

Eastern Baltimore County Emerges as a Major Economic Hub, Again

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Maryland Stakeholders

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Eastern Baltimore County Emerges as a Major Economic Hub, Again

Executive Summary

This Sage Policy Group, Inc. (Sage) report assesses the economic and fiscal implications over the next 4 years of the planned activities of Tradepoint Atlantic (TPA)¹, the master redevelopers of Sparrows Point. TPA manages what is potentially America’s most significant redevelopment opportunity. Offering 3,100 strategically-located acres, TPA represents the East Coast’s largest privately-owned industrial and terminal site. Tradepoint Atlantic purchased the site in 2014.

Blessed with a deep-water port, immediate and on-site access to the nation’s rail and interstate highway system, and 100-miles of internal short-line railroad, the site supplies unrivaled intermodal transportation assets. This infrastructure acquires particular salience when one recognizes that more than 40 percent of America’s population and more than half of Canada’s are within a day’s drive of TPA. The redevelopers of Tradepoint Atlantic endeavor to position the site as North America’s premier industrial gateway.

However, the site is limited in terms of other forms of infrastructure, including in the form of inadequate water/sewer systems, roads, and other amenities. This study presumes no public participation in helping TPA deal with these inadequacies. Correspondingly, there are likely potential economic opportunities that are not reflected in Sage’s estimates of impact – opportunities that could be realized on-site if this massive redevelopment emerged as a genuine public-private partnership.

Redevelopment of TPA will be guided by a Master Plan that emphasizes cargo handling and logistics, but also includes major opportunities for manufacturers, retailers, and specialty service companies. Implementation of the current Master Plan will translate into the development of more than 16 million square feet of built space by 2020-2025. To put that into context, this represents more square footage than encompassed by all the office buildings in downtown Baltimore. Exhibit ES-1 supplies relevant summary detail regarding the Master Plan.

Exhibit ES-1. Tradepoint Atlantic Master Plan

<i>Land use</i>	<i>Acres</i>	<i>Building SF</i>
Distribution, warehouse, manufacturing	468	5,739,128
Terminal, warehouse, transloading, & marine terminal	546	7,921,000
Future container building	322	
Bulk handling & storage	352	39,000
Landfill	104	
Support	340	111,500
Service warehouse	261	1,720,000
Retail	99	141,000
Office/warehouse	33	310,000
Future development	173	220,000
Automotive storage	324	141,000
Total	3,023	16,342,628

¹ In this report, Tradepoint Atlantic (TPA) is used to refer to both the site’s master developer as well as to the 3,100-acre site itself.

Economic Impacts

Construction Phase

- The creation of the infrastructure and buildings anticipated by TPA’s Master Plan will require investments exceeding \$2 billion.
- Much of this investment will take place prior to project completion in 2020-2025.
- More than 21,000 jobs (measured in job-years) will be supported by construction-phase investment statewide, the vast majority of which will be in the Baltimore area.
- These positions will be associated with total income exceeding \$1.2 billion.
- Regional business sales will be augmented by more than \$3 billion (see Exhibit ES-2).
- These impacts could be significantly larger if a public-private partnership were formed in which the public sector would support faster, higher quality infrastructure build-out.

Exhibit ES-2. Total economic impacts, construction/investment: 2016- Master Plan completion (one-time effects)

<i>Type of impact</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Induced effects</i>	<i>Total</i>
• Baltimore region				
Employment/years of work (full- and part-time jobs)	13,718	2,309	4,963	20,990
Labor income (millions)	\$838	\$154	\$238	\$1,230
Business sales (millions)	\$1,934	\$427	\$683	\$3,044
• Maryland				
Employment (full- and part-time jobs)	13,718	2,383	5,039	21,141
Labor income (millions)	\$838	\$156	\$238	\$1,233
Business sales (millions)	\$1,934	\$446	\$690	\$3,070

Sources. TPA, IMPLAN, Sage

Operational Phase

- By the time Master Plan implementation is mostly complete, TPA’s tenants and the businesses providing off-site transportation services are expected to have created almost 9,500 *direct* jobs.
- Unlike the construction phase jobs, which last only as long as development activity persists, operational jobs are ongoing and not time-limited.
- The total annual economic impact of TPA in the region will be an estimated \$2.9 billion by Master Plan completion.
- Once multiplier effects are considered, the *total* employment impact in the Baltimore region is estimated at nearly 17,000 jobs with associated worker income of \$1.1 billion.
- Regional businesses will enjoy augmented annual sales of goods and services valued at \$2.9 billion. Statewide impacts are somewhat larger (see Exhibit ES-3).
- Each of these impacts, particularly income impacts, could be meaningfully increased with public sector participation. There are a number of key economic segments, many related to East Coast commerce, that Tradepoint Atlantic could competitively address with more rapid and thorough infrastructure build-out. These public-private infrastructure investments could position the Baltimore region to better leverage its intermodal transportation network.

Exhibit ES-3. Total economic impacts operational impacts: ongoing annual effects

<i>Type of impact</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Induced effects</i>	<i>Total</i>
• Baltimore region				
Employment (full- and part-time jobs)	9,494	3,122	4,376	16,992
Labor income (millions)	\$676	\$193	\$210	\$1,080
Business sales (millions)	\$1,813	\$527	\$602	\$2,942
• Maryland				
Employment (full- and part-time jobs)	9,494	3,407	4,477	17,378
Labor income (millions)	\$676	\$209	\$213	\$1,098
Business sales (millions)	\$1,813	\$582	\$614	\$3,009

Sources. TPA, IMPLAN, Sage

Fiscal Impacts

Economic impacts give rise to fiscal impacts, mostly in the form of new tax revenue for local and state governments. The principal fiscal impacts associated with construction and related investment activities are generated via the income that workers in the Baltimore region and Maryland earn during the construction period as well as the \$3 billion in business sales. Operational impacts will increase as more businesses open at TPA. Estimates below are the tax revenues based on the projected operational status upon Master Plan completion.

Construction Phase

- The local government share of personal income taxes generated is estimated at \$28 million.
- State income and corporate tax revenue is estimated at \$53 million.
- State sales tax is estimated at \$25 million.²
- Total State and local tax collections during the construction phase will total an estimated \$106 million.

Operational Phase

- Annual Baltimore County property tax collections will increase by an estimated \$26 million.
- Local government in the Baltimore region will collect \$25 million in additional income tax revenue per annum.
- State of Maryland tax collections will be bolstered by \$73 million, primarily from income taxes (\$48 million) and sales taxes (\$23 million). Overall state and local tax collections will be bolstered by \$124 million.

The economic and fiscal impacts estimated in this report represent most, but not all of the potential at TPA. Currently, TPA's Master Plan addresses roughly 2,600 of the site's 3,100 acres. Future development of the remaining acreage will only increase the economic and fiscal benefits created by TPA.

² Does not include any sales tax revenue associated with the purchase of construction materials.

Conclusion

By Master Plan completion (2020-2025), the redevelopment of Tradepoint Atlantic will create an estimated 17,000 net new positions in the Baltimore region. (Even more jobs are likely after Plan completion as additional acreage at TPA is redeveloped.) The pace at which these positions will be created and the quality of these positions remains somewhat uncertain.

One measure of the magnitude of TPA's economic impacts is the effect that TPA will have on employment at the Port of Baltimore. When the initial phase of Master Plan is completed, TPA will add almost 9,500 direct jobs to the Port. When combined with the Port's current employment of 14,630,3 the new jobs at TPA will increase total employment at the Port of Baltimore to over 24,000. If the Port is considered a single employer, this total direct employment of over 24,000 would make the Port the fourth largest employer in Maryland after Fort Meade, University System of Maryland, and Johns Hopkins University.

Sage concludes that for Tradepoint Atlantic to be as impactful as other transportation hubs of similar scale (e.g. Alliance in Texas and CenterPoint in Illinois), there will need to be a significant public-private partnership component, particularly if manufacturing is to have a meaningful presence on-site.

This is because the upfront infrastructure requirements are simply enormous. From the study team's perspective, it makes sense that Baltimore County and/or other public sector entities consider helping to fund roads and bridges, utilities, and stormwater management systems. The collective cost of these items is in the range of \$100-\$150 million. If there is public participation in addressing the on-site infrastructure deficits, TPA would be positioned to accelerate port- and rail-related infrastructure investment estimated at more than \$200 million, thereby helping TPA realize its full multimodal potential more quickly and more broadly.

Should the public sector choose not to engage in a public-private partnership, development at Tradepoint Atlantic will be delayed and predicted economic and fiscal impacts will be jeopardized. While the site possesses many competitive advantages, there are many port communities on the East Coast, all competing for logistics, manufacturing, and cargo.

³ Op. cit., Baker Tilly Virchow Krause.

I. Background and Introduction

The Rise, Fall, and Re-Emergence of Sparrows Point

The history of Sparrows Point reflects the history of industrial development in America. With origins in the late nineteenth century (steel was first manufactured at Sparrow's Point in 1889 by the Pennsylvania Steel Company) and ties to legendary steel making companies, Bethlehem Steel's Sparrows Point plant grew into the largest steelmaking facility in the U.S. By the late 1950s, more than 30,000 workers were employed, with the mill producing nearly 700,000 short tons per annum.

Not long afterwards, a confluence of factors altered Sparrows Point forever and foreshadowed the state of today's global economy. Developing economies entered the global steel market. The emergence of aluminum and plastics as commercial materials also began to take their toll. In June 2012, steelmaking operations, which had represented the backbone of the eastern Baltimore County economy, ceased at Sparrows Point.⁴

Today, Sparrows Point is arguably home to America's greatest economic redevelopment opportunity. At 3,100 acres (almost 5 square miles), the site of the former steel mill (to be referred to as Tradepoint Atlantic for the balance of this report) is the largest privately-owned industrial site and terminal on the East Coast. It offers direct access to the deep water Chesapeake Channel that can serve the largest vessels in the global fleet of freight ships, has over 100 miles of rail track with room for further expansion and is directly connected to I-695 on one of the highest volume U.S interstate highways.

Blessed with a deep-water port, immediate and on-site access to the national rail and interstate highway system, and 100-miles of internal short-line railroad, all within the bounds of Tradepoint Atlantic, the site boasts unrivalled transportation assets. Exhibit 1 locates Tradepoint Atlantic within the Baltimore region and highlights its connections to the Interstate Highway System. Note that I-695, the beltway around Baltimore that connects to the six other Interstate Highways that serve the Baltimore region, passes directly through the site. There are interchanges onsite that allow direct access to I-695.

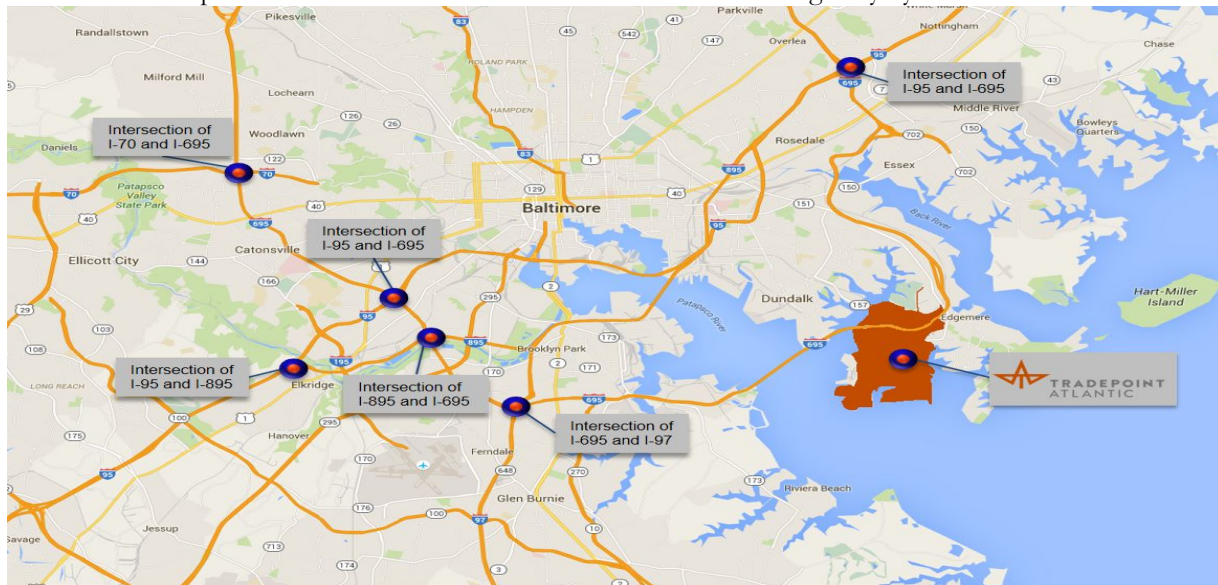
Importantly, the Port of Baltimore and TPA are uniquely situated on the East Coast to efficiently and effectively serve markets in the eastern portions of this country and Canada. More than 40 percent of U.S. population and in excess of half of Canada's population are within a day's drive of Sparrows Point. This exceeds the population access of any other East Coast port and is more than double the population reach of West Coast ports.⁵ These logistical advantages help explain why the

⁴ Tradepoint Atlantic, "The Story: The history of Sparrows Point is the factor of our country" <http://www.Tradepointatlantic.com/the-story/>.

⁵ Florida Department of Transportation, "Intermodal Logistics Centers: Boosting Florida's Economy through Freight Logistics".

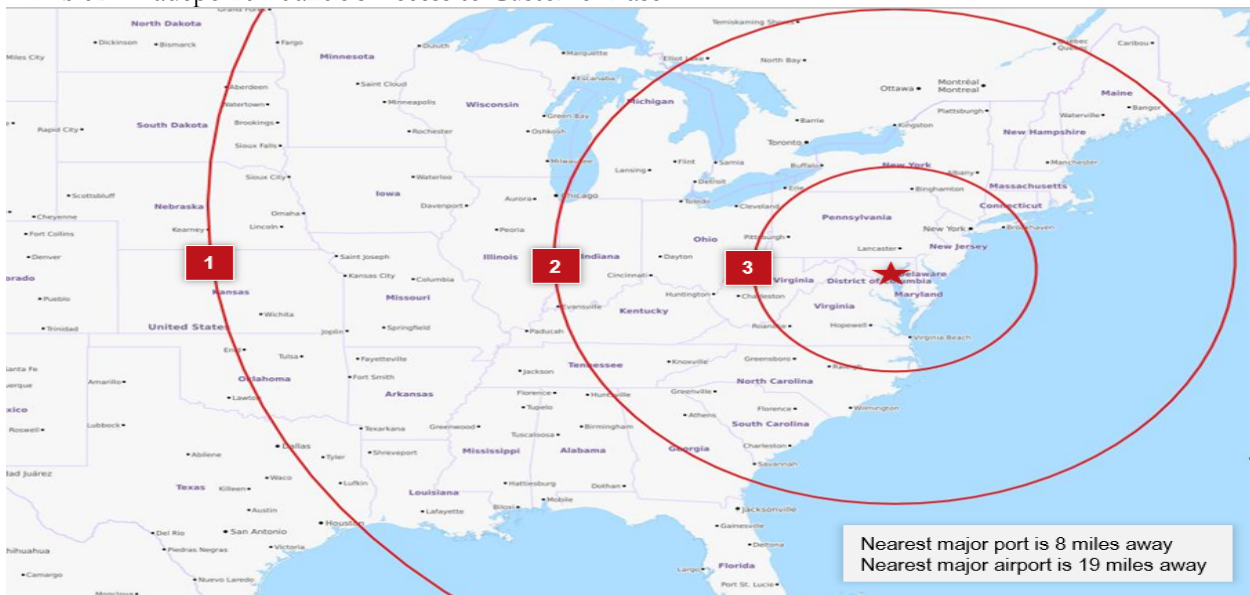
Port of Baltimore generates an estimated 14,630 jobs, the equivalent of being the ninth largest employer in Maryland.⁶ Exhibit 2 shows TPA’s access to its customer base.

Exhibit 1. Tradepoint Atlantic and its connections to the Interstate Highway System



Source: Tradepoint Atlantic

Exhibit 2: Tradepoint Atlantic’s Access to Customer Base



	<i>Area</i>	<i>Distance</i>	<i>Population Served</i>	<i>% of Total Population</i>
1	Super Regional	1200 miles	194,756,705	64%
2	Regional	600 miles	103,394,291	35%
3	Local	250 miles	47,063,802	15%

Source: Tradepoint Atlantic

⁶ Baker Tilly Virchow Krause, LLP, “The Port of Baltimore: Ready for the Future,” June 8 2015

TPA's redevelopment will build upon and likely expand the current reach of the Port of Baltimore. Exhibit 3 lists the top countries for exports and imports through Baltimore in terms of volume. These countries span the globe. While they represent the majority of the volume of all cargo (86 percent of export volume and 63 percent of import volume), foreign trade moving through the Port of Baltimore is destined for and originates from every continent except for Antarctica.

Exhibit 3. Port of Baltimore: Top Export and Import Countries by Volume, 2015

<i>Export Country</i>	<i>Export Tons (000)</i>	<i>Import Country</i>	<i>Import Tons (000)</i>
India	5,404	Chile	2,352
Netherlands	2,792	Canada	1,589
South Korea	1,932	China	1,200
Brazil	1,068	Brazil	990
China	1,065	Mexico	692
Ukraine	929	Germany	641
Japan	804	Spain	513
United Kingdom	664	Russia	510
Germany	301	Japan	430
Turkey	247	United Kingdom	410

Source. Port of Baltimore

By volume cargo moving through the Port of Baltimore is dominated by commodities. Over 14 million tons of coal were exported in 2015, 80 percent of the total volume of exports. The port ranks second in the country in coal export tonnage.⁷ Over 3 million tons of salt were imported, 21 percent of the total volume of imports.⁸

On the other hand, the value of cargo exported from or imported through Baltimore is largely attributable to automobiles and light trucks, agricultural and construction machinery, and other vehicles. The port handles more of these kinds of vehicles and machinery than any other U.S. port. Exhibit 4 lists the top 10 commodities moving through the port in 2015.

Exhibit 4. Port of Baltimore: Top Export and Import Commodities by Value, 2015

<i>Export Commodity</i>	<i>Export Value (millions)</i>	<i>Import Commodity</i>	<i>Import Value (millions)</i>
Automobiles/Light Trucks	\$4,332	Automobiles/Light Trucks	\$14,411
Agricultural Machinery	\$1,343	Construction Machinery	\$1,827
Aircraft Parts	\$1,334	Agricultural Machinery	\$952
Coal	\$1,112	Radioactive Chemical Elements	\$900
Construction Equipment	\$561	Aluminum, unwrought	\$653
Radioactive Chemical Elements	\$332	Furniture	\$652
Military Vehicles	\$219	Nickle, unwrought	\$596
Special Purpose Vehicles	\$207	Aluminum Plates & Sheets	\$560
Fork-Lift Trucks	\$191	Coffee	\$485
Motor Vehicle Parts	\$163	Tin, unwrought	\$484

Source. Port of Baltimore

⁷ Maryland Manual On-line, "Port of Baltimore" <http://msa.maryland.gov/msa/mdmanual/01glance/html/port.html>

⁸ Port of Baltimore, "2015 Foreign Commerce Statistical Report," March 2016

TPA's addition to the current assets and activities of the Port of Baltimore creates the potential for a significant impact on the regional and national economies. Baltimore is already recognized as one of the most efficient ports in the U.S. and is among the first on the East Coast to provide access to and provide services for the latest generation of container ships. With unmatched access to the U.S. and Canadian populations and centers of economic activity, this efficiency and effectiveness can materially improve both the inbound logistics that are the backbone of the manufacturing and distribution industries as well as the outbound logistics that are critical to distribution channels. In the increasingly global economy, the capacity to improve the flow of intermediate products and finished goods can be transformational.

Tradeport Assets

Tradeport Atlantic, LLC (TPA), who purchased the site in 2014, is actively pursuing a Sparrows Point renaissance. The investors behind TPA have a history of success in turning around companies (e.g., Erickson Living) and redeveloping old industrial sites, including abandoned brownfield former automotive properties in the Midwest. These earlier efforts have frequently been characterized as complex and as requiring patience by the investors who have invested years of effort to realize successful, thriving projects.

This renaissance being implemented by TPA is grounded in the particular transportation assets available within the boundaries of the site. Among the most significant assets are the following:⁹

- Deep water access with channels that are expected to be deepened to 50 feet, enabling the accommodation of the latest generation of cargo vessels, thereby maximizing TPA's potential as a seaport;
- Marine terminals including a 2,200-foot berth and a 1,120-foot pier serving a channel currently 42 feet deep;
- Immediate access within the site to the nation's interstate highway system via I-695. This access provides ready connections to other interstate highways (I-95, I-895, I-795, I-83, I-97, and I-70) in the Baltimore region and ultimately beyond;
- The largest privately owned rail yard on the East Coast;
- Shortline railroad service within the site embodying 100 miles of track;
- A fully operational locomotive shop capable of major locomotive repairs;
- Immediate access on the site to two Class I railroads — CSX and Northern Southern.
- Industrial water treatment plant with treatment capacity of 150 million gallons per day, ideal for manufacturing operations that require use of process water.

In support of Sparrows Point as a premier industrial development, TPA has reached an agreement with federal and state environmental agencies to remediate the effects of more than a century of steelmaking. These cleanup activities are underway and have been buttressed by \$48 million from

⁹ Tradeport Atlantic, "Project Overview" <http://www.Tradeportatlantic.com/site-region/>.

TPA to assure completion of this critical work. Successful site cleanup will result in a formal confirmation from the State of Maryland that TPA and its tenants have no liability for legacy environmental conditions.

The Redevelopment Master Plan

The redevelopment of Tradepoint Atlantic is guided by a Master Plan that allocates land uses for more than 3,000 acres. The largest single share of this acreage — almost one-fifth of the entire site — is allocated to terminal, warehouse, transloading, and marine terminal activities. Together with three other cargo handling activities — bulk handling and storage, automotive storage, and an area devoted to the future development of container buildings — total cargo handling is projected to eventually occupy more than half the site. Three other land uses account for most of the balance:

- Distribution, warehouse, and manufacturing are estimated to require 15 percent of the site, while support activities (e.g., mechanics' shops, fabrication and repair facilities) will occupy 11 percent of the site.
- Service warehouse uses flexible space that can encompass a range of activities including: research and development, laboratories, light manufacturing/high tech, data/call centers. In the greater Baltimore region, typical uses include auto mechanics, welders, granite distributors, HVAC companies, and moving companies. Many of these uses also require on-site storage. Flex space also includes a mix of warehousing and office activities. In total, approximately one-tenth of the site is allocated to these flex space activities.
- Finally, current development plans include a mix of retail businesses that will occupy an estimated 3 percent of total acreage.

Remaining uses outlined in the Master Plan include almost 200 acres devoted to undefined future development and a landfill occupying roughly 100 acres. The Master Plan is presented in Exhibit 5. This map shows the relative position of uses within the site as well as connections to highway and rail systems and the proximity of the site to the Port of Baltimore's deep water channels. Exhibit 6 provides specific acreage for the uses outlined in the redevelopment's Master Plan.

While the TPA renaissance outlined in the Master Plan is largely prospective, work on securing tenants has been underway for over 2 years. In addition to the TPA team itself, 10 tenants have signed leases and are already on-site. Current tenants have almost 650 employees on-site. These tenants include such high-profile companies as Pasha, one of the largest ro-ro/automotive services companies in the nation, and Harley Davidson.

Several other tenants are in the pipeline, most notably Under Armour, which will open a 1.3 million square-foot e-commerce distribution center in 2018, and FedEx, which will open a 300,000 square-foot distribution facility in 2017.¹⁰ These two facilities are expected to employ 1,200 workers once

¹⁰ Tradepoint Atlantic, "News & Info" <https://www.tradepointatlantic.com/news-info/>

operational. Between the tenants that are already onsite and other companies that are committed to developing facilities, TPA has already supported over 2,000 jobs onsite.¹¹

Exhibit 5. Tradepoint Atlantic Master Plan with proposed land uses for Sparrow Point



Source: TPA

¹¹ Personal communication, Aaron Tomarchio, Tradepoint Atlantic, to Sage Policy Group, September 22, 2016

Exhibit 6. Acreage devoted to land uses within the Master Plan

<i>Land use</i>	<i>Acres</i>
Distribution, warehouse, manufacturing	468
Terminal, warehouse, transloading, & marine terminal	546
Future container building	322
Bulk handling & storage	352
Landfill	104
Support	340
Service warehouse	261
Retail	99
Office/warehouse	33
Future development	173
Automotive storage	324
Total	3,023

Source. TPA

II. Measuring Economic and Fiscal Impacts

The plan is ambitious, but given the scale of the site, offered amenities and strategic location, it should be. Stakeholders should understand that Tradepoint Atlantic represents the best opportunity for Baltimore County and the region to add significant numbers of well-paying jobs, tax base, and economic diversification.

Sage has endeavored to estimate likely economic and fiscal impacts associated with this plan, recognizing that uncertainty lingers both in the form of market-oriented unknowns and uncertain public policy outcomes. This analysis focuses on the development likely to transpire on-site over the next four to five years, and the multiplier effects that on-site activities will have on the broader regional economy. While the broad outlines of development have been established, TPA planning remains flexible and therefore can accommodate a range of prospective tenants. The ultimate mix of those future tenants will determine actual economic impacts. Although the development described in this report is subject to change, there are certain factors that are known, including the nature of the commercial enterprises best positioned to take advantage of the site's transportation amenities and location as well as the site's development capacity.

Methodological Considerations

A prime example of how this analysis might fail to accurately predict the ultimate status of TPA development is manufacturing. The Sage study team has adopted a relatively conservative approach in estimating the proportion of land use and projected building space likely to be associated with manufacturing vis-à-vis other potential uses, particularly warehousing and distribution.

Manufacturing tends to produce larger economic impacts than warehousing and distribution on a per square foot or acre basis. That means that any shift in activity toward manufacturing would result in greater economic impact produced by TPA *ceteris paribus*.

These are the types of unknowns that can result in deviations between Sage's estimates and what actually transpires at TPA. To the extent possible, the study team has sought to generate conservative as opposed to aggressive estimates of economic impact.

Sage has estimated prospective economic and fiscal impacts to be generated by TPA's redevelopment for both construction and post-construction/operational phases. From an economic perspective, the redevelopment of Sparrows Point will represent a substantial increase in the production of services and goods in the regional economy. The impacts of these increases in production can be defined in terms of employment, the income associated with that employment, and the value of goods and services produced (translates into augmented business sales/revenues).

Importantly, the increase in production of these services and goods creates demand for other goods and services that serve as inputs to the economic activities transpiring at TPA. For instance, enterprises engaged in warehousing or manufacturing purchase goods ranging from office supplies to a host of services ranging from advertising to accounting. Some of the vendors of these goods

and services are located within the Baltimore region and/or in Maryland. The vendors of these goods and services utilize the revenues garnered from TPA establishments to pay their own employees and to purchase the goods and services they need to operate their own businesses. This cascading stream of business-to-business transactions constitutes the supply chain for the varied business activities encompassed by TPA's Master Plan.

Employees of the establishments at Sparrows Point and of businesses in the supply chain are also consumers whose spending further supports the local economy. Collectively, these business-to-business spending impacts and household spending impacts represent the multiplier effect of the activities directly occurring on the 3,100 acres controlled by Tradepoint Atlantic.

To quantify economic impacts, Sage utilized State of Maryland-specific IMPLAN multipliers to generate estimates of employment, income, and regional business sales (also known as output).¹² Estimated employment impacts include both full- and part-time workers. Labor income is defined as encompassing all forms of employment income, including employee compensation (salaries and wages as well as associated benefits) and proprietor income (earnings of business owners and other self-employed persons). Business sales/output represents the sum total of intermediate inputs and all value-added contributions and is generally the same as business revenue.

From a geographic perspective, economic and fiscal impacts are quantified for the Greater Baltimore region as a whole. For purposes of this analysis, the Baltimore region comprises six distinct and mutually exclusive jurisdictions: Baltimore City, Anne Arundel County, Baltimore County, Carroll County, Harford County, and Howard County.

Statewide impacts are virtually indistinguishable from those for the Greater Baltimore region. This is a reflection of the robust nature of the Baltimore region's economy and its ability to meet the human and physical capital needs of a burgeoning Sparrows Point economy.

To conduct the fiscal portion of the analysis, Sage relied upon publicly available information, including government-published tax rates and budgetary information for key tax revenue streams — income and property taxes for local and state governments and sales and use taxes for state government. Additional information regarding analytical methods used to produce this analysis is included in the Appendix to this report.

¹² IMPLAN is the most commonly utilized econometric software for analyses of its type and has emerged as the industry standard for this type of quantification. The model comprises economic multipliers that reflect the statistical relationship between final demand for goods and services at local industries and the likelihood that certain goods and services will be sourced locally as opposed to outside the community. These multipliers are updated each year and Sage purchases model licenses on an annual basis. This study utilizes the most recent multipliers for Maryland counties and Baltimore City.

Lessons from other Intermodal Hubs

Because of the physical scale of TPA, the site creates not only opportunities that are typical of deepwater ports, but also of other transportation hubs that allow intermodal movement of cargo. Successful inland transportation hubs have encouraged the development of distribution and manufacturing businesses, on-site and nearby, that can prosper from their proximity to these transportation assets. The experiences of these other transportation hubs as well as even smaller logistically related projects offer lessons and insights that can be usefully applied to the development plans of TPA.

- The Desirability of Public Support

There are few sites in the U.S. that combine geographical location advantages and existing infrastructure on as large a parcel of land as TPA. Given the generally successful track record of similar locations, TPA's plans for Sparrows Point appear achievable, particularly with meaningful public support. Moreover, there are examples of other projects that provide clear precedent and offer lessons regarding how large, similarly situated, and complex projects can be successful.

Globalization has fundamentally altered the nature of the economy. Not only are finished goods sourced from around the world, but the supply chain that supports business by supplying needed inputs has arguably become even more so. More than ever, the global economy needs interconnected transportation networks. Thus, the time is ripe for repurposing the assets available at TPA so that the site can better support and enhance the Baltimore region's competitiveness in the national and global economies.

Accordingly, the U.S. Department of Transportation has declared that “[n]o economy can grow faster than its ability to move the raw materials and parts its businesses use and the goods its businesses produce.”¹³ Critical links in these networks are hubs wherein different modes of transportation intersect, providing opportunities to optimize transportation efficiencies and supply value-added activities that support supply chains and final product distribution.

By linking water-based and land-based modes of transport, seaports are hubs by definition. Other hubs are often termed intermodal logistics centers, while those developed by port authorities, such as Virginia Port Authority's Front Royal are usually called inland ports. These centers comprise a facility or group of facilities that supply a point of intermodal transfer of freight as well as opportunities for activities related to logistics, goods distribution, consolidation, or other value-added activities.¹⁴

The coordination of multiple freight transportation modes creates additional opportunities to optimize transportation resources, including by encouraging greater use of cost-effective, long-

¹³ U.S. Department of Transportation. “DOT Freight Policy Council: keeping America's economy competitive starts by listening to freight leaders.” September 13, 2013. Cited in op. cit., Florida Department of Transportation

¹⁴ Op. cit., Florida Department of Transportation

distance modes (e.g., rail, waterborne) and reducing vehicle miles by truck. While truck-based transportation may be reduced by these hubs, there is also evidence that the presence of intermodal logistic centers can increase industrial property values along major trucking corridors.¹⁵

Two examples of these transportation hubs that are of a scale similar to Sparrows Point are the Alliance (Texas) and CenterPoint (Illinois) intermodal centers. Their respective experiences are instructive.

1. **Alliance, Fort Worth, Texas.** This business park comprises 9,600 acres and is built around an industrial airport with exceptional rail and highway access. Unlike TPA, there are no proximate seaport facilities. The origins of Alliance date to 1987 when the Federal Aviation Administration approached Ross Perot with a proposal to create an airport on 2,600 acres owned by Perot. This was spurred by a concern that the Dallas-Fort Worth had exhausted its supply of industrial land adjacent to airport infrastructure. The subsequent public/private partnership (hence the name “Alliance”) assembled additional land, secured federal funding for airport development through a City of Fort Worth proposal, and secured city-funded infrastructure (e.g., water, sewer, initial roads) for the airport. Initial public investment totaled \$163 million, leveraging \$1.6 billion in private investment.¹⁶

The transportation assets at Alliance include the world’s first airport totally devoted to freight and industrial uses. The site is served by two Class I rail lines: BNSF and Union Pacific. BNSF also operates the Alliance Intermodal Facility. The site has access to I-35 and several major Texas state highways.

Over the decades, the initial logistical/industrial hub has evolved into AllianceTexas, an 18,000-acre master planned community. Part of this success reflects the challenging learning curve associated with Alliance’s state-of-the-art transportation resources and other site assets. As tenants have realized how to leverage these resources, success has progressively been achieved. The development now comprises more than 425 companies employing more than 44,000 people. To put that into perspective, it has taken Baltimore County roughly 18 years to add 44,000 jobs. Today, Baltimore County is home to about 420,000 jobs, 44,000 more than it had in 1998. In addition to its industrial tenants, the AllianceTexas community includes a 500-acre retail center, a hospital/medical center, and a wide range of residential development.¹⁷

A review of the impacts of Alliance in 2014, after 25 years of operation, estimated that the cumulative economic impact exceeded \$55 billion. That impact had been growing significantly in recent years from \$3.1 billion in 2012 to \$3.8 billion in 2013 to \$4.8 billion in

¹⁵ McNally, Alexandra Chaustre “Intermodal Logistics Centers and Their Impact on Transportation Corridor Industrial Property Value”

¹⁶ Urban Land Institute, “Industrial/Business Park, Alliance, Fort Worth, Texas,” Project Reference File, July-September 1995

¹⁷ AllianceTexas, “Alliance Town Center” <http://www.alliancetexas.com/>

2014. Total capital investment in the project exceeded \$8 billion with private parties investing \$7.8 billion and public agencies at the federal, state, and local level providing over \$450 million. Through 2014, Alliance had generated over \$1.4 billion in tax revenue for Fort Worth and other local jurisdictions and public agencies in the vicinity of the project.¹⁸

2. **CenterPoint Intermodal Center, Elwood, Illinois.** Located 40-miles southwest of Chicago in Will County, this facility was initially developed in 1984 as a 2,500-acre hub focused on the transfer of freight from rail to trucks with 8 million square feet of warehouse and distribution space. The site was previously part of a U.S. Army munitions manufacturing site that was declared a Superfund site by the U.S. Environmental Protection Agency. The EPA ultimately took the lead in site remediation.

Planning and development represented a major public-private collaboration involving agencies at the local, state, and federal levels as well as members of the Illinois Congressional delegation. Public investment totaled \$200 million, including \$125 million in tax increment financing. The remaining \$75 million, primarily in the form of state and federal grants, funded new and upgraded infrastructure as well as environmental remediation.

Transportation assets originally centered on BNSF, which controls the main line freight tracks running adjacent to the site. A BNSF-operated intermodal center is centrally located within the site. Interstate access is via I-55, connected to the site by a road built to serve the hub, and I-80, which intersects with I-55 approximately 10 miles north of the site.¹⁹

Today, CenterPoint Intermodal Center comprises 6,400 acres and 15 million square feet of built space serving 41 tenants. Since 2010 Union Pacific has operated a second intermodal terminal. The expanded hub is now served by four Class I railroads: BNSF and Union Pacific operate intermodal terminals; Norfolk Southern and CSX have interline service.²⁰

The development of CenterPoint has had a substantial impact on the economy of the surrounding area. A 2010 study found that CenterPoint has emerged as the fourth busiest port in terms of containerized cargo. Over the previous decade, industrial space in Will County had increased 125 percent, with the majority of this space dedicated to distribution and logistics activities. Between 2000 and 2007, the rate of job growth in the county was nearly five times the average for the six-county northeast Illinois region, including Cook County (57.1 percent for Will County versus 12.3 percent for the six-county region). Over

¹⁸ Granicus, "2014 Alliance Texas Economic Impact Report," January 6, 2015

http://fortworthgov.granicus.com/MetaViewer.php?view_id=2&clip_id=2105&meta_id=255358

¹⁹ ULI Development Case Studies, "CenterPoint Intermodal Center-Elwood," July-September 2008

²⁰ CenterPoint, "CenterPoint Intermodal Center – Joliet/Elwood: Project description"

<http://centerpoint.com/parks/centerpoint-intermodal-center-jolietelwood/>

approximately the same period, Will County had become the fastest growing county in Illinois in terms of population, gaining 175,000 residents.²¹

Single-industry projects are much less complicated than the plans for Sparrows Point, but still offer relevant development lessons. The recent Amazon fulfillment center in Baltimore City and a PepsiCo complex in northeastern Pennsylvania represent two useful examples.

1. **Amazon fulfillment center, Baltimore, Maryland.** In 2013, Amazon announced plans for a one million square foot warehouse and fulfillment center in Baltimore City. The City and the State of Maryland assembled a \$43-million incentive package as part of the effort to secure Amazon's investment—comprised of \$35.3 million in enterprise zone tax credits, \$5.5 million in One Maryland tax credits, and \$1.7 in tax credits for job creation. This package was contingent upon Amazon investing \$175 million in Baltimore and employing at least 1,000 workers for 10 years.

In July 2015, Amazon announced that it had hired more than 2,500 full-time workers at the center. Part of the explanation for this level of hiring was the company's decision to expand its original facility with a second 345,000-square foot warehouse. This expansion was announced roughly a year after the initial announcement of Amazon's decision to site its fulfillment center in Baltimore. The expanded fulfillment center has a reported maximum capacity of 2,925 workers.²²

2. **PepsiCo, Mountain Top, Pennsylvania.** PepsiCo developed a 500,000-square foot warehouse adjacent to an existing Gatorade manufacturing plant. The warehouse consolidated repacking and distribution activities that had taken place in five other northeastern warehouses. The company reported savings of \$1 million in net transportation costs as a result of the consolidation. The development of the warehouse was facilitated by a \$1.25 million infrastructure grant from the Commonwealth of Pennsylvania.²³

Several years after the warehouse was opened, a bottle manufacturer developed an on-site facility to serve the Gatorade operation. Production is estimated at 650 million bottles annually. By co-locating with the Gatorade production facility, operations are more efficient and sustainable. The bottling operation benefited from strong state and local public agencies, including monies made available for site development and employee training grants.²⁴

²¹ AECOM, "Inland Port Impact Study," September 2010

http://www.willcountyced.com/uploads/4/3/5/2/43522821/inland_port_study.pdf

²² Sherman, Natalie, "Amazon hiring outpaces projections," Baltimore Sun, July 30, 2015

<http://www.baltimoresun.com/business/bs-bz-amazon-jobs-20150730-story.html>

²³ Jones Lang Lasalle, "Case Study: PepsiCo (Mt. Top,PA)"

²⁴ "On-Site PET Plant Opens at Gatorade Pa. Facility," Beverage World, June 25, 2012

<http://www.beverageworld.com/articles/full/15147/on-site-pet-plant-opens-at-gatorade-pa.-facility>

- The remarkable reach of ports as engines of economic development

Savannah and Charleston are major ports on the East Coast that demonstrate the power of seaports to affect economies statewide. Recent studies of these ports have estimated their capacity to support a significant share of their regional economies. They also promote the co-location of other businesses.

Port of Charleston, South Carolina. Charleston is one of three ports operated by the South Carolina Port Authority (SCPA); the others are the seaport at Georgetown and the inland port in Greer. Charlestown, however, accounts for more than 98 percent of the value of cargo moving through the three ports, valued at almost \$77 billion in 2014.²⁵

A recent study examined the impacts associated with port operations as well as the impacts associated with port users -- businesses that depend on ports for import and export services. In 2014, the port operations of all SCPA locations supported more than 17,500 jobs with associated income of \$854 million. Total economic activity associated with port operations was estimated at a whopping \$2.6 billion. These impacts included the direct effects of port operations as well as indirect and induced impacts.

While these impacts are substantial, they are dwarfed by the estimates of impacts attached to port users. The total impacts of SCPA port users (i.e. direct, indirect, and induced impacts) include almost 170,000 jobs with associated income of \$9.4 billion. Total business sales associated with these port users was estimated at \$50.4 billion.

It is important for stakeholders of Maryland's economy to recognize that the great majority of these port users are in the manufacturing sector. Geographically these impacts were generated across South Carolina with the largest impacts tied to the concentrations of manufacturers in the upstate region, the center of the state's automotive industry, considered the main driver of the statewide economy. According to this analysis, the success of the state's automotive industry is largely due to South Carolina's ports' ability to connect this industry to its global supply chain and distribution channel. More recently Boeing has added the aerospace sector to South Carolina's transportation-related manufacturing. The share of the dollar value of total exports attributable to transportation equipment increased from 33 percent to 41 percent in the 3-year period ending in 2014.

The jobs supported by SPCA ports provide compensation at levels well above the statewide average. The more than 187,000 jobs supported by the ports are associated with average annual income in excess of \$54,500, nearly 40 percent higher than the statewide average. This higher income applies to all jobs supported by the ports — direct jobs as well as the

²⁵ The discussion of the Port of Charleston and SCPA is from Von Nessen, Joseph, "The Economic Impact of the South Carolina Ports Authority: A Statewide and Regional Analysis," Moore School of Business, University of South Carolina, September 2015 <http://www.scspa.com/documents/2015EconomicImpactStudyFINAL.pdf>

jobs in the supply chain and induced jobs, the latter often retail positions tied to the household spending element of the economy. Annual wage growth for port-related jobs was also higher than for the typical South Carolina job — 3.2 percent versus 2.3 percent.

Port of Savannah, Georgia. The Port of Savannah is one of two public marine terminals owned by the Georgia Ports Authority. Along with the Port of Brunswick, the ports generate substantial economic impacts statewide when port operations and port users are both considered. Brunswick handles more than 95 percent of vehicular cargo and all dry bulk cargo while Savannah moves almost 90 percent of breakbulk, roughly 75 percent of liquid bulk, and all containerized cargo. Savannah is one of the five busiest container ports in the U.S. It is also America's fastest growing container port and accounts for 84 percent of the economic activity associated with the operations of Georgia's deepwater ports.

A recent report on the impacts of Georgia's deepwater ports estimated the total impacts of port operations at almost 33,000 jobs with associated income of \$1.4 billion. Business sales impacts of port operations were estimated at \$4.1 billion. These impacts include all multiplier effects (i.e., direct, indirect, and induced impacts).²⁶

As was true for South Carolina, the impacts of port operations are but a fraction of the impacts associated with port users, Georgia-based businesses that depend on ports either for imports to supply inputs to their operations or for export services to distribute their products to customers. In 2014, these port users supported more than 336,000 jobs with income totaling almost \$19 billion. Impacts in terms of business sales were estimated at almost \$80 billion.

Total impacts for the Georgia ports accounted for a significant share of the statewide economy. Total employment supported by the ports — more than 369,000 jobs — amounted to 8.4 percent of the state's employment. Total income of over \$20 billion represented 5.3 percent of Georgia's total personal income, while total business sales of over \$84 billion constituted 9.6 percent of statewide business sales.

The success of Savannah as a seaport has been a significant factor in the location decisions of major companies. Almost a score of U.S.-based and foreign companies have sited retail distribution centers in Savannah, including Best Buy, Hugo Boss, Icon H&F, Ikea, Target, and Wal-Mart. Gulfstream also maintains a significant presence in Savannah.²⁷

The impact of the Port of Savannah extends to the educational system. Two area universities offer five different logistics degree programs. Georgia Tech in Atlanta offers graduate degrees and certificate programs in logistics and supply chain management. The

²⁶ The discussion of the Port of Savannah and GPA is from Humphreys, Jeffrey M., "The Economic Impact of Georgia's Deepwater Ports On Georgia's Economy in FY 2014," Terry College of Business The University of Georgia, May 2015 https://www.terry.uga.edu/media/documents/ga_ports_2014_study.pdf

²⁷ "Georgia Ports Equal Prosperity for Savannah," Savannah Morning News, October 16, 2008 <http://savannahnow.com/blog/spivalaw/2008-10-16/georgia-ports-equal-prosperity-savannah>

state's Department of Economic Development partners with Georgia's technical colleges to train logistics employees in classrooms, mobile labs, or at companies' facilities. Logistics firms have also worked with Savannah-area high schools to create internships allowing students to work either at the port or at distribution facilities and place themselves on a career path providing well-paying jobs.²⁸

These examples of development offer several themes that apply to TPA's plans for Sparrows Point.

1. **The regional and national reach of deepwater ports.** The experience of ports in Charleston and Savannah demonstrate the ability of seaports to support economic activity on a statewide, regional, and even national basis. While the ports are major generators of economic activity, those in-state businesses that depend on the ports for their success generate 10 jobs for every job generated by port operations.
2. **High-quality, well-paid employment.** The experience of the ports in Charleston and Savannah demonstrate the ability of ports to create employment not only at the ports themselves, but also to support jobs statewide that offer compensation much greater than the average job in these states.
3. **Synergy and success.** The essential nature of logistical hubs is the concentration of complementary economic activities — not only in the form of multiple modes of transportation but also warehousing, distribution, freight forwarding, light manufacturing, and other value-added activities.

These interrelated economic activities offer opportunities for synergies and economic efficiencies that would otherwise not be available. These synergies contribute to the remarkable success that each of these projects has enjoyed. The clearest examples of this synergy are the relationships that the ports in South Carolina and Georgia have built with manufacturers and other businesses.

As stated, for each job generated by port operations, 10 jobs in those states are supported in businesses that depend on the ports for inbound materials and/or outbound products while even more jobs are supported in surrounding states. Both intermodal logistical centers have substantially outgrown their original footprints. Alliance is not only several times its original size, but has become a mixed-use community with major retail and residential components, even a hospital and medical center. CenterPoint has been the main reason that Will County has enjoyed the fastest job and population growth in northeastern Illinois. Even the single-industry PepsiCo complex reduced costs by \$1 million from the synergy resulting from co-locations of logistical, warehousing, and light manufacturing at the site of the original manufacturing plant.

²⁸ "Georgia: Super Hub of the Southeast," Inbound Logistics, March 2015
<http://www.inboundlogistics.com/cms/article/georgia-super-hub-of-the-southeast/>

4. **Public-private partnerships.** Each of these cases illustrates the crucial role that government plays in large-scale, impactful economic development, particularly during initial phases. Upfront public funding represented an essential component of each project, typically focused on infrastructure. For the intermodal logistical centers, the partnership involved government at local, state, and federal levels.

These partnerships move beyond finance and can involve local and state education systems. Internships have been frequently cited as highly beneficial to companies seeking skilled workers and to students looking for a well-defined path to high-quality, well-paying jobs.

5. **Time enhances benefits and impacts.** For both intermodal logistics centers and for the PepsiCo complex, the passage of time has given tenants the opportunity to learn how either intermodal logistics or complementary value-added activities can create opportunities for better, cheaper, or faster production. A report focused on Alliance specifically noted the difficulty of educating corporate tenants that the project represented much more than an airport. Communicating the prospective benefits of integrated transportation resources is viewed as an ongoing challenge.²⁹

²⁹ Op. cit., Urban Land Institute

III. Infrastructure and Other Site Development Requirements

TPA's Massive Infrastructure and Site Development Investments Will Have a Major Regional Impact

The development of TPA has required and will continue to require substantial infrastructure and site development investment. These expenditures have been ongoing for more than 2 years. While infrastructure and other construction investments represent prerequisites for the business activities that now and will, increasingly in the future, constitute the primary drivers of economic and fiscal impact, they also in and of themselves produce significant positive economic impacts.

While most of the infrastructure investments discussed here are scheduled over the next few years, TPA's investment in the site has been underway since its acquisition in 2014. In addition to the initial infrastructure projects for roads, bridges, port-related, and other projects, TPA has expended substantial sums to remediate the environmental devastation resulting from over a century of steelmaking. As noted above, TPA will invest \$48 million in this remediation work.

Construction of infrastructure creates temporary, but important impacts as buildings, roads, utilities, piers, rail bridges and track, and other infrastructure assets are constructed. In the longer-run, however, infrastructure is likely to trigger periodic re-investment. An example is dredging, which is a predictably recurring expense, particularly for a marine terminal designed to accommodate the substantially larger ships put into service to take advantage of the newly expanded Panama Canal.

Accordingly, investments presented in Exhibit 7 only include infrastructure needs addressed to date or projected through Plan completion. Once in place, these investments support numerous other site development investments and operational activities as well as triggering occasional maintenance expenditures. The ongoing impacts are modeled later in the report.

As indicated, total infrastructure investment will total \$203 million. Any investment of this scale will inevitably generate substantial economic impacts. These impacts are summarized in Exhibit 8, which presents impacts for the Baltimore region and Maryland.

Within the Baltimore region, total impacts include an estimated 2,017 jobs (measured in job-years)³⁰ with associated income of \$122 million. Businesses in the Baltimore region will garner \$311 million in augmented sales of goods and services. Statewide impacts, which include impacts for the Baltimore region, are slightly larger.

³⁰ For instance, if an activity supports one person's employment for two years, that is represented as two jobs in Sage's impact estimates.

Exhibit 7. Infrastructure investments through master plan completion*

<i>Type of infrastructure</i>	2014	2015	2016	2017	2018	2019	2020	Total
Real estate related infrastructure								
Roads & bridges	\$0.0	\$0.0	\$3.5	\$14.0	\$7.0	\$5.0	\$0.0	\$29.5
Utilities	\$0.0	\$0.0	\$2.5	\$15.0	\$10.0	\$6.0	\$1.5	\$35.0
Stormwater management	\$0.0	\$0.0	\$1.0	\$3.5	\$3.5	\$5.0	\$0.0	\$13.0
Soft costs	\$0.0	\$0.0	\$0.5	\$2.5	\$3.0	\$1.5	\$0.0	\$7.5
Total real estate related infrastructure	\$0.0	\$0.0	\$7.5	\$35.0	\$23.5	\$17.5	\$1.5	\$85.0
Port-related infrastructure								
Finger pier improvements	\$0.1	\$0.1	\$1.5	\$4.0	\$2.0	\$0.0	\$0.0	\$7.7
East and West Berth Improvements	\$0.4	\$6.5	\$3.0	\$18.0	\$18.0	\$0.0	\$0.0	\$45.9
Dredging	\$0.0	\$1.2	\$0.0	\$5.0	\$10.0	\$10.0	\$0.0	\$26.2
New berth construction	\$0.0	\$0.0	\$1.0	\$15.0	\$4.0	\$0.0	\$0.0	\$20.0
Total port related infrastructure	\$0.5	\$7.8	\$5.5	\$42.0	\$34.0	\$10.0	\$0.0	\$99.8
Rail-related infrastructure								
Modernize rail infrastructure	\$0.0	\$1.0	\$1.0	\$1.5	\$1.5	\$0.5	\$0.0	\$5.5
Rail bridges	\$0.0	\$0.0	\$0.0	\$1.0	\$1.0	\$1.0	\$0.5	\$5.6
New rail track	\$0.1	\$2.0	\$0.5	\$2.0	\$3.0	\$2.0	\$0.0	\$7.5
Total rail related infrastructure	\$0.1	\$3.0	\$1.5	\$4.5	\$5.5	\$3.5	\$0.5	\$18.6
Consolidated costs	\$0.6	\$10.8	\$14.5	\$81.5	\$63.0	\$31.0	\$2.0	\$203.4
Cumulative costs	\$0.6	\$11.4	\$25.9	\$107.4	\$170.4	\$201.4	\$203.4	

Source: TPA

Note*: Infrastructure investments may extend through 2025.

Exhibit 8. Economic impacts of infrastructure investment (one-time effects)

<i>Type of impact</i>	<i>Direct</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>
• Baltimore region				
Employment/years of work (full- and part-time jobs)	1,265	352	520	2,137
Labor income (millions)	\$84.0	\$20.1	\$25.0	\$129.0
Business sales (millions)	\$202.4	\$55.9	\$71.5	\$329.8
• Maryland				
Employment/years of work (full- and part-time jobs)	1,265	362	528	2,155
Labor income (millions)	\$84.0	\$20.5	\$25.0	\$129.5
Business sales (millions)	\$202.4	\$58.4	\$72.3	\$333.2

Sources: TPA, IMPLAN

In addition to investments in infrastructure, TPA and its tenants at Sparrows Point will make major investments in buildings and equipment as the overall site is developed. Exhibit 9 provides estimates of the value of buildings developed as the Master Plan is implemented over the next several years. Because the majority of this construction activity will occur in the future and has not been precisely planned, the value of this projected construction activity is based on engineering

estimates of the cost of structures that are typical of the proposed distribution, manufacturing, retail, and other uses.

In total, the value of more than 16 million square feet of built space is estimated to be in excess of \$1.7 billion based on cost estimates available from a well-established source of these kinds of construction costs.³¹ Excluded from this estimate is any building space associated with future development, which according to the Master Plan constitutes almost 500 acres or about one-sixth of the total site. More information on the methodology used to develop these cost estimates is included in the Appendix to this report.

Exhibit 9. Estimated value of building construction through plan completion

<i>Land use</i>	<i>Building SF</i>	<i>Total cost (millions)</i>
Distribution, warehouse, manufacturing	5,739,128	\$729.9
Terminal, warehouse, transloading, & marine terminal	7,921,000	\$651.9
Bulk handling & storage	39,000	\$3.2
Support	111,500	\$14.6
Service warehouse	1,720,000	\$253.6
Retail	141,000	\$24.5
Office/warehouse	310,000	\$45.7
Automotive storage	141,000	\$11.6
Total	16,122,628	\$1,735.1

Sources. TPA, RS Means

In addition to the costs of buildings, businesses at Sparrows Point will make significant investments in equipment, fixtures, and furnishings, which are not included in the value of construction. This equipment can be expected to range in value from a few thousand dollars for furniture to millions of dollars for the cranes and other equipment necessary for moving containers and other cargo.³²

Estimating the value of this equipment is important to understanding the overall economic and fiscal impacts of the Master Plan. In all Maryland jurisdictions, property tax rates for equipment are taxed at 2.5 times the rate of real property.

As with buildings, the exact equipment needs of prospective businesses are unknown. Given the industrial nature of the development included in the Master Plan, however, the likelihood of relatively large investments in equipment is considerable.

As a proxy for more specific information, this analysis assumes that the value of equipment for Sparrows Point businesses will parallel the average for all commercial enterprises in the Baltimore

³¹ R.S. Means, "Square foot costs: 2016, 37th annual edition," 2015

³² In 2013, for example, PortMiami invested \$39 million in four super-post-Panamax cranes that are designed to unload the largest container ships that will transit an expanded Panama Canal. Whitefield, Mimi, "Arrival of giant cranes ushers in new era at PortMiami," Miami Herald, October 7, 2013
<http://www.miamiherald.com/news/business/international-business/article1955990.html>

region. As described in more detail in the Appendix, the assessed value of personal business property (the term used by the State of Maryland for fixtures, furnishings, and equipment used by businesses) in the Baltimore region equals 9.4 percent of the value of the region’s commercial real property values. This regional ratio has been used to estimate the value of equipment that will be used by businesses at Sparrows Point. Based on the \$1.7 billion estimated value of construction, the estimated value of equipment is \$163 million.

The economic impacts associated with construction of \$1.7 billion of space for the businesses at TPA are summarized in Exhibit 10. In the Baltimore region, this construction is estimated to support almost 19,000 positions (job-years) with associated income of \$1.1 billion. Businesses in the region will enjoy augmented sales of goods and services valued at an estimated \$2.7 billion. The similarity of regional and statewide impacts is essentially a reflection of the ability of construction firms in the Baltimore region and their vendors/supply chain to meet these building needs. It is worth stressing that the direct employment created by these construction activities primarily take the form of highly desirable, career path-oriented jobs with an average income of more than \$60,000. Average income for all jobs supported by construction exceeds \$58,000.

Exhibit 10. Economic impacts of construction investment (one-time effects)

<i>Type of impact</i>	<i>Direct</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>
• Baltimore region				
Employment/years of work (full- and part-time jobs)	12,453	1,957	4,443	18,853
Labor income (millions)	\$754	\$133	\$213	\$1,101
Business sales (millions)	\$1,731	\$372	\$611	\$2,714
• Maryland				
Employment/years of work (full- and part-time jobs)	12,453	2,022	4,511	18,986
Labor income (millions)	\$754	\$136	\$213	\$1,103
Business sales (millions)	\$1,731	\$387	\$618	\$2,737

Sources. TPA, RS Means, IMPLAN

It should be noted that equipment purchases are likely to increase the economic impacts associated with the development of businesses at Sparrows Point. A major factor in determining the extent of the impacts related to investments in equipment is the extent to which that equipment is produced in Maryland. Without more specific information on equipment needs, determining the locations of equipment providers is not possible. Some equipment is likely to be highly specialized and available from only a few sources, many of them from non-Maryland producers. An extreme example is the recent purchase of container cranes by PortMiami, which were obtained from a Chinese producer.³³ Consequently, this analysis adopts a conservative approach and does not produce any estimates of the impacts associated with investment in fixtures, furnishings, and equipment.

³³ Ibid.

IV. Key Drivers of Economic Activity

Multi-modal Cargo Handling Capacity Is the Primary Economic Driver

TPA has over 4,000 feet of water front most of which is deep enough to accommodate large vessels like capemax and Post-Panama Canal Expansion size ships. Besides I-695 running over TPA's boundaries, there are over 500,000 feet of rail track with at least 300,000 feet in working condition and there is sufficient space to install several loop tracks to support bulk and general consignment trains as well as intermodal container transfer facility areas. With its own power generating and water treatment capacity, TPA has the potential to become the nation's single largest port industrial complex. Combined with other public and private marine terminals in Baltimore, located in the prosperous Mid-Atlantic and on both East-West and North-South trade lanes, TPA is poised to drive Baltimore and Maryland's future.

As a potentially major transshipment point for marine-based cargo (ship to road or rail), economic activity at Sparrows Port will be highly dependent on the volume of cargo that is handled. Naturally, as volume increases, the value of economic activity will tend to increase.

TPA has already generated initial projections regarding the probably volume of several types of cargo that may be unloaded, loaded, or trans-loaded at Sparrows Point. Exhibits 11, 12, and 13 supply projections for dry bulk and break bulk, ro-ro, and rail cargo, respectively. Given the relatively undeveloped current status of the project, each of these projections reflects strong predicted growth in the volume of cargo handled from 2016 to Master Plan completion.

Exhibit 11. Cargo handling trends — dry-break and bulk-break (millions of tons)

	2016	2017	2018	2019	2020
Dry bulk	1.1	2.2	2.7	4.9	5.5
Break bulk	0.3	0.6	0.9	2.1	3.0
Total	1.4	2.8	3.6	7.0	8.5

Source. TPA marine plan

Exhibit 12. Ro-ro cargo handling trends — automobiles and machinery

	2016	2017	2018	2019	2020
Automobiles	24,000	365,000	655,000	835,000	835,000
Machinery	30,000	170,000	320,000	435,000	505,000
Total	54,000	535,000	975,000	1,270,000	1,340,000

Source. TPA marine plan

Exhibit 13. Cargo handling trends — rail volume (car loads)

	2016	2017	2018	2019	2020
Lumber	300	1,260	1,500	1,700	1,700
Domestic auto		1,200	5,500	7,000	7,000
Aggregate		1,300	2,700	2,700	2,700
Resin pellet		-	-	2,800	5,600
Total	300	3,760	9,700	14,200	17,000

Source. TPA marine plan

The growth in cargo handling will create additional demand for workers, equipment, and space in which to store and ultimately distribute cargo. The relationship between increases in the volume of cargo and expanded economic activity can be complex because of the ability of a given array of assets to handle a range of cargo.

Nevertheless, there are certain instances whereby expanding volumes of cargo have a roughly linear correlation with increasing economic activity. One important example is the need for truck drivers to transport containers from dock areas to off-site locations. Projections for containerized cargo estimate that the annual number of containers handled will increase from 80,000 when operations begin to 400,000 upon master plan completion. For each 1.8 TEU containers offloaded at the docks, it is estimated that one off-site trip is required. A driver can make an estimated three of these off-site roundtrips trips per day.

Exhibit 14 shows how this increase in container cargo handled by the port creates an increasing demand for truck drivers, based on the assumption that all containers are moved by truck. In the first year of operations, moving 80,000 containers generates approximately 44,000 truck trips to move these containers off-site. These 44,000 truck trips are the equivalent of approximately 15,000 days of work, a volume of work that will require an estimated 59 full-time-equivalent positions for truck drivers at 250 work-days per year. By master plan completion, the volume of containerized cargo handled at Sparrows Point is projected to quintuple to 400,000 containers. As a result, the demand for truck drivers will also increase five-fold to an estimated 296 full-time-equivalent positions.

Exhibit 14. Cargo handling trends and demand for truck drivers

	<i>Starting year</i>	<i>2020</i>
Containers handled (thousands)	80	400
Truck trips, number (thousands)	44	222
Truck trips, days of work (thousands)	15	74
Truck drivers required	59	296

Source. TPA marine plan

This represents a significant source of impact. Average mean wage in the Baltimore region for truck drivers is in the range of \$50,000/annum according to the Bureau of Labor Statistics.

Nationally a significant share of containers is moved by rail, often about one-fifth of all containers. If this also holds for TPA operations, some reduction in the demand for truck drivers would likely result. Demand for rail services would correspondingly increase so that the overall economic impact would be roughly the same.

V. Economic Impacts of Development Opportunities

Game-changing Infrastructure Build-out Forthcoming

Ultimately, Tradeport Atlantic’s ability to better connect Maryland to the balance of the global economy will result in a broad mix of businesses on-site, with many linked primarily to cargo handling. The starting point for defining these activities is the Sparrows Point Master Plan. That plan defines land uses in broad categories and assigns acreage to each land use. The plan also estimates the level of construction and investment associated with each of the uses. These acreages and associated built space are summarized in Exhibit 15. Note that totals may not add due to rounding.

Exhibit 15. Sparrows Point Master Plan

<i>Land use</i>	<i>Acre</i>	<i>Share</i>	<i>Building SF</i>	<i>Share</i>
Distribution, warehouse, manufacturing	468	15.5%	5,739,128	35.1%
Terminal, warehouse, trans-loading, & marine terminal	546	18.1%	7,921,000	48.5%
Future container building	322	10.7%		0.0%
Bulk handling & storage	352	11.7%	39,000	0.2%
Landfill	104	3.5%		0.0%
Support	340	11.3%	111,500	0.7%
Service warehouse	261	8.6%	1,720,000	10.5%
Retail	99	3.3%	141,000	0.9%
Office/warehouse	33	1.1%	310,000	1.9%
Future development	173	5.7%	220,000	1.4%
Automotive storage	324	10.7%	141,000	0.9%
Total	3,023	100.0%	16,342,628	100.00%

Source. TPA

Certain land uses are defined in more detail. For example, within the overall distribution, warehouse, and manufacturing category listed above, warehousing is expected to represent 80 percent of the 5.7 million square feet allocated to this category in the projections. Manufacturing is associated with the other 20 percent.

The “service warehouse” use encompasses a wide range of potential business activities including research, laboratory, light manufacturing, and various service businesses. For each of these businesses, the service warehouse use encompasses storage and warehousing functions related to the functioning of those businesses.

Initial retail operations are expected to include lodging, restaurants, food, and fuel. Other retail options are likely in the future to meet the needs of the surrounding community, which is generally underserved commercially. The office/retail/flex space represents another mix of business types including office-based and retail, particularly retail with significant storage needs.

This disaggregation of land uses into more specific business activities is important because different businesses have different needs for built space and have varied operating characteristics. Exhibit 16 supplies estimates of the direct employment and business sales associated with each of the business activities contemplated by TPA’s Master Plan. These estimates encompass nearly 9,200 jobs and more than \$1.7 billion in business sales. This is what the development has the potential to achieve by the time the master plan is completed in the views of TPA analysts.

Exhibit 16. Master Plan projected direct jobs and business sales, upon completion

<i>Land uses</i>	<i>Activities</i>	<i>Direct jobs</i>	<i>Business sales (millions)</i>
Distribution, warehouse, manufacturing	Warehousing	2,296	\$307.0
	Manufacturing	1,391	\$673.4
Terminal, warehouse, transloading, & marine terminal	Terminal operations	787	\$116.5
	Port security	50	\$2.7
	Short line rail operation	40	\$12.9
Bulk handling & storage	Warehousing	20	\$2.6
Support	Mechanics, fabricators, repair	223	\$33.2
Service warehouse	R&D, labs, light manufacturing, auto mechanics, moving companies	3,440	\$478.1
Retail	Hotel	69	\$8.4
	Grocer	144	\$27.5
	Gas station	9	\$0.8
	Fast food	121	\$10.0
Office/warehouse/flex space	Office/retail/distribution	594	\$82.2
Automotive storage	Auto servicing and repair	(1)	(1)
Total		9,183	\$1,755.2

Note. 1. Employment included in data for “Terminal, warehouse, transloading, & marine terminal”

Sources. TPA, IMPLAN, Food Marketing Institute, U.S. Census, Sage

Not included in the figures in Exhibit 16 is any economic activity associated with areas designated for future (i.e. later than 2020) development. These areas designated for future development constitute more than 16 percent of the total land area encompassed by the Master Plan. The majority of this acreage is designated for future terminal operations. As the volume of marine cargo expands, the expansion of terminal operations can be expected to generate more private investments, more economic activity (i.e. business sales), and more jobs at TPA.

Estimating Total Economic Impact

These direct impacts create additional economic impacts in the Baltimore region known as multiplier effects. Indirect effects are generated by the purchases made by businesses located at TPA in the local economy. Induced impacts arise from the consumer spending of workers in the directly and indirectly effected businesses.

Exhibit 17 presents estimates of these total impacts for the Baltimore region and Maryland. For the Baltimore region, the total impacts include more than 16,400 jobs with associated income of \$1.1 billion. Augmented business sales of goods and services by Baltimore region establishments are estimated at more than \$2.8 billion. In other words, the regional economic impact of TPA will approach \$3 billion by the time the plan is completed. Statewide impacts, which include impacts in the Baltimore region, are somewhat larger and include almost 17,000 jobs with \$1.1 billion and augmented sales among Maryland businesses estimated at \$2.9 billion.

Unlike construction impacts, which are temporary and endure only as long as construction persists, these impacts are generated by the ongoing operations of businesses at Sparrows Point. The estimates presented below represent annual, ongoing impacts that are presumed to last for many years, with impacts likely shifting a bit during the course of a typical business cycle. Should operations expand, for instance as activity in other parts of the nation are consolidated to TPA given its strategic location and assets, these impacts will increase.

Exhibit 17. Economic impacts of on-site tenants at Sparrows Point, upon plan completion

<i>Type of impact</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Induced effects</i>	<i>Total</i>
• Baltimore region				
Employment (full- and part-time jobs)	9,183	2,986	4,236	16,405
Labor income (millions)	\$655	\$185	\$204	\$1,052
Business sales (millions)	\$1,755	\$505	\$583	\$2,843
• Maryland				
Employment (full- and part-time jobs)	9,183	3,267	4,337	16,787
Labor income (millions)	\$655	\$200	\$206	\$1,065
Business sales (millions)	\$1,755	\$559	\$595	\$2,904

Sources. TPA, IMPLAN

VI. Impact on Maritime Services

Creating Demand for Maritime Professionals

The direct impacts of implementing TPA's Master Plan are not confined to the physical boundaries of the site itself. Certain transportation services will be necessary to bring large vessels to TPA docks. Additional services will be needed to move offloaded cargo to off-site destinations.

For instance, oceangoing vessels that dock at TPA's marine terminals will require the services of ship pilots and tug boats. Ship pilots are highly specialized workers with intimate knowledge of the Chesapeake Bay and Baltimore harbor who help guide all oceangoing vessels coming into the Port of Baltimore. Tug boats assist in the final positioning of such vessels at piers.

The unloading of vessels, particularly containerized cargo, generates demands to move the cargo elsewhere. While stevedores will unload cargo and move it to staging areas within TPA, additional transportation services will be utilized to convey this cargo to off-site locations.

The truck trips tied to containerized cargo, discussed above (see Exhibit 10), represents just one major off-site impact directly created by the activities within the bounds of Sparrows Point. The use of Class I rail service represents the other land-based transportation service that will be needed to move cargo to off-site locations.

Exhibit 18 summarizes the direct impacts associated with these off-site direct impacts. As indicated, trucking will generate the largest number of jobs. While relatively few ship pilots will be required to meet the demands of ships arriving and departing from TPA's marine terminals, these positions are exceptionally well-paid. In total, these transportation services are estimated to support more than 300 jobs by master plan completion and to generate in excess of \$57 million in business sales. These figures do not embody multiplier effects.

Exhibit 18. Off-site activities, projected direct jobs and direct business sales, annual, ongoing impacts

<i>Activities</i>	<i>Direct jobs</i>	<i>Business sales (millions)</i>
Class I rail service	5	\$1.6
Ship pilots	5	\$4.0
Tug boat/tow operations	5	\$3.6
Trucking off-site	296	\$48.3
Total	311	\$57.5

Sources. TPA, IMPLAN, Sage

As with all other activities that are directly supported by the implementation of TPA's Master Plan for Sparrows Point, the demand for off-site transportation services will generate a multiplier effect that includes the economic activity involved in the supply chain for these transportation services (i.e. the indirect effects) and the activity that occurs when the direct workers and those in the supply chain spend their wages and salaries.

These total economic impacts are presented in Exhibit 19. For the Baltimore region, total impacts include an estimated 587 jobs and \$36 million in associated income. Businesses in the region are expected to enjoy \$98 million in augmented sales of goods and services as a result of the new demands for their transportation services. Total impacts in Maryland, which encompass projected Baltimore regional impacts, are estimated at 591 jobs with associated income of \$36 million and statewide business sales of \$99 million.

Exhibit 19. Economic impacts of off-site activities related to Sparrows Point, upon completion

<i>Type of impact</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Induced effects</i>	<i>Total</i>
• Baltimore region				
Employment (full- and part-time jobs)	311	137	140	587
Labor income (millions)	\$21	\$8	\$7	\$36
Business sales (millions)	\$58	\$22	\$19	\$98
• Maryland				
Employment (full- and part-time jobs)	311	140	140	591
Labor income (millions)	\$21	\$8	\$7	\$36
Business sales (millions)	\$58	\$23	\$19	\$99

Sources. TPA, IMPLAN

Importantly, the development of TPA’s Master Plan is expected to generate new movement of cargo within the Port of Baltimore. Based on typical port operations and the scale of development expected in the Master Plan, an estimated 191,000 containers will move between TPA and the Seagirt Marine Terminal.³⁴

In 2015, the port handled 523,848 containers, an increase of 8 percent over 2014, and was ranked as the most productive port in the nation for container berth productivity.³⁵ With TPA projecting to handle 400,000 containers in 2020, the total containers handled by the port would reach 1 million.

The ramp up of activity at TPA may also be an impetus for additional development within the Port of Baltimore or in the greater Baltimore region. If, as expected, the volume of rail traffic increases substantially as a result of new activities at Sparrows Point, there could be an increased incentive to make investments to solve existing problems in the rail system (e.g., restrictive tunnels and bridges – the Howard Street Tunnel, in particular, represents a major East Coast bottleneck). Should these investments occur, TPA would have been part of the rationale for rendering these improvements. Accordingly, the development of the Master Plan has the potential for generating impacts and benefits that would go well beyond the site itself, creating better transportation for the region, state, and East Coast.

³⁴ Tradepoint Atlantic, “Port to point sub-committee meeting,” January 13, 2016

³⁵ Op. cit., Maryland Manual On-line

VII. Total Economic Impacts

The Complete Picture

Thus far, the report has provided insight into various sources of TPA economic impact. This section of the report brings all of this together in one place to allow the reader to acquire a sense of just how massive total economic impact can be.

Total economic impacts estimated for activities at TPA include the construction activities expected to occur by master plan completion, the operations of TPA tenants, and the activities of required off-site transportation services. Construction related impacts are clearly time-limited and are discussed separately below. The activities of tenants and off-site transportation services represent ongoing, essentially permanent impacts.

Total Construction/Investment Impacts

The creation of the infrastructure and buildings anticipated by the Master Plan to occur by plan completion will require combined investment exceeding \$2 billion. The vast majority of this investment is in the buildings that will support tenant business activities.

Infrastructure investments will constitute 9 percent of the total investment, while equipment is estimated to account for 8 percent of the total. The direct impacts of these expenditures are listed in Exhibit 20. More than 13,000 positions will be supported (measured in job-years)³⁶ for construction workers. Additional employment opportunities for Marylanders will be generated via expenditures on equipment, but a lack of data regarding the specific needs of prospective tenants precludes making an estimate of employment impacts associated with this form of investment.

Exhibit 20. Total direct impacts of construction/investments on employment and business sales: 2016-plan completion (one-time effects)

<i>Activities</i>	<i>Direct jobs (years of work)</i>	<i>Business sales (millions)</i>
Infrastructure investments	1,194	\$192
Construction investments	12,453	\$1,735
Equipment investments (1)	N.A.	\$163
Total	13,647	\$2,090

Sources. TPA, IMPLAN, Sage. Note: Data unavailable to determine job impact in Maryland.

The multiplier effects of investments in infrastructure and building construction are shown in Exhibit 21. In the Baltimore region, the total economic impacts of these investments include almost 21,000 jobs with associated income of \$1.2 billion. Businesses in the Baltimore region are expected to garner more than \$3 billion in sales of goods and services as a result of investments in infrastructure and building construction. Impacts statewide, which embody those in the Baltimore

³⁶ For instance, if a construction worker is employed for three years at TPA, that counts as 3 positions out of the 13,647 total.

region, are only slightly larger—an indication of the Baltimore region’s ability to supply the construction workers required for this activity and the robustness of the regional supply chain for construction.

Exhibit 21. Total economic impacts construction/investment: 2016-plan completion (one-time effects)

<i>Type of impact</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Induced effects</i>	<i>Total</i>
• Baltimore region				
Employment/years of work (full- and part-time jobs)	13,647	2,288	4,935	20,870
Labor income (millions)	\$833	\$152	\$237	\$1,223
Business sales (millions)	\$1,922	\$424	\$679	\$3,025
• Maryland				
Employment (full- and part-time jobs)	13,647	2,363	5,011	21,020
Labor income (millions)	\$833	\$155	\$237	\$1,226
Business sales (millions)	\$1,922	\$443	\$687	\$3,051

Sources. TPA, IMPLAN, Sage

Total Operational Impacts

When implementation of the Master Plan is approaching full realization, TPA’s tenants and the businesses providing off-site transportation services are expected to have created almost 9,500 direct jobs. Unlike construction jobs, these are not defined to be time-limited. The annual value of the economic activity undertaken by these tenants and transportation businesses is estimated at \$1.8 billion. To put this figure into context, the gross state product of the entire state of Maryland was estimated at \$342 billion in 2013. In other words, TPA by itself stands to add half a percentage point to gross state output by 2020-2025. See Exhibit 18.

Exhibit 22. Total direct impacts of operations on employment and business sales: ongoing annual effects

<i>Activities</i>	<i>Direct jobs</i>	<i>Business sales (millions)</i>
On-site activities (TPA tenants)	9,183	\$1,755
Off-site activities	311	\$58
Total	9,494	\$1,813

Sources. TPA, IMPLAN, Sage

That’s not where the impact ends, however. The impacts shown above are direct impacts and therefore do not consider multiplier effects.

As summarized in Exhibit 23, the total economic impact in the Baltimore region is estimated at almost 17,000 jobs with income of \$1.1 billion. Regional businesses are estimated to enjoy augmented annual sales of goods and services of \$2.9 billion. Statewide impacts are slightly larger and include almost 17,400 jobs and approximately \$3 billion in annual economic impact, which approaches 1 percent of total gross state product.

These estimates are the annual values of this employment, income, and businesses sales upon full master plan implementation. Because the Master Plan includes a significant amount of land reserved for future development of terminal operations and other uses—almost 500 acres out of the total of 3,100 acres, the potential exists for much more activity at Sparrows Point than is estimated for 2020-2025. The experience of other large-scale transportation hubs focusing on intermodal logistics suggests that long-term growth is a likely prospect. To the extent that TPA continues to add tenants and expand activities after plan completion, the estimates in Exhibit 23 understate the long-term impacts of TPA’s activities.

Exhibit 23. Total economic impacts operational impacts: ongoing annual effects

<i>Type of impact</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Induced effects</i>	<i>Total</i>
• Baltimore region				
Employment (full- and part-time jobs)	9,494	3,122	4,376	16,992
Labor income (millions)	\$676	\$193	\$210	\$1,080
Business sales (millions)	\$1,813	\$527	\$602	\$2,942
• Maryland				
Employment (full- and part-time jobs)	9,494	3,407	4,477	17,378
Labor income (millions)	\$676	\$209	\$213	\$1,098
Business sales (millions)	\$1,813	\$582	\$614	\$3,009

Sources. TPA, IMPLAN, Sage

One measure of the magnitude of these economic impacts is the effect that TPA will have on employment at the Port of Baltimore. By virtue of the development of TPA, the total employment at the port will increase by almost 9,500 jobs. When combined with the current employment of 14,630,³⁷ the new jobs at TPA will increase total employment at the Port of Baltimore to over 24,000. This translates into the equivalent of the fourth largest employer in Maryland.

³⁷ Op. cit., Baker Tilly Virchow Krause.

VIII. Fiscal Impacts

More Revenue for the Public Sector

Adding nearly a full percentage point to statewide output will translate into significant tax revenues for state and local governments in Maryland. While there are many sources of government revenue, three taxes — property, income, and sales — tend to predominate in Maryland. The fiscal impacts presented below are based on the total economic impacts (i.e. direct, indirect, and induced effects) of both the construction period and of ongoing operations.

- One-time construction impacts

The principal fiscal impacts associated with construction and other investment activities are generated by the income gains that workers in the Baltimore region and Maryland will experience during the construction period as well as the \$3 billion in additional regional business sales. This worker income — \$1.2 billion — is virtually the same whether the perspective is the Baltimore region or the State of Maryland.

As reflected in Exhibit 20, the local share of personal income taxes generated by this compensation is estimated at \$28 million. State income tax revenue is estimated at \$53 million. This includes both the State share of personal income tax and corporate income taxes associated with \$3 billion in business sales. State sales taxes are estimated at \$25 million.³⁸ As shown in Exhibit 20, the total fiscal impact associated with construction and investment activities is estimated at \$106 million.

Exhibit 24. Fiscal impacts associated with construction, 2016-plan completion (millions) (one-time effect)

<i>Baltimore region/ Maryland</i>	<i>Value</i>
Local personal income tax	\$28
State income tax	\$53
State sales tax	\$25
Total	\$106

Sources. Maryland Comptroller, Sage

- Annual ongoing impacts

Once operational, an ongoing set of fiscal impacts is generated. These impacts include income, sales and property taxes based on the value of real and business personal property values. Estimates of property taxes presented here exclude the property taxes associated with the value of land. They are based on the value of expected construction (i.e. \$1.9 billion, including \$35 million in utility-related construction) and expected investment in equipment (i.e. \$163 million, taxed as business personal property). Property tax estimates do not consider the potential for Enterprise Zone or other tax credits to reduce these taxes on a temporary basis. As a result, the estimated property taxes

³⁸ Calculation factors in the 6 percent waiver of sales and use tax on construction materials and warehousing equipment.

represent the eventual incremental increase in property taxes that result from the implementation of TPA’s Master Plan, once all tax credits have expired.

Property taxes are location dependent. Because the construction of new buildings and associated equipment within those buildings will occur in Baltimore County, this local property tax has been assigned to that jurisdiction. Based on current County property tax rates, the increase in property taxes collected annually by Baltimore County is estimated at \$26 million. The majority of these new revenues are associated with real property (i.e. the new buildings), a minor part is derived from utility property taxes (part of the investment in infrastructure), while the remainder is associated with taxes on equipment. These tax collection estimates take the form of ongoing, annual impacts.

Exhibit 25. Local property taxes associated with operations (millions) (annual ongoing effects)

<i>Baltimore County</i>	<i>Value</i>
Real property tax	\$21
Utility property	\$1
Business personal property tax	\$4
Total	\$26

Sources. Maryland Comptroller, Sage

In addition to local property taxes, the worker income generated by operations is a major source of local tax revenue. These revenues go to the jurisdictions where workers reside. The exact commuting patterns for prospective workers is not known. The estimate of local personal income tax is therefore assigned to the Baltimore region.

State fiscal impacts are dominated by income taxes — both personal and corporate. Sales and use taxes represent another important source of State of Maryland revenue. While State government also collects real property and utility property taxes, these taxes are relatively modest compared to their importance to local government.

Estimates of these annual fiscal impacts are presented in Exhibit 26. These impacts are overwhelming related to the Baltimore region. Thus, a single set of impacts is presented for the region and state. Local governments will collect \$25 million in personal income tax revenue, while the State of Maryland will enjoy an additional \$73 million in tax revenue each year, primarily from income taxes (\$48 million) and sales taxes (\$23 million).

Exhibit 26. Fiscal impacts associated with operations (millions) (annual ongoing effects)

<i>Baltimore region/Maryland</i>	<i>Value</i>
Local personal income tax	\$25
State income tax	\$48
State sales tax	\$23
State real property tax	\$2
State utility property tax (1)	\$0
Total	\$98

Note. Value less than \$0.5 million; Sources. Maryland Comptroller, Sage

IX. Barriers to Success

The success of TPA's renaissance of Sparrows Point depends on a number of actions that are both internal and external to the site. One consistency among these potential barriers to success is that their resolution depends on collaborative efforts by the private and public sectors. TPA will play a primary role in some cases, but in others, such as improving the Northeast Corridor, TPA is but one of many public and private parties which play a role.

Infrastructure development. TPA's development plans require major capital investments for both standard infrastructure used by industry—roads, bridges, stormwater management, and the like—and the much more specialized infrastructure needed to support marine terminal and rail services. In many cases, these investments must be made before tenants can develop properties on the site and begin operations. Thus, the creation of jobs and the ongoing economic benefits that will produce the permanent impacts of TPA are contingent in large part upon these upfront investments in infrastructure.

Howard Street tunnel. Once the master plan is fully implemented, TPA will increase volumes of **containerized** cargo moving through the Port of Baltimore from present levels by over two-thirds. By virtue of this substantial increase in containerized cargo, TPA will make the need for an improved Howard Street tunnel even greater. The existing tunnel cannot accommodate railcars double-stacked with containers, the industry standard for moving this type of cargo. Eliminating this bottleneck would increase the capacity of TPA (and other terminals in the Port of Baltimore) to handle containerized cargo. Increased cargo would add to business revenue and lead to more jobs at the port. Moving double-tacked railcars through the Howard Street tunnel would also enhance the effectiveness and efficiency of the port in serving customers regionally and nationally and thereby contribute to the ability of TPA to have a transformative impact on the regional and national economy.

Dredging. If the Howard Street tunnel creates a bottleneck for containers moving from TPA to customers in Maryland, the region, and the nation, the shipping channels serving the marine terminals at TPA can be bottlenecks for cargo reaching TPA from other ports. The expansion of the Panama Canal has spawned a new generation of super-sized container ships that need 50-foot channels. Baltimore has such a channel and received its first ship in July 2016.³⁹

The issue for TPA is deepening its connections to Baltimore's 50-foot channel so that the latest and largest ships can dock at TPA's terminals. More specifically, TPA needs state approval for the disposal of dredged materials. The costs of dredging will be borne by TPA. Until TPA has approval for placing dredged materials somewhere, dredging cannot occur and TPA cannot serve the latest generation of container ships.

³⁹ Campbell, Colin, "Port of Baltimore welcomes first container ship via new Panama Canal," Baltimore Sun, July 19, 2016 <http://www.baltimoresun.com/business/ports-rail/bs-md-container-ship-arrival-20160719-story.html>

Northeast Corridor freight traffic. All rail traffic, especially freight traffic, in the Northeast Corridor (NEC), stretching from Washington to Boston, is constrained by infrastructure. Those constraints have led to policies which also constrain freight movement, most notably that freight trains must defer to passenger trains when there are competing needs.

A 2013 report lists 32 separate projects in the NEC that are critical.⁴⁰ A number of these projects focus on passenger service, for example, improvements to stations. The great majority, however, are designed to improve the quality of the basic roadbed and critical elements of that roadbed such as tunnels and bridges. Between Washington and Baltimore, the tracks are used by AMTRAK and the Maryland Area Regional Commuter (MARC) for passenger service as well as by CSX and Norfolk Southern for freight services. The critical needs include what the report terms the B&P tunnels in Baltimore (including the Howard Street tunnel), which limit train speeds to 30 mph as well as preclude double-stack freight cars. The segment between Baltimore and Philadelphia is owned by AMTRAK and also serves two commuter service agencies. Both CSX and Norfolk Southern run freight on this segment which experiences the highest level of freight activity of the entire NEC. In northern Maryland, this segment includes three major bridges each of which is over 100 years old and beyond its design life. These bridges restrict rail traffic to two tracks from three or four tracks. The upshot is limits on the number of trains on the line and delays. All three bridges are too low to allow ships to pass underneath. One requires a crew of 20 workers to hand crank the bridge open for boat traffic.

The Susquehanna River Bridge is considered the worst bottleneck of these bridges. Its two tracks require trains to lower speeds by 30 mph. Although the bridge must be opened for ship traffic only about once a month, this action requires 30 workers who essentially de-construct and re-construct the railroad. (A modern movable bridge requires only one bridge operator.)

AMTRAK and the State of Maryland have plans for replacing these century-old structures with new bridges that would expand the capacity of both passenger and freight traffic. A preliminary estimate of the costs for replacing these three bridges is \$1.8 billion.

In addition to these specific projects, corridor-wide needs are also defined. These include the system's electrical and signaling systems. Track stabilization and roadbed maintenance represents another corridor-wide need.

⁴⁰ Northeast Corridor Infrastructure and Operations Advisory Commission, "Critical Infrastructure Needs on the Northeast Corridor," January 2013 http://www.nec-commission.com/wp-content/uploads/2013/01/necc_cin_20130123.pdf

Conclusion

Renaissance Arrives in Eastern Baltimore County

Eastern Baltimore County is positioned to reemerge as an economic hub in Maryland. This Sage report assesses the economic and fiscal implications of the planned activities of TPA, which manages what is potentially America's most significant redevelopment opportunity. Offering 3,100 strategically-located acres, TPA represents the East Coast's largest privately-owned industrial and terminal site. Tradepoint Atlantic purchased the site in 2014.

Based on our IMPLAN input-output econometric model, Sage estimates that:

- The annual value of the economic activity undertaken by TPA tenants and closely-aligned transportation businesses will be \$1.8 billion per annum by project completion (expected 2020-2025).
- Once multiplier effects are considered, the *total* employment impact in the Baltimore region is estimated at nearly 17,000 jobs with associated worker income of \$1.1 billion.
- Regional businesses will enjoy augmented annual sales of goods and services of \$2.9 billion, which approaches 1 percent of gross state product.

These economic impacts will trigger beneficial fiscal impacts for state and local government in Maryland. Based on parameters induced from data supplied by the Maryland Office of the Comptroller, Sage estimates that each year:

- Baltimore County will collect \$26 million in real property, utility, and business personal property taxes each year.
- Local governments in the Baltimore region will collectively absorb \$25 million in piggyback income taxes each year.
- The State of Maryland will collect an additional \$73 million in tax revenue each year, primarily from income taxes (\$48 million) and sales taxes (\$23 million).

Before these ongoing impacts transpire, there will be massive investment in infrastructure and buildings. The implementation of TPA's master plan will require investments in excess of \$2 billion. This will translate into additional economic and fiscal impacts:

- More than 21,000 jobs (in job-years) will be supported by construction-phase investment.
- These positions will be associated with total income exceeding \$1.2 billion.
- Regional business sales will be augmented by more than \$3 billion.

Policymakers, however, cannot take these beneficial impacts for granted. The upfront infrastructure costs are massive. Other factors (e.g., dredging a 50-foot channel to TPA, expanding the Howard Street tunnel, other issues along the Northeast Corridor) can also enhance or hamper the ultimate success of TPA's efforts. The experience of other major intermodal hubs indicates that public participation in these development can be highly beneficial, both accelerating development and improving the quality of employers attracted. We conclude that the creation of 17,000 permanent jobs is at stake.

Appendix

The Need to Consider Multiplier Effects

Economic activity produced by existing and proposed business activity at Tradepoint Atlantic generates a multiplier effect that impacts the economies of the Greater Baltimore region and the State of Maryland and expands the benefits created directly by TPA at Sparrows Point. In the language of economics, these additional economic activities are termed the indirect and induced effects of the jobs, income, and sales generated by the direct activity.

The study team has endeavored to produce conservative estimates of economic and fiscal impacts. That said, associated multiplier effects are likely to be large. While this multiplier effect is generated by virtually any economic activity, the industrial activities that will be developed by TPA at Sparrows Point typically produce particularly robust multiplier effects.

Direct and Indirect Effects. The jobs physically located at TPA represent the bulk of direct effects. In addition, certain demands for transportation services — e.g. harbor pilots and tug/tow services that deliver ships to and from Sparrows Point, trucking and rail services that originate on-site and transport goods off-site — are also defined as direct services.

Indirect effects occur when, for example, these businesses purchase goods and services from other local firms in the Greater Baltimore region or in the balance of Maryland. These businesses purchase everything from copy paper and paper clips to accounting and advertising services from local firms. In turn, these suppliers purchase office supplies, insurance, and many other items and services from other firms, many of which are also local. In its totality, this succession of purchases by suppliers and suppliers of suppliers (i.e. the supply chain) produces indirect effects, which can also be termed business-to-business purchasing effects or inter-industry effects.

The model employed for this study attempts to account for every dollar spent in order to determine where those dollars are spent and for what purposes. In other words, all of the spending associated with TPA operations is integrated into the model. Importantly, the greater the level of purchases made within the region, the greater are the impacts on the regional and state economy. This is why the study team has not emphasized the economic impacts of equipment purchases, since it is not known where that equipment will be produced. It is probable that the vast preponderance of equipment will be manufactured elsewhere, though economic activity stands to be augmented among local equipment distributors.

Induced effects occur when the income received by workers at TPA and workers at the succession of suppliers linked to TPA operational expenditures create additional effects. A portion of these wages is spent in the regional economy and in Maryland for a broad range of consumer purchases ranging from housing and groceries to entertainment and holiday gifts.

Again, the model attempts to account for each dollar that is absorbed by the local labor force and to determine how those dollars are likely to be spent across product and service types. Consistent with

other impact categories, the model's multipliers reflect the likelihood that purchases by households are made locally as opposed to outside of the regional or state economy. The higher the share of purchases made locally, the greater the induced economic effects are. It is for this reason that the larger the scope of geographic inquiry, the greater is the likelihood that secondary economic impacts will be captured in the area under consideration.

Direct, indirect, and induced effects can be measured along three dimensions: employment (measured in terms of full-and part-time jobs), labor income (measured in dollars), and output or sales of goods and services (also measured in dollars). These effects are estimated using proprietary software and a computer model created specifically for this analysis.⁴¹

Fiscal impacts. In addition to economic impacts, TPA will generate fiscal impacts defined as new streams of tax revenue for Baltimore area local governments and the State of Maryland. As with economic impacts, the model works to account for each dollar spent and the manner in which this spending occurs using data characterizing consumer behavior and describing the interaction between various local industries.

Costs of Construction

TPA's Master Plan encompasses more than 3,000 acres and in excess of 16 million square feet of built space for commercial enterprises. The specific businesses for the majority of this development are yet to be determined.

The value of built space identified in the Master Plan is a fundamental driver of economic impact generated by the implementation of that Master Plan. Because specific plans for individual businesses are unavailable, Sage has relied on more generic estimates of the costs of construction.

R.S. Means is a standard source of costs for a range of commercial and industrial buildings.⁴² These costs are provided for a range of construction options (e.g., exterior wall material) and sizes of buildings that affect unit costs. In selecting specific costs, Sage tended to select higher quality construction materials, which increases costs, and larger size buildings, which decreases costs. In the instance of flex space, which often combines the qualities of office, retail, and warehouse construction, unit cost represents a weighted average of several building types.

⁴¹ Using IMPLAN data, Sage produced a customized economic and fiscal impact model specific to this analysis. IMPLAN employment multipliers encompass total wage and salary employees as well as self-employed people in the region. Both full-time and part-time workers are measured to create an estimate of annual average jobs. CEW (Covered Employment and Wages) data, Regional Economic Information System (REIS), and County Business Patterns are used in conjunction to create the IMPLAN database, because no one data set provides enough information to create a complete set of IMPLAN multipliers. In general, CEW data provide the County-level industry structure for IMPLAN, while County Business Patterns' data are used to make non-disclosure adjustments to CEW data, and REIS data are used to control totals (i.e., prevent double-counting). These data are critical to the analysis because the model works to capture the manner in which KP operations interact with the local labor market in terms of demand for human capital and need for skill sets not sufficiently supplied by the local workforce.

⁴² Op. cit., R.S. Means

Exhibit A-1 supplies Master Plan details and Sage’s estimates of activities encompassed within each land use, building square footage associated within various categories of endeavor, and the estimated unit and total costs of that built space. As indicated, unit costs vary considerably from \$82/sf for warehouse space to more than \$200/sf for two categories of commercial space. Two future land uses included in the Master Plan are assumed to be scheduled for development after completion of the initial project, beyond the time horizon considered by this analysis. Accordingly, they are not included in Sage’s cost estimates.

Exhibit A-1. Cost estimates for construction

<i>Land use</i>	<i>Acres</i>	<i>Building SF</i>	<i>Activities within land use</i>	<i>Building SF</i>	<i>Cost/SF</i>	<i>Total cost (millions)</i>
Distribution, warehouse, manufacturing	468	5,739,128	Warehousing	4,591,302	\$125	\$574.6
			Manufacturing	1,147,826	\$135	\$155.3
Terminal, warehouse, transloading, & marine terminal	546	7,921,000	Warehousing	7,921,000	\$82	\$651.9
Future container building	322					\$0.0
Bulk handling & storage	352	39,000		39,000	\$82	\$3.2
Landfill	104			-		\$0.0
Support	340	111,500	Mechanics, repair	111,500	\$131	\$14.6
Service warehouse	261	1,720,000	Flex space	1,720,000	\$147	\$253.6
Retail	99	141,000	Hotel	70,000	\$188	\$13.1
			Grocer	50,000	\$130	\$6.5
			Gas Station	3,000	\$238	\$0.7
			Fast Food	18,000	\$228.	\$4.1
Office/warehouse	33	310,000	Flex space	310,000	\$147	\$45.7
Future development	173	220,000				\$0.0
Automotive storage	324	141,000	Warehousing	141,000	\$82	\$11.6
Total	3,023	16,342,628		16,122,628	\$108	\$1,735.1

Sources. TPA, R.S. Means

Equipment Costs

Industrial businesses depend on equipment to produce the goods and services they create. At TPA, this equipment will range from desktop computers and the desks on which they rest to the super-post-Panamax cranes that can unload and load containers from the latest generation of container ships designed for an expanded Panama Canal.

As was true of construction costs, there is a lack of information regarding the specific equipment needs of prospective tenants. To estimate these costs, Sage has turned to typical values of equipment relative to the value of commercial real property.

In Maryland, business personal property is the term applied to furnishings, fixtures, and equipment used by businesses. The value of this property is assessed routinely by the State Department of

Assessment and Taxation. Exhibit A-2 presents data from the most recent annual report by the Department regarding the value of commercial real estate and business personal property for Baltimore area jurisdictions and for Maryland. As indicated, the ratio of these values ranges from 7.2 percent in Baltimore City to 14.9 percent for Carroll County. For the entire Baltimore region, the ratio is 9.4 percent.

Exhibit A-2. Commercial real property and business personal property values, Baltimore region

<i>Jurisdiction</i>	<i>Commercial real property (millions)</i>	<i>Business personal property (millions)</i>	<i>Business personal property as share of commercial real property</i>
Anne Arundel County	\$16,079	\$1,650	10.3%
Baltimore County	\$20,531	\$1,750	8.5%
Carroll County	\$2,199	\$328	14.9%
Harford County	\$4,637	\$535	11.5%
Howard County	\$8,784	\$949	10.8%
Baltimore City	\$14,452	\$1,040	7.2%
Baltimore region	\$66,682	\$6,252	9.4%
Maryland	\$148,540	\$12,608	8.5%

Source. Maryland Department of Assessment and Taxation

The regional ratio of 9.4 percent is used to estimate the value of equipment that will be used by tenants at Sparrows Point. Based on the \$1.7 billion estimated value of construction, the estimated value of equipment is \$163 million. This is likely to be highly conservative since industrial producers and distributors tend to be more capital/equipment intensive than the typical Baltimore area business.

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