

Deconstruction Rapid Assessment Tool

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Introduction

- 1. What is Deconstruction?**
- 2. Why Conduct Deconstruction Rapid Building Assessments?**
- 3. How can the Deconstruction Rapid Assessment Tool Data be Used?**
- 4. Will it Work for All Planned Residential Demolitions?**
- 5. Can the Tool be Customized for Specific Applications?**
- 6. What About Rehabilitation Candidates?**
- 7. Are Specialized Skills or Training Needed?**

1. What is Deconstruction?

Deconstruction is a way to systematically dismantle a structure to recover materials for reuse or recycling. Local governments or organizations with active demolition programs have an opportunity to promote environmental stewardship and economic revitalization through deconstruction. While it is possible to completely deconstruct a structure, there are frequently considerations of time, project budget, and material value that result in a more selective approach. In the case of a residential structure, deconstruction may recover materials such as architectural millwork, bricks, or even dimensional lumber. In addition to salvaging these potentially valuable materials, many deconstruction projects provide additional benefits pertaining to public health, waste diversion, job creation, and revenue generation.

2. Why Conduct Deconstruction Rapid Building Assessments?

Picking the best deconstruction candidates can be challenging. Oftentimes, choices must be made among a large quantity of eligible structures and in a short time period. Therefore, a quick scan of property qualities is necessary so that building removal programs can be better designed to recover as many materials as possible while working within funding constraints.

The Deconstruction Rapid Assessment Tool enables organizations to triage building stock slated for demolition by generating a dataset that can help prioritize structures for deconstruction and salvage. The assessment process identifies candidates for deconstruction by examining information on the building's condition and salvageable material inventory. Whether the project scope is a few structures in a neighborhood, or an entire city's blight program, a rapid assessment can help managers make critical decisions regarding the allocation of resources and time.

Benefits of Deconstruction

- Blight management.
- Reduce public health and environmental impact.
- Workforce development and job training.
- Improved construction waste diversion.
- Materials market development.

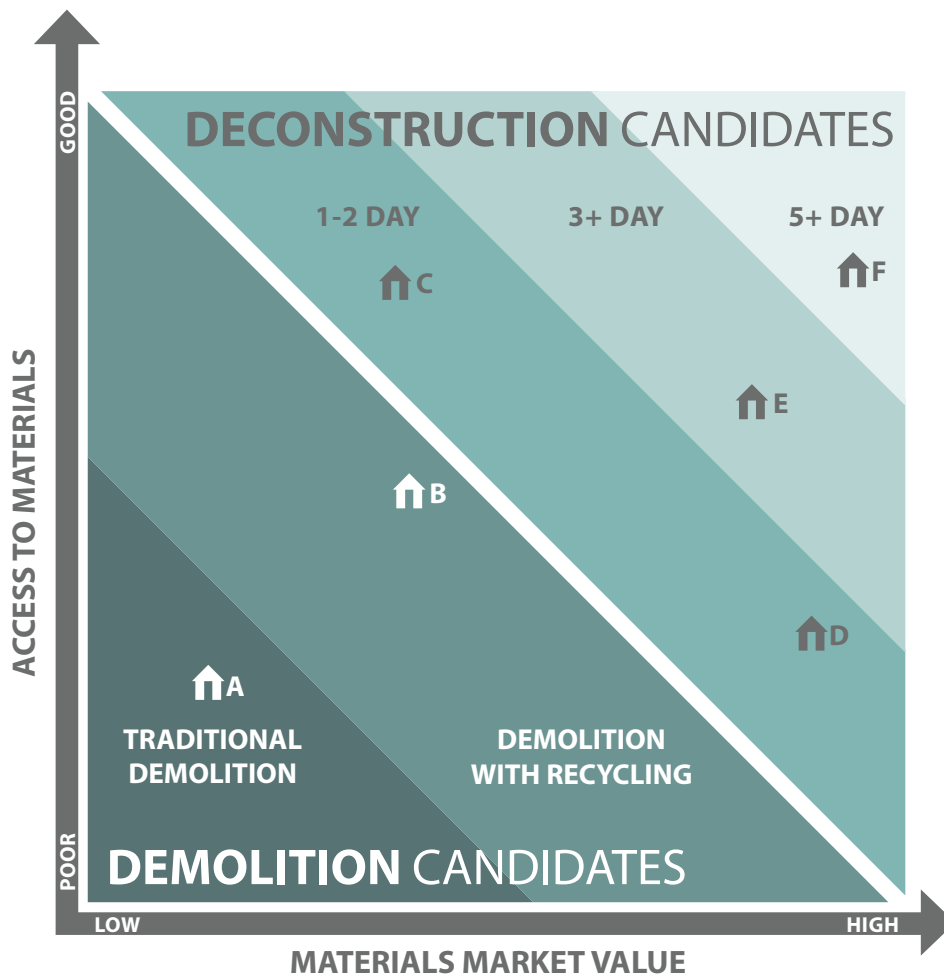
3. How can the Deconstruction Rapid Assessment Tool Data be Used?

Data collected using the Deconstruction Rapid Assessment Tool can provide meaningful information so decision makers can pinpoint the preferred level of salvage operation. As stated above, the Deconstruction Rapid Assessment Tool helps identify structures most eligible for deconstruction and to inventory salvageable materials. Where deconstruction is viable, the Deconstruction Rapid Assessment Tool sheds light on the exact types and quantity of materials that can be recovered. The materials inventory enables program managers to assign a relative duration for deconstruction activities. For example, a deconstruction team may take a "skim" approach of one to two days, or up to 10 days for full deconstruction.

The variability in deconstruction time is dependent on the potential value of materials and the ease in which they can be recovered. However, these aspects of the deconstruction process can be qualitatively and quantitatively explored using the Deconstruction Rapid Assessment Tool. Some targeted materials are more viable to recover than others based on their market value and the level of effort needed to access, dismantle, transport, store, and bring them to market. Many materials need a certain level of expertise to remove and carefully transport, whereas some materials—particularly those targeted for recycling as opposed to reuse—have few restrictions for removal and handling. When considering these variables, a common challenge has been to effectively plan for and manage the deconstruction process, especially for large numbers of planned demolitions within a given city.

On the Road to Reuse

In 2013, U.S. Environmental Protection Agency Region 5 produced the "On the Road to Reuse: Residential Demolition Bid Specification Development Tool" that identifies environmentally sensitive activities associated with demolishing residential buildings. These activities include hazardous materials abatement, fill material selection and placement, and material recycling. Environmental considerations are relevant throughout the entire demolition or deconstruction process, beginning with pre-planning and ending with site rehabilitation.



Below are hypothetical situations to demonstrate how this scenario framework can inform the deconstruction decision-making process. Localized factors, both for access to materials and materials market value, will impact decisions made by each user.

- 🏠 A** **Access:** Impassable entry, building collapse. **Value:** Little wood, no architectural features.
- 🏠 B** **Access:** Roof collapse, excessive dumping. **Value:** Aluminum siding, metal roofing.
- 🏠 C** **Access:** Significant exterior trash, bulky furniture. **Value:** Solid wood doors, wood-framed windows.
- 🏠 D** **Access:** Basement flooding, abandoned cars on site, not fully secured. **Value:** Claw foot tub, sinks, iron gate with fencing.
- 🏠 E** **Access:** Limited interior trash, some graffiti. **Value:** Crown and baseboard moulding throughout house, other architectural work, fire place mantel.
- 🏠 F** **Access:** Some dumping and tires present on site. **Value:** Dimensional ceiling joists, large dimensional old growth lumber, built-in wood cabinetry, stained-glass windows.

The DRAT Action Framework above is intended to illustrate how access to materials and materials market value can influence decision-making for DRAT users.

Factors influencing access to materials may include:

- The age of the structure, which may indicate the presence of hazards such as lead paint.
- Lot conditions and other nuisances, which may determine ease of access or time required to ready site for deconstruction, such as the availability of a staging area or the presence of obstructions such as trash.
- Damage and deterioration, which may indicate the safety of working conditions, such as compromised structural integrity or fire damage.
- Environmental hazards, such as wasp nests or containers of chemicals, which may require extra precautions or steps for removal.

Data for access to materials will be populated in the first half of the tool under "Site Observations and Hazards."

Assessment of materials market value may be influenced by:

- The size of the structure or quantity of material.
- Type and quality or condition of material.
- Salvage or recycling potential.

Data for market value will be populated in the second half of the tool under "Damage and Deterioration," "Materials Inventory," and "Special Consideration for Architectural Features."

Using information collected during the assessment, managers are able to assign a classification to the structure, broadly defined as follows:

- Demolition may be the best option for candidates with poor access to materials and low materials market value. Local factors, such as tipping, fees may incentivize demolition with recycling.
- Demolition with recycling* may occur when candidates exhibit better access to materials and higher materials market value than traditional demolitions, but materials are better suited for recycling than salvage.
- One to two day deconstruction may occur when candidates exhibit better materials access and higher materials market value than demolition with recycling, but the quantity of salvageable materials can be recovered in fewer than three days. Damage may be present, but isolated to specific rooms or sections.
- 3+ day deconstruction may be the best option for candidates with good access to materials and high materials market value. Local factors such as availability of program funds or time constraints may limit scope. The structure should be demolished, but contains opportunities for salvage or deconstruction of architectural finishes and fixtures and/or other materials. Damage may be present, but isolated to specific rooms or sections. The structure appears stable and safe to work in. The property is either currently secure or should be secured immediately.
- 5+ day (or full) deconstruction may be the best option for candidates with better access to materials and higher materials market value than 3+ day deconstruction and when program funds are sufficient to extend the time for project completion to allow for maximum material recovery.

*Materials recycling should be considered in all cases

Decision-makers should find it possible to determine candidates for demolition, demolition with recycling or for multi day deconstruction. Decision-makers may find it more difficult to determine the tipping point between one to two day and 3+ day deconstruction candidates. This task may be made simpler by using an internal weighting system, which can assign values to some of the data points in the tool based on local priorities and factors such as funding availability, project scale, or local materials markets.

4. Will it Work for All Planned Residential Demolitions?

The tool is applicable to cities and any other organization that has residential structures planned for demolition. Cities with large underutilized building inventories may use the tool to plan and manage the demolition process, whereas a state department of transportation or local hospital expanding into a residential community may use the tool as part of planned demolition activities to demonstrate environmental stewardship or build community support and alleviate environmental impact concerns.

Scenarios	Users	DRAT Potential Uses	Example
Blight Removal	Cities, Municipalities, Land Banks	<ul style="list-style-type: none"> Assist program managers with making informed choices on the top prospects for building deconstruction. Create a more comprehensive understanding of blight issues through tracking, mapping, analysis, and linking addresses to structure conditions. Determine specific buildings to be bundled in each solicitation for contractors. 	Detroit Land Bank and Building Authority
Infrastructure Projects	Department of Transportation, Floodplain Management Districts, Sewer Districts	<ul style="list-style-type: none"> Aggregate information about properties acquired as part of large infrastructure projects. Identify homes in good and habitable condition that may have a considerable amount of salvageable material. Assess the extent to which deconstruction may reduce project's environmental impact and provide job training. 	Cincinnati, Ohio Metropolitan Sewer District Lick Run Project Milwaukee, Wis. Metropolitan Sewer District Kinnickinnic River Project
Institutional Expansions	Hospitals, Universities, Anchor Institutions	<ul style="list-style-type: none"> Plan and document how projects align with institutional goals, e.g., promoting health and community values. Act as an educational exercise for student planners and engineers evaluating large demolition/deconstruction projects. 	Detroit, Mich. Ford Hospital Expansion
Workforce Development	Demolition or Deconstruction Contractor, Job Training Programs	<ul style="list-style-type: none"> Map landscape of demolition work to help organize demolition/deconstruction training opportunities. Assist deconstruction educators in identifying potentially salvageable and recyclable materials onsite and set expectations for trainees before beginning work. 	Cincinnati, Ohio Building Value Detroit, Mich. Reclaim Detroit

5. Can the Tool be Customized for Specific Applications?

It is expected that the tool may need to be tailored to specific needs based on local opportunities and constraints. The Excel version of the tool enables users to customize it by reducing, adding, or modifying data collection points to fit specific needs. Some users may develop an index by assigning a weight to each variable to calculate an index value or “score,” which may aid in the prioritization and local decision-making process. Other users may pursue more integrated solutions by linking the tool to other property management databases or existing property assessments. Users are encouraged to adapt this general version based on local issues and materials market considerations.

6. What About Rehabilitation Candidates?

The Deconstruction Rapid Assessment Tool is aimed at inventorying structures that are already on a “Demolition List.” Preserving existing housing stock is always preferable when structural and market conditions allow. After all, the greenest house is the one that already exists. In many cities, there is a separate evaluation for rehabilitation potential that takes place at an earlier stage. This earlier evaluation would determine the value for rehabilitation and evaluate the risks of associated investment.

However, the Tool can help to identify rehabilitation candidates that have mistakenly been added to the inventory of homes slated for demolition. Intervention could then prevent unnecessary demolition or deconstruction of a home that would otherwise hold its value in the market and help to stabilize neighborhood conditions.

7. Are Specialized Skills or Training Needed?

Completing the Deconstruction Rapid Assessment Tool only requires a basic understanding of construction and assessments can be completed fairly quickly. Data points include general information obtained through site observations, followed by more detailed notes on interior quality. It is important to remember that deconstruction does not have to be all or nothing. It is possible to engage in deconstruction activities at various scales that makes sense under specific site conditions and with available resources.



Instructions: Deconstruction Rapid Assessment Tool

Overview

As an alternative to traditional residential demolition, deconstruction is a way to selectively dismantle a structure to recover materials for reuse or recycling. In addition to diverting demolition wastes from landfills, deconstruction protects community health, creates deconstruction jobs, and stimulates the local materials market. The Deconstruction Rapid Assessment Tool provides meaningful information regarding structure condition and salvageable materials to help organizations identify the best candidates for residential deconstruction projects.

The instructions are intended to provide users with requisite information, including guidance on the assignment of values and terminology, to make the resulting product a useful tool for the organization.

- 1. Where Do I Begin?**
- 2. What the Tool Includes**
 - a. Site Observations & Hazards**
 - b. Damage & Deterioration**
 - c. Materials Inventory**
 - d. Special Consideration for Architectural Features**
- 3. Guidance for Selecting the Best Response**
- 4. Why is Completing the Deconstruction Rapid Assessment Important?**
- 5. Is Additional Documentation Needed?**

1. Where Do I Begin?

The general information section of the tool should be populated prior to a site visit based on available data from public records. It includes fields such as the property address, property index number (PIN), year built, and other basic information. The address and PIN are of particular importance for tracking purposes to ensure that the collected data is matched to specific property records. If linked to existing databases, the majority of this information could be automatically generated based on the PIN.

2. What the Tool Includes

2a. Site Observations & Hazards

The Deconstruction Rapid Assessment Tool addresses site observations and hazards prior to building characteristics. Site observations will be variable from site to site and between neighborhoods and are of general concern to the community. Depending on what is observed on site, preparation activities may differ. For example, if there are hazards that need to be mitigated – such as the presence of dogs – prior to safely deconstructing the home, this information will help bring such considerations to the attention of program management. The presence of trash, particularly if it is inside, is very important to note as it may lead to more costly deconstruction projects.

The majority of the Site Observation section can be completed outside of the home with a basic walkaround to visually assess the entire site. There are cases when this information may be used for code enforcement purposes in an effort to stabilize the community prior to demolition.

Structures built pre-1978 are likely to contain lead-based paint and asbestos products. Lead and asbestos are not addressed in the Deconstruction Rapid Assessment Tool because most individuals are unable to readily affirm their presence, and these considerations should be built into the process separately for inspection by a trained environmental professional.

SITE OBSERVATIONS & HAZARDS										
Is the structure currently secured to prevent unwanted entry?	<input type="checkbox"/>	Fully	<input type="checkbox"/>	Partly	<input type="checkbox"/>	No				
Is there room around the structure to serve as staging area?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No						
Presence of exterior trash?	<input type="checkbox"/>	No Trash	<input type="checkbox"/>	Limited Trash (Scattered Debris)	<input type="checkbox"/>	Significant Trash (Piles of Trash)	<input type="checkbox"/>	Large Appliances/ Bulky Furniture	<input type="checkbox"/>	Impassable/ Entry Restricted
Presence of interior trash?	<input type="checkbox"/>	No Trash	<input type="checkbox"/>	Limited Trash (Scattered Debris on Floors)	<input type="checkbox"/>	Significant Trash (Piles of Trash)	<input type="checkbox"/>	Large Appliances/ Bulky Furniture	<input type="checkbox"/>	Impassable/ Entry Restricted
Were any of the following observed on-site?	<input type="checkbox"/>	Tires	<input type="checkbox"/>	Abandoned cars	<input type="checkbox"/>	Graffiti	<input type="checkbox"/>	Signs of Drug-Use	<input type="checkbox"/>	Containers of Chemicals / Oil
	<input type="checkbox"/>	If observed, how many tires are present?								
Were hazards present on-site?	<input type="checkbox"/>	Dogs	<input type="checkbox"/>	Bees/Wasps	<input type="checkbox"/>	Excessive Dumping	<input type="checkbox"/>	Excessive Mold	<input type="checkbox"/>	Basement Flooding
Is structural evaluation recommended? (Collapse, partial collapse, or building off foundation)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No						

2b. Damage & Deterioration

The Damage & Deterioration section is intended to provide an indication of the condition of materials in the structure. If, for example, there are large portions of the roof missing and clear exposure to the elements or missing windows, the chances of materials being damaged and/or deteriorated is increased, thereby making deconstruction unlikely. This is very important in understanding whether deconstruction will be a viable option. For projects in which the structure was recently occupied and in habitable condition, this section may have diminished relevance.

DAMAGE & DETERIORATION					
Major cracking of brick, wood rotting:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Broken or missing windows:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Missing brick and siding:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Roof damage:	<input type="checkbox"/> Small open hole	<input type="checkbox"/> Large open hole(s)	<input type="checkbox"/> Portion of roof missing	<input type="checkbox"/> Significant portion or entire roof missing	
Evidence of major fire damage:	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
Evidence of major water damage:	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
Are gutters/downspout operable to control water?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	

2c. Materials Inventory

The materials inventory includes the types and quantities of building elements commonly found in residential structures. This information is intended to provide estimates of effort required to deconstruct and potential revenue from deconstructed materials.

MATERIALS INVENTORY						
Roof type:	<input type="checkbox"/> Flat	<input type="checkbox"/> Pitched				
Siding type:	Brick	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
	Wood	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
	Stone	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
	Vinyl/Synthetic	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
	Aluminum	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
	Other: _____	<input type="checkbox"/> 1 (little)	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5 (lots)
Wood flooring (number of rooms):	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Specify:	
Have additional layers of flooring been adhered to the wood in the past?	<input type="checkbox"/> Yes	<input type="checkbox"/> No				
Are dimensional ceiling or floor joists observed? (can be viewed from basement or attic)	<input type="checkbox"/> Yes	<input type="checkbox"/> No				
Dimensional lumber larger than 4x4:	<input type="checkbox"/> Yes	<input type="checkbox"/> No				
Are walls plaster or drywall? (total should equal 100%)	Plaster	<input type="checkbox"/> Partly (< 25%)	<input type="checkbox"/> Some (25-50%)	<input type="checkbox"/> Mostly (50-99%)	<input type="checkbox"/> All (100%)	
	Drywall	<input type="checkbox"/> Partly (< 25%)	<input type="checkbox"/> Some (25-50%)	<input type="checkbox"/> Mostly (50-99%)	<input type="checkbox"/> All (100%)	
Crown moulding	<input type="checkbox"/> None	<input type="checkbox"/> Some	<input type="checkbox"/> A Lot			
Casing around doors and windows (number of rooms)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Specify:	
Baseboard moulding (number of rooms)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Specify:	
Chair railing moulding (number of rooms)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Specify:	
Foundation:	<input type="checkbox"/> Monolithic concrete	<input type="checkbox"/> Concrete block	Combination, specify:			
Basement:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partial			

2d. Special Consideration for Architectural Features

This section itemizes some of the more valuable items that should be noted when found. Both unique and standard building materials can be safely removed, resold, and ultimately used in another building. The presence of a few special items can oftentimes mean the difference between a traditional demolition and a one- or two-day deconstruction project that “skims” easily accessible items. In some cases, a real “gem” is found when the house is filled with valuable features, which may merit additional deconstruction effort. Similarly, a house slated for removal due to a future infrastructure project may be in good condition and provide a wealth of salvageable items. Tallying up the materials inside a home also provides future deconstruction contractors with a heads-up in case they need to locate a buyer for a particularly rare item.

SPECIAL CONSIDERATION FOR ARCHITECTURAL FEATURES			
Interior:	Is a fire place mantel present and intact?	<input type="checkbox"/>	Yes
	Stair treads/railings	<input type="checkbox"/>	Yes
	Other architectural woodwork (<i>cornices, etc.</i>)	<input type="checkbox"/>	Yes
	Interior stone details (<i>counter, fireplace</i>)	<input type="checkbox"/>	Yes
	Stained / leaded glass	<input type="checkbox"/>	Yes
	Solid wood doors	<input type="checkbox"/>	Yes
	Door hardware	<input type="checkbox"/>	Yes
	Wood framed windows	<input type="checkbox"/>	Yes
	Built-in wood cabinetry	<input type="checkbox"/>	Yes
	Exterior:	Exterior stone details (<i>cornerstones, window sills, walkways, etc.</i>)	<input type="checkbox"/>
Iron gates/fencing		<input type="checkbox"/>	Yes
Metal roofing		<input type="checkbox"/>	Yes
	Decorative architectural wrought iron	<input type="checkbox"/>	Yes
	Lighting fixtures	<input type="checkbox"/>	Yes
	Radiators	<input type="checkbox"/>	Yes
	Registers	<input type="checkbox"/>	Yes
	Sinks	<input type="checkbox"/>	Yes
	Claw foot tub	<input type="checkbox"/>	Yes
		<input type="checkbox"/>	1st floor
		<input type="checkbox"/>	2nd floor
	Old appliances (<i>oven, refrigerator, etc.</i>)	<input type="checkbox"/>	Yes
	Countertops	<input type="checkbox"/>	Yes

3. Guidance for Selecting the Best Response

Respondents are able to use rough estimates and descriptions to identify how the structure compares to a continuum of options. Some questions have numerical scales or percentage-based options. For questions on a numerical scale of 5, consider 1 to be less than 20 percent, 3 to be roughly half, and 5 to be over 80 percent. Empirical measurements are not necessary. When using the tool, it is good to err on the side of caution. For example, if asked to estimate a response on a scale of 1 to 5, and the user believes the response should be 2.5, use 2 as the response. The rationale of using a scale is to allow users to do quick visual survey and record estimates.

4. Why is Completing the Deconstruction Rapid Assessment Important?

Structures slated to be demolished represent a broad continuum of condition and opportunity for deconstruction or rehabilitation. Upon completion, a recommendation for deconstruction, demolition, or an additional rehabilitation assessment will be made by a central management team based on data collected and reported from the tool. This recommendation can be used for planning and management of the demolition process in cities.

5. Is Additional Documentation Needed?

It is always a good idea to have tool users photo-document each structure by taking both interior and exterior pictures during the evaluation. If the form is completed digitally or through an independently developed app, it may be possible to automatically link the images in a database. Such documentation will enable a more informed decision to be made regarding structure rehabilitation, deconstruction, or demolition.

