SMART GROWTH FOR BROWNFIELDS REDEVELOPMENT

Prepared for

City of Chicago
Department of Environment
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EXECUTIVE SUMMARY

This report presents screening tools to evaluate and identify brownfield sites that can be economically cleaned up and redeveloped as mixed-income residential and/or mixed-use communities using smart growth principles. GSG Consultants, Inc. (GSG) developed the screening tools using lessons learned from previous residential redevelopment of brownfield projects. These lessons have shown the following:

- Impacted typical Chicago fill is present at the majority of brownfield sites.
- Former industrial sites contained higher levels of contamination, source material, hazardous waste, and underground storage tanks.
- Underground storage tanks were present at many former commercial and some residential properties.
- Fly dumping construction debris is often contaminated.
- Higher construction cost can accrue due to unsuitable engineering properties of subsurface soil.
- Higher remediation cost can accrue due to tight redevelopment / remediation schedule.
- Flexible site redevelopment design plans reduce remediation cost.
- Remediation costs are generally uncertain.
- Reliance on engineered barriers and Tier 1 remediation objectives may have increased remediation and construction costs.

The brownfield screening tools utilize steps in evaluating and eliminating sites with the potential of high remediation cost during early stages of the screening process. This would allow the City of Chicago to direct resources toward sites that have higher potential for redevelopment.

GSG also provided two groups of smart growth principles for brownfield redevelopment projects. The first group is site-specific and includes existing infrastructure; access to public transportation; and access to major social, retail, commercial and other institutions. The second group is associated with site design elements and includes creating walkable areas; providing wide range of housing options; and providing open and green spaces. There are some additional principles that are included in the newly adopted City of Chicago Planned Development Zoning Ordinance, which can be utilized to obtain approval for developing sites located in different zoning areas.

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APPENDICES

1. INTRODUCTION

The City of Chicago Department of Environment retained GSG Consultants, Inc. (GSG), to develop screening tools to evaluate and identify brownfield sites that can be economically cleaned up and redeveloped as mixed-income residential and/or mixed-use communities using smart growth principles.

1.1 OBJECTIVES

The objectives of this project were to develop screening tools for brownfield site selections using knowledge and experience gained from previous residential development of brownfield sites, and to provide guidelines for the redevelopment of brownfield sites using smart growth principles.

1.2 PROJECT METHODOLOGY

GSG collected the information provided in this report from various technical documents and publications prepared by the U.S. Environmental Protection Agency (U.S. EPA), the City of Chicago, non-profit organizations, and advocate groups. GSG also collected information from various web sites of the City of Chicago, U.S. EPA, non-profit organizations, and related industries.

1.3 REPORT ORGANIZATION

This report comprises the following sections:

- **Section 1.0 – Introduction**
  This section presents a brief description of the objectives of the project, methodologies utilized to develop the information included in this report, and a brief description of the brownfield process in the City of Chicago.
- **Section 2.0 – Brownfield Redevelopment Screening Tools**
  This section presents remediation examples of residential redevelopment of former brownfield site projects, lessons learned from these projects, and provides screening tools and procedures for future site selections.
- **Section 3.0 – Smart Growth Principles**
  This section presents an overview of smart growth principles and provides guidelines for the redevelopment of brownfield sites using some of these principles.

1.4 BROWNFIELDS VERSUS SMART GROWTH

A brownfield property is defined by the U.S. EPA as "a real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." In a broader definition, brownfield properties can be defined as abandoned, idled, or underutilized residential, industrial, and commercial lands or buildings in already developed urban or suburban areas, where expansion or redevelopment is complicated by real or perceived contamination or intangible factors related to the site's location that can add cost, time, or uncertainty to the redevelopment.

Smart growth is a development that serves the economy, the community, public health, and the environment. Smart growth connects the development to the improvement of the quality of life in the community by creating jobs; building strong neighborhoods with a range of housing, commercial, and transportation options; and achieving healthy communities that provide families with a clean environment. Redevelopment of existing buildings and land, including contaminated brownfield sites, has been pursued since the early 1990s, and is a separate activity from the smart growth initiatives. However, both share the same goals of providing economic growth, creating jobs, and creating a healthy environment.

1.5 BROWNFIELD ACQUISITION AND CLEANUP PROCESS

The City of Chicago evaluates brownfield sites based on access and control, cleanup cost-estimates, and developmental value. If a brownfield site has industrial, commercial or residential development potential, the City of Chicago acquires the site through one or more of the six primary methods, which are described below:

- **Negotiated Purchase:** The City of Chicago may negotiate directly with a property owner to purchase a property.
- **Eminent Domain:** The City of Chicago may acquire a property through eminent domain procedures, also known as condemnation. In Illinois, a municipality can consider the environmental condition of a property in determining the "fair market value" of a property during eminent domain proceedings.
- **Tax Reactivation:** The City of Chicago may acquire abandoned tax delinquent properties through a municipal tax reactivation process (properties that are tax delinquent for 2 or more years.)

- **Lien Foreclosure***:* The City of Chicago may hold and foreclose on municipal liens against brownfield sites. These liens could include demolition liens, environmental liens, and garbage liens.
- **Settlement:** The City of Chicago may accept land as part of a legal settlement agreement.
- **Denotation:** The City of Chicago may accept land denotation from private and other government agencies.

The City of Chicago conducts a pre-acquisition screening that designates which sites will likely need a Phase I Environmental Site Assessment (ESA) and/or Phase II ESA work. Based on the pre-acquisition results, a Phase I will be conducted. The City of Chicago normally completes a Phase I for all properties acquired using one of the above methods. If the Phase I ESA identified the presence of recognized environmental concerns at the site, the City of Chicago performs a Phase II ESA to characterize and determine the nature and extent of impacted material at the site.

Additionally, the City of Chicago enrolls nearly all of its brownfield sites in the Illinois EPA Site Remediation Program (SRP), which is a voluntary cleanup program administrated by the Illinois EPA's Bureau of Land, to receive a comprehensive "No Further Remediation" (NFR) letter. The Illinois EPA normally issues the NFR once the site owner successfully demonstrates, through proper investigation and, where warranted, remedial action, that environmental conditions at the site do not present a significant risk to human health or the environment. The NFR signifies a release from further responsibilities under the Illinois Environmental Protection Act, and is considered prima facie evidence that the site does not constitute a significant risk of harm to human health and the environment, so long as the site is utilized in accordance with the terms of the NFR.

2. BROWNFIELD SCREENING TOOLS

This section provides screening tools to evaluate brownfield sites based on experience gained from previous residential redevelopment of brownfield sites in the City of Chicago.

2.1 CHICAGO BROWNFIELD RESIDENTIAL REDEVELOPMENT PROJECTS

The City of Chicago has completed numerous brownfield redevelopment projects for industrial, commercial and residential properties. Site investigation and remediation costs varied, based on the site's historic uses, nature of contaminants present at the site, and nature of the proposed redevelopment. This section provides examples of residential redevelopment of brownfield sites, and provides discussion of lessons learned from those development projects.

CHA Henry Horner Homes Redevelopment – The site consisted of two parcels; the east parcel was located at 150 North Hermitage and the west parcel was located at 2215 West Lake Street. The east and west parcels were 4.7 and 6.5 acres in size, respectively. The east parcel was formerly occupied by automobile garages, stores, barns and a church prior to 1963. By 1963, the parcel was occupied by two Chicago Housing Authority (CHA) buildings and a parking lot. The parcel was surrounded by industrial and commercial properties. The west parcel was formerly occupied by residential properties, commercial stores, a picture-frame factory, a church, a welding shop, and an automobile garage until sometime in the early 1970s when the CHA constructed two mid-rise buildings at the parcels. The site investigation activities revealed the presence of impacted soils with several polynuclear aromatic (PNA) constituents above the Illinois EPA Tier 1 Soil Remediation Objectives (SROs) for residential properties throughout both parcels. Lead and arsenic were also detected in some soil samples collected from the east and west parcels at a concentration above the Illinois EPA Tier 1 SROs. No underground storage tanks (USTs) or source materials were encountered at the site. The source of impacted soil appeared to be consistent with typical Chicago fill. Proposed remediation work at the site included over-excavating impacted soil to a depth of 3 feet below the proposed finished grade in the landscape areas and the placement of 3 feet of clean fill. Impacted soil was also removed from the proposed new structure foundation area. The site remediation work activities were incorporated into the construction activities at the site. Additional remediation cost associated with the removal of impacted soil from the proposed structures' foundations was incurred by the site developer.

Parnell Place – The site is located at 519-555 West 76th Street in Chicago, Illinois. The site was approximately 7 acres in size and it was formerly utilized for industrial purposes, which included carriage, automobile manufacturing, chemical manufacturing, metal plating, warehouse and other small industrial uses. In addition, several railroad spurs were present at the site. The site investigation activities revealed the presence of soil impacted with semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), and heavy metals; the presence of railroad ties, asbestos-containing materials, large concrete blocks, and miscellaneous debris. The concentration of some PNAs, heavy metals, and VOC constituents were above the Illinois EPA Tier 1 SROs for residential properties. Additionally, lead was detected above characteristically hazardous waste concentration levels at three locations of the site. The source of impacted soil appeared to be associated with the historic uses of the site for industrial purposes, fly dumping, and typical Chicago fill. The site was divided into two areas, northern portion for residential development and southern portion for open-space redevelopment. Remediation work completed at the northern portion included removing 2,400 cubic yards of special/hazardous waste. An engineered barrier in the form of concrete / asphalt cover or 3 feet of clean fill was utilized throughout the northern portion of the site. Remediation work completed at the southern portion included removing concrete debris and railroad ties, over-excavating hazardous waste and placement of 3 feet of clean fill as an engineered barrier. The City of Chicago invested more than $550,000 and $1,057,000 for environmental site investigation and remediation at the northern and southern portions, respectively.

Columbia Pointe – The site is located at 63rd Street and Woodlawn Avenue in Chicago, Illinois. The site was approximately 5.5 acres in size, and was formerly utilized for commercial purposes. Historic uses of the site included a Laundromat, hardware store, public library, repair shop, grocery store, currency exchange, bowling alley, and other commercial businesses. The site investigation activities revealed the presence of soil impacted with elevated concentrations of several PNA constituents and total lead; presence of at least four (4) USTs, and stockpiles of impacted soil associated with fly dumping activities at the site. The impacted soil concentrations were above the Illinois EPA Tier 1 SROs for residential properties, and extended from the surface to a depth of approximately 10 feet. The source of contaminants in the impacted soil appears to be consistent with typical Chicago fill and a release from the USTs. Remediation work completed at the site included removal of the USTs, fly dumping debris and impacted soil, and over-excavation of the impacted soil to a depth of 3 feet from the front yards and backyards of the town-homes. The City of Chicago invested more than $480,000 for environmental site investigation and remediation activities at the site. Additional remediation

cost associated with the removal of impacted soil from the proposed structures' foundations was incurred by the site developer.

Safe Homes for Kids: Single Family Residence – The site was located at 7829 South Racine Avenue in Chicago, Illinois. The site was approximately 0.22 acre in size, and was formerly occupied by a battery ignition commercial facility. The adjacent property to the south was also occupied by a commercial facility. The Phase I ESA investigation revealed the presence of a small stained area at the site. The site investigation activities revealed the presence of impacted soil with elevated concentrations of several PNA constituents above the Illinois EPA Tier 1 SROs for residential properties. Total magnesium was also detected at a concentration above the Metropolitan area background concentration in several soil samples. The source of impacted soil appears to be consistent with typical Chicago fill. Proposed remediation work at the site included over-excavating impacted soil to a depth of 3 feet below the proposed finished grade in the landscape areas and the placement of 3 feet of clean fill. Impacted soil was also removed from the proposed new structure foundation area.

2.2 LESSONS LEARNED

2.2.1 Summary of Lessons

Based on the review of the aforesaid examples and GSG's personnel experience with other residential brownfield redevelopment projects, the lessons learned are presented below:

The Presence of Impacted Chicago Fill – The presence of typical Chicago fill is one of the most common problems encountered in many of the City of Chicago brownfield redevelopment projects. Typical Chicago fill normally contains elevated concentrations of PNAs and total lead and arsenic, which are present due to the urban settings of the City of Chicago and not necessarily due to any releases at the site. These types of contaminants are normally associated with the ingestion exposure route and require the placement of a paved surface consisting of concrete or asphalt or the placement of 3 feet of clean fill as an engineered barrier to prevent exposure to the contaminants. One additional problem associated with the presence of fill materials is that the fill materials are normally not suitable to support structures for redevelopment and will require over-excavation and removal to a greater depth where suitable native soil is present. This normally generates a large volume of impacted soil, which will require disposal at a licensed landfill as part of the site redevelopment activities and not necessarily required to meet the Illinois EPA remediation requirements. The cost for the removal and disposal of impacted fill material is normally substantially higher than clean soil. This issue is often overlooked during the site investigation

activities since the majority of site investigations are performed by environmental scientists and geologists and not by engineers. Therefore, it is important that remediation cost estimates of brownfield redevelopment projects include two components. The first cost estimate should include remediation cost to meet regulatory requirements and to obtain an NFR letter, while the second cost estimate should include remediation cost for engineering consideration to complete the proposed redevelopment project based on the site subsurface soil condition. Unfortunately, the second remediation cost-estimate is often overlooked during site selection/acquisition process. Evaluation of engineering and physical properties of subsurface soil should be performed prior to site selection to accurately determine the actual site remediation cost to complete the proposed redevelopment. This can be accomplished by conducting a combined preliminarily geotechnical engineering and environmental site investigation.

Higher Remediation Cost for Former Industrial Sites – In general, former industrial sites normally contain high levels of contamination and may contain hazardous waste; free product; USTs; and buried drums, batteries, and other debris. Also, certain historical commercial land uses such as dry cleaners and service stations are associated with soil and groundwater contamination. The Illinois EPA requires the removal of all hazardous waste, free product, and source materials from the remediation project. Therefore, engineered barriers are not sufficient to develop sites impacted with hazardous materials, and will require implementing active remediation work, which may include the removal of large volumes of contaminated soil and placement of imported clean fill materials. The imported materials are normally required to be placed and compacted in accordance with the project engineering and design specifications, which will increase the overall cost of the site redevelopment.

The Presence of Underground Storage Tanks – Underground Storage Tanks (USTs) are often encountered during construction activities at brownfield sites. This is due to the fact that many former commercial and residential properties contained USTs, which were a very popular source of heating until the early 1970s. A majority of the USTs are not identified during a Phase I ESA since they were not recorded with the City of Chicago at the time of their installation. Additionally, a majority of the USTs were abandoned in-place without removing their contents and may have been leaking for a long period of time. Therefore, impacted soil is often encountered in the vicinity of USTs. The presence of USTs normally increases the cost of site redevelopment. Additionally, USTs may delay the completion of redevelopment projects if they are discovered during the construction phase of a project.

Contaminated Fly Dumping Construction Debris and Soil – Stockpiles of soils and construction debris associated with fly dumping activities are often encountered at brownfield sites. A majority of the soil and construction debris stockpiles are contaminated or mixed with hazardous building materials such as asbestos or other contaminants. The cost for the removal of clean construction debris is substantially lower than contaminated materials. Additionally, clean construction debris could be recycled and reused at the redevelopment site, while impacted materials must be disposed of at a licensed landfill. Therefore, the nature of soil and construction debris stockpiles should be characterized, and their volume should be adequately estimated during early stages of remediation projects to accurately estimate the cost of their removal and legal handling, management and disposal.

Presence of Hazardous Building Materials in Existing Structures – Older structures normally contain hazardous building materials such as asbestos-containing materials, lead-based paint, polychlorinated biphenyls (PCBs)-containing materials, and universal wastes. A comprehensive hazardous building materials survey should be conducted during early stages of the project to determine the nature, location, quantity, and mitigation/abatement methods required for the project. To avoid project cost-overrun, a remediation cost-estimate for the removal and disposal of hazardous building materials should be completed during the planning stages of a project.

Higher Remediation Cost Due to Tight Schedule – A majority of City of Chicago projects are completed on an expedited basis or on a tight schedule, which may not allow sufficient time for adequate site characterization or for sufficient time to explore and/or implement alternative innovative remediation options. Therefore, the majority of these projects were completed using conventional dig-and-haul methods. Advance project planning and scheduling may allow the City of Chicago to complete such activities using innovative engineering design or to complete a formal risk assessment, which may assist in reducing the overall remediation cost.

Flexible Designs Reduce Remediation Cost – Flexible site design normally assists in reducing the overall remediation cost. This may include flexible selection of a building, street, park or other project components during the development of site design plans. This will allow utilizing proposed site development components such as concrete floor-slab or pavement as an engineered barrier in heavily contaminated areas, or placing green spaces and parks in less contaminated areas. It will also allow coordination of site construction and remediation to create soil management zone within the project limits and reduce the volume of soil required to be removed from the site. Therefore, completing site characterization prior to preparing the redevelopment design plans will allow the

project design team to incorporate remediation work into the project design plans and avoid potential for duplicating work activities at the site.

Groundwater Contaminations Delay Project Progress – Although groundwater is not considered a major issue with the City of Chicago projects since there is an ordinance prohibiting the use of groundwater for potable purposes, the presence of contaminated groundwater may delay the project progress. The Illinois EPA may require the installation of groundwater monitoring wells for groundwater monitoring, and delineating the extent of groundwater contamination, which will increase the project cost and delay project progress. It is recommended, therefore, that during the initial phase of the project investigation, the nature of the site geology, hydrology, and the potential presence of groundwater contamination be determined.

Uncertain Remediation Cost – Remediation cost for many of the brownfield redevelopment projects exceeded the initial estimate due to incomplete or inadequate site characterization activities. While the presence of USTs, free products, and hazardous waste are identified during the site investigation activities, the extent and magnitude of remediation work are often underestimated due to incomplete site characterization caused by factors such as limited site access or budget constraints. This can normally cause substantial increase in the overall remediation cost, especially when certain tasks need to be completed on an expedited basis.

Use of Higher Cleanup Remediation Objectives and Reliance on Engineered Barriers – A majority of brownfield redevelopment projects are completed using the Illinois EPA Tier 1 remediation objectives, which are based on conservative assumptions and do not take into account any site-specific information. This is normally used since the majority of the redevelopment projects are completed on an expedited basis and without exploring any other innovative engineering designs or studies. Additionally, engineered barriers are utilized in almost all brownfield redevelopment projects. The engineered barriers include either the placement of 3 and 10 feet of clean fill in landscape areas to exclude the ingestion and inhalation exposure routes, respectively, or require the placement of paved surfaces such as asphalt or concrete. The placement of engineered barriers will require deed restriction and maintenance of the engineered barriers in accordance with the terms of the NFR. Any damage or permanent breach of the engineered barriers will violate the terms and void the NFR. Prospective owners of residential redevelopment projects are often not aware of the NFR requirements and do not take the necessary steps to comply with these requirements, which are meant to prevent exposure to contaminants that remain at the site. Therefore, the reliance on the Tier 1 remediation objectives and engineered barriers may increase the overall project cost since they are based on conservative assumptions and do not take site-

specific parameters and conditions into consideration. It is recommended that innovative engineering design and/or determining higher remediation objectives, using the Illinois EPA Tier 3 analysis, could reduce the areas and the volume of soil requiring remediation. However, completing such studies is a lengthy process and it may take several months before obtaining approval from the Illinois EPA.

2.3 PROPOSED SCREENING TOOLS AND PROCEDURES

As stated earlier, the City of Chicago normally performs a Phase I ESA for the majority of brownfield sites acquired according to the procedures outlined in Section 1.5. If the Phase I ESA revealed the presence of recognized environmental conditions at a site, a Phase II ESA is normally performed to characterize the site and determine the vertical and horizontal extent of impacted soil at the site. The proposed screening tools developed in this section will utilize the information collected during the Phase I and Phase II ESAs to identify the brownfield sites that can be economically developed for affordable housing and mixed land-use. Completing such investigations is time consuming and costly. Therefore, it is recommended that the site selection process be performed in several steps in order to eliminate during the early stage of the process those sites that cannot be economically developed thereby saving funds for the development instead of remediation. If a brownfield site is selected for redevelopment without completing the required site investigation and screening activities, the site remediation and redevelopment cost may increase substantially due to any future discovery of high levels of contamination, presence of hazardous materials, source materials, etc. GSG developed a two-step matrix to screen sites for redevelopment, which could be performed prior to completing the ESA or simultaneously with the ESA activities in order to eliminate heavily contaminated brownfield sites during the early stages of the site selection process. If a brownfield site is selected for redevelopment, additional screening tools, Design Screening, are proposed to economically develop the site. The following is a list of the screening tools:

A. Preliminary Screening
B. Development Screening
C. Design Screening

A brief description of the above screening tools is presented below:

A. Preliminary Screening – Preliminary Screening consists of the following two steps:

1. Determine historic uses of the site and review all the readily available data. This shall include reviewing historic Fire Insurance Sanborn Maps and the records of the City of Chicago

Department of Environment. The Sanborn map collection consists of a uniform series of large-scale maps, dating from 1867 to the present and depicting the commercial, industrial, and residential sections of cities and towns in the United States. The maps normally show individual building "footprints," complete with construction details such as building material (brick, adobe, frame, etc.), height, number of stories, chimneys and elevators, use of structure (dwelling, hotel, church, etc.), and street address. Other features shown in Sanborn Maps include lot lines, street widths, water pipes, hydrants and cisterns, and fire-fighting facilities. The maps also indicate the presence of USTs since they were originally produced for insurance underwriters who used them to determine risks and to establish premiums. Aerial photographs should be reviewed only if no Sanborn maps are available for a specific area of the City of Chicago. In general, Sanborn maps should be available for a majority of the City of Chicago. Acquiring records of UST installation, removal, and building violations should also be included in this step.

2. Perform a visual inspection of the site to identify the potential presence of any recognized environmental conditions. This should include identifying the presence of construction debris and soil stockpiles, drums, batteries, railroad ties, tires, pits, free products, surface staining, hazardous building materials, and evidence of underground storage tanks.

GSG has developed a numerical scoring system for the above two steps, based on the potential presence of contamination and the cost to perform remediation at the site. Figure 1, Preliminary Screening Matrix, presents a summary of the Preliminary Screening process.

Figure 1 - Preliminary Screening Matrix

Maximum Score	Screening Task	Scoring Guide
1	**Historic Uses (Site and Adjoining Properties for Last 100 Years)**	
25 points	a. Industrial Site	25 points
	b. Dry Cleaning Facility	20 points
	c. Service Station	15 points
	d. Commercial Site	10 points
	e. Residential Site	0 points
2	**Presence of USTs**	
20 points	a. 200 - 500 gallons	2 points for each UST
	b. 501 - 1,000 gallons	5 points for each UST
	c. 1,001 gallons - 5,000 gallons	8 points for each UST
	d. 5,001 gallons - 15,000 gallons	12 points for each UST
3	**Visual Site Inspection**	
50 points	a. Fly Dumping - Construction Debris Stockpiles	1 point/100 tons (maximum 5 points)
	b. Fly Dumping - Soil Stockpiles	2 points/100 tons (maximum 10 points)
	c. Debris, Batteries, Railroad Ties, and Tires >25% of the Site	5 points
	d. Drums	1 point/drum (maximum 5 points)
	e. Surface Staining	
	0% to 20% of the Site Area	5 points
	Greater than 20% to 40% of the Site Area	10 points
	Greater than 40% to 60% of the Site Area	15 points
	Greater than 60% to 80% of the Site Area	20 points
	Greater than 80% to 100% of the Site Area	25 points
4	**Demolition of Structures with Hazardous Building Materials**	
5 points	a. 0 - 5,000 Square Feet	2 points
	b. Greater than 5,000 Square Feet	5 points
Total Preliminary Screening (Maximum 100 points)		

If the total score is less than 60 points, proceed to Development Screening scoring section

The above information will provide indication regarding the potential presence of sources of contamination at a brownfield site. A numerical score is assigned to each step of the screening

process. If the site score exceeds 60 points (out of a maximum 100 points), the site should be removed from further consideration for redevelopment. A remediation cost estimate should be developed upon the completion of the Preliminary Screening process. The remediation cost estimate should include the following two components:

a. **Pre-development Remediation:** This should include the cost for the removal of debris stockpiles, drums, USTs, hazardous building materials, etc.
b. **Development Remediation**: This should include the cost for the management, handling, and disposal of impacted soil.

B. Development Screening – Development Screening consists of performing the following two tasks:

1. A limited environmental and geotechnical site investigation to determine the potential presence of contamination and subsurface soil profile along with engineering characteristics. Upon the completion of the limited site investigation, the screening matrix should be re-evaluated and a new score should be assigned to the site. The new matrix includes components that will require remediation such as the removal of USTs, debris, railroad ties, batteries, etc, and site-specific information based on the results of the subsurface soil investigation. The remediation cost-estimate should be updated upon the completion of the limited site investigation.

2. If the site score does not exceed 60 points, a comprehensive site investigation should be performed to fully characterize the site condition. The comprehensive site investigation should fully characterize the surface and subsurface soil and groundwater conditions. The remediation cost estimate should be refined based on the findings of the comprehensive site investigation. Sites with a score of 60 or more should be eliminated from further evaluation for redevelopment. Figure 2, Development Screening Matrix, presents a summary of the Development Screening process and components.

Figure 2 – Development Screening Matrix		
Maximum Score	**Screening Task**	**Scoring Guide**
A.2	**Preliminary Screening**	
20 points	a. 200 - 500 gallons	2 points for each UST
	b. 501 - 1,000 gallons	5 points for each UST
	c. 1,001 gallons - 5,000 gallons	8 points for each UST
	d. 5,001 gallons - 15,000 gallons	12 points for each UST
A.3	**Visual Site Inspection**	
25 points	a. Fly Dumping - Construction Debris Stockpiles	1 point/100 tons (maximum 5 points)
	b. Fly Dumping - Soil Stockpiles	2 points/100 tons (maximum 10 points)
	c. Debris, Batteries, Railroad Ties, and Tires >25% of the Site	5 points
	d. Drums	1 point/drum (maximum 5 points)
A.4	**Demolition of Structures with Hazardous Building Materials**	
5 points	a. 0 - 5,000 Square Feet	2 points
	b. Greater than 5,000 Square Feet	5 points
B.1	**B. Perform Site Investigation**	
50 points	a. Impacted Typical Chicago Fill below 3 feet	1 point/1 ft of fill (maximum 5 points)
	b. Impacted Surface Soil Above Tier 1 SROs (Residential)	
	0% to 25% of the Site Area	5 points
	Greater than 25% to 50% of the Site Area	10 points
	Greater than 50% to 100% of the Site Area	15 points
	c. Hazardous Waste / Source Material	
	0 -100 tons	5 points
	Greater than 100 tons to 500 tons	10 points
	Greater than 500 tons	20 points
	d. Free Product	1 point /100 gallon (maximum 8 points)
	e. Groundwater Contamination	2 points
Total Development Screening Score		

If the total score is less than 60 points, site should be selected and proceed to Design Screening

Figure 3, Brownfield Screening Matrix, presents a combined Preliminary Screening and Development Screening tools for evaluating potential brownfield sites for redevelopment. The combined matrix shall be used according to the following guidelines:

1. Complete Task A (Preliminary Screening) and determine the site score based on the site history information.
2. Proceed to Task B (Development Screening) if the site score is less than 60 points. Determine the site score using these two components:
   1) A.2, A.3 (a,b,c,d) and A.4; and
   2) Task B

If multiple sites are evaluated at the same time, the site with the lowest score should be considered first for redevelopment.

Figure 3 – Brownfield Screening Matrix

Maximum Score	Screening Task	Scoring Guide	Site Findings	Site Score
Task A.	**Preliminary Screening**			
1	**Historic uses of site and adjoining properties for Last 50-100 years**[1]			
25 points	a. Industrial Site	25 points		
	b. Dry Cleaning Facility	20 points		
	c. Service Station	15 points		
	d. Commercial Site	10 points		
	e. Residential Site	0 points		
2	**Presence of USTs**			
20 points	a. 200 - 500 gallons	2 points for each UST		
	b. 501 - 1,000 gallons	5 points for each UST		
	c. 1,001 gallons - 5,000 gallons	8 points for each UST		
	d. 5,001 gallons - 15,000 gallons	12 points for each UST		
3	**Visual Site Inspection**[1]			
50 points	a. Fly Dumping - Construction Debris Stockpiles	1 point/100 tons (maximum 5 points)		
	b. Fly Dumping - Soil Stockpiles	2 points/100 tons (maximum 10 points)		
	c. Debris, Batteries, Railroad Ties, and Tires>25% of the Site	5 points		
	d. Drums	1 point/drum (maximum 5 points)		
	e. Surface Staining			
	0% to 20% of the Site Area	5 points		
	Greater than 20% to 40% of the Site Area	10 points		
	Greater than 40% to 60% of the Site Area	15 points		
	Greater than 60% to 80% of the Site Area	20 points		
	Greater than 80% to 100% of the Site Area	25 points		
4	**Demolition of Structures - Hazardous Building Materials Present**			
5 points	a. 0 - 5,000 Square Feet	2 points		
	b. Greater than 5,000 Square Feet	5 points		
Total Preliminary Screening Score (If the total score is less than 60, proceed to Development Screening scoring section)				
Task B.	**Development Screening**			
5	**Perform Site Investigation**[1]			
50 points	a. Impacted Typical Chicago Fill below 3 feet	1 point/1 ft of fill (maximum 5 points)		
	b. Impacted Surface Soil Above Tier 1 SROs (Residential)			
	0% to 25% of the Site Area	5 points		
	Greater than 25% to 50% of the Site Area	10 points		
	Greater than 50% to 100% of the Site Area	15 points		
	c. Hazardous Waste / Source Material			
	0 to 100 tons	5 points		
	Greater than 100 tons to 500 tons	10 points		
	Greater than 500 tons	20 points		
	d. Free Product	1 point /100 gallon (maximum 8 points)		
	e. Groundwater Contamination	2 points		
TOTAL SCORE				

[1] Score for activity A.1 and A.3.e should not be included if a Phase II ESA is completed (Task B)

C. Design Screening – If a site is selected for redevelopment, additional screening tools may be utilized to reduce the overall cost of site remediation associated with the proposed redevelopment. The additional tools could be used as part of developing a site design plan and site layout. Design Screening consists of the following 3 steps:

1. Develop a preliminarily design redevelopment plan for the site. The design plan shall be flexible to allow changes in the site layout in order to maximize the benefits of engineered barriers and other remediation components. Based on the proposed site development plan and the nature of contaminants, one of the following tasks should be completed:

    a. Compare design plans with the remediation plan and integrate proposed remediation work into the site construction activities in order to minimize the volume of soil that may require handling, management and removal from the site.

    b. Conduct Tier 3 analysis or formal risk assessment to reduce the volume of impacted soils required to be removed from the site; or

    c. Explore potential usage of innovative technologies to perform an in-situ treatment of the contaminated media.

2. Update the remediation cost-estimate based on the final remediation requirements and site redevelopment plan.

3. Prepare final design plans and specifications for site redevelopment and remediation.

GSG utilized the Brownfield Screening Matrix to evaluate the four projects presented as examples Section 2.1 of this report. Table 1, Example Sites Screening Scores, shows the results for each site using the Brownfield Screening Matrix.

Table 1 – Example Sites Screening Scores

SITE NAME	Task A Preliminary Screening Score	Task B Development Screening Score
CHA Henry Horner Homes Redevelopment	45	40
Parnell Place	70	65
Columbia Pointe	41	41
Safe Homes for Kids	15	15

All sites except Parnell Place received a score lower than 60 during both screening tasks. This suggests that Henry Homes, Columbia Pointe, and Safe Homes for Kids were suitable for economical residential redevelopment. The Parnell Place received a score of 70 and 65 for Task A and Task B Screenings, respectively. The site would have been placed on a low priority for redevelopment. Appendix A, Brownfield Screening Matrix, presents a copy of the brownfield screening tools for each of the above-referenced sites.

3. SMART GROWTH PRINCIPLES

3.1 INTRODUCTION TO SMART GROWTH

This section provides a description of smart growth principles that can be used for the redevelopment of brownfield sites in the City of Chicago. The principles of smart growth vary from community to community; however, there are a number of principles that are common to all communities. The U.S. EPA recognizes the following principles for smart growth:

1. **Mixed land-uses** – Smart growth supports the integration of mixed land-uses into communities as a critical component of achieving better places to live. Having mixed land uses for commercial, residential, recreational, and educational purposes allows community residents to meet with one another and interact on a regular basis. This will create vibrant and diverse communities. Additionally, a mix of land uses provides diverse and sizable population and a wider commercial base that can enhance the vitality and perceived security of an area by increasing the number of people on the street, and will convey substantial fiscal and economic benefits to the community since more economic activity will exist. Commercial uses in close proximity to residential areas often help raise local tax receipts, and increase the property values.

2. **Take advantage of compact building design** – Compact building design helps create convenient neighborhood centers, and presents opportunities to absorb growth and development in an efficient manner. It also leaves undeveloped land open to absorb and filter rainwater. This could help in reducing rain run-off and minimize potential flood and storm water drainage needs, and it may as well lower the amount of runoff pollution. Compact building design also helps to achieve higher population density that is normally needed to support viable mass transit and public transportation projects. Thus, a minimum density of six to eight (6-8) households per acre around bus routes and fifteen to twenty (15-20) households per acre around train stops would support these services. Additionally, communities may accomplish more compact design by incorporating structure rather than surface parking or by encouraging buildings to grow up rather than out.

3. **Create a range of housing opportunities and choices** – Providing quality housing for people of all income levels is an integral component in any smart growth strategy, since it can help reduce the concentrations of poverty in certain areas of the City of Chicago. In addition to improving a household's quality of life, housing can ensure a better job-housing balance and generate a strong foundation of support for neighborhood transit stops, commercial centers, and other services, thereby mitigating the environmental costs of an

auto-dependent development. Existing neighborhoods can benefit from a wider range of choices by changing zoning and building codes to increase the type and quantity of units provided. New housing construction can be an economic stimulus for existing commercial centers that are currently vibrant during the workday but suffer from a lack of foot traffic and consumers in evenings or weekends. Most importantly, a range of housings choices allows all households to find their niche in a smart growth community.

4. **Create walkable neighborhoods** – Walkable communities are those where housing, offices, retail stores, trains, bus stops, schools, libraries, and others are located within an easy and safe walking distance. Walkable communities are an integral part of achieving smart growth because they enhance mobility, reduce negative environmental consequences, strengthen economies, and support stronger communities through improved social interaction. Communities that enhance pedestrian access provide many environmental and economical benefits such as improving air quality by reducing the need for people to drive cars to every destination, improving storm water quality, lowering transportation costs, and improving personal health and fitness. Communities can increase the number and quality of walkable areas by constructing multiple destinations and uses within close proximity.

5. **Foster distinctive, attractive communities with a strong sense of place** – Communities that have a strong sense of place represent the values of their residents and reflect the unique historical, cultural, economic, and geographical context of the area. These communities encourage the construction and preservation of buildings, which prove to be assets over time because of the unique contribution they make to the look and feel of a community. In addition to buildings, these communities reflect their unique characteristics in myriad details, such as landscaping, signs, and awnings that help to further distinguish the area for visitors. Therefore, communities can direct investment and development into areas that already reflect a strong sense of place. This will help such communities retain their economic vitality and value over time, in the process making an efficient use of infra-structures and natural resources.

6. **Preserve open space, farmland, natural beauty, and critical environmental areas** – Open spaces support smart growth goals by improving local economies, preserving critical environmental areas, providing recreational opportunities, and guiding new growth into existing communities. Preserving open space can have a great impact on a community's quality of life and economical prosperity. There are significant economical, environmental, and health benefits associated with the protection of open space. Economical benefits include increasing local property values, providing tourism dollars, and ensuring the

availability of prime farm and ranch lands. Environmental benefits include reducing air pollution, attenuating noise, providing erosion control, moderating temperature, preventing flood damage, and protecting animal and plant habitats.

7. **Strengthen and direct development towards existing communities –** Smart growth directs development towards communities already served by infrastructures, seeking to utilize the resources that existing neighborhoods offer and to maintain the value of public and private investment. By encouraging development in existing areas, where commercial, transit, and other amenities exist, communities benefit from a stronger tax base, closer proximity of jobs and services, increase efficiency of already developed land and infrastructure, reduced development pressure in fringe area. In addition, the process of increasing development in existing communities can maximize the use of existing impervious surfaces, and improve local and regional water quality, and create opportunities for more transportation options, which lower vehicle miles traveled and ultimately improve regional air quality.

8. **Provide a variety of transportation choices –** One major goal of smart growth is providing communities with more choices in housing, shopping, and transportation options. Providing more transportation options, including pedestrian access, bike path, bus route, and mass transit, would provide numerous environmental and social benefits. This could help reduce dependence on vehicles for transportation to work and shopping areas and improve air quality and create a more vibrant environment.

9. **Make development decisions predictable, fair, and cost-effective** - In order to implement smart growth, state and local governments shall make an effort to support smart growth by adapting new changes to existing zoning regulations that do not support smart growth principles. Local government also can create a more attractive investment climate for smart growth in which the private sector is more likely to participate. This includes providing time-efficient process, cost–effective, and predictable decision for zoning changes and new innovative ideas for new development. This may also include creating a supportive regulatory environment for compact, pedestrian-oriented, mixed-use projects.

10. **Encourage community and stakeholder participation in development decision-making-** A key component of smart growth is to ensure early and frequent involvement of all stakeholders to identify and address community needs. The stakeholders may include the developer, urban planners, engineers, conservation and environmental groups, community development advocates, senior citizens, students, and many others. Each may contribute

different and unique prospective to both broad community plans and specific project design. These perspectives are very critical to many of the smart growth principles. This means involving all stakeholders early in the process and throughout the design development process. This strategy can help local community leaders support proposed development that meet their needs.

Implementing brownfield redevelopment using smart growth principles will require support and cooperation of federal, state and local government agencies by providing financial support and incentives to developers, making investment in the communities, and educating communities and developers of the numerous benefits of smart growth. Examples of principles and tools, including a list of strategies that communities around the United States have used to achieve some of the objectives are presented in Appendix B of this report.

3.2 SMART GROWTH EXAMPLES

There is no "one-size-fits-all" solution for implementing smart growth when planning new development. As stated earlier, the objective of smart growth is to revitalize neighborhoods, improve housing affordability, and direct the pace and location of new development to already improved area to ensure wise public expenditures for capital facilities and infrastructures. Several communities have developed smart growth scoring systems and guidelines to encourage development at certain areas, and offered incentive programs for development in these areas. For example, the City of Austin, Texas, has developed a point-based performance evaluation system for smart growth redevelopment projects. The system provides communities/developers guidelines to evaluate projects in terms of the smart growth benefits. A point system is assigned to each criterion, based on a weight and value, the product of which represents the score for that criterion. The individual index scores are then totaled to produce an overall matrix score. Projects that fail to meet the desired level can be redesigned during negotiation with planning staff so that they can achieve a higher score. Communities can offer a wide range of incentives, such as reduction of development fees, support for infrastructure financing, or density bonuses to encourage the features they desire. The value of the incentives may increase as the project scores increase, with a low level of concessions being given for minimally acceptable scores and more valuable incentives given to higher-scoring projects. A copy of Austin smart growth matrix is included in Appendix C. The State of New Jersey developed a smart growth scorecard to identify smart growth strengths and weaknesses in a proposed development. The scorecard evaluates proposed redevelopment with the following criteria: 1) location with respect to existing development and infrastructure, 2) range of housing proposed, 3) protection of open space and farmland, 4) creates or enhances a vibrant mix of land uses (residential, retail, office), 5) creates or enhances choices of transportation, 6) creating

walkable environment designed for personal interaction, and 7) maintaining and respecting community character, design, and historic uses. Each criterion is assigned a weighted score, then all scores are added and a letter-grade between A and F is assigned to the development. A copy of New Jersey scorecard is presented in Appendix C for reference.

3.3 SMART GROWTH FOR BROWNFIELDS

Smart growth principles and initiatives have been included in the newly adopted zoning ordinance, although the City of Chicago does not have a smart growth policy in place. Additionally, the nature of past development of the City of Chicago offers several advantages for implementing some smart growth principles such as the presence of basic infrastructure and utilities, such as water, sewer, electric, and other essential utilities. The City of Chicago also has an efficient transportation system that covers major roadways, highways, and bus and train routes. This past development can help in planning and implementing smart growth since the basic requirements already exist in most places. The City of Chicago objectives for the development of brownfield sites include the following:

- Develop brownfield sites as a mixed-income residential or mixed-use community
- Focus on areas where brownfield redevelopments will likely catalyze additional industrial and commercial development
- Create and retain jobs
- Create and/or preserve open space

Developing smart growth guidelines for the City of Chicago should include and address the above objectives. There are two groups of smart growth guidelines that will impact site review and selection process. The first group includes principles that are site-specific and the second group includes project-specific design elements. The following presents a discussion of both groups.

Prior to evaluating a Brownfield site for residential development, the site zoning should be evaluated for suitability for residential development based on the current land uses of the surrounding areas. The existing zoning of the majority of Brownfield sites is industrial or commercial, based on their former uses. However, land uses around some of the Brownfield sites have changed since the last time the City of Chicago updated its zoning ordinance in 1957, and many planned development zones replaced the old zoning. Prior to evaluating sites for smart growth principles, City of Chicago agencies and the Department of Planning and Development shall review the current zoning of surrounding areas of sites selected using the Brownfield Screening Tools; and select sites that are compatible for residential / mixed land use purposes. Selected sites should then be further evaluated using the following smart growth principles:

A. Smart Growth Evaluation

The principles include the following:

- **Access to Major City Health, Social, Retail and Other Institutions** – Smart growth encourages locating residential development within walking or short driving distance from community infrastructures such as schools, libraries, health clinics, and retail centers. Selecting brownfield sites with close proximity to such amenities will encourage residents to use these resources, and increase interaction between residents. For larger development projects, some of the above services / amenities could be added to the project areas either by the developers or by the City of Chicago. This could include constructing a new school, medical clinic, etc. It should also be noted that the nature and size of the proposed development and existing community should influence some of the decisions regarding the site evaluation process. Recommended distances to the above amenities are provided in Table 2 of this section.

- **Access to Public Transportation -** Providing a variety of transportation choices is a very important element of smart growth principles. Smart growth encourages housing development near major transit areas, and/or close proximity to multiple or interconnected transportation systems. This would eliminate the need to use vehicles for commuting or reduce commuting time, which could contribute to improving air quality. Additionally, having a variety of transportation choices in certain areas may contribute to increase in density, a very desirable factor for smart growth. Based on several studies, a minimum density of six-eight (6 to 8) households per acre around bus routes, and fifteen-twenty (15 to 20) households per acre around train stops is most optimum to support these services. Additionally, having a variety of transportations may provide homeowners with potential mortgage savings such as the Fannie Mae and the Center for Neighborhood Technology Location-Efficient Mortgage^{SM} (LEM) program, which expands the range of housing that is affordable near transit. The program factored into the mortgage qualifying calculates the savings accrued by lower transportation costs. Chicago is one of the four cities to which the program has currently been offered. Transportation options shall also include whether the site is located in a walkable area, where interconnected sidewalks and/or bike paths are present. This will provide residents additional means of transportation to reach their final destination without using vehicles.

- **Mixed Land Uses -** Mixed land uses are defined as those areas where retail/commercial, housing, and office space facilities are built in the same neighborhood. Smart growth promotes the mixing of land uses within communities. It means that residents could find

jobs nearby to avoid lengthy daily commutes. Mixed land use should include several components in a single building or building complex. Mixed land use should be planned when a new development comprises more than 20 households and there is no retail-commercial area within 0.5 acres. Retail-commercial can be either located on the first floor of a building or along major streets, while residential households can be located above the first floor and along side streets. When a building contains retail-commercial and residential units, the project should include a minimum of 80% of the square footage of the first floor for retail or office uses, while the remaining 20% can be used for residential purposes. The ground floor of the building should also be located close to the street and have 80% of the street side available for pedestrian uses. Pedestrian uses are defined as those required for daily public uses such as retail, restaurants, or services. Pedestrian uses should be located as close as possible to the street as setbacks permit; however, the width of sidewalk should be at least 12 feet along major streets and 6 feet along side streets.

- **High-Density Dwelling in Appropriate Locations -** Density is generally defined as the amount of residential development permitted on a given parcel of land. It is typically measured in dwelling units per acre; the larger the number of units permitted per acre, the higher the density. Higher density offers several advantages such as convenient amenities, walkable communities, reasonable taxes, and improved air quality. However, poorly designed high density may backfire and create problems for residents. Therefore, density should be increased only in appropriate locations such as near businesses and commercial districts; along bus routes; and near train stops. The minimum density of sites located along bus routes should be six to eight (6-8) households per acre, and fifteen to twenty (15-20) households per acre within a 0.5-mile radius of train stops and business/commercial districts.

- **Access to Open or Green Spaces –** The presence of open space and parks encourage residential development in general since they provide recreational opportunities for the new development. Brownfield sites should be evaluated for the presence of open and/or green spaces within 0.25 miles of the site. The open space should be connected with the Brwonfield site by sidewalks since the majority of green space visitors are children. If there is no green space within 0.25 miles of the site, and the proposed development is more than 20 households or 3 acres in size, a minimum 5% of the proposed development should be deducted for a park in addition to the standard requirements for green space.

- **Located in Interconnected and Walkable Community -** Dense development with good connections to homes, shops, schools, and offices allow people to choose an alternative to

driving. This can be accomplished by building short blocks of street-grid networks that connect all neighboring areas with compatible uses. The street networks should include a complete sidewalk with trees and lighting along local streets that invite walking and bicycling. The majority of Chicago streets are designed using connected grid system. Sidewalks and bike routes are common in the majority of the City of Chicago. Brownfield sites should be evaluated for the presence of sidewalks that can connect the proposed development with the surrounding amenities such as parking area, commercial area, transportation stations, public parks and other amenities in order to provide safe walking distance to community residents. Additionally, all new development should include constructing new sidewalks as part of the new development. The width of the sidewalks should be at least 5 feet in residential areas and 12 feet in mixed land-use areas.

Based on the foregoing discussion, the following screening matrix is proposed to identify Brownfield sites selected for redevelopment as mixed-income residential and/or mixed-use communities for redevelopment using smart growth principles. The matrix is intended to compare baselines and will establish the potential for a site.

Figure 4 - Site Specific Smart Growth Evaluation

Description	Scoring Guide	Scoring for Site
Location adjacent to existing infrastructure including water/sewer lines		
Less than 1/8 mile (10 points)	10	
1/8-1/4 mile (5 points)	5	
1/4 mile to 1/2 mile (3 points)	3	
More than ½ mile (0 points)	0	
Site located in interconnected road system or on existing street that is interconnected (without cul-de-sacs)		
Yes (10 points)	10	
No (0 points)	0	
Walkable Community		-
Continuation of walkable existing sidewalks present within 1/8 mile radius of the site (10 points)	10	
Between 1/8 – 1/4 mile (5 points)	5	
More than 1/4 mile (0 points)	0	
Transit Friendly - bus commuter and/or rail available		-
Less than 1/8 mile (10 points)	10	
1/8-1/4 mile (7 points)	7	
1/4 mile to 1/2 mile (5 points)	5	
½ mile to ¾ mile (3 points)	3	
More than 1 mile (0 points)	0	
Project in Mixed Land Use Area (combination of retail, commercial, residential, etc.)		-
Yes (15 points)	15	
No (0 points)	0	
Project abides with neighborhood plan (where applicable)		-
Yes (5 points)	5	
No (0 points)	0	
Project Density – Density is greater than that of surrounding areas		-
Yes (10 points)	10	
No (0 points)	0	
Public/open spaces available to public		-
Less than 1/8 mile (5 points)	5	
1/8-1/4 mile (4 points)	4	
1/4 mile to ½ mile (3 points)	3	
More than ½ mile (0 points)	0	
Project rehabs or reuses existing structures		-
Yes (5 points)	5	
No (0 points)	0	
Access to Major City Social, Retail, Commercial, and Other Institutions (Schools, Churches, etc.)		-
Less than ¼ mile (10 points)	10	
¼ mile to 1/2 mile (7 points)	7	
1/2mile to 3/4 mile (5 points)	5	
More than 1 mile (0 points)	0	

Figure 4 - Site Specific Smart Growth Evaluation (Cont'd) Description	Scoring Guide	Scoring for Site
Bike route location		-
Less than ¼ mile (5 points)	5	
¼ mile to 1/2 mile (4 points)	4	
½ mile to 3/4 mile (3 points)	3	
More than 1 mile (0 points)	0	
Parking		-
Parking in rear within units (5 points)	5	
Parking in rear as surface lot (4 points)	4	
Structured and/or underground (3 points)	3	
Structured elsewhere (2 points)	2	
On-street (1 point)	1	
Lot in front (0 points)	0	
TOTAL – 100 Maximum		

Sites with the highest score should be selected first for redevelopment. The minimum score for selecting a site for redevelopment should be 60 points; otherwise, site redevelopment will not be sustainable since the site location will not support smart growth principles. Sites should be developed using the specification outlined in group No. 2 of this section. Sites that failed to receive 60% of the points should be re-evaluated by incorporating some of the above screening tools into the following site design elements.

B. Site Design Smart Growth Requirement

Project-specific design elements should also be required during the site design process. This group of principles can be included in the Request for Proposal of new development, and include smart growth principles such as providing a range of affordable housing choices and providing green and open spaces.

Most of the principles are discussed in Part A of this Section but below is some brief discussion of other principles.

- **Provide a Range of Affordable Housing Choices -** According to U.S. Department of Housing and Urban Development (HUD), affordable housing cost should not exceed 30% of household income. HUD defines affordable housing as "housing cost that low-to-medium income groups of the community can afford without subsidies." A minimum of 30% of the housing units in the new development area should fall within the price range of affordability

based on the average household income of the community. Additionally, new development should provide a mix of housing types and sizes (townhomes; studios; 1-bedroom, 2-bedroom, and 3-bedroom; apartments and owner occupied units, etc.).

- **Provide Walkable Community –** Dense development with good connections to homes, shops, schools, and offices allow people to choose an alternative to driving. This can be accomplished by building short blocks of street-grid networks that connect all neighboring areas with compatible uses. The street networks should include a complete sidewalk with trees and lighting along local streets that invite walking and bicycling. The majority of the City of Chicago streets are designed using a connected grid system, and sidewalks and bike routes are common in many of existing communities. However, many of the abandoned Brownfield properties do not have sidewalks or the sidewalks are in poor conditions. New development should include constructing new sidewalks as part of the new development if sidewalks are not present. Additionally, surrounding areas should be provided with interconnected sidewalks to a minimum distance of 0.25 miles radius from the site. The width of the sidewalks should be at least 5 feet in residential areas and 12 feet in mixed land-use areas, and should connect various amenities such as parking area, commercial area, transportation stations, public parks and other amenities in order to provide safe walking distance to community residents.

- **Provide Open or Green Spaces –** New development should provide open or green spaces within the limits of the site if the size of the redevelopment is more than 20 households and there are no public parks within 0.25 mile of the site. For large residential developments (more than 3 acres), on-site common open space, recreational facilities, and health / fitness facilities should be included as part of the redevelopment plans.

It is anticipated that the majority of Brownfield sites will be developed using the newly adopted City of Chicago Zoning Ordinance, which include some additional smart growth principles. All new site redevelopments should be completed in accordance with the City of Chicago Planned Development Zoning Ordinance if any of the aforesaid principles do not meet the site-specific zoning regulations. Appendix D presents a copy of the City of Chicago Planned Development Zoning Ordinance.

In order for the City of Chicago to be successful in implementing smart growth principles, it is important that smart growth principles are adopted into an ordinance. Additionally, the City of Chicago shall make the development decisions and zoning changes cost-effective and predictable by streamlining the zoning and permitting process, and reduce the review time required to complete the zoning change process.

APPENDIX A

BROWNFIELD SCREENING MATRIX

APPENDIX B

SMART GROWTH PRINCIPLES

SMART GROWTH PRINCIPLES

Smart growth recognizes the benefit of growth, and connects development to improvement to individual quality of life and community. It provides a framework for communities to make informed decisions about how and where new development shall be accommodated, and makes it possible for communities to grow in ways that support economic development and jobs; create strong neighborhoods with a range of housing, commercial, and transportation options; and achieve healthy communities that provide families with a clean environment. Smart growth is more town-centered, is transit and pedestrian oriented, and has a greater mix of housing, and commercial and retail businesses. In general, it invests time, attention, and resources in restoring existing communities and older suburbs. It also preserves open space and many other environmental amenities. Therefore, smart growth is development that serves the economy, the community and the environment, and provides solutions to many of the concerns facing communities such as loss of open space, neglected infrastructure, growing commutes, and disinvestment in existing communities.

Implementing smart growth will require cooperation among local and state government agencies, private entities, and community residents. The U.S. EPA recognizes the following principles for smart growth:

1. Mix land uses
2. Take advantage of compact building design
3. Create a range of housing opportunities and choices
4. Create walkable neighborhoods
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty, and critical environmental areas
7. Strengthen and direct development towards existing communities
8. Provide a variety of transportation choices
9. Make development decisions predictable, fair and cost-effective
10. Encourage community and stakeholder participation in development decisions

There is no “one-size-fits-all” solution for implementing smart growth when planning new development. Several communities and research groups developed tools that can be utilized in order to facilitate smart growth principles in communities. The following section about smart growth principles and accompanying tools is adapted from “Getting to Smart Growth: 100 Policies for Implementation.” There is also a second volume of this publication, which provides new policies to achieve smart growth principles. The section provides a description of smart growth principles and tools, including a list of strategies that communities around the United States have used to achieve some of the principles.

B.1.1 Mix Land Uses

Smart growth supports the integration of mixed land uses into communities as a critical component of achieving better places to live. Having mixed land uses for commercial, residential, recreational, and educational purposes allows community residents to meet and interact on a regular basis and will create vibrant and diverse communities. Additionally, mix of land uses provides diverse and sizable population and a wider commercial base that can enhance the vitality and perceived security of an area by increasing the number of people on the street, and will convey substantial fiscal and economic benefits to the community since more economic activity will exist. Commercial uses in close proximity to residential areas often help raise local tax receipts, and increase the property values. The following is a list of tools that can be used to create mix land uses principles.

- Provide incentives to encourage residents to live near where they work
- Adopt comprehensive plans and sub-area plans that encourage mix land uses
- Adopt smart growth building codes to parallel existing conventional development building codes
- Use innovative zoning tools to encourage mixed-use communities and buildings
- Facilitate financing of mixed use properties
- Zone areas by building type, not by use
- Use flex zoning to allow developers to easily supply space in response to market demands
- Convert declining shopping malls and strip commercial streets into mixed-use developments
- Provide examples of mixed-use development at scales that are appropriate to the community
- Retrofit single-use commercial and retail developments into walkable, mixed-use communities
- Reward communities that create a balance between jobs and housing

B.1.2 Take Advantage of Compact Building Design

The United States' population increased by 17 percent between 1982 and 1997. However, the amount of urbanized land used for development increased by 45 percent, for approximately 51 million acres. This is three times faster than we grew as a nation. This rapid land consumption is due in large part to the growing size of homes and retail space on a per capita basis. An important part of achieving smart growth is using compact building design, which helps create the convenient neighborhood centers, and presents opportunities to absorb growth and development in efficient manner, and leaves undeveloped land open to absorb and filter rainwater. This will reduce flooding and storm water drainage needs and lower the amount of runoff pollution. Compact building design also helps achieve higher population density that is normally needed to support viable transportation alternatives. Thus, a minimum density of six to eight (6-8) households per acre around bus routes, and fifteen to twenty (15-20) households per acre around train stops would support these services. Additionally, communities may accomplish more compact design by incorporating structured rather

than surface parking or by encouraging buildings to grow up rather than out. The following is a list of tools that can be used to take advantage of compact building design principles.

- Use public meetings about development options to educate community members on density and compact building options
- Ensure ready access to open space in compactly developed places
- Encourage developers to reduce off-street surface parking
- Match building scale to street type in zoning and permit approval processes
- Establish model state-level design standards and codes to encourage compact building design that can be adopted by local communities
- Use density bonuses to encourage developers to increase floor-to-area ratio (FAR)
- Ensure a sense of privacy through the design of home and yards
- Employ a design review board to ensure that compact buildings reflect desirable design standards
- Offer incentives that encourage local communities to increase population density
- Support regional planning efforts to encourage compact communities

B.1.3 Create a Range of Housing Opportunities and Choices

Housing provides people with shelter and is a key factor in determining a household's access to transportation; commuting patterns; services and education; and consumption of energy and other natural resources. By using smart growth approaches to create a wider range of housing choices, communities can begin to use their infrastructure resources more efficiently, better accommodate the housing needs of all residents, and help aging citizens remain in their homes.

Providing quality housing for people of all income levels is an integral component in any smart growth strategy. In addition to improving a household's quality of life, housing can ensure a better job-housing balance and generate a strong foundation of support for neighborhood transit stops, commercial centers, and other services, thereby mitigating the environmental costs of auto-dependent development. Existing neighborhoods can benefit from a wider range of choices by changing zoning and building codes to increase the type and quantity of units provided. Integrating single-family and multi-family structures in new housing developments and existing neighborhoods can help reduce the concentration of poverty. New housing construction can be an economic stimulus for existing commercial centers that are currently vibrant during the workday but suffer from a lack of foot traffic and consumers in evenings or weekends. Most importantly, a range of housing choices allows all households to find their niche in a smart growth community. The following is a list of tools that can be used to create a range of housing opportunities.

- Enact an inclusionary zoning ordinance for new housing developments
- Provide home buyer assistance through support to community land trusts

- Revise zoning and building codes to permit a wider variety of housing types
- Plan and zone for affordable and manufactured housing development in rural and urban areas
- Educate developers of multifamily housing units and nonprofits on the use of limited-equity (or equity-restriction) components
- Educate realtors, lenders, and home-buyers on the use of resource-efficient mortgages
- Implement a program to identify and dispose of vacant and abandoned buildings
- Adopt special rehabilitation building codes to regulate the renovation of existing structures
- Enlist local jurisdictions in implementing a regional fair-share housing allocation plan across metropolitan areas
- Give priority to smart growth projects and programs that foster smart growth in the allocation of federal housing and community development block grant, and other funds

B.1.4 Create Walkable Communities

Walkable communities are integral part of achieving smart growth because they enhance mobility, reduce negative environmental consequences, strengthen economies, and support stronger communities through improved social interaction. Walkable communities are places where housing, offices, retail, train, bus stop, schools, libraries, and others are located within an easy and safe walk distance. Walkable communities are characterized by mixed land uses, compact building, inviting pedestrian corridors, and a streetscape that better serves wide range of users such as pedestrians, bicyclists, transit riders, and automobiles, and allow residents to substitute walking, bicycling or other non-auto modes for short trips, thus contributing to reduced congestion and better air quality.

Communities that enhance pedestrian access provide many environmental and economical benefits such as improving air quality by reducing the need for people to drive cars to every destination, improving storm water quality, lowering transportation costs, and improving personal health and fitness. Communities can increase the number and quality of walkable areas by constructing multiple destinations and uses within close proximity. This type of development ensures that streets and sidewalks balance all forms of transportation and that the buildings and corridors are of the proper size and scale. The following is a list of tools that can be used to create walkable communities.

- Provide grants or other financial assistance to local communities to retrofit existing streets and sidewalks to promote more walkable communities
- Concentrate critical services near homes, jobs, and transit
- Require building design that makes commercial areas more walkable
- Adopt design standards for streets that ensure safety and mobility for pedestrian and non-motorized modes of transport
- Adopt design standards for sidewalks

- Require traffic-calming techniques where traffic speed through residential and urban neighborhoods is excessive
- Beautify and maintain existing and future walkways
- Provide Americans with disabilities easy access to sidewalks, streets, parks, and other public and private services
- Connect walkways, parking lots, greenways, and developments
- Identify economic opportunities that stimulate pedestrian activity

B.1.5 Foster Distinctive, Attractive Communities with a Strong Sense of Place

Communities that have a strong sense of place represent the values of their residents and reflect the unique historical, cultural, economic, and geographical context of the area. Such communities set standards for development and construction that respond to community values of architectural beauty and distinctiveness. These communities encourage the construction and preservation of buildings, which prove to be assets over time because of the unique contribution they make to the look and feel of a community. In addition to buildings, these communities reflect their unique characteristics in myriad details such as landscaping, signs, and awnings that help to further distinguish the area for visitors. Therefore, communities can direct investment and development into areas that already reflect a strong sense of place. This will help such communities retain their economic vitality and value over time, in the process making an efficient use of infrastructure and natural resources. The following is a list of tools that can be used to create communities with a strong sense of place.

- Modify state funding and school site selection process to preserve neighborhood schools and build new schools to a "community level"
- Create a state tax credit to encourage adaptive reuse of historic or architecturally significant buildings
- Plant trees throughout communities and preserve existing trees during new construction
- Create active and secure open spaces
- Simplify and expedite permitting regulations to allow vendors to offer sidewalk service
- Create special improvement districts for focused investment
- Define communities and neighborhood with visual cues
- Preserve scenic vistas through the appropriate location of telecommunication towers, and through improved control of billboards
- Create opportunities for community interaction
- Enact clear design guidelines so that streets, buildings, and public spaces work together to create a sense of place

B.1.6 Preserve Open Space, Farmland, Natural Beauty, and Critical Environmental Areas

Open spaces support smart growth goals by improving local economies, preserving critical environmental areas, providing recreational opportunities, and guiding new growth into existing communities. Preserving open space can have great impact on a community's quality of life and economical prosperity. There are significant economical, environmental and health benefits associated with the protection of open space. Economical benefits include increasing local property values, providing tourism dollars, ensuring that prime farm and ranch lands are available.

Environmental benefits include reducing air pollution, attenuating noise, providing erosion control, moderating temperature and preventing flood damage. Preservation of open space protects surface and ground water resources by filtering debris and chemical pollutants before they enter the water system. Open space protects animal and plant habitat, places of natural beauty, and working lands by removing the development pressure and redirecting new growth to existing communities.

The following is a list of tools that can be used to preserve open space and critical environmental areas.

- Use transfer of development rights, purchase of development rights, and other market mechanisms to conserve private lands
- Coordinate and link local, state, and federal planning on land-conservation and development
- Expand use of innovative financing tools to facilitate open-space acquisition and preservation
- Employ regional development strategies that better protect and preserve open space in edge areas
- Adopt a green infrastructure plan
- Create a network of trails and greenways
- Design and implement an information-gathering and education program
- Deign and implement zoning tools that preserve open space
- Provide mechanisms for preserving working lands
- Partner with nongovernmental organizations to acquire and protect land

B.1.7 Strengthen and Direct Development Towards Existing Communities

Urban communities that experienced rapid expansion at their edges often witnessed disinvestment in the urban core and first-ring suburbs as they were abandoned for newer, low-density, dispersed developments on the urban fringe. This pattern of development had caused significant effects on the social, economic and natural environment of many urban areas.

Smart growth directs development towards communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer and to maintain the value of public and private

investment. By encouraging development in existing areas, communities benefit from a stronger tax base, closer proximity of jobs and services, increased efficiency of already developed land and infrastructure, and reduced development pressure in fringe areas. In addition, the process of increasing development in existing communities can maximize the use of existing impervious surfaces, and improve local and regional water quality, and create opportunities for more transportation options, which lower vehicle miles traveled and ultimately improve regional air quality. The following is a list of tools that can be used to direct development towards existing communities.

- Strengthen state or local brownfields programs
- Adopt a fix-it-first policy that sets priorities for upgrading / rehabbing existing facilities
- Institute regional tax-base sharing to limit regional competition and to support schools and infrastructure throughout the region
- Use the split-rate property tax to encourage development on vacant or blighted pieces of land in existing communities
- Locate civic buildings in existing communities rather than in greenfield areas
- Conduct an infill checkup to evaluate and prioritize infill and brownfield sites for redevelopment
- Facilitate programs to encourage home renovation and rehabilitation in existing neighborhoods
- Support community-based organizations involved in revitalizing neighborhoods
- Create economic incentives for business and home owners to locate in areas with existing infrastructure
- Modify average cost-pricing practices in utilities to better account for costs of expanding infrastructure in greenfield areas

B.1.8 Provide a Variety of Transportation Choices

One major goal of smart growth is providing communities with more choices in housing, shopping, and transportation options. Providing transportation options to communities will provide numerous environmental and social benefits. Implementing new approaches to transportation planning is important, such as better coordinating land use and transportation; increasing the availability of high quality transit service; creating redundancy, resiliency and connectivity within their road networks; and ensuring connectivity between pedestrian, bike, transit, and road facilities.

A multi-modal approach to transportation with supportive development patterns to create a variety of transportation options is important. Land use decisions should encourage efficient transportation patterns, such as transit-oriented development, pedestrian and bike friendly design, and mixed-use development. The following is a list of tools that can be used to provide a variety of transportation choices.

- Finance and provide incentives for multimodal transportation systems that include supportive land use and development
- Modify roadway level-of-service standards in areas served by transit
- Plan and permit road networks of neighborhood-scaled streets (generally two or four lanes) with high levels of connectivity and short blocks
- Connect transportation modes to one another
- Zone for concentrated activity centers around transit service
- Require sidewalks in all new developments
- Address parking needs and opportunities
- Collaborate with employers and provide information and incentives for programs to minimize or decrease rush-hour congestion impacts
- Adjust existing transit services to take full advantage of transit-supportive neighborhoods and developments
- Cluster freight facilities near ports, airports, and rail terminals

B.1.9 Make Development Decisions Predictable, Fair, and Cost Effective

In order to implement smart growth, state and local governments shall make an effort to support smart growth by adapting new changes to existing zoning and regulations that do not support smart growth principles. Local government also can create a more attractive investment climate for smart growth in which the private sector is more likely to participate. This includes providing time-efficient process, cost-effective, and predictable decisions for zoning changes and innovative ideas for new development. One can provide leadership for smart growth by creating an environment for innovative, pedestrian-oriented, mixed-use projects. This may also include creating a supportive regulatory environment for compact, pedestrian-oriented, mixed-use projects. The following is a list of tools that can be used to assist in making development decisions predictable, fair and cost effective.

- Provide financial incentives to aid the development of smart growth projects
- Conduct smart growth audits
- Implement a process to expedite the approval of plans and permits for smart growth projects
- Engage political support for improved coordination on approval of smart growth projects
- Use a point-based evaluation system to encourage smart growth projects
- Remove parking from the development equation through public-private partnership to build community parking facilities
- Encourage demand for smart growth through consumer incentives

- Display zoning regulations and design goals in pictorial fashion to better illustrate development goals
- Maximize the value of transit agency property through joint development of transit-oriented development
- Incorporate by-right smart growth redevelopment into existing communities' master plans

B.1.10 Encourage Community and Stakeholder Collaboration in Development Decisions

A key component of smart growth is to ensure early and frequent involvement of all stakeholders to identify and address community needs. The stakeholders may include the developers, urban planners, engineers, conservation and environmental groups, community development advocates, senior citizens, students, and many others. Each may contribute different and unique perspectives to both broad community plans and specific project design. These perspectives are very critical to many of the smart growth principles. This means involving all stakeholders early in the process and throughout the design development process. This strategy can help local community leaders support proposed development that meet their needs. The needs of each community and the programs to address them are best defined by the people who work and live there. An open process that facilitates the participation of community residents and organizations provides members of the community a direct stake in ensuring the success of revitalization efforts and can lead to resolution of any issues. The following are a list of tools that can be utilized to support this principle.

- Seek technical assistance to develop a public participation process
- Use unconventional methods and forums to educate nontraditional, as well as traditional, stakeholders about the development and decision-making processes. Conduct community visioning exercises to determine how and where the neighborhood will grow.
- Require communities to create public access to tax and lien information on all properties to facilitate the rehabilitation of distressed properties
- Incorporate opinions and interests often and routinely into the planning process
- Work with the media to disseminate planning and development information on a consistent basis
- Engage children through education and outreach
- Cultivate relationships with schools, universities and colleges
- Bring developers and the development community into the visioning process
- Hold a design charrette to resolve problematic development decisions

APPENDIX C

EXAMPLES OF SMART GROWTH

APPENDIX D

CITY OF CHICAGO PLANNED DEVELOPMENT ZONING ORDINANCE