

Mass Transit Study

April 30, 2007

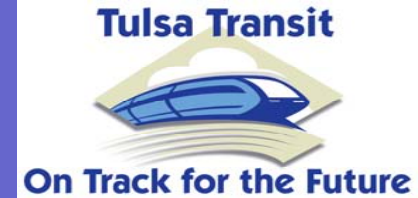
Tulsa Transit



On Track for the Future

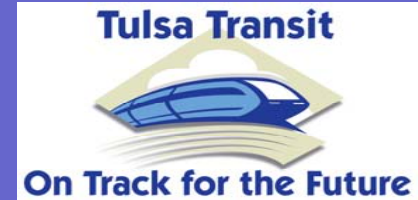
Broken Arrow / Tulsa Mass Transit Feasibility Study

Briefing Agenda



- Feasibility Overview
- Equipment
- Stations
- Ridership
- Capital Costs
- Operating Costs
- Next Steps

Overview



Two mass transit options were considered for the Broken Arrow/Tulsa transportation corridor:

- 1) Commuter Rail
- 2) Bus Rapid Transit (BRT)

Both Options are Feasible.

What is Bus Rapid Transit?



- **The Federal Transit Administration** broadly defines Bus Rapid Transit (BRT) as “combining the quality of rail transit and the flexibility of buses.
- **BRT** can operate on exclusive transit ways, HOV lanes, expressways, or ordinary streets.

- **TECHNOLOGY**

Vehicles – Streamlined features, high capacity, distinctive color schemes, and low-emission diesel or natural gas engines.

Intelligent Transportation Systems (ITS) –Automatic Vehicle Locators (AVL) display real-time information on expected bus arrival times.

Traffic Management Improvements –Signal Light Preemption, curb cuts, and wider lanes at bus stops.

Faster Boarding – Pre-boarding fare collection machines, low-floor buses, and better handicap access.

BRT Vehicles



Commuter Rail Vehicles



Push-Pull Technology



Diesel Multiple Units (DMU)



Potential Station Locations

Commuter Rail



● Commuter Rail Stations

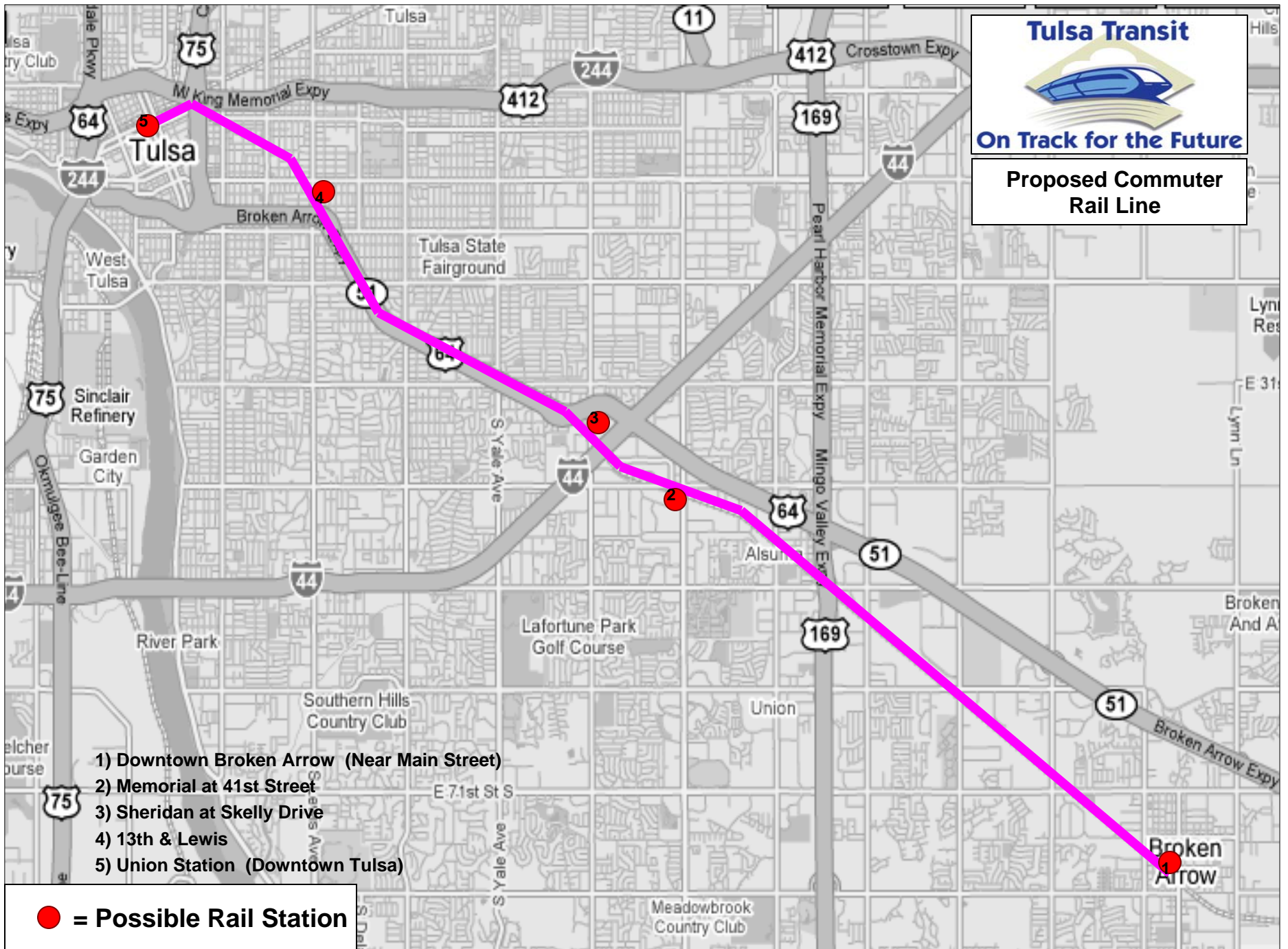
- Downtown Broken Arrow (Near Main Street)
- Memorial at 41st Street
- Sheridan at Skelly Drive
- 13th & Lewis
- Union Station (Downtown Tulsa)

Tulsa Transit



On Track for the Future

**Proposed Commuter
Rail Line**



- 1) Downtown Broken Arrow (Near Main Street)
- 2) Memorial at 41st Street
- 3) Sheridan at Skelly Drive
- 4) 13th & Lewis
- 5) Union Station (Downtown Tulsa)

● = Possible Rail Station

Potential Station Locations

BRT

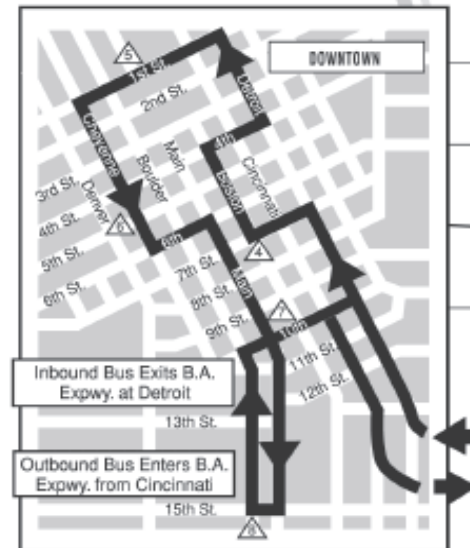


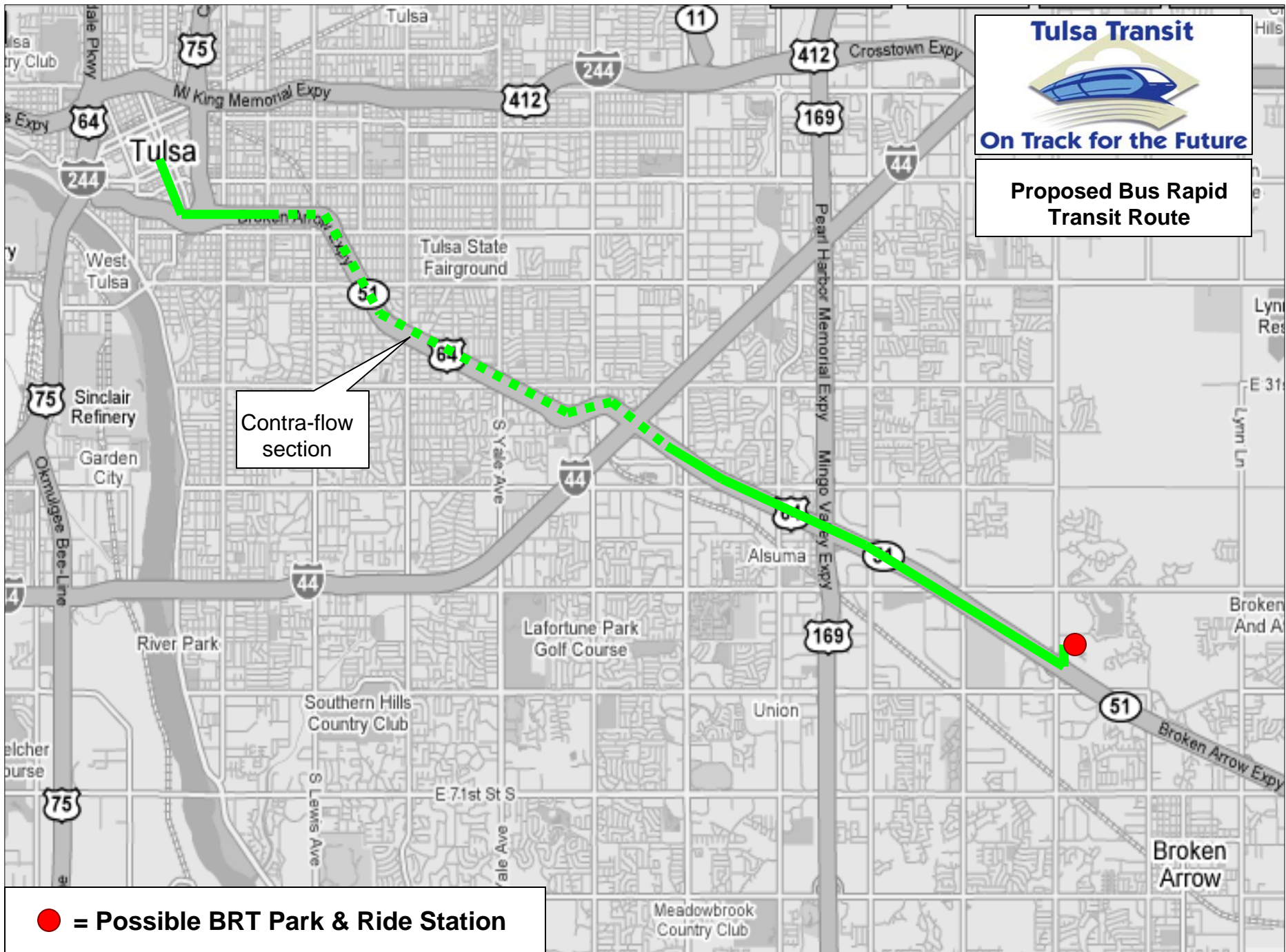
- **Park & Ride Station**

- 145th E. Ave. & Broken Arrow Expressway

- **Downtown Tulsa Stops**

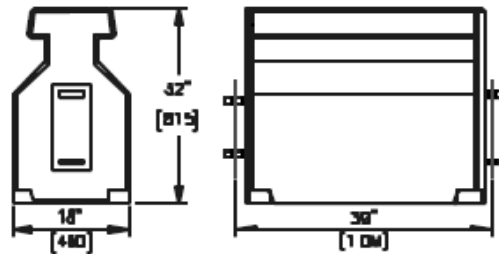
- 7th & Boston
- 1st & Main
- 5th & Cheyenne
- 10th & Main
- 15th & Boulder





BRT Contra-Flow Lanes

- Installation of Movable Barriers



Ridership Projection

Commuter Rail



Two approaches were employed:

- 1) The first looked at 21 cities with similar populations and route miles.* This was paired down to eliminate cities with denser populations.
- 2) The second look is based on a regression model developed by Arizona State University (ASU) Department of Geography, using variables as follows: population density around each station, employment, percent of renters, number of park & ride spaces, number of connections to bus, and climate.

* American Public Transportation (APTA) Statistics

Initial Ridership 2010



Estimated Commuter Rail Ridership 2010

2010 Ridership Forecasts	Low Range			High Range		
	Annual Trips	Weekly Trips	Weekday Trips	Annual Trips	Weekly Trips	Weekday Trips
Broken Arrow	105,267	2,024	357	449,904	8,652	1,527
Memorial	160,813	3,092	546	687,300	13,217	2,332
Sheridan	157,586	3,030	535	673,507	12,952	2,386
Lewis	189,673	3,647	644	810,647	15,589	2,751
Tulsa (Downtown)	133,753	2,572	454	571,650	10,993	1,940
Total w/Sheridan	586,279	11,274	1,990	2,505,708	48,187	8,504
Total w/Memorial	589,506	11,336	2,001	2,519,501	48,451	8,560

Based on employment and population nearby, parking, bus connections, climate, system geometry, and renters (as proxy for income)

Adjusted due to limited schedule

These numbers do not take into account any improvements to the BA Expressway with regards to lane miles or LOS improvements.

These numbers do not reflect potential population density increases due to the establishment of permanent passenger rail facilities.

Potential Ridership 2030



Potential Estimated Commuter Rail Ridership 2030

2030 Ridership Forecasts	Low Range			High Range		
	Annual Trips	Weekly Trips	Weekday Trips	Annual Trips	Weekly Trips	Weekday Trips
Broken Arrow	355,559	6,838	1,206	766,547	14,741	2,601
Memorial	492,917	9,479	1,673	1,062,556	20,434	3,606
Sheridan	503,656	9,868	1,709	1,085,706	20,879	3,685
Lewis	607,768	11,688	2,063	1,310,135	25,195	4,446
Tulsa (Downtown)	459,308	8,833	1,559	990,108	19,041	3,360
Total w/Sheridan	1,926,291	37,044	6,544	4,132,496	79,471	14,040
Total w/Memorial	1,915,552	36,837	6,508	4,152,496	79,855	14,108

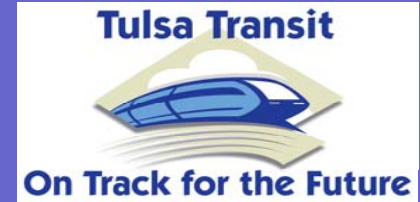
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ASU Model Ridership

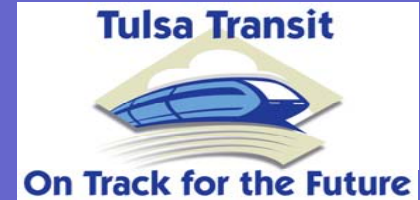


Estimated Commuter Rail Ridership per ASU model

ASU Model	2010 Projections			2030 Projections		
	Annual Trips	Weekly Trips	Weekday Trips	Annual Trips	Weekly Trips	Weekday Trips
Broken Arrow	122,200	2,350	470	228,020	4,385	877
Memorial	141,180	2,715	543	249,080	4,790	958
Sheridan	164,840	3,170	634	287,300	5,525	1,105
Lewis	170,040	3,270	654	261,300	5,025	1,005
Tulsa (Downtown)	191,620	3,685	737	602,680	11,590	2,318
Total w/Sheridan	648,700	12,475	2,495	1,379,300	26,525	5,305
Total w/Memorial	625,040	12,020	2,404	1,133,080	21,790	4,358

Ridership Projection

BRT

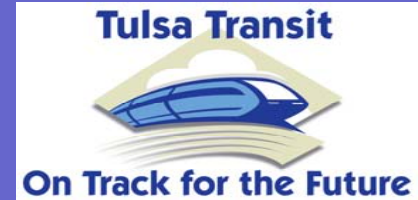


Estimated BRT Ridership

	2006 Ridership	2010 Ridership	2030 Ridership	2010 Ridership w/ fixed route connections	2030 ridership w/ fixed route connections
Annual Trips	26,594	48,360	64,220	58,507	70,208
Weekly Trips	511	930	1,235	1,125	1,350
Weekday Trips	102	186	247	225	270
Combined Percent Increase Population + BRT	0	81.8	32.8	120	20

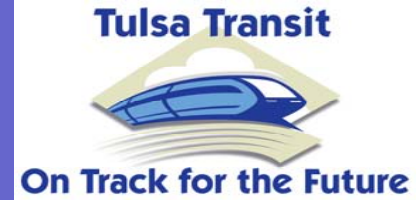
Transit Agency and Corridor	Percent Increase in Ridership Levels	Percent Increase in choice Riders
AC Transit – 72R	66	32
LA MTA Wilshire/Whittier Ventura	42 27	67 67
Boston MBTA – Silver Line	84	
Las Vegas RTC - MAX	>35-40	24
Phoenix Rapid	N/A	33

Rail Capital Costs



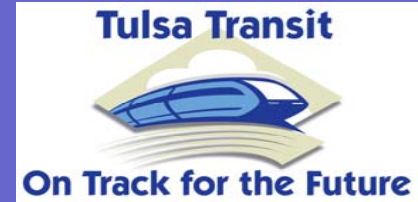
<u>Push-Pull Locomotive</u>	<u>Option 1</u> (with Sheridan Station)	<u>Option 2</u> (with Memorial Station)
Track Improvements	\$ 1,884,900	\$ 1,884,900
Signal & Systems Costs	11,540,000	11,540,000
Yard & Inspection Costs	5,667,800	5,667,800
Station Construction Costs	9,085,500	13,241,200
Soft Costs	5,242,000	5,242,000
Train Equipment Costs	10,000,000	10,000,000
Total Cost	43,420,200	47,575,900
<u>DMU</u>	<u>Option 1</u> (with Sheridan Station)	<u>Option 2</u> (with Memorial Station)
Track Improvements	\$ 1,884,900	\$ 1,884,900
Signal & Systems Costs	11,540,000	11,540,000
Yard & Inspection Costs	5,667,800	5,667,800
Station Construction Costs	9,085,500	13,241,200
Soft Costs	5,242,000	5,242,000
Train Equipment Costs	11,600,000	11,600,000
Total Cost	45,020,200	49,175,900

BRT Capital Costs



BRT	<u>Option 1</u> (existing vehicles)	<u>Option 2</u> (new BRT vehicles)
HOV Guideway Costs	\$ 70,400	\$ 70,400
Contra-Flow Guideway Costs	15,373,900	15,373,900
Park & Ride Facility	2,994,900	2,994,900
Downtown BRT Stops		480,000
Soft Costs	2,823,500	2,823,500
60' Articulated Buses (2)	-	1,700,000
Total Cost	21,262,700	23,442,700

Annual Operating Costs



Commuter Rail

BRT

Method 1

Operating & Maintenance Cost Summary	
Item	Annual Costs
Train Crews	\$500,000
Fuel & Maintenance	\$192,374
Maintenance of Way	\$157,976
Sales and Marketing	\$63,700
<i>Subtotal</i>	\$930,000
General Administrative	\$186,000
<i>Subtotal</i>	\$1,116,000
Insurance*	\$2,000,000
<i>Totals</i>	\$3,116,000

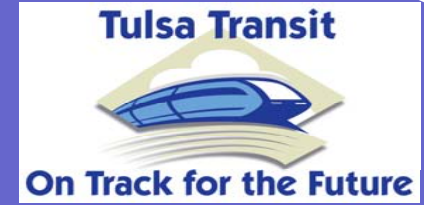
Method 2

	Vehicle Hours	Vehicle Miles
Weekdays	1,330	33,904
Unit Costs	\$1,900	\$98.00
Annual Costs	\$2,527,000	\$3,322,592
Average	\$2,924,796	

	Vehicle Hours	Vehicle Miles
Weekdays	1,083	109,908
Unit Costs	\$1,724	\$1.85
Annual Costs	\$1,867,092	\$2,033,298
Average	\$1,950,195	

* The \$2,000,000 in annual insurance premium does not take into account the Oklahoma Tort Claims Act, which limits the liability of Oklahoma governmental entities with regard to 3rd party claims.

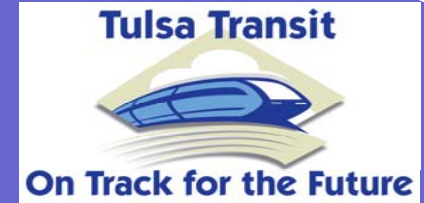
Potential Economic Impact (TOD)



Plano, Texas



Potential Economic Impact (TOD)



Mockingbird Station
Dallas, Tx.

Next Steps



Phase 1 Organizational Phase – Determine what organization will take the lead on this project.

Phase 2 Alternative Analysis / Environmental Phase – Determine eligibility for federal funding and any environmental issues.

Phase 3 Design Phase - Complete the system design and contract with UP.

Phase 4 Construction & Procurement – Begin construction and purchase equipment.

Phase 5 Testing & Start-up – Test equipment and guide way.

Phase 6 Revenue Service – Begin transporting customers.

QUESTIONS

Tulsa Transit



On Track for the Future

<http://tulsatransit.org/news-info/commuter-rail-study/>