TRANSPORTATION ADVISORY SERVICES

Recommendations for Conversion to Electric School Buses

Chappaqua CSD

April 2024

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Introduction 1

Transportation Advisory Services (**TAS**) was engaged to perform an analysis of the student transportation program of the Chappaqua CSD (hereinafter referred to as the "District"). The purpose of this Study was to provide a third-party perspective on the transition to fully electric vehicles for the current transportation system.

The District's liaison for the project was Joshua Culwell-Block, Assistant Superintendent for Business Administration for the Chappaqua CSD. Christopher Wojciechowski served as the consultant for **TAS**. The district currently contracts out their transportation services to Chappaqua Transportation Inc.

An overview of all aspects of the school transportation program transitioning over to and electric fleet to comply with the New York State mandate was sought by the District. Some of the concerns were pertaining to the routing and the various costs that the district will occur over the next decade as the district transitions. Another area of focus in the study was the potential options for buses and charging units.

We have addressed in this report areas that we believe the District should consider making changes to the procedures and/or the structure of the program to enhance the operating efficiency of the overall program. It is important for the reader to keep in mind that the current practices include long-standing historical practices in the Community and the District.

Legislation

- New York State passed legislation which require School Districts to transition their fleet to zero emission vehicles.
- All vehicles purchased after July 1, 2027, are required to be Zero Emissions
- The entire fleet must be all zero emissions by July 1, 2033
- There is a two-year waiver that districts may apply for to change the deadline of having a completely zero emission fleet to July 1, 2035.

Introduction

Transition

There are significant challenges and changes that need to occur in order for the District to transition their entire fleet to electric by 2035. There are several different key projects the district needs to accomplish to accomplish this. The categories to consider are:

- Infrastructure
- Operational
- Power
- Chargers
- Fleet
- Battery

The transition to an all-electric fleet is not possible in a year or two and the process will require years of planning. We have provided a sample timeline on the following pages.

Chappaqua CSD reported an enrollment of 3,546 students in District schools, grades K through 12, for the school year (2022-2023).

According to State Transportation Aid reports, the District encompasses 19.056 square miles, receives a gross transportation aid rate of 41%.

STUDY PROFILE

Transportation is currently provided utilizing a three-tier routing system to/from the District schools, with bell times noted below:

School	Address	Grade
DOUGLAS G GRAFFLIN SCHOOL	650 KING ST CHAPPAQUA, NY 10514-3815	K-4
ROARING BROOK SCHOOL	530 QUAKER RD CHAPPAQUA, NY 10514-2017	K-4
WEST ORCHARD SCHOOL	25 GRANITE RD CHAPPAQUA, NY 10514-1499	K-4
SEVEN BRIDGES MIDDLE SCHOOL	222 SEVEN BRIDGES RD CHAPPAQUA, NY 10514	5-8
ROBERT E BELL SCHOOL	50 SENTER ST CHAPPAQUA, NY 10514-3492	5-8
HORACE GREELEY HIGH SCHOOL	70 ROARING BROOK RD CHAPPAQUA, NY 10514-1700	9-12

Throughout this report we provide our perspectives and recommendations on several areas, including Route Analysis, School Bus Analysis, Charger Selection, Battery Analysis, Infrastructure, Financial, Transition, and Power Generation. Some recommendations contained in this report can be addressed by the District in the near-term while other changes may need to be considered "goals" and achieved over the longer term. *In some areas the desired changes may necessitate labor negotiations, or changes to contractual agreements, and these types of changes can be very difficult and time-consuming. The District may need to implement some of the changes over an extended period of time.*

We commend the District for their willingness to conduct a third-party review of the transition to electrifying their fleet. We often caution districts… *"Don't ask the question if you don't want to hear the answer"*. The Chappaqua CSD has been willing to be open and cooperative in our review of the District's transportation services.

We believe this report will provide the Administration with a thorough understanding of the issues, and insights on the pros and cons of making the type of changes which would help the program meet the mandates implemented upon schools in New York. Community's educational needs at the lowest possible cost.

Methodology 2

The first step in any transportation study is to gain a detailed understanding of the Department's operations and the key financial metrics that report on its operations. To begin this process, **TAS** provided the District with an request for background information as well as specific transportation data related to the facility, the fleet of vehicles, the maintenance program, the labor agreements in place, the financial reporting, and the routing procedures currently being utilized. Upon receipt of this data, and the performance of on-site interviews, **TAS** was able to gain a detailed understanding of the District's overall transportation program.

The following activities were undertaken as part of our analysis:

1) Based upon discussions with District leadership, **TAS** conducted interviews with appropriate District employees and stakeholders. **TAS** met with transportation individuals on-site at the District:

2) Additional documents and analyses were provided by the District in response to questions raised during the analysis process. Throughout the review process, additional items were discussed or provided via telephone conversations or email.

The District staff members were exceptionally responsive in providing all information requested in a thorough and timely fashion.

3) This document constitutes our written report to the District. A digital copy of this report is being provided to various District representatives. A copy of the report should be provided to the State Education Department as supporting information for the District's request for transportation aid. This report is intended to serve as an advisory document and resource for the District, and as such it should be reviewed and evaluated by the District for its applicability to the circumstances at the time of the review.

Methodology (cont.)

4) The following information was utilized as a part of our analysis of the District's transportation program:

a) Enrollment data
b) Line-item financial reports and various budget documents
c) NYS Transportation Aid reports
d) Board Transportation Policies
e) Fleet listing with bus use data
f) Bus ridership and run time reports
g) Miscellaneous District-prepared analyses, forms and reports

TAS *uses available information and its experience to estimate the potential costs and/or savings of transportation service arrangements described in this study. Although experience can be an excellent basis for projections, TAS does not warrant that the costs or savings estimated herein will be realized if implemented.*

Executive Summary 3

As stated in the Introduction section of this report, the comments contained herein pertain to those aspects of the engagement that are within the scope of the study as determined by the District.

Process Recommendation

This report contains several recommendations. We suggest that the District request a review of the report in detail by the transportation leaders, with the intention of summarizing the recommendations and responding with comments or changes. In those instances where the recommendations should move forward, the Transportation leaders should propose a timeline for implementation along with an estimate on the cost or potential savings. The department should then be held accountable for implementation. As mentioned, in some cases the implementation of recommendations may be delayed due to contractual limitations.

In those instances where there is a disagreement with the suggestions or recommendations in this report, the transportation leaders should document the disagreement and support the Department's position. Alternatively, a different approach to the same end could be recommended by the Department.

Recommendations pertaining to each section of this report are embodied in those sections. Some of those recommendations are also included here in summary for ease of reference. For a more definitive discussion of each topic, please refer to the section itself. The following recommendations are not listed in any prioritized order.

Route Analysis 4

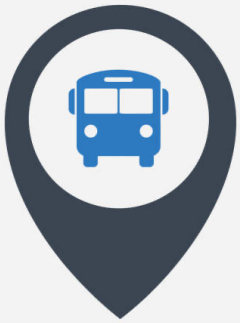
Existing Routes

The district has 50 route buses that service the in-district schools as well as out-of-district schools and BOCES programs. These bus routes cover between 2.2 miles and 45.7 miles each day with an average distance of 22.2 miles per day. The range a bus will need to travel without any midday charge equates to 2 miles at the minimum and 25 at the maximum.

Each bus will have time during the middle of the day to have the opportunity to charge. With current bus routes there is on at least 5 hours and 30 minutes to charge in between morning and afternoon runs. This number does not take in account the time that it takes to get back to the bus garage and to the school in the afternoon. The distance from the schools to the bus garage are less than five minutes in district and up to 30 minutes for out of district vehicles.

There will be a larger challenge for out-of-district buses and the reduced charge time that these buses will have midday. On the following page the current routes are detailed out with information pertaining to the size of the bus, distance traveled in the morning run and afternoon run distances, and the time in between these runs.

Another factor when considering routing and determining what types of vehicles should be utilized when it comes to electric vehicles are athletic trips. Athletic trips can be up to 60 miles away and with the current environment a 60-mile trip will be a large factor when purchasing buses. These longer trips will need to have extended batteries as well as need to be a standalone bus from afternoon home-to-school runs.
The analysis of these current runs are crucial to determine the types and size of buses that will be needed for the district to purchase to comply with the mandate set forth by the Governor's budget. We also believe it is crucial for the district to take a pragmatic approach when it comes to timing of replacing combustion engine vehicles.



Route Analysis

DOUGLAS G GRAFFLIN SCHOOL

Route Name	Vehicle # Assigned	# Students	Start Time	Finish Time	# Stops	Distance
G01-PM	514	44	03:20 PM	04:19 PM	41	9.2
G01-AM	514	44	08:10 AM	08:40 AM	41	9.0
G10-PM	601	41	03:20 PM	04:24 PM	39	11.4
G10-AM	601	41	08:12 AM	08:44 AM	39	10.9
G02-PM	509	47	03:20 PM	03:33 PM	36	3.5
G02-AM	509	47	08:23 AM	08:42 AM	35	3.4
G03-PM	523	49	03:20 PM	04:26 PM	51	8.9
G03-AM	523	49	08:11 AM	08:45 AM	51	8.6
G04-PM	505	44	03:20 PM	04:13 PM	40	7.2
G04-AM	505	44	08:19 AM	08:50 AM	39	6.7
G05-PM	513	45	03:20 PM	04:02 PM	27	3.9
G05-AM	513	45	08:24 AM	08:43 AM	27	5.1
G06-PM	511	37	03:20 PM	04:24 PM	47	10.0
G06-AM	511	37	08:13 AM	08:49 AM	45	7.7
G07-PM	520	50	03:20 PM	03:58 PM	28	3.1
G07-AM	520	50	08:29 AM	08:50 AM	28	3.1
G09-PM	616	42	03:20 PM	04:04 PM	34	3.1
G09-AM	616	42	08:30 AM	08:43 AM	34	2.9
GVAN 1 - PM	49	10	03:20 PM	03:54 PM	20	6.6
GVAN 1 - AM	49	10	08:20 AM	08:45 AM	19	4.8
GVAN 2 - PM	61	16	03:20 PM	03:42 PM	19	2.3
GVAN 2 - AM	61	16	08:33 AM	08:47 AM	19	1.9

Route Analysis

HORACE GREELEY HIGH SCHOOL

Route Name	Vehicle # Assigned	# Students	Start Time	Finish Time	# Stops	Distance
HSVAN1-PM	46	5	02:35 PM	03:20 PM	8	26.8
HSVAN1-AM	57	5	06:35 AM	07:30 AM	8	26.6
HS01-PM	611	82	02:45 PM	02:58 PM	42	9.4
HS01-AM	611	82	06:50 AM	07:23 AM	57	12.0
HS10-PM	616	73	02:45 PM	03:15 PM	39	10.0
HS10-AM	616	73	06:55 AM	07:23 AM	40	11.0
HS11-PM	615	87	02:45 PM	03:17 PM	49	8.5
HS11-AM	615	82	06:56 AM	07:28 AM	49	9.0
HS12-PM	517	92	02:45 PM	03:17 PM	33	5.4
HS12-AM	517	92	06:55 AM	07:16 AM	33	5.1
HS13-PM	520	82	02:45 PM	03:19 PM	58	8.1
HS13-AM	520	82	06:52 AM	07:19 AM	58	7.9
HS02-PM	600	73	02:45 PM	03:03 PM	52	11.6
HS02-AM	405	73	06:50 AM	07:22 AM	51	13.0
HS03-PM	606	79	02:45 PM	02:56 PM	37	7.8
HS03-AM	606	77	06:56 AM	07:27 AM	43	8.8
HS-04 AUX VAN AM	61	3	07:00 AM	07:40 AM	5	0.8
HS04-PM	610	104	02:45 PM	02:59 PM	41	10.2
HS04-AM	610	101	06:54 AM	07:24 AM	40	9.5
HS05-PM	510	100	02:45 PM	02:57 PM	31	7.1
HS05-AM	510	100	06:53 AM	07:25 AM	33	7.3
HS06-PM	523	59	02:45 PM	03:17 PM	49	9.9
HS06-AM	523	59	06:53 AM	07:23 AM	50	9.9
HS07-PM	609	51	02:45 PM	03:22 PM	54	12.0
HS07-AM	609	51	06:52 AM	07:30 AM	53	12.0
HS08-PM	512	89	02:45 PM	03:15 PM	34	8.5
HS08-AM	512	89	06:55 AM	07:33 AM	35	9.0
HS09-PM	399	143	02:45 PM	04:08 PM	51	12.7
HS09-AM	399	118	06:51 AM	07:25 AM	52	10.2
HS-09 AUX VAN AM	42	25	07:02 AM	07:35 AM	8	6.9
HS-03 AUX VAN AM	50	7	06:52 AM	07:40 AM	12	6.8

ROARING BROOK SCHOOL

Route Name	Vehicle # Assigned	# Students	Start Time	Finish Time	# Stops	Distance
RB01-PM	516	25	03:20 PM	03:52 PM	19	6.3
RB01-AM	516	25	08:21 AM	08:46 AM	19	6.5
RB10-PM	508	46	03:20 PM	04:00 PM	22	4.6
RB10-AM	508	46	08:30 AM	08:43 AM	22	4.2
RB11-PM	602	44	03:20 PM	04:07 PM	31	5.2
RB11-AM	602	44	08:21 AM	08:46 AM	30	5.0
RB02-PM	500	46	03:20 PM	03:50 PM	18	4.2
RB02-AM	500	46	08:27 AM	08:47 AM	18	4.3
RB03-PM	522	48	03:20 PM	04:09 PM	35	4.6
RB03-AM	522	48	08:19 AM	08:40 AM	34	6.4
RB04-PM	512	31	03:20 PM	04:00 PM	29	8.5
RB04-AM	512	31	08:15 AM	08:45 AM	29	5.4
RB05-PM	614	35	03:20 PM	04:02 PM	30	5.2
RB05-AM	614	35	08:25 AM	08:48 AM	29	6.5
RB06-PM	519	47	03:20 PM	04:22 PM	51	5.3
RB06-AM	519	47	08:18 AM	08:45 AM	50	4.8
RB07-PM	606	49	03:20 PM	04:09 PM	33	5.5
RB07-AM	606	49	08:24 AM	08:41 AM	32	5.9
RB08-PM	612	44	03:20 PM	04:00 PM	30	3.1
RB08-AM	612	44	08:27 AM	08:46 AM	30	3.5
RBV1-PM	53	12	03:20 PM	03:59 PM	31	5.8
RBV1-AM	53	12	08:03 AM	08:42 AM	31	6.0
RBV2-PM	58	10	03:20 PM	03:33 PM	11	1.2
RBV2-AM	58	10	08:26 AM	08:45 AM	12	1.4

ROBERT E BELL SCHOOL

Route Name	Vehicle # Assigned	# Students	Start Time	Finish Time	# Stops	Distance
B01-PM	601	30	02:40 PM	03:03 PM	28	7.6
B01-AM	601	30	07:22 AM	07:44 AM	27	8.2
B10-PM	405	48	02:40 PM	02:52 PM	26	4.8
B10-AM	520	48	07:23 AM	07:35 AM	27	5.5
B11-PM	522	39	02:40 PM	02:54 PM	16	2.0
B11-AM	522	39	07:33 AM	07:45 AM	18	2.4
B13-PM	513	53	02:40 PM	03:05 PM	41	9.0
B13-AM	513	53	07:15 AM	07:43 AM	40	7.6
B14-PM	505	52	02:40 PM	02:48 PM	37	4.1
B14-AM	505	52	07:24 AM	07:42 AM	36	3.3
B02-PM	509	47	02:40 PM	03:08 PM	24	7.4
B02-AM	510	47	07:21 AM	07:42 AM	24	6.0
B03-PM	604	41	02:40 PM	03:02 PM	34	6.2
B03-AM	604	41	07:08 AM	07:44 AM	32	5.7
B05-PM	614	48	02:40 PM	02:47 PM	33	3.9
B05-AM	614	48	07:29 AM	07:52 AM	31	4.2
B06-PM	511	40	02:40 PM	02:59 PM	33	4.6
B06-AM	511	40	07:28 AM	07:44 AM	32	4.9
B07-PM	514	34	02:40 PM	02:59 PM	37	8.3
B07-AM	514	34	07:14 AM	07:43 AM	36	8.3
B08-PM	608	48	02:40 PM	02:57 PM	30	4.6
B08-AM	608	48	07:27 AM	07:45 AM	30	6.0
B09-PM	602	46	02:40 PM	02:55 PM	23	3.8
B09-AM	602	46	07:24 AM	07:45 AM	25	4.4
BVAN1-PM	56	17	02:40 PM	02:50 PM	19	2.2
BVAN1-AM	54	17	07:35 AM	07:45 AM	19	2.4
BVAN2-PM	58	13	02:40 PM	02:56 PM	15	20.6
BVAN2-AM	61	13	07:20 AM	07:45 AM	16	9.1
B12-PM	501	46	02:40 PM	02:54 PM	29	5.0
B12-AM	523	46	07:27 AM	07:45 AM	28	4.6

Route Analysis

SEVEN BRIDGES MIDDLE SCHOOL

Route Name	Vehicle # Assigned	# Students	Start Time	Finish Time	# Stops	Distance
SB01-PM	618	36	02:40 PM	03:10 PM	38	8.7
SB01-AM	509	36	07:18 AM	07:49 AM	36	7.3
SB10-PM	518	36	02:40 PM	03:02 PM	45	6.0
SB10-AM	518	36	07:22 AM	07:44 AM	45	5.4
SB11-PM	612	45	02:40 PM	03:20 PM	33	5.9
SB11-AM	612	45	07:06 AM	07:45 AM	34	5.1
SB12-PM	519	45	02:40 PM	03:05 PM	38	6.0
SB12-AM	519	45	07:23 AM	07:47 AM	38	6.7
SB02-PM	516	48	02:40 PM	02:49 PM	46	5.4
SB02-AM	516	48	07:17 AM	07:47 AM	46	5.8
SB03-PM	521	40	02:40 PM	03:17 PM	32	5.5
SB03-AM	521	40	07:17 AM	07:55 AM	30	5.5
SB04-PM	500	40	02:40 PM	02:53 PM	44	5.3
SB04-AM	500	41	07:19 AM	07:51 AM	44	6.3
SB05-PM	603	43	02:40 PM	03:02 PM	42	5.5
SB05-AM	603	43	07:18 AM	07:44 AM	42	6.7
SB06-PM	508	33	02:40 PM	03:03 PM	32	7.6
SB06-AM	508	33	07:19 AM	07:49 AM	31	7.4
SB07-PM	607	43	02:40 PM	03:32 PM	41	8.9
SB07-AM	607	43	06:47 AM	07:45 AM	43	10.1
SB08-PM	613	39	02:40 PM	02:58 PM	36	5.1
SB08-AM	619	39	07:22 AM	07:47 AM	37	5.8
SB09-PM	617	28	02:40 PM	02:58 PM	31	5.6
SB09-AM	617	28	07:26 AM	07:46 AM	31	4.5
SBV01-PM	50	12	02:40 PM	03:21 PM	21	15.4
SBV01-AM	50	12	07:12 AM	07:42 AM	21	16.4
SBV02-PM	52	9	02:40 PM	03:07 PM	17	5.8
SBV02-AM	49	9	07:20 AM	07:42 AM	9	5.1
SBV03-PM	53	7	02:40 PM	02:55 PM	13	9.4
SBV03-AM	53	7	07:20 AM	07:45 AM	13	9.8

WEST ORCHARD SCHOOL

Route Name	Vehicle # Assigned	# Students	Start Time	Finish Time	# Stops	Distance
WO11-PM	615	44	03:20 PM	03:52 PM	24	2.4
WO11-AM	615	44	08:24 AM	08:46 AM	24	3.3
WO06-PM	607	31	03:20 PM	04:17 PM	39	11.9
WO06-AM	607	31	08:15 AM	08:40 AM	39	11.6
WO01-PM	521	52	03:20 PM	04:24 PM	40	10.8
WO01-AM	521	52	08:15 AM	08:44 AM	40	10.5
WO10-PM	604	38	03:20 PM	04:17 PM	41	6.8
WO10-AM	604	38	07:56 AM	08:45 AM	41	5.1
WO02-PM	610	46	03:20 PM	04:26 PM	51	7.5
WO02-AM	610	46	08:15 AM	08:40 AM	49	5.6
WO03-PM	617	45	03:20 PM	04:23 PM	49	4.4
WO03-AM	617	45	08:23 AM	08:45 AM	49	4.6
WO05-PM	603	45	03:20 PM	04:10 PM	37	4.5
WO05-AM	603	45	08:22 AM	08:40 AM	37	6.6
WO07-PM	608	42	03:20 PM	04:14 PM	40	5.6
WO07-AM	608	42	07:54 AM	08:40 AM	40	5.4
WO09-PM	600	46	03:20 PM	03:59 PM	27	4.5
WO09-AM	609	46	08:30 AM	08:44 AM	27	3.9
WOV1-PM	50	18	03:20 PM	03:49 PM	21	7.1
WOV1-AM	46	18	08:29 AM	08:49 AM	21	6.9
WOV2-PM	52	15	03:20 PM	04:03 PM	23	11.9
WOV2-AM	52	15	08:20 AM	08:45 AM	23	12.6

Ridership Audit

The District should conduct a ridership audit three times each year – fall, winter, and spring. Given the potential variations in ridership during the opening weeks of school, we recommend that the first audit not occur until early to mid-October. These audits are typically conducted over a five-day period, with the actual ridership numbers averaged for the five days. The audit should cover all scheduled runs. On routes where ridership is consistently low, route changes should be considered to increase ridership through consolidation of routes. Routes should be developed based on actual ridership, not eligible or theoretical ridership. For example, if a bus route historically experiences a 60% ride factor as compared to the number of scheduled riders, the bus could be scheduled for 90 riders knowing that only 54 typically ride. (Obviously, this example has not factored in riding time as a controlling factor in the route development).

The ridership audit data, coupled with the bus usage information, provides valuable insights into the efficiency of the transportation program and the District should make every effort to perform these audits as outlined and noted above.

For ridership audit purposes the capacity of full-sized buses is considered 44 for the Middle School and High School (MS/HS) runs and 66 for the Elementary school runs. These capacity limits were set by the district and are less than the actual capacity of the vehicles. The smaller vehicles are used for special education where the capacity utilization percentage is less important than the allotted time on the bus.

The two most critical factors to consider when assessing the daily runs are ridership capacity and run duration (the amount of time allotted for each run). Based on our analysis, some consolidation of routes may be achieved while also keeping the run time duration within a reasonable time frame.

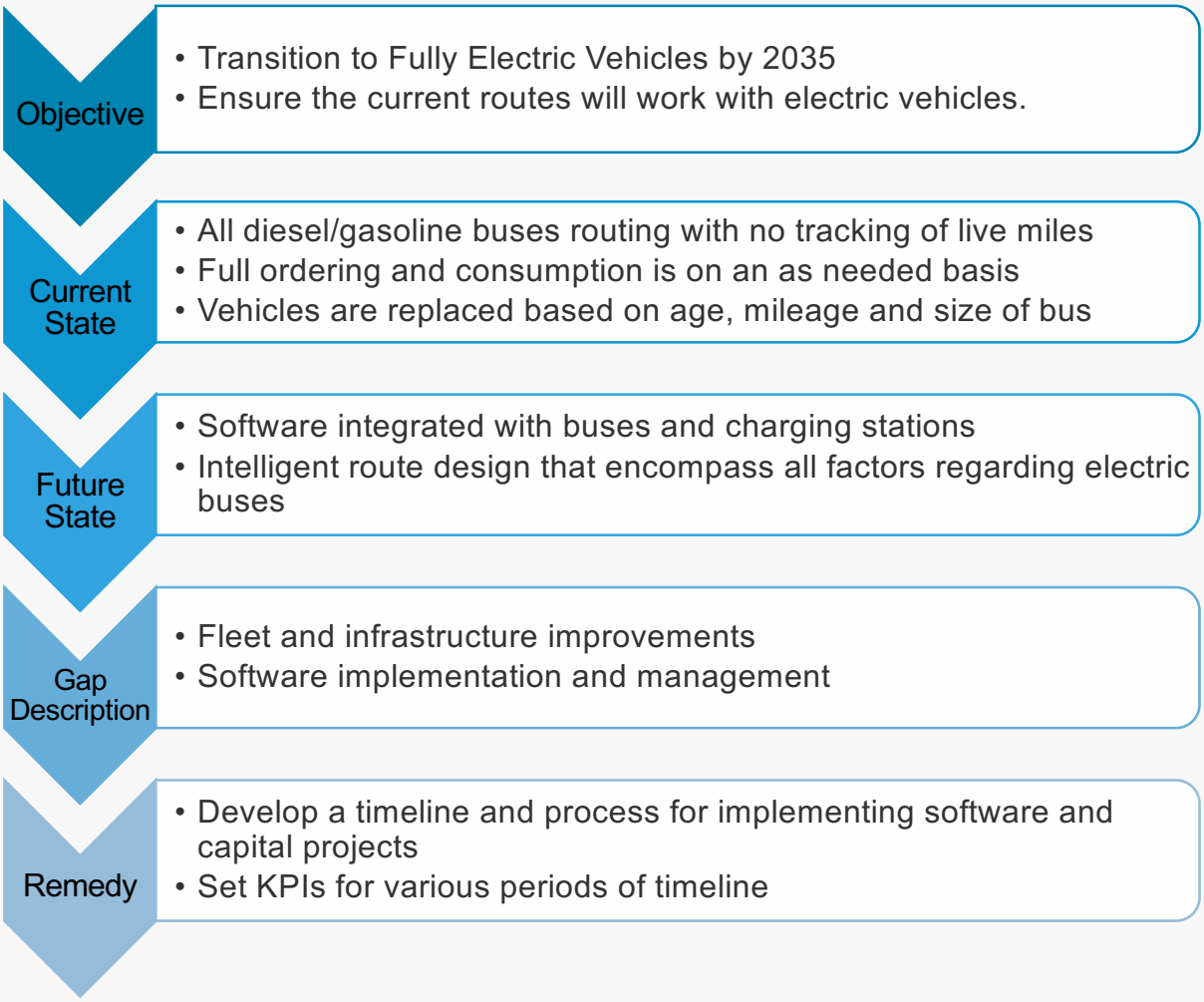
We typically recommend District's aim for around an 85% ridership capacity for each run. When creating and or updating routes a focus should be on increasing the capacity percentage while staying within the time constraints.

Route Analysis

Geography and Climate

The Chappaqua CSD is located in New York. The district encompasses 19.056 square miles. There is a district in upstate New York that is very similar to Chappaqua UFSD that is over 19 square miles and capable of utilizing electric buses today. The geography of the Chappaqua CSD is relatively flat compared to many of the surrounding districts. The main challenge when it comes to climate and geography would be the amount of snow that the district gets on a yearly basis.

GAP Analysis



School Bus Analysis 5

Existing Fleet

The District reports that it currently operates 93 student transportation vehicles. The District has 39 large route buses (capacity 66) and 11 small route buses (capacity 30 or less). Spares are used as a replacement during maintenance downtimes, DOT inspections, or supplemental vehicles should additional program demands occur such as athletic trips during the PM dismissal times.

Industry standards typically recommend a spare ratio of approximately 15% to 20% of the route vehicles (8-10 vehicles). The ratio can vary depending on extra-curricular demands, varying capacities, and the age/mileage of the fleet (older/higher mileage fleets need more spare buses due to maintenance issues), and varying vehicle capacities (a program needs redundancy for capacity and special features). The current spare vehicle profile includes 43 vehicles.

The District's spare ratio equates to 86%, with 43 spare buses and 50 route buses in service. Based on industry standards this ratio is significantly above the norm, and the District should take a strategic look at the number and composition of the spare vehicles and consider whether they are necessary to carry or not. Given the high cost of the electric vehicles it is more important that the district adheres to the spare ratio of 15-20%.

Districts occasionally mistakenly believe that spare buses are "free", given that many older spare buses have been paid for. However, these vehicles require mandated service and inspections, insurance, and space to park. Industry standards estimate that a spare vehicle costs $2,500 to $3,000 per year just to cover the labor, parts, and insurance expenses. In the case for the district leasing spares come with a significantly higher cost. Therefore, it is important that the district keeps their spare to route buses ratio as low as possible to avoid paying for a very new vehicle that is primarily sitting in the transportation department parking lot. When electric buses get added to the mix there is an added emphasis on this as there is a large amount of capital that is required for these buses.

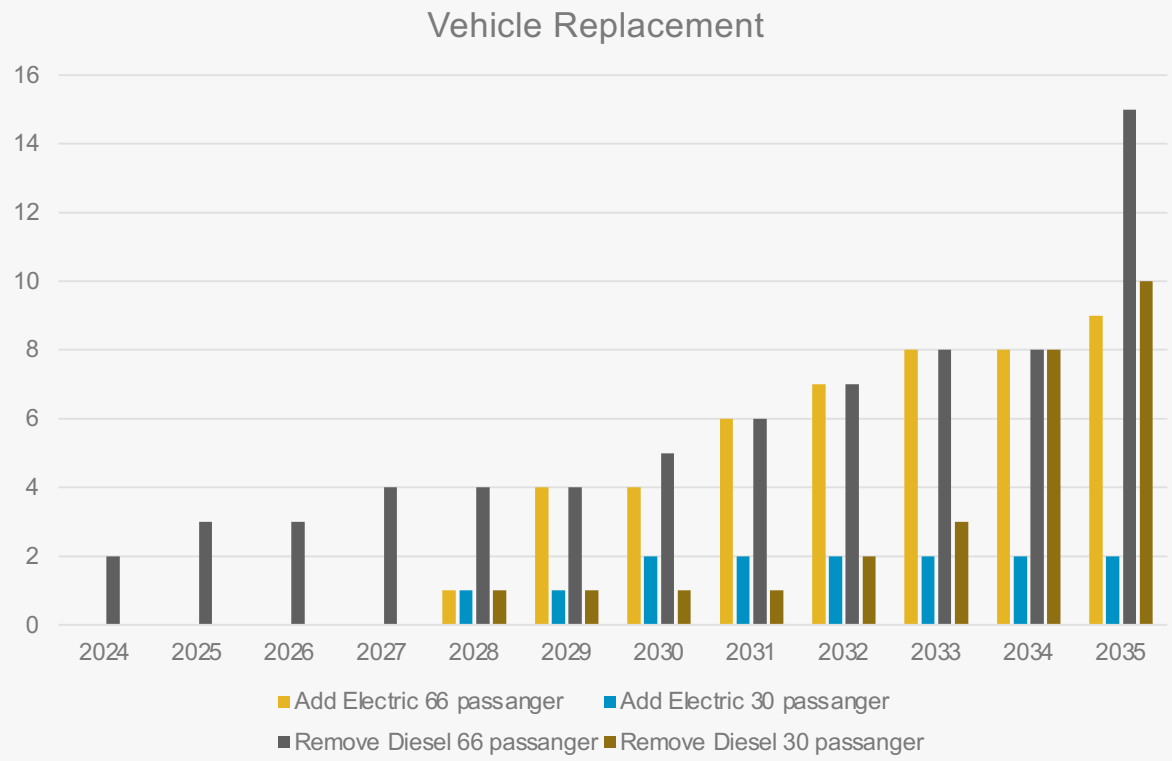
School Bus Analysis

Route Design

Given the existing routes there is several options for the district to pursue electrifying the districts fleet. When designing routes, it is imperative to optimize the routes to pick up the greatest number of students and the least number of miles.

Fleet Replacement Profile

When evaluating the District's fleet profile based on vehicle model year, we found there has needs to be consistency about adding new vehicles. Additionally, when discussing the topic of fleet replacement with District personnel, there should be a formal approach or strategy implemented upon which such decisions were based. While there is certainly some subjectivity related to fleet replacement, and several different criteria factor into these decisions, we believe that a consistent approach, based on a documented set of criteria is the most effective and efficient. When a District orders a lot of buses in one year it creates a bubble which makes passing bus bonds much more challenging. The below chart outlines a potential timeline for fleet replacement.



School Bus Analysis

Capacities on Bus

Currently the district is utilizing 66 and 30 passenger buses today. Given the current ridership the district should consider obtaining some smaller capacity passenger electric vehicles. These vehicles have a significant cost savings both upfront, fuel costs, and maintenance.

We also believe that due to the fact the districts biggest challenges will result from out-of-district runs that have low ridership it is imperative that the district acquires passenger vehicles before the July 1, 2027, deadline. Passenger vehicles have less yearly maintenance, and the fuel source will be more certain and less of a concern for the district and the students they transport.

Technology on the buses

There are other considerations when purchasing buses such as the type of equipment that inside of the bus. Some of the items the district should consider although they are as follows.

- Stop arm and camera
- Cameras
- Child-check-mate
- GPS
- Charging and routing software

Bus Options

The district needs to consider the following bus types when it comes to purchasing vehicles. The district will need to purchase both Type A (smaller buses) and Type C buses (larger buses) the following few pages are a comparison of a few different bus comparisons.

School Bus Analysis

Large Bus Comparison

Model	Blue Bird Vision	Lion C	Thomas – Jouley	IC Bus – CE Series
Price	$365,000+	$422,302	$437,000	$402,000-$462,000
Battery size	155	168	226	210-315
Range*	120	125	138	135-200
Recharge on L2 charger	8 hours	11 hours	8.25 hours	8 hours
Recharge on DCFC	3 hours (60 kW)	4.25 hours (50 kW)	3.4 hours (60) kW	3 hours (60 kW)
Warranty				
Battery	8 years 125,000 miles 160,000 kwh discharge	8 years / 160,000 kwh discharge	8 years 175,000 miles 200,000 kwh discharge	8 years / 175,000 miles
Drive	5 years / 100,000 miles	5 years / 100,000 miles	5 years / 100,000 miles	5 years / 100,000 miles

School Bus Analysis

Small Bus Comparison

Model	Micro Bird G5	Lion A	Motiv Epic E-450
Price	$251,425+	$343,162	$437,000
Battery size	88	84	120
Range*	100	75	100
Recharge on L2 charger	7 hours	6.5-11 hours	5.5-7.5 hours
Recharge on DCFC	50 (kW) 2 hours	50 (kW) 2.5-4.25 hours	80 (kW) 1.5-2 hours
Warranty			
Battery	8 years 100,000 miles 160,000 kwh discharge	8 years / 160,000 kwh discharge	8 years 175,000 miles 200,000 kwh discharge
Drive	5 years / 100,000 miles	5 years / 160,000 miles	5 years / 60,000 miles

School Bus Analysis

Recommendation

The districts route fleet profile consists of 39 large (type C) buses and 11 smaller (type A) buses. The district should also have 15-20% spare buses as well. Bringing the total recommended fleet profile to 47 large (type C) buses and 14 smaller (type A) buses. With the current relationship and preference for Leonard bus we will continue this report that the district will proceed with ordering buses as they always have been.

We would recommend that the district get 4 large buses with the extended battery and smaller buses. We will discuss the battery needs further on in the report. We believe in the just in time approach when it comes to acquiring vehicles. Our thought process is that the district should replace their last diesel bus in the summer of 2035. with that being please reference the chart on a previous page.



Charger Selection 6

Charger Options

When it comes to selecting chargers, the main factor is how many chargers and what type. With the need of the district, we believe most of the charging can be done overnight and in between runs. The only time a vehicle will need longer than the existing battery is when there is a longer athletic trip. In this situation we recommend that the district has a vehicle specifically for this purpose.



The Terra AC Wallbox

Chargers

Below are the three options of chargers currently available that the district may purchase. Our recommendation will be based on the following data.

Charger Pricing:	Cost
Level 2 AC Output EV Charger - 19.2kW Max Output, 208/240VAC Input with (1) 25' SAE J1772 charging cable	$3,560
Level 3 DC Output EV Charger - 30kW Max Output, 480VAC 3-phase Input with (1) 16.4' CCS charging cable	$19,500
Level 3 DC Output EV Charger - 60kW Max Output, 480VAC 3-phase Input with (2) 16.4' CCS charging cables	$43,500

Charger Selection

Recommendation

We would recommend 4 DCFC (direct current fast charging units) and 50 level 2 chargers. We believe that only a few buses will need a full charge midday. We discuss where the chargers should be located in the Infrastructure section of the report. The DCFC units should be the 60 kW type chargers as these allot for one or two buses to be charged at a time. The fast-charging capability will allow a battery to be fully charged from 0 % battery usage to full in the amount of time between tiers.





Battery Analysis 7

When it comes to selecting which battery in a bus it is crucial to take a look at the battery capacity as this will be a good indicator of actual length. Factors to consider are weather, battery degradation and battery conservation.

Battery Conservation

It is best practice to keep the battery level above 10% to ensure extended battery life and keeping all functions of the bus working. Once a battery dips below 10% some non-essential functions start shutting down which include the following.

- Air Conditioning
- GPS
- Video Cameras
- Heating
- Lighting

These items may not be essential for the use of the bus, however there is an increased potential area of issue if these and other things shut off. Without the use of cameras and lighting it could put some students in a more dangerous situation.

Battery Degradation

From data already collected one thing to note is that the capacity of the battery will decrease about 2% each year. If the district will be utilizing these buses for ten year that will be up to 20% battery loss over the life of the vehicle. This loos of battery capacity also means that the length of the run will also decrease. If you start with the last year of your first purchased bus, we recommend that this bus is utilized on the shortest run since the capacity for bus would be the least for the fleet. The shortest current run is only 7 miles for the day, for this case we would not need to worry about battery degradation for this run.

We will need to account for this for all of the runs once the fleet us fully electric. On the next page we detail out the battery degradation and which buses to use on which runs.

Battery Analysis

The chart to the right indicated how each bus should be assigned on the first year of an all-electric fleet. There would be several buses that would be utilized as spares, and we would recommend that these buses are the oldest buses that the district has. The oldest buses in use will be 7-years-old electric buses that will have approximately 14% battery degradation. These vehicles would likely have a reduced distance that they could be covered reduced from around 100 miles down to 86 miles. We would also recommend 10-40% for inclement weather and 10% for the absolute minimum the district should let the battery get.

Bus #	Capacity	Daily Miles	2035 Electric Bus Age	Bus #	Capacity	Daily Miles	2035 Electric Bus Age
501	65	4.99	7	516	65	23.98	2
613	65	5.11	6	513	65	25.6	2
619	65	5.82	6	616	65	27.04	2
618	65	8.68	6	511	65	27.15	2
517	65	10.47	6	520	65	27.65	2
518	65	11.37	5	609	65	27.91	1
522	65	15.44	5	606	65	27.92	1
600	65	16.03	5	512	65	31.39	1
612	65	17.64	5	521	65	32.31	1
405	65	17.87	4	610	65	32.74	1
602	65	18.39	4	514	65	34.82	1
617	65	18.99	4	601	65	38.08	1
614	65	19.92	4	523	65	41.85	1
500	65	20.12	4	607	65	42.47	0
510	65	20.43	4	42	30	6.85	4
505	65	21.24	3	46	30	33.71	1
611	65	21.42	3	49	30	16.43	3
509	65	21.6	3	50	30	45.67	0
608	65	21.66	3	52	30	30.22	1
519	65	22.78	3	53	30	30.99	2
399	65	22.86	3	54	30	2.35	5
615	65	23.24	3	56	30	2.17	6
603	65	23.35	2	57	30	26.55	2
508	65	23.72	2	58	30	23.13	3
604	65	23.76	2	61	30	14.06	4

Infrastructure 8

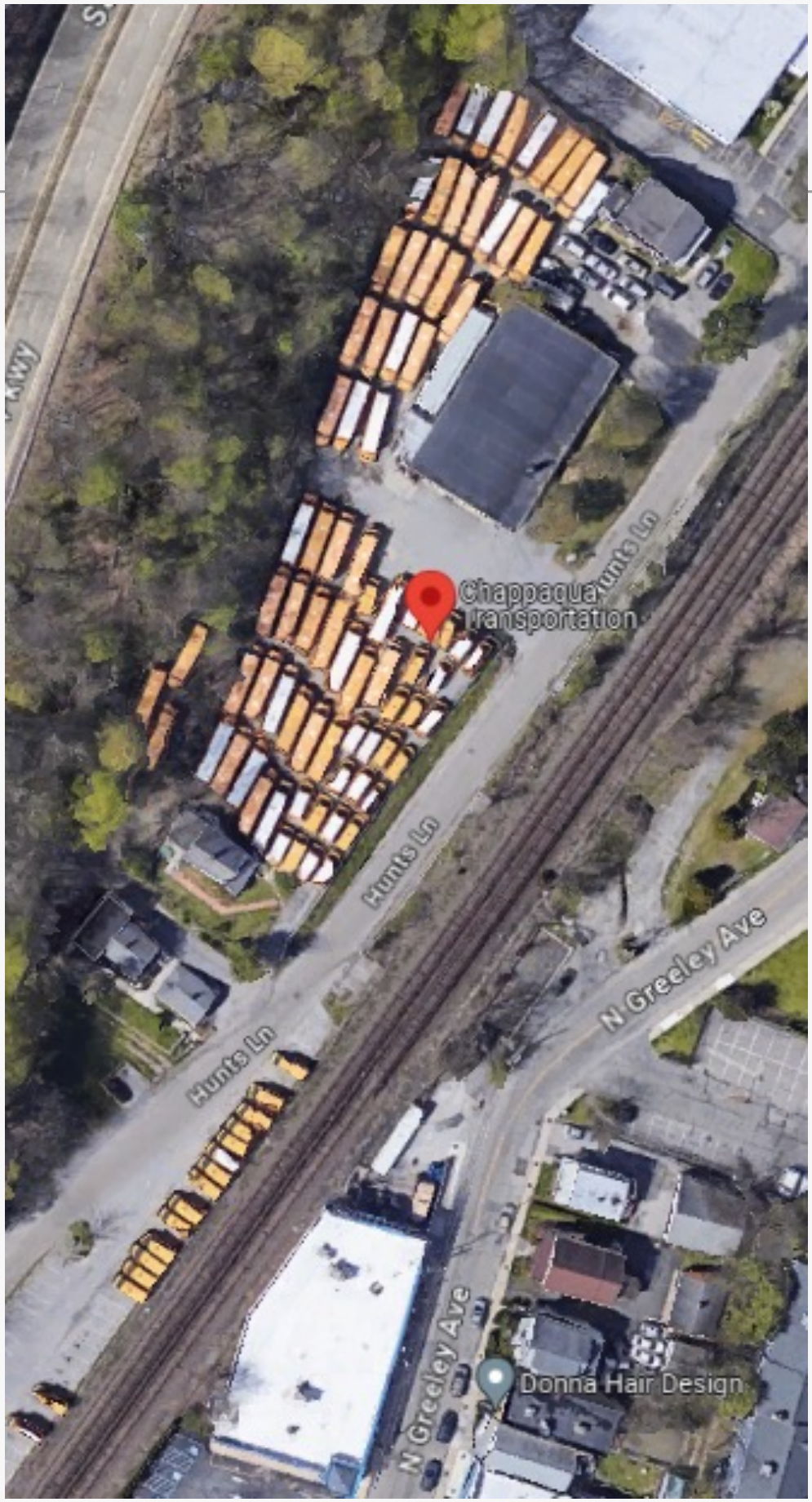
When considering the infrastructure needed the district needs to consider and implement the following items.

- Layout analysis
- Parking solutions
- Utility upgrades
- Charging needs
- Charger locations
- Fire safety equipment

The following page shows the existing garage and lot which is not sustainable for electric charging. We believe that the district cannot implement a charging layout given the existing facility. We believe that an entire new facility will be needed in order to transition to electric buses. There are several options that are could be considered for the transition. There are pros and cons regarding each option, and we will provide you with our recommendation.

The following page has the existing location of the bus garage. There are several flaws with the existing setup from a current operation, but the contractor does make the existing space work.

The current bus garage is not usable for electric vehicles and an alternate solution is needed.


Chappaqua Transportation
Hunts Ln
Hunts Ln
Hunts Ln
N Greeley Ave
N Greeley Ave
Donna Hair Design

Infrastructure (cont.)

Option 1

Require the contractor to locate a suitable facility for electric vehicles.

To meet the requirement of having a contractor locate a suitable facility for electric vehicles (EVs), several key considerations and infrastructure elements must be taken into account:

1. Facility Location and Layout

•Proximity: The facility should be conveniently located relative to bus routes, schools, and maintenance needs to minimize travel time and operational costs.

•Space Requirements: Adequate space is necessary to accommodate the fleet, charging stations, maintenance areas, and parking.

2. Charging Infrastructure

•Electric Vehicle Supply Equipment (EVSE): The facility must have sufficient charging stations that match the type and capacity required by the fleet.

•Power Supply and Grid Capacity: Ensure the facility's electrical supply can support the power demands of multiple simultaneous charges and explore options like upgrading transformers or adding battery storage systems if necessary.

•Charging Speed: Include fast chargers if quick turnaround times are needed, or level 2 chargers for overnight charging, based on fleet schedules.

3. Maintenance Capabilities

•EV Maintenance Area: The facility should have designated areas equipped with the necessary tools and technology to service electric vehicles, including lifts, diagnostic equipment, and specialized training for technicians.

•Battery Storage and Disposal: Safe storage and proper handling of batteries, including disposal plans for used or faulty batteries.

Infrastructure (cont.)

4. Safety and Compliance

•Fire Safety Systems: Given the specific risks associated with high-voltage EV batteries, the facility should have enhanced fire safety measures, such as specialized extinguishers and emergency protocols.

•Environmental Compliance: Ensure the facility meets local environmental regulations, including those related to emissions, waste disposal, and electrical safety.

5. Power Management and Efficiency

•Energy Management Systems: Implement smart charging solutions that optimize charging times based on energy costs and grid demand, possibly integrating renewable energy sources.

•Backup Power Solutions: Consider backup generators or energy storage systems to maintain operations during power outages.

6. Security and Monitoring

•Facility Security: Ensure proper security measures, such as surveillance cameras, secure access points, and lighting, to protect vehicles and equipment.

•Monitoring Systems: Use software to monitor vehicle charge status, maintenance needs, and energy usage.

7. Scalability and Future-Proofing

•Scalable Infrastructure: Design the facility with the potential to expand charging capacity as the fleet grows or evolves with advancing technology.

•Future Technology Integration: Plan for the integration of future technologies, such as vehicle-to-grid (V2G) systems or additional renewables.

8. Contractor Responsibilities

•Site Assessment and Selection: The contractor should conduct a thorough site assessment, including utility availability, zoning restrictions, and potential environmental impacts.

•Permitting and Compliance: Manage all necessary permits and ensure the facility meets regulatory and safety standards.
This approach ensures that the facility is well-equipped to support the operational needs of electric vehicles while being safe, compliant, and prepared for future growth.

Option 2

Acquire property to build a bus garage where a contractor may operate out of.

Acquiring property to build a bus garage where a contractor may operate involves several key steps and considerations. Here's a comprehensive guide on what is needed:

1. Site Selection and Assessment

•Location Analysis: Identify potential properties based on proximity to bus routes, schools, major roads, and maintenance facilities. Consider accessibility and ease of entry and exit for buses.

•Zoning and Land Use: Verify that the property is zoned for commercial or industrial use and specifically allows for vehicle storage, maintenance, and operations. Check any restrictions or special use permits required.

•Environmental Assessment: Conduct environmental site assessments (Phase I and Phase II, if needed) to identify any contamination or environmental concerns that could affect development.

2. Property Acquisition

•Land Purchase or Lease: Decide whether to purchase or lease the property based on long-term needs, costs, and financial feasibility. Negotiate terms that include future expansion options if required.

•Legal Due Diligence: Work with legal professionals to conduct title searches, ensure there are no encumbrances, and handle other legal aspects of the acquisition.

Infrastructure (cont.)

3. Financing and Budget Planning

•Funding Sources: Identify funding sources, such as school district budgets, bonds, grants, or other financing options.

•Cost Estimation: Develop a detailed budget that includes land acquisition, construction, permits, and any necessary environmental remediation.

4. Planning and Design

•Facility Design: Design the bus garage to include adequate parking for buses, maintenance bays, office space, fueling stations, and possibly electric vehicle charging infrastructure if future electrification is planned.

•Architectural and Engineering Services: Engage professionals to create blueprints, structural designs, and site layouts that comply with building codes and operational needs.

5. Permitting and Approvals

•Building Permits: Obtain all necessary building permits from local authorities, including construction, electrical, plumbing, and other relevant permits.

•Environmental Permits: Secure any environmental permits related to stormwater management, emissions, and waste disposal.

6. Infrastructure Development

•Utilities and Services: Ensure the site has or can be equipped with necessary utilities, such as water, electricity, sewer, and internet services.

•Road Access and Paving: Plan for proper road access, parking lot paving, and any required alterations to existing roads or entrances.

7. Construction Management

•Contractor Selection: Hire reputable contractors experienced in building transportation facilities. Ensure clear contracts are in place outlining timelines, costs, and quality expectations.

•Project Management: Manage the construction process to ensure it meets deadlines and stays within budget while adhering to all safety and quality standards.

8. Safety and Compliance

•Security Measures: Incorporate security features, including surveillance cameras, controlled access gates, and lighting.

•Safety Protocols: Design the facility with safety in mind, including emergency exits, fire suppression systems, and adequate ventilation.

9. Legal and Operational Readiness

•Operational Licensing: Ensure the facility is licensed and compliant with local, state, and federal regulations, including health and safety standards.

•Insurance: Obtain appropriate insurance coverage for property, liability, and operational risks.

10. Future Expansion and Sustainability

•Scalability: Design the site with future expansion in mind to accommodate additional buses or technology upgrades, such as electric vehicle charging.

•Sustainability Features: Consider green building practices, energy-efficient designs, and sustainable water management solutions.

This approach will ensure that the property acquisition and development process for a bus garage is thorough, compliant, and aligned with the operational needs of the contractor and the school transportation department.

Option 3

Build on existing property where a contractor may operate out of. Building on existing property where a contractor may operate involves modifying and enhancing the current site to accommodate the needs of a bus garage and its operations. Here are the key steps and considerations:

1. Site Assessment and Evaluation

•Current Condition Assessment: Evaluate the existing property's condition, including the state of buildings, pavement, utilities, and any other structures.

•Space Analysis: Ensure the property has enough space for bus parking, maintenance areas, office space, and any required future expansions.

Infrastructure (cont.)

•Zoning and Compliance: Check local zoning regulations to ensure that the planned operations are permissible on the property. Verify if any zoning modifications or special use permits are needed.

2. Design and Planning

•Facility Layout Design: Plan the layout to include parking areas for buses, maintenance bays, fueling or charging stations, and office space for staff and drivers.

•Architectural and Engineering Services: Hire professionals to draft detailed architectural and engineering plans. Ensure these plans meet safety, operational, and regulatory requirements.

3. Permitting and Approvals

•Building Permits: Obtain necessary building permits, including approvals for modifications or new structures. This may involve structural changes, electrical, plumbing, and mechanical work.

•Environmental Permits: Secure environmental permits if the modifications affect stormwater management, emissions, or require soil disturbance.

4. Infrastructure Upgrades

•Utility Upgrades: Ensure that the site has sufficient utility connections, including water, electricity, and sewer services. Upgrades may be needed, especially for electric vehicle charging or additional maintenance equipment.

•Roadway and Access Improvements: Improve or modify access roads, driveways, and entry points to ensure safe and efficient movement of buses.

5. Construction and Renovation

•Renovation of Existing Structures: Modify existing buildings to meet the operational needs, such as converting spaces into maintenance bays or offices.

•New Construction: If additional structures are needed, such as canopies for fueling or charging stations, garages, or storage facilities, these should be planned and built according to the designed layout.

Infrastructure (cont.)

6. Safety and Security Enhancements

•Safety Upgrades: Install fire suppression systems, safety barriers, proper lighting, and other safety measures in line with regulations and best practices.

•Security Systems: Add or upgrade security measures, including surveillance cameras, controlled access gates, fencing, and security lighting.

7. Operational Facilities

•Maintenance Bays and Equipment: Set up maintenance bays with appropriate tools and equipment for bus servicing. This includes lifts, diagnostic tools, and workspaces.

•Fueling or Charging Stations: Install necessary fueling or electric vehicle charging stations with consideration of future needs, like expanding EV capacity.

8. Compliance and Standards

•Accessibility Compliance: Ensure all buildings and access points comply with ADA (Americans with Disabilities Act) requirements.

•Operational Licenses and Inspections: Obtain all necessary licenses and have the site inspected as required to comply with local, state, and federal regulations.

9. Environmental and Sustainability Considerations

•Stormwater Management: Address any stormwater management issues, particularly if modifications affect existing drainage patterns.

•Energy Efficiency: Incorporate energy-efficient designs, such as LED lighting, insulation improvements, or solar panels, to reduce operational costs.

10. Project Management and Oversight

•Construction Management: Oversee construction and renovations to ensure they are completed on time, within budget, and meet the specified quality standards.

•Coordination with Contractors: Work closely with contractors to ensure that all modifications align with the operational needs of the bus garage and adhere to all safety and compliance standards.

By addressing these steps, building on an existing property can be efficiently managed, creating a functional, compliant, and safe facility for bus operations. The following page is one of two locations. The other potential option is to build a garage on an existing field on school property.

Financial 9

A key factor to the electric bus transition is the fiscal portion of the transition. There are many factors that the district needs to decide on when it comes to their financial approach.

Lease vs. Purchase

One of the items that the district could pursue is the option to lease their electric vehicles. The leasing option has some pros and cons. The main pros are as follows:

- The district will not need a proposition added onto the budget yearly
- Newer buses as leased vehicles are only a handful of years old
- Predictable Line-Item Budget
- Offers Flexibility for Capacity
- and Special Needs

The Cons are

- Higher yearly costs
- Creates a Budget Obligation
- Less internal control
- Another contract and people to manage

Grants

There are several options that the district can pursue. A main factor is to keep in mind is that grants and rebate programs are continuously coming up and being aware of the opportunities is very important. As of now there are several grants that the district could take advantage of to start their journey towards transitioning towards electrifying their fleet. I have provided a list of grants available to the district on the following page.

We believe the EPA Grant round three is the best fit for the district. We have highlighted the site on the links page

Financial

The following is a list of grants that would be applicable to the district. There are a list of links on the next page of this report that include the program website.

Disaster Relief Fund (American Rescue Plan)

Community Project Funding

Local Energy Action Program Pilot Initiative

State Energy Program

States' Economic Development Assistance Program

Energy Efficiency and Conservation Block Grant Program

Community Facilities Direct Loan and Grant Program

Congressionally Directed Spending

Infrastructure for Rebuilding America grant program

State Economic & Infrastructure Development Investment Program

Rebuilding American Infrastructure with Sustainability and Equity Grants

Connected Communities

Building Resilient Infrastructure and Communities

Improved Energy Technology Loans

Hazard Mitigation Grants Program

Congestion Mitigation and Air Quality Improvement Program

Disaster Recovery Supplemental Funding

Alternative Fuel Vehicle Research and Development Funding

Alternative Fueling Infrastructure Tax Credit

Alternative Fuel Infrastructure Tax Credit

Community Development Block Grants Entitlement Program

ZEV Fueling Infrastructure Grant for Municipalities

Electric Vehicle Supply Equipment (EVSE) Rebate

Public Transportation Innovation Program - 5312

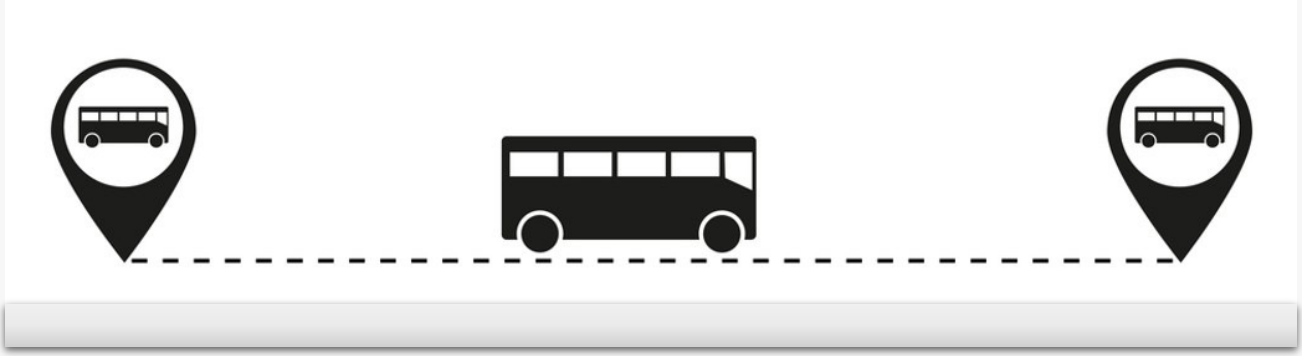
Financial

Program Website
https://electricschoolbusinitiative.org/how-apply-clean-school-bus-program-funding?utm_medium=email+&utm_source=article&utm_campaign=csbp_round2
https://www.fema.gov/about/reports-and-data/disaster-relief-fund-monthly-reports
Appropriations Requests | House Committee on Appropriations
https://www.energy.gov/communitiesLEAP/communities-leap
https://www.energy.gov/eere/wipo/state-energy-program-guidance
https://dra.gov/funding-programs-states-economic-development/states-economic-development-assistance-program/
Energy Efficiency and Conservation Block Grant Program | Department of Energy
https://www.rd.usda.gov/programs-services/community-facilities/community-facilities-direct-loan-grant-program
https://www.appropriations.senate.gov/congressionally-directed-spending-requests
The INFRA Grants Program | US Department of Transportation
https://www.nbrc.gov/content/economic-infrastructure-development-investments
https://www.transportation.gov/RAISEgrants
https://www.energy.gov/eere/solar/funding-opportunity-announcement-connected-communities
https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities
APPLICANT RESOURCES | Department of Energy
https://www.fema.gov/grants/mitigation/hazard-mitigation
https://www.law.cornell.edu/uscode/text/23/149
https://eda.gov/disaster-recovery/supplemental/
https://www.nyserda.ny.gov/All-Programs/Clean-Transportation-Program
https://www.tax.ny.gov/pit/credits/alt_fuels_elec_vehicles.htm
https://afdc.energy.gov/laws/10513
CDBG Entitlement Program - HUD Exchange
Grant Funding for Municipalities - NYS Dept. of Environmental Conservation
Charge Ready NY - NYSERDA
https://www.transit.dot.gov/funding/grants/public-transportation-innovation-5312

Transition 10

The following few pages are a timeline of each year and the recommended progression. It is important to note that the timeline will adjust will each year and progress that is made with each part in the process.

The timeline should be used as a guiding tool to get the district started with a transition plan and to plan before there is not enough time to comply with the regulations.



Transition

	Sample Electric Bus Plan				
	START DATE	October 01, 2024			
#	**PROJECT NAMES + TASK TITLES**	**Pre-Reqs**	**START DATE**	**END DATE**	**# of Days**
	Infrastructure		**10/01/24**	**09/30/26**	**522**
1	Layout Analysis		10/01/24	11/30/24	44
2	Hire Architect		10/01/24	01/30/25	88
3	Parking Solutions	1,2	01/31/25	07/30/25	129
4	Initial Layout	1,2,16	07/31/25	01/27/26	129
5	Financial Assistance	4	01/30/26	07/01/26	109
6	Funding Plan	5	07/02/26	09/30/26	65
	Operational		**10/31/24**	**10/01/27**	**762**
7	Route Requirements		10/31/24	12/30/24	43
8	Managed vs. Unmanaged Charging	7	12/31/24	03/02/25	44
9	OpEx Proposal	8	03/03/25	06/30/25	86
10	OpEx Approval	9	07/01/25	07/31/25	0
11	Facility Installation	10	08/01/25	08/01/27	521
12	Maintenance Training	11	08/02/27	10/01/27	45
13	Safety & Electrical Training	11	08/02/27	10/01/27	45
	Power		**03/02/25**	**02/16/28**	**773**
14	Understanding Power needs	21,22	03/02/25	04/29/25	42
15	Power Requirements	14	04/30/25	06/29/25	43
16	Contact Utility	15	06/30/25	07/30/25	23
17	Funding Plan	14	04/30/25	06/29/25	43
18	OpEx Proposal	17	06/30/25	07/30/25	23
19	OpEx Approval	18	07/31/25	08/29/25	22
20	Upgrade Transmission Lines	16,19	08/30/25	02/16/28	643

Transition

	Sample Electric Bus Plan				
	START DATE	October 01, 2024			
#	**PROJECT NAMES + TASK TITLES**	**Pre-Reqs**	**START DATE**	**END DATE**	**# of Days**
	Charger		**12/30/24**	**05/18/28**	**884**
21	Charging needs	7	12/30/24	01/29/25	23
22	Fast or Slow Charging	21	01/30/25	03/01/25	22
23	Funding Plan	22	03/02/25	06/29/25	85
24	Order Charger	23	06/30/25	06/30/26	262
25	Install Charger	24	02/17/28	05/18/28	66
	School Bus		**10/01/24**	**07/18/29**	**1252**
26	Lease vs. Purchase		10/01/24	11/30/24	44
27	Amortization Plan	26	12/01/24	01/30/25	44
28	Funding Plan	26,27	01/31/25	04/02/25	44
29	Financial Assistance	28	04/03/25	05/31/25	42
30	CapEx Proposal	29	06/01/25	06/30/25	21
31	CapEx Voter Approval	30	07/01/25	07/31/25	23
32	Order Bus	31,24	05/19/28	05/18/29	
33	Driver Training	32	05/19/29	07/18/29	
	Battery		**11/01/24**	**09/29/25**	**237**
34	Route Requirements	7	11/01/24	12/30/24	42
35	Develop KPIs	34	12/31/24	04/01/25	66
36	Amortization Plan	35	04/02/25	06/29/25	63
37	Funding Plan	36	06/30/25	09/29/25	66