



## **Adding It All Up: New Jersey's Opportunity to Reduce \$200 million in School Transportation Costs**

The second in a five-part series focusing on the true size of New Jersey's expansive government, how much is being spent in specific categories and, most importantly, identifying opportunities where it can be made more efficient.

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## Our Mission

The Garden State Initiative is a 501(c)3 nonprofit organization dedicated to strengthening New Jersey by providing an alternative voice and commonsense policy solutions in the state -- solutions that promote new investment, the growth of jobs, the creation of economic opportunities, and innovation to the benefit of all New Jerseyans.

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## Research and analysis conducted by PEL Analytics

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## Executive Summary

**T**hrough a data-driven analysis of New Jersey's pupil transportation expenses, we have identified meaningful improvements at the school district level that could result in a savings to taxpayers of close to \$200 million annually.

At a cost of \$1.2 billion, New Jersey transports nearly three quarters of a million students daily at an average cost of \$1,508 per pupil, representing one of the largest outside-the-classroom costs for hundreds of school districts. However, the statewide average per pupil figure doesn't show the considerable variation among school districts: the middle 50 percent of school districts spend between \$1,160 and \$3,361 per student. Considerable outliers exist, with more than 37 school districts spending over \$10,000 per student transported. So what accounts for all this variation? Is it policy and operational decisions or variables basically outside of a district's control—or all of the above?

By building a model that takes into account all the “fixed” variables that drive school transportation costs—such as enrollment, special education population, and geography—we can better isolate costs driven by policy and operational decision making from the fundamental qualities of a given district. Indeed, our analysis shows that there is far more variation among districts that share socioeconomic characteristics than between each socioeconomically distinct group; i.e., in general, poorer, urban districts are not overspending remarkably more than their wealthier suburban peers—some urban districts do better than other urban districts, just as some suburban districts do better than other suburban districts. In addition, districts statewide provide nearly a third of all students transported with “courtesy” busing, highlighting the role that a district's individual policy decisions play in driving transportation operations—and costs.

This data-driven model shows that districts with otherwise similar fundamental characteristics spend vastly different amounts on school transportation. Most importantly, correcting these variations are essentially within the state and district's management control to improve. That means we have a clear path to reducing spending by reconsidering district transportation policies and improving operational efficiency. This report demonstrates how these two components largely drive this cost differential and not, as some bemoan, something beyond the district's or state's control.

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This report, based on a model that enables smaller and larger school districts to be compared on a more level playing field and measuring actual spending to what the model predicts based on district characteristics, reveals that in transportation cost management:

- 61 districts scored as Excels, spending significantly less than the model predicted
- 213 districts scored as Satisfactory, spending less than the model predicted
- 199 districts scored as Needs Improvement, spending more the model predicted
- 64 districts scored as Unsatisfactory, spending significantly more than the model predicted

More data is currently available at the state and district level in order to incentivize districts to deliver student transportation efficiently and create pathways to do so, following high-performing data models in the States of Washington and North Carolina.

#### **Our analysis explores the basic requirements and needs, as well as:**

- the operational and policy challenges faced by New Jersey school districts when transporting their student body;
- how the observed variations in per pupil spending might be accounted for by school district characteristics;
- how other states address these challenges;
- what opportunities for efficiency strategies exist for school districts; and
- how other states incentivize and monitor transportation efficiency.

Some districts may be fine spending more on transportation because of goals set by the locally elected board of education, but that should not be subsidized by scarce state education dollars. By examining both best practices in both other states and our own—such as using advanced data analytics for routing, transportation needs assessment standardization, and coordinated purchasing—the state can standardize funding levels for transportation and districts can reduce their transportation costs through their own management choices.

When we take into account these additional variables, we found that if every district were able to make meaningful improvement relative to where they're starting from, they could save close to \$200 million overall on transportation costs. But, if every school district just spent at the expected amount predicted by their fundamental characteristics, taxpayers would save \$146 million.

That's an opportunity impossible to ignore.

## Student Transportation: The Basics

General education transportation requirements vary depending on the age of the student, but are the same statewide and codified in state law<sup>i</sup>. School districts must provide for transportation service to elementary and middle school students (K-8) who live more than 2 miles away from school; for high schoolers, the standard is raised to 2.5 miles. Outside of general education students, special education students must be given transportation services pursuant to their individual education plan (IEP), which gives fairly broad discretion to specialists who are in the best position to determine necessary transportation services for the student. For example, some students may be transported with general education students, others require aides, while some medically fragile students must be taken to school in specialized medical vehicles. Many students also require specific special education instruction that their home district cannot offer, necessitating transportation to a school out of the student's home district—commonly called “out of district placements.” This consideration also holds for students attending a vocational/technical school outside of the home district. Finally, many schools provide athletic and field trip transportation services to supplement academic offerings.

While complicated and often beholden to the fact patterns of a particular district and/or type of non-traditional public school, transportation requirements for charter and non-public school districts mirror the requirements of traditional public school districts, leaving those students' home districts responsible for making transportation available or providing “aid in lieu” of transportation as an offset those students' transportation costs. The 41 coordinated Transportation Services Agencies, typically organized as county or regional educational services commissions, often handle non-public transportation considerations and many work to make out of district placements more efficient.

In New Jersey, like most states, school districts have the option to provide transportation services themselves through their own fleet of school buses and drivers or to look to outside vendors or even mass transit (by supplying subsidized bus tickets or passes) to provide the service. The level of funding provided by states to local districts to partially offset transportation costs, and the formulas that are used to derive these amounts, vary considerably. These formulas typically consider some combination of historical expenditures, students and distance traveled, and potentially other cost drivers (e.g. fuel).

The State of New Jersey uses a formula that considers the number of general and special education students transported, the average home-to-school mileage for said students, and in the case of general education students, an incentive factor that effectively incentivizes the use of the same bus for multiple routes during the school day.<sup>ii</sup>

Regardless of the means transportation is provided, school transportation costs are primarily driven by the number of routes and the cost per route. Overall enrollment is an important factor, but two school districts could have the same number of students but a vastly different number of routes thanks to a greater degree of routing efficiency in one over the other. While some of the factors that lead to more routes may be driven by geographic necessity—e.g., a more geographically dispersed school district causing greater distances between students, or heavy traffic with many one way streets—routing and overall transportation inefficiency can also be caused by providing additional “courtesy” services, more field, athletic, and event trips, a higher number of IEPs, more complex IEPs, or not calculating the most efficient path from the student’s home to her school.

- 1. Additional Courtesy Services:** may be used to help students meet the complexities of family life, such as by allowing students to be picked up and dropped off at two different locations (a parent might be there to see them off to school from home in the morning, but a student might need to be dropped at a grandparent’s house in the afternoon); other districts might use a handful of bus stops while others use “door to door” service, which, due to timing, may create more routes. Perhaps most importantly, some districts might be more generous in the mileage calculation than others—in effect, reducing the mileage standard—or more willing to take into account the difficulty of a student’s path to school (e.g., near a busy street or over hilly terrain).
- 2. More field, athletic, and event trips:** the more “programming” a district has, the more transportation needs grow. Unlike many other cost centers that drive transportation expenditures, this one is almost entirely dependent on district policy and programming choices. But for the rarest cases, this type of busing cannot be combined with existing general and special education needs, thereby creating an entirely new set of routes at irregular times.
- 3. A higher number of IEPs or more complex IEPs:** many special education students require specialized services, such as aides and medical equipment, when transported to school and some students’ schools might be geographically spread out, making consolidated routing difficult. Students may also have to attend specialized schools far outside of the district, which may have to have their own dedicated routes.
- 4. Technical efficiency of routing:** planning and designing routes is not easy. Many factors contribute to the ability of school bus to move a student from Point A to Point B that aren’t readily apparent from a map: the time school starts, the number of students to be transported, the distance between stops, local traffic conditions, road work, one way streets, and the age of students. One of the most significant changes in the past decade is the advent of ever more sophisticated, geographic information systems-driven routing software that is able to incorporate many of these factors and use GIS to compute the best possible route—a task that used to be done by hand.

Whether public or privately owned, the cost per route is primarily driven by two major factors: the cost of the equipment and the cost of the people. Within those broader categories, the cost of the vehicle, the cost of the driver, the cost of the aides, the cost of bus technology, the cost of fuel, applicable overhead, and, if a private company, profit, must be considered. Some of these considerations are well within the district's control, but others, like fuel, fleet, and compliance costs, are essentially outside of it.

Moreover, given the highly regulated nature of the school buses, new standards can cause the cost of service to change substantially from year to year or quickly cause others to fall into obsolescence without expensive upgrades. For example, in response to a horrific crash of a school bus in northern New Jersey, Governor Murphy signed a law in August 2018 requiring three-point safety belts in all new school buses, which the Office of Legislative Services projects will cost districts \$7 million to \$10 million more. Nine other bills, all relating to improving school bus and school bus driver safety standards and compliance, are moving through the State Legislature and most are likely to pass (many have so far been voted on unanimously).

The cost of new school vehicles is largely dependent on the pricing set by the three major school bus manufacturers—Thomas, International, and Bluebird—and a district's ability to negotiate with bus dealerships, which themselves are carefully controlled by the manufacturers. School buses are expensive capital assets and it can be difficult for some school districts to purchase them outright, making equipment lease financing an attractive option. Even with financing options, it can be easier to manage the process outside of the district, given ever changing safety requirements and the variety of buses necessary to meet the particular needs of a district's students. Some districts look directly to private companies while others make use of regional purchasing and transportation cooperatives, such as educational services commissions. That being said, while some private school bus companies in New Jersey have successfully achieved the benefits of an economy of scale, many companies are small, family enterprises and maintain only a few buses for their vehicle fleets and do not necessarily offer savings when compared to a school district—especially a larger district or educational services commission. Making matters even more difficult, there is a general shortage of qualified school bus drivers, driving up costs and incentivizing both districts and bus companies to “lock in” contracts early. Districts that move more slowly are therefore likely to pay a premium.<sup>iii</sup>

Personnel costs tend to be higher for local districts given the associated cost of benefits, whereas private companies tend to offer an overall lower compensation and benefits packages than public employers. Any cost savings potential between maintaining the public service and outsourcing needs to be carefully considered on a case-by-case basis, given the ability of a district to absorb associated overhead easily and the absence of a profit requirement.

## Student Transportation Trends Across the States

The proportion of students transported to school in the United States reached its height in the 1980s when approximately six out of every ten students were transported at public expense; this figure has slowly fallen to just under 55 percent in 2007-08 (the last year for which data was available). Federal data projects that per-pupil costs in constant 2016 dollars rose until this time but flat-lined thereafter.

Some states have achieved benefits through consolidation and leveraging economies of scale. A natural example of this can be found in the State of Maryland, where school administration is handled at the county level.<sup>iv</sup> According to 2014-15 data collected by the Maryland State Department of Education,<sup>v</sup> Maryland school districts collectively spent \$672.5 million to transport 623,204 students. This equates to \$1,079 per-pupil, compared to the \$1,508 per pupil cost in New Jersey. Indeed, the Prince George's County School District exhibited the highest per-pupil cost at \$1,492 per student, roughly equivalent to the average New Jersey district.<sup>vi</sup>

North Carolina is one example of a state that leverages data collection and routing software to drive student transportation efficiencies. Over the course of two decades, the North Carolina Department of Public Instruction's (NC DPI) developed and refined the Transportation Information Management System (TIMS). The TIMS program includes state-wide use of the routing software developed by and the incorporation of all school district bus fleets into the state-wide fleet management system. With technical support through the University of North Carolina at Charlotte, the state ensures standardized data collection and provides schools with several databases, including one for day-to-day operations and another to perform various "what-if" analyses. As a result, North Carolina districts collectively spent \$613 million to transport over 753,000 pupils in the 2017-18 school year<sup>vii</sup>, equivalent to \$814 per student or just 54 percent of the per pupil cost in New Jersey. The median North Carolina district spent \$876 per student, while only two districts spent more than the New Jersey state per-pupil cost.

Similarly to North Carolina, the State of Washington tracks transportation spending and allocates funding through its Student Transportation Allocation Reporting System (STARS).<sup>viii</sup> In short, this system uses advanced data analysis to compare school districts to their peers—as determined by the basic geography, facilities, and enrollment—for efficiency scores and for funding determinations. In crafting their funding model, STARS uses the prior year expenditures and the number of buses as variable inputs, and the number of general students and special education students transported as outputs.

## Transportation Expenditures at a Glance

The New Jersey Department of Education (NJDOE) collects student transportation data through the District Report of Transported Resident Students (DRTRS) system, which all school districts are required to use and keep up to date. School year 2017-18 DRTRS audit data shows that 716,502 students were transported as of October 2017. In addition to the figures below, school districts collectively provided “aid in lieu” of transportation on behalf of 52,451 non-public school students.

	General Students	Special Education	Special Needs <sup>ix</sup>	Out of District	Courtesy	Total
Students	357,492	53,326	46,810	32,747	226,128	716,502
% of Total	49.9%	7.4%	6.5%	4.6%	31.6%	N/A

To meet the transportation needs of these students, New Jersey school districts collectively appropriated \$1.2 billion toward transportation services in the 2017-18 school year, representing the second-largest support services cost (after operation and maintenance of plant/facilities). The State of New Jersey partially funds these activities, sending \$184 million in Transportation Aid to school districts in Fiscal Year 2017-18—covering about 16% of the total spend. With 768,953 students provided transportation or aid in lieu of transportation services, this equates to approximately \$1,508 per pupil transported or about 9 percent of the statewide median per student budgetary spend.<sup>x</sup>

However, even for districts that share many of the same foundational qualities, how much they spend per student on transportation varies significantly. If we can understand the reasons behind this variation among otherwise similar districts—and help districts use tools that have been employed successfully by others—there will be potential for significant savings just by helping each district reach its potential. The middle 50 percent of school districts spend between \$1,160 and \$3,361 per student transported or provided aid-in-lieu.

School District Appropriations FY17-18	
Appropriation Type	Amount (\$000,000)
Instruction	10,692
Employee Benefits	3,935
Other	2,824
Op. and Maint. of Plant	2,152
Student Support	1,840
<b>Student Transportation</b>	<b>1,160</b>
Debt Service	725
School Administration	703
Instructional Staff	561
Capital	543
General Admin	435
Central Services	320
Information Technology	175
Other Support Services	21
Non-Instructional Services	13
<b>Grand Total</b>	<b>26,098</b>

A cursory inspection of per-pupil spending by some key variables (district type, socioeconomic status, and housing density) would lead one to believe that unified K-12 districts spend more per student when compared to regional elementary and secondary districts; that the poorest districts spend more to transport students than wealthier ones; and that urban districts spend more per student than suburban and rural districts.

## Adapting a Predictive Analytics Spending Model for New Jersey

Our analysis borrows from states that use richer statistical models to determine the efficacy of transportation funding, taking into account the student population mix, size and density of the districts in order to level the playing field; once we incorporate these variables and map them on to the landscape in New Jersey, the simple per pupil analysis becomes far more complicated and many of the expected correlations disappear. Indeed, the model shows that many districts with high per pupil calculations are actually operating quite efficiently, given the cards they're dealt.

New Jersey school districts data were gathered<sup>xi</sup> to mimic the State of Washington's and North Carolina's data models to show how site characteristics—e.g., a district's geography, facilities, and enrollment—impact the variation in transportation spending in New Jersey. Understanding what cost-drivers are outside of a district's control can help us understand those that are—especially when we can see a district with the same underlying characteristics spending much more than its peers. The number of students transported and the mix of special education, special needs, and out-of-district alone explain 90.6 percent of the variation in spending between districts (“Model 1” in Appendix C)—all factors basically outside of a district's control. Adding square mileage, the miles of road per square mile, the number of students transported per road mile, and the average home-to-school distance improved the predictive model by 3.5 percentage points (the equivalent of \$40 million in transportation spending). The results of this model are displayed in the table below. The percentage of special needs students proved to be the strongest predictor among student classifications, while the percent of students transported out-of-district was shown to have the smallest impact among student-type variables.<sup>xii</sup>

Variable <sup>xiii</sup>	Interpretation
Students Transported ***	A 10 percent increase in general enrollment is associated with 7.8 percent increase in spending.
Students Provided Aid-in-Lieu of Transportation ***	A 10 percent increase is associated with a 0.56 percent increase in spending.
% of Students Transported: Special Needs***	A 10 percent increase is associated with a 18.9 percent increase in spending
% of Students Transported: Special Education***	A 10 percent increase is associated with a 11.4 percent increase in spending.
% of Students Transported: Out-of-District Schools ***	A 10 percent increase is associated with a 0.2 percent increase in spending. Not statistically significant.
Schools ***	Each additional school destination in the district is associated with a 2.4 percent increase in spending.
Square Miles	Each additional square mile of district size is associated with a 0.1 percent increase in spending. Not statistically significant.
Roads per Square Mile***	Each additional road per square mile is associated with a 2.7 percent increase in spending.
Students per Road Mile*	Each additional student per road mile is associated with a 0.6 percent <i>decrease</i> in spending.
Average Miles Transported, General Students *	Each additional home-to-school mile for the average general student is associated with a 3.8 percent increase in spending.
Average Miles Transported, Spec. Education Students ***	Each additional home-to-school mile for the average special education student is associated with a 1.5 percent increase in spending.

All school districts actual expenditures were then compared to the model’s prediction to assess the difference in absolute and percentage terms. The absolute and percentage differences here can be thought of overspending and underspending when compared to the model.

Actual Spend v. Model Prediction		
1st Quartile	Median	3rd Quartile
-\$133,956	-\$3,757	\$204,718
1st Quartile	Median	3rd Quartile
-17%	-1%	22%

The middle fifty percent of school districts spent *between \$134,000 less to \$204,000 more* than the model predicted, or between 17 percent less to 22 percent more than anticipated.

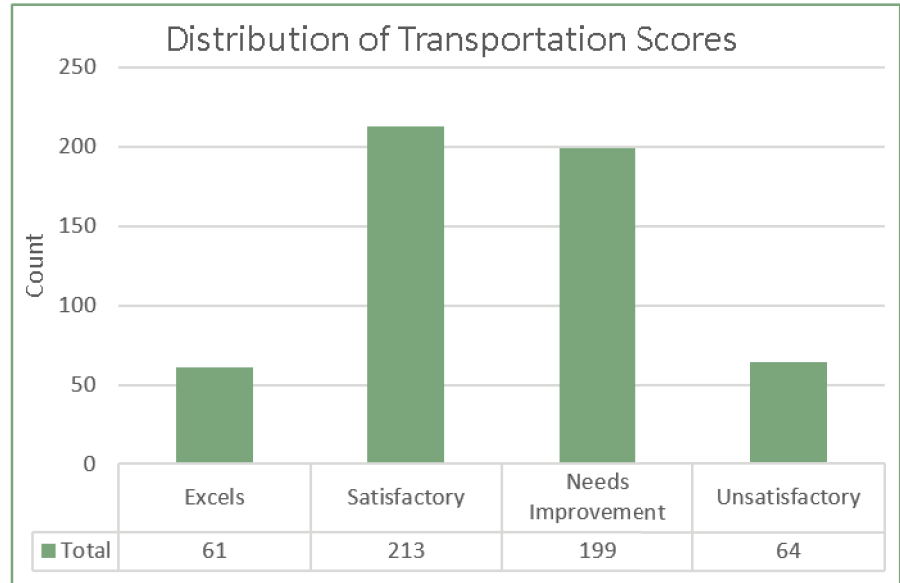
**Next, the percentage of over- and underspending was scored into four groups:**

- 61 districts scored as Excels, spending significantly less than the model predicted
- 213 districts scored as Satisfactory, spending less than the model predicted
- 199 districts scored as Needs Improvement, spending more the model predicted
- 64 districts scored as Unsatisfactory, spending significantly more than the model predicted<sup>xiv</sup>

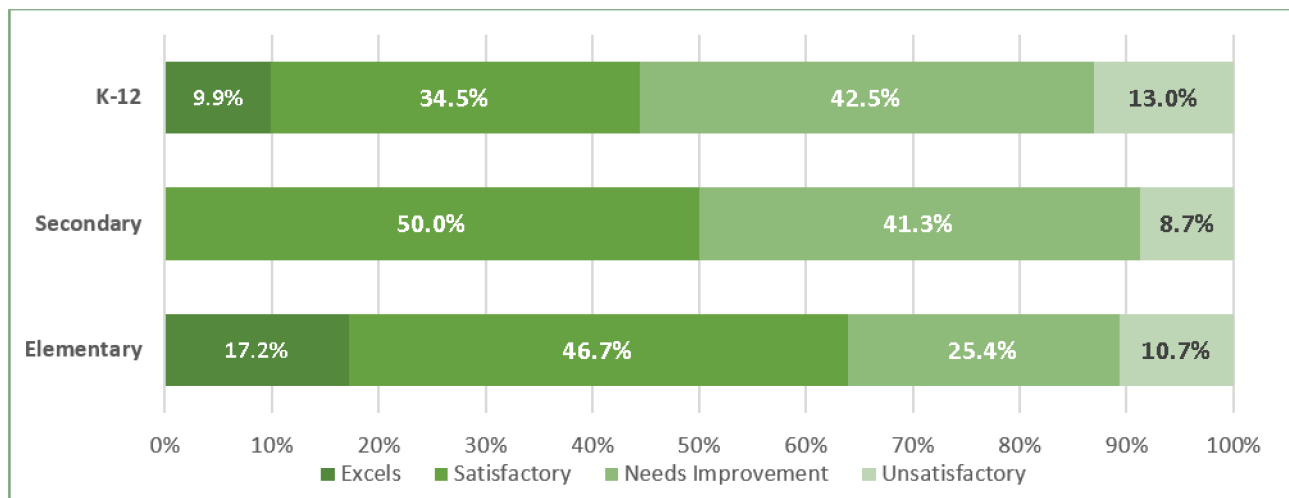
Using percentage over- and underspend, rather than total dollar amount, allowed smaller and larger school districts to be compared on a more level playing field.

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This grading-on-the-curve results in the distribution seen to the right, with 61 districts exceling, 213 beating the model (satisfactory), 199 spending within one standard deviation more than the model and requiring some improvement; and 64 districts with considerable overspend when compared to the model.

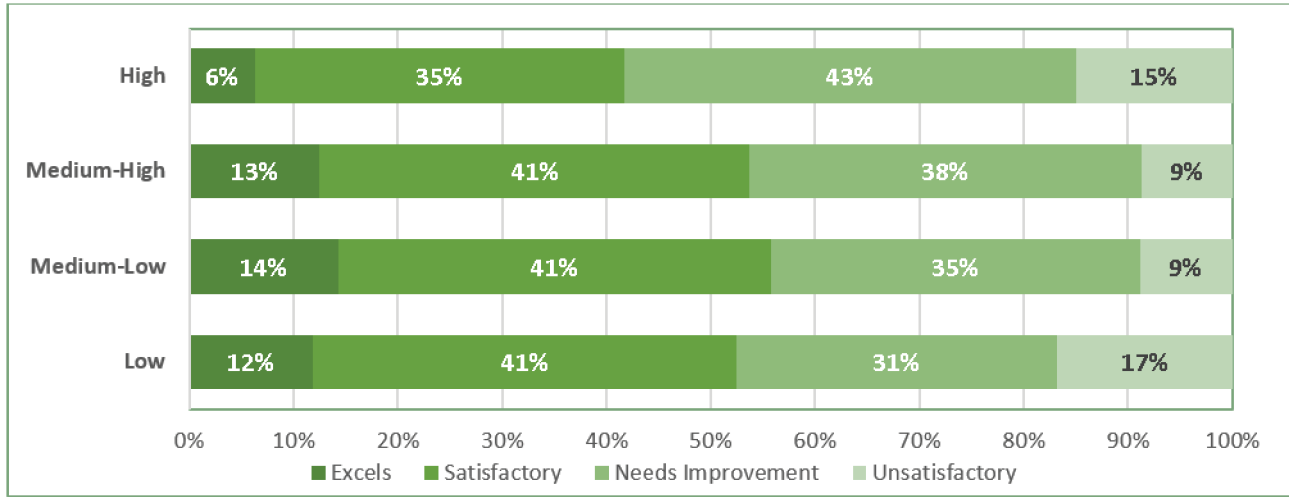


Next we compared district performance within three broad groupings: type of district, district socioeconomic status, and district density. Elementary school districts performed best when compared to the model, with 64 percent of districts exceling or scoring as “satisfactory”. No secondary only districts performed well enough to score in the “excel” category, but 50 percent of districts performed at the satisfactory level. Over 50 percent of K-12 districts, meanwhile, scored “needs improvement” or “unsatisfactory.”

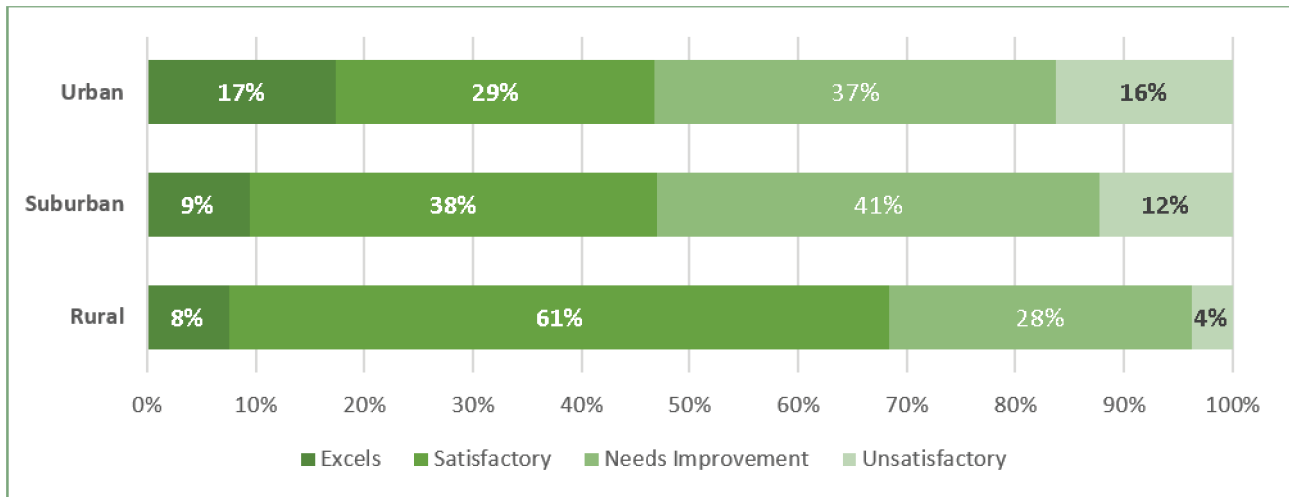


Next, the model scores were compared to District Factor Group (DFG)-based socioeconomic status groupings. The chart below illustrates that the districts scoring as high socioeconomic regions underperform when compared to the other groups, with nearly 60 percent scoring “needs improvement” and “unsatisfactory”. The other three groups score similarly on the higher end of the scoring, with approximately 13 percent and 41 percent scoring “excel” and “satisfactory”, respectively. Low socioeconomic

school districts, however, do exhibit the highest percentage of districts with an unsatisfactory grade—but only 2 percent more than those in the highest DFG.



Last, we examined the distinctions between urban, suburban, and rural districts. When controlling for the variables found in the model, suburban and urban districts score much more similarly than raw per-pupil figures would suggest, with a near fifty-fifty split between model over- and under-performers. Rural districts, meanwhile, perform more favorably in the model with 69 percent of these districts beating the model, and only four percent scoring “unsatisfactory.”



## Transportation Appropriations Modeling – Savings Potential

If all districts spending more than the model were to make policy and operational changes to meet predicted spending levels, the statewide savings would be **\$147 million**. However, no one model is perfect—for example, we do not have access to the specific route-by-route data collected by each district—and all school districts should strive to continually improve service efficiency while insuring student safety and meeting its local policy goals.

If all school district scoring “Unsatisfactory” were to meet the minimum performance of the “Needs Improvement” group, these districts would realize a savings of **\$34 million**.

If all school district scoring “Needs Improvement” were to meet the minimum performance of the “Satisfactory” group, these districts would realize a savings of **\$77 million**.

Last, if all school district scoring “Satisfactory” were to meet the minimum performance of the “Excels” group, these districts would realize a savings of **\$79 million**. The

Improvement Savings (\$)			
Group	Total	Per School	
		District	Per Pupil
Unsatisfactory	\$33,451,862	\$522,685	\$431
Needs Improvement	\$76,742,419	\$385,640	\$246
Satisfactory	\$78,638,677	\$369,196	\$245
<b>Total</b>	<b>\$188,832,958</b>	<b>\$396,708</b>	<b>\$166</b>

table below shows that these combined savings would total over **\$189 million**. While this may seem like a big number in the aggregate it only reflects an average of \$396,708 in savings per school district and \$166 per student transported by these districts.

Alternatively, we consider the savings that might be realized if the largest improvements are made by the lowest-scoring districts, with moderate improvements made by the next two groups of districts.

If all school district scoring “Unsatisfactory” and “Needs Improvement” were to meet the minimum performance of the “Satisfactory” group, these districts would realize a savings of **\$72 million** and **\$77 million**, respectively.

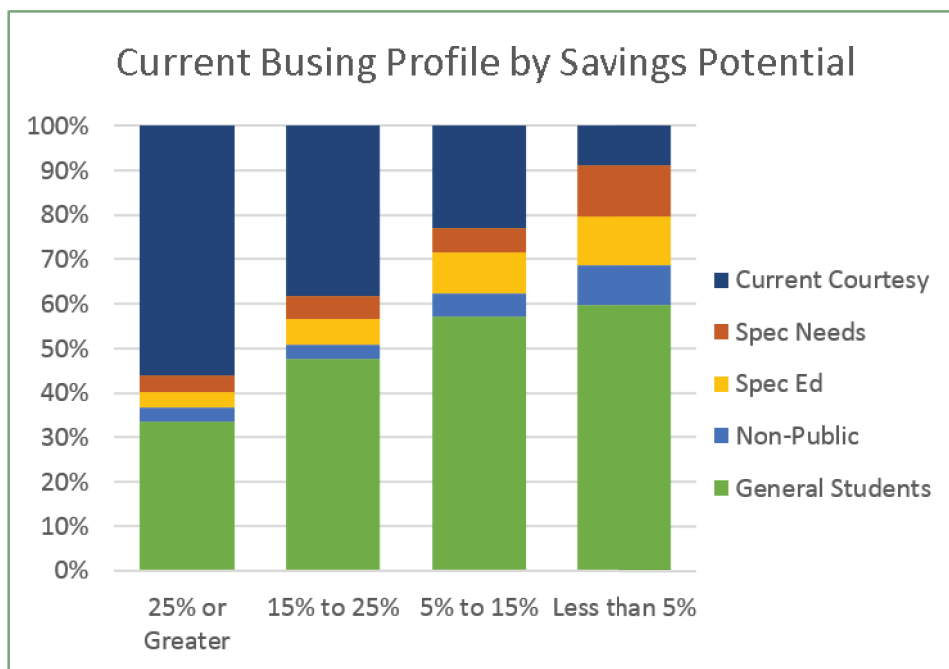
Improvement Savings (\$)			
Group	Total	Per School	
		District	Per Pupil
Unsatisfactory	\$71,097,618	\$1,110,900	\$916
Needs Improvement	\$76,742,419	\$385,640	\$246
Satisfactory	\$35,170,083	\$165,118	\$109
<b>Total</b>	<b>\$183,010,121</b>	<b>\$384,475</b>	<b>\$257</b>

If the bottom 75 percent of districts with a score of “Satisfactory” were to improve to a degree matching the top 25th percent within their group, these districts would collectively realize a savings of **\$35 million**. The table shows a total savings of **\$183 million**, but requires significant improvements from the 70 districts with the worst performance against the model—i.e., over \$1 million.

Alternatively, we also analyzed what savings might be gained if school districts discontinued courtesy busing services as a means of comparison and as a way of isolating the policy choices districts make surrounding transportation as distinct from enrollment, geographic, and technical considerations. New Jersey districts collectively bussed over 226,000 general education students that reside closer than the statutory minimum distance requiring transportation. These students represent over 30 percent of all pupils transported. Nearly all rural districts (98.7 percent) provide courtesy busing, while approximately 80 percent of suburban districts and 70 percent of urban districts providing the service.

Running the model without courtesy busing reduces expenditures by **\$146 million** compared to the baseline model prediction, or an average savings of 12 percent.

Districts that would save 25 percent compared to the baseline currently transport over 50 percent of their students on a courtesy basis, while those expected to save between 15 and 25 percent transport approximately 40 percent via courtesy. Naturally, smaller savings are realized by districts with larger share of special needs and non-public students transported



## Cost Savings Strategies and Recommendations

This study derives two basic conclusions: that simple transportation-related per pupil spending calculations cannot tell the whole story of efficiency given how varied geography, enrollment, and other “fixed” factors are between districts; and, at the same time, that these fixed factors are themselves not entirely determinative of transportation spending, leaving room for policy and technical efficiency to improve service and efficiency. While every district is different, there is no question that most districts can operate more efficiently and hew closer to the median spend of districts among their peers. The State of New Jersey also has a role in driving efficiency and policy directives by reviewing and revising its use of data analytics to make transportation policy decisions. Through the findings uncovered in this report, and in reviewing the data and speaking with district administrators and transportation professionals, several strategies emerged as ways to achieve transportation savings.

### Enhancements to the Student Transportation Data System

First, the District Report of Transported Resident Students (DRTRS) system should be reviewed for enhancements and increased standardization. It is clear from DRTRS training videos<sup>xv</sup> that the system collects a level of detail commensurate with the detail found in the State of North Carolina's TIMS system: student profiles including addresses and school of attendance are collected, and students are assigned to routes also imported or manually added to the reporting system.

Even despite this level of detail, users are asked to manually enter the home-to-school distance for the student. Furthermore, there is no direction given to the user on how to calculate this amount, leaving a level of discretion to the user that can tip the scale for borderline cases of student distance eligibility. A modern system with current GIS technology should be able to calculate a properly-addressed student profile's home-to-school distance in a standardized fashion across the state.

### Enhancements to Efficiency Scoring and Transportation Funding Formula

An enhancement of the DRTRS system should also incorporate the fixed factors utilized in the States of Washington and North Carolina to account for the variables this analysis has shown to impact transportation costs to improve efficiency scoring. These fixed factors, along with the knowledge of student and route data, can allow for frontier analyses and more sophisticated efficiency scoring than the current vehicle utilization scoring. Alternatively, with an understanding of student's home location and school of attendance, as well as the vehicle fleet at the districts' disposal, a modern GIS system can calculate route scenarios and compare those route scenarios with those used by districts for efficiency scores.

### Standardize IEP Transportation Guidelines

Administrators have noted the large discretion given to IEP writers in the drafting of student's IEPs with regard to student transportation needs. Discretion is obviously needed in crafting IEPs, which, by their nature, are case-by-case evaluations. However, the state should empanel transportation and counseling experts to draft detailed guidelines for IEP evaluators with regard to special education and special needs student's transportation requirements to ensure that the appropriations from the state's transportation funding formula, which has a special education component, is shared equitably across the state and is not too dependent on an individual district's view of which student needs require transportation versus how another district might differently treat the same student need.

### District Efficiency Strategies

Local school districts may utilize a number of methods to increase their use of individual school vehicles (called "load factor"), and, therefore, their transportation efficiency. Most of all, districts can carefully consider the tradeoffs between more courtesy services and spending, which may be the single most important lever for determining spend. For the most part the playbook has been written. The State of New Jersey Department of Education publishes guidance on reaching "Models of Transportation Efficiency."<sup>xvi</sup>

**Some of these recommendations are policy-oriented, such as:**

- *Tier school opening and closing times* - Staggering opening and closing times to allow transportation vehicles to be used on several routes, requiring less vehicles to service the same number of students.
- *Standardize ride-time policies for all districts participating in consolidated services* - Limiting the transportation for all participants to the shortest ride-time policy of its members could result in the inability of the agency to provide transportation effectively.
- *Package bids with tiered routes* - This practice would prevent contractors from picking and choosing the most profitable routes compared to those with a lower profit margin, leading to volume discounts from school bus contractors wishing to bid on the entire package.
- *Coordinate school calendars (Public and Nonpublic)* – Consistent and uniform calendars (e.g. start and end dates, teacher services days) improves vehicle utilization and may enable districts to fill a route with both public and nonpublic school students.

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- *Use municipal/school district joint bidding for maintenance, fuel, etc.* – Another potential source of volume discounts benefiting both school districts and municipalities.

### **Other recommendations by NJDOE are operational in nature, including:**

- *Optimizing route design* - Design routes that service the largest numbers of students with the least amount of stops.
- *Design routes with multiple destinations* – Where feasible, efficient routes that pass multiple school facilities should be leveraged to increase vehicle utilization.
- *Provide out of district transportation through a coordinated transportation services agency* – Regional transportation services can likely further enhance the prior two recommendations while also driving efficiencies of out-of-district busing while providing for economies of scale.
- *Provide services through jointures, either as a host or joiner* – Similarly, joiner and host relationships can improve vehicle utilization rates for host districts while providing cost effective transportation services for the joining district when compared to contracting or in-housing.

Additionally, school districts should consider the use of subscription fees to offset transportation costs for students not otherwise eligible for transportation services where an established bus route currently exists. NJDOE data on school district revenues shows 46 districts budgeting for “Transportation Fees from Individuals” for a total of nearly \$4.1 million (0.3 % of transportation appropriation). Reasonable limits should be placed on subscription fees when used. For example, the State of Massachusetts prohibits charging such fees to pupils receiving free or reduced lunch.

## Methodology

Statewide advertised appropriations data for the 2017-18 fiscal year were downloaded via the User Friendly Budget page on the New Jersey Department of Education (NJDOE) website, providing raw and standardized data for all school districts.<sup>xvii</sup> The NJDOE uniform chart of accounts was digitized into a spreadsheet and referenced to code the raw data to their respective fund and appropriation types accordingly.<sup>xviii</sup> Student Transportation Service figures were identified and extracted for each school district.<sup>xix</sup> District Factor Group (DFG) ratings by school district were downloaded via the NJDOE website.<sup>xx</sup> The number of active schools per district was aggregated by school district utilizing school-level data from the NJDOE's *Taxpayers' Guide to Education Spending 2018* dataset<sup>xxi</sup> while the number and average mileage of students transported per school district was downloaded from the "October 2017 DRTRS Summary" PDF file available NJDOE's 2017-18 Audit Information webpage.<sup>xxii</sup> NJDOE transportation efficiency scores for October 2017 were retrieved from the NJDOE Transportation web pages.<sup>xxiii</sup>

Housing and population data by Census tract were acquired for all New Jersey Census tracts from American Community Survey 2012-2017 5-year estimates through the advanced search features of the American Fact Finder tool.<sup>xxiv</sup>

School district polygon (e.g. boundary) GIS and road centerline shapefiles were downloaded from the NJ Geographic Information Network (NJGIN), a spatial data clearinghouse maintained by the New Jersey Office of Information Technology, Office of GIS.<sup>xxv</sup> Census tract polygon shapefiles for the State of New Jersey were downloaded from the Census TIGER/Line© website.<sup>xxvi</sup>

These shapefile data files were loaded into QGIS software package<sup>xxvii</sup> and a number of vector geoprocessing tools were used to allocate Census Tracts to school districts, assign density classifications to districts (e.g. urban, suburban, and rural based on the *FiveThirtyEight* methodology<sup>xxviii</sup> noted in the report) and to calculate district square mileage and road miles per school district.

The resulting shapefile attribute tables and the school district data were joined and analyzed using the R statistical programming language<sup>xxix</sup> and the RStudio integrated development environment.<sup>xxx</sup> Initial regression models showed heteroscedasticity, so the dependent variable (school district transportation expenditures) was log-transformed for subsequent regression analyses. A full model of variables was regressed and run through a stepwise bidirectional linear regression program to find the model with the strongest fit for the main report model ("Model 2" in Appendix B).

Model predictions were compared to actual to compute “residual” values, which were then divided by actual transportation spending to compute a percentage under/over-spend compared to the model. This percentage difference was standardized and, as noted in the body of the report, the degree of over- and underspending compared to the model was scored into four groups, with each standard deviation:

- **Unsatisfactory:** Overspent one standard deviation or more
- **Needs Improvement:** Overspent between 0 and 1 standard deviation
- **Satisfactory:** Underspent between 0 and 1 standard deviation
- **Excels:** Underspent at a rate one standard deviation or less

## Appendix A – Districts with an “Unsatisfactory” Score

Dist Code	District Name	SD Type	DFG Group	Density	Actual Approp-riation (\$)	Model Predict (\$)	Over/Under (%)	Total Students Trans-ported	Special Needs (%)	Special Education (%)	Out-of-Dist (%)	Avg Miles (Gen Students)	Avg Miles (Spec Ed Students)
2620	Leonia Public SD	K-12	Med-High	Urban	1,031,715	285,306	261.6	63	25.4	0.0	0.0	5.5	19.6
2520	Lakewood Township SD	K-12	NA	Suburban	27,648,082	8,499,957	225.3	5,972	12.3	0.3	1.4	3.6	2.8
0280	Belvidere SD	K-12	Med-Low	Suburban	202,595	71,795	182.2	8	50.0	0.0	0.0	6.2	5.8
4090	Perth Amboy Public SD	K-12	Low	Urban	9,365,249	3,974,888	135.6	2,062	14.6	8.2	0.0	4.6	3.6
2080	Hasbrouck Heights SD	K-12	Med-High	Urban	978,030	433,604	125.6	86	44.2	0.0	0.0	4.3	7.9
3240	Mine Hill Township SD	K-12	Med-High	Suburban	906,631	404,922	123.9	225	13.3	0.0	0.4	4.4	10.3
4850	South Bound Brook Public Schools	K-12	Low	Urban	488,000	218,278	123.6	63	19.0	0.0	0.0	6.0	9.5
4020	Paulsboro SD	K-12	Low	Suburban	1,229,845	556,035	121.2	117	36.8	7.7	0.0	9.0	13.9
3100	Mendham Township SD	Elementary	High	Suburban	1,905,812	895,695	112.8	725	5.4	6.2	7.0	4.6	3.9
3460	Mountain Lakes Public SD	K-12	High	Suburban	499,320	235,168	112.3	89	7.9	0.0	0.0	4.8	9.1
5680	West Orange Public Schools	K-12	Med-High	Suburban	9,291,027	4,520,058	105.6	4,574	10.9	0.0	11.1	3.9	5.2
5770	Wharton Borough SD	Elementary	Med-Low	Suburban	422,030	209,317	101.6	39	41.0	5.1	2.6	4.7	7.1
5610	West Cape May Elementary SD	Elementary	Med-Low	Suburban	26,950	13,560	98.7	3	0.0	0.0	33.3	4.7	0.0
4480	Rockaway Borough SD	Elementary	Med-High	Suburban	378,352	192,558	96.5	51	19.6	2.0	0.0	4.7	7.3
2140	High Bridge Borough SD	Elementary	Med-High	Suburban	129,430	66,527	94.6	13	15.4	0.0	0.0	7.7	15.1
4520	Roosevelt Public SD	K-12	Med-High	NA	168,000	89,054	88.6	39	5.1	0.0	0.0	8.5	8.1
2430	Keyport SD	K-12	Med-Low	Urban	535,000	283,667	88.6	25	36.0	0.0	0.0	17.9	15.3
0410	Bloomfield Board Of Education	K-12	Med-Low	Urban	4,043,610	2,146,748	88.4	1,126	1.2	0.0	0.0	4.1	1.4
4690	Sea Girt Borough SD	K-12	High	Suburban	173,473	93,264	86.0	15	13.3	0.0	0.0	9.0	22.7
3980	Passaic County Manchester Regional High SD	Secondary	Low	Suburban	1,078,117	597,020	80.6	251	6.8	3.6	27.9	5.3	7.8
3560	New Providence Board Of Education	K-12	High	Suburban	1,304,638	726,496	79.6	151	42.1	5.0	0.0	8.3	7.2
4940	Delsea Regional High SD	Secondary	Med-Low	Rural	3,704,177	2,089,967	77.2	1,576	6.6	9.7	2.0	6.2	9.4
0660	Caldwell-West Caldwell SD	K-12	High	Suburban	1,599,778	904,590	76.9	162	45.1	1.2	0.0	6.6	7.0

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Dist Code	District Name	SD Type	DFG Group	Density	Actual Appropriation (\$)	Model Predict (\$)	Over/Under (%)	Total Students Transported	Special Needs (%)	Special Education (%)	Out-of-Dist (%)	Avg Miles (Gen Students)	Avg Miles (Spec Ed Students)
0580	Brooklawn Public SD	K-12	Low	Suburban	167,000	94,553	76.6	15	26.7	0.0	0.0	9.6	5.3
0450	Boonton Town SD	K-12	Med-High	Suburban	525,214	297,615	76.5	46	28.3	32.6	0.0	5.9	7.7
3850	Old Tappan Public SD	Elementary	High	Suburban	336,534	191,317	75.9	54	25.9	3.7	9.3	4.7	3.3
5880	Woodcliff Lake SD	Elementary	High	Suburban	348,770	199,946	74.4	70	10.0	1.4	0.0	3.6	11.4
1760	Glen Rock Public SD	K-12	High	Suburban	922,191	544,447	69.4	79	43.0	17.7	0.0	5.0	10.3
0490	Bound Brook SD	K-12	Low	Urban	703,998	417,712	68.5	88	33.5	5.1	0.0	5.9	8.7
0420	Bloomington SD	K-12	Med-High	Suburban	1,362,259	817,745	66.6	452	11.5	1.8	0.2	7.3	7.6
4770	Shrewsbury Borough SD	Elementary	High	Suburban	139,900	84,236	66.1	37	0.0	0.0	75.7	4.3	0.0
3610	North Bergen SD	K-12	Low	Urban	4,150,640	2,500,968	66.0	1,127	7.3	20.6	0.0	3.8	9.2
0760	Cedar Grove Township SD	K-12	High	Suburban	1,176,263	709,978	65.7	242	16.1	2.5	0.0	5.3	11.6
4600	Rutherford SD	K-12	Med-High	Urban	1,396,213	843,699	65.5	205	27.3	0.0	0.0	8.1	12.8
0110	Atlantic City Public Schools	K-12	Low	Urban	5,876,801	3,582,351	64.0	2,477	6.6	4.2	1.0	7.9	7.8
3940	Park Ridge SD	K-12	High	Suburban	732,789	449,015	63.2	49	55.1	0.0	0.0	10.8	12.0
4710	Seaside Heights SD	Elementary	Low	NA	92,276	56,714	62.7	1	100.0	0.0	0.0	0.0	9.5
5035	Sterling Regional SD	Secondary	Med-Low	Suburban	434,557	270,649	60.6	60	11.7	28.3	0.0	6.2	11.5
1400	Essex Fells SD	Elementary	High	Suburban	125,198	79,899	56.7	3	100.0	0.0	0.0	0.0	10.2
3280	Monroe Township Public SD	K-12	Med-Low	Suburban	8,681,792	5,549,051	56.5	5,876	1.4	10.2	2.8	4.3	12.8
2760	Long Beach Island Consolidated SD	Elementary	Med-High	Suburban	423,393	271,351	56.0	181	1.7	7.2	1.7	5.6	7.6
3250	Monmouth Beach Elementary SD	Elementary	High	Suburban	150,000	96,678	55.2	10	40.0	0.0	60.0	6.4	13.3
3530	New Brunswick SD	K-12	Low	Urban	7,541,490	4,866,066	55.0	3,369	4.2	3.0	2.4	3.9	13.0
4540	Roselle Public Schools	K-12	Low	Urban	1,159,454	752,490	54.1	186	9.9	30.9	0.0	5.8	11.4
0880	Clementon Elementary SD	K-12	Low	Suburban	717,645	467,464	53.5	205	8.3	1.0	0.0	4.9	12.5
4970	Spotswood Public SD	K-12	Med-Low	Suburban	987,635	645,050	53.1	347	5.2	0.3	1.7	3.4	10.8
4270	Prospect Park Public SD	Elementary	Low	Urban	362,218	237,337	52.6	27	48.1	0.0	25.9	4.8	6.4
1720	Gibbsboro Elementary School	Elementary	Med-High	Suburban	82,000	53,851	52.3	1	100.0	0.0	0.0	7.9	0.9
1540	Folsom Borough SD	K-12	Med-Low	Rural	648,806	427,044	51.9	268	9.0	11.2	1.5	4.9	10.7
4870	South Hackensack SD	K-12	Med-Low	NA	427,981	282,567	51.5	112	9.8	0.0	0.9	6.4	7.0

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Dist Code	District Name	SD Type	DFG Group	Density	Actual Appropriation (\$)	Model Predict (\$)	Over/Under (%)	Total Students Transported	Special Needs (%)	Special Education (%)	Out-of-Dist (%)	Avg Miles (Gen Students)	Avg Miles (Spec Ed Students)
3710	Northern Valley Regional High SD	Secondary	High	Suburban	1,639,127	1,088,586	50.6	513	8.8	4.1	24.2	6.3	8.2
0350	Bernards Township SD	K-12	High	Suburban	5,593,626	3,750,897	49.1	3,042	5.8	9.3	1.3	4.5	5.3
2410	Kearny	K-12	Low	Suburban	1,619,392	1,093,314	48.1	206	25.7	73.8	0.0	1.1	8.3
5100	Sussex-Wantage Regional SD	Elementary	Med-Low	Rural	1,804,493	1,223,850	47.4	1,077	5.6	12.3	6.6	4.9	5.0
4310	Ramsey SD	K-12	High	Suburban	1,606,003	1,089,898	47.4	470	8.5	11.3	9.6	4.1	11.0
5650	West Milford Township Public SD	K-12	Med-High	Suburban	5,148,164	3,515,205	46.5	3,313	1.5	0.9	1.4	6.2	8.0
1610	Franklin Township Public SD	K-12	Med-High	Suburban	14,012,417	9,642,680	45.3	8,282	2.2	10.9	9.4	5.6	12.4
2330	Irvington Board Of Education	K-12	Low	Urban	6,783,000	4,673,090	45.2	434	54.1	33.6	0.0	2.8	8.5
4830	South Amboy SD	K-12	Med-Low	Suburban	844,158	582,856	44.8	86	61.6	4.7	0.0	6.9	6.3
5240	Union City SD	K-12	Low	Urban	4,639,062	3,204,680	44.8	363	29.2	56.7	0.0	1.2	9.5
5520	Washington Township SD	Elementary	High	Suburban	3,282,386	2,274,324	44.3	2,102	6.6	8.2	1.0	4.0	7.2
1510	Flemington-Raritan Regional SD	Elementary	High	Suburban	4,532,612	3,148,515	44.0	2,808	3.2	12.4	0.4	3.6	6.2
5370	Verona Public SD	K-12	High	Suburban	682,082	475,742	43.4	38	84.2	5.3	0.0	1.4	11.2
3490	National Park Boro SD	Elementary	Low	Suburban	133,507	93,480	42.8	7	42.9	28.6	0.0	6.0	13.7

## Appendix B – Districts with an “Excels” Score

Dist Code	District Name	SD Type	DFG Group	Density	Actual Approp riation (\$)	Model Predict (\$)	Over/ Under (%)	Total Students Trans- ported	Special Needs (%)	Special Education (%)	Out- of-Dist (%)	Avg Miles (Gen Students)	Avg Miles (Spec Ed Students)
1490	Farmingdale Public SD	Elementary	Med-Low	Suburban	17,456	69,740	-75.0	1	100.0	0.0	0.0	7.8	9.0
1820	Greenwich Township SD	Elementary	Med-Low	Rural	46,647	113,617	-58.9	63	9.5	0.0	0.0	4.5	6.5
4410	River Edge SD	Elementary	High	Urban	107,100	256,199	-58.2	23	8.7	87.0	0.0	1.6	15.7
4240	Port Republic SD	K-12	Med-High	NA	88,192	210,495	-58.1	103	5.8	0.0	12.6	8.1	8.3
3570	Newark Public SD	K-12	Low	Urban	35,470,766	82,477,026	-57.0	13,642	4.4	21.4	27.2	3.4	8.4
4460	Riverton SD	K-12	Med-High	Suburban	110,519	254,479	-56.6	23	56.5	0.0	0.0	12.8	11.9
0170	Avalon SD	K-12	Med-High	Suburban	60,832	137,497	-55.8	56	8.9	0.0	3.6	7.1	9.9
2590	Lebanon Borough SD	Elementary	High	Suburban	81,326	183,073	-55.6	51	2.0	0.0	7.8	4.8	30.9
2050	Harrington Park SD	Elementary	High	Suburban	133,719	277,623	-51.8	33	60.6	0.0	6.1	4.6	8.3
4790	Somerdale SD	Elementary	Med-Low	Suburban	104,854	213,195	-50.8	14	64.3	21.4	0.0	7.8	3.2
1970	Hampton Borough SD	Elementary	Med-Low	NA	46,500	92,179	-49.6	20	20.0	0.0	50.0	7.6	5.1
3010	Maple Shade SD	K-12	Med-Low	Urban	1,205,781	2,331,963	-48.3	1,341	7.5	7.8	2.8	4.0	4.4
5640	West Long Branch SD	Elementary	Med-High	Suburban	472,592	902,557	-47.6	623	1.1	1.0	21.2	3.5	9.0
4010	Paterson Public SD	K-12	Low	Urban	19,936,753	37,309,264	-46.6	6,475	24.7	0.6	2.9	3.5	2.4
1680	Frenchtown Borough SD	Elementary	Med-High	NA	18,567	34,725	-46.5	9	11.1	0.0	0.0	7.4	6.5
2550	Lavallette Borough SD	K-12	Med-Low	Suburban	148,167	276,729	-46.5	61	11.5	0.0	8.2	9.7	15.6
0200	Bass River Township Board Of Education	Elementary	Med-Low	NA	105,700	196,002	-46.1	97	1.0	28.9	1.0	3.3	11.3
3730	Northvale Public SD	Elementary	Med-High	Suburban	118,250	218,967	-46.0	8	87.5	12.5	0.0	8.7	4.2
2200	Ho-Ho-Kus SD	K-12	High	Suburban	342,159	632,814	-45.9	282	15.2	0.0	6.4	4.6	4.7
3830	Oceanport SD	Elementary	Med-High	Suburban	334,680	613,432	-45.4	424	1.7	8.3	2.1	3.4	2.8
5210	Trenton Public SD	K-12	Low	Urban	8,787,083	15,903,233	-44.7	4,666	18.1	18.3	3.7	3.4	6.3
2680	Linwood City SD	Elementary	Med-High	Suburban	147,840	266,070	-44.4	79	36.7	0.0	10.1	2.8	2.2
1850	Guttenberg SD	K-12	Low	Urban	255,000	455,399	-44.0	20	95.0	0.0	0.0	4.5	5.7
2970	Mansfield Township Elementary SD	Elementary	Med-High	Suburban	422,802	753,925	-43.9	632	0.5	14.9	0.2	5.9	10.9
4590	Runnemede Public SD	Elementary	Low	Suburban	348,660	619,417	-43.7	79	60.8	3.8	0.0	5.0	2.8
0330	Berlin Borough SD	Elementary	Med-Low	Suburban	350,627	615,541	-43.0	446	5.2	3.6	1.8	2.6	2.7
3420	Mt. Ephraim SD	K-12	Med-Low	Urban	173,536	299,903	-42.1	23	52.2	0.0	0.0	14.1	14.3
3860	Oldmans Township SD	K-12	Med-Low	Rural	227,036	384,553	-41.0	252	3.6	6.0	0.0	6.4	9.0

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Dist Code	District Name	SD Type	DFG Group	Density	Actual Approp riation (\$)	Model Predict (\$)	Over/ Under (%)	Total Students Trans-ported	Special Needs (%)	Special Education (%)	Out-of-Dist (%)	Avg Miles (Gen Students)	Avg Miles (Spec Ed Students)
1280	Edgewater Park Township SD	K-12	Med-Low	Suburban	735,934	1,225,986	-40.0	837	8.4	2.0	1.7	5.5	5.6
0640	Byram Township SD	Elementary	High	Suburban	573,855	947,033	-39.4	825	7.4	7.9	3.6	4.8	5.3
1200	East Newark SD	K-12	Low	Urban	88,627	145,715	-39.2	5	100.0	0.0	0.0	0.0	12.1
5060	Stone Harbor SD	K-12	Med-High	Suburban	54,626	88,777	-38.5	33	12.1	0.0	0.0	5.4	4.7
3750	Nutley Public SD	K-12	Med-High	Urban	1,863,373	3,010,040	-38.1	194	96.4	1.0	0.0	8.4	6.0
3020	Margate City SD	K-12	Med-Low	Suburban	358,091	577,797	-38.0	160	11.3	1.9	11.9	6.7	7.6
5540	Watchung Borough Public SD	Elementary	High	Suburban	526,276	845,984	-37.8	644	3.9	8.1	0.0	3.5	4.2
4210	Point Pleasant Borough SD	K-12	Med-High	Suburban	1,476,855	2,373,002	-37.8	1,460	9.5	5.5	5.1	5.5	7.5
5200	Totowa Public SD	Elementary	Med-Low	Suburban	483,939	767,678	-37.0	413	6.8	0.7	0.0	5.1	2.8
2220	Holland Township SD	Elementary	Med-High	Rural	397,008	629,423	-36.9	539	3.5	16.5	0.6	3.6	2.7
0060	Alloway Twp SD	K-12	Med-Low	Rural	445,872	702,515	-36.5	448	7.6	8.3	0.0	5.9	13.0
4650	Sandyston-Walpack Consolidated SD	Elementary	Med-High	Rural	163,328	257,027	-36.5	152	4.6	9.9	2.0	4.1	15.4
5890	Woodland Township Board Of Education	Elementary	Med-Low	NA	149,774	234,434	-36.1	126	4.0	7.9	0.0	5.5	18.0
0500	Bradley Beach Elementary SD	K-12	Med-Low	Urban	285,046	443,828	-35.8	63	28.6	0.0	14.3	11.8	15.7
2180	Hillsdale SD	Elementary	Med-High	Suburban	468,654	725,588	-35.4	414	6.0	1.2	0.0	3.3	3.4
3500	Neptune City SD	K-12	Med-Low	Urban	322,000	497,729	-35.3	66	48.5	0.0	0.0	6.4	11.9
2700	Little Falls Township Public SD	Elementary	Med-High	Suburban	447,019	690,291	-35.2	247	20.2	4.9	0.4	3.9	2.1
1030	Delanco Township SD	K-12	Med-Low	Suburban	298,283	460,158	-35.2	166	25.3	0.0	13.9	6.3	7.1
0430	Bloomsbury SD	K-12	Med-High	NA	113,490	174,335	-34.9	58	13.8	0.0	5.2	7.9	12.9
4470	Rochelle Park SD	K-12	Med-High	Urban	346,800	529,673	-34.5	221	8.1	0.0	16.7	4.0	5.6
3430	Mount Holly Township Public SD	Elementary	Low	Suburban	424,876	643,170	-33.9	58	53.4	43.1	0.0	3.9	3.9
4450	Riverside Township SD	K-12	Low	Suburban	489,275	738,175	-33.7	85	62.4	0.0	0.0	9.6	9.6
1470	Fairview Public SD	K-12	Low	Urban	429,579	647,277	-33.6	190	21.1	27.4	0.0	2.7	6.8
2090	Haworth Public SD	Elementary	High	Suburban	87,000	129,647	-32.9	10	70.0	0.0	30.0	4.6	3.3
3880	Orange Board Of Education	K-12	Low	Urban	3,126,000	4,645,673	-32.7	414	89.9	5.1	0.0	4.9	4.2
1360	Emerson Public SD	K-12	Med-High	Suburban	545,648	806,547	-32.3	431	5.1	2.6	3.7	4.4	12.5

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Dist Code	District Name	SD Type	DFG Group	Density	Actual Appropriation (\$)	Model Predict (\$)	Over/Under (%)	Total Students Transported	Special Needs (%)	Special Education (%)	Out-of-Dist (%)	Avg Miles (Gen Students)	Avg Miles (Spec Ed Students)
3440	Mount Laurel Township SD	Elementary	High	Suburban	3,432,488	5,068,073	-32.3	4,162	7.3	5.4	4.2	3.7	3.6
3060	Maywood SD	K-12	Med-High	Urban	581,600	857,245	-32.2	273	16.5	1.8	24.9	4.7	5.0
5020	Stafford Township SD	Elementary	Med-Low	Suburban	2,024,132	2,981,607	-32.1	2,111	0.0	17.7	2.3	3.6	33.5
4180	Pleasantville Public SD	K-12	Low	Suburban	1,824,112	2,677,135	-31.9	2,271	3.3	0.9	1.4	6.0	9.1
5320	Upper Pittsgrove Twp School District	K-12	Med-Low	Rural	474,049	693,475	-31.6	452	8.0	8.2	0.2	5.9	8.9
1300	Egg Harbor City SD	Elementary	Low	Suburban	237,688	347,635	-31.6	78	42.3	0.0	14.1	8.9	6.9
3110	Merchantville SD	K-12	Med-Low	Urban	296,215	431,109	-31.3	121	9.9	0.0	0.0	6.1	12.9

## Appendix C – Regression Models

Independent Variables	Model 1	Model 2	Model 3
Students Transported <sup>#</sup>	0.79505***	0.77760***	0.72359***
Students Provided Aid-in-Lieu of Transportation <sup>#</sup>	0.05362***	0.05520***	0.04806***
% of Students Transported: Special Needs	2.42322***	1.89187***	1.63911***
% of Students Transported: Special Education	1.54983***	1.14280***	1.13958***
% of Students Transported: Out-of-District Schools	0.64702***	0.22962	0.26925*
Square Miles		0.02423***	0.02680***
Roads per Square Mile		0.00099	0.00180**
Students per Road Mile		0.02742***	0.01315***
Average Miles Transported, General Students		-0.00562*	-0.00806**
Average Miles Transported, Spec. Education Students		0.03814***	0.03162***
Elementary <sup>a</sup>			0.01543***
Secondary <sup>a</sup>			-0.21358***
DFG: Medium-Low <sup>b</sup>			-0.05224
DFG: Medium-High <sup>b</sup>			-0.05914
DFG: High <sup>b</sup>			-0.02868
Suburban <sup>c</sup>			0.06369
Urban <sup>c</sup>			0.22563***
Constant	8.29524***	7.81006***	8.33271***
Observations	534	534	516
R <sup>2</sup>	0.9058	0.94068	0.94497
R <sup>2</sup> Change		0.03488	0.00429
Residual Std. Error	0.39434 (df = 528)	0.31472 (df = 522)	0.29352 (df = 497)
F Statistic	1,015.39*** (df=5; 528)	752.49*** (df=11; 522)	474.131*** (df=18; 497)

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

<sup>#</sup>Log-transformed (note: dependent variable, Transportation Expenditures, also log-transformed)

<sup>a</sup> Compared to K-12 districts

<sup>b</sup> Compared to low socioeconomic district DFG status

<sup>c</sup> Compared to Rural school districts

## Appendix D – New Jersey Transportation Efficiency Scoring

NJ DOE rates schools on transportation efficiency based on a vehicle utilization calculation that impacts state transportation aid. A districts' efficiency rating is calculated by dividing student ridership by vehicle capacity based on data within the District Report of Transported Resident Students (DRTRS) system. The state sets a standard of 120 percent of vehicle capacity, thereby incentivizing the use of buses for more than one route in a given day.

Efficiency scores impact transportation funding from the state to school districts. The transportation aid formula is a calculation based on the number of students eligible for transportation services and the average home-to-school mileage for said eligible students. An incentive factor is applied to the non-special education pupils portion of the formula with the magnitude of the factor in accordance with each districts' percentile rank in regular vehicle capacity utilization

Analysis of 2017-18 Transportation Scores show that the median score to be 121 percent vehicle utilization, suggesting that nearly approximately half of analyzed school districts meet this efficiency standard.

Summary of 2017-18 NJ DOE Transportation Efficiency Scores				
Minimum	1st Quartile	Median	3rd Quartile	Maximum
6	88	121	156	402

These efficiency scores were compared to the main regression analysis results. In theory, if these efficiency scores are a fair representation of overall student transportation system efficiency given the other fixed factors considered, the difference between actual and expected spending would correlate with these efficiency scores. The correlation between regression errors and these scores is low but negative, indicating a weak relationship between model performance and NJ transportation efficiency ratings (R= -0.09). Adding the variable to the regression model does show it to be a significant variable, suggesting that a one percentage point increase in efficiency scores is associated with a 0.1 percent reduction in spending. However, the number of missing school districts (143) from the 2017-18 efficiency score database requires caution in drawing a definitive conclusion other than a weak, negative relationship exists between the NJ efficiency scoring model and the model presented in this paper. Indeed, vehicle utilization is but one consideration in student transportation efficiency. A K-12 district that effectively staggers its elementary, middle, and high school bell times may score well in terms of vehicle utilization but otherwise run inefficient routes or miss opportunities to design routes with multiple destinations.

## Appendix E: Additional State Case Studies – Massachusetts and Maryland

### Maryland Takeaways

1. Maryland's school districts are organized regionally, primarily along county lines (e.g., Montgomery County, Prince George's County, etc.). Statewide, Maryland's funding formula, purchasing procedures, and routing policies do not appear remarkably different than New Jersey's.
2. Standard mileage requirements are not statutorily driven, other than for those students with disabilities. There may be some prohibitions on heavy courtesy busing (i.e., door to door) by setting out approximate minimum distances between bus stops.
3. One of the largest and richest counties, Montgomery, actually employs over 1,700 employees in its school Department of Transportation, maintains its own fleet of 1,300 buses, and transports 103,000 students daily. Without the economy of scale and buying power of the county, it would be hard to see how such a public-owned consolidated strategy would generate substantial savings.
4. In FY 2019, the State sent \$282.6 million in transportation funding to districts. Without additional research, we cannot compare this to total transportation spend. Though, for Montgomery County, the percentage of State aid covering the transportation budget is 39%. New Jersey's largest District, Newark, by contrast received \$8.5 million in transportation aid versus a spend of \$34.8 million, which is 24%.

### Maryland Student Transportation

Maryland provided \$282.6 million on State Student Transportation funding to districts for FY 2019. However, readily available data does not make clear the aggregate amount of transportation spending; though, in an illustrative example below on Montgomery County, the percentage of State aid covering the transportation budget is 39%.

Based on a 2014-15 pupil transportation fact book, State funding covers nearly 38 percent of the student transportation costs. Roughly 72 percent of total enrollment was transported in that year.<sup>xxxix</sup>

Per an overview of Maryland state education funding

*"Student Transportation: Each local school system is required to provide transportation to and from school for all public school students – Transportation funding consists of a **base grant** that is adjusted annually and a **per pupil grant** based on the number of students with special transportation needs"*<sup>xxxii</sup>

Maryland Educational Code § 5-205 (2013)<sup>xxxiii</sup>

- Establishes a base grant in 2003 per County
- From this 2003 base, subsequent base aid for a district is based on prior year's grant that is adjusted for inflation and enrollment growth, with a guaranteed one percent increase
- The inflation rate used is based off the CPI for private transportation for the Washington-Baltimore metro area, as of July of the preceding fiscal year. Furthermore, the inflation adjustment will not be less than 3 percent or greater than 8 percent, so there is a minimum and maximum band.
- In addition, a per-pupil grant is provided to Counties based on the number of students with disabilities transported.

However, is not readily apparent how the base 2003 values were derived.

### School Transportation Eligibility

According to the Legislative Office of Policy Analysis, *"Each local school system is generally required to provide transportation to and from school for students enrolled in kindergarten through grade 12"*<sup>xxxiv</sup> Based on the language of § 7-805 - Transportation of students living within mileage limit, there does not seem to be a statewide mileage set for the transporting students without disabilities:

- (a) A school bus may be used to transport any student who lives within the mileage limit, if a mileage limit has been established by a local board of education, and if:
  - (1) The school bus is not filled to capacity;
  - (2) No additional bus stop is added to the route to transport the student; and
  - (3) The transportation officer or his designee has identified a specific existing hardship that would justify allowing the student to be transported.
- (b) The transportation allocation of a county may not be reduced because of compliance with this section.<sup>xxxv</sup>

Base aid for a district is based on prior year's grant that is adjusted for inflation and enrollment growth, with a guaranteed one percent increase. Despite the quote below, the authors do suggest using the prior year enrollment or the average of the three prior years' enrollment (whichever is greater) to help buffer impact on districts with declining enrollment. However,

*"There are several issues that the study team explored but for which specific recommendations were not provided. These consist of **transportation aid, the guaranteed tax base (GTB) state aid program, and tax increment financing. In all three cases, the study team determined there were insufficient research findings or examples of best practices from other states in the literature to support making a recommendation.**"*

*"It should be noted that the research team recommended that the transportation aid formula should be thoroughly studied to determine if an updated formula is warranted."*

*"The study team believes that transportation is not best funded at a per pupil level." xxxvi*

### Looking at a Montgomery County MD as an Example

Montgomery County Public Schools' Department of Transportation has over 1,700 employees and over 1,300 buses with a \$109 million budget. The County received \$43 million in transportation aid revenue from the state. xxxvii

### Other Operating Regulations

#### Routing and Operating Procedures

- Section lays out requirements for bus stops, which should be approx. 1/4 mile apart for general population transportation. For four-lane highways, students must be picked up and discharged on the side of the road which they reside. xxxviii

#### Reporting Requirements xxxix

- Accident Reporting
- Number of Students Transported: On Nov 30th, districts report number of students transported on last Friday of October, including number of students with disabilities transported.
- Operational Reporting: On July 15, number of vehicles and the number of miles and hours of route operations for the previous fiscal year

### School Vehicle — Length of Operation <sup>xi</sup>

- School vehicles may not be used for more than 12 years (some counties listed in code allowed 15 years) unless it is maintained under a state-approved preventive maintenance plan that includes an inspection at the end of the 12th year and at least 2 inspections by Motor Vehicle Admin each year thereafter

### Massachusetts Takeaways

1. If the distance between a child's residence and school exceed two miles, and the nearest school bus stop is more than one mile from the child's residence, the Department of Elementary and Secondary Education (DESE) may require the town to provide transportation for children in grades kindergarten through six.
2. Some students who live below the mileage requirement can pay to access existing buses. One district charges \$165 for each student who joins in this manner. It is not possible to calculate the marginal cost (or savings) this adds without significantly more information on overall routing.
3. Massachusetts law *appears* to have a generous transportation funding policy. However, data found on the state's Department of Elementary and Secondary Education (DESE) website shows that the vast majority of state funding for transportation goes towards regional school districts. Local school districts seem to only get reimbursed a percentage of homeless and vocational busing. Up until 2003, the Commonwealth provided funding for all transportation. However, that was last fiscal year that was funded as the Commonwealth made significant cuts due to budget difficulties.
4. 15 years ago, the Commonwealth provided one-time grants to school districts in an effort to modernize their routing procedures by funding acquisitions of the Versatrans and/or Transfinder routing software packages.
5. Most districts contract out for transportation services. There is not a strong marketplace for buses in the Commonwealth, and, while districts are often encouraged to procure a fleet, they typically do not have the cash on hand or a ready ability to finance acquisition.

### Massachusetts Student Transportation

The FY2018 state budget appropriates \$69.9 million for pupil transportation:

Transportation of Pupils - Regional School Districts	\$61,521,000
Non-Resident Pupil Transportation	\$242,500
Homeless Student Transportation	\$8,099,500

## Eligibility

Section 68 states that, if the distance between a child's residence and school exceed two miles, **and** the nearest school bus stop is more than one mile from the child's residence, the Department of Elementary and Secondary Education (DESE) may require the town to provide transportation for children in grades kindergarten through six.<sup>xli</sup>

This section also provides the power of the DESE to require a town to pay for the tuition of a student (and transportation costs) to attend an adjacent district if the student lives more than three miles from his/her town's nearest school but less than three miles from a school in an adjacent district providing "substantially equivalent instruction".

Lastly, this section allows school committees to assess a fee to students provided transportation not required under this section, up to an amount sufficient to cover costs incurred. These fees cannot be charged to students eligible for free or reduced lunch.

The Commonwealth also **obligates** regional school districts to provide transportation, and authorizes reimbursement for such services, provided that no reimbursement for pupils who live less than one and one-half miles from the school of attendance measured by a commonly traveled route.<sup>xlii</sup>

## State Reimbursement of Transportation

*The state treasurer shall annually, on or before November twentieth, pay to the several towns subject to appropriation, the sums required as reimbursement for expenses approved by the commissioner of education, incurred by any town for the transportation of pupils... in excess of five dollars per annum per pupil in the net average membership of such town; provided, however, that (a) no reimbursement for transporting a pupil between school and home shall be made on account of any pupil who resides less than one and one-half miles from the school which he attends, measured by a commonly traveled route.*<sup>xliii</sup>

## Regional Transportation Reimbursement Funds (RTR Funds)

The Commonwealth allows regional school districts to establish Regional Transportation Reimbursement Funds or RTR funds. It allows regional districts to deposit state reimbursements and carry forward amounts not expended for the fiscal year in which they are received, though the amount carried forward must be spent in the following fiscal year.

*"Currently, regional school districts must estimate future reimbursements as they compile their budgets for the next fiscal year, which can occur in the fall or early winter before the Governor's proposed budget is released. Allowing regional school districts to carry forward current reimbursements allows them to more accurately plan for the following year's budget."*<sup>xliv</sup>

Some school districts may charge parents or guardians for their child's transportation services when the pupil resides within 1.5 miles of the school.<sup>xlv</sup>

## Appendix F: Statewide Pupil Transportation Profile

First, we consider the mix of student types found above by school district socioeconomic status. NJDOE began classifying school districts into "District Factor Groups" (DFG) in 1975 to compare student statewide assessment performance across socioeconomically similar districts. Decennial Census and state data is used to compare and classify districts, including educational attainment, occupational status, unemployment rate, poverty and median family income statistics.<sup>xlvi</sup>

Eight DFG groupings exist on a scale from "A" to "J" with A representing the lowest socioeconomic status and J the highest.<sup>xlvii</sup> For ease of analysis, these eight groupings were collapsed into four categories: low, medium-low, medium-high, and high socioeconomic status.

The data shows that over 20 percent of transported students by low socioeconomic school districts are special education and special needs students, a rate far higher than wealthier districts, and thereby generally increasing the baseline of transportation needs and costs.

Students Transported by District DFG Group (%)					
DFG Group	General	Special Education	Special Needs	Out-of-District	Courtesy
Low	45.4	10.5	11.0	4.9	28.3
Medium-Low	47.7	8.1	6.6	4.5	33.3
Medium-High	50.8	6.4	5.3	5.4	32.1
High	54.9	6.1	4.7	3.4	30.9

As the next section will further detail, notable variables to costs are the size of the district, the density of students transported per road mile, the number of schools to which students are transported, and the average mileage transported. Districts are notably similar with regards to the typical distance transported, with general students averaging between 4.9 and 5.8 miles and special education students averaging between 8.4 and 8.7 miles. Districts of low socioeconomic status have a higher density than other districts, which helps to alleviate some cost pressures. However, these districts also average more schools to service, averaging over 6 schools per district compared to under 4 schools at wealthier districts.

Average District Profile by District DFG Group						
DFG Group	Square Miles	Students		Number of District Schools	Avg. Miles	Avg. Miles
		Transported Per Road Mile	Transported, General		Transported, Spec Education	
Low	18.3	10.1	6.5	5.3	8.7	
Medium-Low	21.5	8.1	3.5	5.8	8.6	
Medium-High	21.9	9.1	3.9	5.2	8.4	
High	17.0	8.6	3.8	4.9	8.5	

These trends are more pronounced when district density is considered. School districts were classified as rural, suburban or urban based on 2010 Census tract data and a classification system developed in 2015 by *FiveThirtyEight*.<sup>xlviii</sup>

Special education and special needs students constitute more than 25 percent of students bused by urban school districts, approximately two times the proportion found in suburban and rural districts. Urban districts also transport more students out-of-district, while suburban districts exhibit a notably higher rate of courtesy busing.

Students Transported by District Density (%)					
District Density	General Students	Special Education	Special Needs	Out-of-District	Courtesy
Rural	64.8	7.5	5.0	1.9	20.7
Suburban	49.7	6.9	5.3	4.0	34.2
Urban	42.0	10.6	15.3	9.9	22.1

Rural districts are larger and less dense than their suburban and urban counterparts, with less schools serviced per rural school districts compared to suburban and urban districts. Surprisingly, the average distance required to transport students in the average rural school district is only minimally longer.

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Average District Profile by District Density					
District Density	Square Miles	Students Transported Per Road Mile	Number of District Schools	Avg. Miles Transported, General	Avg. Miles Transported, Spec Education
Rural	47.7	5.5	1.7	5.6	9.4
Suburban	18.2	9.5	4.1	5.2	8.4
Urban	3.4	10.4	7.7	5.2	8.3

Last, the mix of students and average district profile is considered by district type. School districts were categorized as “K-12”, “Elementary” only, and “Secondary” only.<sup>xlix</sup> Under this classification scheme, less disparity exists when the proportion of special needs and special education students are considered, comprising between 12 and 14 percent of students bused. Courtesy-based students make up a smaller proportion of students transported in secondary-only school districts compared to K-12 and elementary-only districts.

Students Transported by District Type (%)					
SD Type	General Students	Special Education	Special Needs	Out-of-District	Courtesy
K-12	48.7	7.0	7.2	5.0	32.1
Secondary	59.8	10.5	4.2	4.1	21.4
Elementary	48.3	7.2	5.1	2.9	36.5

Secondary-only districts, comprised of multiple elementary districts each, average to cover a much larger area than other district types. K-12 districts average more students per road mile but service more school facilities on average. Elementary districts, meanwhile, exhibit the shortest average distances transported for all student types for which data is available.

District Density	Square Miles	Students Transported Per Road Mile	Number of District Schools	Avg. Miles Transported, General	Avg. Miles Transported, Spec Education
K-12	14.1	11.1	5.6	5.7	8.6
Secondary	66.9	5.6	1.7	5.8	12.4
Elementary	18.1	5.4	2.3	4.5	7.3

## Appendix (continued)

- i N.J.S.A. 18A:39-1 et. seq.
- ii As a supplement to our report model, we note in the Appendix how this incentive factor correlates with our model and transportation system efficiencies.
- iii <https://www.schoolbusfleet.com/news/730673/new-jersey-lawmakers-approve-10-school-bus-safety-related-bills>
- iv With the exception of the City of Baltimore, which, given its size, operates at a “county-like” scale.
- v <http://www.marylandpublicschools.org/about/Documents/DBS/FactBook/FactBook20142015.pdf>
- vi More detailed information on Maryland—and another case study state, Massachusetts, can be found in the Appendix.
- vii Per data downloaded from the Transportation section of the North Carolina Department of Public Instruction’s “Statistical Profile Online” tool available at <http://www.dpi.state.nc.us/fbs/resources/data/>
- viii <http://www.k12.wa.us/transportation/STARS/default.aspx>
- ix “Special needs” students have specific transportation services-related requirements based upon their IEPs.
- x 2017-18 Budgeted Costs Amount Per Pupil: \$15,954. Or, 7 percent of the 2016-17 Costs Amount per Pupil: \$20,849 (latest data available). The “budgeted costs” does not include: “pensions paid by the state on behalf of districts, local contribution to special revenue, tuition expenditures, interest payments on the lease purchase of buildings, transportation costs, residential costs, and judgments against the school district. Also excluded from this per pupil calculation are equipment purchases, facilities acquisition and construction services, debt service expenditures, and expenditures funded by restricted local, state, and federal grants (other than the special revenue funds noted above).”
- xi See the Methodology section for data collection and analysis details.
- xii “Model 2” in Appendix C
- xiii \* Statistically significant at the p<0.05 level
- \*\* Statistically significant at the p<0.01 level
- \*\*\* Statistically significant at the p<0.001 level
- xiv Technically, one standard deviation (the amount of difference between a sub-group’s performance and the group’s performance as a whole) corresponds to approximately 37 percent of expected transportation spending: unsatisfactory: Overspent one standard deviation or more; Needs Improvement: Overspent between 0 and 1 standard deviation; Satisfactory: Underspent between 0 and 1 standard deviation; Excels: Underspent at a rate one standard deviation or less.
- xv <https://www.nj.gov/education/finance/transportation/drtrs/videos.shtml>
- xvi <https://www.nj.gov/education/finance/transportation/efficiency/methods.pdf>
- xvii <https://www.nj.gov/education/finance/fp/ufb/>
- xviii <https://www.nj.gov/education/finance/fp/af/coa/coa1718.pdf>
- xix line\_no = 52480; account = 11-000-270-XXX; line\_desc= Total Undist. Expend.-Student Transportation Serv.
- xx <https://www.nj.gov/education/finance/rda/dfg.shtml>
- xxi <https://www.nj.gov/education/guide/2018/>
- xxii <https://www.nj.gov/education/finance/fp/audit/1718/>
- xxiii <https://www.nj.gov/education/finance/transportation/efficiency/>
- xxiv <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>
- xxv [https://njgin.state.nj.us/NJ\\_NJGINExplorer/DataDownloads.jsp](https://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp)

## Appendix (continued)

xxvi 2017 TIGER/Line Shapefiles / prepared by the U.S. Census Bureau, 2017 <https://www.census.gov/geo/maps-data/data/tiger-line.html>

xxvii QGIS Development Team (2019). QGIS Geographic Information System. Open Source Geospatial Foundation Project. <http://qgis.osgeo.org>

xxviii <https://fivethirtyeight.com/features/how-suburban-are-big-american-cities/>

xxix R Core Team (2018). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.

xxx RStudio Team (2016). RStudio: Integrated Development for R. RStudio, Inc., Boston, MA <http://www.rstudio.com/>.

xxxi <http://marylandpublicschools.org/about/Documents/DBS/Transportation/FactBook20142015Transportation.pdf>

xxxii (<http://dls.maryland.gov/pubs/prod/Educ/OverviewOfEducationFundingInMaryland.pdf>)

xxxiii <https://law.justia.com/codes/maryland/2013/article-ged/section-5-205/>

xxxiv ([http://dls.maryland.gov/pubs/prod/NoPblTabMtg/CmsnInnovEduc/2018\\_10\\_10\\_FormulaPrimer.pdf](http://dls.maryland.gov/pubs/prod/NoPblTabMtg/CmsnInnovEduc/2018_10_10_FormulaPrimer.pdf))

xxxv <https://law.justia.com/codes/maryland/2013/article-ged/section-7-805/>

xxxvi <http://www.marylandpublicschools.org/Documents/adequacystudy/AdequacyStudyReportFinal112016.pdf>

xxxvii <https://www.montgomeryschoolsmd.org/budget-101/pdf/FY2019-AllocationofStaffing2014to19-Table5.pdf>

xxxviii <http://mdrules.elaws.us/comar/13a.06.07>

xxxix Sec. 13a.06.07.15.

xl Sec. 13a.06.07.20.

xli <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXII/Chapter71/Section68>

xlii <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXII/Chapter71/Section16C>

xliii <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXII/Chapter71/Section7A>

xliv <http://www.doe.mass.edu/news/news.aspx?id=17814>

xlv [http://www.thesunchronicle.com/news/local\\_news/attleboro-considers-modifying-school-bus-eligibility/article\\_a7e7846d-c3cf-5d00-a29c-1a8641cd9920.html](http://www.thesunchronicle.com/news/local_news/attleboro-considers-modifying-school-bus-eligibility/article_a7e7846d-c3cf-5d00-a29c-1a8641cd9920.html)

xlvi <https://www.nj.gov/education/finance/rda/dfg.shtml>

xlvii State records do not show these categories to have been updated with the 2010 Census, so 2000 groupings were used after comparing 2000 groupings to 1990 codings and determining there to be little notable variation: 68 percent of districts maintained the same score from 1990 to 2000, and 170 of the 174 districts that changed moved only one score higher or lower.

xlviii Districts with more than 2,000 households per square mile = "Urban"; districts with less than 100 households per square mile = "Rural"; all others "Suburban". Our analysis identified 79 rural, 350 suburban, and 92 urban school districts in New Jersey. Based off methodology discussed at <https://fivethirtyeight.com/features/how-suburban-are-big-american-cities/>

xlix Based on geographic information systems (GIS) data available at the New Jersey Office of Information Technology's NJ Geographic Information Network (NJGIN). [https://njgin.state.nj.us/NJ\\_NJGINExplorer/DataDownloads.jsp](https://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp)