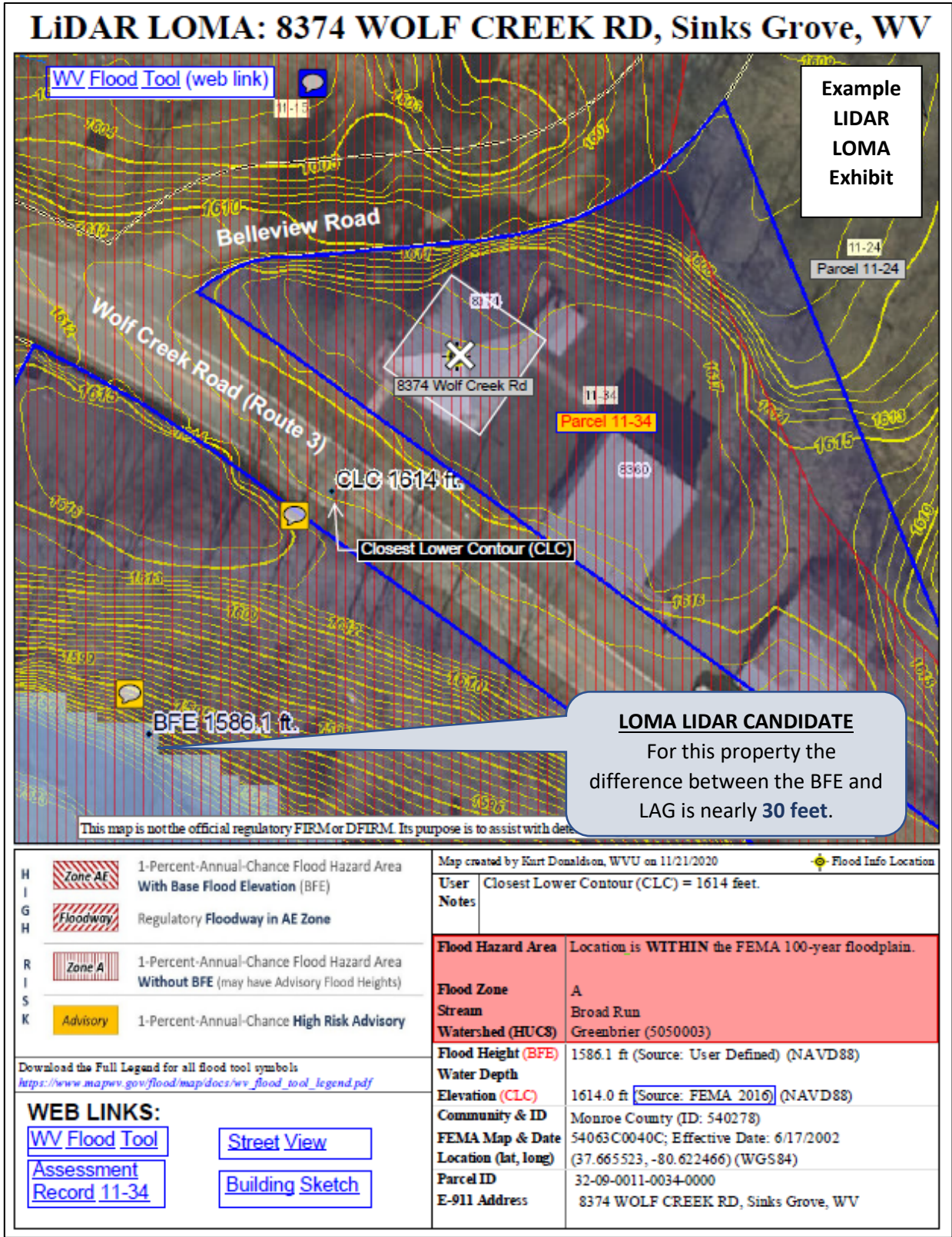


WV Flood Tool

Using LiDAR For Map Amendments



WV FLOOD TOOL: LIDAR FOR LOMA INSTRUCTIONS

Drafted by Kurt Donaldson February 7, 2024

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BACKGROUND INFORMATION

WHAT IS THE PURPOSE OF A LOMA?

Occasionally, a small area is inadvertently shown to be within the SFHA on a FIRM, even though the ground is at or above the BFE. If this occurs, an individual property owner may submit survey information to FEMA and request that FEMA issue a document that officially removes a property from the SFHA, called a Letter of Map Amendment (LOMA).

HOW DO I CHANGE MY FLOOD ZONE DESIGNATION?

Letters of Map Amendment enable property owners to request changes or updates to their property's flood risk status to FEMA. Learn more about how to request a change to your flood zone designation at [FEMA's website](#). Typically, this flood zone change request using the [WV Flood Tool](#) applies to property owners at the floodplain boundary fringe (not in the floodway) of high-risk AE or Approximate A [Flood Zones](#), for existing buildings or lots not elevated on fill (natural grade), and where there is more than two feet difference between the Base Flood Elevation (BFE) and Lowest Adjacent Grade (LAG).

LIDAR FOR MAP AMENDMENTS

If applicable, LiDAR data can replace the requirement to submit certified elevation information which can create a cost savings for property owners. However, when the LAG is close to the BFE, LiDAR data may not be accurate enough and require certified elevations to capture the full risk of the building. The WV Flood Tool can be used to submit LOMAs where accurate LIDAR-derived elevation contours and point data are available. Generally, if there is **two feet** or more difference between the BFE and LAG, then the homeowner or community should investigate using the WV Flood Tool's Print LOMA Map function to generate a LOMA for submission to FEMA at **no charge**.

DOES MY COMMUNITY HAVE LIDAR?

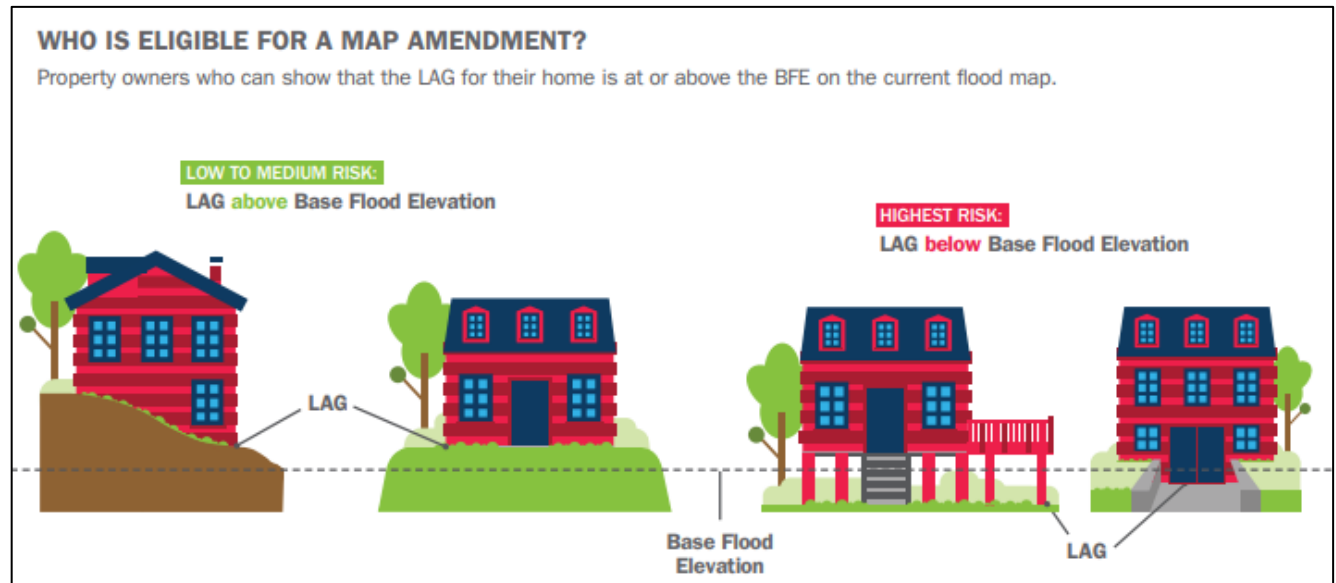
All communities in West Virginia have LiDAR data available that meets the accuracy requirements. Refer to the [Elevation Source Metadata](#) which can also be accessed from the WV Flood Tool.

ONLINE LOMC

The [Online LOMC](#) web application allows homeowners or their designated representatives to easily request a Letter of Map Change (LOMC) for a structure. Use this site if your building was inadvertently included in a flood zone, or if the addition of fill elevated your property so that it is above the flood zone. The Online LOMC tool is an alternative to the MT-1 and MT-2 paper forms and/or MT-EZ paper form. Anyone, including communities, home or property owners, their representatives, and professional surveyors and engineers, may submit a LiDAR LOMA request using the Online LOMC if the application meets the LOMA submission requirements listed in the next section.

WHO IS ELIGIBLE FOR A MAP AMENDMENT?

Property owners who can show the LAG of their home is at or above the BFE on the current flood map.



Source: [How to Request a Map Amendment \(2021\)](#)

WHAT IS LIDAR?

Light Detection and Ranging (LiDAR) is defined as a laser system that is used to acquire x, y, and z coordinates of terrain and terrain features that are both manmade and naturally occurring.



IS THERE A COST SAVINGS USING LIDAR ELEVATION DATA?

LiDAR data can replace the requirement to submit elevation information certified by a licensed land surveyor or professional engineer, which can create a cost savings for property owners. However, LiDAR data may be less accurate than certified elevations and may not capture the full risk for the building or lot.

WHEN CAN LIDAR NOT BE USED?

There are situations when LiDAR cannot be used in a Building LOMA request. These include applications involving the following:

- Parcel LOMAs
- Buildings or lots elevated using fill
- Buildings or lots in the regulatory floodway or Zone AO
 - FEMA is only concerned that the subject of review is outside the floodway
 - The location of the closest lower contour can be within the floodway
- Buildings under construction. LiDAR would need to show that the lot or portion of the lot on which building will be located is above the Base Flood Elevation (BFE)
- Conditional determinations
- Electronic LOMAs (eLOMAs)
- Potential violations identified through the LOMA process
- Physical changes to the flooding source/Special Flood Hazard Area that require revisions to the Flood Insurance Rate Map
- Requests to supersede previously issued LOMAs based on certified elevation data
- If the entire lot is to be reviewed, an Elevation Form is required to complete the case with the Lowest Lot Elevation certified by a licensed land surveyor or registered professional engineer.

WHAT IS REQUIRED IN THE SUBMISSION?

When requesting a LOMA using LiDAR data, you can use the WV Flood Tool to submit a digital PDF that displays:

- an overlay of the LiDAR contours (lines of equal elevation), or
- an overlay of the LiDAR points (points with specific elevations).

Either application submission must include an aerial image of the building or lot with at least one street intersection shown on the map. Your floodplain administrator or a mapping professional can help you develop the map exhibit for your application. For other requirements, please refer to FEMA's online resources about Letters of Map Change (LOMC).

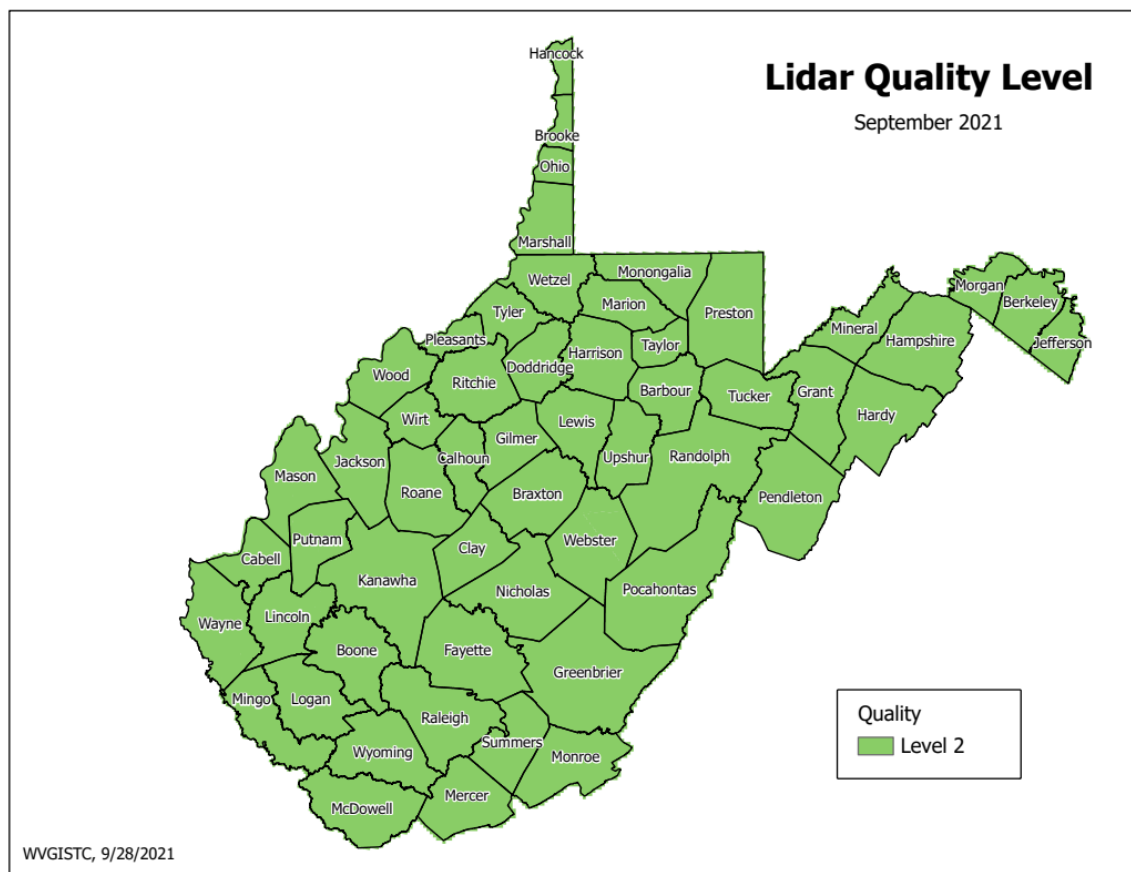
#	Map Elements Required
1	Name, organization, and contact information for the map creator
2	E-911 Address of property
3	Road or street intersection reference
4	Assessor's Parcel Number (APN) for the building/lot
5	Clearly identified building and/or lot boundaries
6	Aerial imagery that shows building footprint
7	Date, Source, and Accuracy of the LiDAR collected (must meet Quality Level 3 standards)
8	Vertical Datum of elevation data (e.g., NAVD 88, NGVD 29)
9	Scale Bar and North Arrow
10	WV Flood Tool Location web link

STEP-BY-STEP INSTRUCTIONS

- 1) **Determine LiDAR Coverage:** West Virginia has statewide [Quality Level 2 \(QL2\) LiDAR](#) coverage and derivative elevation products (statewide 1-meter DEM and 1- or 2-foot contours) published to WV Flood Tool. All the West Virginia QL2 LiDAR data exceeds the accuracy requirement for submitting LiDAR LOMAs. On the WV Flood Tool, LiDAR-derived, high-resolution 1-foot or 2-foot contours are displayed at the 1:564 and 1:282 map scales. When a user queries a location in the WV Flood Tool, the [LiDAR Elevation Source Metadata](#) project name and acquisition year are displayed to the right of the elevation value in the Flood Query Results Panel from which the LiDAR source, accuracy, and date can be identified

Ground Elevation Data: All the newly purchased FEMA LiDAR derived elevation products have been published to the WV Flood Tool.

- 1- or 2-foot contours (published to the highest zoom level 1:282 on Flood Tool)
- 1-meter DEM (1 meter DEM elevation sources)
- 1-meter Hillshade (1 meter DEM elevation sources)



- 2) **Select WV Flood Tool's Print LOMA Tool:** Select the Print Function on the toolbar of the WV Flood Tool and then the FEMA Floodplain LOMA Map option. Refer to the [LiDAR for LOMA Guide](#) for more illustrations and depictions.

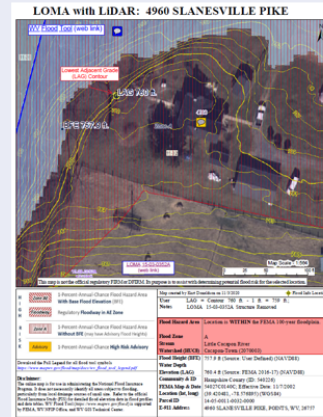
LiDAR LOMA Submission – 4 Steps

- 1) Do all communities in West Virginia have LiDAR. **Yes!!!**

- 1) Print Tax Parcel **Map Exhibit** using [WV Flood Tool](#)

Supporting document for Online LOMC application

- Identify published building-level risk assessments for potential Mapped Out structures
- Determine LOMA Type: Existing Structure or Lot
- Determine BFE
- Determine LAG/LLE
- Add Annotation
- Print and Download LOMA Map
- Save to PDF File



- 2) Further Edit/Annotate Print LOMA (optional)

- 3) Submit LiDAR LOMA **Map Exhibit** along with **Deed** using FEMA's [Online LOMC Portal](#) (no fee charged)

Click [here](#) for more detailed instructions

Print LOMA Map with WV Flood Tool

Tools

Print Map

Click for a normal Flood map

Flood LOMA Map Print

Title

LOMA Map: 144 APPALOOSA WAY, Ch...

User Note

Closest Lower Contour to structure is 436 feet.

153 of 200 character(s) remaining

BFE Value

433.4

(ft)

BFE Datum

NAVD88

Prepared by

Kurt Donaldson, WVU

Print the map

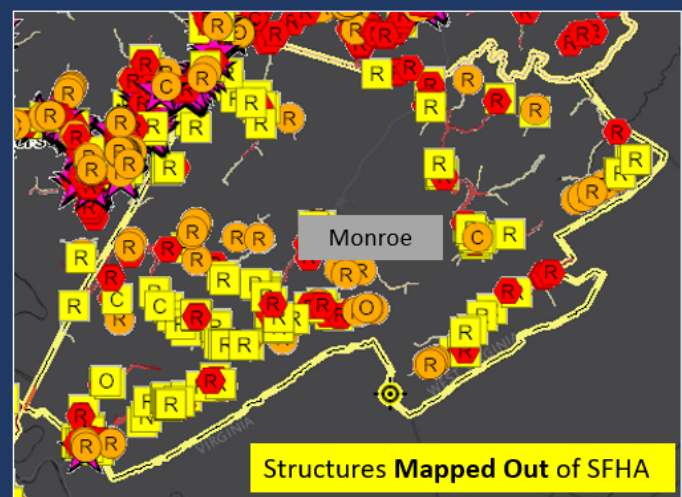
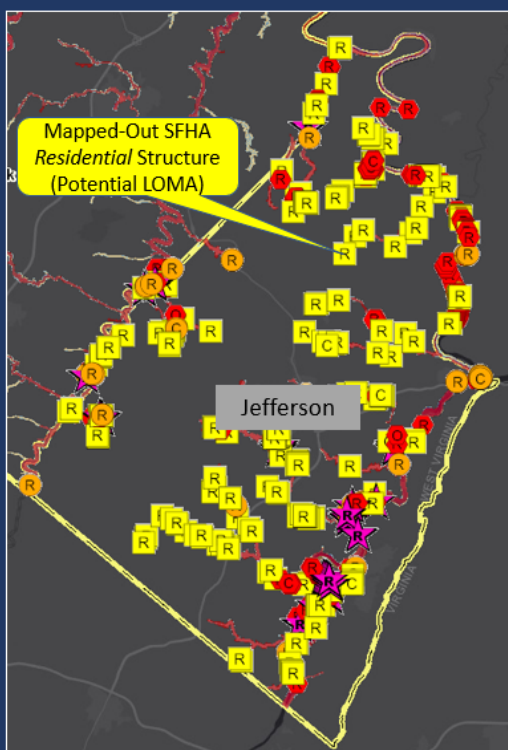
Use the WV Flood Tool's **Print Tool** (LOMA Option) to generate LOMA Maps

LOMA Map: 144 APPALOOSA WAY, Charles Town, WV



- a) **Identify Potential Mapped Out Structures:** Use the EXPERT or RISKMAP Views. Remember that changing between views in the WV Flood Tool resets all the default layers. Ensure the Best Leaf-Off Aerial Imagery is selected as the base map. Look for areas where the model-backed 1% annual chance Water Depth (blue shaded raster) is not near a mapped structure. In the RISKMAP View, for potential LOMAs, consider the “Mapped Out SFHA” (yellow square symbol) structures which indicate Building Risk for Future Map Conditions (or changes to future flood zone designations). The Mapped-Out SFHA structures are only calculated with model-backed depth grids and not Hazus-derived depth grids. Do not consider mapped-out structures that have a Verified LOMA with certified elevation data.

Identify LOMA Structures (Risk MAP View)

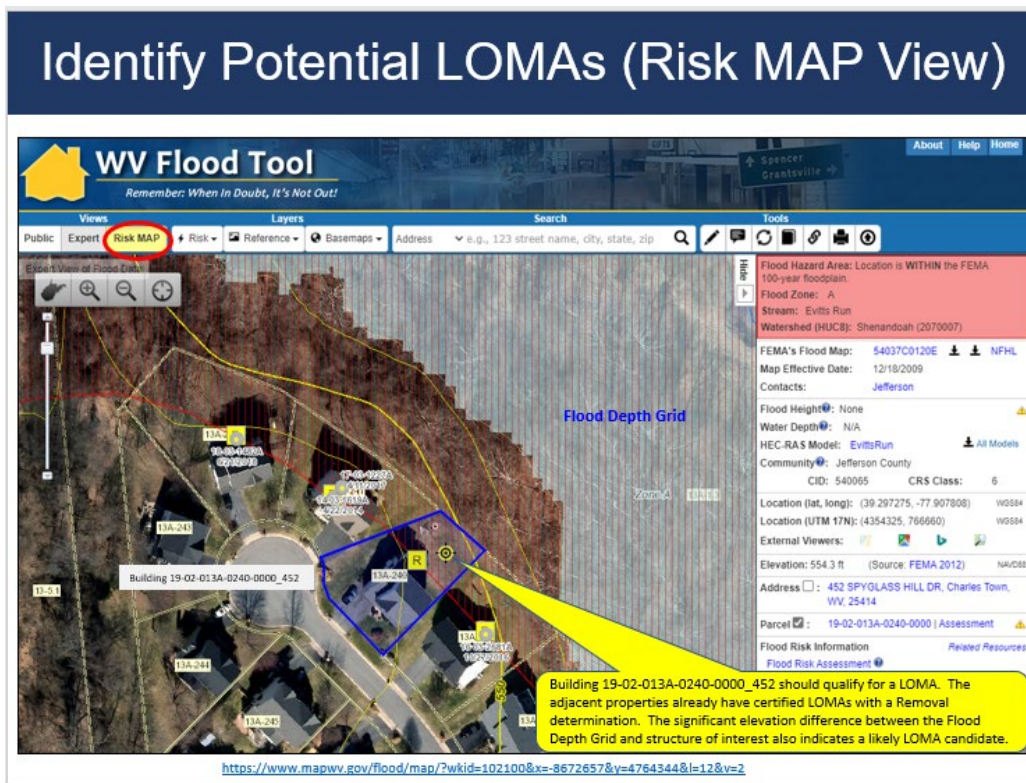
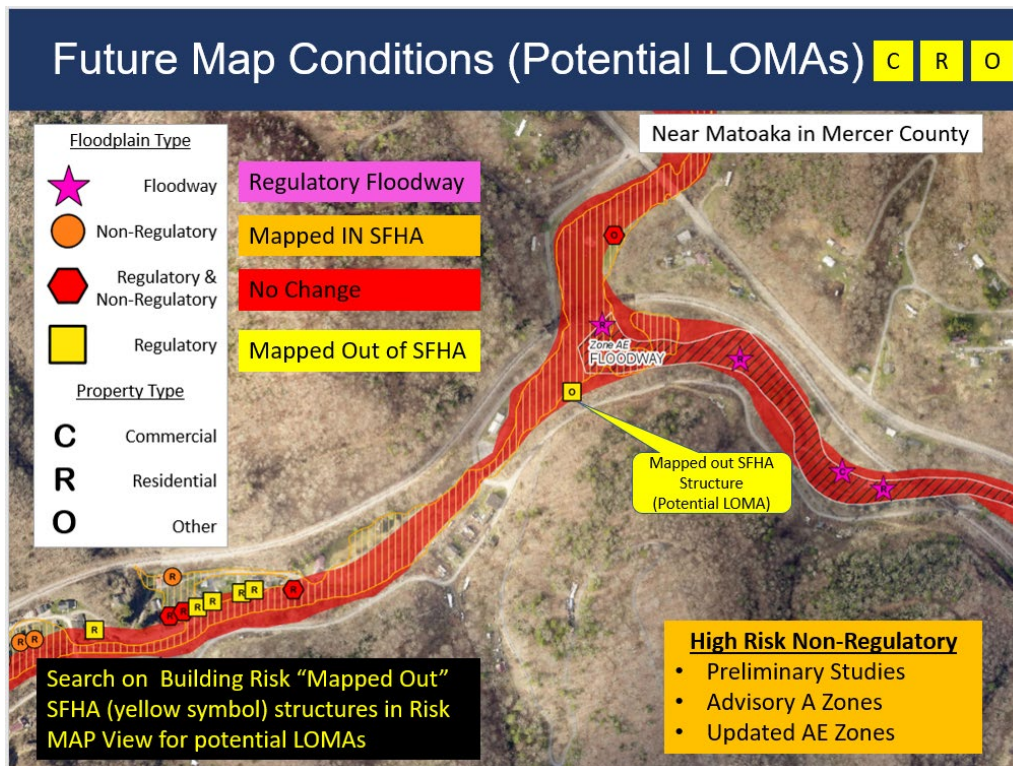


Search on Building Risk “Mapped Out” SFHA structures (yellow square symbol) in Risk MAP View for potential LOMAs. It is estimated that Jefferson County, for example, has 250 structures that could be considered for LOMA Removal Status from the Special Flood Hazard Area (SFHA).

R Residential

C Commercial

O Other



- b) **Determine LOMA type:** Identify the existing structure or lot type for subject of review. Remember that LiDAR LOMAs cannot be submitted for structures or lots elevated on fill – only for natural grade properties. [LOMAs on Fill](#) require a different application process. LOMA

requests involving **one or more structures**, the LAG must be at or above the BFE. LOMA requests involving **one or more lots**, the lowest point on each lot must be at or above the BFE.

- c) **Determine BFE:** Determine the Base Flood Elevation (BFE) of the flooding source closest to the structure. If the property is in an AE Zone, then make sure the X-Sections and BFEs are visible. Identify the BFE value from the Flood Height of the Flood Query Results Panel or the Cross-Sections. In the Print LOMA popup window, enter the BFE Value to the nearest tenth of a foot (0.01). Next enter the Vertical Datum (NAVD88 or NGVD29) which is displayed to the right of the Flood Height value in the Flood Results Query Panel. Use the Text Markup tool to annotate the BFE value on the map. A NAVD88 Ground Elevation is converted to a match a NGVD29 BFE so the ground elevation and flood height elevations are the same for the LOMA submission. IMPORTANT: When submitting LOMA applications, the BFE and LAG Vertical Datums must be the same! See [WV Vertical Datum Conversions](#) for more information.

LOMA Map – Identify BFE

WV Flood Tool
Remember: When In Doubt, It's Not Out!

Views: Public, Expert, **Risk MAP**, Risk, Reference, Basemaps

Search: Address 144 APPALOOSA WAY, Charles Town, WV

Tools: Text Markup tool, Open Print Map tool and select FEMA LOMA Map link

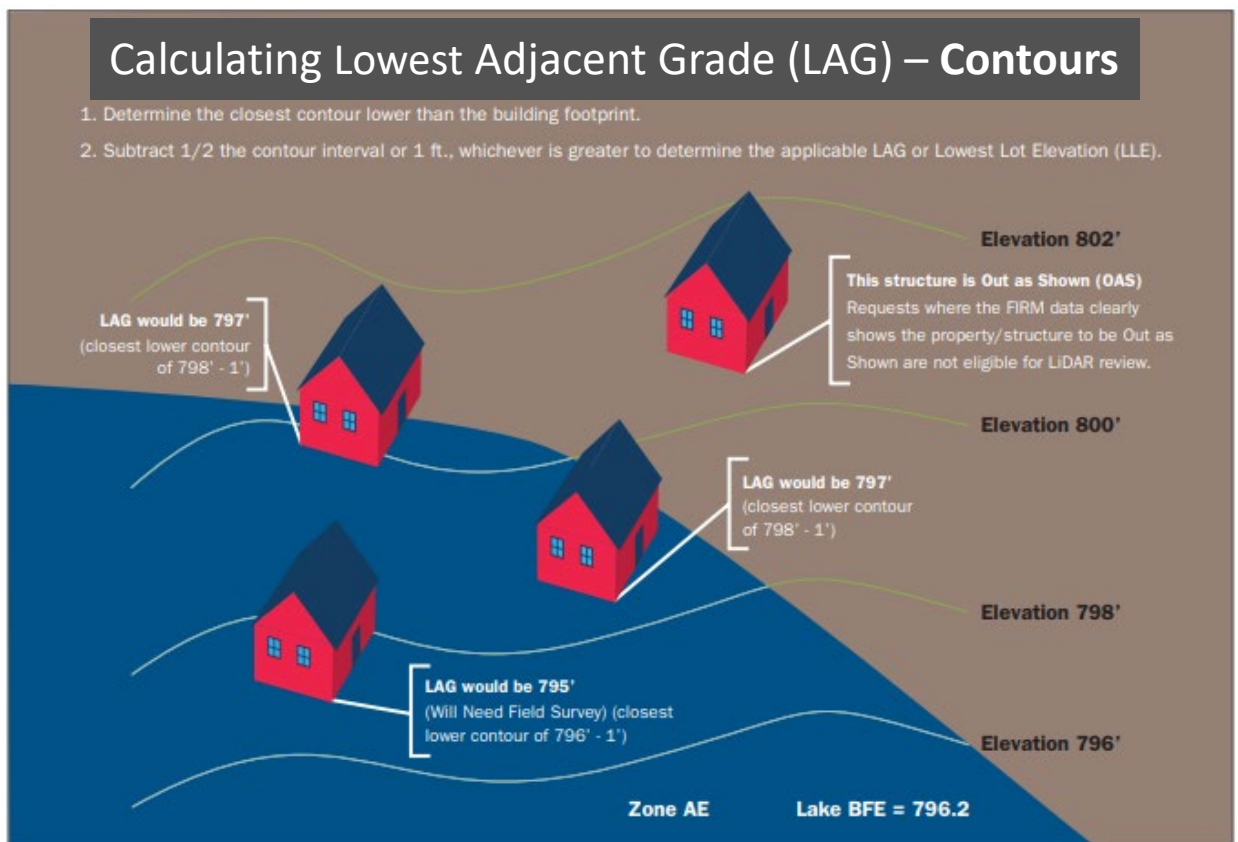
Print LOMA
Click for a normal Flood map
Title: WV Flood Map (LOMA)
User Note: 200 of 200 character(s) remaining
BFE Value: 433.4 (ft)
BFE Datum: NAVD88
Prepared by: Kurt Donaldson, WVU
Print the map

Text Markup
Text: BFE 433.4 ft
Style: Arial, 19, #000000
Add Text Halo: 2, #FFFFFF
Edit Markup Point: Circle, 10000
Tip: Right-click on an existing markup to delete it.

Flood Query Results Panel
Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.
Flood Zone: AE
Stream: Flowing Springs Run
Watershed (HUC8): Shenandoah (2070007)
FEMA's Flood Map: 54037C0130E NFHL
Map Effective Date: 12/18/2009
Contacts: Jefferson
Flood Height: 433.4 ft (BFE - Non-Resudy) NAVD88
Water Depth: About 0.0 Source: HEC-RAS
HEC-RAS Model: N/A
Community: Jefferson
CID: 540065
Location (lat, long): (39.312966, -77.824139) WGS84
Location (UTM 17N): (4356317, 773816) WGS84
Elevation: 432.8 ft (Source: FEMA 2012) NAVD88
Base Flood Elevation (BFE) Lines
DFIRM_ID: 54037C
BFE_LN_ID: 54037C_54
ELEV: 433
LEN_UNIT: Feet
V_DATUM: NAVD88
SOURCE_CIT: 54037C_54037C_FIS1
VERS: Rule1
Zoom: For AE Zones make BFE and X-Section Layers visible in RISK Layers
Flood Depth Grid
<https://www.mapwv.gov/flood/map/?wkid=1071008&x=-8569344&y=-4765601&l=13&v=2>

Using the **Flood Depth Grid** as a reference, click on closest BFE value to structure. Copy BFE Value 433.4 and Datum NAVD88 from **Flood Query Results Panel** to the **LOMA Map Print** window. Annotate flood height value 433.4 ft. on the map layout using the **Text Markup** tool.

- d) **Determine LAG/LLE:** The lowest adjacent grade (LAG) for a building, or the lowest lot elevation (LLE) for a lot, will be compared to the Base Flood Elevation (BFE) to determine the flood zone designation (e.g., A, AE, X shaded). If the LAG/LLE is at or above the BFE on the current flood map, FEMA can issue a removal determination. For buildings or lots that cannot be removed from the high-risk flood zone using LiDAR, certified elevation data will be required for a standard LOMA determination.
- i) **Using LiDAR Contours:** For LOMA submittals that include LiDAR data contours, FEMA will subtract half the contour interval or 1 foot, whichever is greater, from the lowest contour closest to (but not going through) the building (to determine the LAG) or the lot (to determine the LLE)¹. Determine the Lowest Adjacent Grade (LAG) or Lowest Lot Elevation (LLE) using the 1-ft. or 2-ft. LiDAR-Derived Contours. Ensure the Contours Layer in the Reference Layers is visible. High-resolution contours are displayed only at the highest two zoom levels of 1:564 and 1:282 map scales. Use the Text Markup tool to annotate the **Closest Lower Contour** on the map. Submit the LAG/LLE elevation values to the nearest tenth of the foot (0.1). If high-resolution contours do not exist, then use the LiDAR Point Data method described in the following section to determine the LAG.

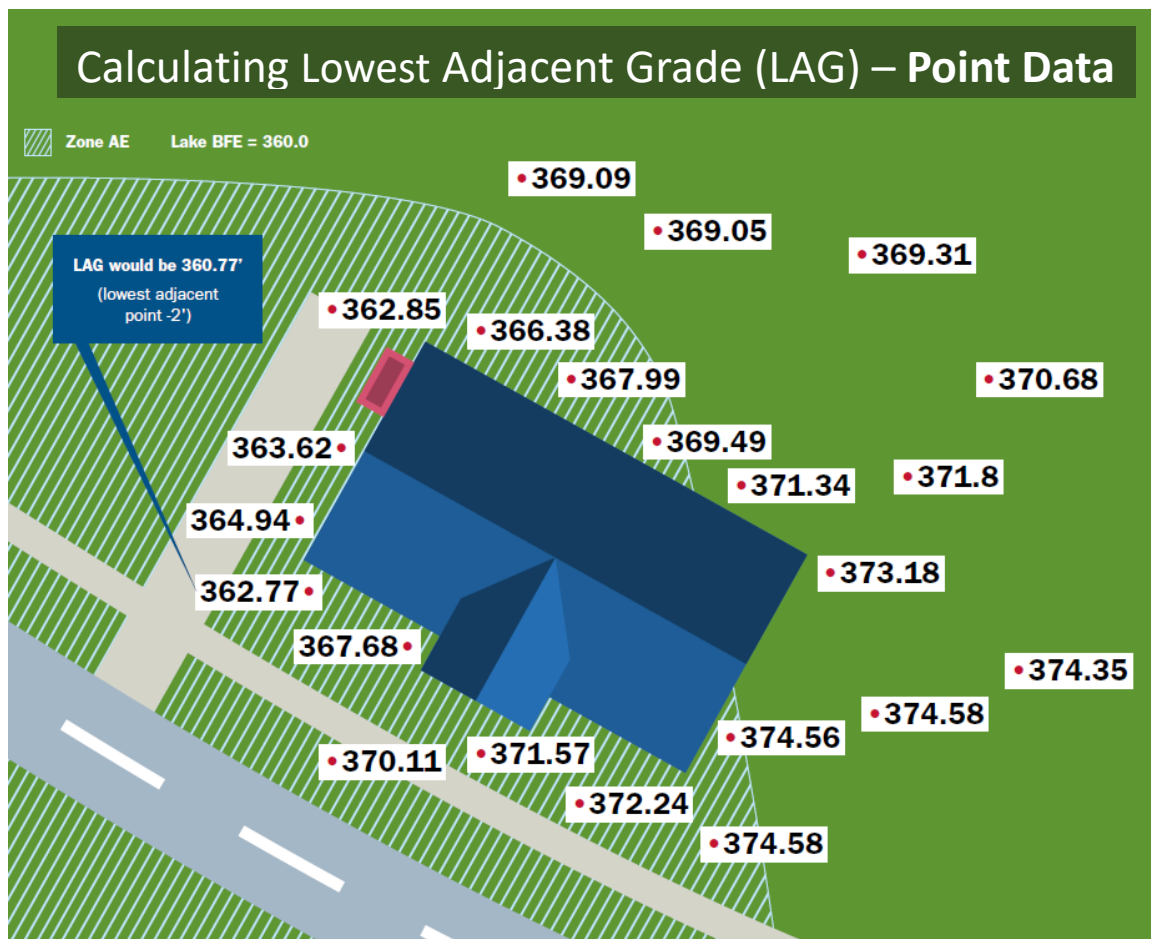


¹ Note: For West Virginia, users will always subtract 1 foot from the Closest Lower Contour to determine the LAG

- ii) **Using LiDAR Point Data:** For submittals that include LiDAR point data, FEMA will subtract 2 feet from the lowest point closest to the building (to determine the LAG) or the lowest point

on the lot (to determine the LLE). Multiple points must cover the building/lot for this method. Use the Text Markup tool to annotate the **Lowest Adjacent Point** value on the map. Submit the LAG/LLE elevation values to the nearest tenth of the foot (0.1).

Where LiDAR contours are not available, in lieu of the LiDAR contours noted above, the overlay exhibit may depict the point cloud, with elevations labeled, that would be used to determine the LAG or LLE. The point density must be sufficient, and the labeled elevations need to be uniformly spaced throughout the subject property to adequately portray changes in elevations.



LOMA Map – Identify LAG

WV Flood Tool

Remember WV

Views: Public, Expert, Risk MAP, Reference, Basemaps

Address: 144 APPALOOSA WAY, Charles Town, WV

Tools: Print Map, Text Markup, Open Print Map tool and select FEMA LOMA Map link

Ensure Contours Layer visible

Print LOMA

Print Map, Download, open map in new browser tab, right click on map and Save to PDF File

BFE Value: 433.4

BFE Datum: NAVD88

Prepared by: Kurt Donaldson, WV

Map, created at 22:46:24. You have 10 minutes to download it. Click [legend link](#) to download the full legend.

Print the map

Text Markup

Text: ELEV 436.0 ft

Turn on Contours Layer in REFERENCE Layers of WV Flood Tool to view two- or one-foot contours at 1:564 and 1:282 zoom scales. Identify the **Closest Lower Contour** 436 ft. and verify elevation in **Flood Query Results Panel**. Annotate contour value 436 ft. on the map frame using **Text Markup** tool.

Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain

Flood Zone: AE

Stream: Flowing Springs Run

Watershed (HUC8): Shenandoah (2070007)

FEMA's Flood Map: 54037C0130E

Map Effective Date: 12/18/2009

Contacts: Jefferson

Flood Height: Refer to FIS report for BFE

Water Depth: N/A

HEC-RAS Model: N/A

Community ID: 54037C0130E

CID: 54037C0130E

Location (lat, long): 39.444, -77.824188

Location (UTM 17N): 18Q337, 773813

External Viewers:

Elevation Value and Metadata

Flood Query Results Panel

Parcel ID: 18-02-0047-0202-0000 | Assessment

Flood Risk Information

Flood Risk Assessment

3D Flood Visualization: No Depth Grid Available

For AE Zones make BFE and X-Section Layers visible in RISK Layers

Flood Depth Grid

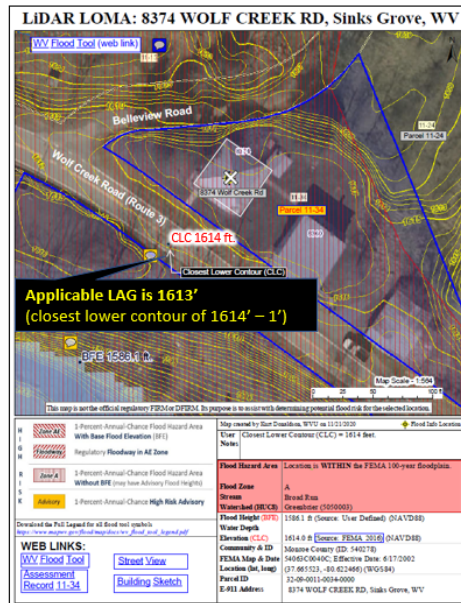
<https://www.mapwv.gov/flood/map/?wkid=10210108&v=866344&v=4766601&v=132&v=2>

@WVGIS2 Leaf-Off Mixed-Resolution Imagery

WV Flood Tool (LAG Methods)

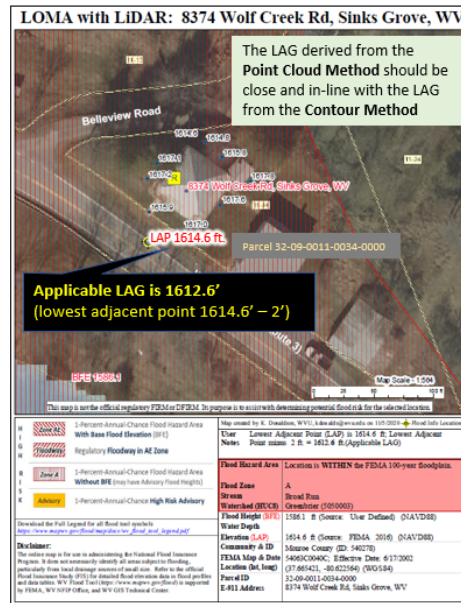
Contours

(Elevation Contours Reference Layer)



Point Data

(Flood Query Results Panel)

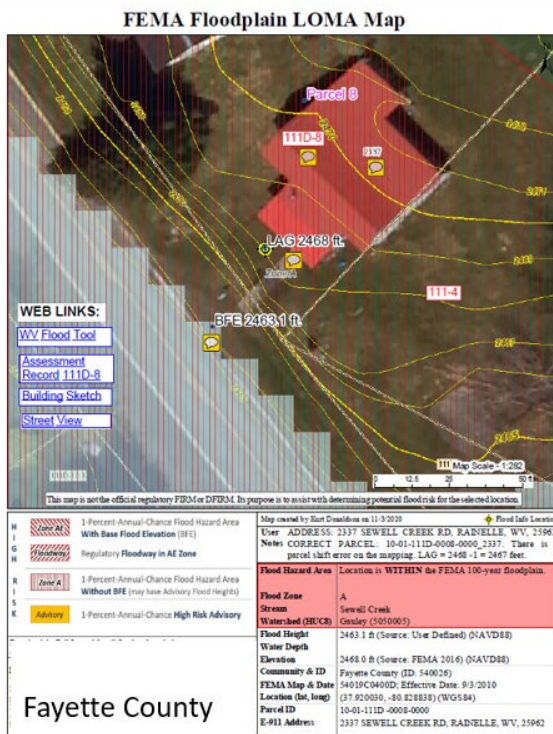


- e) **Add Annotation:** Users can add a customized title and user notes in the Print LOMA popup window to display on the PDF LOMA map. Use the Text Markup tool for annotation on the map;

ant the Text Markup tool to annotate the BFE value on the map. To erase all text markups, select the Clear tool. To erase single features, right click on the annotation to delete; however, the delete function will not work if the parcel selection is on.

- f) **Print and Download LOMA Map:** Select the “Print Button” to generate and download the online PDF LiDAR LOMA Map. Review and make corrections. Download the PDF LOMA Map to view in your web browser. Follow the same procedures each time of printing and downloading the map after an edit or a format change has been made to the layout.
 - g) **Save to PDF LOMA File:** Right click on the LiDAR LOMA Map in your web browser and Save the LOMA Map to a file. For the LiDAR LOMA PDF file name, include the unique [Building Identifier](#) for a structure LOMA and the unique Parcel Identifier for the lot LOMA. This information can be copied from the WV Flood Tool.
- 3) **Further Edit/Annotate Print LOMA (optional):** Import the Print LOMA file into Adobe Acrobat (preferred) or other editing software to add or edit annotation. Ensure the property information is correctly identified on the Print LOMA.

WV LOMA Examples



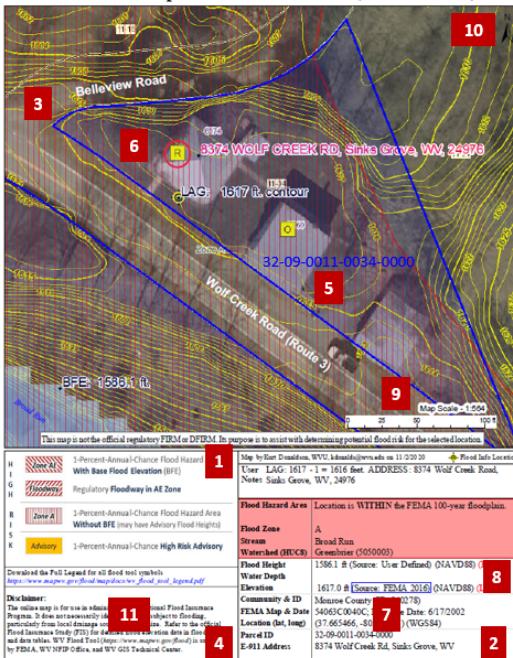
[LiDAR LOMA map examples](#)

- 4) **Submit LiDAR LOMA Map:** Submit the Print LOMA file and elevation information using [FEMA's Online Letter of Map Change](#) submission process. Process multiple maps to ensure all the required elements and parcel/street information are captured. Below are the major processing steps:
- Flood Determination Details (Single Structure, Single Lot, Multiple Structures, Multiple Lots; a survey is required for portions of lots).
 - Community Details
 - E-911 Street Address & Legal Description of Property. Make sure the authoritative E-911 address is utilized and not the Assessor's Parcel Address (which is often incomplete or inaccurate). In the property description, ensure the full building identifier or parcel identifier are the complete [spatial identifiers](#) prescribed for West Virginia properties.
 - Fill Information (Choose *No*)
 - LOMC Type (Choose *LOMA*)
 - Processing Fee (Choose *No Fee Required*)
 - Applicant Name, Mailing Address, Contact Information
 - Upload Supporting Documents. If you do not upload the appropriate supporting documents, you will not be able to continue the LOMC application process.
 - Map Documents (click links for examples)
 - PDF [LOMA Map](#) with BFE and LAG
 - [Street Reference Map](#) for property location
 - Tax Assessor's Map** or suitable map document (WV Flood Tool parcel map should suffice) Property Deed or Plat Map: Upload either a Copy of the **Property Deed** (with recordation data and stamp of the Recorder's Office) OR a Copy of the Subdivision **Plat Map** for property (with recordation data and stamp of the Recorder's Office) as separate files.



What needs to be submitted?

FEMA LOMA Map: 8374 Wolf Creek Rd, Sinks Grove, WV



#	Map Elements Required
1	Name, organization, and contact information for the map creator
2	E-911 Address of property
3	Road or street intersection reference
4	Assessor's Parcel Number (APN) for the building/lot
5	Clearly identified building and/or lot boundaries
6	Aerial imagery that shows building footprint
7	Date, Source, and Accuracy of the LiDAR collected (must meet Quality Level 3 standards)
8	Vertical Datum of elevation data (e.g., NAVD 88, NGVD 29)
9	Scale Bar
10	North Bar
11	WV Flood Tool Location web link

More than one map can be made to present all elements

NEED MORE HELP?

Need more help? Refer to FEMA's [Online Letter of Map Change Tutorial \(2018\)](#). In addition, as a guide, refer to [LIDAR LOMA map examples](#) created using the WV Flood Tool.

Processing Time: Determinations will be made within **60 days** of a completed Amendments request.

Approval for Letter of Map Amendment (LOMA): If the LOMA is approved, the submitter of the application will receive a letter from DHS-FEMA stating that an **existing** structure or parcel of land that has not been elevated by fill (**natural ground**) would not be inundated by the base flood. Approval time

* * *

Assistance: As a guide, refer to [LIDAR LOMA map examples](#) created using the WV Flood Tool.

Local Floodplain Manager: Your floodplain administrator or a mapping professional can help you develop the map exhibit for your online application. Refer to the [State Directory](#) for the contact information of your local floodplain manager.

FEMA: To speak with a Map Specialist about the amendment process, contact the FEMA Map Information eXchange (FMIX) at 877-FEMA-MAP (877-336-2627) or FEMAMapSpecialist@riskmapcds.com

WV Flood Tool (www.mapwv.gov/flood)
WVU GIS Technical Center, West Virginia University

Kurt Donaldson, GIS Manager
kurt.donaldson@mail.wvu.edu, phone: (304) 293-9467

Eric Hopkins, GIS Analyst
Eric.Hopkins@mail.wvu.edu, phone: (304) 293-9463

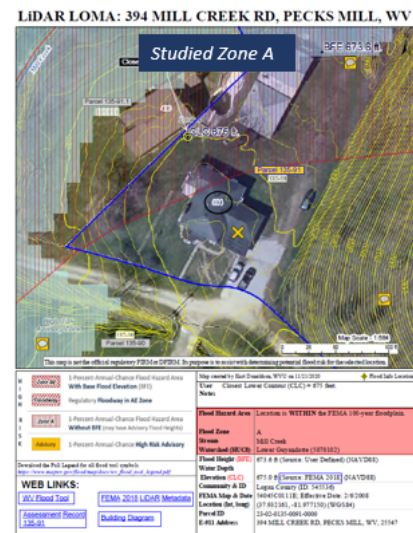
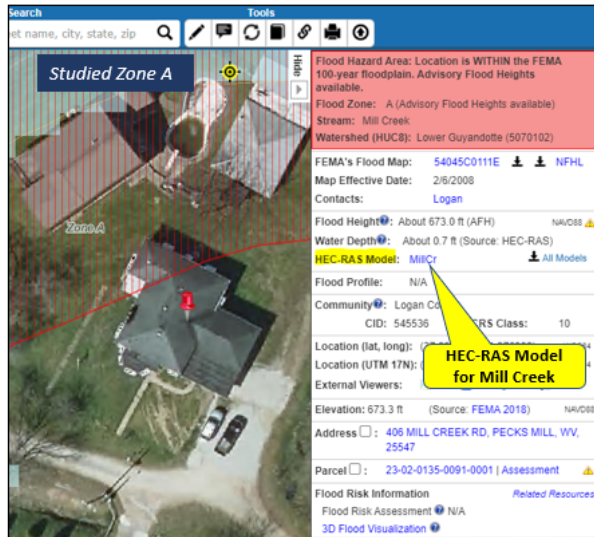
Approximate Zone Base Flood Elevation
(NOTE: Not required for LiDAR LOMA but required for elevation certificate)

The process for determining BFEs in areas of approximate study is currently under review as of summer 2024.

RESOURCES

- West Virginia
 - [WV Flood Tool](#) LiDAR for LOMA [Guide](#) | [Instructions](#)
 - [WV LiDAR for LOMA Examples](#)
 - [WV Elevation Source Metadata](#)
 - [WV FEMA-Purchased LiDAR Status Map](#)
 - [WV Advisory A / AFH Status Map](#)
 - [WV Building and Property Identifiers](#)
 - [WV Vertical Datums](#)
- FEMA
 - [FEMA Online Letter of Map Change \(LOMC\) Website](#)
 - [Online Letter of Map Change Tutorial \(2018\)](#)
 - [How to Request a Map Amendment \(2021\)](#)
 - [How to Request a LOMA or LOMA Based on Fill \(LOMR-F\)](#)
 - [Region V LiDAR LOMA Fact Sheet \(2018\)](#)
 - [Guidance for Flood Risk Analysis and Mapping MT-1 Technical Guidance \(December 2020\)](#),
LiDAR LOMA, Section 5.3, page 55

Studied Zone A (WV Flood Tool)



- FEMA's Zone A Team always refers to the WV Flood Tool as a first resource to validate a LiDAR LOMA submitted for a **Studied Zone A**. The only exception would be if a certified, site specific study, is submitted with the request. In that case, the local study based on ground survey would be considered the best available data.
- For consistency and accuracy, FEMA's analysts always download the HEC-RAS model from the WV Flood tool in order to determine the appropriate BFE from the model profile plot to validate a Studied Zone A. FEMA will not rely solely on the LiDAR LOMA and BFE Exhibit generated from the WV Flood Tool.

Unstudied Zone A (WV Flood Tool)

LIDAR LOMA: 1268 LONG FORK RD, PECKS MILL, WV, 25547



- To estimate a BFE to determine if a structure can be removed from an **Unstudied Zone A** through the LiDAR process, FEMA recommends a simple method like **Contour Interpolation**.
- Using the LiDAR-derived contours and LiDAR points of the WV Flood Tool, estimate the bank elevation and add a safety factor of at least **two feet** to be conservative. FEMA is always conservative in its BFE estimations. In cases where the LiDAR shows a property/structure above a computed BFE, then FEMA would issue the standard LiDAR removal determination.
- If FEMA deems the contour or point cloud data to suggest the LAG could be lower, FEMA will use that lower value in its review. If this review would alter the outcome to be a possible non-removal, FEMA proceeds with asking for certified elevation data. FEMA does not issue non-removals based on LiDAR exhibits.
- The requesters always have the option to provide any additional information and exhibits to assist with a BFE determination. However, until the drainage area and 1% discharge calculations are verified, FEMA cannot determine the BFE.

- To estimate a BFE to determine if a structure can be removed from an **Unstudied Zone A** through the LiDAR process, FEMA recommends a simple method like **Contour Interpolation**.
- Using the LiDAR-derived contours and LiDAR points of the WV Flood Tool, estimate the bank elevation and add a safety factor of at least **two feet** to be conservative. FEMA is always conservative in its BFE estimations. In cases where the LiDAR shows a property/structure above a computed BFE, then FEMA would issue the standard LiDAR removal determination.
- If FEMA deems the contour or point cloud data to suggest the LAG could be lower, FEMA will use that lower value in its review. If this review would alter the outcome to be a possible non-removal, FEMA proceeds with asking for certified elevation data. FEMA does not issue non-removals based on LiDAR exhibits.
- The requesters always have the option to provide any additional information and exhibits to assist with a BFE determination. However, until the drainage area and 1% discharge calculations are verified, FEMA cannot determine the BFE.

Unstudied Zone A

- FEMA will attempt to calculate the BFE when a LOMA application is submitted for properties of less than 50 lots or 5 acres.
- FEMA uses the best available topography to approximately model the BFEs. For areas where there is not a BFE tied to model backing that FEMA can download from the WV Flood Tool, FEMA will use whatever data is submitted or available to determine an applicable BFE for a request. FEMA will use the LiDAR available in the WV Flood Tool to capture the necessary extent to compute BFE determinations where there is no model backing. The availability of LiDAR provides FEMA with more confidence in the outcomes of these reviews and to complete a reasonable BFE determination.
- For riverine flooding, FEMA measure a cross section at the upstream limit of the structure and use FEMA's Quick 2 software to apply Manning's flow equation.
- Where available, FEMA uses gage data or regional regression equations to determine the discharge for the model.
- If the drainage area is too small for the parameter range FEMA may use the rational method.
- If the source is a lake or depressed area, FEMA would apply stage-storage calculations or rectangular weir flow pending the identification of outlet or not.
- FEMA follows the detailed methods of FEMA 256 [Managing Floodplain Development in Approximate Zone A Areas](#) that provides guidance for obtaining and developing base (100-Year) flood elevations.

5.3. Processing Procedures

LIDAR-based submissions will be reviewed based on the following criteria:

- The LOMA analyst will review the submitted exhibit to determine the location of the structure/property in question and identify the elevation data to be assessed.
- Contour submittals: The analyst will identify the lowest contour immediately adjacent to the subject (but not going through it) and subtract one-half the contour interval or 1 foot, whichever is greater, from the lowest contour closest to the structure or property (see Figure 23) to determine the applicable LAG elevation or LLE. This elevation will be compared to the BFE.
- LiDAR point submittals: The analyst will identify the lowest point immediately adjacent to the structure or on the property and subtract 2 feet to determine the LAG or the LLE.
- If the comparison of the LAG or LLE to the BFE results in a removal and all other required data was submitted, a determination can be issued. The LAG/LLE, and possibly the BFE as well, will not be published with the determination. If additional data is required to process the request (i.e., submittal form, deed, plat), it will be requested to complete the determination.
- If the comparison of the LAG/LLE to the BFE results in a non-removal, certified elevations will be requested in addition to any other data needed for the request.

5.4. BFE Development Procedures

For properties in flood zones without published BFEs, the applicant should provide any data that is available to determine the BFE. When data is not available, FEMA will determine the BFE based on the best available data. It should be noted that these BFE determinations are often conservative, and any information that is provided may assist in determining the BFE.

5.5. Disclaimer

All cases issued using LiDAR in lieu of certified elevations will include the following disclaimer:

This determination is based on LiDAR topographic data showing the elevation of the subject property. The elevation data that were used are not certified by a Licensed Land Surveyor or Professional Engineer, but they meet or exceed FEMA requirements. This determination is subject to change if more detailed data becomes available.

[Guidance for Flood Risk Analysis and Mapping MT-1 Technical Guidance \(December 2020\)](#),
LiDAR LOMA, Section 5.5, page 64

Submit all Required Documents



Federal Emergency Management Agency
Washington, D.C. 20472

November 23, 2020

Mr. Kurt Donaldson
WV GIS Technical Center, WVU
98 Beechurst Avenue
Morgantown, WV 26505

IN REPLY REFER TO:
CASE NO: 21-03-0231A
COMMUNITY: MONROE COUNTY, WEST
VIRGINIA
(UNINCORPORATED AREAS)
COMMUNITY NO: 540278
216-AD

RE: (627) 8374 WOLF CREEK ROAD

Dear Mr. Donaldson:

This is in response to your request for a Letter of Map Amendment for the property referenced above.

The Federal Emergency Management Agency (FEMA) uses detailed application/certification forms for revision requests or amendments to the National Flood Insurance Program (NFIP) maps. The forms provide step-by-step instructions for requestors to follow, and are comprehensive, ensuring that the requestors' submissions are complete and more logically structured. Therefore, we can complete our review more quickly and at lower cost to the NFIP. While completing the forms may seem burdensome, the advantages to requestors outweigh any inconvenience.

The following forms or supporting data, which were omitted from your previous submittal, must be provided:

- Please submit a copy of the recorded plat for this subdivision lot that identifies the property noted in your request and that contains recording information from the county Recorder's Office. Recording information is necessary to generate a legally binding property description between the determination document and the property in question. If you choose, you may submit a copy of the deed with both recording information and the property's legal description from the Office of the Recorder in place of the recorded plat.

Please note that if all of the required items are not submitted within 90 days of the date of this letter, any subsequent request will be treated as an original submittal and will be subject to all submittal procedures.

When you write to us concerning your request, please include the case number referenced above in your letter. All required items for your request are to be either uploaded through the Online LOMC tool, for requests initiated online, or mailed to the Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426, for requests initiated through the mail.

Make sure to submit all
require documents
including recorded plat
or deed for property



APPENDIX D: eLOMA Tool versus Online LOMC Tool

eLOMA

The Federal Emergency Management Agency (FEMA) has designed a web-based tool specifically for licensed land surveyors and professional engineers (referred to as Licensed Professionals or LPs) and FEMA approved Certified Professionals (CPs) to submit selected Letter of Map Amendment (LOMA) requests, known as an electronic Letter of Map Amendment (eLOMA). A [LOMA](#) is an official amendment to an effective Flood Insurance Rate Map (FIRM), typically issued to remove a property and/or structure from a Special Flood Hazard Area (SFHA).

Differences between Online Letter of Map Change (LOMC) and Traditional LOMA Paper Form Processes
An eLOMA determination serves the same function as a standard LOMA that was completed via the [Online LOMC tool](#) or the [MT-EZ](#) or [MT-1](#) paper forms submitted by mail. The Online LOMC tool is available to any applicant, including home or property owners who wish to submit a LOMC request online, whereas eLOMA can only be used by a selected group. All LOMC requests may be processed through Online LOMC, including amendment and revision requests, whereas eLOMA is for a selected LOMA (amendment) requests.

A LOMA determination via Online LOMC or the paper forms may take up to 60 days to process, compared to a potentially instant eLOMA determination. The eLOMA tool allows for less mailing and printing of supporting data forms and expedites the electronic transfer and tracking of data.

eLOMA Criteria

The tool accepts LOMA requests that are not considered to be within a coastal zone (Zone V), an alluvial fan, or modified by fill to raise the elevation of the structure.

Determine if the eLOMA tool is right for your LOMA request by answering the following pre-qualifying questions:

Has fill been placed, or will fill be placed, to raise the elevation for the subject of the request?

Is the request for a proposed structure, a proposed portion of property, or a proposed legally recorded parcel of land?

Is the subject of the request located on an alluvial fan or coastal flood hazard area (V Zone)?

Is there a LOMA application currently being processed by FEMA for the subject of the request?

If answered “No” to each question, the request qualifies for an eLOMA determination.

If the request does not meet eLOMA criteria, you will need to use [Online LOMC tool](#) or the MT-1 paper form.

APPENDIX E: WV Flood Tool's LOMA implementation compared to Region V Counties (Minnesota) – 2020 analysis.

The WV Flood Tool's LIDAR for LOMA implementation is similar to select Minnesota counties in FEMA Region V but with additional enhancements:

- *Statewide Geographic Extent:* A statewide, standardized implementation of the LiDAR for LOMA TOOL. The tool can be used by all counties in West Virginia when complete FEMA-purchased QL2 LiDAR coverage is attained and processed for the WV Flood Tool.
- *LAG Determination Methods:* Supports both Contour and Point LiDAR methods for determining the Lowest Adjacent Grade. In the WV Flood Tool, one or two-foot contours are displayed in the REFERENCE Layers at the highest zoom scales (1:564 and 1:282 map scales) and LiDAR points are presented on the FLOOD QUERY RESULTS PANEL. Leaf-off aerial imagery typically at 4-inch cell resolution is also available at the highest zoom scales.
- *NGVD29 Base Flood Elevation Datum Conversion:* The LOMA Map Print Tool converts the Ground Elevation NAVD88 to NGVD29 so the BFE and LAG/LLE are the same vertical datum.
- *Model-Backed A Zones:* For Studied A Zones, HEC-RAS models for the flood studies can be downloaded from the WV Flood Tool's Query Results Panel.
- *LOMA Candidate Identification:* The building-level risk assessments and base flood depth grid provide easy references for users to identify potential LOMAs.

NGVD 29 Datum Conversion

Print Map

[Click for a normal Flood map](#)

Flood LOMA Map Print

Title: LOMA LIDAR: 41 Lymantary Hill Rd, Hol

User Note: Lowest Adjacent Point = 718.2' (NGVD29) - 2' = 716.2' (NGVD29) applicable Lowest Lot Elevation
104 of 200 character(s) remaining

BFE Value: 714.0 (ft)

BFE Datum: NGVD29

Prepared by: K. Donaldson, WVU, kdonald

Map, created at 21:55.25. You have 10 minutes to [download](#) it. Click [legend link](#) to download the full legend.

[Print the map](#)

Flood Hazard Area	Location is WITHIN the FEMA 100-year floodplain.
Flood Zone	AE
Stream	Copperas Mine Fork
Watershed (HUC8)	Upper Guyandotte (5070101)
Flood Height	714.0 ft (Source: User Defined) (NGVD29)
Water Depth	About 1.0 ft (Source: HAZUS)
Elevation	718.2 ft (Source: Logan 2018) (NGVD29) (0.67 CF)
Community & ID	Logan
FEMA Map & Date	5404
Location (lat, long)	(37.8
Parcel ID	23-03-0010-0140-0000
E-911 Address	41 LYMANTARY HILL RD, HOLDEN, WV, 25601

The Print LOMA function converts the Ground Elevation from NAVD88 to NGVD29 to match the BFE NGVD29 Vertical Datum

NGVD29 Base Flood Elevations: The LOMA Map Print Tool converts the Ground Elevation NAVD88 to NGVD29 so the BFE and LAG/LLE are the same vertical datum

Lowest Adjacent Point 717.5 ft (NAVD88) + 0.67 ft. Conversion Factor = 718.2 ft. (NGVD29)