Report of the School Siting Task Group of the Children's Health Protection Advisory Committee:

Comments on US Environmental Protection Agency Draft Guidelines for the Siting of School Facilities

February 27, 2010

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Executive Summary

In 2009, at the request of the US Environmental Protection Agency (EPA), the School Siting Task Group (SSTG) of the Children's Health Protection Advisory Committee (CHPAC) reviewed draft EPA voluntary guidelines for school siting (EPA guidelines, July 15, 2009). The EPA guidelines are focused on protecting the school population from potentially harmful effects from the environment surrounding a school and promoting health and healthy behaviors that can result from siting schools near the children being served. Ensuring a healthy school environment is a major environmental public health issue as children are more susceptible to certain environmental hazards, and children spend a large portion of their childhood in schools. The SSTG applauds EPA for taking a primary prevention approach on this important public health issue. The SSTG urges EPA to complete the guidelines as quickly as possible.

The CHPAC SSTG supports guidance that takes into account best practices that promote a collaborative, equitable, and democratic site selection process. The SSTG supports guidance that emphasizes the importance of meaningful public involvement and stakeholder participation throughout the school siting process.

The SSTG supports guidance that ensures that the health and well being of school children and school staff is not placed at risk because of the location of a school and that appropriately considers the benefits of siting decisions that support healthy behaviors. The SSTG supports approaches to school siting decisions that lead to health benefits to both the school population and the larger community.

Key comments on revisions to the draft guidelines

The environmental review component involves steps of increasingly thorough investigation of potential environmental hazards so that uncertainties around environmental hazards are minimized and decisions can be made that reduce potential health risks. The environmental review component addresses remediation, construction, and operation costs which should influence a site selection decision.

While the EPA draft guidelines describe desirable steps in the siting process and provide many references for a user, the SSTG suggests that EPA provide both a simpler guide and more prescriptive details. This is accomplished with:

- A flow chart for all audiences that contains a step-by-step process for the studies, public involvement, local education authority decisions, and state and local oversight that must take place to properly assess potential environmental hazards near proposed school sites; and
- A more detailed and prescriptive narrative for the consultants that do the work, the local education authority that commissions the work, the state that oversees school siting, and the community members who participate in the process.

The EPA guidelines, currently divided into State/Tribes and Community sections, should be displayed as three user entry points to a single set of guidelines. The SSTG

suggests that the three audiences are state/tribes, local education authorities, and the community (public) and suggests that each entry point (for example, three tabs on a web page) should describe the specific roles, responsibilities, necessary capacity, authorities, and resources for that sector.

Community involvement should be incorporated at every step. School site selection is most successful when the public has a meaningful role. The SSTG suggests that EPA should create public involvement guidelines and incorporate public involvement into EPA's school siting guidelines. EPA guidelines should recommend a school siting committee to provide advice to local education authorities throughout site selection; require local education authorities to post key documents on the Internet; and provide meaningful opportunities for the public to comment on proposed school sites and exposure mitigation measures proposed for those sites.

Additional guidance on developing the capacity to carry out these new guidelines may be needed because capacity is currently lacking at both local education authority and state government levels. Among other things:

- Local education authorities need specific guidance on hiring appropriate consultants and architects, involving the public effectively, securing oversight, and incorporating information on healthy behaviors.
- State oversight needs to be in place to make sure that siting is done according to the EPA guidelines, and states should inventory state and local capacity for policies and programs, expertise, people resources, and funding to carry out school siting according to the EPA guidelines.

Key comments on EPA's role in implementing and supporting school siting

The SSTG found that there was a need for a continuing role for EPA in providing local, state, and tribal governments with leadership and technical assistance in implementing guidelines on school siting. The SSTG determined that the following were necessary roles and tasks for EPA to undertake in order to assure guidelines are used effectively:

Establish an ongoing interaction with multiple federal agencies:

- Establish and implement a federal interagency school siting collaboration.
- Evaluate the extent to which existing federal programs (across all relevant agencies) and authorizations can be used to ensure compliance with guidelines (funding, permitting).
- Aggressively promote the adoption and integration of the guidelines into EPA and other agencies' policies and guidelines around schools (for example, the US Department of Education). Within EPA this includes situations where EPA has authority over a school siting and situations where EPA has authority for siting new facilities (e.g., roads, industries) within perimeters of existing schools.

Provide technical support for state and local school siting activities

- Evaluate the extent to which states have the necessary capacities and authorities to adhere to the guidelines.

- Establish and fund/support EPA staff at the regional level to support school siting decision-making.
- Develop soil, air, and water standards for school exposure scenarios and until standards are established, recommend sources for such standards.

Evaluate the implementation of guidelines and develop guidelines in related areas:

- Develop and use mechanisms to measure the impact of the school siting guidelines.
- Develop additional guidelines for construction and operation/maintenance of schools and other child care and education settings.

Recommend and support the use of the guidelines for the siting of other learning environments (child care centers, preschools, Head Start and Early Head Start programs, after-school care sites, and charter and private schools).

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1.0 Introduction

1.1 Children's Health Protection Advisory Committee

The Children's Health Protection Advisory Committee (CHPAC) provides advice, information and recommendations to assist the US Environmental Protection Agency (EPA) in the development of regulations, guidance and policies to address children's health. The CHPAC advises EPA in accordance with the provisions of the Federal Advisory Committee Act.

The CHPAC is supported by EPA staff, including a Designated Federal Official, from the Office of Children's Health Protection. Staff from many other EPA programs also interact with the CHPAC in giving testimony at CHPAC meetings. In addition, support for meetings (in person meetings and conference call) is provided by contractors. This meeting support includes facilitation services.

1.2 School Siting Task Group

EPA requested assistance from the CHPAC to assist EPA in fulfilling its Congressional mandate[1] to issue voluntary guidelines for the siting of school facilities. The EPA Office of Children's Health Protection established a CHPAC Task Group[2] for the purpose of providing advice concerning draft guidelines.

The Task Group was charged with making recommendations on the contents and scope of a school siting guideline draft document (U.S. Environmental Protection Agency Draft Guidelines for the Siting of School Facilities, July 15, 2009) that would subsequently be available for public comment. EPA's purpose in asking for assistance from CHPAC was to ensure that comments on the draft reflected a diverse range of perspectives concerning the complex issues around school site selection and children's health.

Members of the CHPAC School Siting Task Group (SSTG) were selected by EPA staff. SSTG members included five CHPAC members and fourteen individuals recruited by

[1] SEC. 502. MODEL GUIDELINES FOR SITING OF SCHOOL FACILITIES.

> Not later than 18 months after the date of enactment of this section, the Administrator, in consultation with the Secretary of Education and the Secretary of Health and Human Services, shall issue voluntary school site selection guidelines that account for--
>
> (1) the special vulnerability of children to hazardous substances or pollution exposures in any case in which the potential for contamination at a potential school site exists;
> (2) modes of transportation available to students and staff;
> (3) the efficient use of energy; and
> (4) the potential use of a school at the site as an emergency shelter.

[2] EPA, or the CHPAC with EPA's approval, may form CHPAC subcommittees or workgroups for any purpose consistent with this charter. Such subcommittees or workgroups may not work independently of the chartered committee and must report their recommendations and advice to the CHPAC for full deliberation and discussion. Subcommittees or workgroups have no authority to make decisions on behalf of the chartered committee nor can they report directly to EPA.

EPA to serve on the SSTG, with additional recruitment throughout the year (see Membership Roster, Appendix A). A wide diversity of experience with issues concerning school siting was represented on the SSTG.

The SSTG met in person on July 20, 2009, in Washington, D.C., a day in advance of a meeting of the full CHPAC. The meeting agenda (Appendix A) included presentations by key EPA staff and administrators. The presentations to the SSTG provided a comprehensive overview of the efforts that EPA had made to date, and intended to make in the future, to develop voluntary guidelines for school siting.

Throughout the day-long meeting, members of the SSTG raised and discussed issues that individuals believed presented the most pressing children's health concerns related to school siting. The ideas discussed on July 20 were recorded and over the course of the remaining days of the CHPAC meeting, the issues and concerns raised by the SSTG were grouped into five major categories for further discussion. Five subgroups were established and each member of the SSTG was assigned to at least one of the subgroups after the facilitator asked the members to indicate their primary interest areas. Co-leads for each subgroup were selected by the chair and facilitator. A CHPAC member was selected as a co-lead for each group.

The five subgroups were:

Environmental Review Process
- Discussed and commented on guidelines for investigation, analysis, characterization, and remediation of environmental hazards.
- Co-leads: Maida Galvez, Ian MacMillan, Ron Carper

School Site Screening Criteria
- Discussed and commented on hazards that should be addressed by guidelines, including comments on hazards that should exclude a site from consideration as a school site.
- Co-leads: Jan Mostowy and Al Huang

Federal/state/local Capacity
- Discussed and commented on the resources that the guidelines should recommend be available to support school siting decisions and long-term management of hazards that may be present.
- Co-leads: Anne Turner-Henson and Margo Pedroso

Oversight and Stewardship
- Discussed and commented on guidelines for governmental and third party oversight of school siting decisions and plans.
- Co-leads: Pam Shubat and Gavin Kearney

Community Involvement
- Discussed and commented on guidelines for involving the community in school siting proposals, investigations, decisions, and management.
- Co-leads: Rochelle Davis and Elizabeth Yeampierre

The SSTG subgroups operated independently of the full SSTG. The co-leads for each subgroup convened subgroup conference calls, led the conversation within subgroups,

and kept records of discussions and work products. The co-leads participated in additional facilitated conference calls among all co-leads. The co-lead conference calls were intended to 1) ensure that areas of overlap were identified and the work was divided according to subgroup interests, 2) establish work deadlines, and 3) ensure that work products that the SSTG had agreed to undertake were being discussed according to deadlines. The subgroup co-leads reported findings and work products of the subgroup to the SSTG.

1.3 Timeline for the work of the task group

In addition to the July, 2009 meeting, the SSTG conferred by conference call on October 1, 2009. Various deadlines were established and met, including distributing work products of the subgroups to the entire SSTG by November 19, 2009. A second meeting of the SSTG took place on December 1, 2009. At that time, a draft report of comments on the draft EPA guidelines had been written containing the work products of the subgroups. The agenda for the December 1 meeting (see Appendix A) included reviewing the report, answering the charge questions, and developing recommendations for the CHPAC to discuss at the CHPAC meeting scheduled for March 2010. Interim products were shared with EPA staff on November 19, 2009 and EPA and staff of partner federal agencies attended the December 1 meeting. The SSTG conferred again on December 11, 2009 and by December 24 multiple edits had been made to the report. The second major draft was distributed on January 8, 2010, and additional edits made. A final report was completed on February 27, reviewed by the entire SSTG, and shared with the entire CHPAC. The SSTG completed its work with a final conference call scheduled on March 4, 2010.

1.4 Content of the report

The remainder of this report is divided into three parts. Section 2 contains responses to questions that EPA addressed to the SSTG. Section 3 contains comments on the content of the draft EPA guidelines. Section 3 includes a set of principles for community involvement (Section 3.1), a very detailed description of best practices for school siting (including a flow chart) that SSTG members produced as a model for use by EPA (Section 3.2), comments on the capacity of local education authorities and states to implement school siting guidelines (Section 3.3), and comments on making the guidelines more accessible to various audiences (Section 3.4). Section 4 contains comments on a continued and expanded role for EPA in supporting the implementation of voluntary school siting guidelines. Appendices to the report contain supporting documents and details.

2.0 Charge Questions

The CHPAC SSTG believes that ensuring healthy school environments is a major children's environmental public health issue, and commends EPA for taking a primary prevention and health promotion approach in school siting. Many issues of critical importance to SSTG members appear in the draft guidelines (such as the need for meaningful community involvement). SSTG members appreciate EPA's willingness to

seek input on the guidelines and listen to the concerns of stakeholders, especially early in the process of developing the guidelines. The CHPAC SSTG appreciates the incorporation of smart growth and sustainability concepts in the guidelines and a focus on reducing the environmental impacts of school siting (for example, reusing old buildings, minimizing impermeable surfaces, turf management, and building design and management to reduce environmental impacts).

The CHPAC SSTG supports guidance that takes into account best practices that promote a collaborative, equitable, and democratic site selection process. The SSTG supports guidance that emphasizes the importance of meaningful public involvement and stakeholder participation throughout the school siting process.

The CHPAC SSTG supports guidance that considers the health benefits of healthy behaviors along with considerations to ensure adverse health impacts do not occur. The SSTG applauds EPA for thinking comprehensively about how school siting decisions can lead to health benefits to both the school population and the community around it. The SSTG also supports school siting guidance that promotes high performance healthy schools.

The SSTG considered the following specific questions ("Charge Questions") posed by EPA.

2.1 Separate guidelines

Are separate guideline recommendations for states/tribes, and local education agencies/communities logical and helpful?

The SSTG understands that EPA has drafted a single, comprehensive set of guidelines for school siting that meets the needs of many audiences. The SSTG fully supports EPA's intention to provide audience-specific direction to states and tribes, as well as direction to local education authorities and the community (the public) on how to use the set of guidelines. In order to more fully engage the public, the SSTG suggests that EPA add directions that will assist the general public in using the guidelines. The SSTG envisions a web-based model with three entry points into the guidelines (e.g., three tabs on a web page) for state/tribes, local education authorities, and the community (public), with each entry point describing the specific roles, responsibilities, necessary capacity, authorities, and resources for that sector. The concept of three audiences is also described below in Section 3.4. The SSTG believes that EPA should recommend these guidelines to any entity constructing or leasing space for the care and instruction of children.

2.2 Scope and substance

Are the guideline recommendations for state, tribal, and local policy- and decision-makers appropriate in scope and substance?

While the environmental review component to school siting cannot be reduced to a one-size-fits-all, cookbook approach, the SSTG suggests that the agency develop guidelines that offer simultaneously a simpler guide and more prescriptive details. This is best accomplished with:

- A flow chart for all audiences that contains a step-by-step process for the studies, public involvement, local education authority decisions, and state and local oversight that must take place to properly assess potential environmental hazards near proposed school sites; and
- More detailed and prescriptive narrative for the consultants who do the work, the local education authority that commissions the work, the state that oversees school siting, and the public.

Section 3.2 of this report contains best practices for consultants, local education authorities, state agencies, and the public. A flow chart developed by the SSTG is found in Appendix B.

The SSTG found that cost is often cited as a limiting factor in carrying out a comprehensive environmental review of potential school sites and local education authorities are sensitive to the adverse impact of unfunded mandates. An EPA survey of several school districts and state agencies about costs of both environmental review and site remediation and mitigation would assist in understanding the costs associated with school siting. The cost estimates from the survey should be made available with the final guidance along with a discussion of potential liabilities (financial and health) if the environmental review were not conducted.

2.3 Community involvement

Do the guideline recommendations for communities provide information of sufficient detail to help ensure meaningful and productive involvement of community members in the school siting or school renovation process?

While the EPA guidelines stress community involvement, the concept of community involvement in school siting should receive greater emphasis by adding a separate section in the guidelines that describe principles and best practices for community involvement and involvement. EPA already has strong guidance in its National Environmental Justice Advisory Council (NEJAC) Model Plan for Public Participation. EPA should incorporate similar guidance into a section which is suitable for use by the lay public. Community involvement principles identified by the SSTG are described in Section 3.1, below.

2.4 Nearby sources

In evaluating a particular candidate site, how much and what type of guidance should EPA provide communities with respect to what constitutes a "nearby" source[s] of potential contamination and how to evaluate the potential risks?

The SSTG formed a subgroup to specifically discuss and describe the types of hazards that should be considered in school siting (Appendix C: Hazards). The SSTG researched and discussed two screening distances ("screening perimeters" and "exclusion zones") between proposed school sites and environmental features that may present hazards to future school occupants (Appendix D). For potential school sites identified within the "screening perimeter" of an environmental feature, further study is warranted to ensure that risks from that feature are not significant. If a potential school

site is located within an "exclusion zone" of an environmental feature, the site should no longer be pursued.[3]

The SSTG recognizes that the information to support specific distances in the Environmental Hazards Screening Table is largely based on reducing potential exposure rather than on reducing health impacts. The references from which the screening perimeter and exclusion zone distances were drawn are primarily state or local rules, law, ordinance, policy or guidance rather than studies of environmental exposure or health impacts.

The SSTG also recognizes that guidance concerning exclusion zones may be controversial because many urban local education authorities have limited choices for new or renovated school sites. In addition, smart growth concepts (such as reduced use of school buses) and community objectives and community health benefit concepts (such as promoting walking to school, reducing time on school buses, or using schools as community centers) support selecting a site that may require some type of mitigation before use. The SSTG believes that the unique challenges of urban settings should be addressed with the goal of ensuring the health of students, school personnel, and community members.

Ultimately, state and local policies should support selection of school sites that do not place the health and well being of school children at risk and that facilitate physical activity, healthy behaviors, and healthy communities. Locating schools in the neighborhoods of the students they serve encourages students to walk and bicycle between home, school, and centers of community activity. In addition, the family's access to school playgrounds and facilities encourages physical activity outside of school time. The location of schools in neighborhoods promotes children's after school access to community resources such as libraries, parks, and community centers. These are important factors for the community, which the SSTG summarized in an "Environmental Assets Screening Table" (Appendix E).

2.5 Sites that have been cleaned up

What does the Task Group recommend the agency say about sites that have been cleaned up under Federal, state or tribal response programs? How does the task group suggest we improve educational agencies capacity to ensure safe siting of a school on a site that requires active management of engineering and institutional controls? Should EPA define what constitutes demonstrable capacity to ensure active management of engineering controls and institutional controls? If so, how should that capacity be defined?

The SSTG subgroup that discussed the environmental review process carefully considered the question of use of contaminated sites and stewardship of sites that have been cleaned up. As a result of that discussion, the SSTG has made extensive suggestions in this report concerning the actions of state, local, and third parties in ensuring that sites are thoroughly and appropriately investigated before siting decisions

[3] In rare cases there may be exceptions to the exclusion zones due to unusual and extenuating circumstances that are discussed further in section 3.2.2.

are made (Section 3.2). The SSTG has also suggested in this report the necessity of thoroughly evaluating potential site management plans in both making siting decisions and managing potential hazards as remediated sites are developed and put into operation. In addition, both the capacity and oversight and stewardship subgroups commented on the institutional capacities and relationships that are necessary to carry out school siting and oversight of school siting effectively and safely (Section 3.3).

While it is best to avoid currently or previously contaminated sites, some communities genuinely have no option but to evaluate and remediate a site with a history of contamination. For those sites that have been investigated and cleaned up under Federal, state, or tribal response programs it is important to identify the extent of clean up that was conducted and evaluate the cleanup standards that were in place at the time of cleanup. More extensive clean up of contaminated sites is required for school or residential land uses than for other land uses. This is because some sensitive subpopulations, such as children, have the potential for greater exposure to and impacts from hazards and contaminants. In school settings students, teachers and school staff may have greater exposure to contaminants (greater frequency and duration of exposure) compared to exposures in other settings.

Among many concerns that troubled SSTG members was the possible misperception that once a site had been cleaned up through a state or federal response program, there is no need for further study before it can be used for a school site. The SSTG has made clear in this report that a site that has been cleaned up should undergo the same siting assessment (as described in Section 3.2) as a site with an unknown history of contamination. The SSTG finds that various databases should be helpful in the process of reviewing sites for past investigations, and EPA should refer to its own databases (such as EPA databases developed from RCRA, CERCLA, other programs data, and such as state databases on underground storage tanks and brownfields).[4]

2.6 Table of potential hazards

Is the draft Appendix—Table of Potential Hazards to Identify During the Site Evaluation Process helpful information? How could it be improved?

The SSTG supports using lists of hazards in the guidelines. The SSTG found the EPA table important, however a bit unwieldy as presented. An SSTG subgroup was formed to identify on- and off-site potential hazards and environmental assets that should be considered early in the site selection process (Appendices C, D, and E).

3.0 Key comments on revisions to the draft guidelines

In order to assist readers of the EPA guidance, the SSTG prepared an example flow chart that integrates crucial steps involved in school siting (Appendix B: Flow chart). The sections that follow provide a more detailed and prescriptive narrative for the

[4] See ASTM standard E1527-05 Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process.

consultants that do the work, the local education authority that commissions the work, the state agencies that oversee school siting, and the public. The principles outlined below ensure that the process of school siting is carried out with meaningful public involvement. Together, these comprise best practices for the review and selection of school sites.

Throughout this section the SSTG has used the term "environmental review process" or "environmental impact review" to refer to the process for assessing potential impacts of a proposed school siting on the environment, including potential impacts on human health. Health impact assessments[5] and health risk assessments are additional assessment tools for evaluating the effect of the environment on human health.

Throughout this report the term "local education authority" or "LEA" refers to a school district, including its staff and its governing or voting body (for example, a school board or a tribal board).

3.1 Site review and selection principles

EPA must include in its school siting guidelines a rigorous process for reviewing and selecting sites for school facilities that is sufficiently protective of human health and provides for meaningful public involvement at all stages of the review and site selection process. Fewer than half the states currently mandate environmental review of candidate school sites and even fewer require formal public involvement measures in the review and selection of school sites.[6] This section discusses principles which should underlie a rigorous review and selection process and the rationale behind those principles.

3.1.1 Principle 1: The process should provide for meaningful public involvement.

The SSTG focused a great deal of attention on public involvement and found it was a concern that affected the topics that each subgroup discussed. Stakeholder groups such as students, parents, teachers, other school personnel, and nearby residents are most directly impacted by the extent to which school siting decisions promote and protect health. In its final guidance, EPA should include the following principles for public involvement and engagement in the guidelines:

- Build public involvement into the processes of determining whether or not to build or renovate schools, site selection, and school design.
- Clearly articulate a transparent process that incorporates public involvement into all aspects of educational facility planning and site selection.
- Provide the public with timely access to materials that simply and clearly explain the technical steps of school siting so that the public can effectively participate in the process. This includes access to information on the inventory, condition, design and utilization of public school buildings and grounds so the public can influence the initial decision about the need for new schools.

[5] Health impact assessments are described by the Centers for Disease Control at http://www.cdc.gov/healthyplaces/hia.htm

[6] Rhode Island Legal Services and Center for Health, Environment and Justice. 50 State Survey Existing School Siting Laws, Policies, and Regulations http://www.childproofing.org/school_siting_50_state.htm

- Provide community members with access to technical assistance[7] so that community members can receive help from an independent third party to better understand technical information provided during the site review and selection process and to develop independent information for consideration in the process.
- Translate key documents and/or summary documents into any language spoken by more than 5% of the school population.
- Provide translation services at public hearing if the school district has a sizable number of non-English speaking parents.
- Assure that the public involvement process has been adequately followed through oversight by a regulatory and/or funding agency.
- Provide members of the public with the opportunity to comment on key analyses and decisions before they are adopted (both in writing and at public hearings) and require local education authorities to substantively address such comments.

3.1.2 Principle 2: The process should apply to a broad range of facility siting decisions.

Potential school sites subject to this environmental review process should include

- Proposals for new school facility construction;
- Expansions[8] of existing schools on land owned by local education authorities;
- Leased properties and buildings that are renovated for use as temporary space; and
- Newly acquired or leased property where temporary or mobile classrooms may be situated.

In addition, the SSTG suggests that a thorough environmental review, as described in the guidelines, is a desirable goal for siting any learning environment for children (e.g., child care, preschool, Head Start, private schools, charter schools).

The SSTG notes that existing or leased sites may have additional considerations for environmental review, including the concern that a leased site may not have been built and/or remediated to an adequate standard for occupation by students (e.g. with respect to seismic activity[9] or vapor intrusion protection) and that leased sites may not be accessible for intrusive sampling of onsite contamination. The SSTG suggests that EPA consider adding a worksheet which identifies potential concerns for leased sites and provides guidance on how to best address these concerns.

3.1.3 Principle 3: The process should be sufficiently rigorous, with decisions documented and rationale for decisions clearly articulated

Environmental analyses and remedial actions should be subject to regulatory oversight and approval from appropriate agencies. The EPA guidelines should provide greater clarity on who makes decisions regarding the environmental review and at what point in

[7] State and federal program will need to provide access to technical assistance if local education authorities are unable to do so.
[8] This may not apply to all expansions, but perhaps those of greater than ten classrooms, greater than 25 percent increase in capacity or some other measure of impact.
[9] For example, California's Field Act. http://www.excellence.dgs.ca.gov/StudentSafety/S7_7-1.htm

the environmental review process these decisions must be made. Approval from and oversight by state environmental regulatory officials should be required or secured when a contaminated site is selected, and again when site remediation and management plans are fully developed. The state environmental regulatory agency should play a central role in ensuring the integrity of site management plans, including any institutional and engineering controls that may be relied upon, over the long term. While EPA may have no jurisdiction in state decision-making around oversight of school siting, EPA should encourage states to adopt school siting policies that provide state-level authority to approve a proposal, deny a proposal, or approve a proposal subject to conditions. In addition, model state policy should articulate the information to be included with such submissions, and provide clear authority for the oversight agency to request additional information necessary for evaluating the site selection decision where appropriate.

There is potential for significant legal and financial liability and/or public backlash when thorough reviews are not conducted. As an example, in urban environments, eminent domain may be required to acquire a site. Hence, the rationale for choosing one site over another must be clearly articulated based on a robust review of candidate sites, especially if the environmental review is a deciding factor. The guidelines should make clear that local authorities are best served when engineering and scientific reporting is of sufficient quality to withstand legal scrutiny, and comply with applicable state and federal regulations.

To conduct the environmental review process, the SSTG suggests that EPA recommend local education authorities hire environmental consultants that are independent of the architect and construction contractor hired to design and build the school. This independence will add credibility and transparency to the environmental review process, and will eliminate intentional or unintentional attempts to diminish the significance of an environmental issue that could halt a project. An architect is necessary early in the school planning stages to determine whether the educational program for a school will fit on a proposed piece of real estate. The architect may need to suspend work until the environmental review process reaches a decision point for approval or is completed. The guidelines should also make clear that due to the complexity of some environmental issues, a LEA must engage an independent consultant to evaluate environmental quality of a proposed school site. Since many LEAs may not have the experience and resources to identify appropriate consultants, develop the necessary work plans for the consultants, or contract with the consultants, the SSTG suggests that EPA support school siting by providing experts and resources within each EPA region to provide state and local technical assistance for the school environmental review process.

3.1.4 Principle 4: The process requires sufficient resources to ensure that the review of potential sites occurs in concert with other steps in the process.

With any regulatory oversight of construction projects there is the potential for timing conflicts between the environmental review process and deadlines related to the development process such as obtaining site control, construction schedules, political realities (for example, schedules of decision-making boards), and community concerns.

Unless experienced scientifically trained regulators are dedicated to the environmental review process, the time necessary to obtain various regulatory approvals could adversely impact school construction schedules and pose significant cost implications. This may be addressed by increasing capacity or shifting resources at the state level.[10] The SSTG suggests that EPA support school siting by providing experts and resources within each EPA region to provide state and local technical assistance for the school environmental review process.

3.2 Site review and selection process

The SSTG has described best practices for a comprehensive site review and selection process, and divides this set of best practices into seven discrete stages:

- Stage 1: Institutionalize public involvement in facility planning and site selection
- Stage 2: Project scoping/initial screen of candidate sites
- Stage 3: Preliminary environmental review
- Stage 4: Comprehensive environmental review
- Stage 5: Development of site specific mitigation/remediation measures
- Stage 6: Implementation of mitigation/remediation
- Stage 7: Long-term maintenance and monitoring

To help understand the process, the SSTG developed a flow chart that identifies each stage of the process and highlights key decisions that are made in the process (Appendix B: Flow Chart). Each of the stages is shown in a different color on the flow chart.

The SSTG developed more than one version of the flow chart and also reviewed a project management chart as an alternative method for displaying the steps in school siting. A simple graphic depiction of the steps in school siting is desirable for users to understand the sequence of steps and decision making of school siting. The SSTG suggests that if EPA develops a web page for the guidelines, that a chart would provide an interactive way of navigating through the steps in school siting as well as provide an overall visual aid. The chart in Appendix B is coded to correspond with the report (boxes are labeled with the corresponding report section). The SSTG suggests that EPA develop descriptive text similar to what is written below for each step in a flow chart.

The flow chart shows that most of the environmental review of candidate school sites occurs in Stages 3 through 4. Stage 5 addresses the remediation and mitigation measures that must be followed if there are potential exposures associated with the site and the costs associated with the proposed measures. The chart shows that the LEA should complete the review of all potential sites through Stage 5 before acquiring or leasing any site for further development or before commencing work on a property already owned by the LEA (e.g., expanding an existing school structure or rebuilding on a site already used for school purposes).

[10] California statutes prescribe review time limits for the regulatory agency and EPA may need to recommend timelines for agency review periods.

The environmental review is designed to answer the following questions:

- Are site surface soils and subsurface soils, soil gases, or onsite groundwater contaminated with hazardous materials and substances to a degree that the site should not be used for school purposes? (*onsite contamination*)
- Are there off-site sources of pollution, contaminants, or other environmental hazards affecting the site such that the site should not be used for school purposes? (*off-site environmental impacts*)
- Are the environmental impacts associated with putting a school on the site so significant that the site should not be used for school purposes? (*impacts of the project on the environment*)

The SSTG discussed the most desirable role for the interaction of state and local agencies in answering the questions above, and discussed how these roles might vary from state to state. All state environmental regulatory agencies have programs in place to evaluate and approve cleanup plans of onsite contamination for specific types of sites or projects. However, few states have programs in which mitigation of off-site environmental hazards are evaluated and approved. Only six states require sponsors of new school construction projects to assess the environmental impact of the project as part of a state environmental review process,[11] and the extent to which human health impacts are considered in such reviews varies.[12]

The site review and selection process outlined below incorporates state environmental regulatory approval and oversight for *onsite contamination* evaluations. An evaluation of *off-site environmental hazards* and the potential *environmental impacts* associated with placing a school on a given site are also described. However, the actual state and local oversight relationships for various steps in the environmental review process may vary, with state policies mandating greater or lesser oversight. Because oversight within a state may not be mandated, EPA should develop guidelines for both local education authorities and states to review the oversight capacity of the state and to take steps to secure the level of review that is described in the steps below. For example, in the absence of a statutory requirement, the LEA or the state education agency might secure an oversight agreement with the state environmental regulatory agency, enabling the state to provide the oversight and review that is described below.

Best practice for the process of evaluating candidate sites for locating a school begins with an initial or preliminary environmental review followed by a more detailed or comprehensive environmental review. These evaluations of hazards and impacts are performed by environmental professionals and include public involvement at multiple

[11] California, Maryland, Minnesota, New Jersey, New York and Washington. Other states that have environmental review laws include Connecticut, Georgia, Hawaii, Indiana, Montana, North Carolina, South Dakota, Virginia and Wisconsin. Discussion, The Historical Development of SEQRA, 65 ALBANY LAW REVIEW 323, 356, n. 49 (2001).

[12] State environmental impact review requirements are modeled on the National Environmental Policy Act, which requires the preparation of an environmental impact statement for major federal actions significantly affecting the quality of the human environment.

steps in the process. The process of environmental review culminates in a final evaluation that responds to comments received from the public and the agencies providing oversight of the process.

The remainder of Section 3.2 is a narrative that describes each stage and step in school siting.

3.2.1 Stage 1: Institutionalize public involvement in facility planning and site selection

Meaningful public involvement must be institutionalized in the school siting process. This may require LEAs (shown on the flow chart as “Public Body” or “PB”, in particular the governing or voting body) to create new committees and planning activities for public involvement, and new practices to assure those plans and committees are utilized to their fullest potential. Best practice for public involvement is broken down into three areas: a comprehensive long range plan, a school siting committee, and a communications plan (described below).[13]

3.2.1.1 LEAs should prepare a long range school facilities plan

LEAs should prepare a long-range school facililties plan that:

- Projects school district enrollments for the foreseeable future (e.g., five years);
- Identifies existing school infrastructure that may need to be improved or replaced;
- Establishes the need for additional instructional space, if any, based on projections;
- Develops a plan for meeting new space needs that considers building new school buildings on newly acquired sites, leasing space in existing buildings, renovating or reconstructing school facilities on existing school grounds, jointly developing land with other public or private entities to optimize site location and utilization, etc;
- Includes approximate dates for opening any new school facilities; and
- Includes estimated costs of facility improvements

The LEA long range plan should be reviewed and commented on by the public, including other local public entities (e.g., municipalities, planning department). Finally, the long range plan should be approved by the voting body of the LEA.

3.2.1.2 LEAs should establish a school siting committee

LEAs should establish a school siting committee (SSC on the flow chart), whose responsibilities include making recommendations to the LEA’s governing body on sites for building new schools, leasing space for new schools, and/or renovating or expanding existing schools. Committee responsibilities also include participating in the environmental review of potential sites. The committee should include representatives of the LEA’s governing body (such as elected school board members), local

[13] These steps for meaningful public participation in school site selection are described in New Jersey's School Preconstruction Regulations (Chapter 34).

government or tribal staff (such as a city planner, government environmental health specialist, or county auditor), as well as representatives from additional stakeholder groups (such as parents of children likely to attend the new school, teachers, public health organizations, community members, environmental advocacy and environmental justice groups, age-appropriate students, local trade/building associations, etc.).

3.2.1.3 LEAs should develop a communications plan

LEAs should develop a communications plan to ensure effective public involvement in school siting. The plan should provide information to the public and identify ways for the public to participate in school siting decisions. It is essential that the public receives timely notice about the LEA's plans for new school facilities. In order to ensure that key stakeholders receive such notice, LEAs should publicize the release of draft plans and reports, the commencement of public comment periods, and public hearings through written notice that is:

- Composed in lay-accessible language.
- Published in newspapers of general circulation within the LEAs jurisdiction (including foreign language newspapers for any non-English speaking population that comprises more than 5% of the school population).
- Placed conspicuously in schools within the LEA.
- Delivered to each parent-teacher organization within the LEA.
- Delivered to each labor union covered by a collective bargaining agreement with the LEA.
- Delivered to businesses located within 1,000 feet of potential school sites.
- Delivered to residents living within 1,000 feet of potential school sites.

LEAs and/or state environmental agencies should also establish and make public key contact persons and create central repositories (a project web site and other centralized sources such as community libraries) for key documents and notices related to school siting and monitoring. For each ongoing school siting process, these repositories, including the web site, should provide:

- Documents that are or have been subject to review, and comments received on such documents.
- Relevant correspondence between LEAs and the state oversight agency, including any supplemental information provided as a result thereof.
- A timeline for the review process that specifically notes opportunities for public comment and public hearings.
- Copies of any public notices.
- Key school siting resources including laws, regulations, guidance documents, and appropriate agency contacts.
- For any schools where environmental remediation measures are put in place and/or long term site management plans are implemented, copies of such measures or plans and the results of any monitoring results or reports generated under those measures or plans.

3.2.2 Stage 2: Project scoping/initial screen of candidate site (1 to 2 months duration)

This portion of the environmental review process begins when the LEA decides to proceed with a school facility project identified in the long-range school facility plan. This decision includes such considerations as the project size (number of students to be served), scope (type of school to be built) and target date for completion. At this point the school siting committee should be tasked with identifying at least three sites for the school project.[14]

The committee should review possible sites for the project, and screen sites using a variety of siting criteria (criteria may include cost, availability, educational program, services to be provided, zoning, and more). The screening should also assess the likelihood of obtaining the various environmental, historical and cultural, and other land use approvals and permits relevant to the proposed school site.[15] The SSTG developed environmental siting criteria (Appendices C, D, and E) that the LEA should also use, and suggests EPA incorporate these environmental siting criteria into EPA guidelines. The SSTG suggests the screening activity may need to be facilitated or supported by advisors from various disciplines, including environmental professionals, and consultation and support from federal, state, or local government may be needed at this stage.

The committee should recommend a preferred site to the LEA for further environmental review along with two alternative sites for the school project. Should the application of the environmental screening criteria (Appendices C, D, and E) result in the elimination of all or nearly all of the candidate sites, the committee could decide to recommend one or more sites that had been eliminated in the initial screen. The committee should recommend such sites to the LEA for further environmental review and evaluation of potential environmental mitigation and remediation options.

The LEA should take the recommendations of the committee into consideration and designate a preferred site for further environmental review, with the understanding that the environmental review will likely be more comprehensive for a site that was eliminated in the initial environmental screening.

3.2.3 Stage 3: Preliminary environmental review (2 to 3 months duration)

Once the LEA designates a preferred site for the project, the LEA should engage environmental assessment professionals or professional firms (EAP on the flow chart) to conduct the necessary environmental reviews for the project.[16] The LEA may need assistance from federal, state or local government agencies to guide or even undertake

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[14] A school siting committee and LEA should consider giving the public an opportunity to comment on the preferred site that is selected, perhaps by making the committee meeting open to the public.

[15] Such an evaluation is required in New Jersey under the Environmental Screening Report (ESR). The scope of the ESR is summarized in the SDA Real Estate Practices Manual at http://www.njsda.gov/Business/Doc_Form/PDFsForms/RE_Manual.pdf

[16] EPA's CERCLA regulations define the qualifications of an "environmental professional" engaged to perform "All Appropriate Inquiries" studies (40 CFR § 312.10(b)). Additional certification may also be appropriate such as an AICP from the American Planning Association.

this work.[17] Careful and comprehensive environmental review begins with a preliminary environmental review of the site (Phase I environmental site assessment) with the aim of:

- Identifying issues for immediate decision-making about the suitability of the preferred site; and
- Identifying issues to be addressed in detail during the next stage of environmental review (Stage 4, comprehensive environmental assessment) if the site continues to be the preferred site.

The four reviews described below can be conducted concurrently. When complete and when possible, the four reviews described below should be combined into a preliminary review report.

3.2.3.1a Onsite contamination

Onsite contamination refers to site surface soils and subsurface soils, soil gases, or onsite groundwater that may be contaminated. An assessment of the potential environmental health impact of onsite contamination is commonly referred to as an "All Appropriate Inquiry" or a Phase I environmental site assessment[18] and is described in Section 101(35) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Phase I environmental site assessments conducted for proposed school sites should include an enhanced database search to identify additional potential hazards.

The purpose of the draft Phase I environmental site assessment is to identify the presence or the likely presence of any hazardous materials or petroleum products on a property based on historical and current site uses. A typical Phase I environmental site assessment involves no collection or testing of samples taken from the site, though limited sampling may be appropriate for some school sites.[19] Instead, the assessment will be based on a review of public and private records of current and past land uses, historical aerial photographs, environmental databases, and the files of federal, state and local regulatory agencies. In addition, the assessment includes conducting a site visit, inspecting adjacent properties, and interviewing people familiar with the site's history, including past and present owners.

Ultimately, a Phase I environmental site assessment determines if further action (FA on the flow chart) or no further action (NFA on the flow chart) is required for the site. For example, if a review of records shows onsite environmental contamination exceeds state or local standards, a comprehensive assessment would be conducted. The standards used should be the most stringent levels in effect for any contaminants found at the site, which typically are levels set for residential use. If further action is required,

[17] LEAs may have limited experience and limited resources for carrying out the work described in the guidelines.
[18] See ASTM standard E1527-05 and CHEJ School Siting Guidelines
[19] See ASTM standard E2600-08 for vapor intrusion sampling guidance. See http://www.dtsc.ca.gov/Schools/upload/Guidance_Lead_Contamination_060912.pdf for guidance on limited lead-based paint, pesticide, and poly-chlorinated biphenyl sampling guidance.

the Phase I environmental site assessment report will specify “Recognized Environmental Conditions” for further study.

3.2.3.1b Off-site environmental impacts
The environmental professional should identify potential environmental hazards surrounding the project site such as from old waste sites (including superfund sites), localized air pollution, rail lines, hazardous material pipelines, and others. Hazards of concern and the distance from the site for which hazards must be identified are described in Appendices C and D.

3.2.3.1c Impacts of the project on the environment
An environmental impact review identifies potential significant impacts of the project on the surrounding environment and human health, as well as construction and regulatory obstacles that cannot be overcome. An environmental impact review may be required by a state environmental regulatory agency or planning board (e.g., for large school construction projects). The outcome of the review could result in rejecting a site from further consideration either by the state or by the LEA. The potential impacts that should be assessed may include:

- Local utilities such as water supply, sewerage service, and electricity;
- Local traffic and pedestrian safety patterns;
- Hydrology/water quality such as coastal wetlands, floodplains, and stream encroachment constraints;
- Public land such as displacement of parks;
- Historical or archeological resources;
- Threatened or endangered plant or animal species;
- Aesthetics such as lighting or noise from stadiums;
- Hazards and hazardous materials such as disposal of onsite contamination;
- Agricultural resources such as displacement of farmland;
- Air quality such as dust emissions from construction;
- Geology/soils such as creating slope instability during construction;
- Mineral resources such as displacing drilling rights;
- Public services such as police and fire; and
- Excessive community relocation and displacement impacts.

3.2.3.1d Positive environmental attributes of a site
Positive environmental attributes of a given site should also be assessed, such as the site’s proximity to residences where future students live (so students would be able to walk or bicycle to school), whether sidewalks, crosswalks, and streets in proximity to the site provide safe routes to schools, the availability of public transportation to and from the site, and access to community resources such as libraries, community centers, parks, and other features.

3.2.3.2 Preliminary agency review of the preliminary review report
Environmental professionals conduct the four reviews described above and delivers the reports, which make up the preliminary review report, to the LEA. Should the LEA decide to continue pursuing the site, the LEA will comply with the state’s oversight and

requirements for environmental review and submit the draft Phase I environmental site assessment to the state environmental regulatory agency (SERA on the flow chart). When there are no state requirements, the LEA should secure an agreement with the state environmental regulatory agency for review of the draft Phase I environmental site assessment. It is desirable to have the state review the other reviews as well (off-site contamination review, environmental impact review, and positive environmental attributes). Depending on the thoroughness of the assessment, the state agency may give preliminary approval to the assessment, disapprove the assessment, or request more information.

3.2.3.3 Public comment on the preliminary review report

All four reviews that comprise the preliminary review report should be made available to the public and relevant local agencies (such as the local department of transportation, the local police, etc.) for comment, even though they may not be ready at the same time.

If the Phase I environmental site assessment recommends no further action (NFA on the flow chart) the LEA should publicize the work conducted (reports submitted to the state, any responses, and other supporting assessments) and provide a public comment period, including a public hearing, before formally adopting the recommendations of the preliminary review.

If the Phase I environmental site assessment recommends further action (FA on the flow chart) then public review of the Phase I environmental site assessment may occur during Stage 4 (comprehensive environmental review). The Phase I environmental site assessment report should be posted on the project web site and notices published according to the LEA's communication plan.

Regardless of findings, the components of the preliminary review report should be publicized and public comments invited simultaneously or as each assessment and review becomes available.

Written notice of the results of the preliminary review (posted on the web site and sent to those identified in the communications plan) should include:

- A statement that a preliminary environmental review (and its specific components) of the site has been completed;
- Prior uses of the site that raise potential health and safety issues
- Potential environmental impacts to the site and project (hazardous materials, police services, traffic, etc.)
- A brief summary of the conclusions of the review
- The location where people can review a copy of the report or an executive summary written in the appropriate foreign language (if applicable)
- In the case of a determination of no further action, instructions and addresses for submitting public comments on the various products of the preliminary review.

Public comment on the preliminary review is required and should be conducted by the LEA. How and when public comment is solicited will vary from state to state.[20] A public comment period is needed or may be required by the state regulatory agency, particularly if the preliminary review indicates that no further environmental review is necessary and no other methods of securing public comment is likely. The information listed above should be included in a public notice.

3.2.3.4 Final agency review of Phase I environmental site assessment
Prior to final state-level review, the LEA's report should be modified to address substantive issues raised during the public review phase. The state environmental regulatory agency (SERA on the flowchart) should also review all comments received on the Phase I environmental site assessment. The state agency will then accept or reject the conclusion of the assessment, determining whether no further action is required on the site or whether further action (for example, a comprehensive environmental review) is required. The state regulatory agency should explain in detail the reasons for accepting or rejecting the final Phase I environmental site assessment.

3.2.3.5 School siting committee and LEA review and recommendation
After the state environmental regulatory agency concurs with the findings of the final Phase I environmental site assessment, the school siting committee, the governing body of the LEA, or LEA staff[21] will review the findings of the preliminary environmental review. The reviewers will make a decision/recommendation on the project. The recommendation should be based on the products of the four reviews that make up the preliminary review report and public comments received. The purpose of this review is for the LEA to either:

1. Abandon the site and pursue alternative sites;
2. Continue evaluating the potential environmental hazards at the site with a comprehensive environmental review;
3. Proceed with construction if no further remediation or study is required.

If the recommendation is to proceed with a comprehensive environmental review or to proceed with construction, and subsequent decisions involve fiscal impacts, procedures for making subsequent decisions should be explicitly described for the public and should involve the public to the extent possible.

If the recommendation is to proceed with construction of a new school because no further remediation or study is required (no further action is needed), the governing body of the LEA must certify the findings of the review and then approve funding for the project.

[20] For example, in California, public comment is not solicited on the Phase 1 by the state environmental review agency; however, comments are made on a broader school siting environmental evaluation document that usually encompasses the Phase 1 components.
[21] Some LEAs have operating procedures in place that authorize staff to make decisions on behalf of the LEA. If that is not the case, a school board might pass a special resolution to authorize LEA staff to make the decision at this point in the review whether or not to proceed with the project.

3.2.4 Stage 4: Comprehensive environmental review (3 to 12 months duration)

If the LEA decides to conduct a comprehensive environmental review, the environmental professional will conduct a more thorough examination of onsite contamination, off-site environmental hazards, and potentially significant environmental impacts of the proposed school on the surrounding environment.

The purpose of the comprehensive environmental review is to gather and analyze data on environmental hazards and impacts identified in the preliminary environmental review, and evaluate the risks posed to children's health, public health, and the environment based on the contamination or impacts found. The comprehensive environmental review also includes developing preliminary plans and cost estimates for mitigating or reducing risks.

In many states, the only portion of the comprehensive review that is subject to review and approval by the state environmental regulatory agency is the onsite contamination component. An oversight review of the offsite and environmental impact reports should also be completed, but which agency conducts the review will vary from state to state.

The environmental professional will prepare draft versions of onsite contamination investigation, off-site hazards, and project environmental impacts and the LEA will publish those drafts for public comment. The environmental professional will prepare final drafts that take into account public comments. The final drafts will be subject to review and approval by the school siting committee and LEA.

The three reviews described below can be conducted concurrently. Typically, reports detailing off-site hazards and project impacts are prepared in a single summary document.

3.2.4.1a Onsite contamination

If the state regulatory agency concurs with the findings from the Phase I environmental site assessment and no further action is required, the review for on-site contamination is complete.

If further action is recommended and the LEA continues to consider this site, the environmental professional must conduct a preliminary endangerment assessment[22] or Phase II environmental site assessment (Phase II on the flow chart).[23] The primary objective of the Phase II environmental site assessment is to determine if hazardous materials are present or if there is potential for a release of a hazardous material or substance that could pose a health threat to children, staff, or community members. The Phase II environmental site assessment will include full-scale grid sampling and analysis of soil, soil gases (if any), and potentially surface water, groundwater, and air in order to accurately define the type and extent of hazardous material contamination present on the candidate site.[24] Criteria for establishing the degree of cleanup needed

[22] See http://www.dtsc.ca.gov/SiteCleanup/Brownfields/index.cfm#CP_JUMP_13316
[23] See ASTM E1903-97
[24] See the SEAM Guidance from California

should be based on the most stringent level in effect for each contaminant found at the site, which typically is a level set for residential/unrestricted use.

Before any work is done on the Phase II environmental site assessment, the LEA must develop a public involvement plan (see below) that ensures public and community involvement in the Phase II environmental site assessment process. The plan should indicate what mechanisms the LEA will use to establish open lines of communication with the public. The state environmental regulatory agency should require LEAs to obtain state review and approval of public participation plans, but even if such oversight is not mandated, the LEA should submit the public involvement plan to the state regulatory agency for comment before Phase II environmental site assessment activities begin.

Before any sampling is conducted as part of the Phase II environmental site assessment, a work plan must be prepared that defines the goals of the sampling; the rationale for the sampling strategy including the number and location of sampling sites and what substances to analyze in the samples; the sampling methods and procedures that will be used and the analytical methods and procedures. SSTG members note that, particularly in jurisdictions with little experience undertaking environmental assessments, Phase II assessments may be improved through the consideration of public comments and through peer review of the work plan by an environmental professional.

State environmental regulatory agency approval of the work plan is required prior to the initiation of sampling. Prior to sampling, the LEA should obtain signed access agreements from property owners. State laws may need review and updating to ensure the LEA can obtain access on preferred sites.

When intrusive environmental testing is completed, and remedial actions are undertaken to mitigate potential environmental exposures, it is important to preserve the right to pursue cost recovery in the future. The environmental professional should keep detailed records during all phases of the environmental assessment and remediation. Photo-documentation, complete field notes, written notification to property owners of environmental conditions, and provisions to allow property owners to obtain split samples for analysis are all recognized methods to preserve cost recovery rights.

The SSTG suggests that the EPA guidelines provide more definitive and specific guidance on how, when, and where to sample for contaminants. For example, EPA should specify when soil matrix, soil vapor, groundwater, indoor air, outdoor air, building materials, and other matrices should be sampled. References from EPA sources and relevant state guidance should be included. The SSTG suggests that the EPA guidelines include a conceptual site model illustration that identifies various pathways of contaminant migration such as vapor intrusion.[25]

[25] Cf. EPA, User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, 01/04.
ITRC, Vapor Intrusion Pathway: A Practical Guideline, 01/07.
CA DTSC, Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air, 12/04.

The Phase II environmental site assessment should also include an evaluation of the risks posed to children's health, public health, or the environment based on the contamination found. This evaluation should include:

- A written description and graphic depiction of all possible pathways of exposure that could result in children, school staff, and the community being exposed to potentially harmful contaminants on the school site (e.g., inhalation, soil ingestion, dermal);
- A description of health consequences of long-term and short-term exposure to any potentially harmful contaminants found on the site.

Because children differ from adults anatomically, physiologically, and behaviorally in ways that affect both exposure and sensitivity to chemicals, the guidelines should include a discussion of how the assessment of risks can be enhanced to address children's exposures and sensitivity to toxicants. For example, the use of early life cancer potency adjustments is appropriate for environmental review for school siting. Early life stage inhalation and ingestion rates and body surface area differ from adult values and are appropriate for developing risk assessments for school siting.

The LEA should submit the draft Phase II environmental site assessment to the state environmental regulatory agency and the public upon its completion by the environmental professional. The LEA should post the draft Phase II environmental site assessment on the project web site and publish a notice in accordance with the LEA's communication plan. Public notice should include:

- A statement that a Phase II investigation of the site has been completed;
- A brief statement describing the results of the assessment, such as a list of contaminants found in excess of regulatory standards and prior uses of site that might raise health and safety issues;
- A brief summary of the conclusions of the assessment, including a description of alternative site remediation approaches if such approaches were identified at this stage;
- The location where people can review a copy of the assessment and an executive summary written in the appropriate local language(s); and
- An announcement of a public comment period that includes a public hearing, provides a reasonable opportunity for meaningful public involvement (typically 30 days or longer) as determined by the circumstances, LEA practice, or recommendations of the state, and includes instructions and addresses for submitting written comments.
- The date, time, and place of any scheduled public meetings to discuss project impacts.

The LEA and state environmental regulatory agency should evaluate public response to the public notice and alter the public involvement plan (for example, extend the comment period) where appropriate. The LEA should address all substantive comments received during the comment period.

The state environmental regulatory agency should review all comments received on the Phase II environmental site assessment. The agency may then accept (with revisions) or reject the conclusion of the assessment.[26] If accepted, the agency may concur with the finding that no further action is required regarding onsite contamination at the candidate site (No Further Action on the flow chart) or that a Remedial Action Workplan (RAW on the flow chart) is required. The agency will explain in detail the reasons for accepting or rejecting the Phase II environmental site assessment and the basis for its determination.

3.2.4.1b Off-site environmental hazards

Using the list of offsite hazards identified in the preliminary environmental review (Stage 3, above), the environmental professional should evaluate and report the risks those hazards pose to future users of the school site, identifying both the risks that can be mitigated and those that cannot be mitigated and proposing measures to reduce these risks to the extent feasible. Old waste sites (including superfund sites), air pollution, seismic activity, rail lines/yards and power lines are examples of the kind of hazards that would be evaluated at this stage (see Appendix C and D for a full list). The report on off-site hazards must discuss whether feasible mitigation measures are available that would eliminate all significant risks.

Some members of the SSTG were particularly concerned that the air quality health risk assessment procedures in the draft EPA guidelines should be enhanced. Some level of air quality analysis should be considered for every new school site prior to project approval by the LEA.[27] This analysis should at a minimum include diesel exhaust, criteria air pollutants, and hazardous air pollutants (air toxics). Depending on the location of the site, the analysis may require database reviews, contaminant transport modeling, monitoring, health risk assessments, and/or other methods[28].

While database reviews are necessary for air toxics analyses, site reconnaissance should also be required. EPA should recommend a search radius of at least 1/4 to 1/2 mile around the site, and the reconnaissance must include interviews with business owners with potential toxic emissions since many businesses or operations are not included in available databases. The findings (a source list) should be made publicly available for every new school site. The SSTG suggests that the National Air Toxics Assessment (NATA) database should only be used as supplemental information as SSTG members have found that there are many errors and omissions in this resource (typical for a database of this size and scope). The NATA database should not be the basis for ruling out the need for a detailed air quality analysis.

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[26] In some cases (e.g., due to timing or access constraints), the Phase II environmental site assessement may not characterize all contaminants onsite. A separate supplemental site investigation may be necessary prior to determining the potential need for remediation. The process for conducting a supplemental site investigation should follow the steps identified above for the Phase II environmental site assessment.

[27] For example, California's Education Code 17213

[28] See http://oehha.ca.gov/air/hot_spots/HRAguidefinal.html

The benefits and detriments of modeling, monitoring, and other methods of assessing exposures to air contaminants should be presented in the guidance. For example, modeling is generally recommended by EPA in these types of assessments and may be preferential to monitoring data in characterizing potential risks from ambient air and nearby point sources. However, care needs to be taken as risk modeling does not address chemicals lacking toxicity criteria (e.g., ultrafine particles). Conversely, there are many limitations to monitored data (what to monitor, the duration and frequency of measurements, source of contaminants, comparison with background levels, etc.).

3.2.4.1c Impacts of the project on the environment

Using the list of potential significant environmental impacts (such as traffic, utilities, and others found in Appendix C) identified in the preliminary environmental review, the environmental professional should evaluate and report potential impacts the project may have on the surrounding environment and propose alternatives to mitigate or eliminate those impacts. The report should discuss what impacts to the environment will remain even after mitigation measures are taken.

3.2.4.2 Public comment on project impacts and off-site impacts

The environmental professional will prepare a draft report that combines the findings of the preliminary review of off site impacts and the assessment of impacts of the project on the environment. This report, called a draft "Potential Environmental Risks and Impacts" (PERI on the flow chart) will also describe proposed and alternative mitigation measures to reduce those risks and impacts. The report should document which impacts are less than significant, less than significant after mitigation, and significant after all feasible mitigation has been implemented. When the draft is completed the LEA should post the draft report on the project web site, submit copies of the report to public repositories and relevant public agencies (for example, local police departments, department of transportation, county health department, etc.), and publish a notice in accordance with the LEA's communication plan. The notice should include:

- A statement that a draft report of potential environmental risks and impacts of the site has been completed;
- A brief statement describing the results in the draft report, such as a list of potentially significant impacts
- A brief summary of the conclusions in the draft report, including a description of alternative mitigation approaches;
- The location where people can review a copy of the report and an executive summary written in the appropriate local language(s);
- An announcement of a public comment period that includes a public hearing, provides a reasonable opportunity for meaningful public involvement (typically 30 days or longer) as determined by the circumstances, LEA practice, or recommendations of the state, and includes instructions and addresses for submitting written comments.
- The date, time, and place of any scheduled public meetings to discuss project impacts.

3.2.4.3 Final report of Potential Environmental Risks and Impacts
Following the public comment period the environmental professional, in consultation with the LEA and the school siting committee, will evaluate and respond to all public comments, and incorporate those comments into a final Potential Environmental Risks and Impacts report.

The final report of Potential Environmental Risks and Impacts should then be forwarded to the school siting committee, relevant public agencies, posted on the project web site, and the LEA should publish a notice of availability of the report in accordance with the LEA's communication plan. Public notice should include:

- A statement that a final report of Potential Environmental Risks and Impacts of the site and mitigation measures have been completed;
- A brief statement describing the results in the report, such as a list of potentially significant impacts requiring mitigation, and potentially significant impacts that will remain significant after all feasible mitigation has been implemented;
- A brief summary of the conclusions in the final report, including a description of alternative mitigation approaches;
- The location where people can review a copy of the final report and an executive summary written in the appropriate local language(s); and
- An announcement of a public comment period of sufficient length to review revisions and responses to comments, including instructions and addresses for submitting public comments.

3.2.4.4 Cost estimates and schedules of remediation and/or mitigation measures
If the final report of potential environmental risks and impacts includes proposals for mitigation measures (such as additional side walks, enhanced filtration in the HVAC[29] system, etc.), potential cost estimates and schedules of implementation should be developed in coordination with facility planners (e.g., architects, local agencies, etc.). In addition, preliminary cost estimates and schedules of implementation should be prepared for any remediation of onsite contamination including, where appropriate, the cost of maintaining and monitoring controls over the life of the school.[30] These preliminary cost and schedule estimates for mitigation and remediation should then be forwarded to the school siting committee and LEA.

3.2.4.5 School siting committee review and recommendation
The school siting committee will review the:

- Onsite contamination reports (Phase II assessment and any supplemental investigation) approved by the state regulatory agency;
- The final report of Potential Environmental Risks and Impacts;
- The preliminary cost estimates and schedules for remediation and mitigation; and
- Public comments received on these documents.

[29] HVAC is the acronym for heating, ventilation, and air conditioning systems
[30] USEPA, Guidance on Conducting Non-Time Critical Removal Actions under CERCLA, 1993.

The committee will recommend to the LEA whether to certify the adequacy of the environmental reports. Following this determination, the school siting committee can recommend to the LEA whether to proceed or abandon the site based on public health risks, costs and schedule impacts, public concerns, and other factors.

The LEA should then review the committee recommendations, including any analysis of potential alternatives, impacts to public health, project costs/schedule impacts, public concerns, etc. and vote to either certify the environmental reports, revise the reports, or reject the reports. Following this determination, the LEA may then approve proceeding with the project at the site for which the comprehensive environmental review was completed, or to abandon that site. If the LEA votes to abandon the site, the project is referred back to the school siting committee and the committee should then recommend another preferred site for environmental review that begins at Stage 3. If the LEA votes to proceed with the project at the site evaluated, from that point forward the LEA may consider approving final funding for the project and site acquisition.

3.2.5 Stage 5: Develop site specific mitigation/remediation measures (6 to 9 months duration)[31]

If the LEA decides to proceed with a site where contamination must be cleaned up, a remedial action work plan (RAW on the flow chart) must be developed and submitted to the state regulatory agency for approval. The state and LEA should use cleanup levels that are explicitly protective of early life sensitivity to toxicants and early life exposures whenever such values are available. Typically, cleanup levels for sites intended for residential use are appropriate for use at sites considered for a future school use.

The remedial action work plan must:

- Identify methods for cleaning up the site to contaminant levels that meet the applicable cleanup standards;[32]
- Contain a financial analysis that compares estimated costs over the life of the school for the identified cleanup methods that will bring the site into compliance with applicable cleanup standards;
- Recommend a cleanup plan from the alternatives identified, including a description of long term maintenance and monitoring of any institutional or engineering controls implemented as part of the cleanup (preliminary site maintenance plan);
- Explain how the recommended cleanup option will prevent children from being exposed to the hazardous substances found at the site or on any adjoining contaminated parcels; and

[31] Development of site mitigation/remediation measures may occur either before or after the LEA has approved funding for the project as long as the state environmental regulatory agency has regulatory authority over the final Remedial Action Workplan. If not, the Remedial Action Workplan should always be developed prior to approval of funding for the project.

[32] The cleanup standards should be the most stringent standards in effect for any contaminants found at the sites, which typically are levels set for residential/unrestricted use.

- Clearly describe the responsibilities and long term environmental stewardship obligations of the LEA (or other responsible party) for inspection, maintenance, and reporting associated with any engineering control implemented as part of the cleanup.

3.2.5.1 Remediation techniques

Although the specific remedial response measures prescribed in a remedial action work plan will need to be tailored to the particularities of a given site, a number of environmental conditions in need of remediation are routinely encountered on existing and proposed school sites. The environmental professional and the state environmental regulatory agency should have the expertise needed to develop each of the remediation options described below. A few of many possible conditions and the various remediation response actions to address them are summarized below. Further discussion of these and additional conditions are described in Appendix F.

- The presence of volatile organic compounds (VOCs) in soil and groundwater may require remedial measures to protect against potential vapor intrusion into overlying school buildings. Common contaminants in soil and groundwater that can cause a vapor intrusion concern include gasoline (benzene) and dry cleaning and degreasing solvents (PCE and TCE). Periodic indoor air testing may be warranted, and depending on the concentration and duration of exposure, remedial actions such as the installation of an underground soil vapor barrier or a vapor recovery system may be required to eliminate a potential vapor intrusion concern.
- The presence of petroleum in soil and groundwater as a result of leaking underground heating oil tanks is a common occurrence at existing and proposed school sites and may require soil and groundwater remediation. Soil must be excavated and separate phase petroleum floating on the water table usually requires recovery and off-site treatment and disposal.
- Soils at existing and proposed schools may be unsuitable from both a geotechnical and environmental quality perspective. Soils that require excavation in order to repair or construct a new foundation may be found to contain contaminants above cleanup standards. These soils will likely require off-site disposal, and the excavation restored using clean soils of suitable bearing capacity.
- When it is not feasible to remove large quantities of soil that is found to contain low-level contamination in excess of residential standards, engineering controls (such as a multi-layered barrier) may be used to eliminate direct contact exposure to the soil. Such engineering controls should be approved by a regulatory agency, and used in conjunction with an enforceable agreement with the LEA to maintain the engineering controls.
- Landscaping plans and provisions for future underground utility maintenance should be compatible with the engineering controls.
- The presence of banned pesticides and herbicides may be encountered in soil and groundwater at existing and proposed school sites as a result of former agricultural and pest management practices. Some of these pesticides and herbicides do not readily degrade, and as a result may present a potential

exposure when soil is excavated. Soils should be tested for pesticides and herbicides prior to excavation.

EPA should provide guidance on the proper use of engineering and institutional controls. The table in the current EPA draft (page 39) should be expanded to include many additional examples of engineering and institutional controls (such as those described above and in Appendix F) and include references that provide more details on these methods.

3.2.5.2 Preliminary site maintenance plan

If the remedial action work plan includes partial cleanup in conjunction with the use of institutional engineering controls to prevent potentially harmful exposures to contaminants, the LEA must also develop a preliminary site management plan (SMP on the flow chart) as part of the remedial action plan to ensure full consideration of long-term feasibility and cost. A preliminary site management plan should include:

- Proposed plans to contain contaminants including any engineering and institutional controls to be used.
- Long-term maintenance and monitoring measures necessary to ensure the long-term integrity of engineering and institutional controls.
- A detailed evaluation of the resources and expertise necessary to effectuate the plan and a discussion of alternative measures considered and the basis for their rejection.
- A demonstrated commitment of funding and personnel sufficient to ensure the effectuation of the plan over the long-term (i.e. the life of the school).
- When a school is proposed for only a portion of a known contaminated site, the remedial action work plan must include clean up of the entire contaminated site or the site management plan must outline the ongoing security measures and public notification which will insure that future users of the school and the general public cannot gain access to the unremediated portion of the contaminated site.
- Recommendations for the final site sampling to be done after the cleanup has been completed to ensure that all residual contamination is less than the cleanup goals defined for the site.[33] Such sampling recommendations should be designed to discover the highest possible concentrations of contamination on the candidate site.

3.2.5.3 School siting committee and state agency review and public comment

The LEA should secure state regulatory agency review and approval of the remedial action work plan prepared by an environmental professional. Upon submitting this plan to the state environmental regulatory agency, the draft remedial action work plan should be made available to the school siting committee for review and comment. Once the work plan is submitted to the state agency for approval the LEA should proceed with a public notification and outreach plan similar to that conducted for the preliminary and comprehensive environmental reviews (Stages 3 and 4). This should include posting the

[33] The cleanup standards should be the most stringent standards in effect for any contaminants found at the sites, which typically are levels set for residential/unrestricted use.

plan on the project web site and publishing a notice, in accordance with the LEA's public involvement plan, that includes the following information:

- A statement that a remedial action work plan has been submitted to the state environmental regulatory agency for approval;
- A brief statement describing the work plan, including a list of contaminants found in excess of regulatory standards and a description of how the plan will reduce the level of contamination to meet those regulatory standards;
- The location where people can review a copy of the remediation plan and an executive summary written in the appropriate local language(s); and
- An announcement of a public comment period that includes a public hearing, provides a reasonable opportunity for meaningful public involvement (typically 30 days or longer) as determined by the circumstances, LEA practice, or recommendations of the state, and includes instructions and addresses for submitting written comments.

The public hearing on the remediation plan should be conducted in the neighborhood or jurisdiction where the candidate site is located. The state should work with the LEA to publish a notice of the hearing in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) and post a notice on the state and project web sites stating the date, time and location of the hearing.

After the public hearing and after reviewing any comments received during the public comment period, the state will approve the remedial action work plan, approve the work plan with revisions, or disapprove the work plan. If the state requires additional information, a copy of the state's comments and the responses prepared by the environmental professional in coordination with the LEA should be made available to the school siting committee and be posted on the project web site. Any additional information submitted by the LEA to the state should also be made available to the committee.

After reviewing any additional information, the state must approve or reject the work plan. The state will explain in detail the reasons for accepting or rejecting the work plan. Before approving a work plan, the state should make an explicit finding that the LEA has the requisite capacity to oversee and manage the remediation measures and institutional and engineering controls proposed in the remedial action work plan.

After the state approves the work plan, the school siting committee may also review the plan and recommend to the LEA whether to proceed with acquiring the site and implementing the remediation plan. The LEA should not begin constructing the school until site clearance has been provided by the state environmental regulatory agency, following its approval of the remediation activities (post-Stage 6).

3.2.5.4 Off-site mitigation measures

In addition to remediation of on-site contamination, the LEA should, at this stage in the process, coordinate with the appropriate state and local government agencies to

develop any necessary off-site mitigation measures, such as installing traffic signals, signage, utilities, etc.

3.2.6 Stage 6: Implementation of remedial/mitigation measures (0 to18 months duration)

Prior to the onset of any school construction on the candidate site, the remediation of the site as defined in the remedial action work plan must be completed. If engineering controls are required as part of remediation, construction of those controls may begin following approval by the state environmental regulatory agency.

Final sampling (in accordance with sampling procedures in the Phase II assessment or the remedial action work plan) should be conducted to verify that clean-up goals have been met. Documentation regarding the implementation of the plan and all final sampling results will be compiled into a report and submitted to the LEA and school siting committee for posting on the project web site, and also submitted to the state for review, which may require additional sampling and/or remediation efforts as the state deems appropriate. Any modifications to the remedial action work plan should also go through the appropriate public review processes.

Towards the completion of remedial activities the environmental professional shall develop a final site management plan, which will set forth in detail the specific manner in which institutional and engineering controls will be employed. The final site management plan should address all contamination left on site following remediation that would prevent unrestricted use of and unlimited access to the site. The final plan should be submitted for public review and comment in the same manner undertaken for all of the proceeding plans and reports, and should be submitted to the state for approval prior to the commencement of construction. The contents of the final site management plan should include (see Appendix G for additional details):

- A site description of historical uses, current location of any remaining contaminants, and a summary of remedial work on the site
- Accurate mapping of institutional and engineering controls with demonstrable compliance measures
- Participation in one-call systems to prevent breaches, where available
- Specific contingency plans
- Specific performance goals to evaluate effectiveness of controls, and specify criteria for termination of long-term operations and maintenance requirements
- A description of any prohibited activities (e.g., digging)
- A detailed articulation of the expertise and resources necessary to carry out the site management plan and a description of specific activities taken to procure such expertise and resources
- Establishment of any necessary monitoring programs to be carried out by qualified environmental professionals
- A public accountability and oversight plan that, among other things, requires periodic reporting on monitoring and maintenance results and any compliance issues that may have arisen.

School building construction should begin only after the state approves the final site management plan and determines that remediation of onsite contamination is complete (except for engineering controls to be implemented during construction). When engineering controls are put into place during construction, the environmental professional should submit documentation of completion of those controls to the state regulatory agency for review and approval. The school building may be occupied once the state regulatory agency determines that site remediation activities have been successfully completed.

3.2.6.1 Off-site mitigation measures

In addition to remediation of on-site contamination, the LEA should, at this stage in the process, coordinate with the appropriate state and local government agencies to implement any necessary off-site mitigation measures, such as installing traffic signals, signage, or utilities.

3.2.7 Stage 7: Long-term maintenance and monitoring

After the school project is complete and the school has been put into operation, the state environmental regulatory agency should conduct a periodic review[34] of the effectiveness of remedial measures and engineering and institutional controls used at the site. Such reviews could be based on the five year review EPA presently conducts for Superfund sites. Five-year reviews provide an opportunity to evaluate the implementation and performance of a remedy to determine whether it remains protective of human health and the environment. Generally, reviews at Superfund sites are performed five years following the initiation of a CERCLA response action, and are repeated every succeeding five year period so long as future uses remain restricted. Further information about EPA's five year review of superfund sites can be found at http://www.epa.gov/superfund/cleanup/postconstruction/5yr.htm.

Ongoing monitoring of environmental conditions at school sites where remedial actions have taken place are usually provided for in the site management plan. The LEA should hire an environmental professional to perform periodic tests described in the site management plan; compile the results; evaluate the effectiveness of remedial actions; and report the results to the LEA. Copies of the testing results and the report should be submitted to the state regulatory agency for review and be placed on the LEA web site. The state agency will take public comment on the report. The agency will determine if any further actions are required, such as modifying the remedial actions or changing the monitoring schedule. The agency may also find that no further actions are needed until the next periodic review.

3.3 Comments concerning the capacity to carry out guidelines

The SSTG believes that many if not most states and LEAs lack the capacity to carry out school siting activities according to the draft EPA guidelines. The SSTG urges EPA to develop additional guidance for LEAs and states on developing the capacity to carry out these new guidelines.

[34] For example, the first review could be after 2 years and then every 5 years thereafter if the engineering and institutional controls are functioning properly.

- LEAs need additional guidance on what kinds of consultants and architects should be hired, greater ability to involve the public, securing oversight, and incorporating information on healthy behaviors.
- State oversight needs to be in place to make sure that siting is done according to the guidelines, and states should inventory state and local capacity for policies and programs, expertise, people resources, and funding.

The SSTG found section II of the draft guidelines (Guidelines for States and Tribes) a good starting place to describe necessary federal, state, and local capacity for school siting. The draft document calls for states and tribes to "identify and evaluate existing state/tribal policies, regulations and guidelines." However, the SSTG is concerned that the capacity to carry out this work is variable at the state level. Additionally, there is a lack of capacity at the federal and state levels to support local communities in making siting decisions. Significant disparities in school siting policies have been found when examining school siting laws, regulations and policies. State policies range from no policy (20 states) to varying state level policies. Policies that do exist include policies that prohibit sites, require environmental evaluations, provide for site remediation measures or standards, prescribe specific siting factors, proscribe funding provisions, and require public involvement[35]. Some states may also have laws, regulations and policies in place (such as those governing school enrollment and minimum acreage standards) that intentionally or unintentionally influence school siting decisions. These policies may result in site selection that is in conflict with the intent of the EPA guidelines. Many of these laws and regulations have been put into place in piece-meal fashion over time and may not have been reviewed collectively for their impact on school siting decisions.

School siting involves a complex set of stakeholders, including several types of state and local agencies (education, environment, public health, transportation, etc.), local and state governments (local, county, state), community groups (non-governmental organizations, state and local coalitions, parent organizations, civic and neighborhood associations, individuals), and professionals (education, health, environmental, child advocates, community advocates, etc.). Stakeholder groups have differing knowledge, skill sets and financial resources that create challenges in the school siting process. The various entities may have differing cultures, communications, and control structures. LEAs often lack staffing and skill sets, money, resources, and experience in conducting environmental assessments of sites, and often turn to the state for guidance and resources. However, it can be challenging for LEAs and local communities to identify the responsible agencies and personnel to reach out to for assistance during the siting process—and the resources may not be in place at the state or federal level to provide that assistance.

The SSTG offers the following specific comments on state and local activities and relationships that will build capacity to implement the school siting guidelines.

[35] Rhode Island Legal Services and Center for Health, Environment and Justice. 50 State Survey Existing School Siting Laws, Policies, and Regulations http://www.childproofing.org/school_siting_50_state.htm

3.3.1 State database of site reviews

EPA guidance should recommend that states maintain a publicly available, easily accessible database of past school siting assessments to assist with future school siting assessments. The state database should list rejected candidate sites, provide a description of the site, include information on finding previous reviews and responsible parties, and provide the reasons the LEA rejected the site. EPA should emphasize that a site placed on such a list would not necessarily preclude future use of the site for a school, although any further consideration of the site should address the reasons the site was previously rejected (for example, an environmental concern). If the site was previously subjected to remediation, or is planned for remediation as part of the school development, the database should contain a record of decision (or equivalent description of remediation status) from a regulatory agency that the site was effectively remediated to a particular exposure-based standard. As discussed earlier, such sites will still need to be evaluated according to the environmental review process. The SSTG recognizes that a list of rejected sites may have potential liabilities for landowners. However, a central record of rejected sites will make better use of an LEA's resources if that site is considered in the future.

3.3.2 State policy review

States should be encouraged to conduct a comprehensive review of all laws, policies and regulations in place that affect school siting, consider whether changes are needed to encourage healthy and green siting, and provide local communities with guidance concerning the state policies that pertain to siting decisions.[36] The draft EPA guidelines include some relevant language (starting on page 15), but it should be strengthened and expanded to include a broader review of policies that influence siting. EPA should consider providing incentives for states to enable them to conduct these reviews.

In addition to policies related to environmental review and clean up (described in section III, part 2, above), relevant policies include those that promote public health and policies concerning the impact of proposed or existing off-site sources on existing schools.

Policies that promote public health at school sites include those that facilitate physical activity, healthy behaviors and healthy communities. Schools located in the neighborhoods of the students they serve will have an increased number of children who walk and bicycle to and from school and will provide families with access to playgrounds and facilities that encourages physical activity outside of school time. States may want to examine a number of policies, laws and regulations to determine whether they are supportive of this intent, including:

- Formulas for state education funding allocations should not favor larger enrollment schools, which are challenging to build within neighborhoods.
- School busing reimbursement formulas and busing radius policies should encourage efficient location of schools and judicious use of busing.

[36] See the 2006 report "Not In My Schoolyard" which inventoried state policies related to school siting then in effect (http://www.nylpi.org/images/FE/chain234siteType8/site203/client/EJ%20-%20Not%20in%20My%20Schoolyard%20-%20Improving%20Site%20Selection%20Process.pdf)

- School construction funding formulas (often called the "two-thirds" rule[37]) should not favor new construction (which often takes place in outlying areas) over renovation of existing schools (which are often in the neighborhood where students live).
- State policies on estimating costs for renovation versus construction should take into account the true long-term costs of a site. These costs may include land acquisition, initial construction, long-term busing costs, improvements to the utilities and street network around the school site, and long-term site mitigation and monitoring costs.
- State laws or policies should account for dense, urban neighborhoods when considering minimum acreage for school sites; higher requirements can prevent LEAs from using smaller sites in neighborhoods and force them to build schools on large tracts of lands on the outskirts of communities. The Council on Educational Facility Planners International has abolished its "minimum acreage standards" policy but many states still have outdated laws based on this policy.
- State laws and policies should encourage communities and LEAs to work together on joint use of libraries, parks and ball fields to facilitate physical activity among community members and students, and to increase the efficient use of available land.
- State policies on estimating costs for renovation should be examined.

Resources the SSTG identified for this assessment of health promotion include:

- EPA's report: Travel and Environmental Implications of School Siting, available at http://www.epa.gov/dced/school_travel.htm
- Planning for Schools and Livable Communities: The Oregon School Siting Handbook, available at: http://www.oregon.gov/LCD/TGM/docs/schoolsitinghandbook.pdf
- NGA Center for Best Practices Issue Brief on School Siting, available at: http://www.nga.org/Files/pdf/0705SCHOOLSHEALTHYDESIGN.PDF
- Good Schools, Good Neighborhoods: The Impacts of State and Local School Board Policies on the Design and Location of Schools in North Carolina, available at http://curs.unc.edu/curs-pdf-downloads/recentlyreleased/goodschoolsreport.pdf
- National Trust for Historic Preservation resources on Neighborhood schools (includes policy resources and state-by-state assessments of siting policies): http://www.preservationnation.org/issues/historic-schools/

Policies concerning impact of off-site sources on existing schools may be needed. Permits for new construction or changes to existing structures (industries, roads and transportation hubs, public works, and many other potential sources of air, land, and water contamination) should consider risks to sensitive populations at nearby schools. States and localities should evaluate siting and permit processes for those facilities

[37] If renovation costs exceed two-thirds of the cost of building a new school, the Ohio School Facilities Commission (OSFC) requires school districts receiving state capital funds to replace the existing school with a new one. http://www.preservationnation.org/issues/historic-schools/additional-resources/best_statebystate.pdf

listed in the screening criteria to ensure that they are sufficiently protective of school environments, that is, to ensure that they do not allow for the siting of potentially harmful facilities within the screening perimeter/exclusion zones (Appendix B) of a school that has been safely sited.

3.3.3 State resource review

Several state agencies are likely to be involved in school siting decisions and implementation, including departments of education, public health, transportation, and environment, as well as local governments. Different agencies will likely have staff with knowledge, expertise, and skill sets that can be helpful in various parts of the school siting process. But, it may be challenging for local communities to know which agency to contact for specific concerns and questions. States should be encouraged to perform an inventory of their capacity across agencies, and publicize state-level contacts and available assistance. States should be encouraged to assign an office or agency to serve as the liaison for questions and assistance during school siting. EPA should consider whether it can identify resources to assist states with these reviews, and consider developing a tool to assist states with this review.

The SSTG suggests the assessment address the following issues:

- Whether the existing program management structure is able to perform the necessary high-level coordination and supervision between agencies;
- Which state and/or local agencies need to be involved in school siting and the responsibilities of each agency;
- Whether state agency staff have the experience and training to evaluate site assessment reports and remedial action plans;
- Whether there are adequate resources and staffing levels in place to assist local communities with school siting decisions and planning processes;
- Whether there are legal and institutional impediments that need to be addressed;
- Whether a framework exists for effective communication and community engagement;
- Necessary measures for addressing gaps in staffing and resources; and
- Mechanism for monitor the progress and effectiveness of the state’s assistance in the area of school siting.

States may want to consider developing a formal memorandum of understanding (MOU) between agencies to ensure that staff resources and expertise are available to assist with school siting.

Many states may lack the resources and personnel to provide assistance to local communities making school siting decisions as discussed in this section. States should be encouraged to increase this capacity, and EPA should consider providing assistance to states to increase state-level staff capacity and knowledge on school siting.

3.3.4 LEA needs

LEAs also likely need assistance in the selection and use of consultants, for example. in areas such as evaluating the skills and abilities of consultants, determining necessary

skills and expertise, guiding the work of consultants, and contracting with consultants. The SSTG suggests that the EPA guidelines include resources on best practices for selecting and working with consultants (such as sample contracts). EPA regional offices could assist in the development of databases of qualified consultants for school siting.

LEAs will to varying degrees possess the expertise and resources necessary to effectively evaluate sites and to design and implement effective oversight and stewardship policies for contaminated sites. As a necessary complement to its oversight authority, and in order to address limitations in expertise and resources, states should provide technical assistance to states and LEAs throughout the school siting process. This should include providing LEAs with general guidance and assistance on the:

- Proper evaluation of possible contamination at potential sites (including how to manage and review Phase I and Phase II environmental site assessments).
- Evaluation of site remediation cost analyses including for proper removal and offsite disposal of contamination, and for engineering and institutional controls to contain contaminants.
- Development of long-term maintenance and monitoring plans to ensure the effectiveness of controls for the life of the school.

As part of its technical assistance function, states (and EPA) should also provide professional development and training opportunities that will enable LEAs to ensure healthy learning environments. As appropriate, such training and development should be targeted to superintendents, members of the school board (and other entities engaged in the school siting process), administrators, and operations and maintenance staff. States should also help ensure that LEAs are appraised of advances in control technologies over time and should update their guidelines and regulations accordingly. In furtherance of these goals, states and EPA should establish centralized web access to all relevant state and federal regulations, policies, guidelines and resources that are of assistance to communities engaging in the school site selection process.

3.4. Comments concerning ensuring utility for different audiences

The SSTG suggests that the EPA guidelines, currently divided into State/Tribes and Community, should be displayed as three entry points into the web-based set of guidelines or as three introductory sections for a paper version of the guidelines.

The SSTG envisioned an organization for the guidelines such as:

1) For state/tribes
   a) Describe roles and responsibilities and authorities
   b) Describe infrastructure that is needed
2) For LEAs
   a) Describe roles and responsibilities and authorities
   b) Describe infrastructure that is needed
3) For Community
   a) Describe role of the community and the ways the community may influence school siting

b) Describe the roles, responsibilities and authorities of local and state government entities involved in school siting decisions
c) Describe resources that are available or needed (agency contacts, documents, regional EPA staff) to participate in school siting in a meaningful way

These sections concerning roles and responsibilities (which appear in the current draft EPA guidelines) should precede and link to the steps for conducting school siting described in Sections 2 and 3, above.

The SSTG suggests that EPA fully develop an entry point for the public (community members including school families, staff, and neighbors) which describes the role of the public through community involvement. Information on community involvement should encourage participation and should be written in language easily understandable by a lay person. In writing this section, EPA should consider the likelihood that a user is attempting to participate in a local process that is not adhering to best practices for community involvement.

4.0 Key comments on EPA's role in implementing and supporting school siting

The SSTG had many concerns about an ongoing EPA commitment to school siting, and the role of federal agencies in implementing and supporting the guidelines that are developed.

4.1 Establish a federal interagency school siting collaboration

Interagency collaborations at the federal level (e.g., interagency collaborations on childhood asthma) have been used to facilitate the exchange of information, coordinate parallel activities, and avoid duplication. EPA should model federal interagency behaviors that regions, states and local communities should be implementing. For example, EPA should work closely with other federal agencies (Departments of Education, Transportation, Housing and Urban Development, Defense, Homeland Security, Health and Human Services, Centers for Disease Control, Bureau of Indian Affairs, Indian Health Services, etc.) to coordinate action and resources on school siting.

4.2 Assign staff at the regional level to support school siting decision-making

Just as LEAs and communities need assistance from the states in school siting processes, states need assistance from EPA. While EPA should consider incentives, funding, and training opportunities to expand staff capacity and knowledge at the state level, EPA should also consider providing at minimum one staff person in each EPA region dedicated to school siting. The SSTG believes that LEAs would also appreciate and use this resource.

These experts at the EPA region level could assist states as the states inventory state-level capacity and expertise and conduct state-level reviews of policies, laws and regulations. As these reviews will take time, in the interim, EPA region staff could develop a centralized repository of information on school siting, including federal and state agencies and contact persons, a summary of relevant state laws, and other resources available at the state and regional level. For example, EPA has published State Brownfields and Voluntary Response Programs: An Update from the States (available at http://epa.gov/brownfields/state_tribal/pubs.htm) that includes a state-by-state examination of state legislation, programs, and contact information on brownfields. A similar school siting resource would be very helpful and could be developed by EPA region staff.

In addition, experts at the EPA region level could provide assistance to LEAs. SSTG members have stated that some LEAs need assistance in selecting consultants (see section III, part 3, above). EPA regional offices could assist in the development of regional databases of qualified consultants for school siting.

4.3 Evaluate current federal program support

EPA should evaluate the extent to which existing federal programs (across all relevant agencies) and authorizations can be used to ensure compliance with the voluntary guidelines (for examples., leverage offered by funding aspects of siting, permitting regulations that support the guidelines). EPA should also aggressively promote the adoption and integration of the guidelines into other agencies' policies and guidelines around schools. The SSTG considered two general situations in which EPA has the ability to implement the guidelines: where EPA has authority over school siting (perhaps through funding or permitting) and situations where EPA has authority for siting new facilities and infrastructure (e.g., federal roads, federal agency facilities) within screening perimeters of existing schools.

4.4 Evaluate state capacities and authorities to implement guidelines

States should be encouraged to perform an inventory of their capacity to provide the oversight and assistance described in the guidelines (Section 3.3, above) and policies impacting school siting. EPA should encourage states to conduct this inventory across multiple agencies, and publicize state-level contacts and available assistance. EPA should identify resources to assist states with these reviews, consider developing a tool to assist states with this review, and conduct some type of capacity evaluation for those states that cannot.

Many states may lack the resources and personnel to provide assistance and oversight to local communities making school siting decisions. States should be encouraged to increase this capacity and to assign an office or agency to serve as the liaison for questions and assistance during school siting. EPA should consider providing assistance (e.g., training, funding for staff) to states to increase state-level staff capacity and knowledge on school siting.

4.5 Develop and recommend standards for school exposure scenarios

Because children differ from adults anatomically, physiologically, and behaviorally in ways that affect both exposure and sensitivity to chemicals, it is appropriate to use cleanup levels or other standards for soil, water, and air contamination that explicitly address early life susceptibility. EPA should develop and recommend appropriate soil, groundwater and air remediation standards that are appropriate for school exposure scenarios. The SSTG would expand this to include exposure scenarios for infants and preschool age children due to the use of school buildings and grounds as centers of the community. Schools attract all ages of children and schools host many resident programs, including Head Start preschools, early childhood and family education classes, and other community classes for babies and toddlers.

Because the fields of children's health and exposure sciences are rapidly evolving, EPA should establish a panel of experts in public health and risk assessment to assist in the development of scientifically-based soil, groundwater, and air remediation standards that are protective of children's health, and are specific to the unique exposures at existing and proposed school sites[38]. These experts should include, but not be limited to, expert practitioners in the areas of risk assessment, environmental toxicology, epidemiology, children's health, and engineering science.

Until such standards are developed, EPA should recommend standards that have been specifically evaluated for early life susceptibility (e.g., standards incorporating early life stage cancer potency adjustments, standards that combine intake rates for early life stages with developmental health effects endpoints).[39]

4.6 Measure the impact of the school siting guidelines

The SSTG understands that these draft guidelines are voluntary and that implementation of the guidelines will vary according to many factors outside of the control of EPA. However, an important step in the ongoing development and promotion of the guidelines is to evaluate the usefulness and effectiveness of the guidelines as they are implemented. There are various forms of evaluation that the SSTG suggests EPA carry out.

In order to provide the LEA using the guidelines with an understanding of successful implementation, the SSTG urges EPA to develop measures for successful implementation and measures of impact, and include these measures in the guidelines. Such measures should apply to the LEA and its processes (sample measures might include whether appropriate documents were posted according to established timelines; whether stakeholder comments and concerns altered the siting plans that were adopted and used; and whether the length of the public comment period at different stages of the environmental review process was appropriate).

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[38] See http://www.oehha.ca.gov/air/hot_spots/tsd052909.html for an example of recent state guidance addressing this concern.

[39] Standards developed in past years for residential or unrestricted use may not have included an evaluation for early life susceptibility.

In order to understand future directions that the guidelines might take, the SSTG suggests EPA develop measures for adoption, adaption, and implementation of the guidelines across LEAs. This may be a short term evaluation that is best carried out at the EPA region level by staff familiar with school siting projects within states. EPA should determine what barriers prevented LEAs from using the guidelines, what adaptations were made in order to use the guidelines, and how comprehensively the guidelines were followed (e.g., which parts of the guidelines were not implemented). Results of the evaluation should be used to make continual improvements to the guidelines and the support that EPA provides to states and LEAs.

Finally, EPA should consider methods of measuring the extent to which knowledge and use of the guidelines promotes children's health. This evaluation might include decisions that were made that promoted physical activities and integration with community resources and programs. This evaluation should include LEA or state decisions made because of the guidelines that potentially reduced children's exposures to contaminants (for example, diesel school buses were retrofitted with emission controls) or increased children's healthy behaviors (for example, walking paths were established) and estimates of the numbers of communities and children that were affected.

4.7 Develop guidelines for construction and operation and maintenance

The SSTG understands that EPA is interested in developing guidelines and best practices for constructing and renovating schools and operating and maintaining built schools. The SSTG supports the development of separate guidelines that complement the current draft EPA guidelines on siting. The SSTG supports advice and guidance that would include green and sustainable building and maintenance practices. Such advice should be recommended to additional potential users (i.e., any building intended for child or infant care and education). In the interim, EPA should consider recommending existing resources such as [40]EPA's HealthySEAT; the U.S. Green Building Council's LEED for Schools; and the Collaborative for High Performance Schools (CHPS) assessment tools.

4.8 Recommend using the guidelines for siting any learning environment

The SSTG urges EPA to encourage entities besides local government to use the guidelines. Any to-be-built or leased space for child care or education could be evaluated according to the guidelines. There are innumerable sites for preschool (Head Start and Early Head Start program, child care centers, preschools), and school-age care (after-school care sites) that should apply these guidelines to siting decisions.

[40] EPA's HealthySEAT(http://www.epa.gov/schools1/healthyseat/), the U.S. Green Building Council's LEED for Schools (http://www.usgbc.org/ShowFile.aspx?DocumentID=2593); and the Collaborative for High Performance Schools assessment tools (http://www.chps.net/dev/Drupal/node)

Other schools that should be encouraged to use these guidelines include state schools (boarding schools and other specialized schools), private schools, and particularly charter schools (given current federal policy to promote new charter schools).

The SSTG suggests that the guidelines could be written in a manner to encourage this broader use of the guidelines or develop guidelines for the unique challenges that other setting will present.

5.0 Appendices

Appendix A: Membership and Meeting Agendas
Appendix B: Flow Chart
Appendix C: Hazards
Appendix D: Environmental Hazards Screening Table
Appendix E: Environmental Assets
Appendix F: Environmental Issues and Remediation Response Actions
Appendix G: Final Site Remediation Plan

Appendix A: Membership and Meeting Agendas

Membership Roster

U.S. Environmental Protection Agency Children's Health Protection Advisory Committee
Schools Siting Task Group Members

Darryl Alexander
Program Director, American Federation of Teachers

Yasmin Bowers
American Association of School Administrators

Shirley Brandman
Member, Montgomery County Board of Education
Montgomery County, MD

Ronald F. Carper, Jr.*
Director, Environmental Services, New Jersey Schools Development Authority

Thomas Crowe
Fairfax County Health Department, Fairfax, Virginia
National Association of County and City Health Officials (NACCHO)

Rochelle Davis*
Founding Executive Director
Healthy Schools Campaign

Mary Filardo
Executive Director
21st Century School Fund and Building Educational Success Together

Steve Fischbach
Community Lawyer
Rhode Island Legal Services

Maida Galvez, MD, MPH*
Assistant Professor,
Department of Community and Preventive Medicine, Department of Pediatrics
Mt. Sinai School of Medicine

Terry Gray
Assistant Director for Air, Waste, and Compliance
Rhode Island Department of Environmental Management

Al Huang*
Environmental Justice Attorney
Natural Resources Defense Council

Gavin Kearney*
Director, Environmental Justice Project
New York Lawyers for the Public Interest

Stephen Lester
Science Director
Center for Health, Environment & Justice

Ian MacMillan* and Sharon Fair
Consultants and Designated Participants
Los Angeles Unified School District
Office of Environmental Health and Safety

Janet M. Mostowy, PhD*
Vice President of Product Safety and Regulatory Affairs
Bayer Material Science

Michael O'Neill
Consultant/Environmental Coordinator
School Facilities Planning Division, California Department of Education

Margo Pedroso*
Deputy Director
Safe Routes to School National Partnership

David Schrader, President- Elect, and Barbara Worth
Northeast Region Council of Educational Facility Planners International

Pamela Shubat, PhD (Chair)*
Supervisor
Health Risk Assessment Unit, Minnesota Department of Health

Anne Turner-Henson, RN, DSN*
University of Alabama at Birmingham School of Nursing

Elizabeth Yeampierre*
Executive Director
United Puerto Rican Organization of Sunset Park Liaison
National Environmental Justice Advisory Council

Clay Bravo
National Tribal Caucus

Subgroup co-leaders(*)

U.S. Environmental Protection Agency
CHILDREN'S HEALTH PROTECTION ADVISORY COMMITTEE

School Siting Task Group
Task Group Meeting

Marriott Metro Center
Ballroom Level, Salon C and D3
775 12th St NW
Washington, DC

NOTE: *For those unable to join in person, we have established a GoToMeeting on-line connection as well as an audio connection. You can join the on-line meeting Monday, July 20 prior to 9:30 AM Eastern Daylight Time by going to this link:* ***https://www1.gotomeeting.com/join/564034888 Meeting ID: 564-034-888***

Join the conference call at: ***1-866-299-3188; access code 2023439315#***

July 20, 2009
Agenda

Meeting Objectives:

- *Review purpose and vision for EPA draft guidelines for siting school facilities*
- *Review and discuss School Siting Task Group charge and roles and responsibilities of members*
- *Review process to date for developing draft school siting guidelines*
- *Discuss initial perspectives on key aspects of draft school siting guidelines*
- *Develop plan for organizing the Task Group's work*

9:30 – 9:55	**Welcome and Introductions** • Introduction of Task Group Members (1 minute each, max.) • Review agenda (facilitator)	*Task Group Members and Kathy Grant, RESOLVE Facilitator*
9:55 – 10:20	**Opening Remarks, Charge and Discussion** • Purpose of school siting guidelines • Charge of School Siting Task Group	*Peter Grevatt, Senior Advisor to the Administrator, Children's Environmental Health*
10:20 – 10:45	**Overview of Work to Date on Guidelines** • Draft development and content • Stakeholder engagement	*Bob Axelrad, Indoor Environments Division, USEPA and EPA Workgroup Members*

10:45 – 11:00	**Remarks** • Mathy Stanislaus, Assistant Administrator, Office of Solid Waste and Emergency Response	*Mathy Stanislaus*
11:00 – 11:20	**Operating Principles/Roles and Responsibilities** • Timeline • Recommendations process • Meetings	*Pam Shubat, Task Group Chair and Kathy Grant*
11:20 – 12:00	**Initial Task Group Participant Perspectives** • Document audience, scope • Community participation • Site evaluation issues • Smart Growth issues • Expansion to include, design, construction, O&M, etc	*Facilitated Discussion*
12:00 – 1:00	**LUNCH**	*Task Group members*
1:00 – 2:45	**Continue Initial Task Group Participant Perspectives**	*Facilitated Discussion*
2:45- 3:00	**Break**	
3:00 – 4:00	**Organizing the Task Group's Work and Development of Work Plan/Next Steps** • Sub-groups around topics? • Individual comments? • Other approaches • Next steps, roles, assignments	*Pam Shubat, Task Group Chair* *Facilitated Discussion*
4:00- 4:30	**Report to Full CHPAC Wednesday 7/22** • Discuss content and format of report to CHPAC	*Pam Shubat* *Facilitated Discussion*
4:30	**Second Conversation with Mathy Stanislaus**	*Mathy Stanislaus*

5:00 **Adjourn**

Agenda

Children's Health Protection Advisory Committee
School Siting Task Group Meeting

December 1, 2009

Meeting Objective: Develop and approve key recommendations on school siting for inclusion in a Report from the SSTG to the full CHPAC.

Time	Item	Responsible Party
7:45 – 8:00	Arrival and light refreshments	
8:00 – 8:30	Welcome, Introductions, Housekeeping	Scott Graves
8:30 – 9:45	Subgroup briefings (10 min/subgroup) and questions	Subgroup co-leads, and SSTG members
9:45 – 10:00	**BREAK**	
10:00 – 10:30	Draft Report Overview and questions	Pam Shubat
10:30 – 11:30	Subgroup Breakouts	Subgroups
11:30 – 12:30	**LUNCH on your own**	
12:30 – 1:15	Subgroup Report (5 minutes/subgroup)	Subgroup co-leads
1:15 – 2:00	Discussion on Charge Questions and Parking Lot Questions	SSTG
2:00 – 2:15	**BREAK**	
2:15 – 3:00	Discussion on Charge Questions and Parking Lot Questions	SSTG
3:00 – 3:30	Public Comments	Public
3:30 – 4:00	Final Discussion	SSTG
4:00 – 4:30	Wrap-up and next steps	Pam Shubat Scott Graves

Appendix B: Flow Chart

EXAMPLE ENVIRONMENTAL REVIEW PROCESS FLOW CHART

The flow chart on the following pages is a graphic showing the steps of the environmental review process described in Section 3.2 of the report. The flow chart displays steps in school siting, but flow charts could have been developed to show key decision points, or other perspectives on school siting. Similarly, project management charts could be used to describe steps in school siting.

The flow chart shows key decision making points by all stakeholders (the public, agencies, school officials, etc.). The chart shows that at any time in the process, if information becomes available about significant environmental concerns, the site may be abandoned, and the process can begin again.

Each step in the flow chart corresponds to a section (for example, Section 3.2.1) of the text of the report. Many steps are depicted side-by-side, indicating that they may be conducted concurrently. The duration for each stage is shown in the corresponding text of the report.

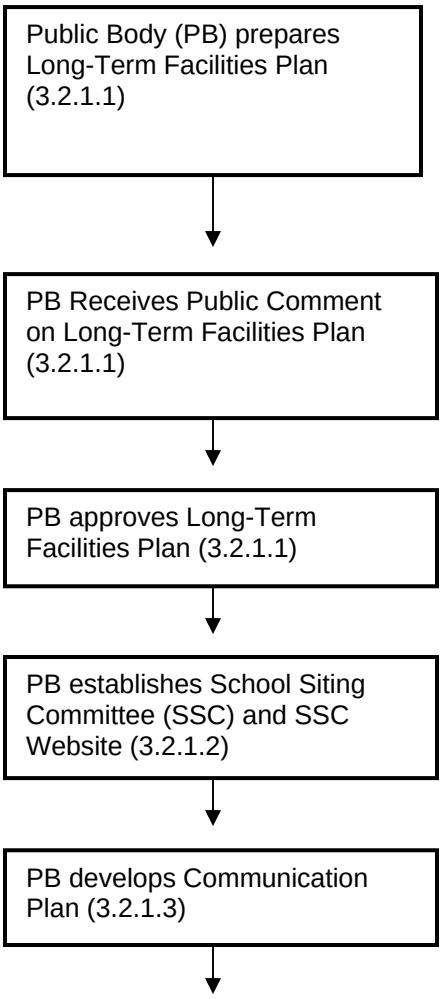
Basic Flow Chart Stages

Stage 1 - Institutionalize Public Involvement in Facility Planning & Site Selection
Stage 2 - Project Scoping/Initial Screen of Candidate Sites
Stage 3 - Preliminary Environmental Review
Stage 4 - Comprehensive Environmental Review
Stage 5 - Development of Site-Specific Remediation/Mitigation Measures
Stage 6 – Implementation of Mitigation/Remediation
Stage 7 – Long-Term Maintenance and Monitoring

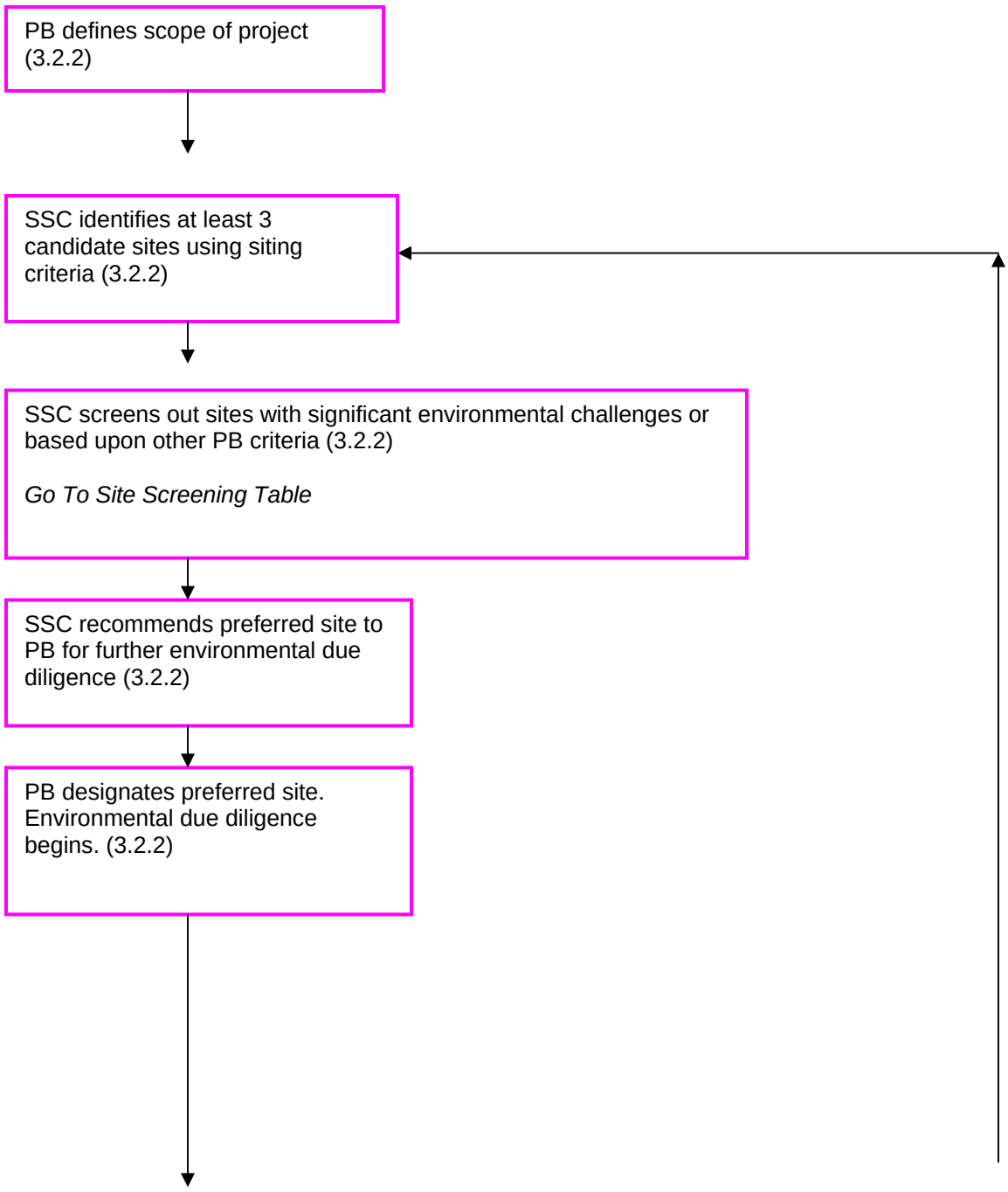
Acronyms

EAP	Environmental Assessment Professional
FA	Further Action
NFA	No Further Action
O&M	Operations & Maintenance
PB	Public Body, the school district or the school board (voting body)
PERI	Potential Environmental Risks & Impacts Report
Phase I ESA	Phase I Environmental Site Assessment
Phase II ESA	Phase II Environmental Site Assessment
RAW	Removal Action Workplan
SSC	School Siting Committee
SERA	State Environmental Regulatory Agency
SMP	Site Management Plan

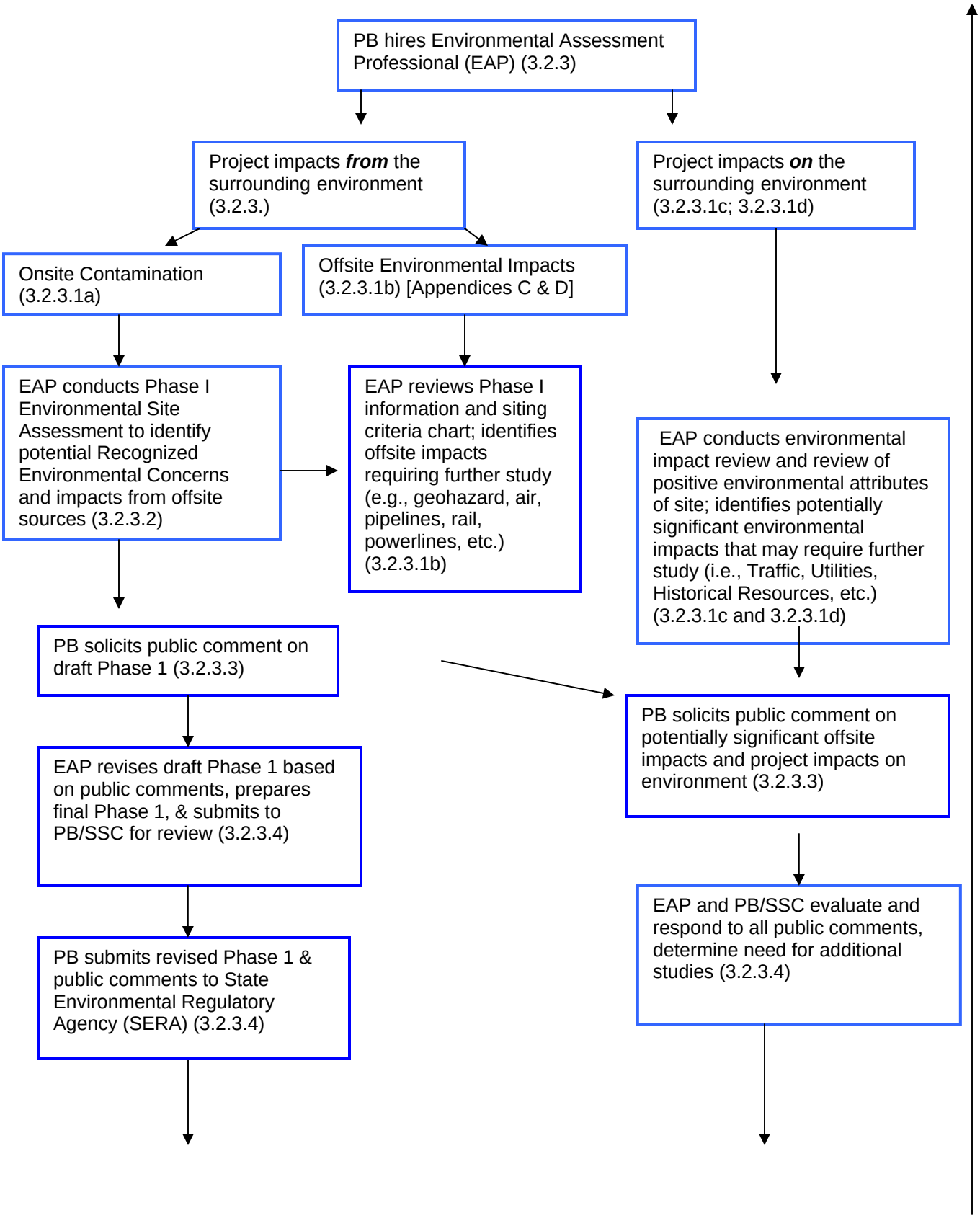
Stage 1 – Institutionalize Public Involvement in Facility Planning & Site Selection



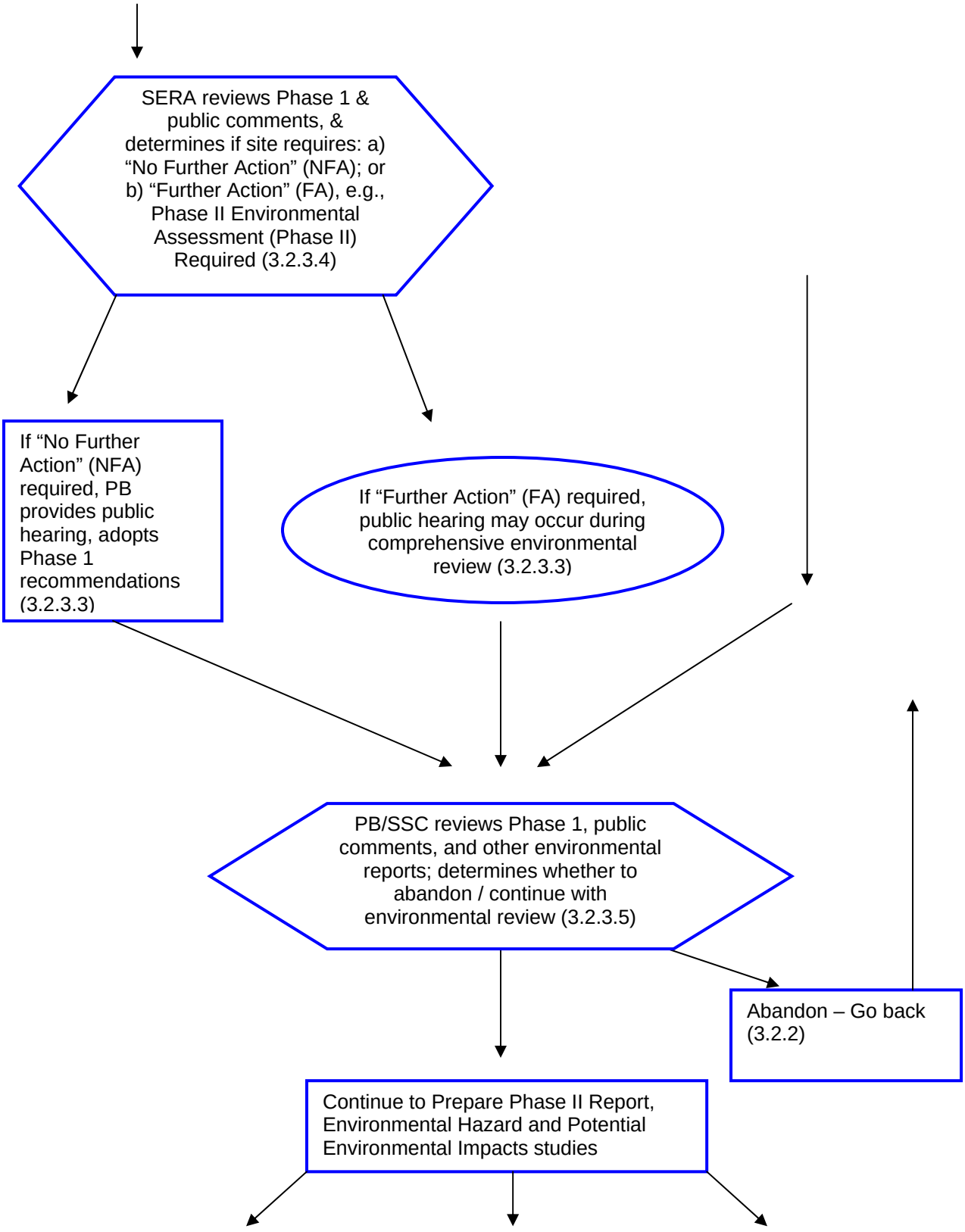
Stage 2 – Project Scoping/Initial Screen of Candidate Sites



Stage 3 – Preliminary Environmental Review

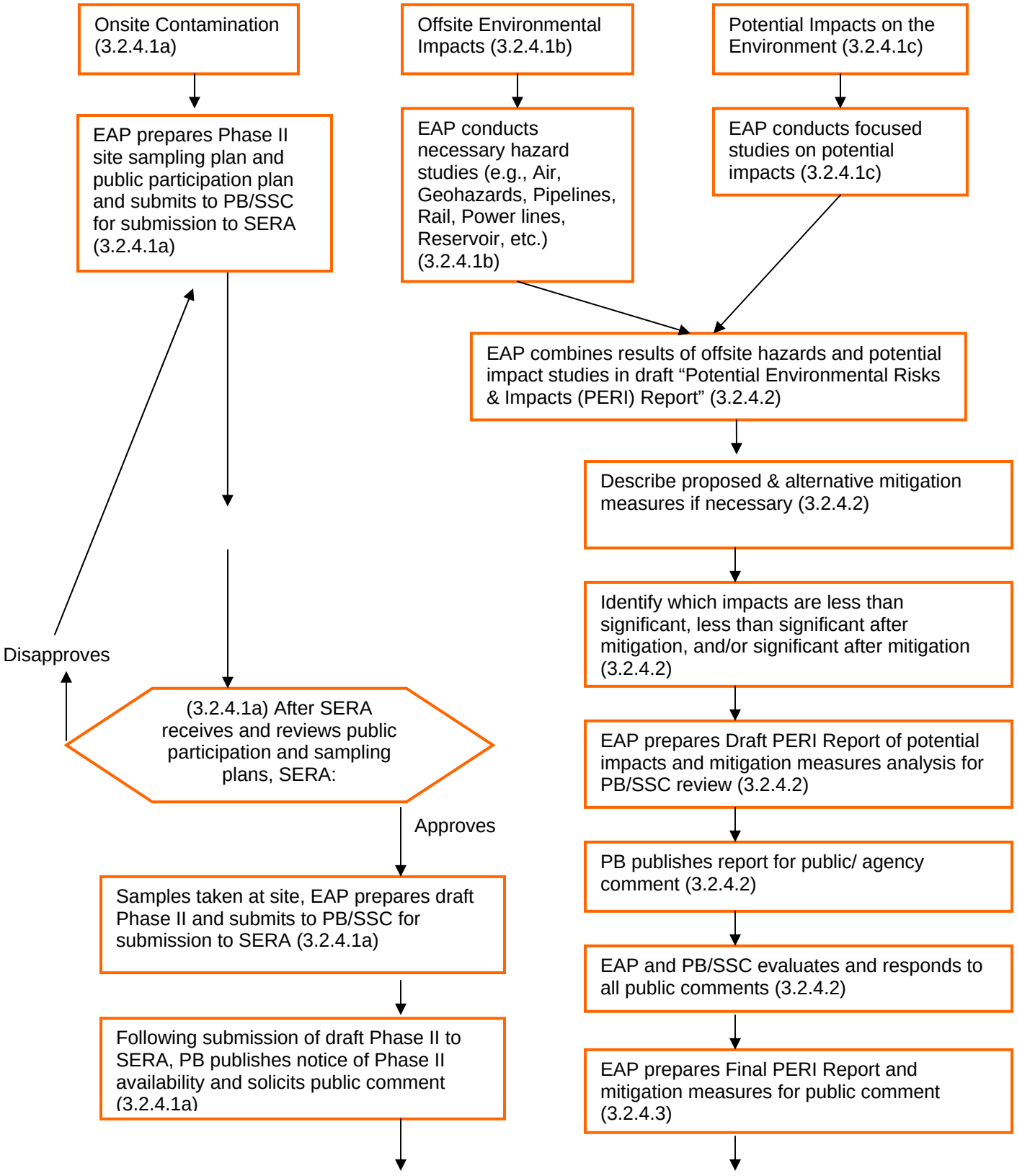


Stage 3 – Preliminary Environmental Review, Continued

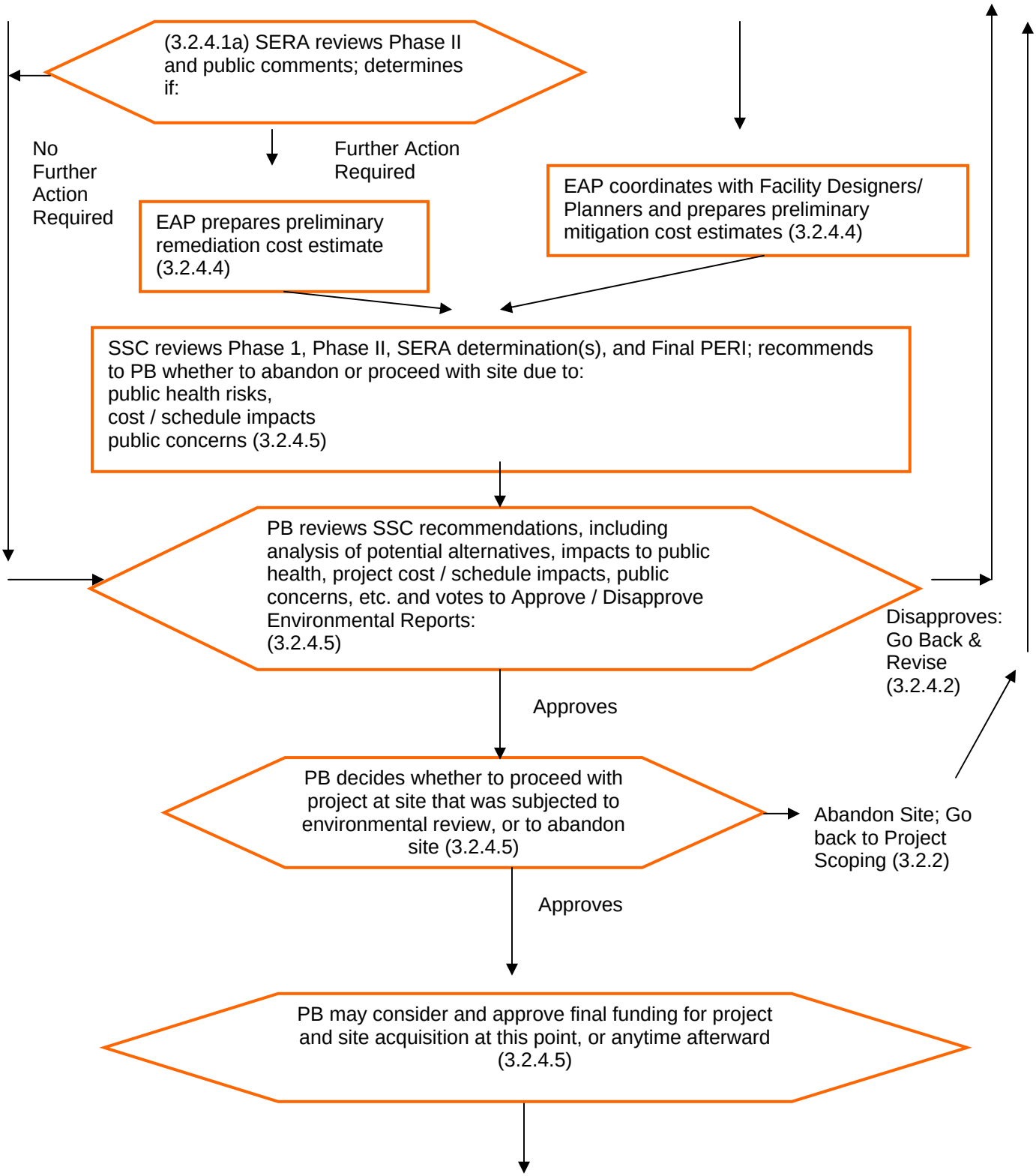


Stage 4 – Comprehensive Environmental Review

If PB/SSC elects to proceed, additional environmental review is required for:

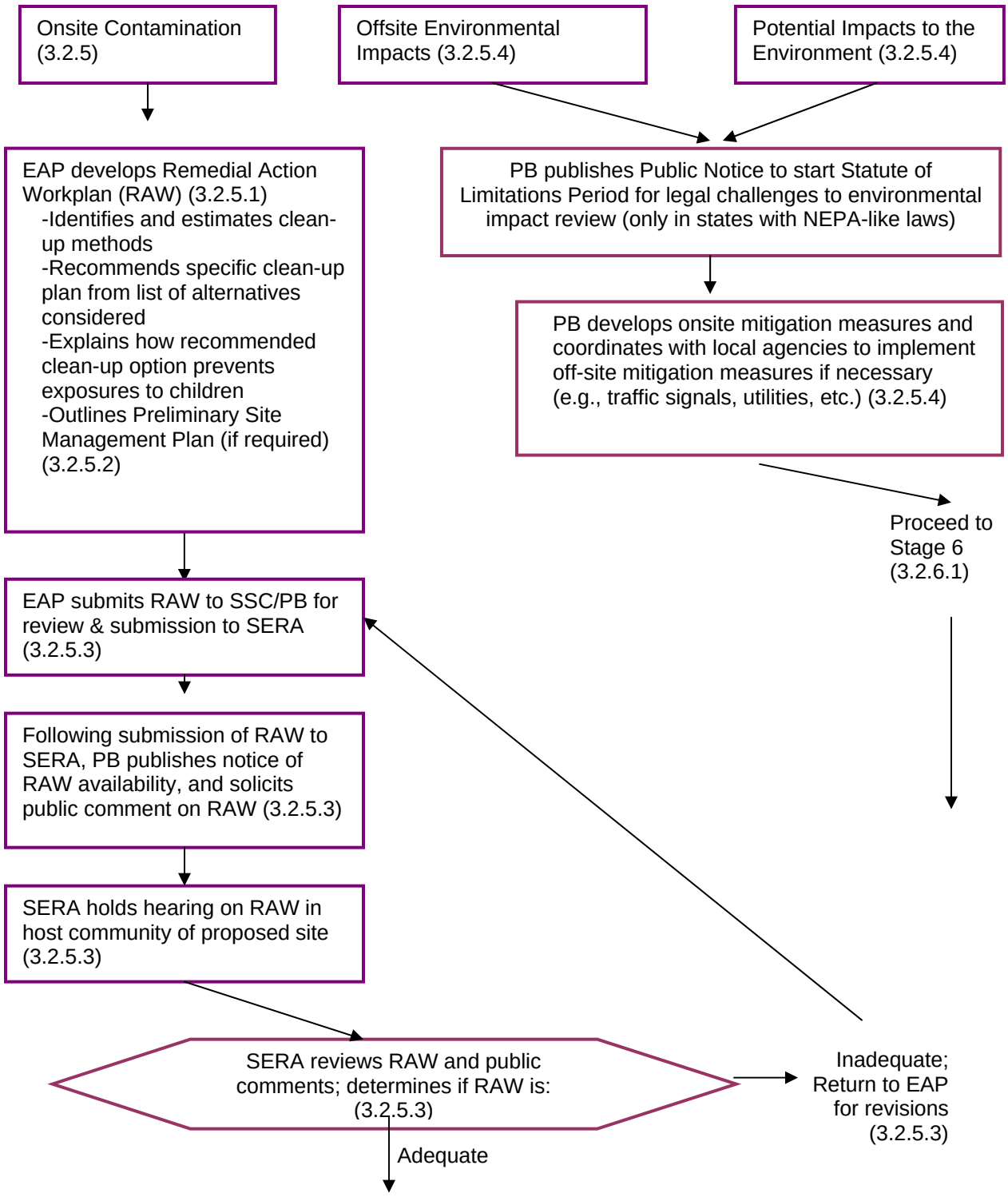


Stage 4 – Comprehensive Environmental Review, Continued

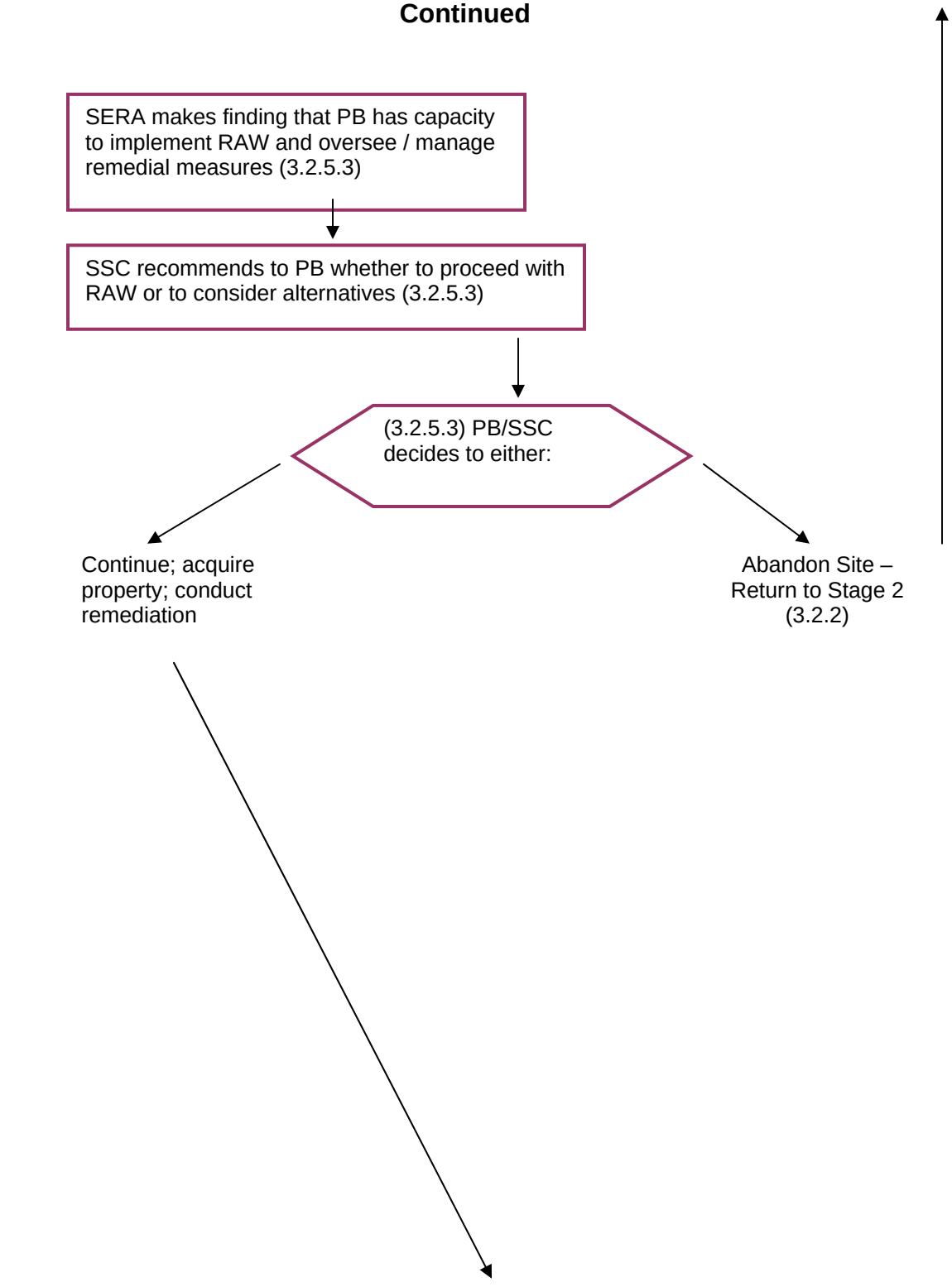


Stage 5 – Development of Site-Specific Remediation/Mitigation Measures

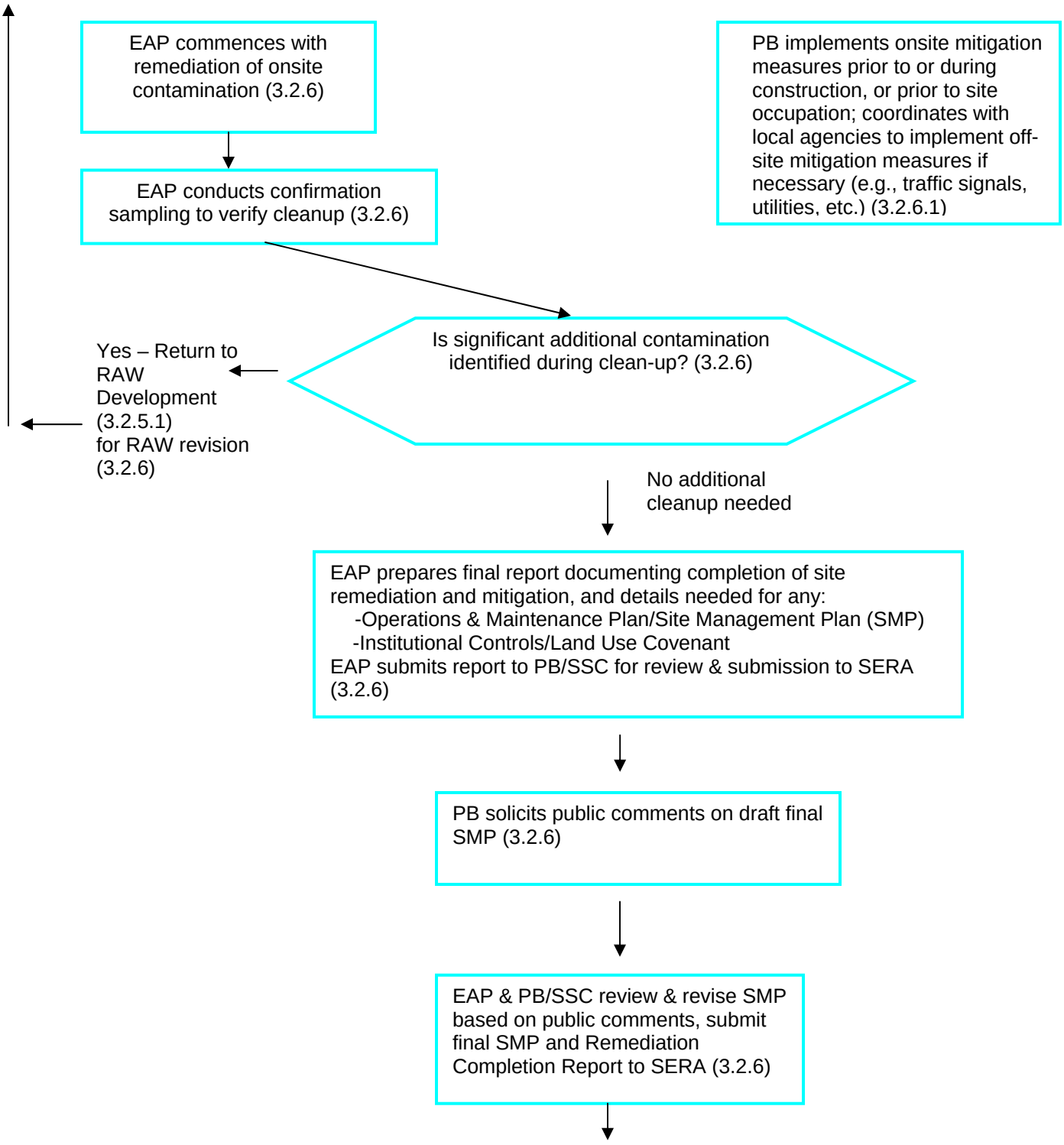
If PB elects to proceed, remediation and/or mitigation may be required for:



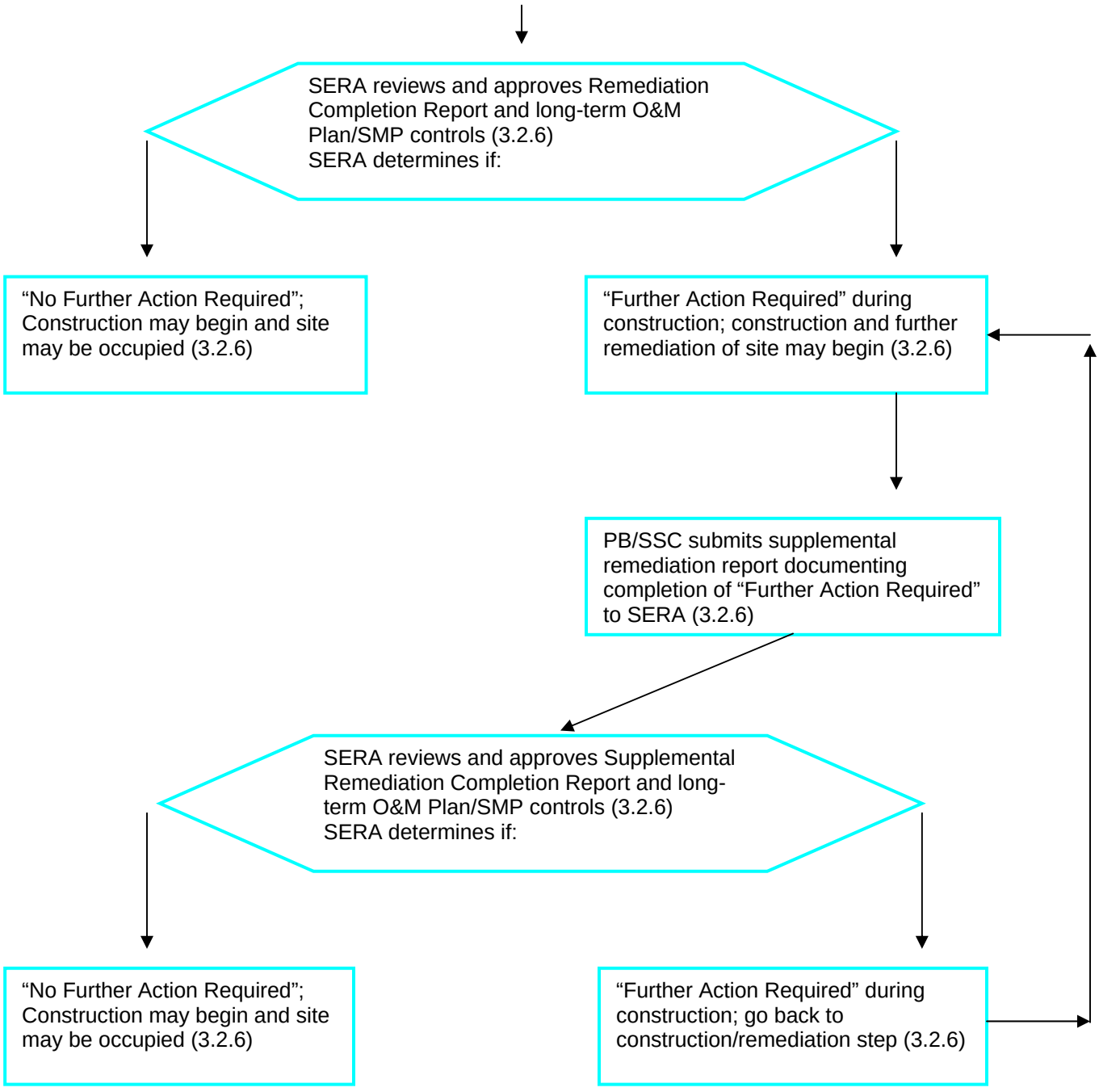
Stage 5 – Development of Site-Specific Remediation/Mitigation Measures, Continued



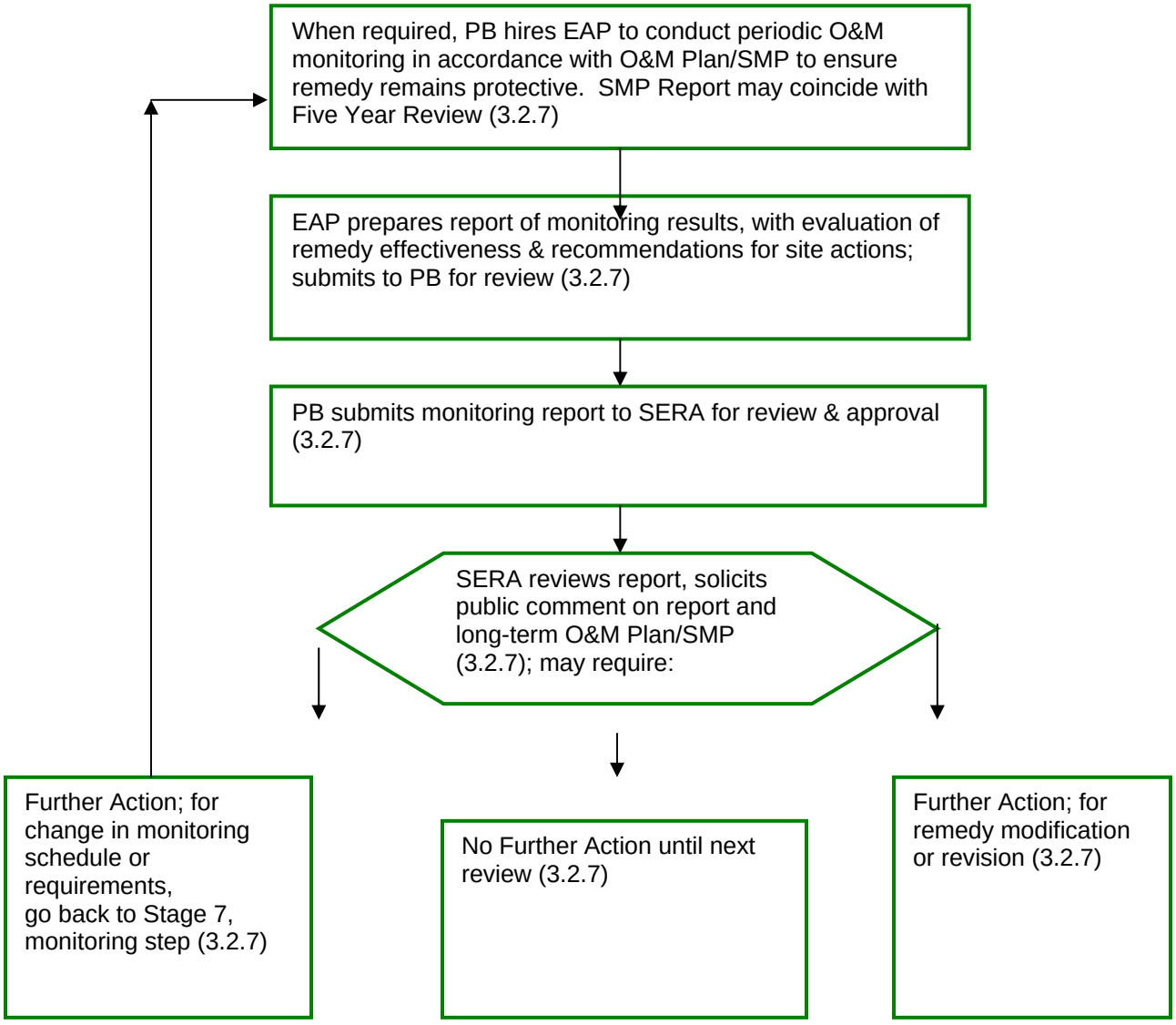
Stage 6 – Implementation of Mitigation/Remediation



Stage 6 – Implementation of Mitigation/Remediation, Continued



Stage 7 – Long-Term Maintenance and Monitoring



Appendix C: Hazards

Comments are provided regarding off-site or nearby features/sources that should be considered when a local education authority and its school siting committee are initially screening and comparing sites in order to select better potential sites to send through the more detailed and exhaustive Environmental Review Process.

The SSTG described a wide range of hazards features (for example, commercial or industrial activities), and in comments, why each feature or source is a potential concern (for example, the hazardous materials and substances). The types of features/sources are listed in alphabetical order.

The list of hazards in Appendix C can be used with the SSTG comments on screening perimeters and exclusion zones in Appendix D. In addition, environmental assets were identified (Appendix E) that would make a site more desirable. Used together, these appendices provide school districts and school siting committees with information for screening potential new school sites.

The SSTG considered a variety of viewpoints in developing the lists and tables in Appendices C, D, and E. Viewpoints included the use of screening criteria for ‘categorical exclusion’ or eliminating sites that may pose the greatest risk from on-site hazardous materials and off-site sources of nearby pollution and/or contamination. Viewpoints also included the use of screening criteria to identify the need for further investigation, risk assessment, and development of mitigation controls and the capacity to maintain controls. And, as shown in Appendix E, viewpoints on health promotion, smart growth, and community assets were also considered.

Off-Site or Nearby Features/Sources That Should Be Considered for School Siting Criteria

The following is a list of features that school districts should be aware of when selecting potential candidate school sites. Each listed feature is followed by brief bullets that describe why the feature’s proximity to a potential school site may be of concern.

Safety concerns may include risk of fires or explosions; risk of injury from chemical spills, accidents with large machinery, or excess traffic; and hazards from noise and odors. Chemicals may be released from residential, commercial, industrial, or military activities or operations into air and soil. Air pollutants, including gases, aerosols, or particulates, may be dispersed and deposited through the atmosphere, resulting in potential health risks and environmental impacts. Contaminants in soil, surface waters, subsurface soil vapor, or groundwater may migrate in soil vapor or groundwater beyond the area of original deposition, extending contaminants across broad areas, posing potential significant health or environmental risks and potential future liabilities.

Not listed below are social hazards that may concern the community. These may include the presence or known history of illegal/criminal activity in area, prisons, sources of alcohol and tobacco, or adult entertainment.

A. Stationary Source/Operations/Features

Agricultural Operations (Large Scale)

- Air pollutants such as particulate matter, pesticides, ammonia, and odors from farming practices, and particulates, aromatics, and aldehydes from burning fields and operating farm equipment and vehicles
- Leakage, dust, and concern for potential explosions from stored chemicals or grain (examples: storage tanks, grain silos)
- Soil and subsurface contaminants, examples: herbicides containing arsenicals, and organochlorine pesticides

Agricultural Sites Where Fertilizers and Pesticides are Mixed or Applied

- Air pollutants, including pesticide drift (herbicides, insecticides, fungicides, etc) and releases from mills and mixing operations (fertilizer plants)
- Soil and subsurface contaminants, examples: herbicides containing arsenicals, organochlorine pesticides, fertilizers containing metals

Autobody Shops

- Air pollutants such as solvents and heavy metals
- Soil and subsurface contaminants, examples: antifreeze, hydraulic fluids, fuels (total petroleum hydrocarbons [TPH]), solvents (volatile organic compounds [VOCs]), metals, acids

Batch plants

- Air and surface pollutants, hazardous materials, truck traffic, noise

Boilers and Back-Up Generators

- Air pollutants, such as diesel particulate matter
- Leaking fuel storage tanks
- Soil and sub-surface contaminants, including metals, fuels, TPH, VOCs

Cement Kilns

- Air pollutants, such as particulate matter, metals, and asbestos

Char-Broilers

- Air pollutants, such as aromatics and aldehydes
- Soil and subsurface contaminants, e.g. fuels, polycyclic aromatic hydrocarbons (PAHs)

Chemical, Pharmaceutical, Rubber, and Plastic Plants

- Air pollutants, such as solvents, metals, aromatics, aldehydes, and particulate matter
- Soil and sub-surface contaminants, examples: VOCs, semi-volatile organic compounds (SVOCs), metals, PAHs, reactives (acids, bases);

Chrome Platers

- Exposure to hexavalent chromium in air emissions, perfluorochemicals in waste water
- Soil and sub-surface contaminants, examples: VOCs, metals (examples: hexavalent chromium), reactives

Commercial Sterilization

- Air pollutants such as ethylene oxide and solvents

Composting Plants

- Air pollutants such as odors and particulate matter

Concentrated Animal Feeding Operations

- Air pollutants such as particulate matter, pesticides, ammonia, and odors
- Soil and subsurface contaminants, methane

Drycleaners using Tetrachloroehylene (also called TCE, Perc) and other Solvents

- Air pollutants such as TCE
- Soil and subsurface contaminants, examples: VOCs (examples: TCE and vinyl chloride)

Furniture manufacturing & repair

- Air pollutants such as solvents and methylene chloride
- Soil and subsurface contaminants, examples: VOCs

Gasoline Dispensing Facilities

- Air pollutants such as aromatics, solvents, and particulate matter from facilities' operation and leaking underground storage tanks
- Leaking underground fuel storage tanks
- Soil and subsurface contaminants, examples: TPH/VOCs including aliphatic and aromatic hydrocarbons such as benzene, ethylene, toluene, xylene (called BETX)), fuels, reactants, metals

Incinerators

- Air pollutants such as dioxin, solvents, heavy metals, particulate matter, aldehydes, and aromatics
- Soil and subsurface contaminants, examples: VOCs, SVOCs, metals

Industrial Coating Operations (such as paint spray booths)

- Air pollutants such as solvents and metals
- Soil and subsurface contaminants, examples: VOCs, SVOCs, metals

Landfills / Dumps (such as tire dumps)

- Air pollutants, such as gases, particulate matter, odors
- Safety hazards from truck traffic, noise
- For construction and debris landfills, potential exposures to toxic materials (examples: asbestos) that are handled on site
- Landfill fires may pollute air with smoke, particulates, metals
- Decomposing trash releases methane, carbon dioxide and creates instability of surrounding soil
- Leachate may contain reactives, VOCs, PAHs, SVOCs (examples: polychlorinated biphenyls (PCBs), dioxins and furans), depending on what was disposed of at the site
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, reactives

Manufacturing: Large Scale (asphalt, glass, fertilizers, food processing, paint and any industrial facilities reporting emissions in the Toxics Release Inventory)

- Air pollutants such as particulate matter, VOCs, (examples: aldehydes, aromatics), and metals
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, TPH, PAHs, reactives

Manufacturing: Electronics

- Air pollutants such as VOCs, heavy metals
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, PAHs, TPH, reactives

Metal Foundaries and Platers (such as steel production, lead smelters, etc.)

- Air pollutants, such as heavy metals, particulate matter, VOCs, and acids
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, TPH, PAHs, reactives

Methamphetamine Laboratories (active, abandoned, or closed clandestine laboratories)

- Exposure to toxic substances

Military sites (active, closed)

- Unexploded ordnance
- Hazardous air pollutants, examples: gases, aerosols, particulates, metals, noise
- Extensive surface, subsurface, water contamination, from fuels, and other substances found at airports and Superfund sites

Mines (operating, abandoned or closed)

- Safety concerns, including instability of subsurface soils, cave-ins
- Soil and subsurface contaminants, including metals and metal compounds, acids

Pipelines (natural gas, fuels, oil, sewage, hazardous materials)

- Potential ruptures, leaks, pooling, or subsidence/sinkholes from underground or above ground pipelines carrying hazardous chemicals
- For high-pressure natural gas, ruptures may cause vapor cloud ignition heat/fire impacts
- For liquids (including crude oil, gasoline, and other fuels), pooling may occur
- For high volume/pressure water and sewer pipelines, rupture or pooling could lead to flooding, subterranean erosion, subsidence/ liquefaction
- Soil and subsurface contaminants, examples: VOCs, TPH

Power Plants

- Air pollutants such as aldehydes, aromatics, particulate matter, and mercury
- Radiation from nuclear power plants
- Soil and subsurface contaminants, examples: VOCs, SVOCs, metals, reactives;

Printing

- Air pollutants such as solvents (TCE, PCE, etc.)
- Soil and subsurface contaminants, examples: VOCs, SVOCs, PAHs, metals

Quarries

- Noise from equipment, excavations
- Air pollutants, particulate matter, asbestos, metals in dust
- Used as source of backfill, but could be potentially contaminated by heavy metals, TPH, etc.

Refineries and Oil/Gas Extraction Sites

- For refineries, exposure to potentially hazardous air pollutants released from stacks during refining process, particularly during non-routine emissions releases
- For both refineries and oil fields/gas extraction sites, exposure to toxic air pollutants such as VOCs, metals, and sulfur compounds
- Soil and subsurface contaminants, examples: metals, leaking underground storage tanks containing fuels, VOCs, SVOCs, fuel additives (such as MTBE), metals, reactives;

Rendering Plants

- Air pollutants, such as particulate matter, and odors

Reservoirs

- Flooding

Salvage or scrap yards

- Air pollutants, such as particulates, metals, noise
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, metals, reactives, unexploded ordnance

Sewage and Wastewater Treatment Plants

- Air pollutants, such as biological, medical waste, particulate matter
- Odors
- Storage of hazardous chemicals, examples: chlorine; potential leaks, releases
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, metals, reactives, pesticides

Shipbuilding, aircraft, or weapons manufacturing and repair

- Air pollutants such as VOCs and heavy metals (especially chromium)
- Soil and subsurface contaminants, e.g. VOCs, SVOCs, metals, TPH, PAHs, reactives, unexploded ordnance, radioactive materials

Storage Tanks (above and below ground) – Water & Fuel

- Leakage of hazardous substances, including toxic, reactive, ignitable, or corrosive substances, including flammable and explosive fuels; and potential flooding from above ground storage tanks
- Soil and subsurface contaminants, examples: VOCs, SVOCs, metals, TPH, reactives

Superfund Sites

- Hazardous air pollutants, examples: gases, aerosols, particulates, metals, noise
- Extensive surface, subsurface, water contamination, examples: from metals, VOCs, SVOCs, PAHS, TPH, reactives, unexploded ordnance, radioactive substances

Wood Product Manufacturing or Processing

- Air pollutants, such as formaldehyde and solvents
- Saw mills, concern with dust, air pollutants such as particulate matter
- Soil and subsurface contaminants, examples: VOCs, SVOCs (examples: chlorine and hydrogen chloride, chloroform, creosote, formaldehyde, dioxin), metals (arsenic, chromium), acids/bases (acetic acid; hydrochloric acid, sodium hydroxide)

B. Transportation/Goods Movement

Airports

- Air pollutants such as particulate matter, aromatics, and solvents
- Aircraft safety issues near runways
- Noise
- Soil and subsurface contaminants, examples: VOCs, SVOCs, TPH, PAHs, metals, reactives

Distribution Centers (more than 100 trucks per day)

- Air pollutants such as particulate matter, aromatics, noise, and odor
- Pedestrian safety
- Soil and subsurface contaminants, examples: VOCs, SVOCs, TPH, metals

Freeway/Major Transportation Corridors (100,000 vehicles per day)

- Air pollutants such as noise, particulate matter, aromatics, and carbon monoxide
- Safety concerns regarding pedestrian safety
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs, TPH, pesticides

Heliports

- Air pollutants such as noise and particulate matter
- Soil and subsurface contaminants, examples: VOCs, SVOCs, metals, reactives, pesticides

Ports

- Air pollutants such as noise, diesel particulate matter
- Pedestrian safety
- Soil and subsurface contaminants, examples: VOCs, SVOCs, TPH, PAHs, metals, reactives, pesticides

Rail Lines/Railyards

- Air pollutants such as noise, odors, particulate matter, and aromatics
- Chemical spills
- Derailments
- Potential for fires/explosions of cargo
- Pedestrian safety
- Soil and subsurface contaminants, examples: pesticides, VOCs, SVOCs, metals, reactives, TPH

Freeways/Highways/Roads (50,000 vehicles per day)

- Air pollutants such as noise, particulate matter, aromatics, and noise
- Pedestrian safety
- Soil and subsurface contaminants, examples: metals, VOCs, TPH

Transportation Facilities, Large (bus garages; truck-stops)

- Air pollutants such as diesel particulate matter
- Soil and subsurface contaminants, examples: metals, VOCs

Waste Transfer Stations

- Air pollutants such as particulate matter and odor
- Soil and subsurface contaminants, examples: metals, VOCs, SVOCs

C. Communications

Cellular Phone Antennas

- Potential health concerns from exposure to electromagnetic fields and radio frequency emissions
- The tower fall distance
- Soil and subsurface contaminants, examples: electronic wastes, VOCs, SVOCs, metals

D. Power Transmission

High Voltage Power Lines

- Potential health concerns from exposure to electromagnetic fields

E. Naturally Occurring

Asbestos at elevated concentrations

- Air pollution from dust and soil

Earthquake Faults

- Building safety in the event of an earthquake

Flooding/Flood Plains/Dam inundation/Tsunami/Seiche

- High flood risk; moisture build-up inside school building

Liquifaction

Methane gas; hydrogen sulfide gas from oil fields

- Vapor intrusion, accumulation in crawl spaces, potential explosion, and toxic effects

Radon

- Radioactive gas build-up in structure

Seismic Instability

- Ground instability in the event of earthquakes, tremors

Steep Slopes

- Mud slides, cave-ins

Volcanic Activity

Wildfire Prone

- Safety hazards from wildfire

F. Other

Noise generators (resulting in 65 decibel or greater annual Community Noise Equivalent Level)

Acronyms

PAH	polycyclic aromatic hydrocarbons
SVOC	semi-volatile organic compound
TPH	total petroleum hydrocarbon
VOC	volatile organic compound

Appendix D: Environmental Hazards Screening Table

The table of screening perimeters and exclusion zones in Appendix D can be used with the SSTG comments on hazards in Appendix D and with the table of environmental assets in Appendix E. Used together, these appendices provide school districts and school siting committees with information for screening potential new school sites.

The SSTG considered a variety of viewpoints in developing the lists and tables in Appendices C, D, and E. Viewpoints included the use of screening criteria for ‘categorical exclusion’ or eliminating sites that may pose the greatest risk from on-site hazardous materials and off-site sources of nearby pollution and/or contamination. Viewpoints also included the use of screening criteria to identify the need for further investigation, risk assessment, and development of mitigation controls and the capacity to maintain controls. And, as shown in Appendix E, viewpoints on health promotion, smart growth, and community assets were also considered.

Potential Environmental Hazards Screening Table

Environmental Feature	Description	Screening Perimeter[1]	Exclusion Zone[2]	Recommendation	Potential hazard	Reference
Railyards and Major Rail-lines	A major service and maintenance railyard; rail lines serving > 50 trains/day	1 mile (rural) ½ mile (urban)	1,000 feet	Avoid siting schools within 1,000 feet of a major service and maintenance railyard. Within one mile of a railyard, consider siting limitations and mitigation approaches.	-Toxic air emissions -Noise -Subsurface contamination -Accidental releases/spills of hazardous chemicals	-CARB Air Quality and Land Use Handbook (2005) -CARB rail yard air quality HRA's http://www.arb.ca.gov/railyard/hra/hra.htm -CA Education Code 17213
Rail Lines	All rail lines	1,500 feet	128 feet	Keep all occupied spaces more than 128 feet from at-grade rail lines. Recommend safety study based on cargo, speed, traffic, etc. regarding setbacks and other mitigations	-Physical hazards due to derailment -Pedestrian safety -Hazardous cargo spills	-LAUSD Distance Criteria - CA Code of Regulations Title 5 Section 14010
Ports	Marine ports with > 100 truck visits/day	1 mile (rural) ½ mile (urban)	1,000 feet	Avoid siting schools within 1,000 feet of a marine port. Within one mile of a marine port consider siting limitations and mitigation approaches.	-Toxic air emissions -Noise -Subsurface contamination -Accidental releases/spills of hazardous chemicals	-CARB Air Quality and Land Use Handbook (2005)
Freeways and High-Traffic Roads	Urban road with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day, or roadways with heavy diesel truck traffic.	½ mile	500-1,000 feet	Avoid siting schools within 1,000 feet of a freeway, urban road with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day, or roadways with heavy diesel truck traffic.	-Toxic air emissions -Noise -Accidental releases/spills of hazardous chemicals	-CA Education Code 17213 -CARB Air Quality and Land Use Handbook (2005) -SCAQMD Air Quality Issues in School Site Selection (2007) -Gaudermann et al., (2007) -Kim et al., (2008) - NJDOT Chapter 308, Title 18A - "Terrell James Law."

[1] If a potential school site is located within the screening perimeter of an environmental feature, then potential risks from that feature require further study.
[2] Exceptions can be made if supported by quantitative risk assessment (including consideration of mitigation measures) and compliant with applicable law.

Environmental Feature	Description	Screening Perimeter[1]	Exclusion Zone[2]	Recommendation	Potential hazard	Reference
Distribution Centers, bus garages, and truck-stops	Facilities with >100 trucks/buses per day, or > 40 refrigerated trucks per day	½ mile	1,000 feet	Avoid siting schools within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRU) per day, or where TRU unit operations exceed 300 hours per week).	-Toxic air emissions -Pedestrian safety -Subsurface contamination	-CARB Air Quality and Land Use Handbook (2005) -SCAQMD Air Quality Issues in School Site Selection (2007)
Large industrial facilities	Fossil fuel power plants (>50mw), incinerators, refineries, chemical / pharmaceutical / rubber & plastics plants, cement kilns, metal foundries and smelters, and industrial facilities with tall exhaust stacks	½ mile	500-1,000 feet	Avoid siting new schools immediately downwind of large industrial facilities. Consult with local air quality agencies to determine appropriate separation.	-Toxic air emissions -Subsurface contamination -Accidental releases/spills of hazardous chemicals -Odors	-CARB Air Quality and Land Use Handbook (2005) -SCAQMD Air Quality Issues in School Site Selection (2007)
Other large Sources	Metal platers (especially chrome), rendering plants, sewage treatment plants, composting operations, large manufacturing facilities	½ mile	500-1,000 feet		-Toxic air emissions -Subsurface contamination -Accidental releases/spills of hazardous chemicals -Odors	-LAUSD Distance Criteria
Hazardous Waste Sites	Superfund sites, landfills & transfer stations,	1 mile	1,000 feet	Avoid siting new schools within 1,000 feet of Superfund Sites, an active Landfill, or Waste Transfer Station	-Toxic air emissions -Subsurface Contamination -Odors	-R.I. School Construction Regulations, Sec. 1.05-2(4)[3] -LAUSD Distance Criteria

[3] *See* http://www.ride.ri.gov/Finance/Funding/construction/Documents/FY08%20Housing%20Aid/Prior%20to%20May%2031%20Updates/School_Constr_Regs_FINAL.pdf

Environmental Feature	Description	Screening Perimeter[1]	Exclusion Zone[2]	Recommendation	Potential hazard	Reference
Large agricultural growing operations	Operations employing aerial pesticide spraying	3 miles	¼ - 2.5 miles	Setback distances may vary depending upon local control/ application practices for various crops	-Toxic air emissions -Subsurface contamination -Burning of agricultural stubble	-CA DPR Methyl Bromide Field Soil Fumigation Buffer Zone Determination -Kern County Department of Agriculture, California[4] -NJDEP Pesticide Control Regulations, § 7:30-10.2(k)[5]
Large Concentrated Animal Feeding Operations (CAFOs)	According to EPA definition; for example 1,000 or more head of cattle.[6]	1 – 3 miles	½ mile	Avoid siting schools within 0.5 miles of large CAFOs, as defined by US EPA.	-Toxic air emissions -Subsurface contamination -Odors	-The Swine Farm Siting Act, North Carolina, NCGS §§106 803(a)(2)[7] -Mirabelli et al., (2006)[8] -www.nrdc.org/water/pollution/factor/stwyo.asp -http://www.madera-county.com/rma/archives/uploads/1129914227_Document_interimdairydevelopmentstandardsapril2005.pdf -http://www.chestjournal.org/cgi/content/abstract/129/6/1486
Airports	All private, commercial and military airports, consider flight patterns / runway configuration	2 miles (from runways)	1,200 – 3,000 ft	Avoid siting schools within 0.5 miles of existing or planned runways	-Safety concerns near runways -Noise -Toxic air emissions	–CA Code of Regulations Title 21 Division 2.5 Chapter 2.1

[4] Permit condition prohibits pesticide application "within ¼ mile of a school in session or during school sponsored activities." Effective January 1, 2010. *See* http://www.kernag.com/dept/news/2009/school-buffer-notice-10-29-09.pdf.
[5] Statute prohibits gypsy moth pesticide applications within 2.5 miles of schools during normal student commuting times (NJAC, Pesticide Control Regulations § 7:30-10.2(k)). NJDEP also restricts aerial applications 300 horizontal feet around any school property (NJAC § 7:30-10.6(q)).
[6] http://www.epa.gov/npdes/pubs/sector_table.pdf
[7] Statute requires that swine houses or lagoons holding animal waste shall be located at least 2500 ft from any school, hospital, or church. *See* http://www.cals.ncsu.edu/wq/sfzn/PDFNorthCarolina/PDFNCPollutionStatutesandCode/SwineFarmSitingAct.PDF.
[8] Study showed that children living or attending schools within half a mile of a CAFO have increased prevalence of asthma; some jurisdictions already have siting restrictions to protect school children from CAFOs within ½ mile or greater distances. *See* Pediatrics. 2006 Jul;118(1):e66-75.

Environmental Feature	Description	Screening Perimeter[1]	Exclusion Zone[2]	Recommendation	Potential hazard	Reference
Drycleaners	Facilities using perchloroethylene (perc) or similarly toxic chemicals	1,000 feet	300 feet for perc cleaners 500 feet for operations with two or more machines.	Avoid siting new schools within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with three or more machines, consult local air quality agencies. Do not site new schools within the same building with perc dry cleaning operations.	-Toxic air emissions -Subsurface contamination	-CARB Air Quality and Land Use Handbook (2005)
Gas Stations	Large gas station dispense > 3.6 million gallons per year	1,000 feet	50 feet, typical gas station 300 feet, large gas station	Avoid siting new schools within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.	-Toxic air emissions -Subsurface contamination	-CARB Air Quality and Land Use Handbook (2005)
Other small sources	Auto body shops, furniture manufacturing & repair; wood product manufacturing or processing; printing, electronics and chip manufacturing; char-broilers, commercial sterilization, back-up generators; pharmaceutical, rubber, and plastic plants	500-1,000 feet	Site-specific		-Toxic air emissions -Subsurface contamination -Odors	-CA Education Code 17213

Environmental Feature	Description	Screening Perimeter[1]	Exclusion Zone[2]	Recommendation	Potential hazard	Reference
Power Lines	High voltage power lines >50 kV	350 feet	25 – 350 feet[9]	Setback distances vary on voltage (kV) and depending if lines are above ground or below ground[10]	-Exposure to electromagnetic fields -Safety concerns if power lines fall	-CA Code of Regulations Title 5 Section 14010 -CA Dept. of Ed. Power Line Setback Exemption Guidance (2006) - RI Dept. of Ed. School Construction Regulations (5/24/07), Section 1.05-2(2)
Cellular Phone Towers	All cellular phone towers and antennas	200 feet	On or adjacent to site	Avoid siting schools on or adjacent to cell towers or placing cell towers on or adjacent to school sites.	-Exposure to electromagnetic fields -Fall distance of towers	-LAUSD Board Resolutions -FCC's "A Local Official's Guide to RF Emission Antenna Safety -World Health Organization
Hazardous Material Pipelines	Oil/fuel pipelines, high pressure natural gas pipelines (80+ psi), chemical pipelines, high pressure/volume water lines	1,500 feet	Site specific	No hazardous pipelines on–site (except school serving natural gas), setbacks based upon risk analysis	-Subsurface contamination -Accidental release / spills of hazardous materials -Fire/heat from flammable fuels -Flooding/erosion from water	--CA Dept. of Ed. Guidance Protocol School Site Pipeline Risk -CA Code of Regulations Title 5 Section 14010 -LAUSD Pipeline Safety Hazard Assessment Protocol
Reservoirs, water or fuel storage tanks	All above ground large volume liquid storage tanks	1,500 feet	Site-specific	Allow 60 minutes warning time for arrival of first wave >1 foot high	-Potential for inundation in an accident	

[9] Rhode Island has larger exclusion zones for power lines. In RI, project sites must have a minimum separation of 500 feet from 50-133kV power-lines, 750 feet from 220-230kV power-lines, and 1,500 feet from 500-550kV power-lines. http://www.ride.ri.gov/Finance/Funding/construction/Documents/FY08%20Housing%20Aid/Prior%20to%20May%2031%20Updates/School_Constr_Regs_FINAL.pdf

[10] California has setback distances that vary with kV and above ground (AG) or below ground (BG) lines as follows: KV 50-199: 100 feet AG or 25 feet BG; kV 200-230:150 feet AG or 37.5 feet BG; and kV 500-550: 350 feet AG or 87.5 feet BG.

Environmental Feature	Description	Screening Perimeter[1]	Exclusion Zone[2]	Recommendation	Potential hazard	Reference
Geologic features	Earthquake faults, liquefaction zones, volcanic/geothermal activity, landslide zones, flood zones, methane zones, naturally occurring hazardous materials (examples: asbestos, uranium, radon) areas, etc.; reservoirs	¼ mile	50 feet from active faults to buildings	Recommend geologic/geotechnical hazards report for every site. Avoid areas subject to high liquefaction, landslides, 100 year flood plains, etc.	-Natural hazards -Toxic air emissions	-CA Code of Regulations Title 5 Section 14010 - CA Geological Survey Publication No. 48 Checklist

Appendix E: Environmental Assets

The table of environmental assets in Appendix E can be used with the tables of screening perimeters and exclusion zones in Appendix D and the lists of hazards in Appendix D. Used together, these appendices provide school districts and school siting committees with information for screening potential new school sites.

The SSTG considered a variety of viewpoints in developing the lists and tables in Appendices C, D, and E. Viewpoints included the use of screening criteria for ‘categorical exclusion’ or eliminating sites that may pose the greatest risk from on-site hazardous materials and off-site sources of nearby pollution and/or contamination. Viewpoints also included the use of screening criteria to identify the need for further investigation, risk assessment, and development of mitigation controls and the capacity to maintain controls. And, as shown in Appendix E, viewpoints on health promotion, smart growth, and community assets were also considered.

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Environmental Assets Screening Table

Environmental Feature	Description	Distance	Recommendation	Potential benefit	Reference
Public and private infrastructure	Libraries, museums, parks, public and private pools, etc.	½ mile	Site school such that neighborhood resources are within walking/biking distance of students and/or joint use is available onsite	-Ability to walk or bike to compatible student resources -Joint use may reduce school acreage needed	-Collaborative for High Performing Schools
Public utilities/services	Water pipelines, sewage pipelines, drainage, public transit		Site schools that use existing improvements rather than require new or extended services/capacities	-Contributes to green and sustainable concepts	
Attendance boundary	Area in which most students live	½ mile to 1 mile	Site school such that large portion of student body lives within ½ mile to 1 mile of school.	-Ability to walk or bike to school for majority of students -Reduces bussing	-Pedestrian Facilities Guidebook: Incorporating Pedestrians into Washington's Transportation System. Washington State Department of Transportation, September 1997. - Martin S and Carlson S. "Barriers to Children Walking To and From School: United States, 2004." *Journal of the American Medical Association*, 294(17): 2160–2162, 2005.

Environmental Feature	Description	Distance	Recommendation	Potential benefit	Reference
Neighborhood access	Presence of sidewalks, bike lanes, crosswalks, etc.	½ mile	Ensure that safe routes to school are available for students	-Ability to walk or bike to school for majority of students -Reduces bussing	http://safety.fhwa.dot.gov/saferoutes/ http://www.cdph.ca.gov/HealthInfo/injviosaf/Pages/SafeRoutestoSchool.aspx http://www.saferoutesinfo.org/guide/
Sensitive land preservation	Critical habitats, important farmland, parks, archeological/cultural/historical resources etc.	Site-specific	Avoid siting new schools on existing sensitive land uses	-Preservation of critical land uses	-Collaborative for High Performing Schools
Natural Resources	Wind, solar, geothermal	Site-specific	Make use of renewal natural resources for energy generation	Contributes to green and sustainable concepts	

Appendix F: Environmental Issues and Remediation Response Actions

Local educational authorities have a fiduciary responsibility to maximize available and limited school construction dollars. Care needs to be exercised so that scarce educational dollars are not directed toward evaluating proposed school sites that later prove infeasible, are patently unsuitable from a development perspective, or will become too costly to remediate. As the future owner of a school, the LEA has a vested interest in identifying viable sites for school construction within its community, and that the most appropriate site is selected at the beginning and planning stages of a given project.

Environmental liabilities can be difficult and expensive to identify and remediate. Even when they are identified, and environmental cleanups are successfully undertaken to address the liabilities, the selection of school sites in need of environmental remediation will continue to be controversial. This underscores the importance of avoiding sites that may be overly complicated by environmental conditions in need of remediation.

It is important to recognize, however, that fewer options may exist for new school sites in some communities, and land development, especially near major population centers, can be a challenging endeavor as a result of legacy land uses. In many densely-populated communities land availability for new school construction is scarce, land valuations are high, and existing infrastructure is often in need of major capital investment and improvement. Environmental conditions such as soil and groundwater contamination; questionable fill materials; residential building materials containing asbestos and lead paint; and leaking fuel tanks may also pose development challenges.

The following environmental conditions may be encountered during the environmental review process for a proposed school. This list is presented to give real-life examples of environmental condition encountered at existing and prospective school sites, along with some of the various remediation best practices and techniques to address the conditions.

Volatile Organic Compounds (VOCs) in Soil and Groundwater

The potential for vapor intrusion into overlying buildings has received much attention in the last decade. There is a heightened awareness nationally and internationally by the general public of the potential health concerns related to vapor intrusion.

Vapor intrusion is generally defined as the underground upward migration of volatile organic compounds (VOCs) into overlying buildings. Common contaminants that may create a vapor intrusion health concern include, but are not limited to, gasoline components (benzene) and dry cleaning and degreasing solvents. Common dry cleaning and degreasing solvents include perchloroethylene (PCE), and trichlolorethylene (TCE).

The presence of these contaminants in the soil or the groundwater beneath a building does not always present a vapor intrusion concern. Physical factors, such as soil chemistry, groundwater conditions, subsurface features, and weather conditions also play a factor in whether vapor intrusion occurs.

Even though well designed, well constructed, and well operated new buildings are generally not susceptible to vapor intrusion, the use of integrated foundation sub-slab venting systems equipped with polyethylene vapor barriers are becoming increasingly common in new construction in densely-populated regions of the country, including California, New York, and New Jersey. There are many different types of designs for subslab venting systems. Most systems, originally developed for protection against naturally-occurring radon gas accumulation, consist of a relatively inexpensive network of horizontal perforated PVC piping installed within a gravel layer under a poured concrete slab beneath the ground floor of a building. The PVC pipes are connected to a manifold collection system, and the collected vapor is vented by vertical piping up through the roof of the building. In some cases, a synthetic vapor barrier is recommended, or roof-top fans are included to operate the system in a more active mode. A typical cost to install a 60-mil thick polyethylene vapor barrier into a concrete foundation system ranges from $3 to $10 per square foot.

In much the same way that venting systems are used to intercept radon gas before it enters a home; such venting systems are effective in preventing the accumulation of VOCs. Addressing vapor intrusion into older buildings is more of a challenge. The installation of subslab depressurization systems or soil vapor extraction systems after a building is constructed can be very costly. Installation of such systems can cost tens of thousands of dollars.

The design and installation of sub-slab venting systems and vapor barriers built into the building foundation are best completed by experienced architectural and engineering firms. The proper installation of a vapor barrier that may overly a sub-slab venting system is very important. Once installed, the vapor barrier should be inspected, tested, and certified by the engineer or architect of record that the barrier was installed correctly and works as designed. Smoke testing is a recognized method to assess proper installation of vapor barriers and other synthetic liners.

The engineer and/or architect of record should furnish a report to the LEA along with the results of the testing, and a copy of the inspection and test results should be included in a report to an oversight regulatory agency.

Performance monitoring of a venting system is equally important. If residual underground soil and groundwater contamination exists, the LEA should retain an experienced environmental professional to develop a long term monitoring plan and periodically complete testing around the school to document that the system is operating properly. Soil gas sampling ports are best integrated into the building design, within a vent piping, or as close to the building as is feasible if the structure already

exists. Depending on the level of testing, such performance monitoring can cost upward of $10,000 annually.

Petroleum Hydrocarbons in Soil and Groundwater

Perhaps the most pervasive environmental pollutant encountered at existing and proposed school sites is attributed to petroleum products that have leaked from old underground storage tank systems. In many parts of the country, especially older cities, home heating oil continues to be the fuel of choice. Most buried residential underground tanks are smaller than 1,000 gallons in size, but due to their age, poor condition, and location (commonly under sidewalks), fuel leaks are commonly encountered. Remediation of petroleum-impacted soil arising from leaking residential underground tanks can range from several hundred to several thousand dollars per tank. Budget contingencies for leaking underground tanks should be established. In some instances, fuel tanks are located within basements. These systems present less of a concern, as they can be visually-inspected. The LEA should retain an experience environmental professional to oversee the removal of underground storage tanks and any excavation that may be necessary to remove and properly dispose of petroleum-impacted soil.

The heating fuels of choice for many schools are still No. 2 and No. 4 heating oils. Underground heating oil tanks associated with school buildings can be larger than 10,000-gallons in size. A standard of care should be exercised whenever older heating oil tanks are encountered. Soil samples should be obtained from around the underground tank prior to its removal or abandonment, and appropriate budget contingencies should be established by the LEA to address soil and groundwater remediation costs associated with leaking heating oil tanks. Remediation of soil resulting from a large leaking underground tank can range from several thousand to several tens of thousands of dollars.

Many older schools at one time however may have been heated with coal. Coal ash is generally recognized as a waste and currently managed as such. However, current waste disposal practices prior to 1970 were not always adopted. Coal ash has been known to be used as fill material for parking areas, playfields, and other backfill needs. Coal ash may contain heavy metals, polycyclic aromatic hydrocarbons (PAHs), dioxins, and furans.

Lead in Soil on Residential Properties

Household paint and soils surrounding older residential housing stock are still found to contain lead that may present an unacceptable exposure risk. Representative testing for lead in surface soils is a best practice. If lead is detected at a concentration in soil that poses a risk to children, the best practice is to have an experienced and licensed contractor properly remove and dispose of impacted soils.

PCBs in Window Caulking and in Soil Associated with Older Buildings

Polychlorinated biphenyls (PCBs) were widely used in electrical and manufacturing processes before they were banned 30 years ago. Recent studies conducted by USEPA have identified a potential exposure risk to PCBs because they were used in the past for certain window caulk and rubberized paint formulations to make them more flexible and durable. As a result, PCBs may be found in soil that surrounds older buildings. Representative testing of surface soils and deteriorated window caulk for PCBs in buildings that were built or renovated between 1950 and 1978 is a best practice. If PCBs are found in deteriorated window caulking, the best practice is to have an experienced and licensed contractor properly remove and dispose of the caulking. Similarly, If PCBs are detected in soils, the best practice is to have an experienced and licensed contractor properly remove and dispose of impacted soils.

If older buildings exist on a site proposed for a school, the LEA should engage an experienced environmental professional to investigate existing buildings/structures to determine the presence of PCB-containing equipment/fixtures and building materials. PCBs can be found in light fixtures, electrical equipment (transformers), older paint formulations, and older window caulk products. If PCBs are found, an environmental professional should furnish a report to the LEA that documents their occurrence and remediation options and costs. The environmental professional should also define the federal and state regulatory requirements for handling, storage, and marking of PCB containing items.

Heavy Metals in Soil and Groundwater

Metals such as lead, arsenic, cadmium, mercury, and chromium can be found in paint pigments and older pesticide formulations. Metals may also have been released to the environment from commercial or industrial operations. Metals do not degrade in the environment, and as a result, can be found in soil and groundwater in many areas. Although low levels of metals may not represent a health concern, metals in soil are frequently encountered in rural and developed areas of the country.

Metals are also found in older masonry products. A standard of care needs to be undertaken if masonry materials from older buildings are to be crushed and recycled as fill material. This issue has only recently surfaced in environmental assessments of older building slated for demolition. Older masonry materials may contain elevated levels of metals, such as beryllium and cadmium that may not be suitable for on-site recycling. This is especially true if masonry materials are painted. Representative samples of the masonry should be obtained by an experienced environmental professional to determine whether the masonry is suitable for on-site recycling.

Pesticides and Herbicides in Soil and Groundwater

Pesticides and herbicides may be encountered on existing and proposed school sites. If a proposed school site was historically used for residential or agricultural purposes,

surface and subsurface soils should be tested for pesticides and herbicides, such as chlordane, dieldrin, and DDT. Pesticides used for termite protection at schools were routinely sprayed adjacent to building foundations. If a school building is proposed for demolition or expansion, soils should be tested for pesticides in areas proposed for disturbance. Proper health and safety precautions should be employed by workers that may come in contact with pesticides. Excavation and off-site disposal of soil found to contain pesticides may be required prior to or during school construction.

Pesticides and herbicides in groundwater generally occur as a result of leaching from soil into groundwater. The potential presence of herbicides and pesticides in groundwater should also be considered if an on-site source of drinking is required.

Soil Management Issues

Fill materials should not always be assumed to be free of contaminants. Depending on the source of soil and fill materials to be imported to a school site, the soil and fill may contain contaminants. Not only does fill material imported to a school site need to be suitable from an engineering perspective, the soil may need to meet environmental quality standards. It is recommended that the architect or engineer of record approve the placement of fill material on school sites before it is delivered to the site. Contract documents should clearly state that imported fill materials need to meet established environmental quality specifications.

Contract documents should clearly state that fill and topsoil imported to a proposed school site be suitable for the intended future use of the property as a school, from both an engineering and environmental quality perspective, and that the quality of the imported fill and topsoil shall not change the environmental classification of the property from an unrestricted to a restricted use. Similarly, the exportation of excess fill and topsoil that originates from a proposed school site should not be assumed to be free of contaminants. Low-levels of contaminants are commonly found, especially in urban and former agricultural areas. The LEA and its environmental professional must ensure that the exportation of fill material is suitable for property to which it is delivered.

When testing is necessary to document fill and soil quality, representative samples of the fill and soil should be tested for such contaminants as pesticides and herbicides, PCBs, metals, and polycyclic aromatic hydrocarbons (PAHs).

Landscaping Issues

Planting trees with extensive root systems should be avoided if a site is constructed with a multilayered engineering control barrier. When an engineering control, in the form of a clean landscaped soil cover of sufficient thickness, is necessary to eliminate a direct contact exposure to soil, trees and shrubs are best planted in clean soil zones specifically excavated to accommodate their root systems. This often requires excavation to a depth of four to six feet to accommodate the root ball of the tree or shrub.

Asbestos Containing Material Surveys

The LEA should engage an experienced environmental professional to determine the presence of asbestos containing materials (ACM) using recognized testing methods. ACM may be found on interior and exterior pipe/duct insulations, equipment and boiler insulations, fire brick, HVAC units, plaster materials, floor and ceiling tiles, mastics/glues, roofing materials, window glazing caulks, wire wrap, between old wooden flooring (for noise reduction), and fireproofing, The environmental professional should furnish a report to the LEA that includes the test results, an itemized inventory of all suspected ACM materials, and a corresponding cost estimate to abate such conditions and conduct the appropriate testing in accordance with all applicable regulatory agency and code requirements.

Lead in Drinking Water

The LEA should engage an experience environmental professional to investigation the drinking water quality within existing buildings/structures. For schools that are to be renovated or expanded, the sampling and analyses of potable water systems within the building(s) is a best practice to determine the presence and concentration of lead. This work is best done by an environmental professional experienced in water supply systems. If lead is detected above standards, the environmental professional should furnish a report to the LEA that identifies the potable water sources (and locations) that contain lead above State/Federal safe drinking water standards, and provides options on how best to address the situation.

Historic Fill

Historic fill is generally defined as non-indigenous material that was imported to a site in order to raise the topographic elevation. Examples of historic fill may include: construction debris, dredge spoils, incinerator residue, demolition debris, fly ash, or non-hazardous solid waste.

Prior to the turn of the last century it was a common practice in certain areas of the United States to fill low-lying areas to reduce mosquito breeding grounds and expand urban land on which to build. In many instances, this historic fill material originated from an off-site location, and its environmental quality was never determined. Most historic fill contains low levels of pollutants, but some historic fill can have poorer quality.

In some instances there can be economic and impracticability issues associated with removal of such large quantities of historic fill materials, which in some areas of the northeastern United States can be 20-feet thick. In these instances construction of various impervious and engineering controls is currently an accepted practice.

Engineering Controls for soil

Examples of engineering controls include the placement of two-feet (or more) of clean soil/fill material (suitable for residential uses) and turf grass on playgrounds and athletic fields. Impervious engineered surface parking lots and building slabs represent other acceptable engineering controls for eliminating direct contact exposure to soils.

A number of best construction and performance management practices exist when an engineering control in the form of a clean soil cover is necessary to eliminate direct contact exposure to soil found to contain pollutants. The most common practice is to isolate the underlying soil using geotextile and visual barrier materials (such as polyethylene orange construction/snow fencing material). Two feet of clean fill and soil is placed over the geotextile and visual barrier. The visual barrier serves as a "marker layer" to warn anyone who might dig into the soil that soil below this marker contains pollutants in soil that should not be disturbed. However, sites that contain an area of contaminated soil/fill may require additional engineering controls to encapsulate the contaminated layer of soil/fill. For example, a layer of crushed stone underneath the clean fill layer will provide a "capillary break" that limits the upward and downward movement of water or leachate. This layer will also prevent burrowing animals and worms from transporting contaminated soil into the clean fill and potentially to the surface. LEAs should review EPA's requirements for encapsulating contaminated soils.

Underground utilities are best installed within clean soil zones to mitigate exposure should future repairs, alterations, improvements, or disturbances be necessary. Such "clean utility corridors" are recommended when an engineering control is necessary for a particular property to eliminate a potential direct contact exposure to pre-existing soils that may contain low-levels of pollutants in excess of a health-based concentration. A clean utility corridor is defined as a linear trench that is excavated to support the installation of underground utilities, the trench of which is eventually restored to grade (after the installation of utilities) with clean soil or fill materials. Clean utility corridors reduce the potential for damage to an existing engineering control when future utility repairs, alterations, or improvements are necessary.

Use of Engineering Controls

Although the use of engineering controls is an effective method for eliminating direct contact exposure, there remains some skepticism over whether various LEAs have the capacity and resources to maintain the engineering controls in perpetuity. If an engineering control is necessary to eliminate direct contact exposure, the LEA should adequately budget for periodic inspections, maintenance, and repair/replacement of the controls.

In some states, an institutional control, in the form of a notice to the property deed, will specify certain actions to be completed by the property owner, and will identify the various reporting requirements to document that the engineering control remains intact. This "deed notice" typically obligates the owner (and future owners) of the property to:

maintain the engineering controls; notify the regulatory agency prior to any alterations, improvements or disturbances in the area (i.e., the restricted area); sets forth the schedule to conduct periodic inspections of the area; and, any specific certification requirements that the engineering control remains intact.

Appendix G: Final Site Management Plan

The preparation of a site-specific site management plan (SMP) is a best practice to follow whenever real estate is subjected to site remediation activities. The SMP essentially memorializes the remedial actions that were performed, the standards to which the remediation was performed, and describes the remedial activities the environmental professional should develop if engineering controls are used. The SMP describes in detail the specific manner in which institutional and engineering controls will be employed in the future, and by whom. The final SMP should clearly show on figures and drawings those locations where soil quality remains above unrestricted residential standards, including as-built drawings depicting the engineering control. The SMP should clearly define the roles and responsibilities for maintaining the engineering control, and these responsibilities should be memorialized in an institutional control in the form of a legal notice to the property deed.

The contents of the SMP should include:

1) A site description that includes:
- Historical uses of the site and relevant adjacent historical uses;
- A summary of the environmental evaluation of the site including details on the location and extent of soil in excess of regulatory standards.
- A summary of the remedial work done at the site;

2) Clear depiction of the institutional and engineering controls, a description of the long term environmental stewardship obligations required of the property owner, and a written declaration that publicly defines property owner's responsibility to maintain the engineering control.
3) Participation in one-call systems to prevent breaches, if such a one-call system exists for engineering control disturbances. ;
4) Specific contingency plans that describe engineering control restoration activities should the engineering control be disturbed;
5) A description of prohibited activities in areas constructed with an engineering control to maintain the integrity of the engineering control;
6) The SMP should define the minimum professional requirements (i.e. licensed professional engineer) for maintaining the engineering control, including where appropriate any necessary training of school staff responsible for managing school grounds including:
- Identification/creation of a position within the schools facility department for a technically knowledgeable person trained and responsible for oversight of the school and grounds.
- Training or personnel responsible for managing the school building and grounds on techniques for monitoring cracks in the school foundation and breaches in the engineering control; how to handle and/or report problems with equipment and remedial systems; and how to handle complaints and comments about environmental conditions at the school;

7) The SMP should set forth a compliance monitoring program to be carried out by qualified environmental professionals, as necessary that will:

- Routinely inspect, test and maintain engineering and institutional controls to ensure their continued effectiveness;
    - Test for the presence of contaminants in the soil, soil gas, indoor air, and groundwater on the school grounds if an engineering control is disturbed.
- The SMP should clearly articulate the allocation of responsibility for these activities amongst LEAs, state agencies, school officials, and staff;
- The SMP should provide for an independent audit by a licensed professional engineer not affiliated with the school.

8) A public accountability/oversight plan that includes:

- The prominent placement of signage within the school that clearly defines the extent of the engineering control on the property, and directs readers to appropriate personnel and documents for further inquiry;
- Development of a Due Care Plan, to be kept on-site and made available electronically, that summarizes key elements and responsibilities for implementing the SMP in lay-accessible manner.
- Measures to promote the long-term, institutional and public memory of the SMP through activities designed to promote awareness by students, staff, and the community, such as guest speakers and dedication of a section of the school or local library to the history of the site, remediation strategies, and oversight and stewardship measures.
- The establishment of regular reporting mechanisms that publicly disseminate information on the location of controls, compliance status, and monitoring reports in a manner consistent with the notice provisions discussed above and including relevant local and state environmental agencies;
    - Included in this should be testing reports that clearly describe the purpose of the testing, sample locations and collection procedures, and analytical methods used;
    - The release of reports should be accompanied by a meaningful opportunity to provide public comment and meet with school officials responsible for maintaining the engineering controls.
    - The release of information should target parents and school workers.
    - Each year parents and school workers should be notified about where and how to obtain information about contamination, remediation activities and on-going monitoring.

EPA guidelines can be enhanced by adding references to documents that include site management plans. A template is available at http://www.dtsc.ca.gov/Schools/upload/NOA_OM_Plan_Template_101105.pdf.