Guideline for Risk Hazard Assessment of Educational Facility Sites

160-5-4-.16 (a) 5

Facility Site, Construction and Reimbursement

Georgia Department of Education
Facilities Services Unit

Effective Date: 05-30-12

Georgia Department of Education

Guideline for Risk Hazard Assessment of Educational Facility Sites

BACKGROUND AND PURPOSE

The Georgia Department of Education (GaDOE) prepared “A Guide to Educational Facility SiteSelection,” .This document provided the framework for site selection and determination of a
site’s acceptability. The main documents are to be completed by the School Board requesting approval of a property for construction of a facility. A major aspect of this selection process is the determination of potential hazards that could affect the safety, health, and/or integrity of theproposed facility and occupants, and is referred to as the hazard analysis. The Guide provides alist of potential hazards, as a minimum, and the four steps required for the hazard analysis.

The purpose of this document is to outline a procedure for obtaining the information and completing the forms in the Guide. Specific directions are provided for making the required hazard analysis. In this manner, consistent evaluations will be performed for all school systems in the state. Further, this will provide performance direction to those not familiar with environmental or hazardous concerns as they relate to school and student safety. Ultimately, thisguidance document has been prepared to assist school boards in understanding and, thus, completing the requirements of the Guide.

OVERVIEW AND APPROACH

School boards throughout the state must continually locate new properties for proposed educational facilities. These sites must be located to serve a particular population center. Each local school board must rely on the expertise of the school system and their chosen professionals to identify potential sites, assess their usage for a school facility, possibly compare alternative sites, design the facilities, and then develop the property into a functioning educational facility. The responsibility for the selection rests with the local school board. The GaDOE developed thisguide to further assess a site’s acceptability, relative to constructability, function, and conditions that could impact a building’s integrity or result in injury to occupants. Since few school boards in the state are composed of technically trained personnel, this guideline has been prepared to assist in the evaluation of the sites, particularly relative to the hazard evaluations.

Seven major criteria were defined in this Guideline for the selection of school sites. These are:

- Size;
- Utilities;
- Safety Hazards;
- Environmental Factors;
- Geographical and Related Factors;
- Site Development; and
- Criteria for Selection.

The above includes items that need to be evaluated in relation to site development. The safetyhazards component includes the performance of a risk/hazard assessment. As outlined in the Guide, there are four major sequential components to the hazard analysis:

- Hazard Identification;
- Hazard Evaluation;
- Hazard Mitigation; and then
- Site Suitability Statement

All four components should be performed in a methodical manner. Every site can generally beapproached similarly. However, the four components must be performed linearly.

The suitability of a site cannot possibly be assessed without performing the work. Similarly, theevaluations cannot possibly be performed until the identification of potential hazards has been completed. A procedure for completing each of the components is presented herein.

Overall, this guideline was developed for the review of only reasonable hazards, to provide forevaluations based on established procedures or industrial standards, with consideration of existing environmental assessment programs and the use of standard search/review distances based on regulatory or industry standards. This guidance is to support the development of a workable approach for site criteria definition, and the hazard identification and evaluation. It also uses a common-sense approach for the identification of mitigation measures for site conditions assessed as hazardous. Each of the conditions is addressed below.

SIZE

The site under consideration should have sufficient area to accommodate the educational facilities and activities for each school, based on the grades in the school. The first criteria is to select sites that meet the minimum size criteria that are provided in the Guide. These minimumsare:

TABLE 1: MINIMUM USEABLE ACREAGE

GRADE	MINIMUM USEABLE ACREAGE	ADDITIONAL ACREAGE
Elementary	5	1
Middle	12	1
High	20	1
Additional acreage is based on each 100 FTE		

Variations from these minimums may be requested. However, potential expansion, site, shape, development limitations, use of the instructional programs, and extracurricular activities will affect the size requirements.

UTILITIES

Locate proposed educational facilities sites for ready utility connections. The selected site musthave access to water, sewage, electricity, telephone and high speed internet. Natural gas, cable and other utilities should be accessible if practical. The lack of water or sewage may be a limiting factor. Areas without the desired utilities should be carefully considered. If access is not available, the utility companies should be contacted concerning the potential for connectionsat no cost, the schedule for utilities to be in the area, and/or the cost for making connections.
Public water and sewer connection are highly preferred over private connections.

SAFETY HAZARDS

Identify proposed school sites that have no or minimum potential hazards from outside sources.The Guide specifically defines hazards that require assessment.

ENVIRONMENTAL FACTORS

The site selected for consideration must possess physically desirable characteristics, encouragingto student attendance and learning. The area should be conducive to the development of attitudesand responses in children considered to be socially, culturally and educationally desirable. In other words, locate the site in an area that will provide positive reinforcement. Planners are encouraged not to locate educational facilities in run-down neighborhoods, industrial or commercial developments, sites close to landfills and dumps, and isolated, barren areas. Access routes for vehicle, bike, and pedestrian traffic should be evaluated and incorporated into the planning of the site development. Finally, the site should be acceptable to the community.
Proper site placement will avoid major negative response from the community to be served bythe site.

Protected species, as identified in the National Endangered Species Act, need to be identified.

GEOGRAPHICAL FACTORS

Geographical factors should be considered in selecting sites for consideration for an educationalfacility site. Two major conditions are presented in the Guide: (1) access and (2) location outside floodplains or coastal high hazard areas. The site needs to be centrally located in the population area it is serving, with ready access to support services (such as hospital and fire department). The area plan should identify these educational facilities, along with routes to the school. Procedures for obtaining a letter of assurance that sufficient acreage for all buildings andstructures are located outside floodplains or coastal high hazard areas are described in the Guide.

SITE DEVELOPMENT

Each site must be appropriately developed to provide for the educational facilities and activitiesof students. Site development includes the layout and grading of the site. Access, facilities, andutility connections shall be considered and optimized for the site.

The site development plans need to be prepared by qualified and experienced professionals. Local design professional firms or individuals may not be capable of providing the wide range ofexpertise needed to prepare these plans. The development plans must consider personnel usage, special activities, access, parking, building structural requirements, site grading, hydrology, storm water management, electrical, sanitary etc. to meet school and building code requirements.Design professional firms are available with expertise to assist school systems. These firms should be selected on the basis of their qualifications, including the range of capabilities they bring to the process and their past experience. Many individual components of the design must be stamped by the professionals.

CRITERIA FOR SELECTION (OR HAZARDS CRITERIA)

Potential hazards to an educational facility site include but are not limited to:

- Electrical transmission lines rated at 115 KV or higher
- Oil or petroleum product transmission lines and storage facilities
- Hazardous chemical pipelines
- Natural gas transmission and distribution lines larger than ten inches in diameter witha pressure of 200 psi or greater
- Propane storage facilities
- Railroads
- Major highways
- Airports, approach and departure paths
- Industrial or manufacturing facilities that:
  - Use or store hazardous substances as defined under Title 40 CFR 262
  - Emit hazardous air pollutants as defined under the Clean Air Act and/orthe 1990 Clean Air Act Amendments – Risk Management Plan Section112 (r)
  - Use or store pentachlorophenol
  - Use or store other substances that may pose a hazard to soil, water, or air.
- Lakes, rivers, dams, reservoirs, or other bodies of water
- Potential flooding because the property is located within the 100-year flood plain ordam breach zone
- Nuclear waste storage facilities
- Munitions or explosive storage or manufacturing
- Water towers adjacent to the site
- Active or abandoned mines or quarries
- Remedial hazardous waste sites
- Landfills and dumps
- Treatment plants
- Power plants
- Military installations

The process for assessing these hazards is presented in subsequent sections of this Guideline. This assessment and evaluation must be performed by competent, experienced, qualified professionals. The professional firms or individuals must be licensed professional engineers. Civil or mechanical engineers typically will have the requisite background for providing these evaluations. Past experience with industrial firms is necessary to be capable of properly assessing potential hazards. Knowledge and experience in working with chemicals, including petroleum products, is also required. Further, the firm or individual must have a breadth of modeling capabilities to be able to use the various models for evaluation of hazards and to knowthe limitations of the models and the data produced. A qualified firm must have at least five years of experience in performing similar assessments. Engineering firms and individuals are available with this expertise. These firms or individuals should be selected on the basis of their qualifications, including the range of capabilities they bring to the process and their past experience. The final recommendations may require designs that must be stamped by the professionals.

PHASE I ENVIRONMENTAL ASSESSMENT

The first task is to complete a standard Phase I Environmental Assessment for the site. The Phase I Environmental Assessment procedures are described in the American Society for Testingand Materials (ASTM) standard. The purpose of this assessment is to determine whether there isevidence of hazardous substances (including hazardous wastes and/or petroleum products) on or adjacent to the site, which could impose an environmental liability on the site. The intent of a Phase I Environmental Assessment is to determine the potential of encountering hazardous substances from a specific parcel prior to land acquisition and/or construction activities. A PhaseI Environmental Assessment involves researching and reviewing site-specific information in order to determine if there is evidence of chemical releases that have impacted the site, or if the site may require further investigation, probably by means of a Phase II Environmental Assessment, to make this determination. The current ASTM Practice E was developed to establish the Innocent Landowners Defense provided for in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) relating to the presence of hazardous chemicals on a property. The ASTM approach constitutes a limited, but commercially prudent and reasonable, inquiry. This assessment was therefore performed to identify environmental concerns that may be discerned by visual observation and information-gathering procedures. At the completion of the Phase I Environmental Assessment, the need for further evaluation of potential chemical impacts to the site will be identified.

The Phase I Environmental Assessment is a customary assessment for property acquisition to limit future potential liability. It focuses mainly on events that may have occurred in the past. The hazard assessment is to identify existing conditions that could result in damage to propertyor injury to persons on the site, with a focus on present or future events that could result in impacts to the site or students. The hazard identification is the first step of the assessment.

HAZARD IDENTIFICATION

Approach

The hazard assessment is to identify conditions that could result in damage to property or injury to persons on the site. The identification of potential hazards is performed first-; then the potential hazards that have been identified are evaluated. This screening should be performed utilizing tools available from the Phase I Environmental Assessment, so it should be performed at the same time as the Phase I Environmental Assessment. The overlap in the information fromthe Phase I Environmental Assessment and its tools and their use in the hazard identification process are presented below.

Maps

The first tool is the United States Geologic Survey (USGS), 7.5-minute, quadrangle, topographicmap. This is used to assess relative hydraulic conditions and connections in the Phase I Environmental Assessment. For the hazard identification, the map is a primary source of information. A one-mile radius and a three mile radius should be drawn on the map, or the combination of maps, necessary for coverage around the Site. The map should then be reviewedfor items earlier listed as potential hazards,

Other maps and photographs, if available, should be reviewed for these features. This could include aerial photographs, soil survey maps, street maps (listing features), and area developmentplans. However, the review of these should be for the structures or features that used to exist andthose that are present now that could impact the site.

Data Bases

The regulatory database review process should follow the review of the maps. The key UnitedStates Environmental Protection Agency databases to review are:

- Resource for Conservation and Recovery Act (RCRA) for all hazardous waste generatingfacilities which could use large quantities of dangerous chemicals;
- RCRA-Treatment, Storage, and Disposal (TSD) for all facilities that receive for treatment, storage or disposal large quantities of hazardous wastes;
- Transportation Research Information Services(TRIS) for all facilities that produce quantities of air-borne wastes that are hazardous or otherwise dangerous;
- Underground Storage Tank (UST) for the nearest facilities that store petroleum products on their facility; and
- National Priorities List (NPL) and Corrective Action Sites (CORRACTS) for any Sites under active corrective action, under Superfund or RCRA, that generate waste materials and may have active treatment units that could contain dangerous chemicals.

The identified sites should then be checked and/or located on a map of the area.

Reconnaissance

A field check is then performed to verify the presence of the features identified from the maps and/or databases. The most current available street map should be utilized for the reconnaissance. Each feature should be reviewed. Also, key areas, such as industrial complexes,should be visited for facilities and items not shown on the maps or listed in the databases. In particular, facilities with large tanks must be identified, including propane tanks. Facilities which are no longer in operation or features which are no longer in existence can be excluded from further consideration. Interviews should be used to assist in this process to identify potential sources of hazards. All other features must be considered potential sources of hazards and evaluated further.

Distances

An important consideration is the distance and relative location of various features to the site. Many sources cannot affect the site unless they are on or very near the site, while other sourcescan project impacts over long distances. A review of the relative location of the source can be used to eliminate many features from further consideration without extensive analyses. Some specific features and relative distances or locations for this stage of the review are described in Table 1, below, with limited descriptions of the potential features or impacts of concern. Otherfeatures, impacts or sources may exist and are not included in Table 2. This table is meant to serve as a reference for the most common potential hazard features, or sources.

TABLE 2: DISTANCES FOR IDENTIFIED HAZARDS –

FEATURE	LOCATION/ ORIENTATION	COMMENTS
Streams	On or adjacent to Site	Unless a major stream or river, only streams located adjacent to or on the Site are of concern for children's direct access
Streams	Up-Stream of Site	Large water-sheds are sources for flooding. Sites located at confluence of streams are subject to flooding
Pond and Lakes	On or adjacent to Site	Bodies of water on or adjacent to ~~S~~Site are of concern forchildren's direct access
	Up-Stream of Site	Source for flooding due to failure/breach or activating the emergency spillway
Power Lines	300 feet of Site	must be greater than 300 feet from the portion of the Site to beused for facilities or where students gather
Fuel Pipelines	1 Mile Radius	
Chemical Pipelines	1Mile Radius	
Fuel Facilities	1Mile Radius	1/2 mile for gas stations and 1 mile for large fuel storage facilities
Industrial Facilities	1Mile Radius	
Airports	3Mile Radius	Sites should not be located in-line with runways.
Highways and Rail	1-Mile Radius	½ mile for highways and 1 mile for railroads
Landfills	½ Mile Radius	Landfills adjacent to a Site can be a major concern for vectors andmethane. Methane gas migration may extend ½-mile from landfill
Dry Cleaners	1-Mile Radius	Very few cleaners store large quantities of cleaning fluids.
Power Plants	1-Mile Radius	Electrical substations – ½ mile
Nuclear Facilities	3-Mile Radius	
Note: Other features, impacts or sources may exist and are not included in this table		

Potential Hazards

Following the screening process described above, features or facilities may exist that pose a potential hazard that could impact the site. Evaluation of potential impacts associated with thesefeatures or facilities must then be performed. Several potential sources warrant evaluation for almost any site, and include the following:

- Petroleum station underground storage tanks (USTs);
- Chemical and fuel pipelines
- Tanker haulage on a nearby state or US highway or railway; and
- USTs and ASTs at sanitary facilities; and

Features of facilities that affect most sites include:

- Creeks and/or streams
- Electrical transmission lines
- Industrial/manufacturing plants

HAZARD EVALUATION

Hazard Evaluation Approach

Potential hazards should be identified in the hazard screen. Not all of these hazards may have asignificant impact to the proposed school because of their location. Therefore, hazards need further evaluation to define if or how much of a hazard they pose to the site.

The hazard evaluation is primarily performed to evaluate the hazard associated with incidents due to activities in the area of the site, such as accidental releases, gasoline spills and/or fires. Conservative assessments should be used in this evaluation concerning releases that could affectthe site. This is to assess potential impacts to people and property at different distances.

All of the hazards identified from this evaluation should also be reviewed for procedures to helpmitigate the potential impacts. A major aspect of this approach is that preliminary consideration is made of measures that can be incorporated for reducing the risks, or mitigation procedures, if practical. Once the hazards are identified and quantified, engineering controls may be possible to reduce or remove hazards relative to the school operation. For example, fences can mitigatesome stream hazards, vehicle access control to defined distances can remove tanker hazards, andmoving the structure may provide sufficient additional distance to avoid or reduce to a manageable level a particular hazard. This may require additional evaluations to assess the impact of a particular mitigating measure.

The evaluation of potential hazards takes three steps:

- Obtaining additional data concerning the feature/facility and the hazard;
- Defining the nature of the hazard for assessment; and
- Evaluation of the hazard, the magnitude of its impacts, and the magnitude of the impactson the site.

Additional Facility Research

Additional reconnaissance and interviews are made to further assess the specific potential hazards identified in the area of the site. Site specific data is obtained to determine if no potential hazard exists or to provide the basis for the hazard evaluation. This hazard evaluationmay require calculating or modeling to assess a potential impact to the site. Therefore, specificdata may be needed from each facility to make these calculations. Reconnaissance and interviews provide necessary specific information for evaluating each hazard or facility.

If the potential hazard has been assessed by others, try to utilize that information. For example, most industrial or manufacturing facilities have developed process safety management (PSM) plans for hazards on their facility, along with measures to mitigate the impacts or to react for personnel protection. Under Section 112 (r) of Title V of the Clean Air Act Amendments (CAAA),facilities that produce, handle, process, distribute, or store certain chemicals mustdevelop a Risk Management Plan (RMP). This plan should define the worst case release scenario that could occur at the facility and associated measures to mitigate impacts to the neighboring community and the facility. These programs have been developed by professionalsfor the facility and have been reviewed by regulators.

Hazards and Analysis Tools

The previously identified hazards are then analyzed for potential impacts to the site. A computermodel will be required for some of these analyses. Specific hazards associated with chemicals and fuels, in particular, those that require a computer to analyze are: toxic or explosive cloud generation, cloud migration, and explosions. These are discussed further, below.

All other hazards will require separate evaluation relative to the site. The evaluation tool to usewill depend on the type of hazard. Several examples are provided in Table 3, below.

The United States Department of Transportation's Emergency Response Book has identified fuelpipelines greater than 10 inch diameter, fuel storage tanks, railways, and major highways as possible hazards within a one mile radius. Therefore any of these possible hazards must be evaluated using a computerized modeling program if the feature is within a one mile radius of the school site.

TABLE 3: EXAMPLE HAZARD EVALUATION TOOLS

FEATURE	HAZARD	TOOL	COMMENTS
Dams	Breach	DAMBREAK	model for dam failure and wave propagation
Streams	Flow	Hydrologic Models	common hydrologic models
Tanks And USTs	Flame/Jet	ARCHIE	or equal computer model
	Toxic Cloud	ARCHIE	or equal computer model
	Explosion	ARCHIE	or equal computer model
	Burning Pool	ARCHIE	or equal computer model
Pipelines	Flame/Jet	ARCHIE	or equal computer model
	Toxic Cloud	ARCHIE	or equal computer model
	Explosion	ARCHIE	or equal computer model
Tankers	Toxic Cloud	ARCHIE	or equal computer model
	Explosion	ARCHIE	or equal computer model
	Burning Pool	ARCHIE	or equal computer model
Industrial Facilities	Air Discharges	ARCHIE/ ALOHA	air discharge migration and dispersion towards Site
	PSM or RMP	Research	obtain documents from facility identifying hazard and mitigating measures
Notes: ARCHIE is Automated Resource for Chemical Hazard Incident Evaluation, by NOAA and EPAOther models may be used in-lieu-of ARCHIE, such as ALOHA ALOHA is a chemical cloud migration and dispersion model Other models that can evaluate cloud generation, migration, dispersion, and/or explosion may be used.			

Each of these models or tools requires specific information, such as maps, or data, such as chemical characteristics. This information or data should be acquired during this portion of the evaluation. Familiarity with the tools is critical to efficiently obtain requisite input data orinformation.

Common Hazard Models

Hydrologic events can be catastrophic to a school site. Rainfall and runoff hydrologic events, such as severe storms, can be assessed with a suite of models commercially available. A release from a dam or water retention structure can have a front wave that is highly destructive. This can be modeled using a tool developed by the National Oceanic and Atmospheric Administration(NOAA) - DAMBREAK. The model generates a leading wave and uses dynamic routing to estimate the height of the flood wave as it propagates down-stream. This model is very unstable and can give erroneous results if not used properly. The original model or commercial versions are available but must be used by engineers experienced in dam design and failure analyses.

Chemical hazards pose significant risk of impacts to potential sites. A federally sponsored computer model can be used to analyze potential impacts to the site from specific hazards. The Automated Resource for Chemical Hazard Incident Evaluation (ARCHIE) model can help assessthe chemical hazards associated with the development of the Site. ARCHIE was developed by the Federal Emergency Management Agency (FEMA) and the United States Department of Transportation (DOT). The Model can be used to evaluate the effects at the site of moderate to highly flammable and/or explosive chemicals. These effects are associated with releases generating toxic or explosive clouds and the migration of toxic or explosive clouds. It can evaluate flame jets associated with pressure releases and explosive conditions. Alternative models exist for assessing chemical impacts. Most models will either assess cloud migration anddispersion, explosion, or cloud generation, not a combination of actions. ALOHA, for example, models the cloud migration and dispersion, along with concentrations. ALOHA can only be used to model pure liquids. It will not model explosions. The Engineer cannot say that a site will not be impacted without first using a model to assess the impacts.

Hazards other than those that are hydrologic or chemical based may exist and can impact a site.The Engineer must select the appropriate tool for evaluating their impacts. Again, the Engineer performing the evaluation must understand these tools, their limitations, and their use to obtain meaningful results.

Hazard Analyses and Evaluations

Sites exposed to hydrologic events will need to be evaluated for inundation, primarily. The toolfor evaluating the hazard must be used to extrapolate water conditions to the site. Several majorconditions (other than location in the defined flood plain) may warrant further assessment. Siteslocated downstream of dams must be assessed for impacts associate with the failure of the dam and the flow conditions initiating use of the dams emergency spillway. Sites located at the confluence of streams may have multiple stream-flow conditions that could result in flooding.
Sites located at topographic necks in the watersheds may be subject to extreme conditions due toforcing large water-shed discharges or stream-flows through a narrow area, with an increased potential for flash flooding.

Chemicals and chemical containers are the major types of hazard. Chemicals can cause hazardsthrough:

- Pooling and flowing towards the site;
- Cloud formation that migrates towards the site;
- Creation and migration of toxic clouds that are dangerous to contact or breath;
- Creation and migration of explosive gas clouds;
- Fire from the pooled chemicals;
- Chemical impacts;
- Pressurized releases that burn, referred to as a flame jet; and/or
- Tank or container explosions.

Each of these potential hazards needs to be assessed using computer models. The cloud generation and migration can be modeled. The toxicity of the chemical in a gaseous state can bemodeled to define the distance that dangerous concentrations spread from the source of the release. Similarly, explosive clouds can be created and migrate towards the site. If the clouds ortanks explode, the distance for various pressures can be calculated using computer models.
Associated ranges of damage for typical structures can be defined. If appropriate, mitigatingmeasures can be developed based on the various pressures from the release/explosion point.

While not commonly considered, gasoline distribution facilities (gas stations) have tanks and dispensers subject to releases and should be analyzed for fire and explosion potential. Both truckand rail tanker can have similar releases. The location of these facilities or releases should be identified, the closest gas station evaluated and the radii for impacts from highway tanker or rail tanker releases evaluated. This is only based on rail within a 3-mile radius or trucks on major highways (State, US, Interstate, and some county roads).

The evaluations using the ARCHIE model, for example, cannot consider multiple events, such asseveral tanks exploding at the same time. Therefore, facilities with multiple tanks should be primarily modeled using the worst-case scenario of the largest storage vessel with the most explosive/flammable substance experiencing a catastrophic release. The ignition of the explosive/flammable substance generally occurs after storage vessels have released the maximum amount of its contents. In a similar manner, model results can be used subjectively to evaluate highway and railroad releases as consistent in nature to the tank releases.

Each of the chemical effects can be assessed from a given release source, with a known size andcontent. The model will define distances for potential adverse impacts. These distances shouldthen be compared to the distance from the source, or release point, to the site to determine if these pose a hazard to the site. Once this is determined, then options can be reviewed for mitigating adverse impacts, if they exist.

HAZARD MITIGATION

Hazards that can affect the site must be evaluated. If the evaluation indicates that the hazard cancause damage/harm, measures must be assessed to reduce or eliminate the hazard or impact on the site. These measures can mitigate the impacts and make the site suitable for use as a school (at least relative to the particular hazard).

Many methods may be available to mitigate hazards. The engineer performing the evaluations and assessments may be able to recommend several options that will alleviate the potential for injury or damage. Other options must come from the design professional who has a greater levelof control over the Site's development and the orientation or construction of the facilities. Some,and not all, of the basic methods available to mitigate particular hazards are presented in the following table. Using a mitigation from this table may or may not be appropriate based on the distance from the hazard to the site. The engineer must determine what if any mitigations wouldbe appropriate for a site.

Hazard	Mitigating Measure	Comment
Any hazard	Emergency PreparednessPlan	All schools are required to have a comprehensive emergency preparedness plan. Any hazard identified in the risk hazard report that may impact the site is to be included in this plan.
Any hazard	evacuation	The time necessary for evacuation must be less than the time beforethe hazardous situation effects the site
Chemicals and gas vapors	earthen berm or retainingwall	An earthen berm or retaining wall can act as a blast deterrent fromgas or vapor explosions
Chemicals and gas vapors	tree and/or vegetation barrier	Large vegetation can act as a blast deterrent from gas or vaporexplosions
Chemicals and gas vapors	structural modification	Architectural design to withstand a blast shock wave and reinforcedwindows can reduce the hazard
Chemicals and gas vapors	engineering controls	Provide an emergency HVAC cutoff to eliminate intake of outside airand provide positive indoor air pressure
existing septic tanks	remove	Any unused septic tanks are to be removed
Existing structures	remove	Any structure that will not be used must be removed or fenced off toprevent access
Existing structures	bring up to current codes	All existing structures that will be used must be brought up to existincodes
Existing storage tanks	remove	All existing fuel and/or chemical tanks are to be removed and soiltested for contamination
Flooding	locate buildings out of flood plain	Site development should manage water runoff
High voltage electric lines	construct fence to prevent access	Fence off a 300 foot buffer from all high voltage electric lines
On site solid waste or contaminated soils	remove	Remove all solid waste and/or contaminated soil.
On-site cemetery	do not disturb area	Leave undisturbed or otherwise addressed prior to any land development activities in relation to Georgia Cemetery PreservationLaw (OCGA 36-72-1-16).
On-site or adjacent body of water	construct fence to prevent access	Access to all on-site or adjacent bodies of water must be restricted bfencing or other barrier.
Pipelines	install gas vapor and/or chemical vapor detectors	Detection devices can provide advance warning of a hazardouscondition
Proximity to highway, railroad, or pipelines	locate facility and areas where students gather a safe distance from hazard	A computerized modeling program must be used to determine safedistances
Road frontage	Provide fencing or other barrier to prevent access of roads by students	Fencing the perimeter of the property both restricts students fromleaving the property but also limits access to the property
Wells or abandon septic tanks	fill in unused wells according to Georgia Well Standards Act of 1985	Wells that will be used for irrigation must be fenced to preventstudent access

The Engineer analyzing the hazard can propose one to several options to mitigate the impacts.The school system or design professional, both of which have much greater knowledge of thesite's flexibility in the proposed development system, must review these for viability. If other options are apparent, these should be discussed with the engineer for inclusion in the recommendations. Since the basic premise of evaluating a site is that it is the best available option, the goal of the Engineer should be to find means to make the selected Site viable, if practical.

SITE SUITABILITY STATEMENT

The purpose of the risk hazard study is not to get a selected site approved but to help identify appropriate sites to develop. Therefore, this evaluation should not necessarily be performed asthe last step in the site selection process, but as an aid to the site selection during this process. Two or more sites may need to be evaluated to provide the best for the school system and the students.

A suitability statement is required for the selected site to be considered by the GaDOE. The engineer, based on the site conditions, the risk/hazard analyses performed, and experience or professional judgment, must define the suitability of the site for a facility. This statement is onlymade relative to the hazards that could potentially affect the site or school population. The statement may need qualification, based on implementation of specific mitigation measures. Thesite suitability statement must contain the engineer's signature and seal.