FEMA

A Risk Reduction Presentation: Floodplain Management Series
FEMA Region VII – Kansas City, MO

The NFIP's Substantial Improvement/Damage requirements

Pre/Post flood compliance

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KEMA Conference – Topeka, KS

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Topics

- **NFIP- SI/SD Overview**
- **DATA Collection**
- **NFIP Info/Training resources**
- **Implementing SI/SD**
- **Final observations**






NFIP and the Local Community

The National Flood Insurance Program is:

A voluntary program based on a mutual agreement between the federal government and the local community.

Overview

National Flood Insurance Program (NFIP)

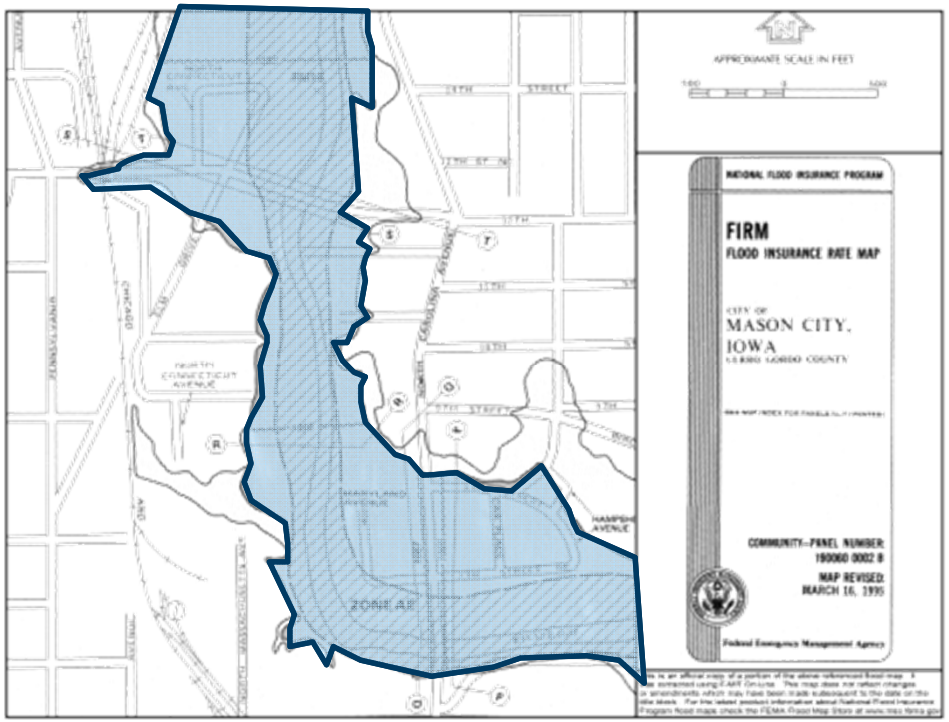
- FEMA's FM&I manages the National Flood Insurance Program (NFIP) to reduce loss from natural disasters.
- Effective Mitigation can break the cycle of disaster damage, reconstruction, and repeated damage.

NATIONAL FLOOD INSURANCE PROGRAM

FloodSmart.gov
The official site of the NFIP

Where are determinations required?

Applies to Pre-FIRM development . . . within the Special Flood Hazard Area:



- All Zone A boundaries
  - 100-Year Floodplain
  - 1% Annual Chance Flood
  - Base Flood

BASIC FLOODPLAIN MANAGEMENT

- Adopt/enforce floodplain management ordinances
- Require new construction/substantial improvements to be elevated/flood resistant
- Prohibit new development in designated floodways that would increase flood heights

"For a Few Dollars More"

Can we afford to rebuild higher? Can we afford *not* to?

The Parkers realized that weather is **unpredictable and that flood risk can change.** Another big flood could happen at any time. But could they really afford to build higher? It was time to break out the calculator and do the math.

Option 1: Building to the current requirements

- Estimated construction costs: $250,000
- Estimated monthly mortgage payment: $1,122
- Flood insurance premium: $143 per month or $1,716 per year
- Total monthly costs: $1,265

Option 2: Building 3 feet above the current requirements

- Estimated construction costs: $252,125
- Estimated monthly mortgage payment: $1,132
- Flood insurance premium: $46 per month or $552 per year
- Total monthly costs: $1,178

Note: This comparison is based on a 1-story home in an AE Flood Zone built at BFE and 3 feet above BFE on a concrete or CMU perimeter with vents. It has the NFIP maximum coverage of $250,000 building coverage and $100,000 contents coverage with a $1,000 deductible. Elevation costs are estimated at roughly 0.85 percent of total construction costs per additional foot of elevation. Cost savings could vary for different construction methods. Insurance premiums are based on rates published in the Jan. 2013 NFIP Manual. Mortgage payments are based on a 30-year fixed-rate mortgage at 3.5 percent APR for the full construction amount and exclude all insurance costs. Flood insurance must be paid in full at the beginning of the coverage year.

Good news!

The Parkers will save about $90 every month by building 3 feet higher.

Spending a little extra on construction reduced the Parkers' flood risk, cut their

Substantial Damage Defined




- Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damage condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial Improvement Defined

- **Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. This term does not include:**
  - **(1)** Any project for repair code violations of state or local health, sanitary, or building safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions
  - **(2)** Any alteration of a "historic structure", provided that the alteration will not preclude the structures continued designation as a "historic structure".

Calculating SI / SD

$$\frac{\text{Cost of Improvement or Cost to Repair to Pre-Damage Condition}}{\text{Market Value of Building}} \geq 50\%$$

- **<u>The 50% Rule is determined by this ratio</u>:**
  - The cost of repairing the structure to its before damaged condition ***<u>to</u>***
  - The market value (assessment/appraisal) of the structure prior to the damage
    - Note: the cost of the repairs must include all costs necessary to fully repair the structure to its before damage condition
  - If over 50%, enforcement is required.

Substantial Improvement/ Substantial Damage Desk Reference

FEMA P-758 / May 2010

FEMA

Table 6-1a. Compliance Matrix (A Zones)

Types of Work	Building is Pre-FIRM	Building is Post-FIRM
Rehabilitation (renovate or remodel), not SI	Compliance not required	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Rehabilitation (renovate or remodel), SI	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Lateral addition and Rehabilitation, SI	Addition required to comply; building required to comply	Addition required to comply; building required to comply (see Note below table)
Lateral addition, not SI	Addition not required to comply	Addition required to be elevated to at least the elevation of the existing lowest floor
Lateral addition, SI, not structurally connected	Addition required to comply; building not required to comply	Addition required to comply
Lateral addition, SI, structurally connected	Addition required to comply; building required to comply	Addition required to comply; building required to comply (see Note below table)
Vertical addition above building, not SI	Compliance not required	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Vertical addition above building, SI	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Repair foundation, not SI	Compliance not required	Repairs shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance
Repair foundation, SI	Building required to comply	Building required to comply (see Note below table)
Replace/extend foundation, SI (including "elevate-in-place")	Building required to comply	Building required to comply (see Note below table)
Repair damage, SD	Building required to comply	Work shall comply and shall not be allowed to make the building non-compliant with any aspect of the building that was required for compliance (see Note below table)
Reconstruct new building on existing or new foundation, SI	Reconstructed building required to comply	Reconstructed building required to comply (see Note below table)

Note: If a map revision has resulted in a higher BFE, a post-FIRM building must comply based on the new BFE.

Pre-FIRM Residential Compliance

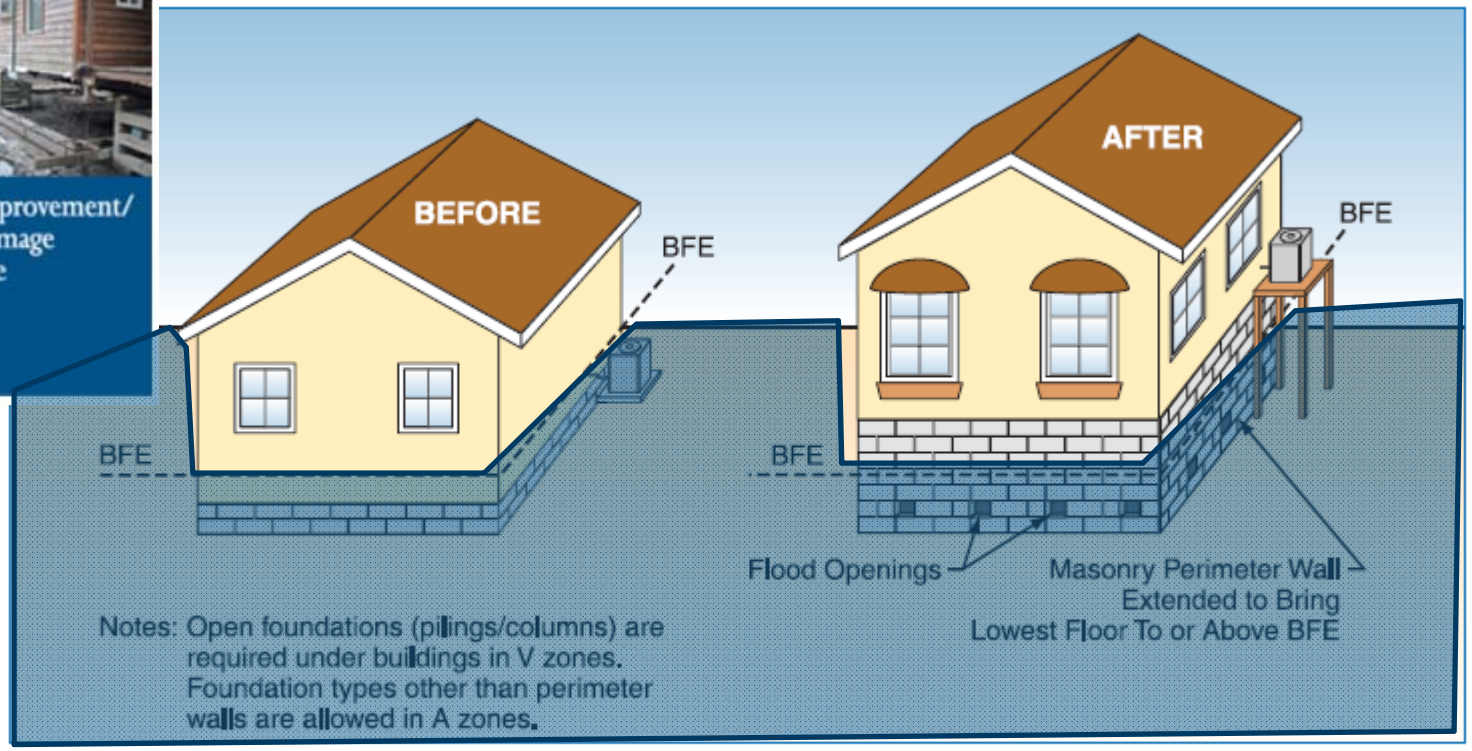


Figure 6-1. Rehabilitation or remodel (no increase in footprint) of residential building in an A zone – the proposed work was determined to be a substantial improvement. The building is brought into compliance by elevating it on an extended perimeter foundation wall, installing flood openings, and raising the HVAC equipment onto a platform.

SI - SD A zones

- **Lateral additions for Pre-FIRM structures in Zone A only.**
  - SI that do not involve structural changes (may elevate addition only).

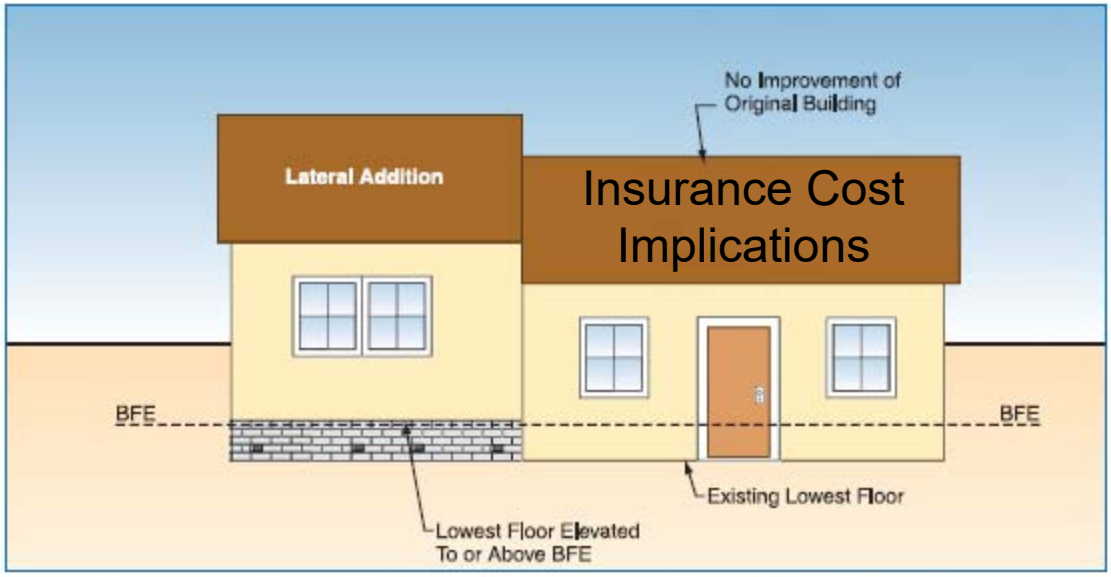


Figure 6-3. Lateral addition to a pre-FIRM building in an A zone – the proposed work is only the addition (no work was performed on the original building and no structural modification was made to the common wall or roof). The addition constitutes a substantial improvement and it complies with all NFIP requirements.

- **Lateral additions for Pre-FIRM structures in Zone A only.**
  - SI that involve structural changes (must elevate entire structure).

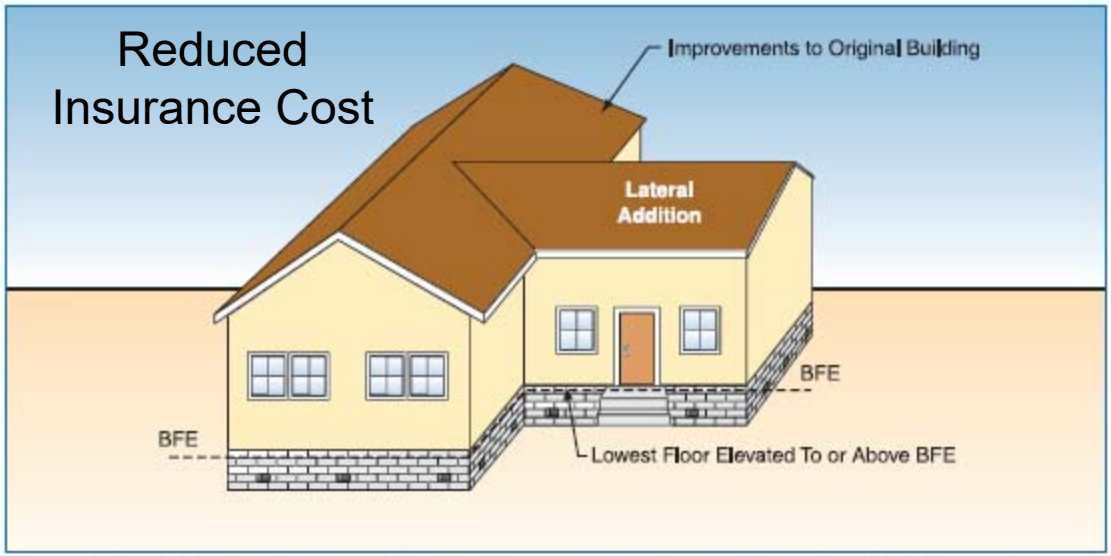


Figure 6-4. Lateral addition to a pre-FIRM building in an A zone – the proposed work includes an addition and work on the original building, including structural modification of the common wall or roof. The proposed work was determined to be a substantial improvement. The addition complies with all requirements and the building is brought into compliance by elevating it on a compliant foundation.

Pre-FIRM Manufactured Homes

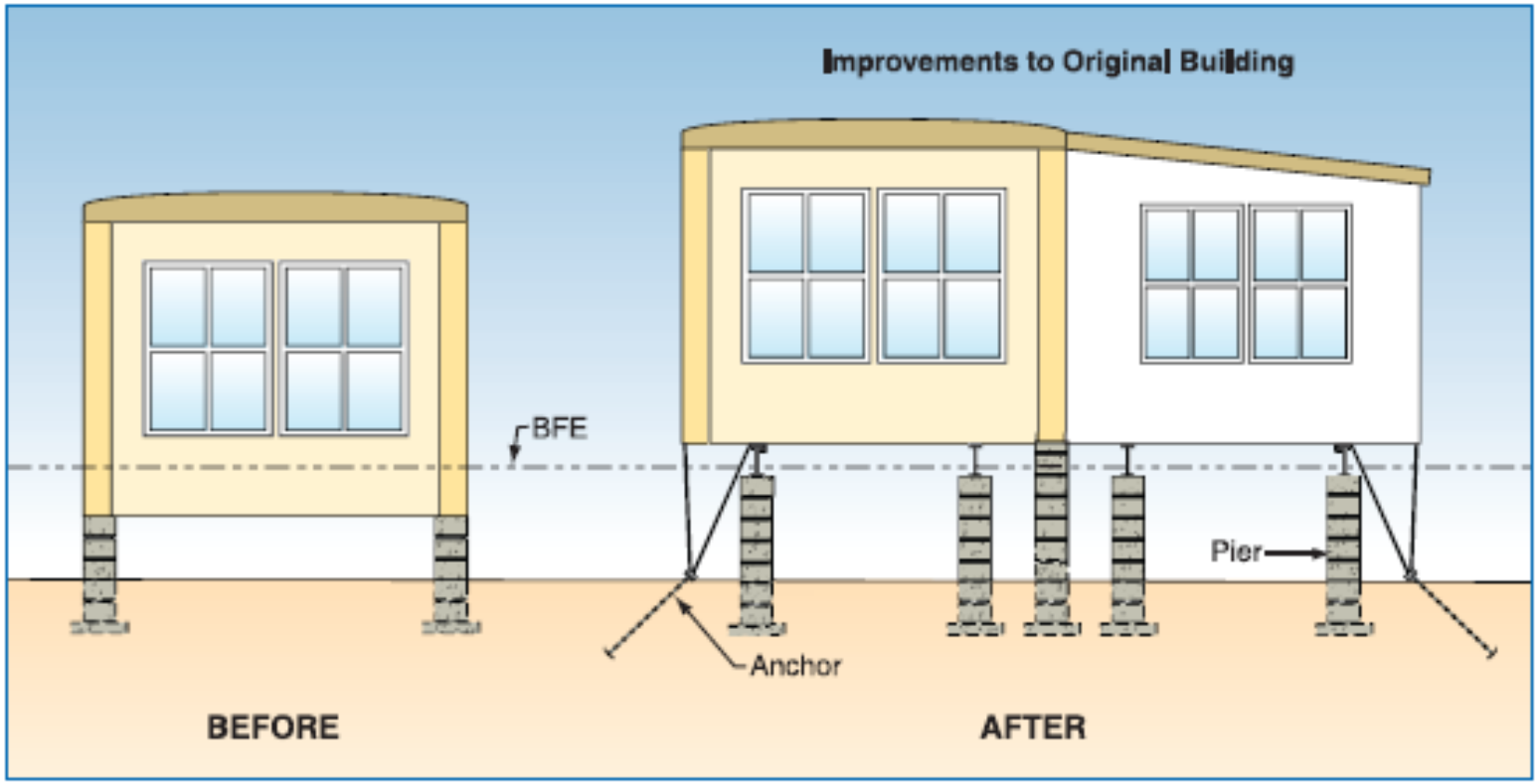


Figure 6-6. Lateral addition to a pre-FIRM manufactured home in an A zone – the proposed work includes improvements to the existing home. The work constitutes substantial improvement. The addition and the home are elevated to or above the BFE.

Pre-FIRM
Non-residential Compliance

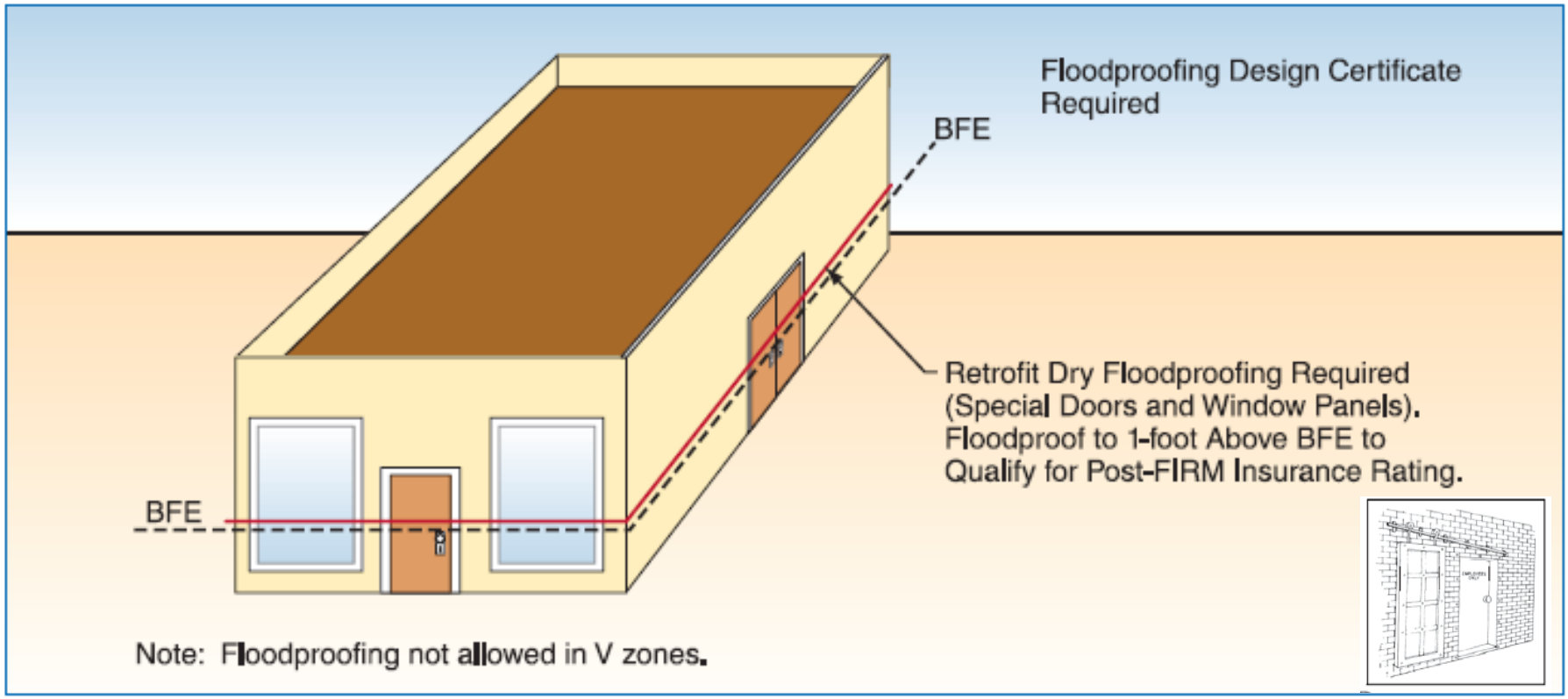
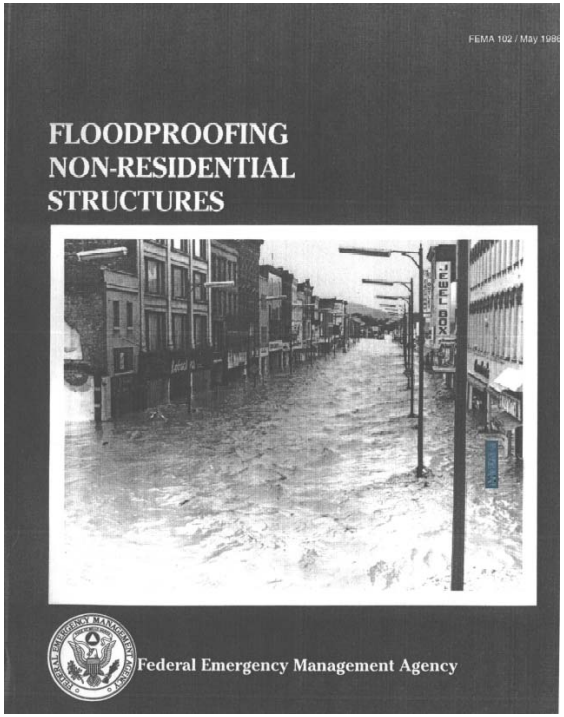
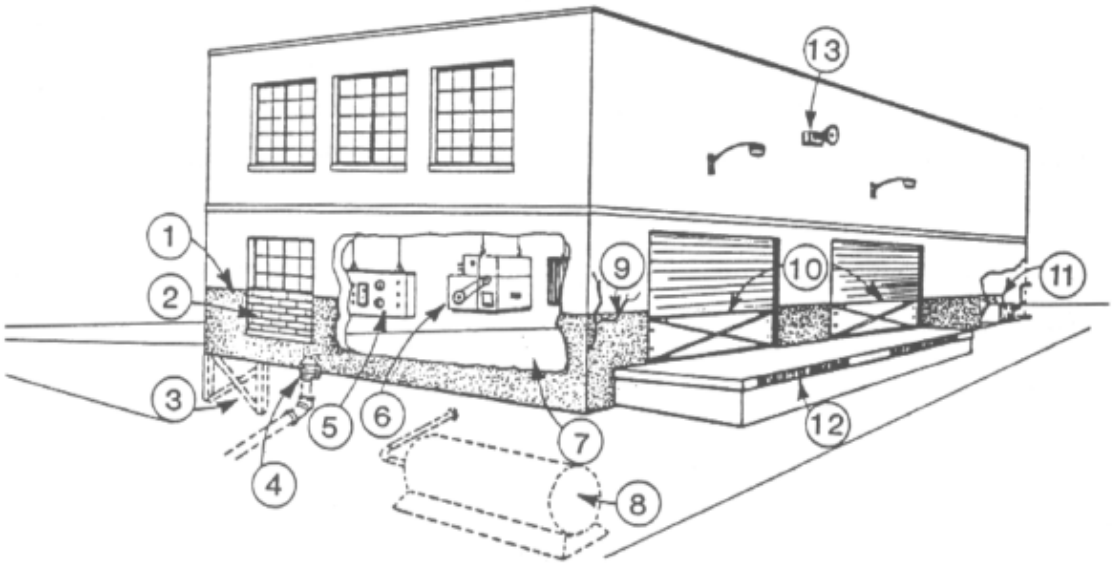


Figure 6-2. Rehabilitation or remodel (no increase in footprint) of non-residential building in an A zone – the proposed work was determined to be a substantial improvement. The building is brought into compliance by retrofit dry floodproofing measures (certification of design by registered design professional is required).

Retro-fitting non-residential structures for Dry-Flood proofing

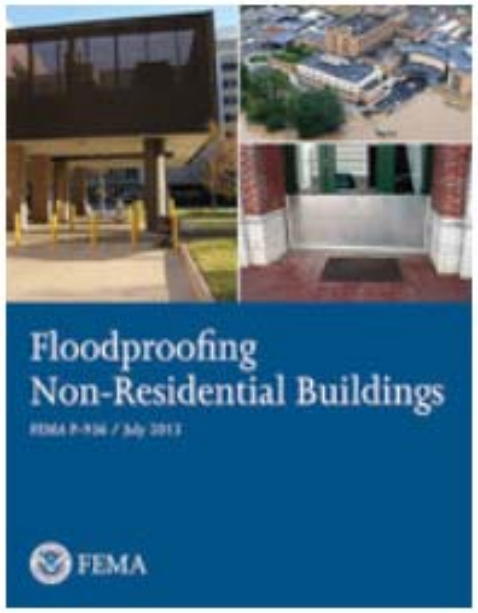


FEMA 102, Floodproofing for Non-Residential Structures (1986)



1. Waterproof coating to reduce seepage
2. Permanent closure of opening with masonry
3. Underpinning of structure to resist hydrostatic pressure
4. Valve on sewer line to prevent backflow
5. Instrument panel raised above expected flood level
6. Major equipment installed with quick-disconnects and elevated above flood level with overhead hoist
7. Floor has been reinforced to withstand uplift pressure
8. Underground storage tank properly anchored
9. Cracks sealed with hydraulic cement
10. Steel bulkheads for doorways
11. Sump pump and drain to eject seepage
12. Rescheduling has emptied the loading dock
13. Audible alarm installed as part of area-wide flood warning system

Retro-fitting non-residential structures for Dry-Flood proofing



FEMA P-936, Floodproofing Non-Residential Buildings (2013)

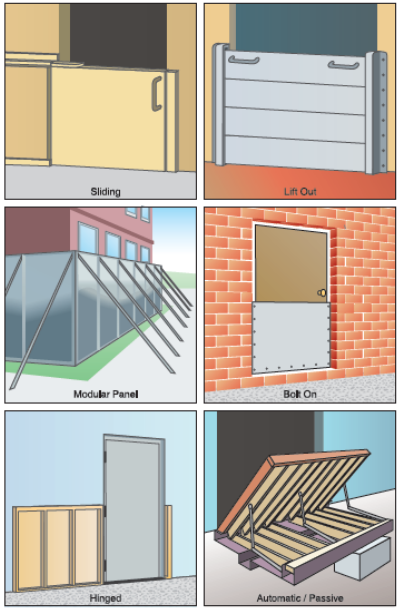
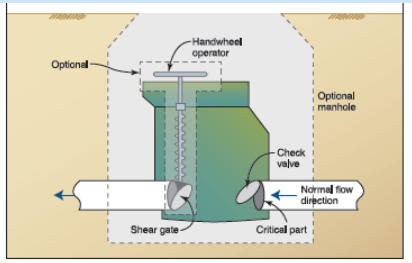


Figure 3-10. Types of flood shields

Connections between buildings presented a considerable design challenge because there were limited options for floodproofing. In some areas, the tight spaces between buildings were filled with expansion joint material, which was then waterproofed to prevent floodwater infiltration.

Figure 3-25. Three sets of stairs that provide building egress during the design flood event, but still allow normal use of the building (source: Walter P. Moore)

Figure 3-23. Flood doors incorporated into the existing building façade (source: Walter P. Moore)



Recovery and Development

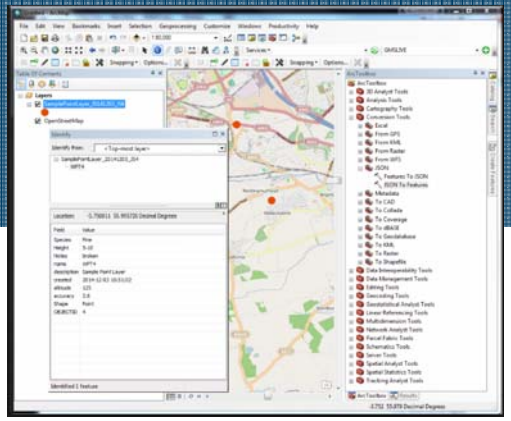
Branson, Mo.: Substantially damaged Pre-FIRM structure – Date of Damage. April 2011 w/1 foot of flood water. Elevated in 2012 to 1 foot above BFE, using ICC.

Branson, Mo. : Structures demonstrating how the BFE has changed over time and implementation of the Substantial Damage requirement.

Topics

- NFIP- SI/SD Overview
- **DATA Collection**
- NFIP Info/Training resources
- Implementing SI/SD
- Final observations

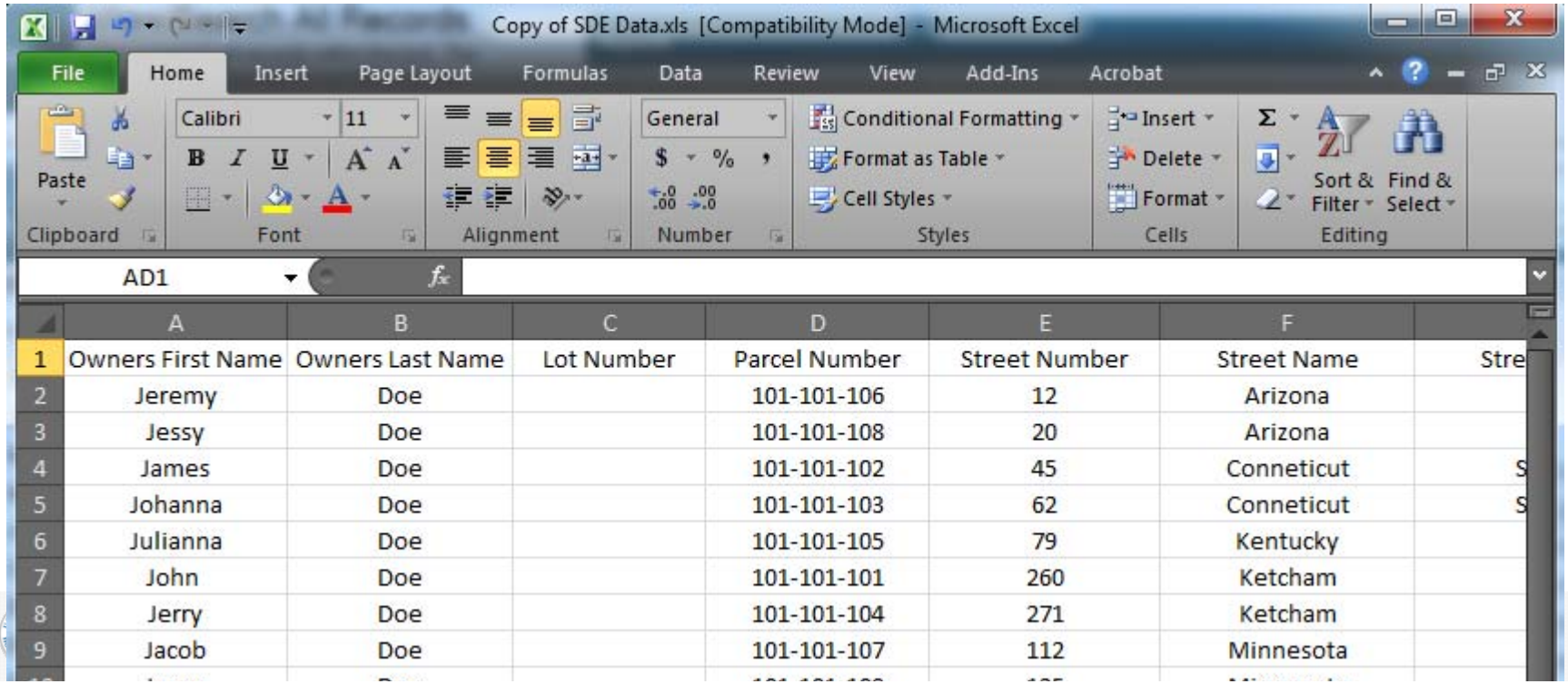
DATA Collection



1. Identify / load Pre-FIRM structures (located within SFHA)
2. Determine - Pre-disaster market value of the Structure
3. Determine - Repair Costs – Cost per Square foot
4. Understand how elements relate to the outcome - Percent Damage of the Structure

Data collection

1. **Recommended to collect the 22 most commonly used data fields for future Import to SDE (*.xls file available upon request).**
2. **Reduces data errors and omissions**
   - In SDE User is prompted to use default data for every new assessment
   - Default data can be overwritten
     - Default data remains active until the user deletes it or enters new default data



	A	B	C	D	E	F	
1	Owners First Name	Owners Last Name	Lot Number	Parcel Number	Street Number	Street Name	Stre
2	Jeremy	Doe		101-101-106	12	Arizona	
3	Jessy	Doe		101-101-108	20	Arizona	
4	James	Doe		101-101-102	45	Conneticut	S
5	Johanna	Doe		101-101-103	62	Conneticut	S
6	Julianna	Doe		101-101-105	79	Kentucky	
7	John	Doe		101-101-101	260	Ketcham	
8	Jerry	Doe		101-101-104	271	Ketcham	
9	Jacob	Doe		101-101-107	112	Minnesota	

Steps to determine Market Value

Figure 4-3 illustrates the steps local officials need to take in order to determine market values. Additional guidance on estimating market value following disasters is provided in Chapter 7.

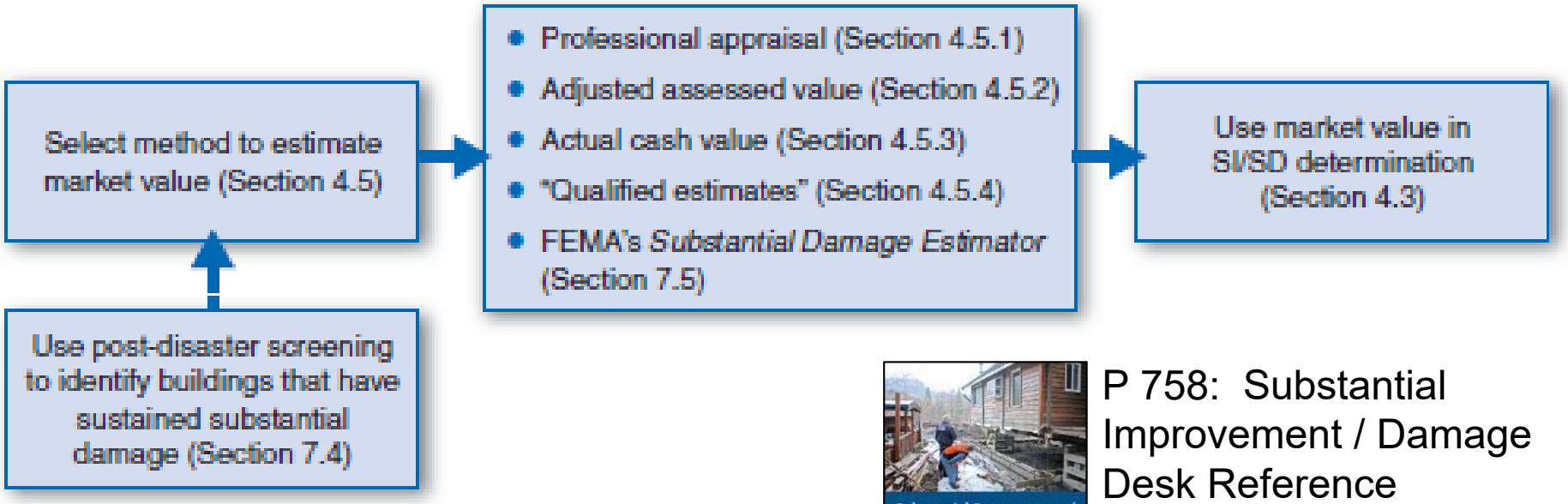


Figure 4-3. Determine the market value (overview)

P 758: Substantial Improvement / Damage Desk Reference

Calculate Repair Cost

Repair estimate (labor-material) is based on the fair market cost of construction per square foot

- **Marshall & Swift**
- **R.S. Means**
- **Locality based labor & material estimate**
- **Contractor estimates**

$100.00 / SF to $400.00 / SF?

Communities construction values vary across the country and within the State. Some communities estimate their construction cost just below $100.00/S.F., while others indicate its over $400.00. Where does your community fall?

Dilemma: why wouldn't you want to use the permit construction value for value?

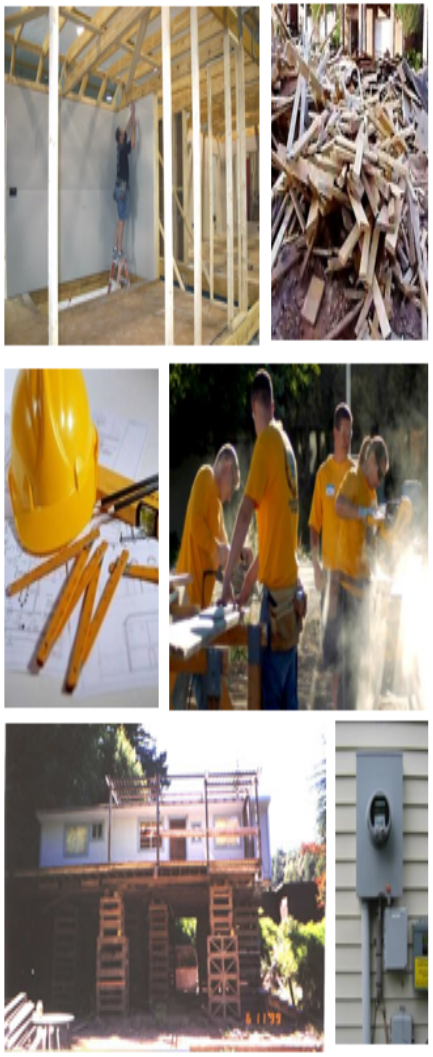
Calculating SI / SD

$$\frac{\text{Cost of Improvement or Cost to Repair to Pre-Damage Condition}}{\text{Market Value of Building}} \geq 50\%$$

- **<u>The 50% Rule is determined by this ratio</u>:**
  - The cost of repairing the structure to its before damaged condition ***<u>to</u>***
  - The market value (assessment/appraisal) of the structure prior to the damage
  - Note: the cost of the repairs must include all costs necessary to fully repair the structure to its before damage condition
  - If over 50%, enforcement is required.

Costs included in SI/SD determinations

- Material and labor (even when donated)
- Site Preparation
- Demolition of construction debris (excluding trash removal / clean up cost)
- Cost of complying with other regulations and codes (i.e. Health Dept., ADA, etc.)
- Cost of elevating the structure when the proposed elevation is below BFE.
- Construction management and supervision
- Contractor's overhead
- Sales tax on materials
- Structural elements and exterior finishes
- Interior finish
- Utility and service equipment



Costs excluded from SI/SD determinations

- Damage Clean-up and trash removal
- Temporary stabilization of the structure.
- Construction plans and specifications
- Land Survey
- Permit Fees
- Carpeting or re-carpeting installed over a finished floor (wood/tiling).
- Outside improvements (landscaping, pool enclosures, sidewalks, fences, yards lights, and detached accessory structures).
- Cost associated with the minimum work necessary to correct existing violations of health, safety, and sanitary codes.
- Plug-in appliances such as washing machines, dryers and stoves.

12 Elements of Residential SDE Inspection

ELEMENT PERCENTAGES Tab

Element Percentages

Residence Type: ____ Single-Family **(SF)** House ____ Manufactured House **(MH)**

Item	% Damaged	Element %	Item Cost	Damage Values
Foundation **(SF only)**				
Superstructure				
Roof Covering				
Exterior Finish				
Interior Finish				
Doors and Windows				
Cabinets and Countertops				
Flood Finish				
Plumbing				
Electrical				
Appliances				
HVAC				
Skirting / Forms Piers **(MH only)**				

SDE OUTPUT SUMMARY Tab - ***Optional User Entered Data***

Professional Market Appraisal: _____

Tax Assessed Value: _____ Factor Adjustment: __ Adjusted Tax Assessed Value: _____

Contractor's Estimate of Damage: _____

Community's Estimate of Damage: _____

*SDE Residential Damage Inspection Workshee*t 7 of 7

Roof Covering			0- 25%	25-50%	50-75%	Over 75%
Description	Roofing includes a lightweight composition shingle, tile roofs, metal roofs, or a built-up roof with gravel or rock cover material. Roofing does not include structural framing members such as rafters or prefabricated trusses that support the roof deck. The roof sheathing and flashing is included in this section.	Threshold Markers	Minor wind damage to the roof coverings. Main surface areas are unaffected. Flashings are intact. No damages to the roof sheathing.	Some damaged areas of the roof from high-winds or damages from debris. Some sections of the roof covering are missing or loose. Some damages to the flashings. Minimal damage to the roof sheathing.	Significant damaged areas of the roof from high winds or damages from debris. Significant sections of the roof covering are missing or loose. Damages to the flashings allow some water infiltration at joints and roof penetrations. Significant damage to the roof sheathing - some areas of the sheathing will need replacement.	Large damaged areas of the roof from high winds or damages from debris. Major sections of the roof covering are missing or loose. Damages to the flashings allow significant water infiltration at joints and roof penetrations. Major damage to the roof sheathing - most of the roof sheathing will need replacement.
		Common Damages	Roof shingles or tiles mostly intact. Some minor damage to roof shingles - some torn or loose shingles in limited areas.	Some areas where the roof shingles were damaged by high winds. Several small areas of exposed roof sheathing as a result of missing/damaged shingles.	Some areas where the roof shingles were damaged by high winds. Several small areas of exposed roof sheathing as a result of missing/damaged shingles. Some damage to the roof covering and sheathing due to debris falling or penetrating the roof assembly.	Major areas of the roof where the shingles/tile are missing, allowing rainwater to freely enter the house below. Significant damage to roof covering and roof sheathing from strong winds or windborne debris penetrating the roof assembly.
	Special Considerations for Coastal/High Velocity Floods		Coastal areas have higher wind conditions requiring additional roof covering requirements. Damages to these roof coverings would indicate a higher percent of damages, because they are designed to resist higher wind conditions. Damages to the roofing are more likely during high-wind conditions due to the loss of protection from missing roof coverings and water infiltration. This will increase the percent of damages.			

7 Elements Commercial SDE Inspection

- **Foundation**
- **Superstructure**
- **Roof Covering**
- **Plumbing**
- **Electrical**
- **Interiors**
- **HVAC**

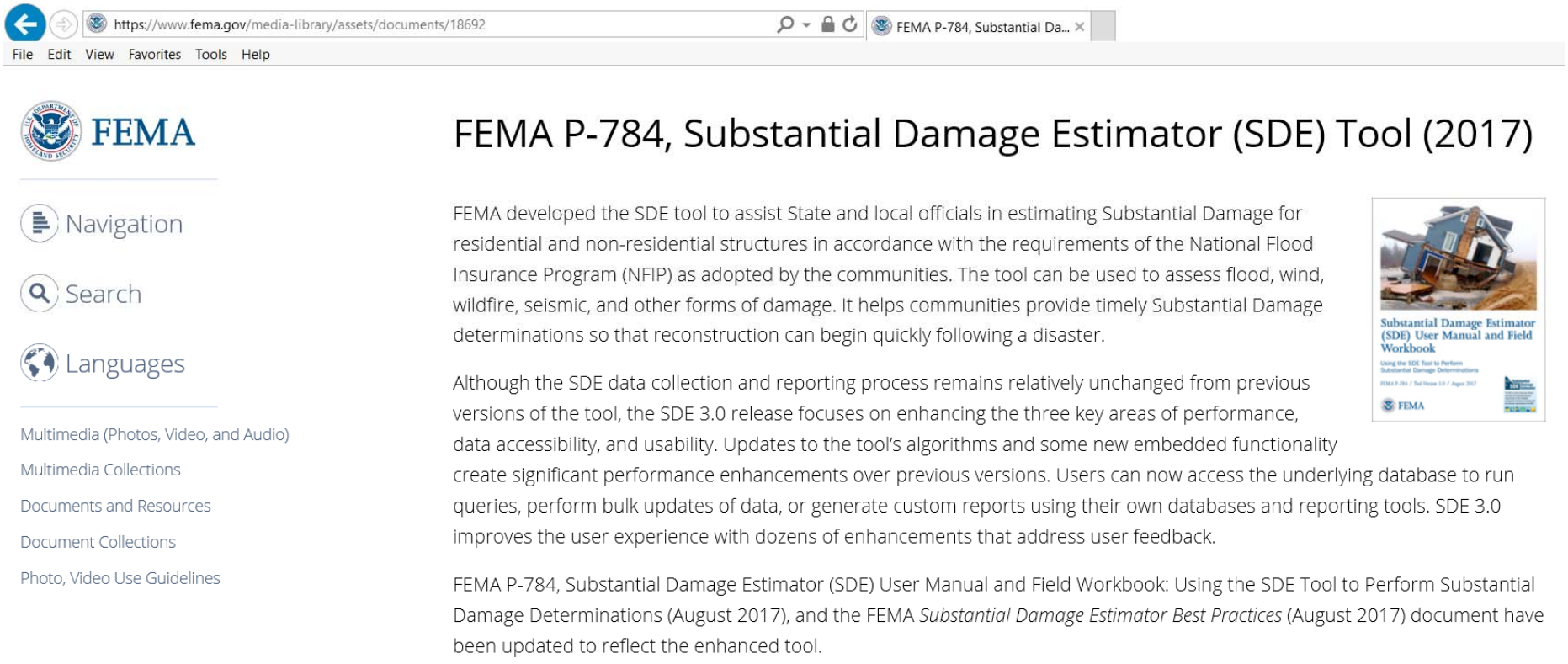
ELEMENT PERCENTAGES Tab

Element Percentages

Item	% Damaged	Element %	Item Cost	Damage Values
Foundation				
Superstructure				
Roof Covering				
Plumbing				
Electrical				
Interiors				
HVAC				

Interiors		0-25%	25-50%	50-75%	Over 75%
Description	Interiors include the partitions, interior doors, and surface finishes (for walls, floors, and ceilings). Materials include low-grade wood/plastic composites, soft woods, and hard woods. Finishes include paint, stain, or varnish. This item also covers any exterior and interior painted surfaces. This includes all interior painted surfaces, but not the building or repairs of the underlying surfaces. This also includes those exterior siding materials (and trim work) that need to be painted, but not those that have inherent coloring within the materials themselves (brick, stucco, EIFS). NOTE: Non-residential structures with multiple stories will receive less damage to this element than single- story structures, as the majority of interior finish for multi-story structures will likely not be on the ground floor.	Threshold Markers	Water level does not rise to the level of the first floor structure. The duration of the floodwaters is limited - less than 12 hours.	Water level rises just above the first floor level. The duration of the floodwaters is limited - less than 12 hours.	Water level is up to 3 feet above the first floor level. The duration of the floodwaters is more than 12 hours.	Water is more than 3 feet above the first floor level of the building. The duration of the floodwaters is more than 12 hours.
		Common Damages	Wicking of the water and high moisture conditions into the finished materials at the subflooring and at the bottom of the walls. Water staining and damages possible at baseboard and the casings at the bottoms of door openings. Some adjustment/repair/replacement may be necessary. No damages anticipated on door, cabinet, and window hardware. The baseboards and the bottom of the door casings may need to be cleaned and painted.	Water staining and damages likely at the baseboard and the casings at the bottoms of door openings. Some adjustment/repair/replacement may be necessary. Water damage at the lowest levels of the wall assembly - lower wall and trim may need to be removed and replaced. Minor damages anticipated on door, cabinet, and window hardware. After repairs to surfaces, the lower wall finishes, baseboards, and door casings will need to be primed and repainted. The bottoms of cabinet bases in bathrooms may require repainting.	Water staining and damages at the baseboards and the casings at door openings need to be replaced. Water damage at the lowest levels of the wall assembly - wall and trim, window sills and window aprons, wall paneling, wainscoting, and chair rails require removal and replacement. Wall surfaces should be removed to a height of 4 feet. Some damages anticipated on door, cabinet, and window hardware. Some replacement needed. After repairs to surfaces, the entire wall finishes, baseboards, and door and window casings will need to be primed and repainted, along with the vanity cabinets in the bathrooms. Both upper and lower paint-grade cabinets should be repainted where lower cabinets were repaired or replaced.	Water staining and damages at the baseboards, running trim, and casings at door and window openings need to be replaced. Water damage at all the levels of the wall assembly - wall and trim, window sills and window aprons, wall paneling, wainscoting, and chair rails require removal and replacement. Wall surfaces should be removed to a height of 8 feet. Significant damages anticipated on door, cabinet, and window hardware. Some replacement needed. After repairs to surfaces, the entire wall finishes, baseboards and door and window casings, and window sashes will need to be primed and repainted along with the vanity cabinets in the bathrooms. Repaint both upper and lower cabinets, where these are paint-grade cabinets.
	Special Considerations for Coastal/High Velocity Floods		**Damages to the interior finishes are more likely during high-wind conditions due to the loss of protection from missing roof coverings and exterior finishes, and from subsequent water infiltration. The salt, erosion, and winds in coastal areas will have a damaging effect on the quality of exterior hardware. This will significantly increase the percent of damages.**			

FEMA Library – SDE 3.0



https://www.fema.gov/media-library/assets/documents/18692

SDE 3.0 – Installation

http://www.fema.gov/library/viewRecord.do?id=4166

General Guidance for Installation and Use of SDE 3.0

- Before installing the new version, export any existing SDE data that you want saved from previous SDE versions.

- Although it is not required, FEMA recommends that users uninstall previous versions of SDE from the host computer to avoid confusion between past and current inventories.

- Refer to the *SDE Read Me – SDE 3.0 Tool Installation Guide* (2017) in the list of downloads below.

The FEMA *Substantial Damage Estimator Best Practices* (2017) document suggests approaches for dealing with some of the challenging situations users may encounter while using the SDE tool. After a disaster, the complexity of field conditions and the need to prepare for and perform SDE inspections to assess damage can present numerous challenges. This document contains suggested solutions to some common challenges that SDE users may encounter. The information and methods can be used by Federal, State, and local officials when developing SDE-based inventories of potentially substantially damaged residential and non-residential structures. The guidance is organized into three phases of SDE management: 1. Planning for Data Collection, 2. Field Work, and 3. SDE Quality Assurance Reviews.

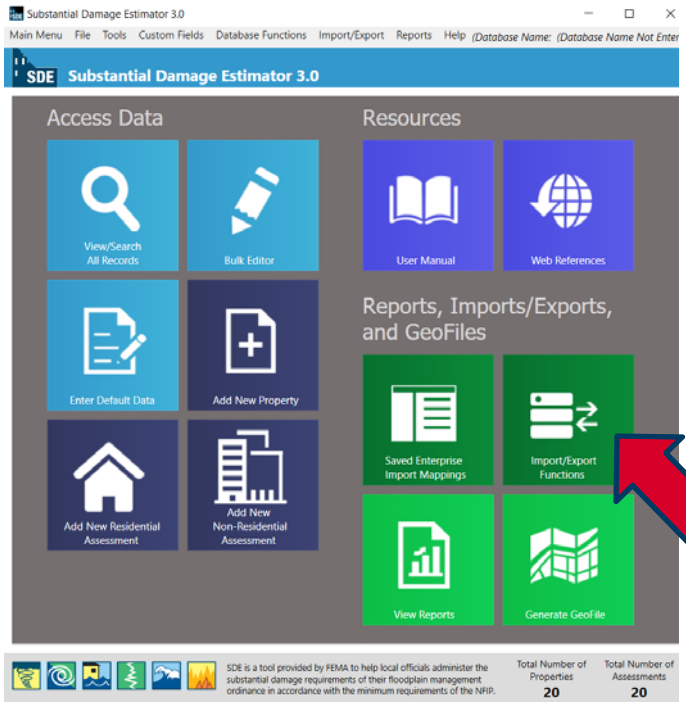
		Size	Publication Date
	SDE 3.0 Installation Package Zip File	0.06G	September 1, 2017
PDF	SDE 3.0 User Manual and Field Workbook	7.86M	September 1, 2017
PDF	SDE Read Me – SDE 3.0 Tool Installation Guide	0.16M	September 1, 2017

SDE 3.0 Main Menu

The main menu:

1. Main Toolbar
2. View/Search
3. Bulk Property Editor
4. Enter Data
5. Add Property
6. Add Residential Assessment
7. Add Non-Residential
8. Saved Enterprise Import Map
9. Import/Export Functions
10. View Reports
11. Geo File
12. Resources

Upload Data



Enterprise Import

The **Enterprise Import** function is used to import multiple properties at one time. This can be a very useful function for large numbers of assessments, and any number of the available fields may be selected for importing.

Begin the process by clicking on the **Enterprise Import** button on the main menu.

After selecting the **Get File** button, you will be prompted to browse and select the file to be imported.

On-screen prompts will then ask questions specific to the type of file selected for import.

In this example, records are being importing from an Excel spreadsheet.

Click the **Format Excel** button.

When asked if this Excel sheet contains column headers, answer **yes** if appropriate. This will depend upon the format of the source data.

Once the data has loaded, click on the **Import Using This Format** button.

You will see a data-entry field for each type of data used in the SDE 2.0 tool.

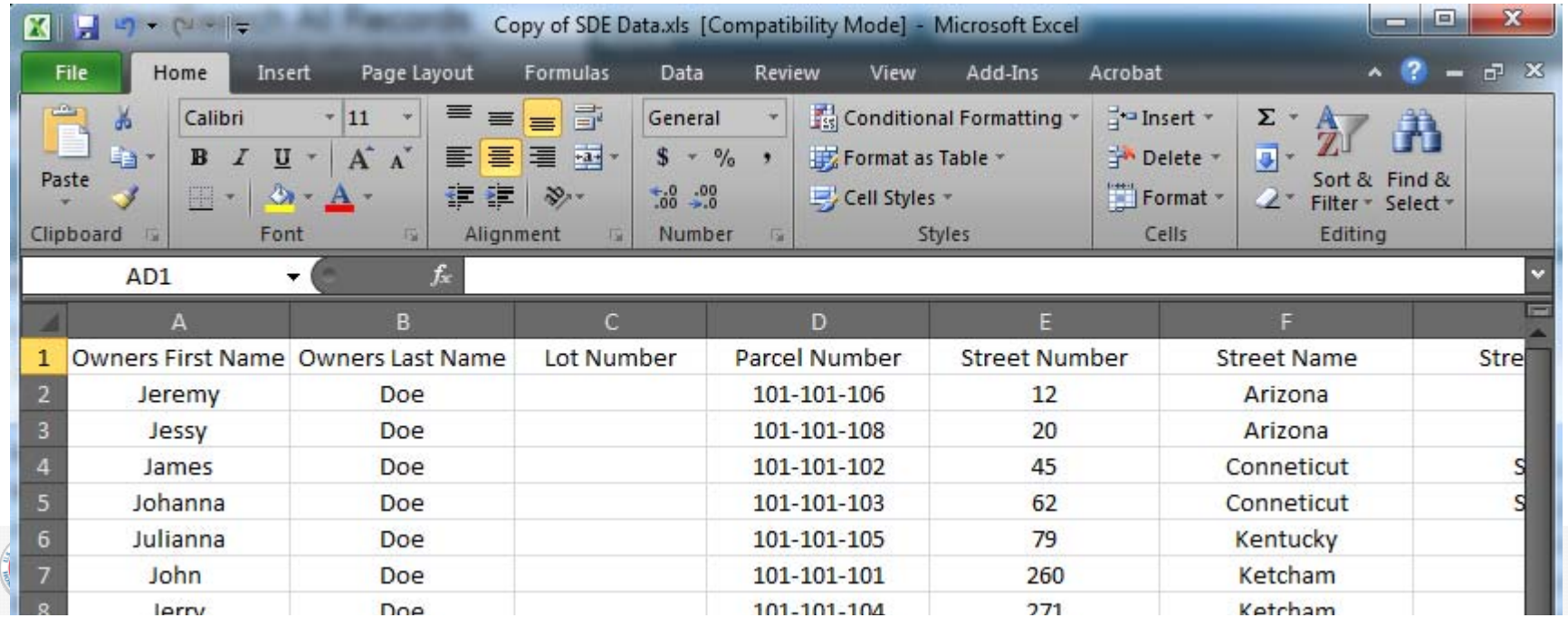
In the **Select a Field** section, simply select the Excel spreadsheet column heading that contains the data needed for the SDE field.

For example, in the **Owner's First Name** field, select the field **Structure Owner's First Name.**

In the **Owner's Last Name** field, select the column heading **Structure Owner's Last Name.**

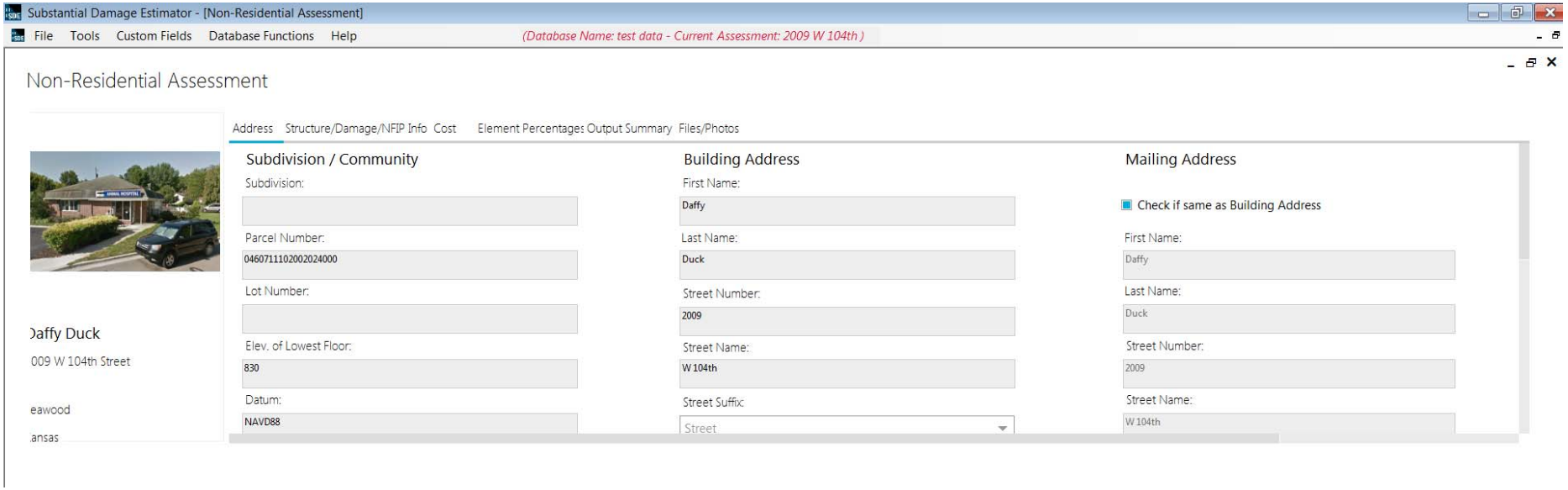
Excel Spreadsheet Template

1. **Recommended to pre-load data for 22 of the most commonly used data fields using Enterprise Import (*.xls file available upon request).**
2. **Reduces data errors and omissions**
3. **User is prompted to use default data for every new assessment**
4. **Default data can be overwritten**
   - Default data remains active until the user deletes it or enters new default data

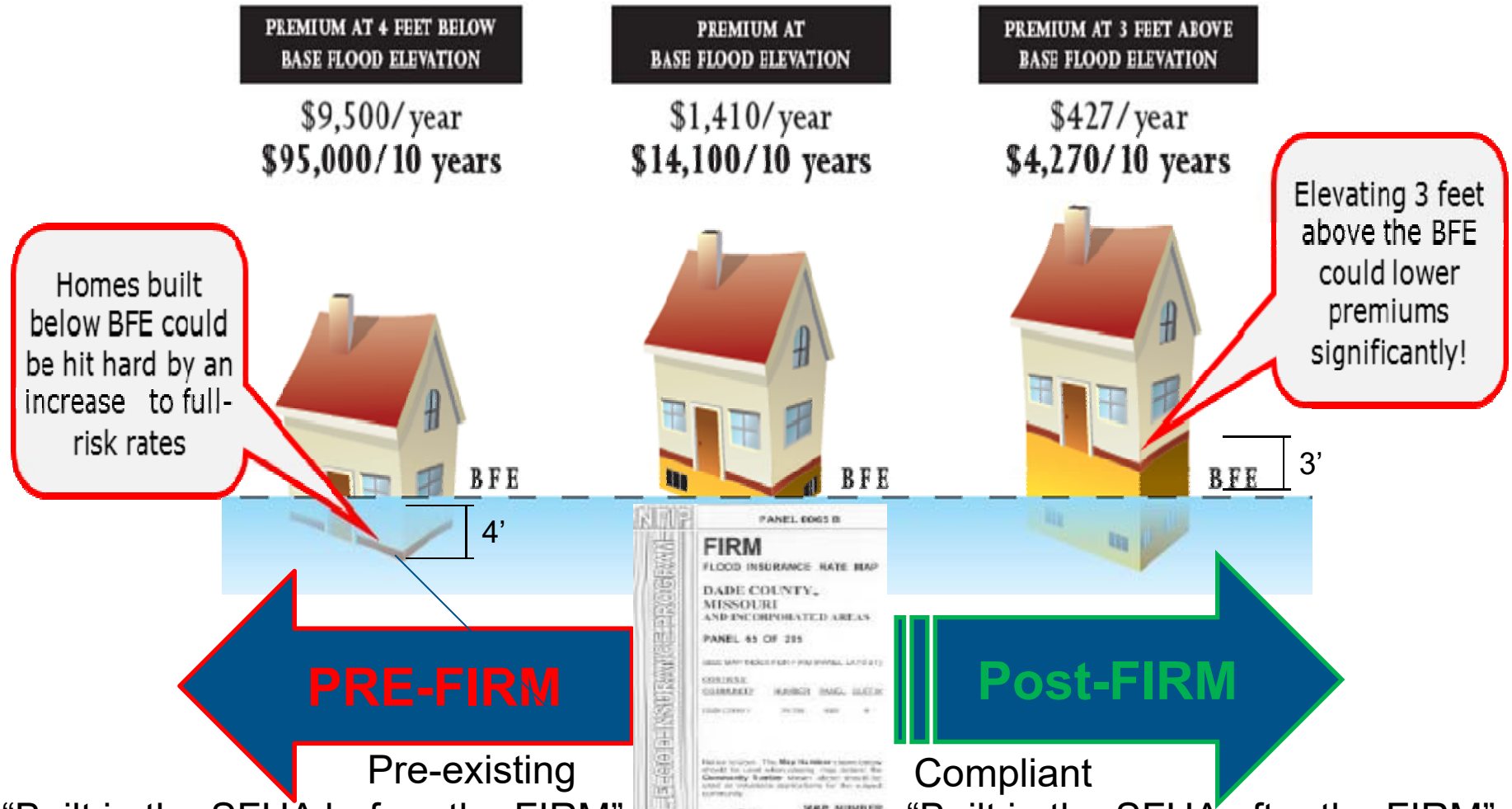


	A	B	C	D	E	F	
1	Owners First Name	Owners Last Name	Lot Number	Parcel Number	Street Number	Street Name	Stre
2	Jeremy	Doe		101-101-106	12	Arizona	
3	Jessy	Doe		101-101-108	20	Arizona	
4	James	Doe		101-101-102	45	Conneticut	S
5	Johanna	Doe		101-101-103	62	Conneticut	S
6	Julianna	Doe		101-101-105	79	Kentucky	
7	John	Doe		101-101-101	260	Ketcham	
8	Jerry	Doe		101-101-104	271	Ketcham	

Inputting Data into SDE 3.0



Pre-FIRM vs. Post-FIRM



Pre-existing
"Built in the SFHA before the FIRM"

Compliant
"Built in the SFHA after the FIRM"

Example 1: Calculate Substantial Damage

- **Market value = $40,000.**
- **Square footage = 1,000 sq. ft.**
- **SDE inspection percent of damage = 30%**

- **Construction cost per square foot = $80.**
  - 1,000 sq. ft. x 30% = 300 sq. ft. to be repaired.
  - 300 sq. ft. x $80 = $24,000 cost of flood repair.
  - $24,000 divided by $40,000 = **60% damage.**

- **The cost of flood repair is over 50%.**
- **The structure is substantially damaged.**

Example 2: Calculate Substantial Damage

- **Market value = $80,000.**
- **Square footage = 1,000 sq. ft.**
- **SDE inspection percent of damage = 30%**

- **Construction cost per square foot = $80.**
  - 1,000 sq. ft. x 30% = 300 sq. ft. to be repaired.
  - 300 sq. ft. x $80 = $24,000 cost of flood repair.
  - $24,000 divided by $80,000 = **30% damage.**

- **The cost of flood repair is below 50%.**
- **The structure is not substantially damaged.**

Topics

- NFIP- SI/SD Overview
- **DATA Collection**
- **NFIP Info/Training resources**
- Implementing SI/SD
- Final observations



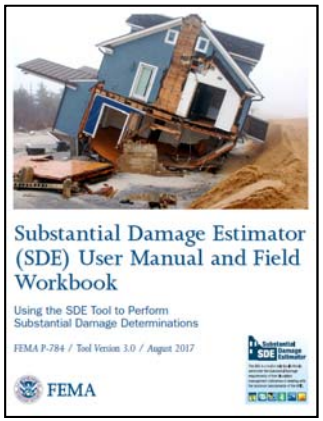



IS-284: Using the Substantial Damage Estimator 2.0 Tool

- http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=IS-284

Good / accurate basic info but not yet updated to 3.0

SDE 2.0 – Installation / Resources

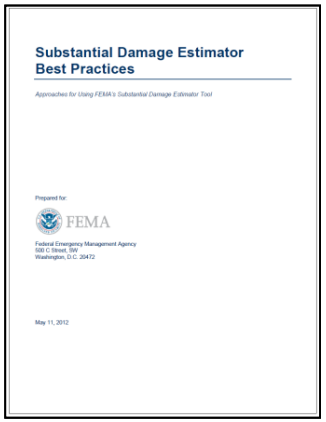


- **SDE 3.0:**
- **users manual:**

https://www.fema.gov/media-library/assets/documents/18692

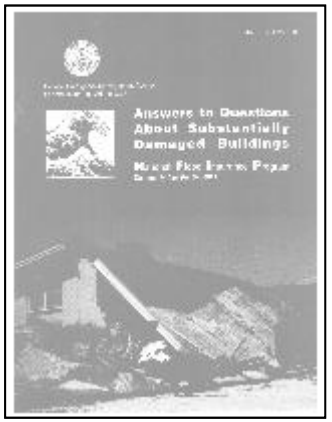
- **P 758: Substantial Improvement / Damage Desk Reference:**

ttp://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4160



- **Substantial Damage Estimator Best Practices:**

http://www.fema.gov/library/viewRecord.do?id=5929



- **FEMA – 213: Answers to Questions About Substantially Damaged Buildings:**

http://www.fema.gov/library/viewRecord.do?id=1636

Topics

- NFIP- SI/SD Overview
- DATA Collection
- NFIP Info/Training resources
- **Implementing SI/SD**
- **Final observations**

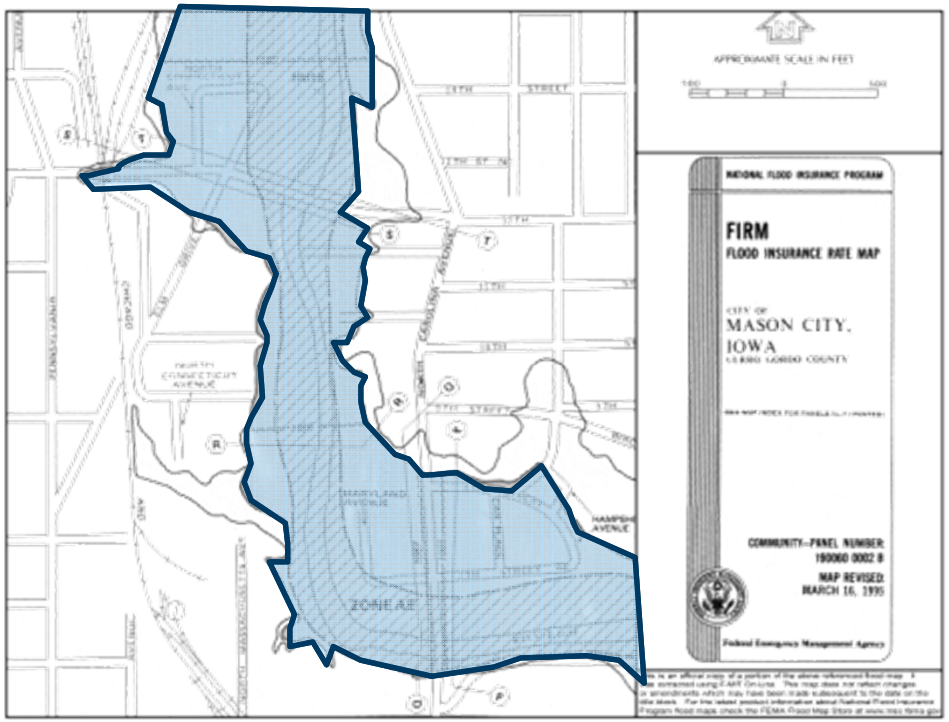
Substantial Improvement/Damage Estimation:

Post-Flood Event:

- **Identify Impacted Pre-Firm Structures**.
  - Assess the damage to Pre-FIRM / cumulative damage structures in the SFHA.
- Explain / enforce substantial damage / improvement and compliance requirements.
- Address overlapping compliance issues / challenges.

Where are determinations required?

Applies to Pre-FIRM development . . . within the Special Flood Hazard Area:



- All Zone A boundaries
  - 100-Year Floodplain
  - 1% Annual Chance Flood
  - Base Flood

SDE prioritization and field application

- **Up to 40% damage relative to market value:**
  - Use approximate damage determination methods. *Reconstruct as before flood.**

- **40-60% damage relative to market value:**
  - Use detailed, itemized repair cost estimates and definitive estimates of market value. *Reconstruct in full compliance if over 50%.*

- **60-100% damage relative to market value:**
  - Use approximate damage determination methods. *Reconstruct In full compliance.**

SDE prioritization and field application

- **Up to 40% damage relative to market value:**
  - Use approximate damage determination methods. *Reconstruct as before flood.**

SDE prioritization and field application

- **Up to 40% damage relative to market value:**
  - Use approximate damage determination methods. *Reconstruct as before flood.**

GUIDANCE FOR ESTIMATING PERCENT DAMAGE CATEGORIES USING THE SUBSTANTIAL DAMAGE ESTIMATOR (SDE) FOR RESIDENTIAL PROPERTIES

Basic Flooding Model Assumptions:

1) **Medium height freshwater flooding - limited duration. No high-velocity action; no wave action.**
2) **A 1-story house (without a basement) is used for this example house to establish the Categories of Work percentages of total costs.**

			Damage Threshold			
Foundation			**0 to 25%**	**25-50%**	**50-75%**	**Over 75%**
Description	Continuous perimeter foundations, footings, and piers for internal beams and floor loads. Footing depth averages between 30 inches and 42 inches below ground level. Materials include unreinforced cast-in-place concrete, unreinforced masonry or concrete masonry units (CMUs), concrete slab on grade, or raised slab construction.	**Threshold Markers**	Water level does not rise to the level of the bottom of the first floor of the structure. No scouring at the footings. Some undermining but no visible cracking at concrete slab.	Water level rises just above first floor level. Limited scouring at the footings. Soils are saturated. Undermining of the concrete slab, especially at corners - hairline cracks only.	Water level is 4-7 feet against the outside of the building. Limited scouring at the footings. Soils are saturated and unstable Cracks noted on or along the foundation walls. Significant undermining of the concrete slab - significant cracking is visible.	Water level is 7 feet or higher against the outside of the building. Limited scouring at the footings. Foundation is notably cracked and/or displaced. Structure has been knocked off its foundation. Portions of the foundation are damaged or missing Significant undermining of the concrete slab - major cracking and separation of the concrete slab.
		Common Damages	Short-term inundation to limited heights. Limited scouring and erosion - low flow and low velocity floodwaters. No noticeable cracking of the masonry or displacement of the foundation walls.	Short-term inundation - Foundation is inundated with flood waters but for a limited duration. Limited scouring or undermining of the foundation or footings is found. Minor cracking from some settlement but no displacement, heaving or discontinuities of the structural support systems.	Floodwaters extend over the top of the foundation system - significant inundation for over 12 hours. Some cracking of the masonry/concrete foundation walls. Some damages to the foundation wall from debris or settlement noted.	Settlement noted at the footings, due to erosion or unstable soils. Foundation wall damage - sections of the walls are cracking, displaced, and missing, causing an inherent instability to the support for the house. Use caution when approaching or entering the house.
	Special Considerations for Coastal/High Velocity Floods		Coastal floods may have more evidence of scouring at the supports - the foundation system may be better designed to resist this scouring action. High velocity floodwaters may create erosion/scouring that the building has not been designed to resist.			

SDE prioritization and field application

- **40-60% damage relative to market value:**
  - Use detailed, itemized repair cost estimates and definitive estimates of market value. *Reconstruct in full compliance if over 50%.*

Branson, Mo.
Substantially damaged April 2011 w/ 1 foot of flood water.
Being elevated to 1 foot above BFE (±8 feet).

SDE prioritization and field application

- **40-60% damage relative to market value:**
  - Use detailed, itemized repair cost estimates and definitive estimates of market value. *Reconstruct in full compliance if over 50%.*

GUIDANCE FOR ESTIMATING PERCENT DAMAGE CATEGORIES USING THE SUBSTANTIAL DAMAGE ESTIMATOR (SDE) FOR RESIDENTIAL PROPERTIES

Basic Flooding Model Assumptions:

1) Medium height freshwater flooding - limited duration. No high-velocity action; no wave action.
2) A 1-story house (without a basement) is used for this example house to establish the Categories of Work percentages of total costs.

			Damage Threshold			
Foundation			0 to 25%	25-50%	50-75%	Over 75%
Description	Continuous perimeter foundations, footings, and piers for internal beams and floor loads. Footing depth averages between 30 inches and 42 inches below ground level. Materials include unreinforced cast-in-place concrete, unreinforced masonry or concrete masonry units (CMUs), concrete slab on grade, or raised slab construction.	Threshold Markers	Water level does not rise to the level of the bottom of the first floor of the structure. No scouring at the footings. Some undermining but no visible cracking at concrete slab.	Water level rises just above first floor level. Limited scouring at the footings. Soils are saturated. Undermining of the concrete slab, especially at corners - hairline cracks only.	Water level is 4-7 feet against the outside of the building. Limited scouring at the footings. Soils are saturated and unstable Cracks noted on or along the foundation walls. Significant undermining of the concrete slab - significant cracking is visible.	Water level is 7 feet or higher against the outside of the building. Limited scouring at the footings. Foundation is notably cracked and/or displaced. Structure has been knocked off its foundation. Portions of the foundation are damaged or missing Significant undermining of the concrete slab - major cracking and separation of the concrete slab.
		Common Damages	Short-term inundation to limited heights. Limited scouring and erosion - low flow and low velocity floodwaters. No noticeable cracking of the masonry or displacement of the foundation walls.	Short-term inundation - Foundation is inundated with flood waters but for a limited duration. Limited scouring or undermining of the foundation or footings is found. Minor cracking from some settlement but no displacement, heaving or discontinuities of the structural support systems.	Floodwaters extend over the top of the foundation system - significant inundation for over 12 hours. Some cracking of the masonry/concrete foundation walls. Some damages to the foundation wall from debris or settlement noted.	Settlement noted at the footings, due to erosion or unstable soils. Foundation wall damage - sections of the walls are cracking, displaced, and missing, causing an inherent instability to the support for the house. Use caution when approaching or entering the house.
Special Considerations for Coastal/High Velocity Floods			Coastal floods may have more evidence of scouring at the supports - the foundation system may be better designed to resist this scouring action. High velocity floodwaters may create erosion/scouring that the building has not been designed to resist.			

FEMA

SDE prioritization and field application

- **60-100% damage relative to market value:**
  - Use approximate damage determination methods. *Reconstruct In full compliance.**

Damage Assessment Guidance

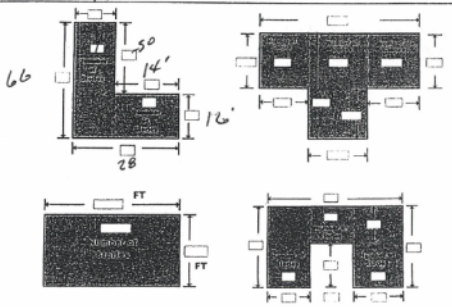
GUIDANCE FOR ESTIMATING PERCENT DAMAGE CATEGORIES USING THE SUBSTANTIAL DAMAGE ESTIMATOR (SDE) FOR RESIDENTIAL PROPERTIES

Cabinets and Countertops		0 to 25%	25-50%	50-75%	Over 75%
Description	The basic cabinets for bathroom vanities and kitchens include paint-grade cabinets made of a fiberboard or plywood material. The countertop is laminated plastic or a manmade 'cultured stone' surface. Paint-grade cabinets are the baseline because they can be painted to match upper wall cabinets, when they are repairable, to return the house to pre-disaster conditions. Damaged cabinets with hardwood face-frames, doors, and drawers will require replacement of both the base cabinets and upper wall cabinets, to allow return to the pre-disaster condition. Hardwood cabinets will require replacement (at 100% value) when water is more than 12 inches above finish floor.				
Threshold Markers		Water level is less than 4 inches above the finished floor level.	Water level is between 4 and 12 inches above the finish floor level. Flood duration is short - no prolonged exposure to water or contaminants.	Water level is between 1 foot and 3 feet above the finish floor level. Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.	Water level is more than 3 feet above finish floor level. Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.
Common Damages		Base cabinets have minimal water damage. Swelling and deterioration of manufactured case goods, especially cabinet bases, sides, and drawers using engineered wood products. Bathroom vanity cabinets and kitchen base cabinets may need cleaning, sanitizing, and limited repairs. Repainting will be required to match upper cabinets in kitchen.	Base cabinets of particleboard or medium-density fiberboard need to be replaced. Repaint to match upper cabinets in kitchen. Wood and plywood base cabinets may need cleaning, sanitizing, and some repairs at cabinet base. Repainting will be required to match upper cabinets in kitchen.	Replace base cabinets. Water damage and exposure is prolonged - deformation, delamination, and warping of cabinet base drawers and doors. Water contains debris and contaminants. The countertops may need to be replaced.	Replace base cabinets and wall cabinets. Water damage and exposure is prolonged - deformation, delamination, and warping of cabinet base drawers and doors. Water contains debris and contaminants. The countertops will need to be replaced.

9. SDE Sample Notice of Determination – Substantial Damage	0.12M	September 1, 2017
10. SDE Sample Notice of Determination – Substantial Improvement	0.12M	September 1, 2017
11. SDE Sample Notice of Determination – No Substantial Damage	0.12M	September 1, 2017
12. SDE Appendix E – Guidance for Estimating Percent Damage for Residential Structures	0.27M	September 1, 2017
13. SDE Appendix F – Guidance for Estimating Percent Damage for Non-Residential Structures	0.18M	September 1, 2017

http://www.fema.gov/media-library/assets/documents/18692

SDE Field Workbook 14' **Appendix B**



Damage Information:

Date Damaged Occurred: _____

Cause of Damage: Fire _____ Flood _____ Seismic _____ Wind _____ Other _____

Duration of Flood: _____ hours or _____ days

Est. Flood Elevation (ft.) 4.2' Est. Flood Depth (ft. above first floor) 2.8'

Flood Depth above Lowest Floor: Exterior Walls _____ ft Interior Walls _____ ft

Inspector Information:

Name of Inspector: Jim Dower

Date of Inspection: 10/13/2011 Time of Inspection: 10:00 A

Phone Number of Inspector *(including area code)*: _____

NFIP Information:

NFIP Community I.D.# _____ FIRM Panel #: _____

FIRM Suffix: _____ Date of FIRM Panel: _____ FIRM Zone: _____

BFE (NGVD): 1228 Regulatory Floodway: Yes _____ No _____ Potential _____

Adjustments:

Roof: Description Metal Quantity (Sq. Ft.) _____ Unit Cost _____

SDE Field Workbook **Appendix B**

PERCENT OF DAMAGE FIELD ESTIMATE *(for manufactured homes)*

20	% Foundations
50	%Superstructure (Framing/Masonry)
0	% Roof Covering
60	% Exterior Finish
100	% Interior Finish
40	% Doors and Windows
100	% Cabinets/Countertops
100	% Floor Finish
20	% Plumbing
75	% Electrical
100	% Appliances
100	% Heating/Cooling (HVAC)

Condition of Structure: *(Check one)*

1 Inundation damage only ___ Minor structural damage ___ Major structural damage

V Partially collapsed ___ Structure moved off foundation ___ Totally destroyed/collapsed

Description of Damage: *(Answer yes or no)*

Plumbing: Exposed NO In need of repair _____

HVAC/Electrical: Submerged YES Damaged _____ Repair _____ Replace YES

Use numbers from the right to describe the condition of items C through F:

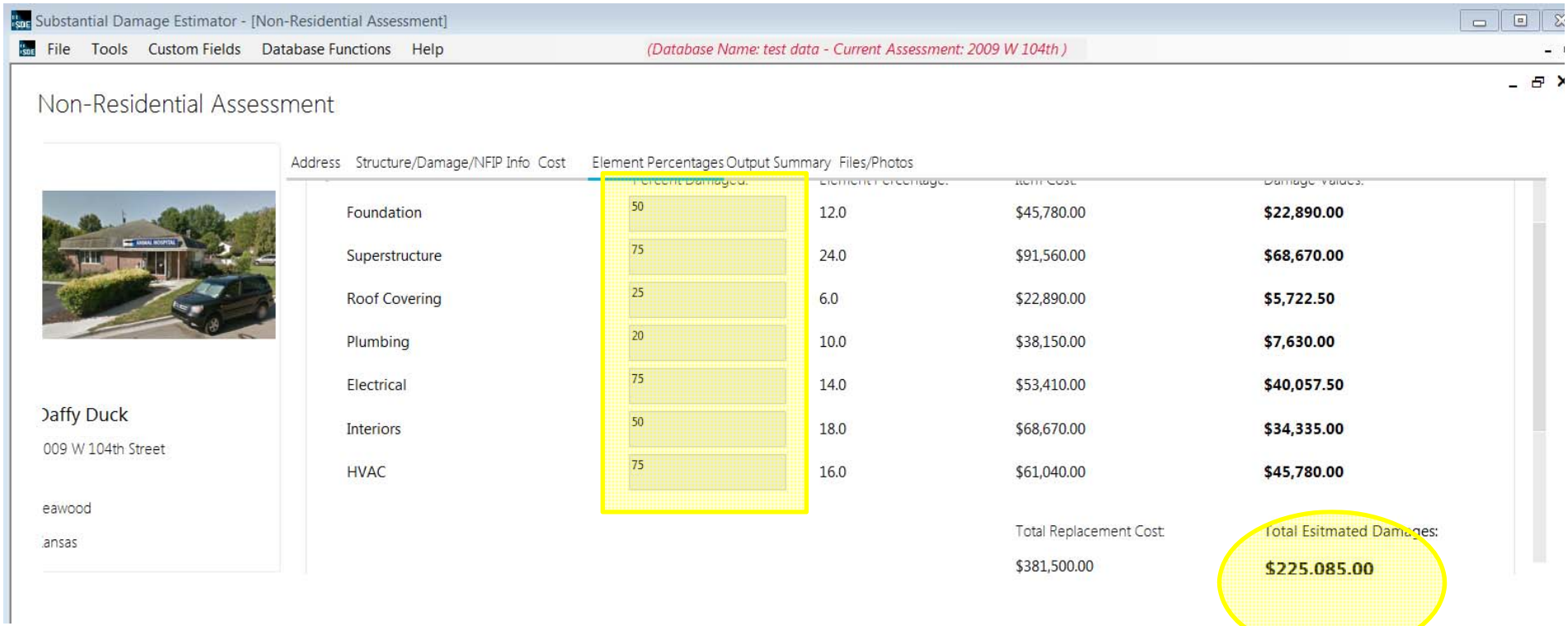
(C) Foundation 2	1. No visible damage	5. Dislodged/Destroyed
(D) Exterior walls 6, 2	2. Settlement/cracked	6. Submerged
(E) Interior walls 6	3. Partially missing	7. Include all of the above
(F) Roof 1	4. Sagging	8. Other (explain) _____

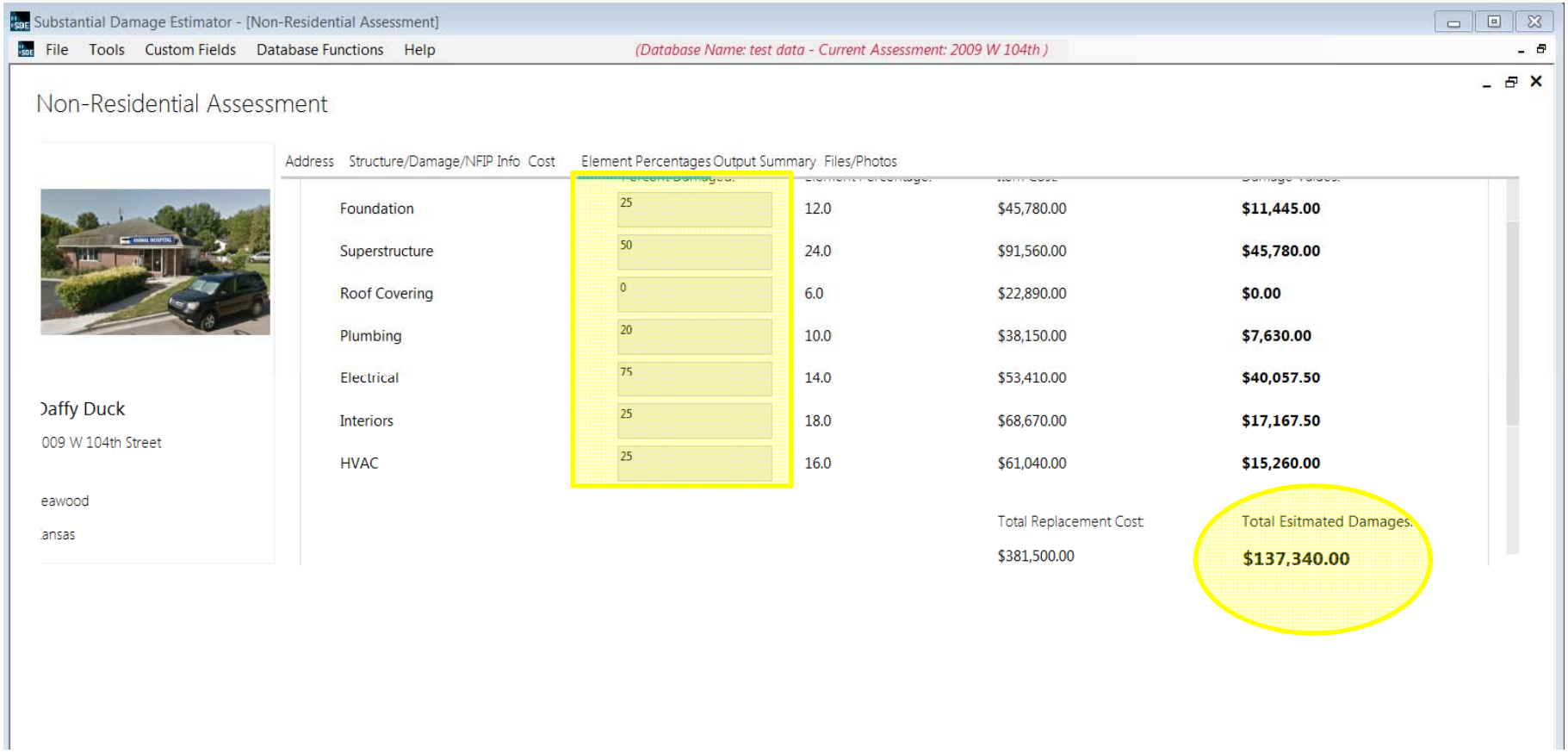
[redacted]8760

Assessment of: 10/13/2011

Owner Name Percent Damaged	Basis for Value of Building	Basis for Cost of Repairs	Actual Cash Value of Home	Type of Structure
[redacted]	Computed Actual Cash Value	Computed Damages	$32,144.00	Manufactured House
91.5 %	$32,144.00	$29,411.77		

Completed example




Substantial Damage Estimator - [Non-Residential Assessment]
File Tools Custom Fields Database Functions Help
(Database Name: test data - Current Assessment: 2009 W 104th)
Non-Residential Assessment
Address Structure/Damage/NFIP Info Cost Element Percentages Output Summary Files/Photos
Daffy Duck
009 W 104th Street
eawood
ansas
Foundation 25 12.0 $45,780.00 $11,445.00
Superstructure 50 24.0 $91,560.00 $45,780.00
Roof Covering 0 6.0 $22,890.00 $0.00
Plumbing 20 10.0 $38,150.00 $7,630.00
Electrical 75 14.0 $53,410.00 $40,057.50
Interiors 25 18.0 $68,670.00 $17,167.50
HVAC 25 16.0 $61,040.00 $15,260.00
Total Replacement Cost:
$381,500.00
Total Esitmated Damages:
$137,340.00

Inspection Date:

From-

To-

Percent Damaged:

Min-

Current Record Detail

Owner:

Address:

Community ID:

Community:

Inspection Date:
7/7/2014

Inspector:
Shandi Teltschik

Percent Damaged:
38.4 %

View / Edit Property Info

Delete Property

View / Edit Assessment Info

Delete Assessment

67.9 %
(Substantially Damaged)

23.6 %
(Not Substantially Damaged)

SD report/Letter

Substantial Damage Estimator

Subdivision

Subdivision
Parcel # 0460711102002024000
Lot Number
Elev. of Lowest Floor 830 ft.
Datum NAVD88

Community

NFIP Community Name [redacted]
NFIP Community ID #
Latitude 39.938453

Building Address

Owner's Name	Duck, Daffy
Street Address	2009 W 104th Street
City	Leawood
County	Johnson
State	Kansas
Zip	66206
Phone	(999) 888-7777
Additional Owner(s)	N/A

Building Information

Date of Construction 1965
Use Commercial Retail
Quality Average

Damage Information

Date of Inspection 01/21/2016
Inspected by Todd Tucker
Inspector Phone (816) 283-7528
Date of Damage 7/14/2015
Cause of Damage Flood
Duration of Flood 6 Hours
Est. depth above lowest floor 2
Structure Information

NFIP Information

Firm Panel #	Suffix	Date of FIRM Panel	Firm Zone	BFE	Regulatory Floodway
29095C0275	F	8/16/2012	A	832.5	No

Percent Damaged

Value of Building	Percent Damaged	Cost of Repairs/Improvements
$301,004.00	45.6 %	$137,340.00
Computed Actual Cash Value	Possibly Substantially Damaged	Computed Damages

Damage Summary

Replacement Cost	$381,500.00	Computed Damages	$137,340.00
Depreciation %	21.1 %	Percent of Existing Improvements and Repairs Pre-Disaster	100 %
Computed Actual Cash Value*	$301,004.00	Repair/Reconstruction %	45.6 %

* Per FEMA Publication 213, Actual Cash Value may be used as Market Value.

Optional User Entered Data

Professional Appraisal		Contractor's Estimate of Repairs/Improvements	
Tax Assessment	$282,960.00		
Factor Adjustment	11	Community's Estimate of Repairs/Improvements	
Adjusted Tax Assessed Value	$3,112,560.00		

Authorized Local Official : _____ Authorized Local Official : _____

Thursday, January 21, 2016 Page 1 of 2

Substantial Damage

Sample Letter to Notify Structure Owner of Determination

NOTICE OF SUBSTANTIAL DAMAGE DETERMINATION (RESIDENTIAL)

Dear [name of structure owner]:

The City of Floodville has reviewed your recent application for a permit to repair [*describe proposed improvement/addition*] for the existing residential structure located at [insert structure address], Floodville, NY 14056. These repairs are required as a result of flood damage from the storms of August 26–28, 2017.

The Department of Building Inspections has determined that this structure is located within a mapped Special Flood Hazard Area on the Flood Insurance Rate Map (FIRM), Panel 0150, with an effective date of June 19, 2008. As required by our floodplain management ordinance or building code, we have evaluated the proposed repairs and determined that the damage constitutes Substantial Damage for the structure. This determination is based on a comparison of the cost estimate of the proposed cost of repairs to the pre-damage market value of the structure (excluding land value). When the cost of repairs equals or exceeds 50 percent of the pre-damage market value of the structure, the damage is considered to be Substantial Damage under the requirements of the National Flood Insurance Program (NFIP) and the city's Floodplain Management Ordinance dated April 8, 2005.

As a result of this determination, you are required to bring the structure into compliance with the flood damage-resistant provisions of the City regulations and/or code [cite pertinent sections].

We would be pleased to meet with you and your designated representative (architect/builder) to discuss the requirements and potential options for bringing the structure into compliance. Several issues must be addressed to achieve compliance. The most significant requirement is that the lowest floor, as defined in the regulations/code, must be elevated to or above the base flood elevation (BFE) [or the elevation specified in the regulations/code] on the FIRM. You may wish to contact your insurance agent to understand how raising the lowest floor higher than the minimum required elevation can reduce NFIP flood insurance premiums.

Please resubmit your permit application along with plans and specifications that incorporate compliance measures. Construction activities that are undertaken without a proper permit are violations and may result in citations, fines, the removal of the non-compliant construction, or other legal action.

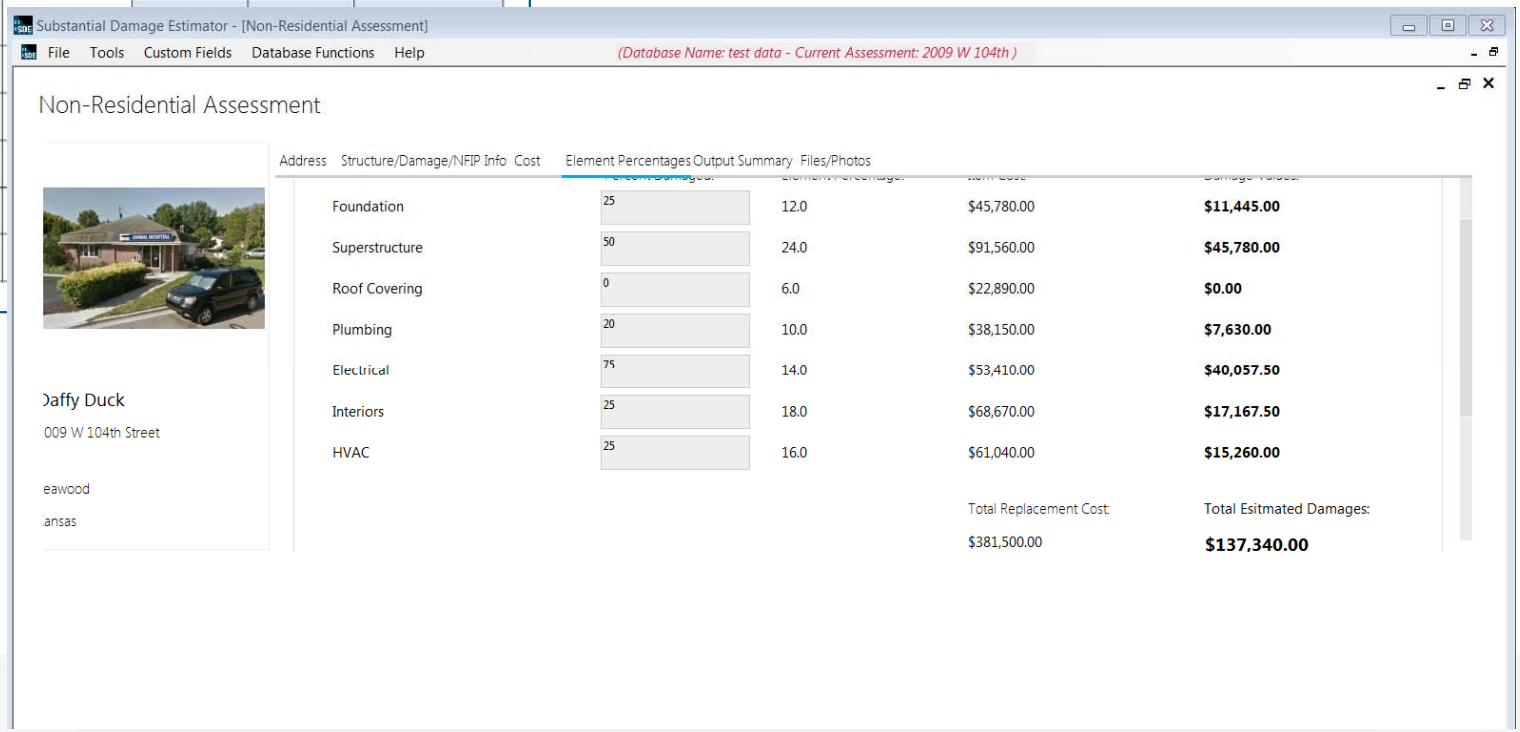
Non-Residential Assessment

Plumbing	0-25%	25-50%	50-75%	Over 75%
Description The plumbing system includes the incoming water service (municipal water supply or well service), the water heater, water distribution piping, fire protection system, and the wastewater system. Wastewater will be conveyed away from the structure by either a connection to the municipal sewer system or a septic system. When floodwaters saturate the soils, septic systems may be unable to discharge their waste, causing a back-up of the septic systems. If floodwaters rise above the level of the municipal sewer manhole covers, the sewage can back-up into the building through the sewer lines. Verify the condition of the potable water supply to determine if it can provide a safe water supply.	**Threshold Markers** Water level is less than 6 inches above the lowest floor level.	Water level is between 6 inches and 18 inches above the lowest floor level. Flood duration is short - no prolonged exposure to water or contaminants.	Water level is between 18 inches and 3 feet above the lowest floor level. Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.	Water level is more than 3 feet above the lowest floor level. Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.
	on Damages Floor drains can backflow into the building. Under floor (or under slab) plumbing systems should be purged, cleaned, and sanitized. Any materials that might contain remnants of waste materials ts in the ire	Floor drains, shower drains, bathtubs, and toilets can backflow into the building. Septic contamination is likely. Water heaters may need to be replaced.	Floor drains, shower drains, bathtubs, toilets, bathroom sinks, utility sinks, and toilets will backflow into the building. Septic contamination will occur. Water heaters will need to be replaced.	All plumbing fixtures will backflow into the building. Septic contamination will occur. Water heaters will need to be replaced.
	ms in place in the buildings may vary significantly, and damage thresholds should account for the ling being assessed.			

ELEMENT PERCENTAGES Tab

Element Percentages

Item	% Damaged	Element %	Item Cost	Damage Values
Foundation				
Superstructure				
Roof Covering				
Plumbing				
Electrical				
Interiors				
HVAC				



Non-entry assessments

Exterior Finish	0- 25%	25-50%	50-75%	Over 75%
Description The wall covering system that covers the wall sheathing, as well as insulation and weather stripping. This includes the water resistant materials and the finish materials: Stucco, Siding (aluminum, vinyl, or wood), Masonry, Stone veneer. Insulation is installed at the flooring beneath the lowest floor level and throughout the walls and ceilings. Types of insulation include: fiberglass wall and ceiling insulation, blown wall and ceiling insulation, and rigid wall insulation.	**Threshold Markers** Water level is less than 6 inches above the lowest floor level. The duration of the floodwaters is limited - less than 12 hours.	Water level is between 6 and 18 inches above the lowest floor level. The duration of the floodwaters is limited - less than 12 hours.	Water level is between 18 inches and 3 feet above the lowest floor level. The duration of the floodwaters is more than 12 hours.	Water level is more than 3 feet above the lowest floor level. The duration of the floodwaters is more than 12 hours.
	Water staining, contamination, and damages on some of the exterior wall finishes. 'Clean and repair' process is likely. Brick and stone veneer walls, stucco and 'cultured stone' may need some water techniques to allow the interior s and wall cavities. dherence of the finish s to the wall e. A limited amount ding materials may replacement as No damage or	Damages/losses to some areas of the exterior wall surfaces, in addition to water staining and contamination. Some repairs are required at damaged locations prior or during 'clean and repair' process. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify adherence of the finish materials to the wall substrate. Damaged house	Damages/losses to significant sections of the exterior wall surfaces, in addition to water staining and contamination. Significant repairs are required at damaged locations prior to 'clean and repair' process. Replacement of some sections of the exterior siding is required. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify	Damages/losses to major sections of the exterior wall surfaces, in addition to water staining and contamination. Major repairs are required at damaged locations prior to 'clean and repair' process. Replacement of large sections of the exterior siding is required. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify adherence of the finish

ELEMENT PERCENTAGES Tab

Element Percentages

Residence Type: ____ Single-Family **(SF)** House ____ Manufactured House **(MH)**

Item	% Damaged	Element %	Item Cost	Damage Values
Foundation **(SF only)**				
Superstructure				
Roof Covering				
Exterior Finish				
Interior Finish				
Doors and Windows				
Cabinets and Count				
Flood Finish				
Plumbing				
Electrical				
Appliances				
HVAC				
Skirting / Forms Pier				

SDE OUTPUT SUMM

Professional Market

Tax Assessed Value

Contractor's Estima

Community's Estim

SDE Residential Damage Inspection Worksheet *7 of 7*

Residential Assessment

oren Eckert

30 S. Stanton Street

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lebraska

Address Structure/Damage/NFIP Info Cost Element Percentages Output Summary Files/Photos

Item:	Percent Damaged:	Element Percentage:	Item Cost:	Damage Values:
Foundation	0	8.8	$14,167.12	**$0.00**
Superstructure	25	19.9	$32,037.01	**$8,009.25**
Roof Covering	50	2	$3,219.80	**$1,609.90**
Exterior Finish	100	7.5	$12,074.25	**$12,074.25**
Interior Finish	20	11.6	$18,674.84	**$3,734.97**
Doors and Windows	80	13	$20,928.70	**$16,742.96**
Cabinets and Countertops	50	3.8	$6,117.62	**$3,058.81**
Floor Finish	50	11.9	$19,157.81	**$9,578.91**

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ICC and SD Estimation