

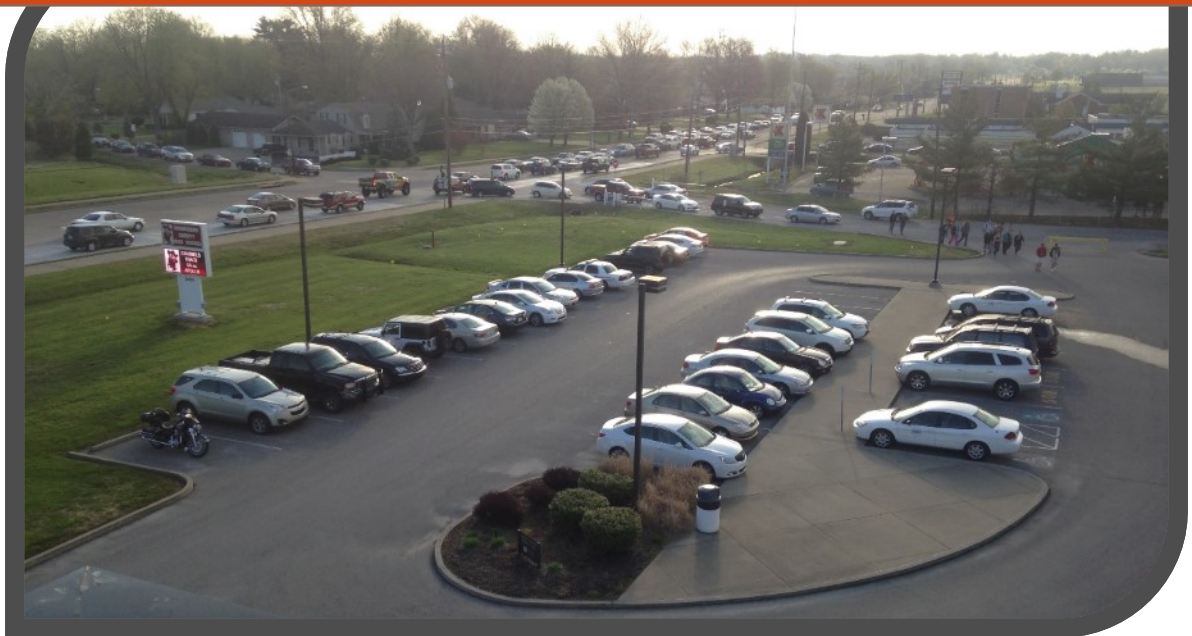


AMERICAN ENGINEERS, INC.

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HCHS Conceptual Traffic Study



Prepared for: Henderson County Schools

Date: June 2014

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Executive Summary

The Henderson County High School (HCHS) Conceptual Traffic Study was completed to identify and develop conceptual traffic plans for all modes of traffic on the grounds of HCHS, located at 2424 Zion Road (KY 351) in Henderson, KY. Existing conflicts with access, mode separation, and thoroughfare conditions were reasons conceptual alternatives were requested by the Henderson County Schools. Additionally, a planned Career and Technical Education (CTE) Unit expansion and a recent student pedestrian fatality on Garden Mile Road, resulted in Henderson County School's accelerated desire for this study.



Following data collection, site observations, concept development meetings, and refinement of preliminary concepts, American Engineers, Inc. (AEI) developed two final concepts. Each of the two concepts (1 and 2) have egress variation alternatives (A and B), as a result of ongoing property acquisition negotiations between Henderson County Schools and an adjacent property owner. The final concepts drastically modify the primary access points for vehicular traffic at HCHS. Bus traffic in each concept moves to the north side of campus and requires bus traffic to enter at the existing main school entrance directly across from Larue Road. Buses will stage in front of the school and will exit campus by way of the westernmost existing access on KY 351 (Zion Road).

Concepts 1A and 1B assume all peak (arrival/dismissal) non-bus vehicular traffic will access HCHS via a single point of entry on Garden Mile Road (location varies between 1A and 1B). Access to the east and north sides of campus will be restricted to permit staff and guests during peak times. Furthermore, all student drop-off traffic will utilize a single drop off location near the existing bus drop off location and will exit HCHS campus by way of the westernmost access on KY 351 (Zion Road).

Concepts 2A and 2B assume all peak (arrival/dismissal) non-bus vehicular traffic will access HCHS via dual entry points. One entry point will be on Garden Mile Road (location varies), while the second will be at the westernmost existing access point on KY 351 (Zion Road). Similar to Concepts 1A and 1B, access to the east and north sides of campus will be restricted during peak times. Concepts 2A and 2B will utilize dual student drop-off/pick-up zones to increase capacity and decrease peak volumes at specific locations on campus.

The resulting concepts will require capital investment by the Henderson County Schools. The initial infrastructure probable costs of construction for full implementation of a concept ranges from \$250,000 to \$325,000 (2014 dollars). Additionally, Henderson County Schools will need to coordinate with the City of Henderson regarding potential intersection / signalization improvements on Garden Mile Rd. Additional costs ranging from \$100,000 - \$650,000 (2014 dollars) are expected, depending on the scope of the improvements coordinated with the City of Henderson. The responsible party for these additional costs is not identified as part of this study. Additionally, the concepts provide 73 to 101 additional on-campus parking spaces, depending on the concept utilized.

If partial concept implementation is preferred, Henderson County School should plan on initial probable costs of construction on the order of \$130,000 (2014 dollars)

TABLE OF CONTENTS

Executive Summary.....1

Table of Contents.....2

Existing Conditions / Observations.....3

Key Considerations for Concept Development.....7

Outside Factors / Opportunities.....8

Summary of Concepts.....10

Suggestions for Implementation / Next Steps.....14

Appendix A.....15

Appendix B.....21



Existing Conditions / Observations

Based on information provided to AEI, information gathered from various sources, and more importantly by way of on-site observations between 4/17/14 and 4/25/14, the following existing conditions are identified:

ARRIVAL (Morning Peak – 7:00am to 8:00am)

NON-BUS TRAFFIC

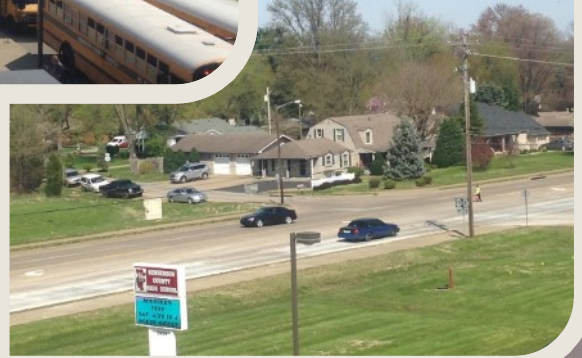
- City Traffic Guard directs traffic at LaRue/KY351/Main Entry intersection from approximately 7:00am- 8:00am
- The main faculty/staff/drop-off access is located less than 200' from the signalized KY 351/Garden Mile intersection.
- As a result, an inefficient situation exists. The Traffic Guard cannot coordinate traffic control with the Garden Mile Rd signal, KY 351 and Larue Rd traffic, departing vehicles, or pedestrians crossing main entry road on-campus grounds.
- Over 80% of the vehicles turning left onto KY 351 from Garden Mile Rd. make an immediate left into HCHS at the main entry on KY 351.
- Over 70% of traffic from Larue Rd enters HCHS by making a straight movement across KY 351. Less than 10% makes a left onto KY 351.
- 7:20am-8:00am → Crossing guard directs student walkers across the main entry road. Pedestrians cross incoming and outgoing vehicular traffic, and do so within 150-feet of the city traffic guard directing traffic on KY 351. 250-300 student arrive by foot during favorable weather conditions.
- 7:20am-8:00am → Staff entry guards deny/allow access to front parking and dedicated handicap drop-off area. This occurs within 200-feet of the city traffic guard directing traffic on KY 351.
- At times, there are upwards of 35-40 vehicles backed-up on campus waiting to depart onto KY 351.
- 10 – 20 vehicles drop off students in the rear student parking lot by way of Garden Mile Rd.
- There is little to no congestion in the rear student parking lot accessed from Garden Mile Road.
- Drop-off occurs in many creative ways/locations (ex: neighborhood to the west, driveways on Larue Rd, Kmart parking lot, Kangaroo Station, gated KY 351 entry, directly from vehicles on KY 351, etc.) as a result of inefficiencies on campus.
- Faculty/Staff designated to north parking lot (Blue/Green Units) use main entry. Depending on time of arrival, 3-4 traffic control personnel help direct these vehicles to their parking space. Approximately 40%-50% of the blue/green parking use a western entry into the main building once parked in the blue/green lot.

The main entry location at intersection of Larue Road and KY 351, and activities in the vicinity of this entry are the source/root cause of the majority of the traffic conflicts on the Henderson County High School Campus.

BUS TRAFFIC

- First bus arrives around 7:15am. Mr. Summers provides traffic control on KY 351 from 7:15am-8:00am.
- A total of 39 buses arrive to drop off students on a normal school day. Only 3 arrive from the south on KY 351. As the buses depart campus, 27 exit to the north on KY 351 and 12 exit to the south.





DEPARTURE (Afternoon Peak – 3:15pm to 3:45pm)**NON-BUS TRAFFIC**

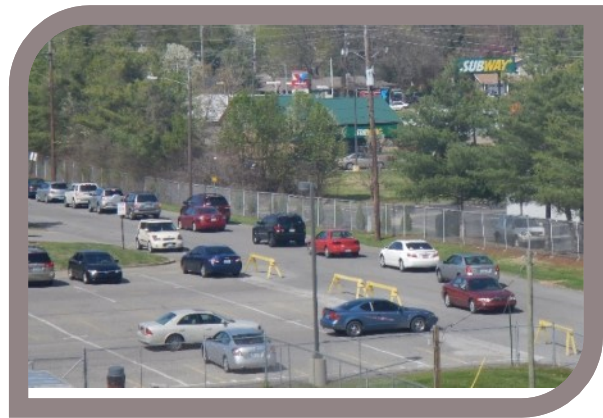
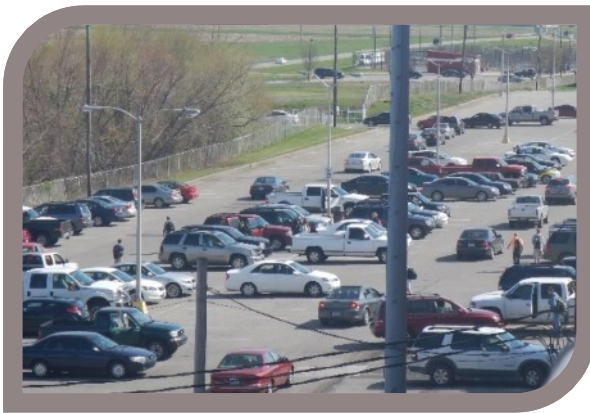
- City Traffic Guard is typically in place by 3:20pm to direct traffic at LaRue/KY351/Main Entry intersection.
- Crossing Guards, other staff, and traffic/pedestrian control are also typically in place by 3:20pm.
- Saw-Horse Barricades are moved into place at 3:20pm to restrict movements around main car-rider and staff campus exit (KY 351/Larue Road intersection).
- The designated car rider pick-up location in the back of the school only allows for 15 vehicles to stack in preparation of student pick-up, due to the lack of an enforced stacking pattern. Observations show that specific vehicles arrive and park in the same location (convenient to them) as a matter of “first-come first-serve” on a daily basis. This pattern has created a large amount of un-used staging space. As a result, pick up locations are segmented, and 2-3 other locations on campus have become “parent” dictated auxiliary pick-up locations.
- The eastern edge of the main exit road on campus is lined with vehicles for pick-up from the front of the school to rear designated pick-up loop without any continuity.
- Typically, 10-15 vehicles arrive, stage, and wait in an unorganized manner in rear student parking lot for car rider pick-ups. Subsequently, they proceed to exit onto Garden Mile Rd with the student drivers.
- Numerous vehicles completely avoid the HCHS campus and park in the Kangaroo Gas Station Parking Lot, the Spuds-N-Stuff parking lot, and the Kmart parking lot. As a result, a large number of student pedestrians cross the main exit location on campus, just to walk an additional distance to get in a car to ride home. This pattern is a perfect example of how inefficient traffic patterns and unnecessary waiting times on campus grounds, have resulted in alternative exit/dismissal strategies becoming commonplace at HCHS.
- Vehicles also line the west shoulder and driveways of Larue Road to pick up students at departure. Student are actually walking, crossing a busy state highway, and avoiding on-site car-rider departure because it is easier and less frustrating. Yet, it is definitely not the safest way for departure.
- At approximately 3:21pm, student pedestrians start exiting the building.
- At approximately 3:25pm-3:27pm, student pedestrians are leaving in earnest. The vast majority exit the HCHS campus to the northeast crossing the main entry/exit roadway thus requiring the secondary crossing guard. Approximately 450-500 students leave campus on foot when there are favorable weather conditions.
- The volume of pedestrian students leaving campus by foot, just to cross Garden Mile Road (away from KY 351), is large enough that a second city provided traffic guard/policeman is needed at the northern entry into Kmart parking lot on Garden Mile to help with traffic control and pedestrian crossing.
- Not a single student pedestrian uses the crosswalk at KY 351/Garden Mile to get to the north side of KY351. Every pedestrian needing to get to Larue Road or the north side of KY 351 utilizes the city traffic guard.
- As a result of the conflicts around the main exit at Larue/KY351 intersection and the KY 351/Garden Mile Rd signalized intersection, a large quantity of traffic is trying to bypass the congestion by using the Garden Mile Shopping Center access on KY 351. This pattern is a result of unsynchronized traffic control, inefficient use of the traffic signal at KY 351/Garden Mile Rd, car riders getting in vehicles in the Kmart parking lot and Kangaroo Gas Station, and a large amount of student drivers travelling north onto Garden Mile Road.
- City Traffic Guard at the main exit on KY 351 is typically gone between 3:42pm-3:45pm. Traffic remains backed up on Garden Mile Road only for a short time after traffic control at the main school exit concludes.

Similar to the arrival peak time period, the main exit location at Larue Road and KY 351 along with activities in the vicinity of this exit are the source/root cause of the majority of the traffic conflicts on the Henderson County High School Campus.



BUS TRAFFIC (AFTERNOON DEPARTURE)

- For the daily departure cycle, buses start arriving at HCHS well in advance of 3:15pm.
- On typical days, all 23 buses that are responsible for delivering bus riders are on campus by 3:22pm.
- The entire fleet of buses (when they are all on-time) depart between 3:33pm and 3:40pm
- Of the 23 departing buses, only 3 buses make a right turn out of the HCHS campus onto KY 351.
- At approximately 3:20pm, the center entry gate on KY 351 allowing entry onto campus and departures onto KY 351 is closed.
- Mr. Summers is in positions for bus departure traffic control at 3:20pm
- Following bus departure, the center entry gate on KY 351 is typically re-opened by 3:35pm.
- Bus Traffic Control typically complete by 3:25pm

**Summary of Existing Conditions / Observations:**

Based on the existing conditions and AEI's observations, it is obvious the location and the associated activities in the close vicinity of the current main entrance and exit used by non-bus vehicular traffic (intersection of KY 351 and Larue Road) is causing the majority of the conflicts associated with traffic patterns (vehicles and pedestrian) at Henderson County High School. Some of the associated conflicts are directly related to on-going issues. However, the most concerning conflicts are those that have evolved over the years, as a result of the onsite traffic issues. Students, parents, and friends have all created their own "perceived" best way to arrive and depart campus. The challenge with an existing school the size of Henderson County High School, is developing and implementing a concept that helps alleviate a majority of the traffic conflicts on campus, while also reversing the perception of it being "easier to do it my way than the way the school wants me to do it."

Key Considerations for Concept Development

Concepts developed as part of this study took a number of specific considerations into account to maximize the benefits of each concept. Additionally, it is important to note the constraints of the site and buildings played a key role in the concept development. Ultimately, it limited the flexibility of the concepts. In no particular order, some of the key considerations are as follows:

1. SAFETY

- The primary concern for this study. Concept development involved safety evaluation not only on school grounds, but also in adjacent areas (Garden Mile Rd, Larue Road, etc.).

2. Ability for school staff to enforce the planned traffic pattern

- Enforcement is required, but making it as simple as possible is key.

3. Maximize On-Site Vehicle Stacking Capacity

- By increasing capacity, while maintaining thoroughfare efficiency, means less people are leaving the site before entering their intended mode of travel.

4. Separation of the Basic Modes of Travel (Bus, Vehicles, Pedestrians/Bikers)

- The best and safest school traffic plans eliminate the crossing and direct interactions of individual modes of travel. Not only is this an important design consideration, but an equally important operational consideration.

5. Minimize distance between vehicles and cover/entrance

- The shorter the distance, the more people will effectively use the plan.

6. Reversibility

- In the case that major widening/improvements take place on Garden Mile Road in the future, the concepts should be as reversible as possible. Such improvements could potentially make traffic flow work better in the opposite direction.

7. Prevent and/or eliminate conducive “cut-through” options

- If people have the ability to create a perceived easier option, they will try to take advantage without hesitation. Vehicles and people should take the intended route proposed in concepts without hesitation.

8. Reduction of Peak Volume

- By reducing the Peak Volume at any given location mean less people need to unload, pick-up, cross, or park within a given time period.

9. Ability to incorporate simple Maintenance of Traffic signage, barriers, and other elements.

- The needed/recommended signs, warnings, striping, speed bumps, or other safety devices should be able to be installed without the need for extravagant designs or excessive costs.

Outside Factors / Opportunities

The potential capital improvement projects that may be designed, developed, and constructed, as a result of this study, should involve an intensive evaluation of outside factors and opportunities. Not only will financial opportunities be important to the decision making process, but so will outside agency/government involvement, economic and commercial development, shifts in demographic patterns, and population growth. Some of the outside factors and/or opportunities taken into consideration as part the concept development include, but are not limited to:

1. **TAP Funding** – There is funding available from MAP-21’s Transportation Alternatives Program through the Evansville MPO as well as the Kentucky Transportation Cabinet’s Office of Local Programs. These funds are available via competitive application and are matching reimbursable funds from the federal government.
2. **City of Henderson Traffic Signal Installation / Intersection Improvements** – Since the pedestrian fatality on Garden Mile Road in January 2014, the City of Henderson and Henderson County Schools have had discussions, and the city may eventually agree to install a traffic signal and make some intersection improvements on Garden Mile Road in correlation with Henderson County School’s planned facility improvements/expansion.
3. **Property Acquisition** – There are significant amounts of adjacent property currently available or may become available to Henderson County Schools to expand HCHS footprint and accessibility. As part of the study, it was the understanding of AEI that negotiations to acquire some adjacent property is underway. This specific acquisition would help expand the CTE unit and improve access to HCHS from Garden Mile Road. Additionally, if future expansion or growth of HCHS is expected, further land acquisition should be adequately evaluated, as the land is known to become available. Typically, land becomes much more costly to acquire when there is an inherent need to acquire it. Therefore, the ability or need to acquire land for future expansion/improvement should always be a topic of discussion when considering other capital improvement projects.
4. **KYTC Unscheduled Projects List** – The KYTC maintains a lists of projects that have previously been identified and prioritized as needed project by local communities/governments. Some of the local priority projects are yet to be included or funded by way of KYTC’s road plan. These projects are typically referred to UPL projects, or unscheduled projects. Currently, based on research done as part of this study, there are two UPL projects in the vicinity of HCHS that should not be ignored. The fact they are UPL projects means they have been identified as a need, and the challenge becomes getting them included in the road plan and funded for completion. The two projects identified are:
 - a. **Garden Mile Road at KY 351 (2nd Street/Zion Road)** – This projects was identified as a local need in 2012 and involved intersection improvements, addition of dedicated turn lanes, and the widening of Garden Mile Road for an unspecified length. The estimated cost for this project was listed at \$3,350,000, which would most likely allow for intersection improvements and widening of Garden Mile Road back to the southern entrance into Kmart, if not further. KYTC District 2 acknowledged this project on the UPL list, but no recent attention has been given to the project.

- b. *Garden Mile Road at KY 812 (Airline Road)* – This project has also been identified as a local priority in the recent past, but it remains on the UPL list without funding or planned inclusion in KYTC’s road plan. The project was identified to include reconstruction of the intersection to correct the skew of Garden Mile Road, the additions of dedicated turn lanes, and installation of a phased traffic signal. The estimated cost for this project has been documented at \$1,350,000. KYTC District 2 acknowledged this project on the UPL list.
5. **Economic Development** – The Henderson/Henderson County community is actively working to attract new industry and business to the region. In the case that a large industry decides to invest in Henderson, it is important to ensure the HCHS campus is prepared for potential enrollment growth associated with such an expansion. Additionally, if HCHS facilities are not in good condition or capable of absorbing population growth, it is very feasible that potential industry will overlook Henderson County as a potential investment option.
6. **Interstate 69** – The looming completion of I-69 will have profound impacts on the Henderson/Henderson County region. Planned facility improvements and/or expansions should take into account various traffic patterns and demographic changes that could potentially occur once this monumental transportation project is completed.
7. **Population** – Current population figures for the Henderson area show a small reduction in the population of the community. It is important to understand this current trend, and to fully consider the variables driving this pattern as capital improvement projects are considered within the Henderson County Schools.
8. **Other local/state/federal/private grant opportunities** – There are various other grant opportunities for Henderson County Schools to pursue to help fund or finance capital improvement projects. Although Henderson County does not qualify for CMAQ (Congestion Mitigation and Air Quality) federal funding, there are other avenues that should continually be investigated.
9. **Local Ordinances and current/planned State or Federal legislation** – Local Ordinances and Legislation is ever changing, and keeping up with these movable parts is an important part of facilities planning and improvement plans. Knowing how things need to get done or where the money source is, sometimes is the first step in helping get a public capital improvement project moving. In many cases, supporting documentation of an improvement plan is needed for specific money sources. Thus, the level of detail of concept development and preliminary design should be considered moving forward.

As previously stated, these factors and opportunities do not capture everything which could have a potential impact on steps taken following this study. However, they should be recognized as considerations evaluated during the study’s concept development process. Furthermore, these factors should also continue to be considerations as further capital improvement projects are investigate by the Henderson County Schools.

Summary of Concepts

Throughout the Concept Development process, it was imperative to keep existing conditions, key considerations, outside factors, and opportunities at the forefront during the evaluation of concepts. Following preliminary concept development and meetings with school administration, two final concepts have been developed for consideration by the Henderson County Schools. Each of the two concepts have two alternates with varied egress locations on Garden Mile Road. This is a result of ongoing property acquisition negotiations.

Before reading about the specific details of each concept, please refer to Diagram 1 below for a simple explanation of the differences between each of the four concept variations. Conceptual Layouts with detailed notes of each concept are included in Appendix A of this study. The final concepts drastically modify the primary access points for vehicular traffic at Henderson County High School.

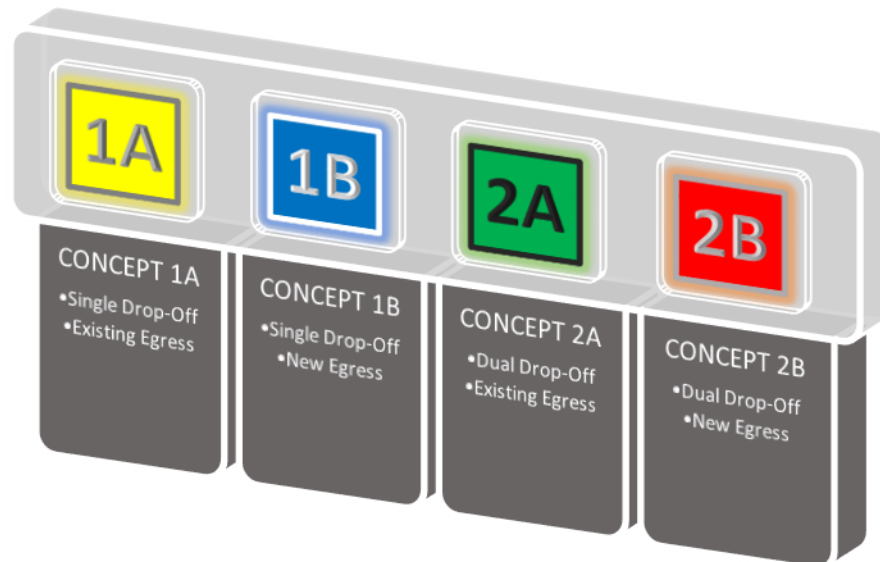


DIAGRAM 1: Explanation of primary differences between final traffic concepts.

Bus Traffic

A common component of each of the final concept variations is the location and travel path for drop-off and pick-up bus traffic. The bus unloading and staging area is moved to the north side (front) of the HCHS campus, and requires bus traffic to enter at the existing main school entrance directly across from Larue Road. During peak arrival and dismissal times, the center entrance gate on KY 351 will be closed and locked, and access to the guest parking on the north side of the campus will be restricted. At arrival, buses will unload in front of the main entrance into the HCHS building. In the afternoon, the buses will stage in a single chevron configuration in front of the school. The chevron (or angled) parking configuration will allow students to access their bus without needing to cross the path of another bus, thus creating a safer situation for bus loading procedures. At the time of departure, the buses will exit campus in a mass controlled movement by way of a newly constructed access drive to the westernmost existing access on KY 351. Please refer to the aerial concepts layouts in Appendix A for a visual representation of the planned bus traffic.

A key aspect of the modified bus travel path, is the addition/construction of a raised concrete sidewalk on the northeast quadrant of the HCHS campus. This sidewalk creates a mechanism to separate pedestrian, bus, and all other vehicular traffic from each other in a reasonable and safe manner.

Concepts 1A & 1B

Aerial concept layouts for Concepts 1A and 1B (Appendix A) show all peak (arrival/dismissal) non-bus vehicular traffic will access HCHS via a single point of entry on Garden Mile Road. Concept 1A assumes access by way of the existing rear student parking lot egress. Concept 1B assumes a newly constructed point of egress in line with the southern entrance of Kmart on Garden Mile Road. Access to the east and north sides of the HCHS campus will be restricted to permit staff and guests only during peak times. Furthermore, all student drop-off / pick-up traffic will utilize a single location near the existing bus drop-off location. The new drop-off / pick-up location will provide a total of 8 drop off bays, each of which will be striped with a dimension of 10'x30' and will be clearly marked. Student drop-up/pick-up traffic will exit the HCHS campus via a one-way two lane exit at the westernmost access on KY 351.

Traffic calming components will be provided in strategic locations around campus to ensure vehicles maintain a safe rate of speed. Speed bumps, pedestrian crossing warning signs, and sawhorse barricades will be the primary traffic calming mechanisms.

Concepts 1A and 1B create a specific area of concern, at the student driver pedestrian crossing on the south side of HCHS. At this location, student drivers will be required to cross the drop-off / pick-up traffic pattern of concepts 1A and 1B. Thus, a speed table, LED pedestrian warning signs, and potentially some closely spaced approach speed bumps may be required in this location to create a safe and controlled crossing zone. The specific details would be developed if one of these concepts is designed for construction.

Remaining details of Concepts 1A and 1B are clearly marked and described on the layouts in Appendix A.

Concepts 2A & 2B

Concepts 2A and 2B assume all peak (arrival/dismissal) non-bus vehicular traffic will access HCHS via dual entry points. For high schools with a student population near or above 2500 students, it is recommended to provide two separate drop-off and pick-up loops. While the student population at HCHS is currently closer to 2000 students, Concepts 2A and 2B were developed to take future growth into account. Additionally, these concepts eliminate the area of concern, related to student driver pedestrian crossing presented in Concepts 1A and 1B. The dual entry/exit points for Concept 2A will be at the existing rear student parking lot egress on Garden Mile Road and at the westernmost existing access point on KY 351. For Concept 2B, the access point on Garden Mile Road will be the same as described for Concept 1A. A new egress will be construction in line with the southern entrance to Kmart on Garden Mile Road. Concepts 2A and 2B will also restrict access to the east and north sides of campus during peak times.

As eluded to above, Concepts 2A and 2B will utilize dual student drop-off / pick-up zones to increase capacity and decrease peak volumes at each of the drop-off /pick-up zones. Each of the drop-off / pick-up locations will provide 7 drop off bays, each with a dimension of 10' x 30'. During peak arrival/dismissal times, non-bus vehicular traffic will exit the HCHS campus via their same point of entry into campus.

Similar to the 1A and 1B concepts, traffic calming components will be provided in strategic locations around campus to ensure vehicles maintain a safe rate of speed. Concepts 2A and 2B will not require a speed table and LED pedestrian crossing signs that the student driver crosswalk on the south side of HCHS. During peak arrival/dismissal times, no traffic will be permitted to cross the student driver crosswalk. Sawhorse barricades



can be utilized in this location in a very effective manner. Specific details required for traffic calming elements will be developed and designed if Concept 2A or 2B is chosen to be implemented and designed.

Remaining details of Concepts 2A and 2B are clearly marked and described on the aerial layouts in Appendix A.

Parking

Another characteristic common among all of the concept variations is the increase in onsite parking capacity. Parking capacity is increased by sealing and restriping all areas not requiring pavement improvement, expansion, or reconstruction. The far rear student parking lot, southern staff and co-op student parking lots, guest parking near the bus staging area, and east side permit and guest parking are all areas where a more efficient parking layout is utilized. Additionally, a portion of the existing wide concrete pad on the west side of the building is partially reconstructed to create 31 new parking spots. The visible representations of the concepts in Appendix A clearly show how parking is planned, and how the concepts provide between 73 and 101 additional parking spots compared to the existing parking configurations. Table 1 below provides a detailed breakdown of parking spots by location for each concept and the existing conditions.

Parking Location	Existing Parking Totals	Concept 1A	Concept 1B	Concept 2A	Concept 2B
Visitor Parking	36	34	34	34	34
Blue & Green Unit Staff	88	44	44	44	44
Central Unit Staff	30	32	32	32	32
Auxiliary gym	18	18	18	18	18
Cafeteria	24	24	24	24	24
Back Lot	119	147	147	121	121
Red Unit Staff	46	136	136	134	134
Student (countable)	354	350	350	350	350
New Side	-	31	31	31	31
Total	715	816	816	788	788

TABLE 1: Parking Breakdown for final concepts and existing HCHS conditions.

Probable Costs of Construction

Details described within this study and with the conceptual layout drawings provide the basis for the probable costs of construction for the final traffic concepts. In Table 2 below, the probable costs of construction are summarized, and include a 15% factor for contingency and design. Following Table 2, there are some brief clarifications regarding the assumptions of the probable costs of construction.

Probable Cost Category	Concept 1A	Concept 1B	Concept 2A	Concept 2B
Full Concept Implementation ** (HCHS portion ONLY)	\$255,000	\$325,000	\$255,000	\$325,000
Partial Implementation * (Primarily new Bus Staging area)	\$130,000	\$130,000	\$130,000	\$130,000
Garden Mile Road Intersection / Signal Improvements (LOW END)	\$100,000	\$100,000	\$100,000	\$100,000
Garden Mile Road Intersection / Signal Improvements (HIGH END)	\$650,000	\$650,000	\$650,000	\$650,000
Total Probable Cost including Garden Mile Road Intersection / Signal Improvement (LOW END)	\$355,000	\$425,000	\$355,000	\$425,000
Total Probable Cost including Garden Mile Road Intersection / Signal Improvement (HIGH END)	\$905,000	\$975,000	\$905,000	\$975,000
Notes: All probable costs of construction estimates include a 15% factor to include design services and contingency. * The partial implementation probable cost involves only the recommended construction activities believed to be required to get concept into use without completing pavement sealing, striping, traffic calming, construction of new western side parking. ** The full implementation probable costs of construction include the \$130,000 figure shown for partial implementation. An additional \$130,000 is not required in addition to these figures to reach full concept implementation on HCHS grounds.				

TABLE 2: PROBABLE COSTS OF CONSTRUCTION SUMMARY (2014 DOLLARS).

In Table 2, the probable costs associated with the intersection / signal improvements on Garden Mile Road are not included in the probable costs for the concepts. The Garden Mile Road improvements will be a City of Henderson project, and any cost sharing agreements would need to be developed and executed between Henderson County Schools and the City of Henderson.

The final traffic concepts are not expected to create a significant effect on the current AADT (Annual Average Daily Traffic) or modify the level of service of the existing Garden Mile Road. KYTC and the Evansville MPO have conflicting traffic count data, and the AADT ranges from 1,929 vpd to 3,418 vpd depending on the source. If the City of Henderson and the Henderson County Schools come to an agreement to proceed with the Garden Mile Road intersection / signalization improvements, it is our recommendation that a highway capacity analysis be considered and performed to ensure the correct and adequate intersection improvements are designed and constructed as part of the project.

With the exception of paving, reconstruction, demolition, drainage, construction activities on the north side of HCHS for the bus traffic reconfiguration, creation of western parking spots, and the construction of a new access road for concepts 1B and 2B, the remaining work associated with the concepts involves sealing and striping existing pavement elsewhere on campus. Additionally, the costs for the necessary traffic calming components are included in the probable costs of construction for the various concepts.

If the Henderson County Schools decide to proceed with the partial implementation with probable cost of construction of \$130,000, it is feasible various element of the partial implementation (demolition of existing raised concrete, the construction of the new pedestrian separating sidewalk, pipe culvert replacement, and pavement reconstruction) could be eliminated and/or ignored for a short period of time in order to get the partial implementation cost down to around \$75,000 - \$80,000. However, this is not recommended.

Suggestions for Implementation / Next Steps

The concepts presented in this study are only the first step in deciding if and how to implement one of the concepts. It will be very important to establish the necessary steps for implementation of a specific concept. Conversely, it could be very important to determine the concept that best fits the Henderson County School's preferred acquisition, access, and expansion plans. Therefore, it is AEI's opinion that the following key activities take place to determine the best course of action:

1. Decide if partial or full concept implementation is desirable.
2. Finalize land acquisition needed for CTE expansion and additional access to Garden Mile Road.
3. Coordinate an agreement with the City of Henderson regarding intersection / signalization improvements on Garden Mile Road.
4. Coordinate any signal phase modifications with KYTC for the KY 351 / Garden Mile Road intersection.
5. Meet with local government officials and state legislators regarding the UPL projects identified at the north and south ends of Garden Mile Road, and devise a plan on getting those projects programmed as part of the KYTC road plan within a specific timeframe (4-8 years).
6. Work with A/E Design team to develop a BG-1 for the capital improvements needed to implement the preferred traffic concept. The BG-1 for the CTE unit expansion could potentially be modified to include the work necessary for traffic concept design, construction, and implementation.
7. Design and Construct the preferred concept that fits best with the information gathered and decisions made above.

Appendix A:
CONCEPT LAYOUTS

Existing Conditions

Concept 1A

Concept 1B

Concept 2A

Concept 2B

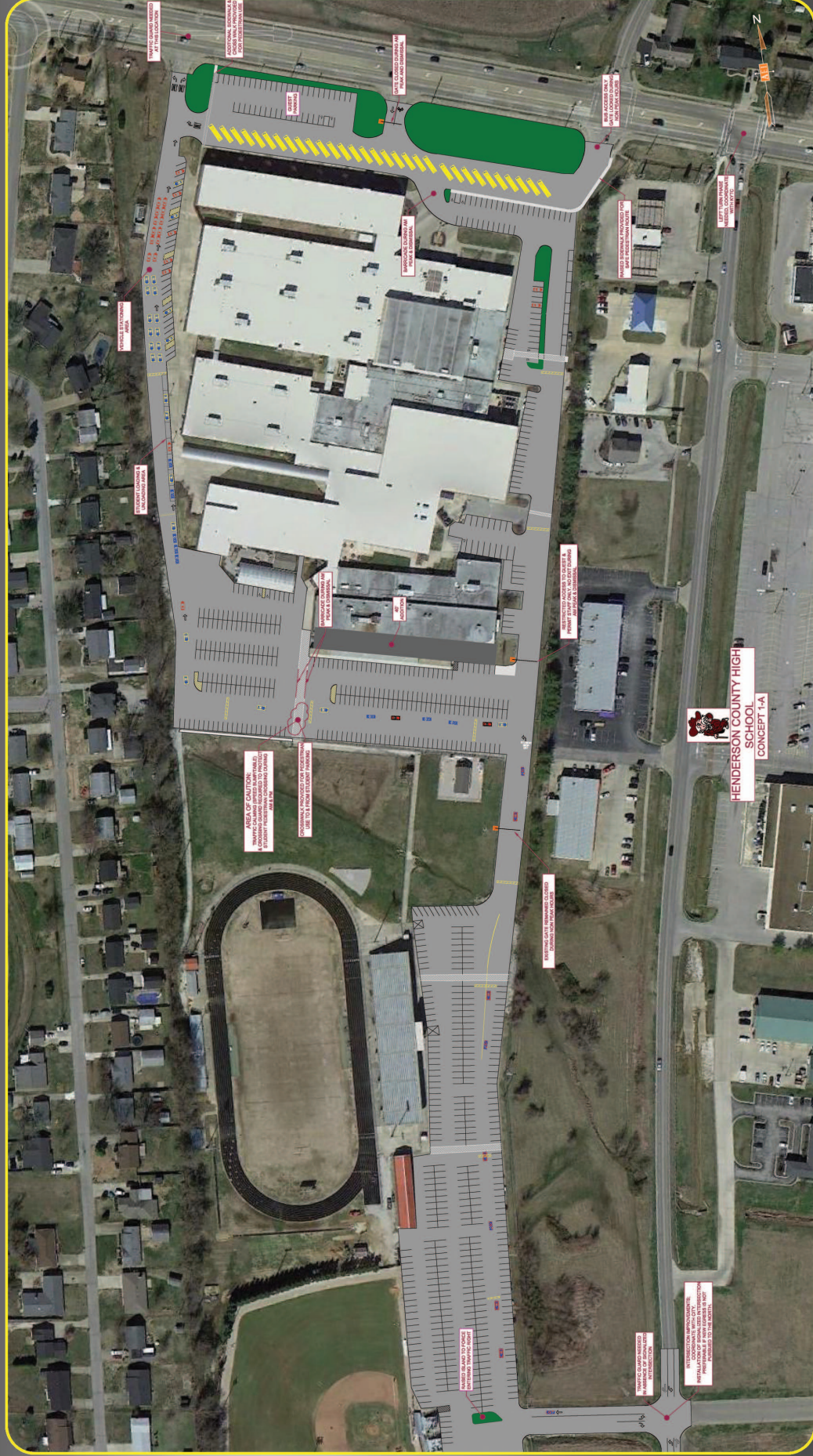


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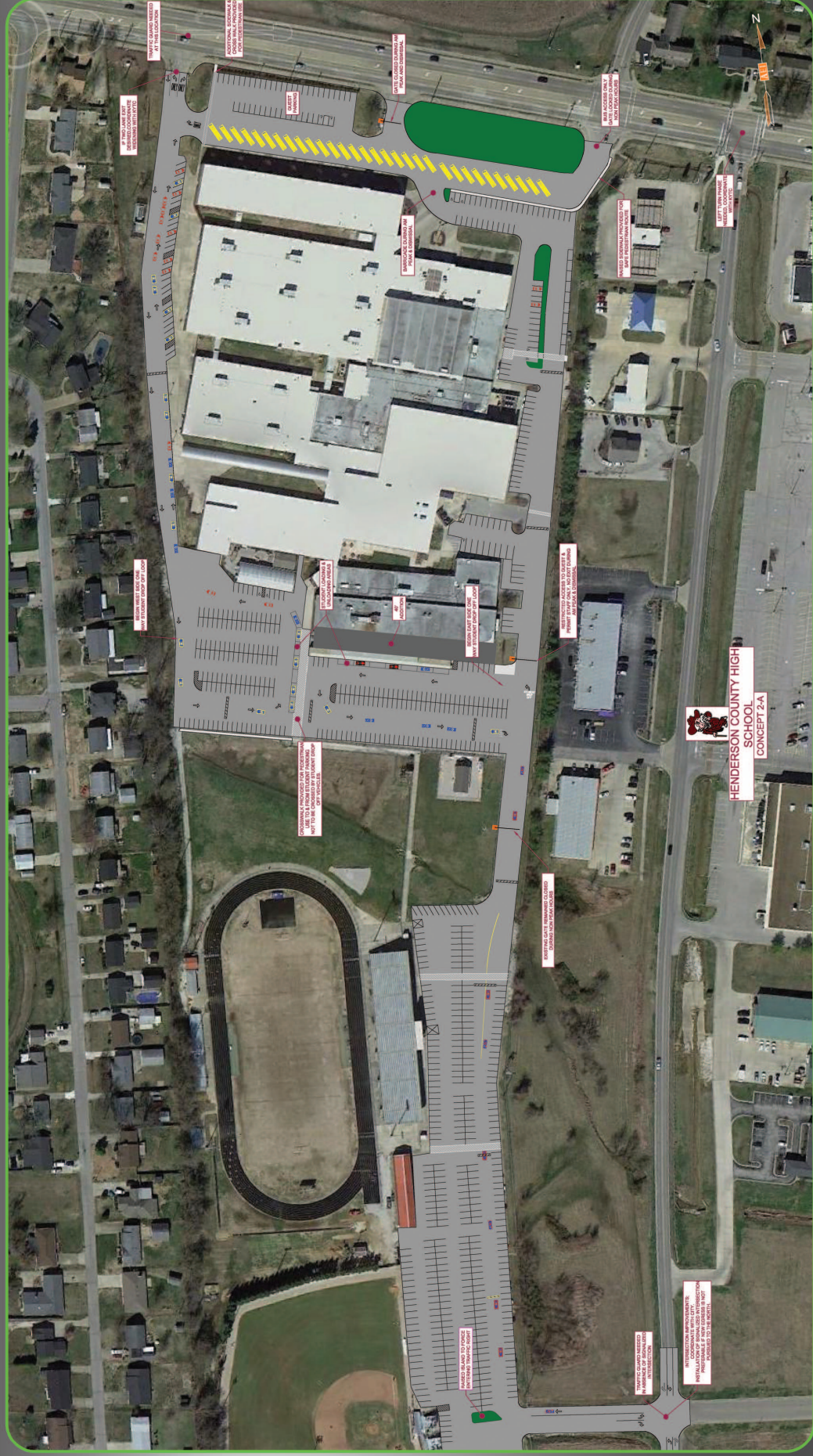
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Appendix B:

EXISTING DATA PROVIDED TO AEI

HCHS Traffic Pattern Map (Existing)

2012-2013 HCHS Parking

School Bus Arrival/Departure Summary

HENDERSON COUNTY HIGH SCHOOL TRAFFIC PATTERN MAP

2

Zion Road

Zion Road

Front Entrance

Bus Only
Entrance/Exit

Parent Only
Entrance/Exit

Teacher Parking

Visitor Parking

School

Green House

South Entrance

Parent
Drop-Off
Here Only

Teacher Parking

Student Walkway

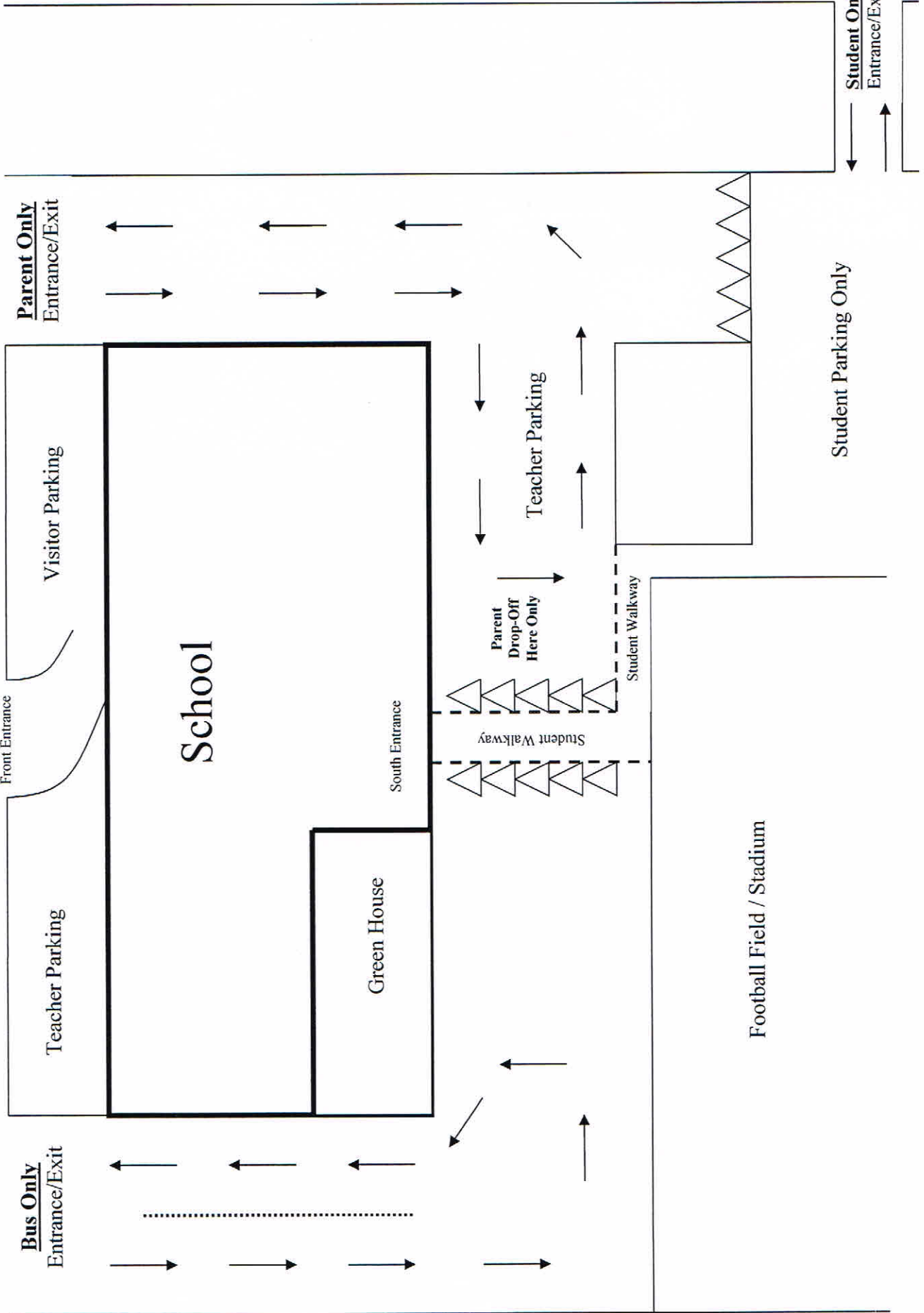
Student Walkway

Football Field / Stadium

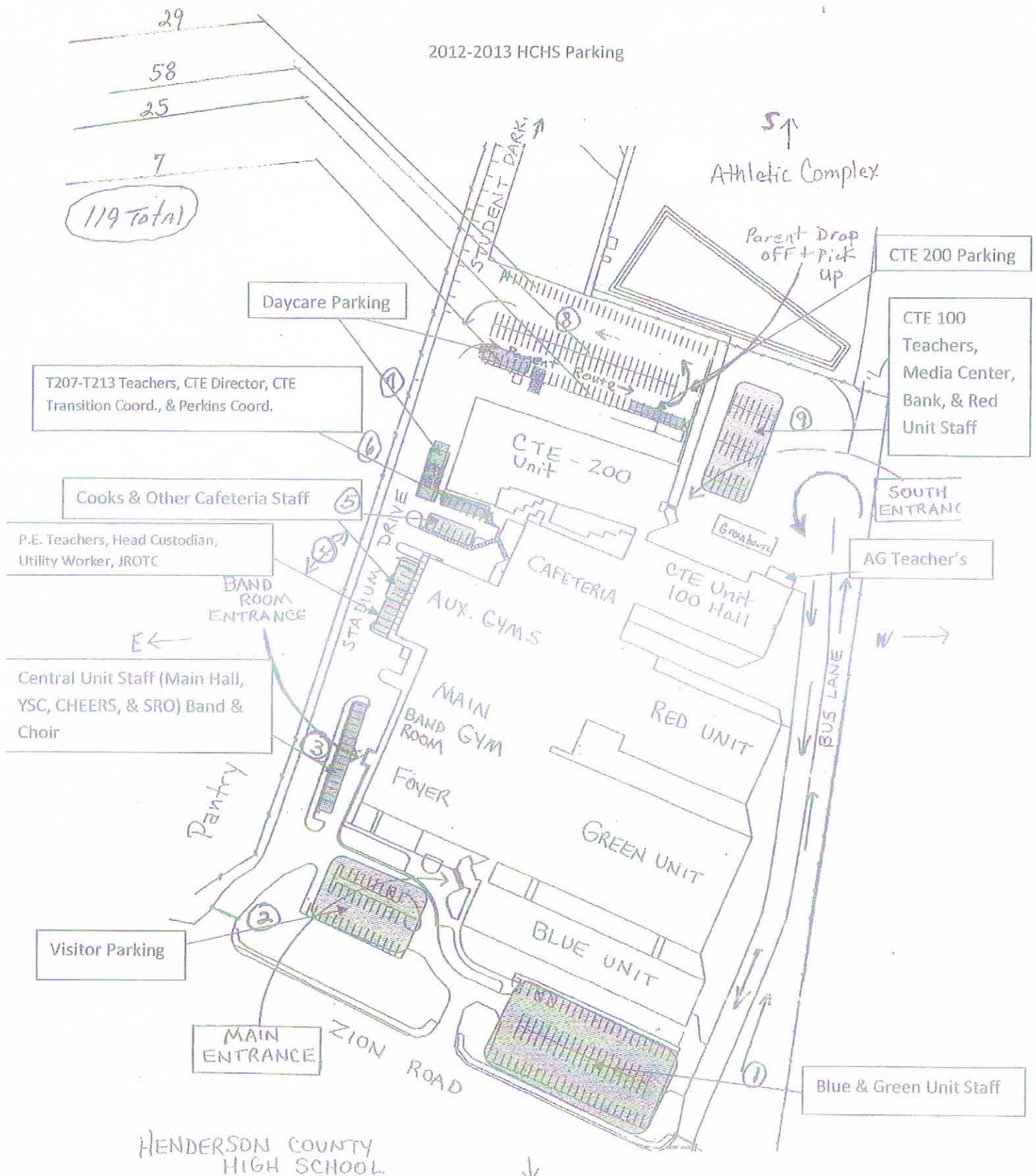
Student Parking Only

Student Only
Entrance/Exit

Garden Mile Rd.



2012-2013 HCHS Parking



1. 86 + 2 handi-cap (Blue/Green)
2. 34 + 2 handi-cap (VISITOR)
3. 21 + 2 handi-cap (Central)
4. 17 (AUX Gym)
5. 11 (Cafeteria)

6. CTE 8 + 1 handi-cap
7. DAY CARE 5
8. Res PARKING (Total) 119
- 9 Red 46

For the afternoon (departure) – I counted only 3 buses that make a right turn out of HCHS when they are let out collectively. Please confirm this is what current routes suggest. Also, if you could please give me the official figures for the #'s that are supposed to turn left and right.

For afternoon (arrivals) – Could you tell me how many buses are supposed to arrive from each direction (north and south)?

In the morning (arrival) – Could you tell me how many buses are supposed to arrive from each direction (north and south)?

In the morning (departure) – Could you tell how many buses are supposed to exit in each direction (north and south)?

	North	South	Total
Morning Arrival	36	3	39
Morning Departure	27	12	39
Afternoon Arrival	20	3	23
Afternoon Departure	20	3	23