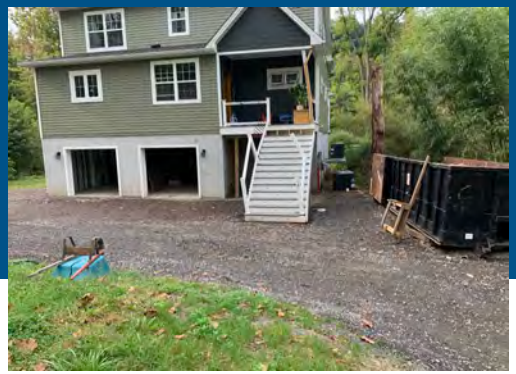
Substantial Damage Estimation (SDE) Introduction



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

FEMA

Substantial SDE Damage Estimator

Housekeeping/Health and Safety

- Emergency exits and evacuation procedures
- Facilities – restrooms and refreshments
- General class arrangement
- Course materials – paper vs. computer-based materials
- Wi-Fi access and password
- Lunch arrangements
- Field exercise and transportation
- Questions welcome anytime!

Unit 1 – Substantial Damage Estimation Introduction

Substantial Damage Estimation 3.0 Introduction

Substantial Damage Estimator

Introduction

Gregory Wilson

Emergency Management Specialist

FEMA Building Science Branch

SDE Lead, FEMA Headquarters (2010 - present)

FEMA

Substantial Damage Estimator

Introduction

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Program Analyst

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Substantial Damage Estimator

Introduction

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Floodplain Management Section Supervisor

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FEMA Region III

Substantial Damage Estimator

Introduction

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Advancing Resilience in Communities (ARC)

Tetra Tech

Substantial Damage Estimator

Introduction

Melissa Mitchell, CFM

Floodplain Management Analyst

Advancing Resilience in Communities (ARC)

Tetra Tech

FEMA

Icebreaker

Icebreaker

SDE Program Schedule

Day 1:

- Intro and General Information
- SDE Overview
- Inspection Guidance
- SDE Tool Introduction and Installation
- SDE Tool Overview
- Percent Damage Estimates
- Manual/Paper Exercises
- SDE Tool Features

Day 2:

- SDE Tool Features Continued
- SDE Tool Exercises
- SDE Best Practices
- SDE Resources and Final Comments
- Field Exercises

SDE Program Handouts

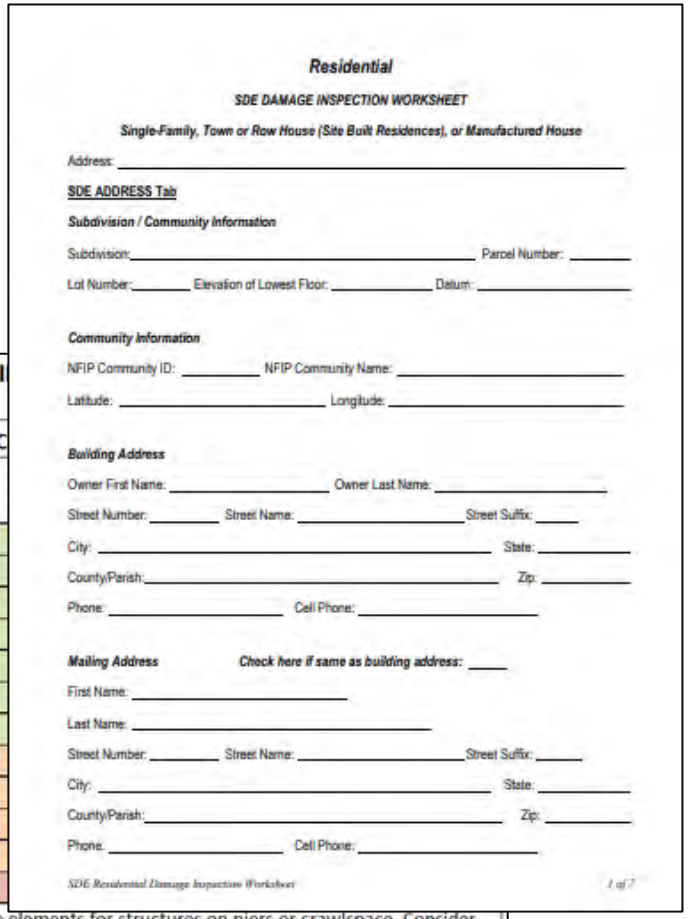
- Manual/Paper SDE Worksheets
- Rainbow Charts
- Case Studies

SIMPLIFIED QA/QC GUIDANCE FOR EVALUATION OF RESIDENTIAL CONCRETE BUI

1-STORY RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPAC

Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]
0'	0%	0%	0%	0%	0%
0.5'	10%	25%	5%	0%	0%
1'	20%	50%	5%	5%	10%
1.5'	40%	50%	5%	10%	10%
2'	40%	50%	5%	10%	20%
2.5'	40%	50%	5%	10%	20%
3'	50%	50%	10%	20%	20%
3.5'	50%	50%	10%	20%	50%
4'	75%	75%	15%	20%	60%
5'	100%	100%	20%	30%	60%
6'	100%	100%	25%	40%	70%
7'+	100%	100%	30%	50%	80%

NOTES: 1) **This simplified guidance should be used when the inspector cannot enter a structure.** **2)**Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. **3)** Structures on piles will be assessed on a case-by-case basis due to variability in finished space below the structure, location of utilities, and potential foundation and superstructure damage if located in a high velocity area.



Residential

SDE DAMAGE INSPECTION WORKSHEET

Single-Family, Town or Row House (Site Built Residences), or Manufactured House

Address: _____

SDE ADDRESS Tab

Subdivision / Community Information

Subdivision: _____ Parcel Number: _____

Lot Number: _____ Elevation of Lowest Floor: _____ Datum: _____

Community Information

NFIP Community ID: _____ NFIP Community Name: _____

Latitude: _____ Longitude: _____

Building Address

Owner First Name: _____ Owner Last Name: _____

Street Number: _____ Street Name: _____ Street Suffix: _____

City: _____ State: _____

County/Parish: _____ Zip: _____

Phone: _____ Cell Phone: _____

Mailing Address ***Check here if same as building address:*** _____

First Name: _____

Last Name: _____

Street Number: _____ Street Name: _____ Street Suffix: _____

City: _____ State: _____

County/Parish: _____ Zip: _____

Phone: _____ Cell Phone: _____

SDE Residential Damage Inspection Worksheet *1 of 7*

SDE Program Objectives

- What is SD?
- What is an SDE?
- Why are SD and SDE important?
- Percent Damage Determinations
- SDE Manual/Paper Exercises
- SDE Tool
- Field Exercises

SDE Purpose

- Community-wide and large-scale damage assessment.
- Multiple structure damage assessment.
- Prompt, effective, efficient and economical damage assessment.
- Rapid damage assessment and simplified damage estimate in percentage terms.
- Expedite prompt community recovery and regulatory processes, including permit administration.
- Consistent and standardized.
- Reasonable and defensible.

SDE Application

SDE assessments and determinations include:

- Primary structure only.

SDE assessments and determinations exclude:

- Property/real estate value.
- Secondary or accessory structures.
- Property improvements.
- Structure contents and personal property.
- Vehicles.
- Lost wages and income, including rental income.

SDE Application

SDE determinations are applicable to:

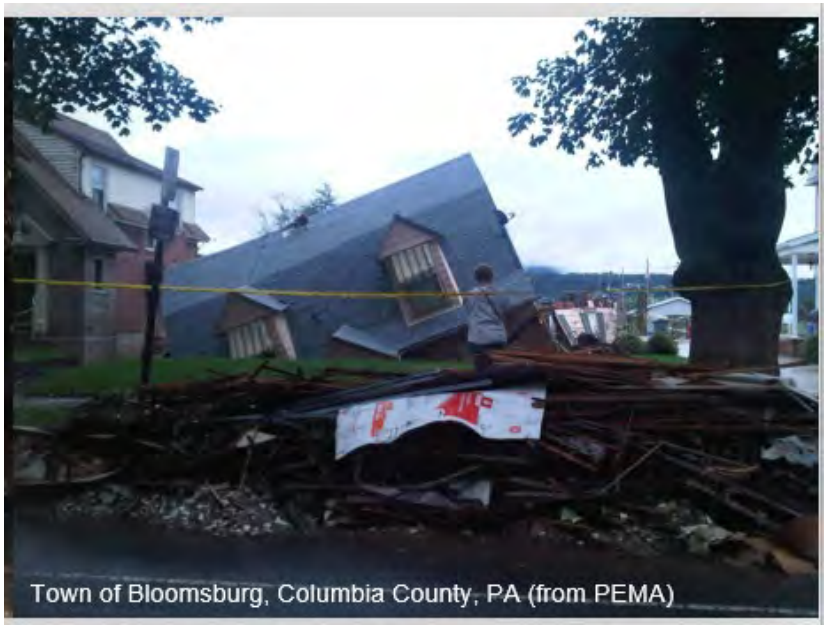
- Residential structures.
- Non-Residential/Commercial structures.
- Mixed-use structures and occupancies/uses.

SDE considerations and determinations are based on a structure's:

- Area (in square feet) and height (in stories).
- Construction type, characteristics and attributes.
- Primary, initial, intended and approved occupancy/use.

Substantial Damage Estimator

Questions?


Town of Bloomsburg, Columbia County, PA (from PEMA)

Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

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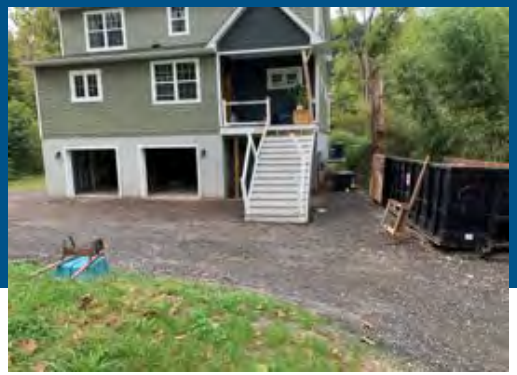
Substantial Damage Estimation (SDE) Overview



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

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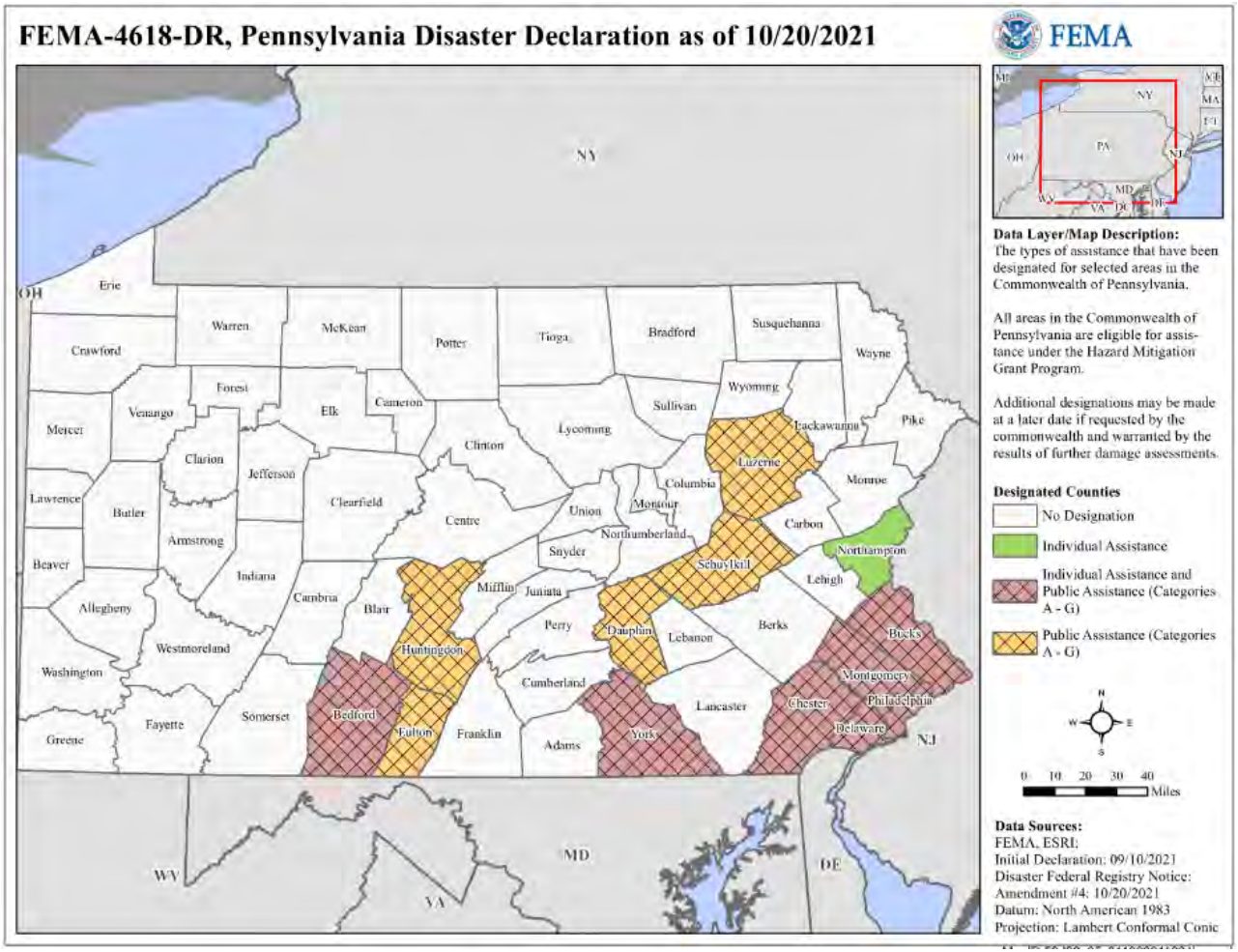
Substantial SDE Damage Estimator

Unit 2 – Substantial Damage Estimation Overview

Overview of Substantial Damage Estimation

Substantial Damage Estimator

Statistics – More Than Numbers



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Substantial Damage (SD) Definition

Substantial Damage as defined in the National Flood Insurance Program (NFIP) 44 CFR 59.1:

- Damage of any origin sustained by structures whereby restoration costs to return to its pre-damage condition equal or exceed 50% of the structure's market value prior to damage occurrence.
- "*Any origin*" refers to any natural or man-made hazards or other sources.

"*Damage is damage, no matter the origin*".

Why Conduct Substantial Damage Assessments & Determinations?

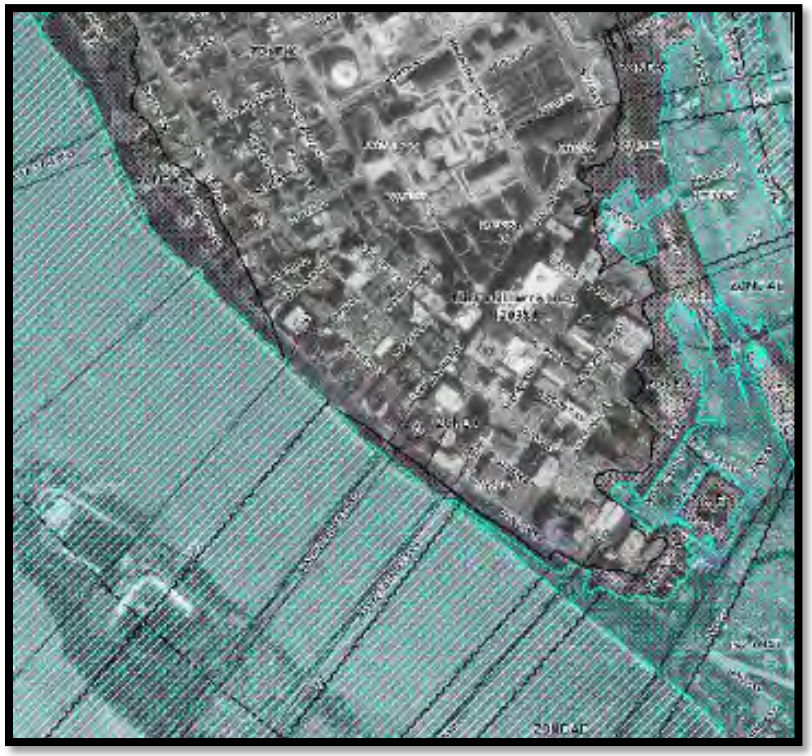
NFIP regulations require NFIP-participating communities to determine the extent of structure damage after all damage events.

- Determine structures as substantially damaged or not.
- Does not pertain to structures beyond designated Special Flood Hazard Areas (SFHAs) boundaries unless addressed in local floodplain management ordinances.

Why Conduct Substantial Damage Assessments & Determinations?

Substantial damage requirements and determinations apply to:

- All structures or portions thereof located in SFHA designated boundaries by FEMA/Flood Insurance Rate Maps(FIRMs).
- All structures located in other SFHAs designated by local community floodplain management ordinances.
- SFHA = 100-year floodplain



Purpose of SDE Assessments, Inspections and Determinations

SDE assessments, inspections and determinations provide:

- Structure assessments and estimated damages in percentages.
- Structure total percent damage at/above or below 50% threshold.

Purpose of SDE Assessments, Inspections and Determinations

Discussion Points:

- Target structures with 30 to 70 percent estimated damage to concentrate SDE efforts on those structure determinations at/above 50%.
- 50% ratio threshold as a compromise to zero versus total reconstruction.

SDE Determinations

- SDE determinations must be reasonable and defensible.
- SDE tool provides effective, efficient and equitable process for local officials to estimate substantial damage determinations.
  - Aids in calculating substantial damage estimates.
  - Aids in rapid collection of SDE data based on SDE tool inspection criteria based on visual observations.
  - Creates formal, standardized and organized reports of SDE inspection results.

Damage of Any Origin

Although primary causes of damage may be flood or flood and high winds, SDE assessments must evaluate impacts of all damages caused by all sources, including:

Hurricane	Foundation Settlement
Storm Surge	Roof Damage from Trees
Tsunami	Lack of Maintenance
Tornado	Vandalism
Fire	Pre-Event Damage and Other Origins

Substantial Damage Ratio

$$\frac{\text{Structure Repair Cost}}{\text{Structure Market Value}} \geq 50\%$$

A ratio equal to or greater than 50% is considered substantially damaged.

Market Value = Pre-Damage Value

Structure Repair Costs

The NFIP regulations allow three options for determining structure repair cost:

- SDE tool-computed cost estimate.
- Contractor cost estimate.
- Community cost estimate.

Substantial Damage Estimator

Structure Repair Costs

Contractor and community cost estimates must:

- Include all itemized structure repair costs required to return a structure to pre-damage condition.
- Estimate labor and materials at prevailing market values.
- Include volunteer labor and donated or discounted materials at prevailing market values.

Structure Repair Costs

General Structure Repair Cost Items Include:

- Materials and labor
- Site preparation
- Demolition and construction debris removal
- Costs required for compliance with other regulations
- Construction management
- Sales tax on materials

Note: Project cost estimates should provide detailed and itemized information for these items.

Substantial Damage Estimator

Cost Estimate Method

- Communities must decide which cost estimate methods can be used for estimating structure fair market value and structure repair cost community-wide.

- Communities must apply one single, consistent cost estimate method for structure fair market value and structure repair cost community-wide.

- Property owners may appeal SDE determinations and may hire professional appraisals at their own expense, provided this option is available to all property owners.

Substantial Damage Estimator

Structure Market Value

The NFIP requirements allow three options for determining structure value or structure pre-damage market value:

- Computed Actual Cash Value (ACV) – calculated from SDE tool, multiplies structure area (square feet) and base cost (or per unit cost).
- Adjusted Tax Assessed Value.
- Professional Appraisal Value.

Substantial Damage Determinations and Appeals

- Property owners possess legal rights to appeal SDE determinations completed by communities.
- Property owners must demonstrate SDE determinations and damage percentages by approved methods that differ from the community's selected method of SDE determinations for structure repair cost and structure market value.
- Property owners may appeal community SDE determinations by any other approved methods at their expense, including contractor estimates and professional appraisals, provided all other property owners may exercise the same rights and processes.
- The community's best defenses against appeal challenges and losses are SDE determinations that are consistent, reasonable and defensible.

General Guidance

Consider structure repairs required to return structures to pre-damage conditions while in compliance with local construction codes, floodplain management and other ordinance requirements.

SDE Purpose

SDE Purpose:

- Verify total structure percent damage at/above or below 50%.
- Verify reasonableness of structure substantial damage determination.
- Verify substantial damage determination supported by the SDE data collected and accurate calculations.

SD Determination Impact

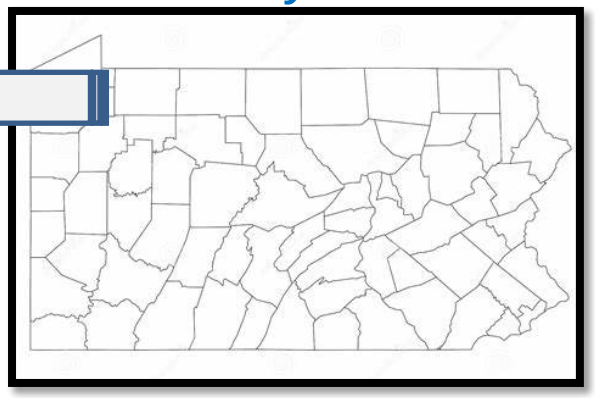
Substantial damage determinations at/above 50% require that structures be brought into compliance with all local floodplain management ordinances and construction codes.

Federal, State, Territorial and Local Roles and Responsibilities

Federal, state, territorial and local governments possess distinct roles and responsibilities related to substantial damage estimation.

FEMA

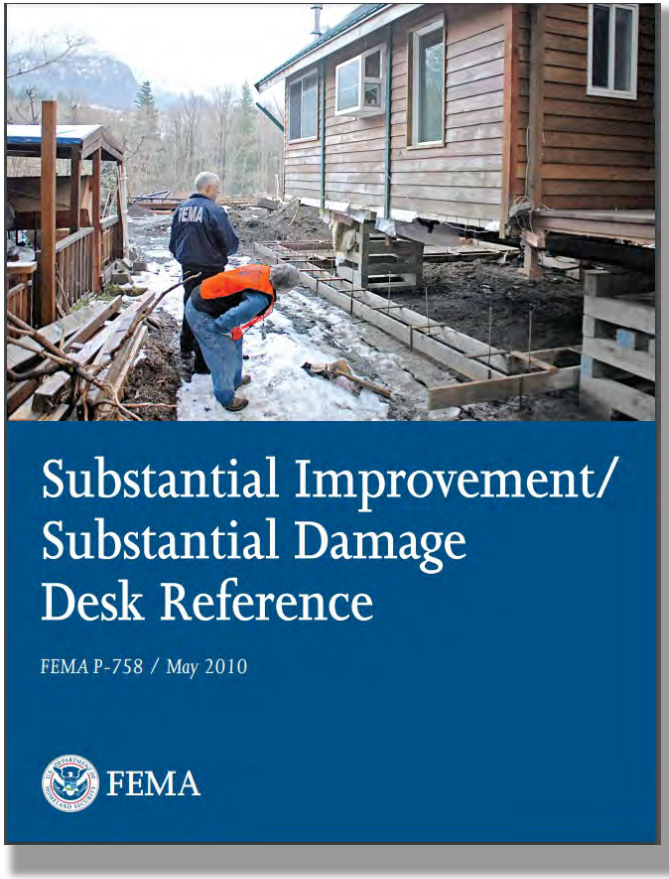
State/County



Federal Roles and Responsibilities

FEMA, through the NFIP:

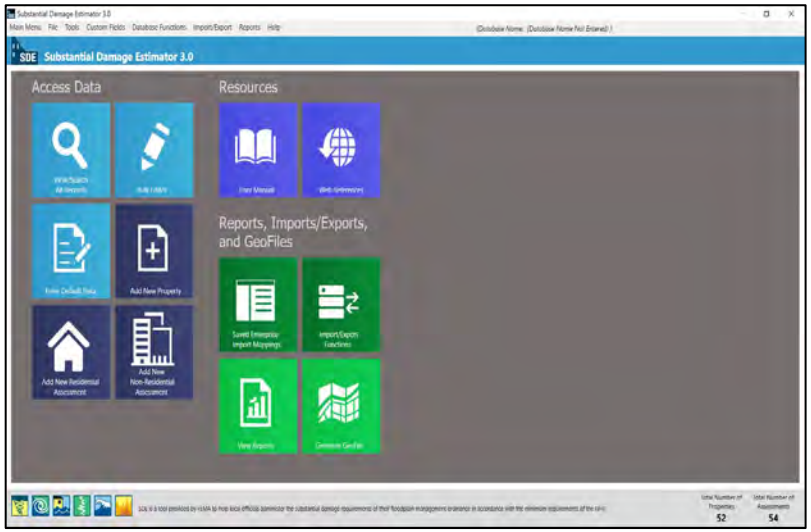
- Supplements state and local communities with technical assistance, guidance and instruction following:
  - Presidential disaster declarations.
  - Post-disaster substantial damage requirements.
- Acts as a liaison with state and local communities, as requested.

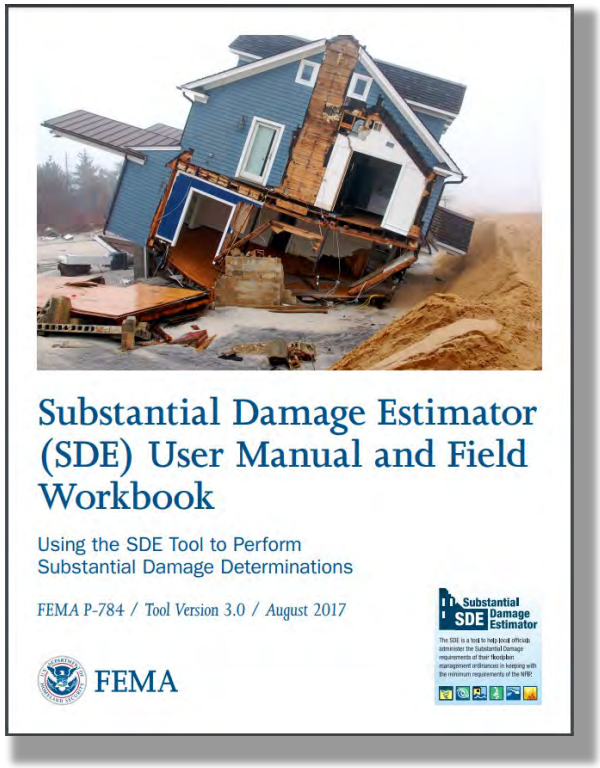


Federal Roles and Responsibilities

FEMA, through the NFIP:

- Administers the NFIP programs.
- Provides free educational resources regarding substantial damage assessments and estimations.





Substantial Damage Estimator

State and Territory Roles and Responsibilities

State and territorial authorities assist communities with:

- Understanding substantial damage requirements.
- Identifying and prioritizing neighborhoods requiring substantial damage assessments and determinations.
- Organizing local and volunteer resources to attend to immediate issues.
- Assisting FEMA in prioritizing communities for assistance as required.
- Conducting substantial damage assessments and determinations on all state-owned facilities.

Local Roles and Responsibilities

Local communities are responsible for:

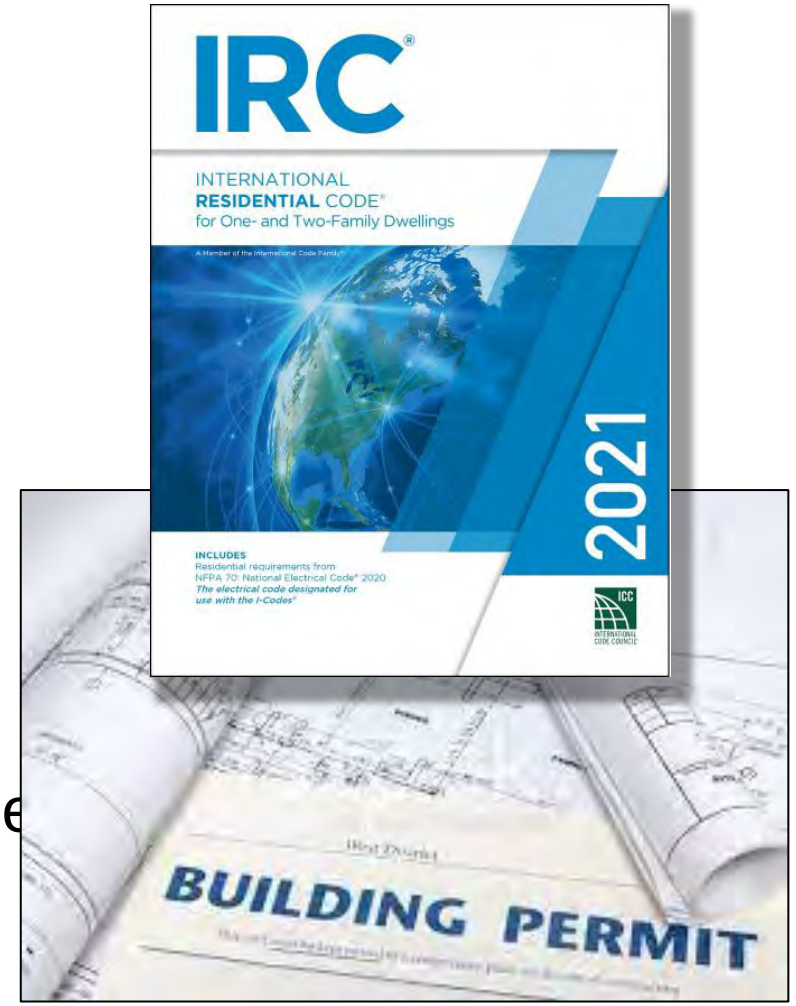
- Selecting methods to determine substantial damage determinations.
- Providing property data to conduct substantial damage assessments and determinations.
- Conducting timely substantial damage assessments and determinations for publicly and privately owned structures.

Local Roles and Responsibilities

- Promptly informing property owners regarding:
  - SDE determination requirements.
  - Post-disaster regulatory demolition and construction permit requirements.
  - Appeal rights and process.
- Provide technical assistance.
  - Assist the community and residents in understanding flood hazards, floodplain maps and substantial damage.

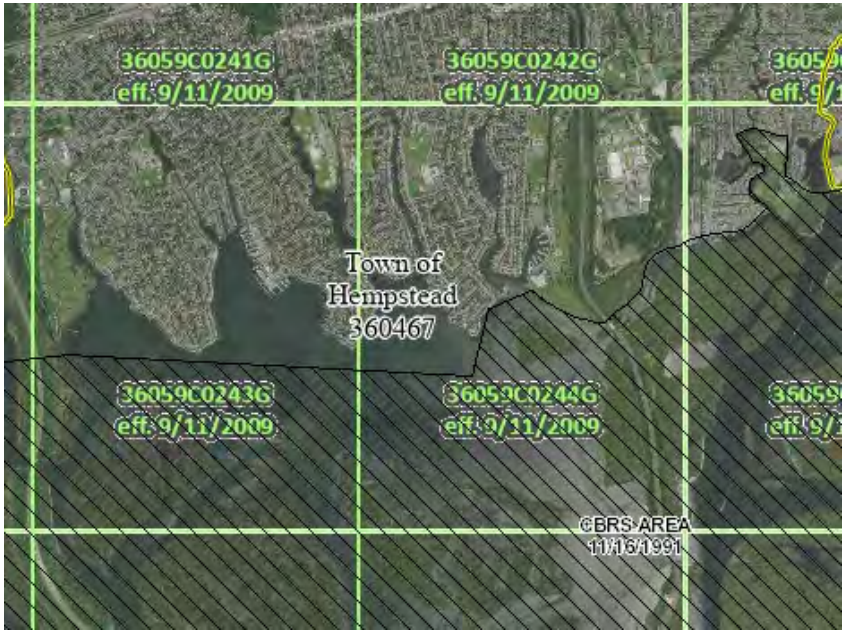
Local Roles and Responsibilities

- Enforcing reconstruction requirements.
- NFIP regulations and requirements.
- Local floodplain management ordinances.
- Local construction codes.
- Substantial Improvement/Substantial Damage (SI/SD) requirements.



Local Community Roles and Responsibilities

- Identify the local agency, department or official responsible for floodplain management.
- Determine SFHA boundaries and when structures or portions of structures are in SFHAs.
  - Designated by FEMA FIRM maps.
  - Designated by local community floodplain management ordinances and maps.



Local Community Roles and Responsibilities

- Review development and construction proposals for regulatory compliance.
  - Issue or deny SFHA demolition, development and construction permits.
- Assist with data collection for revising floodplain maps.

Local Community Roles and Responsibilities

- Conduct substantial damage assessments and determinations.
- Review post-disaster SDE assessments and determinations for accuracy and reasonableness.
- Review cost estimates for post-disaster repairs to determine if they are complete, itemized and reasonable with fair market values.

Substantial Damage Estimator

Subdivision
Subdivision
Parcel # 60T2R70000017
Lot Number
Elev. of Lowest Floor 0.1 ft.
Datum TBD

Community
NFIP Community Name VILLAGE OF TANGIPAHOA
NFIP Community ID # 220213
Latitude 30.88126 Longitude -90.51376

Building Address
Owner's Name
Street Address
City
County
State
Zip
Phone
Additional Owner(s) NA

Building Information
Year of Construction 1960
Type Manufactured House
Quality Average

Damage Information
Date of Inspection 10/10/2016
Inspected by Team_02
Inspector Phone
Date of Damage 8/12/2016
Cause of Damage Flood
Duration of Flood 24 Hours
Est. depth above lowest floor 1.0
Residence Information

NFIP Information

Firm Panel #	Suffix	Date of FIRM Panel	Firm Zone	BFE	Regulatory Floodway
22105C0075	F	7/22/2010	AE	177.0	Possible

Percent Damaged

Value of Building	Percent Damaged	Cost of Repairs/Improvements
$43,388.72	80.1 %	$34,767.69
Computed Actual Cash Value	Substantially Damaged	Computed Damages

Damage Summary

Replacement Cost	$70,896.60	Computed Damages	$34,767.69
Depreciation %	38.8 %	Percent of Existing Improvements and Repairs Pre-Disaster	0 %
Computed Actual Cash Value*	$43,388.72	Repair/Reconstruction %	80.13

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

Optional User Entered Data
Professional Appraisal
Tax Assessment $0.00
Factor Adjustment 0
Adjusted Tax Assessed Value
Contractor's Estimate of Repairs/Improvements
Community's Estimate of Repairs/Improvements

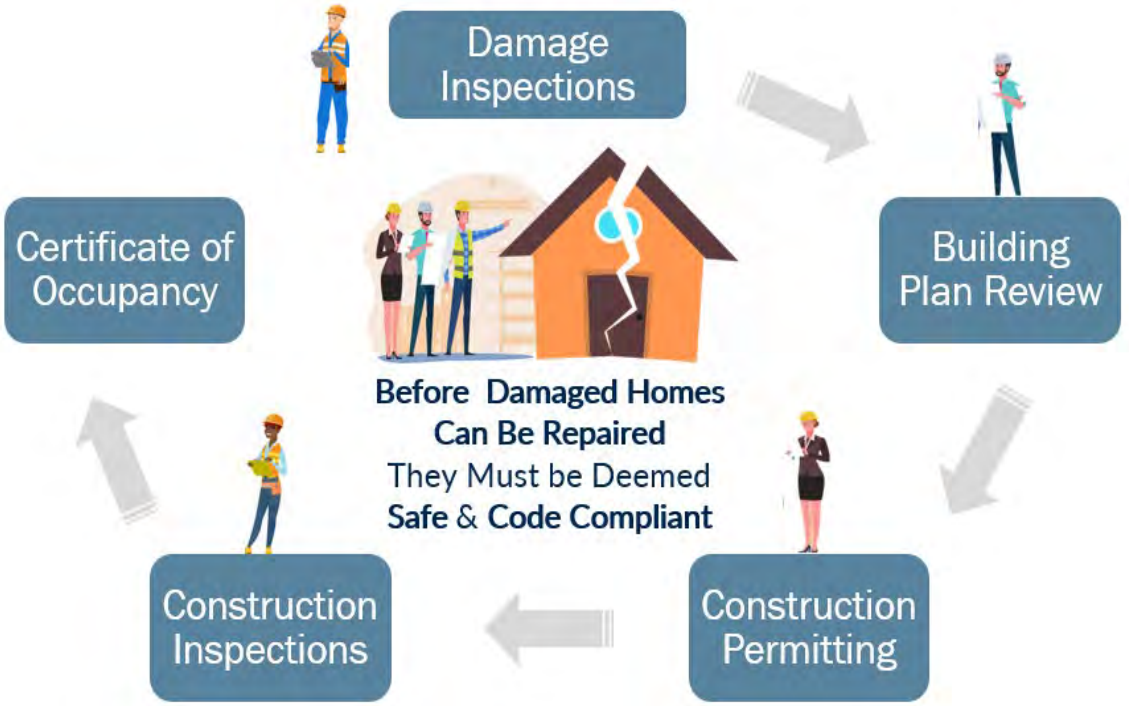
Authorized Local Official : Signature _____
Authorized Local Official : Printed Name _____

Thursday, October 05, 2017
Page 1 of 1

Community Challenges

Discussion Point:

What post-disaster challenges might communities face that may affect their abilities to conform to substantial damage requirements in disaster aftermaths?



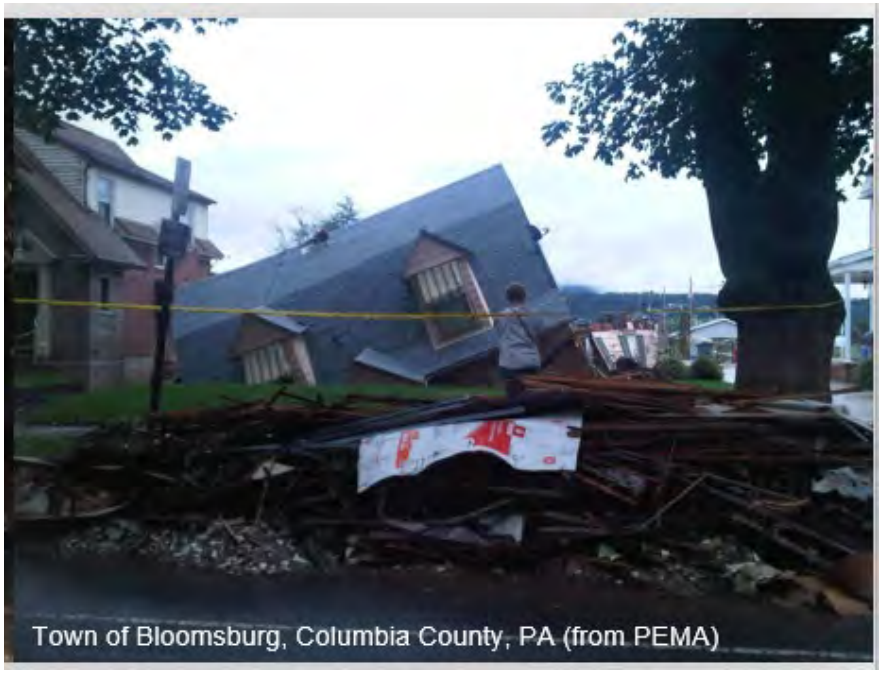
Substantial Damage Estimator

Community Challenges

- Lack of knowledge of community responsibilities and obligations under NFIP regulations for post-disaster actions.
- Lack of experience with disasters.
- Disaster types and extents.
- Multiple competing interests and priorities.
- Damaged or limited city facilities.
- Damaged infrastructure and transportation.
- Loss of utilities – electric, gas, water, wastewater, phone and internet.
- Loss of critical services – police, fire, medical and Emergency Operation Centers.

Substantial Damage Estimator

Questions?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Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

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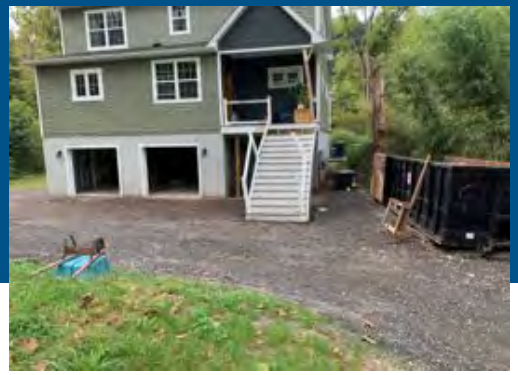
Substantial Damage Estimator

Community Challenges

- Lack of access to damaged or restricted areas due to flooding, debris or downed power lines.
- Quickly identifying damage extent in floodplains.
- Lack of pre-disaster data needed for cost estimates:
  - Structure market or assessed values.
  - Structure repair costs.
- Neighboring communities also affected by disasters.
- Large number of affected structures.
- Large number of permit applicants.
- Limited staff and resource availability.

Substantial Damage Estimation (SDE) Inspection Guidance



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

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Substantial SDE Damage Estimator

Unit 3 – SDE Inspection Guidance

Prior to SDE assessments and inspections, communities must establish and identify:

- SDE manager
- SDE chain of command
- SDE roles and responsibilities
- SDE expectations
- SDE processes, procedures and protocols
  - May differ for various governmental levels and agencies

SDE Inspection Guidance

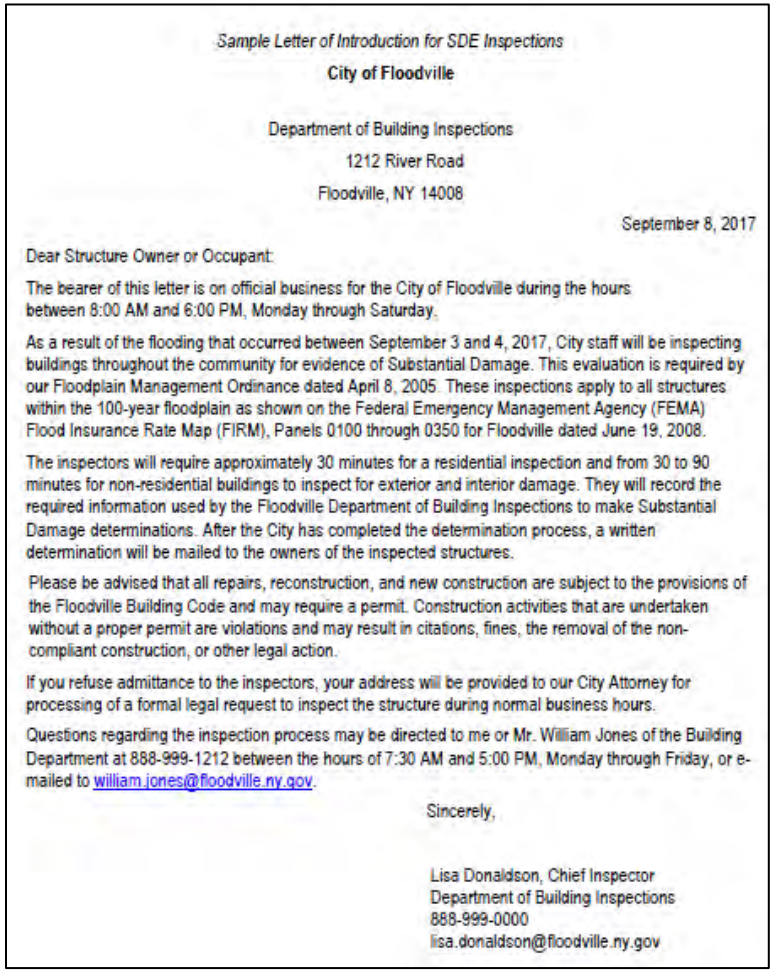
Two-Person SDE Inspection Teams:

- Reduced personal safety and security issues
- Improved SDE inspection data accuracy, completeness and quality
- Reduced SDE inspection distraction and delay impacts
- Increased SDE inspection timeliness and speeds

SDE Inspection Guidance

Community Communications:

- Develop Letters of Introduction from community points of contact
- Issue SDE inspection notices on jurisdictional letterhead
- Conduct and/or issue public service announcements
- Provide photographic identification inspection badges



Sample Letter of Introduction for SDE Inspections

City of Floodville

Department of Building Inspections
1212 River Road
Floodville, NY 14008

September 8, 2017

Dear Structure Owner or Occupant:

The bearer of this letter is on official business for the City of Floodville during the hours between 8:00 AM and 6:00 PM, Monday through Saturday.

As a result of the flooding that occurred between September 3 and 4, 2017, City staff will be inspecting buildings throughout the community for evidence of Substantial Damage. This evaluation is required by our Floodplain Management Ordinance dated April 8, 2005. These inspections apply to all structures within the 100-year floodplain as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Panels 0100 through 0350 for Floodville dated June 19, 2008.

The inspectors will require approximately 30 minutes for a residential inspection and from 30 to 90 minutes for non-residential buildings to inspect for exterior and interior damage. They will record the required information used by the Floodville Department of Building Inspections to make Substantial Damage determinations. After the City has completed the determination process, a written determination will be mailed to the owners of the inspected structures.

Please be advised that all repairs, reconstruction, and new construction are subject to the provisions of the Floodville Building Code and may require a permit. 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.

If you refuse admittance to the inspectors, your address will be provided to our City Attorney for processing of a formal legal request to inspect the structure during normal business hours.

Questions regarding the inspection process may be directed to me or Mr. William Jones of the Building Department at 888-999-1212 between the hours of 7:30 AM and 5:00 PM, Monday through Friday, or e-mailed to william.jones@floodville.ny.gov.

Sincerely,

Lisa Donaldson, Chief Inspector
Department of Building Inspections
888-999-0000
lisa.donaldson@floodville.ny.gov

SDE Inspection Guidance

Property and Structure Access and Entry:

Communities and SDE inspection teams must:

- Always request authorization prior to entering properties and structures
  - Possibly request written permission with initialed SDE assessment form
- Verify permission granted by legal property owners or tenants
- Never trespass or demonstrate forceful behaviors
- Never enter properties and structures having any potentially unsafe, unsanitary, dangerous or hazardous conditions

SDE Inspection Guidance

"As-Is" Property and Structure Conditions

- SDE inspections to be completed in "*as-is*" condition
- SDE inspections not invasive or destructive
- SDE inspectors should never:
  - Remove exterior or interior finishes or other items
  - Access certain inaccessible spaces, especially with ladders

SDE Inspection Guidance

Three components of SDE inspections that require **best professional judgement** by SDE inspectors:

- Initial/original structure construction quality
- Pre-damage structure depreciation value
- Structure percent damage for structure elements
  - Recorded in 5% increments

SDE Inspection Guidance – Damage Undetermined

Select **damage undetermined** options in SDE tool when:

- **No physical damage** sustained by structures
- **Vacant property parcel/lot** without structures
- **No applicable property address** or property address does not exist
- **No property access** or structure entry otherwise not possible
- **Refused structure inspection** by occupant/resident
- **Other**

When selecting Damage Undetermined, other data fields become unavailable or grayed out.

SDE Inspection Guidance

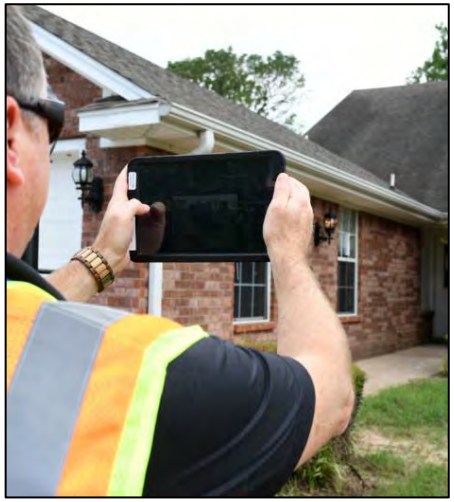
Anticipated SDE Inspection Times:

- Residential inspections – 15 minutes each
- Non-Residential/Commercial inspections – 15 to 45 minutes each
  - Dependent upon structure area/size and complexity
- Daily average – 20 inspections per team
  - Daily average typically slower on initial first and second SDE inspection days

SDE Tool Data & Photograph Entry Options

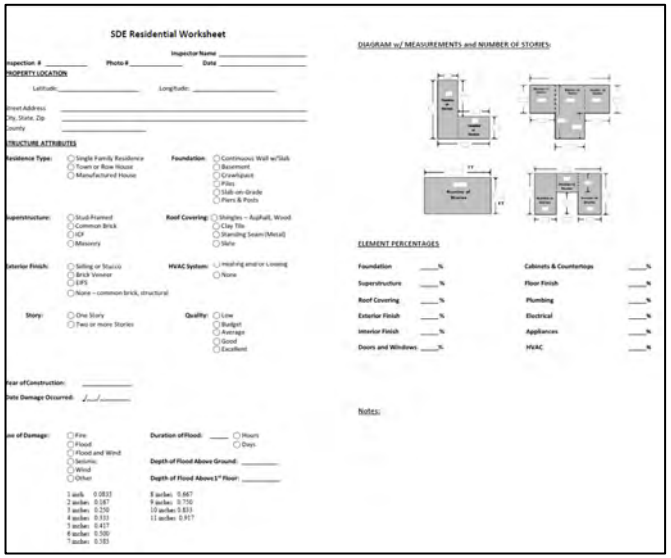
Use of **computer/tablet** in field

- Input structure damage data into SDE tool
- Integrated camera with GEO coordinates locator



Use of **manual/paper inspection form** in field

- Input data on paper, then later enter it into the SDE tool
- Separate camera equipment or cell phone



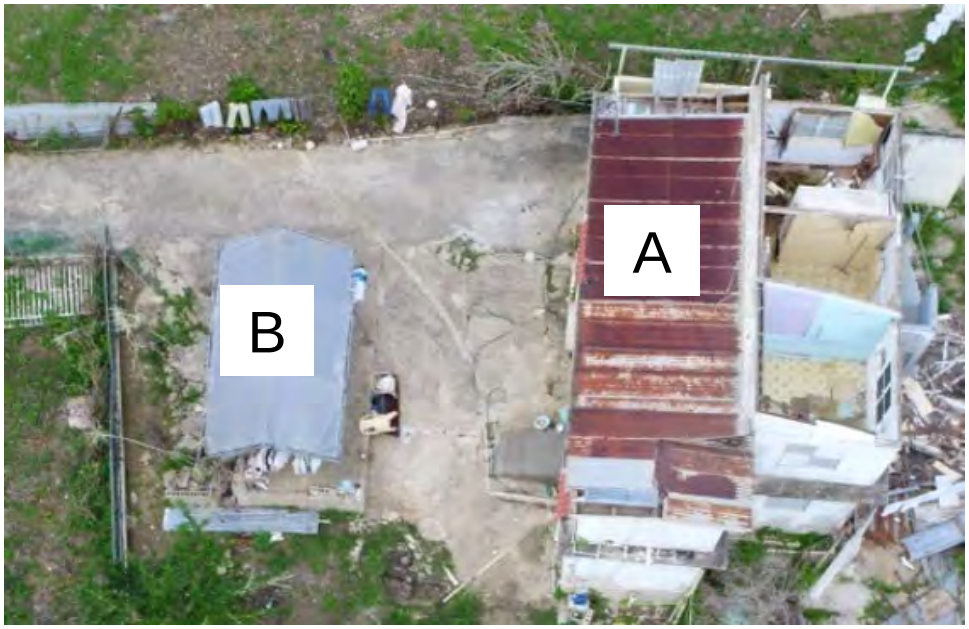
FEMA

SDE Inspection Guidance

Property Address Protocols:

Properties containing multiple primary structures

- Create additional SDE assessments using the following identification system



Primary structures include addresses with an **"A"** in the address, such as "100 A Main Street"

Secondary structures include addresses, such as "100 **B** Main Street, 100 **C**, etc."

Each structure address on property parcels must include:

- Address with a letter after the number
- Completed assessments

SDE Inspection Guidance

Property Address Protocols – Townhomes, Rowhomes, Condominiums, Cooperatives, and Strip Malls

- Prepare one SDE assessment for each unique property address
- Provide each property owner or tenant of each space or unit within larger structures with individual SDE summary reports if requested

SDE Inspection Photographs

Photograph General Guidance:

- Obtain property/structure photographs for each SDE assessment and inspection
- Obtain two property/structure photographs from different positions or viewpoints – front/street and side/corner views

Front/Street View

Side/Corner View

SDE Inspection Photographs

Photograph General Guidance:

- Photographs with integrated GPS coordinates identify and verify structure locations associated with SDE inspection data
- Dry erase boards may identify property and structure locations and property addresses

SDE Inspection Photographs

General Photograph Guidance:

- Distance and clarity to identify and verify structures
  - Avoid photograph rotation or angles
  - Avoid taking photographs into sun or with bad lighting
- What is visible in person may not be visible in photographs
- Additional photographs if objects obstruct structure view
- Not necessary to display and demonstrate all damage
- Other protocols when no or undetermined damage

SDE Inspection Photographs

1

2

3

4

Common Photograph Errors

SDE Inspection Photographs

Floodwater Depth and High-Water Mark or Debris Line

- Demonstrate estimated floodwater depth above structure's lowest floor height/elevation based on high-water mark or debris line
- Include tape measure to indicate high-water mark and record:
  - Height above lowest adjacent grade level
  - Height above structure's lowest floor level height/elevation

SDE Inspection Photographs

Floodwater Depth and High-Water Mark/Debris Line

SDE Inspection Photographs

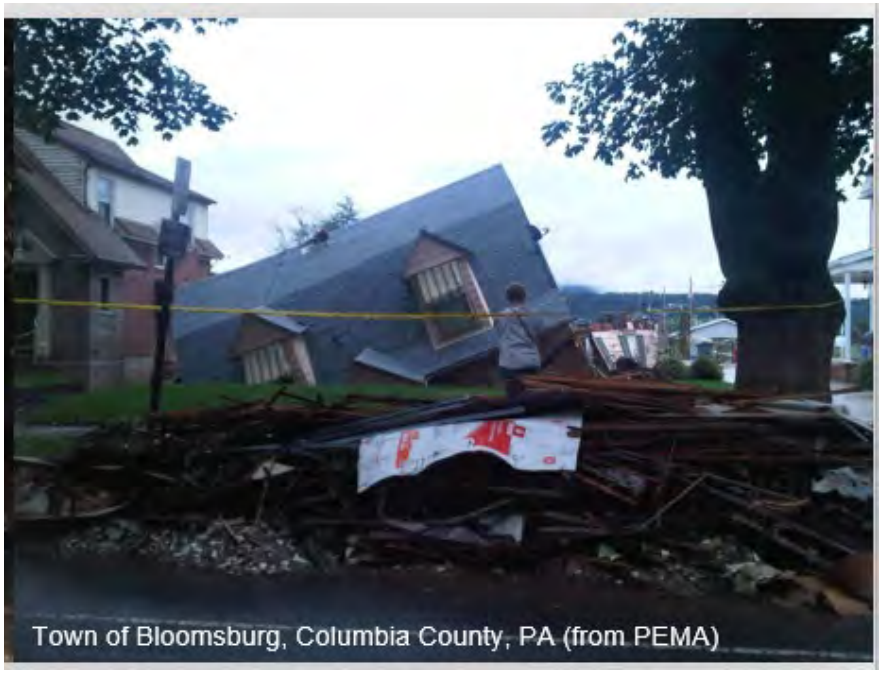
Damage Undetermined Photographs

- Two photographs from different angles or viewpoints from public rights of way:
  - No Physical Damage
  - Vacant Parcel/Lot
  - Refused Inspection
  - Other

- When SDE inspectors are unable to access properties or structures
- Unless occupants/residents expressly forbid or refuse inspections and/or photographs

Substantial Damage Estimator

Questions?


Town of Bloomsburg, Columbia County, PA (from PEMA)

Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

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Substantial Damage Estimation (SDE) Introduction and Installation



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

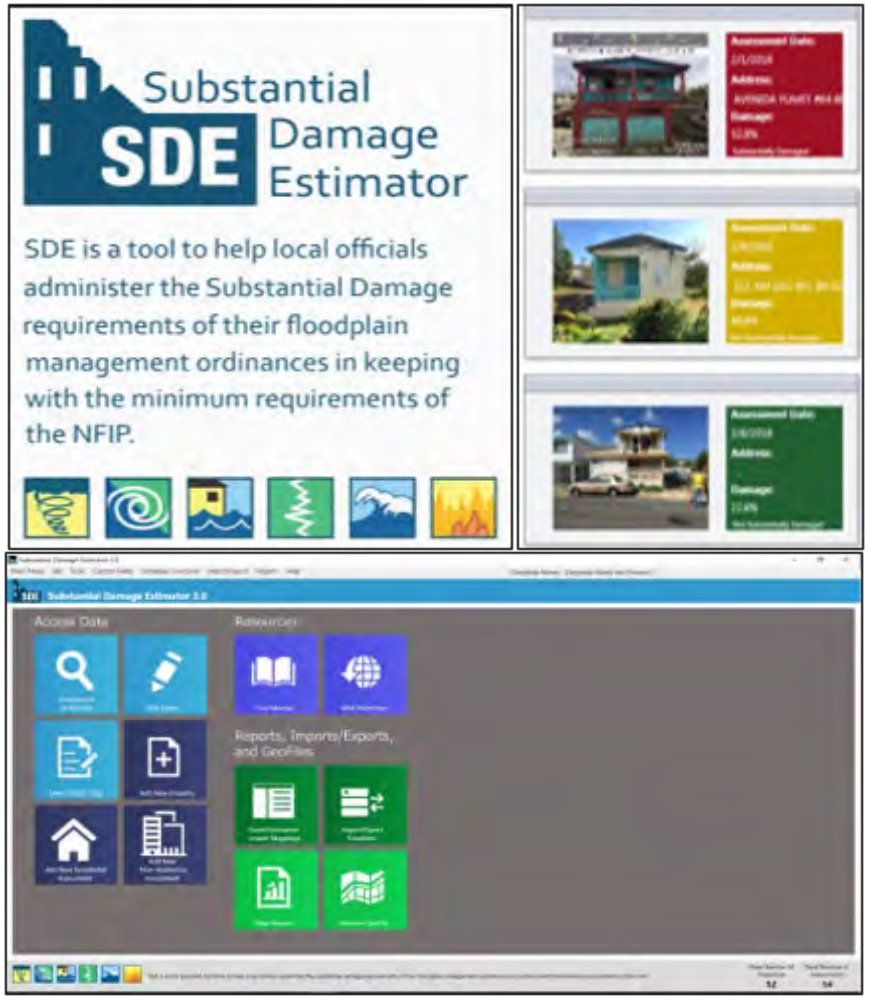
FEMA

Substantial SDE Damage Estimator

Unit 4 – SDE Tool Introduction and Installation

SDE Tool Introduction, Installation and Basics:

- Windows-based desktop, laptop or tablet tool.
- Windows tablets compatibility.
- Installed locally .
- Internet connectivity not required.
- Client server/network interface functionality.
- Integrated camera capability.



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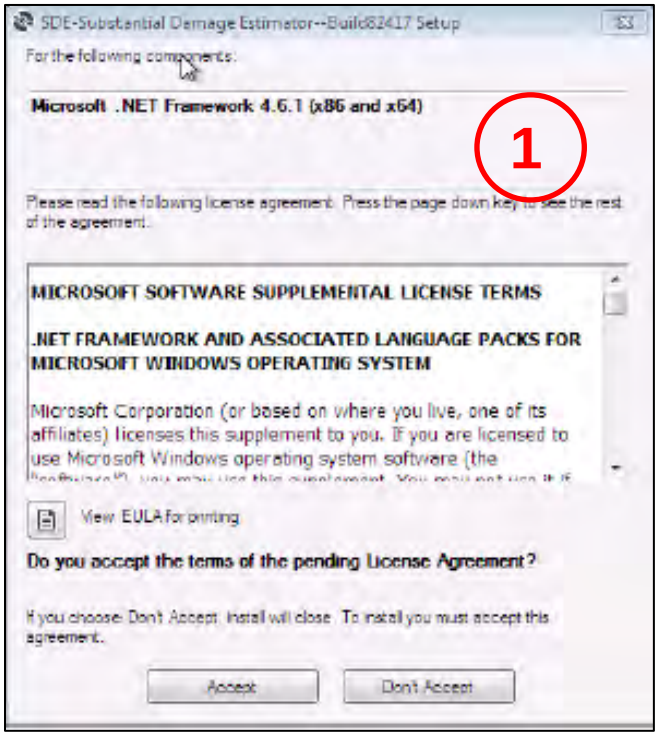
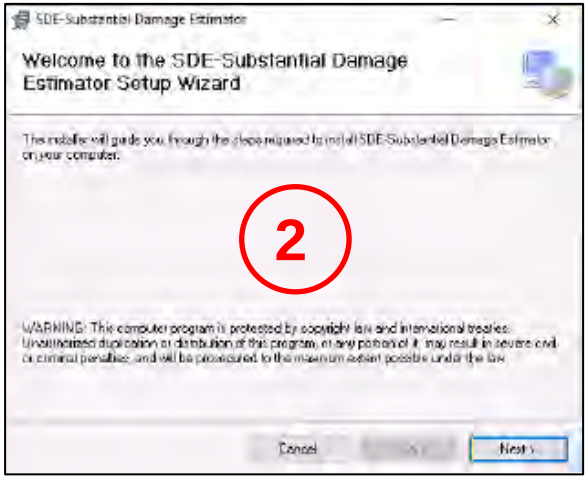
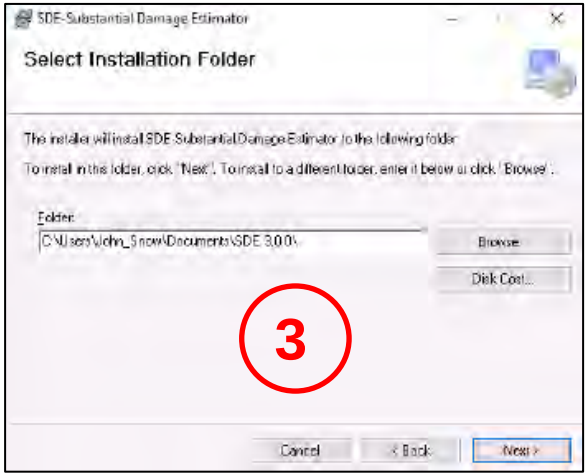
SDE Tool Installation

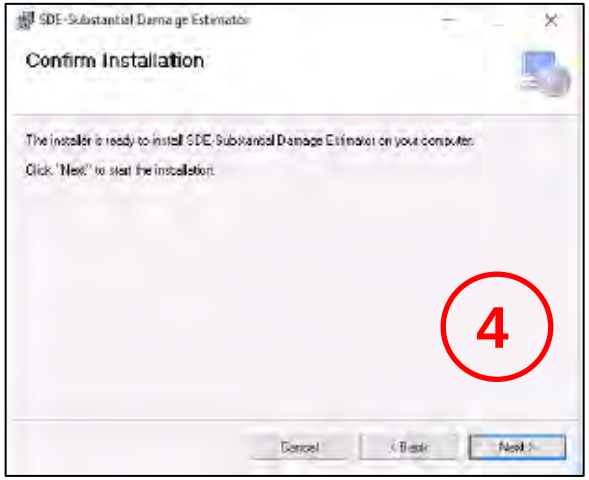


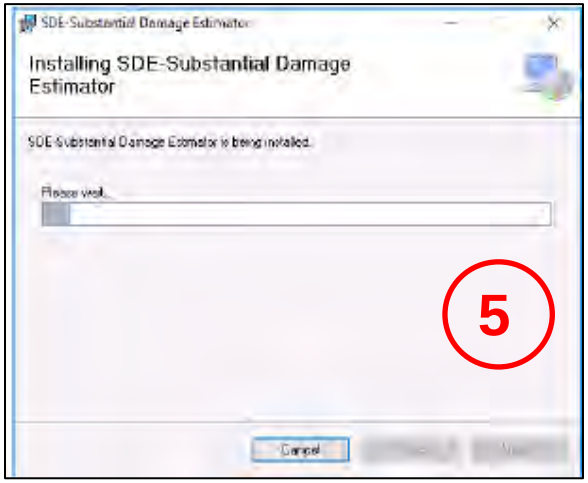


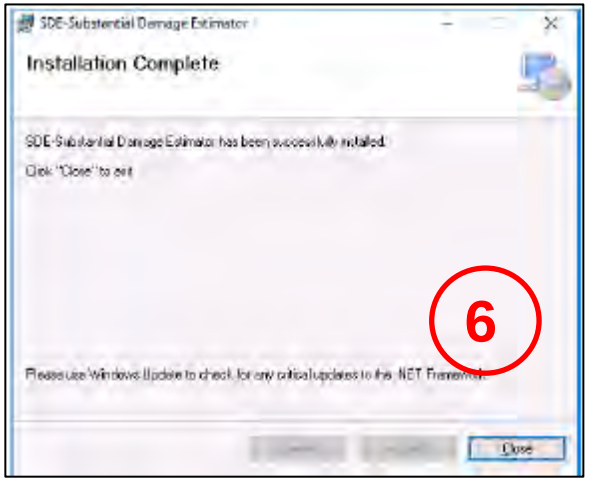


https://www.fema.gov/sites/default/files/2020-07/SDE3_04062018.zip

SDE Tool Installation







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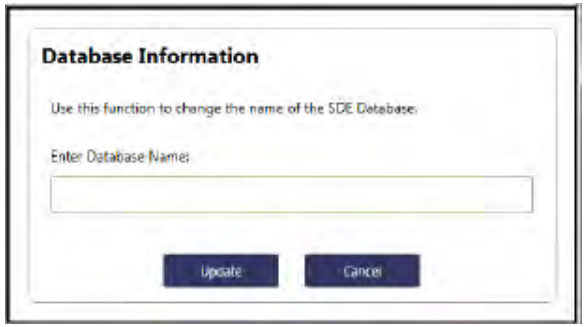
SDE Tool Installation

7

8



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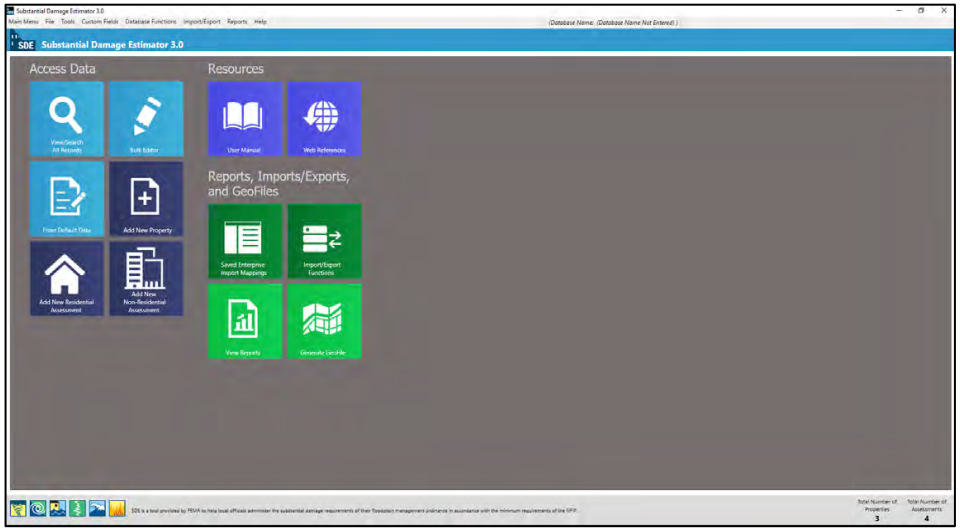

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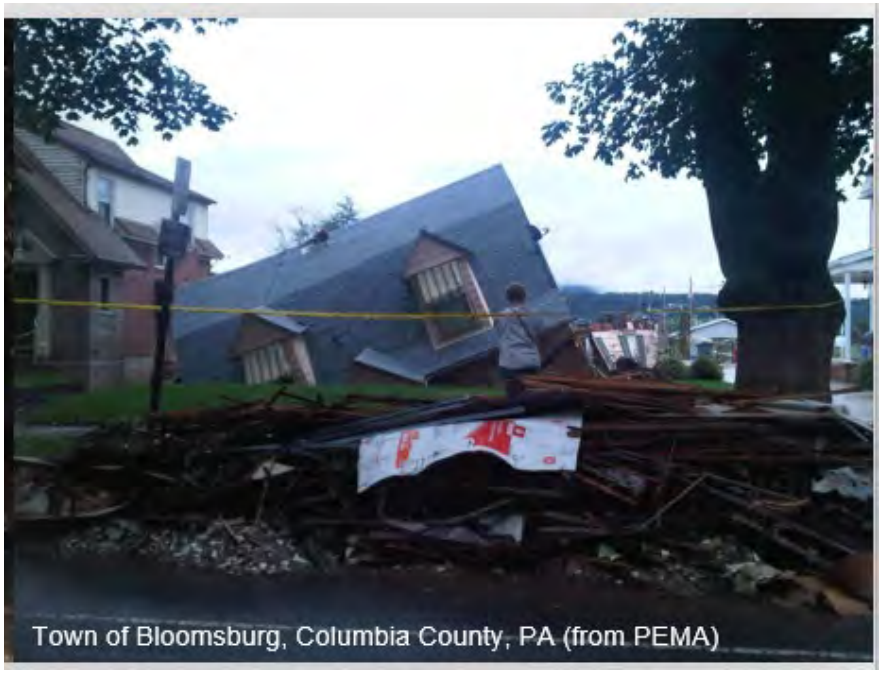
Substantial Damage Estimator

Questions?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FEMA

Substantial Damage Estimation (SDE) Tool Overview



Federal Emergency Management Agency (FEMA)

Harrisburg, Pennsylvania

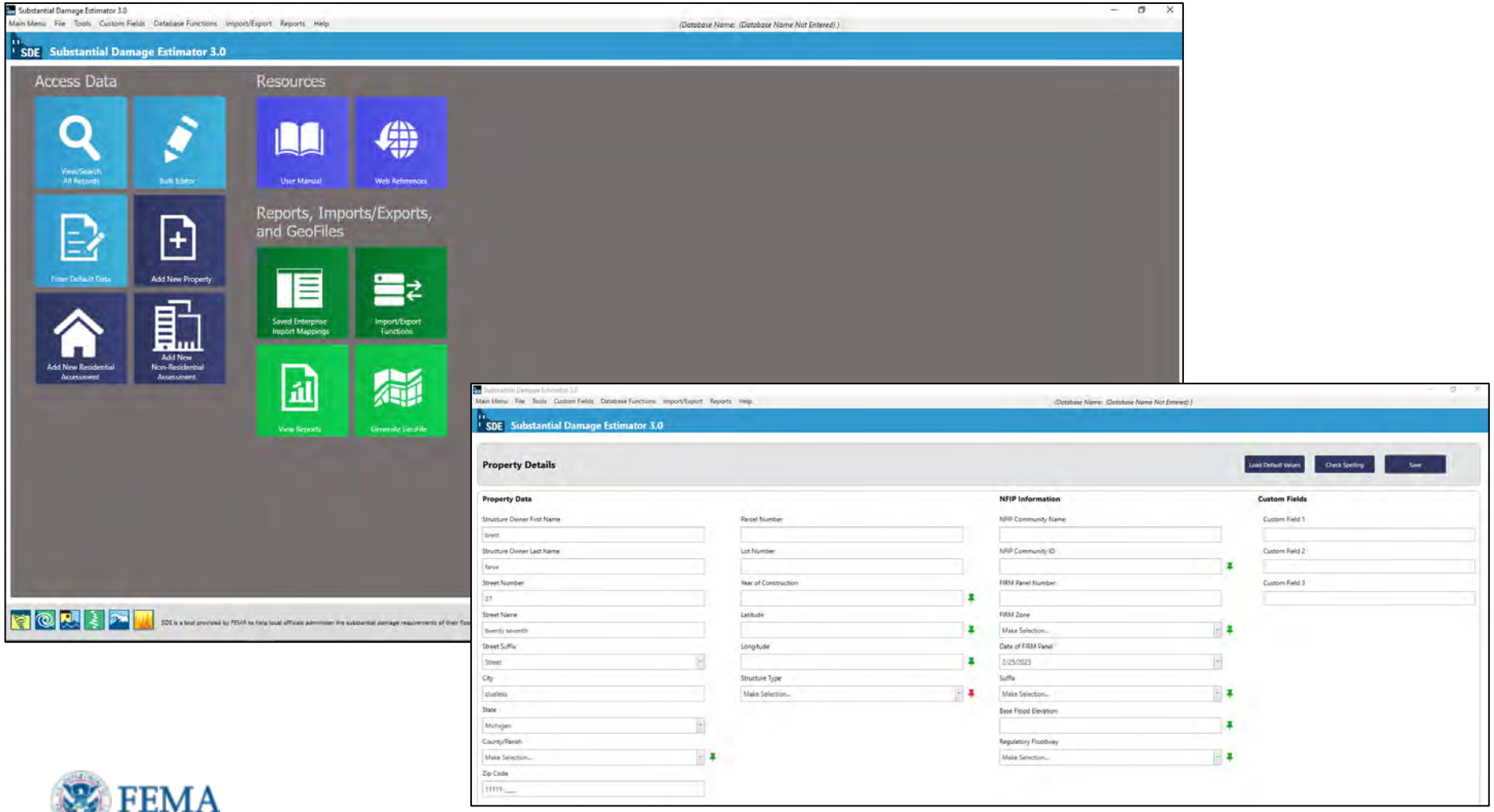
June 2023

FEMA

Substantial SDE Damage Estimator

Unit 5 – SDE Tool Overview

SDE Tool Overview and Exploration



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SDE Tool Benefits

- Identifies SDE data fields required to be collected for substantial damage determinations.
- Records data in formal, standardized, structured and organized manners.
- Provides a central database of inventoried structures.
- Allows photograph and file attachments relevant to SDE inspections.
- Provides inquiries and reports that summarize SDE data collected during the substantial damage (SD) determination process.
- Demonstrates National Flood Insurance Program (NFIP) and local code compliance and FEMA acceptance.

SDE Terminology

SDE Record – refers to property data entered into the SDE tool before entering SDE inspection data.

- May include pre-populated data.

SDE Assessment – refers to SDE record after SDE inspection data are entered into the record.

- Includes property data plus inspection data.
- Describes the complete entry including sufficient data to calculate SD determinations.

SDE Assessment Types

Two **SDE Assessment Form/Inspection Worksheet** types:

- **Residential:**
  - Detached single family dwelling structures.
  - Attached townhouse or rowhome structures.
  - Manufactured home structures.
- **Non-Residential (Commercial):**
  - Multi-family structures/apartment buildings.
  - Commercial structures.
  - Mixed-use structures.
  - All other structures.

Structure Type Determination

SDE Assessment Form Selection and Structure Type Determination Requirements

- Select SDE assessment form and structure type are based on:
  - Initial structure design.
  - Initial structure construction type, materials and methods.
  - Initial structure intended and approved occupancy and use.
- Structure type is not based on:
  - Current structure occupancy and use.
  - Exterior appearance.
  - Interior contents.

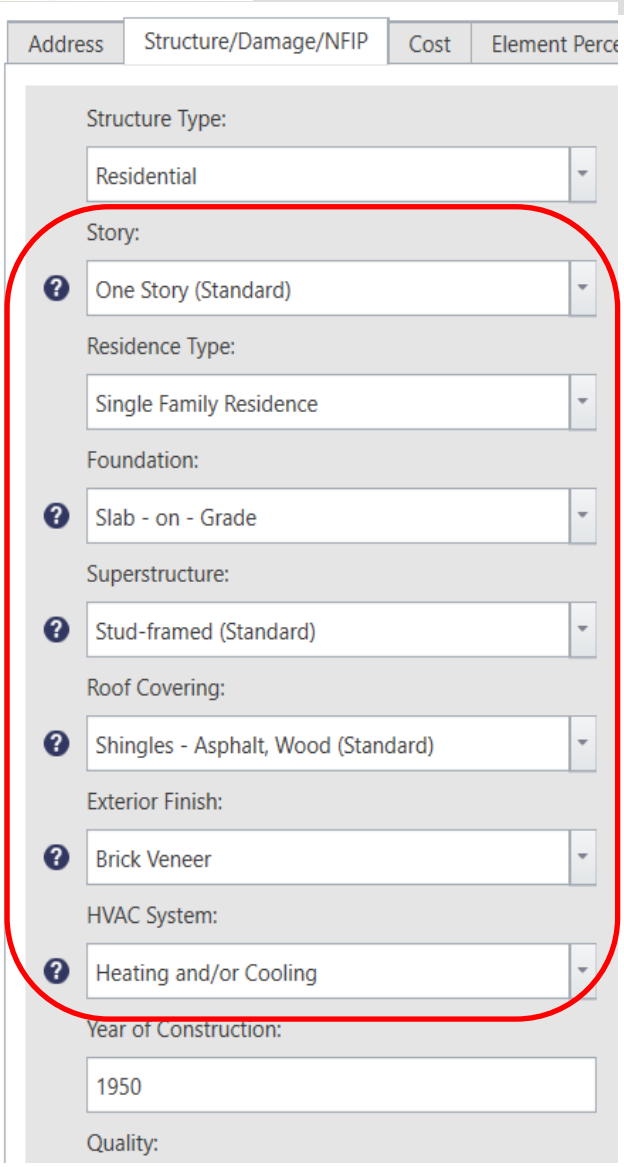
Residential Structures Types

Single- or Two-Family Dwellings

Townhouses or Rowhomes

Manufactured Homes

Residential Structure Attributes



Required Residential Attributes:

- **Story** (2)
- **Residence Type** (3)
- **Foundation** (6)
- **Superstructure** (4)
- **Roof Covering** (4)
- **Exterior Finish** (4)
- **HVAC system** (2)
- **Construction Year**
- **Quality** of initial construction – (5)

Residential Structure Types – Manufactured Homes

Manufactured or mobile homes (MHs)

- 1 inch of water in MH = 5 feet of flood damage in single family homes (SFR).
- Floor system damage or warping weakens structural integrity.
- Floor system is the strongest structural member.
- Utility systems and connections are located below the floor system.
- Recent MH model construction is similar to a single-family dwelling with a stick-frame construction.
  - May be less susceptible to flood damage than an older MH model.
  - May be confused with modular construction or industrialized buildings.

Non-Residential Structure Types

Apartment buildings

Commercial structures

Warehouse

Apartments vs Townhomes

- Apartments, flats, lofts, cooperatives and condominiums are evaluated as non-residential structures.
- Townhouses/rowhomes are evaluated as residential structures.

Polling Question

Residential or Non-Residential Structure?

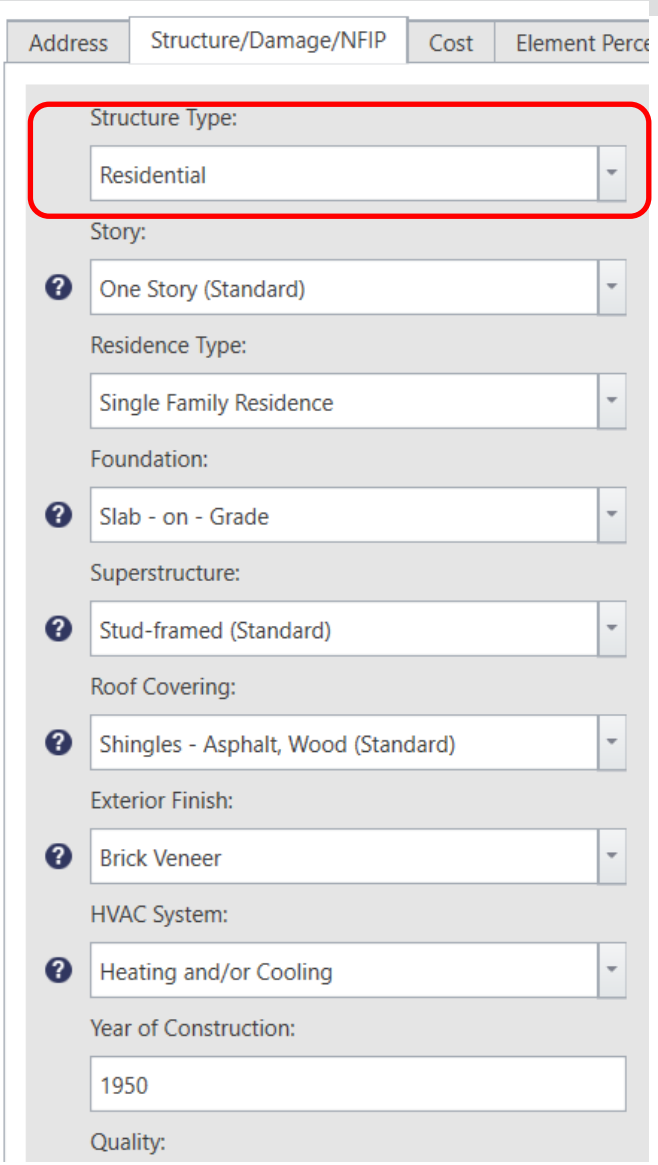
Polling Question

Residential or Non-Residential?

Structure Type Selection

Select Structure Type in SDE Tool:

- Select using the drop-down menu feature in SDE tool.
- Residential or Non-Residential.



Story

Structure Height/Stories:

- Floor levels only above grade level.
- Floor levels must include habitable/living space.
- Storage/carport space below elevated structures = 1 story.
- Habitable/Living space area/square footage differs on 1st and 2nd floor levels = 1.5 stories – Select 2 stories.

One Story

Two Story

1.5 Story

Polling Question

1 or 2 story structure?

Substantial Damage Estimator

Foundations

Continuous Walls with Slab

Slab-on-Grade

Basement Walls

Crawlspace Walls

Piles

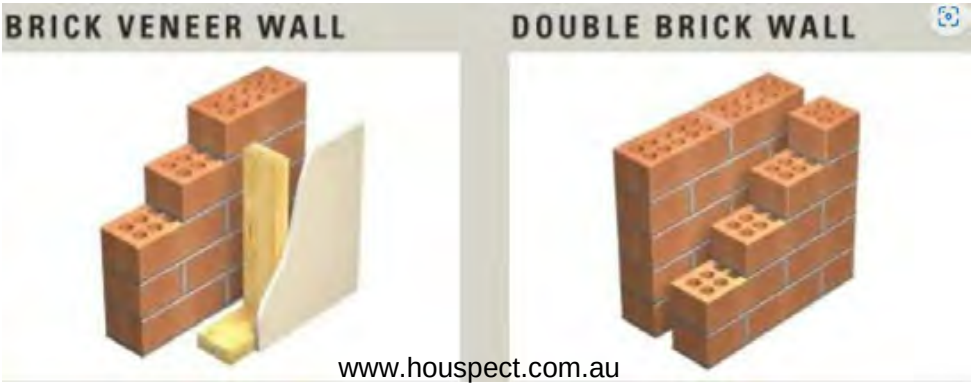
Piers and Posts

FEMA

Superstructure

Stud-Frame

Common Brick



www.houspect.com.au

Superstructure

Insulated Concrete Form (ICF)
(Styrofoam wall system, infilled with concrete and rebar)

Masonry/CMU

Includes unreinforced and reinforced concrete masonry

Superstructure

Mixed construction types

- Select masonry when a structure is constructed of half masonry/half wood framed.

Substantial Damage Estimator

Polling Question

Assign appropriate superstructure type to Structures A, B and C.

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Structure Attributes – Roof Covering

Economy Roof Covering Materials

Corrugated Metal Panels

Metal Sheets

Bitumen

Asphalt Shingles

Liquid Applied Membrane

Structure Attributes – Roof Covering

Clay Tile

Slate

Metal Standing Seam

Concrete - Select Slate

Structure Attributes – Roof Covering

Standing Seam Metal Panels versus Corrugated Metal Sheets

Standing Seam Metal Panels = $$

- High end material – good to excellent, not economy.
- Increased wind performance.
- Secured by interlocking seams/clips.
- No exposed rivets or fasteners.

Corrugated Metal Panels = $

- Economy material – low to budget
- Poor wind performance.
- Vulnerable to weather and corrosion.
- Exposed rivets or fasteners.

Structure Attributes – Roof Covering

Metal Roof Covering Material Failure

Corroded Rivet/Fastener

Structure Attributes – Roof Covering

Missing Roof System or Covering

Blue Tarped Roof:

- Wood framed structures.
  - Assume standard roof covering and low, budget or average quality.

- Masonry structures have no wood frame second story.
  - Assume slate roof covering(for concrete roof).

Missing Roof Covering:

- Assume similar superstructure and roof system materials.
- Assume standard asphalt shingle roof covering and average quality.

TIPS:

- Seek information from property owner or resident if/when present.
- Compare with neighboring structures with similar design and construction.

Substantial Damage Estimator

Polling Question

Assign the appropriate **roof construction type** to **Structures A, B and C**

FEMA

Polling Question

Mixed roof construction type and materials – concrete and metal.

- If mixed on separate stories, select covering that received damage.

Structure Attributes – Exterior Finish

Siding/Stucco - standard

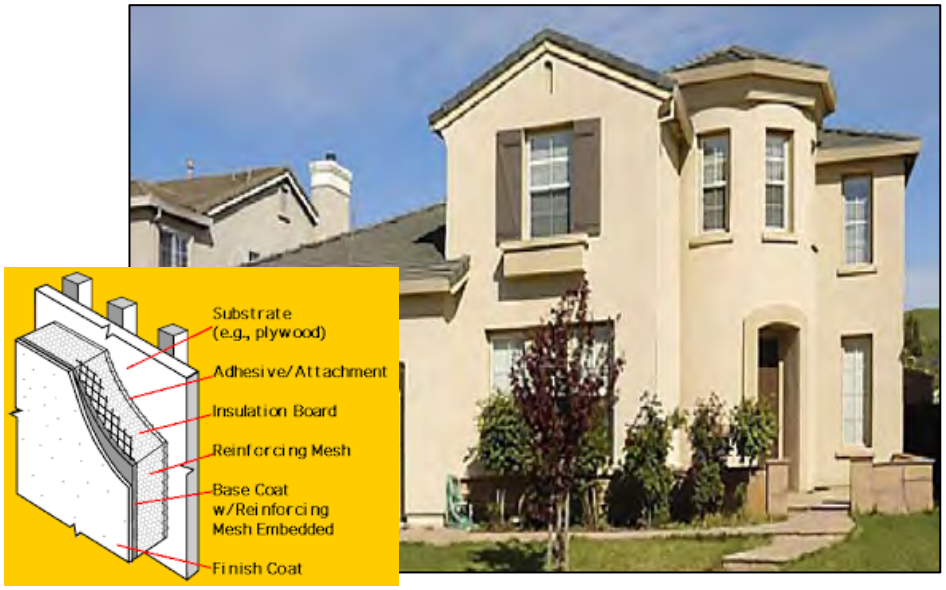
No Exterior Finish

Structure Attributes – Exterior Finish

Exterior Finish

Brick Veneer –
Not Common Brick

Exterior Insulated Finish System (EIFS) –
Not Stucco



Both exterior finishes typically used with wood frame superstructure

Structure Attributes – Mechanical/HVAC System

Mechanical/HVAC System

Heating and/or Cooling

None

Structure Attributes – Construction Year

- Estimate construction decade according to design and construction trends.
- Confirm construction date with homeowner if possible.

1800s

1930s

1960s

Source: zillow.com

1980s

2000s

2020s

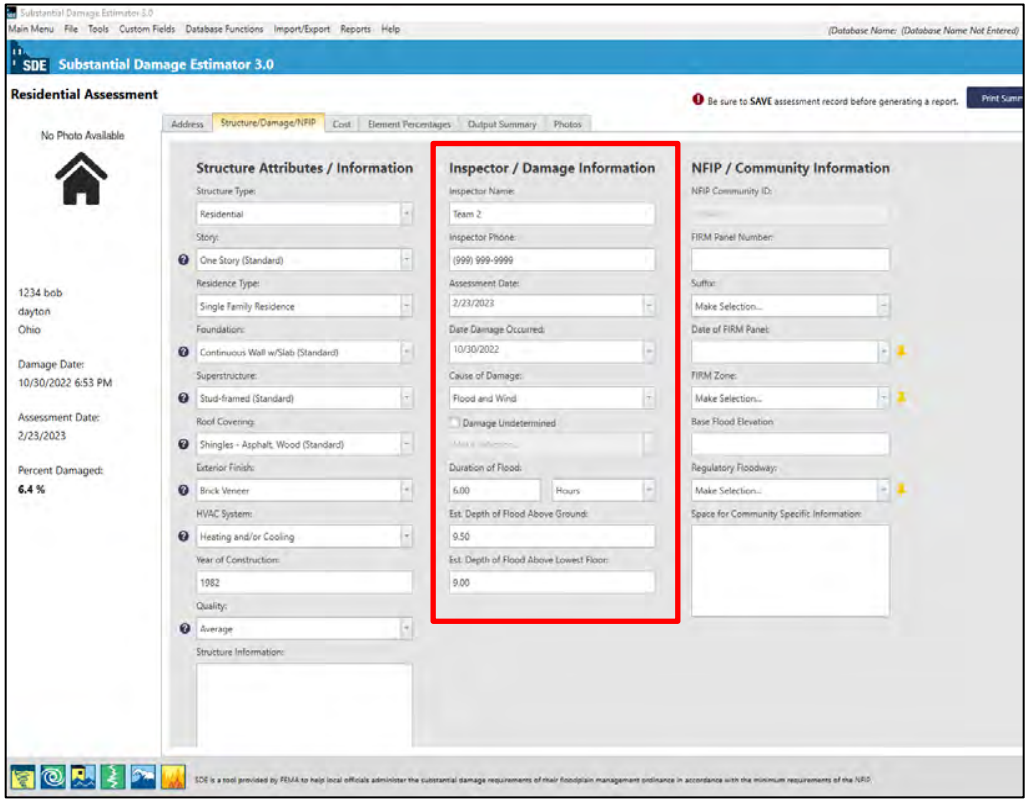
FEMA

Construction Quality

Low Budget	Average	Good Excellent
Informal/illegal structures not constructed to construction codes and standards.	Less recent structures constructed to some construction codes and standards when initially constructed – less hazard-resistant code provisions.	More recent structures constructed to current construction codes and standards – greater hazard-resistant code provisions.

Inspector/Damage Information

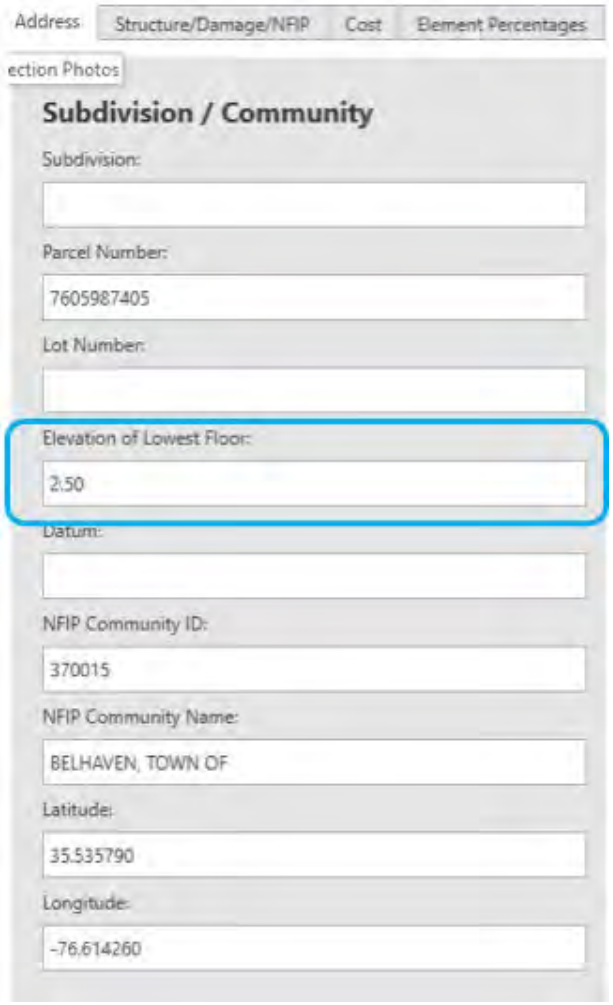
- Inspector "Team" Name
- Assessment Date
- NFIP Community ID
- Cause of Damage
- Duration of Flood (event)
- Estimated Depth of Flood Above Ground (grade level)
- Estimated Depth of Flood Above Lowest Floor



Lowest Floor Elevations

Measure the height/elevation of the lowest floor (in feet) above the lowest adjacent grade level.

- Verify reasonableness of the SD determination.
- No impact on structure percent damage.



Flood Depth Measurements

Address | Structure/Damage/NFIP | Cost | Element Percentages | Output Summary | Photos

Structure Attributes / Information

Structure Type: Residential

Story: Two or More Stories

Residence Type: Single Family Residence

Foundation: Crawlspace

Superstructure: Stud-framed (Standard)

Roof Covering: Shingles - Asphalt, Wood (Standard)

Exterior Finish: Siding or Stucco (Standard)

HVAC System: None

Year of Construction: 1900

Inspector / Damage Information

Inspector Name: Team 1

Inspector Phone:

Assessment Date: 12/19/2018

Date Damage Occurred: 9/14/2018

Cause of Damage: Flood

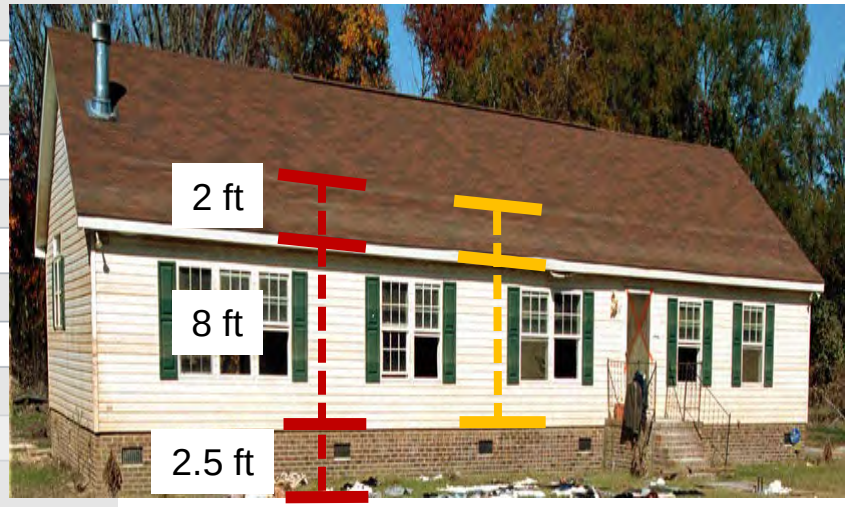
Damage Undetermined

Make Selection...

Duration of Flood: 1.00 Days

Est. Depth of Flood Above Ground: 12.5

Est. Depth of Flood Above Lowest Floor: 10.0



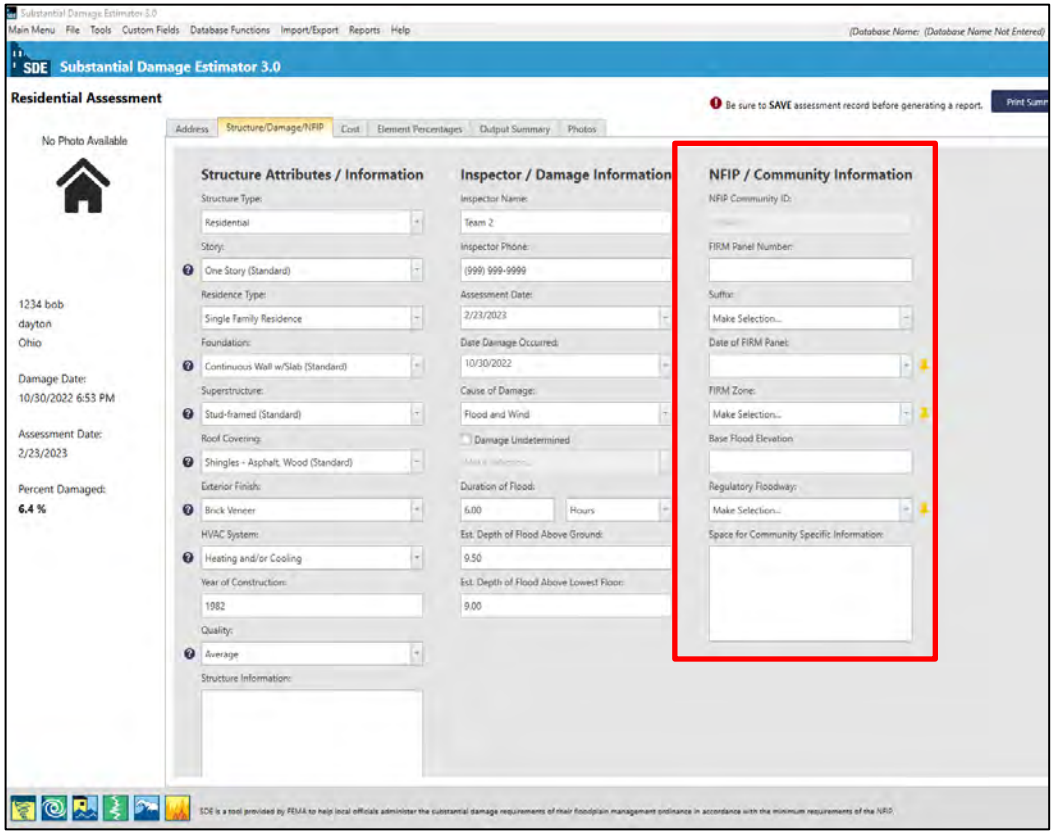
Flood Depth Above Ground

Flood Depth Above Lowest Floor

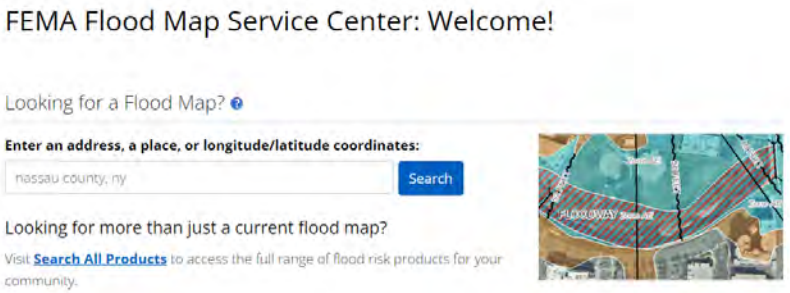
FEMA

NFIP/Community Information

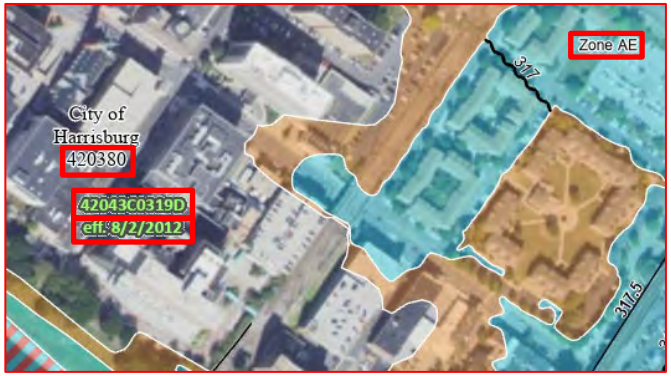
Community Status Book	Map Service Center
NFIP Community ID	NFIP Community ID
Date of Flood Insurance Rate Map (FIRM) Panel	Date of FIRM Panel
	NFIP FIRM Panel Number
	FIRM Zone
	Base Flood Elevation*
	Regulatory Floodway

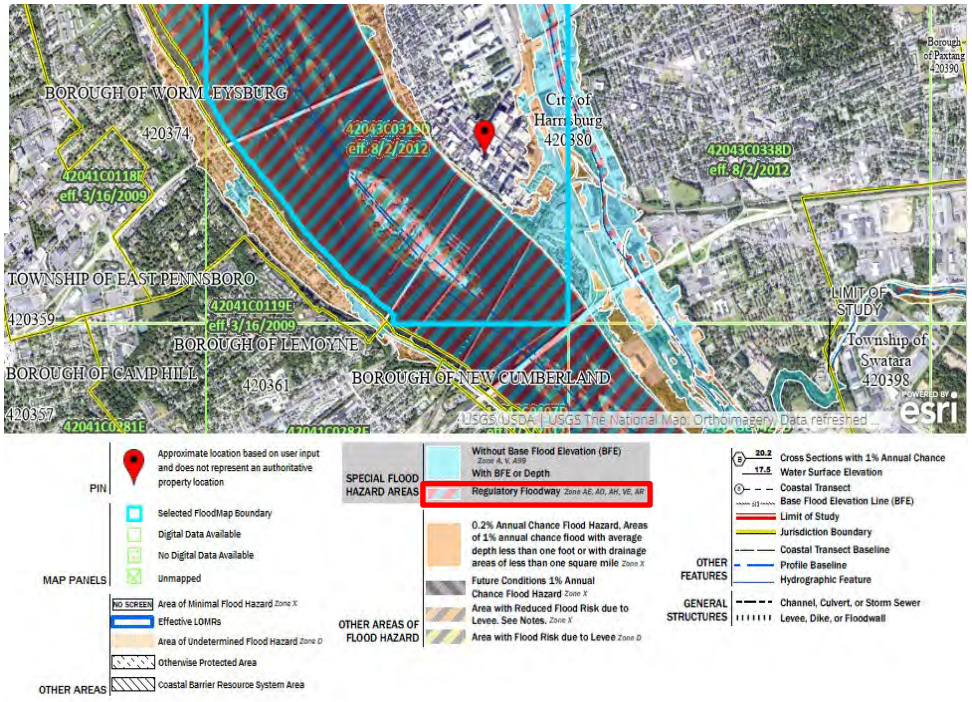


Map Service Center



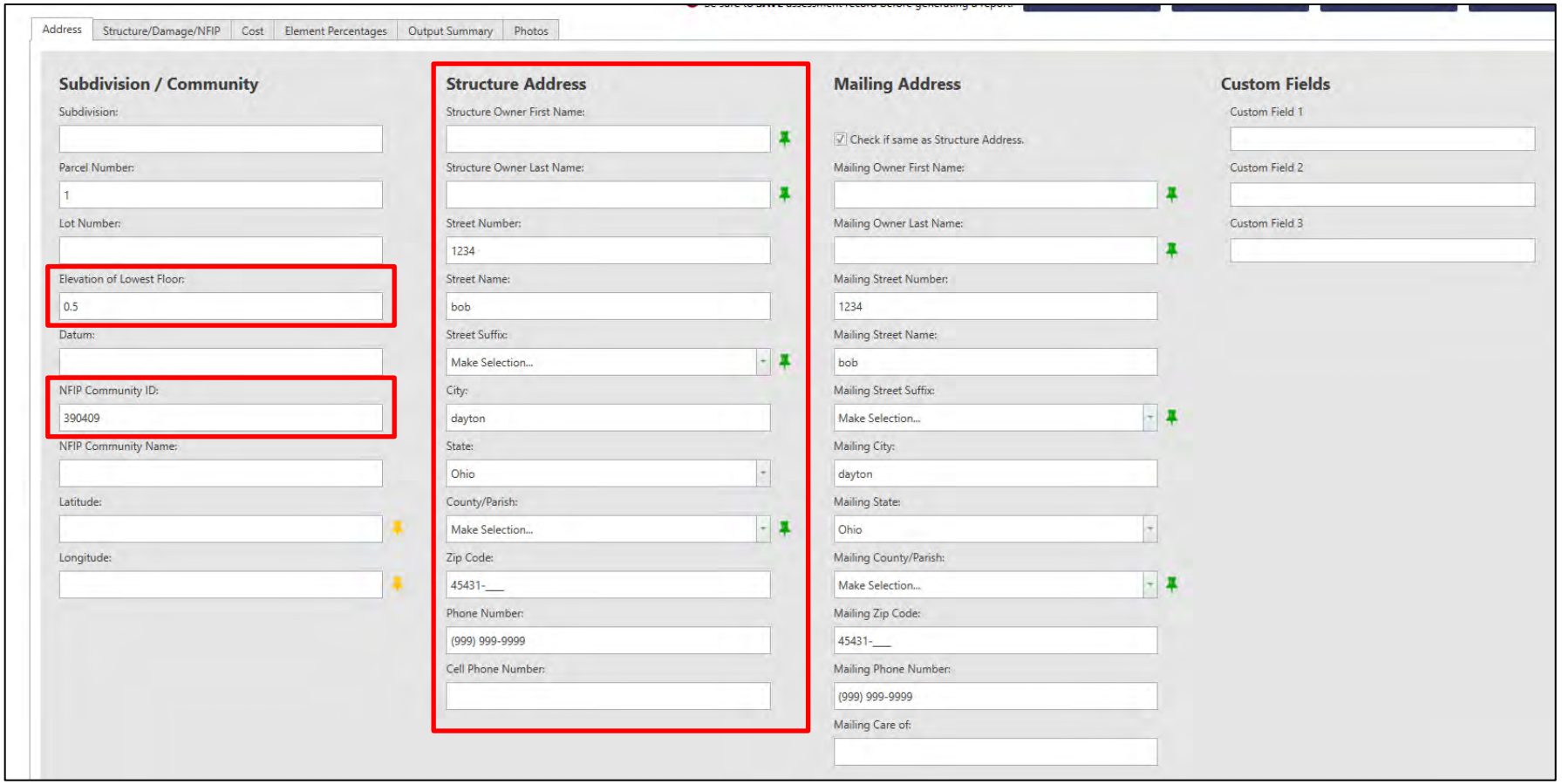
https://msc.fema.gov/portal/home





Substantial Damage Estimator

Address



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Percent Damage

The **Percent Damage** feature of SDE Tool estimates structure damage extent and structure repair costs required for the following structure elements:

Residential Structures

- Foundation
- Superstructure
- Roof Covering
- Doors and Windows
- Cabinets and Countertops
- Floor Finish
- Plumbing
- Electrical
- Appliance
- Interior Finish
- Mechanical/HVAC

Non-Residential Structures

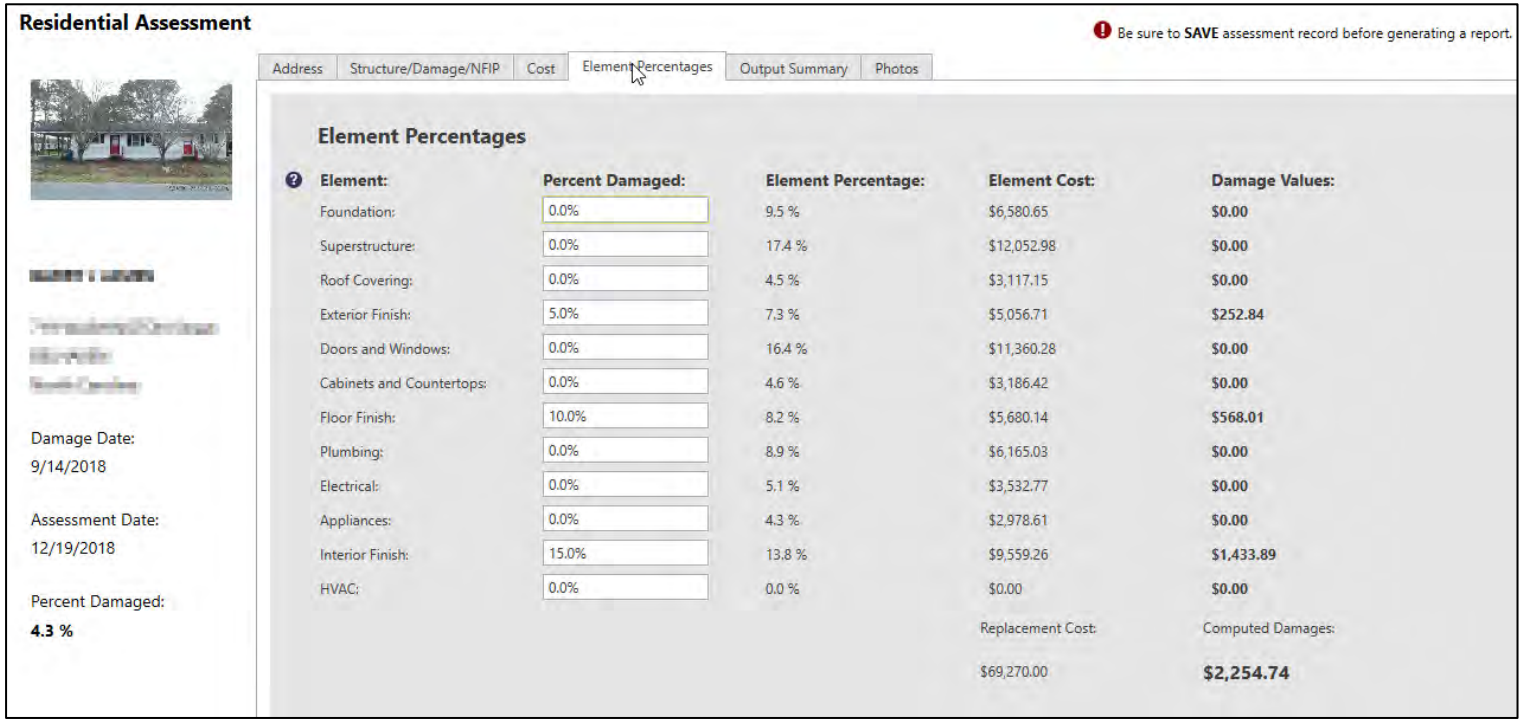
- Foundation
- Superstructure
- Roof Covering
- Plumbing
- Electrical
- Interior Finish
- Mechanical/HVAC

Percent Damage should be entered in **5% increments.**

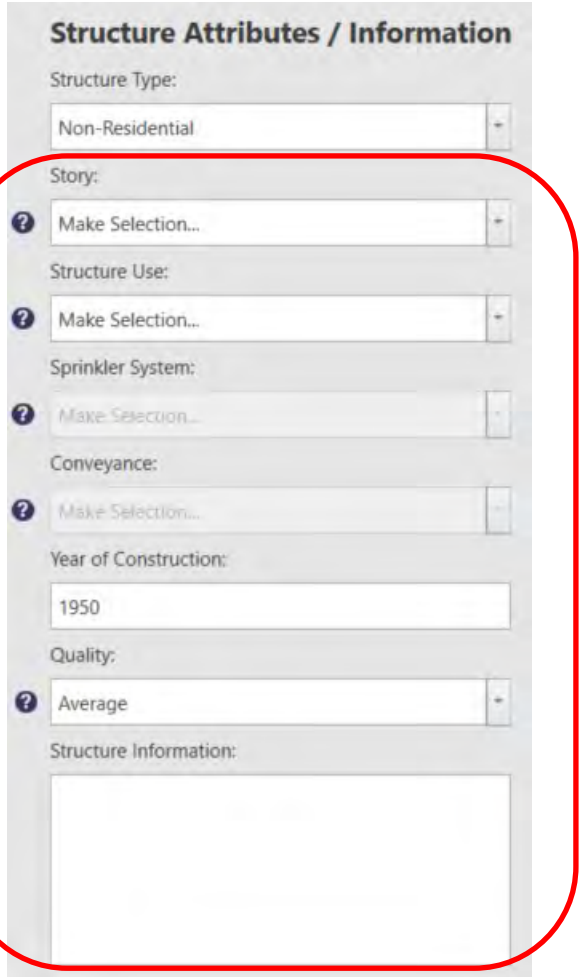
Residential Percent Damage and Element Percentages

Percent Damage – Estimates and data entry required by SDE inspector.

Element Percentages – Values of structure elements as part of total structure value.



Non-Residential Structures

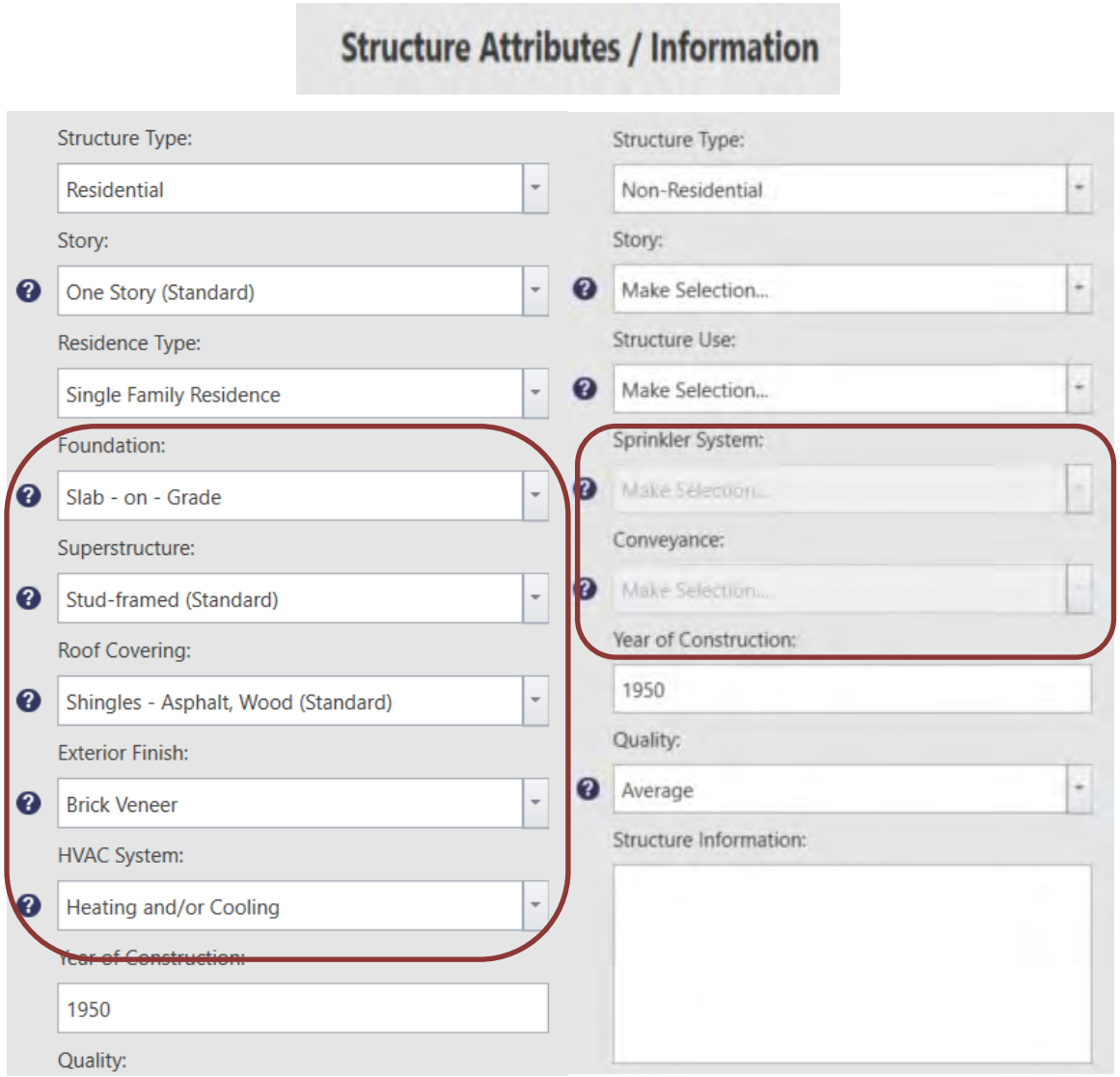


Required Non-Residential Attributes

- **Story** (3)
- **Structure Use** (22)
- **Sprinkler System** – fire protection/fire sprinkler system (Y/N)
- **Conveyance** – elevators/escalators (Y/N)
- **Year of Construction**
- **Quality** of initial construction – (5)

Residential and Non-Residential Assessment Form Differences

Residential construction attributes



Non-Residential construction attributes

Conveyance and Sprinkler Systems

Vertical Conveyance Systems

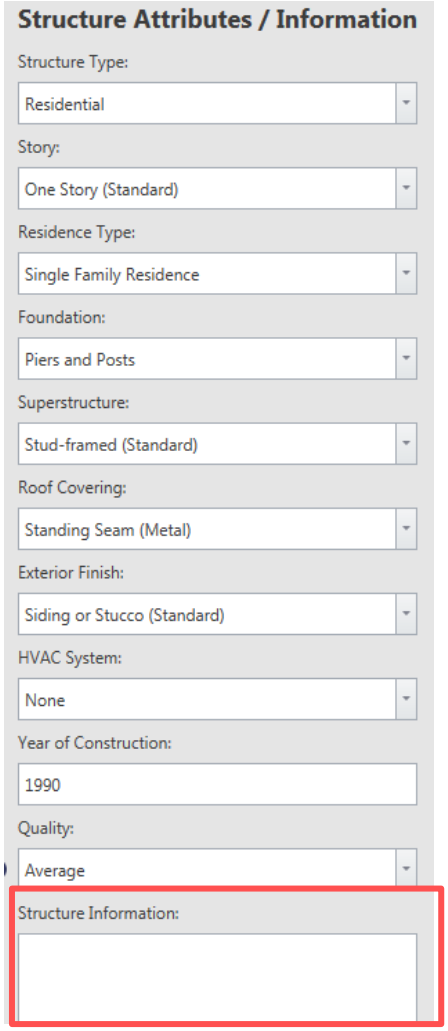
- Elevators
- Escalators

Fire Protection – Fire Suppression/Sprinkler Systems

Structure Information

Field Inspection Comments Data Field:

- Structure access/entry unavailable or otherwise unable to access/enter.
- Structure owner/resident refused SDE inspection and/or photographs.
- Structure existed prior to storm but was demolished.
- Structure repair completed.
- Structure under repair currently.
- Structure was under construction prior to storm.
- Structure owner/resident provided damage information.



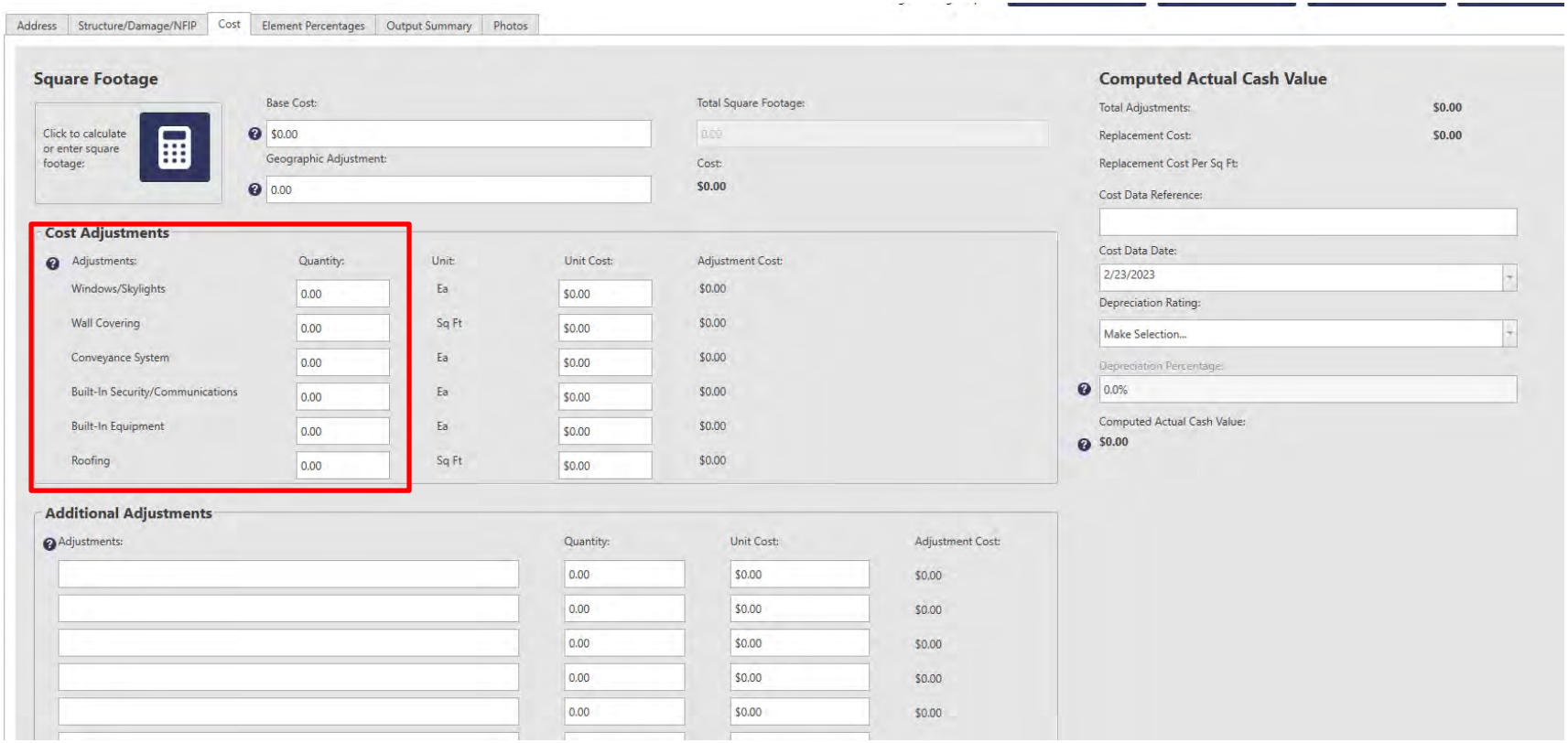
Standard Field Comments

Field Inspection Comments Data Field continued:

- Structure does not include four walls and a roof.
- Structure has a basement.
- Structure is built into a hill.
- Structure area/square footage updated based on field inspection.
- Structure area/square footage needs to be updated by office staff.
- Structure neighbor provided damage information.
- Structure damage cause established by adjacent property.

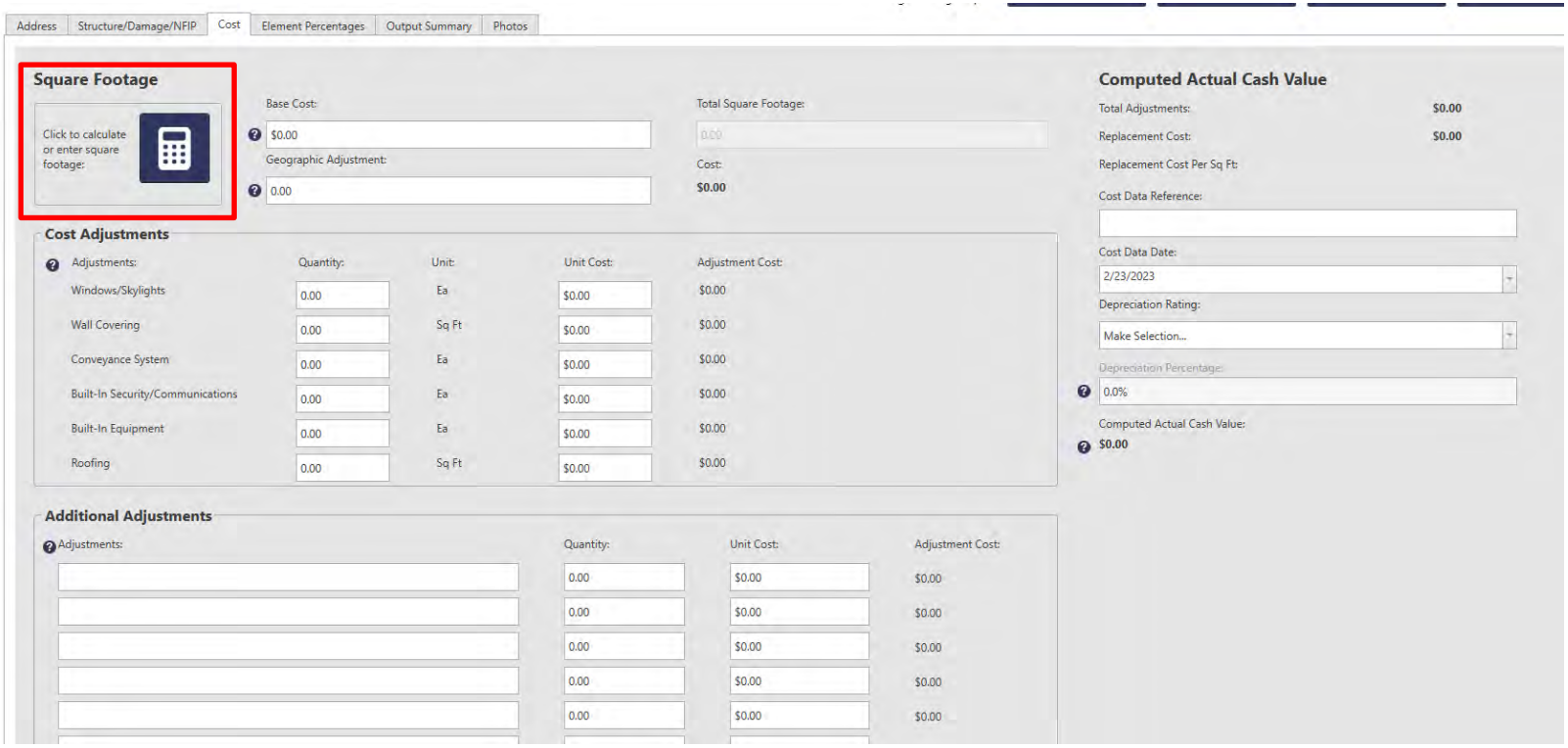
Cost Tab

Cost Adjustments Field:



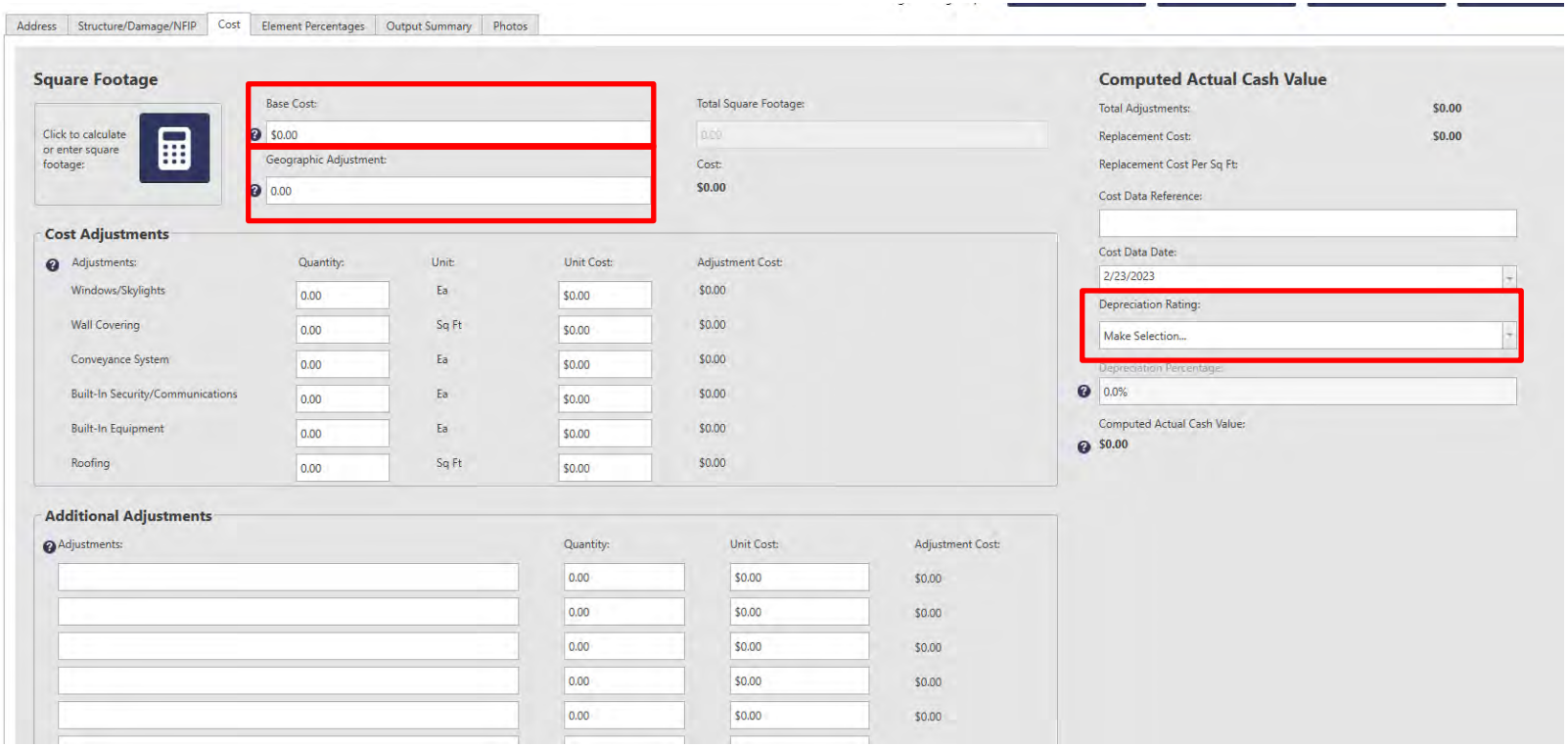
Cost Tab

Square footage calculator



Cost Tab

- Base or Unit Cost
- Geographic Adjustment
- Structure Depreciation Rating



Structure Percent Damage

The Structure **Percent Damage** feature of the SDE Tool estimates level of structure damage and cost of structure repair required for these following structure elements:

Residential Structures

- Foundation
- Superstructure
- Roof Covering
- Doors and Windows
- Cabinets and Countertops
- Floor Finish
- Plumbing
- Electrical
- Appliance
- Interior Finish
- HVAC

Non-Residential Structures

- Foundation
- Superstructure
- Roof Covering
- Plumbing
- Electrical
- Interior
- HVAC

Enter Percent Damage estimates in 5% increments.

Non-Residential Structure Percent Damaged and Element Percentages

Non-Residential Assessment

Be sure to **SAVE** assessment record before generating a report.

Address | Structure/Damage/NFIP | Cost | Element Percentages | Output Summary | Photos

[redacted]

Damage Date:
9/14/2018

Assessment Date:
12/11/2018

Percent Damaged:
43.7 %

Element Percentages

Element:	Percent Damaged:	Element Percentage:	Element Cost:	Damage Values:
Foundation:	0.0%	13.0 %	$8,815.30	**$0.00**
Superstructure:	20.0%	29.0 %	$19,664.90	**$3,932.98**
Roof Covering:	10.0%	8.0 %	$5,424.80	**$542.48**
Plumbing:	0.0%	11.0 %	$7,459.10	**$0.00**
Electrical:	90.0%	6.0 %	$4,068.60	**$3,661.74**
Interiors:	100.0%	23.0 %	$15,596.30	**$15,596.30**
HVAC:	0.0%	10.0 %	$6,781.00	**$0.00**
			Replacement Cost:	Computed Damages:
			$67,810.00	**$23,733.50**

Substantial Damage Estimator

Structure Percent Damaged Guidance

"Rainbow Charts" or other aids may be developed by communities to assist with assigning structure percent damage.

IMPORTANT: Aids are generic and may not adequately account for special conditions, so structure percent damaged may need to be adjusted.

SIMPLIFIED QA/QC GUIDANCE FOR EVALUATION OF RESIDENTIAL CONCRETE BUILDING INTERIOR ELEMENTS[1]

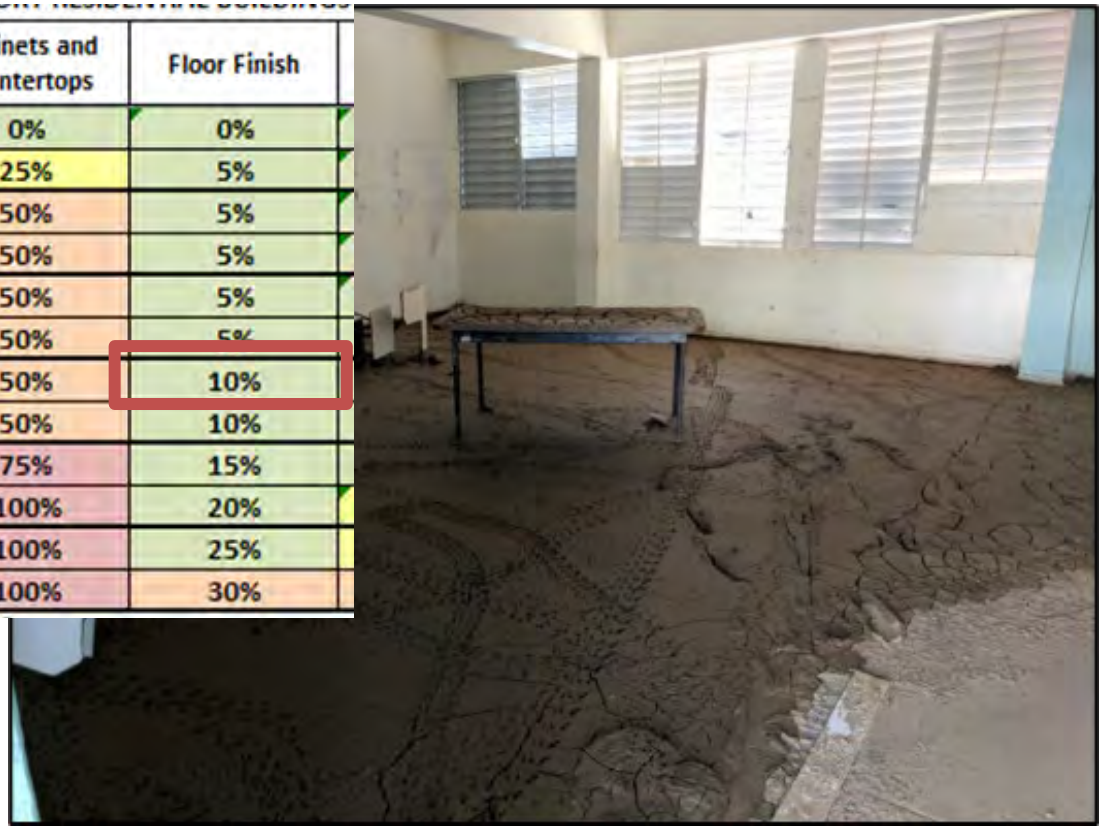
	1-STORY RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[3]							
Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]	Appliances	Interior Finish	HVAC[2]
0'	0%	0%	0%	0%	0%	0%	0%	0%
0.5'	10%	25%	5%	0%	0%	25%	5%	10%
1'	20%	50%	5%	5%	10%	100%	5%	25%
1.5'	40%	50%	5%	10%	10%	100%	5%	50%
2'	40%	50%	5%	10%	20%	100%	5%	60%
2.5'	40%	50%	5%	10%	20%	100%	5%	65%
3'	50%	50%	10%	20%	20%	100%	10%	70%
3.5'	50%	50%	10%	20%	50%	100%	10%	75%
4'	75%	75%	15%	20%	60%	100%	15%	80%
5'	100%	100%	20%	30%	60%	100%	20%	85%
6'	100%	100%	25%	40%	70%	100%	25%	100%
7'+	100%	100%	30%	50%	80%	100%	30%	100%

NOTES: 1) This simplified guidance should be used when the inspector cannot enter a structure. 2)Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. 3) Structures on piles will be assessed on a case-by-case basis due to variability in finished space below the structure, location of utilities, and potential foundation and superstructure damage if located in a high velocity area.

Polling Question

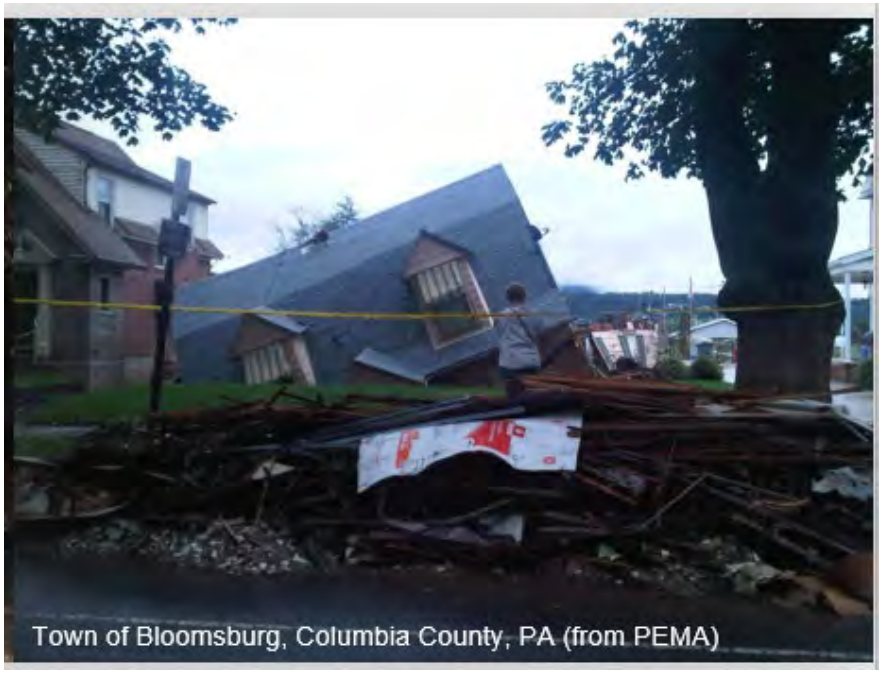
Should the percent damaged be adjusted for this concrete floor?

Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish
0'	0%	0%	0%
0.5'	10%	25%	5%
1'	20%	50%	5%
1.5'	40%	50%	5%
2'	40%	50%	5%
2.5'	40%	50%	5%
3'	50%	50%	10%
3.5'	50%	50%	10%
4'	75%	75%	15%
5'	100%	100%	20%
6'	100%	100%	25%
7'+	100%	100%	30%



Substantial Damage Estimator

Questions?


Town of Bloomsburg, Columbia County, PA (from PEMA)

Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

FEMA

Substantial Damage Estimation (SDE) Percent Damages by Structure Element for Residential Structures

Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

FEMA

Substantial SDE Damage Estimator

Unit 6 – Percent Damage by Structure Elements

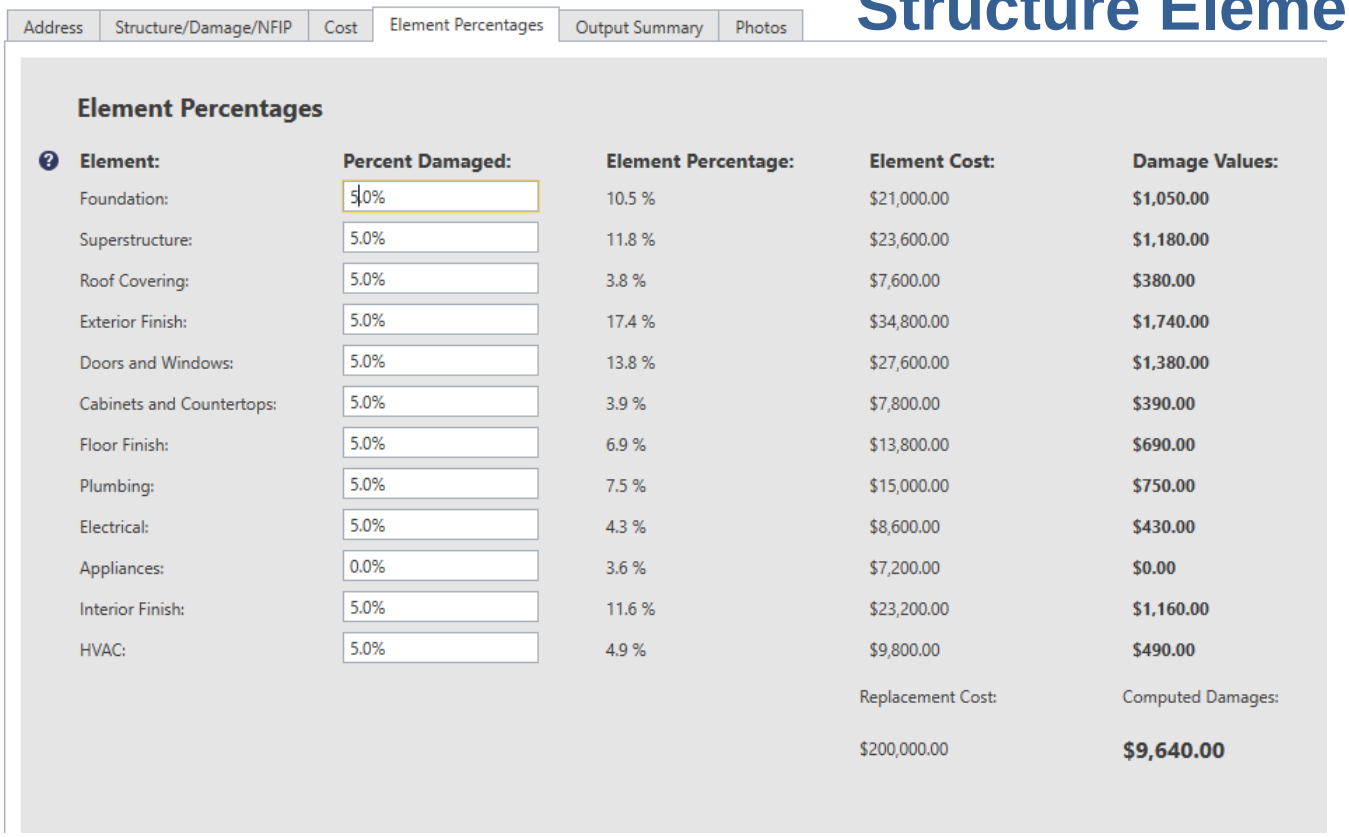
Reminder:

$$\frac{\text{Structure Repair Cost}}{\text{Structure Market Value}} \geq 50\%$$

Ratio equal to or greater than 50% considered substantially damaged

Percent Damage by Structure Elements

Percent Damage by Structure Elements



Element:	Percent Damaged:	Element Percentage:	Element Cost:	Damage Values:
Foundation:	5.0%	10.5 %	$21,000.00	**$1,050.00**
Superstructure:	5.0%	11.8 %	$23,600.00	**$1,180.00**
Roof Covering:	5.0%	3.8 %	$7,600.00	**$380.00**
Exterior Finish:	5.0%	17.4 %	$34,800.00	**$1,740.00**
Doors and Windows:	5.0%	13.8 %	$27,600.00	**$1,380.00**
Cabinets and Countertops:	5.0%	3.9 %	$7,800.00	**$390.00**
Floor Finish:	5.0%	6.9 %	$13,800.00	**$690.00**
Plumbing:	5.0%	7.5 %	$15,000.00	**$750.00**
Electrical:	5.0%	4.3 %	$8,600.00	**$430.00**
Appliances:	0.0%	3.6 %	$7,200.00	**$0.00**
Interior Finish:	5.0%	11.6 %	$23,200.00	**$1,160.00**
HVAC:	5.0%	4.9 %	$9,800.00	**$490.00**
			Replacement Cost:	Computed Damages:
			$200,000.00	**$9,640.00**

Reminder: Estimate Structure Percent Damage in 5% Increments

Percent Damage – General: 0% - 100%

Percent Damage for All Structure Elements:

- 0% - 24% – no to minimum damage or structure element not existing
- 25% - 49% – minimum to minor damage
- 50% - 74% – minor to major damage
- 75% - 100% – major to maximum/total damage

Percent Damage – Foundation: 0% - 24%

Common Damage:

- Footing/foundation: no to minimum footing/foundation damage, undermining or scour
- Footing/foundation piles or piers: no to minimum pile or pier damage, undermining or scour
- Foundation walls: no to minimum foundation wall damage, cracking, settlement or displacement

Percent Damage – Foundation: 25% - 49%

Common Damage:

- Footing/foundation: minimum to minor foundation damage, undermining or scour
- Footing/foundation and/or structural support systems: minimum to minor damage, cracking, but no displacement, heaving or discontinuity
- Cross bracing and/or breakaway walls on elevated pile or pier foundations: minimum to minor damage

Percent Damage – Foundation: 50% - 74%

Common Damage:

- Footing/foundation: minor to major foundation damage, settlement, undermining or scour
- Foundation walls: minor to major foundation wall damage, debris damage, cracking
- Concrete slab: minor to major slab damage, significant/severe undermining

Percent Damage – Foundation: 75% - 100%

Always use caution when approaching!

Common Damage:

- Footing/foundation: major to maximum/total foundation damage, settlement
- Foundation walls: major to maximum/total foundation wall damage, cracking, settlement, displacement or missing foundation wall portions
- Concrete slab: major to maximum/total slab damage, settlement, displacement or undermining

Substantial Damage Estimator

Percent Damage – Superstructure: 0% - 24%

Common Damage:

- Floor system: no to minimum floor damage, no missing floor portions
- Wall system: no to minimum exterior or load-bearing wall damage, no missing wall portions
- Roof system: no to minimum roof damage, no missing roof portions
- Structural system: no to minimum structural deformation or distortion

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Percent Damage – Superstructure: 25% - 49%

Common Damage:

- Floor system: minimal to minor floor damage, limited missing floor portions
- Wall system: minimal to minor wall damage, limited missing wall portions
- Roof system: minimal to minor roof damage, limited missing roof portions
- Structural system: minimal to minor structural deformation or distortion, no to limited structural components missing

Percent Damage – Superstructure: 50% - 74%

Common Damages

- Floor system: minor to major floor damage, limited open portions
- Wall system: minor to major wall damage, damage by debris and pressure, open wall damage or missing wall portions
- Roof system: minor to major roof damage, limited missing portions
- Structural system: minor to major structural deformation or distortion

Percent Damage – Superstructure: 75% - 100%

Common Damage:

- Floor system: major to maximum/total floor damage, large open floor damage, or large missing portions
- Exterior wall system: major to maximum/total wall damage, large open wall damage or open damage to large portions or large missing portions
- Wall system: major to maximum/total damage by debris and pressure
- Roof system: major to maximum/total damage, large open roof damage to portions or missing portions
- Structural system: major to maximum/total structural deformation or distortion

Substantial Damage Estimator

Percent Damage – Roof Covering: 0% - 100%

FEMA

Substantial Damage Estimator

Percent Damage – Rainbow Charts

"Rainbow Charts" and Percent Roof Damage – Wind-Driven Rain

SIMPLIFIED QA/QC GUIDANCE FOR EVALUATION OF RESIDENTIAL BUILDING INTERIOR ELEMENTS[1] DUE TO WIND DAMAGE

1-STORY CONCRETE RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[3]								
	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]	Appliances	Interior Finish	HVAC[2]
50% Roof Damage or Less	25%	50%	5%	0%	35%	50%	5%	0%
More than 50% Roof Damage	50%	100%	5%	0%	75%	100%	5%	0%

NOTES: 1) This simplified guidance should be used when the inspector cannot enter a structure. **2)** Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. **3)** Structures on piles will be assessed on a case-by-case basis due to variability in finished space below the structure, location of utilities, and potential foundation and superstructure damage if located in a high velocity area.

1-STORY WOOD RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[3]								
	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]	Appliances	Interior Finish	HVAC[2]
50% Roof Damage or Less	25%	50%	50%	0%	50%	50%	50%	0%
More than 50% Roof Damage	50%	100%	100%	0%	100%	100%	100%	0%

NOTES: 1) This simplified guidance should be used when the inspector cannot enter a structure. **2)** Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. **3)** Structures on piles will be assessed on a case-by-case basis due to variability in finished space below the structure, location of utilities, and potential foundation and superstructure damage if located in a high velocity area.

Substantial Damage Estimator

Percent Damage – Exterior Finish: 0% - 100%

FEMA

Percent Damage – Exterior Doors & Windows

- Includes all doors and windows, as well as frames and hardware, including hinges, handles and locks
- Excludes paint and stain
- Assumptions:

Low Quality	Fair Quality	Average Quality	Good Quality	Excellent Quality
Hollow Core Doors	Hollow Core Doors	Hollow Core Doors	Raised-panel Hardwood Doors	Raised-panel Hardwood Doors
Low Quality Hardware	Low Quality Hardware	Low Quality Hardware	High Quality Hardware	High Quality Hardware

Percent Damage – Exterior Doors & Windows

Use "Rainbow Charts" and Flood Depth

Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows
0'	0%
0.5'	10%
1'	20%
1.5'	40%
2'	40%
2.5'	40%
3'	50%
3.5'	50%
4'	75%
5'	100%
6'	100%
7'+	100%

Percent Damages – Cabinets & Countertops

- 50% damage at 1 foot to 5 feet of water depth above floor level – lower cabinets only not upper cabinets – include bathrooms
- 100% damage at 5 feet or more of water depth

Depth of Flooding Above Top of First Finished Floor (ft)	Cabinets and Countertops
0'	0%
0.5'	25%
1'	50%
1.5'	50%
2'	50%
2.5'	50%
3'	50%
3.5'	50%
4'	75%
5'	100%
6'	100%
7'+	100%

Percent Damage – Floor Finish: 0% - 5%

Common Damage:

- Concrete floor finish in concrete structures – typically no damage
- No damage cost included for cleanup and sanitation/disinfection costs

Percent Damage – Floor Finish: 50% - 100%

Common Damage:

- Wood floor finish in wood structures:
  - 50% - 100% damage may require removal and replacement
- Typical values for floor finish damage in wood structures:
  - 50% for two-story structures
  - 100% for one-story structures

Percent Damage – Plumbing Systems

- Plumbing systems include incoming water services; water distribution systems and piping; wastewater systems and piping; plumbing fixtures; and water heaters.
- Greywater systems included if/when existing prior to damage, whether required alternate systems or optional supplemental systems.
- Septic systems currently not included, although under consideration for future regulatory revision.
- If/When floodwaters rise above municipal sewer manhole cover levels and/or saturate soils, septic systems may be unable to discharge waste and sewage may back up into structures through sewer lines.

Percent Damage – Plumbing Systems

Damage to fixtures

Common Damage:

- Sewage backup

Depth of Flooding Above Top of First Finished Floor (ft)	Plumbing[2]
0'	0%
0.5'	0%
1'	5%
1.5'	10%
2'	10%
2.5'	10%
3'	20%
3.5'	20%
4'	20%
5'	30%
6'	40%
7'+	50%

Substantial Damage Estimator

Percent Damage – Electrical Systems

- Circuit breaker panels and electrical distribution wiring
- Basic wiring systems for receptacles, switches and light fixtures
- Wiring systems and receptacles for equipment and appliances, including refrigerators, stoves/ovens, and washers and dryers
- Solar array systems when installed directly on structures
- Minimum number of electrical receptacles and light fixtures, sometimes quantified by the local construction code
- Greater damage in slab-on-grade, crawlspace or basement structures occurs more rapidly than in elevated structures

Percent Damage – Electrical Systems

Substantial Damage Estimator

Depth of Flooding Above Top of First Finished Floor (ft)	Electrical[2]
0'	0%
0.5'	0%
1'	10%
1.5'	10%
2'	20%
2.5'	20%
3'	20%
3.5'	50%
4'	60%
5'	60%
6'	70%
7'+	80%

FEMA

Percent Damage – Equipment and Appliances

Built-in appliances – eligible cost in SDE cost estimates, since removal of broken equipment and appliances may damage other structure parts

Think: Built-in stove/oven and connected water heater

Plug-in or cord-connected appliances – no eligible cost in SDE cost estimates since easy removal without damage to other structure parts

Think: Washing machine, dryer, and stove/oven

Depth of Flooding Above Top of First Finished Floor (ft)	Appliances
0'	0%
0.5'	25%
1'	100%
1.5'	100%
2'	100%
2.5'	100%
3'	100%
3.5'	100%
4'	100%
5'	100%
6'	100%
7'+	100%

Polling Question

Built-in or Plug-in Cord-Connected Appliance?

A

B

Dishwasher

C

D

E

Electric Water Heater

Percent Damages – Interior Finishes: 0 - 100%

Use "Rainbow Charts" and Flood Depth of Flood

SIMPLIFIED QA/QC GUIDANCE FOR EVALUATION OF RESIDENTIAL CONCRETE BUILDING INTERIOR ELEMENTS[1]

1-STORY RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[3]

Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]	Appliances	Interior Finish	HVAC[2]
0'	0%	0%	0%	0%	0%	0%	0%	0%
0.5'	10%	25%	5%	0%	0%	25%	5%	10%
1'	20%	50%	5%	5%	10%	100%	5%	25%
1.5'	40%	50%	5%	10%	10%	100%	5%	50%
2'	40%	50%	5%	10%	20%	100%	5%	60%
2.5'	40%	50%	5%	10%	20%	100%	5%	65%
3'	50%	50%	10%	20%	20%	100%	10%	70%
3.5'	50%	50%	10%	20%	50%	100%	10%	75%
4'	75%	75%	15%	20%	60%	100%	15%	80%
5'	100%	100%	20%	30%	60%	100%	20%	85%
6'	100%	100%	25%	40%	70%	100%	25%	100%
7'+	100%	100%	30%	50%	80%	100%	30%	100%

2-STORY RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[4]

Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish[2]	Plumbing[3]	Electrical[3]	Appliances	Interior Finish	HVAC[3]
0'	0%	0%	0%	0%	0%	0%	0%	0%
0.5'	5%	25%	5%	0%	0%	25%	5%	5%
1'	10%	40%	5%	5%	0%	50%	5%	15%
1.5'	20%	40%	5%	5%	10%	75%	5%	25%
2'	20%	40%	5%	5%	10%	100%	5%	35%
2.5'	20%	40%	5%	10%	10%	100%	5%	40%
3'	25%	40%	5%	10%	30%	100%	5%	50%
3.5'	25%	40%	5%	10%	35%	100%	5%	50%
4'	35%	70%	5%	10%	50%	100%	5%	55%
5'	50%	70%	10%	15%	50%	100%	10%	55%
6'	50%	70%	15%	20%	50%	100%	15%	55%
7'+	50%	70%	20%	25%	50%	100%	20%	60%

NOTES: 1) <u>**This simplified guidance should be used when the inspector cannot enter a structure.**</u> **2)** This guidance assumes the 2nd floor living area is equivalent to the 1st floor living area. Consider increasing floor finish damage if the 2nd floor is significantly less square footage than first floor. **3)** Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. **4)** Structures on piles will be assessed on a case-by-case basis due to variability in finished space below the structure, location of utilities, and potential foundation and superstructure damage if located in a high velocity area.

Percent Damages – Mechanical/HVAC Systems

Depth of Flooding Above Top of First Finished Floor (ft)	HVAC[2]
0'	0%
0.5'	10%
1'	25%
1.5'	50%
2'	60%
2.5'	65%
3'	70%
3.5'	75%
4'	80%
5'	85%
6'	100%
7'+	100%

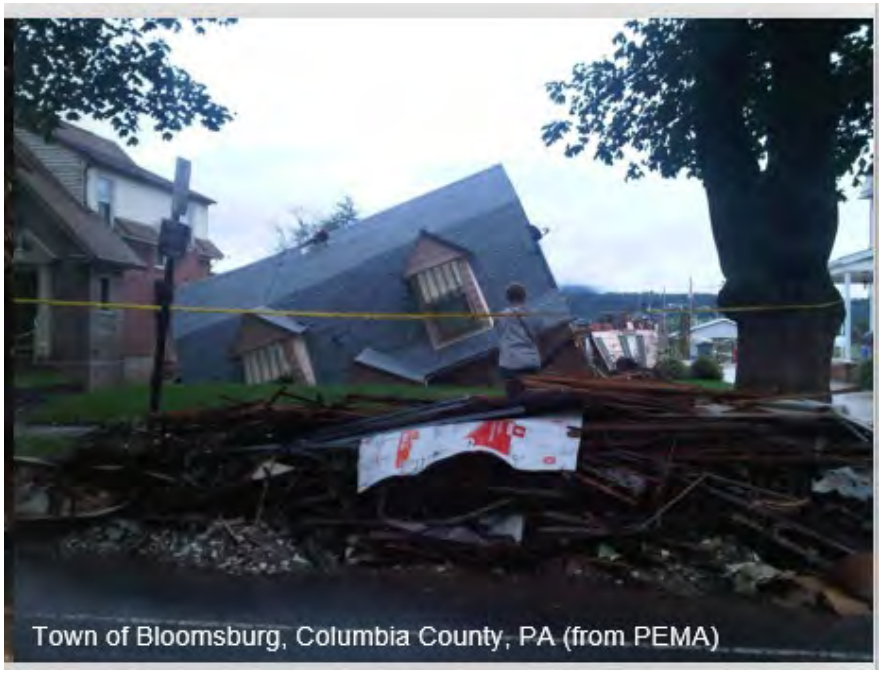
Window A/C Units and Plug-in Cord Heating Units:

- Select none

FEMA

Substantial Damage Estimator

Questions?


Town of Bloomsburg, Columbia County, PA (from PEMA)

Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

FEMA

Substantial Damage Estimation (SDE) Manual/Paper Exercises



Federal Emergency Management Agency (FEMA)

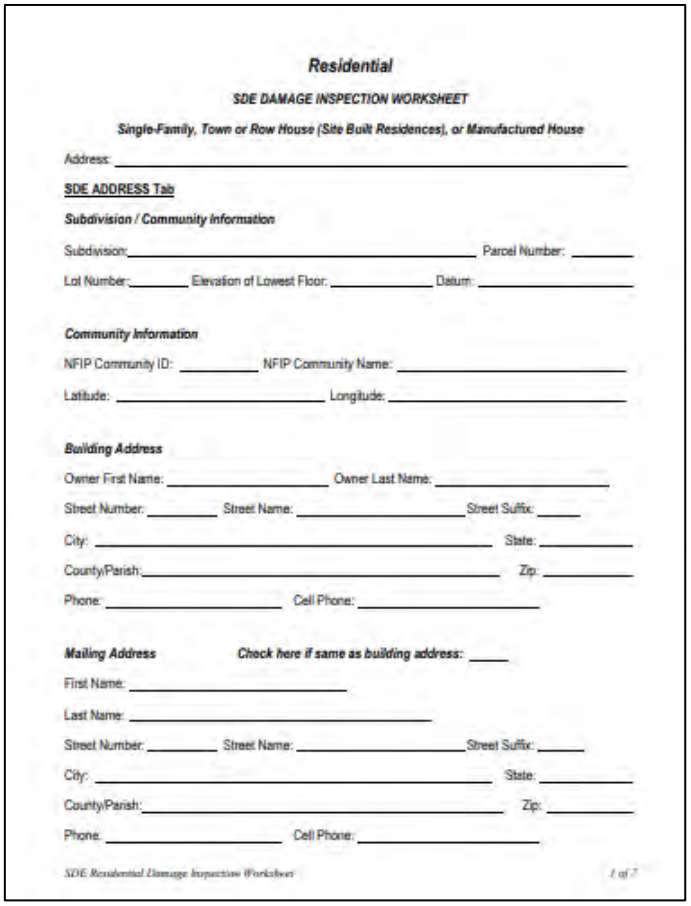
Harrisburg, PA

June 2023

FEMA

Substantial SDE Damage Estimator

Unit 7 – SDE Manual/Paper Assessment Form



Residential

SDE DAMAGE INSPECTION WORKSHEET

Single-Family, Town or Row House (Site Built Residences), or Manufactured House

Address: _____

SDE ADDRESS Tab

Subdivision / Community Information

Subdivision: _____ Parcel Number: _____

Lot Number: _____ Elevation of Lowest Floor: _____ Datum: _____

Community Information

NFIP Community ID: _____ NFIP Community Name: _____

Latitude: _____ Longitude: _____

Building Address

Owner First Name: _____ Owner Last Name: _____

Street Number: _____ Street Name: _____ Street Suffix: _____

City: _____ State: _____

County/Parish: _____ Zip: _____

Phone: _____ Cell Phone: _____

Mailing Address ***Check here if same as building address:*** _____

First Name: _____

Last Name: _____

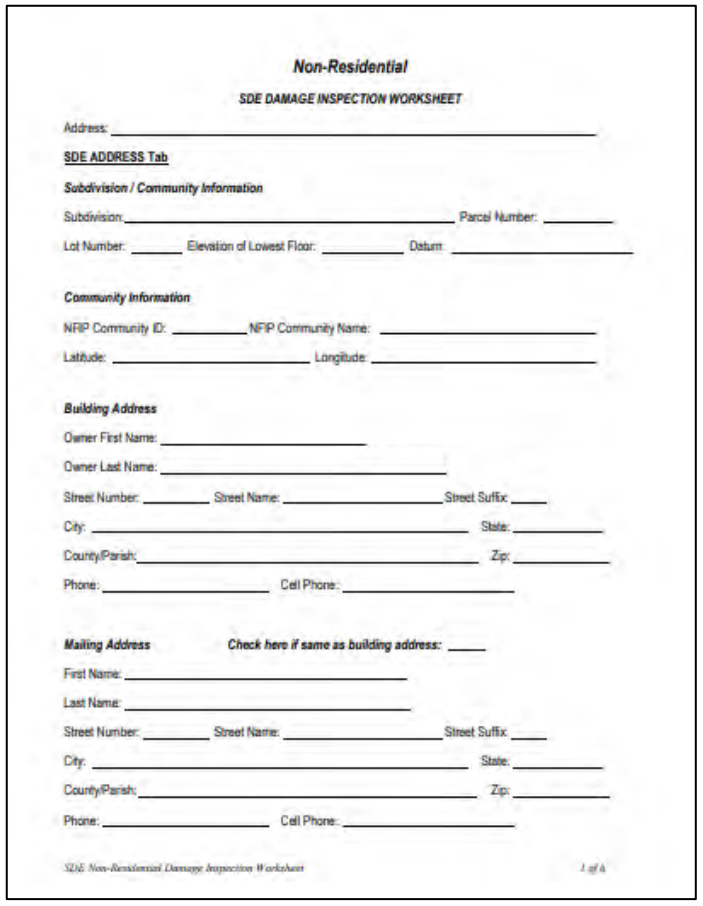
Street Number: _____ Street Name: _____ Street Suffix: _____

City: _____ State: _____

County/Parish: _____ Zip: _____

Phone: _____ Cell Phone: _____

SDE Residential Damage Inspection Worksheet *1 of 7*



Non-Residential

SDE DAMAGE INSPECTION WORKSHEET

Address: _____

SDE ADDRESS Tab

Subdivision / Community Information

Subdivision: _____ Parcel Number: _____

Lot Number: _____ Elevation of Lowest Floor: _____ Datum: _____

Community Information

NFIP Community ID: _____ NFIP Community Name: _____

Latitude: _____ Longitude: _____

Building Address

Owner First Name: _____

Owner Last Name: _____

Street Number: _____ Street Name: _____ Street Suffix: _____

City: _____ State: _____

County/Parish: _____ Zip: _____

Phone: _____ Cell Phone: _____

Mailing Address ***Check here if same as building address:*** _____

First Name: _____

Last Name: _____

Street Number: _____ Street Name: _____ Street Suffix: _____

City: _____ State: _____

County/Parish: _____ Zip: _____

Phone: _____ Cell Phone: _____

SDE Non-Residential Damage Inspection Worksheet *1 of 6*

SDE Manual/Paper Assessment Form or Inspection Worksheet

Substantial Damage Estimator

Rainbow Charts

SIMPLIFIED QA/QC GUIDANCE FOR EVALUATION OF RESIDENTIAL CONCRETE BUILDING INTERIOR ELEMENTS[1]

1-STORY RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[3]								
Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]	Appliances	Interior Finish	HVAC[2]
0'	0%	0%	0%	0%	0%	0%	0%	0%
0.5'	10%	25%	5%	0%	0%	25%	5%	10%
1'	20%	50%	5%	5%	10%	100%	5%	25%
1.5'	40%	50%	5%	10%	10%	100%	5%	50%
2'	40%	50%	5%	10%	20%	100%	5%	60%
2.5'	40%	50%	5%	10%	20%	100%	5%	65%
3'	50%	50%	10%	20%	20%	100%	10%	70%
3.5'	50%	50%	10%	20%	50%	100%	10%	75%
4'	75%	75%	15%	20%	60%	100%	15%	80%
5'	100%	100%	20%	30%	60%	100%	20%	85%
6'	100%	100%	25%	40%	70%	100%	25%	100%
7'+	100%	100%	30%	50%	80%	100%	30%	100%

NOTES: 1) This simplified guidance should be used when the inspector cannot enter a structure. 2)Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. 3) Structures on piles will be assessed on a case-by-case basis due to variability in finished space

SIMPLIFIED QA/QC GUIDANCE FOR EVALUATION OF RESIDENTIAL WOOD BUILDING INTERIOR ELEMENTS[1]

1-STORY RESIDENTIAL BUILDINGS ON SLAB/PIERS/CRAWLSPACE[3]								
Depth of Flooding Above Top of First Finished Floor (ft)	Doors and Windows	Cabinets and Countertops	Floor Finish	Plumbing[2]	Electrical[2]	Appliances	Interior Finish	HVAC[2]
0'	0%	0%	0%	0%	0%	0%	0%	0%
0.5'	10%	25%	100%	0%	5%	25%	20%	10%
1'	20%	50%	100%	5%	10%	100%	25%	25%
1.5'	40%	50%	100%	10%	10%	100%	40%	50%
2'	40%	50%	100%	10%	20%	100%	50%	60%
2.5'	40%	50%	100%	20%	20%	100%	65%	65%
3'	50%	50%	100%	20%	20%	100%	70%	70%
3.5'	50%	50%	100%	20%	50%	100%	75%	75%
4'	75%	75%	100%	20%	60%	100%	80%	80%
5'	100%	100%	100%	30%	60%	100%	85%	85%
6'	100%	100%	100%	40%	70%	100%	100%	100%
7'+	100%	100%	100%	50%	80%	100%	100%	100%

NOTES: 1) This simplified guidance should be used when the inspector cannot enter a structure. 2)Values may differ on some elements for structures on piers or crawlspace. Consider increasing plumbing, electrical, hvac damage if present beneath 1st floor structure. 3) Structures on piles will be assessed on a case-by-case basis due to variability in finished space below the structure, location of utilities, and potential foundation and superstructure damage if located in a high velocity area.

FEMA

Substantial Damage Estimator

SDE Residential Case Study

Substantial Damage Estimator

Results/Discussion

Structure Attributes:

- Residence type
- Foundation type
- Superstructure
- Roof covering
- Exterior finish
- Mechanical/HVAC system
- Number of stories
- Quality of construction
- Depth of flood

Percent Damages by Structure Elements:

- Foundation
- Superstructure
- Roof covering
- Exterior finish
- Interior finish
- Doors and windows
- Cabinets and countertops
- Floor finish
- Plumbing system
- Electrical system
- Equipment and appliances
- Mechanical/HVAC system

FEMA

Preparation for Field Exercises

- Remember paper copies of SDE Assessment Forms and Rainbow Charts.
- Remember electronics, laptops or tablets.
- Tomorrow's schedule:
  - Unit 8: Tool Features
  - Unit 9: Tool Exercises
  - Unit 10: Best Practices
  - Unit 11: Resources and Final Comments Out
  - Lunch: 12:30 – 1:30 p.m.
  - Field Exercise 1:30– 4:30 p.m.: INSERT CORRECT LOCATION
  - Transportation

Substantial Damage Estimator

Questions?


Town of Bloomsburg, Columbia County, PA (from PEMA)

Flood/Wind Building Science Helpline:

FEMA-BuildingScienceHelp@fema.dhs.gov

866.927.2104

http://www.fema.gov/building-science

FEMA

Substantial Damage Estimation (SDE) Tool Features and Functions



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

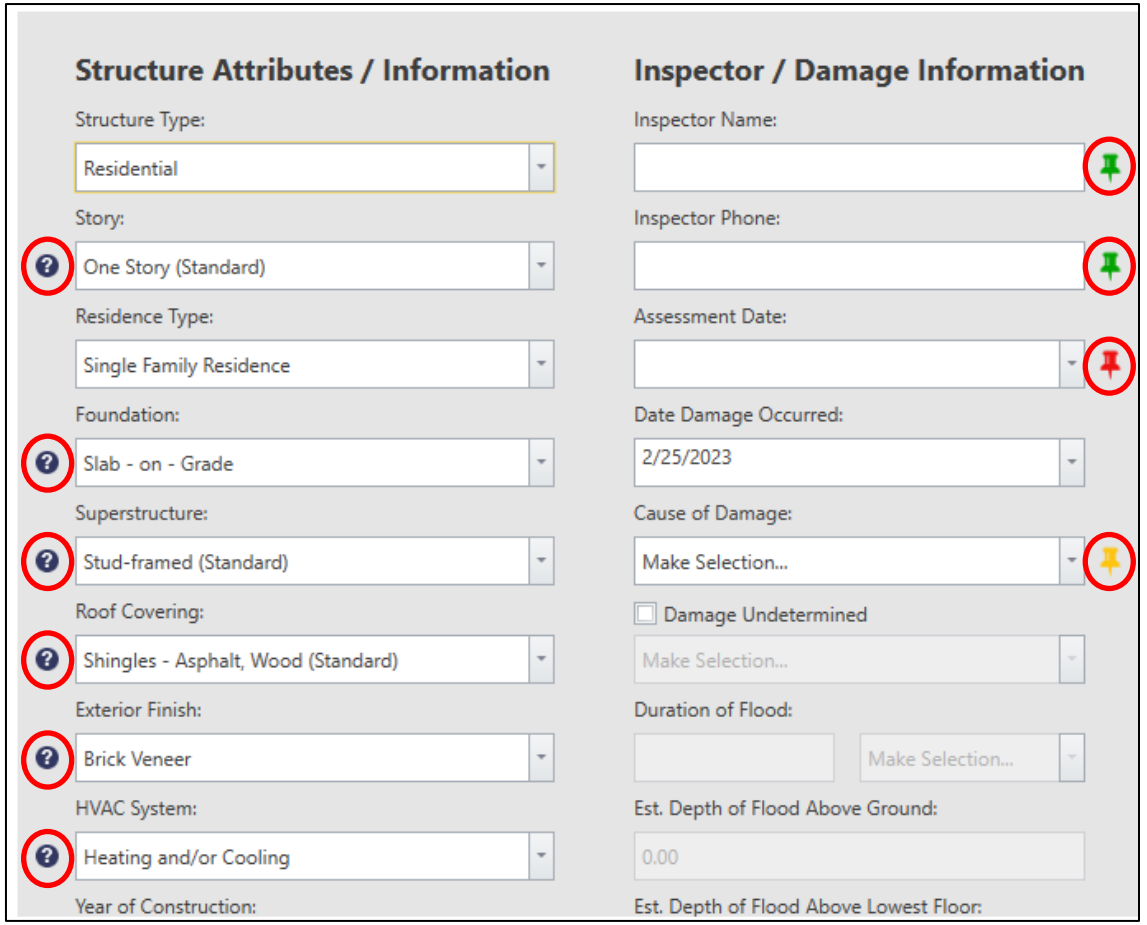
FEMA

Substantial SDE Damage Estimator

Unit 8 – SDE Tool Features and Functions

SDE Tool Features and Functions

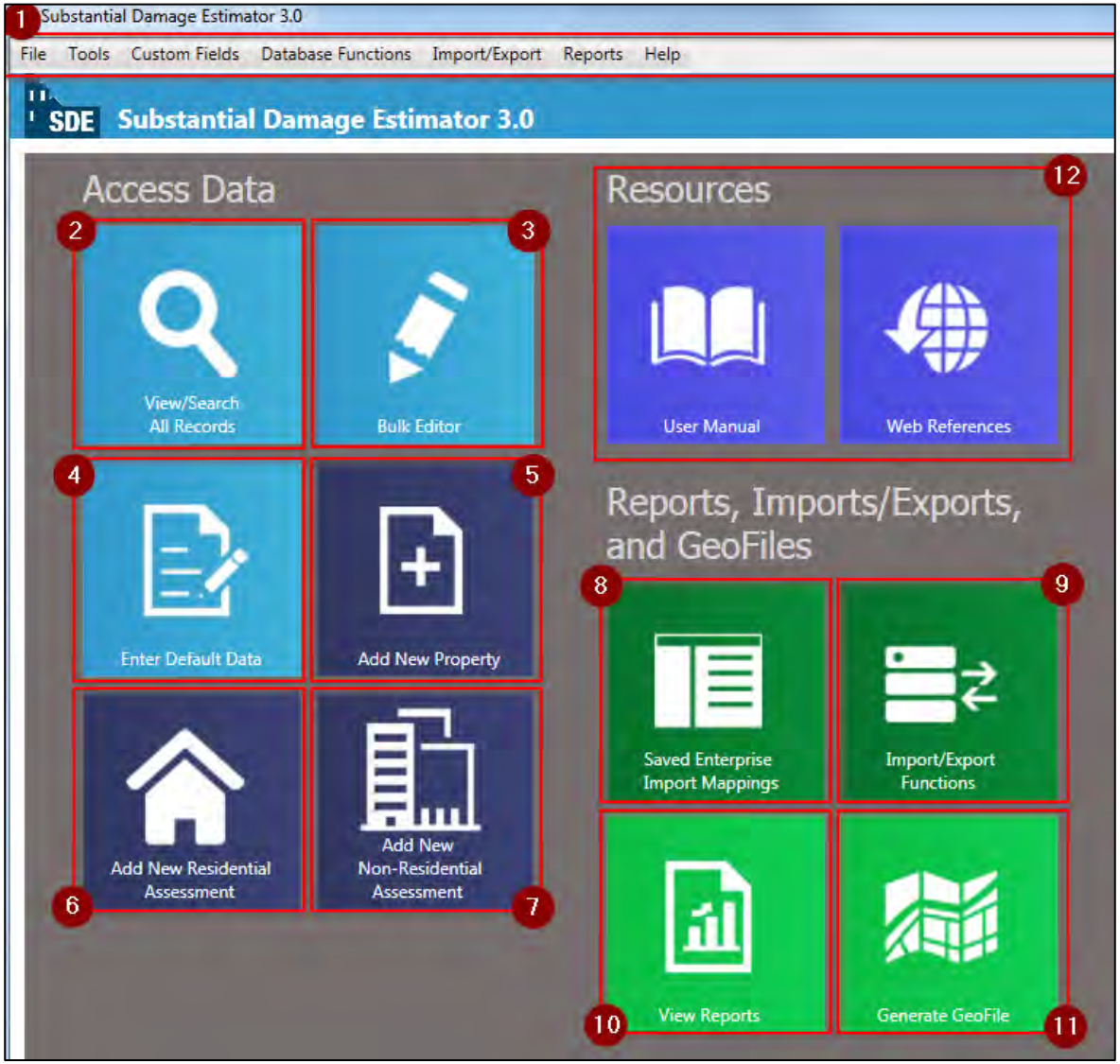
- Use help links and informational buttons.
- Enter all required information.
- SAVE, SAVE, SAVE!!!



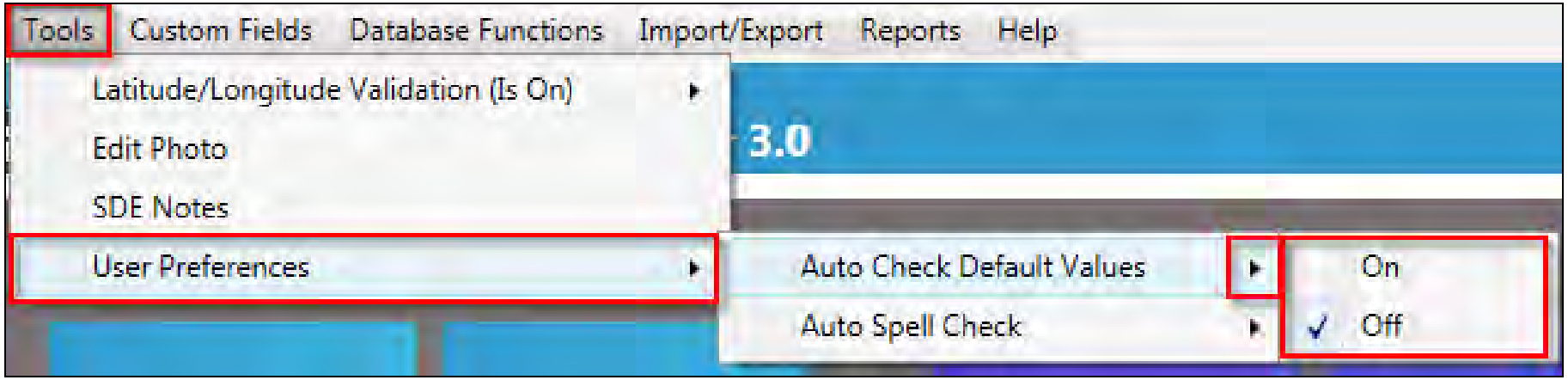
SDE Tool Order of Operations

1. Identify the affected area to perform SDE inspections.
2. Import parcel and/or tax assessment data into the SDE tool.
3. Coordinate teams and a plan for performing SDE assessments.
4. Collect data and perform their assessments using the SDE tool.
5. Perform QA/QC on data prior to submitting them.
6. Export final assessments to the database.
7. Perform additional QA/QC on finalized assessments.

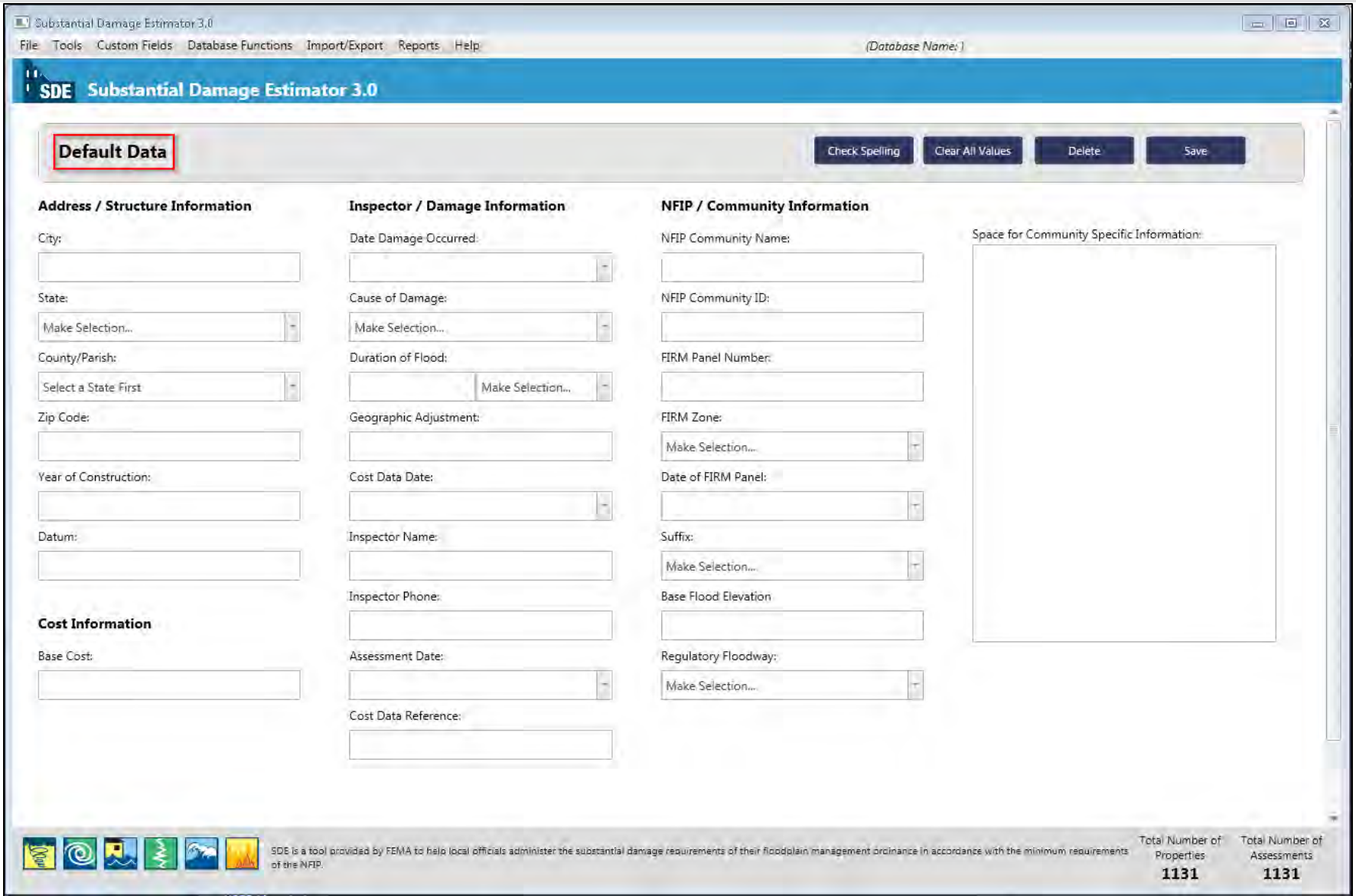
SDE Main Menu



SDE Tools Menu



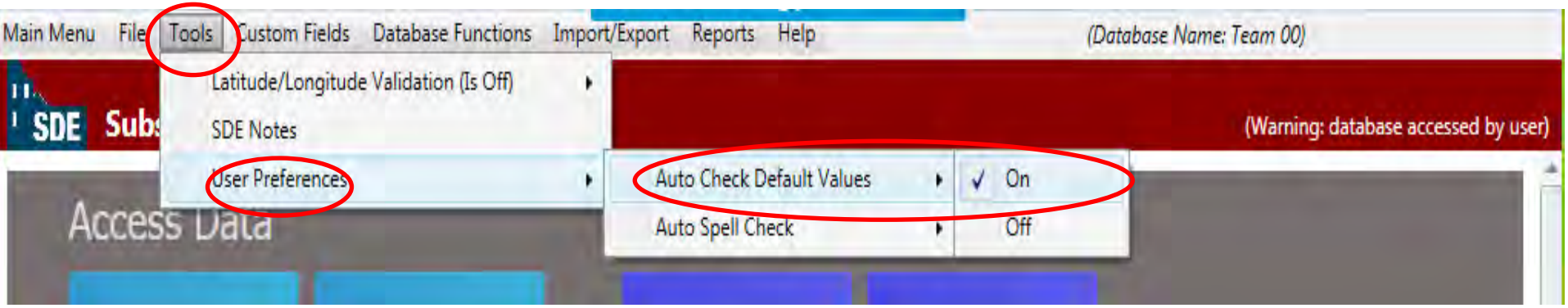
SDE Default Data



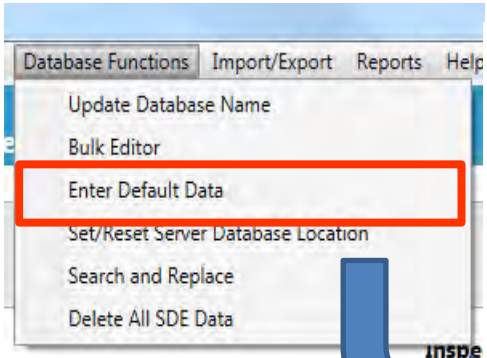
SDE Tool Default Values

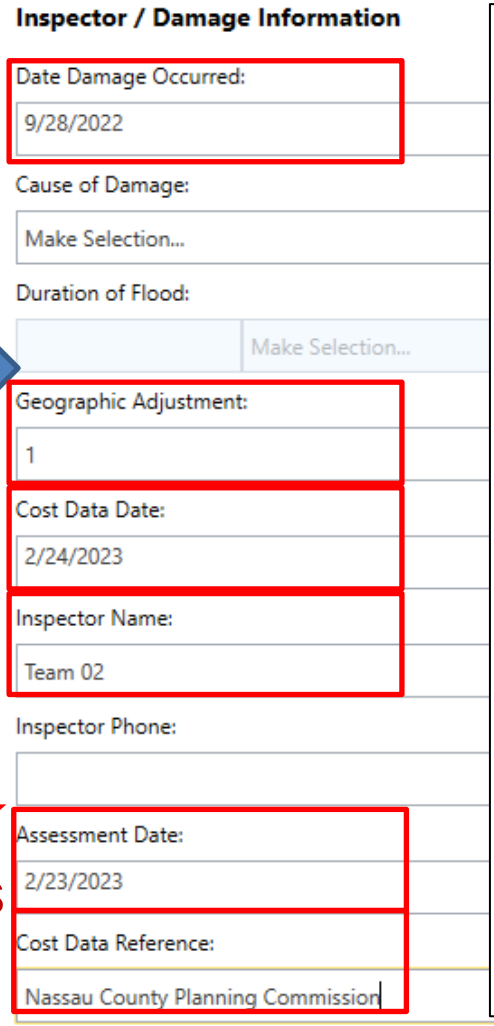
Set Auto Check Default Values to “ON.”

To use default values, select **Default Values** each time after exiting the SDE tool.



SDE Tool Default Values





Assessment Date must be set prior to SDE inspections

Enter Default Data

- **Date Damage Occurred**: XX/XX/20XX
- **Geographic Adjustment:** 1
- **Inspector Name:** Team XX
- **Cost Data Date:** XX/XX/20XX
- **Assessment Date:** Set to current date prior to SDE inspections
- **Cost Data Reference:** Nassau County Planning Commission

SDE Data Import

There are **two methods** for **importing data** into the SDE tool:

1. **SDE Format Data Import** plus photos (SDE Import):
   - SDE data from another SDE database
   - Data from other disasters
   - Data from the current disaster stored on a different computer

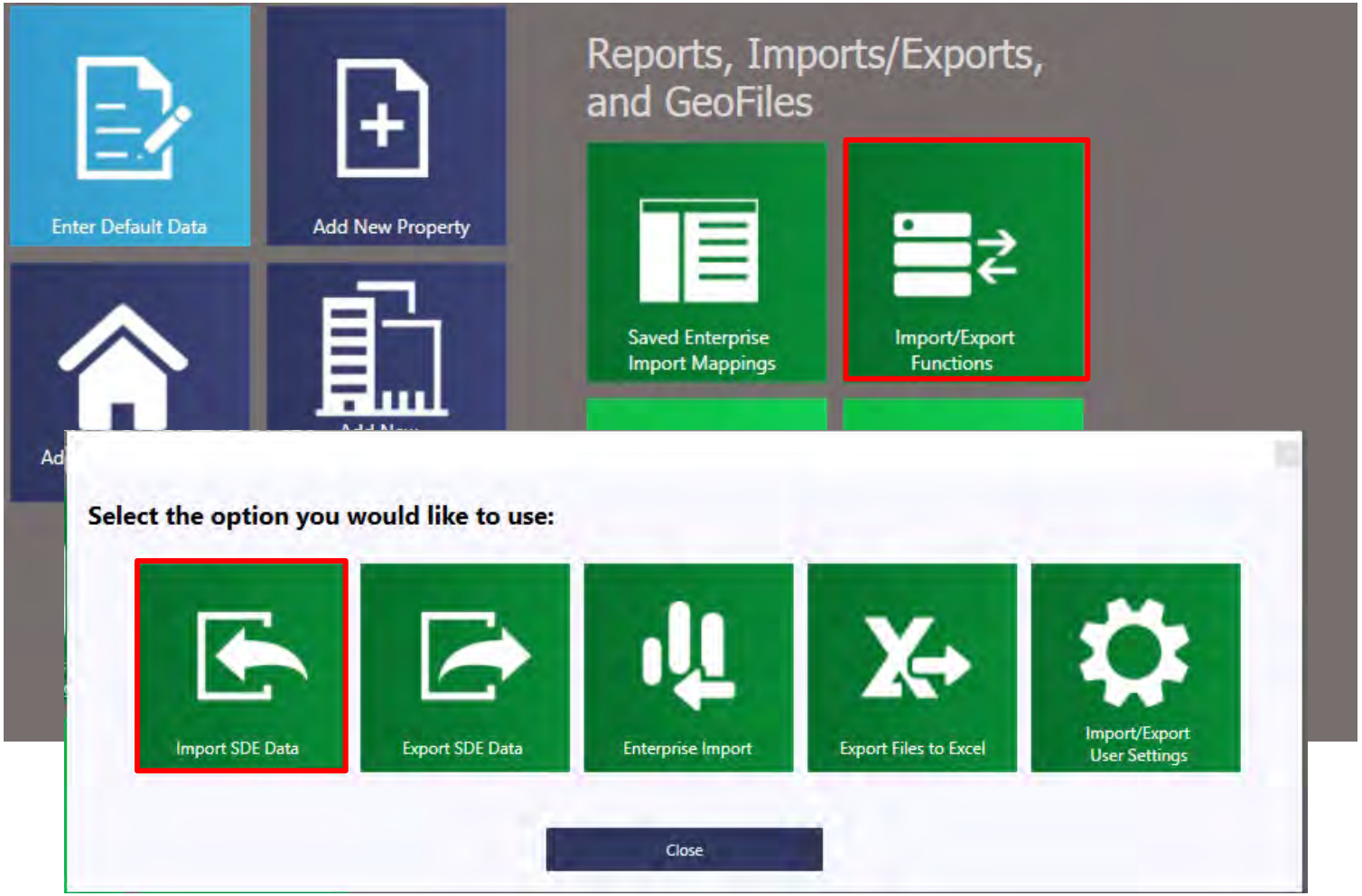
2. **Enterprise Import** of property data from a non-SDE source such as tax records or standalone lists in Microsoft Excel

SDE Format Data Import

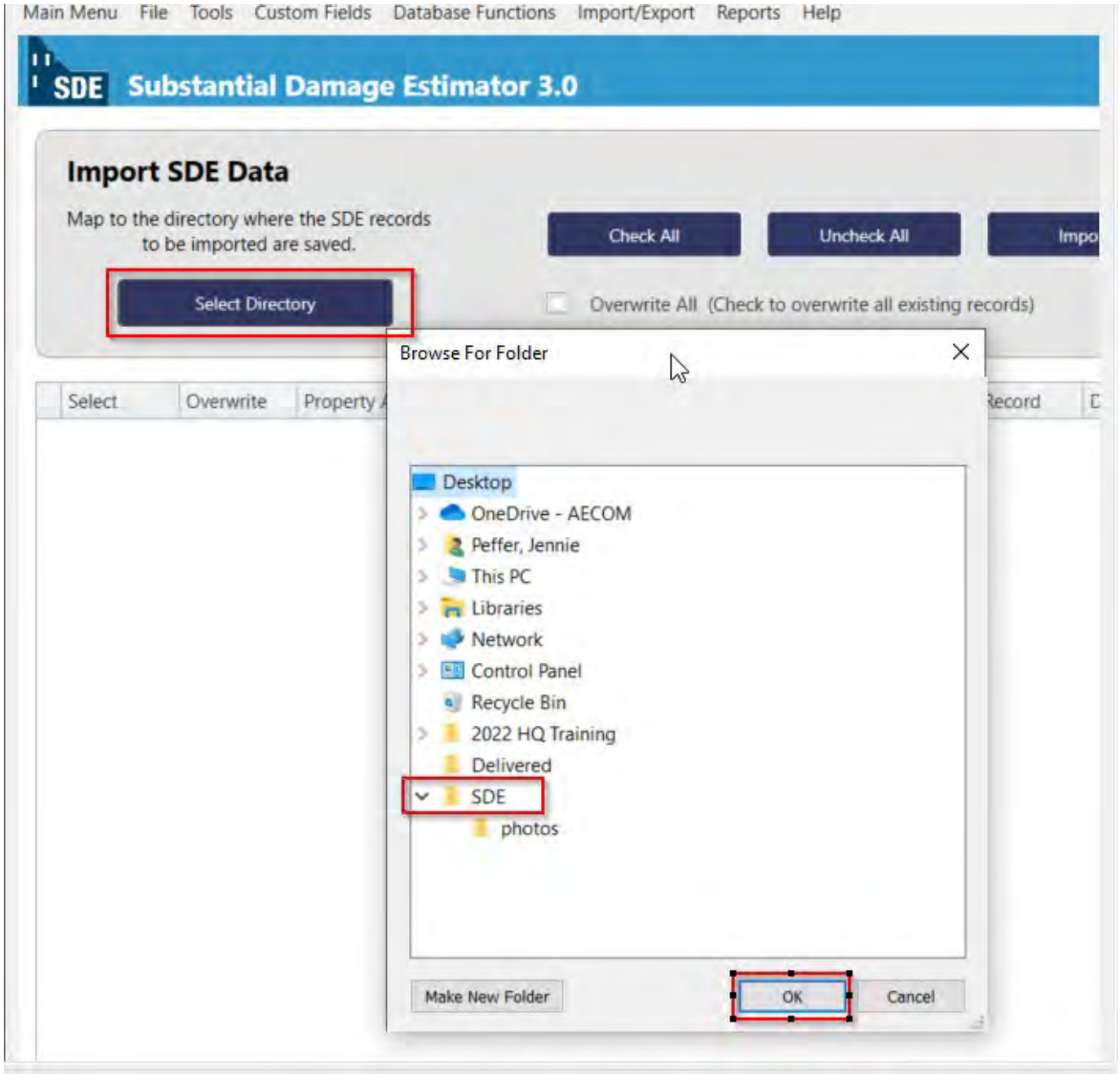
Method 1: SDE Format Data Import (SDE data from another SDE database)

- This involves previously saved assessments in SDE format, with structure attributes, value, and element percent damaged.
- It works with SDE databases from previous SDE versions.
- It allows for import of data and photos.

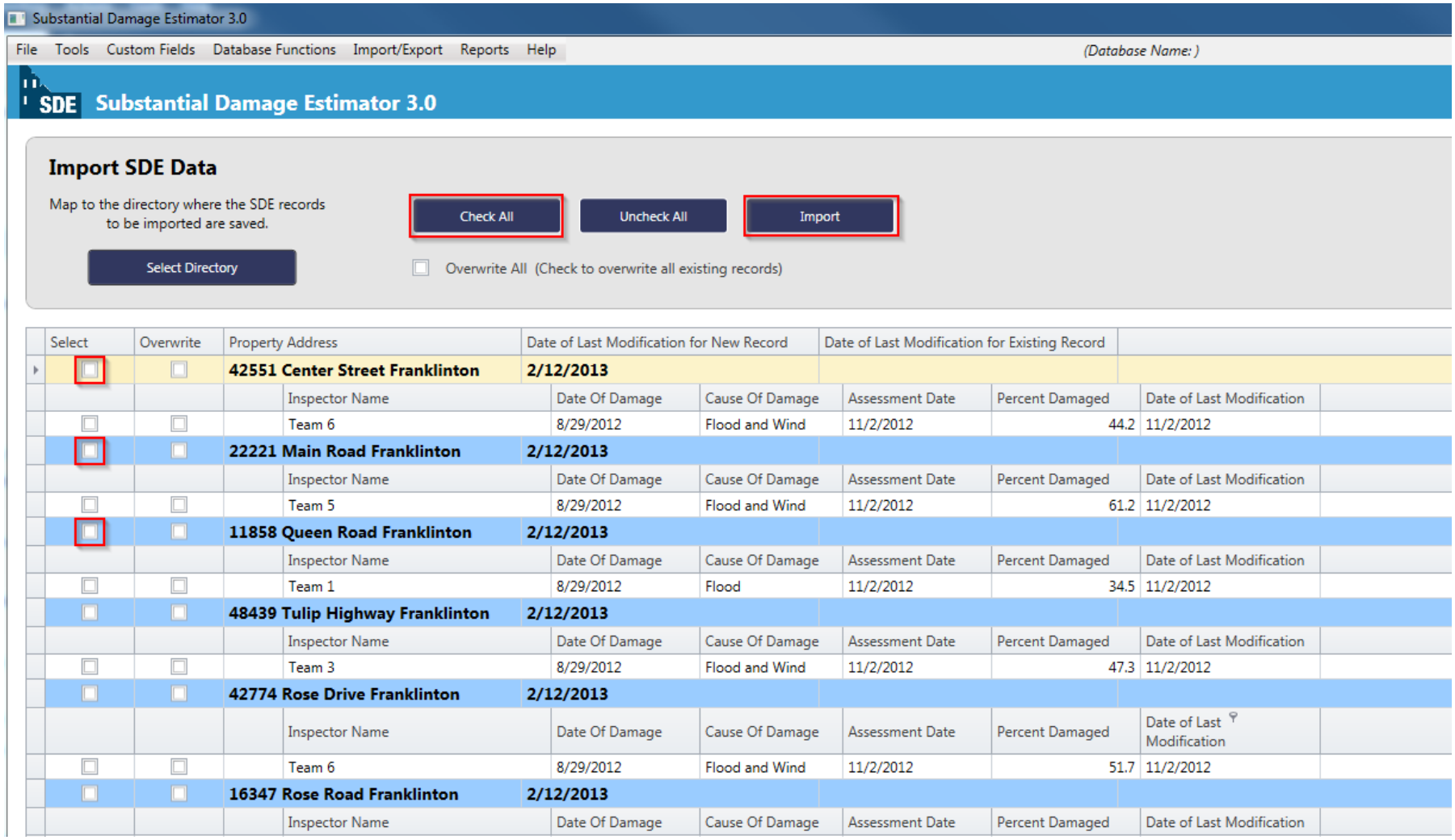
SDE Format Data Import



SDE Format Data Import



SDE Format Data Import



Select	Overwrite	Property Address	Date of Last Modification for New Record	Date of Last Modification for Existing Record
☐	☐	**42551 Center Street Franklinton**	**2/12/2013**	

Inspector Name	Date Of Damage	Cause Of Damage	Assessment Date	Percent Damaged	Date of Last Modification
Team 6	8/29/2012	Flood and Wind	11/2/2012	44.2	11/2/2012

Select	Overwrite	Property Address	Date of Last Modification for New Record	Date of Last Modification for Existing Record
☐	☐	**22221 Main Road Franklinton**	**2/12/2013**	

Inspector Name	Date Of Damage	Cause Of Damage	Assessment Date	Percent Damaged	Date of Last Modification
Team 5	8/29/2012	Flood and Wind	11/2/2012	61.2	11/2/2012

Select	Overwrite	Property Address	Date of Last Modification for New Record	Date of Last Modification for Existing Record
☐	☐	**11858 Queen Road Franklinton**	**2/12/2013**	

Inspector Name	Date Of Damage	Cause Of Damage	Assessment Date	Percent Damaged	Date of Last Modification
Team 1	8/29/2012	Flood	11/2/2012	34.5	11/2/2012

Select	Overwrite	Property Address	Date of Last Modification for New Record	Date of Last Modification for Existing Record
☐	☐	**48439 Tulip Highway Franklinton**	**2/12/2013**	

Inspector Name	Date Of Damage	Cause Of Damage	Assessment Date	Percent Damaged	Date of Last Modification
Team 3	8/29/2012	Flood and Wind	11/2/2012	47.3	11/2/2012

Select	Overwrite	Property Address	Date of Last Modification for New Record	Date of Last Modification for Existing Record
☐	☐	**42774 Rose Drive Franklinton**	**2/12/2013**	

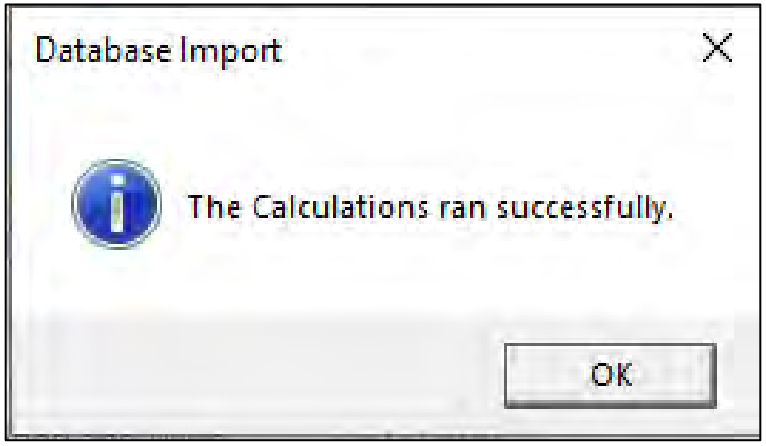
Inspector Name	Date Of Damage	Cause Of Damage	Assessment Date	Percent Damaged	Date of Last Modification
Team 6	8/29/2012	Flood and Wind	11/2/2012	51.7	11/2/2012

Select	Overwrite	Property Address	Date of Last Modification for New Record	Date of Last Modification for Existing Record
☐	☐	**16347 Rose Road Franklinton**	**2/12/2013**	

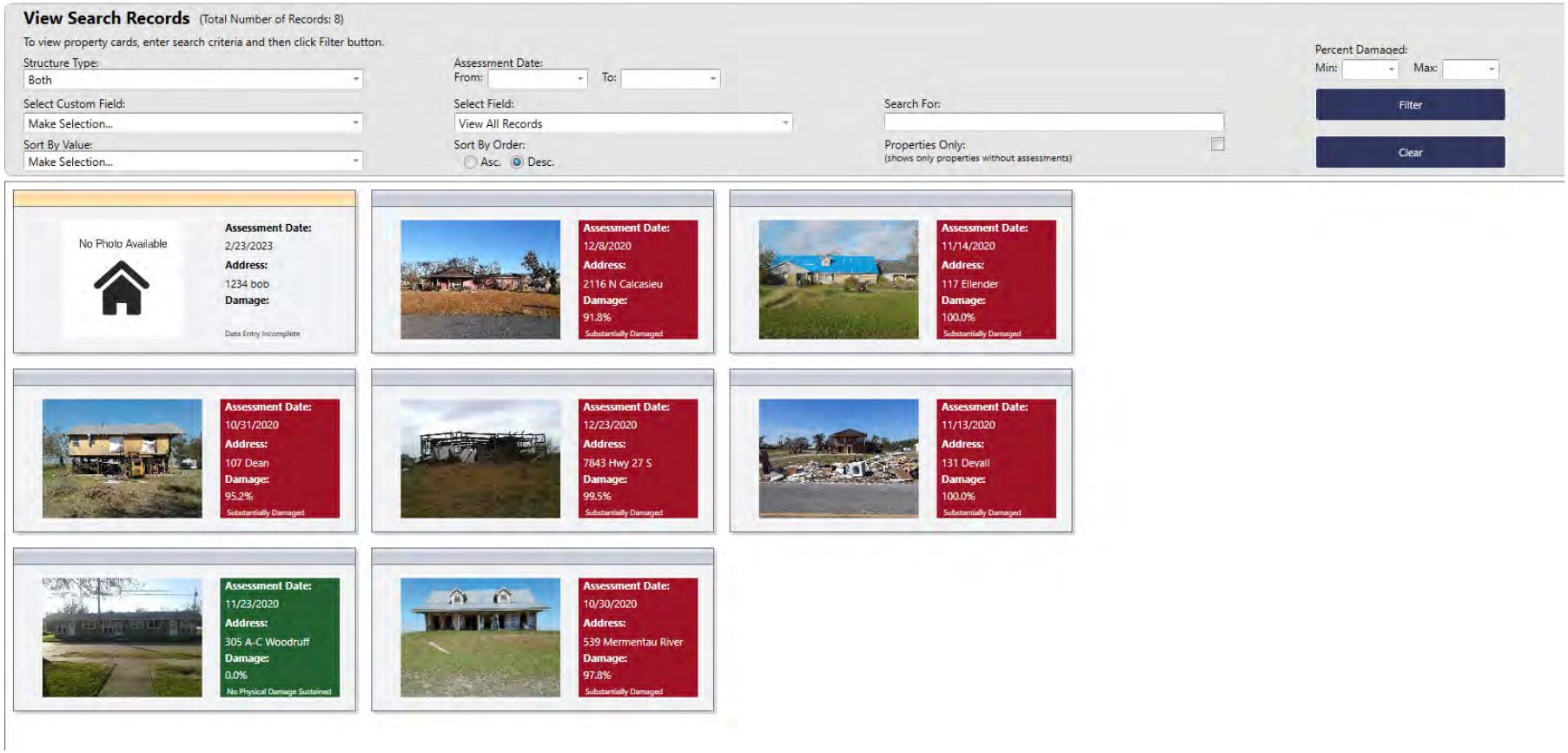
Inspector Name	Date Of Damage	Cause Of Damage	Assessment Date	Percent Damaged	Date of Last Modification

SDE Format Data Import

When **SDE Data Import** is complete, confirmation windows will open.



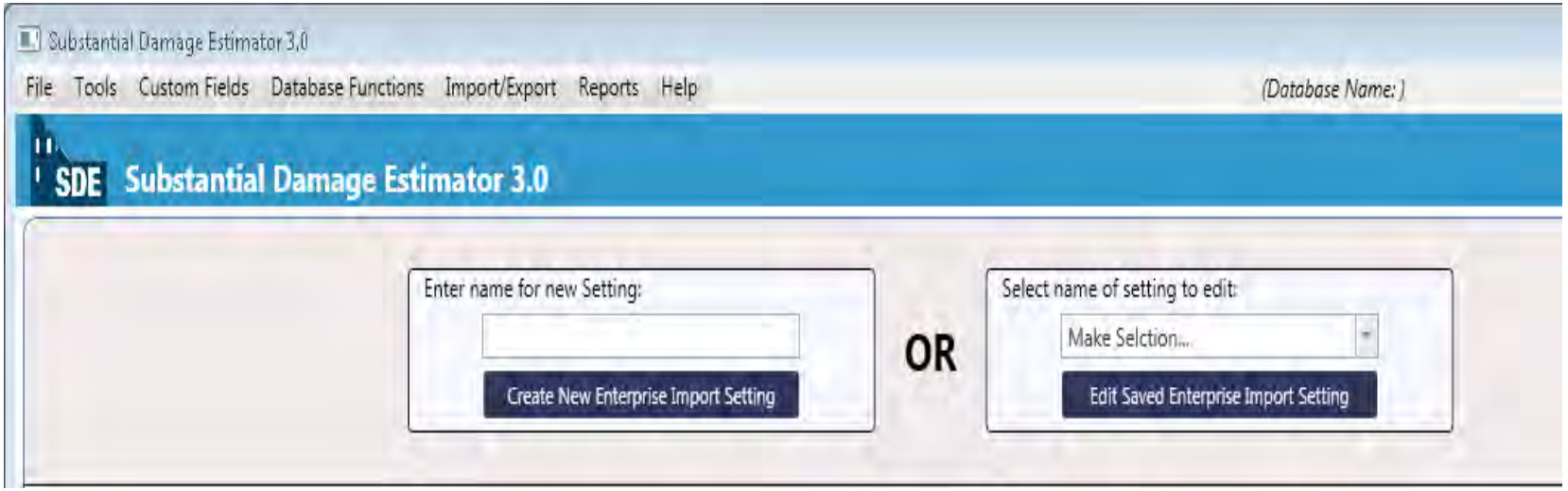
SDE Format Data Import



SDE Enterprise Import

Method 2: Enterprise Import of property data from a non-SDE source.

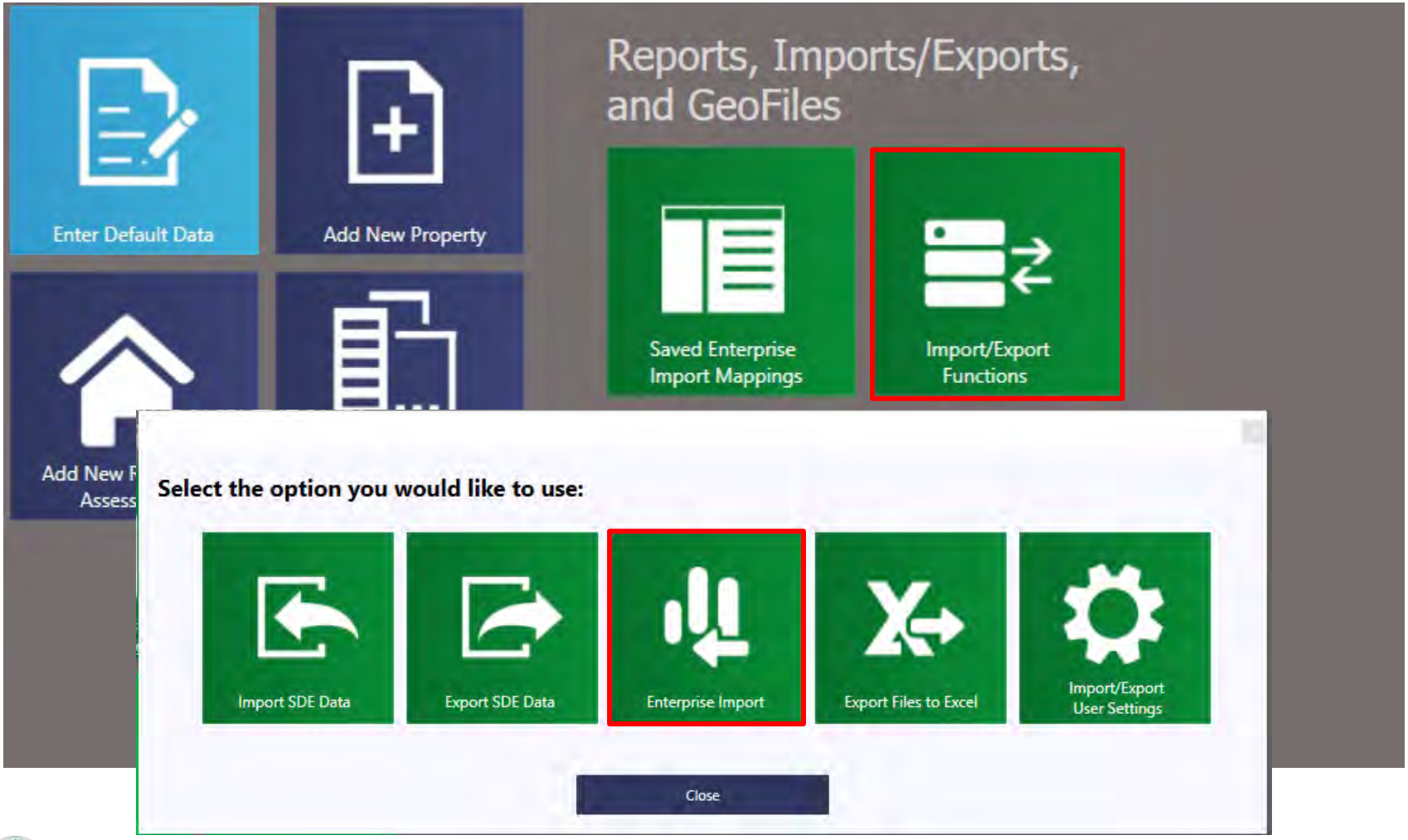
- Only property-level data in Excel can be imported using the *Enterprise Import* function.
- Assessment data can only be imported from SDE exports.



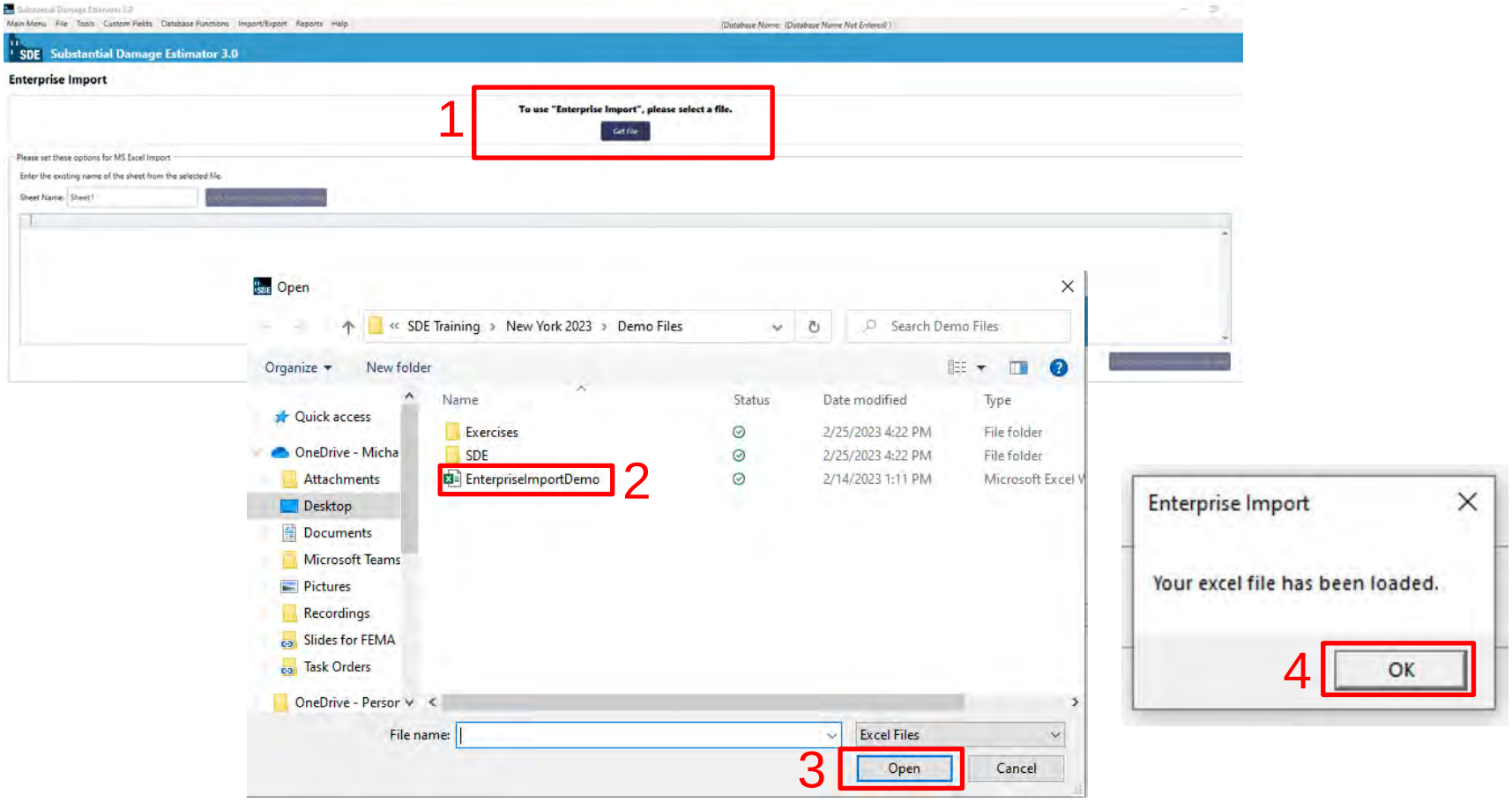
SDE Fields for Enterprise Import

Owner's First and Last Names	Community NFIP ID
Lot Number	FIRM Panel
Parcel Number	FIRM Zone
Address Lines 1 and 2	BFE
Street Suffix	Suffix
Cardinal (N, E, S, W) or quadrant directions (NW, SW, NE, SE) either preceding or following (structure type)the street name	Residential or Non-Residential Structure Type
Apartment, Unit, etc.	Phone Number
City	Date of FIRM Panel
State	Regulatory Floodway (Yes, No or Possible)
County	Subdivision
Zip Code	First Floor Elevation
Year of Construction	Datum
Longitude	Total Square Footage
Latitude	Custom Fields (Max 3)
Community Name	

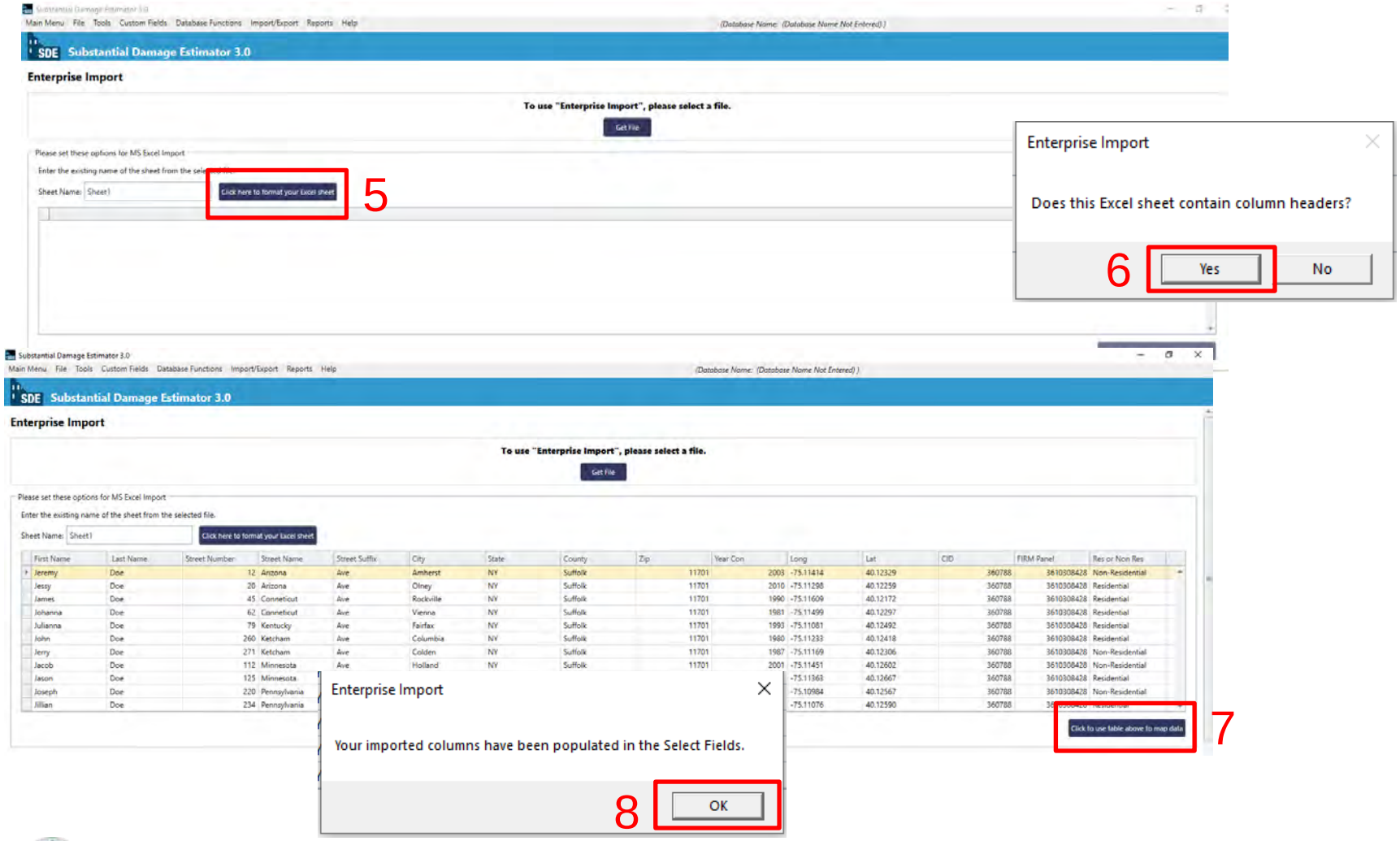
SDE Enterprise Import



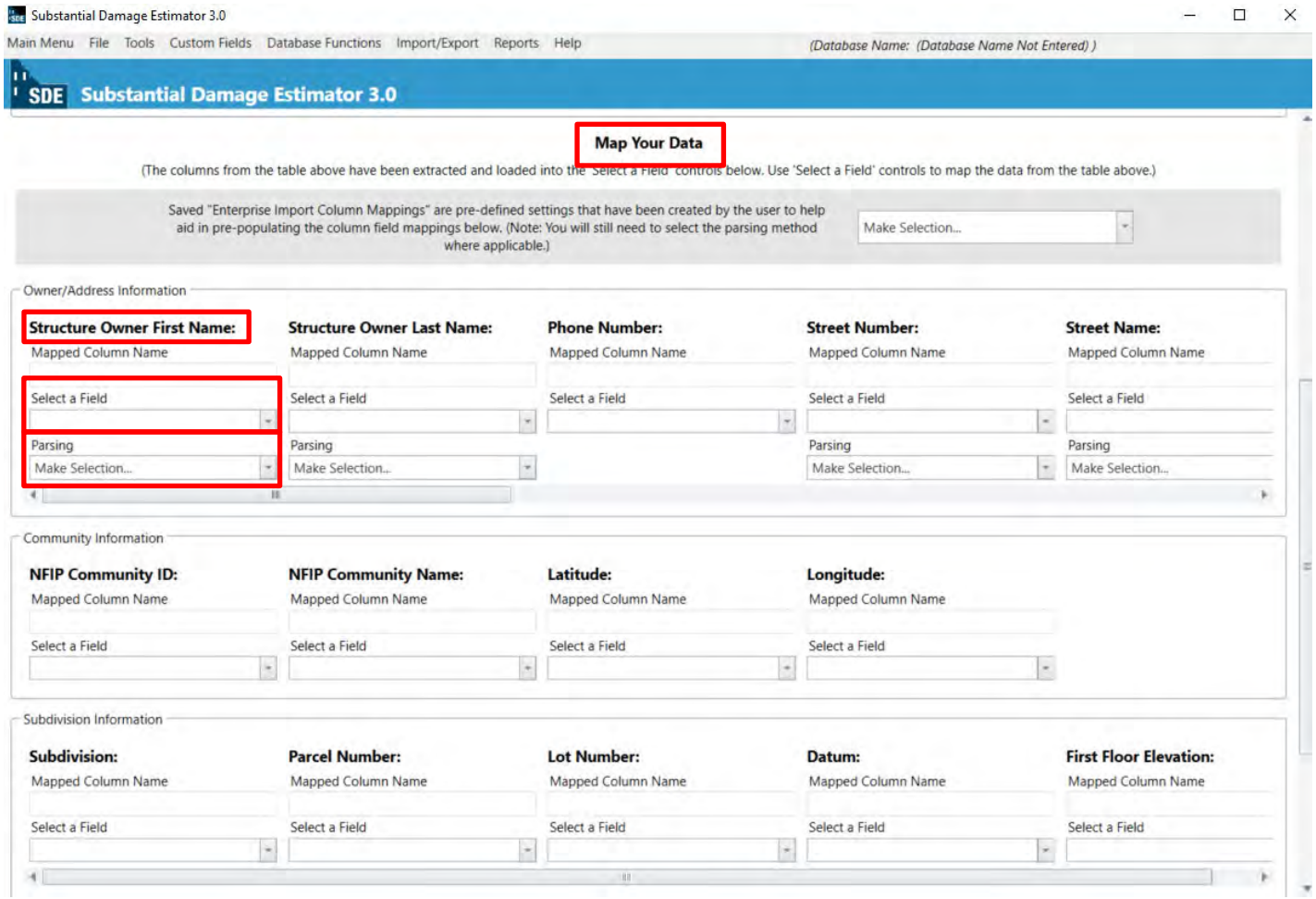
SDE Enterprise Import – Step 1



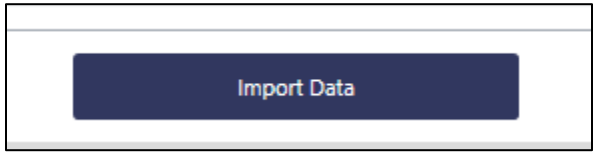
SDE Enterprise Import – Step 2



SDE Enterprise Import – Step 3

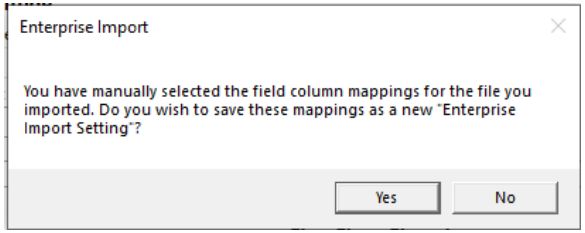


SDE Enterprise Import – Step 4

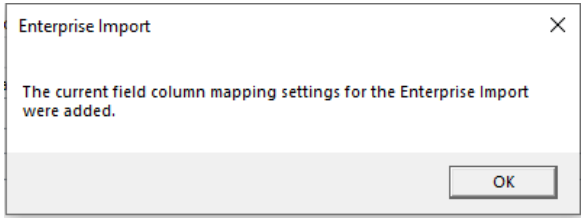


1

2

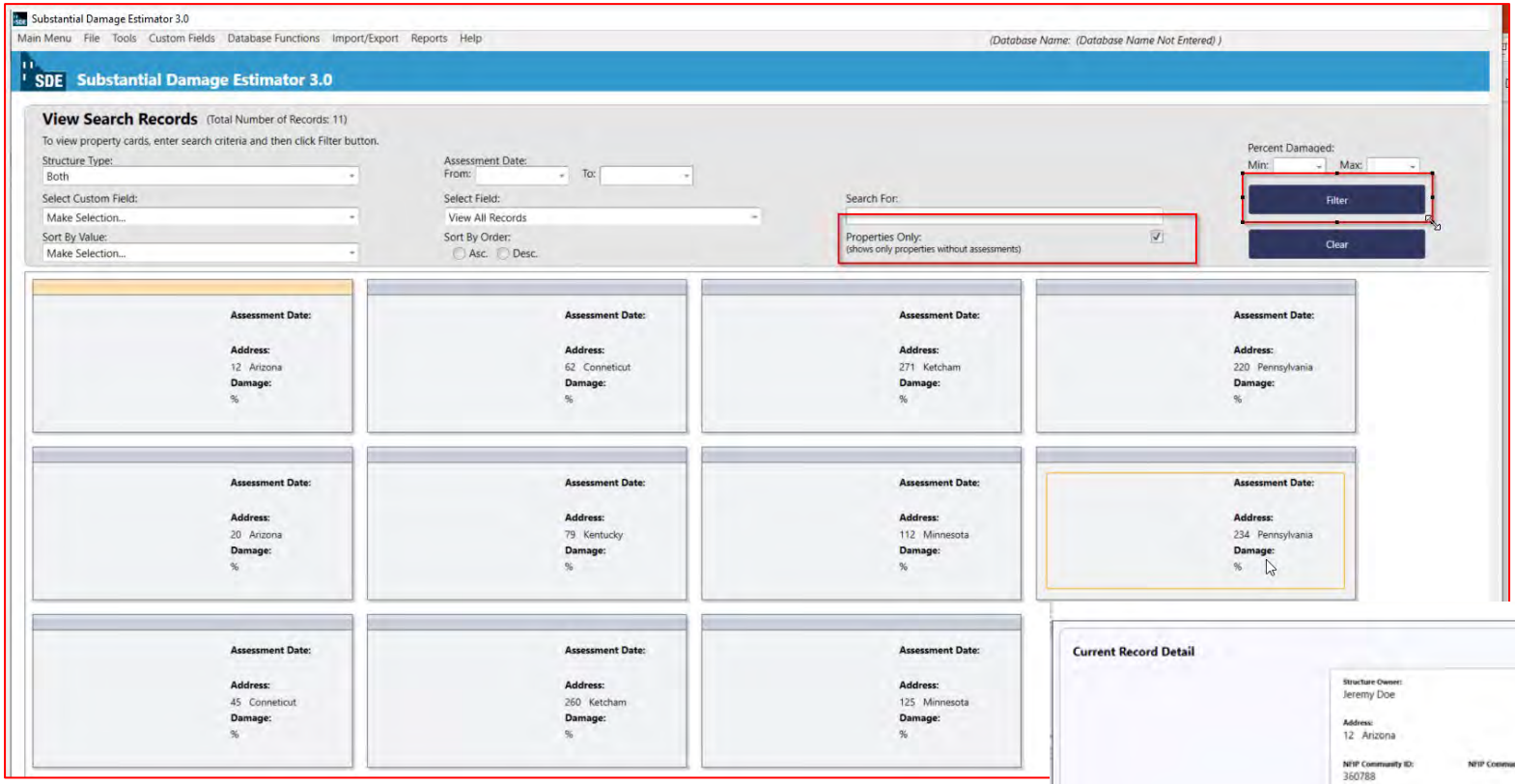


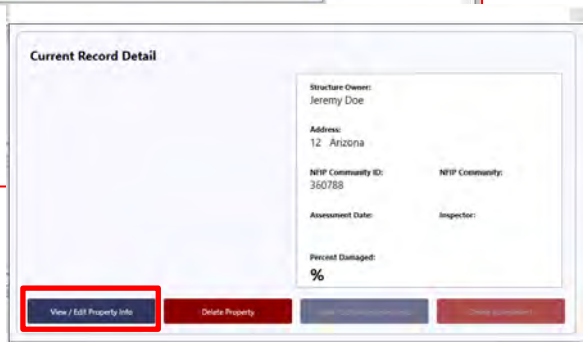
3



4

SDE Enterprise Import – Step 5





Create SDE Assessment

Substantial Damage Estimator

Please Select a Property

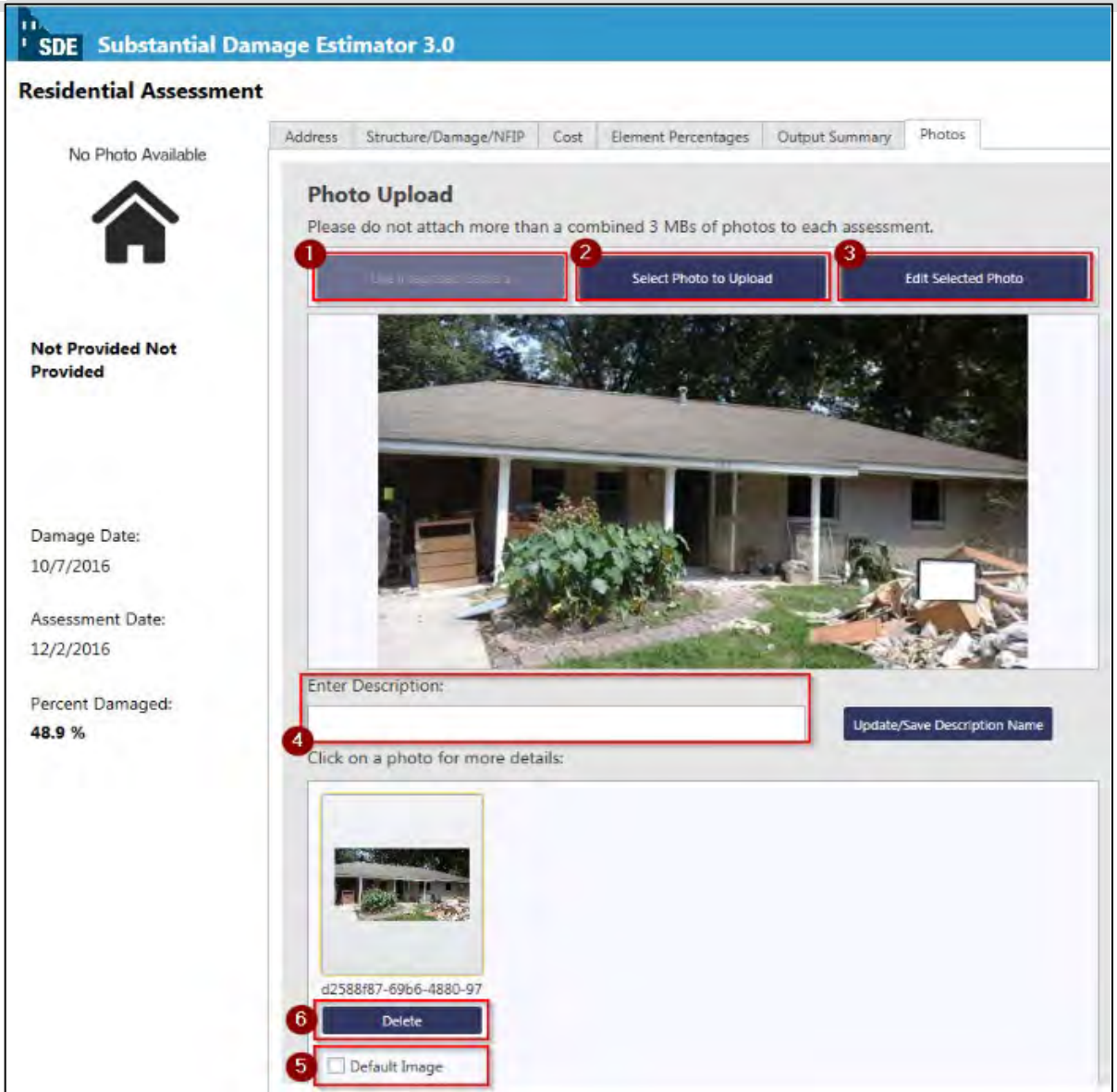
Structure Owner Name	Property Address	County/Parish	Parcel Number	Lot Number	Subdivision	Year of Construction
Not Provided Not Provi...	1008 We...	Duval	05037200...			1900
Not Provided Not Provi...	12933 He...	Duval	15787500...			1900
Not Provided Not Provi...	14054 Pi...	Duval	17928902...			1900
Not Provided Not Provi...	14074 Pi...	Duval	17928901...			1900
Not Provided Not Provi...	14221 Pl...	Duval	16089800...			1900
Not Provided Not Provi...	1824 Buc...	Duval	16097900...			1900
Not Provided Not Provi...	1834 Buc...	Duval	16098000...			1985
Not Provided Not Provi...	1844 Buc...	Duval	16098100...			1900
Not Provided Not Provi...	1944 Hov...	Duval	16528552...			1900
Not Provided Not Provi...	1976 W 2...	Duval	08730300...			1900
Not Provided Not Provi...	2018 Leo...	Duval	16499300...			1900
Not Provided Not Provi...	2040 Leo...	Duval	16499100...			1900
Not Provided Not Provi...	2075 Sun...	Duval	16494200...			1900
Not Provided Not Provi...	3526 San...	Duval	18036607...			1988
Not Provided Not Provi...	4369 Port...	Duval	18035510...			1900
Not Provided Not Provi...	4377 Port...	Duval	18035510...			1900
Not Provided Not Provi...	4389 Port...	Duval	18035510...			1900
Not Provided Not Provi...	4417 Port...	Duval	18035510...			1900
Not Provided Not Provi...	5118 Hea...	Duval	15997100...			1948

Preload using default values.

New Property | Use Selected Property

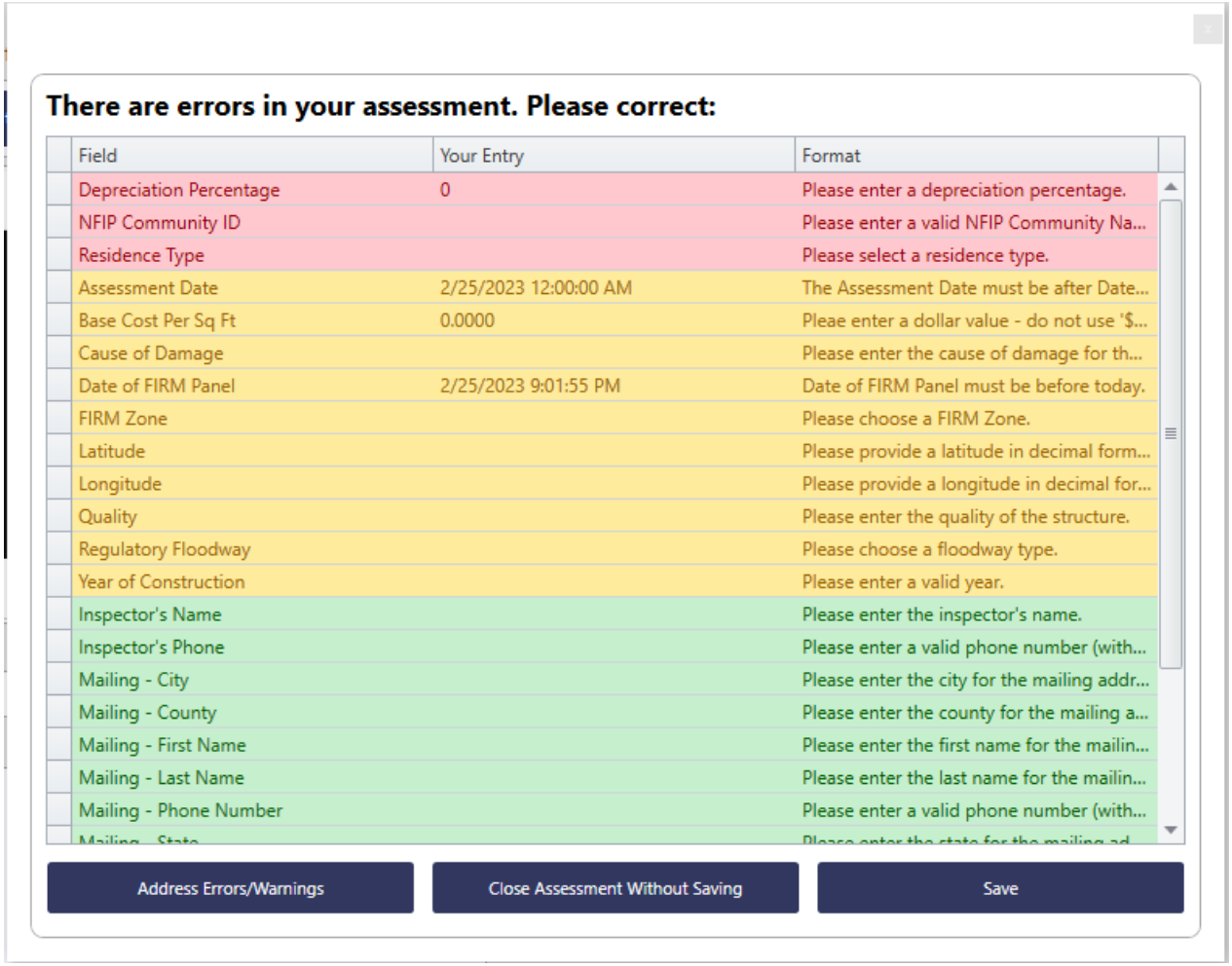
FEMA

SDE Photographs



SDE Edit Photographs

SDE Data Validation



Data Validation

Flags

Red – Required to save assessments

Yellow – Required to save valid assessments

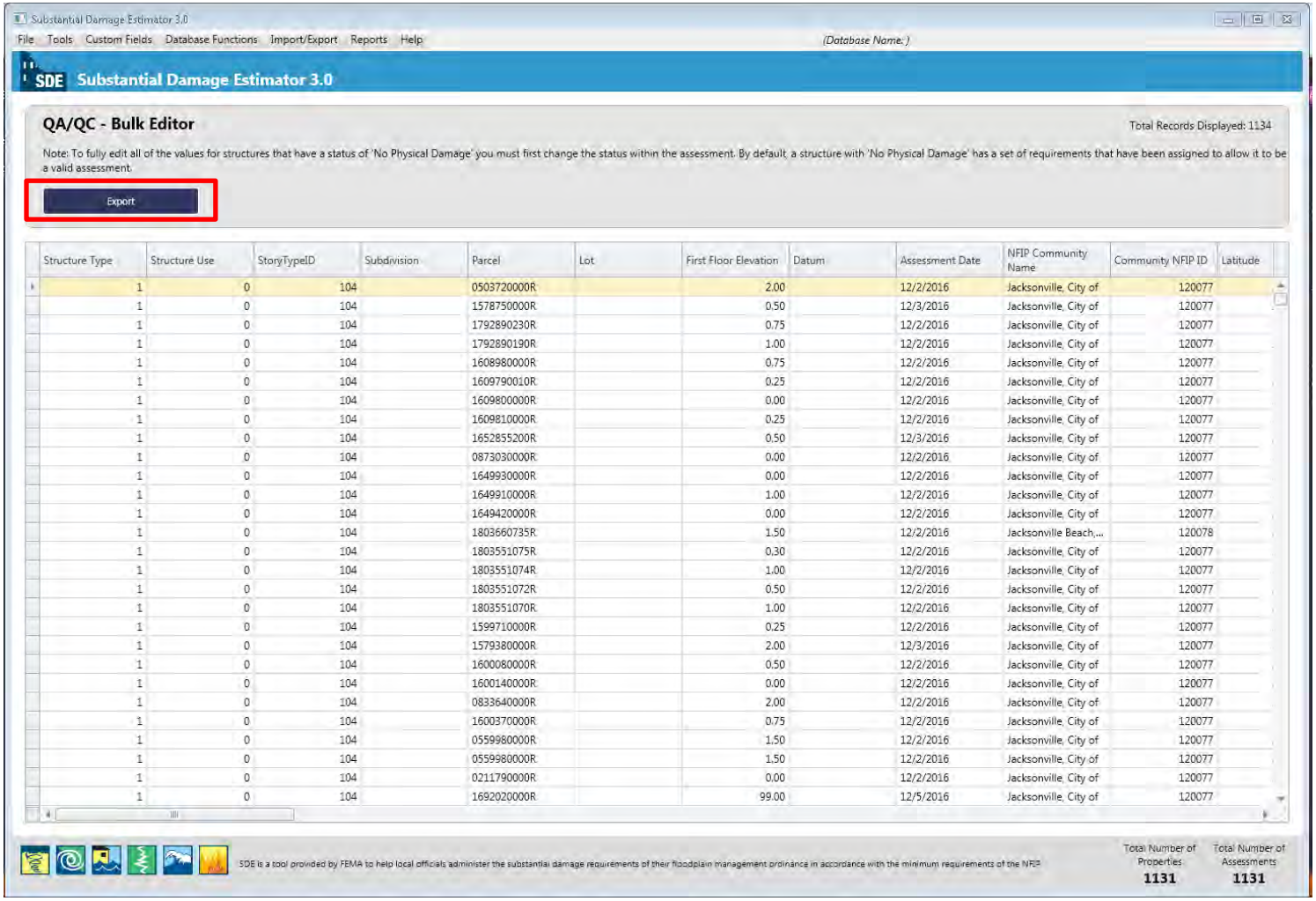
Green – Recommended and not required

SDE Data Validation

Assessments

Required or Suggested	Fields
Required to Save an Assessment	1. NFIP CID 2. Date of Assessment (i.e., inspection date) **Residential-specific:** 1. Residence Type 2. Number of Stories (1, 2 or more) **Non-Residential-specific:** 1. Number of Stories (1, 2-4, 5 or more) 2. Structure Use
Required to Save a Valid Assessment (same fields required for residential and non-residential assessments)	1. Elevation of Lowest Floor 2. Latitude and Longitude 3. Year of Construction 4. Quality (initial construction) 5. Date Damage Occurred 6. Cause of Damage 7. FIRM Panel Number 8. Date of FIRM Panel 9. FIRM Flood Zone 10. BFE 11. Regulatory Floodway 12. Base Cost Per Square Foot 13. Depreciation Rating 14. Depreciation Explanation (if manual depreciation value is entered)
Suggested (same fields suggested for residential and non-residential assessments)	1. Building Owner Name and Address Information 2. Owner Mailing Address 3. Inspector Name and Phone Number

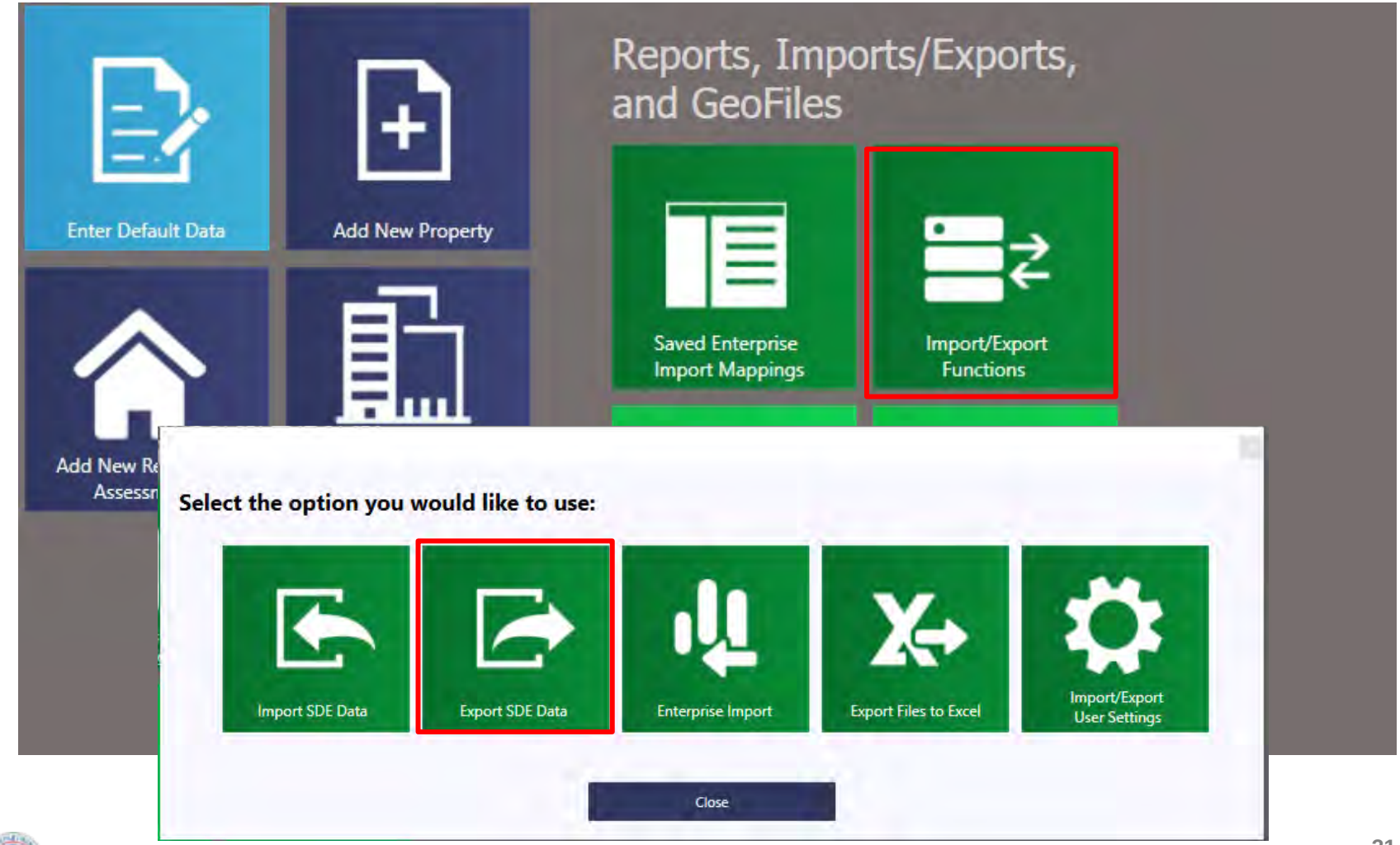
SDE Tool Bulk Editor



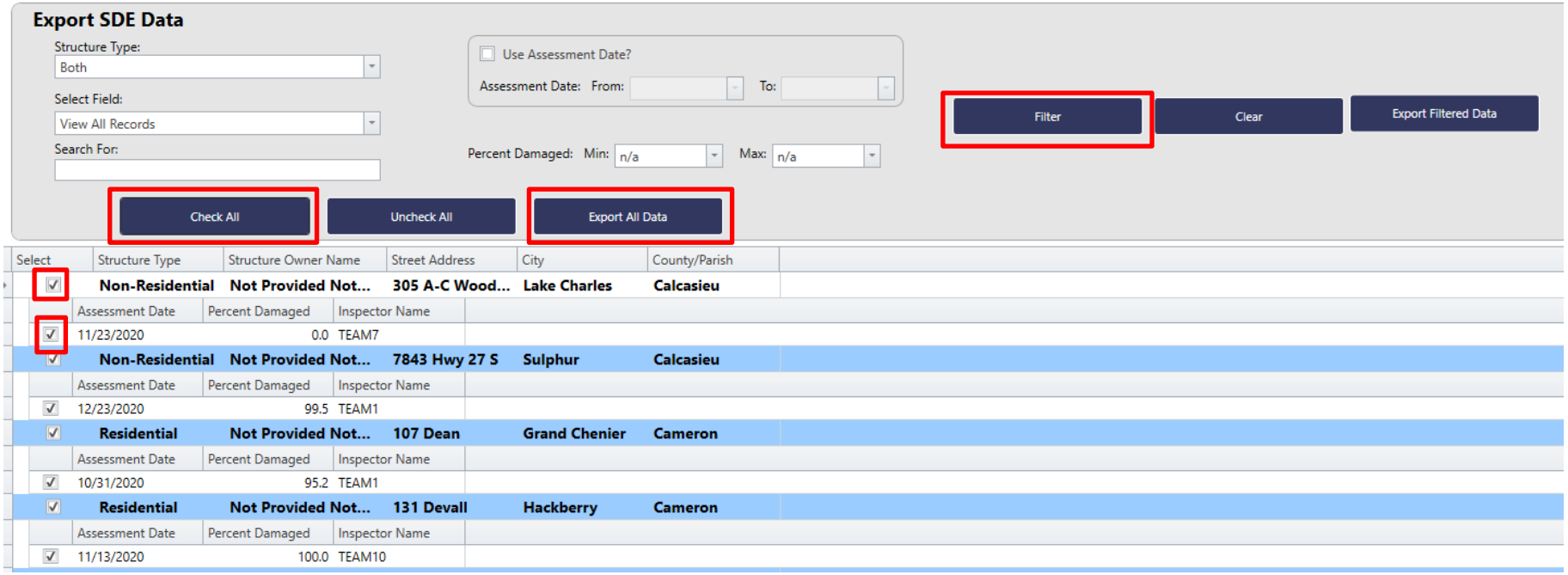
SDE Tool Export

1. **Export SDE Data** – for use only within the SDE tool.
   - I includes photographs.
2. **Export Data to Excel** – one-way export.
   - Use SDE filters to export by:
     - Structure type.
     - Inspection date.
     - Percent damaged.
     - Eight other filter categories.

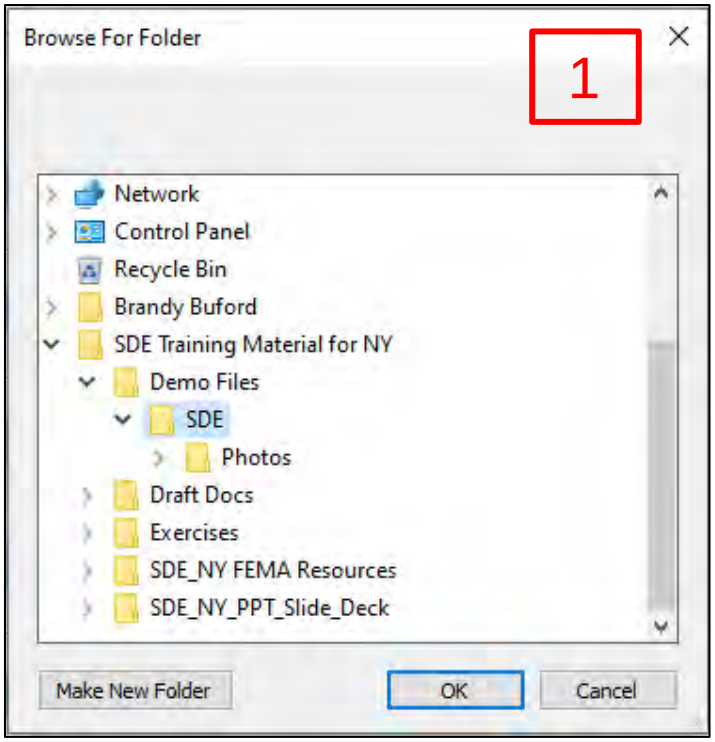
SDE Tool Export

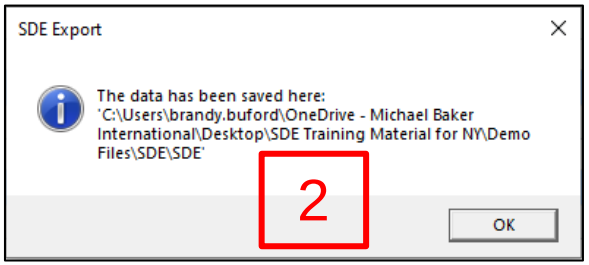


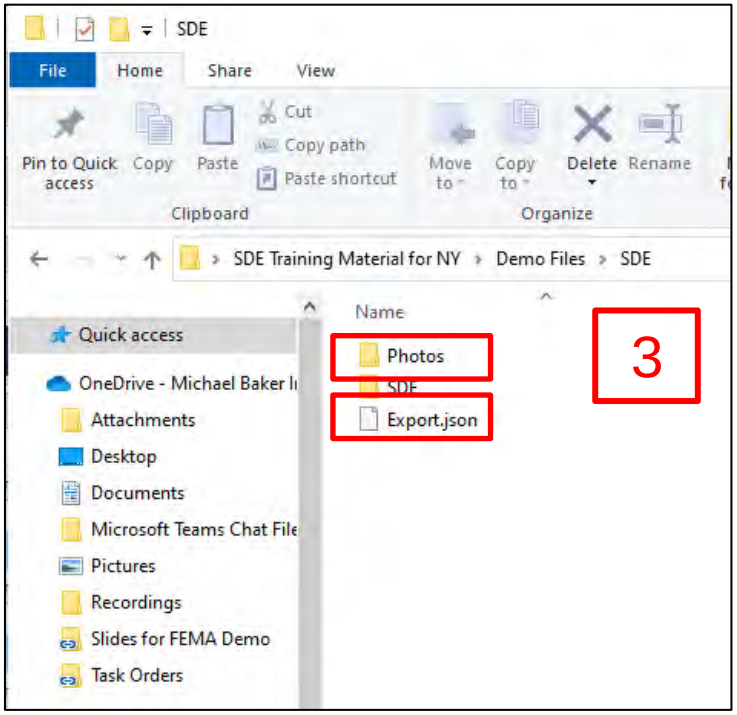
SDE Tool Export



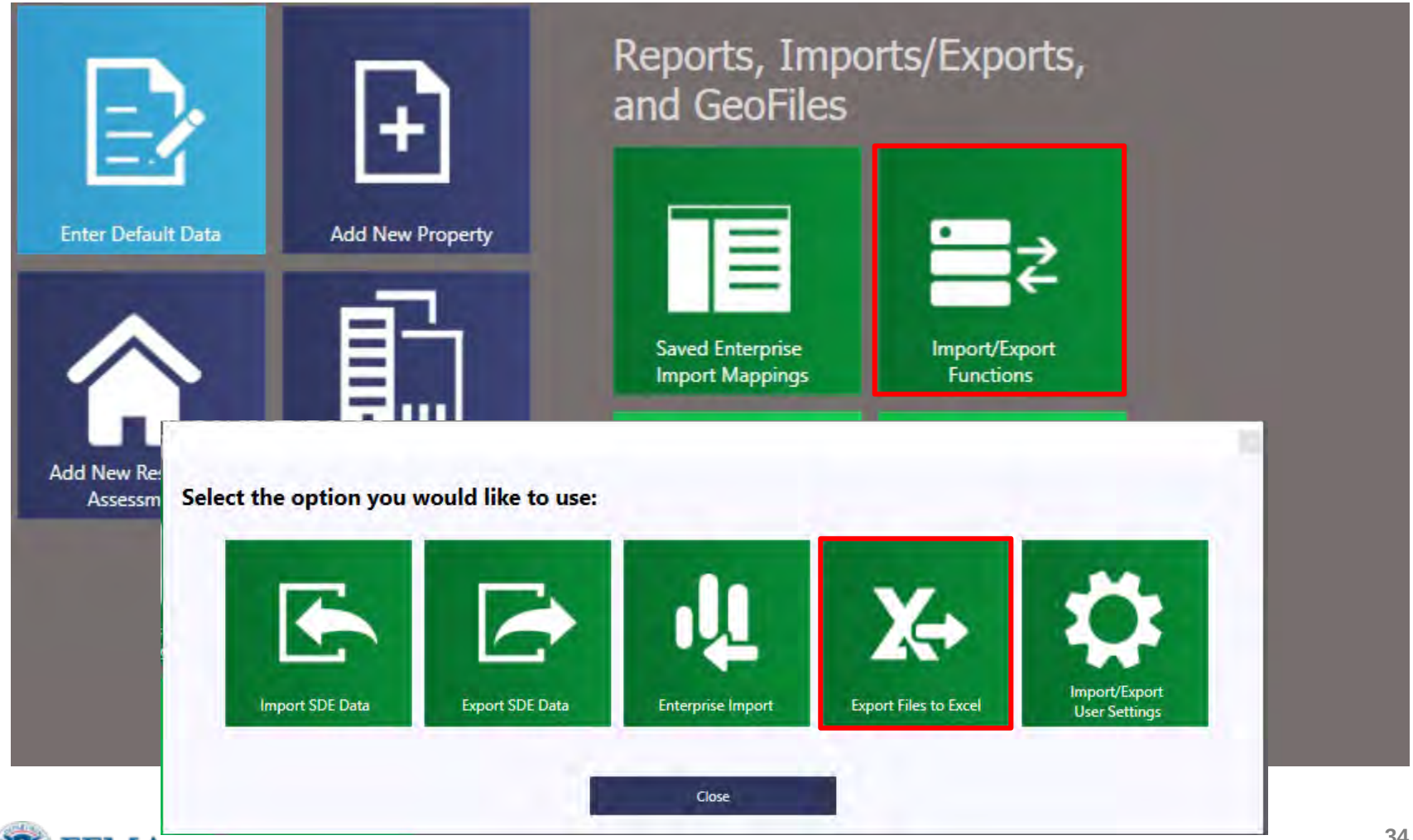
SDE Tool Export



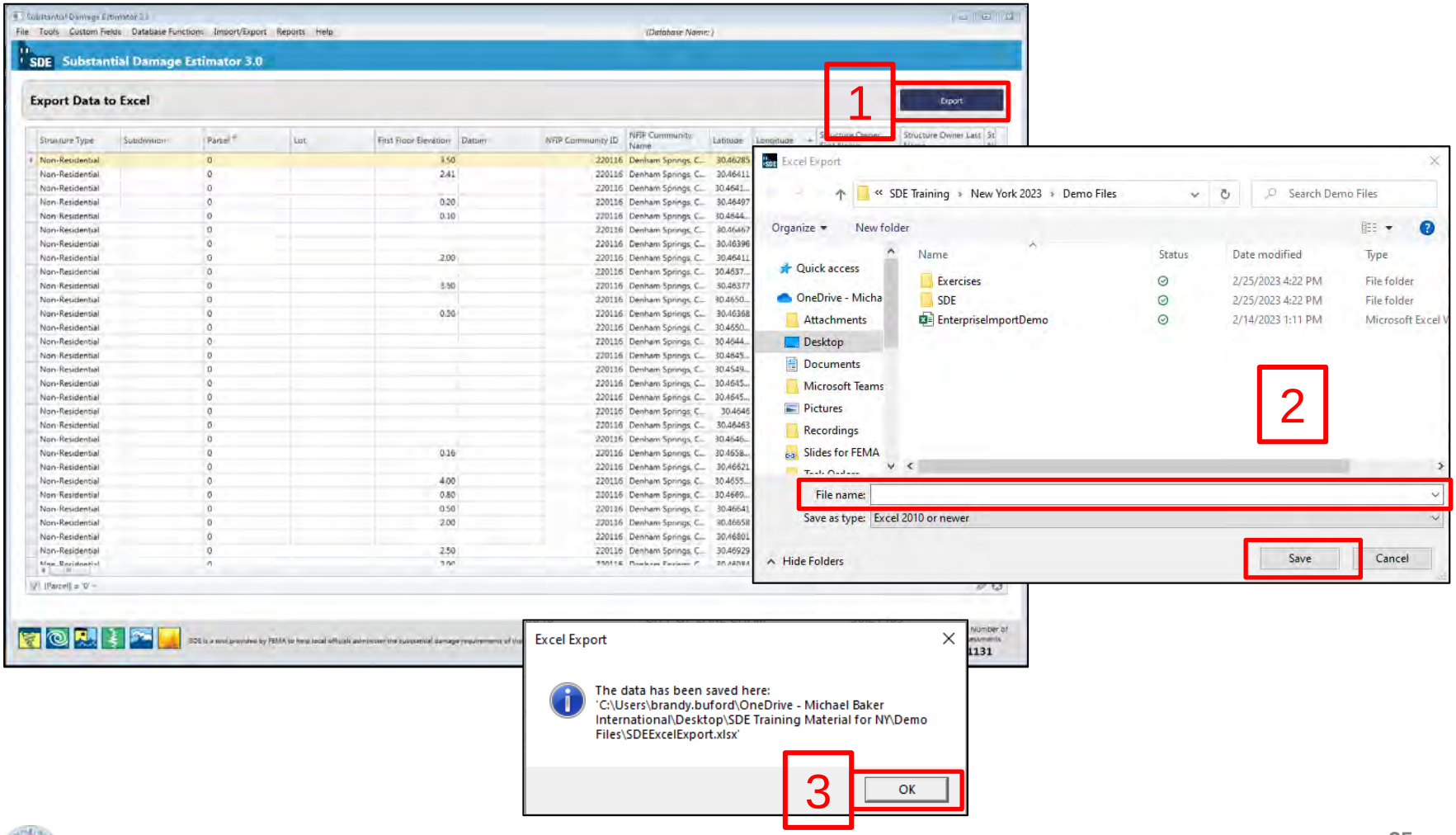




SDE Excel Export



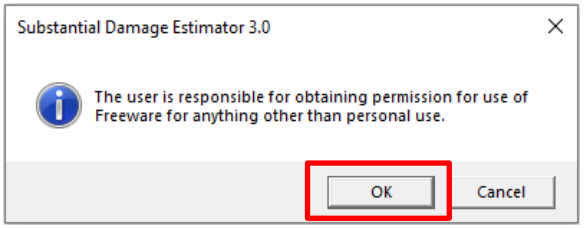
SDE Tool Excel Export

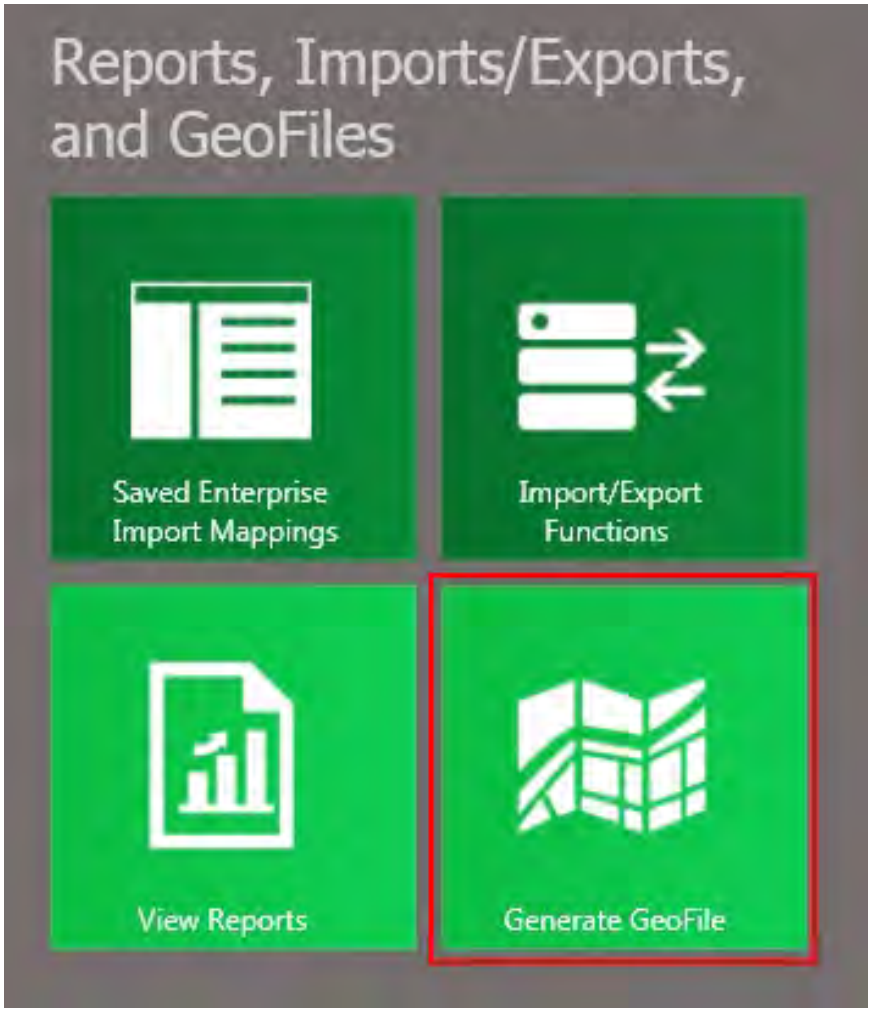


SDE Tool Generate GeoFile

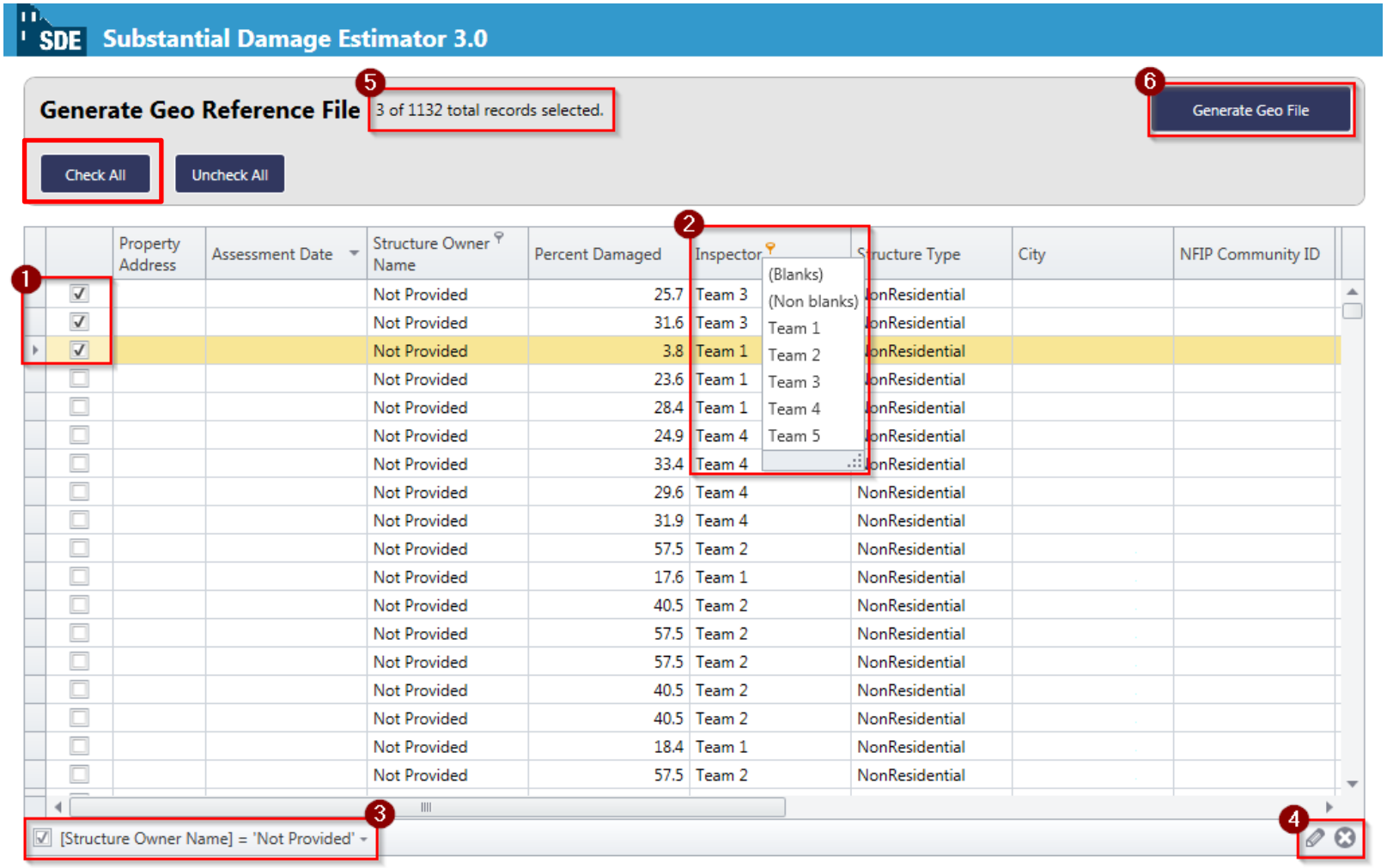
Assessments being plotted on the GIS map:

- Select **Generate GeoFile** from the main menu.
- The function prepares the .KMZ file.



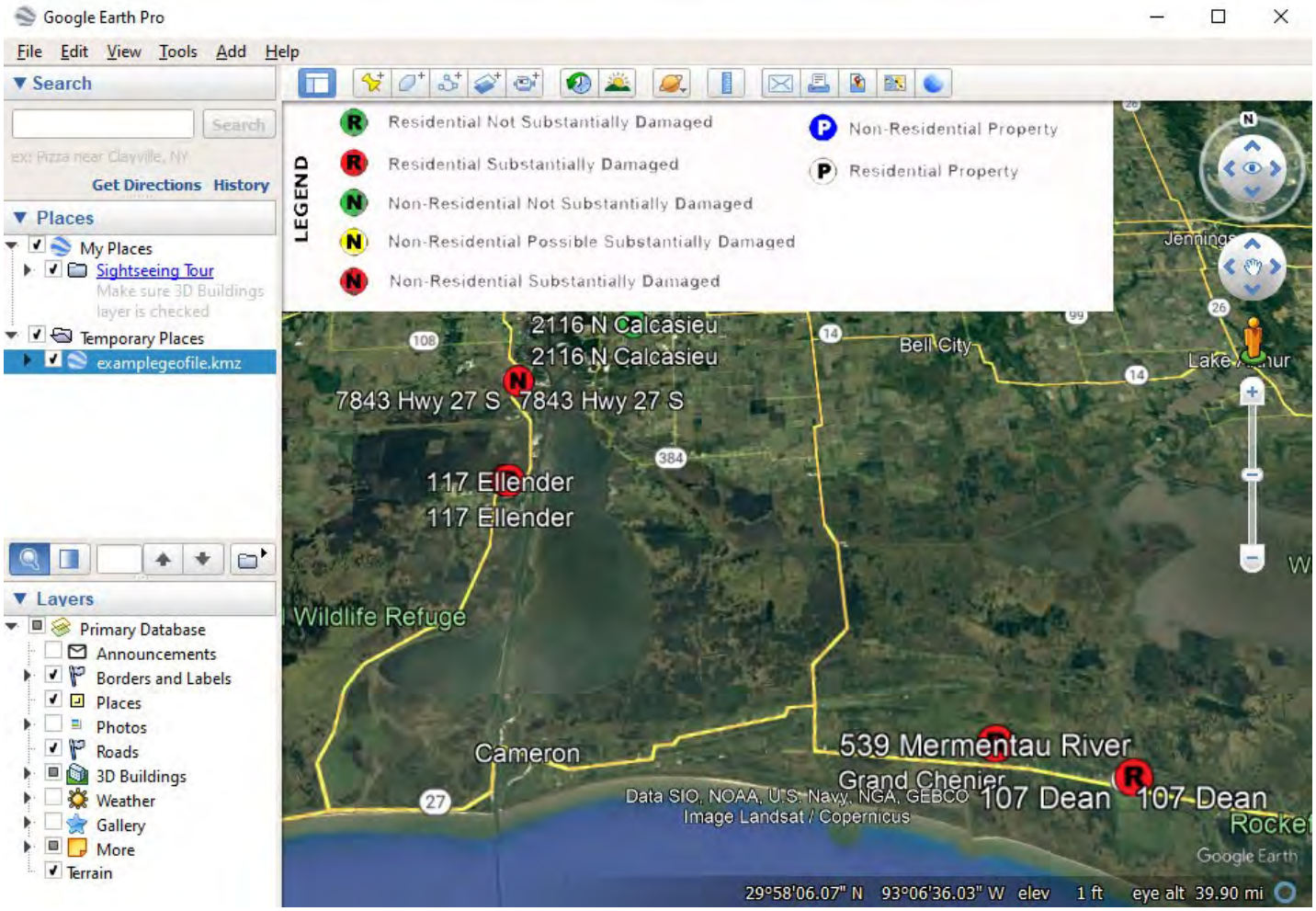


SDE Generate GeoFile



	Property Address	Assessment Date	Structure Owner Name	Percent Damaged	Inspector	Structure Type	City	NFIP Community ID
☑			Not Provided	25.7	Team 3	onResidential		
☑			Not Provided	31.6	Team 3	onResidential		
☑			Not Provided	3.8	Team 1	onResidential		
☐			Not Provided	23.6	Team 1	onResidential		
☐			Not Provided	28.4	Team 1	onResidential		
☐			Not Provided	24.9	Team 4	onResidential		
☐			Not Provided	33.4	Team 4	onResidential		
☐			Not Provided	29.6	Team 4	NonResidential		
☐			Not Provided	31.9	Team 4	NonResidential		
☐			Not Provided	57.5	Team 2	NonResidential		
☐			Not Provided	17.6	Team 1	NonResidential		
☐			Not Provided	40.5	Team 2	NonResidential		
☐			Not Provided	57.5	Team 2	NonResidential		
☐			Not Provided	57.5	Team 2	NonResidential		
☐			Not Provided	40.5	Team 2	NonResidential		
☐			Not Provided	40.5	Team 2	NonResidential		
☐			Not Provided	18.4	Team 1	NonResidential		
☐			Not Provided	57.5	Team 2	NonResidential		

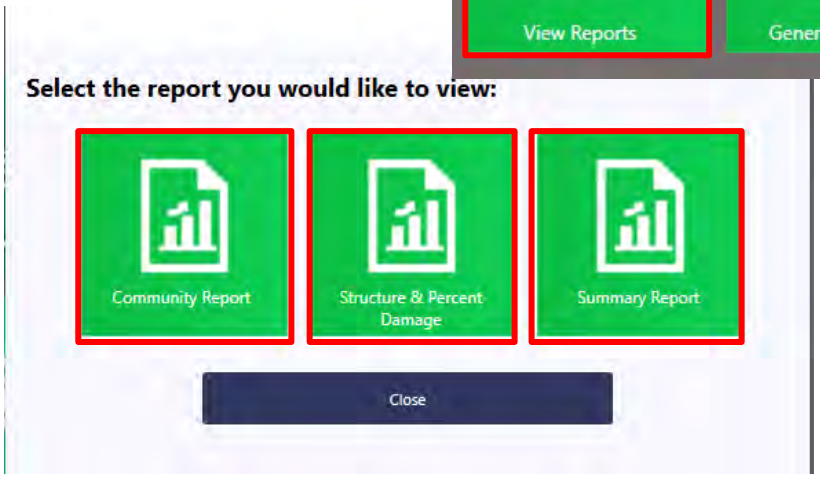
SDE Generate GeoFile



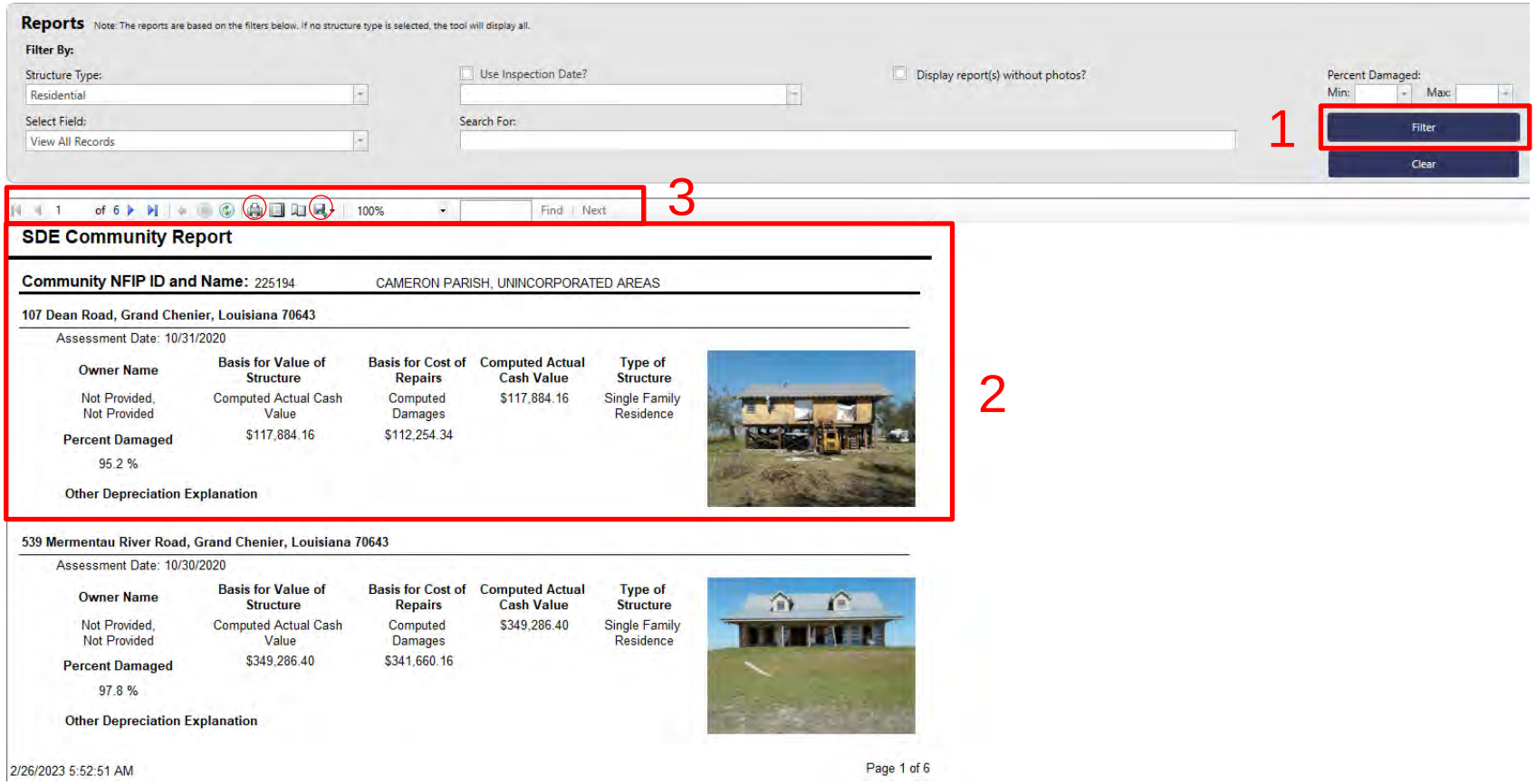
SDE Tool Reports

The SDE tool generates four separate types of **reports**:

- **Community Report**
- **Structure and Percent Damage Report**
- **One-Page Structure Summary Report** for individual structures
- **Five-Page Detailed Structure Report** for individual structures



SDE Tool Reports



SDE Tool Reports

Substantial Damage Estimator

Subdivision

Subdivision		Elev. of Lowest Floor	
Parcel #	0200031952		10.00 ft.
Lot #		Datum	

Community

NFIP Community Name	CAMERON PARISH, UNINCORPORATED AREAS		
NFIP Community ID #	225194		
Latitude	29.745630	Longitude	-92.883770

Structure Address

Owner's Name	Not Provided, Not Provided
Street Address	107 Dean Road
City	Grand Chenier
County/Parish	Cameron
State	Louisiana
Zip	70643
Phone	

Structure Information

Year of Construction	9999
Residence Type	Single Family Residence
Quality	Average

Damage Information

Date of Assessment	10/31/2020	Date of Damage	08/27/2020
Inspector Name	TEAM1	Cause of Damage	Flood and Wind
Inspector Phone	337-775-2800	Duration of Flood	1 Days
		Est. Depth of Flood Above Lowest Floor	3.00

Residence Information

Could not get close to structure due to ongoing construction work. currently repairing foundation and super structure. estimate fist floor at 10 feet, based on surrounding area and known food elevation assume fluffing is 13 feet. can see ceiling has to be replaced so leads to believe leakage through roof. mold seen inside ad will.

NFIP Information

Firm Panel #	Suffix	Date of FIRM Panel	Firm Zone	BFE	Regulatory Floodway
22023C1075H	H	11/16/2012	AE	13.00	No

Percent Damaged

Basis for Value of Structure	Percent Damaged	Basis for Cost of Repairs
$117,884.16	95.2 %	$112,254.34
Computed Actual Cash Value	Substantially Damaged	Computed Damages

Damage Summary

Replacement Cost	$155,520.00	Computed Damages	$112,254.34
Depreciation %	24.2 %	Percent of Existing Improvements and Repairs Pre-Disaster	
Computed Actual Cash Value*	$117,884.16	Repair/Reconstruction %	95.2 %
		Other Depreciation Explanation	

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

Optional User Entered Data

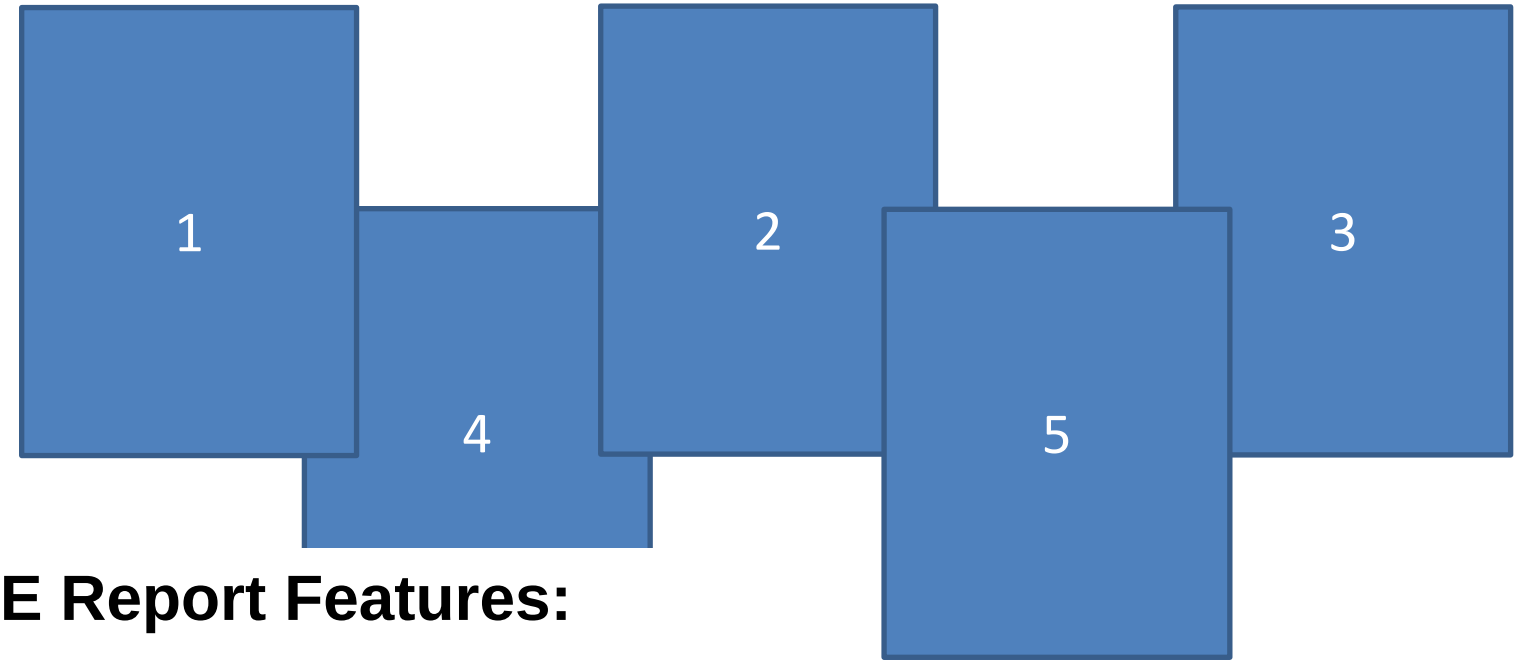
Professional Market Appraisal		Contractor Estimate	
Tax Assessed Value	$0.00		
Factor Adjustment		Community Estimate	
Adjusted Tax Assessed Value	$0.00		

Authorized Local Official : _____ Signature

Authorized Local Official : _____ Printed Name

Sunday, February 26, 2023 Page 1 of 12

SDE Tool Reports



SDE Report Features:

- It has a fixed format, but users can export data and customize in Excel.
- There is an option to select all structures or select certain structures.
- It provides a quick view of the property owner's name, address, percent damage, and default photo.

SDE Functions and Features for Data Quality Reviews

- Data validation flags
- Check spelling feature
- Records search
- Bulk editor tool
- Column headings can be used to sort data A to Z, or Z to A, or numerical values low to high, or high to low
- Review for outliers, unreasonable values, and inconsistent or incorrect spelling
- Errors affect credibility

SDE Features Review

WHAT did we just do?

Step 1: The municipality imports the SDE record.

Step 2: Teams collect data in the field and generate SDEs.

Step 3: Teams perform QA/QC of data.

Step 4: Teams export data back to the database to create an SDE assessment record.

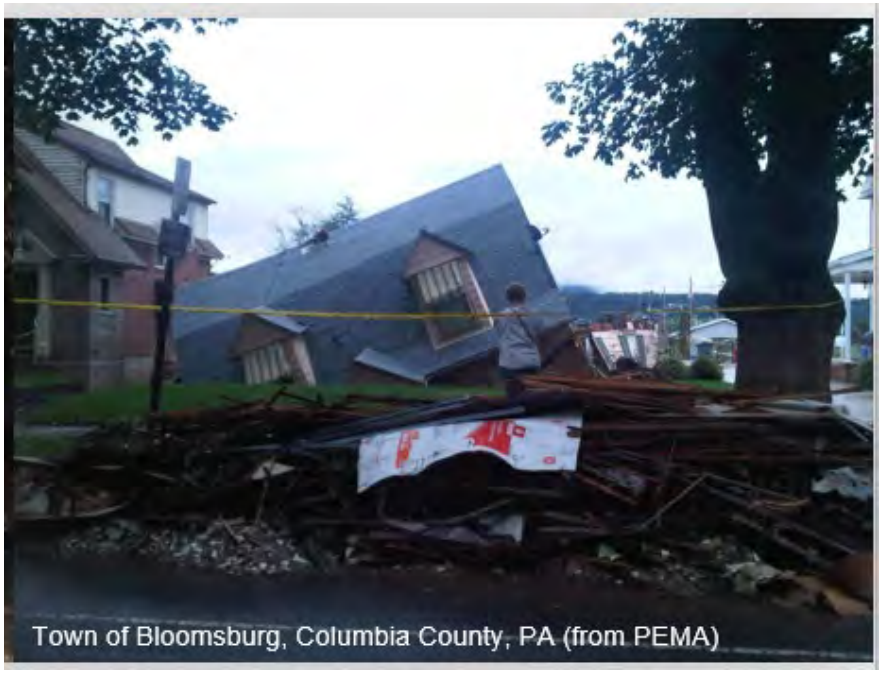
Step 5: Additional QA/QC of assessments (optional).

SDE Tool Features Tips

- Default data and/or data imports useful to complete multiple assessments
- Enter all required information
- Save data before leaving each page
- Informational help buttons as needed
- Photos should be small; avoid high-definition photos
- Bulk editor to perform QA/QC
- Delete All function

Substantial Damage Estimator

Questions?


Town of Bloomsburg, Columbia County, PA (from PEMA)

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866.927.2104
http://www.fema.gov/building-science

FEMA

Substantial Damage Estimation (SDE) Tool Exercises



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

FEMA

Substantial SDE Damage Estimator

Unit 9 – SDE Tool Exercises

1. ALWAYS save on each page.
2. Fill in all required information.
3. Inspector name is the inspection team number.
4. Inspector phone is the community contact number, NOT the individual inspector's contact number.
5. Use informational buttons, help links and other resources.
6. Measurements must be in imperial measurements (inches must be converted to feet prior to entry into the SDE tool).
7. Percent damage estimates must be in 5% increments.
8. If an element is not included, enter zero for percent damage value.

SDE Exercise 1 – 888 Main Road

Select Exercise 1

SDE Exercise 1

Review the detailed .pdf report and compare answers.

SDE Exercise 2 – 305 Tulip Street

Select Exercise 2

SDE Exercise 2

Review the detailed .pdf report and compare answers.

SDE Exercise 3 – Manufactured Home

Select Exercise 3

SDE Exercise 3

Review the detailed .pdf report and compare answers.

SDE Exercise 4 – 7843 Marigold

Select Exercise 4

SDE Exercise 4

Review the detailed .pdf report and compare answers.

SDE Exercise 5 – 2116 Lilly Drive

Select Exercise 5

SDE Exercise 5

Review the detailed .pdf report and compare answers.

SDE Exercises Reports

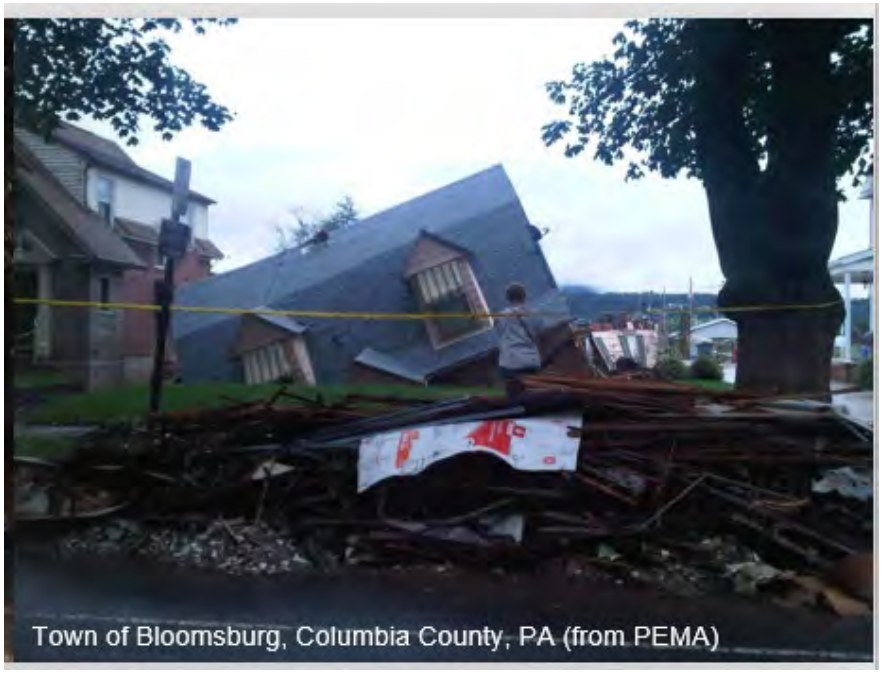
- Run and export the five-page detailed report for one property.
- Run and export the SDE Summary Report.
- Run and export the SDE Community Report.

SDE Exercises Data

- Use Bulk Editor – update the Parcel Number and Owner Last Name.
- Generate the Geofile.
- Export data to Excel and view the output.
- Use SDE Export – export all data.
- Delete all data in the SDE tool.
- Import the SDE data created above.
- Delete function: Database functions, Delete All.

Substantial Damage Estimator

Questions?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Substantial Damage Estimation (SDE) Best Practices

Federal Emergency Management Agency (FEMA)

Harrisburg, PA

June 2023

FEMA

Substantial SDE Damage Estimator

Unit 10 – SDE Best Practices

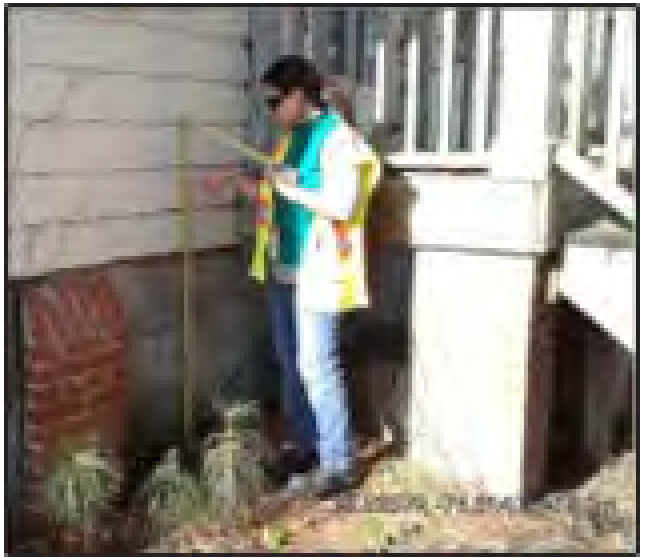
Photographs

- Photos are not intended to show all damage.

Recommendations:

- Take two photographs per structure – one photo of the **front or street view** and one of the **side or corner view** showing the roof.
- Take a photograph of **high-water mark** or **debris line** indicated with tape measure.

SDE Best Practices



SDE Tool – Photograph Requirements

- Photo size should be 640 pixels wide by 480 pixels high (640 x 480).
- Photos should be in a .JPG format.
- Photographs with a high resolution or large file sizes adversely affect the SDE tool operating speed.

Photography Best Practice

- **Photograph quality:** Photo must be clear; structure to fill at least 75% of photograph.
- **Elevated structures:** One photograph with perspective and scale on the structure's height/elevation above grade level.

Structure too far away

Photo too dark

Photo taken too close & doesn't show full structure


Dry erase board not visible

SDE Tool Data Quality Assurance/Control

Inspection data for each team should be reviewed daily for the following:

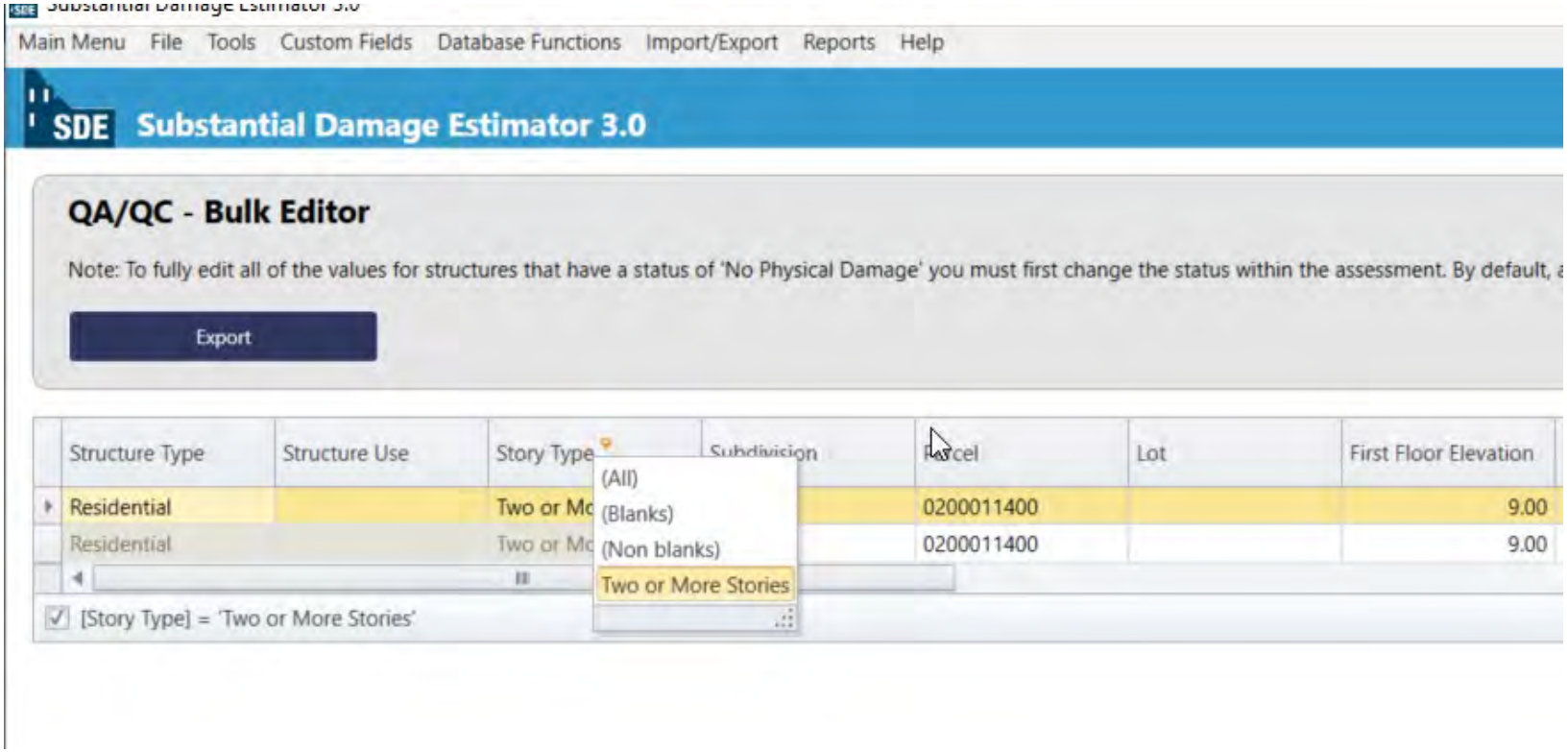
- Completeness of SDE assessments and records.
- Consistency in SDE data entry.
- Structure area/square feet.
- Structure attributes.
- Structure element and percent damage.
- Floodwater depth.
- Comparison of data with recorded floodwater depth.
- Analysis of structure photographs.
- Digital photograph quality.

SDE Tool Data Quality Assurance/Quality Control

- Data validation flags.
- Check spelling feature.
- Records search.
- Bulk editor tool.
- Column headings can be used to sort data:
  - Alphabetically A to Z or Z to A.
  - Numerically low to high or high to low.
- Review for outliers, unreasonable values and inconsistent or incorrect spelling.
- Errors affect credibility.

SDE Tool Data Quality Reviews

Use headings in the **Bulk Property Editor** to sort columns and find outliers, typos and misspellings.



SDE Tool Save Property Inspection Data and Review Errors

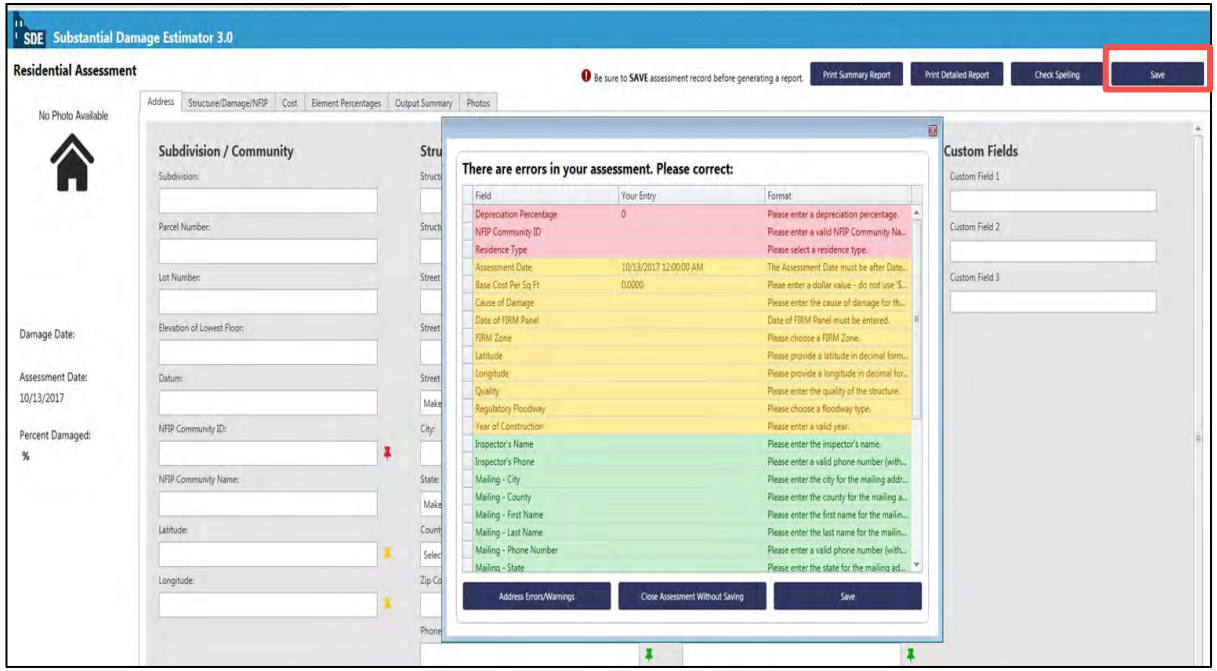
- **You MUST hit SAVE for each record** before navigating to the main menu or you will lose all changes without warning!
  - Double-check to make sure the assessment is **COMPLETE**.
  - Triple-check Square Footage – it will not provide an error warning if empty.

Data Entry Fields in the SDE Tool

Red – Required to save the assessment

Yellow – Required to save a *valid* assessment

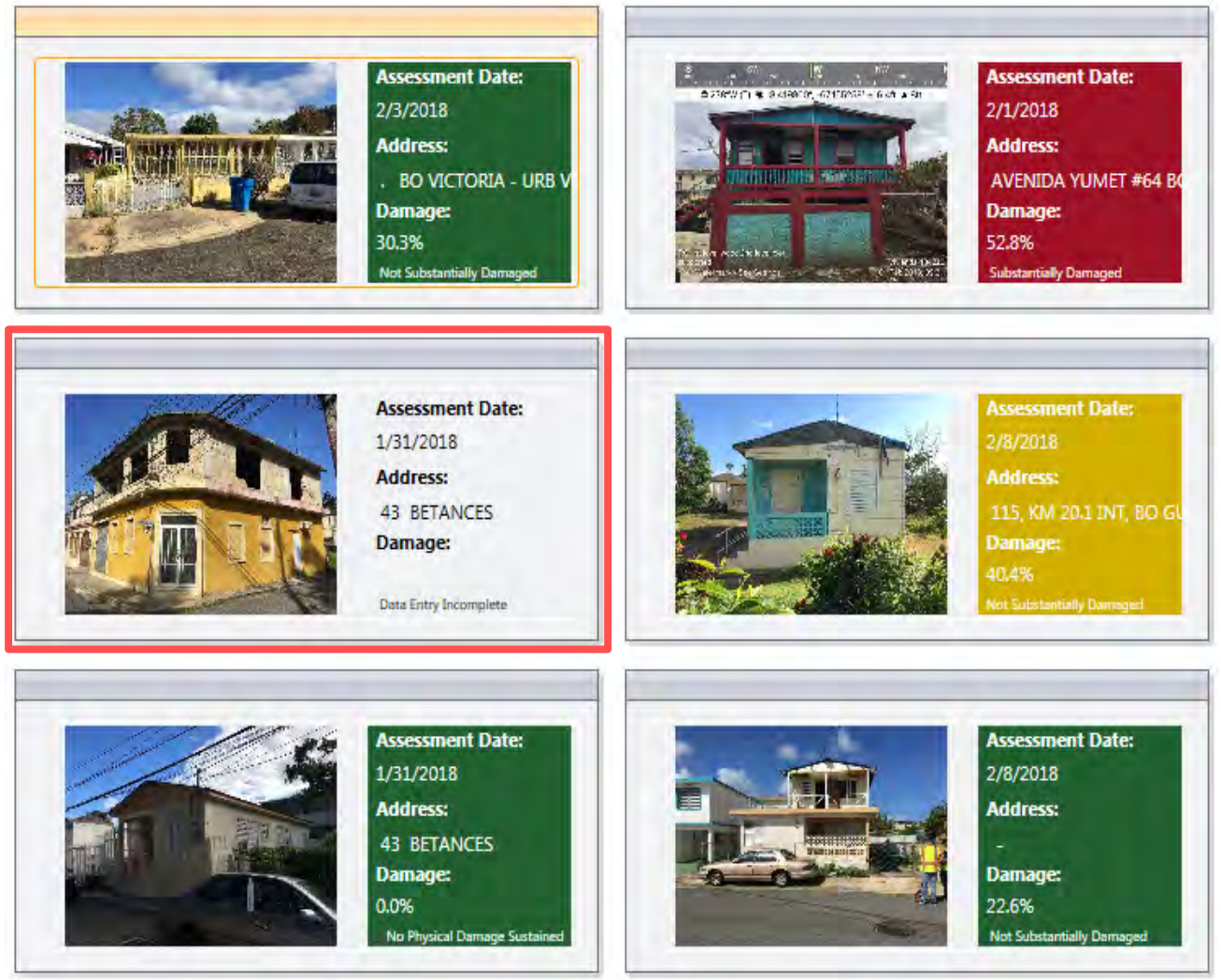
Green – Recommended, not required



Confirming Completeness of Property Records

After the property inspection record is **SAVED**:

1. Go to **View Search**.
2. Enter the **search criteria**.
3. Confirm the assessment is **not "grey."**

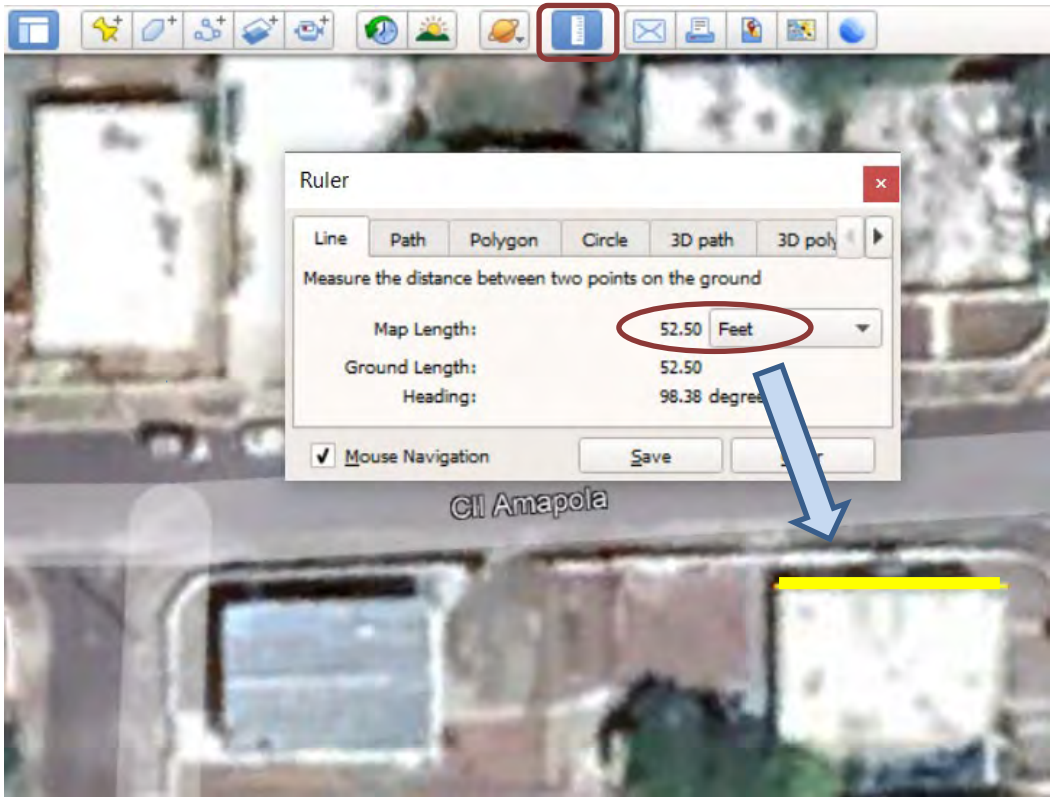


Using Visual Checks for Quality Control

Compare number of stories and footprint area/size to structure photos and aerial imagery.

Use **Google Earth** as supplemental aid:

- Ruler tool.
- Street view.



Visual Checks for Quality Control

Compare percent damage to structure photographs.

Example: Do these percent damage estimates match your visual observations?

If not, this structure requires additional field observation.

Element Percentages

Element:	Percent Damaged:
Foundation:	0.0%
Superstructure:	50.0%
Roof Covering:	50.0%
Exterior Finish:	50.0%
Doors and Windows:	50.0%
Cabinets and Countertops:	0.0%
Floor Finish:	0.0%
Plumbing:	50.0%
Electrical:	100.0%
Appliances:	100.0%
Interior Finish:	100.0%
HVAC:	0.0%

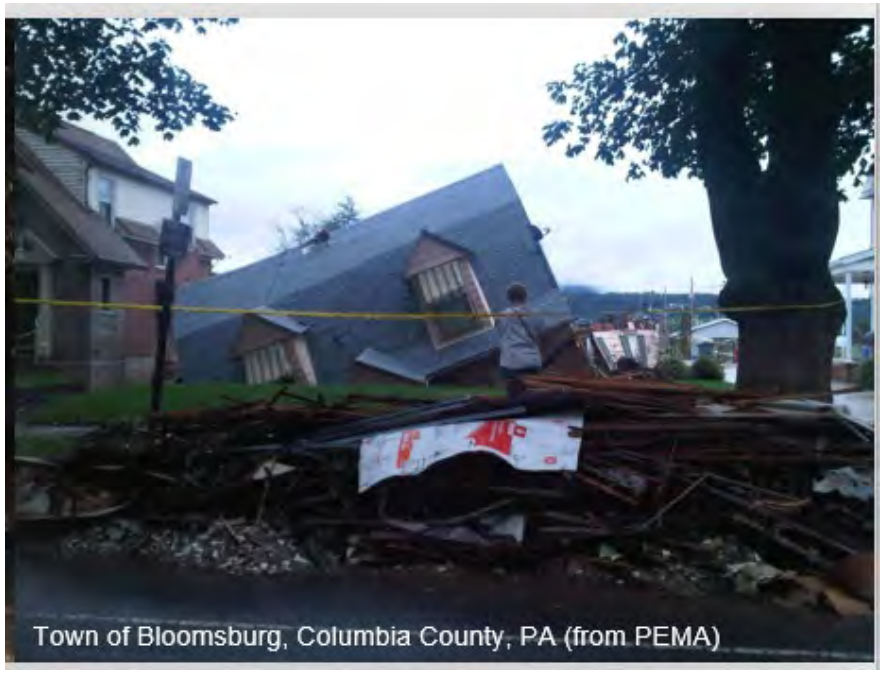
SFHA Property Inventory

Maintain structure inventories in SDE databases to prepare for future SDE inspections.

- Pre-populate property-level data for structures in the Special Flood Hazard Area (SFHA).
- Maintain/update SDE databases and SFHA maps.
- Prepare in *"blue-sky days" BEFORE disasters strike!*

SDE Assessments and Inspections in Areas Located Outside SFHA: Either avoid entirely or defer these inspections until after the areas inside the regulated SFHA are completed.

Questions?



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Substantial Damage Estimation (SDE) Resources & Final Comments



Federal Emergency Management Agency (FEMA)

Harrisburg, PA

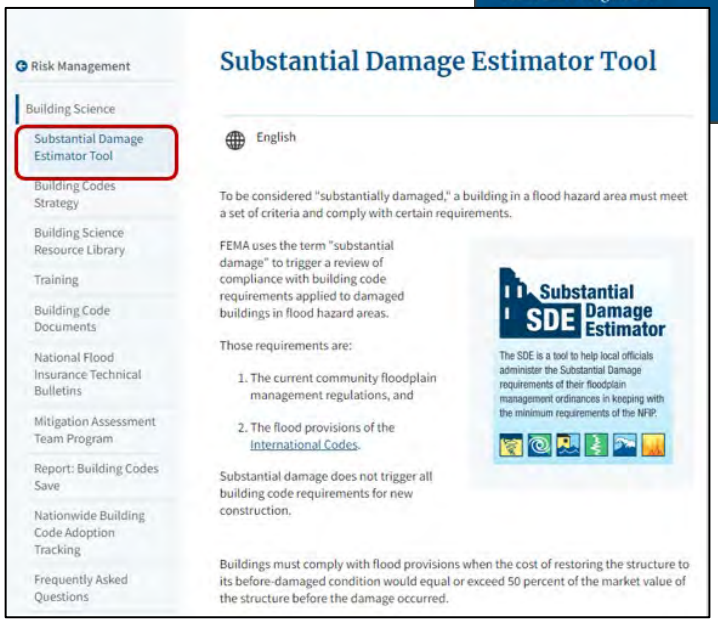
June 2023

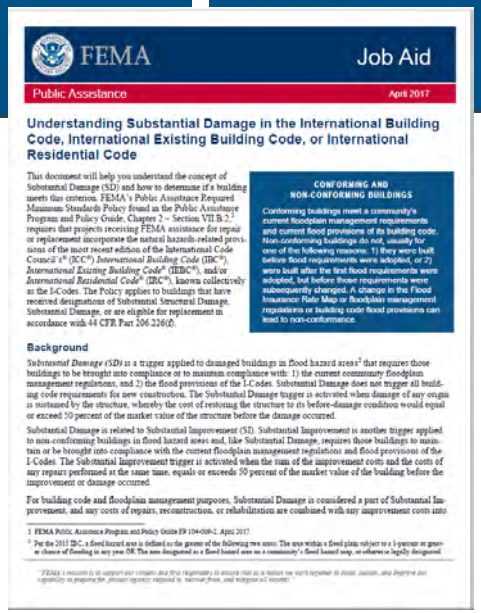
FEMA

Substantial SDE Damage Estimator

Unit 11 – Resources

FEMA SDE and Recovery Resources

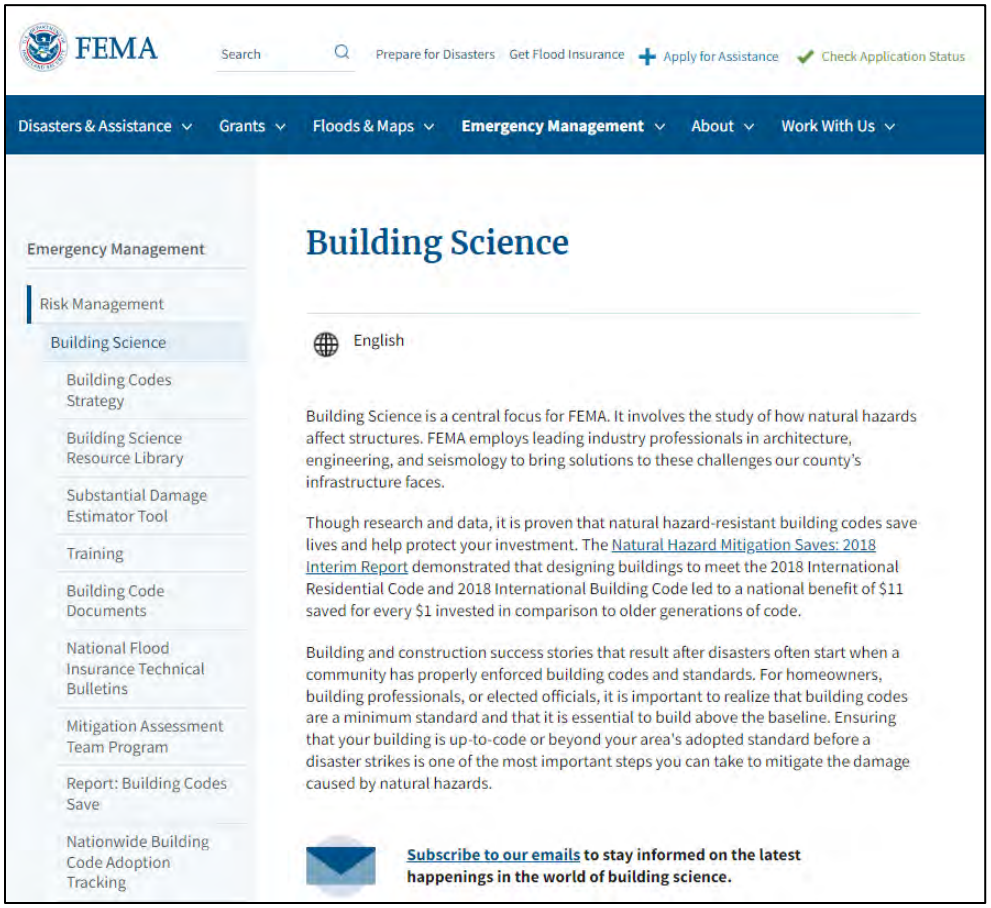




FEMA Building Science SDE Resources

FEMA Building Science Website: *Search "FEMA Building Science"*

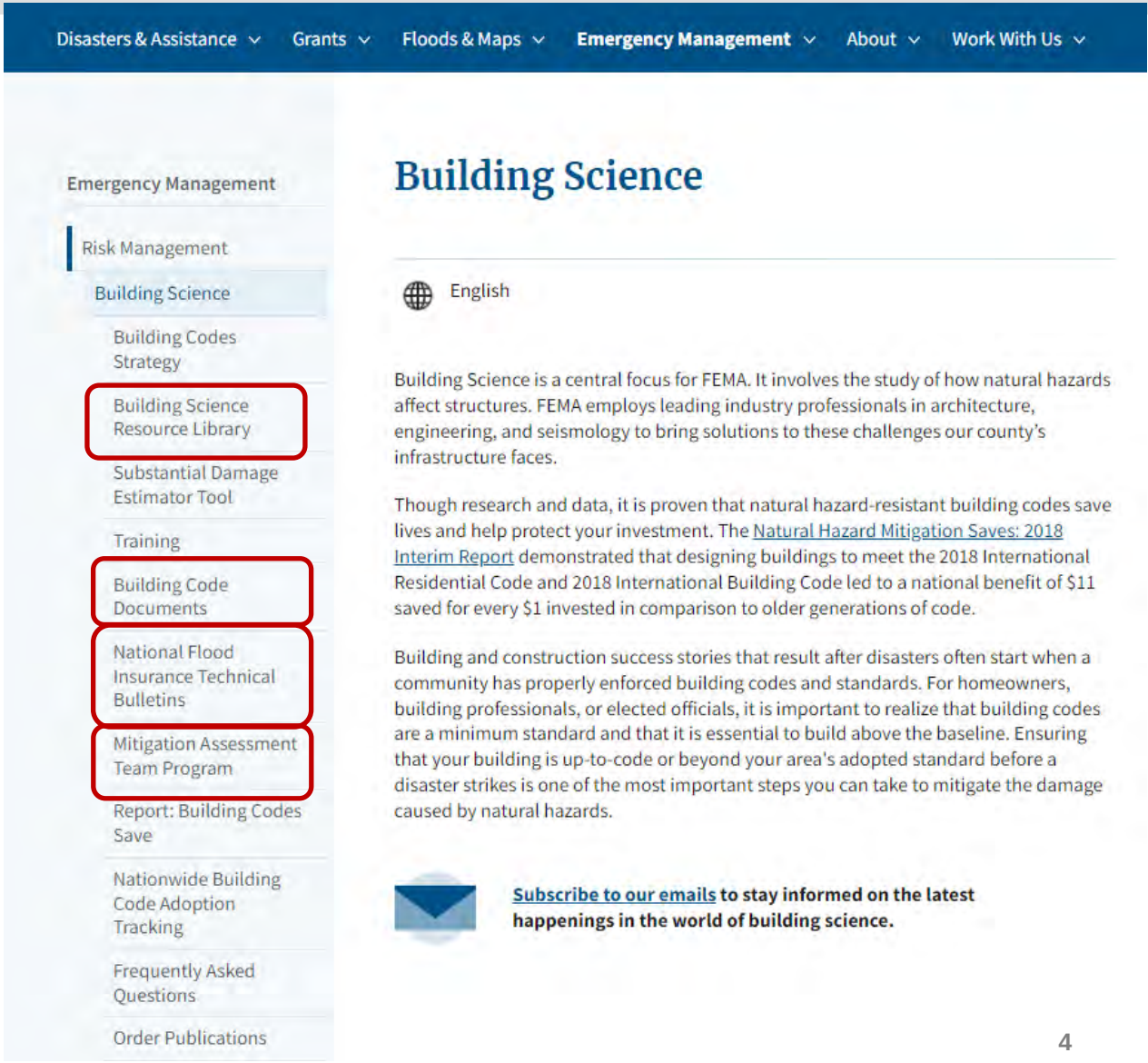
https://www.fema.gov/emergency-managers/risk-management/building-science



FEMA Building Science Resources

Other resources on the FEMA Building Science webpage:

- Design/Mitigation technical guidance.
- Building code adoption.
- National Flood Insurance Program Technical Bulletins.
- Mitigation Assessment Team reports.
- Recovery Advisories and Fact Sheets.

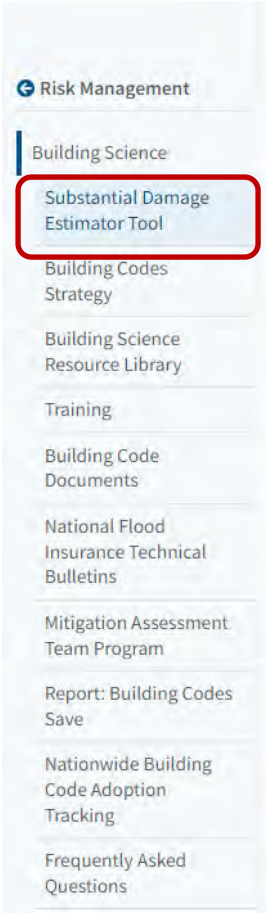


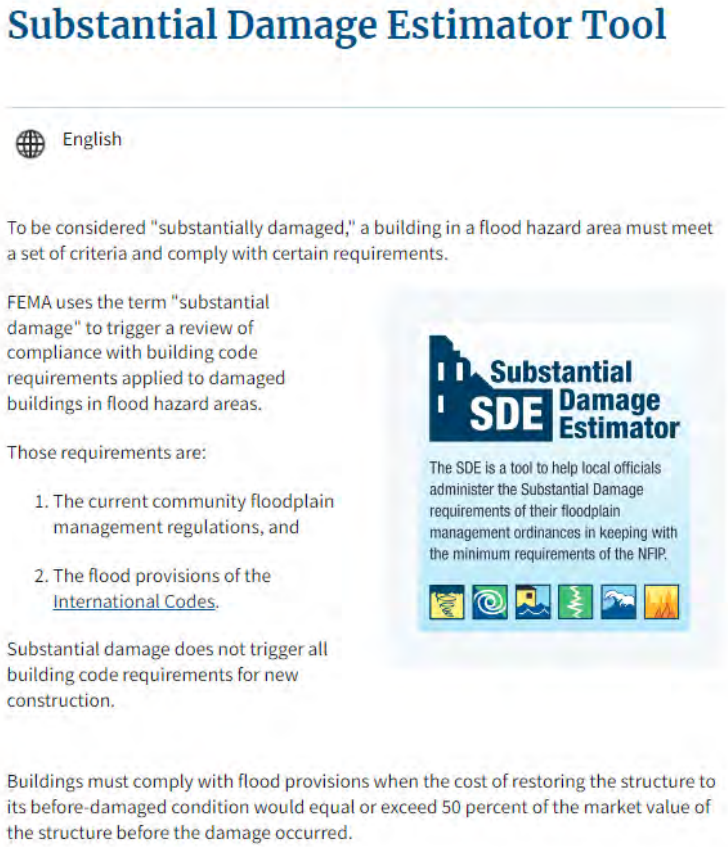
FEMA Building Science SDE Resources

Substantial Damage Estimator (SDE) 3.0 Tool (2017):

- SDE 3.0 User Manual and Field Workbook.
- Built-in help menus and informational buttons.

- Residential and Nonresidential Inspection forms (for manual data collection).
- Substantial Damage Policy, Regulatory and Guidance Information.
- Substantial Damage Estimator Best Practices (2017).

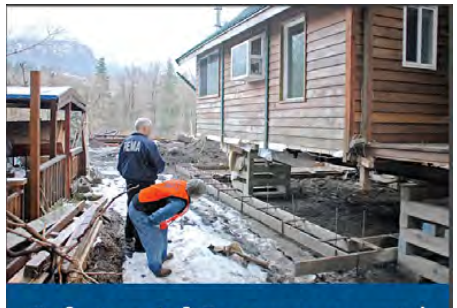


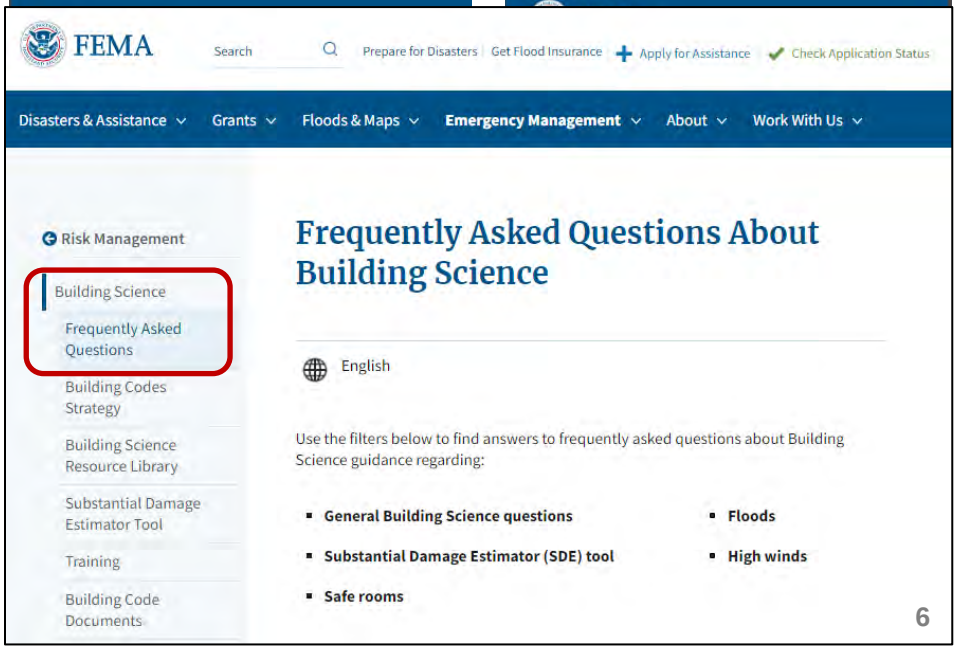


FEMA

FEMA Building Science SDE Resources

- **FEMA 213**, *Answers to Questions About Substantially Damaged Buildings* (2018)
- **FEMA P-758**, *Substantial Improvement / Substantial Damage Desk Reference* (2018)
- **SDE Frequently Asked Questions (FAQs)**; on the FEMA Building Science FAQ webpage





Substantial Damage Estimator

Additional Resources

- 44 CFR 60.3:

eCFR :: 44 CFR 60.3 -- Flood plain management criteria for flood-prone areas.

- FEMA SDE Training 10-module series:

https://www.youtube.com/playlist?list=PL720Kw_OojlKaUGLcplGiC2Gw9-lutGHt

- Map Service Center:

https://msc.fema.gov/portal/home

- Community Status Book:

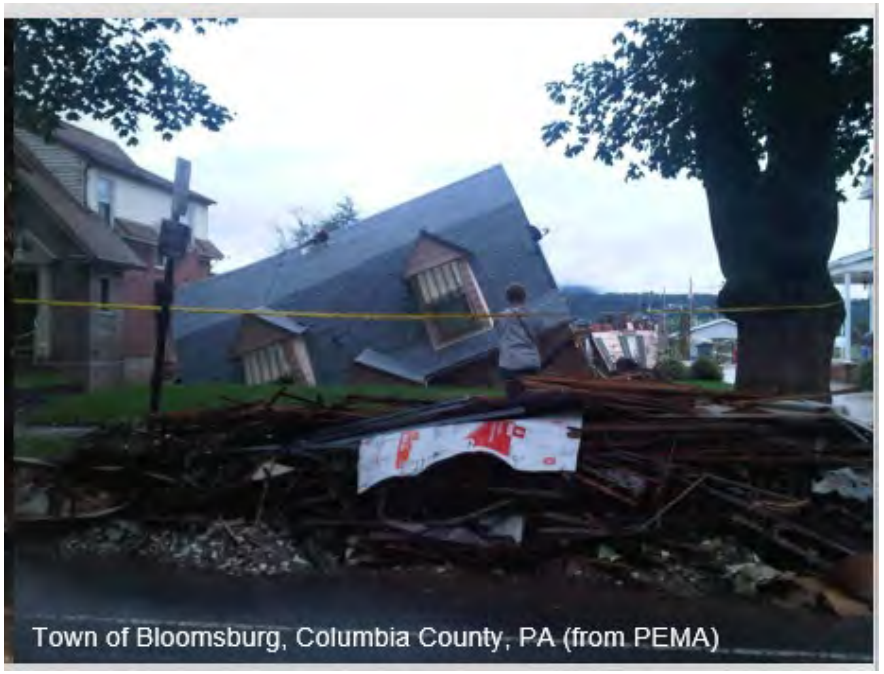
https://www.fema.gov/flood-insurance/work-with-nfip/community-status-book

Final Comments

- The correct application of SDE assessments and determinations and subsequent recovery and reconstruction enhances the community's resilience and sustainability during future hazard and disaster events.
- Damage is damage, no matter the origin.
- Consistency throughout the SDE process confirms validity and credibility throughout the community.

Substantial Damage Estimator

Questions?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