THE ECONOMIC IMPACT OF OKLAHOMA'S BROWNFIELDS PROGRAM

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Oklahoma Department of Environmental Quality

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Executive Summary

Pollution and contamination from inappropriate disposal of waste during the industrialization of America led to a public outcry in the 1960s and 70s that culminated in the passing of federal and state environmental protections. These protections helped stop further damage. However, they did not speak about how the liabilities associated with existing contaminated (or perceived to be contaminated) sites should be addressed. Furthermore, urban blight and negative perceptions that had seeped into the surrounding neighborhood needed to be resolved. In short, an economic development tool was still required.

In June 1996, the state legislature passed the Oklahoma Brownfields Voluntary Redevelopment Act to do exactly that. This act enabled brownfield sites (sites believed to be contaminated) to be assessed and remediated to maximize the utility of the parcel in question, as well as to minimize the harm to the economy of the surrounding area because of the site's reputation. Again, brownfields are an important issue in real estate. Liability for contaminated sites and the uncertainty that comes from that, prevents sites from being redeveloped by the private sector and hinders investment in the surrounding area. Entering Oklahoma's Brownfield Program, a program administered by the Department of Environmental Quality, gave sites an opportunity to address these issues and has seen 27 years of measurable success.

"Brownfields are critical to the expansion and the redevelopment of many Oklahoma communities; they represent enormous potential for economic development. This program allows for state, federal, and municipal governments to partner with private entities to address, clean, and remediate contaminated sites in local communities.

Oklahoma is proud to share its accomplishments and record success through the 2023 Economic Impact of Oklahoma's Brownfields Program report. The State has created great partnerships over the years and will continue to build a better quality of life for all communities through the Brownfields program."

Ken McQueen, Oklahoma Secretary of Energy and the Environment

For this study, the Oklahoma Department of Commerce has analyzed the results of 78 brownfield projects, including 36 that have been certified in the Brownfield Program or utilized loans or grant funds for brownfield remediation over the last seven years. New projects mean the opportunity to aid new areas; for example, the last seven years have seen 16 remediation projects in Sapulpa. Creek County, therefore, is now part of the dataset for this study. The dataset consists of data gathered on businesses located on Brownfields properties and immediate surrounding areas (for some metrics, within a quarter mile) before and after remediation. Property values associated with brownfield sites and estimated tax collections were included as a part of the economic impact.

Additionally, six projects have been selected for use as case studies to further flesh out and exemplify the program. These six are listed below:

Evans-Fintube in Tulsa
Former Airpark/Wheeler District in Oklahoma City
Keystone Corridor in Sand Springs

MAPS 3 Upper Park in Oklahoma City
Oklahoma Industries Authority/Boeing in Oklahoma City
Sheridan in East Bricktown in Oklahoma City

Findings

Brownfield remediation in Oklahoma has returned valuable property, including both downtown metropolitan areas and rural zones, to productive use. This remediation has significantly increased economic activity, employment, property values and taxes for both the brownfield properties as well as bordering properties. By returning land to productive economic use, Oklahoma's Brownfields Program direct impacts associated with the brownfield properties include:

- **Employment:** Employment increased ***137***% from 1998 to 2022 on remediated properties. That rate is more than ***eight*** times Oklahoma's employment growth and more than ***six*** times the national employment growth over the same period.
- **Employment and Payroll:** Employment growth totaled ***3,013*** jobs with an associated payroll of ***$163.807*** million since 1998 on remediated properties.
- **Federal Return on Investment (ROI):** Federal government spending in the Oklahoma Brownfields program has been slightly more than ***$20 million*** in 2023 equivalent dollars, adjusting for inflation. Furthermore, for every $1 the federal government spent on Oklahoma's Brownfields Program, an estimated ***$5.83*** was returned to it from federal income taxes.

"Oklahomans know the value of hard work and the importance of preserving our land for the next generation. DEQ's Brownfields Program is about revitalizing our communities and fueling our economy— and it's a testament to the Oklahoma Standard of resiliency, innovation, and taking pride in our neighborhoods."

Oklahoma Governor Kevin Stitt

Further, as previously mentioned, addressing the actual contamination or the perception of contamination on brownfield properties has an impact beyond the direct properties themselves. When properties participate in Oklahoma's Brownfields Program, the assessment and/or remediation has an impact on the economic activity on bordering areas as well. The process addresses blight and either returns properties to productive economic use or prepares them for future use. This in turn increases the value of other properties. Combining the economic impact of remediated properties in addition to the bordering properties has the following total impacts:

- **Employment and Payroll:** Properties in a brownfield and within a quarter mile of grew employment by ***5,181*** jobs from 1998 to 2022 with an associated payroll of ***$247.2 million***.
- **Property Values:** The value of remediated areas and surrounding properties (within a quarter mile) in Oklahoma increased ***$1.2 billion*** from 1998 to 2022, even accounting for inflation. These properties contributed over ***$13 million*** in property taxes.
- **Retail Sales and Sales Taxes:** Including bordering properties within a quarter mile, retail sales increased ***$443.6 million*** and sales tax collections increased ***$41.5 million.***

- **State Income Taxes:** Oklahoma's Personal and Corporate income taxes associated with remediated and surrounding properties within a quarter mile increased ***$41.66 million*** from 1998 to 2022, accounting for inflation.

Clearly, Oklahoma's Brownfields Program has a substantial economic impact on the state by returning properties to productive use. Further, this impact includes reducing urban blight and extends beyond the properties themselves. Addressing liability associated with actual or perceived contamination by participating in Oklahoma's Brownfields Program reduces uncertainty. And this in turn attracts private capital to invest in the properties and returns economic activity to blighted areas.

The following report provides a brief history of national and state environmental regulations, societal and health benefits of remediating contaminated properties, details of Oklahoma's Brownfields Program and the economic impact of returning properties to productive use when these properties participate in Oklahoma's Brownfields Program.

Background and Context

Manufacturing-focused economic development brings jobs, payroll, improved quality of life, enhanced scientific and engineering capacity, as well as the increase in material wealth and capital which can be invested in various ways for the advancement of society. While these are all positive effects of development, there are negative impacts as well, and the nature of industrial activity has been forced to change in the face of these externalities.

Early industrial activity was centered on the production process and neglected addressing the side-effects such as pollution and environmental degradation. Left unaddressed, hazardous waste from some industrial activities can contaminate the environment including the air, groundwater, and surface water. Not only can this affect citizens' health, but it can also complicate urban and regional development as the possible presence of hazardous waste has become an unacceptable liability for developers. Ultimately, the contamination and the uncertainty associated with the resulting liability can even go as far as placing a damper on future economic development – not only for the original property, but via seeping and spreading contamination for surrounding properties and the broader community as well. There are reasons for environmental regulations and this section provides historical context leading up to the development of the Brownfields Program.

Cuyahoga River on Fire (Credit: Thomas James, Cleveland Press Collection)

Following several decades of uninterrupted economic growth and industrial expansion in the United States, by the 1960s, many harmful environmental effects began to accumulate, producing badly polluted areas around the country. The roots of environmental awareness began in the early 20th century with

Theodore Roosevelt's creation of the National Park Service. It continued with the work of the Civilian Conservation Corps during the Great Depression. Even Oklahoma's first Republican Governor Henry Bellmon sought to conserve water and soil. The turning point in the national environmental conversation, however, was the 1969 incident in which the Cuyahoga River near Cleveland, Ohio, burst into flames because of years of accumulated petrochemicals and industrial waste.

Prior to government intervention, the costs associated with environmental degradation, and the resulting problems for health and economic productivity, were born collectively by society, with little incentive on the part of polluters to reduce their emission of pollutants – a classic example of the so-called "tragedy of the commons". To reduce this trend of environmental destruction and social harm, the US federal government, as well as states, began efforts to control pollution through comprehensive legislation. Federally, these included the Clean Air Act (1970) and Clean Water Act (1972 amendments to the 1948 Federal Water Pollution Control Act), which placed limits on acceptable levels of pollutant emissions, thereby forcing businesses to include the production of such substances in their cost/benefit analyses and thus avoid thoughtless pollution. These regulations were extended with the Resource Conservation and Recovery Act of 1976, which empowered the Environmental Protection Agency (EPA) to oversee the "generation, transportation, treatment, storage, and disposal of hazardous waste," or so-called "cradle-to-grave" control of contamination.

Love Canal Waste and Protester ca.1978
(Credit: EPA and Associated Press)

Sweeping and critical though they were, the environmental legislation of the 1970s tackled only the *emission of new pollutants*, leaving largely unaddressed any *existing contaminated* sites, many of which continued to pose hazards to human health long after the initial contamination. Like the Cuyahoga River fire, the seminal event forcing further government action on the matter was public awareness of the Love Canal disaster, in which a Niagara Falls, NY neighborhood, built atop a former hazardous waste disposal site, developed catastrophic rates of health problems including Leukemia, miscarriages and birth defects. As a result of public outcry over the Love Canal and contemporaneous Three Mile Island meltdown, Congress and the Carter Administration passed the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Administered by the EPA, CERCLA's main function was to hold the polluter responsible for the contamination, thus establishing the "polluter pays" principle. This was reinforced through standards of strict liability, meaning that even a small role in the pollution could render a party liable. In addition to the main function, CERCLA also created the "Superfund" trust to support the mission of remediating and cleaning up pollution on some of the most badly contaminated locations in the country. If the EPA held an entity responsible for the cleanup, that party had to pay for the cleanup conducted under EPA's

oversight. If either (1) the responsible party could not pay for the cleanup or (2) there were no identifiable responsible parties (including corporate successors), then the Superfund trust could be used to pay for the cleanup of some of the most highly contaminated sites. The Superfund trust, initially of $1.6 billion, was used to remediate nearly 400 of the 1,323 sites on the National Priority List before 2003. In 1995, Congress allowed petroleum and chemical feedstock taxes, a primary source of CERCLA's general fund, to expire, and by 2003 the general fund was empty; the Superfund program has been reliant on annual congressional appropriations since that time, reducing its overall funding, and thus ability to remediate sites, to a fraction of mid-1990s levels.[1]

CERCLA was passed in 1980, and while there have been many successfully remediated Superfund sites, there were unintended consequences of CERCLA. Chief among them were the legal liabilities placed on contaminated sites, whether they were designated on the National Priority List or not. The potentially onerous legal liability tainted industrial and commercial properties and new economic development projects shunned using a site that was even rumored to have been previously contaminated. This contributed to urban blight, urban sprawl, and the higher environmental, infrastructural, and human costs associated with them.

Superfund Site Sign (Credit: EPA)

In the mid-1990s, states approached the EPA about the legal liability and began working with it to resolve these negative impacts. The Oklahoma Legislature passed the Oklahoma Brownfields Voluntary Redevelopment Act in 1996, which defined brownfields in state law and established authority for DEQ to administer the remediation process in Oklahoma and relieving state liability. In 1999, the Oklahoma Department of Environmental Quality signed a Memorandum of Agreement (MOA) with the EPA that recognized Oklahoma's program and included EPA's assurance it would not pursue CERCLA enforcement activities on a property that has been relieved of state liability by DEQ. Oklahoma's law, coupled with the MOA, enabled properties to receive liability release lacking in CERCLA.

Congress incorporated EPA's experience from both its pilot grant program and state Brownfields Programs and amended CERCLA by passing the *2002 Small Business Liability Relief and Brownfields Revitalization Act*, referred to in short as the Brownfields Law. The Brownfields Law clarified liability, set up a grant program for assessment, cleanup, and revolving loan funds, and codified a process by which states could create a state Brownfields Program and acquire EPA approval for it. This EPA approval is not superficial but rather instrumentally important, for when the state relieves a property of state liability while under EPA approval, EPA is barred from pursuing CERCLA enforcement activities on the property. And, while

[1] http://www.nationalgeographic.com/superfund/

Congress codified this in the 2002 Brownfields Law, Oklahoma already had its MOA established with EPA. Eliminating the legal liability reduces risk and business uncertainty, and ultimately, allows communities to encourage development on sites that were previously contaminated.

Though future environmental contamination remains a possibility, the regulations passed in the past forty years make it far less likely that serious environmental issues will arise with current industrial activity and development. And while currently operating facilities must ensure they follow the law, for the most part, it is the historical industrial sites that remain the bigger problem since there were relatively few controls on hazardous waste disposal or defined practices when contamination occurred from spills. The Brownfields Program is one tool to address problems resulting from contaminated sites and the potential legal liability associated with them.

Timeline

1905	Theodore Roosevelt Creates National Parks Service, setting precedent for federal protection of the environment
1933	Civilian Conservation Corps established temporary mechanisms for federal funding for environmental remediation
1933	The Great Depression reaches its worst point; the following decades represent long periods of unprecedented economic growth and industrial expansion, leading to prosperity but with largely unaddressed environmental degradation
1940s	Niagara Falls and a local electrochemical company began dumping chemicals in Love Canal; total contamination would amount to 21,000 tons of chemical waste
1948	Water Pollution Control Act and 1955 Air Pollution Control Act provided financial assistance for state enforcement of pollution control, signed into law by Truman and Eisenhower, respectively
1950s	Neighborhoods and two schools constructed over the former Love Canal dumpsite
1969	Cuyahoga River Fire
1970	Clean Air Act, the first iteration of the name being signed by President Johnson in 1963, was substantially amended and signed by President Nixon in 1970 to give broad enforcement powers to the soon-to-form EPA to develop regulations limiting emissions.
1970	Environmental Protection Agency formed in December by executive order of President Nixon, combining numerous executive bodies into one organization.
1972	Clean Water Act empowers federal enforcement of water standards; Nixon's pocket veto was overridden by overwhelming bipartisan support in the House and Senate
1978	Catastrophic rate of birth defects, cancer, and other disease near the Love Canal become publicized
1979	The Three Mile Island meltdown, combined with Love Canal news, adds to growing public outcry about environmental contamination, prompting the Carter Administration to push for federal funding for environmental cleanup
1980	CERCLA, or Superfund, creates funding and authority for remediating contaminated sites and holding those accountable responsible for damages

1990s	Seeking mechanisms to responsibly self-remediate and avoid massive CERCLA liability, states and cities push for what was in 1993 first called a Brownfields Program. The EPA began testing pilot programs and compiling state standards and practices
1993	Oklahoma establishes the Office of the Secretary of Environment along with the Oklahoma Department of Environmental Quality
1996	The Oklahoma State Legislature empowers the Department of Environmental Quality to set up a voluntary Brownfields Remediation Program
1999	The Oklahoma Department of Environmental Quality and the EPA sign a Memorandum of Agreement recognizing Oklahoma's program and providing a mechanism for EPA to provide assurance that it would not pursue CERCLA action at a site in Oklahoma's program
2002	Small Business Liability Relief and Brownfields Revitalization Act clarifies liability and allocates funding for brownfields assessment and cleanup
2018	The Brownfields Utilization, Investment, and Local Development Act (BUILD Act) reauthorized EPA's Brownfields Program and made amendments to the 2002 Small Business Liability Relief and Brownfields Revitalization Act

Societal Benefits of the Brownfields Program

In Oklahoma statutes, a brownfield is:

> *"an abandoned, idled or underused industrial or commercial facility or other real property at which expansion or redevelopment of the real property is complicated by pollution;"*

Similarly, EPA defines a brownfield as:

> *"a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant."*

It should be noted that there does not need to be actual contamination for a site to be a brownfield. The perception that the site is contaminated causes properties to lose value as well and be classified as brownfields. EPA estimates that there are more than 450,000 Brownfields in the U.S. and cleaning up and reinvesting in these properties increases local tax bases, facilitates job growth, utilizes existing infrastructure, takes development pressures off undeveloped land, and both improves and protects the environment.[2]

Brownfield *remediation* is very important, but equally as important are brownfield *assessments* that can show that no remediation is necessary. The simple perception that a property is contaminated introduces the uncertainty associated with potential legal liability, which negatively impacts property values, investment, and employment. In terms of impacts on economic development, having tools to address perceptions through brownfield *assessments* is equally as important as addressing actual contamination through brownfield *remediation*.

The effects of brownfield assessment and remediation will obviously vary enormously depending on the economic, social, and geographic nature of the community in question, but some of the biggest advantages include the following:

- **Improves Health and the Environment:** Remediation improves a community's environment and benefits the safety and health of residents by ensuring they have safe places to live and work

[2] https://www.epa.gov/brownfields/overview-epas-brownfields-program

- **Improves Quality of Life:** Remediation and assessment raises quality of life by removing blight associated with abandoned buildings and properties from surrounding communities (which because of the nature of many brownfield sites are often low-income/minority communities)
- **Limits Urban Sprawl:** Remediation and assessment limits urban sprawl by returning land closer to city centers to beneficial reuse rather than turning to new development of distant parcels[3]
- **Improves Property Values:** Brownfield remediation and assessment raises land values and property attractiveness to investors, allowing it to be more readily repurposed to reach its maximum economic potential
- **Improves Government Finances:** Remediation and assessment improve the financial capacity of communities as higher tax revenues are generated from sites that are being productively used and expenses associated with city services (such as police, fire and utility maintenance) become more efficiently utilized
- **Improves Infrastructure Utilization:** Remediation and assessment improves efficiency associated with infrastructure utilization since an undeveloped site typically requires more infrastructure to be built than an existing brownfield
- **Improves Economic Outcomes:** Remediation and assessment can revitalize historic districts, improve tourism, and generate employment when businesses locate on a brownfield

"Quality of life improves economic development prospects and improves our ability to attract out-of-state visitors to Oklahoma. It also benefits our own citizens with additional amenities in their local communities. Remediated brownfield properties reduce risks to investors and attracts new capital to the state. Removing blight through remediation results in improved quality of life that rejuvenates the area and attracts more people to spend their time and money in the local economy."

Lt. Governor Matt Pinnell, Secretary of Workforce and Economic Development

Through each of its positive effects, especially the last one, remediation can often directly and indirectly increase tax revenues more than covering the cost of the remediation itself.

Several of the above benefits associated with remediating and assessing brownfield properties, including property values, health impacts, fiscal and economic impacts will be addressed later in the report.

EPA as a Partner

The primary focus of this report is the Oklahoma Brownfields Program administered by the Oklahoma Department of Environmental Quality. However, the EPA should be mentioned in the role it too plays in brownfield remediation. The US EPA partners with state, tribal, and local governments as well as private institutions around the country to facilitate brownfield remediation as well as other forms of environmental revitalization support.

The main form of assistance from the EPA is through grants, of which there are many available. These grants are tailored to each aspect of redressing brownfields, including their assessment, cleanup, job

[3] According to the EPA, 4.5 acres of unused green space is preserved for every acre of reused brownfields.

training for waste management, and funding for state and tribal governments to establish or augment their own brownfield program. Qualifications for these grants are not identical, but certain criteria are consistently found such as:

- Sites must be eligible with evidence of possible contamination that is not the fault of the applicant
- There should be a future planned use in mind for the eligible site
- No grant is open to individuals, for-profit organizations, or nonprofit organizations which engage in lobbying the Federal government
- If awarded, all grants require data, documents, and other necessary information to be submitted to the EPA's online database for continued eligibility monitoring[4]

Since its inception, the EPA's Brownfield Program has helped to assess 37,466 properties and leveraged $39.46 billion and created more than 266,192 jobs. The leveraging of dollars came at a rate of $21 per dollar of EPA funds spent while job creation occurred at just over 14 jobs per $100,000 spent. The EPA can be a vital partner in brownfield assessment and remediation and should continue to be a resource to explore and utilize for communities in need of these services.[5]

Overview of the Oklahoma Brownfields Program

Key documents provide the basis for administering Oklahoma's Brownfields Program by the Oklahoma Department of Environmental Quality. They are derived from Oklahoma's statutes, regulations, and federal law.

- The Oklahoma Brownfields Voluntary Redevelopment Act was enacted in 1996. It is in Title 27A of the Oklahoma Statutes at O.S. §2-15-101 through O.S. §2-15-110.
- Brownfields Rules are codified in §252:221 of the Oklahoma Administrative Code. These Rules were updated with various changes in 2022.
- In 1999, the Oklahoma Department of Environmental Quality signed a Memorandum of Agreement (MOA) with the EPA whereby EPA agreed that Oklahoma's program provided a cleanup equivalent to the Superfund program. The agreement also provided assurances that the EPA would not pursue CERCLA enforcement activities on a property that has been relieved of state liability by DEQ[6].
- In 2002, Congress enacted the Small Business Liability Relief and Brownfields Revitalization Act and, with the MOA signed in 1999, indicates that Oklahoma has an approved Brownfields Program and the authority to resolve state and federal Superfund liability.
- In March 2018, Congress enacted the Brownfields Utilization, Investment, and Local Development Act (BUILD Act), which amended the former federal law approving the DEQ brownfield

[4] https://www.epa.gov/brownfields/types-funding
[5] https://www.epa.gov/brownfields/about
[6] The MOA and Federal Brownfields Law contains recognition that properties listed on the National Priorities list do not apply and that there must be mechanisms in place ensuring meaningful opportunities for public participation and mechanisms for approval of a cleanup plan and verification and certification that cleanup is complete.

redevelopment program -- the Small Business Liability Relief and Brownfields Revitalization Act of 2002. BUILD amended the Brownfields provisions of CERCLA and instituted several changes. These include grants to states and tribes for technical assistance to small communities, as well as removal of the "of relative low risk" requirement for petroleum brownfield enhancement.[7]

- Two federal laws, the 2021 Bipartisan Infrastructure Law and the 2022 Inflation Reduction Act provided more funding to brownfields programs outside of the regular appropriations process.[8]

The DEQ administers these key Brownfields Programs:

- **Voluntary Remediation**: Brownfields is a voluntary program rather than an enforcement program. An owner is encouraged to investigate if their property is contaminated. If a cleanup is needed, DEQ oversees the cleanup. Participants that finish the program receive a certificate that resolves liability to the state and bars EPA from pursuing CERCLA enforcement actions at the site. Since the inception of the Voluntary Brownfields Redevelopment Program in 1996, 69 properties have undergone Brownfields Certificate Program, and 9 are currently in process.
- **Targeted Brownfield Assessments**: TBAs are custom assessments of a property typically pursued by prospective buyers. An examination can be a Phase I Environmental Site Assessment (a written environmental history that details potential contamination), Phase II Environmental Site Assessment (sampling for actual contamination), or other specialized assessments such as that for asbestos. A Phase I Assessment is required for DEQ and EPA Brownfield Cleanup Grants. The purpose is to protect buyers from Superfund liability. Public and nonprofit entities such as municipalities, counties, tribes and community redevelopers of abandoned or underused properties are eligible for a TBA.
- **Revolving Loan Funds**: The Brownfields Revolving Loan Fund provides qualified brownfield property owners with funding to pay for the costs of self-remediation. Sites already engaged in federal or state enforcement actions are not eligible. The application requires a 20% match. Borrowers must own the property and the owner must be its bone fide purchaser. There have been 6 RLF participants who have been lent a total of $2.9 million since the program began.
    - **Subgrants**: Subgrants are a specific implementation of the Revolving Loan Fund program. Funded by the EPA, DEQ dispenses grants to high-impact, local government and non-profit cleanup projects. Thus far, the program has presented subgrants to 14 recipients totaling $2.7 million.

The Basis and Process for Voluntary Remediation

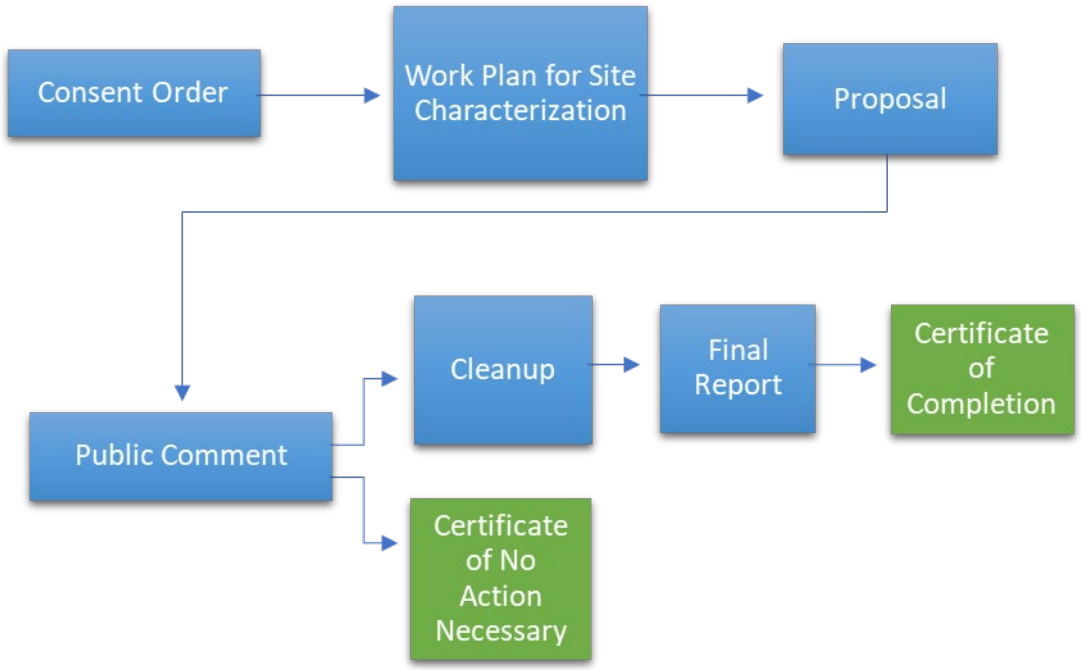
Under both state and federal law, responsibility for environmental cleanup – and thus liability in the case of harm resulting from lack of cleanup – rests with many different parties associated with a property, including owners, operators, lessees, and those who engage in improper disposal. This responsibility is

[7] Other BUILD Act features can be found here: https://www.epa.gov/sites/default/files/2018-08/documents/1-pg_build_summary_handout_508_0818.pdf

[8] For the list of programs, see: https://www.epa.gov/brownfields/federal-infrastructure-investment-programs-related-brownfields

not abrogated upon the transfer of property; rather it transfers with the deed. Further, responsible parties that are non-cooperative can be fined up to three times the cost of cleanup under CERCLA authority. Therefore, remediation (or settlement) must be conducted at some point to erase state or federal liability for environmental contamination or hazard. In Oklahoma, this can be accomplished by successfully completing DEQ's Brownfields cleanup program. The Certificate resolves the environmental liability for the participant and associates of the property.

The voluntary remediation program is the largest component of DEQ's brownfields efforts, and certification through the program is one way that liability can be released. Parties might also choose to directly settle with EPA and DEQ as a separate path to address liability to the state and federal government. However, for the purposes of explaining the impacts of the Oklahoma Brownfields Program, additional detail regarding the statutes, rules and the process involved helps explain how liability is released from the state and federal government through voluntary remediation.[9]



The flowchart above depicts the typical process for brownfield assessment and remediation. To begin the process, all participants of the Brownfields Program must enter into a **Consent Order** with DEQ.[10] A

[9] A responsible party may still have liability to a third party associated with hazardous waste or unsafe work practices.

[10] A participant is defined as "any person or entity which: has acquired ownership, operation, management or control of site; or possesses a written expression of interest to purchase a brownfield and the ability to implement a brownfield redevelopment proposal; or is the legal owner, or is a tenant, or lessee, or is undertaking the remediation of a brownfield site"

"Consent Order" is a voluntary agreement between DEQ and one or more participants to resolve the legal liability associated with a brownfield. The parties are bound to specific requirements during the process.

After a consent order has been signed, then a **Work Plan** is developed for **Site Characterization**. This process includes:

- The participants summarize what is known about the site including former uses and existing sampling data
- The participants discuss how additional data will be gathered to adequately delineate environmental contamination on property to DEQ's satisfaction and support the risk-evaluation and decision-making by DEQ
- DEQ must approve the written work plan prior to sampling
- Use risk-based remediation procedures as determined by the agency to establish cleanup levels; evaluate the use of engineering and institutional controls for protection and performance

After the site characterization is completed, participants will submit brownfield **Proposals** for either (1) a risk-based remediation of a brownfield site or (2) a Certificate of No Action Necessary determination. When DEQ and the participant are satisfied that the Proposal will be protective of human health and the environment and that the proposal adequately addresses long term stewardship, then the proposal is made available for **Public Review and Comment.**

After public comments are completed, DEQ prepares a responsive summary for all public comments received. After consideration of the comments, DEQ may require the participant to revise the proposal in a manner that satisfies the public's concerns or may accept the proposal.

If the approved proposal recommends a determination that no remediation is deemed necessary (for the expansion or redevelopment of the property for planned use), then DEQ will issue a **Certificate of No Action Necessary**.

If the approved proposal recommends remediation, then **Cleanup** activities would commence under the requirements set forth by DEQ, including a Remediation Work Plan. After clean-up has occurred, and DEQ is satisfied that the remediation was properly implemented, and the site is safe to use for a planned use, then a **Final Report** will be issued. If all the requirements set forth in the consent order were completed, then DEQ will issue a **Certificate of Completion**, which lists the use specified in the consent order for the site.

Under O.S 27.A § 2-15-106(G), DEQ is permitted to issue either a Certificate of Completion or a Certificate of No Action Necessary. The Certificate of Completion certifies that the participant "has successfully completed the requirements" of a consent order, and a Certificate of No Action Necessary certifies that "no remediation action is deemed necessary for the site". Both certificates exempt "all lenders, lessees, and successors and assigns" from any civil (i.e., state and federal) liability relating to the environmental contamination or brownfield status. Without this process, the threat of civil liability could deter any future

purchase or lease of a property. The ability of a state body to issue these certificates is critical; it facilitates the return of brownfield sites to productive economic use.

Pursuant to (§ 2-15-109), DEQ may require the participant to reimburse the agency for reasonable costs associated with review and oversight. This includes any remediation, reports, field activities or other services performed toward the issue of either certificate. As a part of routine compliance, DEQ will audit completed projects to ensure the sites are being used according to their certificates. This ensures that the current use of the site is safe and in compliance with the use specified in the certificate. For example, no residential property will be constructed on sites that were only cleared for industrial use.

Need for Future Remediation

While increasingly becoming a service economy, Oklahoma remains much involved in the manufacturing, mining, and transportation/distribution sectors. With this industrial base, there will always be the potential for pollution. Along with activities tending to air and water pollution, a robust brownfields program helps ensure current industry does not leave land worse for future generations. It helps with urban development, infrastructure reuse, public health, and blight removal. It can assist real estate developers, property owners, and businesses in examining perceived or real liabilities within future development sites. Brownfield remediation is a key public service that benefits both businesses and residents.

Economic Impact of Oklahoma's Brownfields Program

An interesting aspect in evaluating the cost-benefit ratio of any brownfields project is the extent to which it can reverse the blight that has developed in areas targeted by brownfields remediation. In studies conducted, there is unanimous agreement that unremediated sites constitute a nuisance to people, neighborhoods, and local government. Unremediated sites take both an economic and aesthetic toll on the areas in which they are present.

A study published in 2013 by the Steel River Council of Governments, identified the exorbitant cost of blight in Southwestern Pennsylvania. The study identified three main costs that blight affects in local areas: additional municipal services, direct loss of real estate tax revenue, and direct loss of earned income tax. Quantifying these numbers, the Council found that blight creates a $40 million annual loss on their community.

The reduction of blight, in conjunction with economic development, makes the Brownfields Program an economic and social boon in communities throughout the country. Oklahomans in Oklahoma City, Tulsa, Okmulgee, Midwest City, and other locales have a chance to see the positive impacts of brownfield remediation daily in their cities and towns.

To assess the economic impact of Oklahoma's Brownfields Program, the Oklahoma Department of Environmental Quality provided a list of over 40 properties (see Appendix A) that either participated in the Voluntary Remediation Program, participated in DEQ's brownfield Revolving Loan Fund, or received a subgrant from DEQ for a brownfield project. These properties participated in the Brownfields Program

between 1997 and the present. Properties currently participating in the Brownfields Program but have not received a Certificate were not included in the economic impact.

The economic impact of Oklahoma's Brownfields Program was chiefly performed comparing employment and payroll at two points in time – 1998 and 2022. The 1998 date is at a point in time when the Brownfields Program was beginning and represents the furthest date for which we have data associated with the physical locations of the brownfields. Tying employment to the actual properties at two points in time allows a before/after comparison associated with the assessment and remediation activities for most properties.

Therefore, the economic impact of the assessment and remediation of properties participating in Oklahoma's Brownfields Program is the difference between 2022 and 1998 as well. Quarterly Census of Employment & Wages (QCEW) data were compiled for each of the 78 brownfield properties. However, given that this source of data requires confidentiality of identifiable business information, we must present the results in aggregate for the state. This ensures that identifiable business information, which requires confidentiality by the Bureau of Labor Statistics and the Oklahoma Employment Security Commission, is maintained.

Further regarding the economic impact analysis, this is an economic impact of Oklahoma's Brownfields Program. It is not an impact of businesses located on brownfields. Certainly, they too have an economic impact, but the most concrete way of communicating the impact of returning land to productive use through brownfield assessment and remediation is by comparing actual levels of employment and payroll at two points in time.

Lastly, there are a couple data points that were unavailable for most properties and as a result have been excluded in the economic impact. Specifically, the expenses associated with remediation and investment associated with site development and new construction were excluded from this economic impact. As a result, the impacts presented are conservative. Certainly, the millions of dollars spent on site development and new construction, as well as brownfield assessment/remediation expenses, would have had a sizable impact in Oklahoma's construction and service sectors had they been included.

Employment, Payroll and Sales

From the list of properties, we used GIS as well as the QCEW information to compile and compare employment and payroll records for the businesses located on the brownfield properties between 1998 and 2022. For sales, we used an output-per-worker calculation based employment and sales/output data from IMPLAN and applied it to the businesses located on remediated properties.

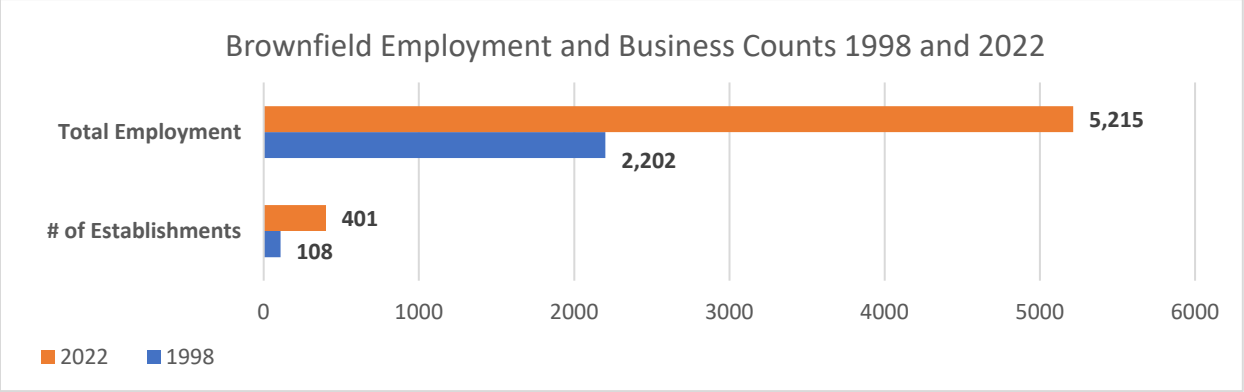
It should be noted that the brownfield properties include the former GM facility, which in 1998 bordered Tinker AFB, and has since become a part of the Tinker Aerospace Complex as Building 9001. In 1998, the QCEW employment at the GM facility was too high to report in conjunction with the employment/payroll associated with the other brownfield properties. Therefore, any 1998 employment associated with GM in the table below is employment that was publicly reported as close to 1998 as could be found. And GM's payroll was estimated using automotive industry wages for the same timeframe. This is the best

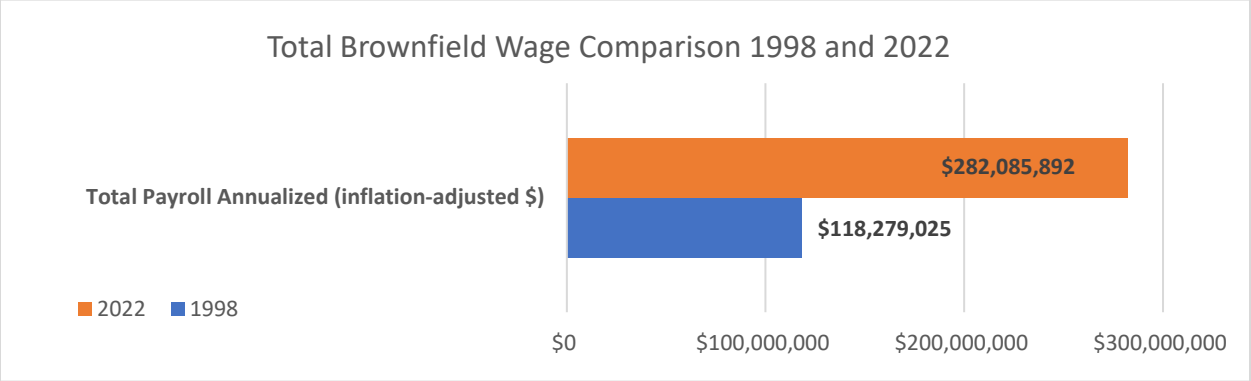
alternative that incorporates GM data while it was operating and still maintains confidentiality of GM. Therefore, this report assumes that the reported employment and industry average wages are accurate.

Impacts on Economic Activity for Brownfield Property Businesses and Immediate Surroundings

	1998	2022	Impact	% Change
# of Establishments	108	401	293	271%
Total Employment	2,202	5,215	3,013	137%
Total Payroll Annualized (inflation-adjusted $)	$118,279,025	$282,085,892	$163,806,867	138%

Employment and Payroll at Establishments within a Remediated Brownfield





As may be seen in the above table, Brownfield remediation/assessment has had a positive impact on the business activity (including employment, payroll and output/sales) of the businesses that were associated with the properties between 1998 and 2022. Total employment on properties within a 10th of a mile of a site that participated in Oklahoma's Brownfields increased 271% between 1998 and 2022. For comparison, Oklahoma's employment grew 24.5% and the national employment grew 34% over the same period (Source: www.bea.gov).

Impact on Surrounding Businesses

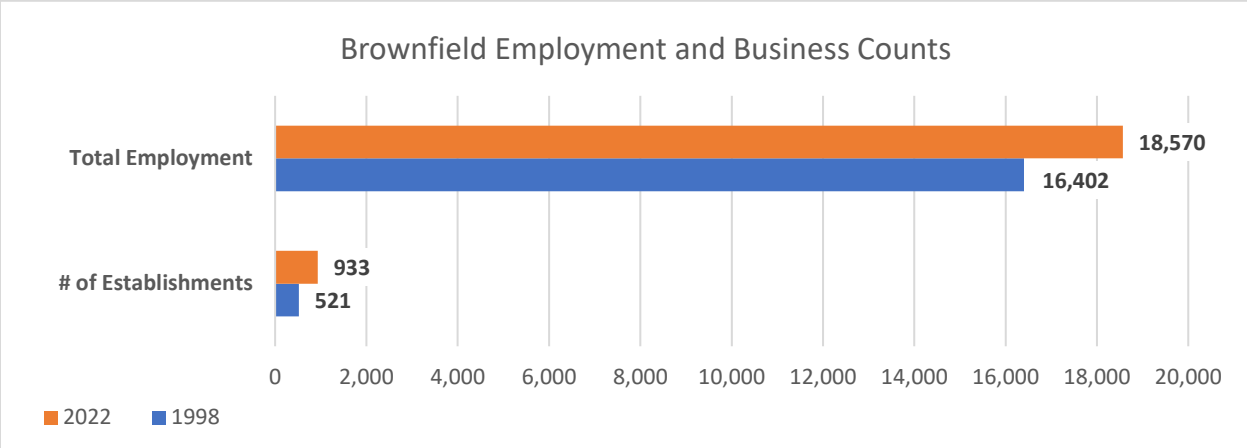
Additionally, using GIS, we identified businesses that bordered the brownfield properties within a quarter of a mile and then compiled the employment and payroll for those businesses in 1998 and 2022. Not only has the impact that has occurred on sites remediated through the Brownfields Program been sizeable, but it has also been substantial on bordering properties. Quarterly Census of Employment and Wages (QCEW) data indicate there were 521 establishments between a 10th of a mile and a quarter of a mile in 1998. By 2022, after the property was remediated, there were at least 401 establishments.

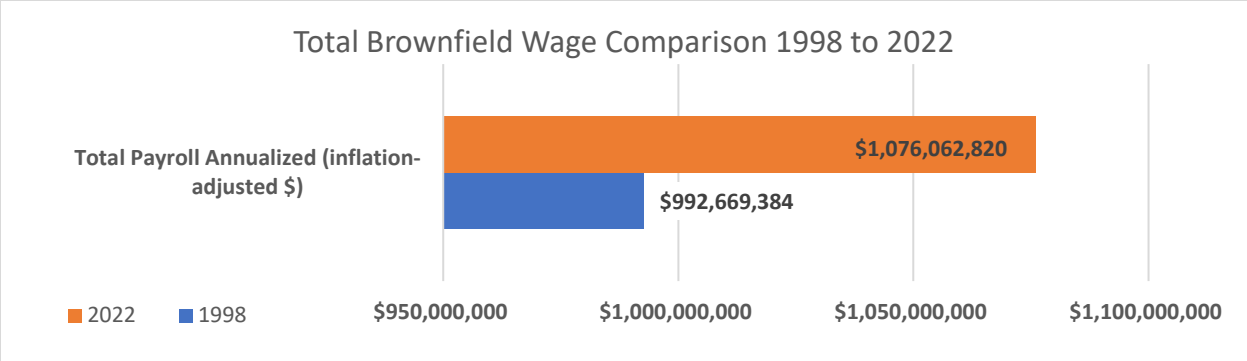
Employment of properties within a quarter mile and 10th of a mile increased 13% between 1998 and 2022; growing from 16,402 jobs in 1998 to 18,570 jobs in 2022. The inflation adjusted payroll associated with these businesses grew 8% over the same time period. Oklahoma's employment grew 34% and national employment grew 24.5% over this same time period. Growth in the brownfield area is higher than surrounding areas and helps to spur local growth.

Impacts on Economic Activity for Businesses within .25 mile but outside .10 mile

	1998	2022	Impact	% Change
# of Establishments	521	933	412	79%
Total Employment	16,402	18,570	2,168	13%
Total Payroll Annualized (inflation-adjusted $)	$992,669,384	$1,076,062,820	$83,393,436	8%

Employment and Payroll between .10 and .25 Miles of a Remediated Brownfield





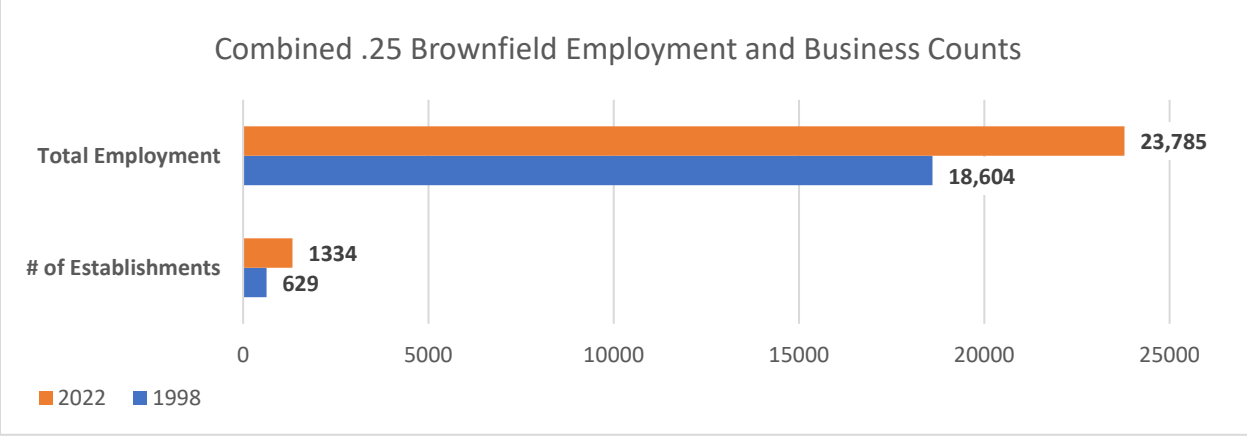
Combined Impacts

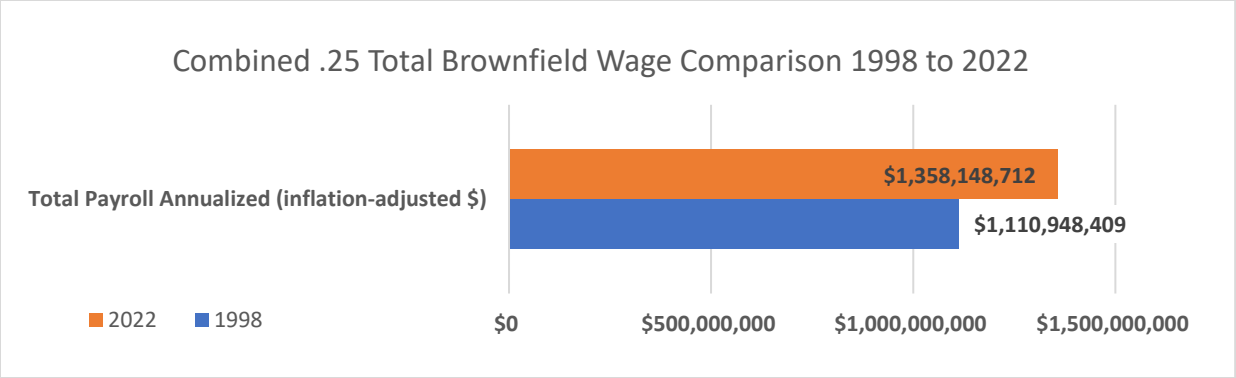
Properties that have participated in Oklahoma's Brownfields Program have been returned to productive use and have contributed to significant growth of economic activity on the brownfield properties as well as properties that border the remediated brownfields. Combined economic activity was greater than $3.6 billion in 2022. This is a highly conservative estimate given that productivity is much higher in current years than 1998 when looking at a per person productivity. Also, the mix of manufacturing jobs is higher in 1998 and may have had a larger impact, but without remediation current activity would be less due to the liability of expanding at or near areas in need of remediation.

Combined Impacts on Economic Activity on Brownfield Properties and Bordering Properties

	1998	2022	Impact	% Change
# of Establishments	629	1334	705	112%
Total Employment	18,604	23,785	5,181	28%
Total Payroll Annualized (inflation-adjusted $)	$1,110,948,409	$1,358,148,712	$247,200,303	22%

Employment and Payroll at Establishments within .25 Miles of a Remediated Brownfield





The Health Effects of Remediating Brownfield Sites

Exposure to hazardous chemicals/pollutants on brownfield sites has been linked to higher incidents of non-communicable diseases in addition to other health issues such as low birth weight, higher rates of infant mortality, and lower life expectancy.[11] Chronic diseases such as asthma, cancer, cardiovascular disease, hypertension, stroke, depression and diabetes can all be caused by environmental exposure to hazardous compounds and materials.

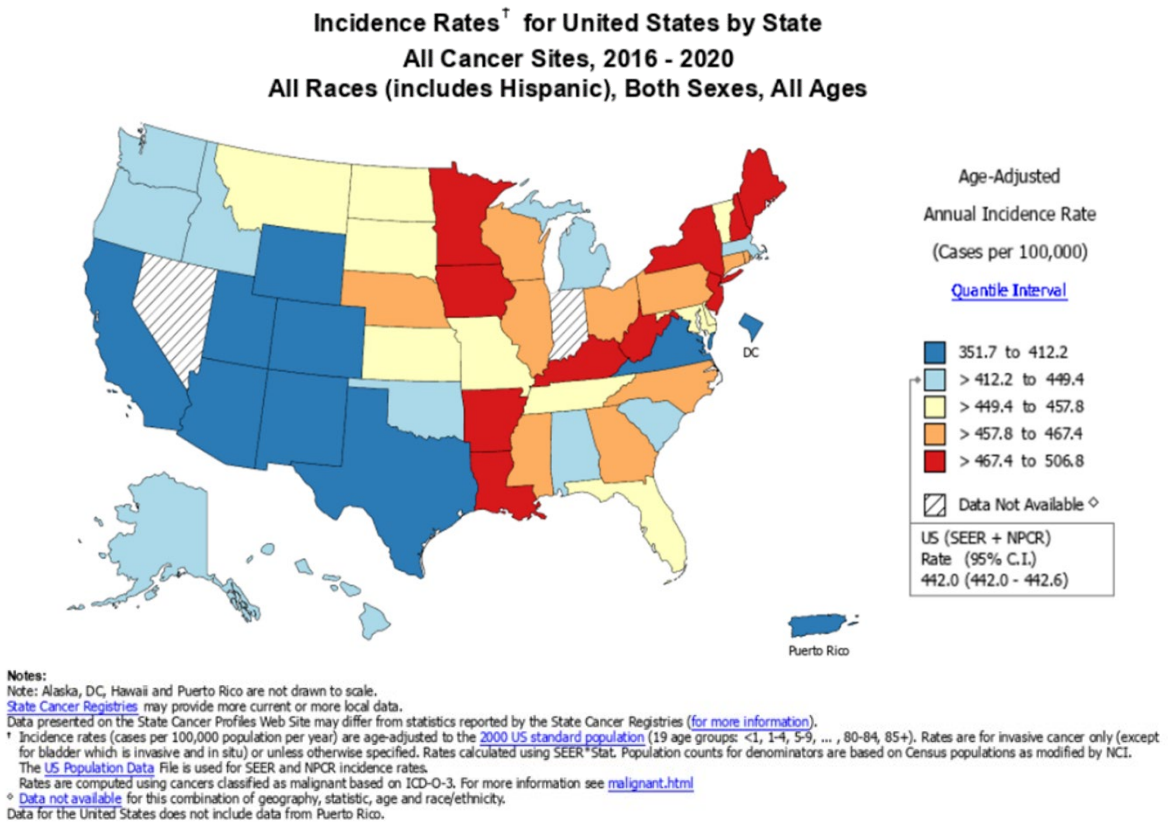
Cleaning up land that has been polluted with toxic waste has obvious positive health effects and remediation programs play a significant role in protecting the well-being of the public. Remediation programs can also help reduce costs associated with future incidents of chronic disease associated with exposure. According to the Partnership to Fight Chronic Diseases, chronic diseases are projected to cost Oklahomans $24.7 billion in medical expenses and an extra $9.8 billion annually in lost employee productivity (average per year 2016-2030).[12]

Cancer is a disease that can be linked to a variety of factors, including factors unrelated to exposure to pollution, as well as factors associated with some of the pollutants often found at brownfield locations. The National Cancer Institute projects costs of cancer care in the US to reach $246.6 billion by 2030.[13]

[11] https://www.jyi.org/2006-february/2017/10/10/brownfield-remediation-for-urban-health-a-systematic-review-and-case-assessment-of-baltimore-maryland

[12] https://www.fightchronicdisease.org/states/oklahoma

[13] https://www.cancercenter.com/community/blog/2023/07/managing-cancer-treatment-cost



According to the National Cancer Institute in the chart above, Oklahoma's incidence of cancer is 443.4 people per 100,000 population, which is higher than the national incidence of cancer at 442.3 people per 100,000 population from 2016 - 2020. For comparison, higher incidences of cancer occur in the rust belt where historically, these states had early and high levels of industrial activity. For example, the incidence of cancer per 100,000 is 467.4 in Pennsylvania, 459.7 in Illinois, 465.3 in Ohio, 474.4 in New York and 449.4 in Massachusetts.

According to the Partnership to Fight Chronic Diseases, the total projected cost of chronic diseases (including cancer) from 2016-2030 is $518 billion. Although estimating the cost of contaminated sites on Oklahomans' health is difficult, it is likely that a portion of the total costs associated with cancer and other chronic diseases can be cut by remediating additional brownfield locations throughout the state.

Fiscal Impacts

Impact on Property Values

Brownfields that have not been remediated depress property values as investors and business owners that would otherwise be willing to dedicate capital for redevelopment are unwilling to take on the risk associated with the properties. This affects development in neighboring areas as well, and the neglected properties and lower economic activity lead to blight.

On the other hand, remediated brownfields that have participated in DEQ's Brownfields Program eliminate the risk faced by investors and business owners. They are willing to dedicate their capital and invest in redevelopment for the area. In addition to improving public health and turning environmental liabilities into assets, participation in a Brownfields Program reverses the negative perceptions that accompany previously blighted areas. The increased investment and economic activity leads to increased economic activity and property values. And this, in turn, leads to increased tax revenue for cities and school districts through healthy property and sales taxes.

Nationwide, there are studies that quantify the positive impact of remediated brownfield projects on property values. In 2017, a study by Haniger, Ma and Timmins published in the *Journal of the Association of Environmental and Resource Economists* reported increases in residential property values of 5% to 15.2% within 2.07 km of a remediated brownfield site[14]. These increased property values led to increased property taxes, which, in the study, were estimated to range from $600,000 to $2,000,000 annually.

On the flip side, there are also studies that estimate the foregone revenue to cities when brownfields are not remediated. In 2013, Mihaescu and Vom Hofe published in the *Journal of Environmental Assessment Policy and Management* estimated that property values within 2,000 feet of eighty-seven brownfields in Cincinnati were depressed. The lower property values resulted in over $2,260,000 of foregone property tax revenue annually to the city than if the brownfields had been remediated.[15]

In our previous economic impact report in 2016, we did not have the resources to compare property values or property taxes over time. However, we did report estimated property values of $178,531,594 and property taxes of $5,837,500 directly associated with remediated real brownfield properties in the (then) current year of data availability.

"Real property that has experienced blight from pollution is returned to productive use through participation in the Department of Environmental Quality's Brownfields Program. This has a positive impact to the cities and towns where brownfields have participated in the remediation process. Many of these properties are located where there is already existing infrastructure in place and underutilized. By returning these properties to productive use, remediation reduces the need for additional infrastructure investments compared to land on the edge of a city. This reutilization of infrastructure reduces the strain on constrained budgets, and the remediation attracts new investment to the area, which improves tax generation for the local governments."

Executive Director Hopper Smith, Oklahoma Department of Commerce

In this updated report, we utilized GIS to map the brownfields and identify properties within ¼ mile of the remediated brownfield. We then used county assessor data in each of the 10 counties that had remediated brownfield properties for 2022 as well as the earliest year presently available from each of the respective county assessors. The earliest years ranged from 1998 to 2010 in the counties. For counties

[14] Haninger, Ma and Timmins (2017). The value of brownfield remediation. *Journal of the Association of Environmental and Resource Economists.*

[15] Mihaescu and Vom Hofe (2013). Using spatial regression to estimate property tax discounts from proximity to brownfields: A tool for local policy-making. *Journal of Environmental Assessment Policy and Management*.

that did not have 1998 data available, we utilized Oklahoma Tax Commission data and US Census Bureau data to adjust the values to the earlier 1998 year. The county assessor data also was limited to within ¼ mile.

For the remainder of this section, these properties within ¼ mile are referred to as the "brownfield district." As a comparison to the previously referenced studies that had boundaries of 2.07 km (6,791 feet in the Haniger, Ma and Timmins study) and 2,000 feet (Mihaescu and Vom Hofe), the one-quarter mile boundary in our report is 1,320 feet from the brownfield boundary and can be considered more conservative for assessing the property values within the brownfield district.

In the brownfield districts, additional demolition and construction activity has occurred in several of the districts between 1998 and 2002. So, the values expressed in the table below represent the aggregate value of properties within the district at each of the points in time rather only specific properties that existed in both time periods.

	1998 Fair Cash Value	1998 Fair Cash Value expressed in 2022 Dollars	2022 Fair Cash Value	Impact of Remediation on District Property Values
Brownfield Districts	$101,407,772	$183,664,179	$1,378,157,508	**$1,194,493,329**

In 1998, properties within brownfield districts had an aggregate market value of $101.4 million. When adjusting for inflation to 2022 dollars, that value was $183.7 million. By 2022, after remediation of brownfield properties, the property values within the same brownfield districts had a market value of $1.378 billion. This $1.194 billion change represents a 650% gain in property values in the brownfield districts over the 1998-2022 time frame even after adjusting for inflation. Comparatively, property values in the state increased in value 271% over the same time frame. The difference between the changes in property values would presumably be associated with the fact that remediation occurred in the brownfield districts and these properties previously had depressed property values associated with blight and is estimated to be $696.8 million increased values than if remediation had not occurred.

	1998 Estimated Property Taxes	1998 Property Taxes expressed in 2022 Dollars	2022 Estimated Property Taxes	Impact of Remediation on District Property Taxes
Brownfield Districts	$1,115,000	$2,020,000	$15,159,000	**$13,139,000**

For local governments and school districts, lower property values affect the property taxes that can be collected. This impacts the ability for local governments and their school entities to provide services. In

1998, property taxes associated with properties in brownfield districts had $1.1 million in property taxes associated with them based on the assessment and levy rates. When adjusting for inflation to 2022 dollars, property taxes would be valued at $2.0 million. By 2022, after remediation of brownfield properties, the property taxes within the same brownfield districts equaled $15.2 million. Again, the $13.1 million gain in property taxes represents a 650% gain in the brownfield districts over the 1998-2022 time frame after adjusting for inflation. The increase in property taxes associated with brownfield districts is estimated to be $7.7 million higher annually than if remediation would not have occurred.

Sales Taxes

Retail sales and the resulting sales taxes associated with retail industries may be estimated using industry sales estimates from Lightcast using the actual activity in brownfield districts that participated in Oklahoma's Brownfields Program. Sales taxes may be estimated by applying the appropriate sales or excise tax rate to the establishments in the remediated properties for each of the two years. Most retail establishments require a sales tax; however, gasoline and new car sales require the appropriate excise tax and hotels have a lodging tax in addition to the sales tax.

People shop as a part of an experience, and urban blight, which contaminated properties in close proximity contributes to the blight, is not an experience that attracts people to retail attractions. Comparing 2022 retail sales with the retail sales of the same properties before they participated in the Oklahoma Brownfields Program provides a stark example of the positive impact that assessment and remediation can have on development and sales tax revenues.

Estimated retail sales in 1998 totaled $19.9 million at businesses in brownfield districts, and adjusting these values to 2022 dollars, the 1998 retail sales are estimated to be $36.2 million. By 2022, retail sales within brownfield districts that have been remediated through DEQ's Brownfields Program totaled $479.8 million. The impact of the remediation is estimated to be $443.6 million in increased retail sales that were facilitated through the increased retail development in the remediated brownfield districts. This $443.6 million gain in retail sales represents a 1124% growth rate between 1998 and 2022.

Retail Sales and Sales Tax Estimates in Proximity to Remediated Brownfields

Variable	Retail Sales within One-Quarter Mile	Local (City and County) Sales Tax Collections	State Sales Tax Collections	Total Sales Tax Collections
1998 Values	$19,887,563	$875,053	$900,675	$1,775,728
1998 $ Expressed in 2022 $ Adjusting for Inflation	$36,168,993	$1,591,436	$1,638,034	$3,229,470
2022 Values	$479,758,497	$23,138,752	$21,589,132	$44,727,885
Impact of Remediation	**$443,589,504**	**$21,547,317**	**$19,951,098**	**$41,498,415**

Retail sales at retail establishments are subject to sales tax, and in 1998 before remediation, retail businesses in brownfield districts generated $1.59 million (adjusted for inflation) in sales taxes for local

government entities, and $1.64 million in sales taxes for the state for total sales taxes of $3.23 million in 1998.

By 2022, after remediation and participation in DEQ's Brownfields Program, retail establishments in brownfield districts generated $23.14 million in local sales taxes and $21.59 million state sales taxes for total sales tax collections of $44.73 million.

The impact of reducing risks to investors and businesses when properties participate in remediation totaled $21.55 million in sales taxes for city and county sales tax collections and totaled $19.95 million in additional state sales taxes between 1998 and 2022.

State and Federal Income Taxes

Income taxes are confidential, however they can be estimated. For the purposes of this report, we used Lightcast to estimate sales, personal income and value-added activity. From this information, income taxes can be estimated for the direct activity occurring in 1998 and 2022 based on industry, employment and payrolls associated with businesses and other employing entities located within brownfield districts. Lastly, the income tax rates and tax brackets associated each of the years was utilized to provide the income tax estimates.

In 1998 many of the establishments operating in the brownfield districts were manufacturing or other high productivity and higher wage industries. These industries are important and remain important to bring new dollars into the state. By 2022, there was a higher proportion of retail establishments. Even though the mix of industries has changed over time, the job increases between the two time periods offsets some of the muting effects of the industry mix representing a higher proportion of retail industries in 2022 when compared to 1998.

In 1998, the state income taxes, which includes personal and corporate income taxes, occurring in brownfield districts is estimated to have been $40.6 million expressed in 2022 dollars. By 2022, those same corporate and personal income taxes in brownfield districts are estimated to have grown to $82.3 million resulting in a presumed impact from remediation of $41.7 million for state income taxes in brownfield districts.

State and Federal Personal and Corporate Income Tax Estimates 1998 to 2022

	1998 (Inflation-adjusted $)	2022	Difference
State Personal & Corporate Income Taxes			
Brownfield Districts	$40,601,660	$82,264,871	**$41,663,211**
Federal Personal & Corporate Income Taxes			
Brownfield Districts	$126,072,088	$272,681,169	**$146,609,081**

Likewise for federal income taxes in 1998 associated with jobs and businesses located in brownfield districts before remediation are estimated to have totaled $126.1 million expressed in 2022 dollars. By

2022, after remediation and participation in the Brownfield Program, federal corporate and personal income taxes are estimated to have been $272.7 million resulting in a presumed impact from remediation of $146.6 million for federal income taxes.

Federal Return on Investment

The majority of the assessment/remediation expenditures are from the private sector, and it is the private sector that spends money for site development, renovation and new construction after remediation occurs. However, without the liability relief provided by Oklahoma's Brownfields Program, the private sector would not likely take on the risk associated with uncertainty.

Having stated the above, local government, state government and the federal government all benefit from the activity occurring on the sites from the economic activity, employment and the associated tax collections generated. While each of the levels of government benefit from increased tax revenues, Oklahoma's Brownfields Program does not receive any state appropriations. Most of the operational expenditures are from the federal government, and the only state expenditures associated with the program equaled $111,680, which was a state match for the Revolving Loan Fund (RLF) and are not from appropriations.[16]

Cumulatively from 2001 through 2023, the federal government contributed $17,868,776 to Oklahoma's Brownfields Program. The Revolving Loan Fund has provided $9.6 million in federal expenditures for cleanups. And of the $9.6 million, approximately $2.9 million is associated with loans with the remainder distributed as subgrants and programmatic costs. Adjusting for inflation, the 2023 equivalent dollars spent by the federal government was slightly more than $20 million.[17] Over the same 2001-2023 time frame, employment and economic activity of properties participating in Oklahoma's Brownfields Program is estimated to have generated $136.6 million in federal income taxes over the amount of federal income tax levels.

Return on Investment (ROI) is a measure of profitability/earnings and is expressed as a ratio of net income to the amount of capital employed. Using the federal expenditures as the amount of capital it has employed, the ROI for the Oklahoma Brownfields Program has been tremendous even when comparing one year's federal income tax gains compared to the cumulative cost of the federal expenditures. If the activities occurring on 78 brownfields projects would not have occurred elsewhere, then the federal government has had a return on its investment of 583%, calculated as:

$$\frac{\textit{(New Federal income taxes collected in 2022 – Total Federal Expenditures)}}{\textit{Total Federal Expenditures between 2001 and 2023}}$$

[16] The loans are expected to be paid back; however, this dollar amount represents the portion of the RLF that covers DEQ salaries, which are recouped via interest and fees on the loans.

[17] While there were federal brownfield expenditures before 2001, the data are not available since accounting systems changed around that time and the federal Brownfields Law was passed in 2002.

This means that for every $1 the federal government spent on Oklahoma's Brownfields Program, an estimated $5.83 was returned to it from federal income taxes. Aggregating the annual gains would mean that the ROI would be much greater. For example, assuming the same $136.6 million more in federal income taxes occurs in 2023 as in 2022, then the ROI would be 1266% for the same federal expenditure.

Demographics

The Oklahoma Brownfields Program can have a positive impact on neighborhoods and commercial districts that have remediated sites within their immediate area. Redevelopment of these sites can provide more housing and development for local residents as well as employees within the wider workforce who choose to work for employers in or near brownfield properties.

According to decennial Census data, Oklahoma grew in population from 3,450,654 in 2000 to 3,959,353 in 2020, for a gain of 14.7%. For comparison, its resident population in and near brownfield sites outpaced that growth, going from 77,960 in 2000 to 115,121 in 2020, for a gain of 47.7% within Census tracts.[18] It should be noted that every census tract is different, and oftentimes, changes in demographics over time may be impacted by other factors especially in geographically large census tracts.

Using data from the Bureau of Labor Statistics filtered through GIS mapping, it was found 21,644 people were employed in 2022 by businesses within these brownfield areas.[19]

Median household income for populations within a remediated brownfield grew from $38,869 to $48,451 between 2000 and 2020, according to the American Community Survey. However, this growth is almost half (24.7% to 49.9%) than what would be expected at the rate of inflation.

The poverty rate within brownfield areas rose from 8.85% in 2000 to 19.57% in 2020. A few factors may explain the rise. First, 2020 was an unusual year in which large swaths of the economic supply chain stalled or shut down due to business closures imposed by COVID-19 health restrictions. Local businesses (such as restaurants, retail, and personal services) that proliferated with urban gentrification minimized in-house operations and emphasized delivery and e-commerce. More broadly, inner city pockets highlighted by downtowns making comebacks still had areas with below-market housing and remnants of old industry.

Educational attainment is a metric of workforce preparation and upward mobility for an area.[20] Within brownfield areas, 35.32% of 18 – 24-year-olds had graduated from high school or earned equivalency in 2000. In 2020, the rate saw a slight increase to 38.74%. The state rate in 2020 was 35.1%. Within brownfields areas, 11.7% of those aged 25 and over had earned at least a bachelor's degree in 2000. The

[18] Based on data from Census tract layers covering brownfield areas. Areas are based on a quarter mile buffer from the brownfield site. Data sourced from the American Community Survey. It should be noted that Census tracts vary in size with some rural Census tracts spanning most of the county in which it is located while some urban Census tracts only cover a few blocks.

[19] Figure based on a three-month average of total employment within the fourth quarter of 2022. Source: Quarterly Census of Employment and Wages (QCEW) data from the Bureau of Labor Statistics. Again, quarter-mile buffer areas spread out from brownfields were used to find employer addresses.

[20] All educational attainment figures are derived from Census estimates.

rate improved to 22.77% in 2020, reflecting an increase in knowledge-based employment. The state rate in 2020 was 26.1%.

Change between the two years may not seem impressive. However, it should be reiterated that perceptions can change over time. While a brownfield may be remediated, it does not mean that subsequent housing and commercial development will automatically occur. Development after remediation can take years and resulting demographic shifts can take years to show up in survey data. Ultimately, each census tract is unique and its changes over time would be better analyzed individually rather than in aggregate.

Demographic Metric	2000 by Tracts (Weighted by Population)	2020 by Tracts (Weighted by Population)
Population	77,960	115,121
Median Household Income	$38,869	$48,451
Poverty Rate	8.85%	19.57%
High School Completion	35.32%	38.74%
Bachelor's Degree Attainment	11.77%	22.77%

Case Studies

Evans-Fintube Site/BMX

Tulsa, OK

Prior Use

This area was a manufacturing site originally built in 1911. The Evans building, on the southern side of the site, is also known as the Oklahoma Ironworks/Bethlehem Supply Company building. According to *Tulsa World*, it was once the largest manufacturing plant in Tulsa. The Fintube building on the northern half manufactured metal products. Heat exchangers, electrical parts and transformers were produced or stored onsite at one point as well. At its most active, the site had more than a dozen buildings; most have since been removed. The combined facilities ultimately closed in 1961 as the Bethlehem Steel Company. By 2015, the City of Tulsa owned the property, and was leasing it to a construction company for materials and equipment storage.

Evans/Oklahoma Ironworks Building (Credit: Tulsa World)

The site spans 22.3 acres. It occupies the northeast corner of the interchange between I-244 and U.S. Highway 75, known locally as the Cherokee Expressway.

The site is closely tied to the Greenwood Cultural District, a historical neighborhood known in its affluent heyday as the Black Wall Street. In 1921, a white mob attacked its African American residents and destroyed 35 blocks of the neighborhood in what would later be called the Tulsa Race Massacre. The violence stemmed from an allegation one of them assaulted a 17-year-old white woman. 36 residents were officially pronounced dead, although a 2001 state commission deemed the actual count could range from 75 to 300.

The National Register of Historic Places added the 120,000-square-foot Oklahoma Ironworks Building to its list in 2014. Its application cited the complex's example of early large-scale industry and its proximity to the Greenwood district.

Assessment and Remediation

Surface soils onsite were contaminated with petroleum hydrocarbons and metals. By 2017, the City of Tulsa had reserved $1.3 million for pollutant removal, including $900,000 from two EPA Brownfields Cleanup grants. DEQ contributed and additional $65,000 in assessment funding. The city, in accordance with the Oklahoma Brownfields Voluntary Redevelopment Act, performed risk-based remediation from October 2017 to April 2020. For the effort, the city received a Certificate of Completion from DEQ.

Current Status & Future Development

Tulsa had established strong ties to the American Bicycle Association (ABA), the governing body of USA BMX, by the time the ABA sent out requests for proposals for a national headquarters in 2012. The city had hosted the ABA's largest event, the USA BMX Grand Nationals, for 14 years. The ABA simultaneously sought an agreement with its current home, Gilbert, Arizona.

Tulsa officials kept in touch with the ABA as talks with Gilbert failed. The ABA eventually agreed in 2017 to relocate its headquarters to northeastern Oklahoma. The City of Tulsa offered the Fintube building for the new BMX complex. It includes headquarters for USA BMX and the USA BMX Foundation, National BMX Hall of Fame and Museum, and the 2,000-seat Hardesty National BMX Stadium. The complex held its grand opening in February 2022. Tulsa invested $23 million in the project.

USA BMX Headquarters (Credit: Aron Samwel)

For the Evans building, the City of Tulsa in May 2022 selected Team Alchemy as developer. The group's ambitious plans included renovation of the building, 42-story mixed-use tower with lower-level retail plaza, live-work units, landscaped amenities, and pedestrian-friendly street connection to Greenwood underneath I-244.

As of June 2023, the Evans-Fintube redevelopment project halted before construction began. After a two-year-long, community-led process, the planners received notice that the negotiations with Team Alchemy will stop, as there were changes to the developmental team. The City of Tulsa and PartnerTulsa will look at development plans and conduct community outreach to figure out the future of Evans building redevelopment over the next 6 to 9 months.

Impact of Remediation

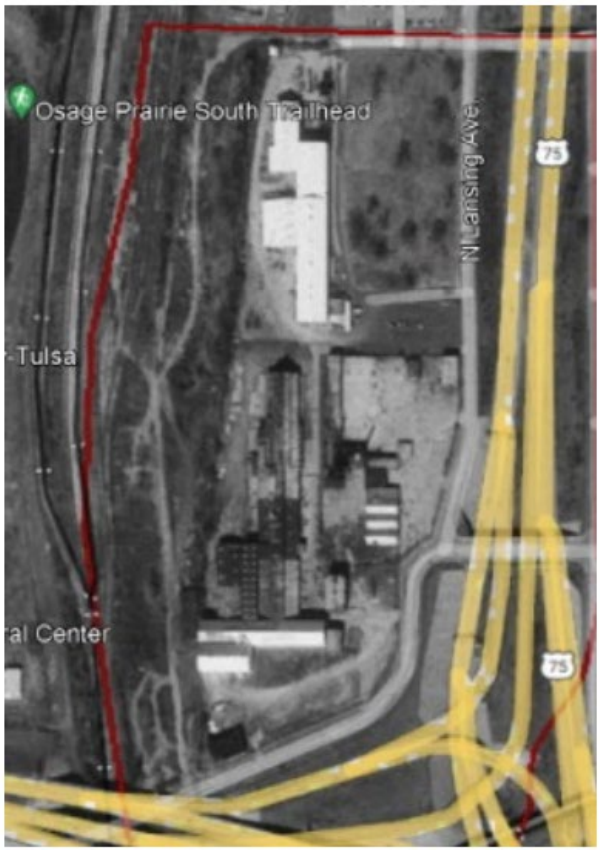
The BMX complex promises to be a consistent magnet for sports tourism in Tulsa. Officials estimate 100,000 visitors will attend more than 100 local, state, and national events in the first five years.
They expect the events to generate $11 million in economic impact for the City of Tulsa. Furthermore, the headquarters resulted in 25 new jobs in the city.

The ABA plans to be involved in the local community. In other places, the body has offered STEM programs focused on bike-building and the science behind BMX racing. Aptly, the ABA seeks to encourage local youth to start riding bicycles.

The Evans-Fintube redevelopment re-activates a highly visible plot close to the Greenwood district. City leaders see the BMX project as part of the healing process for the African-American neighborhood by bringing public amenities to it. USA BMX joins other community assets and businesses to commemorate and move forward from the Tulsa Race Massacre. These assets include the Greenwood Cultural Center, the Greenwood Rising Black Wall Street History Center, Greenwood Gallery, John Hope Franklin Reconciliation Park, and the Tulsa Drillers' ballpark ONEOK Field.

Tulsa County Tract 12		
	2000 Census	**2020 Census**
Population	2,024	1,730
Median Household Income	$20,000	$48,215
Percent Below Poverty	27.6%	22.7%
High School Graduate Age 25+	44%	71.5%
Bachelor's 25+	1.8%	2.9%

The population of census tract 12 associated with the Evans-Fintube site project includes the Cherokee Heights neighborhood east of Highway 75. The neighborhood notably includes the house-turned museum from S.E. Hinton's book *The Outsiders*. It has seen a population decline of over 14% in the past two decades. During these 20 years, however, the median household income has more than doubled, and the poverty rate has fallen. Education attainment levels have improved, portending a brighter future for Cherokee Heights if solid employment can be found and residents choose to stay.



Evans-Fintube Site in 1995 (Credit: Google Earth)

Evans-Fintube Site in 2021 (Credit: Google Earth)

MAPS 3 Upper Park

Oklahoma City, OK

Prior Use

The area, just south of downtown Oklahoma City, had historically been used for a myriad of industrial and commercial uses. The northernmost portion was adjacent to the former interstate 40 bridge called the Crosstown Expressway.

In 2002, the Oklahoma Department of Transportation secured funding to rebuild the dilapidated I-40 Crosstown bridge as an at-grade highway. City leaders blamed the old bridge for causing neglect of the area between the interstate and Oklahoma River. They envisioned an area reborn with the removal of that visual barrier. In 2008, the City of Oklahoma City put forward a land use plan connecting the central business district to the river called Core to Shore.

Hub Cap Alley in its Latter Years (Credit: Oklahoman)

Chief among the uses for the area would be Oklahoma City's own Central Park. In December 2009, Oklahoma City residents passed the MAPS 3 projects, including that central park.

Assessment and Remediation

With the anticipated opening of this park in 2019, the City of Oklahoma City submitted a brownfields proposal to DEQ for the park site in 2015. Both parties entered into a memorandum of agreement (MOA) for remediation. During cleanup, the contaminants removed from this site included chlorinated volatile organic compounds and oil. The City of Oklahoma City received a Certificate of Completion in 2020.

Scissortail Park, Upper Park (Credit: City of Oklahoma City)

Current Status and Future Development

The upper portion of that central park, eventually named Scissortail Park, opened with fanfare in 2019. At 40 acres, it lies north of the new I-40 and south of a new Oklahoma City Boulevard that stretches along the former I-40 viaduct. Robinson Avenue remains the eastern boundary of the site and Hudson Avenue its western border. An additional 30-acre lower park for Scissortail was completed in 2022. That lower portion fulfills the vision of the park connecting the core to the shore of the Oklahoma River. Collections from the MAPS 3 tax built the park at a cost of $132 million.

"The partnership between The City of Oklahoma City, EPA, ODEQ and OCC provides the support needed to revitalize underused Brownfields sites."

Mayor David Holt – City of Oklahoma City

The Upper Park features an oval-shaped grand lawn, plus a covered stage, 3 ½-acre lake, boathouse, covered event pavilions, a playground, a tree-lined promenade and more. The Union Station in Upper Park is set to be renovated into a café, store and further event spaces. The park includes multiple locations for food trucks and hosts a burger joint, Spark. The Lower Park complements the Upper Park with ample green space, but also includes a soccer field as well as courts for pickleball, basketball, and futsal.

Impact of Remediation

The remediation and clearance of the brownfield, as well as cleared land to its east (west of Shields Boulevard) has created a tourism quarter for Oklahoma City. The park has become a favorite of locals and a happy discovery for visitors. It sees over 560,000 visitors annually, hosting farmers markets, concerts, and community events. As part of MAPS 3, Oklahoma City sited its new convention center on land east of the park. Accompanying it are the upscale, 605-room Omni Hotel (with meetings rooms of its own), overflow accommodations at a Fairfield Inn & Suites, and 1,110-space garage serving those buildings plus the Paycom Center across the street. This visitor quarter is served by a new streetcar loop that connects it to Bricktown, Automobile Alley, and Midtown.

The combination makes Oklahoma City a prime meeting location. After opening in 2021, the convention center generated $70 million in economic impact from bookings in 2022.

More meaningful for locals, the parks and Skydance Bridge over the new I-40 have provided a critical connection to the city's predominantly Hispanic neighborhoods south of the Oklahoma River. On any given day, the parks present a truly diverse picture of the city. Along with further investment into the Capitol Hill district, the city is catalyzing long-dormant development in the south side.

Oklahoma County Tract 9800.09 (1037 in 2000)		
	2000 Census	**2020 Census**
Population	546	102
Median Household Income	$17,917	N/A
Percent Below Poverty	70.5%	69.6%
High School Graduate Age 25+	44%	71.5%
Bachelor's 25+	5.0%	0.0%

Census tract 9800.09 covers a relatively small area around the upper park. Clearance for Scissortail Park and the convention facilities has reduced the residential population of this historically commercial area to only isolated spots. As a result, there is scant demographic data. What residential remains has slightly improved in poverty status but shown a marked increased high school graduation level.

MAPS 3 Upper Park Area in 1995
(Credit: Google Earth)

MAPS 3 Upper Park and Convention Facilities in 2023
(Credit: Google Maps)

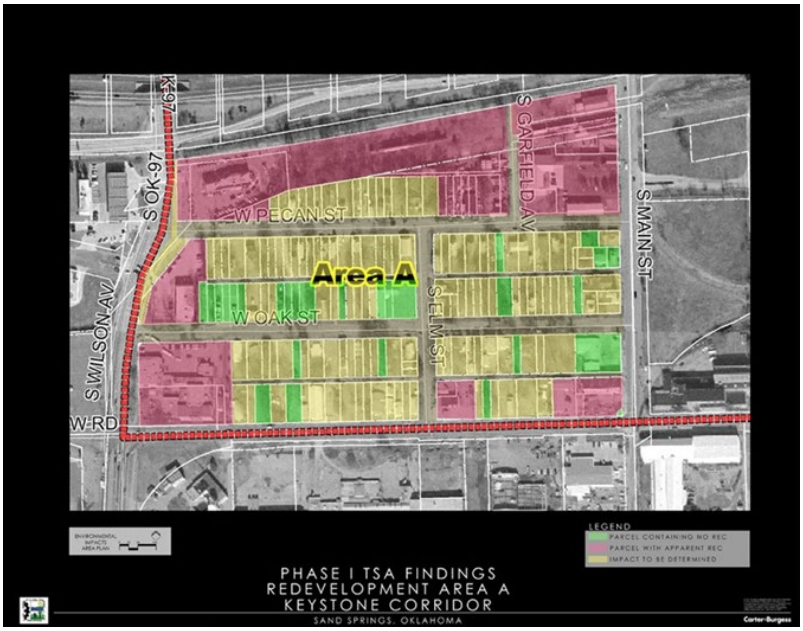
Keystone Corridor Redevelopment

Sand Springs, OK

Prior Use

The Town of Sand Springs was established in 1908. Among early uses shown in 1919 and 1925 Sanborn maps were single family residences, hotels, and a school. Automobile-serving gas stations and garages were among early businesses, as well as a railroad-serving depot and warehouse.

The use associated with the brownfield was the former zinc smelter plant built by Federated Metals Corp. It opened in 1914 and operated until the late 1980s. According to Schnabel Engineering, the plant produced zinc by separating it from ore. The process generated considerable waste that had productive use as gravel product. The waste was found to be hazardous due to its composition of metals, including lead.



River West section adjacent to the Federated Metals site. The image shows blocks to be cleared for retail development. (Credit: City of Sand Springs)

Assessment and Remediation

Federated and Kucharski Development Co. commenced remediation of lead from the Cimarron Center in 1997, with oversight from DEQ. Precipitating the effort was the aforementioned 1996 Oklahoma Brownfields Voluntary Redevelopment Act, which allowed property owners and lenders to clean their sites to limited their liability. The project was completed in 2003, and DEQ granted the developer a Certificate for No Action Necessary in March of 2004. The project was awarded the Region 6 2004 Phoenix Award for brownfield redevelopment.

The City of Sand Springs continued cleanup by taking adjacent land just east of the Cimarron site through the DEQ Brownfields Program. That land would be part of the city's Keystone Corridor Redevelopment Plan: 2025. Keystone Corridor was awarded a Certificate of No Action Necessary in December of 2011,

"Sand Springs began our history as a heavy industrial community. While that brought many blessings, we were also left with many issues. Our future has already started to take shape with retail, food and other sectors on these troubled sites. Without the help of the ODEQ Brownfields program and staff, it would have taken us much longer to see the positive changes that we have already benefitted from."

Mayor James O. Spoon – City of Sand Springs

In Oklahoma, four different programs have been used to oversee smelter cleanups. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, aka Superfund), the Resource Conservation and Recovery Act (RCRA, aka Hazardous Waste law), and the Voluntary Redevelopment and the Brownfields programs.

Current Status & Future Development

Tulsa County sales tax initiative Vision 2025 allocated $14.5 million toward the purchase and clearance of the subject area. The City of Sand Springs then initiated the Keystone Corridor plan in the mid-2000s. The plan included: Area A, which was contaminated by material from Federated Metals site, and is situated between Wilson and Main Street south of the expressway to Morrow Road; Area B, the neighborhood blocks just north of the expressway to 2nd Street from Wilson east to Adams Road; and Area C, industrial land between Main Street and Adams.

Schlotzsky's at River West Development in Sand Springs (Credit: Sandite Pride News)

The plan specified retail and commercial for the 25.7-acre Area A. The eventual project, called "River West" by Tapp Development, finally broke ground in 2016. At present day, it is an attractive retail center with restaurants Colton's Steak House, Tropical Smoothie Cafe, IHOP, Starbucks, Schlotzsky's, and local Mexican place El Maguey. Retailers include CVS, O'Reilly Auto Parts, and Aldi grocery store. Service tenants include a Holiday Inn Express, a branch of the Tulsa-based Warren Clinic, and TTCU Federal Credit Union.

The $20 million Cimarron Center retail development on the western side of Wilson occupies a significant portion of the Federated Metals site. With a Walmart Supercenter as anchor, Cimarron helped spur the Area A development. The same uses are planned for Area C immediately east of Main Street.

Retention ponds add a natural amenity to the development. Another asset, the Katy Trail, fronts the Sand Springs Expressway in Areas A and C and connects to downtown Tulsa.

Impact of Remediation

The new retail development in the subject and adjacent areas has allowed Sand Springs to capture further sales tax revenue locally and from the expressway. The highway brings in traffic from western and central Oklahoma to the Tulsa region -- 31,600 vehicles per day at its Sand Springs section. The developer in 2011 noted that the Rib Crib in Cimarron Center was its highest-grossing non-franchise restaurant. By 2016, the Cimarron Center had added almost 600 new jobs. The River West development has further added hundreds of jobs. Together, they have contributed over $40 million in annual sales tax revenue to the City of Sand Springs.

Tulsa County Tract 92		
	2000 Census	**2020 Census**
Population	3,742	3,530
Median Household Income	$31,714	$33,750
Percent Below Poverty	10.6%	6.0%
High School Graduate Age 25+	26.1%	23.2%
Bachelor's 25+	15.7%	13.5%

This census tract covers land east of Wilson (south of Highway 412) and McKinley (north of Highway 412), west of S. 81st Street, north of the Arkansas River and south of the Osage County border. The tract includes older neighborhoods in central Sand Springs and larger exurban lots. The population of census tract 93 has seen a decline of over 5.7% in the past two decades. During these 20 years, the median household income has slightly increased but far below the same salary adjusted for inflation. The general poverty level has dropped during this period, which is better than the county level benchmark. The education attainment levels in this census tract show declines, a challenge for this steadily growing Tulsa suburb.

Keystone Corridor Site in 1995 (Credit: Google Earth)

Keystone Corridor Site in 2022 (Credit: Google Maps)

Sheridan (East Bricktown) - Steelyard Apartments

Oklahoma City, OK

W.H. Stewart Steel Company before Clearance (Credit: Abandoned Oklahoma)

Prior Use

For decades, from 1934 to 2003, the W.H. Stewart Steel Company operated along the 401 – 505 blocks north of Sheridan.[21] The fabricator made metal components for companies such as Allied Signal, AT&T, Kerr McGee, Halliburton and Mitsubishi. Products included relay racks, frames, cabinets, air ducts, trailers, and tanks. In 1990, it employed 125 people.

Assessment and Remediation

With intent to build, Cornerstone Development, doing business as Bricktown Apartments LLC entered into a consent order for brownfields risk-based remediation, meaning the cleanup entails the possibility of contamination. Contaminants identified during the remediation process included oil, polycyclic aromatic hydrocarbons, and heavy metals. The developer earned a Certificate of Completion in 2019.

[21] The brownfield also included the block at 100 N. Lincoln Boulevard.

Current Status and Future Development

Cornerstone Development pursued a mixed-use project for Bricktown. It includes residential housing and retail space in the aptly named Steelyard, a 250-unit apartment complex. Consisting of two four-story buildings with courtyards and a garage, the community brings dense residential to a quieter corner of the tourism district. Facing Sheridan on the first floor are 28,000 square feet of rental retail space. Phase II of the complex will add 150 more units and be built east of the current buildings.

Steelyard Apartments (Credit: Steelyard)

In addition, two stylish limited-service brands, Hyatt Place and AC Hotels, on the corner of Joe Carter and Sheridan were built. The sites received a Certificate of Completion in 2014. The Steelyard and AC Hotel opened in 2017, and Hyatt Place in 2018.

Impact of Remediation

With East Sheridan once industrial or empty, the project broadens the Bricktown experience for locals and visitors. Handsomely finished in brick with consistent heights, the hotels and apartments added a much-needed visual streetwall to the neighborhood and extended the pedestrian experience in Bricktown.

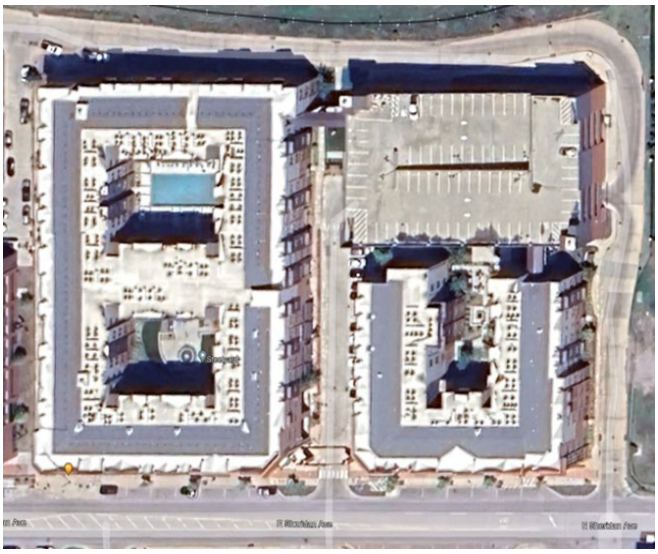
The development complemented and catalyzed neighboring development. The popular 4,000-seat music venue The Criterion across the street opened in 2016. Tiff's Treats serves residents and concert goers. The nearby Springhill Suites also opened in 2017. Facing Steelyard on the south side of Sheridan, Springhill further filled space toward Lincoln Boulevard.

Oklahoma County Tract 1097 (1038 in 2000)		
	2000 Census	**2020 Census**
Population	163	1,762
Median Household Income	$7,864	$60,273
Percent Below Poverty	77.9%	12.2%
High School Graduate Age 25+	68.9%	98.9%
Bachelor's 25+	18.2%	85.1%

This census tract includes new Bricktown/Deep Deuce/Automobile Alley housing as well as older, African-American neighborhoods east of I-235. With new multi-family housing, the residential population swelled to over 280 households. It will further grow with the addition of 150 apartments from Steelyard's second phase. Bricktown's transition from an industrial warehouse district to an entertainment center to nascent neighborhood reflects an emerging pattern of places in the center of larger American cities. With the shift

in the economy to more remote work, older buildings and neighborhoods are being repurposed into housing.

Sheridan/East Bricktown in 2002
(Credit: Google Earth)



Sheridan/East Bricktown in 2023
(Credit: Google Maps)

Oklahoma Industries Authority-Boeing

Oklahoma City, OK

Prior Use

This area sits in Oklahoma City's industrial east side near Del City and Midwest City. When Tinker Air Force Base located in town in 1941, it brought with it a massive economic engine. At 26,000 military and civilian personnel, it is the largest single site employer in Oklahoma. Several military units operate on base, such as the Oklahoma City Air Logistics Complex (OC-ALC), Air Force Sustainment Center, and 448th Supply Chain Management Wing.

Tinker Air Force Base in 2017 (Credit: Tinker Air Force Base)

The OC-ALC is responsible for the maintenance of four aircraft, including the B-52. It is also the maintenance, repair, and overhaul (MRO) servicer for several aircraft engines. Because of this activity, the base attracts prime defense contractors for close collaboration, including Boeing, Northrop Grumman, and Lockheed Martin.

The brownfield site is located at the northwest corner of SE 59th and Air Depot in Oklahoma City, immediately west of Tinker Air Force Base. Prior to entering the Brownfields Program, this site had been used for county storage and as a pipe threading business. With contracting growing, Boeing began to increase its presence in Oklahoma City. Boeing determined it would build a new facility to staff maintenance of its fleet of KC-46A tankers. After Oklahoma County, the City of Oklahoma City, State of Oklahoma, and U.S. Air Force partnered to acquire the land, the Oklahoma Industries Authority owned the property.

Assessment and Remediation

The Oklahoma Industries Authority is still investigating the site. They did find chlorinated volatile organic compounds in a small area in the groundwater. Fortunately, groundwater can be investigated and remediated without disrupting development activities.

Current Status and Future Development

Boeing broke ground on its $80 million, 290,000-square-foot facility in July 2015, as they announced that Oklahoma City would become the new headquarters of Boeing's Aircraft Modernization and Sustainment division. The building would house 800 jobs in engineering and research & development positions with a few support roles. The average wage for those jobs was expected to be $90,000 per year.

Boeing Aircraft Modernization and Sustainment Building (Credit: Boeing)

Impact of Remediation

In April 2022, Boeing dedicated another building, a new high-bay structure. The 60,000 square foot modernization facility houses a B-52 that engineers will use to integrate new and improved engines through the Commercial Engine Replacement Program, also updating the Avionics and Radar Modernization Program. The modernization program is expected to bring an additional 400 - 600 jobs to Boeing Oklahoma and will generate an annual economic impact of over $44 billion.

Boeing has continued to grow its presence in Oklahoma City, attracting workers from other locations. Its buildings in the city now employ over 3,000. The company is the commercial flagship for the city's aerospace and defense sector, now the second largest industry in the state.

Oklahoma County Tract 1074.06 (1074.03 in 2000)		
	2000 Census	**2020 Census**
Population	4,162	8,271
Median Household Income	$45,245	$61,023
Percent Below Poverty	8.6%	9.0%
High School Graduate Age 25+	85.0%	91.6%
Bachelor's 25+	23.2%	32.1%

This census tract, which covers a mile-wide rectangular swath from Tinker Golf Course down to SE 89th along the western side of Air Depot, features a mix of military/aerospace, single-family housing, and assorted commercial uses. More residential than the previous case studies, its population has doubled. The emergence of the aerospace and defense sector has brought hundreds of new higher-paying professional positions to the city. Rising income and educational attainment reflect this growing industry. Yet, the increase in median household income falls short of what the same salary would be adjusted for inflation. The climbing cost of living perhaps explains why the percentage of residents below poverty level increased slightly.

OIA/Boeing/Tinker Area in 1995 (Credit: Google Earth)

OIA/Boeing/Tinker Area in 2023 (Credit: Google Maps)

Downtown Airpark – Wheeler District

Oklahoma City, OK

Prior Use

Oklahoma City's Downtown Airpark originally opened in 1947. Its longest runway was 3200' and was utilized by private aircraft owners. In five large hangars, the Downtown Airpark had a major service center, including aircraft painting operations, for Aero Commander Aircraft. Located on the south shore of the Oklahoma River, the 150-acre site on Western Avenue provides direct automobile access to Interstate 40 and pedestrian and bike access to the river's trail network.

While the airpark was in a central location, the size of its runway and its proximity to downtown high-rises were barriers to larger, faster aircraft using the airport. The Downtown Airpark closed in 2005. It was purchased in 2006 by Humphreys Partners 2006, LLC.

Downtown Airpark after Opening in 1947 (Credit: Oklahoma Historical Society)

The Humphreys group envisioned the area as a mixed-use commercial and residential neighborhood. Branded the Wheeler District, it is complementary to the MAPS 3 Upper Park "Core to Shore" redevelopment zone on the north side of the Oklahoma River. Wheeler is named after long-standing Wheeler Park, also on the north shore of the river near downtown.

Present-day Wheeler Ferris Wheel and Park

Assessment and Remediation

With residential use a critical component of the development, ensuring the health of future occupants was especially important. To proceed, extensive assessment and remediation were necessary. This included removing tanks of used solvent and petroleum from underground storage tanks, removing and selling buildings from the site, and investigating the soil and groundwater. The site received a Certificate of No Action Necessary in 2012.

Current Status and Future Development

Construction on the Wheeler District began in 2017. The development gained national attention when Humphreys purchased the former Santa Monica Ferris Wheel via ebay in 2018. The wheel now anchors a scenic park area with the "OKC" public art installation, food vendors, games, and hammocks right on the Oklahoma River facing downtown.

Wheeler District Homes

Wheeler District welcomed its first residents in April 2019, and since then the neighborhood has grown to include almost 100 single family homes. The neighborhood features 2 to 4-bedroom houses in Scandinavian architecture, along with shoebox condo buildings and several live-work units featuring commercial on the first floor. The development is well-known for practicing New Urbanism, a style of mixed-use planning that emphasizes building on a more intimate scale with smaller lots. The street grid is laid out to encourage walking or riding to school, work, dining, the park and river.

Non-residential uses continue to be added. In 2020, the former airport terminal was redeveloped into an all-day café known as Terminal Commons (and what is now Taco Nation). The Big Friendly Brewery and taproom opened afterward across the street. A public charter school, Western Gateway Elementary School, opened in August of 2021 offering dual-language immersion for residents of the district and nearby neighborhoods of College Hill, Higgins Heights, Jones Grove, and Will Rogers Courts. Wheeler Block 13, a new barrel-shaped office building, hosts a branch of the local coffeehouse Clarity Coffee. Farmers markets and annual Wheeler Criterium bike races bring life to the district.

Impact of Remediation

The Wheeler District is a development refreshing in its approach and location. Though charging premium asking prices per square foot, it has attracted a growing community of residents. They have bought into the New Urbanist vision of a pedestrian-friendly neighborhood with distinctive architecture and amenities. It provides a unique residential alternative to a city whose newer homes tend to be large with open floor plans. Wheeler's ferris wheel park has become a place beloved by locals and featured in videos taken by tourists.

Significant has been its location on Oklahoma City's south side. Historically underrepresented in the Oklahoma City pantheon of highly desired food, cultural, and neighborhood scenes, the Wheeler District brings an admired, cutting-edge residential community south of the river. It has become a complementary counterpart to the emerging Capitol Hill district to the east.

Oklahoma County Tract 1041		
	2000 Census	**2020 Census**
Population	3,281	2,810
Median Household Income	$15,369	$14,066
Percent Below Poverty	38.3%	39.1%
High School Graduate Age 25+	46.4%	62.4%
Bachelor's 25+	6.6%	4.6%

This census tract covers land south of the Oklahoma River from Pennsylvania to Walker down to SW 22nd. To the east of Wheeler are the Will Rogers Courts public housing and aforementioned neighborhoods. Wheeler was still early in construction and move-in by the time 2020 Census was taken. Hence, these numbers largely reflect existing housing. The tract declined in population and income, with a high percentage below poverty level at 39.1%. Despite a lower percentage in 2020 of the population with a bachelor's degree or higher, its educational attainment figures reflect a population suitable for entry-level work.

Former Downtown Airpark in 2005
(Credit: Google Earth)

Former Downtown Airpark in 2023
(Credit: Google Maps)

Future Site Projects

The Oklahoma Brownfields Program at DEQ continues to clean up and remediate many communities and former business sites across the state. A few of these projects are outlined below.

Thomas Hospital Complex

Approximately 18 miles north of Weatherford, is the small town of Thomas with a population of 1,337[22]. has two rail lines and two highways but no hospital. Thomas Memorial Hospital, an eight-building complex on the east side of town, served the small community of Thomas, OK since 1949 before its original closure in 1989. With financial assistance from its citizenry, the hospital was able to reopen and operate for several years, but it was forced to close again in 1995, permanently this time.[19] With no one coming to the complex' rescue, it was subjected to vandalism for years while also acting as an eyesore to the surrounding neighborhood.

In 2019, EPA and DEQ began investigating the structures for possible contamination. During their work, they identified several types including lead-based paint, asbestos, and mercury thermometers. With this information, the City of Thomas successfully applied for clean-up funding through DEQ's Community Revitalization and Brownfields Program. Approximately $1 million has been spent to remove the sources of contamination.[23]

Three of the eight structures are slated for demolition. Having been rid of contaminants, the buildings can be brought down safely with the debris removed without any long-term ill-effects on the site. This land

[22] 2021 American Community Survey, Total Population, table B01003, 5-Year population estimates
[23] file:///C:/Users/361768/AppData/Local/Microsoft/Windows/INetCache/Content.Outlook/1068AGUP/FormerThomasHospitalComplexFactSheet%20(2).pdf

can then be used for new developments. Three more buildings will be reused as a retirement facility. According to Census Bureau data, the median age of Custer County rose by nearly 1% between 2020 and 2021, so the need for Thomas and the surrounding area will only increase.[24] One more building is currently being rented to a wind turbine company, a successful reuse of that facility.

Buffalo Main Street Building

Buffalo, Oklahoma is a small community of 1,039, per the Census Bureau, in northwestern Oklahoma.[25] As befalls many rural towns, there are buildings along their Main Street that have not been occupied for decades. With time spent unoccupied, questions arise around their redevelopment: What could they be used for? What investment would be required to bring them up? And where would the money come from? For one such building, Buffalo is working with DEQ to investigate potential options.

The Town of Buffalo and other nearby communities applied through DEQ for a Technical Assistance Grant from EPA and in April 2020 received an Asset Inventory. This is a planning tool that identifies sources of strength (current or potential) within the community. The Buffalo study outlined strong points in the community's human resources and sites for potential redevelopment.[26] This effort was furthered three years later in June 2023 when the Technical Assistance to Brownfields Program completed and shared a Resource Roadmap that outlined potential sources of funding for redevelopment.

With their studies in hand, the Town of Buffalo purchased a long-vacant Main Street building on September 29, 2023. Already, DEQ and the Environmental Protection Agency (EPA) are working together to assess and potentially clean up any contaminants. Once completed, the Town of Buffalo can market this building for a new occupant or developer and hopefully gain additional vitality on Main Street.

Recommendation

One recommendation associated with Oklahoma's Brownfields Program would be to gather/incorporate additional investment and remediation data in the administration of the program. Presently, very limited information is available about how much money is spent by private companies to assess and remediate the properties. Additionally, limited information is available regarding any investment private companies spend to renovate, perform site development and/or construct buildings or infrastructure on the brownfields. This activity has an economic impact.

By incorporating the data requirements in the administration of the program, future studies assessing the economic impact of Oklahoma's Brownfields Program will have additional data to incorporate in the study. For the purposes of this report, any expenditures on assessment and remediation as well as any investment associated with construction and renovation were excluded from the economic impact. This means that the economic impacts are conservative.

[24] https://datausa.io/profile/geo/custer-county-ok
[25] https://data.census.gov/all?q=buffalo,+oklahoma
[26] https://astswmo.org/files/Resources/CERCLA_and_Brownfields/Brownfields-Storymap/Buffalo-Asset-ID.pdf

Conclusion

Brownfields programs enjoy bipartisan support nationwide. They are federal and state programs that address multiple issues at once – neighborhood blight; urban disinvestment; lack of services and employment opportunities; declining property values; environmental contamination; encroachment into greenfields; and resource-inefficient urban sprawl. When cleanup (or a positive-outcome assessment) occurs at a brownfield site, the benefits extend beyond the brownfield properties themselves and into adjacent areas.

Oklahoma balances its land among residential, commercial, agricultural and industrial uses. Remediating brownfields sites has many benefits and encourages the productive reuse of land preserving greenfields and farmland for future generations.

"The positive impact of the Brownfields Program can be seen across Oklahoma. Where once there were abandoned, blighted areas, there are now parks and thriving businesses that serve as economic and societal hubs for their communities. From the urban core to rural towns, the Brownfields Program has proven to be a driver for change and prosperity."

DEQ Executive Director Scott Thompson

Jobs, payroll, and taxes are all positively impacted by returning land to productive use. Focusing solely on the direct impact of properties that participated in Oklahoma's Brownfields Program, the state has benefited from the creation of 3,013 jobs and associated payrolls increasing $163.8 million. In brownfields and within a quarter mile, retail sales increased $443.6 million, state sales taxes grew by $19.95 million, and state income taxes increased $41.66 million from 1998 to 2022.

Acknowledgements

We appreciate DEQ staff for their assistance during this project. First and foremost, we are indebted to Aron Samwel. Her expertise and meticulous administration of the program have been invaluable, and we greatly appreciate her review of this report. Her insight and provision of background materials ensured we understood the history and featured the latest information on the Brownfields Program. Her steadfast help was a luxury for us as report authors.

We appreciate the leadership of Lloyd Kirk and the assistance lent by other DEQ staff during the project – Rachel Franks and Dustin Davidson. All were extremely responsive and answered e-mails timely on occasions when we could not speak with them directly. We could not have asked for more from our relationship with DEQ.

For questions or comments about this economic impact report, contact Jon_Chiappe@okcommerce.gov

Appendix A

BROWNFIELD CERTIFICATES					
Project Name	**Location**	**Brownfield Certificate Issued**	**Start Date – Issue Date**	**Cleanup**	**Before Use/End Use**
Shawnee Gun Club	Shawnee	Certificate of No Action Necessary	2/22/13-3/16/16	Metals	Shooting range/Residential
GRC/VGR/Sercel	Tulsa	Certificate of No Action Necessary	6/5/12-6/27/16	Chlorinated VOCs	Manufacturing of geophysical instrumentation/Industrial
Sapulpa Refinery – Carson Yochum Tract	Sapulpa	Certificate of No Action Necessary	2/22/16-10/26/16	TPH and PAHs	Former oil refinery/Commercial
Sapulpa Tank Farm	Sapulpa	Certificate of Completion	11/3/08-1/18/17	TPH and PAHs	Former oil refinery tank storage and oil pipeline/Commercial
Spartan College of Aeronautics & Technology	Tulsa	Certificate of No Action Necessary	4/21/14-1/27/17	TPH, Metals, and Chlorinated VOCs	Aeronautical Education Facility/Aeronautical Education Facility
Nuway Laundry Facility	Oklahoma City	Certificate of No Action Necessary	7/14/14-2/24/17	Chlorinated VOCs and TPH	Former dry cleaner/For sale – vacant
JM Assets LP	Broken Arrow	Certificate of No Action Necessary	3/24/09-8/24/17	Metals and Volatile Organics	Former landfill and strip coal mine/Commercial
Blackwell Zinc Company and Blackwell Industrial Authority Jon W. Anderson Property North Part of Tracts 7 and 10	Blackwell	Certificate of Completion	12/17/92-9/13/18	Metals	Former zinc smelter/Industrial property
Sheridan MFP Parcel (a.k.a. Steelyard – MFP Parcel)	Oklahoma City	Certificate of Completion	3/4/13-6/28/19	Metals, PAHs, and TPH	Former railyard and roundhouse, oil field activities, oil storage, and steel fabrication/Steelyard apartments and parking garage

Red Eagle Site	Midwest City	Certificate of No Action Necessary	1/22/18-10/17/19	Chlorinated VOCs	Former painting and refurbishing of aircraft oxygen tank dials/Commercial
Second Sunshine, LLC Site	Oklahoma City	Certificate of No Action Necessary	5/22/19-11/19/19	Chlorinated VOCs	Former industrial site/Commercial
MAPS 3 Upper Park	Oklahoma City	Certificate of Completion	1/19/16-3/10/20	TPH, PAHs, and Chlorinated VOCs	Various uses including auto sales, oil and gas production, residential, grocery stores, gas station/Scissortail Park
Evans-Fintube Site Tract 1	Tulsa	Certificate of Completion	10/2/17-4/27/20	PAHs, TPH, Metals, and PCBs	Former iron machine shop and foundry and electrical parts and transformer warehouse/BMX headquarters
Evans-Fintube Site Tract 2	Tulsa	Certificate of Completion	10/2/17-4/27/20	PAHs, TPH, Metals, and PCBs	Former iron machine shop and foundry and electrical parts and transformer warehouse/BMX headquarters
Evans-Fintube Site Tract 3	Tulsa	Certificate of Completion	10/2/17-4/27/20	PAHs, TPH, Metals, and PCBs	Former iron machine shop and foundry and electrical parts and transformer warehouse/BMX headquarters
Sapulpa Refinery 894 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 900 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 901 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 902 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 904 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 905 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 906 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential

Sapulpa Refinery 910 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 912 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 914 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 916 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery 920 N Linden	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery Carson Yochum LLC 1	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Sapulpa Refinery N Linden Rd	Sapulpa	Certificate of No Action Necessary	3/11/19-7/28/20	Metals and TPH	Former oil refinery/Residential
Southwest Chemical Services	McAlester	Certificate of No Action Necessary	3/25/14-8/27/20	Chlorinated VOCs and Metals	Past circuit board and electronic equipment manufacturing/Commercial
8th and 9th Street Project	Oklahoma City	Certificate of No Action Necessary	1/25/19-9/30/20	Chlorinated VOCs	Former warehouse/Commercial
SE Corner of NW 4th and Shartel	Oklahoma City	Certificate of No Action Necessary	3/20/20-3/10/21	Chlorinated VOCs	Former filling station, dry cleaner, and auto repair facility/Commercial
Interstate Metals	Oklahoma City	Certificate of No Action Necessary	2/5/16-4/6/21	Metals	Former metals recycling and smelting/Commercial
American Indian Boulevard Site	Oklahoma City	Certificate of No Action Necessary	10/9/20-12/29/21	PAHs and SVOCs	Oil and gas exploration/Resort and water park, commercial
Valero Property	Ardmore	Certificate of Completion	8/4/11-4/7/22	PAHs and Metals	Former oil refinery/Commercial
Thunder Alley	Oklahoma City	Certificate of No Action Necessary	10/7/21-1/6/23	VOCs	Former expressway/Commercial

SUBGRANTS					
Grantee/Project Name	**Location**	**Funding Amount**	**Awarded – Completed**	**Cleanup**	**Before Use/Planned Use**
Greer County Economic Development Authority/Hotel Franklin	Mangum	$79,007	August 2015 – July 2017	Asbestos and lead-based paint	Former hotel/Planned mixed-use residential
City of Pawnee/Pawnee Hospital	Pawnee	$121,656	August 2015 – March 2018	Asbestos	Former hospital/Planned use as a clinic
Ki Bois Community Action Foundation/The Oaks	McAlester	$116,572	August 2015 – December 2017	Asbestos and lead-based paint	Former hospital/Planned expansion of residential treatment facility
Alpha Community Foundation of Oklahoma/Garden Oaks Elementary	Oklahoma City	$350,000	September 2021 – August 2022	Asbestos, lead-based paint	Former school/Planned community center including a sports complex, community garden, library, computer lab, and business center
Tulsa/Former Auction House	Tulsa	$350,000	April 2021 –	Asbestos, lead-based paint, and low-level radiation	Former auction house/Planned city offices

REVOLVING LOAN FUND - LOANS					
Grantee/Project Name	**Location**	**Funding Amount**	**Date Awarded – Date Completed**	**Cleanup**	**Before Use/Planned Use**
1101 East Reno LLC/Interstate Metals	Oklahoma City	$740,000 loan	June 2016 – September 2017	Soil removal	Former scrap metal recycler/Future redevelopment plans are pending

Absentee Shawnee Tribe/Rodeside Motel	Shawnee	$147,610 loan	December 2018 – September 2019	Asbestos	Former motel/Demolished to make way for future redevelopment
Absentee Shawnee Tribe/Former Newton Walls	Tecumseh	$96,210 loan	December 2018 – September 2019	Asbestos	Former retail and warehouse/Redevelopment plans are pending
Sharp Development/Diamond Building	Tulsa	$930,000 loan	February 2020– April 2022	Asbestos	Former Oral Roberts headquarters/Residential development planned

Art by Madeline Dillner – Brownfield Project Coordinator

Oklahoma Corporation Commission

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Prepared By:

Oklahoma Department of Commerce, Research and Economic Analysis Services