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outreach center of the
school of architecture

May 21, 2007

Dear Northwest Arkansas:

We hope that you will enjoy reviewing the following study on rail transit as much as our architecture programs at the University of Arkansas and Washington University in St. Louis have enjoyed speculating on the various planning possibilities. Our research shows that Northwest Arkansas (NWA) would be an ideal candidate for federal funding to study rail transit feasibility.

Some say that the idea of rail transit in NWA is outlandish: that folks here would never leave their cars to ride trains. Similar observations were voiced about nearby Dallas more than two decades ago. Now its rail transit system, DART, is considered to be one of the finest nationwide. Over the past ten years alone, DART has generated more than $1 billion in mixed-use, high quality urban development—much of it unexpected. Now, the planning industry understands that well-planned rail transit not only mitigates seemingly intractable traffic problems, but also promotes desirable economic development. Indeed, over 60 regions, large and small, participate in the federal “New Start” program, obtaining assistance for rail transit development. Will lack of planning foresight compromise the economic sustainability of NWA when compared to peer regions?

Others in leadership positions will contend that while rail transit is a good idea, it is not yet feasible for NWA. However, the traditional calculus of feasibility for rail transit has changed as less populated regions are making rail transit work. As a growing region (with the population doubling in only 15 years), we must keep in mind that NWA was historically a rail transit region. Future trends indicate that the smart money will reward those regions that have developed “green” energy systems and efficient transportation. Since Arkansas is a leader in the logistics industry why not shift traffic demand from highways to a resuscitated rail asset, opening more highway capacity to trucking without costly new road construction?

This book, however, is not just about enhancing transportation networks, but more importantly, imagining new development forms, links, and variations on life in NWA. The greatest challenge is the cultivation of imaginative political and business leadership willing to “future” different development scenarios for our region. Enjoy the book NWA, and consider a future where we could become a national model for smart growth.

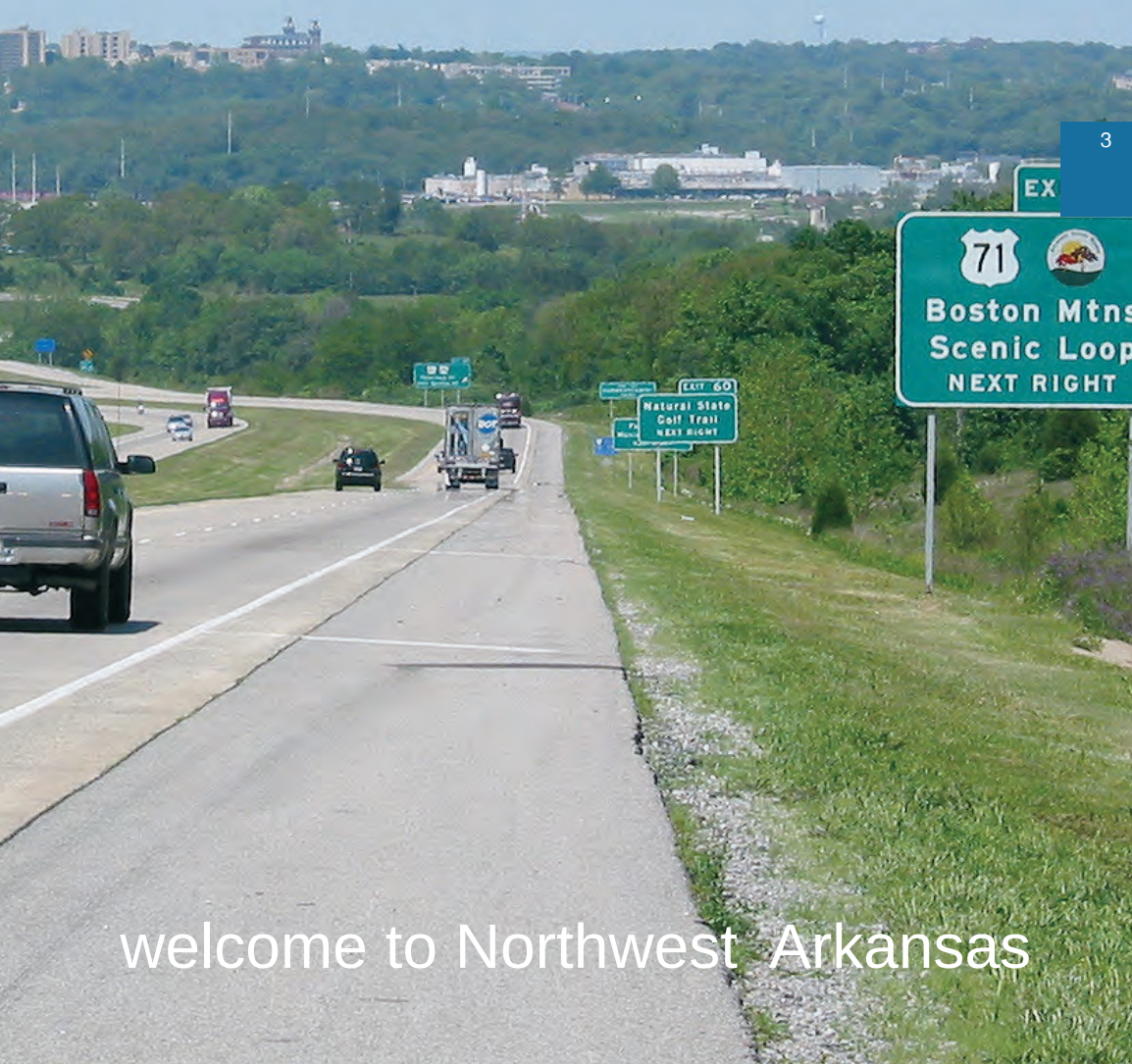
Sincerely,
The Rail Transit Design Studio

“The new mobility culture considers not only transit but also health, education, housing, waste, and social needs. No transportation system is an island; it must coordinate all shared systems for maximum effect.”

Bruce Mau, *et al.*, *Massive Change*

“We cannot talk about urban transport until we know what type of city we want. How do we want to live? Do we want to create a city for humans or a city for automobiles? The important questions are not about engineering, but about ways to live.”

Enrique Penalosa, former Mayor of Bogota, Colombia in *Massive Change*

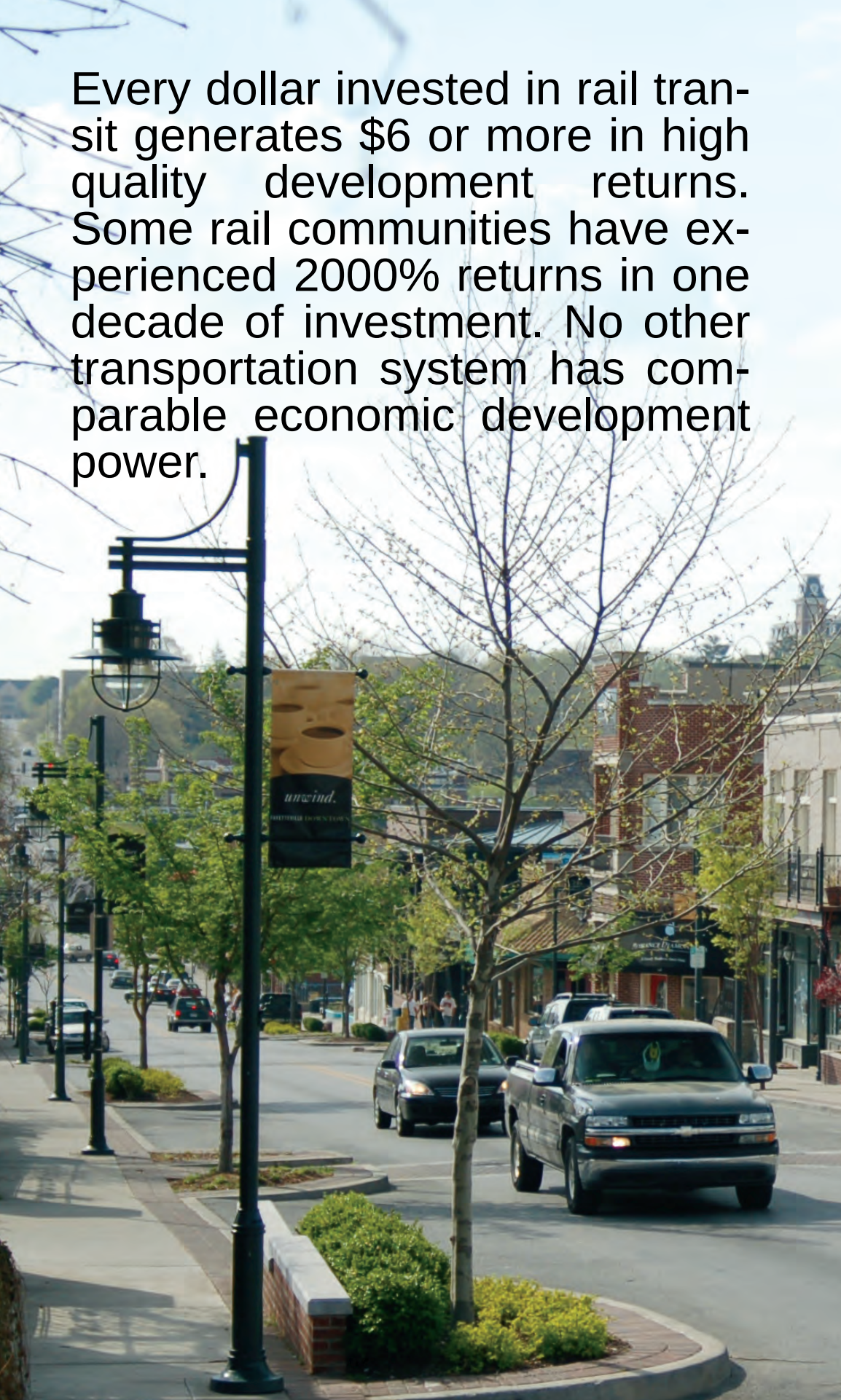


welcome to Northwest Arkansas

Man now moves more material around than atmospheric, geological, and oceanic forces combined, placing tremendous stress on the environment. Land use and transportation are the city's metabolic regulators and its most pressing sustainability issues, arguably of greater urgency than improving energy efficiency in product, automobile, and building design.

Trends indicate that the smart investment capital will reward regions that have developed “green” energy systems, efficient multimodal transportation, and innovative urban places.

Every dollar invested in rail transit generates $6 or more in high quality development returns. Some rail communities have experienced 2000% returns in one decade of investment. No other transportation system has comparable economic development power.

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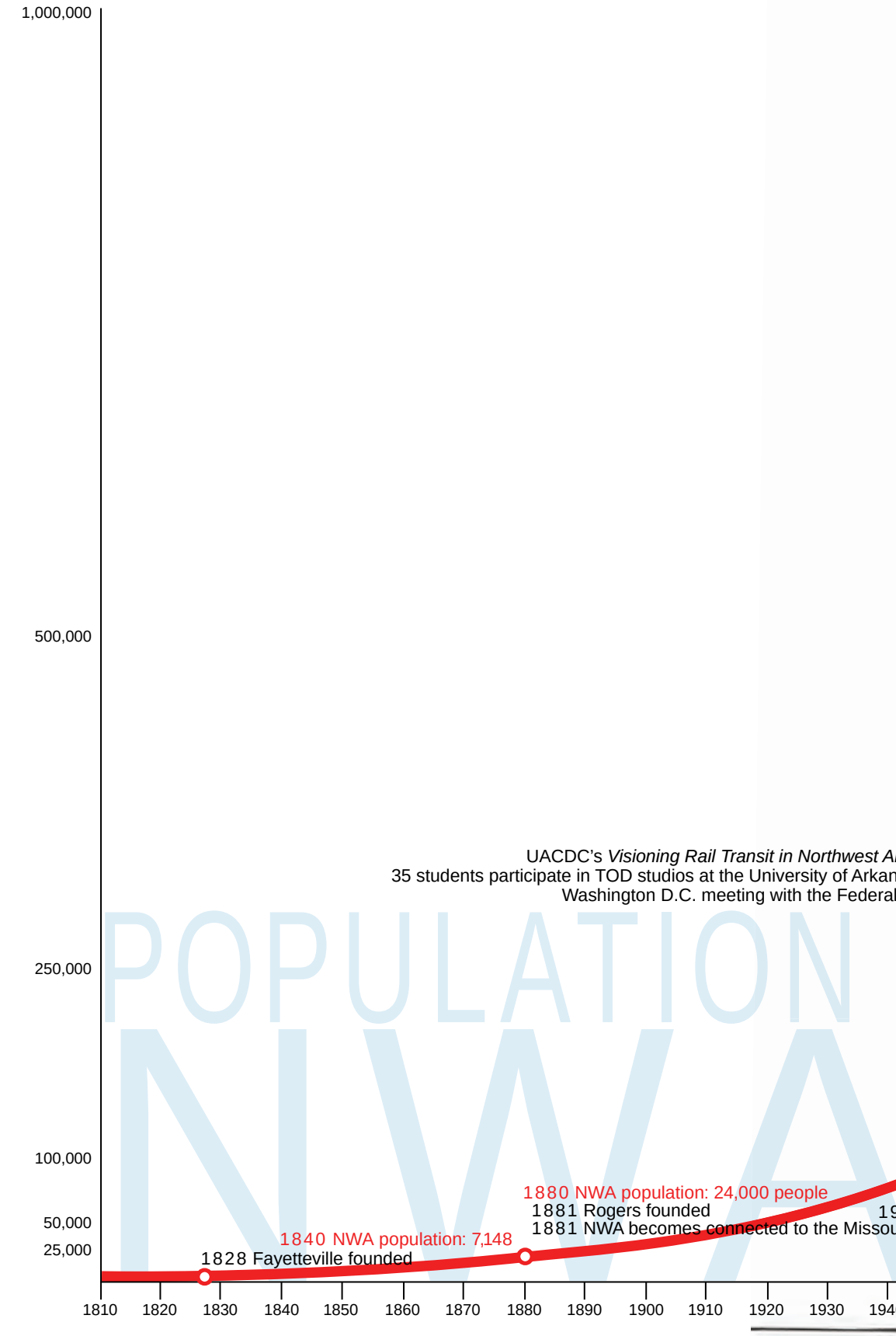
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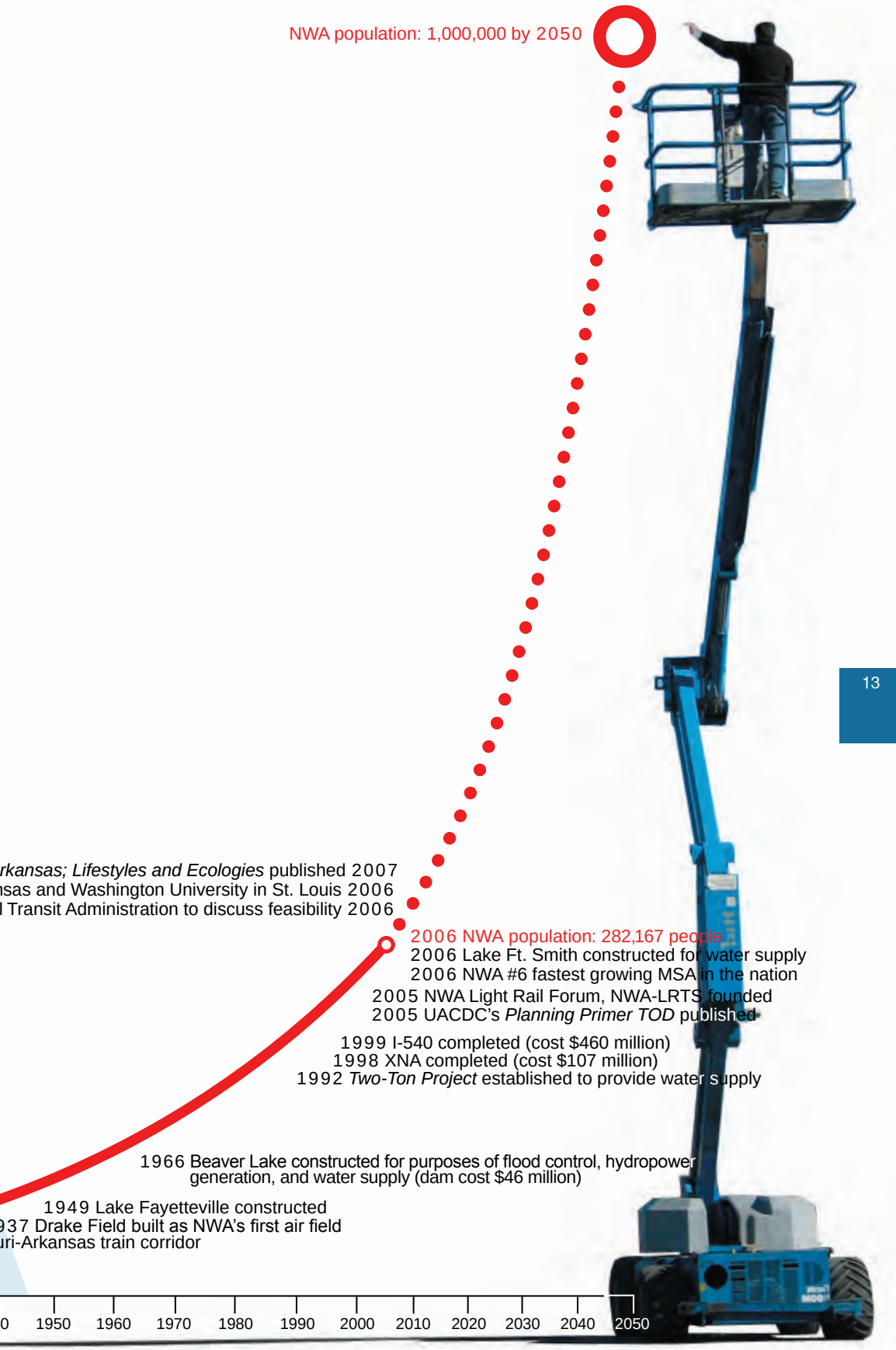
1810
1820
1830
1840
1850
1860
1870
1880
1890
1900
1910
1920
1930
1828 Fayetteville founded
1840 NWA population: 7,148
1880 NWA population: 24,000 people
1881 Rogers founded
1881 NWA becomes connected to the Missou
UACDC's Visioning Rail Transit in Northwest A
35 students participate in TOD studios at the University of Arkan
Washington D.C. meeting with the Federal
POPULATION
NWA


NWA population: 1,000,000 by 2050
rkansas; Lifestyles and Ecologies published 2007
nsas and Washington University in St. Louis 2006
l Transit Administration to discuss feasibility 2006
2006 NWA population: 282,167 people
2006 Lake Ft. Smith constructed for water supply
2006 NWA #6 fastest growing MSA in the nation
2005 NWA Light Rail Forum, NWA-LRTS founded
2005 UACDC's Planning Primer TOD published
1999 I-540 completed (cost $460 million)
1998 XNA completed (cost $107 million)
1992 Two-Ton Project established to provide water supply
1966 Beaver Lake constructed for purposes of flood control, hydropower generation, and water supply (dam cost $46 million)
1949 Lake Fayetteville constructed
937 Drake Field built as NWA's first air field
uri-Arkansas train corridor
0
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050

25,000

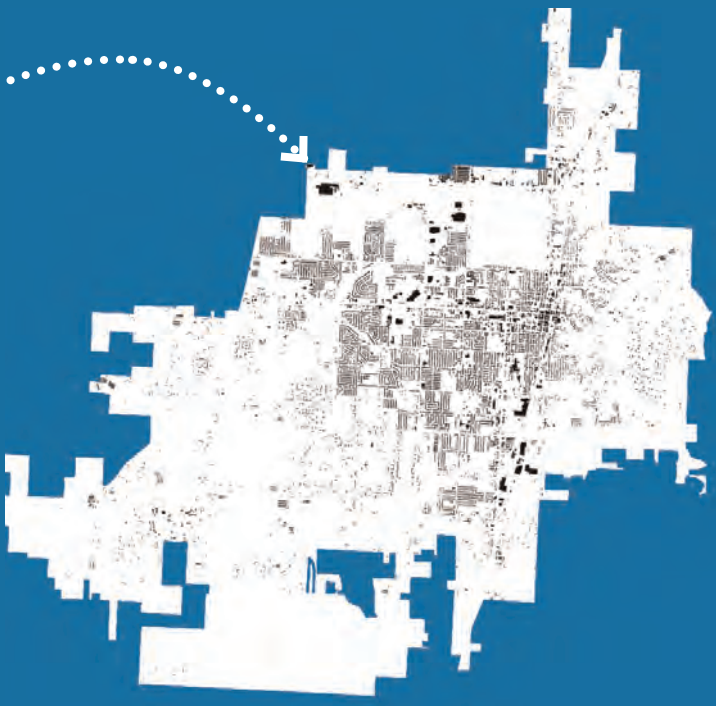
4 units / acre

Bentonville will double its population

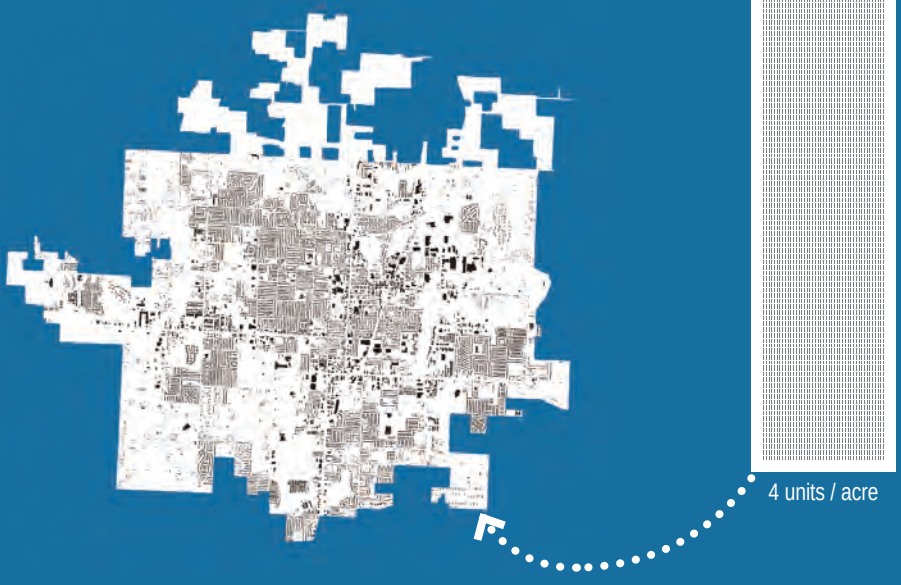
2050: projected

35,500

4 units / acre



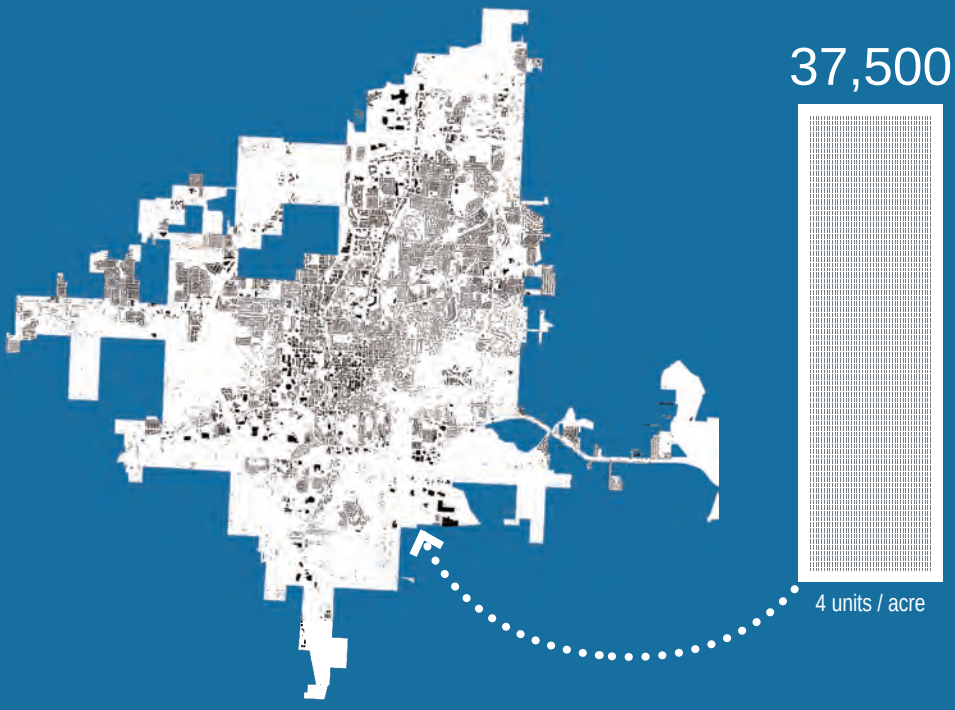
Rogers will triple its population



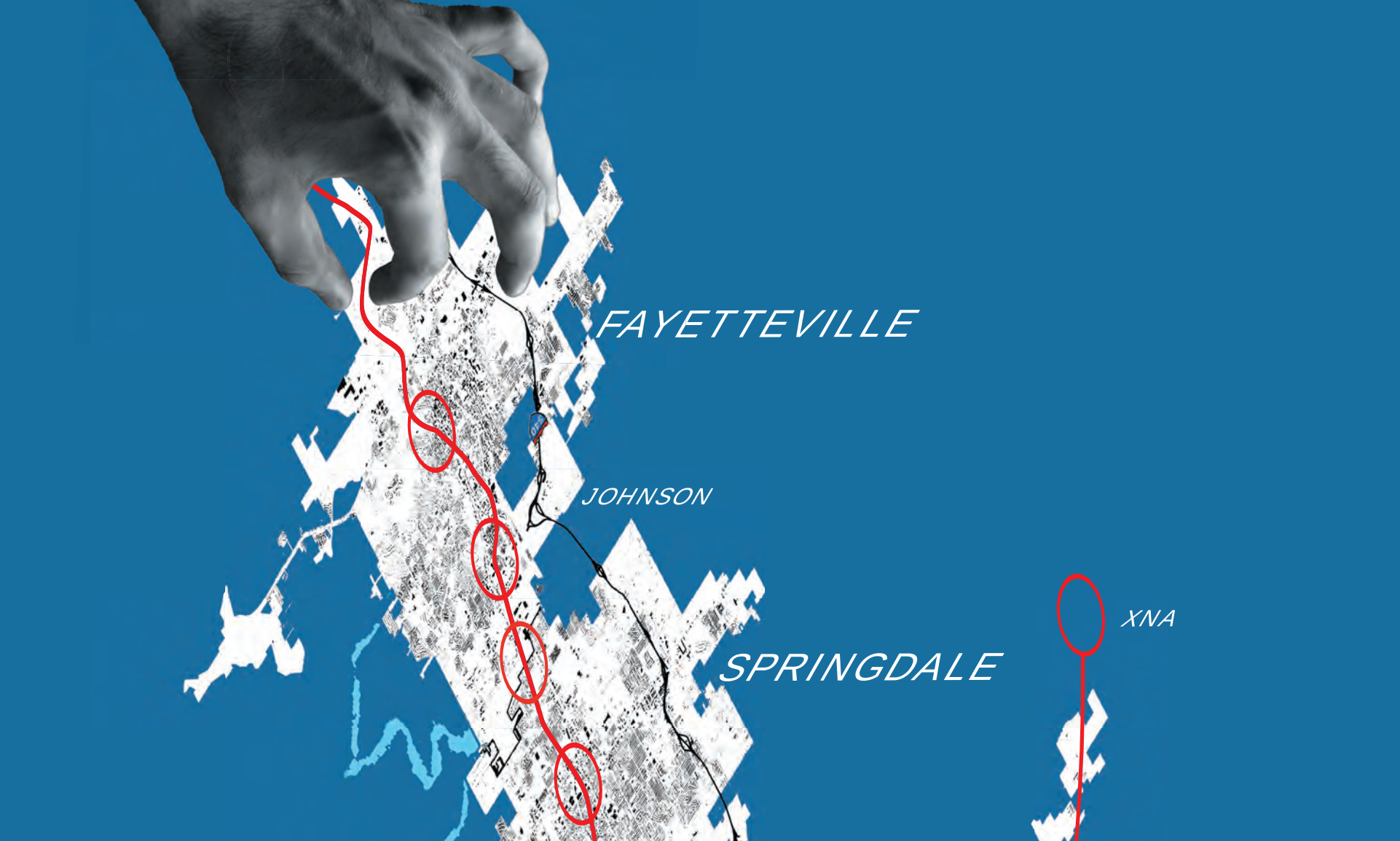
Springdale will triple its population

housing starts

new footprints do not include all other land uses and infrastructure that support housing



Fayetteville will double its population

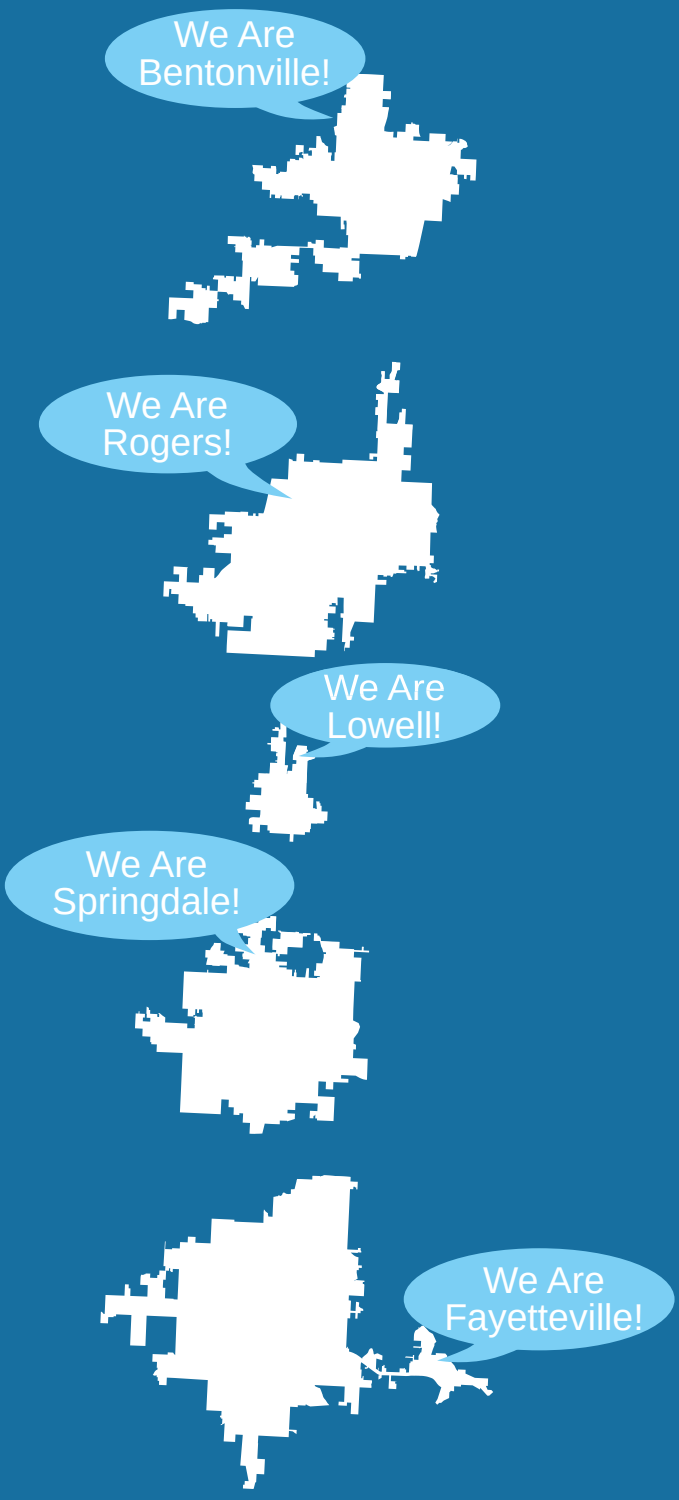

FAYETTEVILLE
JOHNSON
SPRINGDALE
XNA

Since NWA is growing rapidly, how might we responsibly urbanize the “Natural State”?

One possible future might include regional light rail. Take a look and see what you think...

re-envision NWA...

from a collection of autonomous cities to a well-connected, interdependent region, serving various travel markets (e.g. commuters, tourists, a traveling business class, students, and zero-car households). Accessible public transit means that each city can cooperatively develop niche services at the scale of the region.



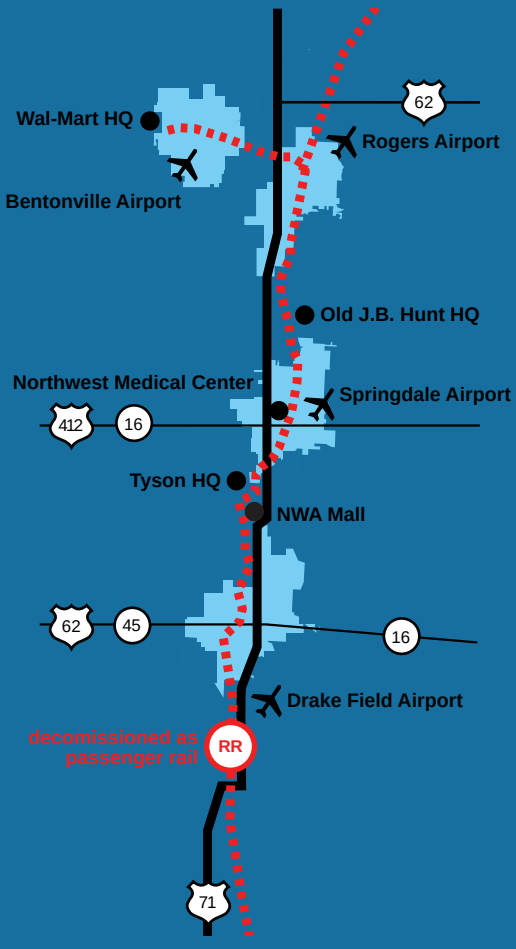

We Are Northwest Arkansas!
the nation's 6th fastest growing region
Crystal Bridges Museum
BENTONVILLE
Farmers Market
Wal-Mart Historical Museum
Wal-Mart Headquarters
NWA Commu-nity College
NWACC
Bentonville Airport
Rogers Airport
ROGERS
The Promenade Lifestyle Mall
Beaver Lake
Pinnacle Hills Development
J.B. Hunt Headquarters
XNA
Northwest Arkansas Regional Airport
LOWELL
EMMA AVENUE
19
Jones Family Center
Springdale Airport
Rodeo of the Ozarks
The Naturals Minor League Baseball Stadium
Tyson Headquarters
JOHNSON
NWA MALL
NWA Regional Mall
NWA Regional Medical Center
DICKSON STREET
University of Arkansas
Walton Performing Arts Center
Farmers Market
Razorback Stadium
Ozark Plateau
DRAKE FIELD
Drake Field Airport
North
0
1 mile

retool NWA...

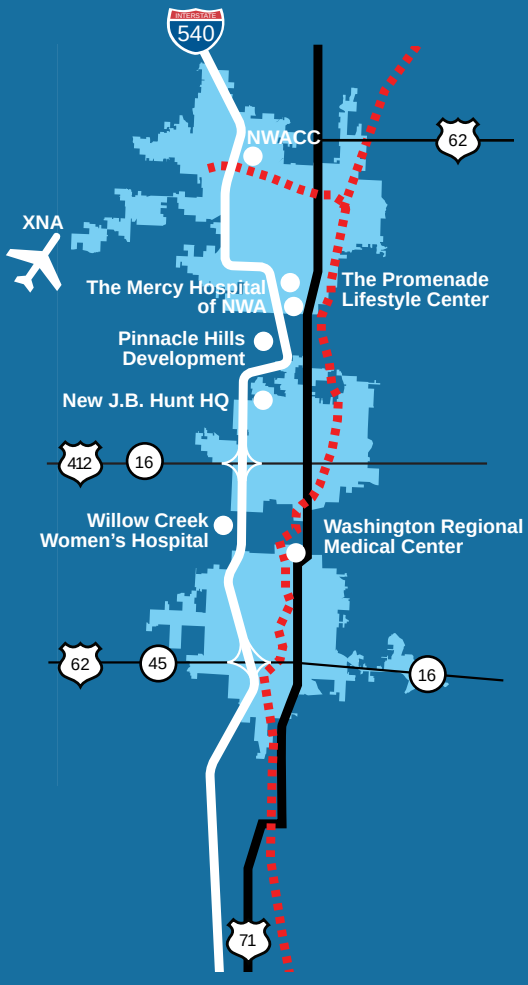
integrating existing transportation systems before leapfrogging them with new systems. Redundancy will amplify efficiencies in each mode of transportation.

Due to historic railroad development, two-thirds of today's NWA population live within one mile of the rail right-of-way.

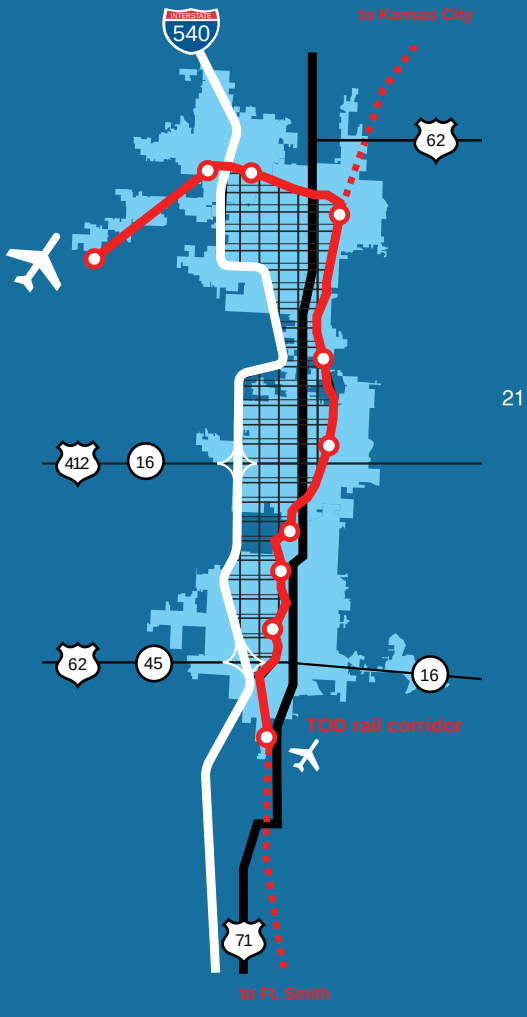
NWA
1900
Rail



NWA
1960
Highway



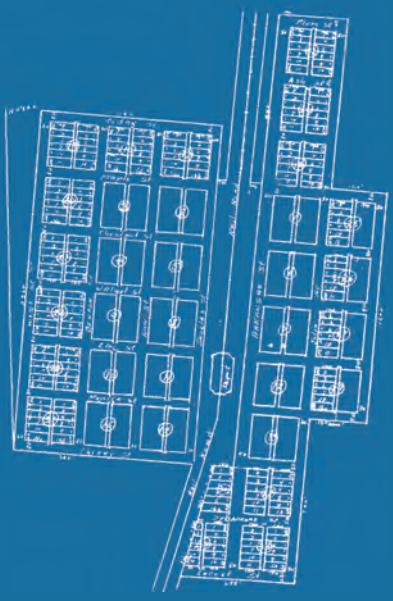
NWA
2000



NWA
future

Integrated Transportation

North 0 3 miles



The first plat of 15 blocks in Rogers, dated 1881 and laid out for S.T. Arkansas and Texas R.R. Co.

Bentonville, Arkansas 1914

"On May 10, 1881, occurring almost simultaneously with the inaugural run of the Frisco (St. Louis & San Francisco Railroad) on the newly laid tracks in Rogers, the town was named, businesses started, and a structure for governing established. Rogers gave the honor of its name to Captain Charles Warrington Rogers, the general manager of the St. Louis and San Francisco Railroad."

Marilyn Collins, *Rogers: The Town the Frisco Built*

NWA is a historic rail region

Due to historic railroad development, two-thirds of today's NWA population live within one mile of the rail right-of-way. The rail is currently an underutilized regional resource.

The development of the railroad shaped much of the region's economic and cultural geography in the 19th century. Its four major cities, Fayetteville, Springdale, Rogers, and Bentonville were rail communities developed along the still-active Arkansas Missouri Railroad corridor, creating a linear morphology ideal for the renewal of rail transit.

Despite the contemporary prevalence of sprawl development based on single-use zoning, two-thirds of NWA's population and three of its top four employment centers reside within one mile of the rail right-of-way. While historic transit-sensitive land-use patterns and building fabrics remain intact throughout these four downtowns, such accessible land patterns have not influenced contemporary development trends, with the exception of Fayetteville.

The region's anchor communities, Bentonville and Fayetteville, are in the process of adopting downtown masterplans, prompting greater housing densities, compact and mixed-use land development, and pedestrian-oriented environments—in short, accessible land use patterns.

LESS EFFICIENT

EFFICIENT

MORE EFFICIENT

constellation cities

radial cities

linear cities

KANSAS CITY

RALEIGH-DURHAM

GREENVILLE-SPARTANBURG

MEMPHIS

CHARLOTTE

LITTLE ROCK

LOUISVILLE

NASHVILLE

NORTHWEST ARKANSAS

OKLAHOMA CITY

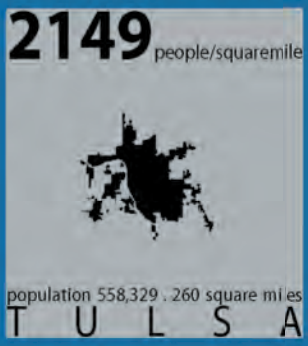
BURLINGTON

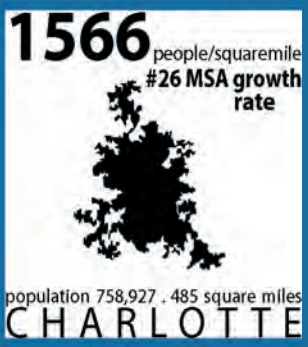
Rail transit offers an additional transportation option that can shift passenger traffic from highways and free up valuable highway capacity for the trucking and logistics industry of Arkansas.

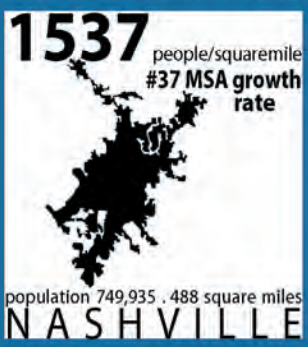
the case for rail in NWA

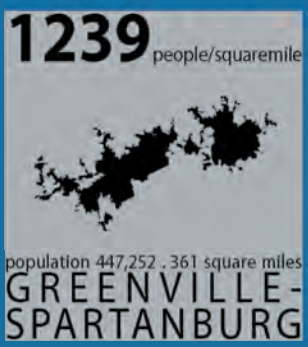
Based on regional morphology (geometric structure and services distribution), NWA is an ideal candidate for rail transit development, arguably fulfilling the Federal Transit Administration's New Start criteria better than many recent recipients.

In addition to a favorable density comparison with recent New Start recipients, NWA's linear demand pattern is uniquely configured for rail transit. Most peer urbanized areas are radial or constellation structures, less than ideal configurations for fixed guideway efficiency. NWA's development along an existing rail corridor is ideal for mass transit. Linear organizations, however, are characteristically arterial with a low street connectivity ratio that promotes highway traffic congestion. Expanding highway capacity typically compounds congestion in arterial systems. An intermodal system including rail would absorb traffic demand with greater efficiencies. Rail transit would also increase accessibility for low-income and zero-car households, a ridership group located along the rail right-of-way. Almost all major regional employment and activity centers are located along the rail corridor, a key factor for achieving high ridership.









Peer New Start Cities Urbanized Area Comparisons

NWA compares well to other cities that have received federal New Start consideration. In fact, NWA has a higher density than five New Start cities and none expecting a comparable rate of growth.

*cities seeking non-rail transit funds

The Federal Transit Administration New Start program is the primary financial resource supporting locally planned and operated transit investments. The New Start program has helped to make possible hundreds of new or extended fixed guideway projects across the country.

NWA as a New Start funding candidate

The calculus for rail feasibility has changed, no longer tied to a few large metropolitan regions and their high population densities. Communities nationwide are reinvesting in rail systems dismantled from their fabrics just 50 years ago.

NWA has significant populations that are more likely to use rail transit. These groups include: inter-city commuters, out-of-town business travelers, university students, retirees, Hispanics, and households without cars. Hispanics, another "early adopter" group to historically support rail ridership, comprise 20% of the populations of Springdale and Rogers and continues to grow in numbers. NWA is a popular retirement destination for the nation's elderly and home to over 21,000 students on college campuses in Fayetteville and Bentonville. These early adopters groups are progressive, inventive, and see the tipping point earlier than others. Rail also attracts a high number of discretionary riders, late adopters who would otherwise not use buses.

San Diego, California

Denver, Colorado

what is Transit-Oriented Development (TOD)?

…It's building a place, not just a transportation system. The creation of an engaging public realm beyond mere engineering of a transportation project is critical to rail transit feasibility.

…It's a regional planning instrument for developing land uses that consume less land per capita, conserve sensitive natural areas, and revitalize urban areas.

…It's creating a pedestrian-oriented urban district within a half-mile radius around a rail transit station.

…It's about guiding growth, rather than creating it. Unlike highway development, good transit design can capture sustained economic value from the triangulation of transportation efficiencies, community redevelopment, and shifting consumer habits due to "agglomeration efficiencies".

Being well-connected to the rest of the region is capitalized into the value of the land.


my commute time is still the same, but this way I can read the newspaper!
besides Fayetteville, how would urban housing be feasible in other NWA downtowns?

*"**Scenario Planning** is a tool that allows us to think outside of the box, constructing a series of plausible futures. In contrast to the myopic end condition produced by traditional forecasting, developing TOD scenarios, in all their possible forms, will enable us to imagine multiple ways in which the landscape of Northwest Arkansas may unfold. Through the use of scenarios we can open up and illustrate plausible and nuanced ways in which the future of NWA may grow, allowing us to then strategically guide and plan intelligently..."*

Eric Kahn, Architect and Scenario Planner
The Rail Transit Design Studio Participant

planning approach

its not just about transportation, but also...

Mob

Urb

What if rail transit revived the amenity-rich environments of historic NWA downtowns? pp. 62-89

Comme

Enviro

What if NWA directed its growth to become a model region for sustainability, lowering energy footprints, and weaving nature into the city? pp. 110-133

What if choices in transit mode beyond the car were provided in NWA? pp. 34-61

ility

panism

erce

What if commerce were integrated into the development of NWA neighborhoods? pp. 90-109

nment

1

What if choices in transit mode beyond the car were provided in NWA?

Mobility

Will provide convenient access and transportation choice for all households and reduce household travel budget.

Will benefit the logistics industry as automobile traffic demand is shifted to rail, expanding highway capacity for trucking and commerce.

Will relieve traffic congestion and reduce time wasted driving on crowded roads.

In terms of transit and mobility did you know...

More than bus, rail transit attracts former car commuters…in Denver, 48% of light rail riders had never previously used public transit; in St. Louis it was 70%.

Average four-lane highways move 8,800 passengers/hour and cost $40 million per mile to build while rail moves 40,000 passengers/ hour with average costs of $35 million per mile.

At capacity, rail carries the same number of passengers as a 16-lane highway and costs 80% less.

The Washington D.C. Metro is the most efficient rail transit system as 80% of its operating costs are covered by ticket fares.

Gasoline taxes at the pump cover only 25% of highway operating costs.

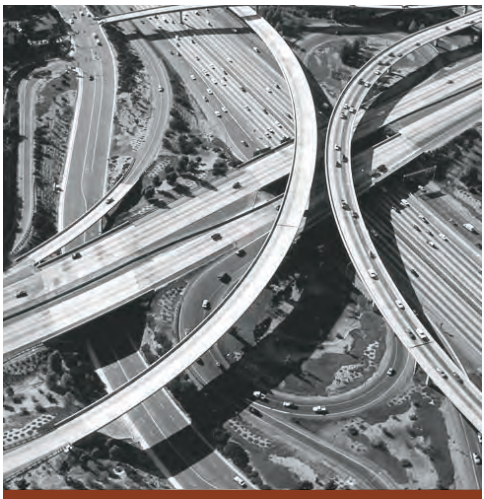
As little as a 5% mode shift from automobile to rail on major corridors is sufficient to halt congestion growth and justify rail investments.

Congestion is a non-linear phenomenon. Adding 100 additional vehicles per hour on a road at 90% capacity can increase delays by 20% or more.

Rail transit requires about $12.5 billion in annual public subsidies, which average an additional $90 per Rail City resident compared with Bus Only cities.

1,000 feet of street serves 6 buildings and you can only drive...

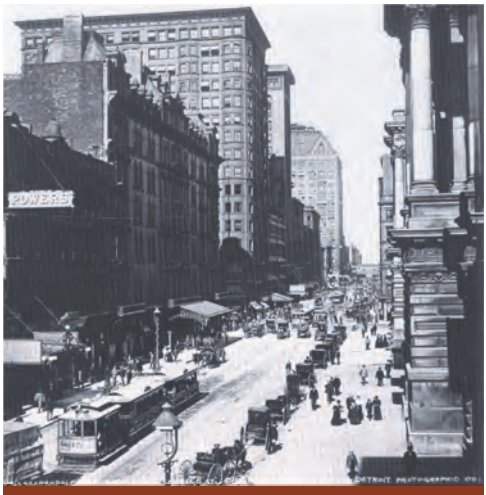
drive



ROAD

No transportation system—a highway, port, airport, or railroad—has ever been a profit-making

1,000 feet of street serves 34 buildings and you can walk, drive, ride...



PLACE

jog
drive
ride the train
walk
bike
motorless carriage

system, as all must be socially subsidized. “Transit is expensive to build and operate, just as cars

and roads are… the real question is not the total cost, but what the money buys." (Dunphy, et al.)

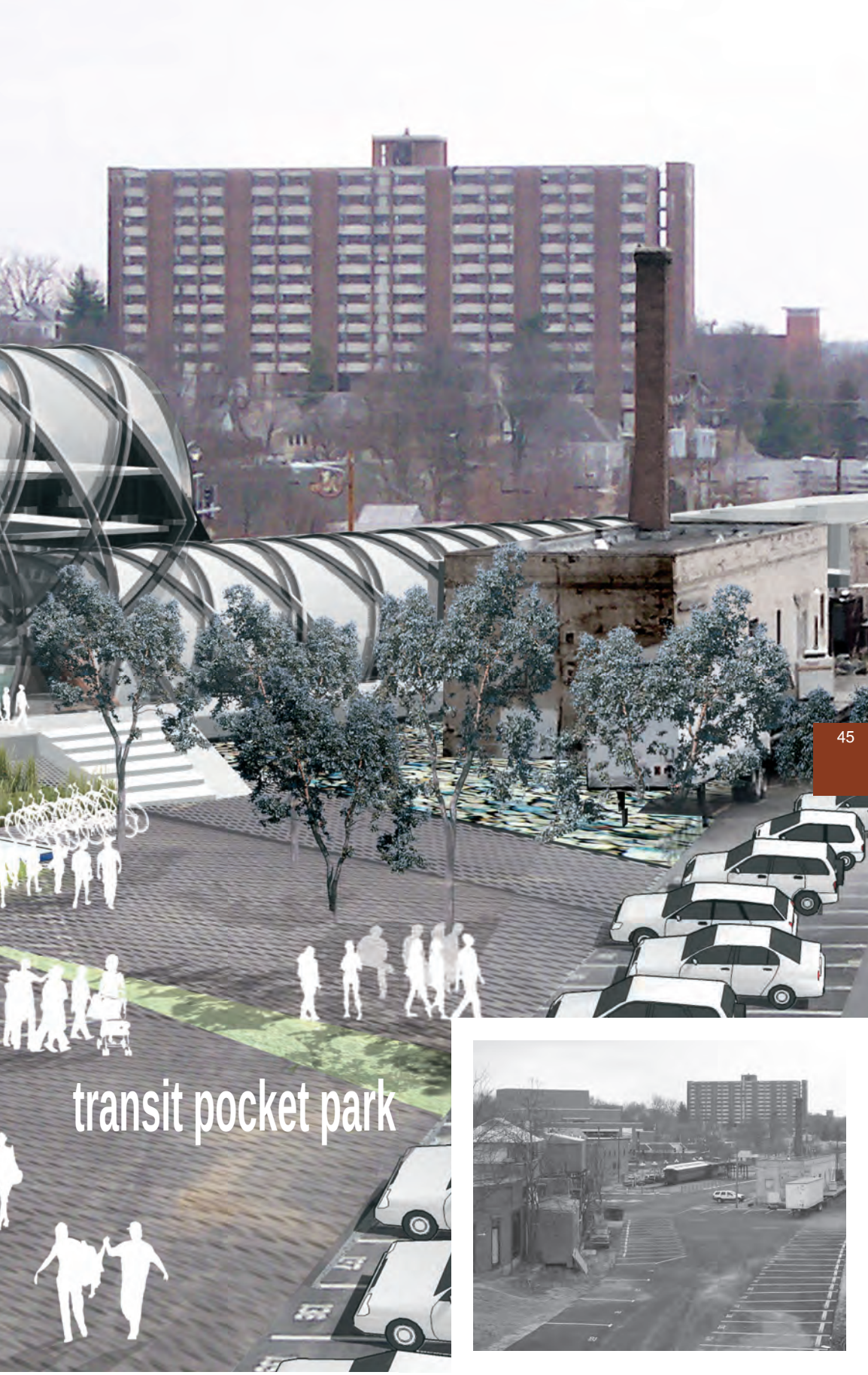
Decades of transit underinvestment must be overcome by new projects—the initial project costs may

appear high, but are much smaller when averaged over the operational life of the facility. “Described

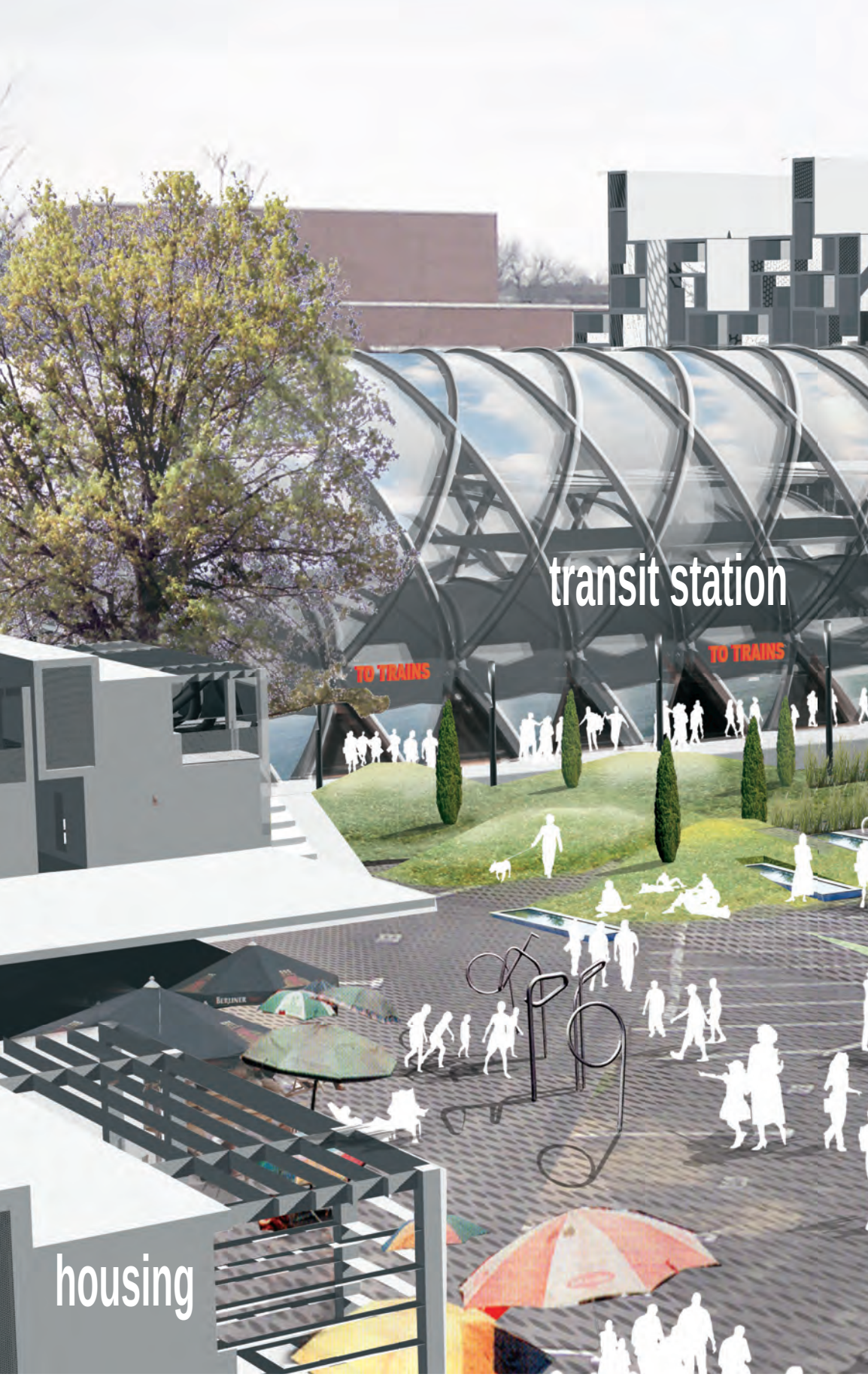
transit pocket park

differently, the major urban transportation problems facing cities are traffic and parking congestion,

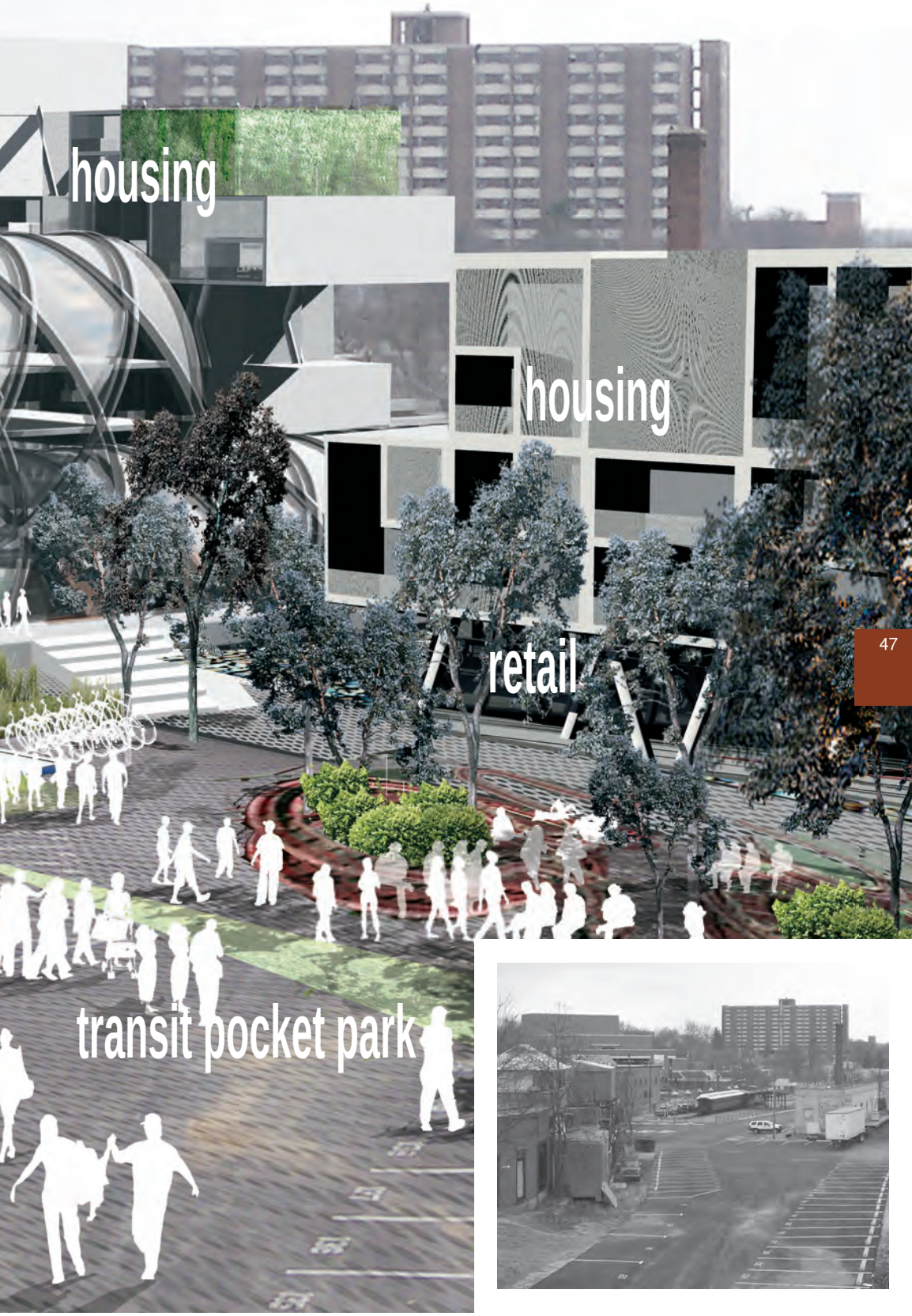
traffic accidents, vehicle pollution and inadequate mobility for non-drivers, exactly the problems that



rail transit can help solve." (Litman: 2005) Some argue that current traffic patterns and suburban



land development reflect market demands, when in fact both received more than half a century



of government intervention and subsidy. The average U.S. household has 1.9 cars but only 1.8

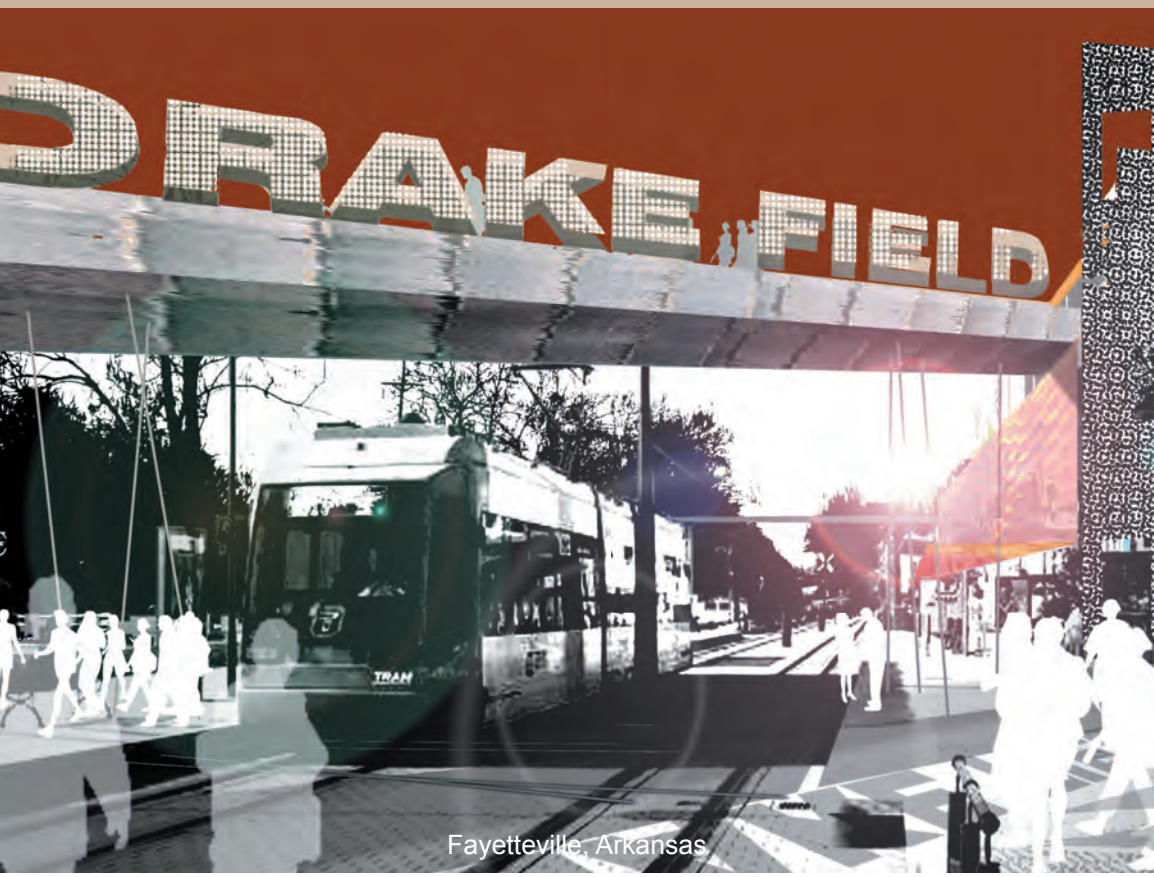
The 2030 NWA Regional Transportation Plan stipulates $1.9 billion for highway funding, yet only $412 million will be available. Rail would absorb peak traffic demand and reduce the largest burden on the highway system. Rail would cost $.7-1 billion and be matched by federal funding allocated for rail. The combination of highway and rail would bring another level of economic development and smart growth not possible with highways alone.

drivers. American drivers sat in traffic for a combined 3.7 billion hours in 2003, a 500% increase in

just over 20 years. “A regular rush-hour driver wastes an average of 99 gallons of gasoline a year

Vehicle-miles in millions	54	7,077	1,628,332
Passenger-miles in millions	1,437	150,042	2,556,481
Expenses to Passenger per Mile	**14¢**	**20¢**	**51¢**
Percentage of Return from user fees	30%	8%	18%

U.S. Department of Transportation,
Bureau of Transportation Statistics (2001)



Fayetteville, Arkansas

due to traffic. The average cost of the time lost in rush hour traffic is $1,160 per person." (www.

If our planning decisions were "fair-costed" for hidden costs, life-cycle costs, and negative externalities from pollution, affordability, fatalities, property damage, and lost time from the automobile, our transportation systems would certainly incorporate more public transit options.

cost of transportation

Rail transit costs and return on investment are now competitive with highway costs.

Average new highway construction costs, including right-of-way acquisition, engineering, and utility reconfiguration, can easily exceed $40 million per mile for a new four-lane highway within a developed area—and over $100 million in urbanized areas. Springdale recently approved a bond issue of $105 million for road improvements over the next five years, which will not satisfy current needs.

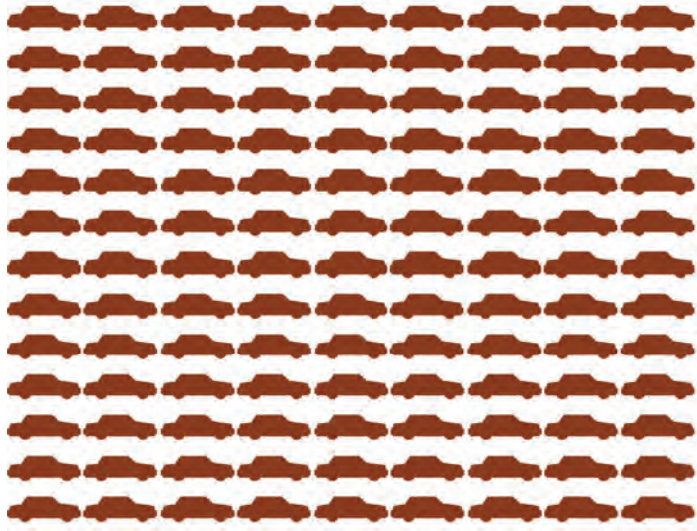
The Raleigh-Durham rail system, a recent New Start recipient, is slated to cost $23 million per mile. NWA's system may be less expensive due to fewer conflicts with surface streets, cheaper land costs, and fewer active freight lines than in Raleigh-Durham. Arkansas & Missouri Railroad is a willing partner, which minimizes property acquisition costs—typically the largest capital expense for New Start cities.

In effect, transit riders whose ticket fares pay for 30-70% of their systems' operating costs, are subsidizing suburban motorists, whose gasoline taxes pay for only 25% of highway operating costs.

publictransportation.org) British scientists have reported that the tension experienced by commuters

currently
300,000 cars

by 2050
1,250,000 cars



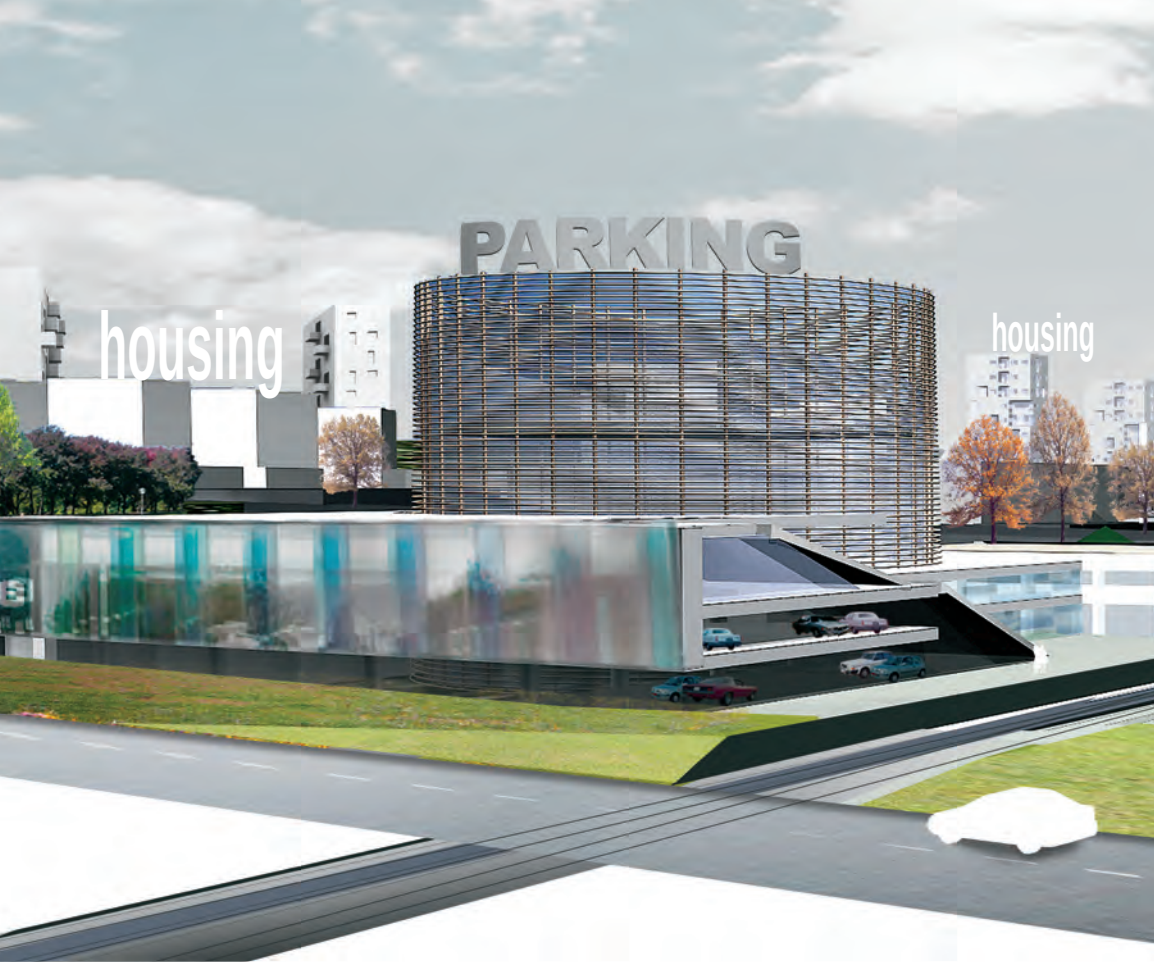
41 square miles of new parking
(the size of Springdale, Johnson, and Lowell combined)

stuck in traffic is equivalent to that felt when parachuting for the first time. Medical symptoms ranging

how do you want to spend your time?

NWA traffic growth

from sleep deprivation to digestive problems are linked to long commutes. “A 2004 article in the



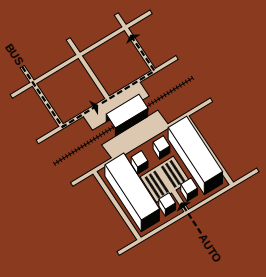
New England Journal of Medicine found that being stuck in a traffic jam more than doubles one's

new development captures a premium market value due to being well-connected to the rest of NWA

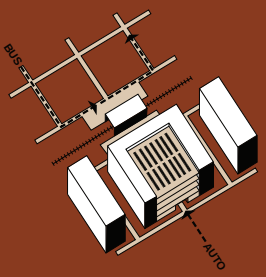
well-designed pedestrian facilities and civic spaces are important anchors in creating desirable public environments around transit stations

chance of experiencing a heart attack...", states Will Sullivan in "Road Warriors" U.S. News & World

Plano, Texas—Dallas Area Rapid Transit



share it



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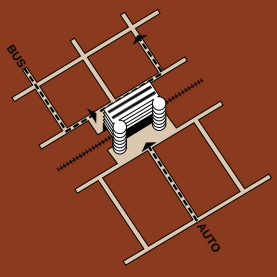


deck it

Report, May 7, 2007. Highway capacity will increase by 10% between now and 2050, while the

Contemporary land development is planned for the 400 hours of driving by the average motorist annually, and does not satisfactorily design for the remaining 8,360 hours that the car is parked.

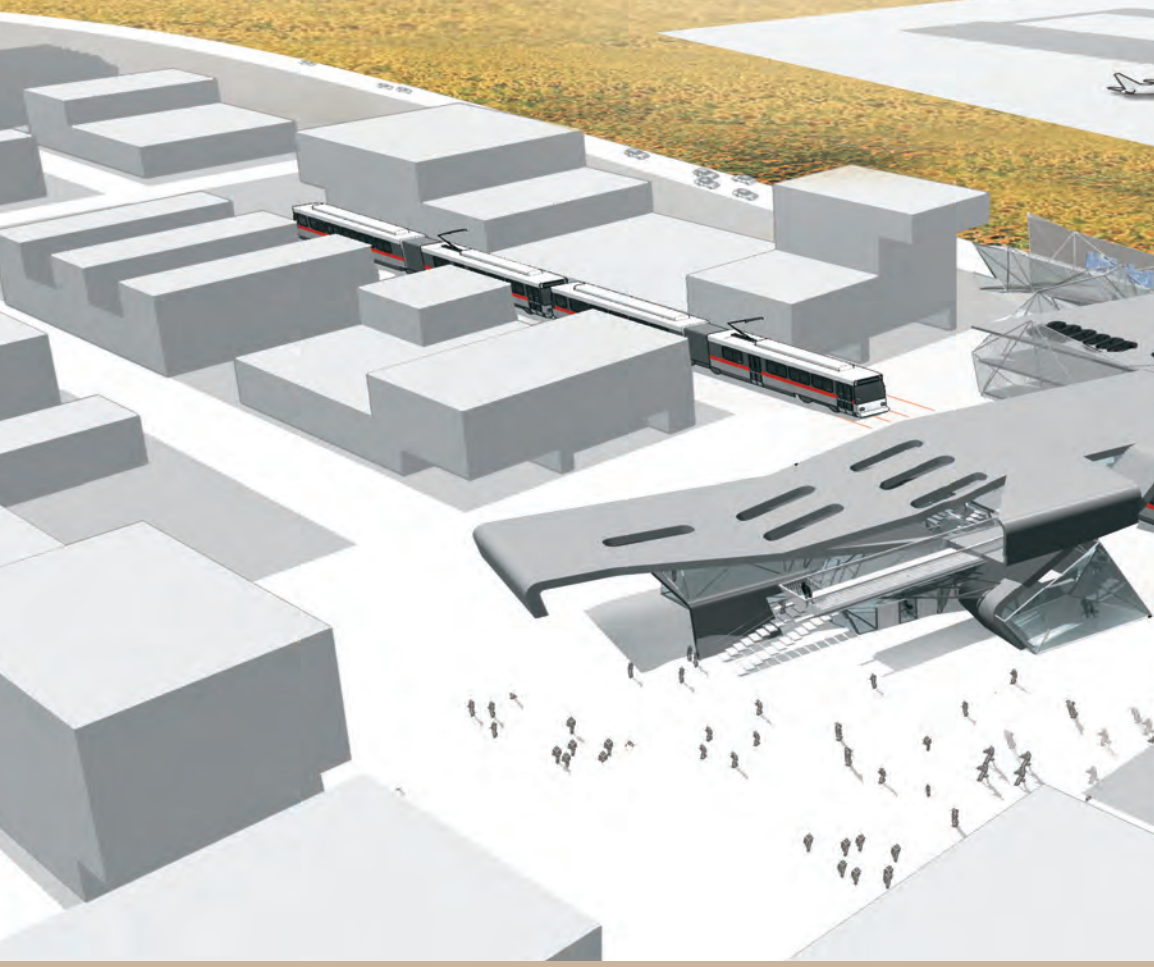
TOD parking strategies

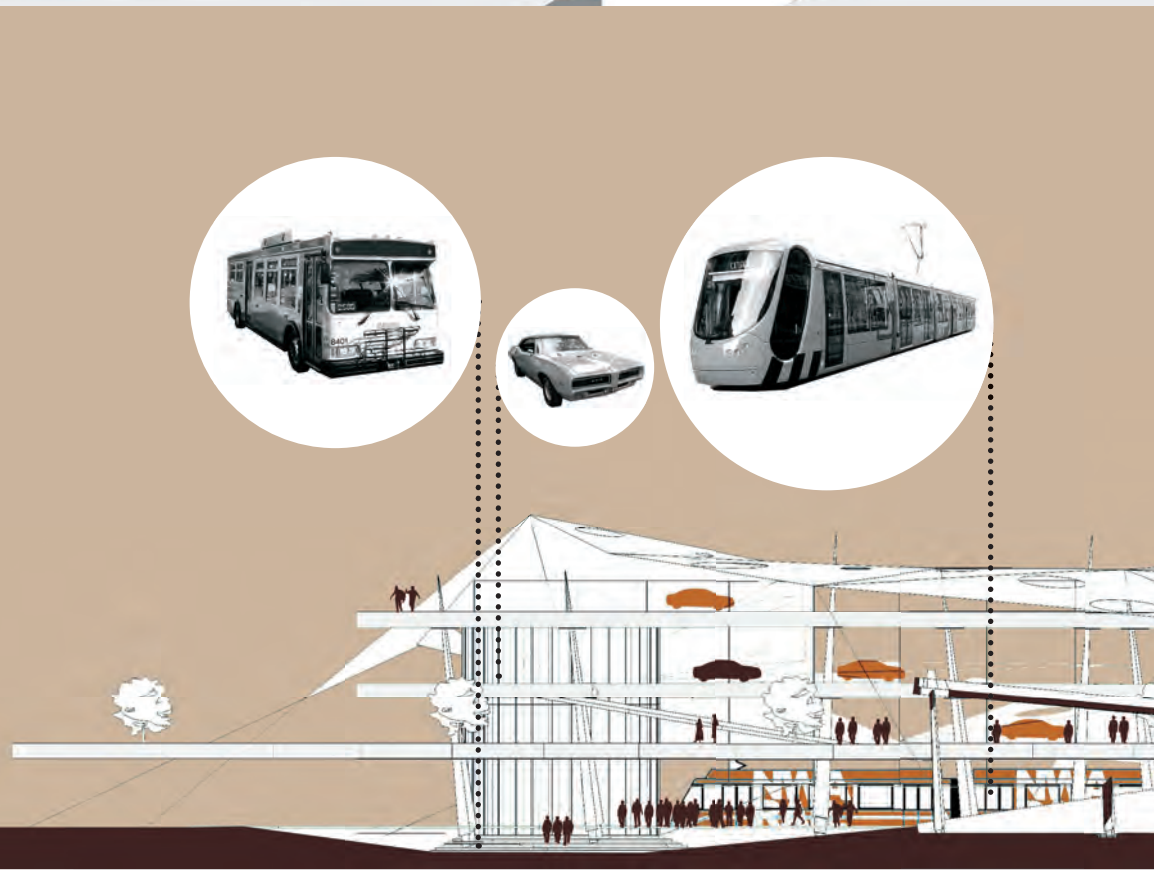
One of the biggest challenges in planning pedestrian-friendly, walkable TOD districts is the accommodation of automobiles. A basic guide for TOD parking is to share it, wrap it, or deck it.

Use on-street parking to support ground floor commercial activity. Minimize large surface parking lots greater than two acres for private development.

A generally accepted planning practice locates commuter park-and-ride facilities at a 5-7 minute walk (one-quarter mile) from the rail station bridged by mixed-use development to accommodate commercial activity. Parking should not separate stations from their contexts nor impair pedestrian access between them.

demand for ground transportation overall will increase by 250%. In 1970, before the installation

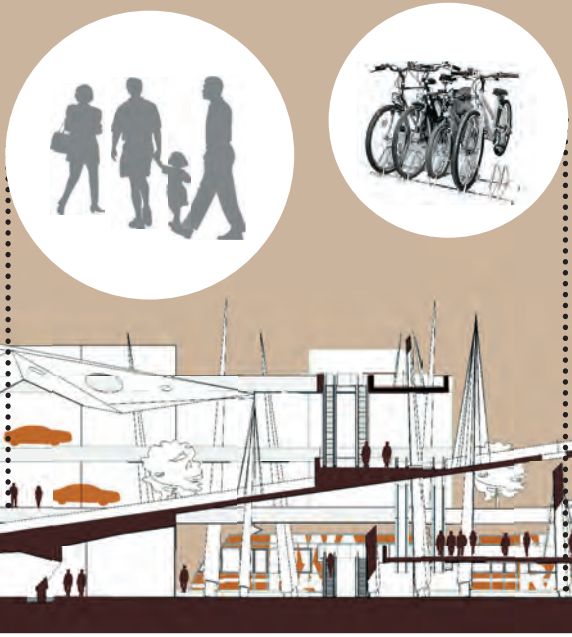




of a modern rail transit system, 4% of Washington DC commuters used mass transportation, i.e.,

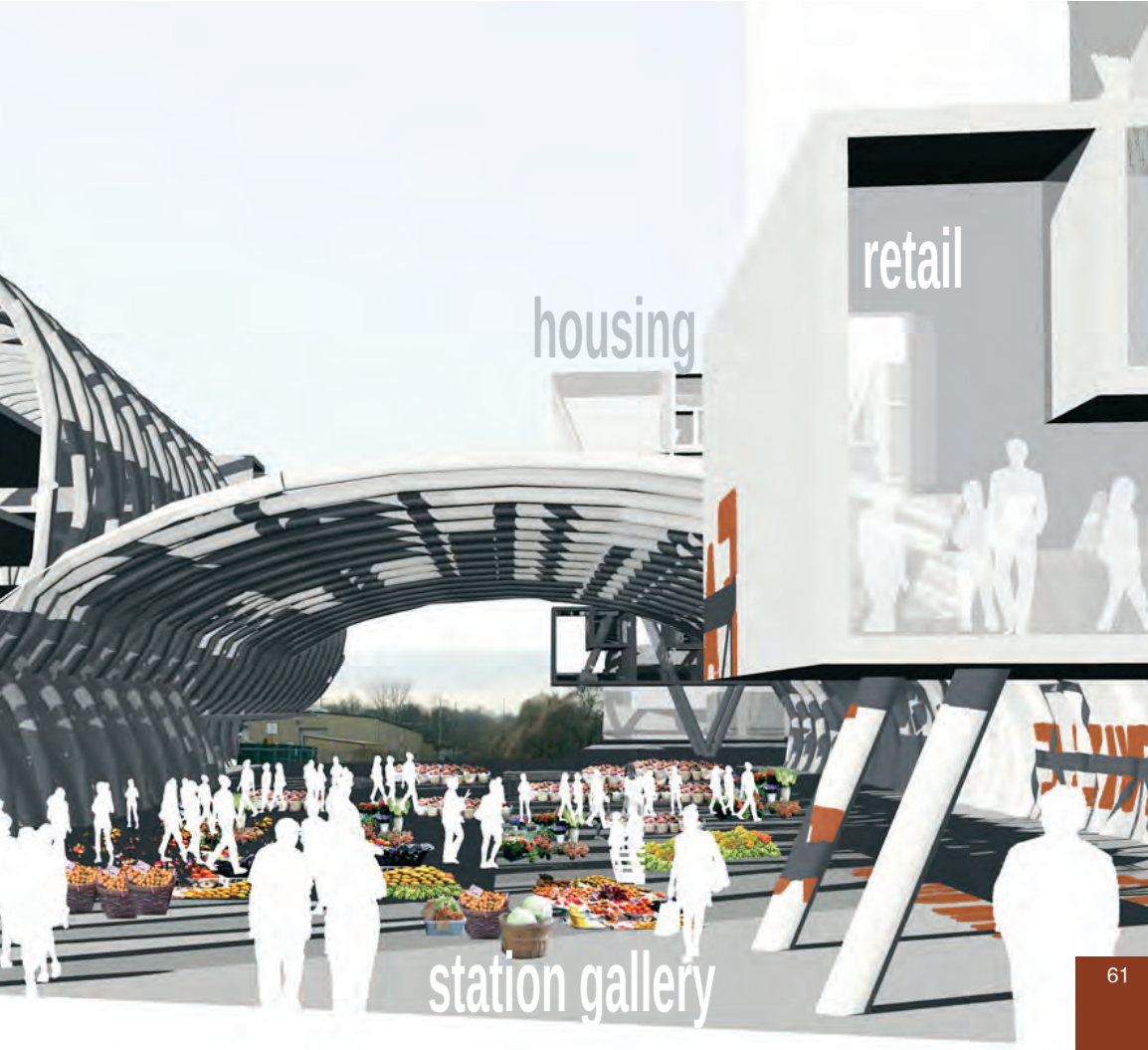
plan for intermodal transportation

make transportation facilities, once again, great public spaces and civic landmarks



the city bus system. In 2000, by contrast, 38% used mass transportation, predominantly the Metro

subway system. Between 1998 and 2001 U.S. transit travel grew faster than automobile travel. Every



connect regional mobility with local commerce

to create great civic places

advance in transportation over the last two hundred years has enriched the ecology of the street.

2

What if rail transit revived the amenity-rich environments of historic NWA downtowns?

Urbanism

Will allow walking to be a routine transit option, promoting physical activity and healthy lifestyles.

Will facilitate new venues for social engagement, culture, and entertainment.

Will provide new urban housing products—like walk-ups, lofts, and condominiums that feature auto-independent lifestyles.

Will reward preservation of historic structures and reuse of underutilized urban resources.

In terms of transit and urbanism did you know...

Rail transit feasibility requires a minimum density of 9 dwelling units/acre. Most low-density regions like NWA are built at 4 dwelling units/acre.

For each doubling of density within communities, annual vehicle miles traveled are reduced by 20-40 percent.

One study found that doubling a county-level density index is associated with a 6% increase in state-level productivity.

While demographers estimate that as much as 30% of the demand for housing is for denser, transit-oriented communities, less than 2% of housing starts are in this category.

Average home values increase $140 for every 10 feet closer they are to a transit station, beginning at 1,460 feet. A home located 100 feet from the station has a $19,029 premium over the same house located 1,460 feet away.

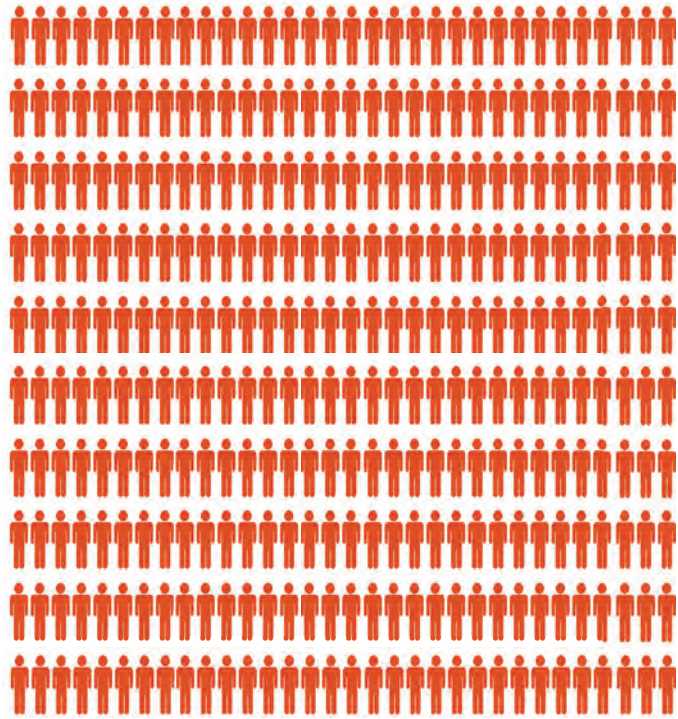
Residents of TOD's typically reduce single-occupant vehicle commuting by 15-30 percent, about half of which shifts to transit.

The value of commercial space near Metrorail stations in Northern Virginia has jumped more than 600 percent since the first station opened in 1977.

Three-quarters of Americans support the use of public funds for the expansion and improvement of public transportation.

currently
282,167 people

by 2050
1,000,000 people



Successive transportation technologies in canals, railroads, streetcars, horses, motor carriages,

NWA population growth

automobiles, and subways did not render the street obsolete, but rather enhanced its multimodal

functioning. As Alex Marshall observes in his book, *How Cities Work*, each transportation technology

...Springdale now

rail could unlock underutilized potential in NWA downtowns like Springdale...

acted as a “force multiplier” for the classic street, amplifying the commercial and social range of human

interaction. The singular commitment to the automobile has eroded community access to multiple

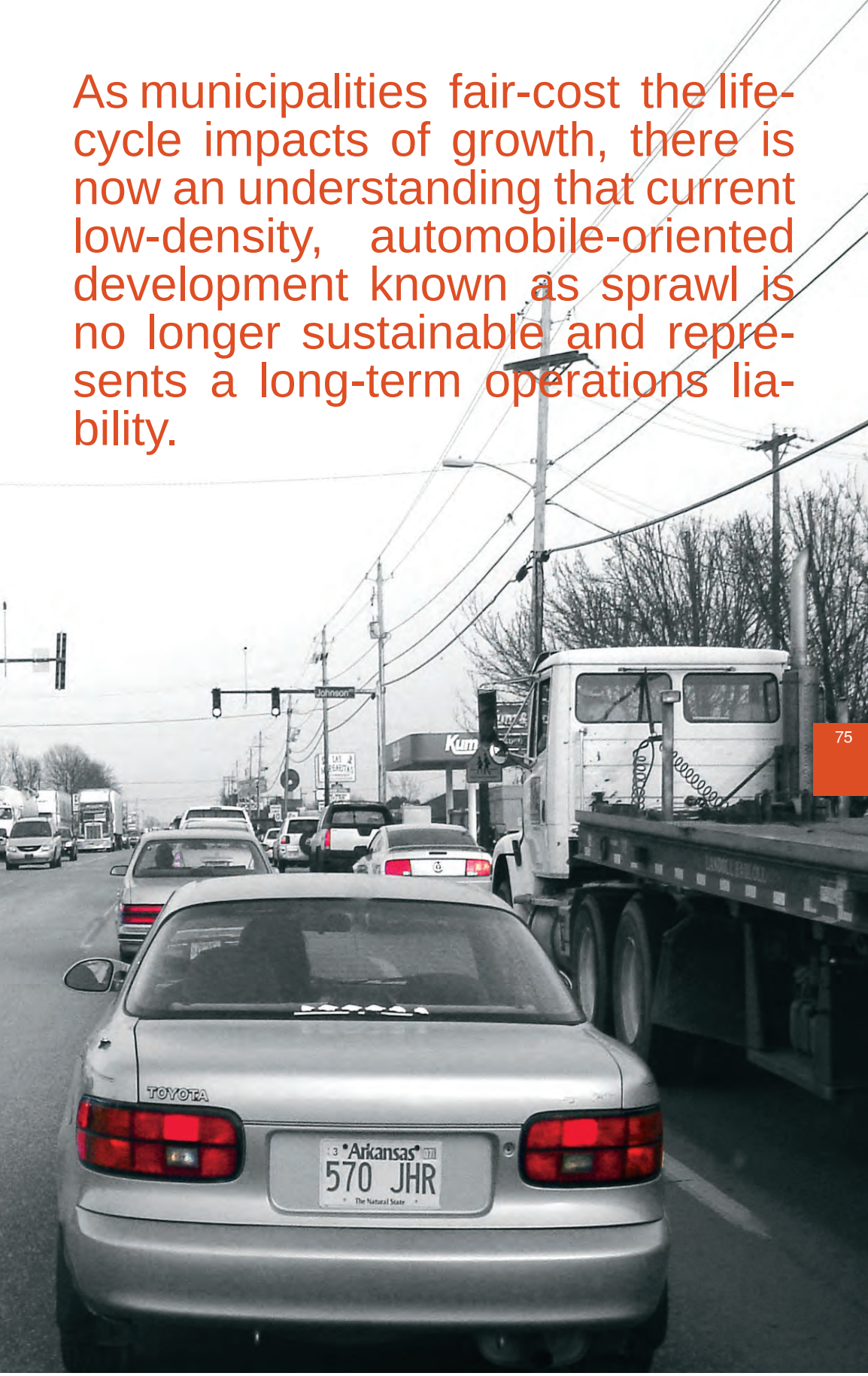
movement modalities, primarily walking. For every 10 minutes spent driving to work, community

involvement by the commuter falls 10%. “People who live and work in transit-oriented developments

tend to own fewer vehicles, drive fewer annual miles, rely more on walking and transit for transportation,

and as a result cause and experience less traffic congestion, fewer traffic accidents, reduced energy

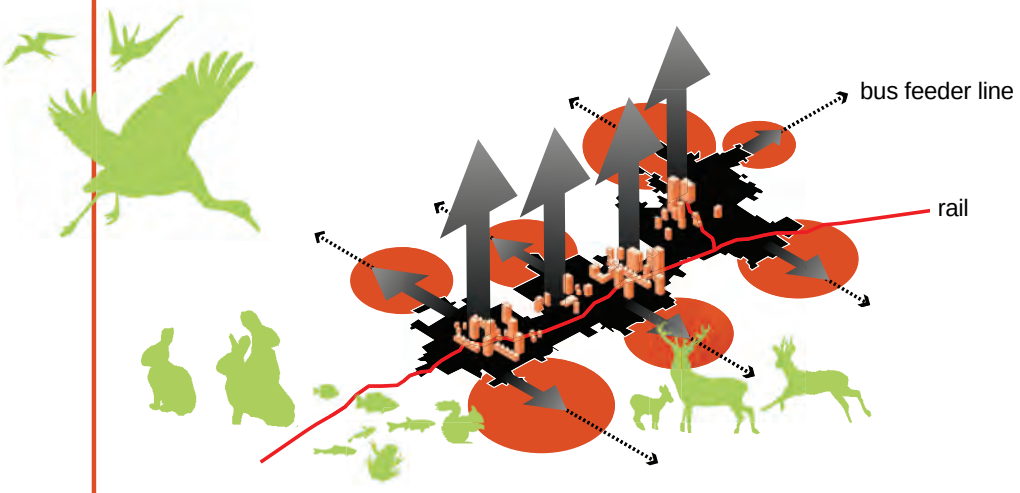
As municipalities fair-cost the life-cycle impacts of growth, there is now an understanding that current low-density, automobile-oriented development known as sprawl is no longer sustainable and represents a long-term operations liability.



consumption and pollution emissions, improved fitness, and household travel cost savings." (Litman:

2007 Northwest Arkansas

2050 Sprawl Scenario: erasure of the “Natural State”



2050 Transit Scenario: stewardship of the “Natural State”

2005) Forty-seven percent of residents who live within one-half mile of the Washington Metro in Arlington

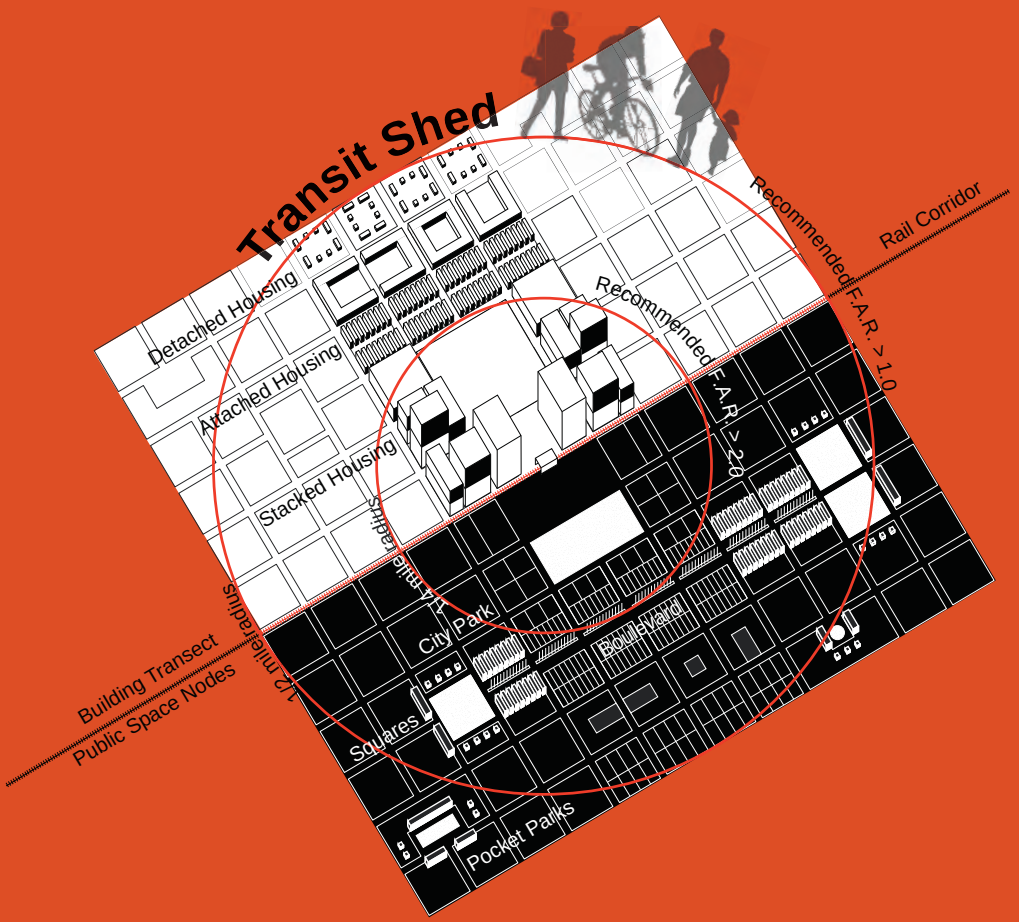
80% of the built environment projected to exist by 2050 has not yet been constructed...now is our opportunity to shape the region

Automobile Dependent
TRAFFIC CONGESTION
More Land Consumed
Higher Infrastructure Costs
More Pollution

or

Pedestrian Friendly
Increased Housing Choices
Reduced Traffic
Reduced Transportation Costs
Increased Choice of Transportation Mode

County, Virginia use rail transit to commute. Seventy-three percent of those commuters walk to stations.



planning within the transit shed should support “accessible” development patterns

accessibility enhances walkability among land uses through mixed-use development, higher densities, and pedestrian-scaled street networks

According to the Urban Land Institute, two-thirds of all New Start regions have housing densities of four

Streets/Public Space

TOD requires pedestrian-friendly street networks with both high connectivity and proximity among destinations. Well-designed pedestrian facilities and civic spaces are important anchors in creating desirable public environments around transit stations.

Blocks

Block sizes lose their capacity to support pedestrian activity above 500 feet, or seven acres, and ideally should be less than three acres or approximately 400' x 300'.

Transit Station

Commercial uses, housing, employment centers and civic spaces should be within walking distance (half-mile) of transit stops. Transit stations may become activity centers within TOD districts rather than single-use constructions relegated to district margins.

Housing

All market grades of housing with a mix of type, density, and cost should be developed in TOD districts to create social and economic viability.

TOD planning metrics

Parking

Since parking is often the largest land use, urban parking strategies attentive to footprint, street frontage, and location must balance parking needs with the creation of a desirable pedestrian-oriented environment. Outdated suburban zoning codes result in parking areas greater than the building areas they serve. For example, at 5 spaces per 1,000 square feet of building, retail parking becomes 150% of the size of the enclosed building.

Employment Centers

Residential and employment land uses are significant determinants in creating ridership. Substantial ridership increases occur once employment centers concentrate 125 employees per acre in TOD neighborhoods.

Commercial/Retail

According to the Urban Land Institute, the primary role of retail and service functions in TOD districts is their "amenity contribution" in the creation of great places for living and working. Outside of large retail agglomerations like malls and big box power centers, retail on its own will not generate notable ridership…"retail follows rooftops".

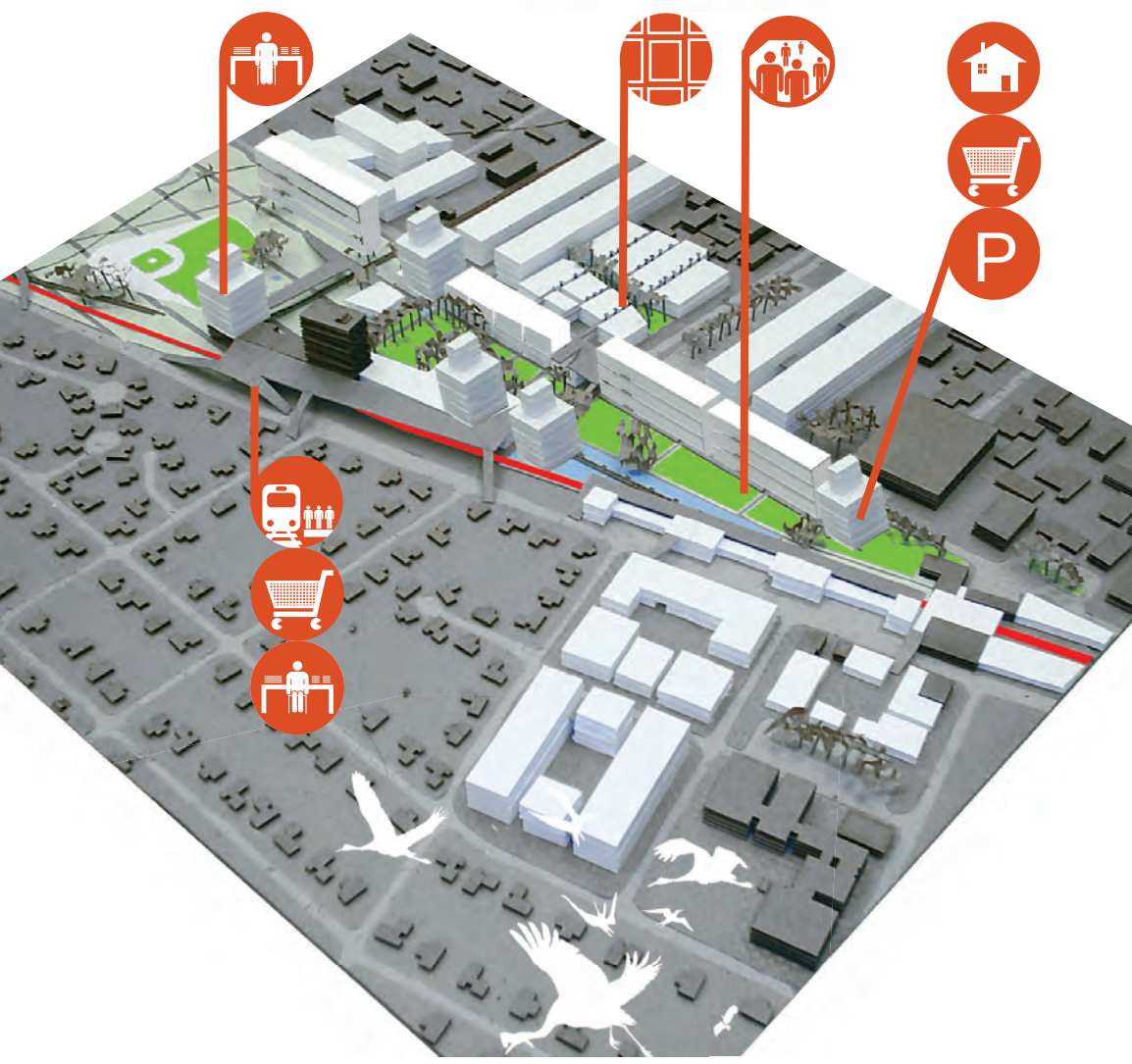
housing units/acre, well under the 15 units/acre recommended for rail transit feasibility. This indicates

that regions are subsidizing rail transit as a mechanism to achieve denser, less sprawling (and thus

coordinate transit planning with the context-sensitive design of public spaces

TOD offers creative linkages between culture, commerce, art, and community experiences

less costly) land development patterns like those called for by smart growth planning advocates. In

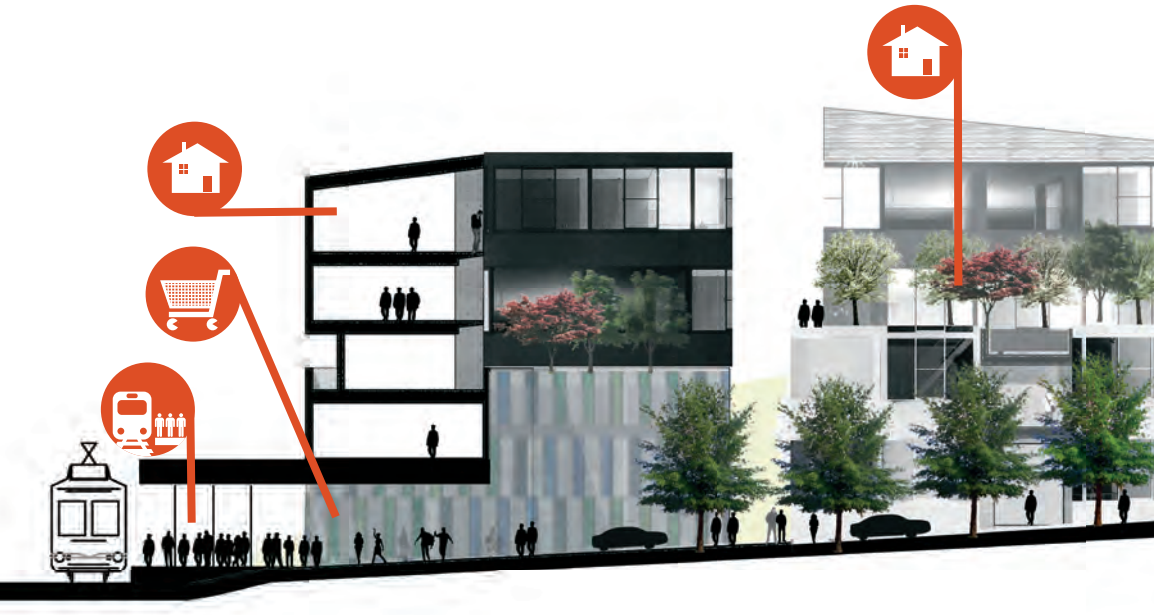


his *The Flight of the Creative Class*, author Richard Florida writes: “A common feature of leading

incorporate urban floodplains and other areas with low-development potential as transit-accessible parks

parks increase adjacent property values

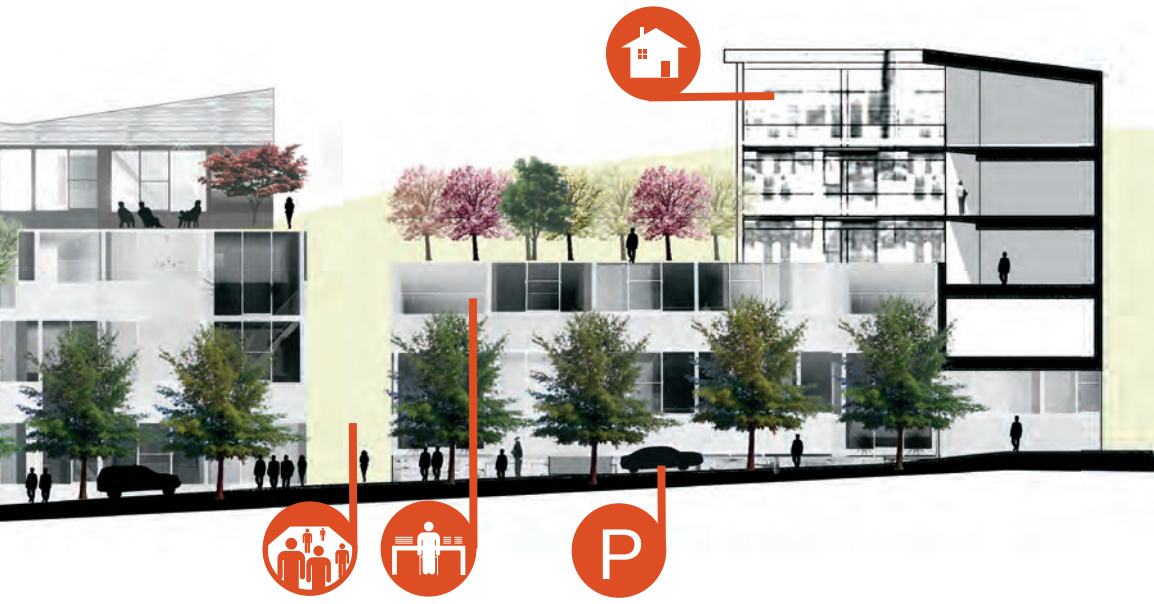
creative centers around the world is efficient and heavily trafficked subway and light rail systems. The



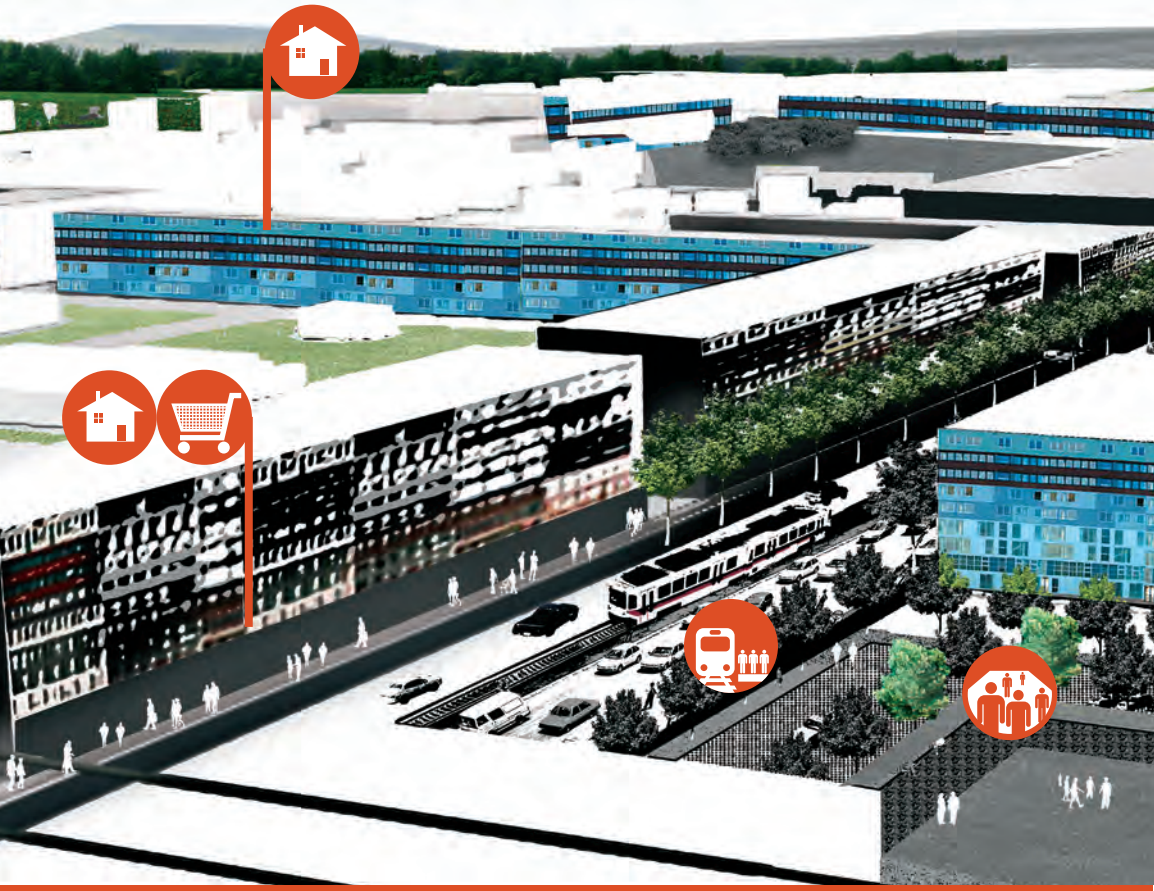
availability of subway and rail transportation was a key factor cited by creative people in the interviews

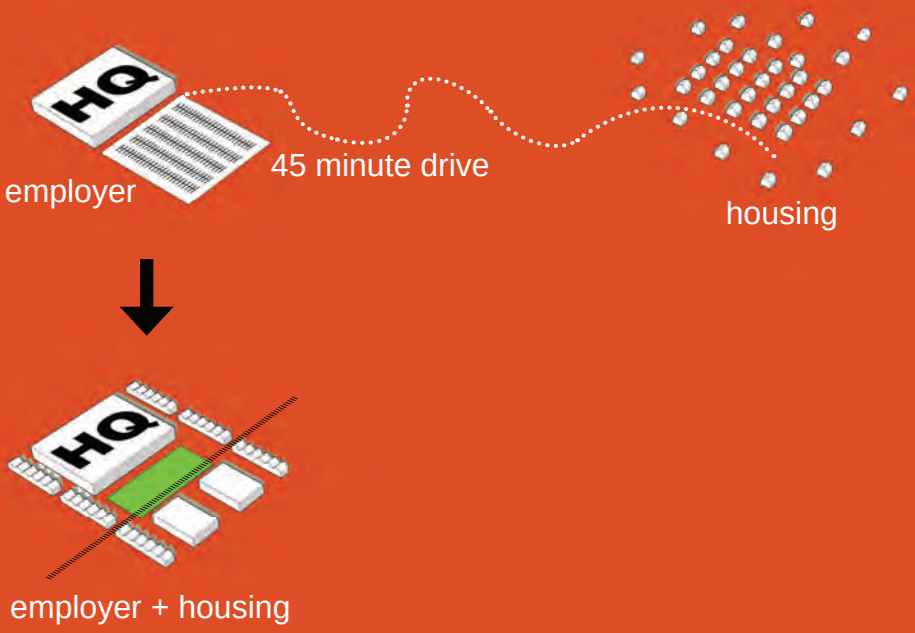
intensify urban housing

housing diversity is the catalyst for subsequent commercial development as “retail follows rooftops”



and focus groups for *The Rise of the Creative Class*, trumping amenities like bike trails, coffee bars,





and music venues. In our largest and most creative centers, such public transportation does exist and

integrate corporate campuses with the city

TOD districts create a high quality commuter lifestyle

provides an edge in attracting talent. But it is sorely inadequate in far too many others." "Rail transit also

Portland, Oregon

Portland, Oregon

tends to increase regional employment, business activity and productivity by reducing fuel and vehicle

"…there is likely to be significant demand for housing within a half-mile radius of fixed guideway transit stations…over the next 25 years. Our market assessment shows that at least a quarter of all new households—14.6 million households—could be looking for housing in these transit zones… more than double the amount of housing in transit zones by 2025."

Reconnecting America, *Hidden in Plain Sight: Capturing the Demand for Housing Near Transit*

TOD as a new real-estate product

Coincident with renewed investment in America's downtowns, TOD as a new real estate product can improve housing affordability, revitalize downtowns, introduce mixed uses into single-use suburban neighborhoods, and augment public space in communities.

TOD success depends on the ability of the market to deliver high-quality real estate solutions responsive to consumer preference for urban environments. One recent study found that one-third of all residents living in conventional development would have preferred a more walkable environment, suggesting a mismatch between housing supply and demand.

Four criteria are important in planning TOD:

- Location efficiency
- Increased mobility, shopping, and housing choices
- Higher value capture and return on investment
- Balance between requirements of successful place-making and transportation planning

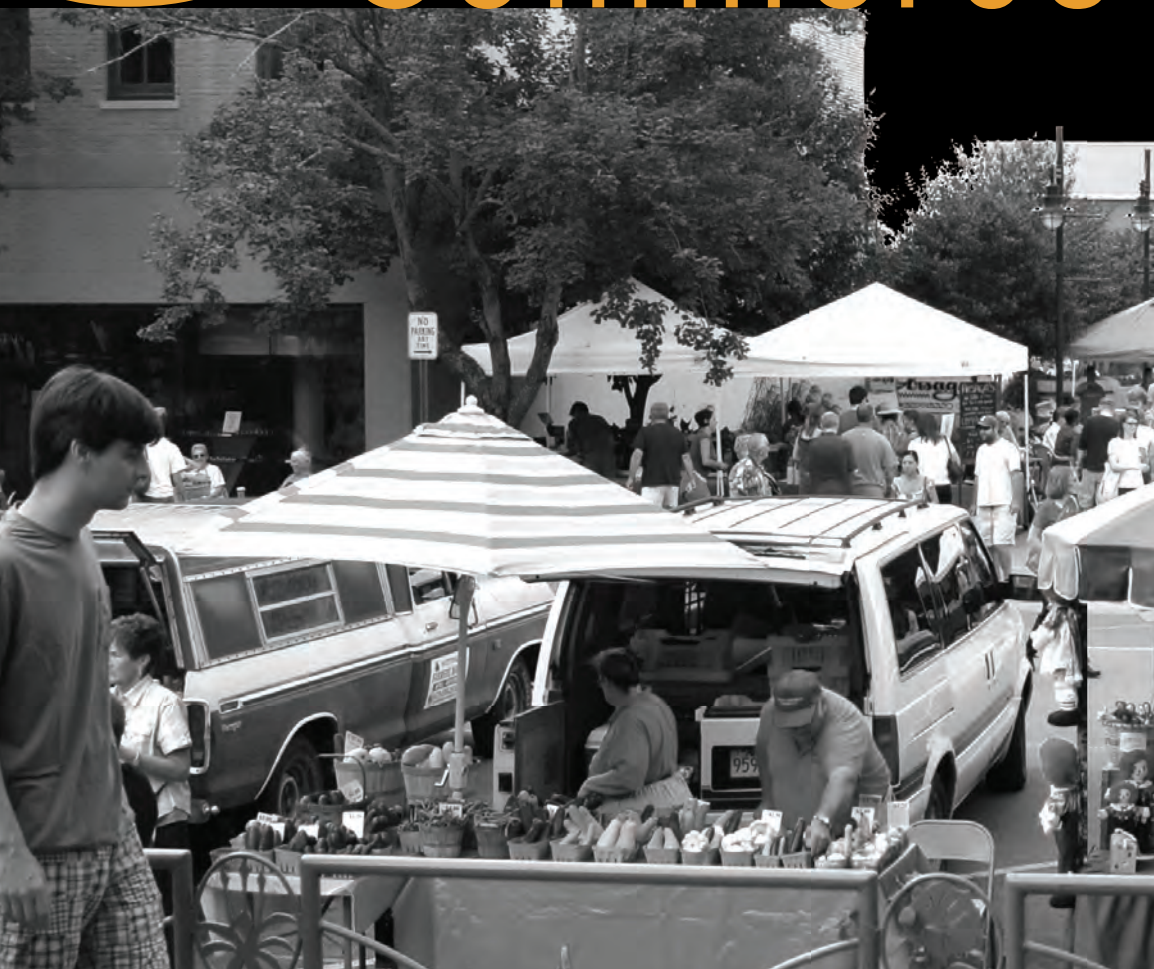
Success also depends on local government's ability to implement infrastructural improvements supportive of TOD market investments.

import costs, and shifting consumer expenditures to more locally-produced goods." (Litman: 2006)

3

What if commerce were integrated into the development of NWA neighborhoods?

Commerce



Will support small businesses and regional supply chains, enhancing the availability of locally produced quality products and services.

Will produce a vital and interesting street life, reestablishing community and personal relations in local commerce.

Will improve convenience of everyday shopping through farmer's markets, urban arcades, neighborhood grocers, green grocers, and street vendors.

In terms of transit and commerce did you know...

A 2002 study showed that participants were willing to pay 12% more to shop on tree-lined streets like those in TOD neighborhoods. They perceived shops on tree-lined streets as better maintained, more pleasant, and having higher quality products.

Every dollar that U.S. taxpayers invest in rail transit generates $6 or more in economic returns. No other transportation system has comparable economic development power.

A typical set of transit investments creates 19% more jobs than the same amount spent on a typical set of road and bridge projects.

On average, a typical state/local government could realize a 4-16 percent gain in revenues due to increases in both income and employment generated by transit investments.

Residents of cities with well-established rail transit systems spend an average of 16% of their total household expenditures on transportation, compared with cities that lack rail systems, whose residents spend 18%.

Percentage of total household expenditures on transportation in Arkansas: 20.5%.

Americans living in transit-intensive areas save $22 billion each year by using public transportation.

...Bentonville now

Mixed-use communities have a more robust economy and are less costly to service than ‘bedroom

rail transit could incubate under-utilized local commercial environments...

communities' comprised only of residential land uses. This was confirmed in the "Cost of Community

Services Study" conducted by the American Farmland Trust, showing that farmland and open space

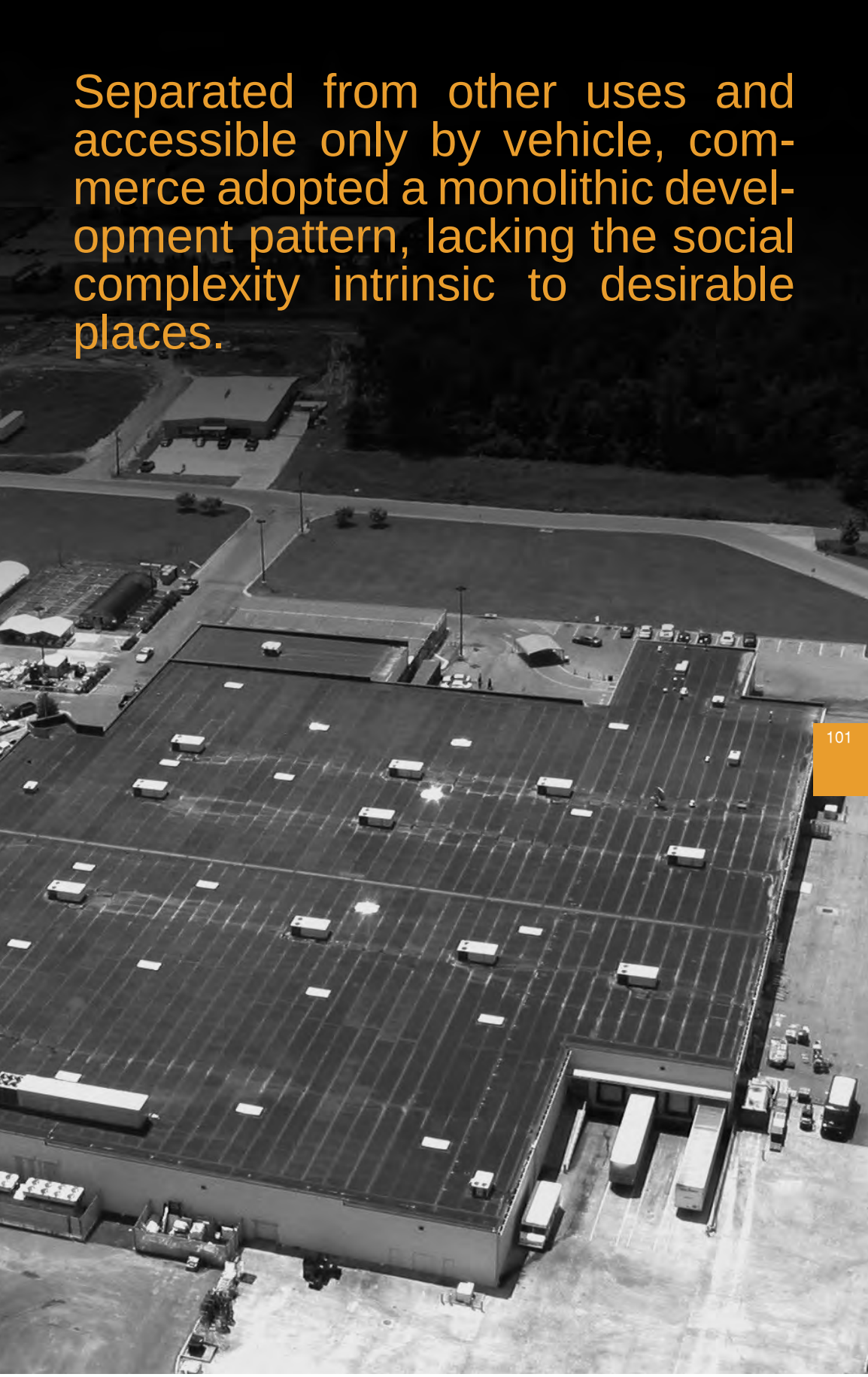
required $.53 in services for every dollar paid in taxes whereas residential land required $1.14 for

every dollar paid in taxes. The annual cost of providing public services was 43% higher for sprawling

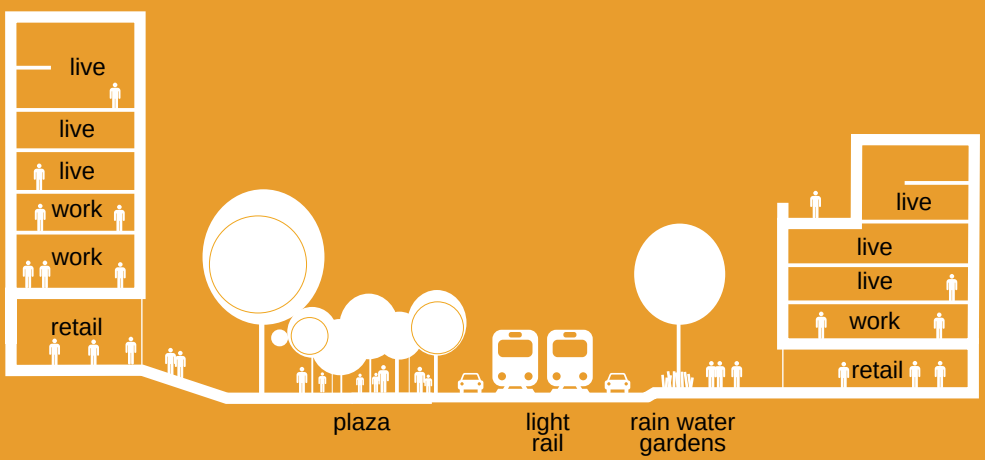
development compared with compact development. Most environmental problems are reflections of

social problems. “The winners in the new economy will be those regions that learn to work together

Separated from other uses and accessible only by vehicle, commerce adopted a monolithic development pattern, lacking the social complexity intrinsic to desirable places.



to relieve traffic congestion, build affordable housing, preserve open space, and promote economic



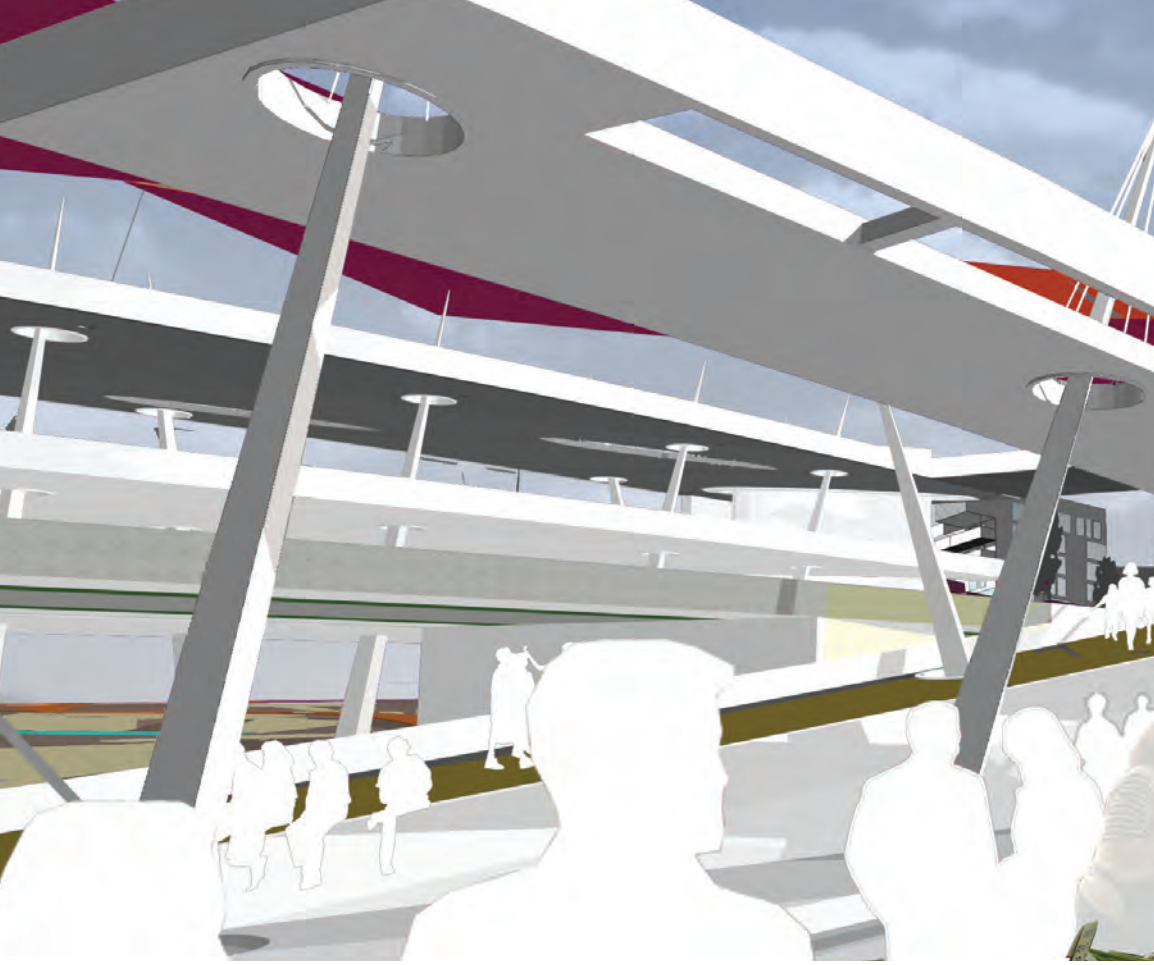
transit corridor streetscape

development", states author and former mayor of Indianapolis, William Hudnut. Political leadership must

introduce landscape systems into transit corridors

green streets facilitate greater social and economic exchange

substitute the *silos* of specialized thinking with integrated approaches to planning and development. The

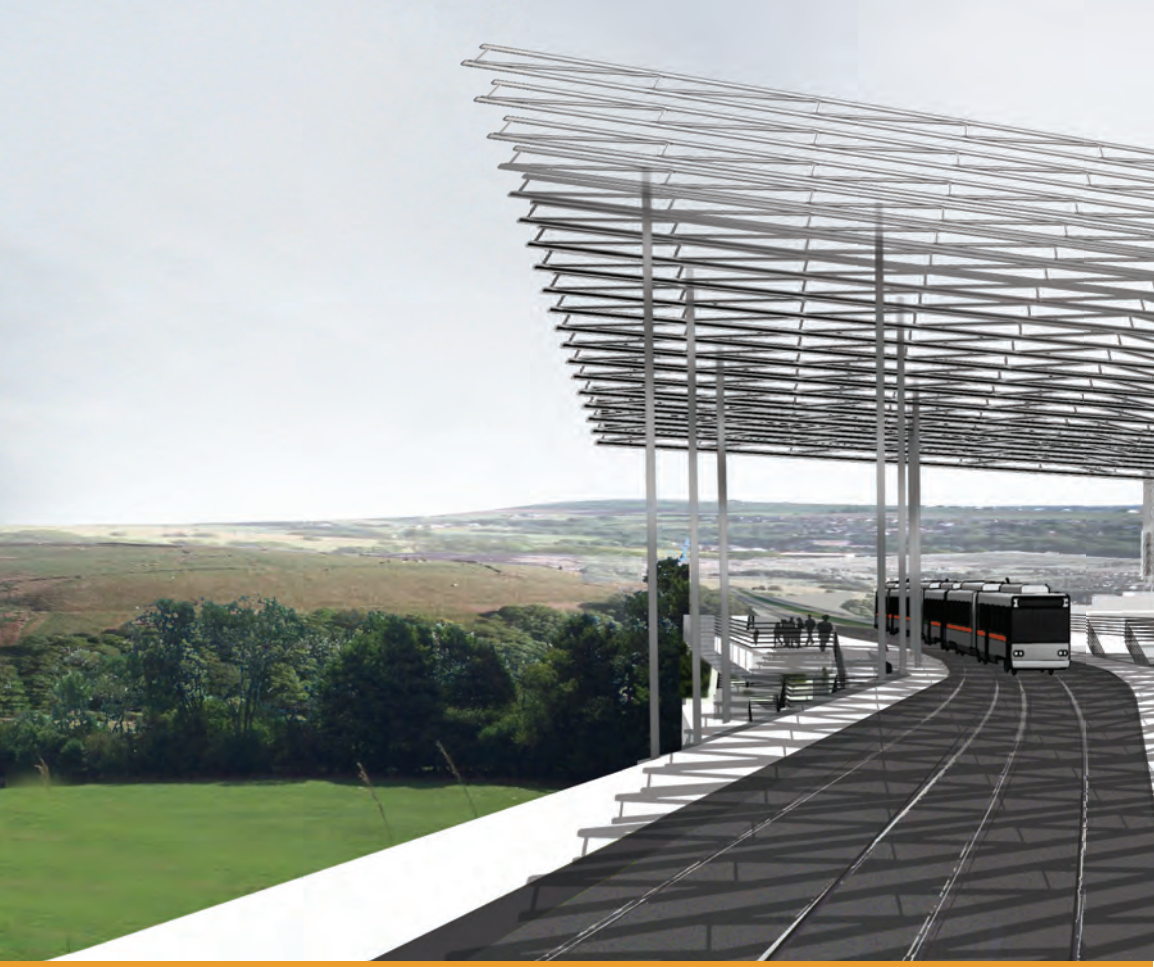


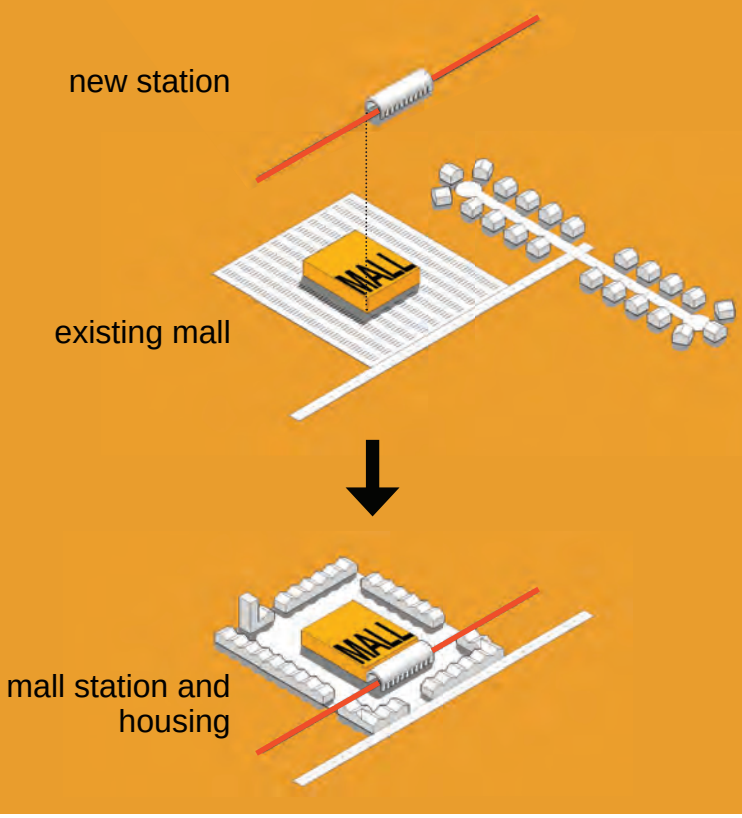
environmental costs of sprawl are high: three to four times more miles of road are needed to serve

integrate the transit experience with other activities

Lowell has the greatest potential to be an exemplary transit town as it emerges from being a collection of subdivisions

development in suburban communities versus urban centers, and ten times more in rural communities.



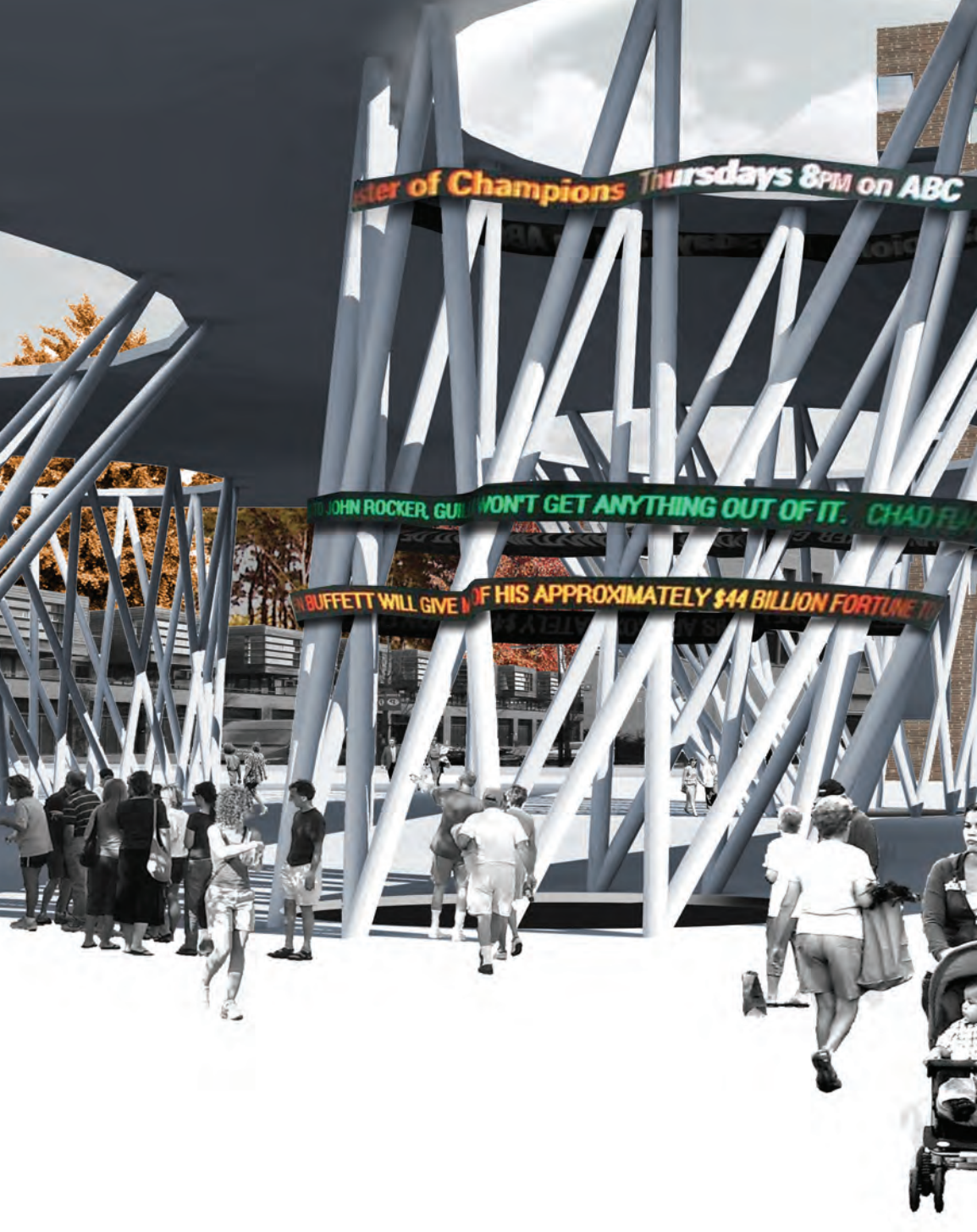


Every hour more than fifty acres of U.S. farmland are consumed by development. Studies indicate

revitalize and strengthen regional commercial anchors

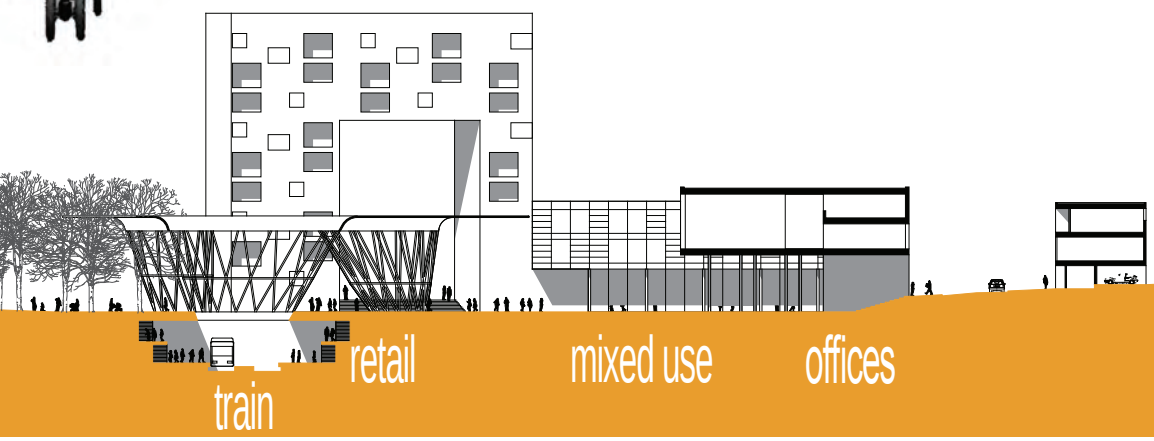
the single-use zoning of the NWA Mall area could be readily transformed into a mixed-use neighborhood

that per capita traffic fatality rates decline with increased per capita transit ridership. “Compared



to private vehicles, public transportation produces 95% less carbon monoxide (CO), more than 92%

TOD mixed-use creates greater consumer traffic and social exchange



fewer volatile organic compounds for every passenger mile traveled." (www.publictransportation.org)

4

What if NWA directed its growth to become a model region for sustainability, lowering energy footprints, and weaving nature into the city?

Environme

Will support less land consumption since rail transit prompts urban and dense development.

Will reduce energy consumption, as rail requires less energy per capita than the automobile.

Will reverse land development sprawl, allowing for conservation of valuable ecological systems.

ent

In terms of transit and the environment did you know...

Light rail is an emissions-free transit mode.

Light rail consumes fuel at one-third the rate of a car and one-fourth that of an SUV per passenger mile.

Public transportation saves more than 855 million gallons of gasoline, or 45 million barrels of oil a year—a level equivalent to the energy used to heat, cool, and operate one-fourth of all American homes annually.

Regions are scrambling to follow San Francisco's commitment to supply 50% of its municipal power budget from renewable energy resources by 2015.

Converting land from second-growth forest to pavement represents an irreversible environmental cost of $25,000 per acre, and $40,000 per acre of wetland.

Highway fatalities in U.S. during 2001: 46,803

Light rail fatalities in U.S. during 2001: 22 (21 due to motorists illegally crossing over rail tracks)

Sprawl increases local road lane-miles 10%, annual public service costs about 10%, and housing costs about 8%, increasing total costs an average of $13,000 per dwelling unit.

Since transit causes otherwise sedentary people to walk or bicycle an hour or more a week it provides significant health benefits.

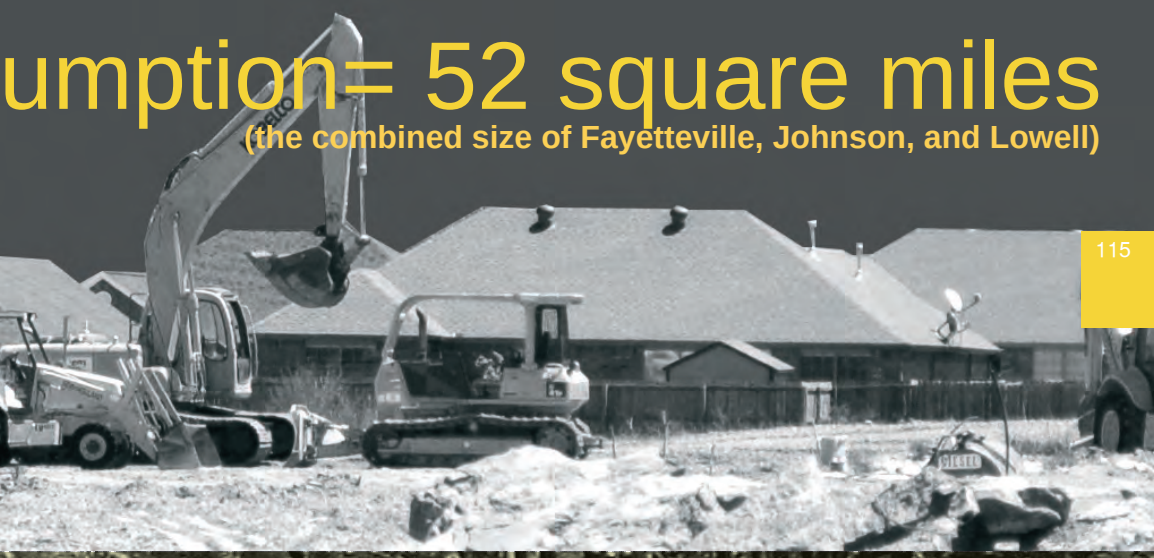
At four units per acre the 2050 NWA housing buildout alone will consume 33,677 acres of farm and natural lands.

2050: projected land cons

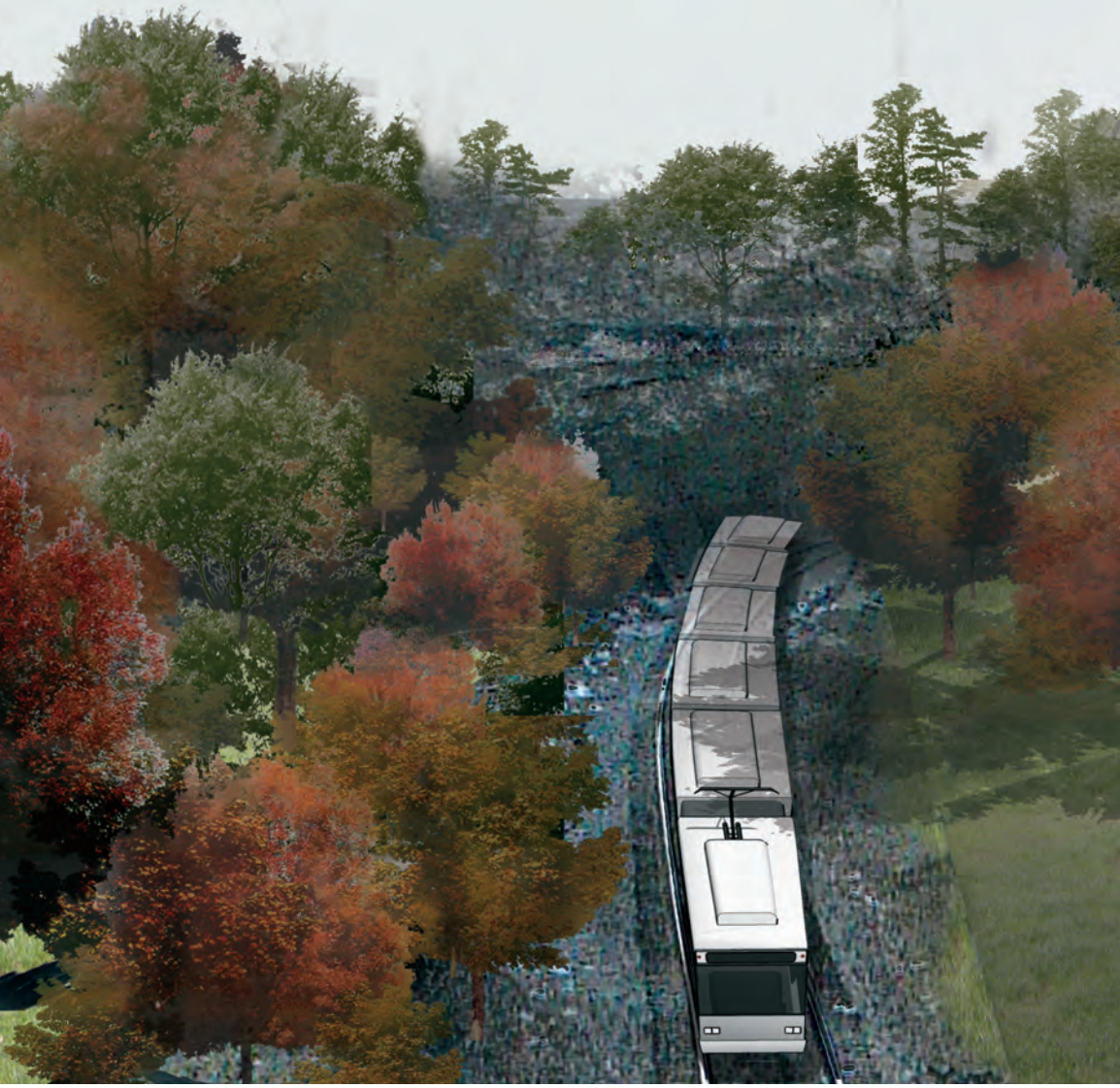
Studies show that once 10% of a watershed's surface is paved, degradation takes place, and

umption= 52 square miles

(the combined size of Fayetteville, Johnson, and Lowell)



at 30% paved, irreversible environmental degradation occurs within the watershed. Two-thirds



of Los Angeles' surface area is paved. Houston provides the equivalent of 30 parking spaces

per household, far above the national average of eight spaces per household. Automobile

infrastructure requires 12 times the surface area of rail transit infrastructure. One study showed

city park preserve

that state economies with strong environmental standards have grown nearly one-half percent

faster than states with weaker environmental standards. Electrified transportation, like light rail,

is more environmentally benign as central power plants are more efficient thermodynamically

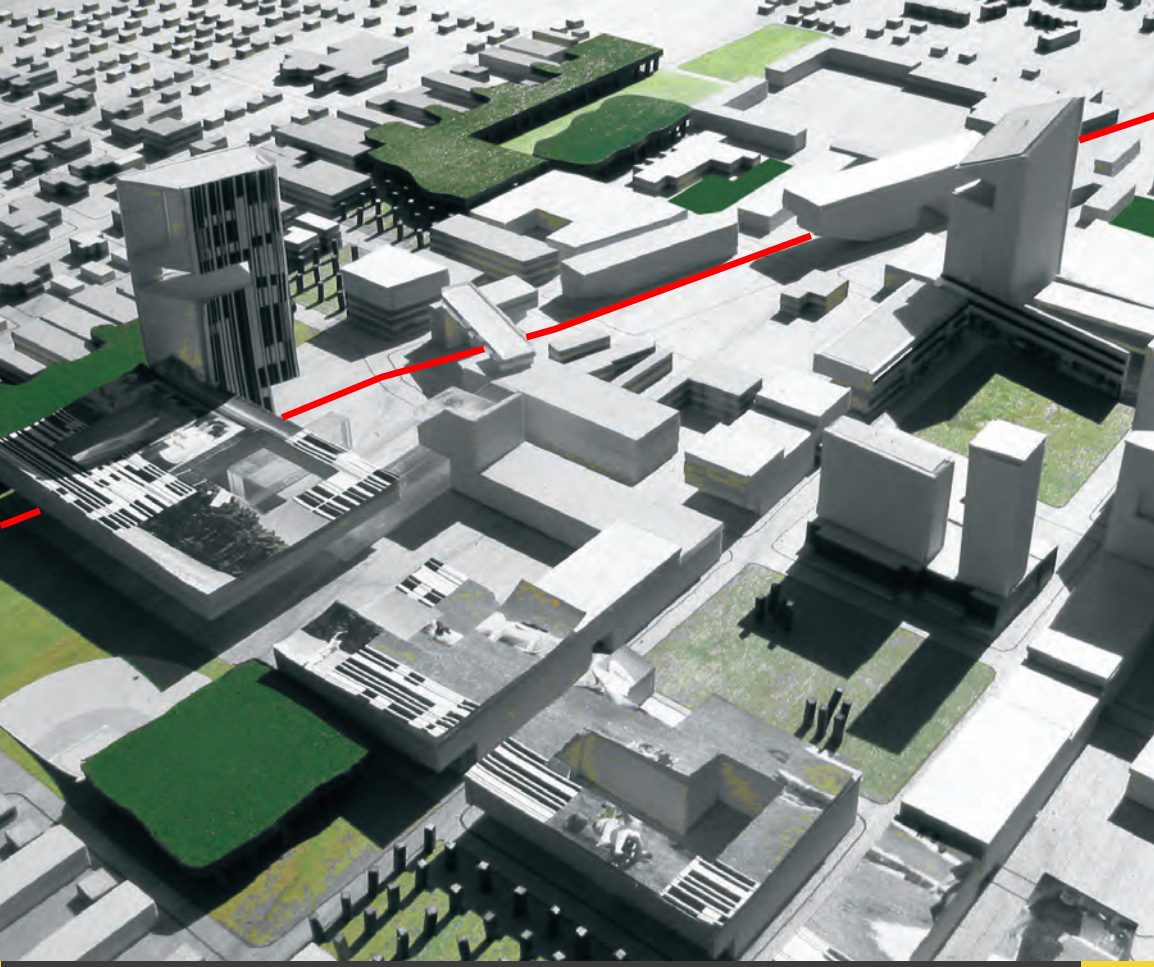
and their emissions can be more easily controlled. Electric motors are dramatically more efficient

cultivate floodplains in urban areas as development assets

higher density commercial development requires fewer roads, which lessens the impact on urban streams and waterways

than internal combustion engines. TOD is also more energy-efficient in providing services and

moving goods. Postal workers can walk their routes, many police can walk or bicycle a beat,



TOD densities preserve forestry for urban “green rings” and parks

greenway systems also maximize pedestrian connectivity, complementing other transit modalities

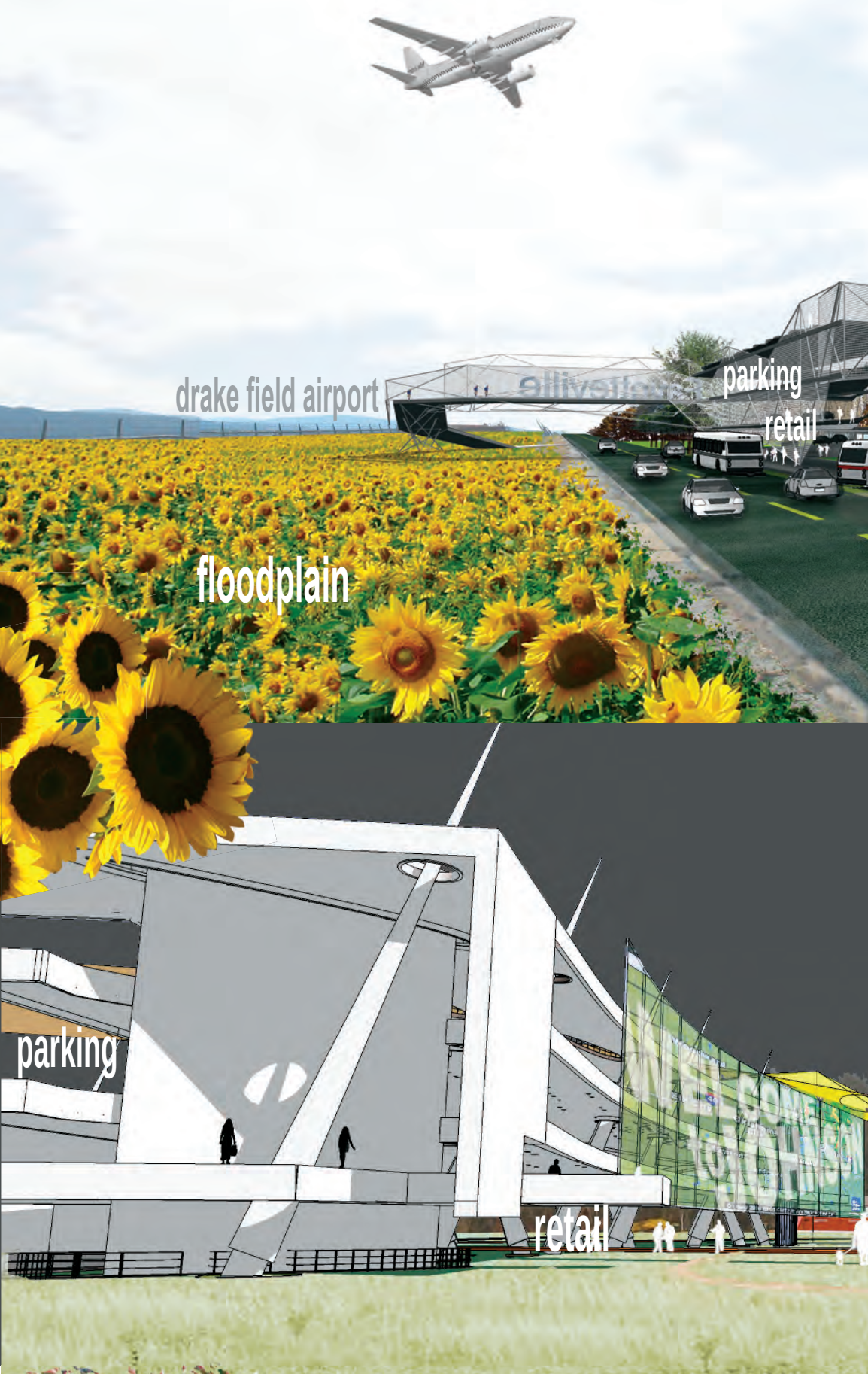
and deliveries can be concentrated rather than spread out, states Robert L. Hirsch in “Peaking

of World Oil Production: Impacts, Mitigation, & Risk Management". In her book *Asphalt Nation*,

distinct urban-ecological edges amplify the benefits of both urban and ecological services

like beaches, being at the edge creates value

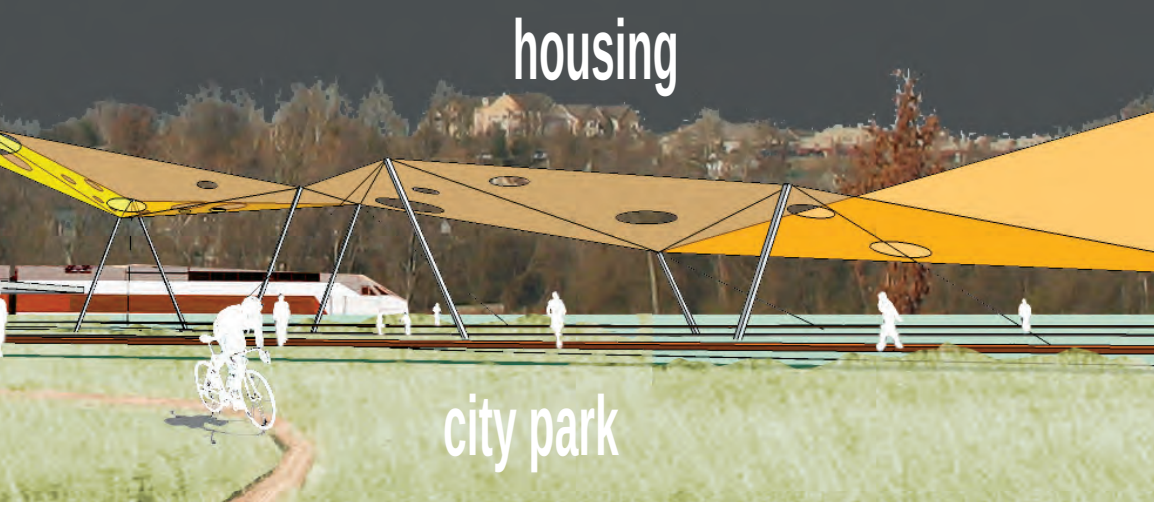
Jane Holtz Kay recalls a speech by President Reagan before the Detroit Automobile Club where



he “asked for an end to the huge federal subsidy of $35 per train passenger, ignoring the $42

Arkansas: “The Natural State”

urban development + landscape creates unique gateways for NWA communities

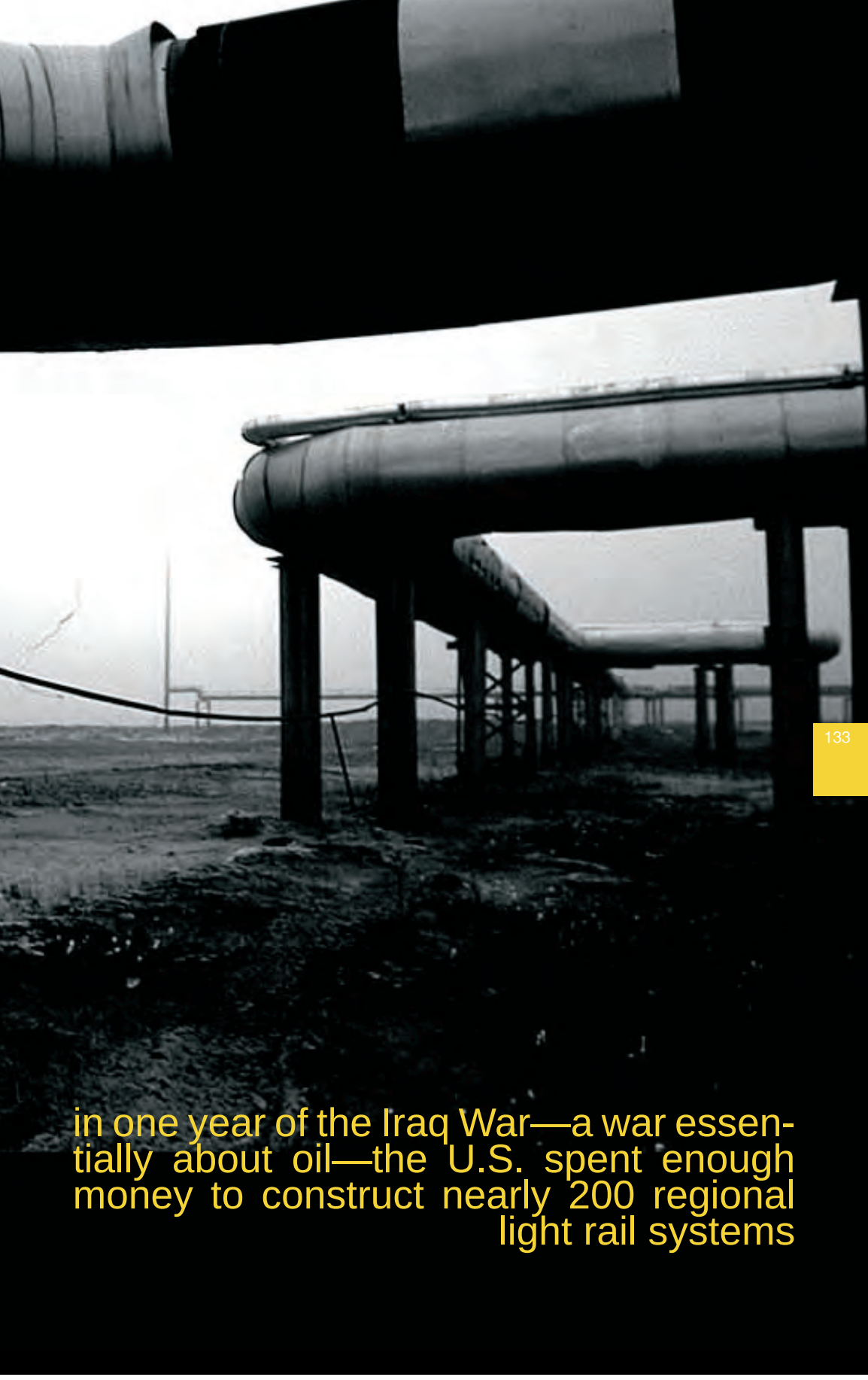


subsidy per flyer and the auto-based subsidies at seven times ($245) mass transit’s.” Highway

construction costs average about $10 million per lane mile. From a household's perspective,

rail transit provides an attractive return on investment: quality rail transit requires about $95

annually per capita in additional taxes, but provides direct transportation cost savings that



in one year of the Iraq War—a war essentially about oil—the U.S. spent enough money to construct nearly 200 regional light rail systems

average about $450 annually, indicating an annual financial return of about 500%. (Litman: 2007)


Seattle
King County
Portland
Washington County
Springfield
Minneapolis
St. Paul
Salt Lake City
Chicago
Sacramento
San Francisco
San Jose
Santa Clara County
Weber County
Ft. Collins
Denver
Johnson County
St. Louis
Las Vegas
Los Angeles
Orange County
Albuquerque
NWA?
San Diego
Phoenix
Little Rock
Dallas
Austin
New Orleans
Houston
Galveston
Prince William
Wasilla
Girdwood
Honolulu
San Juan

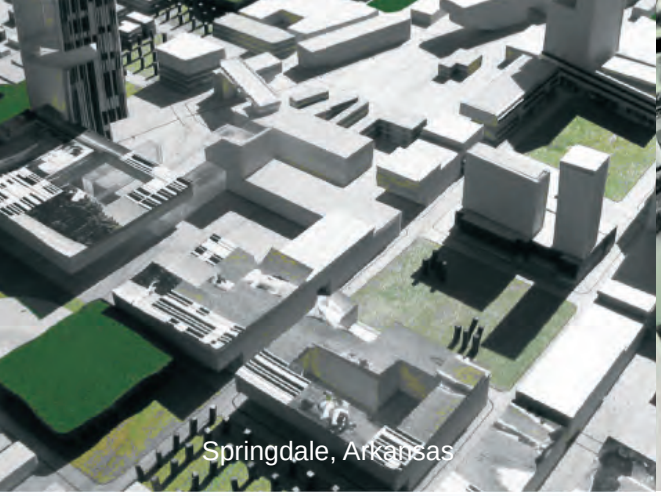
the future is now

More than 60 “new economy” regions nationwide have developed rail transit systems. Could rail transit help NWA to become the “Center of the New Smart South”?

These 60 regions compete for the same labor pool, business starts, and creative economic development as NWA. Will lack of planning foresight compromise our future economic sustainability when compared to peer regions?

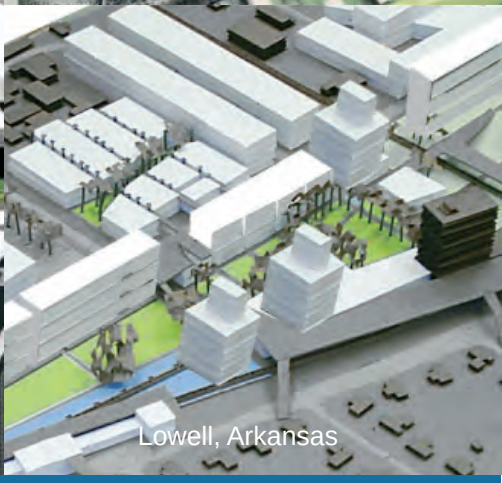
More then simply a movement system, transportation is an ecology determining how cities function. Rail communities consistently experience expansive economic and environmental returns. Rail will multiply lifestyle choices for NWA.

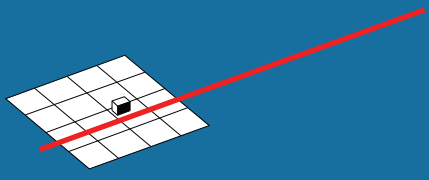
The NWA rail system would intensify urban living scenarios while also serving residents who choose to live outside the city in the region’s distinguished Ozark Plateau landscape—now threatened by sprawling development. Rail operates as a multiplier development force for creating more innovative and sustainable forms of living.


Springdale, Arkansas

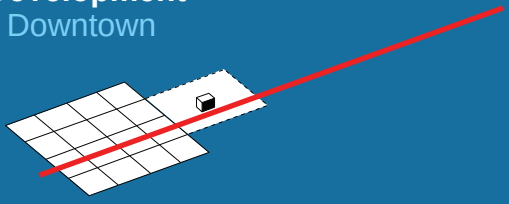

Johnson, Arkansas


Bentonville, Arkansas


Lowell, Arkansas



Infill Development
Urban Downtown



First Ring Development
Urban Neighborhood
Suburban Town Center

Greenfield Development
Suburban Neighborhood
Commuter Town Center

Different transit stops would emphasize different uses given their respective contexts. Several NWA locations already house concentrated employment centers. Historic downtowns would likely absorb the greatest mix of uses while greenfield sites would likely favor residential development followed by retail. Though a full range of uses would not necessarily occur at each stop, a linear mix of uses would likely become distributed throughout the line, balancing cycles and frequencies of use.

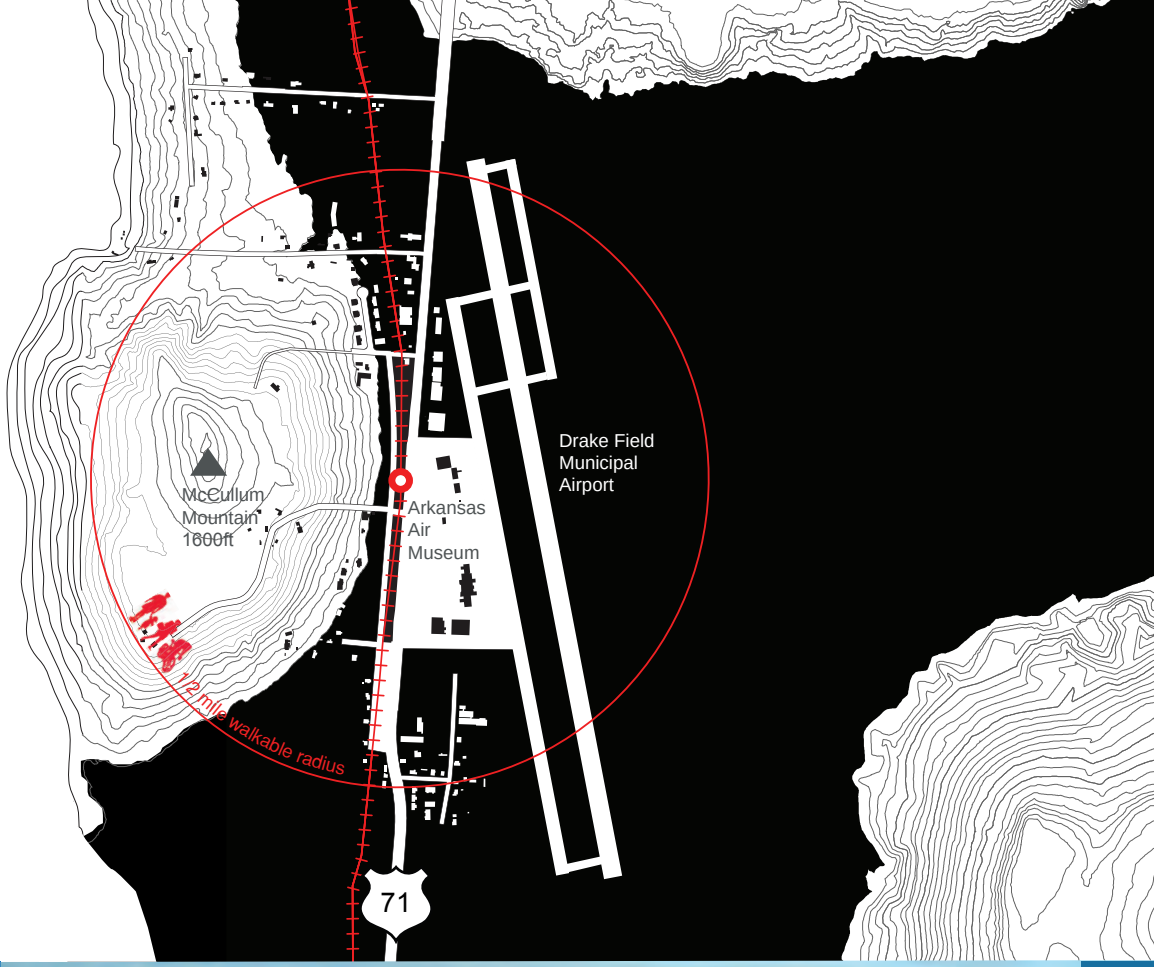
TOD station types

TOD Type	Land Use Mix	Minimum Housing Density	Frequencies
Urban Downtown	Office Center Urban Entertainment Multifamily Housing Retail	>60 units/acre	<10 minutes
Urban Neighborhood	Residential Retail Commercial	>20 units/acre	10 minutes peak 20 minutes off-peak
Suburban Town Center	Primary Office Center Urban Entertainment Multifamily Housing	>50 units/acre	10 minutes peak 15 minutes off-peak
Suburban Neighborhood	Residential Neighborhood Retail Local Office	>9 units/acre	20 minutes peak 30 minutes off-peak
Commuter Town Center	Retail Center Residential	>9 units/acre	Peak service Demand responsive

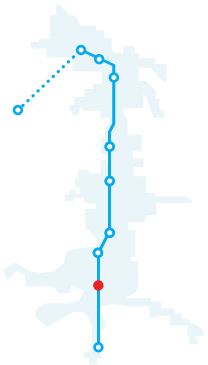
Modified from Reconnecting America, *Hidden in Plain Sight: Capturing the Demand for Transit*

Drake Field Station

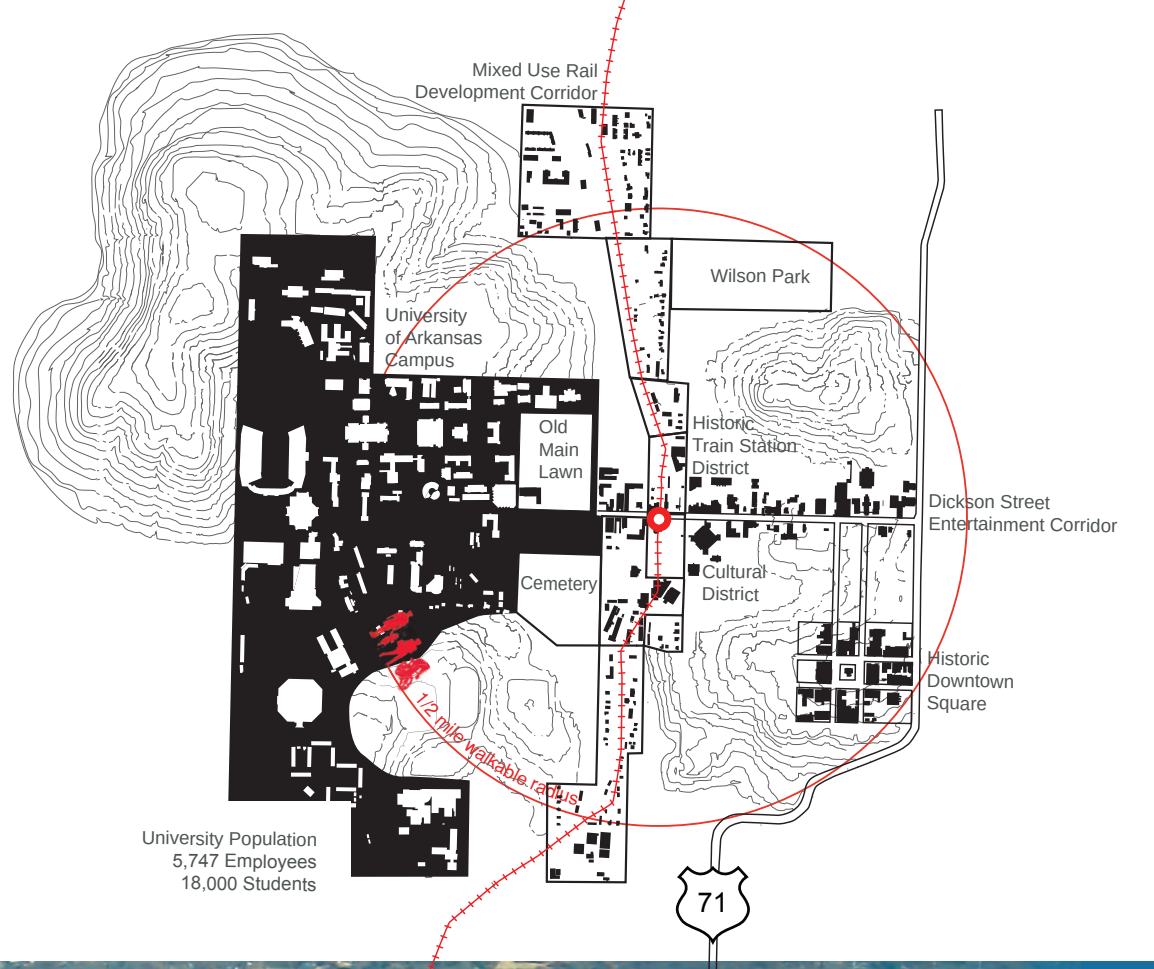
intermodal transit gateway


Drake Field
Municipal
Airport
McCullum
Mountain
1600ft
Arkansas
Air
Museum
1/2 mile walkable radius
71

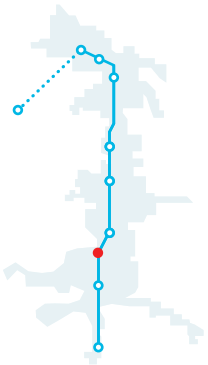
Dickson Street Station



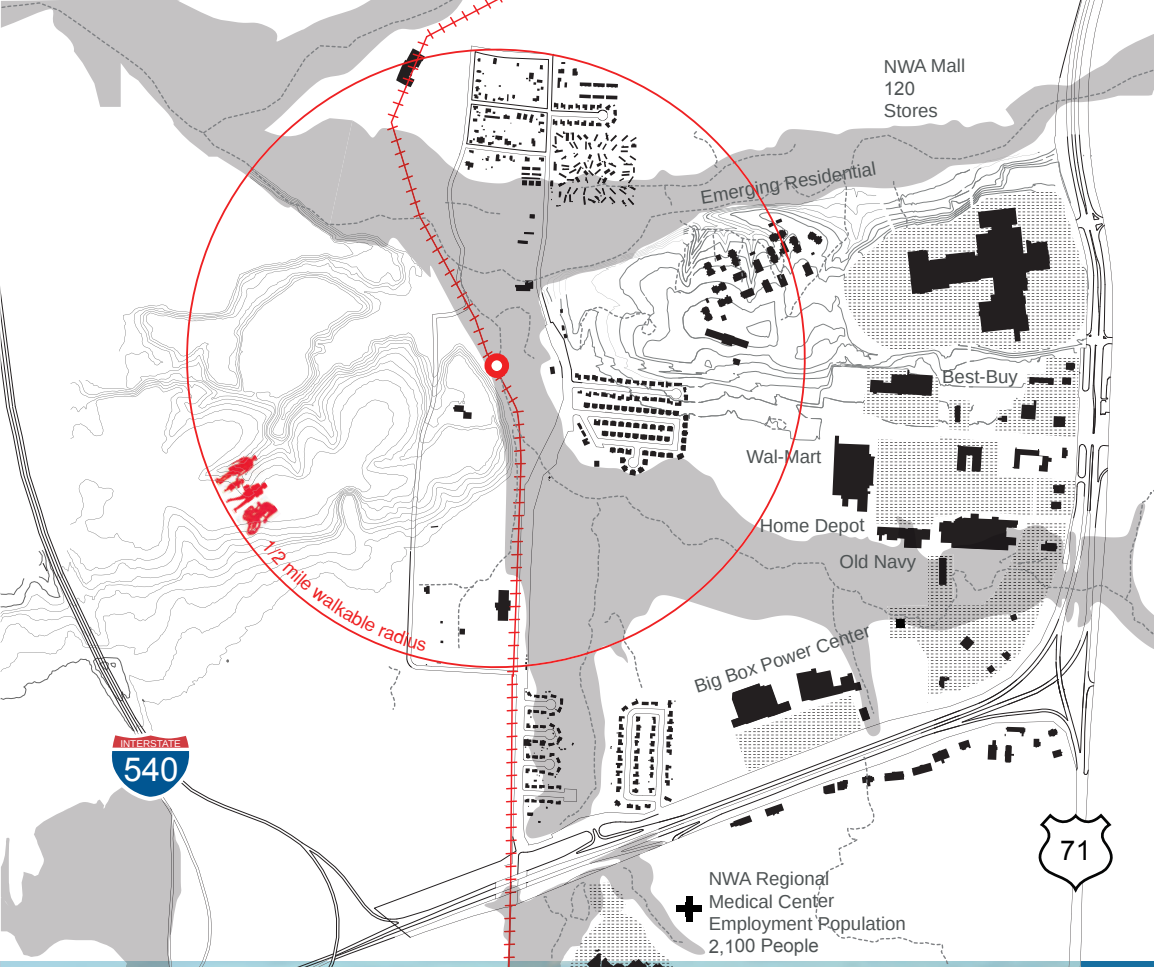
premiere statewide education and entertainment destination


Mixed Use Rail
Development Corridor
Wilson Park
University
of Arkansas
Campus
Old
Main
Lawn
Historic
Train Station
District
Dickson Street
Entertainment Corridor
Cemetery
Cultural
District
Historic
Downtown
Square
1/2 mile walkable radius
University Population
5,747 Employees
18,000 Students
71

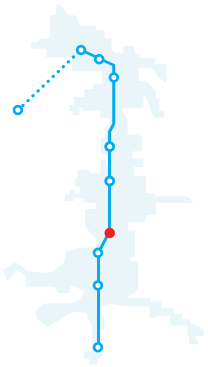
NWA Mall Station



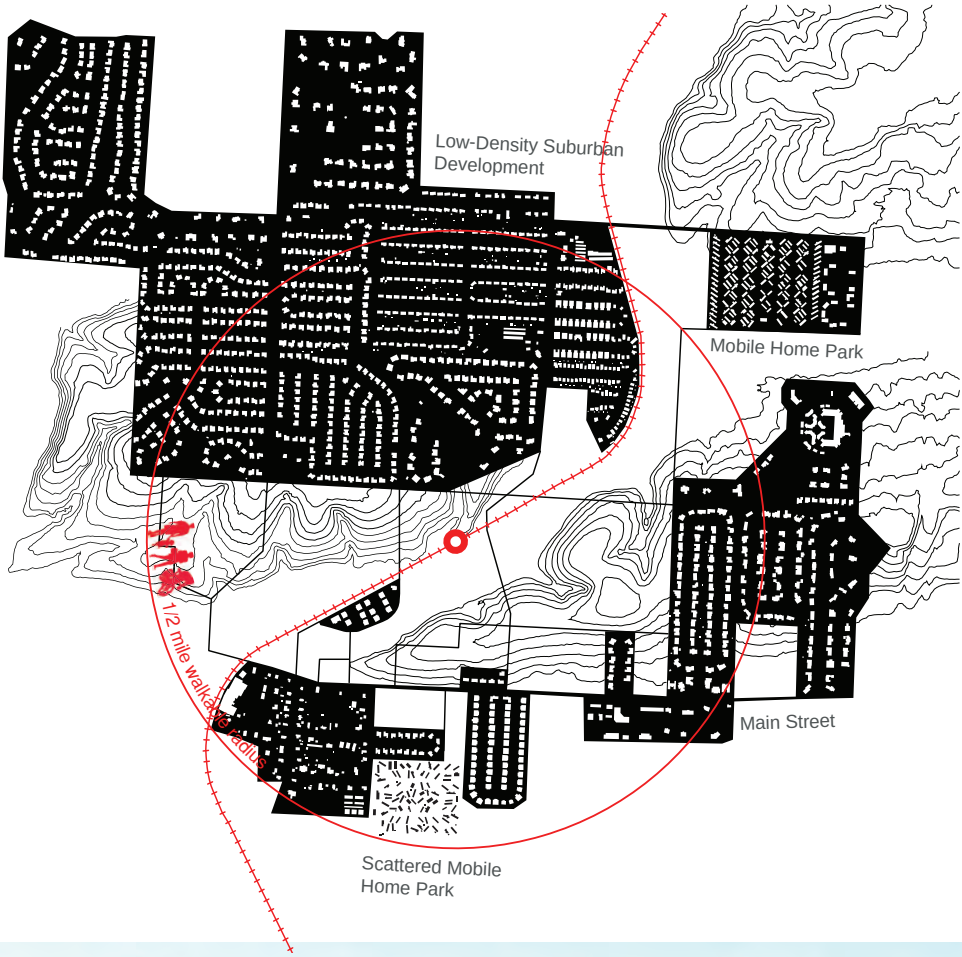
regional commercial anchor
with emerging mixed uses


NWA Mall
120
Stores
Emerging Residential
Best-Buy
Wal-Mart
Home Depot
Old Navy
Big Box Power Center
1/2 mile walkable radius
INTERSTATE
540
71
NWA Regional
Medical Center
Employment Population
2,100 People

Johnson Station



one of the fastest developing cities in NWA


Low-Density Suburban Development
Mobile Home Park
1/2 mile walkshed radius
Main Street
Scattered Mobile Home Park

Springdale Station

one of the more underutilized downtowns

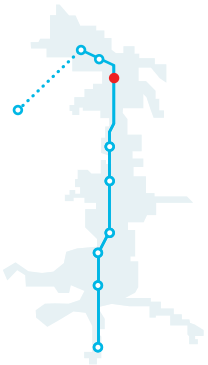

Commercial
Arterial
Existing
Downtown
Bluff Cemetery
Emma
Avenue
Urban
Neighborhoods
Industrial District
1/2 mile walkable radius
71

Lowell Station

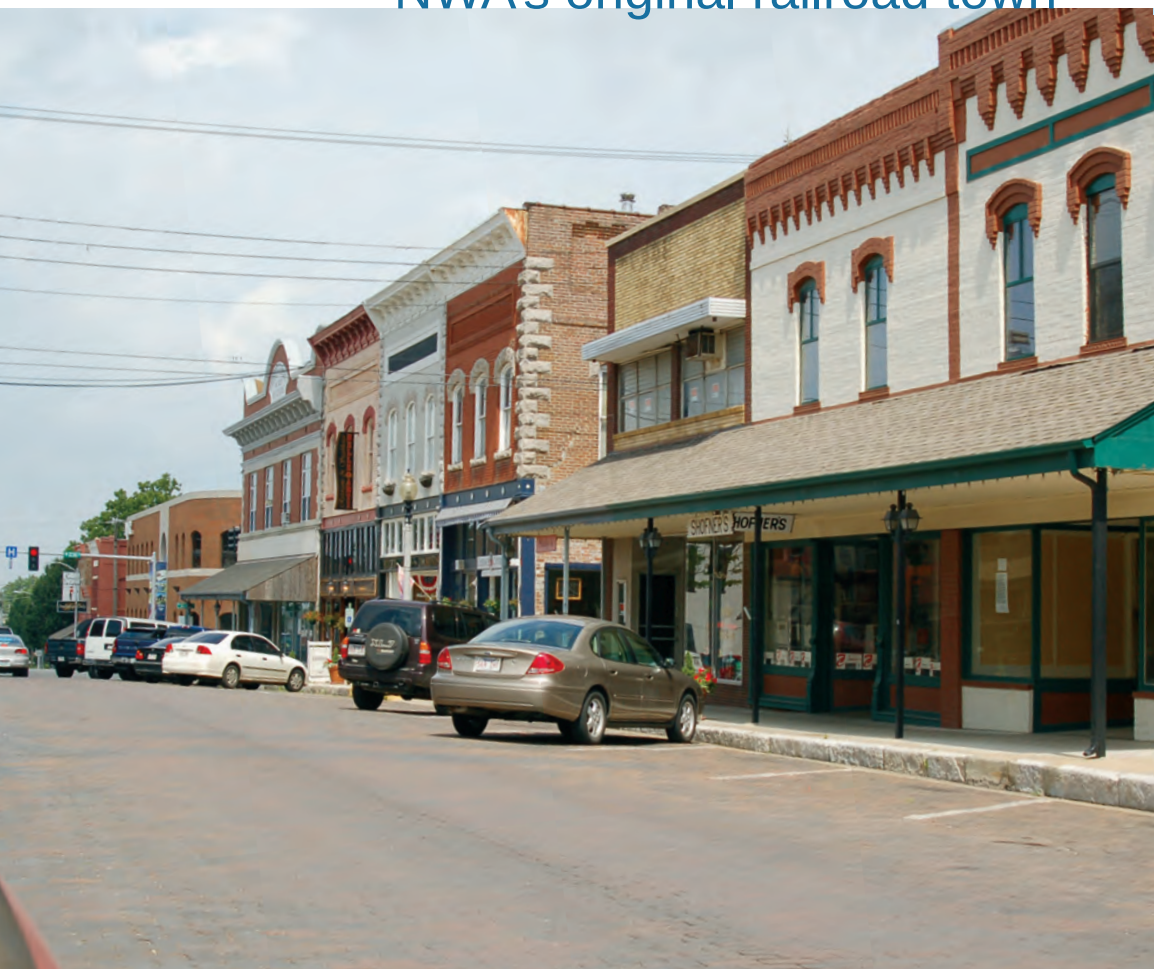
an emerging greenfield city

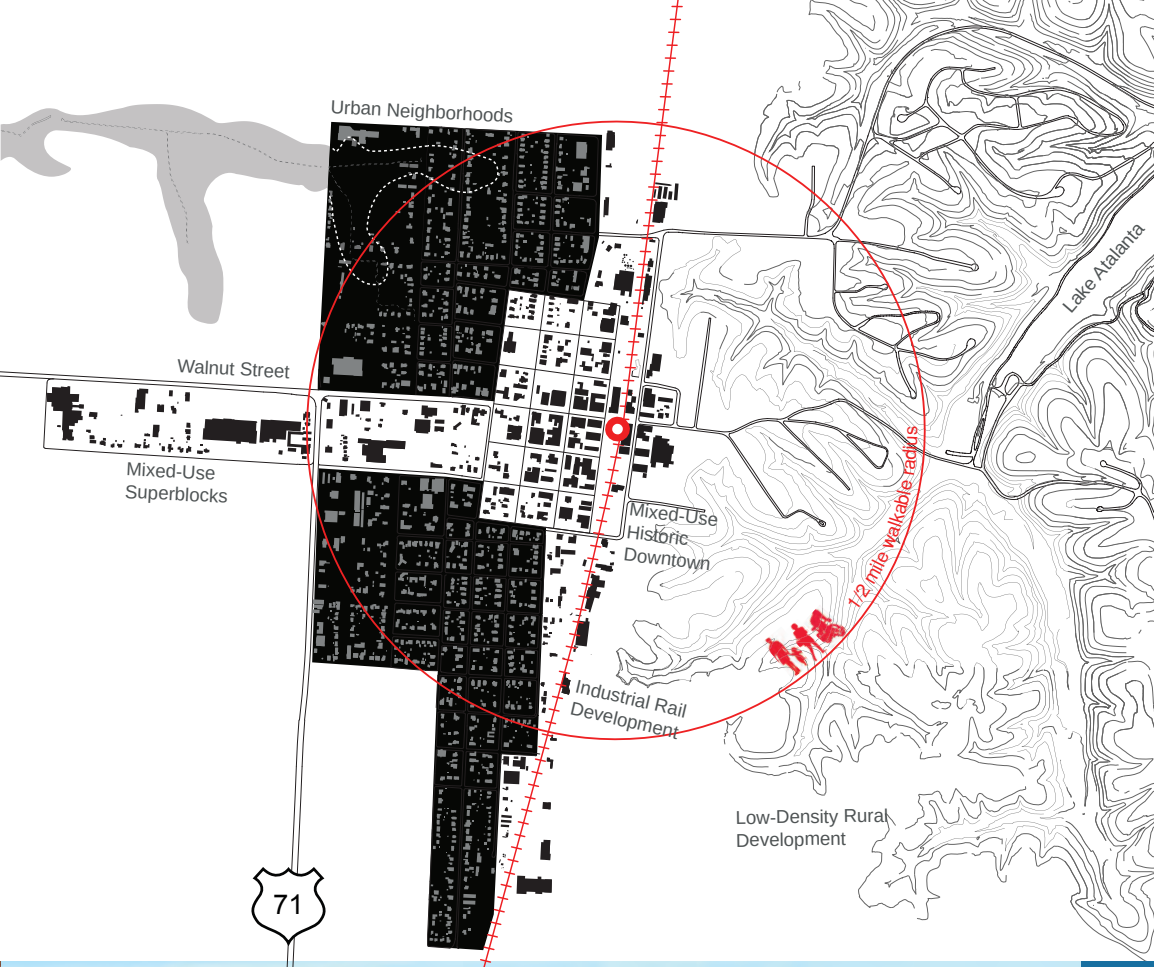

Single-Family
Subdivisions
Town
Center
1/2 mile walkable radius
INTERSTATE
540

Rogers Station

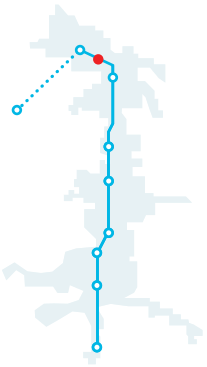


NWA's original railroad town

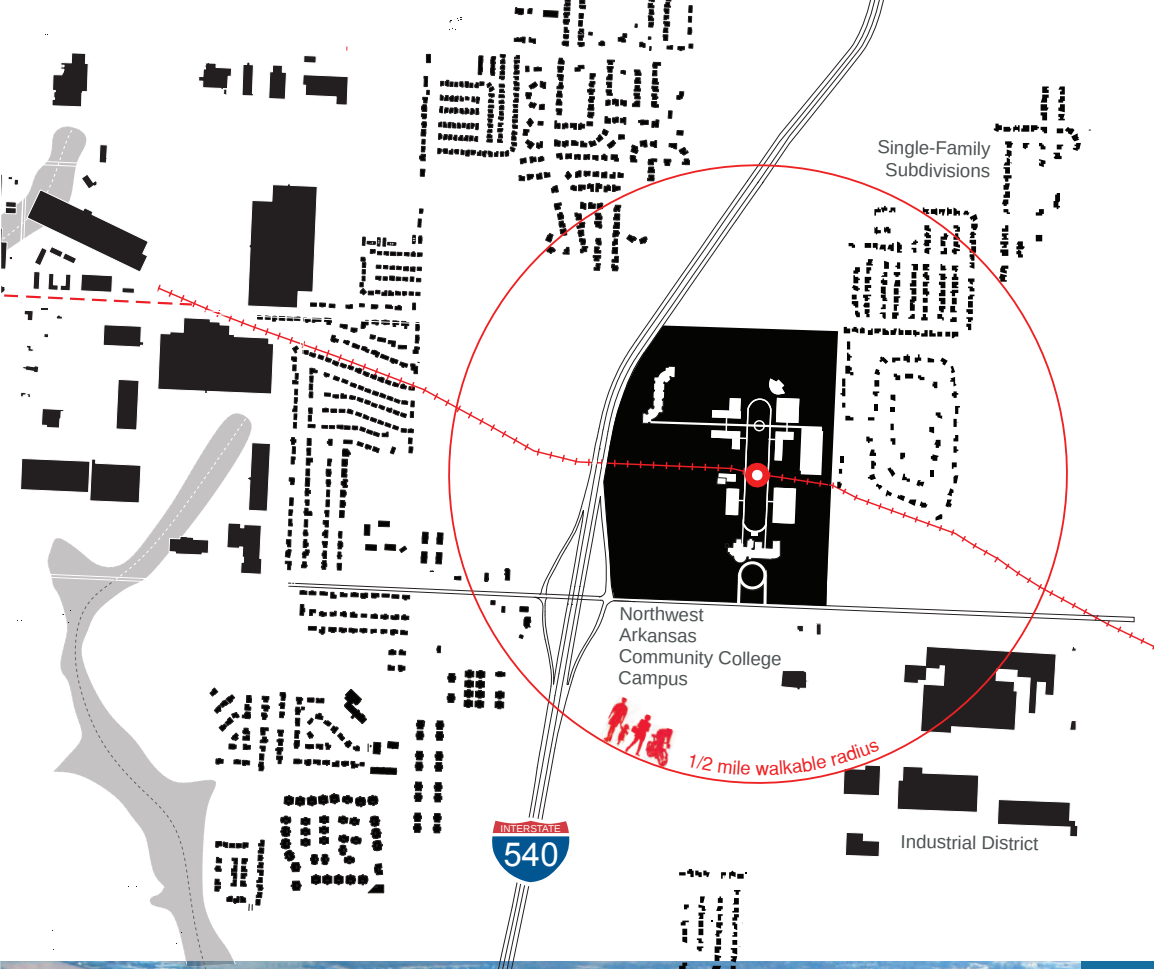



Urban Neighborhoods
Walnut Street
Mixed-Use
Superblocks
Mixed-Use
Historic
Downtown
1/2 mile walkable radius
Industrial Rail
Development
Low-Density Rural
Development
Lake Atalanta
71

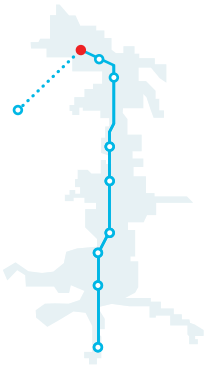
NWACC Station



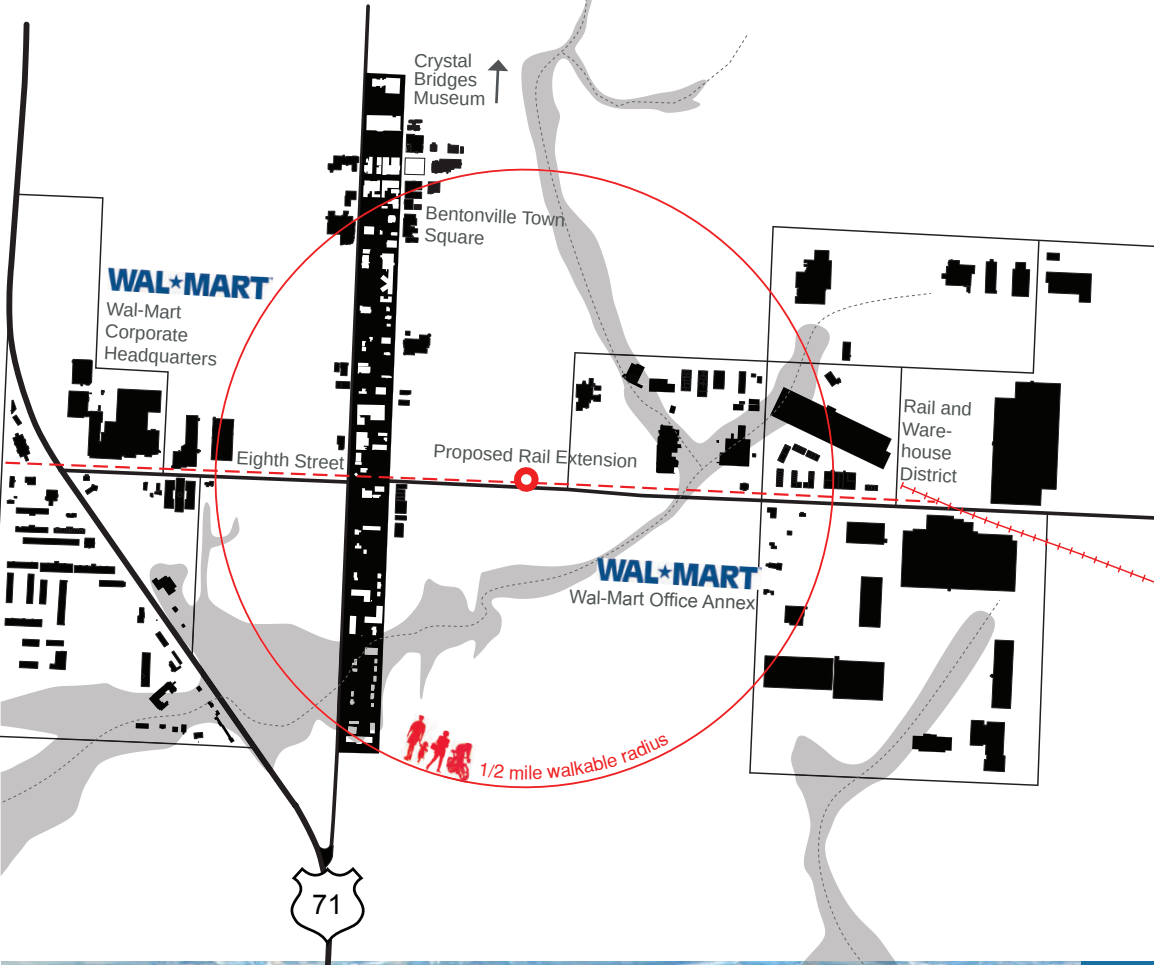
regional commuter school of 4,400


Single-Family
Subdivisions
Northwest
Arkansas
Community College
Campus
1/2 mile walkable radius
INTERSTATE
540
Industrial District

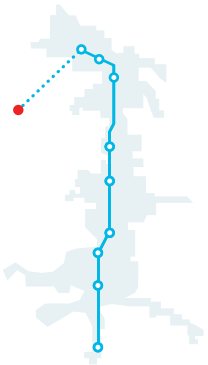
Bentonville Station



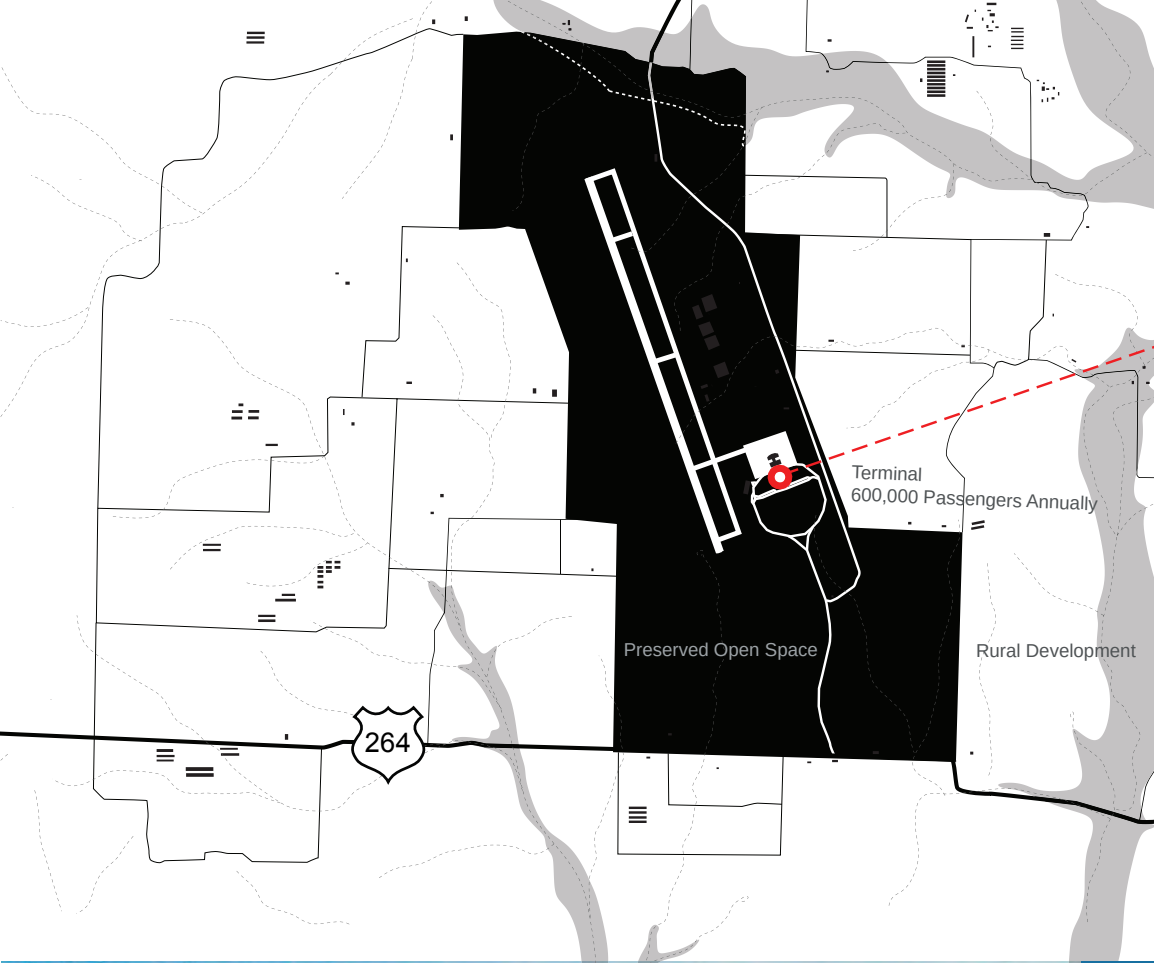
Wal-Mart Headquarters employs more than 10% of the region's population


Crystal Bridges Museum
Bentonville Town Square
WAL★MART
Wal-Mart Corporate Headquarters
Eighth Street
Proposed Rail Extension
Rail and Warehouse District
WAL★MART
Wal-Mart Office Annex
1/2 mile walkable radius
71

XNA Airport Station



direct connections to 18 U.S. cities


Terminal
600,000 Passengers Annually
Preserved Open Space
Rural Development
264

If you are a political or business leader, facilitate funding for a NWA Rail Transit Feasibility Study and implement smart growth in our region.

Educate yourself further about land development issues and their role in determining quality of life.

If you are affiliated with the University, organize your activities or scholarship to address sustainability issues in NWA.

Speak to other groups about the importance of sustainable growth in NWA.

Support development projects with mixed uses and higher densities in NWA downtowns that are transit supportive.

If you are a civic organization, develop an official platform calling for study of rail transit feasibility.

The most important thing you can do is to let your U.S. Congress persons and Senators know of your support for further study of rail transit feasibility.

If you fill a leadership position in our region, understand what is at stake.

what you can do...

Calthorpe, Peter and Fulton, William. *The Regional City: Planning for the End of Sprawl*, Washington DC: Island Press, 2001.

Calthorpe, Peter. *The Next American Metropolis: Ecology, Community, and the American Dream*, New York: Princeton Architectural Press, 1993.

Dittmar, Hank and Ohland, Gloria, ed. *The New Transit Town: Best Practices in Transit-Oriented Development,* Washington DC: Island Press, 2004.

Dunphy, Robert T., *et al. Developing Around Transit: Strategies and Solutions That Work,* Washington DC: ULI-the Urban Land Institute, 2004.

November 2005 NWA-LRTS Forum Northwest Arkansas Light Rail Transit System: http://www.nwa-lrts.org/ .

Litman, Todd. *Evaluating Public Transit Benefits and Costs: Best Practices Guidebook*, British Columbia: Victoria Transport Policy Institute, 2006, www.vtpi.org .

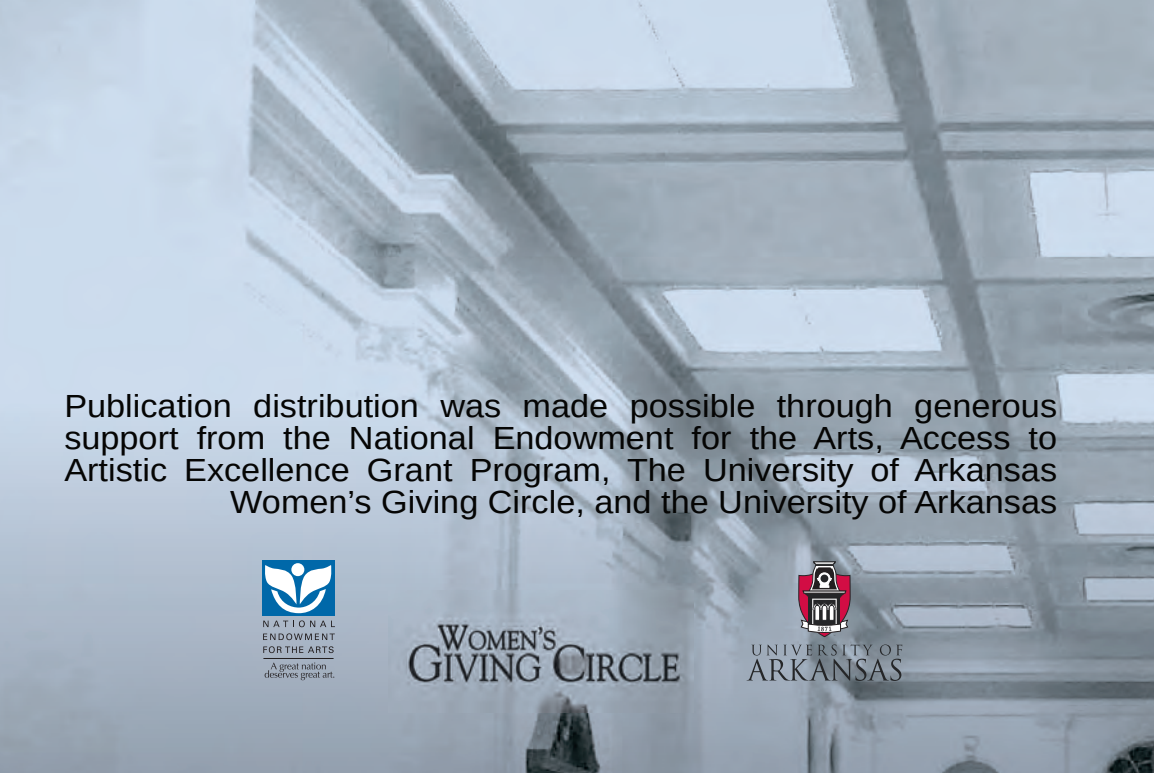
Litman, Todd. *Evaluating Rail Transit Criticism,* British Columbia: Victoria Transit Policy Institute, 2007, www.vtpi.org .

Reconnecting America Center for Transit-Oriented Development. *Hidden in Plain Sight: Capturing Demand for Housing Near Transit*, September 2004, http://www.reconnectingamerica.org/html/TOD/index.htm .

Zykofsky, Paul. *Building Livable Communities with Transit,* Sacramento: Local Government Commission, 2004, http://www.lgc.org/freepub/land_use/articles/buildcomm/

Zykofsky, Paul. *Why Build Near Transit*, Sacramento: Local Government Commission, 2004, http://www.lgc.org/freepub/land_use/articles/whybuild/ .

Publication distribution was made possible through generous support from the National Endowment for the Arts, Access to Artistic Excellence Grant Program, The University of Arkansas Women's Giving Circle, and the University of Arkansas



The Rail Transit Design Studio

Visioning Rail Transit in Northwest Arkansas: Lifestyles and Ecologies

UACDC UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER

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Steven L. Anderson Chair in Architecture and Urban Studies at University of Arkansas
and
Ruth and Norman Moore Visiting Professor at Washington University in St. Louis

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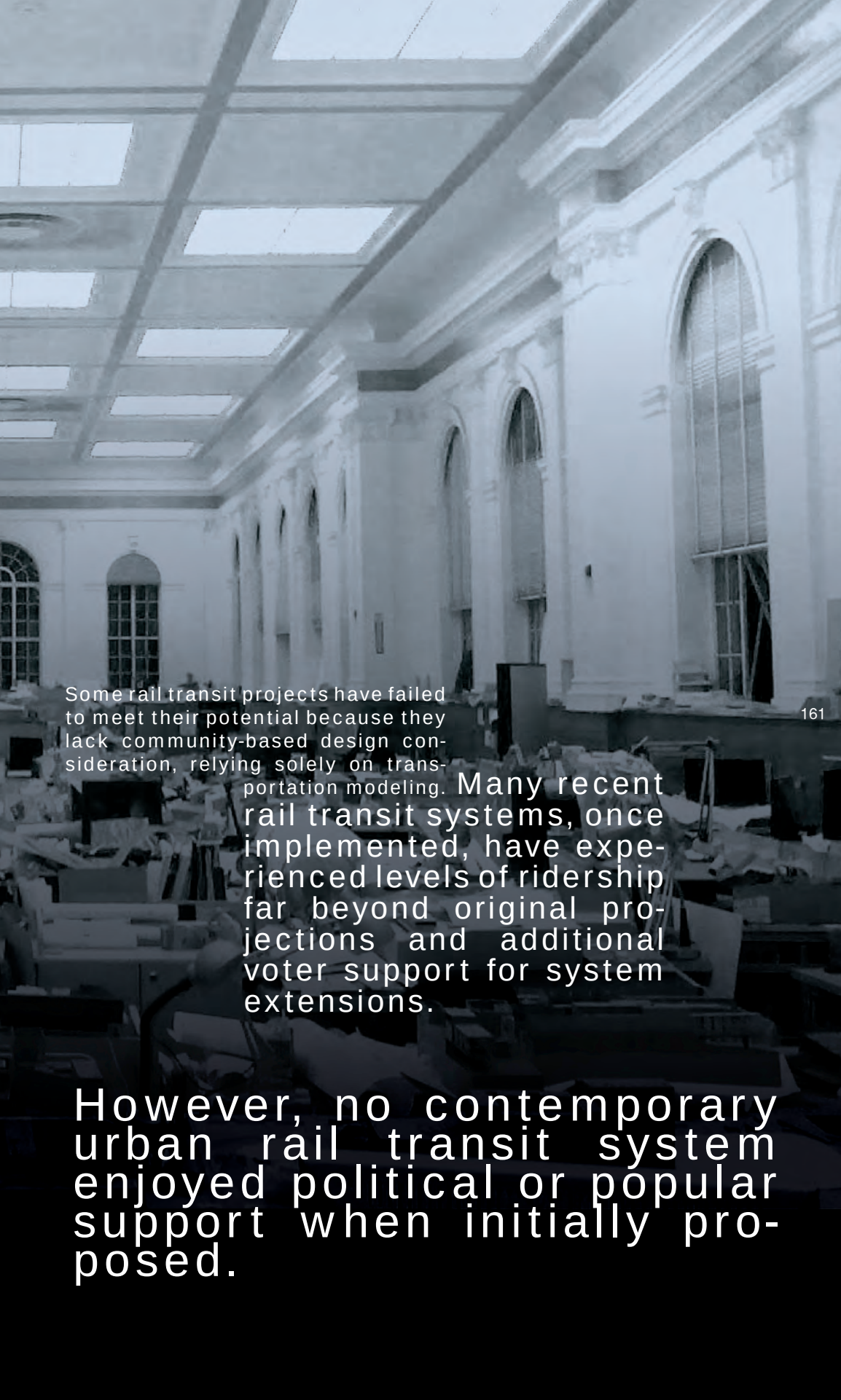

Some rail transit projects have failed to meet their potential because they lack community-based design consideration, relying solely on transportation modeling. Many recent rail transit systems, once implemented, have experienced levels of ridership far beyond original projections and additional voter support for system extensions.

However, no contemporary urban rail transit system enjoyed political or popular support when initially proposed.


SALMON
POST CARDS
Station Plaza
Rogers Station
Rogers Station
Bentonville Station
NWA RAIL
Safe, Conservative and Warm!
Rogers Station