

## Executive Summary

For several decades, incandescent gas mantle manufacturing operations employed workers at the Welsbach and General Gas Mantle companies in Gloucester City and Camden, New Jersey. These operations led to extensive radiological soil contamination across the two cities, both at the manufacturing facilities and properties nearby. Cleanup actions by the U.S. Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) have removed much of the contamination and made possible new redevelopment opportunities in the area. Project priorities included completing residential property cleanups first, and phasing the cleanup and restoration efforts to accommodate commercial activities and community priorities while ensuring the remedy protected human health and the environment.

Today, Gloucester Marine Terminal, a cargo terminal that ships and receives products from around the world, remains open for business on site. Other developments at the site include a new theatre, a new elementary and middle school, and the restoration of several athletic fields and swimming pools.

## Beneficial Effects

- On-site businesses support more than 500 employees, providing more than \$31 million in estimated annual employment income.
- In 2015, local officials broke ground on a new elementary and middle school on site.
- Collaborative cleanup efforts expedited the development of several community athletic fields and a local swim club complex.
- EPA has completed cleanup at more than 120 residential properties, 15 commercial properties and 18 municipal properties.

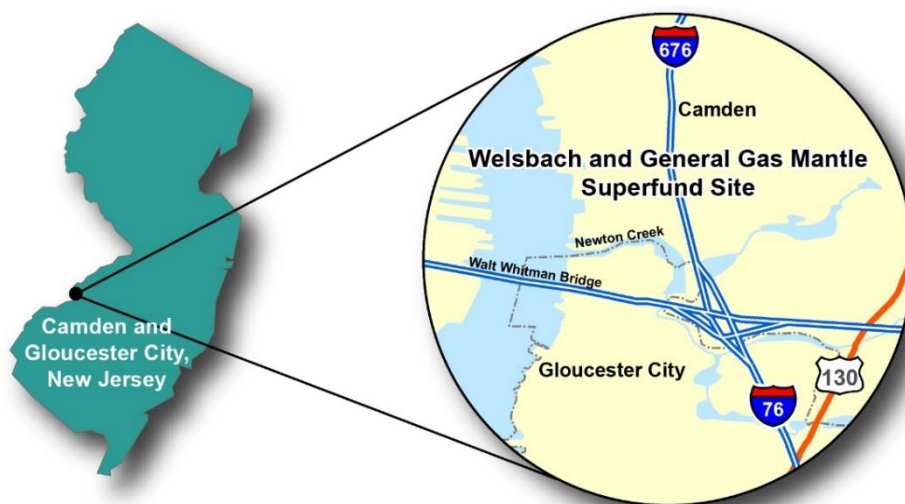


Figure 1. The site is located in Camden and Gloucester City, Camden County, New Jersey.

## Introduction

When a Superfund site undergoes redevelopment, it can help revitalize a local economy with jobs, new businesses, tax revenues and spending. Continued use of contaminated properties can also be important to local economies. When cleanups take existing business operations and community priorities into account, they help ensure the resilience of local economies and build community support for cleanup efforts. This case study highlights the beneficial effects of new and continued uses at the Welsbach and General Gas Mantle Superfund site.

The multi-property site is located in Camden and Gloucester City, in Camden County, New Jersey, on the eastern side of the Delaware River. EPA is investigating several focus areas, including residential, recreational, industrial and commercial properties surrounding the former General Gas Mantle and Welsbach facilities. This case study highlights cleanup areas that have served as a foundation for redevelopment efforts and areas where business has remained ongoing while EPA continues to perform remedial actions. These areas include the Gloucester Marine Terminal, J&R Pallets, the Gloucester City Swim Club, the Waterfront South Theatre, several recreation fields and property slated to host an elementary and middle school (see Figure 2).

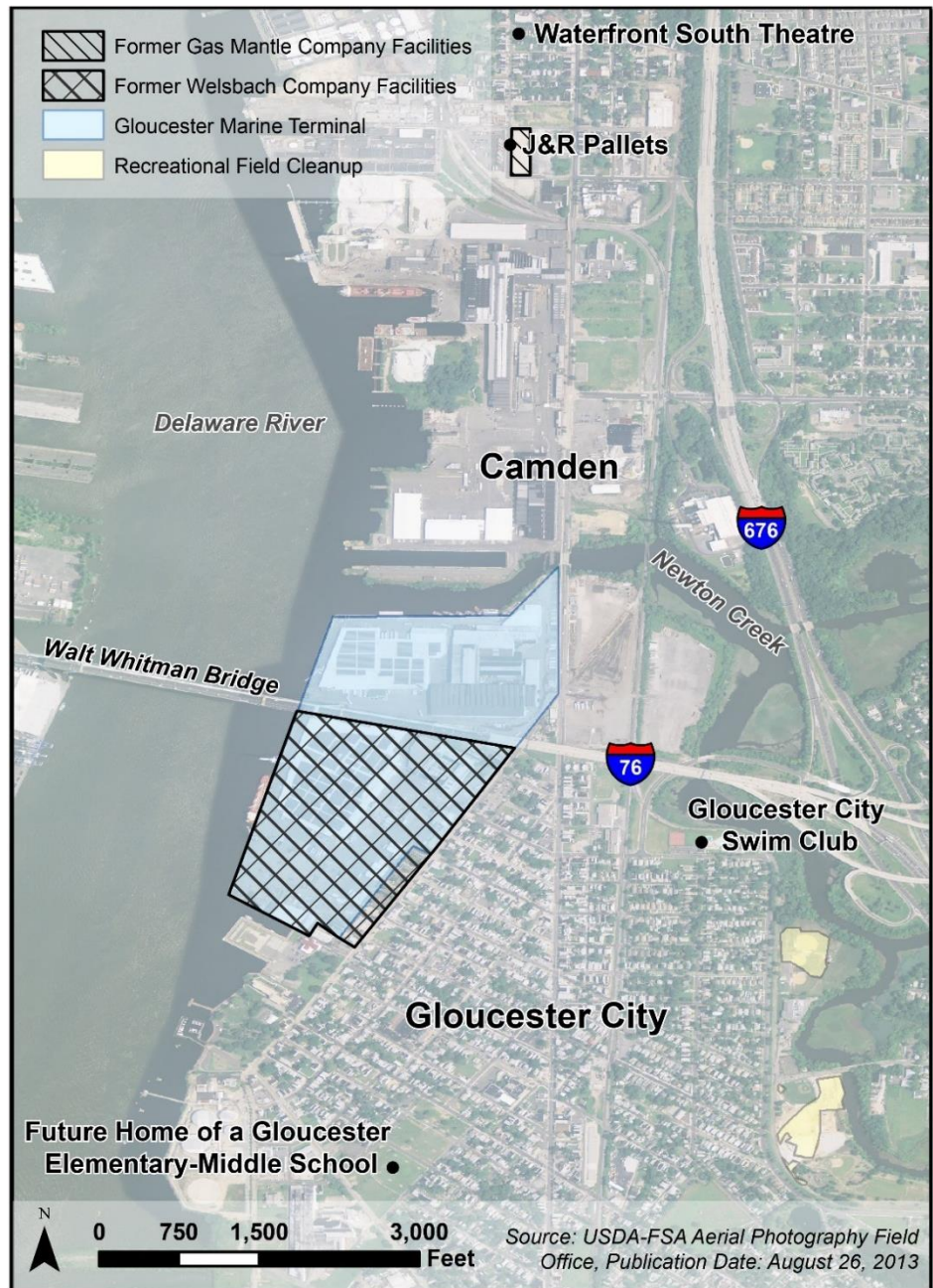


Figure 2. Key cleanup areas in Camden and Gloucester City.

## Site History

Between the 1890s and the 1940s, two different gas mantle manufacturing companies operated out of several on-site buildings. The Welsbach Company operated out of a facility in Gloucester City (see crisscrossed area in Figure 2). General Gas Mantle Company had a facility just north of Gloucester City in Camden (see striped area in Figure 2). To make their gas mantles glow more brightly, the companies used the radioactive element thorium, which was extracted from monazite ore. The Welsbach Company was a major manufacturer and distributor of gas mantles. In the early 1900s, Welsbach was the largest producer of gas mantles and lamps in the United States, making up to 250,000 mantles per day. General Gas Mantle Company did not process ore materials; the company only used refined thorium in its gas mantle manufacturing processes. Operations continued until electric lighting replaced gas lighting. Both facilities closed in the early 1940s.

Ore tailings and other wastes from these facilities were used as fill throughout Gloucester City and Camden. After the Welsbach facility closed, many on-site buildings were demolished and the demolition debris was also used as fill material in surrounding areas as well.

## Early Investigations

In 1981, EPA sponsored an aerial radiological survey of the 20-square-kilometer area around the former facilities to investigate possible radioactive contamination. Areas throughout Camden and Gloucester City had elevated gamma radiation.

In the early 1990s, NJDEP followed up with radiological investigations at more than 1,000 properties across the two cities. Radiological contamination was identified at the two former manufacturing facilities and at about 100 other residential and municipal properties in the area. Short-term cleanup measures by NJDEP included the installation of radon/thoron mitigation systems and the installation of gamma radiation shielding (soil, concrete and lead).<sup>1,2</sup>

To address long-term protectiveness, EPA placed the site on the Superfund program's National Priorities List (NPL) in 1996.



**Figure 3. An abandoned pub (top) was demolished and the area excavated (bottom) to prepare the site for reuse as a professional theatre.**

<sup>1</sup> Radon occurs as a decay product of radium. Thoron is the isotope of radon.

<sup>2</sup> For more information on the relationship between radon and thoron, and health impacts, visit <https://www.epa.gov/sites/production/files/2015-05/documents/402-r-03-003.pdf>.

## A Phased Cleanup

In 1997, EPA began in-depth site investigations to determine the type, amount and extent of contamination present. The investigations confirmed elevated concentrations of thorium and radium radionuclides in the soil at both former facilities as well as at nearby residential properties.<sup>3,4</sup>

EPA and NJDEP are addressing the site's remaining cleanup in two phases: immediate actions and a long-term remedial phase focused on the entire impacted area. Immediate actions included installing gamma radiation shielding and radon ventilation systems where necessary. In the early 1990s, NJDEP purchased a contaminated residential property and relocated a commercial business. In 1998, EPA excavated about 260 tons of contaminated soil from a public park area in Gloucester City and replaced it with clean fill.

To manage the long-term remedial phase, EPA divided the site into four operable units (OUs). The goal is to minimize the potential for humans to come in contact with radioactive contamination. OU1 – the largest OU – is soils and waste materials. OU2 is a former Welsbach building known as the Armstrong Building. OU3 is surface water, sediment and wetland areas. OU4 is groundwater.

The OU1 cleanup of some of the areas highlighted below involved excavation and off-site disposal of radiologically contaminated soil and building materials. Excavated areas were backfilled with clean soil.

## Involving the Community

Throughout the cleanup, EPA has worked closely with local officials and community members to make sure cleanup and restoration efforts are not only safe but take local livelihoods and community priorities into account. This coordination has helped accelerate the cleanup process and address community concerns. For example, EPA worked closely with city officials and local sports teams during the restoration of athletic fields along Johnson Boulevard in Gloucester City. EPA adjusted work plans so that evening practices and games at the fields were not disturbed.

When Gloucester City's Board of Education expressed interest in locating a new elementary and middle school on site property in 2004, EPA expedited the property's cleanup. For several years after cleanup, factors unrelated to remediation delayed school construction. Finally, in May 2015, students and local officials participated in a groundbreaking ceremony for the 122,000-square-foot facility. In anticipation of almost 690 students in grades 4 through 8, the new school will include 27 classrooms.<sup>5</sup>



Figure 4. Remediation of a property for a much-needed future elementary and middle school.

<sup>3</sup> For more information on thorium, visit <https://www.epa.gov/radiation/radionuclide-basics-thorium>.

<sup>4</sup> Radium is a radionuclide formed by the decay of [uranium](#) and [thorium](#). For more information on radium, visit <https://www.epa.gov/radiation/radionuclide-basics-radium>.

<sup>5</sup> [www.gloucestercitynews.net](http://www.gloucestercitynews.net)

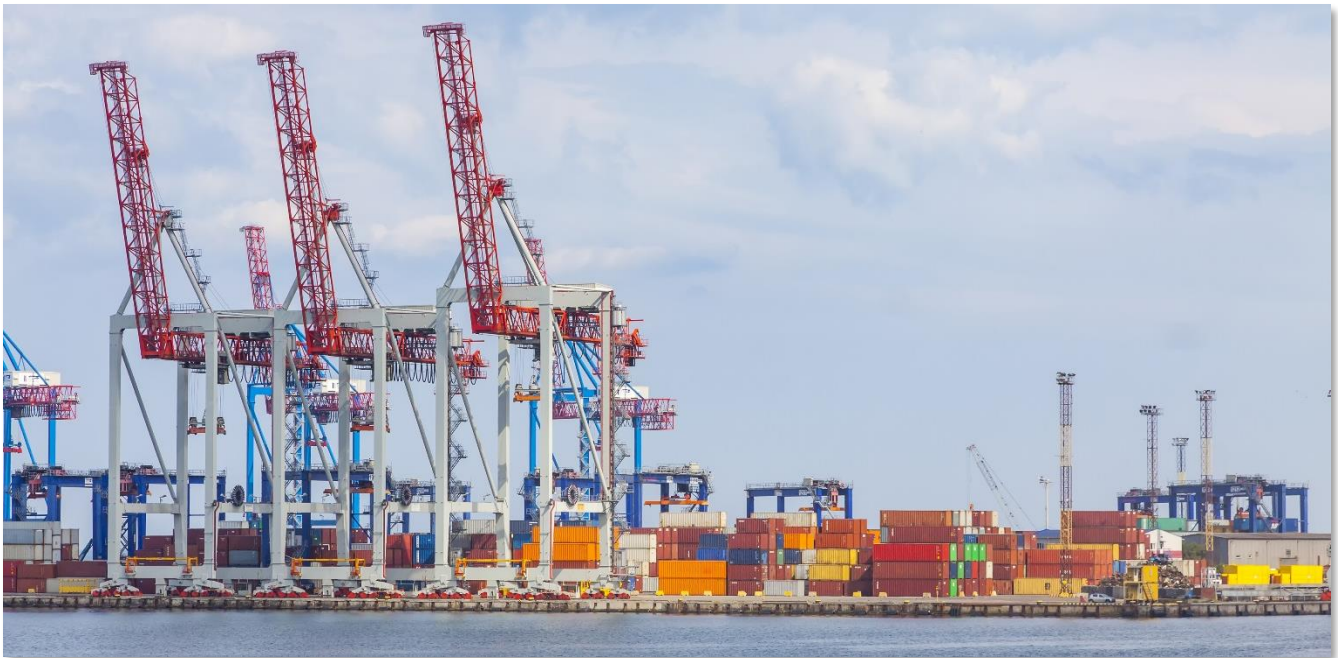
To date, across the entire site, EPA has removed and disposed of more than 200,000 cubic yards of radiologically contaminated soil and waste material. A total of 121 residential properties, 15 commercial and industrial properties, and 18 municipal properties have been cleaned up. The ongoing cleanup has created more than 330 jobs – more than 90 percent of them filled locally – and spurred redevelopment in the area.<sup>6</sup>

## Local Beneficial Effects

Several site areas illustrate the success of ongoing collaborative efforts by EPA, NJDEP and the communities of Camden and Gloucester City. Active businesses and organizations on site include Gloucester Terminals, which operates the Gloucester Marine Terminal; the South Camden Theatre Company, which runs the Waterfront South Theatre; J&R Pallet; the William Flynn Veterans Sports Complex; and the Gloucester City Swim Club. It is estimated that these properties provide more than \$31 million in annual employment income.

### Gloucester Marine Terminal

In 1976, Holt Hauling and Warehousing Systems, Inc., purchased the former Welsbach property in Gloucester City and converted it to a marine terminal and warehousing facility. Today, GMT Realty, LLC owns an 88-acre cargo terminal. The terminal includes 25 buildings. EPA and GMT Realty have worked cooperatively so that terminal and warehousing operations can continue while EPA investigates the site. EPA and GMT Realty will continue to work cooperatively once active remediation begins on impacted portions of the terminal. The terminal operations include imports and exports of specialized cargo such as perishable products, steel products, forest products and other project cargo and containers, in both foreign and domestic trade. It has the largest refrigerated capacity of any terminal in the United States, with a total capacity for more than 20 million cubic feet of refrigerated and frozen goods. Products received at the terminal travel to all 48 contiguous states and Canada by truck or train.<sup>7</sup>



**Figure 5. Marine terminal operations may involve coordination between several businesses to ensure efficient receipt, storage and delivery of products and cargo.**

<sup>6</sup> EPA News Release, November 1, 2011 ([EPA Cleanup Restores Gloucester, New Jersey Ballfield and Puts People to Work](#)).

<sup>7</sup> <http://www.holtlogistics.com/facilities/gloucester-terminals-llc>.

The marine terminal and other businesses supporting terminal operations provide nearly \$30 million in estimated annual employment income. The terminal's daily operations also involve many other people, such as delivery and shipping contractors. Estimated 2014 annual sales for this business reached \$34.8 million.

### **Riverside Renewable Energy, LLC**

The roof of the terminal's refrigerated warehouse hosts more than 27,000 photovoltaic rooftop solar panels covering 1.1 million square feet, making it the largest rooftop solar array in North America. Riverside Renewable Energy completed the installation at the terminal and was commissioned in November 2011. The array has the capacity to produce nine megawatts of electricity, enough to meet 50 percent of the terminal's power needs. The electricity is channeled into a main substation. Any leftover electricity is sold to the local power grid through a net metering agreement with Public Service and Electric Gas (PSEG). The array eliminates 16 million pounds of carbon dioxide from the atmosphere annually, equivalent to removing 1,200 cars from the road.<sup>8</sup>



**Figure 6. Rooftop solar arrays can provide energy cost savings.**

### **J&R Pallets**

As part of its business expansion efforts, J&R Pallets recently purchased the former Dynamic Blending property in an industrial area in Camden. The company acquired the property soon after EPA cleaned it up. The company provides skid and pallet sales to large corporations and small businesses. It provides more than \$1 million in estimated annual employment income. Estimated 2014 annual revenue for the business was about \$2 million.

### **Waterfront South Theatre**

Heart of Camden, a non-profit redevelopment organization, owned a small property in South Camden that included an abandoned bar. After the property's cleanup, the organization turned it over to the South Camden Theatre Company. For more than three years, the theatre company had staged productions in the basement of Sacred Heart Church, located across the street from the abandoned property. The theatre company's vision was to create a space for theatre, music and art in the center of the Waterfront South redevelopment area. After cleanup, the organization broke ground on the 96-seat Waterfront South Theatre in April 2008. Its first season in the new theatre began in September 2010. More than 450 people attended the opening three-week run of shows. In addition to the theatre company, the building hosts a weekly movie night for kids. The theatre also hosts plays that are part of the Sacred Heart School's curriculum. The theatre generated more than \$50,000 in sales in 2014. In addition to a large number of volunteers, there are also about 50 actors, production staff and directors paid on a per-production basis.<sup>9</sup>



**Figure 7. Construction on the Waterfront South Theatre.**

<sup>8</sup> <http://www.holtlogistics.com/riverside-renewable-energy>.

<sup>9</sup> Information provided by Producing Artistic Director Joe Paprzycki. Income information is not available for actors, production staff or directors.

## Gloucester City Swim Club

Just east of the terminal, EPA found radiological material in soil throughout the Gloucester City Swim Club property; contamination was also identified in the dive pool concrete. Cleanup at the swim club began in April 2002 and finished in November 2006. EPA provided the funding for the swim club to rebuild its clubhouse, concession stand, dive pool and tennis courts. After remediation, the club reopened its pool for community members. Today, the swim club operates three pools; volleyball, basketball and tennis courts; a soccer practice field; and a concession stand. The swim club is also home to the Gloucester City Stingrays swim team.

## William Flynn Veterans Sports Complex

Soil contamination affected several athletic fields along Johnson Boulevard in Gloucester City. Cleanup removed more than 130,000 tons of contaminated soil from the fields. EPA restored three baseball fields and three softball fields. New amenities at the complex include handicap-accessible dugouts and bleachers, fencing, energy-efficient lighting, a new bathroom/storage building, and a concession stand. The sports complex is located on a parcel of land with a current property value of more than \$3.2 million.

## Property Value and Tax Revenues

On-site properties help generate property tax revenues that support local government and public services. In fiscal year 2014, the properties highlighted above generated more than \$1.1 million in property taxes for Camden County. In 2015, these properties had a total estimated property value of more than \$65 million. On-site businesses that produce retail sales and services also generate tax revenues through the collection of sales taxes, which support state and local governments.<sup>10</sup>



Figure 8. Site cleanup efforts included the restoration of three softball fields.

## Conclusion

Collaboration and cooperation among EPA, NJDEP, local officials and community members has been key to the successful ongoing cleanup, continued use and reuse of the Welsbach and General Gas Mantle Superfund site. Careful cleanup planning made possible the continued operation of recreation facilities and on-site businesses, while ensuring the protection of human health and the environment. In 2014, annual sales for businesses operating at the highlighted site areas reached an estimated \$37 million. Today, on-site businesses provide more than 500 jobs and annual employee income is estimated to exceed \$31 million.

*For more information about EPA's Superfund Redevelopment Initiative (SRI), visit:  
<http://www.epa.gov/superfund/programs/recycle>.*

*This resource contains Adobe Stock images not for use elsewhere without license.*

<sup>10</sup> The combined sales tax rate in the state of New Jersey is 7 percent. For more information, see: <http://www.state.nj.us/treasury/taxation/salestax.shtml>.



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## Reuse and the Benefit to Community Welsbach & General Gas Mantle

### Technical Appendix

#### Employment Information for On-site Jobs

EPA obtained the data included in this Technical Appendix directly from reputable sources, and reported the data as presented by those sources.

Information on the number of employees and sales volume for on-site businesses came from the Hoovers/Dun & Bradstreet ([D&B](#)) database. EPA also gathered information on businesses and corporations from D&B.

D&B maintains a database of over 225 million active and inactive businesses worldwide. Database data include public records, financials, private company insights, extensive global information, telephone numbers and physical addresses.

When Hoovers/D&B database research could not identify employment and sales volume for on-site businesses, EPA used the Manta database. Both databases include data reported by businesses. Accordingly, some reported values might be underestimates or overestimates. In some instances, business and employment information came from local newspaper stories/articles and discussions with local officials and business representatives.

#### Wage and Income Information for On-site Jobs

EPA obtained wage and income information from the U.S. Bureau of Labor Statistics (BLS). Part of the U.S. Department of Labor, the BLS is the principal federal agency responsible for measuring labor market activity, working conditions and price changes in the economy. Its mission is to collect, analyze and disseminate essential economic information to support public and private decision-making. All BLS data meet high standards of accuracy, statistical quality and impartiality.

EPA used the BLS Quarterly Census of Employment and Wages database to obtain average weekly wage data for businesses at the Welsbach and General Gas Mantle Superfund site. Average weekly wage data were identified by matching the North American Industry Classification System (NAICS) codes for each type of business with weekly wage data for corresponding businesses in Camden County. If weekly wage data were not available at the county level, EPA sought wage data by state or national level, respectively. In cases where wage data were not available for the six-digit NAICS code, EPA used higher-level (less-detailed) NAICS codes to obtain the wage data.

To determine the annual wages (mean annual) earned from jobs generated by each of the selected businesses at the Welsbach and General Gas Mantle Superfund site, EPA multiplied the average weekly wage figure by the number of weeks in a year (52) and by the number of jobs (employees) for each business.



**Table 1. Welsbach and General Gas Mantle Superfund Site: Information for On-Site Organizations and Businesses**

On-site Business	NAICS Code <sup>a</sup>	NAICS Title	Number of Employees <sup>b</sup>	Average Weekly Wage (2014) <sup>c</sup>	Annual Wage (Mean Annual) per Employee	Total Annual Income <sup>d</sup>	Annual Sales (2014) <sup>b</sup>
Gloucester Marine Terminal Inc.	488320	Marine Cargo Handling	500 <sup>e</sup>	\$1,153	\$59,956	\$29,978,000	\$34,800,000
J&R Pallets	321920	Wood Container and Pallet Manufacturing	30	\$656	\$34,112	\$1,023,360	\$2,000,000
Riverside Renewable Energy LLC	23822	Plumbing and HVAC Contractors	2	\$1,085	\$56,420	\$112,840	\$190,000
South Camden Theatre Company	711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures	1 <sup>f</sup>	\$479 <sup>g</sup>	\$24,910	\$24,910	\$50,050
<b>Total</b>			<b>533</b>			<b>\$31,139,110</b>	<b>\$37,040,050</b>

<sup>a</sup> NAICS code provided in the D&B database.

<sup>b</sup> Data are from the D&B database, unless otherwise noted.

<sup>c</sup> Average weekly wage per employee is based upon BLS 2014 Average Weekly Wage data, unless otherwise noted.

<sup>d</sup> Total annual income figures were derived by multiplying “Number of Employees” by “Annual Wage (Mean Annual) per Employee.”

<sup>e</sup> Value provided by terminal staff, February 2016.

<sup>f</sup> Figure based on conversations with theatre staff. Figure only includes permanent employees and does not include the approximately 50 professional actors paid on a per-production basis.

<sup>g</sup> Income provided from the D&B database.

### Property Values and Local Tax Revenue Generated from Property Taxes

EPA obtained data on the most recently assessed values for property parcels at the Welsbach and General Gas Mantle Superfund site in May 2015 through property records accessible through Camden County's online property appraisal database (<http://www.camdencounty.com/government/property-tax-search>). EPA also obtained 2014 property tax information for the site parcels through the New Jersey Property Tax List ([https://www.net1.state.nj.us/Treasury/Taxation/TYTR\\_TLSPS\\_WEB/Taxlistsearch.aspx](https://www.net1.state.nj.us/Treasury/Taxation/TYTR_TLSPS_WEB/Taxlistsearch.aspx)).

**Table 2. Property Value and Tax Summary for Taxes Payable in 2014**

Parcel ID No.	Parcel Address	Total Market Value of Land and Improvements (2015)	Total Property Tax (2014)
0408-480-1	400 Jasper Street	\$334,900	\$0.00
0408-494-3	1929 South 4th Street	\$424,900	\$11,171
0408-498-34	260 East 4th Street	\$32,200	\$0.00
0408-498-63	160 East 4th Street	\$98,000	\$0.00
0414-168-1	Johnson Boulevard	\$1,603,900	\$0.00
0414-195-1	Johnson Boulevard	\$3,237,400	\$0.00
0414-198-1	901 Essex Street	\$411,100	\$14,846
0414-2.01-3	North Broadway	\$10,928,300	\$657,964
0414-2.01-3-X	North Broadway	\$26,460,000	\$0.00
0414-2-1	Ellis Street	\$19,591,000	\$477,711
0414-26-1	Ellis & Mercer	\$1,763,300	\$25,564
0414-86-1	516 Hunter Street	\$86,300	\$0.00
0414-86-14	Division Street	\$126,400	\$0.00
0414-86-6	512 Hunter Street	\$126,300	\$0.00
		<b>\$65,224,000</b>	<b>\$1,187,256</b>