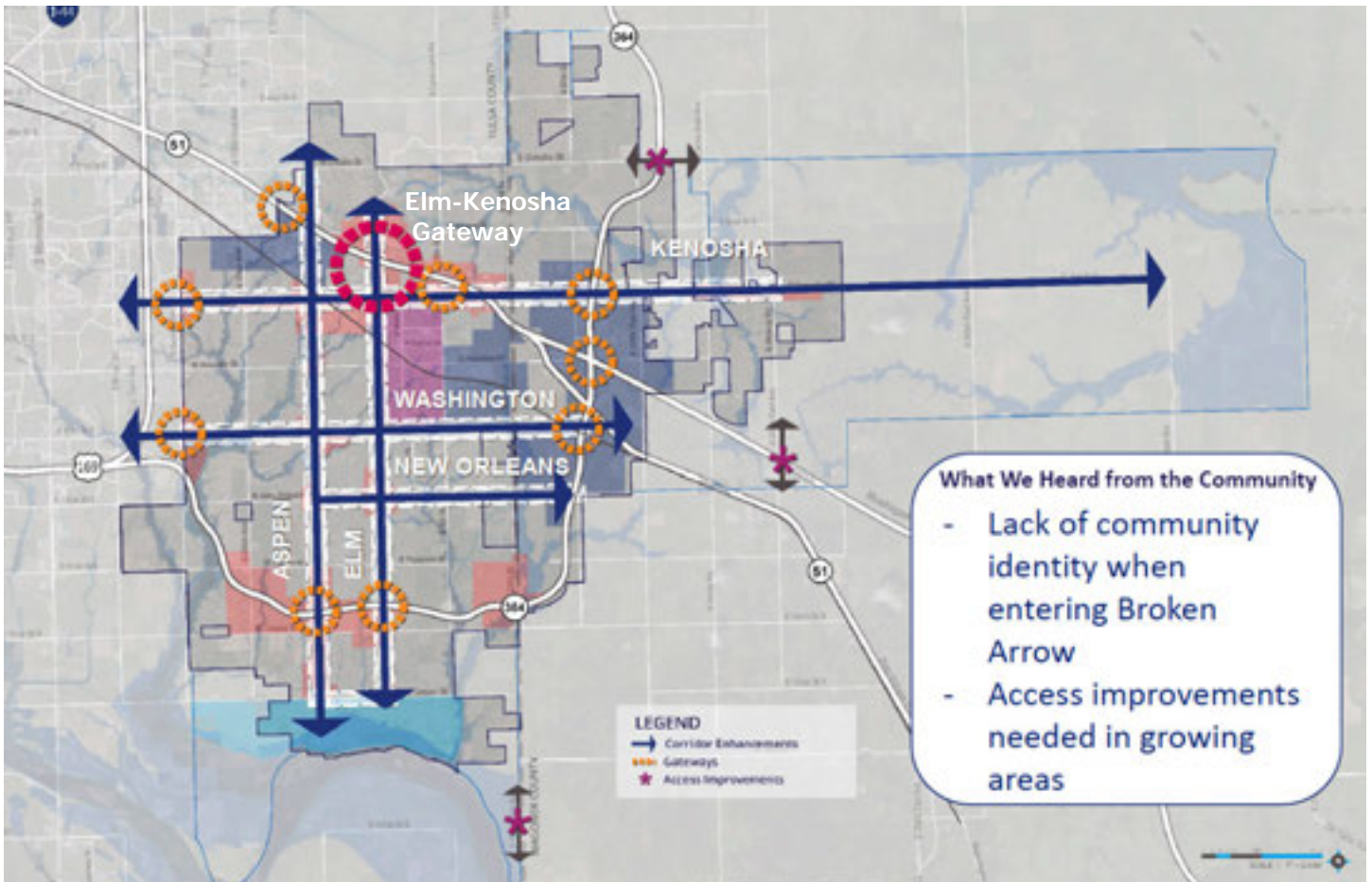


Narrow Sidewalks With No Trees

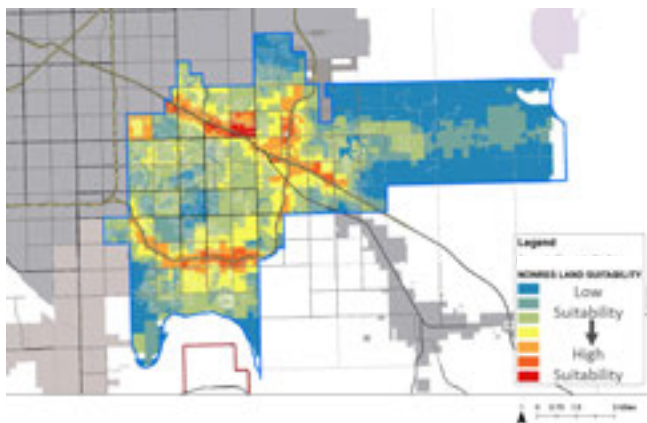


Undesirable and Unsafe Walking Conditions

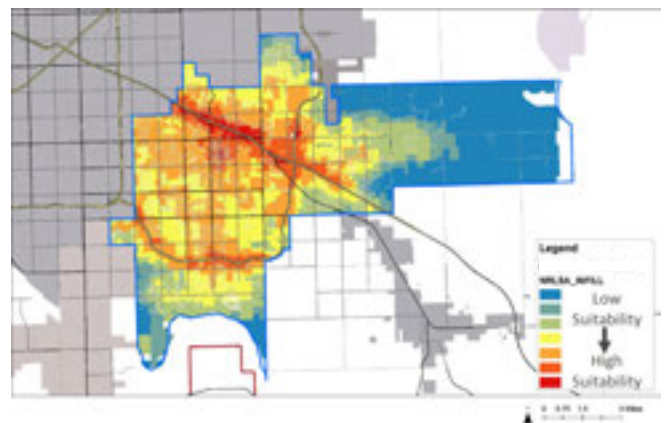




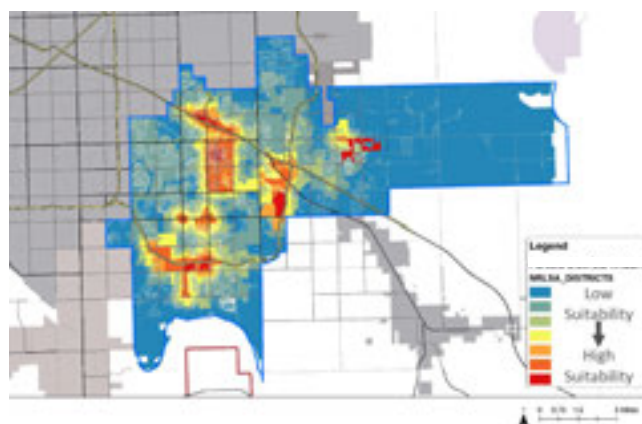
Gateway Corridors Identified in Comprehensive Plan (Source- <http://brokenarrownext.com/>)



Trend Scenario (Source- <http://brokenarrownext.com/>)



Infill Scenario (Source- <http://brokenarrownext.com/>)



District Scenario (Source- <http://brokenarrownext.com/>)

What is a Gateway?

A Gateway can be simply defined as a node or a corridor connecting two different regions, cities or areas. In this report, this term is used for a street corridor of Elm Place from Broken Arrow Expressway to Kenosha Street and from Kenosha Street to Main Street Intersection.

What are the Characteristics of a Gateway?

There can be multiple gateway corridors to the same region, city or an area. Depending on their geographical location they will have unique physical setting of streets, open spaces and built forms. A gateway may represent multiple characteristics of different regions it is connecting. The term gateway is commonly used with reference to a city, specially suburban cities.

Suburban cities usually develop in the shadow of their central cities. Hence, a gateway provides an opportunity for suburbs to start marking their own unique physical identity. A gateway strengthens the physical difference between two cities in terms of streetscapes and built forms.

Why a Gateway?

- The concept of a gateway sounds more relevant in the current era of suburbanization.
- It creates branding opportunities for suburban cities.
- They have existed since ancient times and are an integral part of city planning.
- A gateway enhances and demarcates key entry points.
- It creates strong sense of identity visually and physically to distinguish different communities, cities or regions.
- A gateway improves and enhances the experience of navigating through suburban streets.
- It creates sense of place.
- A gateway draws attention to a specific place by creating landmarks.
- It provides an opportunity for public art and encourage local art & talent.
- A gateway addresses crucial transition zones and networks.
- It guides public and private development in responsible manner.

Land Suitability and Selection of Elm-Kenosha Gateway

Adjacent images show the scenario models from Broken Arrow Comprehensive Plan. These models are based on three scenarios- Trend, Infill and District. It shows the non-residential land suitability for these three scenarios in Broken Arrow.

Trend Scenario- It replicates the current development pattern in Broken Arrow. It is low density and suburban style.

Infill Scenario- It aligns the new development within the existing incorporated development. It densifies the current development.

District Scenario- It aligns new development around 9 districts identified during June 2018 charrette in Broken Arrow.

All these scenarios show the selected corridor is suitable for the development other than the residential development. Hence the selected gateway corridor has a potential for mixed use development which will enhance the key entry points of Broken Arrow. It will also offer recreational and entertainment activities along with the improved transportation and streetscapes. Also, this corridor was prioritized by the City of Broken Arrow Planning Department as one of the primary gateway. This decision was further strengthened by the study of three scenarios of land suitability shown in the adjacent images under the Broken Arrow Next Comprehensive Plan.

Reference: Broken Arrow Next Comprehensive Plan Draft
<http://bit.ly/2Vxp8zn>



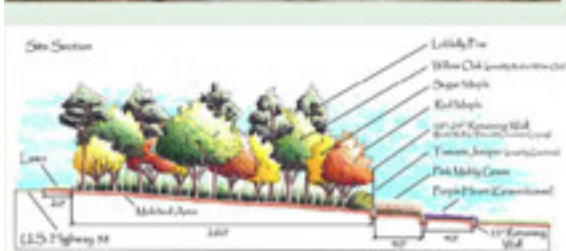
Gateway Sequence (Source- City and Gateway Draft Urban Design Framework Australia,2018)



Streetscape (Source- ReVision Florence, City of Florence, Oregon)



Architecture (Source-<https://www.3dliftplan.com/LPOTY/HamiltonStanley.aspx>, City Gateway for Council Bluffs)



Planting (Source- City of Franklin Gateway Enhancement Plan)

Important Aspects To Be Considered While Designing a Gateway

- A gateway should emphasize or highlight the features of a city or an area for which it is planned.
- It should consider the context around such as streets, pathways, buildings, land use and people.
- Both natural and built environment should be an integral part of a gateway.

Streetscape

- It is an important aspect of a gateway which incorporates both pedestrian and vehicular experience.
- Streetscape should consider sense of place and scale, street width, pedestrian walkways, street plantings, signages and lighting.
- It should strengthen the sense of journey rather than just traveling.
- Built structures are also an inevitable part of a streetscape. Placement of buildings, its scale & character can be used to serve as a gateway itself.

Architecture

- Buildings, architectural elements and structures can be used to enhance the key entry points.
- Architectural features help in framing the scenic views and marking the transitions for pedestrians and vehicles.
- It also creates visual interest through scale, placement and hierarchy.

Planting

- Planting creates visual interest and it also provides shade in harsh summers. Hence they have functional as well as visual importance in planning a gateway.
- Planting can be used to mark the transition zones, frame the views and to create visual, textural interest.
- Local species of plants can be used to make it environmentally sustainable.

Reference: City of Chesapeake, Virginia- Design Guidelines Manual
http://www.cityofchesapeake.net/assets/documents/departments/planning/design_guidelines/chapter-v.pdf



Pedestrian Walkways (Source- Buffalo Niagara Medical Campus, SCAPE Studio)



Site Furnishings (Source- Osseo Central Avenue Streetscape, HKGI)



Parking Facilities (Source- Osseo Central Avenue Streetscape, HKGI)



Public Art

Important Aspects To Be Considered While Designing a Gateway

Pedestrian Walkways

- Pedestrians are an important part of transportational facilities.
- A gateway should enhance the experience of walking by creating visual interest and providing the safety.
- Plants, street furniture, lighting and signage are important factors while designing pedestrian walkways.

Site Furnishings and Utility Placement

- Site furnishings such as benches, lights, trash receptacles, transit shelters, planters enhance the experience of a traveler.
- Appropriate placement, design and scale of these elements will make the journey more interesting and comfortable for a visitor.
- ADA accessibility should be given an importance while designing and placing the site furnishings and utilities.

Parking Facilities

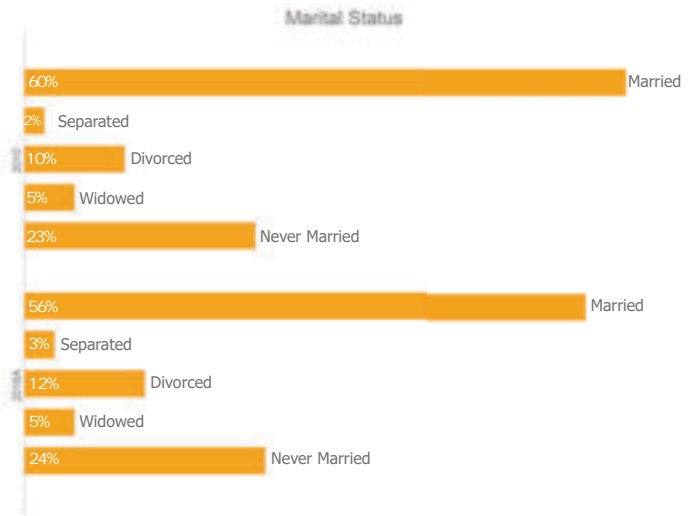
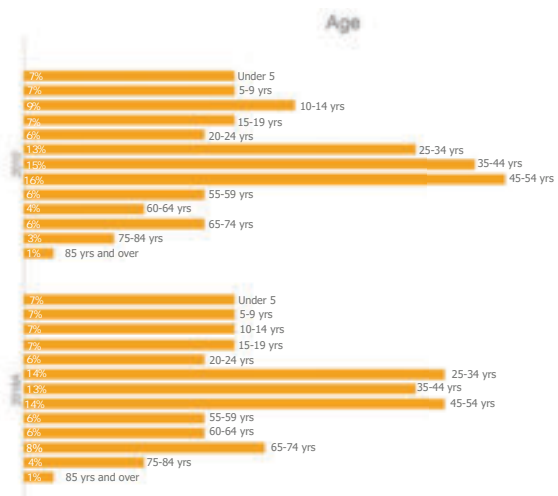
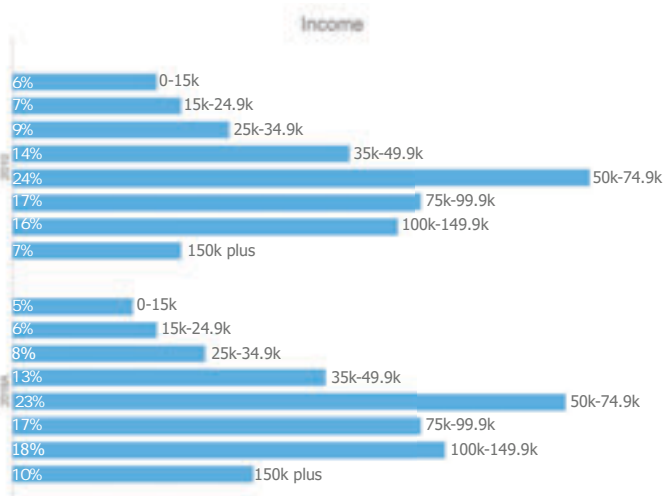
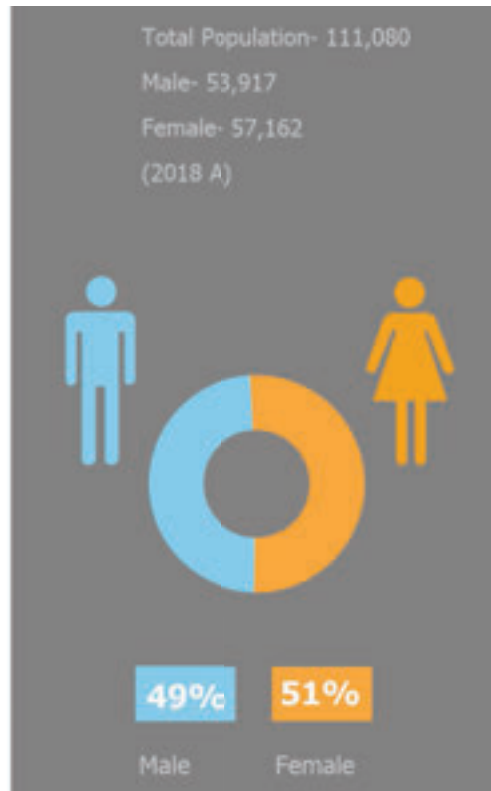
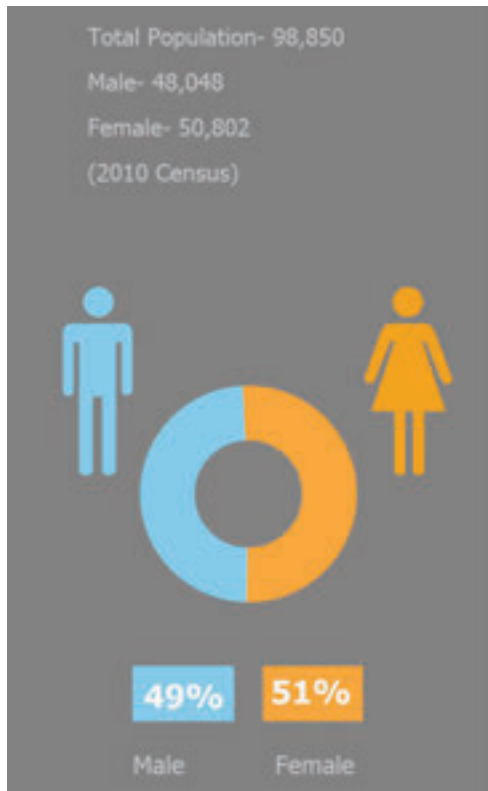
- It is important to provide parking facilities for vehicles. But at the same time it is also important how you plan and place the parking.
- Parking lots and garages mark the entry points for vehicular traffic, but at the same can be problematic for pedestrian traffic.
- Hence the placement of these facilities should consider the pedestrian comfort and safety.
- Placement of parking facilities should not be directly adjacent to pedestrian facilities such as walkways specially when it comes to surface lots and parking garages.

Public Art and Signage

- Signage is commonly used for directing the visitors and help them identify the new areas.
- Public art is important while planning a gateway as it creates important landmarks for travelers.
- It also creates visual interest and provide an important platform for local talent to display their art.
- Strategic placement of these two elements will be visually and functionally appealing for the visitors.

Reference: City of Chesapeake, Virginia- Design Guidelines Manual
http://www.cityofchesapeake.net/assets/documents/departments/planning/design_guidelines/chapter-v.pdf

INVENTORY



Broken Arrow Demographics

(Data Source- Demographics Now, U.S Census Bureau
 Graphs- Created with Piktochart)

Community Profile and Demographics

- Broken Arrow is the fourth largest city in the state of Oklahoma and is located in the northeast region.
- The city has experienced 32% of significant growth between 2000-2010 according to the US Census Bureau.
- It is also the third largest hub for manufacturing industries with a significant amount of people working in the energy sector.
- Broken Arrow is known for its affordable residential properties. The city has a majority of its land dedicated for residential developments, most of which are single family housing units.
- Property values in Broken Arrow range roughly between \$101,000-\$259,000.
- The city hosts various events and seasonal festivals every year such as Rooster Days, local Farmer’s Market and musical performances in the park.
- Rose District, the Performing Arts Center, Warren theater, Bass Pro Shops are the main attractions for visitors and local people for cultural and recreational activities.

Population

- According to 2010 census, the population of Broken Arrow is 98,850 out of which 51% is the female population and 49% is the male population.
- The estimated population for 2023 is 119,744 and the ratio of male and female population will likely remain the same.
- 2010-2018 estimated population growth rate is 12.3%

Income

- The income profile of Broken Arrow is above state norms. According to 2010 census the median household income is \$63,942 and is likely to increase according to 2023 projections.
- 2010 census data shows that there are total 38,005 housing units in Broken Arrow out of which 95% are occupied. Out of these units 62% are owner occupied. According to 2023 projections the trend is likely to remain the same which indicates that the housing in Broken Arrow is affordable.

Race

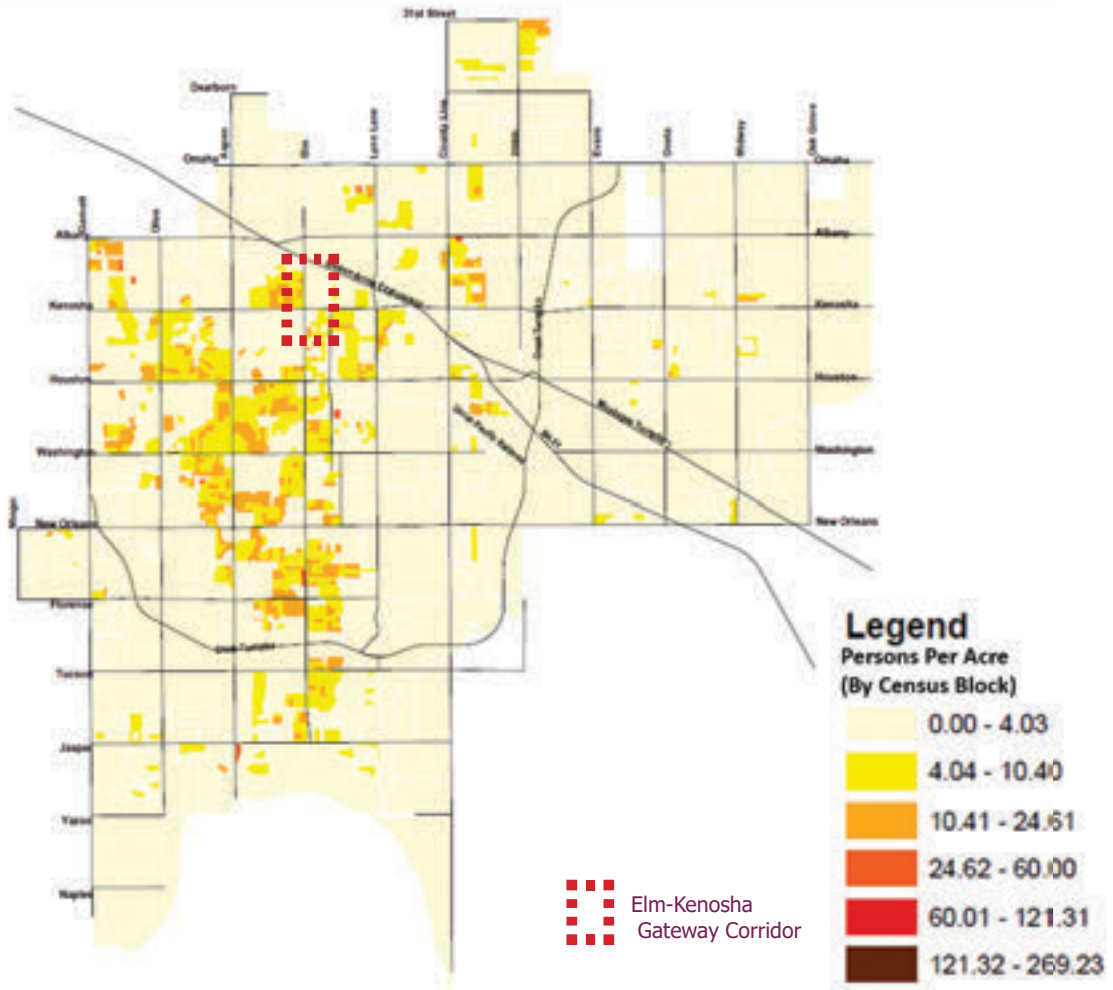
- Broken Arrow has a majority of White population according to 2010 census. It is likely to decrease by small percentage according to 2023 projections.
- The projections also show that the population with two or more races /multiracial population is likely to increase.
- This has the connection with current millennial trend and immigrant population in the United States.

Age

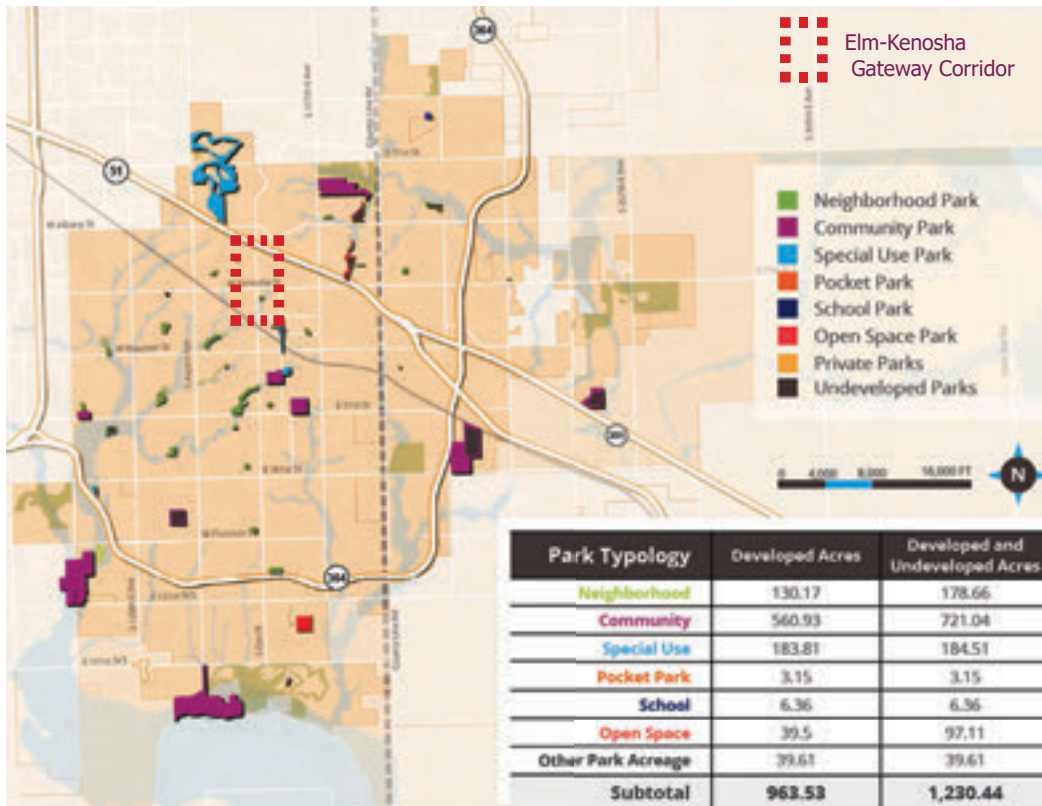
- The median age in Broken Arrow is 35.5 according to 2010 census which is similar to Tulsa. According to 2023 projections it is likely to increase to 37.5.

Marital Status

- According to 2010 census almost 62% of population is married which is higher than Tulsa. It is likely to decrease to 57% according to 2023 projections.



Population Density (Source- <http://www.brokenarrowok.gov>)



Broken Arrow Park Locations (Source- Broken Arrow Next Comprehensive Plan Draft)

Broken Arrow Demographics and Gateways

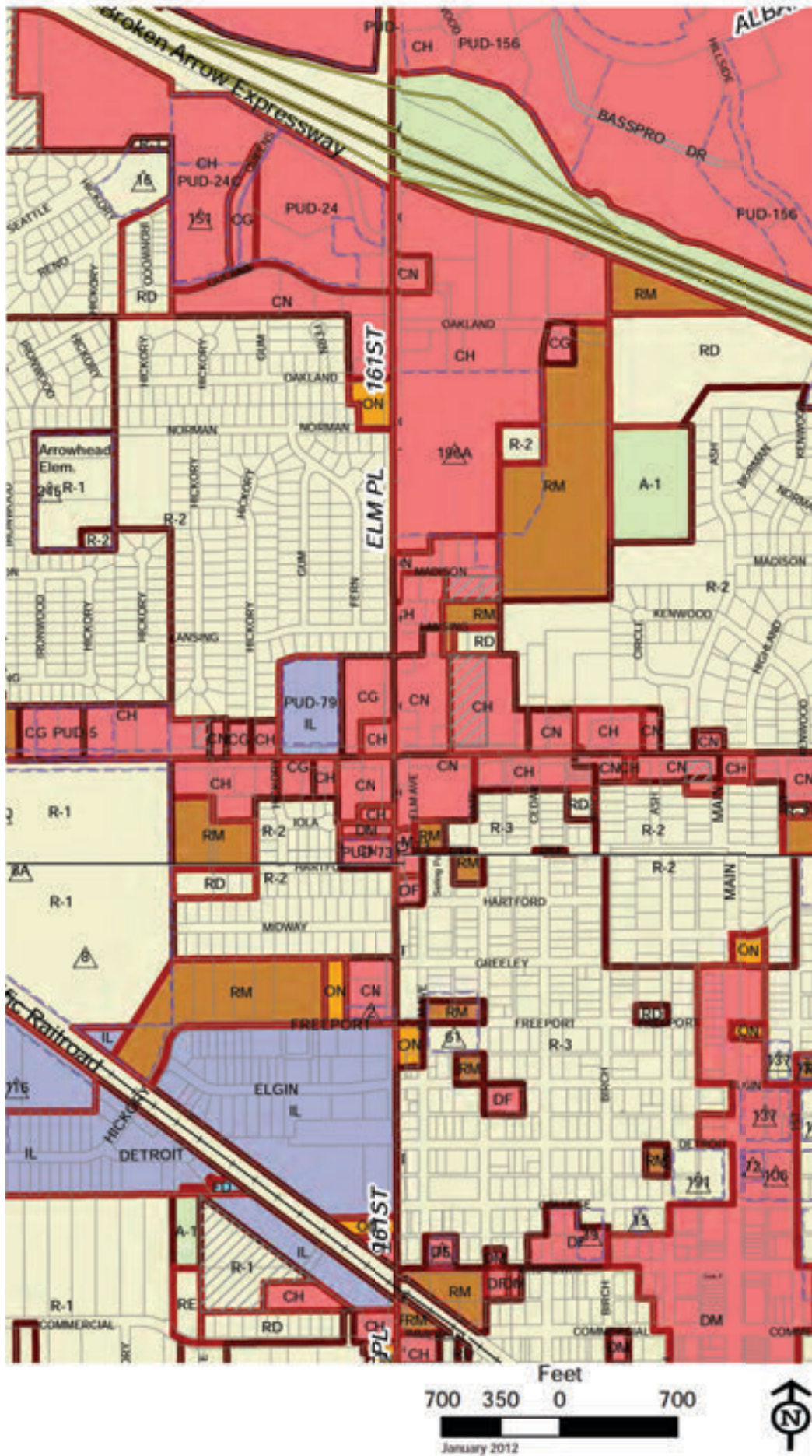
- Broken Arrow is one of the fastest growing suburbs in Oklahoma. It faces similar challenges as any other suburb.
- Leap frog developments lead to sparsely populated areas. Almost all the areas in Broken Arrow are sparsely populated.
- The average maximum density in some of the areas is 4-10 persons per acre.
- Population density affects lot of factors in terms of developments. If an area is sparsely populated you are likely to be car dependent for most of your routine activities.
- The current development is mostly concentrated in the south-west and north-west region of Broken Arrow.
- New developments are mostly towards the eastern part of the city.
- Considering the demographics of Broken Arrow, the median age according to 2018 estimate is 36.5 years which shows that Broken Arrow has significant amount of young population from the 'millennials'.
- Millennials are highly educated, work driven and technologically savvy. They choose to be more connected through technology & social media and use their cellphones significantly than their previous generations. They usually prefer urban environments.
- Almost 60% population is married which shows there is a possibility of many young parents. The median household income is \$64,000 which is above state norms. It shows the financial stability and prosperity.
- If Broken Arrow wants to attract younger population and make the existing one stay here, it needs more urban areas with recreational, shopping and cultural activities.
- Gateways sound promising to concentrate all these developments.

Parks and Recreation

- There are 38 parks throughout the city which offer different activities.
- Out of 38 parks 6-8 parks are community parks over 50 acres and offer multiple recreational and sports activities like softball fields, splash pads, tennis and basketball courts, event centers, fishing, football fields, etc. Rest of them are neighborhood parks, special use parks or school parks.
- Overall there are significant amount of recreational activities and spaces available throughout the city, though, it lacks in city wide walking and biking trails. Very few parks are located in the northern part of the city.

Conclusion

- Gateways have a potential to attract and sustain existing demographics of the city because of their strategic locations.
- Elm Place which is located in the northern part of the city is one of the busiest street in terms vehicular traffic and has variety of commercial development around.
- Although it is an important gateway for the city, the land has not been utilized to its maximum capacity and worth.
- It has a potential of becoming people-friendly place for all ages by densifying the development and offering various recreational, shopping and entertainment activities.
- The higher percentage of younger population in the city promises the good response and support to these spaces.
- Futuristic approach for these gateway corridors will definitely help the city to respond the needs of future generations in more innovative ways which will resonate with their lifestyle.



(Source- City of Broken Arrow)

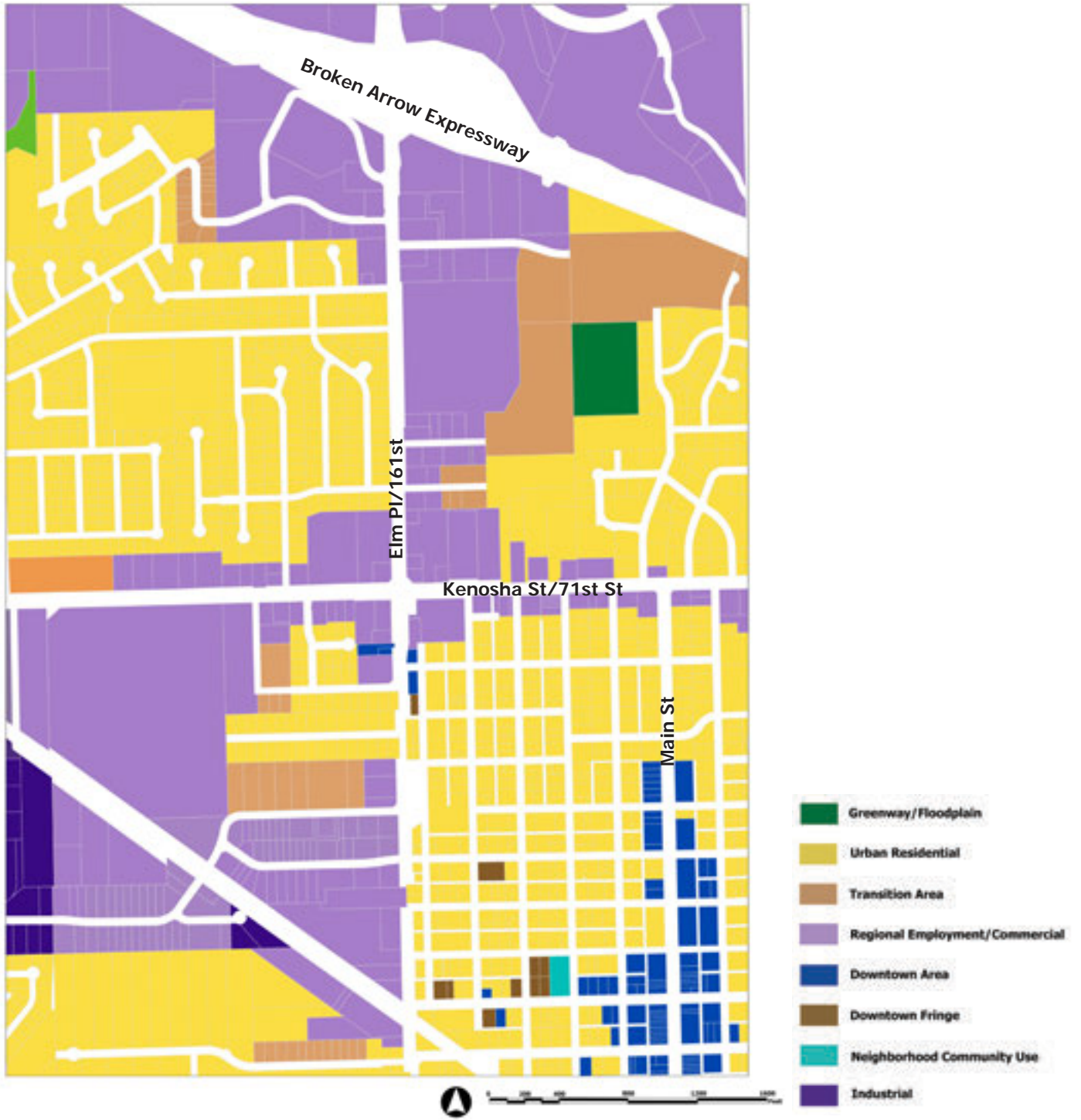
Zoning Map

A-1	Agricultural
RE	Residential Estate
RS-1	Single-Family Residential - 1
R-2	Single-Family Residential - 2
RS-2	Single-Family Residential - 2
RS-3	Single-Family Residential - 3
R-1	R-1 [Inactive]
R-3	R-3 [Inactive]
RD	Residential Duplex
RM	Residential Multi-Family
RM	Residential Multi-Family
RMH	Residential Mobile Home Park
DM	Downtown Mixed-Use Core
DM	Downtown Mixed-Use Core
DF	Downtown Fringe
DF	Downtown Fringe
ON	Office Neighborhood
CN	Commercial Neighborhood
CG	Commercial General
CG	Commercial General
CH	Commercial Heavy
CH	Commercial Heavy
IL	Industrial Light
IL	Industrial Light
IH	Industrial Heavy
FD	Floodplain

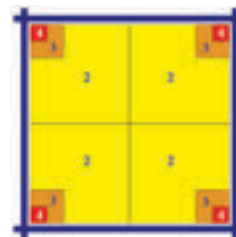
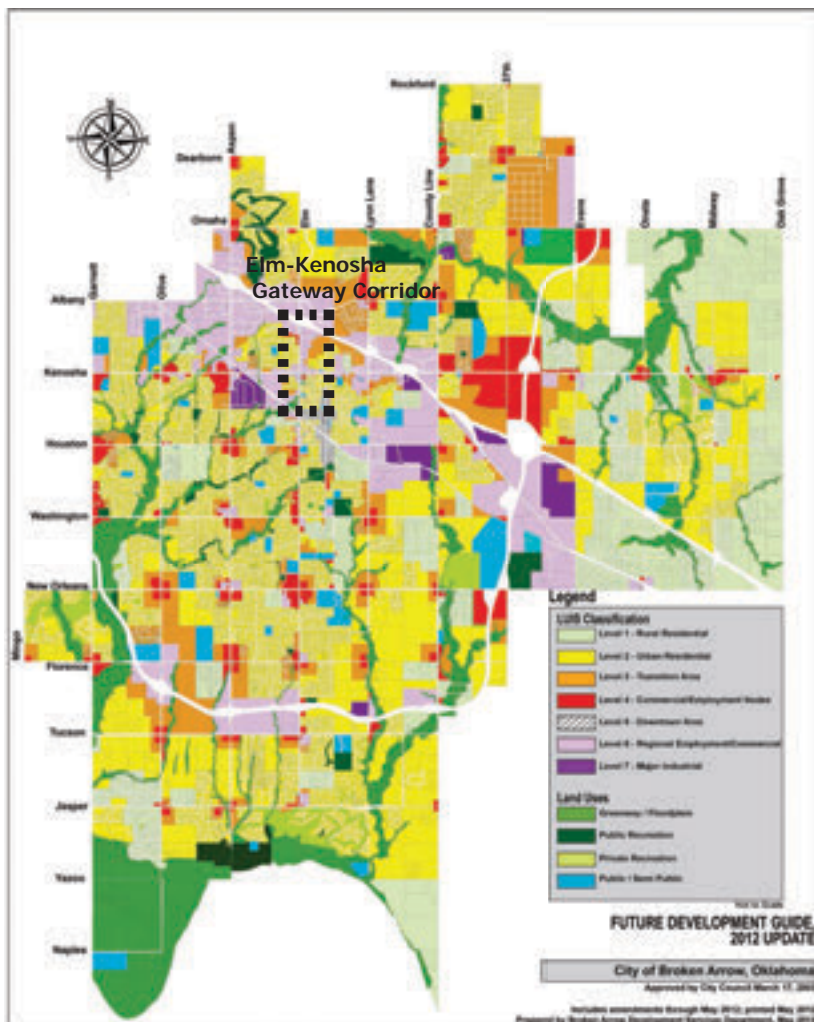
(Source- City of Broken Arrow)

- The study area shows a mix of different zoning categories.
- The majority of the zoning is categorized as residential, primarily as RS1, RS2 and R2.
- Some of the lots have Residential Duplex which is categorized as RD.
- The next major zoning category after residential is commercial. These lots are primarily along the arterial streets acting as a buffer between street and the residential neighborhood.
- All of the commercial lots vary in sizes. The main categories seen under commercial zoning are Commercial Neighborhood (CN), Commercial General (CG), Commercial Heavy (CH) and Downtown Fringe (DF).
- There are few industrial zones categorized as Industrial Light (IL) and Industrial Heavy (IH).
- There are Residential Multifamily zones categorized as RM and RMH.
- Along with lot zoning some of the area falls under Historic Rose District found in Comprehensive Plan.
- There are some PUDs, mainly along arterial streets. The rezoning applications for these. PUDs are approved and subject to platting or other conditions.
- The term Planned Unit Development (PUD) is used to describe a type of development and the regulatory process that permits a developer to meet overall community density and land use goals without being bound by existing zoning requirements. PUD is a special type of floating overlay district which generally does not appear on the municipal zoning map until a designation is requested. (Source-www.uwsp.edu/cnr/landcenter/)

Reference: City of Broken Arrow Zoning Maps
<http://www.brokenarrowok.gov/DocumentCenter/View/270/2012-Broken-Arrow-Zoning-Book?bidId=>



Land Use Map



Prototypical LUIS model for one-mile section
(Source-City of Broken Arrow)

LUIS

- City of Broken Arrow uses the Land Use Intensity System as a tool and approach to establish Future Development Guide.
- It is based on the concept that certain land uses have similarities in intensity of uses and are compatible while other land uses having a different level of intensity may not be compatible.
- The zoning ordinance is the primary means used to implement the Future Development Guide. It has been tied together with LUIS for various zoning classifications.
- To make the Future Development Guide easy to understand, specific zoning districts have been grouped into seven levels of land use intensity.
- Each level permits a focused mixture of land use classification and workable framework.

1. LUIS Level 1-Rural Residential: Represents the lowest intensity of land use in Broken Arrow. It represents rural areas or existing established areas with very low density.

2. LUIS Level 2-Urban Residential: Represents the predominant land use in Broken Arrow with areas of typical residential subdivision development.

3. LUIS Level 3-Transition Area: Represents a transition zone from strictly residential to strictly non-residential development. Primary uses are higher density residential and lower density employment development.

4. LUIS Level 4- Commercial/Employment Nodes: Represents local commercial and office intensity land use. It designates commercial or office activities around arterial nodes.

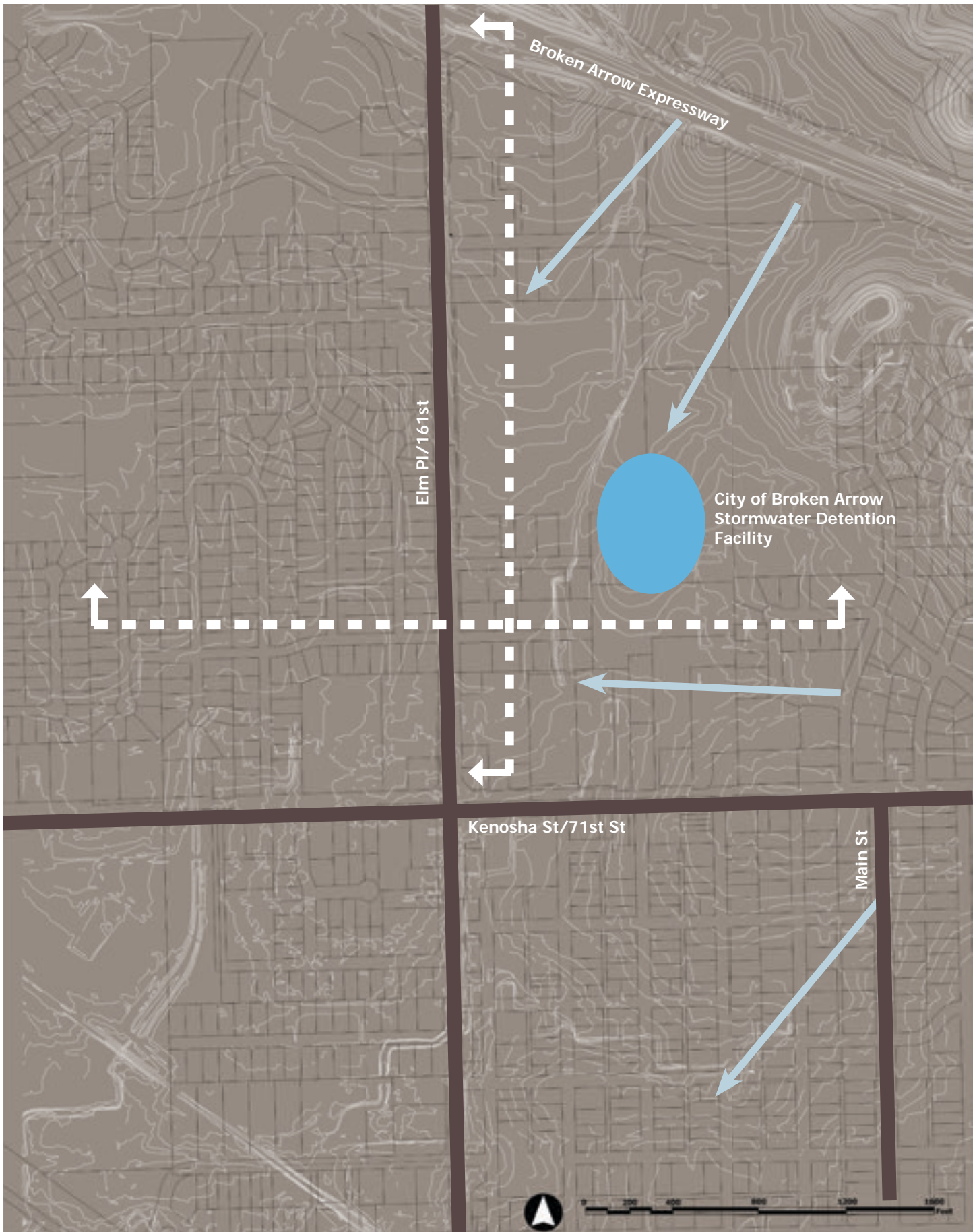
5. LUIS Level 5-Downtown Area: Represents the development and style that is typical of downtown Broken Arrow. Principal land uses are mixed-use office, retail and service commercial.

6. LUIS Level 6-Regional Commercial/Employment: Provides an opportunity to develop regionally significant and highway oriented commercial and employment nodes.

7. LUIS Level 7-Major Industrial: Represents the highest intensity land use, predominantly industrial and employment facilities.

The selected area of study has all seven levels of LUIS mentioned above.

ANALYSIS & MAPPING

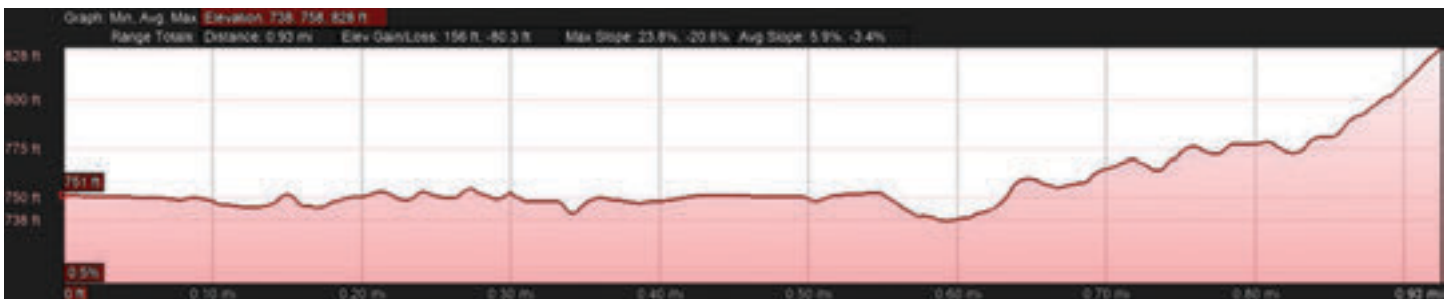


(Source- Survey Data from the City of Broken Arrow, ESRI)

Topography Map



Elevation Profile North-South (Source- Google Earth)



Elevation Profile East-West (Source- Google Earth)

- The topography of the study area ranges from 827 ft above sea level being the highest point at the eastern end of Kenosha street to the lowest point at 750 ft above sea level being the lowest point at the southern end of Elm Pl.
- Study area slopes from northern end to southern end and from eastern end to western end.
- Two shallow valleys run from north-east end to south-west end and also from eastern end to western end.
- Two shallow ridges run from north-east end to south-west end and also from eastern end to western end.
- There is a natural stormwater detention facility on the north-east end of the Elm-Kenosha intersection.
- This facility is maintained by the City of Broken Arrow.
- There also a creek just east of the Elm-Kenosha intersection.
- Overall the area has minimum risk of flood.
- The stormwater detention facility by City of Broken Arrow has a potential of becoming a recreational facility for the neighborhood and for the city as well.



Legibility Analysis

Legibility is the term used in urban planning, defined as 'the ease with which its parts can be recognized and organized into a coherent pattern' (Lynch,1960:2).The degree of distinctiveness that allows the viewer to distinguish or categorize the elements of the scene is legibility. 'The greater the legibility the greater the preference'(Bell et al.,2005:45). According to Lynch definition, legibility can enhance the identity, structure and the meaning of environmental surroundings. The city may have a strong identity and character but still confusing and unclear because of confusion of its path system. Characteristics of environmental elements, whether they are natural or man-made, determine the visual quality of the built environment, these characteristics are what Lynch named Imageability, 'it is that quality in a physical object which gives it a higher probability of evoking a strong image in any given observer'(Lynch,1960:9).

Lynchian Elements

1. Paths

These are the passages of the movement through which observer moves and conceives the city. Alleys, streets, railroads, motorways, canals,etc

Prominent paths in the study area- 161st/Elm PI, Broken Arrow Expressway, 71st St/Kenosha, Main St, 1st St, Norman St, Railroad

2.Edges

These are linear elements which act as boundaries between two phases having different features from each other. They are not considered as paths by the observer

Prominent edges in the study area- Broken Arrow Expressway, Railroad

3. Districts

These are the areas perceived with common characteristics and features. They have distinct visual characteristic from rest of the environment. These characteristics are based on continuity and homogeneity of facade materials, textures, spaces, forms, details, symbols, building type, uses, activities, inhabitants, colors, skyline, topography,etc. (Lynch,1960).

Prominent districts in the study area- Rose District, commercial areas around the Kenosha and Elm PI intersection, Arrow Head Elementary School neighborhood, Industrial area in the south-west corner

4. Nodes

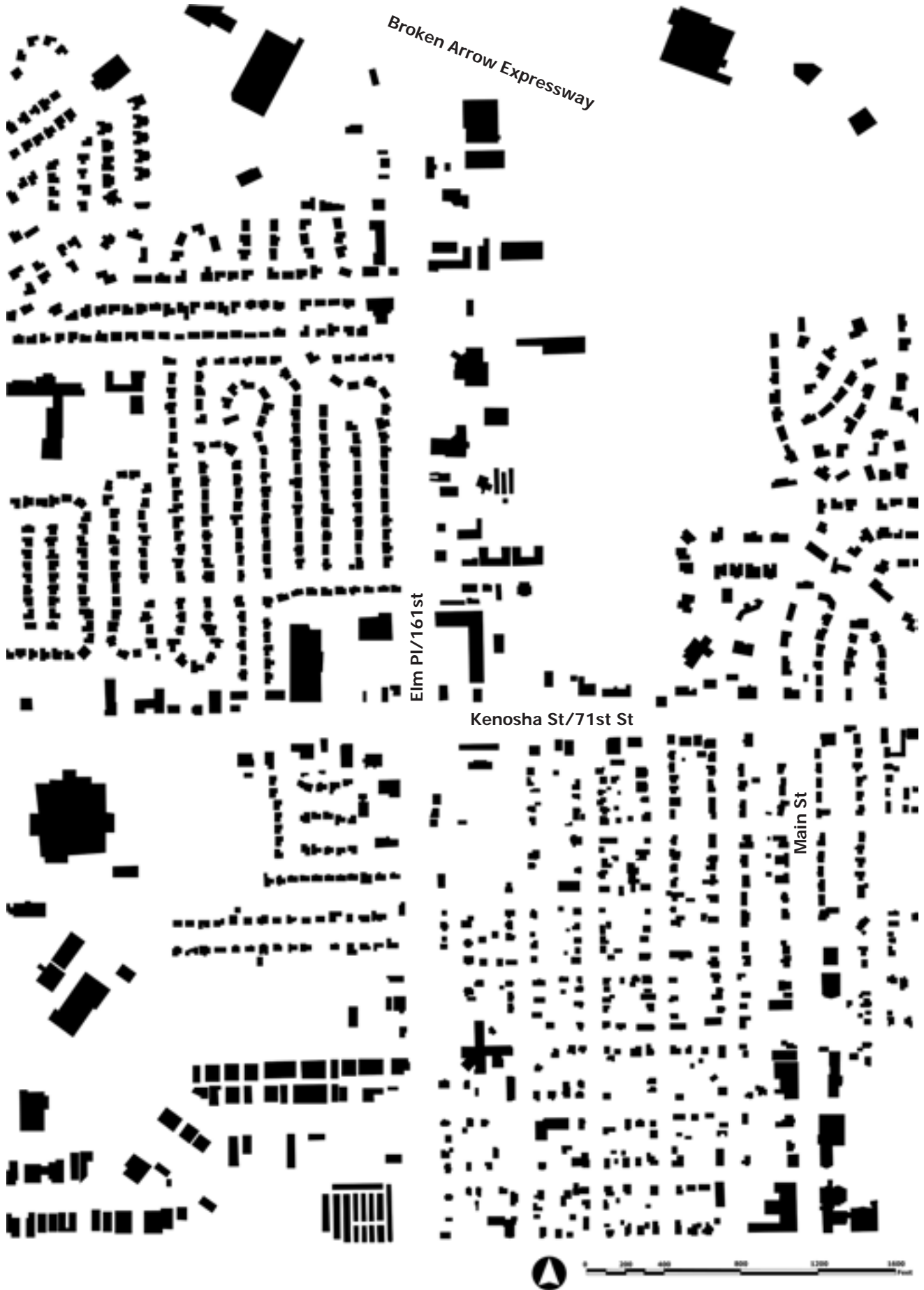
These are intersections or junctions of paths or concentrations of a particular characteristic in which the observer can enter(Lynch,1960:72). These are gathering points such as plazas, squares, street intersections, junctions or railroad stations.

Prominent nodes in the study area- Broken Arrow Expressway and Elm PI intersection, Elm PI and Kenosha intersection, Kenosha and Main St intersection

5. Landmarks

These are the external features which act as reference points to the observer (Lynch,1960). They can be entered and are subjected to observer's personal experience.

Prominent landmarks in the study area- Ferguson Kia, Arrowhead Elementary School, Northside Christian Church, Rhema Bible Church, QT Gas Station, Broken Arrow Nursing Home



Mass/Void

Built structures are referred as mass and unbuilt/open spaces are referred as voids. Both mass and void create interesting visual patterns if they are in right proportions. The term 'urban grain' is used to represent the cellular structure of an urban environment. There are two types of urban grains- Coarse Grain and Fine Grain. Areas which represent high granularity have large numbers of small buildings on small lots, whereas areas of low granularity have fewer, bigger buildings occupying large lots, sometimes in the form of superblocks (Preservation Greenlab,2014).

When we call it a fine grain structure it means it is made up of many small units, in this case small lots or buildings. When we call it a coarse grain structure it means it is made up of large units, in this case big lots or buildings. When we talk in terms of economy, the same concept of fine and coarse granularity can be used. If an economy is made up of many small businesses it is a fine grain economy. If it is made up of few big businesses it is a coarse grain economy. For any city or economy it is always good to have a mixture of both fine and coarse granularity. This degree of mixture is called as the urban texture in urbanism.

The majority of the study area is fine grained. But when it comes to arterials and intersections we observe coarse grained structure. All the commercial areas around Elm Pl and Kenosha are coarse grained. This shows the granularity in ownership as well. Commercial spaces in this case, even though they are not big building blocks represent the ownership of the lot. The majority of the remaining space in these lots is utilized for parking.

In the case of suburban areas, because of the coarse grained structure mentioned above around arterials produce inactive streets. These streets end up facing big surface parking lots or fenced backyards of houses. Therefore to create lively and walkable urban streets, it is important to have these streets open to destinations and activities. Sometimes we have to build big blocks of buildings. But if we design those blocks with fewer destinations or blank walls it produces dead streets with no activities. Hence, to create big blocks based on the concept of faux-granularity, it should be divided into many small destinations at street level creating the same effect of fine-grained urbanism.

Reference: Urban Grain, Jonathan R. Konkol, University of Washington, 2015
Strong Towns, Fine Grained vs Coarse Grained Urbanism,2017



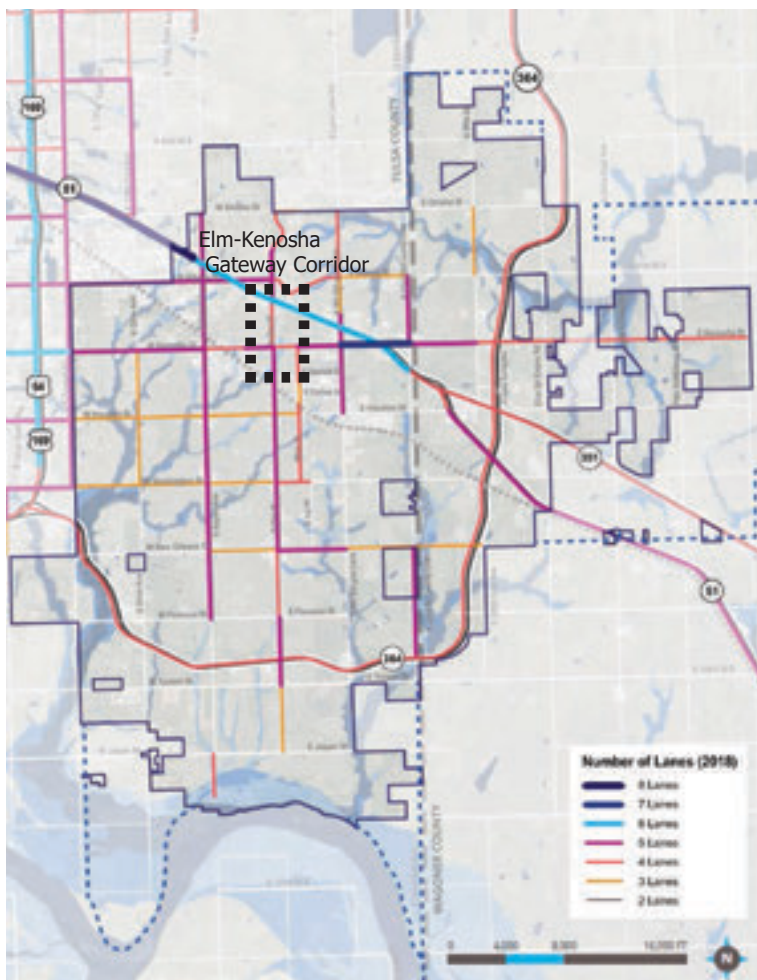
Faux Granularity creating the effect of Fine Grained Urbanism, Tanger Outlets, Atlantic City,NJ

(Source- <https://www.strongtowns.org/journal/2017/10/31/fine-grained-vs-coarse-grained-urbanism>)



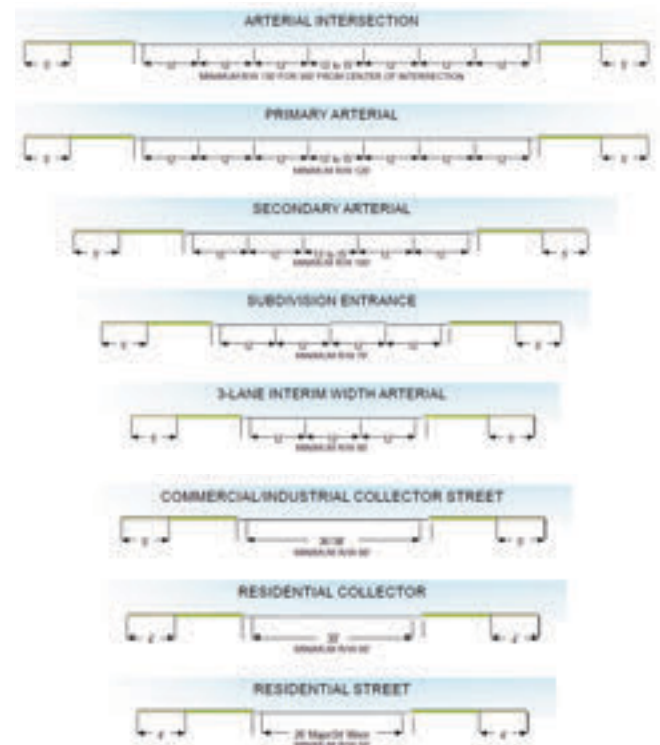
(Traffic Count Data Source-<https://incog.maps.arcgis.com>)

Vehicular Circulation



Existing Arterial Network by number of Lanes

(Source- Broken Arrow Next Comprehensive Plan Draft)



Street and Roadway Standards, Broken Arrow

(Source- Broken Arrow Next Comprehensive Plan Draft)

- The adjacent map shows the vehicular transportation network and hierarchy of roads in the study area.
- The most heavily used roads are Broken Arrow Expressway and arterial streets, Elm Pl and Kenosha.
- Collector streets which connects the traffic from residential neighborhoods to the arterials are also used often and may be busy during peak hours.
- There are few residential streets especially in north-west and south-east corner of the study area.
- Few residential streets around Rose District and collectors connect the vehicular traffic to downtown.
- There are few residential alleys present near housing in downtown Broken Arrow.
- The map above shows the existing arterial network by number of lanes.
- The study area has two arterials which have 4 and 5 lanes respectively. The arterial intersection of Elm Pl and Kenosha have 7 lanes with 2 left turn lanes each direction.
- Few residential areas in the Arrowhead Elementary school neighborhood have poor connectivity to collectors and arterials due to poor subdivision layouts.
- Otherwise all the areas are well connected in terms of vehicular circulation in the study area.



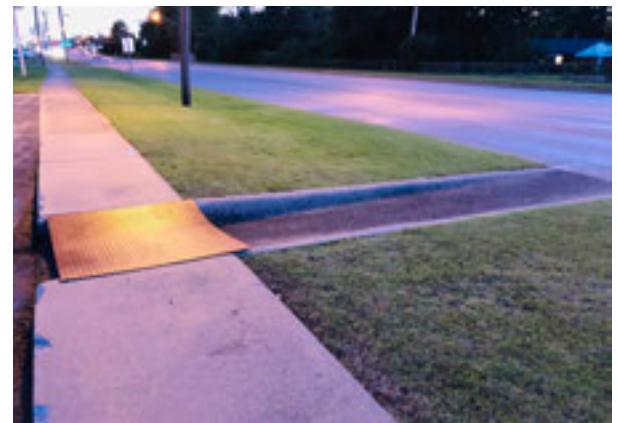
Pedestrian/Bicycle Circulation



Traffic Collision Map

(Source- INCOG, ESRI)

- There is not a much pedestrian traffic on this stretch of the street.
- There are few sections of N&S Elm Pl and W Kenosha which are missing sidewalks.
- These sections are marked as prioritized sidewalk gaps under the Tulsa Regional Bicycle and Pedestrian Masterplan by INCOG.
- Broken Arrow downtown, specially Rose District has a walkable character because of shops, restaurants and Farmers Market.
- There are 22 non-fatality pedestrian collisions observed near Elm Pl & Kenosha intersection in 2013 according to the data provided by INCOG
- There are several other non-fatality pedestrian collisions which can be seen in the map above.
- Therefore making this section of the street safe for pedestrians and cyclists should be a priority.
- This intersection has 7 lanes each almost 13 ft wide. The width makes it difficult to cross this intersection without a refuge median.



Undesirable Walking Conditions



Parking



Curb Cuts Along Elm PI

(Source- Google Earth)



Curb Cuts



Cars Displayed along the Sidewalk

- The study area has numerous curb cuts because of adjacent parking lots and businesses.
- These curb cuts create undesirable walking conditions which are unsafe.
- This particular section of the street has several small auto dealerships. The cars displayed near the sidewalk sometimes block or hide the sidewalk which creates visibility and safety issues.
- Also surface parking lots abutting the sidewalk discourages walking.
- Most of these parking lots are not utilized to their capacity.
- Minimizing the curb cuts will have to be the priority while designing the gateway.

Total Land Values



- This map represents the total land values for all the properties in the study area
- These values range from \$1.00 to \$25.00 per square foot.
- According to Tulsa County Assessor website fair market values for lands in this area range from \$100 to \$20M dollars in this area.
- Properties near the arterial intersections and Broken Arrow Expressway have the higher land values because of the location and proximity.

Commercial Land Values



- This map represents the land values for all the commercial properties in the study area.
- These values range from \$3.00 to \$20.00 per square foot.
- Commercial properties near the arterial intersections and Broken Arrow Expressway have the higher land values because of the location and proximity.
- Almost all the commercial properties are located along arterial streets and along the Main Street in the Rose District.



Ownership Map

The adjacent map shows the two important types of ownership- Public and Private.

Public Ownership- This ownership represents the properties that are owned and controlled by the government. Government represents all the people of a nation, particularly in any democratic nation. Government ownership is considered to be the ultimate form of public ownership.

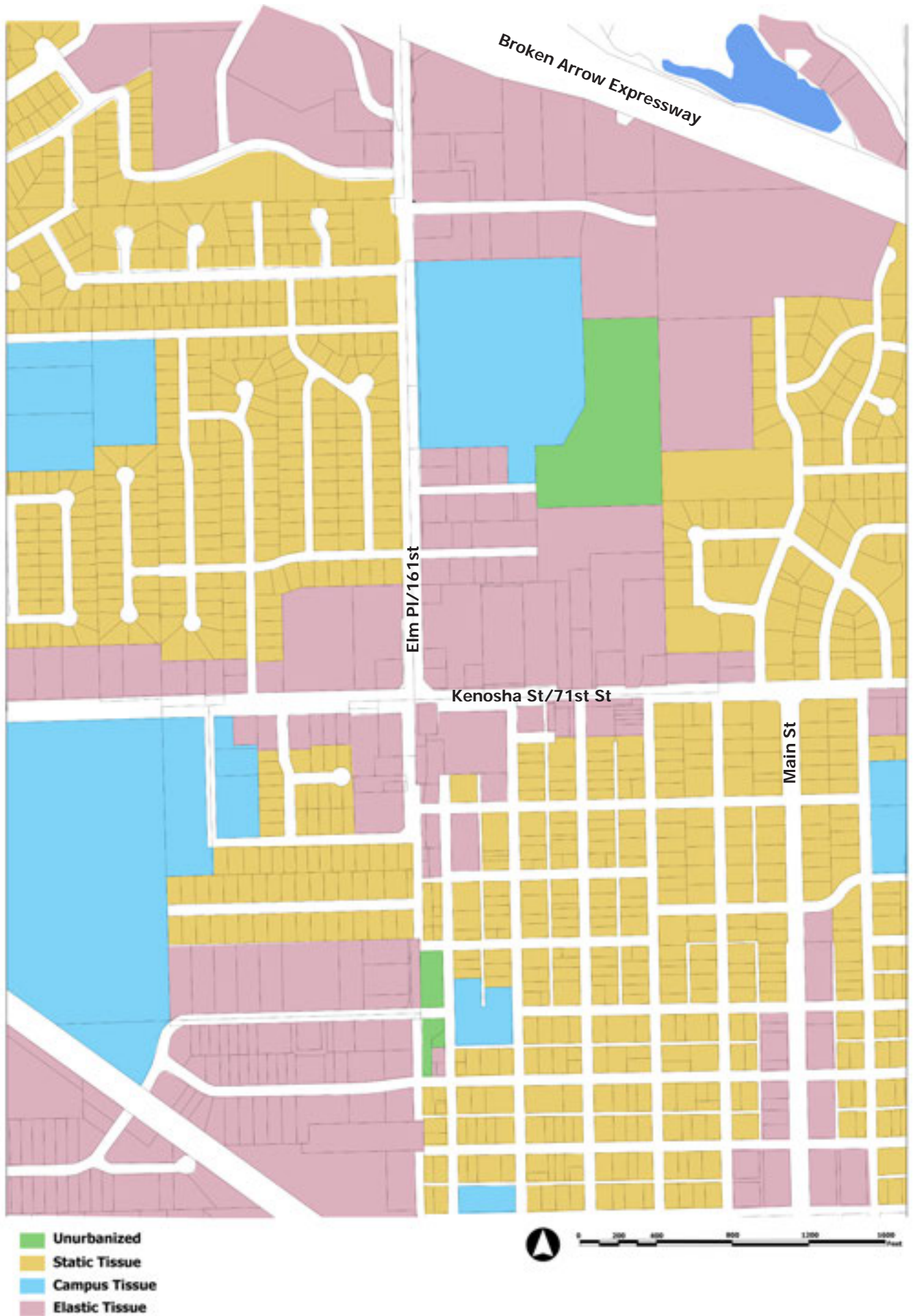
Private Ownership- This ownership represents the properties that are owned by an individual or group of individuals in the form companies, enterprises and other businesses. These properties are mainly controlled by owners and their chosen board of directors. Most of these are for profit businesses and ventures. The profit is shared by owners or shareholders. Government has limited control over this type of ownership and does not have a direct say in decision making process.

Considering the existing study area, it has majority of private ownership. Private ownership may slow down the decision making process regarding the new development or redevelopment of an area in the city. Since there are multiple owners, it is difficult for the government to get everyone on the board and implement the development strategies.

When it comes to implementing the projects like gateways, it is important to have a joint venture between public and private sector. Since governments function for the benefit of the people, the for-profit model of private companies doesn't usually work with government run facilities like transit and utilities systems. As these facilities are not run for profit, private investors are usually hesitant to invest in such projects. The government usually uses the tax money to subsidize the shortfalls. It may also invest in the private companies in return for the use of latest technology or to expedite the process of development. The government, sometimes also incentivizes the private owners to invest in the development in return of the added tax benefits and development rights.

Suburban cities like Broken Arrow have the challenge to deal with varied ownership. For the implementation of Gateway project, it will be essential for the city government to motivate, promote and incentivize the entire private sector along the gateway corridor to invest in it. Without their support it is most likely that this project will not come to fruition. As a responsible citizen it is important to come together for the betterment of our society. The city government can organize community meetings and workshops to address all the concerns and making people a part of this process. For people, to adopt any change is always going to be inconvenient and unfavorable. But it is necessary to adopt these changes for the benefit of our society and for our future generations.

If Broken Arrow wants to see a significant change in its community, it is necessary for the government to tackle with the ownership aspect innovatively.



Urban Tissue

Urban Tissue or Urban Fabric is the term used by urban morphologists to illustrate the arrangement of lots, blocks, streets or the demarcation of the space owned by the city. This concept was proposed by Brenda Case Scheer, an urban morphologist and dean of the College of Architecture & Planning at the University of Utah. She states that “buildings and even building types are rather ephemeral, but the urban tissue- streets and lots- is persistent. Street rights-of-way and property lines will endure for centuries, while buildings come and go” (Scheer,47)

Static Tissue- This tissue is coherent and form orderly pattern. Urban grids and single family subdivisions are classic examples of Static Tissue. These tissue is very stable and lasting element because of its highly protected property ownership. The change in this tissue happens in small increments.

Campus Tissue- This tissue represents multiple buildings on large piece of land owned by a single entity. Apartment complexes, universities, airports, large hospitals, industrial parks and shopping centers are classic examples of this tissue.(Scheer 2010) They may be physically isolated from nearby tissues and have their own internal circulation system of roads and pathways that connect the buildings.

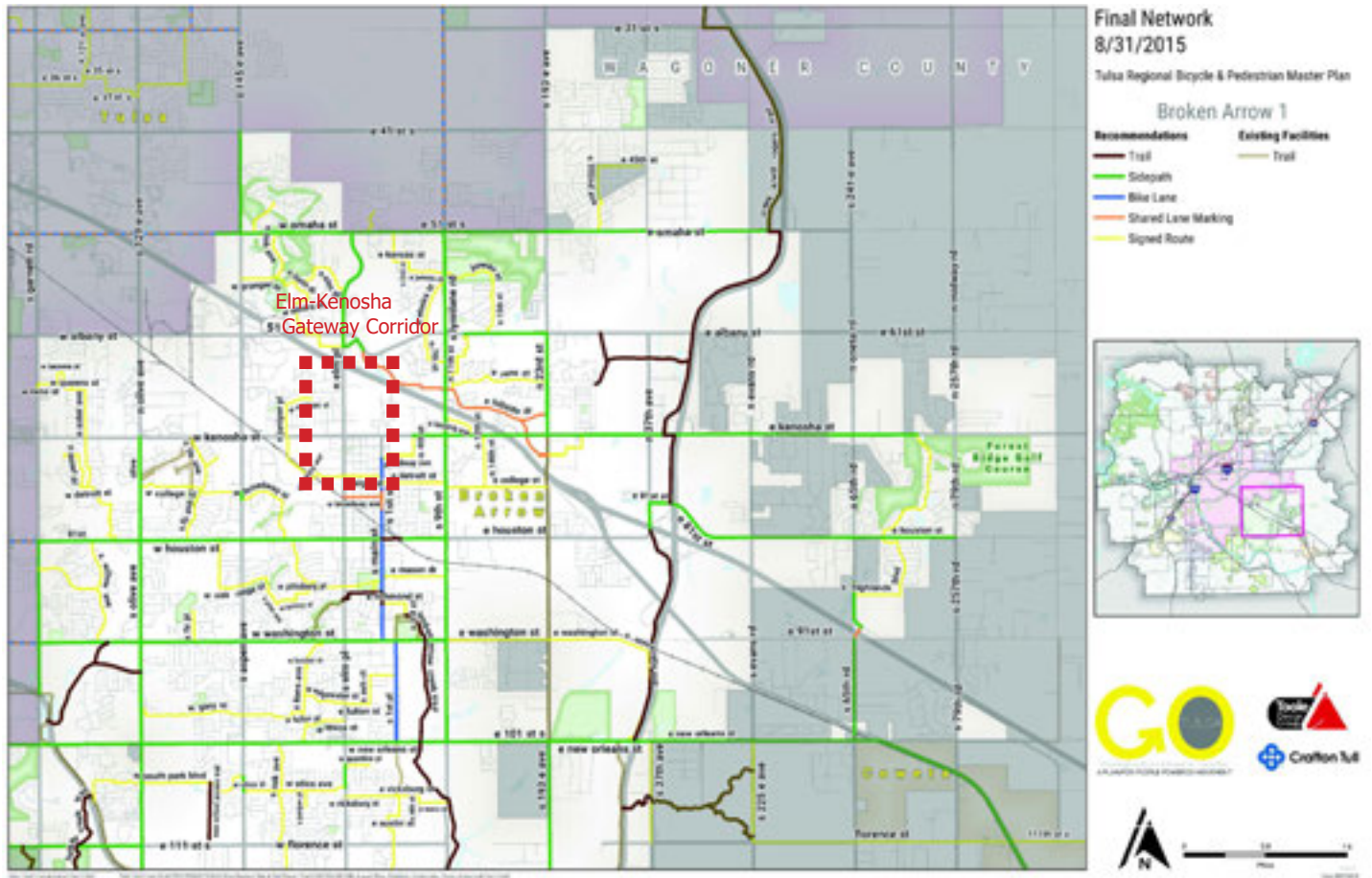
Elastic Tissue- This tissue is the least stable and undergoes multiple changes in shorter period of time as compared to other tissues. They are typically developed along arterial roads and intersections. They are usually distinguished by varied lot sizes, multiple ownerships, different building types and lack of street network. Scheer states “these tissues pose a great many problems since they are so fundamentally disordered” (Scheer 2010). As there is no establishment of street network this tissue is highly dependent on arterial roads creating large volume of traffic. Varied building types and lot sizes are incoherent with each other and have no convincing placement and relationship to the street and lot. Commercial strip centers are best examples of this tissue.

Unurbanized Tissue- This tissue represent undeveloped or rural land. Agricultural lands, floodplains, stormwater detention facilities, creeks are classic examples of this tissue.

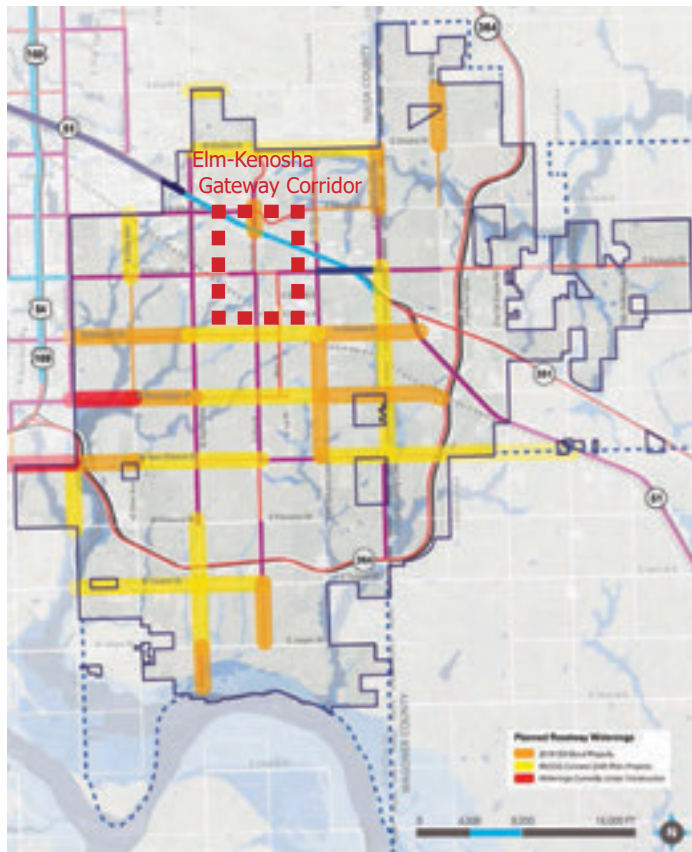
- Considering the study area, it has a majority of static and elastic tissue. Elastic tissue is generally observed along the arterials Kenosha St and Elm Pl.
- Elastic tissue can be seen as an opportunity for a gateway. By addressing the issues associated with this tissue, it will help to create a positive relationship between the street and surrounding buildings.
- It will also create a logical street network in the surrounding areas.
- Tackling with multiple ownerships can be a difficult task.

PLANNING SUMMARY

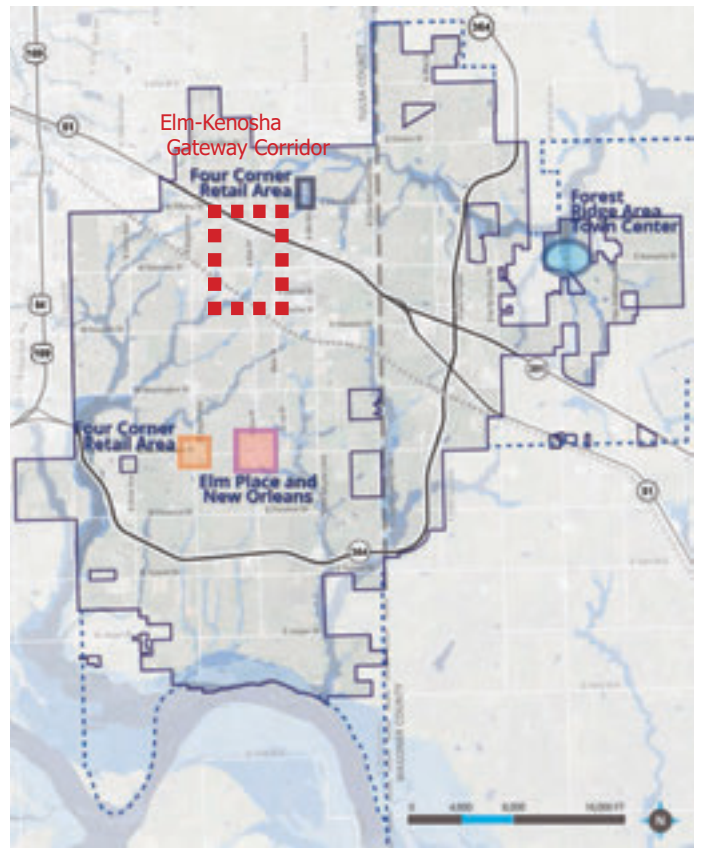
Planning Summary



(Source- INCOG GO Plan)

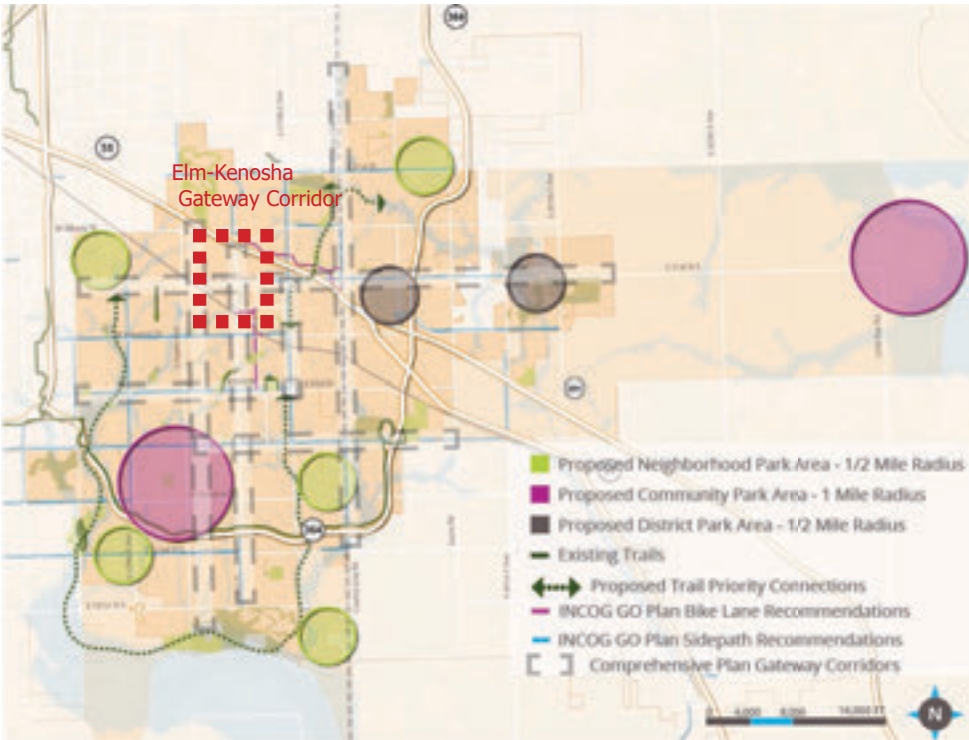


Planned Road Widening (Source- Broken Arrow Next Comprehensive Plan Draft)

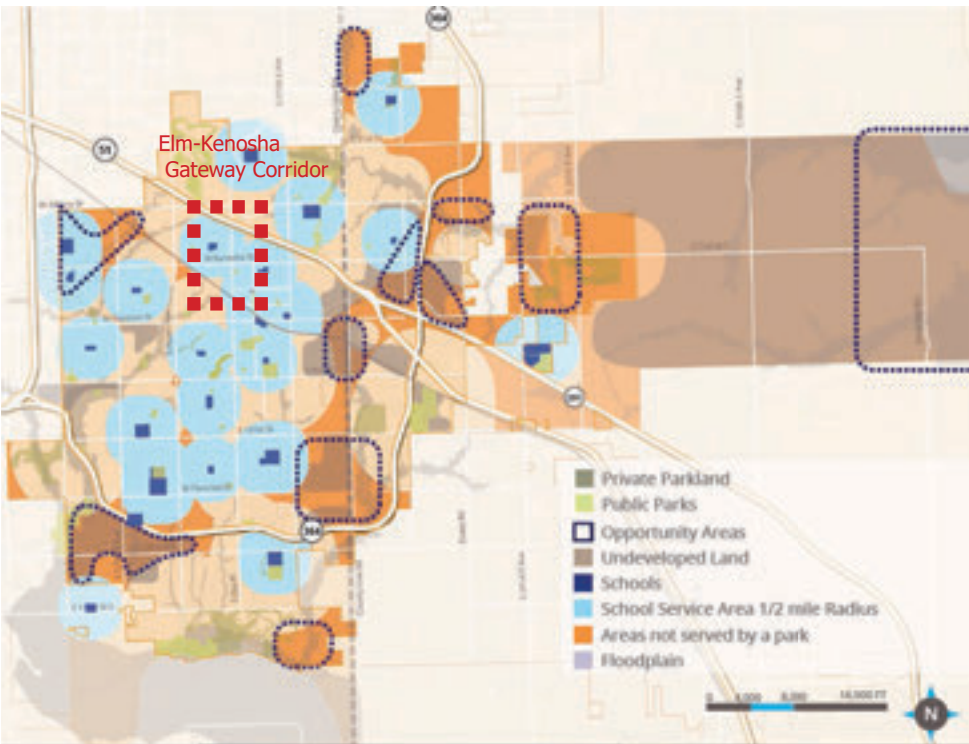


District Opportunity Plan (Source- Broken Arrow Next Comprehensive Plan Draft)

Planning Summary



Parks and Trails Masterplan (Source- Broken Arrow Next Comprehensive Plan Draft)



Parks Opportunities Plan (Source- Broken Arrow Next Comprehensive Plan Draft)

INCOG GO Plan

In terms of active transportation, for the selected study area, GO Plan doesn't look promising.

But the Broken Arrow downtown gets shared lane marking, bike lane and shared route.

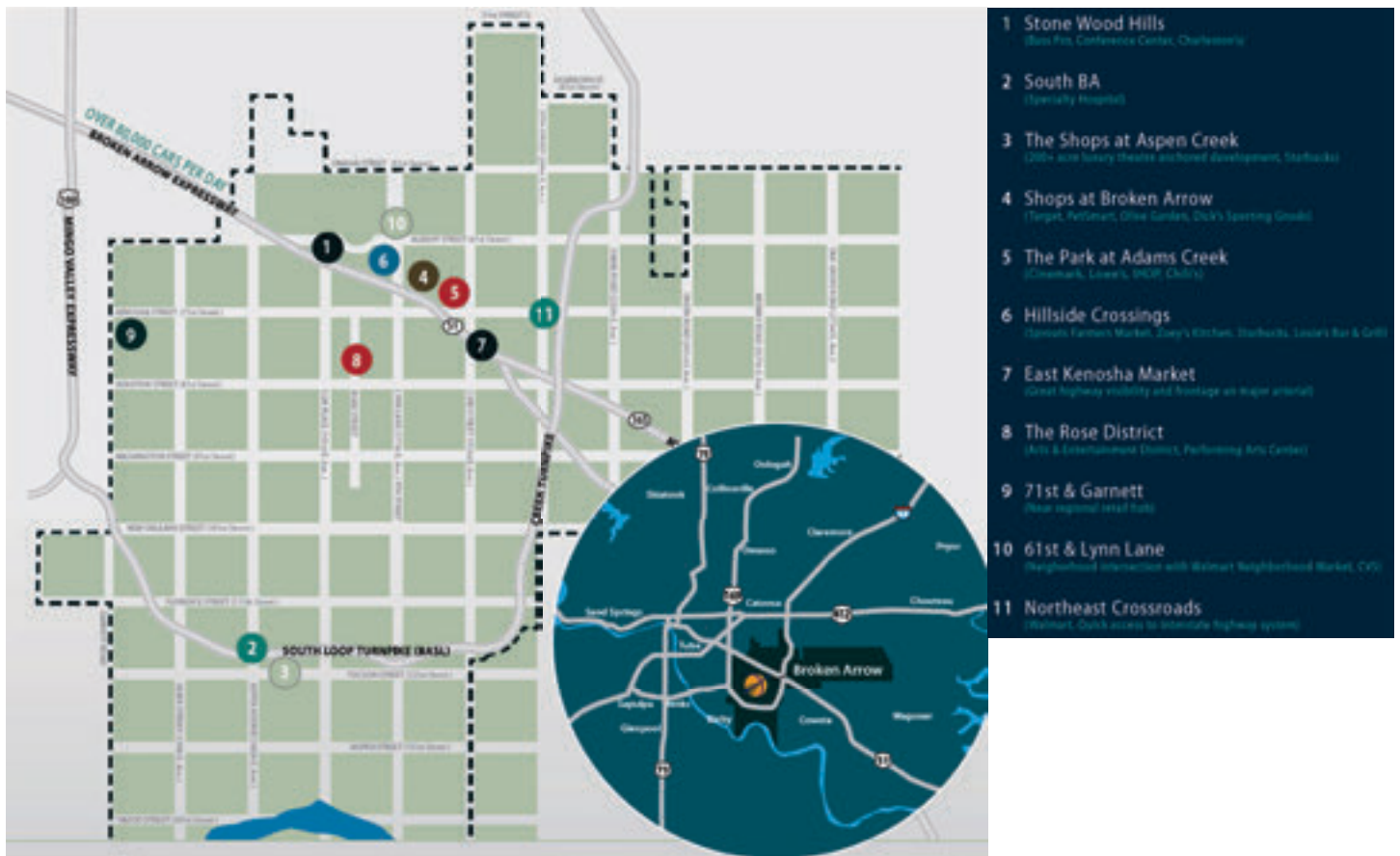
Broken Arrow Next Comprehensive Plan

Under the Park Opportunities Plan there is an opportunity of two neighborhood parks in the Elm-Kenosha gateway corridor. But it has not been finalized in the Parks Masterplan.

Under the Planned Road Widenings the Elm-Kenosha gateway corridor has got lane widening from 4 to 5 lanes starting from BA Expressway-Elm intersection to Elm-Kenosha intersection.

Under the District Opportunity Plan, there is nothing planned near the Elm-Kenosha gateway corridor.

Economic Development



Upcoming Major Retail Developments in Broken Arrow
 (Source- Broken Arrow Economic Development-2018 Grounds for Development)



Proposed Retail Development along Elm-Kenosha Gateway
 (Source- Broken Arrow Economic Development-2018 Grounds for Development)

Economic Development

INDUSTRY GROUP	NAICS	PRIMARY LEAKAGE AMOUNT	SECONDARY LEAKAGE AMOUNT
Motor Vehicle & Parts Dealers	441	\$43,057,336	—
Automobile Dealers	4411	—	—
Other Motor Vehicle Dealers	4412	\$62,574,940	\$38,170,034
Auto Parts, Accessories & Tire Stores	4413	\$8,529,066	—
Furniture & Home Furnishings Stores	442	—	—
Furniture Stores	4421	—	—
Home Furnishings Stores	4422	—	—
Electronics & Appliance Stores	443	—	—
Bldg Materials, Garden Equip. & Supply Stores	444	—	—
Bldg Material & Supplies Dealers	4441	—	—
Lawn & Garden Equip & Supply Stores	4442	\$532,529	\$2,334,967
Food & Beverage Stores	445	\$111,280,674	\$201,822,367
Grocery Stores	4451	\$99,888,284	\$191,424,634
Specialty Food Stores	4452	\$5,134,207	\$6,629,163
Beer, Wine & Liquor Stores	4453	\$6,258,183	\$3,768,570
Health & Personal Care Stores	446,4461	—	—
Gasoline Stations	447,4471	\$109,802,014	\$185,545,311
Clothing & Clothing Accessories Stores	448	\$9,521,008	—
Clothing Stores	4481	—	—
Shoe Stores	4482	\$399,796	—
Jewelry, Luggage & Leather Goods Stores	4483	\$11,946,762	\$14,710,585
Sporting Goods, Hobby, Book & Music Stores	451	—	—
Sporting Goods/Hobby/Musical Instr Stores	4511	—	—
Book, Periodical & Music Stores	4512	—	\$2,778,490
General Merchandise Stores	452	—	—
Department Stores Excluding Leased Depts.	4521	—	—
Other General Merchandise Stores	4529	\$49,236,490	—
Miscellaneous Store Retailers	453	\$11,730,811	—
Florists	4531	\$2,559,284	\$5,935,259
Office Supplies, Stationery & Gift Stores	4532	—	—
Used Merchandise Stores	4533	—	—
Other Miscellaneous Store Retailers	4539	\$15,080,715	\$3,921,600
Nonstore Retailers	454	\$6,151,228	\$15,741,933
Electronic Shopping & Mail-Order Houses	4541	—	\$981,439
Vending Machine Operators	4542	\$2,485,426	\$4,397,508
Direct Selling Establishments	4543	\$3,741,273	\$10,362,986
Food Services & Drinking Places	722	—	—
Special Food Services	7223	\$2,058,876	\$2,961,231
Drinking Places - Alcoholic Beverages	7224	—	—
Restaurants/Other Eating Places	7225	—	—

Primary and Secondary Leakage in Capital in Broken Arrow

(Source- Broken Arrow Economic Development-2018 Grounds for Development, NAICS)

The adjacent images show the planned retail development in Broken Arrow. These are significant developments for the growth of Broken Arrow economy. There is retail development proposed towards the North part of Elm Pl. This development is consisted of hotels and 35,000 sq.ft of conference space. This development will essentially be the new regional hub of hotels and conference space.

The table above shows the primary and secondary leakage in the Broken Arrow economy to the surrounding areas. There are different industry groups mentioned in the table. The primary and secondary leakage amount in dollars represent the loss of economy to Broken Arrow due to lack of supply or unavailability of that industry. Food & beverage stores, Grocery stores and Gasoline stations have the highest primary leakage amount of \$1 billion.

The upcoming developments near the Elm-Kenosha gateway highlights the importance of enhancement of this corridor. Also the leakage amounts related to the food&grocery stores, other retail stores and gas stations indicate that there is a scope for attracting these industries. Gateways can be the most promising areas due to their proximity to the entry points of Broken Arrow and surrounding areas.

**COMMUNITY
ENGAGEMENT
& FINDINGS**

Comprehensive Plan Steering Committee Meeting and Public Open House



Steering Committee Meeting



Public Open House



Consultants Presenting to the Community



People Having a Discussion With the Consultants



People Having a Discussion with Broken Arrow Planners



People Having a Discussion With the Consultants

Broken Arrow Comprehensive Plan

Comprehensive Plan is a policy document that governs and guides the future growth and development of the community. It provides the vision for community to be proactive about the growth and utilize the opportunities responsibly to enhance their quality of life in present and future times. The comprehensive plan has following major components which form its base-

- 1. Vision-** Community-driven statement about the growth.
- 2. Future and Land Use Map-** Defines how and where community desires the growth.
- 3. Policies-** It forms the statement of the community's current approach to future growth and development.
- 4. Implementation Strategies & Actions-** Defined actions to be taken by the community to achieve their overall vision.

Comprehensive Plan Process

It was a year and half process that evaluated existing conditions, engaged the community and created recommendations for the future growth. The city contracted and collaborated with a team of professional planners led by Halff Associates, a planning and engineering consulting firm based out of Richardson, TX. The process was based on following five aspects-

- 1. Understanding-** Creating an in-depth inventory of existing conditions and seeking initial input from key stakeholders.
- 2. Engagement-** Public workshops, steering committee meetings, an online survey and a planning charrette to gather feedback about the city and understand what the community wants.
- 3. Creation-** Developing the plan vision, guiding principles and goals from the feedback from the community, stakeholders and steering committee.
- 4. Evaluation-** Creating a proposed development scenario based on feedback that serves as the framework for subsequent plan recommendations.
- 5. Recommendation-** Final plan policies and action items that the city can use and refer as a road map for implementation.

Reference: Broken Arrow Next Comprehensive Plan Draft
<http://bit.ly/2Vxp8zn>

Community Engagement

It is an important aspect of the project since this project will be implemented for the enhancement of the community of the Broken Arrow. Since Broken Arrow Gateway project is planned under the recently adopted comprehensive plan, it was essential to know the stakeholder and steering committee thoughts about it. I attended two steering committee meetings in September 2018 and November 2018. There were several issues and aspects discussed in these meetings regarding the fence line planning, transportation, current and future residential development, gateway projects and healthy city initiatives. I also attendend two public meetings for comprehensive plan in September 2018 and March 2019. It was helpful to understand the community insights and how people perceived Broken Arrow. This information turned out to be very useful while addressing some of the development issues in the study area, specially regarding the transportation. I presented my Gateway ideas to the community in March 2019 public meeting for their feedback.

All the city planners and hired consultants were very resourceful and shared some important insights regarding the future growth patterns of Broken Arrow. Steering Committee consisted of mayor, vice mayor, city manager, city councilors, members of planning commission, representatives from Broken Arrow Public Schools and Union Schools, members of Chamber of Commerce, representatives from Economic Development corporation, Home Builders Association, Tulsa Healthe Department, Robson Companies and First National Bank, and City Council Appointees.

Findings

Broken Arrow is at the stage of implementing their next comprehensive plan. This plan, for the first time has identified potential gateway and street enhancement corridors within the city. This is going to be the big step for Broken Arrow since it provides them the opportunity for branding and creating their unique identity. Broken Arrow, even though being the fourth largest city in the state of Oklahoma is still coming out of shadow of Tulsa. Even though it started as a bedroom community, it has come a long way in terms of its development. The recently incorporated downtown masterplan for historic Rose District has been welcomed by the community due to its walkability, mix of uses and other recreational activities. Rose District, therefore became sort of identity of Broken Arrow. It is required for Broken Arrow now, to not just limit its identity to Rose District but to expand it to the other areas of the city. Broken Arrow needs some innovative solutions for this and it resonates with the idea of the gateways. The current comprehensive plan does not really lay the framework for these corridors in terms of zoning changes or land use. But there are some important aspects regarding gateways which need to be addressed. These are collective findings from the previous chapters.

1. Intersections and High Intensity Development

There are three important intersections in the selected gateway corridor: Elm Pl and Broken Arrow Expressway, Elm Pl and Kenosha St, Kenosha St and Main St. All of these intersections are significant in terms of vehicular traffic volume. Therefore they need to be intensified in terms of development considering their prime location in the city and the land values. Most of the land around these intersections is occupied by surface parking lots which are overdesigned and need to be minimized.

2. Walkability

“Get walkability right and so much of the rest will follow” (Jeff Speck, 2012)

Under the Broken Arrow Comprehensive Plan open house, it has been identified that almost 53% people opted for safe and walkable environment. The selected Elm-Kenosha gateway corridor does not have desirable walking conditions and is also missing a sidewalk along certain length of the street. Frequent curb cuts for parking lots makes it difficult to walk without any interruption specially for people with disability. Also lack of street furnishings like trees, benches, signage, planters, trash receptacles and transit shelters create unpleasant walking experience.

3. Streetscape and Utilities

Placement of utilities play an important role in streetscape and walkability. Existing placement of electric poles and other utilities create unpleasant aesthetics. It also hampers the walkability and create safety issues. All of these utilities need to be burried underground to create better aesthetics. As far as streetscape is considered there are no existing provisions apart from sidewalks for trees, benches, planters and other furnishings.

4. Transportation and Mobility

This corridor needs innovative and futuristic solution for vehicular and active transportation. Idea of roundabouts at the arterial intersection will create low speed vehicular traffic favorable for walking and biking. It will also create an opportunity for landscaping, art and branding.

5. Active Transportation, Parks and Trails

INCOG GO Plan does not provide any active transportation framework as far as this corridor is considered. But existing available right of way may be utilized for active transportation by widening the sidewalks and providing a bike lane. There is an opportunity to develop a neighborhood park in the north-east corner of this corridor. Majority of this land is utilized for stormwater detention which can be converted into a recreational water body. This park may also provide a link to Bass-Pro shops on the other side of Broken Arrow Expressway through walking and biking trails.

6. Surface Parking Lots

All the surface parking lots around the commercial development in this corridor are overdesigned and create unpleasant environment for walking. These lots produce inactive streets with almost no pedestrian activity and do not provide any opportunity for interaction between its surrounding and people. The big mass of asphalt create unpleasant aesthetics and produce heat during summer. Frequent curb cuts imposed by these lots are troublesome for pedestrians and are disagreeable for their safety.

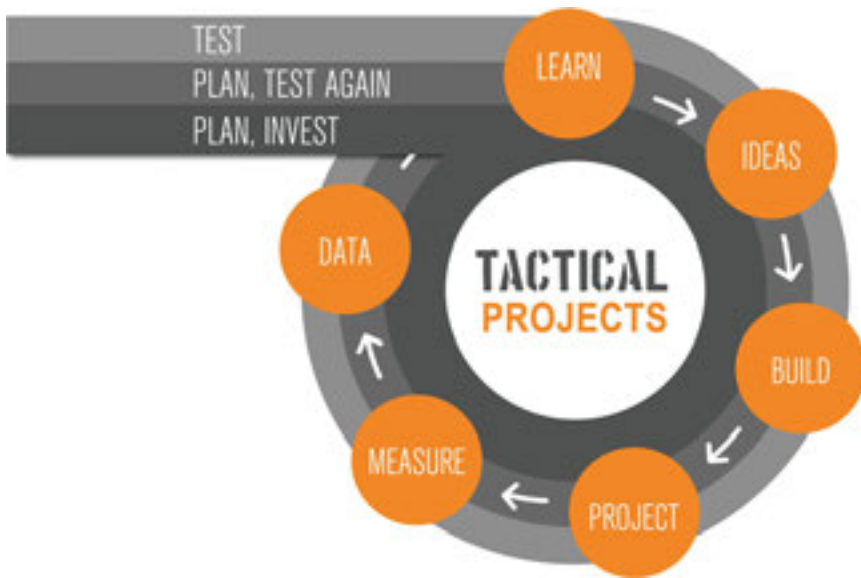
7. Mixed-Use Development and Zoning Regulations

Zoning and land use regulations under recently adopted comprehensive plan does not provide any framework for gateway corridors. As these are the entry points of the city they need special attention in the zoning and land use regulations. These provisions will impact the type of development in the future. Selected corridor has varied ownership, majority of being the private. Most of these properties are privately owned commercial spaces. Special provisions regarding the new development and redevelopment need to be addressed in the planning documents. Under the public open house people have opted for expanded Rose District due to its walkable character and mixed-use development. As this corridor is closer to Rose District, it has a potential of having more mixed-use properties which will act as an expansion.

8. Branding

Broken Arrow currently does not have a strong branding strategy in place. Rose District attracts a few number of people from the surrounding cities during special events. The city is known for its housing affordability. But apart from this, Broken Arrow definitely needs some strong branding strategy in place which will create several destinations around the city. Gateways are favorable to have these destinations because of their proximity to the surrounding cities. It will create several opportunities for the new development, destinations and activities which will strengthen the brand of Broken Arrow.

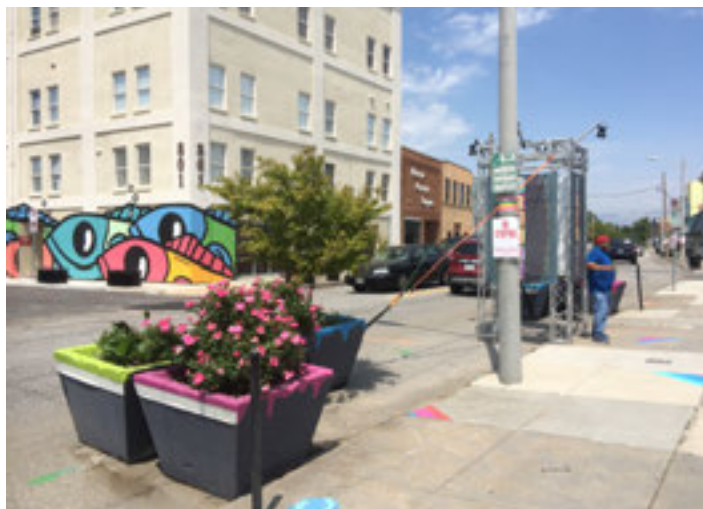
GATEWAY DESIGN STRATEGIES



Islington Street Demonstration Projects, Portsmouth, NH



JC Walks Pedestrian Enhancement Plan, Jersey City, NJ



100 Resilient Cities Tactical Resilience, Norfolk, VA



Southern California Association of Governments GoHuman Campaign- Mini Roundabout

(All Images by Street Plans Collaborative)

Design Methodology

There are several aspects which need to be considered while developing the proposal and recommendations. For making it easier to understand the proposal will mainly focus on two types of strategies- Short Term and Long Term.

Short Term Strategies

These strategies are planned for a shorter period of time. They are stepping stones for adopting long term strategies. Short term strategies show immediate results usually within a year or two. When it comes to city planning, these may be necessary before making any huge investment in terms of financial resources.

Tactical Urbanism is one such current trend in planning which is gaining popularity and importance world wide. Tactical means “of or relating to small-scale actions serving a larger purpose”. Tactical Urbanism provides an opportunity to neighborhood building and activation with the help of short-term, low-cost and scalable interventions and policies. It is used by governments, non-profit organizations, businesses, citizen groups and individuals. It uses the available resources efficiently and creatively by social interaction.

Tactical Urbanism is a learned and quick response to the otherwise slow city building and planning processes. It enables the immediate retrieval, redesign and reprogramming of public space. For developers and businesses it helps in collecting design perspectives from the market they wish to serve. For advocacy organizations it is an opportunity to show what is viable to gain public and political support. For governments, it is a process to put best strategies into practice and test them quickly for effective long term changes. Tactical Urbanism does not provide a comprehensive solutions but deliberate and adaptive responses. It may provide an opportunity to create a permit which would allow citizen and community groups to initiate Tactical Urbanism projects.

Six ways how short-term tactics would bring long-term transformation in the physical and policy environment-

1. Rethink the Intersection
2. Wayfinding Signs
3. Build a Better Neighborhood
4. Placemaking and Street art
5. Pop-up Plazas
6. Community led Tactical Urbanism Projects Permit

Wildflower Plantation and Painting the Elm PI-Broken Arrow Expressway Bridge



Proposed (Image Source-Google Earth)



Existing (Image Source-Google Earth)

Some Wildflowers for Roadside Planting (Not all are suitable for all parts of Oklahoma. Not all are available commercially)

Crimson Clover - *Trifolium incarnatum*
Corn Flower - *Centaurea cyanus*
Corn Poppy - *Papaver rhoeas*
Bluebonnet - *Lupinus subcarnosus*
Showy Primrose - *Oenothera speciosa*
Verbena - *Verbena tenuisecta*
Indian Paintbrush - *Castilleja indivisa*
Drummond Phlox - *Phlox drummondii*
Yarrow - *Achillea millefolium*
Rocket Larkspur - *Delphinium gracilis*
Scarlet Flax - *Linum rubrum*
Catch Fly - *Silene armeria*
Dames Rocket - *Hesperis matronalis*
Oxeye Daisy - *Chrysanthemum leucanthemum*
Tickseed - *Coreopsis lanceolata*
Indian Blanket - *Gaillardia pulchella*
Blanketflower - *Gaillardia aristata*

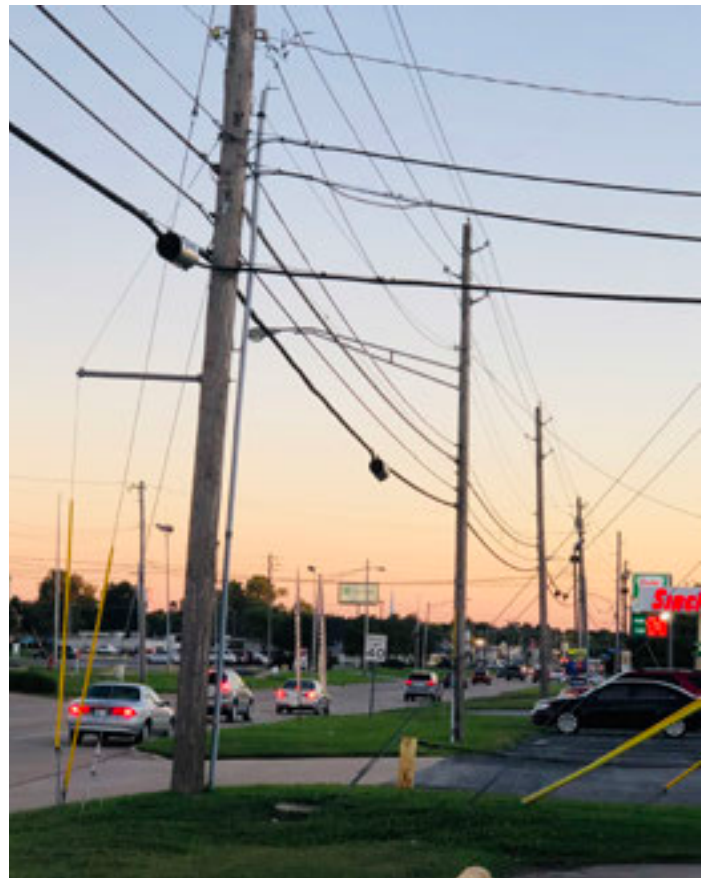
Standing Cypress - *Ipomopsis rubra*
Lazy Daisy - *Aphanostephus skirrobasis*
Prairie Sabatia - *Sabatia campestris*
Sand Primrose - *Oenothera laciniata*
Missouri Primrose - *Oenothera missouriensis*
Butterfly Weed - *Asclepias tuberosa*
Purple Coneflower - *Echinacea angustifolia*
Beard-Tongue - *Penstemon cobaea*
Plains Coreopsis - *Coreopsis tinctoria*
Purple Prairie Clover 'Kaneb' - *Petalostemum purpureum*
Lemon Mint - *Monarda citriodora*
Mexican Hat - *Ratibida columnaris*
Clasping Coneflower - *Rudbeckia amplexicaulis*
Black-eyed Susan - *Rudbeckia hirta*
Four Point Primrose - *Oenothera rhombipetala*
Handsome Blazing Star - *Liatris aspera*
Mealy Blue Sage - *Salvia farinacea*

(Source-ODOT)

Beautification of Utility Poles



Proposed



Existing



(Image Source- pinterest.com)



(Image Source- pinterest.com)

Adopt a Pole for Beautification

Street Art



Proposed



Existing



Pop-Up/Temporary Plaza



Proposed (Image Source-Google Earth)

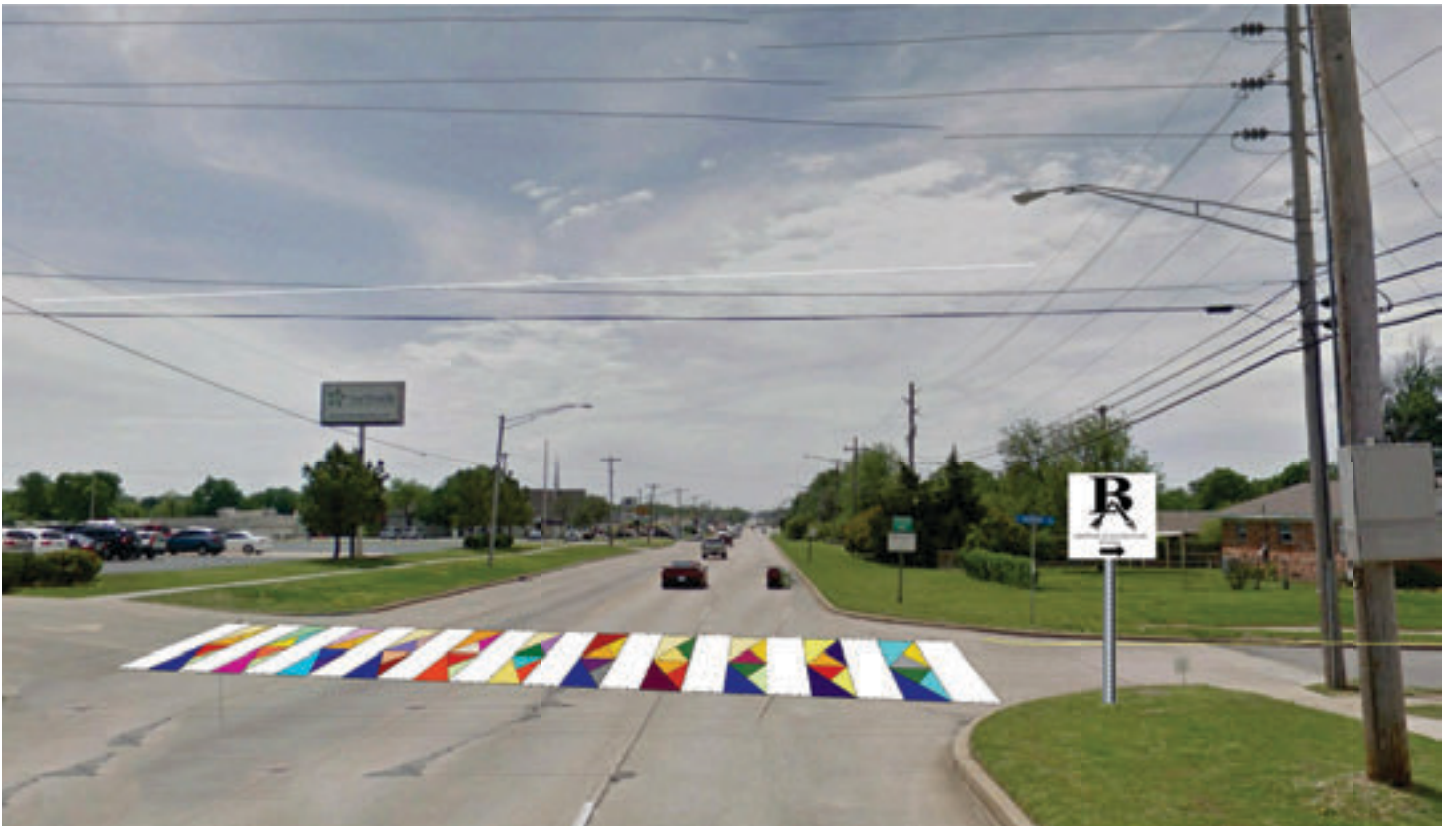


Existing (Image Source-Google Earth)



Proposed Pop-Up Roundabout at Elm Pl- Kenosha St Intersection

(Image Source-Google Earth)



Proposed Crosswalk near W Norman St- Elm Pl Intersection and Wayfinding Sign For Arrowhead Elementary School

(Image Source-Google Earth)



Building A Better Neighborhood- Proposed Community Art Project near Arrowhead Elementary School
(Image Source-Google Earth)



Placemaking- Proposed Community Lunch near New Life Baptist Church
(Image Source-Google Earth)



Proposed Gateway District- Long Term Strategies Plan

Long Term Strategies

Growth is an important factor in any field. In the case of urban planning, it plays a vital role since it can affect the existing and future infrastructure provisions for the development. To achieve the long term goals it is important to have long term strategies planned with defined objectives and set of actions. Long term strategies are planned to achieve long term goals which can be achieved over a period time. As compared to short term strategies, long term strategies make a slow progress in showing the results after they are implemented. But once they are implemented, it is likely to stay for a longer time. Long term strategies help a city to build a vision for future growth and provide the necessary infrastructure. To achieve the long term goals it is necessary to have intermediate or short term goals to measure the accomplishments and effectiveness of the long term strategies. In the case of gateways, short term strategies mentioned above will help the City of Broken Arrow to plan for the necessary infrastructure in the future. But to achieve these long term goals it is first necessary to identify them and define the strategies needed to accomplish them.

Gateway District Long Term Strategies

1. Rebuilding the Intersections and Streetscape

Purpose- To provide a comprehensive strategy to rebuild the current intersections of Broken Arrow Expressway-Elm Pl, Elm Pl-Kenosha St and Kenosha St-Main St to manage the traffic volume and speed. To improve the streetscape to create safe, walkable and pleasant environment for people.

Details- This strategy will focus on implementing the modern roundabouts for the major intersections in the Elm-Kenosha gateway corridor. This will manage the traffic volume more efficiently with reduced speeds and continuous movement of the vehicles. It will also create safer environment for pedestrians and cyclists. Roundabouts will provide an opportunity to display art making each intersection unique and identifiable. Streetscape will focus on widening the sidewalks and providing the street furnishings like light poles, benches/parklets, trash receptacles, signage and trees & plantings. Burying the existing utilities like electric lines along with reduced curbcuts to the adjacent parking lots is recommended to create unobstructed and safe pedestrian movement.

2. Providing the Guidelines for the Built Form

Purpose- To intensify the development around major intersections like Broken Arrow Expressway and Elm Pl, Elm Pl and Kenosha St. To improve the visual and urban experience by providing different built form scales. To provide the framework for new development and urban renewal.

Details- This strategy will focus on implementing the built form which will create the activities along the corridor by providing mixed-use buildings/developments. The intensification of Elm Pl and Kenosha St intersection in terms of having a new mixed-use development is required to make this intersection more active, pedestrian friendly and attractive. It will create an opportunity of urban renewal for the city and property owners to make existing businesses more profitable. This strategy will also create the hierarchy of the built form in the Elm-Kenosha gateway corridor.



Bethesda Row- Urban Mixed Use Development in Bethesda, Maryland, Outside Washington DC.

(Image Source- Federal Realty Properties)



Retrofitting a Dead Mall- Belmar in Lakewood, Colorado

(Image Credits- Chris Whitis, Suburban Remix)

3. Providing the Recreational Opportunities for the Community

Purpose- To create a neighborhood park and trail system in the Elm-Kenosha gateway corridor. To create the active transportation facilities in the neighborhood.

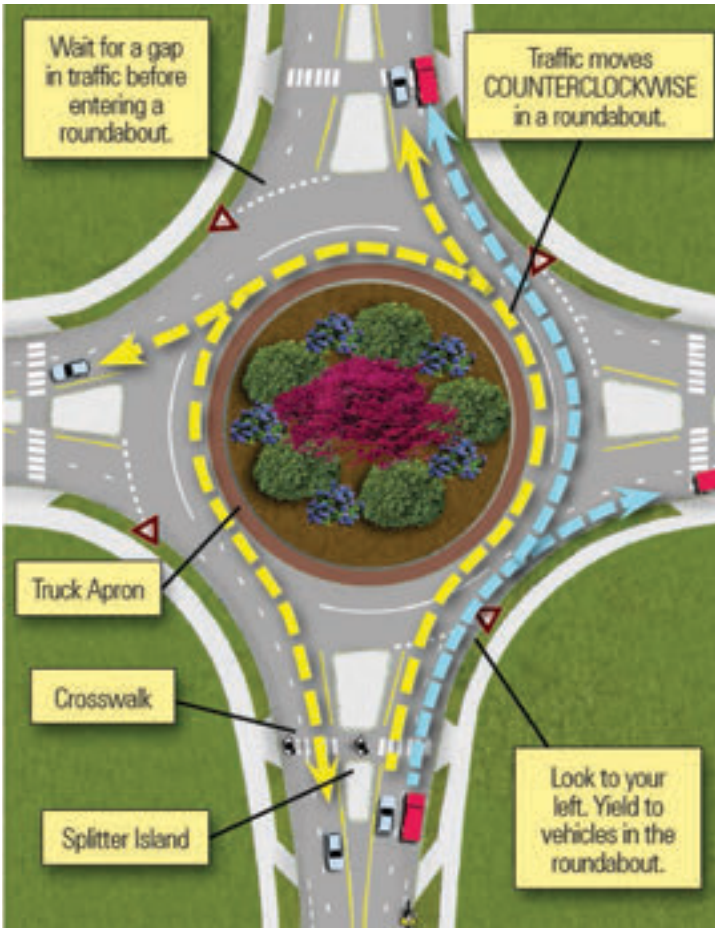
Details- This strategy will focus on creating a neighborhood park in the north-east part of the Elm-Kenosha gateway corridor. This part already has a stormwater detention facility run by the City of Broken Arrow. This facility has a potential of becoming a recreational pond for fishing and other activities. It will also establish a walking and biking trail system which will connect to the Bass-Pro shops on the northern side of the Elm-Kenosha gateway corridor. This park will enhance the walking and biking experience in the neighborhood.

4. Providing Zoning Regulations for the Gateway Corridors

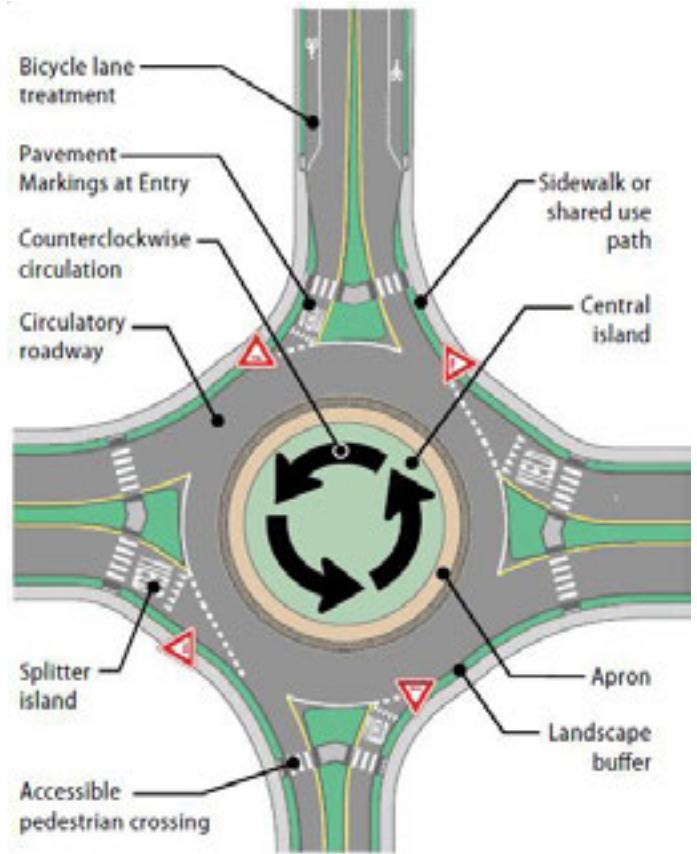
Purpose- To provide the comprehensive framework for the existing and future development in the identified gateway corridors under the Broken Arrow Next Comprehensive Plan.

Details- As these are the entry points of the city they need special attention in the zoning and land use regulations. These provisions will impact the type of development in the future. Selected corridor has varied ownership, majority of being the private. Most of these properties are privately owned commercial spaces. Special provisions regarding the new development and redevelopment needs to be addressed in the planning document. It will also form the framework for Tax Increment Financing(TIF) and other tax incentive programs in the case of redevelopments in this corridor.

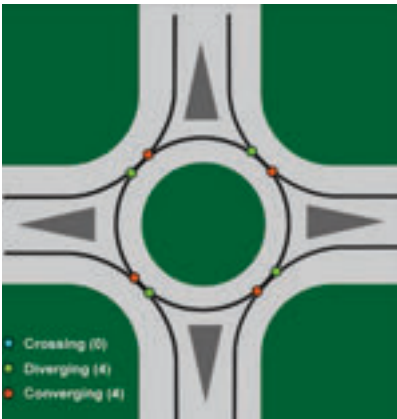
Broken Arrow has decided to keep the Land Use Intensification System (LUIS) in their recently developed 'Broken Arrow Next Comprehensive Plan'. It is one of the traditional American city planning methods used by planners. Though this system is accustomed for years, it needs an innovative and futuristic approach. Today many suburban cities in America are looking for urban lifestyle which will bring the communities together again which were separated by urban sprawls. Broken Arrow needs a bold move in terms of city planning, by addressing these gateway corridors with special zoning provisions which will create people friendly urban spaces. These corridors should be designated under mixed-use zoning category to generate more community oriented spaces.



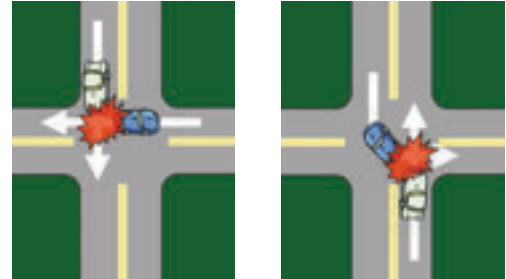
Traffic Movement in a Multilane Roundabout
(Image Source- Pennsylvania DOT)



Roundabout Key Features
(Image Source- part380.com)



Vehicle Conflict Points
(Image Source- USDOT, FHWA)



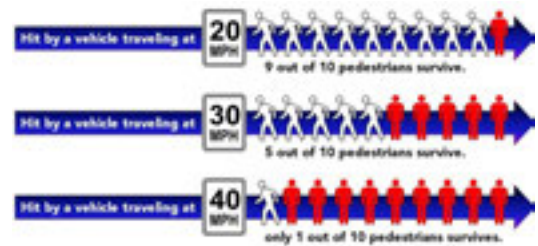
Type of Crashes: Typical 4-leg Intersection
(Image Source- USDOT, FHWA)



Vehicle-Pedestrian Conflict Points
(Image Source- USDOT, FHWA)



Type of Crashes: Roundabout
(Image Source- USDOT, FHWA)



Pedestrian Survival Rate
(Image Source- nextstl.com)

1. Rebuilding the Intersections and Streetscape

Roundabouts

Roundabout is a type of circular intersection where traffic travels counterclockwise (in the United States and other right-hand traffic countries) around a central island and in which entering traffic must yield to circulating traffic in the circle. One of the first traffic circles in the United States was designed in New York City in 1905 and is known as the Columbus Circle. In a roundabout, approaches are channelized to direct traffic into a proper entry path. They are designed to slow the speed of vehicles and are considered safe over the conventional signalized intersections.

Roundabout Key Features

- 1. Central Island-** It is the raised area in the center of a roundabout around which traffic circulates. It does not have to be circular in shape. It can be used for landscaping and displaying art.
- 2. Splitter Island-** It is a raised or painted area on an approach route to a roundabout to separate entering from exiting traffic, direct and slow entering traffic, and allow pedestrians to cross the road in two stages.
- 3. Circulatory Roadway-** It is a curved path used by vehicles in a roundabout around the central island to travel in a counterclockwise direction.
- 4. Apron-** It is a traversable portion of the central island adjacent to the circulatory roadway that may be needed to accommodate the wheel tracking of large vehicles. It may be provided on the outside of the circulatory roadway.
- 5. Entrance Line-** It marks the entry point into the circulatory roadway and is physically an extension of the circulatory roadway edge line or yield line. Entering vehicles must yield to circulating traffic from the left and also to pedestrians.
- 6. Accessible Pedestrian Crossings-** For roundabouts designed with pedestrian crossings, the location is set back from the entrance line. The splitter island is cut to allow pedestrians, wheelchairs, strollers and bicycles to pass through. They need to be designed in accordance with ADA requirements.
- 7. Landscape Strip-** It separates vehicular and pedestrian traffic and guide pedestrians to the designated crossing locations. It is a important wayfinding feature for visually impaired individuals. Landscape strip improves the aesthetics of the intersection.

Design Characteristics of Roundabouts

There are three types of roundabouts.

1. Mini Roundabout
2. Single Lane Roundabout
3. Multilane Roundabout

The adjacent table shows the design characteristics of the three types of roundabouts mentioned above.

Paraphrased from: NCHRP Report 672, USDOT, FHWA
<https://nacto.org/docs/usdg/nchrprpt672.pdf>

Design Element	Mini-Roundabout	Single-Lane Roundabout	Multilane Roundabout
Desirable maximum entry design speed	15 to 20 mph (25 to 30 km/h)	20 to 25 mph (30 to 40 km/h)	25 to 30 mph (40 to 50 km/h)
Maximum number of entering lanes per approach	1	1	2+
Typical inscribed circle diameter	45 to 90 ft (13 to 27 m)	90 to 180 ft (27 to 55 m)	150 to 300 ft (46 to 91 m)
Central island treatment	Fully traversable	Raised (may have traversable apron)	Raised (may have traversable apron)
Typical daily service volumes on 4-leg roundabout below which may be expected to operate without requiring a detailed capacity analysis (veh/day)*	Up to approximately 15,000	Up to approximately 25,000	Up to approximately 45,000 for two-lane roundabout

*Operational analysis needed to verify upper limit for specific applications or for roundabouts with more than two lanes or four legs.

Roundabout Category Comparison (Source- NCHRP Report 672)



Mingzhu Roundabout, Shanghai, China (Image Credits- Laurent Dequick)



Village of Wesy Clay Roundabout, Carmel, IN
(Image Source- fox59.com)



Roundabouts at Highway Intersections, Carmel, IN (Image Source- Google Earth)



Single Lane Roundabout, Carmel, IN
(Image Source- Google Earth)

Where to Consider Roundabouts

- Intersections with high crash/severity rates
- Intersections with complex geometry, skewed approaches
- Rural intersections with high speed approaches
- Freeway interchange ramps
- Closely spaced intersections
- Replacement of all-way stops
- Replacement of signalized intersections
- Intersections with high left turn and U-turn volume
- Replacement of two-way stop with high side-street delay
- Transitions from higher-speed to lower-speed areas
- Where aesthetics are important
- Where accommodating older drivers is an objective

General Characteristics of Roundabouts

1. **Safety-** They have been manifested to be safer than other forms of intersection. The safety performance is a product of its design which allows slower speeds and more time for entering drivers to judge, adjust speed for, and enter a gap in circulating traffic. It increases the likelihood of drivers yielding to pedestrians. The crashes are less frequent and less severe. Slower speeds make it more safer for older drivers by allowing them more time to judge.
2. **User Decisions-** Decisions by drivers, pedestrians and cyclists are generally simpler at roundabouts. However, there is more reliance on individuals to make decisions rather than directing them by a traffic control device. Drivers have to make two basic decisions regarding other users- select the appropriate lane for the intended destination and yield to those who have the right-of-way. Pedestrians have to cross one direction of traffic at a time which is simpler as compared to conventional signalized intersection. Bicyclist decisions depend on how they want to travel, as a vehicle or as a pedestrian.
3. **Traffic Operations-** It is determined by gap acceptance where entering vehicles look for and accept gaps in circulating traffic. Low speeds allow this gap acceptance process. The operational efficiency of a roundabout is greater at lower circulating speeds.
4. **Spatial Requirements-** Roundabouts often require more space in the immediate vicinity intersection in comparison with conventional signalized intersections. The space requirement is dictated by size and shape of a roundabout. A comparable roundabout would outperform a signal in terms of reduced delay and shorter queues thus, reducing the number of approaching lanes.
5. **Access Management-** Roundabouts can be used at key public and private intersections to manage the major movements efficiently and enhance access management. Minor access points between roundabouts can be accommodated by providing two-way stop-controlled intersections by allowing roundabouts to provide U-turn opportunities.
6. **Environmental Factors-** Roundabouts can be environmentally beneficial since they reduce vehicle delay, number & duration of stops and acceleration/deceleration cycles.
7. **Operation and Maintenance Cost-** They usually vary significantly depending on the size, right of way impacts, illumination and other aesthetic requirements. A new single-lane roundabout has a comparable cost to a traffic signal in an unbuilt environment.
8. **Traffic Calming-** Roundabouts have traffic calming effects due to their lower speeds using geometric design rather than other traffic controlled devices. **They have been used successfully as gateway treatments at the interface between urban and rural areas where speed limits change or at freeway ramp terminals.**
9. **Aesthetics-** Roundabouts provide an excellent opportunity to provide attractive entries, landmarks and display art which does not pose any significant safety hazard. They also provide landscaping opportunities on central and splitter island as long as sight-distance requirements are met.

Paraphrased from: NCHRP Report 672, USDOT, FHWA
<https://nacto.org/docs/usdg/nchrprpt672.pdf>



Proposed Roundabout and Gateway Feature at Elm PI- Broken Arrow Expressway Intersection

(Image Source-Google Earth)

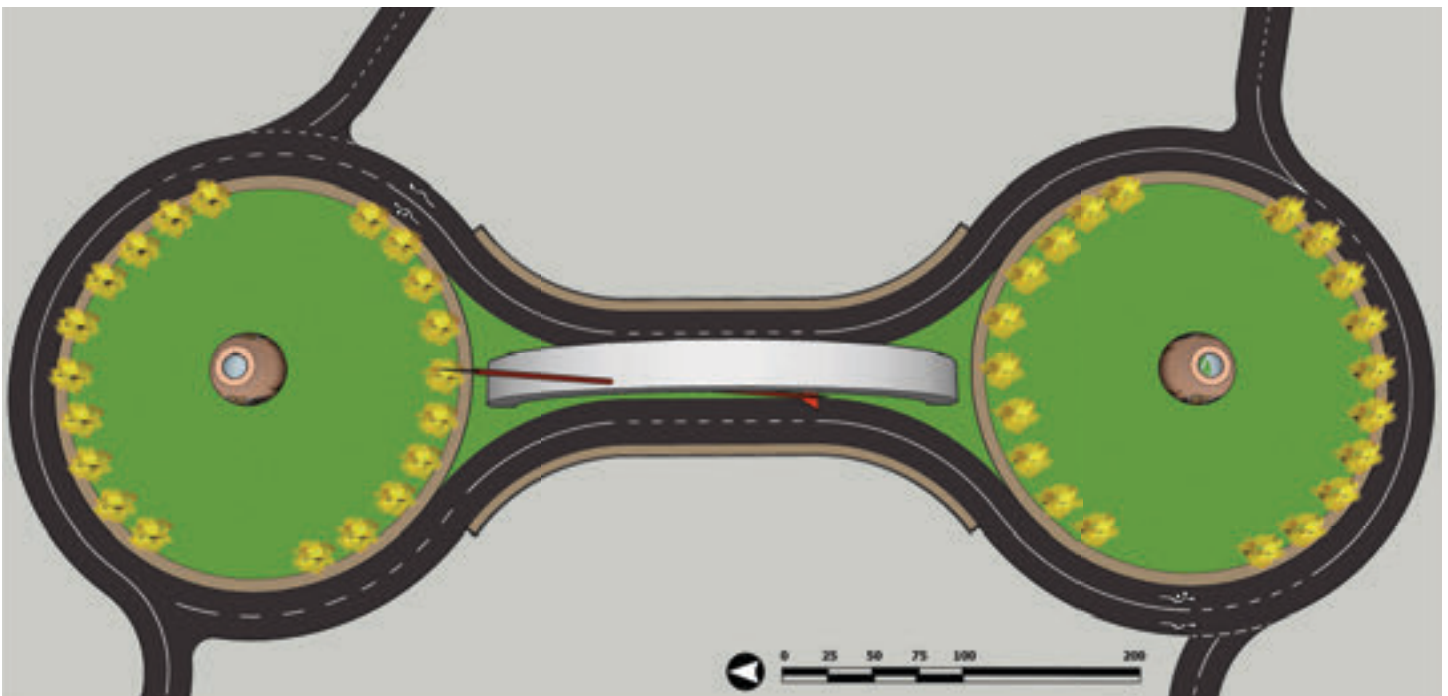


Existing Elm PI- Broken Arrow Expressway Intersection

(Image Source-Google Earth)

Broken Arrow Expressway and Elm-PI Roundabout

- This roundabout is proposed at the intersection of Broken Arrow Expressway and Elm Pl.
- The traffic count for Broken Arrow Expressway is approximately 86,000 near this intersection and falls down to 61,000 after crossing it. (Please refer to the Vehicular Circulation map in chapter no.3)
- It shows that there are almost 25,000 vehicles entering into the city through Elm Pl exit from the Broken Arrow Expressway daily.
- Therefore this is the strategic location for displaying the gateway feature which can be seen from the distance.
- The adjacent renderings of 'Bow & Arrow' and Native Indian Pots sculptures explain the idea of a gateway feature for this intersection.
- The concept of this sculpture is based on the logo of Broken Arrow.
- This roundabout will have two exits for Elm Pl in both the directions from Broken Arrow Expressway.
- This roundabout will facilitate the transition from Broken Arrow Expressway to Elm Pl with lower speeds, no traffic signal and with continuous flow of traffic without any congestion.
- It will also provide an opportunity to display public art, gateway monuments along with landscaping of the central islands.



Renderings of a Proposed Roundabout at Elm PI- Kenosha St Intersection



(Image Source-Google Earth)



Elm-PI and Kenosha St Roundabout

- This roundabout is proposed at the arterial intersection of Elm PI and Kenosha St.
- The traffic count is approximately 46,000 for Elm PI and 43,000 for Kenosha St near this intersection daily. (Please refer to the Vehicular Circulation map in chapter no.3)
- This corridor of Elm PI from Broken Arrow Expressway to Kenosha St has several commercial properties.
- Therefore this is the next strategic location for displaying the gateway/landscape feature.
- The adjacent renderings of a 'Rose' sculpture explain the idea of a landscaping feature for this intersection.
- This sculpture acts like an intermediate landmark feature for the historic Rose District in downtown Broken Arrow.
- This roundabout will facilitate and manage the traffic volume near this intersection more efficiently with lower speeds, no traffic signal and with continuous flow of traffic without any congestion.
- It will also provide safer pedestrian crossings set back from the circular traffic flow.
- Pedestrians will cross only direction of a traffic at one time which will help in bringing down the crash count near this intersection. (Please refer to the Traffic Collision map in chapter no.3)

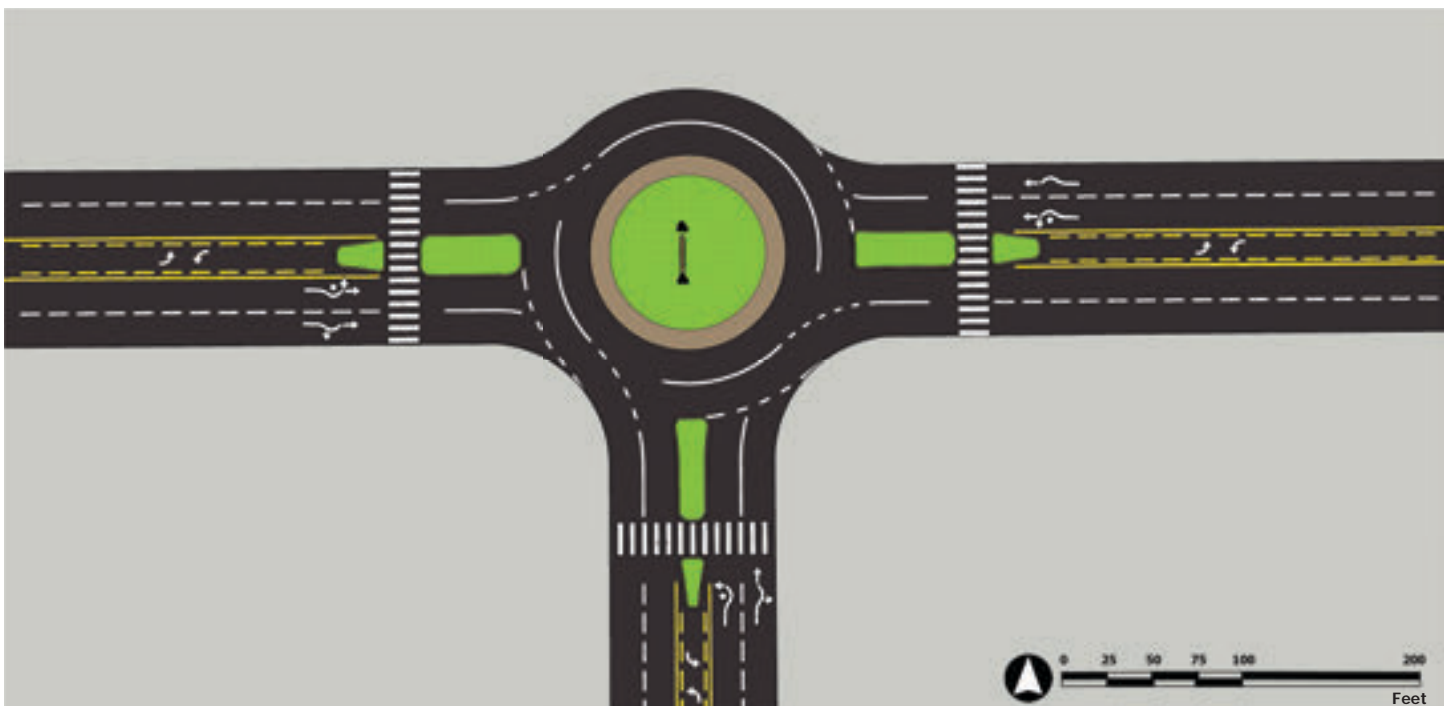


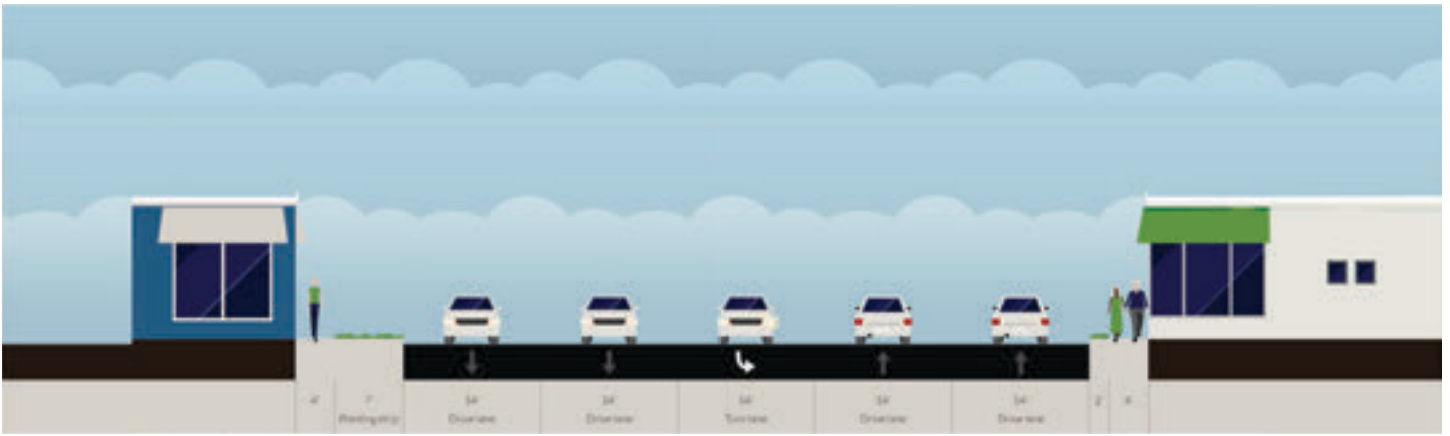
Renderings of a Proposed Roundabout at Kenosha St- Main St Intersection



Kenosha St and Main St Roundabout

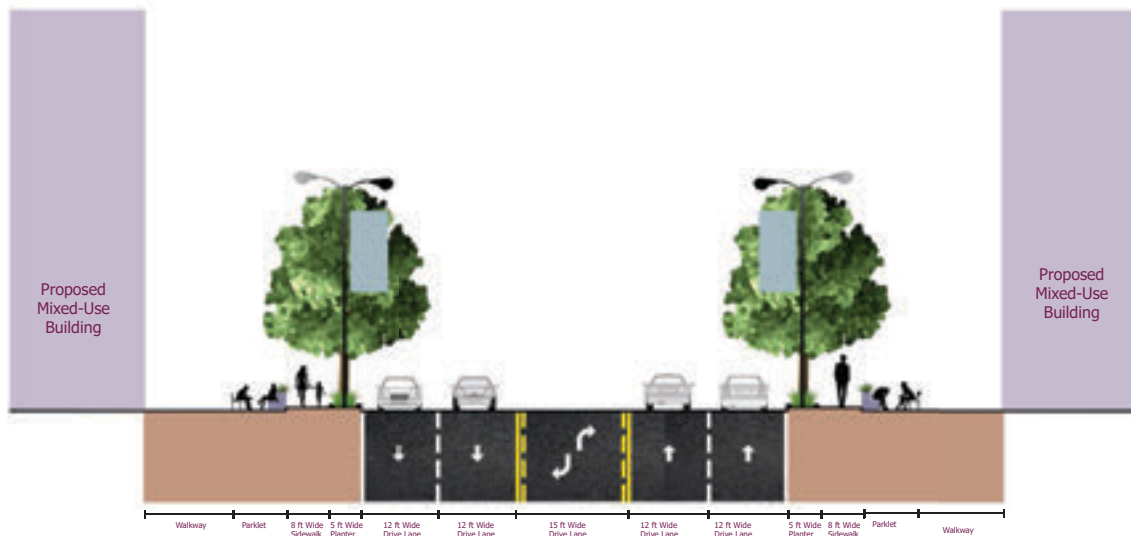
- This roundabout is proposed at the arterial intersection of Kenosha St and Main St.
- The traffic count is approximately 23,313 for Kenosha St and 6683 for Main St near this intersection daily. (Please refer to the Vehicular Circulation map in chapter no.3)
- This corridor of Kenosha St has several commercial properties.
- It is one of the major streets connecting to the historic Rose District.
- The adjacent renderings of a roundabout shows the landscaping feature for this intersection which acts like a landmark feature for the Rose District.
- This sculpture also acts like a wayfinding sign for vehicles and pedestrians for the Rose District and downtown Broken Arrow.
- This roundabout will facilitate and manage the traffic volume near this intersection more efficiently with lower speeds, no traffic signal and with continuous flow of traffic without any congestion.
- It will also provide safer pedestrian crossings set back from the circular traffic flow.
- Pedestrians will cross only direction of a traffic at one time which will help in bringing down the crash count near this intersection. (Please refer to the Traffic Collision map in chapter no.3)
- The pedestrian and bicycle safety near this intersection is important since it leads to the Rose District which has a walkable character. There is also a proposed bike lane for Main St under the Regional Bicycle Pedestrian Masterplan (GO Plan) by INCOG.
- By making this intersection pedestrian and bicycle friendly will encourage people to use the modes of active transportation in this area.





Existing Street Section

(Image Source- Streetmix)



Proposed Elm PI Section with Center Turning Lane



Proposed Elm PI Section with 4-Lanes

Streetscape

- Proposed streetscape on Elm PI focuses more on pedestrian friendly environment.
- The existing street section lacks in street furnishings like planters, trees, benches, trash receptacles and public signage.
- The proposed street section provides all these features with parklets along certain lengths of Elm PI, especially near the Elm PI-Kenosha St intersection.
- The existing driving lane width on Elm PI ranges from 13ft near the Elm PI-Kenosha St intersection to 10 ft towards the Broken Arrow Expressway-Elm PI intersection.
- The existing center turning lane is approximately 16 ft wide.
- Existing Elm PI-Kenosha St intersection has 7 lanes with two left turning lanes, all lanes being approximately 13 ft wide.
- The proposed street section is similar to the existing street section in terms of the dimensions of driving lane and center turning lane.
- Since proposed intersection has a roundabout, it will have a grass/landscape median upto a pedestrian crossing. After the crossing it will continue as a center turning lane.
- The proposed roundabout intersection will have 4 lanes versus existing 7 lanes.
- The proposed street section will have 2 driving lanes in each direction.
- The existing electric lines are proposed to be buried underground to remove the poles.



Proposed Elm PI Section near Intersection

Renderings of a Proposed Streetscape at Elm PI



Near Elm PI-Kenosha St Intersection



Near Elm PI-Kenosha St Intersection



Parklets Near Elm PI-Kenosha St Intersection



Near Elm PI-Broken Arrow Expressway Intersection



Proposed Reduced Curbcuts Along Elm PI



Existing Curbcuts Along Elm PI

Reducing the Curbcuts

- The Elm-Kenosha gateway corridor has several commercial properties.
- These properties are accessible through surface parking lots producing numerous curbcuts.
- Since the proposed streetscape emphasizes on walkability, it is necessary to address this issue.
- Frequent curbcuts generate undesirable walking conditions for pedestrians having to deal with level differences for a short walk.
- These conditions are unpleasant especially for physically challenged and visually impaired people.
- Therefore the proposed streetscape will have fewer curbcuts with one wider vehicular entry/exit point for each block.
- Depending on the length of the block, number of building entrances facing the street and availability of adjacent collector streets, the number and width of entry/exit points will vary.
- By reducing the number of curbcuts, it will create continuous and unobstructed pedestrian movement along with safer environment for the pedestrians.



Proposed Bigger Entrances For Each Block Along Elm PI to Reduce the Curbcuts

Renderings of a Proposed Residential and Commercial Mixed-Use Development Near Elm PI- Kenosha St Intersection

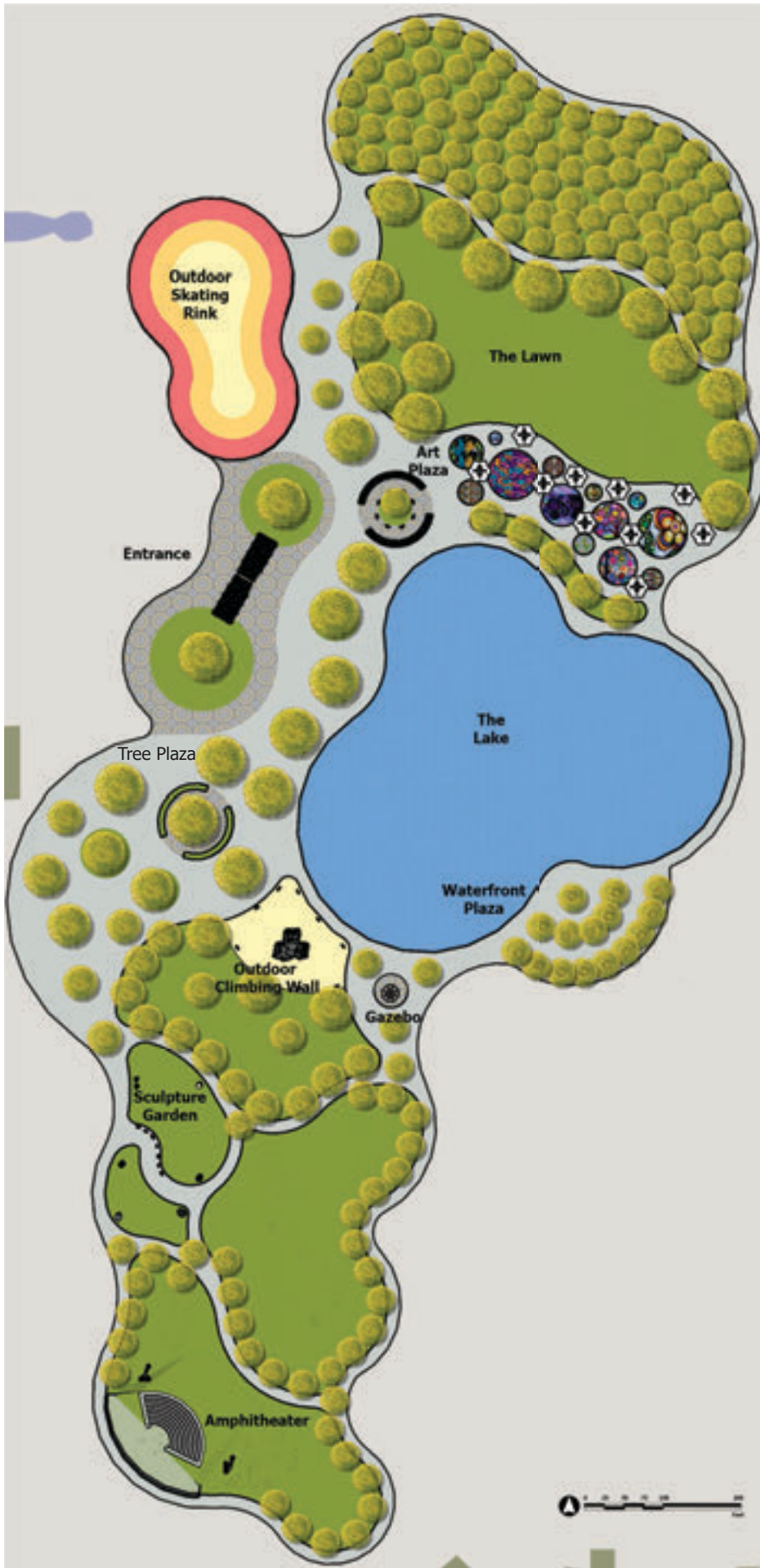


Built Form

- It is one of the important aspects in planning a gateway corridor since the built form and type of buildings will generate various activities.
- Since this proposal focuses on people-friendly walkable spaces, it is important to develop strategies for built form and its type.
- The proposed built form in this corridor focuses on multistory mixed-use development, especially near the intersection of Elm Pl and Kenosha St.
- The proposed mixed-use development near the intersection combines the existing commercial development with residential, office and retail use.
- It will create community-friendly activity centers.
- Intensifying the development around important arterial intersections is important since these intersections act as landmark spaces in the city.
- Therefore to make these intersections more identifiable, type and form of the buildings near them is a key factor which needs to be addressed not just in this proposal but in a city planning document as well.
- The proposed built structures near the Elm Pl-Kenosha St intersection have retail & commercial spaces on the street level with residential/office spaces on top floors.
- Some of these structures will have roof-top restaurants and landscaped spaces as well.
- The clock towers near the intersection act as landmarks which can be seen from farther distances. They can be converted into elevator shafts for elevated walkway in the future.

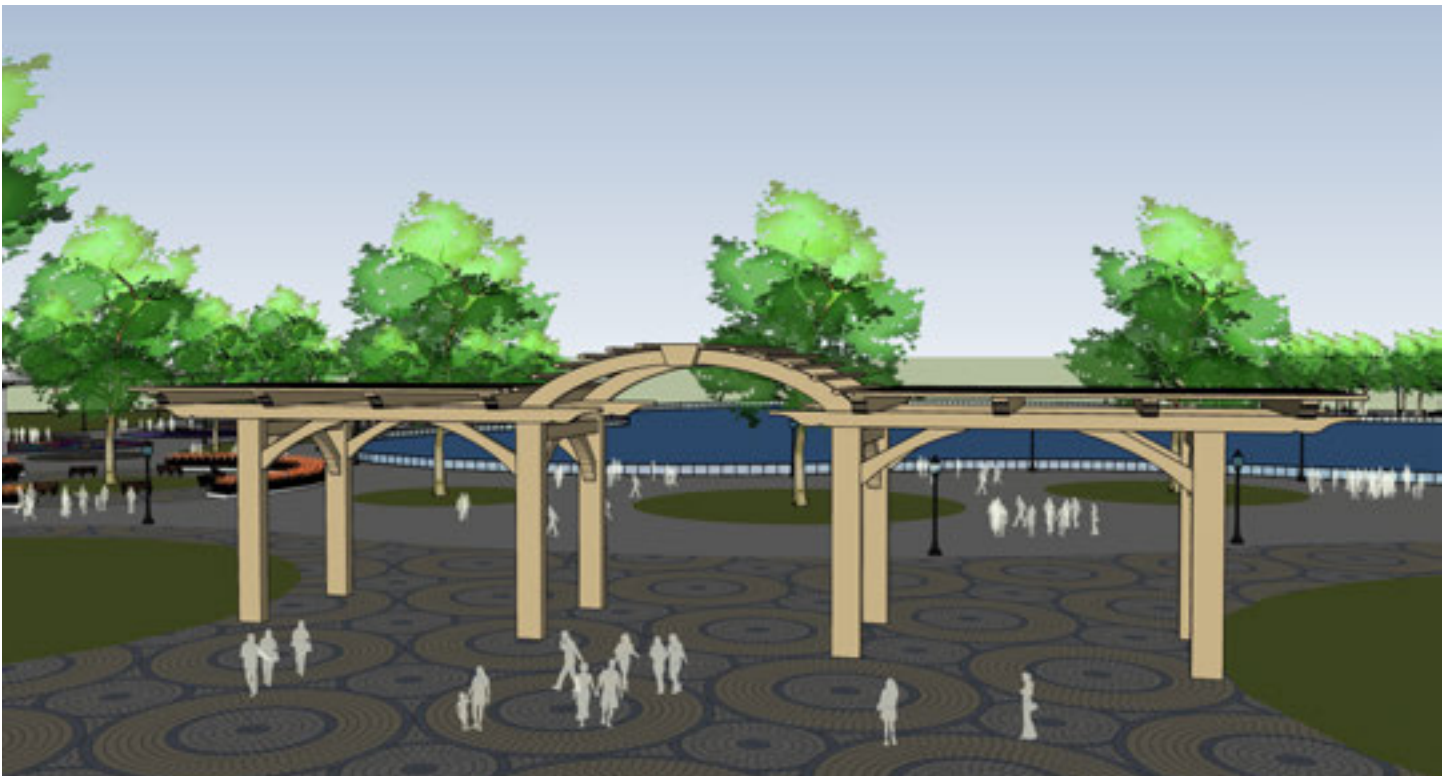


Proposed Gateway Park Plan



Recreational Facilities- Neighborhood Park and Trail

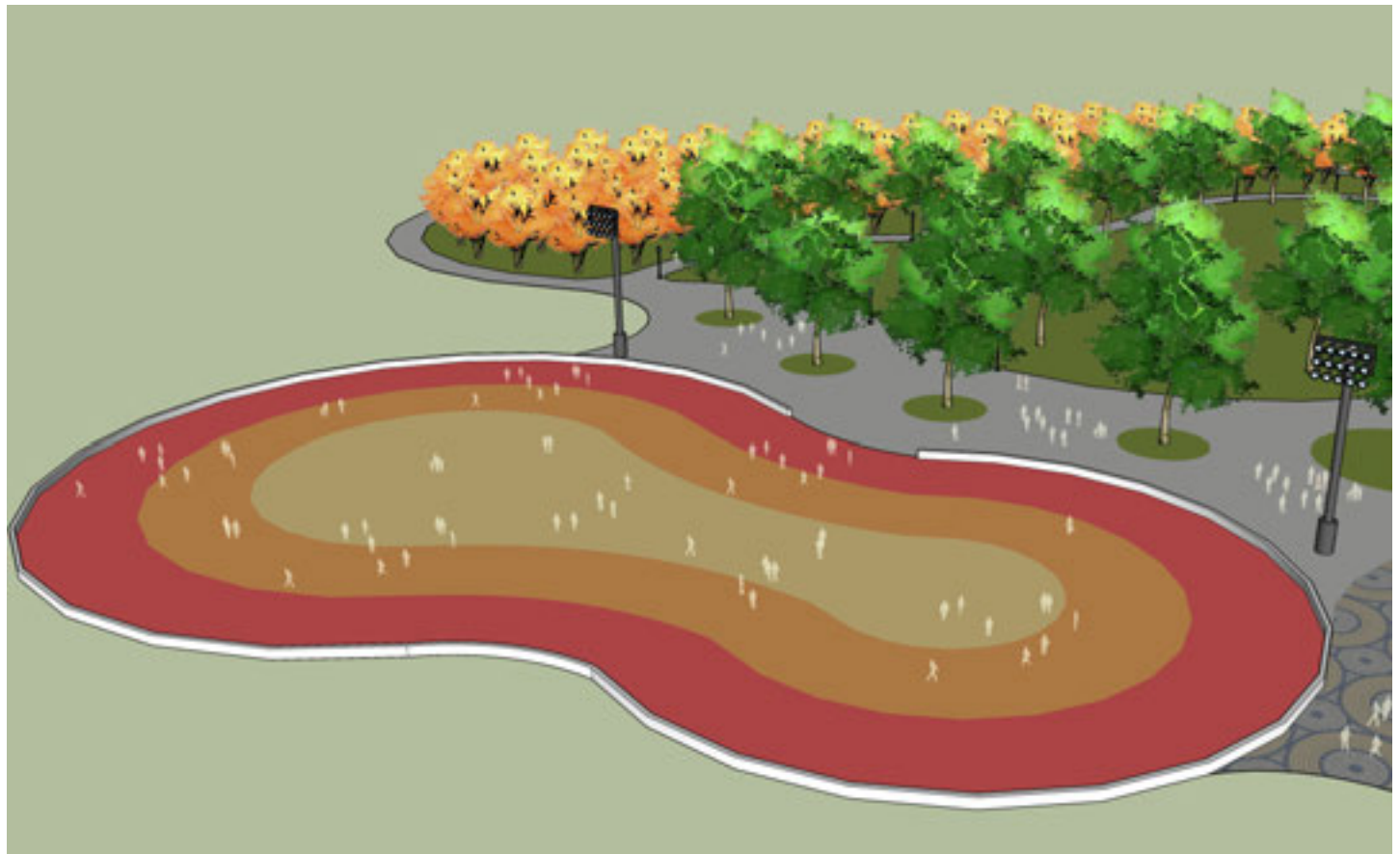
- Recreational facilities like parks, trails and plazas are important for communities as they bring people together.
- These spaces are community spaces which can be used during public events.
- The proposed neighborhood Gateway Park is in the north-east corner of the gateway.
- This part of the city has stormwater detention facility which is maintained by the City of Broken Arrow.
- Due to natural drainage pattern, some of the properties may get flooded during heavy rains.
- The stormwater detention facility can be converted into a recreational pond which will cater fishing, swimming and other water related sports.
- The proposed neighborhood park will also have a walking and biking trail which may be connected to Bass-Pro shops on the Northern side of the Broken Arrow Expressway.
- The park will also have an outdoor climbing wall, children's play area and event plaza.
- An outdoor roller skating rink is proposed near Broken Arrow Roller Sports which will be an outdoor extension to the existing facility.
- The park can be programmed for various events which will be beneficial for the surrounding communities.
- Since this part of the city does not have any active transportation provisions under INCOG GO Plan, the walking and biking trail in the park will facilitate these activities with enhanced safety and connectivity.



Park Entrance



Seating Area



Outdoor Skating Rink



Art Plaza



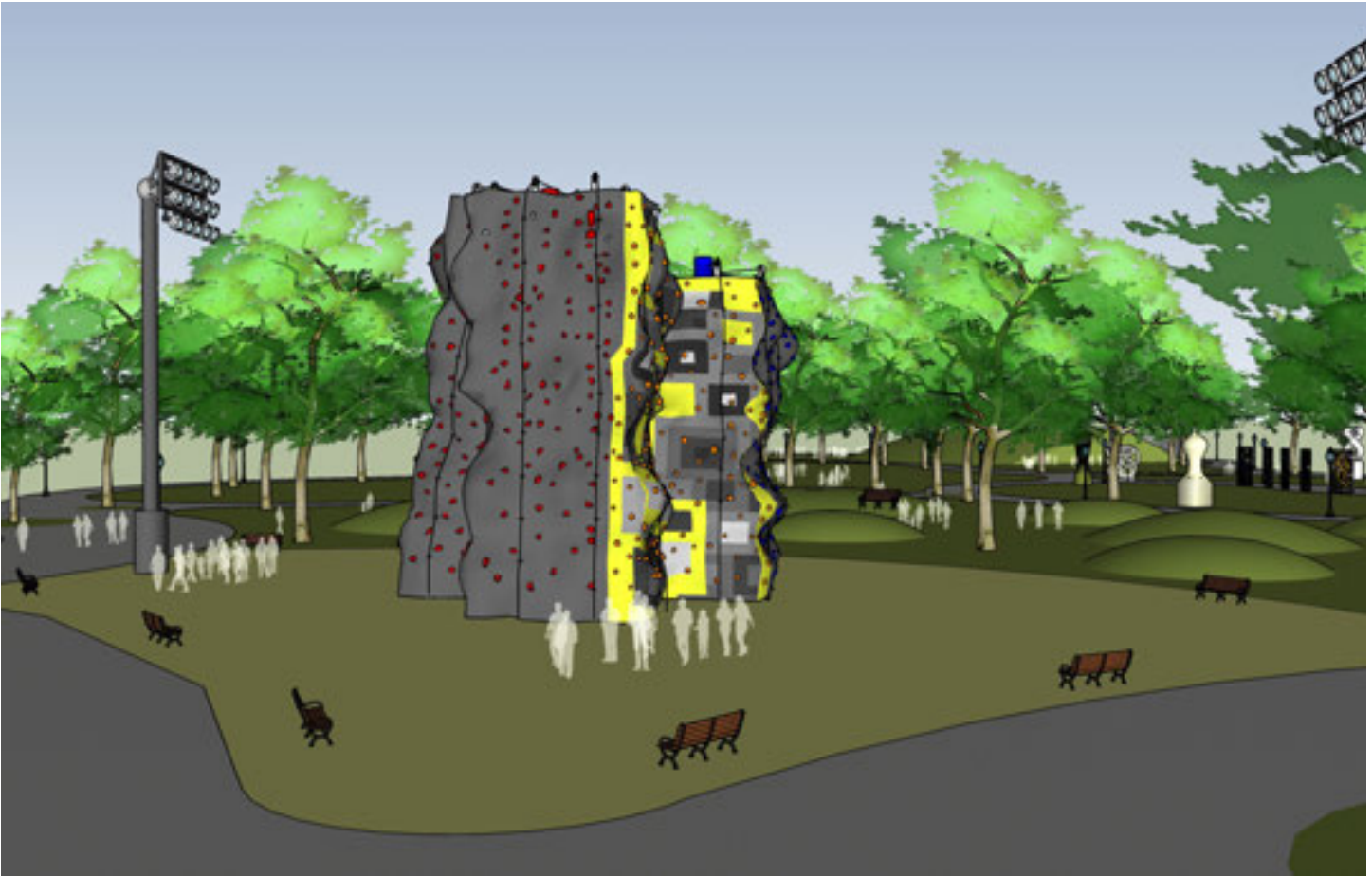
Waterfront Plaza



Waterfront Plaza



Gazebo



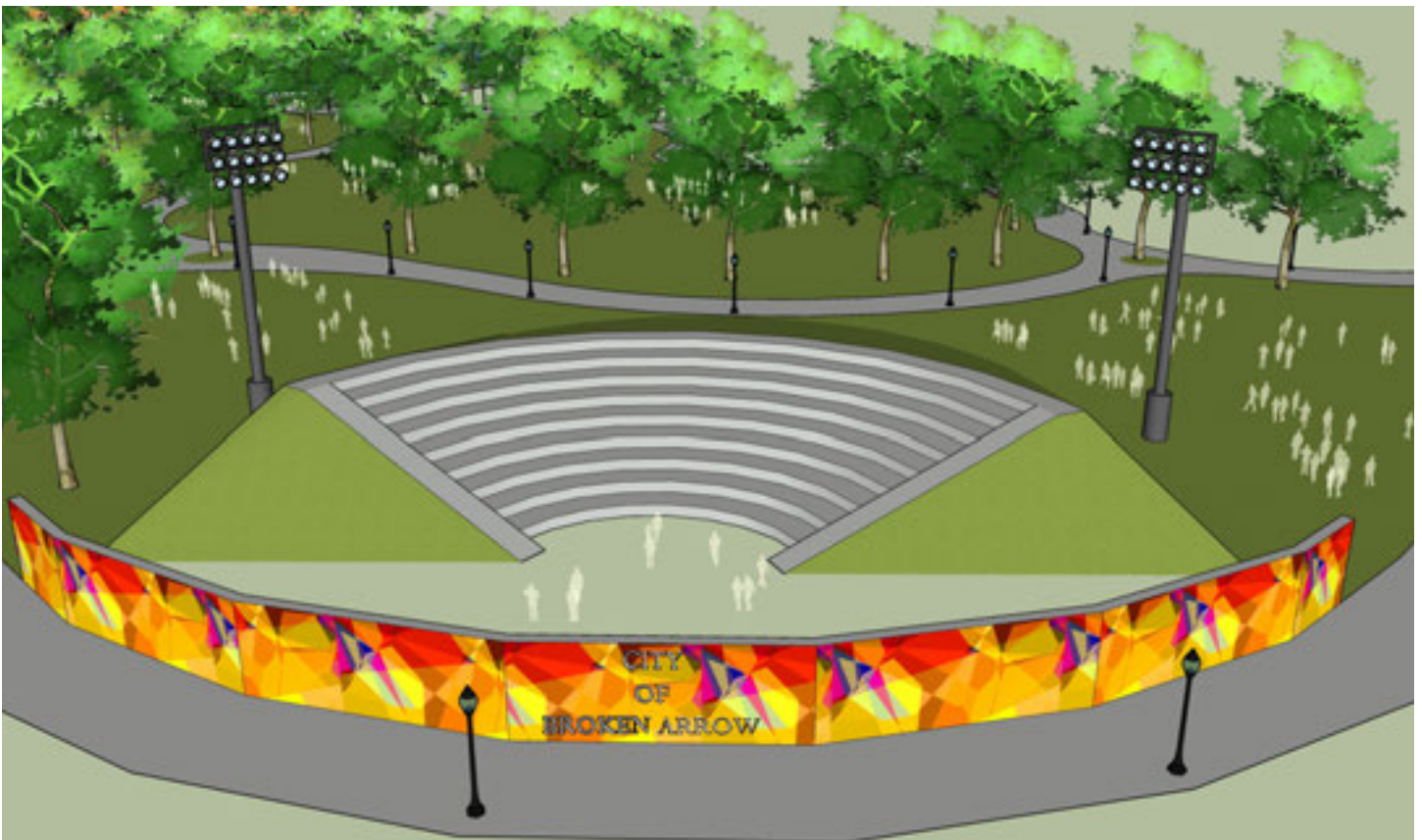
Outdoor Climbing Wall



Mounds



Sculpture Garden



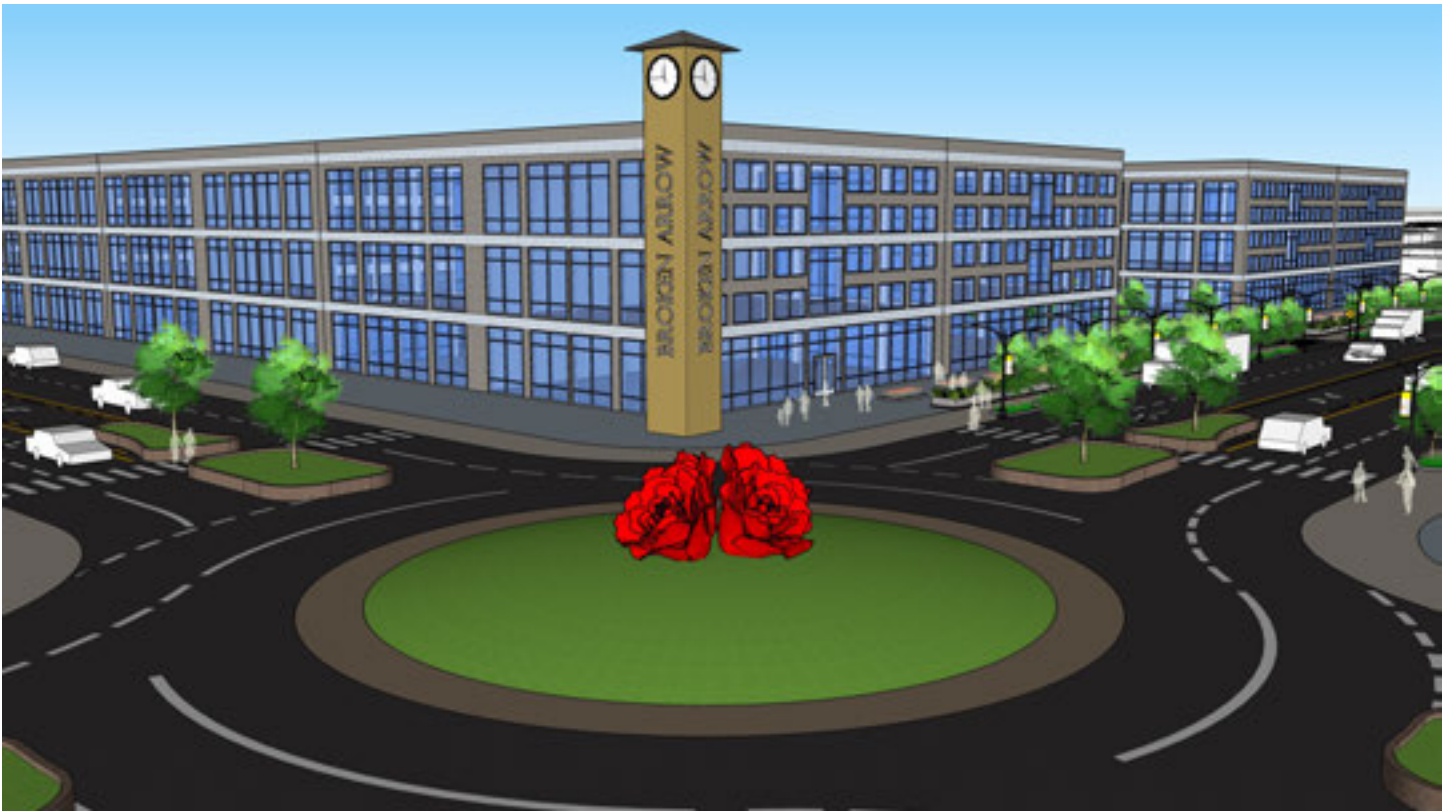
Amphitheater



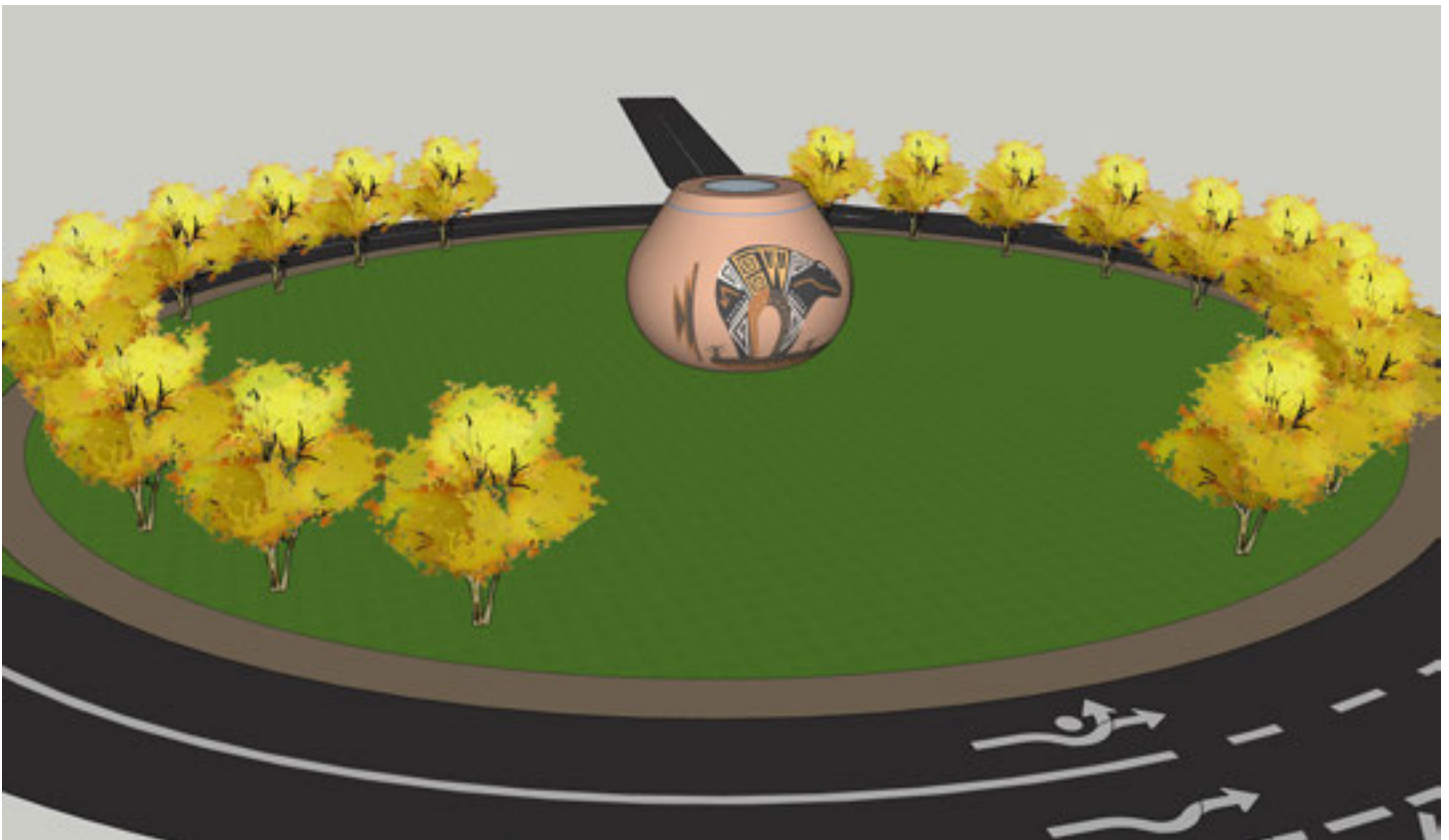
Walkway



Tree Plaza



Proposed Rose Sculpture Near Elm Pl-Kenosha St Roundabout Intersection



Proposed Native Indian Sculpture Near Elm Pl-Broken Arrow Expressway Roundabout Intersection

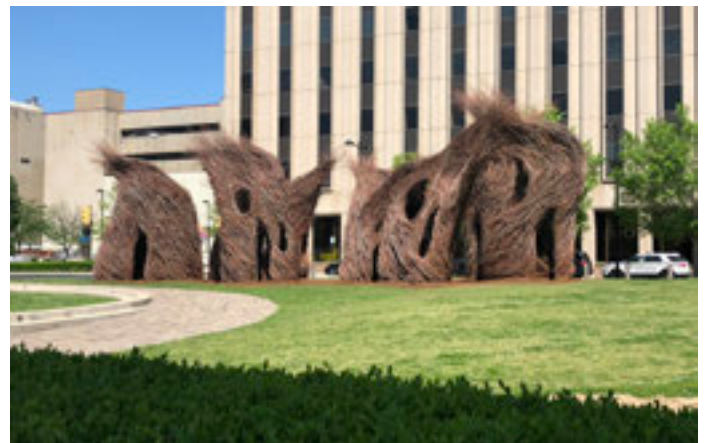
Public Art

- Art is a part of city planning since ancient times.
- Public art makes an area, city or a region more identifiable by enhancing the aesthetics.
- Art not only improves the aesthetics but also acts as wayfinding signs or landmarks in a city or a community.
- Considering gateways, art plays an important role of creating the identity specific to a city.
- Adjacent renderings of proposed art in the Elm Pl-Kenosha St gateway corridor represents specific areas in Broken Arrow.
- The Rose sculpture proposed for Elm Pl-Kenosha St roundabout represents the historic Rose District in Broken Arrow downtown.
- The Bow & Arrow sculpture proposed for Elm Pl-Broken Arrow Expressway represents the symbol of City of Broken Arrow.
- These two sculptures will act landmarks for the specific areas, especially the Rose sculpture.
- Public art also generates an opportunity for local talent to display thier creative work.
- By adopting roundabout model for intersections, Broken Arrow can create sustainable transportation network with improved aesthetics.
- Each roundabout intersection in the city can be made unique with art, making it identifiable for people in the city and for the visitors.



Patterned Carpets by Arthur Louis Ignore

(Image Source- thisiscolossal.com)



Stickwork by Patrick Dougherty



Root Bench by Yong Ju Lee

(Image Source- thisiscolossal.com)



Air, Sea, Land by Okuda San Miguel

(Image Source- thisiscolossal.com)

COMMUNITY FEEDBACK & FUTURE STEPS



With Broken Arrow Residents and Halff Associate Planners



With Broken Arrow Residents



Broken Arrow Residents at the Public Meeting



With Broken Arrow Development Services Director Michael Skates



With Broken Arrow Mayor Craig Thurmond



With Broken Arrow Special Projects Manager Farhad Daroga

Community Feedback

This was the exciting part of my project since I was going to interact with people and get their feedback on my proposal. The last and fourth public meeting for the 'Broken Arrow Next Comprehensive Plan' was held on March 6th from 06.00pm-8.00pm at Central On Main. There were 80-100 people present for this meeting including the City of Broken Arrow staff. The Comprehensive Plan procedure was lead by team of professionals from Halff Associates, Texas based engineering and architecture firm. The meeting started with brief introduction by City Manager Michael Spurgeon. The introduction was followed by a short presentation by Halff Associates. The presentation mainly focused on the Parks & Recreation chapter of the comprehensive plan. It also covered the time frame of implementation of the comprehensive plan.

Posters covering the key points from each chapter of the comprehensive plan were displayed on the walls of a community hall. The purpose behind displaying these posters were to get the feedback from people and to provide an opportunity for people to interact with planners. I had my own table where I displayed my poster. the idea behind this exercise was to interact with people informally and get their feedback on my proposal. I also asked them about the brand of Broken Arrow. I got to interact with 15-20 people approximately. They asked me few questions regarding the roundabouts. The most frequent questions were 'How does a roundabout work?' and 'Is roundabout safe for pedestrians and drivers?'. The majority of people I talked with were in their mid 50s and mid 60s. I also talked with a few younger people in their mid 30s. It was helpful to know the opinions from various age groups and how they perceived new system of transportation.

When I asked about the branding of Broken Arrow, a few people said that it should be the 'Rose District'. But the majority of them did not know the answer. It indicated that Broken Arrow lacks in a strong branding strategy. The people who thought the brand of Broken Arrow should be the Rose District- indicated that they liked the fact that it is a place full of activity and has walkable spaces. I also interacted with planners from Halff Associates and Broken Arrow City planners. All of them welcomed the idea of roundabouts in Broken Arrow and the opportunity they bring for gateways.

Broken Arrow City planner and Special Projects Manager, Farhad Daroga thought that this proposal for Elm Pl-Kenosha St gateway corridor will bring the topic of roundabouts on table again which got sidetracked in the previous comprehensive plan discussions. He also welcomed the idea of a neighborhood park in the north-east corner of the gateway. Director of Development Services, Michael Skates thought that the idea of roundabouts for gateways and for the entire city sound promising and it will bring the opportunity of an efficient transportation infrastructure. He also offered an opportunity for me to present my proposal in front of the City Council. The mayor of Broken Arrow, Craig Thurmond appreciated the idea of an identifiable structure on the Elm Pl bridge over Broken Arrow Expressway.

Overall it was a pleasant experience since, everyone I interacted with were receptive and curious about my ideas. I also hope some of these ideas get implemented soon.



Future Steps

It is always important to plan for future for better growth management. It is also essential to gather the resources required to implement that plan. Public projects usually take longer time for implementation because of their slow decision making processes. In the case of Elm Pl-Kenosha St gateway corridor, varied ownership will play a key role in implementing the proposed changes. Since a majority of the ownership is private in this corridor, the City of Broken Arrow needs to find a solution to get everyone on board for this project. A group of stakeholders from the property owners in this corridor needs to be formed to represent the businesses and community around. Stakeholders will act as mediators between the city and private property owners.

The project needs to be listed under Capital Improvement Plan (CIP). By enlisting it under CIP, it will be easier for the City of Broken Arrow to manage the financial resources according to the preference of this project. There are roughly two parts of this project- street improvement and property redevelopment/upgrade. For the street improvements, especially roundabouts, the city needs to have a technical team. This team will be necessary to research and develop technical details for roundabouts. The team will consist roundabout experts, city engineers, city planners and landscape architects for overall streetscape design. City engineers may have to go through a short training process to gather the required technical knowledge. They can approach Federal Highway Administration and Oklahoma State Department of Transportation for technical help. These agencies can arrange the required resources for the technical team.

For redeveloping the surrounding properties, the city needs to form tax incentive programs for the businesses and property owners. Stakeholders will play an important role in forming the framework for these programs. Apart from this, the gateway corridors need to have a special zoning regulation in planning documents. It will help defining the type of development in these corridors. The framework for gateway corridors needs to be recognized in current comprehensive plan or the next ammendment. It will provide the vision for city planners, leaders and people of Broken Arrow.

This proposal mainly concentrated on Elm Pl corridor between Broken Arrow Expressway and Kenosha St for street and property improvements. But it has also identified Kenosha St until Main St intersection as a secondary gateway corridor for the Rose District. Future steps should focus street and property improvements for this corridor as well.

The Elm Pl-Kenosha St gateway proposal provides an opportunity for the City of Broken Arrow to be a pilot project for other gateway corridors. If implemented, it will definitely bring the sense of place to Broken Arrow community and build an image for its people as well as for its visitors.

References

Books

National Association of City Transportation Officials. 2016. Global Street Design Guide. New York: ISLAND PRESS.

—. 2016. Transit Street Design Guide. New York: ISLAND PRESS.

—. 2014. Urban Bikeway Design Guide. New York: ISLANDPRESS.

—. 2013. Urban Street Design Guide. New York: ISLANDPRESS.

Tachieva, Galina. 2010. Sprawl Repair Manual. Washington: ISLAND PRESS.

Williamson, Ellen Dunham-Jones and June. 2011. Retrofitting Suburbia. Hoboken, New Jersey: John Wiley & Sons, Inc.

Congress for the New Urbanism. 2000. Charter of the New Urbanism. McGRAW-HILL.

Garcia, Mike Lydon & Anthony. 2015. Tactical Urbanism. Washington, DC: ISLAND PRESS.

Dixon, Jason Beske and David. 2018. Suburban Remix: Creating the Next Generation of Urban Places. Washington,DC: ISLAND PRESS.

Documents from Websites

Australian Capital Territory Government, Canberra. 2018. "City and Gateway Draft Urban Design Framework."

<https://yoursay.act.gov.au/city-and-gateway-draft-urban-design-framework>

"City of Franklin Gateway Enhancement Plan, Virginia, 2009".

<https://www.franklinva.com/media/24639/gateway.pdf>

"City of Chesapeake, Virginia- Design Guidelines Manual"

http://www.cityofchesapeake.net/assets/documents/departments/planning/design_guidelines/chapter-v.pdf

"Urban Grain, Jonathan R. Konkol, University of Washington, 2015"

https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/33444/Konkol_washington_02500_14936.pdf?sequence=1

"Suburban Tissue Analysis and Retrofitability, Arman Tolentino, 2011"

<https://smartech.gatech.edu/handle/1853/40881>

Planning Documents

Broken Arrow Next Comprehensive Plan Draft
<http://bit.ly/2Vxp8zn>

City of Broken Arrow Zoning Maps
<http://www.brokenarrowok.gov/DocumentCenter/View/270/2012-Broken-Arrow-Zoning-Book?bidId=>

City of Broken Arrow 2012 Comprehensive Plan Brochure Update
<http://www.brokenarrowok.gov/DocumentCenter/View/581/Broken-Arrow-Comprehensive-Plan-for-Broken-Arrow-2012-Brochure-Update?bidId=>

Articles from Websites

The Brookings Institution/ William H. Frey. 2017. City growth dips below suburban growth, Census shows. May 30. Accessed August 01, 2018. <https://www.brookings.edu/blog/the-avenue/2017/05/30/city-growth-dips-below-suburban-growth-census-shows/>.

—. 2018. US population disperses to suburbs, exurbs, rural areas, and “middle of the country” metros. March 26. Accessed August 01, 2018. <https://www.brookings.edu/blog/the-avenue/2018/03/26/us-population-disperses-to-suburbs-exurbs-rural-areas-and-middle-of-the-country-metros/>.

Website Links

Street Plans Collaborative
<https://www.street-plans.com/>

<http://www.co.berks.pa.us/Dept/Planning/Pages/Roundabout%20Information.aspx>

https://www.penndot.gov/ProjectAndPrograms/RoadDesignEnvironment/RoadDesign/Pages/Roundabouts.aspx#.VthV5_krLGI/Internet/web.nsf/Secondary?openframeset&frame=main&src=Roundabout-ContactInfo?readform

<https://www.cars.com/articles/circular-logic-making-intersections-safer-in-a-roundabout-way-1420692633893/>

<http://carmel.in.gov/department-services/engineering/roundabouts>

<http://www.okladot.state.ok.us/beauty/wildflower/faqs.htm>

<https://iowadot.gov/traffic/roundabouts/Roundabout-education>

<https://www.census.gov/quickfacts/brokenarrowcityoklahoma>

<http://www.city-data.com/city/Broken-Arrow-Oklahoma.html>

<https://3dwarehouse.sketchup.com/>

<https://www.strongtowns.org/journal/2017/10/31/fine-grained-vs-coarse-grained-urbanism>

<https://bizfluent.com/about-7217190-difference-between-public-private-enterprise.html>

<http://tacticalurbanismguide.com/materials/>

<https://www.theatlantic.com/health/archive/2014/08/blame-the-city/375888/>

