

# THE TULSA REGIONAL Bicycle and Pedestrian Master Plan



*Recommended for adoption by the Transportation Technical  
Committee: November 18, 2015*

*Adopted by the Transportation Policy Committee: December 2, 2015*

*Endorsed by the INCOG Board of Directors: December 8, 2015*

# 1 INTRODUCTION

The Indian Nations Council of Governments (INCOG) and its member jurisdictions are seeking to change the norm for travel in the region by overcoming current challenges to active transportation with smart design and implementation of facilities for pedestrians and bicyclists. As the regional transportation planning body, INCOG provides a vision for transportation, administers funding programs and provides member jurisdictions with resources to plan and implement projects at the local level. This Plan is part of that suite of resources and equips member jurisdictions with:

- Bicycle network recommendations,
- Pedestrian design approaches,
- Policy and funding recommendations, and
- Design guidance.

Each element of this plan will help the 11 cities involved make walking and bicycling safe, comfortable and convenient for its residents and visitors.<sup>1</sup> Taken as a whole, the GO Plan provides a clear path toward achieving this vision for all communities in the region.

<sup>1</sup> The 11 communities are: Bixby, Broken Arrow, Catoosa, Collinsville, Coweta, Glenpool, Jenks, Owasso, Sand Springs, Skiatook and Tulsa.

## Plan Vision and Goals

### The vision:

The Tulsa metropolitan area is a place where walking and biking are viable and appealing choices for transportation and recreation. Safety, comfort and convenience for users are addressed along roads, at crossings, on multi-use trails and at key destinations.

This powerful vision to make the Tulsa area a great place for walking and biking for everyone was conceived by community members and leaders during an 18-month planning process to create the GO Plan, the region's first comprehensive bicycle and pedestrian plan. This vision and the goals stated below were developed early in the planning process in concert with the project steering committee which includes representatives from all 11 participating communities.

The vision for bicycling and walking in the Tulsa region guided development of the plan process and the goals and recommendations included in this report. They achieve the vision through the following strategy:

1. Make bicycling and walking *viable* options through connected networks of facilities
2. Make bicycling and walking *appealing* options through facilities that provide a level of design that makes them safe, comfortable and convenient for the widest possible range of users

### The goals:



**Goal 1:** Implement and maintain a **connected network** of walking and bicycling facilities focusing on linking destinations to neighborhoods.



**Goal 2: Improve safety and security** for all users of the transportation system by applying strategies that reduce fatal and injury crash rates in the Tulsa metropolitan area.



**Goal 3:** Establish or increase local bicycle and pedestrian **mode share goals** across the Tulsa metropolitan area with target milestones for 2017 and 2022.



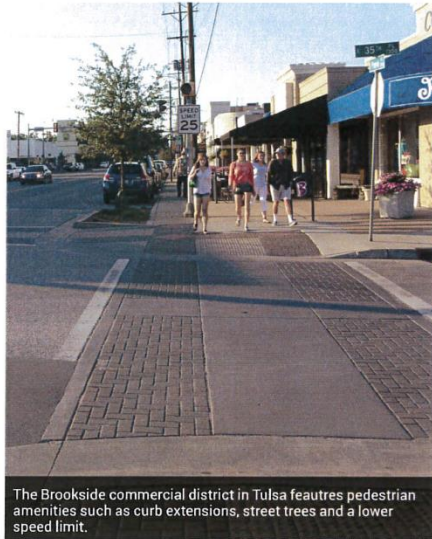
**Goal 4:** Develop implementation of **public education campaigns and programs** that include targeted efforts for law enforcement, students, traditionally underserved populations and other key stakeholders with target outreach goals set for 2017.



**Goal 5:** Position Tulsa and the surrounding areas as officially **recognized Walk and Bicycle Friendly Communities** by engaging or continuing efforts to achieve status with the national certification programs applicable to walk and bicycle friendliness.



**Goal 6:** Pursue **funding toward bicycle and pedestrian infrastructure** within local transportation funding bond and sales tax packages.



The Brookside commercial district in Tulsa features pedestrian amenities such as curb extensions, street trees and a lower speed limit.



Area residents enjoy access to long-distance trails such as the Creek Turnpike Trail for recreation and transportation.

### Plan Purpose and Scope

The GO Plan is a regional pedestrian and bicycle plan. It does not provide the same level of detail that a city-scale plan would, but instead seeks to create a bicycle network that connects major destinations in the region. These destinations include significant employment centers, downtown business districts, schools and universities, and the existing trails system. Although the plan provides a list of bicycle network projects and prioritizes arterial sidewalk gaps, it is not a comprehensive master plan for each community. Pedestrian improvements are addressed through recommendations in a community-chosen focus area in each jurisdiction and through design approaches to typical pedestrian challenges in the region. Implementation of the facility recommendations will be an important start to improving pedestrian and bicycling conditions, but the routine application of the Plan's design guidelines for each mode will have an even greater impact over the long term. The design guidelines are included in Appendix A.

### The Benefits of Walking and Biking for the Tulsa Region

Improving walking and bicycling conditions in the Tulsa region can foster economic development, improve health, increase safety and provide additional transportation options for residents.

Cities around the country are recognizing the attractive force of livable places.<sup>2</sup> Communities that are walkable and bikeable for the majority of their residents are seeing rising property values and increases in population.<sup>3</sup> The Tulsa Young Professionals (TYPros) group has seen this national trend and is pushing the city forward by encouraging a focus on creating more pedestrian and bike friendly streets. The 2014 StreetCred event temporarily transformed a street to put the focus on people instead of traffic and showed residents the possibilities when space is reallocated. The City of Broken Arrow has also recognized the importance of creating a better

<sup>2</sup> <http://www.realtor.org/sites/default/files/reports/2013/2013-community-preference-analysis-slides.pdf>

<sup>3</sup> [http://www.advocacyadvance.org/site\\_images/content/Final\\_Econ\\_Update\(small\).pdf](http://www.advocacyadvance.org/site_images/content/Final_Econ_Update(small).pdf)

walking environment and recently revamped its downtown streetscapes in the Rose District, leading to a more vibrant area that attracts visitors and retains residents. New businesses attracted to the revitalized neighborhood by \$3.7 million in streetscape improvements are already contributing to a 120-percent increase in tax revenues in the district.<sup>4</sup> Other communities in the region can look to these examples to see the power of creating streets that not only move people but create a place where they want to spend time.

Existing trails in the region are already immensely popular with thousands of bicyclists and pedestrians using trails weekly, and improving access to them for bicyclists and pedestrians will enable more residents to use them without needing to get in a car. The Master Trails Plan adopted by INCOG in 1999 set a vision for the development of a robust trail system that reaches and connects all communities. The facilities that have been built as a result of that plan are designed to be comfortable for all types of users from families out for a Sunday walk to running groups to bicyclists on a long ride.

### Low-Stress Bicycle Facilities

Low-stress bicycle facilities include low-speed and low-volume streets with comfortable crossings, cycle tracks or sidepaths on major roads, and paved trails. These streets and off-street facilities are comfortable for the full range of bicyclists—including children and inexperienced riders—and are more likely to encourage greater numbers of people to bicycle. The Tulsa region has the backbone of a low-stress bicycle network with paved trails such as the KATY Trail and Creek Turnpike Trail. While many low-stress neighborhood streets exist, they are disconnected by busy arterial street barriers.<sup>5</sup>

The regional trail system provides opportunities to improve community health through increased physical activity. This is another reason the Tulsa region wants to make walking and bicycling easier and safer beyond trails. Residents who live in communities with opportunities for physical activity nearby are more active.<sup>6</sup> These opportunities can be as simple as a sidewalk network that connects work to a lunch destination, or a safe, comfortable bike route on local streets that connects home to a local grocery store.

Improving pedestrian and bicyclist safety is also a critical element for improving community health. From 2009 to 2014, there were 815 pedestrian and 363 bicycle crashes reported in the region.<sup>7</sup> Most occurred on the high-speed, high-volume arterial streets that connect major destinations in the region and are also the location of much of the commercial development throughout communities. People do and will want to access these stores on foot and by bicycle, so providing adequate facilities for these modes will improve safety.

Enabling and encouraging travel by foot and bicycle can also help take burdens off the roadway system by decreasing the number of necessary car trips. As the Tulsa region grows, automobile traffic will continue to increase. Further investments in the roadway system to increase automobile capacity can require substantial investment by communities, but these may be reduced or avoided through shifting more trips away from single-occupancy automobiles. The region has already recognized the value of improving its transit system with on-going implementation of Fast Forward, the regional transit system plan adopted by INCOG in 2011. The project team recognized that every transit rider is a pedestrian at both ends of his or her trip. Implementation of the GO Plan recommendations will complement and maximize these improvements by providing better first and last mile access to transit stops.

<sup>4</sup> [http://www.tulsaworld.com/communities/brokenarrow/news/broken-arrow-s-rose-district-blossoming/article\\_ca17b50c-9191-53c2-97be-0ccc6055e473.html](http://www.tulsaworld.com/communities/brokenarrow/news/broken-arrow-s-rose-district-blossoming/article_ca17b50c-9191-53c2-97be-0ccc6055e473.html)

<sup>5</sup> The Level of Traffic Stress analysis conducted for this plan is detailed in Chapter 3.

<sup>6</sup> <http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/physical-activity-environment/>

<sup>7</sup> Crash data compiled by Oklahoma Department of Transportation from local police department reports.

## Support for Walking and Biking in Existing Plans

Numerous plans developed for the Tulsa region and individual communities have called for and supported improved conditions for pedestrians and bicyclists. In particular, the Connections 2035 Regional Transportation Plan, which was completed in 2012, called for the development of a regional bicycle and pedestrian master plan. The Connections 2035 plan touched on a number of elements that have been further developed in the GO Plan:

- Incorporation of pedestrian and bicyclist needs into the land development process through:
  - Acquisition of trail easements
  - Additional sidewalk connections, and
  - Accommodation at planned transit stops
- Improved connections between regional trails and neighborhoods
- Consistent application of pedestrian and bicycle facility design standards
- Trail improvements including lighting, maintenance and wayfinding
- Use of context sensitive design to improve the pedestrian and bicycling environment

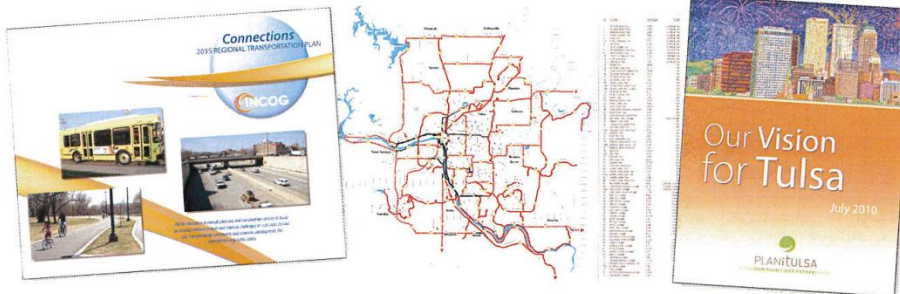
The GO Plan also builds on the bicycle and pedestrian planning effort of the 1999 Trails Master Plan by integrating that Plan's

off-street trail recommendations with new on-street bikeway recommendations to make region-wide connections.

Recent comprehensive planning in the City of Tulsa also supports a multimodal vision. PLANiTULSA, the city's comprehensive plan adopted in 2010, calls for a transportation system that provides a wide variety of mode choices. These choices will be supported by changes in land use that direct development toward downtown and new communities that are mixed use, dense and walkable.

Recommendations in PLANiTULSA about the street network itself call for a greater level of connectivity in the construction of new streets. The City will move away from a disjointed network that funnels trips onto arterial streets and toward one that provides greater connectivity. Street design is also addressed through a recommendation for "context sensitive solutions," which respond to the surrounding land uses rather than prioritizing automobile throughput on all streets. All of these changes would benefit bicyclists and pedestrians through creating the ability to take more short trips and through providing facilities such as high-quality sidewalks and bike lanes on more streets.

Planning efforts in other communities in the region are beginning to reflect this move toward a more concentrated mixed-use development pattern rather than the lower-density single use patterns typical today.



## GO Plan Development

The GO Plan was developed over the course of 18 months during 2014 and 2015. The process was guided by a steering committee, representatives from participating jurisdictions, and INCOG staff. Their input was sought on critical issues such as the Plan vision and goals, bicycle network recommendations, and the project prioritization process. A mid-point check-in was held with the committee and key stakeholders such as elected officials and advocates in October 2014 to ensure the process was on the right track. This stakeholder retreat was also used to gather input and priorities for policy recommendations included in this report.

Public input was sought through a number of means. A kick-off meeting was held in March 2014 which introduced the region's residents to project goals and the upcoming process to develop the plan. Local residents were engaged through a series of "walkshops," walking workshops that evaluated the pedestrian and bicycle conditions for a set of neighborhoods defined by the communities themselves. Most jurisdictions held one walkshop in or near their downtown, and the City of Tulsa held four separate events focused on East Tulsa, Cherry Street, Northwest Tulsa, and South Tulsa. A final public workshop was held for this planning process in September 2015 to celebrate the release of the plan and seek final public comment.

The public was also engaged through two online means: an interactive WikiMap map and a survey. WikiMap input helped identify priority locations for improvements throughout the region where barriers to walking and biking exist today and locations where residents would like to be able to walk and bike more comfortably and safely. The online survey sought more general information about travel patterns and attitudes about bicycling and walking. Survey results are presented throughout the plan and fully reported in Appendix B.

Importantly, staff from each jurisdiction have also been involved throughout the process. Though INCOG is the coordinating body for this plan, recommendations will be implemented by each of its member jurisdictions, so their involvement in the



Community staff reviewed network recommendations throughout the planning process, including at the October 2014 check-in.



The project team presented on the engagement and data analysis that led to draft recommendations development.

plan development was essential. Local staff were involved in the following efforts:

- Development and review of the bicycle network
- Identification of pedestrian focus areas
- Mid-point check-in on plan process and results
- Full-day facilities design training on the 2012 American Association of State Highway and Transportation Officials Guide for the Development of Bicycle Facilities
- Review meetings with INCOG staff for community plans

Regular presentations were also made to update the INCOG Transportation Technical and Policy Committees and Bicycle and Pedestrian Advisory Committee throughout the plan process.

## Plan Organization

The GO Plan contains the following elements to help communities implement pedestrian and bicycle projects and policies.

### 2 Bicycle Strategy

Chapter 2 summarizes the existing state of bicycling in the Tulsa region and outlines the process undertaken to develop the bicycle facility network recommendations of the GO Plan and describes the proposed network.

### 3 Pedestrian Strategy

Chapter 3 summarizes the existing state of the pedestrian environment in the Tulsa region. It provides general guidance about improvements that will increase safety and comfort and a summary of the selected pedestrian focus areas for each community. Concept designs for five typical locations are also provided that can be used by any community with similar pedestrian design challenges.

### 4 Project Implementation

Chapter 4 outlines how bicycle and pedestrian projects were prioritized for this plan and how this prioritized list can be used at the local and regional scales. Cost estimates for bicycle facility types are also presented, as well as a review of the current funding process for bicycle and pedestrian projects and recommendations for future funding.

### 5 Non-Infrastructure Strategies

Recommendations for policy and code changes that will result in an improved bicycling and pedestrian environment are presented in Chapter 5. Brief guidance on education, enforcement and encouragement programs is also provided.

### 6 Community Plans

Chapter 6 contains a summary of input received for each participating community, maps of network recommendations, a table detailing bicycle network facilities, mileage and costs, and the detailed recommendations for each community's focus area(s). This section is intended as a standalone element for each community to use, along with the bicycle and pedestrian design guidelines, in implementing their pieces of the network.

#### Appendices:

- A. Bicycle and Pedestrian Facility Design Guidelines
- B. Public Involvement: Complete summary including all survey results
- C. Prioritization: Detail on methodology, scores for all projects
- D. Cost Estimate Details
- E. Policy Review: Full table; summary of input from retreat



FFY 2015-2016 Transportation Alternatives Program Application  
Tulsa Urbanized Areas

for

**Broken Arrow Creek Trail** *- Phase 1*



**BROKEN ARROW**

*Where opportunity lives*

City of Broken Arrow  
Thomas D. Hendrix, PE - Engineering Division Manager  
485 N. Poplar Street  
Broken Arrow, OK 74012  
918 259-2400 x5414  
thendrix@brokenarrowok.gov



September 10, 2013

Thomas Hendrix  
City of Broken Arrow  
Engineering Division Manager  
485 N. Poplar Street  
Broken Arrow, OK 74012

Dear Thomas Hendrix:

**Subject: Urbanized Area Transportation Alternatives Program for FFY2015-16**

On July 31, 2013, the Transportation Policy Committee selected projects for the Federal Fiscal Year (FFY)2015-2016 Urbanized Transportation Alternatives Program. On August 13, 2013, the INCOG Board of Directors endorsed the selected projects. The following project you submitted was selected for funding:

Project	Description	Federal	Local	Total
Broken Arrow Creek Trail	Phase 1 is 2.5 miles of "share the road" on street bikeway extending from the Liberty Trail Trailhead to Ithica Place. Phase 2 is 1.1 miles of off-road multi-use trail connecting Phase 1 to Arrowhead Park and Oak Crest Elementary School to the north.	\$497,562	\$165,500	\$663,062

Per the project selection process, the Oklahoma Department of Transportation (ODOT) Local Government Division will coordinate the contract development for this project with you. INCOG will continue its practice of funding projects on a "first ready, first let" basis, as we do with our Urbanized STP program. Therefore, although these funds are for future fiscal years, if your project is ready to proceed, you may initiate contact with ODOT to begin the project development process. Contact James Wagner at (918) 579-9447 should you have any questions.

Sincerely,

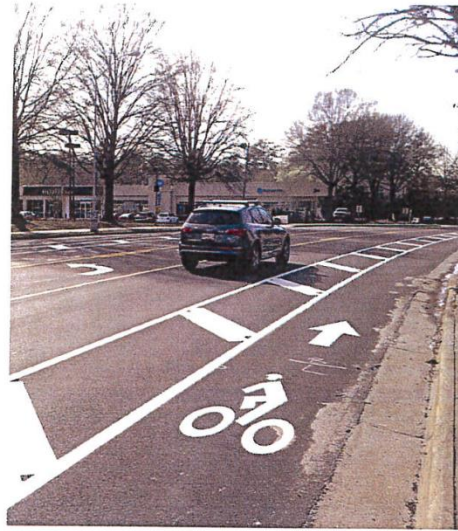
Viplav Putta  
Manager, Transportation Planning & Programs

cc: Pete Regan, ODOT District 8 Commissioner  
Mark Scott, ODOT Local Governments Division  
John Bowman, ODOT Planning & Research Division





**Bike routes alert** drivers through signage located along the route



**Buffered bike lanes** provide greater shy distance between motor vehicles and bicyclists



**Shared lane markings** indicate bicyclists' presence to drivers and appropriate placement on the roadway



**Striping bike facilities** through intersections highlights the bicyclist's path of travel

The facility types outlined here cover all of the on-street facilities used in the GO Plan network. More detail on their application and design is provided in the Bicycle Design Guidelines in Appendix A.



#### Trail

- Path fully separated from a street, shared by bicyclists, pedestrians and others
- Typically paved and marked with a center line
- Located along a separate alignment from street right-of-way
- High-volume or high-speed streets



#### Sidepath

- Path for use by both bicyclists and pedestrians within street right of way
- At curb level to separate from traffic, preferably with buffer between path and street
- Typically marked with a center line
- High-volume or high-speed streets



#### Cycle Track

- Provides bike-only facility physically separated from automobile travel lane and sidewalk
- Separated from traffic by curb, bollards, parked cars and/or other vertical elements
- Medium- and high-volume streets



#### Buffered Bike Lane

- Increases riding space and comfort by adding a painted buffer to standard bike lane
- Buffer located either between the bike lane and automobile travel lane, or between bike lane and parking
- Medium- to high-volume streets

# Memo

To: Roger Hughes, PE

From: Robert Shears, ASLA

Date: March 24, 2016

Subject: Broken Arrow Creek Trail Phase 1

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03/11/2016 – Notice to Proceed

03/24/2016 – Kick-Off Meeting

03/11/2016 – 04/25/2016 Topographic Survey (45 Days)

04/26/2016 – 06/10/2016 Preliminary Field Review Plans (30%) (45 Days)

06/23/2016 – Plan in Hand Review Meeting

06/23/2016 – 09/22/2016 Final Field Review Plans (65%) (90 Days)

10/06/2016 – Review Meeting

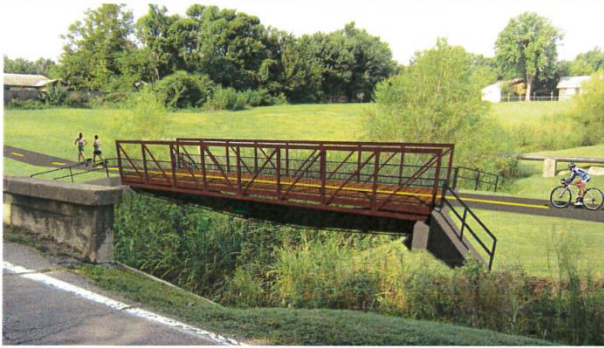
10/7/2016 – 12/06/2016 Final Plan for Review (95%) (60 Days)

12/20/2016 – Review Meeting

12/21/2016 – 01/23/2017 Submit Final Approved Plans (100%) (33 Days)

# CONCEPTUAL DESIGN REPORT

BROKEN ARROW CREEK TRAIL - PHASE 2  
CITY OF BROKEN ARROW, OKLAHOMA



PREPARED FOR:



PREPARED BY:

**R.L. SHEARS COMPANY, P.C.**  
**Landscape Architects**  
1522 SOUTH CARSON AVENUE  
TULSA, OKLAHOMA 74119  
TEL 918.582.0612 FAX 918.582.0613  
WEB: WWW.RLSHEARSCO.COM  
C.A. NO. 1759 EXPIRES: JUNE 30, 2017





**PLAN LEGEND**

	PRIMARY TRAIL ALIGNMENT		ALTERNATE TRAIL ALIGNMENT
	PRIMARY TRAIL ALIGNMENT ON-STREET BIKEWAY		ALTERNATE TRAIL ALIGNMENT ON-STREET BIKEWAY
	6" CONCRETE SIDEWALK		EXISTING TRAIL



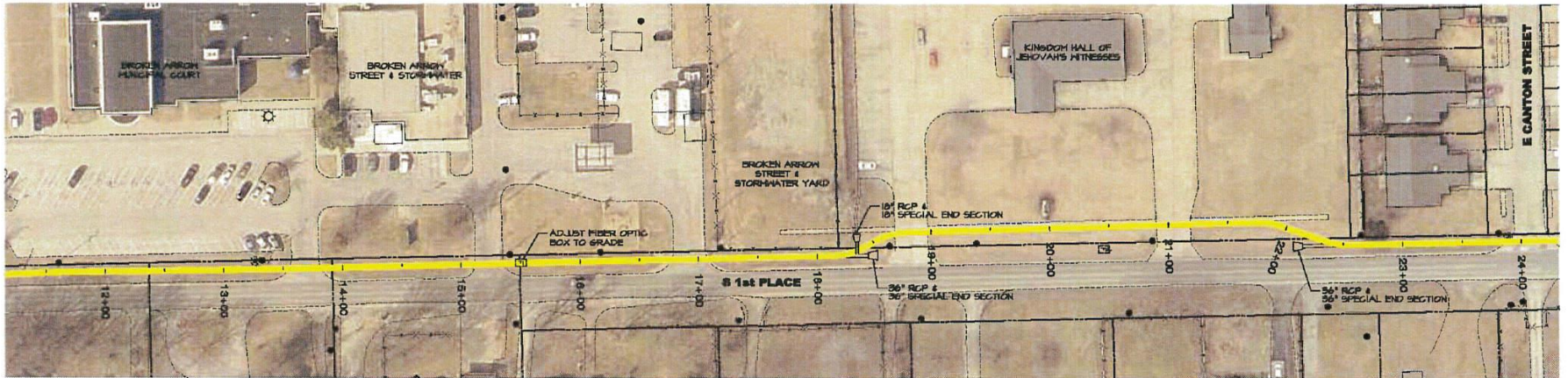
City of Broken Arrow - Phase 2 Broken Arrow Creek Trail  
**OVERALL PLAN SHEET**

**R.L. SHEARS COMPANY, P.C.**  
 Landscape Architects  
 1522 SOUTH CARSON AVENUE  
 SUITE 200 OKLAHOMA CITY, OK 73119  
 TEL: 918.582.0612 FAX: 918.582.0613  
 EMAIL: rlshears@rlshearsco.com





A



B

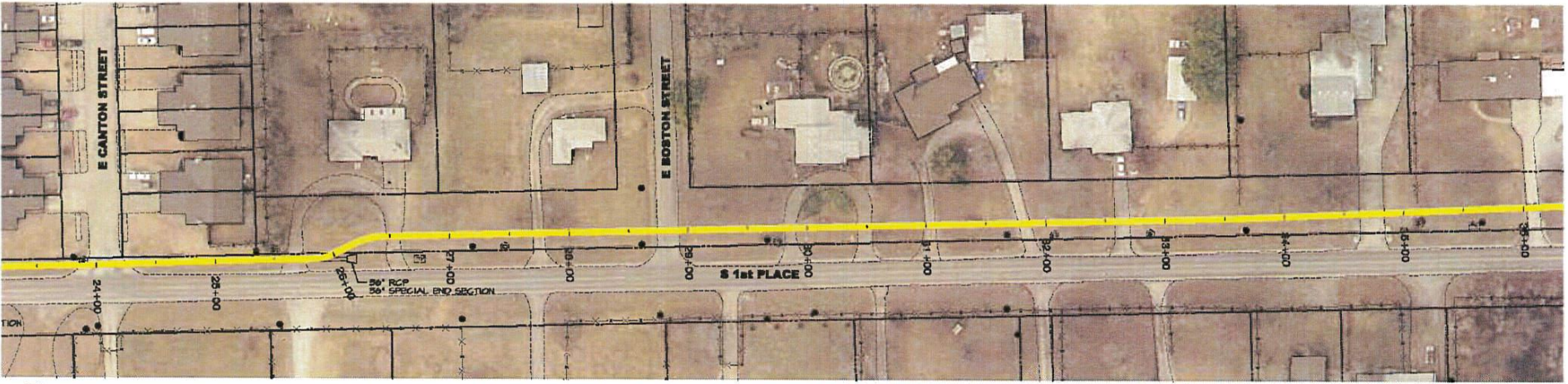


City of Broken Arrow - Phase 2 Broken Arrow Creek Trail

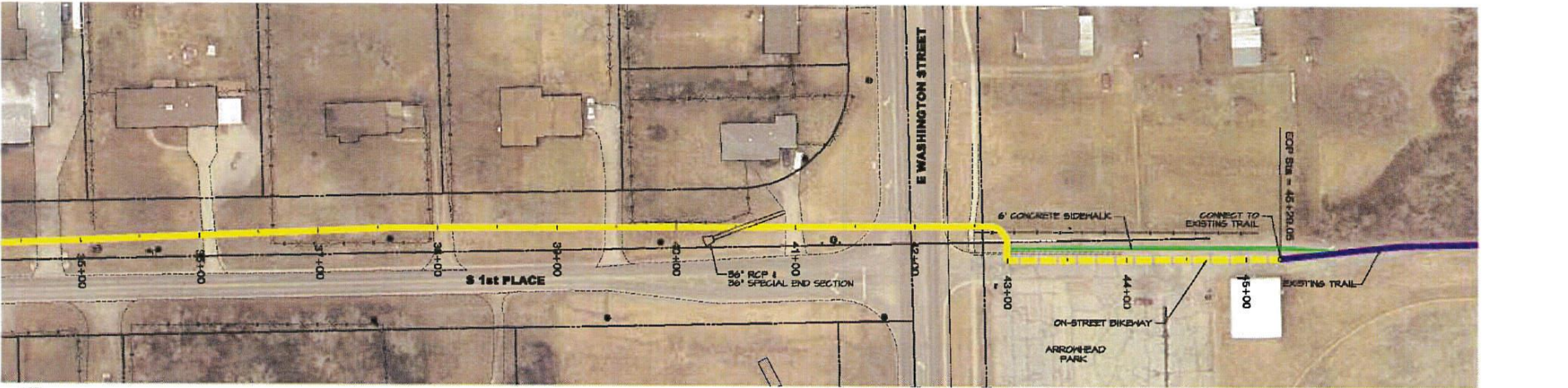
# PRIMARY ALIGNMENT - CONCEPTUAL PLAN SHEET 01



**R.L. SHEARS COMPANY, P.C.**  
 Landscape Architects  
 1117 SOUTH CAROLAN AVENUE  
 TULSA, OKLAHOMA 74106  
 TEL: 918.332.2512 FAX: 918.332.0512  
 EMAIL: rlshears@rlshears.com



A



B



City of Broken Arrow - Phase 2 Broken Arrow Creek Trail

**PRIMARY ALIGNMENT - CONCEPTUAL PLAN SHEET 02**

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 EMAIL: rlshears@rlshearsco.com







ENGINEER'S ESTIMATE  
BROKEN ARROW CREEK TRAIL PHASE 2 - PRIMARY ALIGNMENT  
09 SEPTEMBER 2015

ITEM #	SPEC NUMBER	ITEM DESCRIPTION	UNIT	QUAN.	UNIT PRICE	AMOUNT
	201 (B)	SELECTIVE CLEARING	LSUM	1	\$5,000.00	\$5,000.00
	202 (A)	UNCLASSIFIED EXCAVATION	CY	993	\$12.00	\$11,916.00
	202 (D)	UNCLASSIFIED BORROW	CY	4257	\$16.00	\$68,112.00
	221 (C)	TEMPORARY SILT FENCE	LF	4997	\$2.00	\$9,994.00
	230 (A)	BERMUDA GRASS SOLID SLAB SOD	SY	10237	\$2.00	\$20,474.00
	303 (A)	AGGREGATE BASE - TYPE A	CY	1181	\$42.00	\$49,602.00
	310 (B)	SUBGRADE METHOD B	SY	5003	\$1.75	\$8,755.25
	325	SEPARATOR FABRIC	SY	500	\$2.50	\$1,250.00
	326 (B)	GEOGRID REINFORCEMENT	SY	500	\$3.50	\$1,750.00
	411 (C)	ASPHALTIC CONCRETE TYPE C	TON	667	\$80.00	\$53,360.00
	414 (B)	ASPHALT CONCRETE PAVING - PAVEMENT REPAIR	SY	309	\$85.00	\$26,265.00
	601 (B)	TYPE I-A PLAIN RIPRAP 12"	TON	24	\$70.00	\$1,680.00
	601 (I)	FILTER FABRIC (RIPRAP)	SY	19	\$35.00	\$665.00
	609 (B)	COMBINED CURB AND GUTTER (6" BARRIER)	LF	1058	\$21.00	\$22,218.00
	610 (A)	5" CONCRETE PAVEMENT	SY	276	\$50.00	\$13,800.00
	610 (B)	6" CONCRETE DRIVEWAY H.E.S.	SY	943	\$75.00	\$70,725.00
	610 (I)	TACTILE WARNING DEVICE	SF	139	\$35.00	\$4,865.00
	611 (A)	MANHOLE 6' ID	EA	7	\$4,000.00	\$28,000.00
	611 (G)	INLET (CI DESIGN 1)	EA	4	\$4,600.00	\$18,400.00
	611 (H)	ADDITIONAL DEPTH INLET (CI DESIGN 1)	VF	6	\$400.00	\$2,400.00
	612 (A)	ADJUST FIBER OPTIC BOX TO GRADE	EA	2	\$1,000.00	\$2,000.00
	612 (A)	ADJUST WATER VALVE BOX TO GRADE	EA	4	\$350.00	\$1,400.00
	613 (A)	18" ROUND REINFORCED CONCRETE PIPE	LF	122	\$50.00	\$6,100.00
	613 (A)	36" ROUND REINFORCED CONCRETE PIPE	LF	1581	\$70.00	\$110,670.00
	613 (C)	18" SPECIAL END SECTION OF REINFORCED CONCRETE	EA	1	\$650.00	\$650.00
	613 (C)	36" SPECIAL END SECTION OF REINFORCED CONCRETE	EA	5	\$750.00	\$3,750.00
	619 (B)	REMOVAL OF CURB	LF	52	\$3.50	\$182.00
	619 (B)	REMOVAL OF DRIVEWAY	SY	663	\$12.00	\$7,956.00
	619 (B)	REMOVAL OF ROADWAY	SY	309	\$19.00	\$5,871.00
	622 (A)	PIPE RAILING (TGIC POLYESTER POWDER COAT)	LF	79	\$65.00	\$5,135.00
	625 (B)	REMOVE AND RECONSTRUCT FENCE	LF	268	\$22.00	\$5,896.00
	642 (B)	CONSTRUCTION STAKING LEVEL II	LSUM	1	\$9,500.00	\$9,500.00
	850 (A)	SHEET ALUMINUM SIGNS	SF	35	\$26.00	\$910.00
	851 (D)	FLANGE CHANNEL POST	LF	128	\$16.00	\$2,048.00
	854 (A)	TRAFFIC STRIPE (PAINT) (4" WIDE) (WHITE)	LF	130	\$1.00	\$130.00
	854 (A)	TRAFFIC STRIPE (PAINT) (4" WIDE)(YELLOW)	LF	1359	\$1.60	\$2,174.40
	855 (A)	TRAFFIC STRIPE (THERMOPLASTIC) (4" WIDE)(WHITE)	LF	2088	\$2.85	\$5,950.80
	855 (D)	TRAFFIC STRIPE (SYMBOLS)	EA	8	\$400.00	\$3,200.00
	880 (J)	CONSTRUCTION TRAFFIC CONTROL	LSUM	1	\$8,000.00	\$8,000.00
	SP	REMOVABLE BOLLARDS	EA	8	\$600.00	\$4,800.00
	SP	(PL) DOUBLE SIDED FIBERGLASS SIGN WITH FRAME	EA	2	\$3,000.00	\$6,000.00
	SP	JUMBO SPLIT RAIL FENCE	LF	320	\$20.00	\$6,400.00
	SP	PROJECT SIGN	EA	2	\$500.00	\$1,000.00
	SP	PREFABRICATED BRIDGE	LF	54	\$2,000.00	\$108,000.00
	641	MOBILIZATION	LSUM	1	\$21,658.63	\$21,658.63

**BASE SUB-TOTAL**     \$748,613.08  
 20% CONTINGENCY     \$149,722.62  
 SURVEY                 \$12,500.00  
 DESIGN                 \$93,576.64  
 INSPECTIONS         \$44,916.78  
 TESTING                 \$7,500.00  
**TOTAL**                 **\$1,056,829.12**



CITY OF BROKEN ARROW


PLAN OF THE PROPOSED

**BROKEN ARROW  
MAIN STREET BIKEWAY TAP FUNDING**

SHEET INDEX

SHEET	TITLE
0	TITLE SHEET
1	MAIN STREET BIKE LANE
2a	MAIN STREET BIKE LANE
2b-2d	E. RICHMOND STREET BIKE ROUTE
3-5	MAIN STREET BIKE LANE
10a-10e	E. MIDWAY STREET BIKE ROUTE
11	MAIN STREET TRANSITION STRIPING
12	TYPICAL BIKEWAY APPLICATIONS

LEGEND

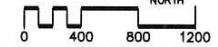
-  BIKE LANE
-  SHARE THE ROAD LANE
-  BIKE ROUTE



CITY OF BROKEN ARROW  
POPULATION 103,300  
ENTIRE PROJECT IS WITHIN THE CORPORATE  
AND URBAN LIMITS OF THE CITY OF BROKEN ARROW



**LANDPLAN  
CONSULTANTS  
INCORPORATED**  
1110 West 83rd  
Tulsa, OK 74107  
(918) 584-8464





BIKE LANES ARE MARKED WITH A BICYCLIST SYMBOL AND ARROW INDICATING DIRECTION OF TRAVEL



BUFFERED BIKE LANES PROVIDE GREATER SHY DISTANCE BETWEEN MOTOR VEHICLES AND BICYCLISTS



BIKE ROUTES ALERT DRIVERS THROUGH SIGNAGE LOCATED ALONG THE ROUTE



SHARED LANE MARKINGS INDICATE BICYCLISTS' PRESENCE TO DRIVERS AND APPROPRIATE PLACEMENT ON THE ROADWAY



COLORLED PAVEMENT WITHIN A BICYCLE LANE INCREASES THE VISIBILITY OF THE FACILITY, IDENTIFIES POTENTIAL AREAS OF CONFLICT, AND REINFORCES PRIORITY TO BICYCLISTS



BACK IN PARKING ADJACENT TO BIKE LANES PROVIDE CYCLISTS A SAFER LANE OF TRAVEL AND REDUCES CONFLICT PARKED CARS

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CONSULTANTS  
INC. A LECO GROUP COMPANY  
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Tulsa, OK 74107  
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Sheet:

BROKEN ARROW  
MAIN STREET BIKEWAY TAP  
FUNDING

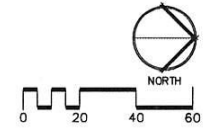
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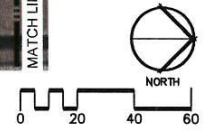
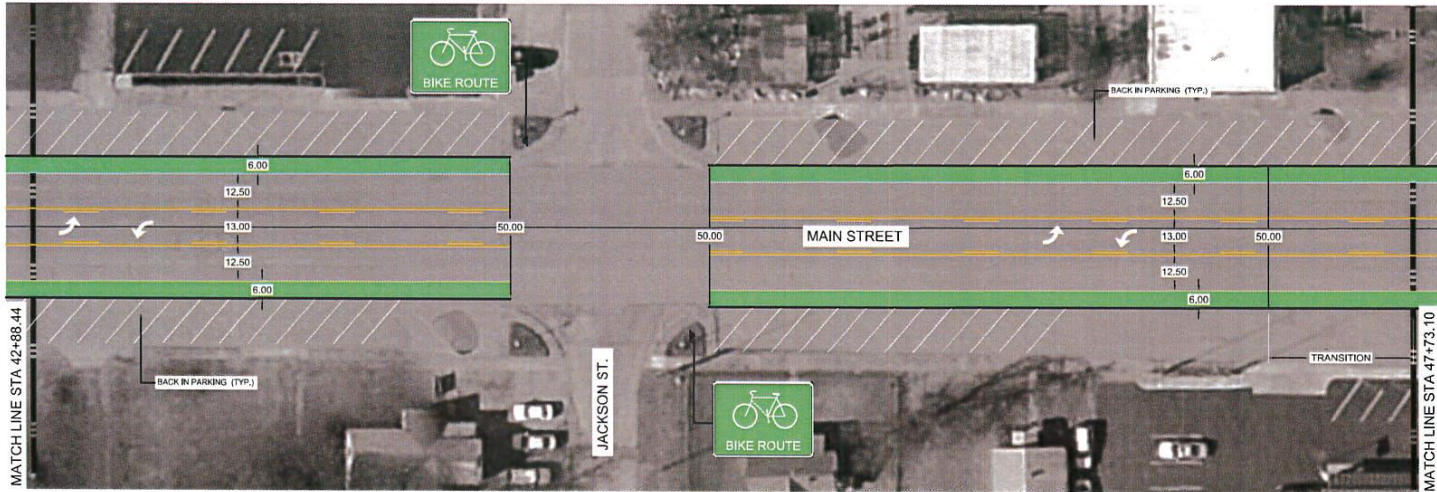
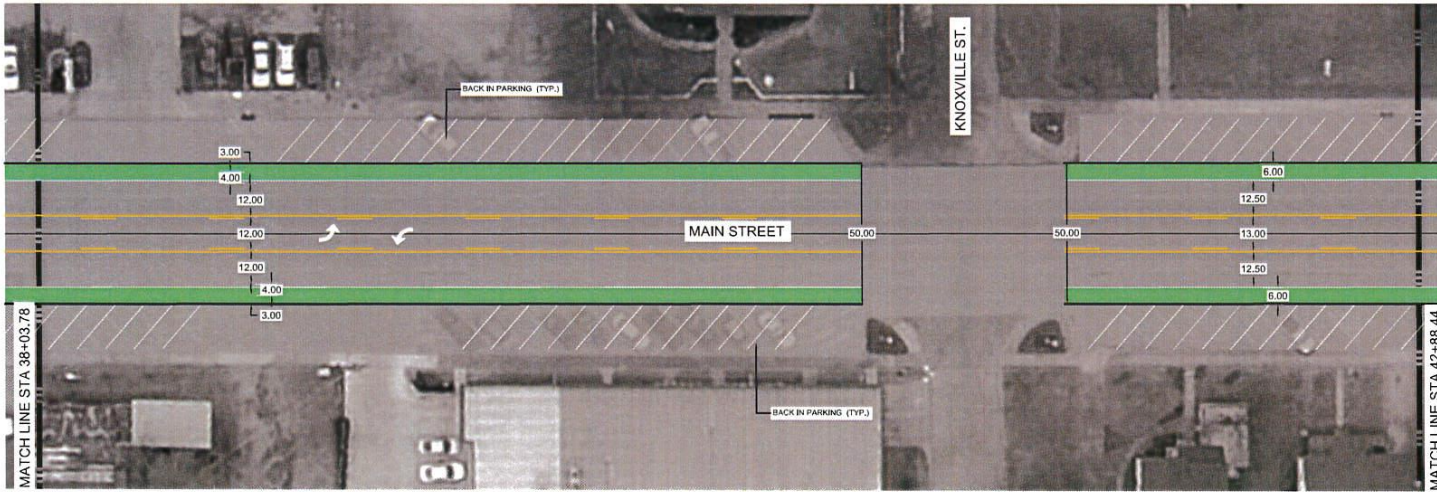

BROKEN ARROW  
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Design	MDH 4-6-18
Drawn	
Checked	
Approved	
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Sheet:  
Page 12 of 12





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Sheet:

# BROKEN ARROW MAIN STREET BIKEWAY TAP FUNDING

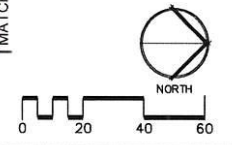
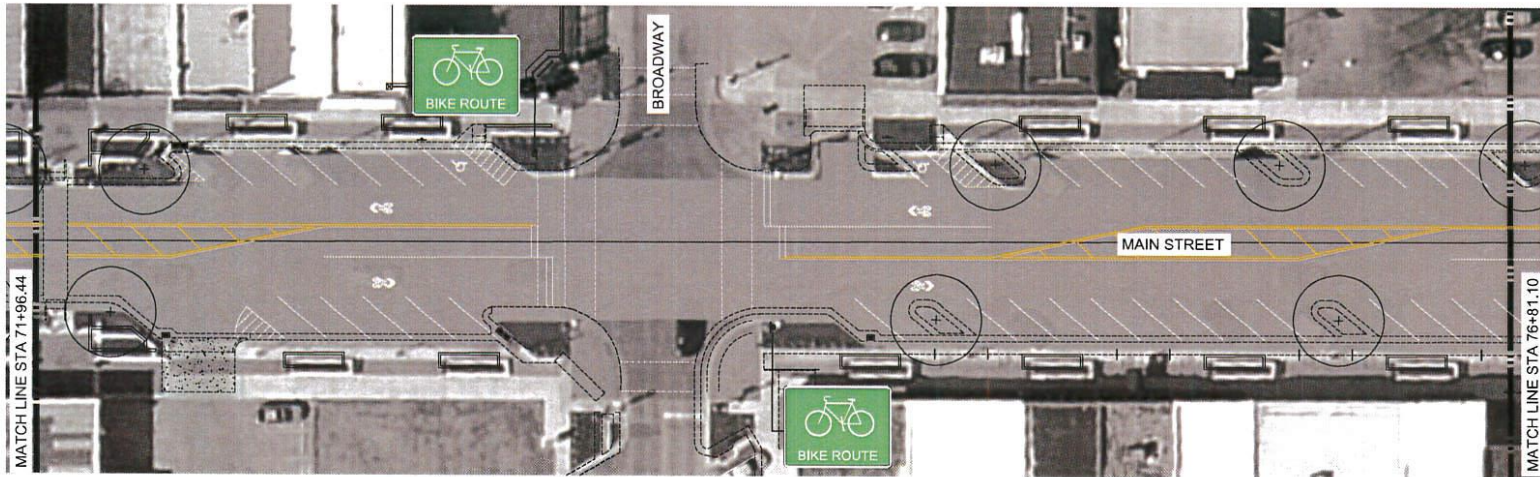
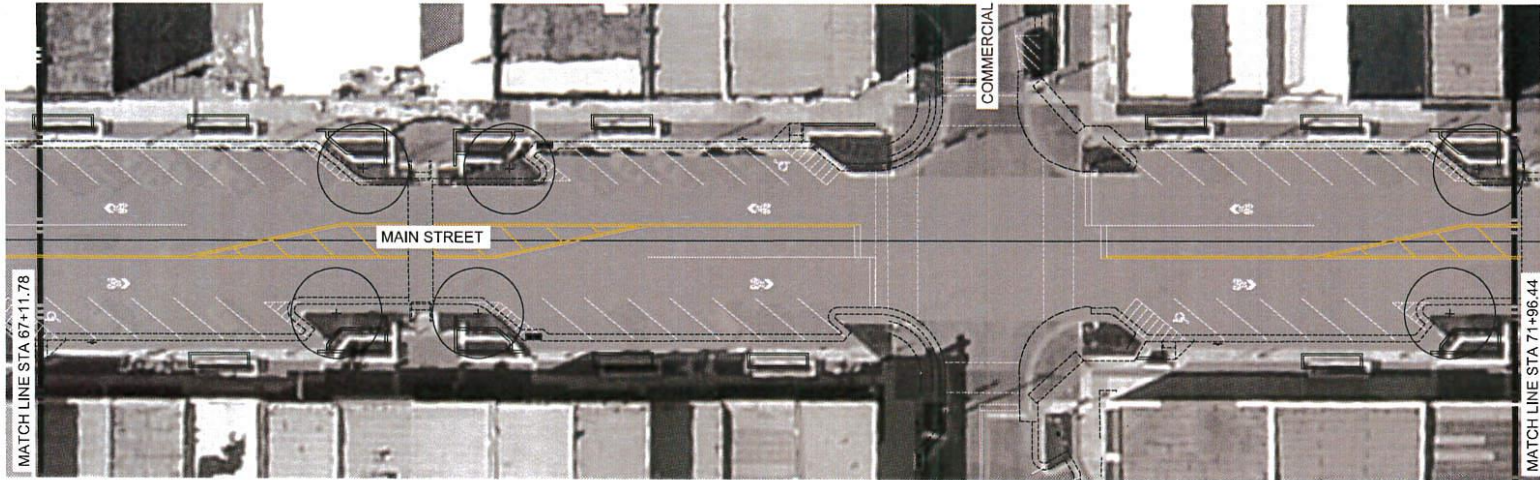
Revisions:




Design	MDH 4-6-16
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PROJECT NUMBER: 577	







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Sheet:

# BROKEN ARROW MAIN STREET BIKEWAY TAP

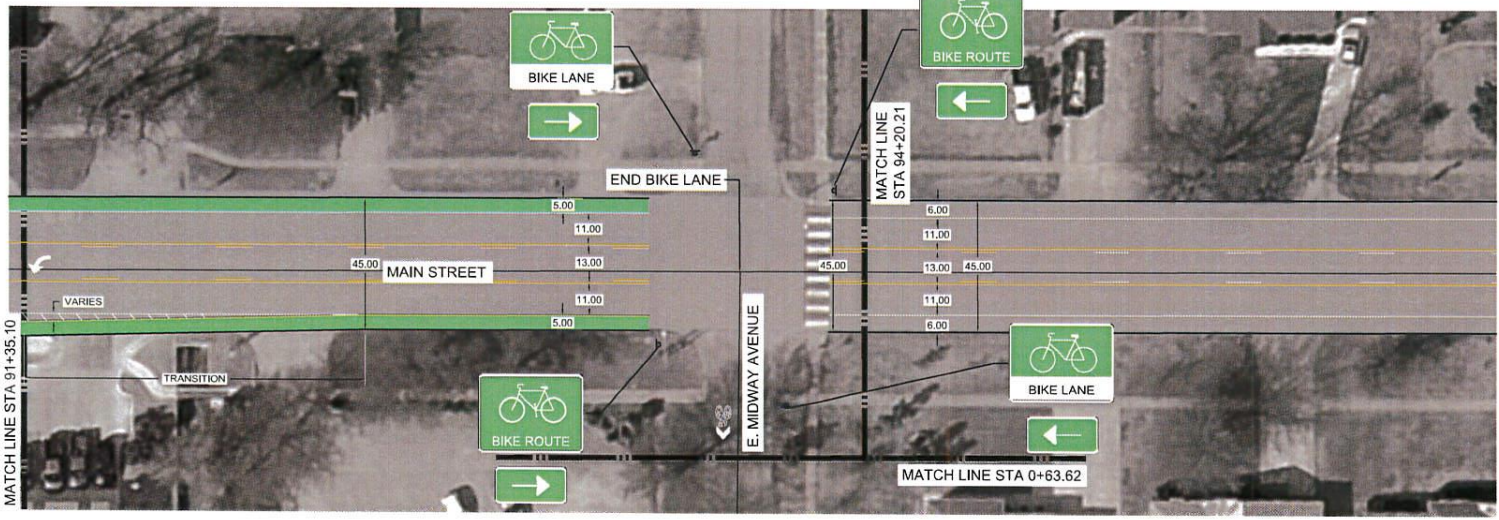
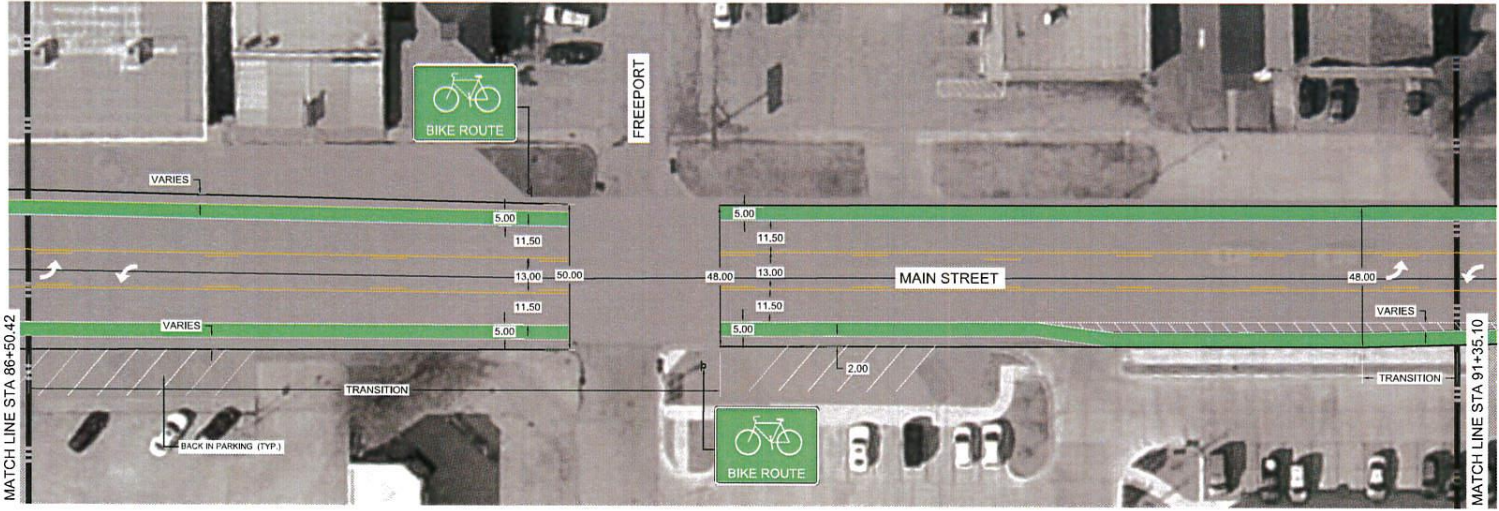
Revisions:

NO.	DATE	DESCRIPTION

DESIGN  
 DRAWN  
 CHECKED  
 APPROVED  
 PROJECT NO.



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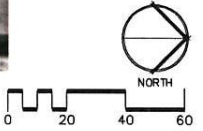
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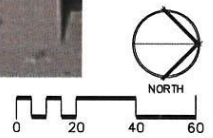
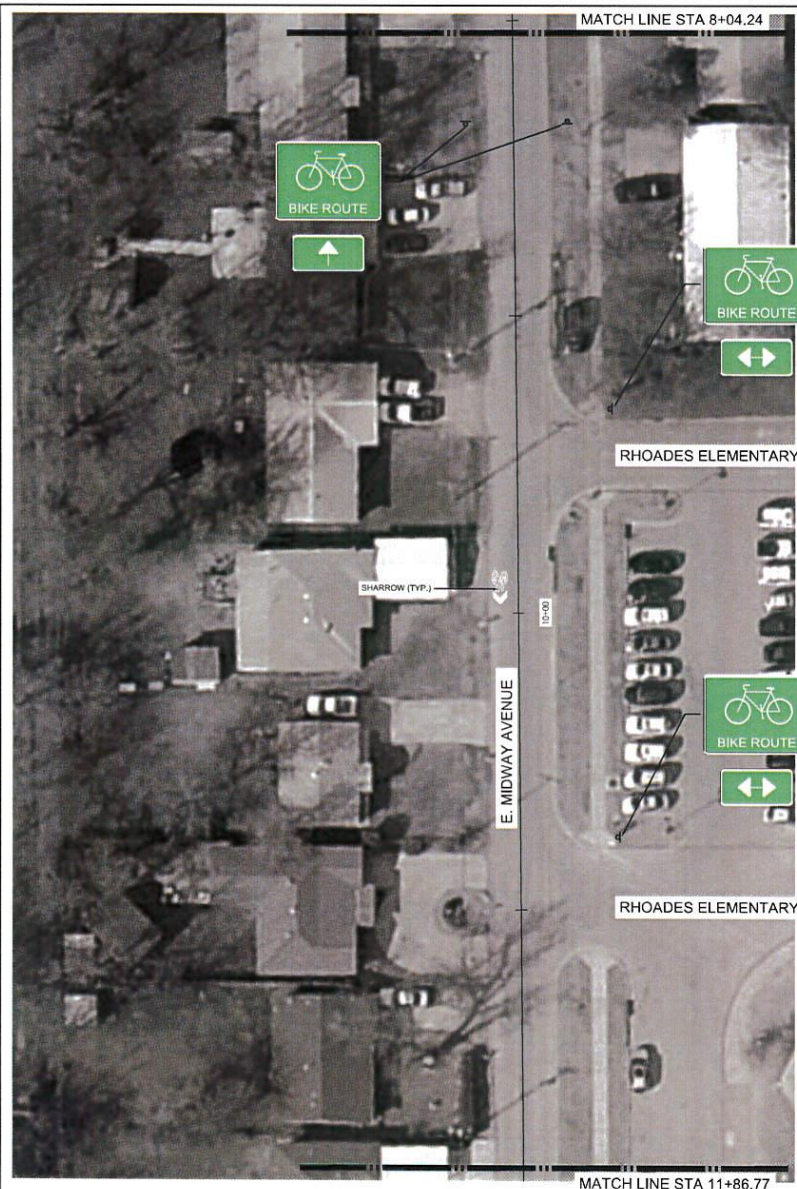
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**BROKEN ARROW  
 MAIN STREET BIKEWAY TAP  
 FUNDING**

Revisions:


**BROKEN ARROW**  
 DESIGN CONSULTANTS  
 Design: MDH 4-6-18  
 Drawn:   
 Checked:   
 Approved:   
 PROJECT NUMBER: 577





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# BROKEN ARROW MAIN STREET BIKEWAY TAP FUNDING

Revisions:


BROKEN ARROW  
 PROJECT NUMBER: 577

Design	MDH 4-6-18
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Checked	
Approved	
PROJECT NUMBER:	577





**DRAFT**  
**Broken Arrow Main Street Bikeway**  
 3/28/2016

Description	Units	Quantity	Cost / Unit	Price
TRAFFIC STRIPE (REMOVAL)	LF	38,500	\$1.00	\$38,500.00
TRAFFIC STRIPE (PLASTIC) (4" WIDE)	LF	29,000	\$2.00	\$58,000.00
TRAFFIC STRIPE (PLASTIC) (SYMBOLS)	EA	90	\$425.00	\$38,250.00
BIKE ROUTE AND SHARE THE ROAD SIGNAGE WITH POSTS	SF	165	\$64.89	\$10,706.85
MOBILIZATION	LS	1	\$4,363.71	\$4,363.71
			<b>5% Contingency</b>	\$7,491.03
			<b>Construction Subtotal</b>	\$157,311.58
			<b>Design</b>	\$19,663.95
			<b>Survey</b>	\$10,000.00
			<b>Geotech</b>	\$0.00
			<b>6% ODOT CA COST</b>	\$9,438.69
			<b>Total Cost</b>	<b>\$196,414.23</b>

**Midway Ave. Signed Route**

Description	Units	Quantity	Cost / Unit	Price
TRAFFIC STRIPE (PLASTIC) (SYMBOLS)	EA	7	\$425.00	\$2,975.00
BIKE ROUTE AND SHARE THE ROAD SIGNAGE WITH POSTS	SF	96	\$64.89	\$6,229.44
MOBILIZATION	LS	1	\$276.13	\$276.13
			<b>5% Contingency</b>	\$474.03
			<b>Construction Subtotal</b>	\$9,954.60
			<b>Design</b>	\$1,244.33
			<b>Survey</b>	\$3,500.00
			<b>Geotech</b>	\$0.00
			<b>6% ODOT CA COST</b>	\$597.28
			<b>Total Cost</b>	<b>\$15,296.20</b>

**Richmond Street Signed Route**

Description	Units	Quantity	Cost / Unit	Price
TRAFFIC STRIPE (PLASTIC) (SYMBOLS)	EA	7	\$425.00	\$2,975.00
BIKE ROUTE AND SHARE THE ROAD SIGNAGE WITH POSTS	SF	75	\$64.89	\$4,866.75
MOBILIZATION	LS	1	\$235.25	\$235.25
			<b>5% Contingency</b>	\$403.85
			<b>Construction Subtotal</b>	\$8,480.85
			<b>Design</b>	\$1,060.11
			<b>Survey</b>	\$3,500.00
			<b>Geotech</b>	\$0.00
			<b>6% ODOT CA COST</b>	\$508.85
			<b>Total Cost</b>	<b>\$13,549.81</b>

**Arrowhead Park Trail**

Description	Units	Quantity	Cost / Unit	Price
2" ASPHALT OVERLAY	TON	477	\$110.00	\$52,520.16
STAKING	LS	1	\$3,000.00	\$3,000.00
MOBILIZATION	LS	1	\$1,665.60	\$1,665.60
			<b>5% Contingency</b>	\$2,859.29
			<b>Construction Subtotal</b>	\$60,045.05
			<b>Design</b>	\$7,505.63
			<b>Survey</b>	\$3,500.00
			<b>Geotech</b>	\$0.00
			<b>6% ODOT CA COST</b>	\$3,602.70
			<b>Total Cost</b>	<b>\$74,653.39</b>

**Combined Total Cost            \$299,913.63**