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Economic Impact

Northern Virginia Transportation Authority Capital Investment

CHMURA

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1. Summary

Since Fiscal Year 2015,[1] the Northern Virginia Transportation Authority (NVTA or the Authority) has implemented five funding programs, with a total investment of $2.5 billion from FY2015 through FY2029. In addition, total funding allocated to local jurisdictions for local fund projects reached $834.7 million.[2] Adding NVTA funding programs and local fund projects, the total actual and planned investment of NVTA will reach $3.3 billion from FY2015 through FY2029.

It is estimated that capital spending from NVTA total investment (NVTA funding programs plus local fund projects) can generate a total economic impact (direct, indirect, and induced) of $4.6 billion from FY2015 through FY2029, supporting 27,118 cumulative jobs in Northern Virginia.[3] The estimated economic impact of NVTA total investment in Virginia will reach $5.1 billion (direct, indirect, and induced) that can support 30,253 jobs in the state. For every dollar of NVTA total investment, there is $1.39 total economic return to Northern Virginia and $1.54 to the state of Virginia.[4]

Of the total economic impact, tax revenues are the benefit specifically to the state and local governments. From FY2025 through FY2029, total NVTA investment can generate an estimated tax revenue of $68.2 million for the state government, and $4.3 million for local governments in Northern Virginia.[5]

NVTA's transportation investment also has broader economic and social benefits, including increasing economic productivity, attracting businesses, improving safety and regional quality of life, and environmental benefits.

[1] Fiscal Year 2015 runs from July 1, 2014 to June 30, 2015.
[2] Please see Section 2 for details of the NVTA funding structure.
[3] Please see Section 2 for a list of cities and counties in the Northern Virginia region.
[4] The state economic impact is inclusive of that in Northern Virginia.
[5] Tax revenue is part of the broader economic impact. State fiscal impact only includes tax revenues to the state government, and does not include tax revenues to local governments.

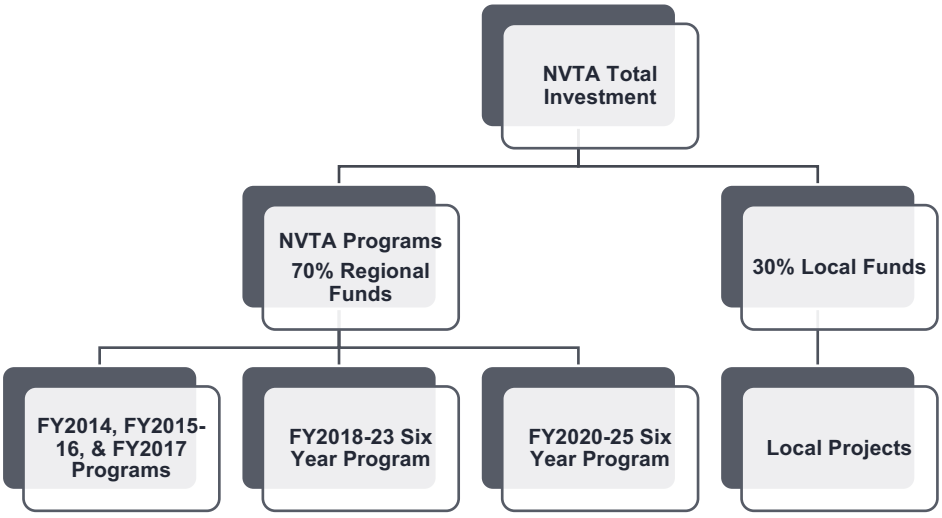
2. Background

The Northern Virginia Transportation Authority was created by the General Assembly of Virginia in 2002. The Authority is responsible for long-range planning of multimodal transportation projects in Northern Virginia.[6] The member jurisdictions of the NVTA include the counties of Arlington, Fairfax, Loudoun, and Prince William; and cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park.[7]

In 2013, the Virginia General Assembly passed legislation that authorized a dedicated funding stream—through regional increases in sales tax, transient occupancy tax, and grantor's tax—for transportation projects in Northern Virginia. In 2018, the General Assembly redirected the proceeds of the regional increase in transient occupancy tax and grantor's tax to meet funding commitments to the Washington Metropolitan Area Transit Authority.

In this report, the dedicated funding stream authorized by the General Assembly is referred to as the NVTA total investment. All funds received by the NVTA must be used for transportation purposes within the region. The Authority develops Northern Virginia's long-range, multimodal transportation plan, TransAction. Of the funds received annually, 70% must be used for regional transportation projects included in TransAction (referred to as NVTA funding programs in this report). After completing an annual certification process through the Authority, member jurisdictions receive their proportionate share of the remaining 30% of funding (local funds) for transportation purposes at their discretion. Figure 2.1 illustrates the funding structure for NVTA total investment.

Figure 2.1: NVTA Funding Structure



The Authority plans for and implements many projects through its regular programs. Three funding programs were developed before 2018, which are the FY2014, FY2015-16, and FY2017 programs. Total investment for projects in those programs reached $658.9 million. In 2018, the NVTA approved its inaugural Six Year Program (FY2018-23 Six Year Program), including multimodal transportation projects totaling $1.3 billion of investment. In 2020, the NVTA approved another Six

[6] Source: NVTA website at: http://thenovaauthority.org/about/the-authority/.
[7] These cities and counties are collectively referred to as Northern Virginia in this report.

Year Program, the FY2020-25 Six Year Program, with planned investment of $539.1 million.[8] In addition, local governments are planning their own project investments.

In 2018, Chmura Economics & Analytics (Chmura)[9] completed an economic and fiscal impact analysis of the FY2018-23 Six Year Program, as well as the overall economic impact of its total investment, including local projects, in Northern Virginia and the Commonwealth of Virginia.

Chmura was retained to update the economic impact analysis of NVTA investment, with a focus on the FY2020-25 Six Year Program. In this study, Chmura presents the economic impact of NVTA's FY2020-25 Six Year Program, all NVTA funding programs, as well as NVTA total investment (including 30% for local funding). This study only quantifies the economic impact of capital expenditure activities, as broader data on the ongoing benefits of the NVTA investment are not available.[10]

The economic impact of capital expenditure from the NVTA's transportation investment is analyzed in the following three categories of impact: direct, indirect, and induced.[11] Direct impact measures the actual dollar amount spent on transportation projects in Northern Virginia and Virginia. Indirect and induced impacts measure the secondary benefits of NVTA capital spending for state and regional businesses. For example, indirect impacts are attributed to state and regional industries supporting construction activities, such as site development and heavy equipment deployment. Induced impacts occur when individuals hired by the construction firms spend their income at regional or state businesses (such as retailers or doctor's offices), thus injecting more money into the regional and state economies.

The indirect and induced impacts are estimated with IMPLAN[12] software after the direct impact is estimated. IMPLAN Pro is an economic impact assessment modeling system that allows the user to build economic models to estimate the impact of economic changes in states and communities. It is one of the most widely used economic impact software packages. IMPLAN is updated annually and is customized for individual localities—thus providing a realistic picture of the impact of an economic change on local economies.

[8] The total investment amount does not include 30% of funding; this is allocated to local jurisdictions.

[9] Chmura provides economic software, consulting, and data so our clients can make informed decisions that benefit their communities. Our PhD economists, data scientists, and strategic planners guide clients through their local labor market. Over the past 22 years, we have served hundreds of clients nationwide with our thoroughness, accuracy, and objectivity.

[10] This report includes a qualitative discussion of such benefits.

[11] Appendix 1 of this study provides a glossary including these terms.

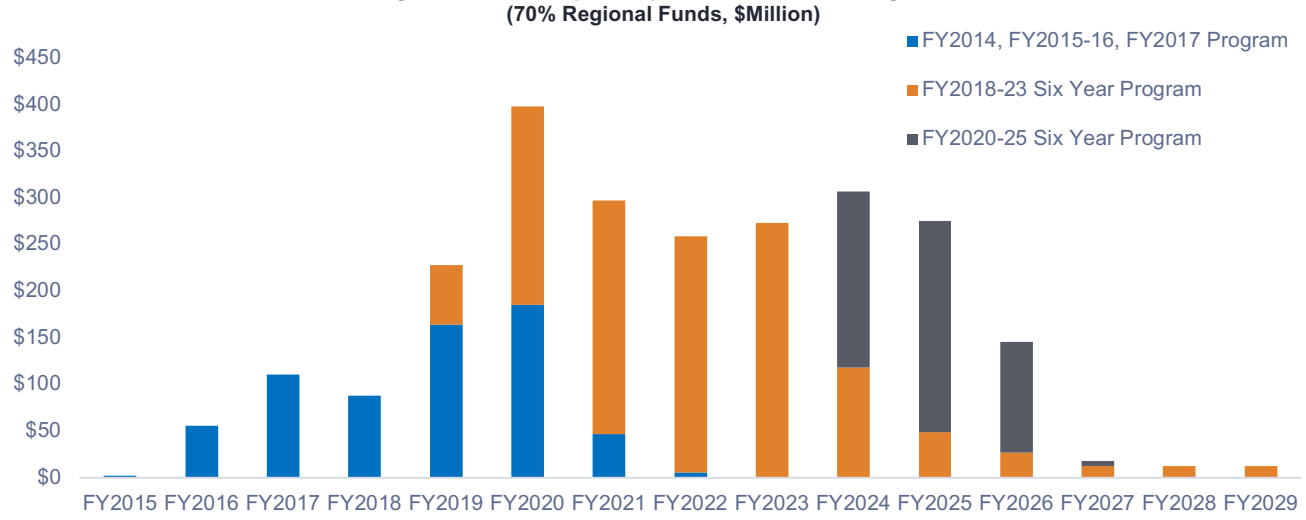
[12] IMPLAN Pro is one of two major software packages used by economists to evaluate the effects of an economic event.

3. Economic Impact of NVTA Total Investment

3.1. Economic Impact of NVTA Funding Programs

The newly approved NVTA FY2020-25 Six Year Program includes investment totaling $539.1 million for multimodal transportation projects. This plan's spending is expected to occur from FY2024 through FY2027 (Figure 3.1).[13] The prior Six Year Program (the FY2018-23 Six Year Program) had a total investment of $1.3 billion and was allocated from FY2019 to FY2029. In addition, NVTA's FY2014, FY2015-16, and FY2017 programs included projects with a total investment of $659.9 million, which was allocated from FY2015 to FY2022.[14] These programs overlap in certain years. For example, the total investment in FY2020 is expected to reach $403.0 million, and this includes projects carried over from the FY2014 through FY2017 programs as well as the FY2018-23 Six Year Program. NVTA funding programs cover a variety of transportation projects across Northern Virginia, including construction of transit facilities, bike/pedestrian facilities and necessary parking; transit equipment installation, road and bridge construction, transportation technology deployment, and capital asset acquisition.

Figure 3.1: Total Capital Expenditure for NVTA Programs (70% Regional Funds, $Million)



The total investment presented in Figure 3.1 only includes NVTA projects with 70% regional funds. The 30% funding allocated to local jurisdictions is not part of this investment. The available data indicate that total funding allocated to local jurisdictions, through all programs, will amount to $834.7 million from FY2015 to FY2029. This includes the anticipated funding for local projects corresponding to the FY2020-25 Six Year Program.[15] Adding NVTA funding programs and local projects, the total actual and planned investment of NVTA will reach $3.3 billion from FY2015 through FY2029.

3.1.1. Economic Impact of NTVA's FY2020-25 Six Year Program

Table 3.1 presents the estimated economic impact of the NVTA's FY2020-25 Six Year Program. The total planned investment is $539.1 million (in 2020 dollars). Chmura excludes 62% of the right-of-way cost from analysis as it involves both a property transfer and an economic impact that is difficult to quantify. Approximately 38% of the right-of-way cost is related

[13] Please note that while the plan is called the Six Year Program, actual spending of funds may occur over more than six years.
[14] In the analysis, the impacts are estimated based on the year in which the project spending occurs, not the program year. For example, the NVTA FY2020-25 Six Year Program includes capital expenditures from FY2024 to FY2027.
[15] Source: NVTA. The annual amounts are not available for local projects.

to utility work, which is included in the analysis.[16] Chmura further excludes the estimated spending outside the region. The resulting direct spending in Northern Virginia is estimated to be $534.5 million (in nominal dollars) from FY2024 through FY2027.[17]

Table 3.1: Economic Impact of NVTA's FY2020-25 Six Year Program

			Direct	Indirect	Induced	Total Impact
Northern Virginia	Cumulative (FY2024-27)	Spending ($Million)	$534.5	$129.2	$155.2	$818.9
		Employment	2,563	510	1,065	4,138
	Annual Average (FY2024-27)	Spending ($Million)	$133.6	$32.3	$38.8	$204.7
		Employment	641	127	266	1,034
Virginia	Cumulative (FY2024-27)	Spending ($Million)	$534.9	$182.7	$178.5	$896.0
		Employment	2,565	680	1,348	4,593
	Annual Average (FY2024-27)	Spending ($Million)	$133.7	$45.7	$44.6	$224.0
		Employment	641	170	337	1,148

Note: Numbers may not sum due to rounding.

Source: IMPLAN Pro 2019 and Chmura

It is estimated that capital expenditure from NVTA's FY2020-25 Six Year Program will generate a total economic impact (direct, indirect, and induced) of $818.9 million (in nominal dollars) in Northern Virginia, supporting a total of 4,138 cumulative jobs.[18] Of the total economic impact, $534.5 million is estimated to be direct spending within Northern Virginia, with direct cumulative jobs amounting to 2,563 from FY2024 through FY2027, or 641 per year. The cumulative indirect impact in Northern Virginia is estimated to be $129.2 million that can support 510 cumulative jobs, or 127 per year, in industries related to construction, such as site preparation, truck transportation, and congestion-relieving technology. The cumulative induced impact is expected to total $155.2 million with 1,065 cumulative jobs, or 266 per year, in the region; these jobs will be concentrated in consumer service-related industries such as restaurants, hospitals, and retail stores. From FY2024 through FY2027, the annual average economic impact of NVTA's capital expenditure is estimated to total $204.7 million that can support 1,034 jobs in Northern Virginia.

The economic impact of NVTA's Six Year Program in Virginia is larger than in Northern Virginia, as businesses elsewhere in the state will also benefit from NVTA's investment activities. It is estimated that from FY2024 through FY2027, the annual average statewide impact will reach $224.0 million (direct, indirect, and induced) that can support 1,148 jobs in Virginia.[19]

3.1.2. Economic Impact of All NVTA Funding Programs (FY2014 Program through FY2020-25 Six Year Programs)[20]

Combining economic impacts from the FY2020-25 Six Year Program, the FY2018-23 Six Year Program, and those from NVTA's FY2014, FY2015-16, and FY2017 programs, Table 3.2 summarizes the economic impact of all programs since

[16] Source: NVTA.

[17] In addition, Chmura used the consumer price index (CPI) to convert the investment from fixed dollars to nominal dollars. The average annual CPI from 2010 to present is 1.7%. Source: Bureau of Labor Economics.

[18] Please note that the cumulative jobs are the sum of jobs in each year. For example, if a construction worker is involved in the project for two years, cumulative jobs will be two.

[19] The economic impact in Virginia is inclusive of the impact in Northern Virginia.

[20] A separate impact analysis of the FY2014 through FY2017 programs was conducted by George Mason University in 2016. As a result, this section only presents the aggregate impact.

NVTA started receiving dedicated funding. In Northern Virginia, for FY2015 through FY2029, the estimated capital expenditure can generate a total economic impact (direct, indirect, and induced) of $3.4 billion, supporting 18,285 cumulative jobs. On an annual average basis, the economic impact of all NVTA funding programs is estimated to be $224.8 million that can support 1,219 jobs in Northern Virginia from FY2015 through FY2029.

Table 3.2: Economic Impact of all NVTA Funding Programs (FY2014 program through FY2020-25 Six Year Programs)

			Direct	Indirect	Induced	Total Impact
Northern Virginia	Cumulative (FY2015-29)	Spending ($Million)	$2,195.9	$531.5	$645.2	$3,372.6
		Employment	11,016	2,427	4,842	18,285
	Annual Average (FY2015-29)	Spending ($Million)	$146.4	$35.4	$43.0	$224.8
		Employment	734	162	323	1,219
Virginia	Cumulative (FY2015-29)	Spending ($Million)	$2,201.2	$743.4	$758.9	$3,703.5
		Employment	11,039	3,134	6,137	20,311
	Annual Average (FY2015-29)	Spending ($Million)	$146.7	$49.6	$50.6	$246.9
		Employment	736	209	409	1,354

Note: Numbers may not sum due to rounding.

Source: IMPLAN Pro 2019 and Chmura

The economic impact of NVTA projects is larger in Virginia than in Northern Virginia, and the annual average statewide impact is estimated to reach $246.9 million (direct, indirect, and induced) that can support 1,354 jobs in Virginia from FY2015 through FY2029.

3.2. Economic Impact of NVTA Total Investment, Including 30% Local Fund Projects

The economic impact analyzed above includes only NVTA funding programs supported by regional funds, which account for 70% of the total funding stream allocated by the state legislation. The 30% funding allocated to local jurisdictions also generates a sizable impact in Northern Virginia and Virginia.

Adding the impact from local projects, Table 3.3 summarizes the economic impact of total NVTA investment. In Northern Virginia, from FY2015 through FY2029, it is estimated that capital spending from NVTA total investment can generate a total economic impact (direct, indirect, and induced) of $4.6 billion, supporting 27,118 cumulative jobs in the region. On an annual average basis, the economic impact of NVTA total investment is estimated to be $307.0 million that can support 1,808 jobs in Northern Virginia from FY2015 through FY2029. The economic impact of NVTA total investment in the state is larger than in Northern Virginia, and the annual average statewide impact will reach $340.3 million (direct, indirect, and induced) that can support 2,017 jobs in Virginia.

Table 3.3: Economic Impact of NVTA Total Investment

			Direct	Indirect	Induced	Total Impact
Northern Virginia	Cumulative (FY2015-29)	Spending ($Million)	$2,968.3	$705.7	$931.7	$4,605.7
		Employment	16,291	3,417	7,410	27,118
	Annual Average (FY2015-29)	Spending ($Million)	$197.9	$47.0	$62.1	$307.0
		Employment	1,086	228	494	1,808
Virginia	Cumulative (FY2015-29)	Spending ($Million)	$2,977.0	$1,005.6	$1,122.2	$5,104.8
		Employment	16,328	4,363	9,561	30,253
	Annual Average (FY2015-29)	Spending ($Million)	$198.5	$67.0	$74.8	$340.3
		Employment	1,089	291	637	2,017

Note: Numbers may not sum due to rounding.

Source: IMPLAN Pro 2019 and Chmura

4. Fiscal Impact

NVTA investment will also generate tax revenue for local and state governments. In order to be conservative, only tax revenue from the direct impact is estimated in this section.[21]

For capital expenditure activities, the business, professional, and occupational license (BPOL) tax is collected for local governments, and individual and corporate income taxes are collected for the state government. Chmura used the average BPOL tax rates of all local governments in Northern Virginia to calculate BPOL tax revenue, which is an estimated $0.7 million for the FY2020-25 Six Year Program. When including all NVTA funding programs, the total BPOL tax is estimated to be $3.3 million from FY2015 through FY2029. Finally, adding local projects, local tax revenue from all NVTA investment is estimated to be $4.3 million from FY2015 through FY2029 (Table 4.1).

Table 4.1: State and Local Fiscal Impacts ($Million)

		Northern Virginia		Virginia	
Programs	Impact Years	Cumulative	Annual Average	Cumulative	Annual Average
NVTA FY2020-25 Six Year Program	FY2024-27	$0.7	$0.2	$10.9	$2.7
All NVTA Funding Programs (FY2014, FY2015-16, FY2017, FY2018-23, FY2020-25)	FY2015-29	$3.3	$0.2	$49.0	$3.3
NVTA Total Investment (NVTA Funding Programs & Local Projects)	FY2015-29	$4.3	$0.3	$68.2	$4.5

Source: Chmura

For the Virginia state government, revenue originates from individual and corporate income taxes as a result of new employment and profits from capital expenditure. The total state tax revenue is estimated to be $10.9 million from FY2024 through FY2027, from planned investment based on the FY2020-25 Six Year Program. Including all NVTA funding programs, total state tax is estimated to be $49.0 million. Finally, adding local projects, total NVTA investment can generate an estimated tax revenue of $68.2 million from FY2015 through FY2029.

[21] This approach is recommended by Burchell and Listokin in *The Fiscal Impact Handbook*. The fiscal impact is part of the broader economic impact estimated in Section 3.

5. Other Impacts

5.1. Broader Benefits of Transportation Investment

The economic impact of capital expenditure from NVTA's transportation investment does not only occur during the construction phase. After the projects are completed, improvements in Northern Virginia's regional multimodal transportation infrastructure can lead to other sustained benefits. A quantitative assessment of the broader economic benefits to the Northern Virginia region and the Commonwealth is not in the scope of this study. However, these impacts are discussed qualitatively in this section.

Transportation investment will increase the capacity of Northern Virginia's transit, roadways, and all modes of the public transportation network, which will provide time savings for businesses and residents. The time savings can translate into higher productivity and growth opportunities for state and regional businesses.

NVTA's transportation investment will also replace and rehabilitate transit facilities, equipment, roads, and bridges as part of the capacity expansion. This investment will also have safety benefits. For example, expanded road capacity, improved road conditions, and more efficient incident management systems can reduce traffic congestion and accidents on Northern Virginia's roads and within the transit systems.

Furthermore, investment in transportation infrastructure can also bring other benefits to Northern Virginia. It can help attract businesses and stimulate job growth. Investment in transportation infrastructure can also boost tourism in Northern Virginia. Studies have found that traffic congestion, poor road conditions, and absent or confusing signage decreases the drawing power of a tourist attraction. In addition, transportation investment helps increase tourist volume, length of stay, and spending per visitor—thus benefiting state and regional economies.

Finally, transportation investment can improve quality of life for regional residents. Better roads and increased transit capacity can allow residents to reach destinations for work, shopping, recreation, and entertainment in a safer and more convenient manner. Further, it can increase the appeal of the region to future businesses and residents. This investment can help improve regional air quality, which will not only foster improved wellbeing for residents but also reduce their healthcare costs.

5.2. COVID-19 Impact

The COVID-19 pandemic, though it is a public health crisis, has the potential of changing the way Americans work and travel in the long term. Chmura performed research on the implications of this pandemic on the national transportation infrastructure and summarizes these findings below.

Many experts agree that after the pandemic is over, more businesses will switch to telework on a permanent basis. This trend will reduce travel demand on the road and decrease congestion.[22] Similarly, business travel demand may be reduced as companies will widely utilize remote meeting and conferencing technology that became popular during the pandemic.

[22] Source: https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1253&context=cutr_nctr.

Another factor that could reduce vehicular traffic after the pandemic is that many consumers increased their utilization of online shopping sites and delivery services. During the pandemic, online shopping and delivery services expanded dramatically. Some of those habits may persist, and Americans may make fewer shopping trips than before the pandemic.[23]

However, in the immediate aftermath of the pandemic, there might be an increase in travel due to pent-up demand. Individuals may travel more for leisure activities, such as dining out and shopping, to make up for lost opportunities during the COVID-19 pandemic.[24] It is also anticipated that domestic travel utilizing vehicles will increase shortly after the pandemic due to factors such as international travel restrictions, and the relative safety of using a personal vehicle compared to air-based travel.[25] Nonetheless, a December 2020 survey indicated that one-third of those polled did not expect to travel more in 2021 to make up for any travel lost in 2020, as the pandemic persists.[26]

Many studies predict that traveling via public transportation will decline after the pandemic, more so than traveling by car. One reason is that switching to telework reduces overall public transit ridership, which drives down travel demand for both vehicle and public transportation. In addition, even after the pandemic is over, individuals may have lingering health concerns over public transportation, and may choose to drive instead.[27] Nevertheless, many individuals will rely on public transportation after the pandemic just as they did before—particularly if they do not own personal vehicles.[28]

These changes resulting from the COVID-19 pandemic will present challenges and opportunities for regional transportation planners to innovate and improve transportation system efficiency and safety moving forward.

[23] Ibid.
[24] Source: https://frontiergroup.org/blogs/blog/fg/america-pause-vehicle-travel-during-covid-19-and-what-comes-next.
[25] Source: https://www.mckinsey.com/industries/travel-logistics-and-transport-infrastructure/our-insights/covid-19-tourism-spend-recovery-in-numbers.
[26] Source: https://www.nationalgeographic.com/travel/2021/01/what-will-covid-19-vaccines-mean-for-travel-coronavirus/.
[27] Source: https://www.archdaily.com/952441/bus-or-bust-the-future-of-public-transit-in-life-after-covid-19.
[28] Source: https://time.com/5869375/public-transit-coronavirus-covid/.

Appendix: Impact Analysis Glossary

IMPLAN Professional—an economic impact assessment modeling system. It allows the user to build economic models to estimate the impacts of economic changes in states, counties, or communities. It was created in the 1970s by the Forestry Service and is widely used by economists to estimate the impact of specific events on the overall economy.

Input-Output Analysis—an examination of business-business and business-consumer economic relationships capturing all monetary transactions in a given period, allowing one to calculate the effects of a change in an economic activity on the entire economy (impact analysis).

Direct Impact—economic activity generated by a project or operation. For construction, this represents activity of the contractor; for operations, this represents activity by tenants of the property.

Overhead—construction inputs not provided by the contractor.

Indirect Impact—secondary economic activity that is generated by a project or operation. An example might be a new office building generating demand for parking garages.

Induced (Household) Impact—economic activity generated by household income resulting from direct and indirect impacts.

Ripple Effect—the sum of induced and indirect impacts. In some projects, it is more appropriate to report ripple effects than indirect and induced impacts separately.

Multiplier—the cumulative impacts of a unit change in economic activity on the entire economy.