National Flood Insurance Program

Session 804- Flood Plain with No Base Flood Elevations

Surveyor Training – Presented by Thomas F. Smith, PE, PLS

FEMA

January 25, 2022

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FEMA Region III Mitigation Division
Floodplain Management & Insurance Branch

Developed with support from:
Risk Analysis Branch
Hazard Mitigation Assistance Branch

Edited and supplemented by Thomas F. Smith, PE, PLS to fit time constraints of the Surveyors' Conference
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Objectives and Agenda

Provide Land Surveyors with information to determine Base Flood Elevations (BFEs) in a Zone A stream.

- Flood Zone Overview.
- Mapping methods
- Hydrologic Methods
  - NRCS TR-55
  - USGS StreamStats (web based method)
- Hydraulic methods
- Elevation Certificates for Zone A Streams.
- Letter of Map Amendment (LOMA)
- Case Studies

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Flood Zone Overview
Key Definitions

- *Special Flood Hazard Area* – The area on a Flood Insurance Rate Map (FIRM) which is subject to the Base Flood. Also known as the A Zone or V Zone or the Regulatory Floodplain.
- *Base Flood* – The flood having a 1% chance of being equaled or exceeded in any given year.
- *Base Flood Elevation (BFE)* - Height of the 1% annual chance (100 year) flood measured in feet above sea level
- Zone A – Areas subject to inundation by the 1-percent-annual-chance flood ("100-year flood") event generally determined using approximate methodologies. Detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

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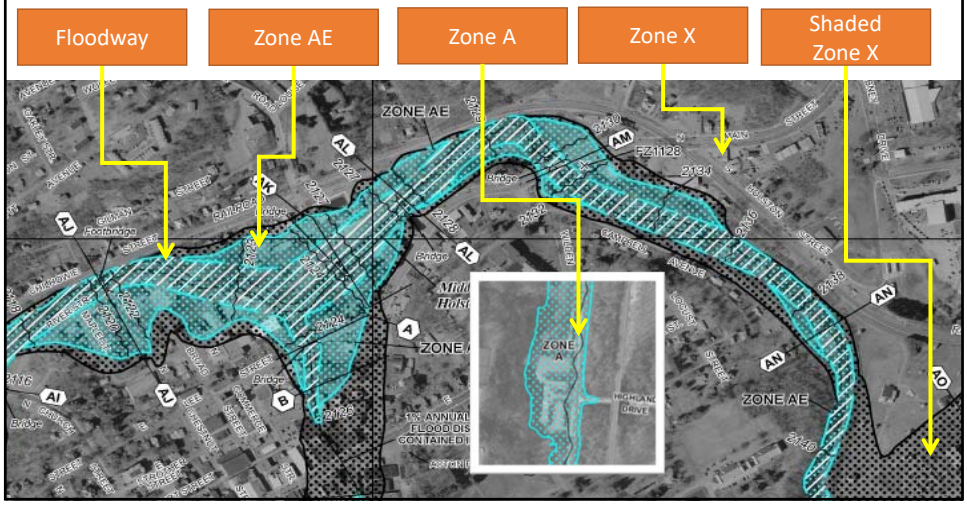
Understanding the FIRM - Riverine

- Insurance implications and regulatory requirements



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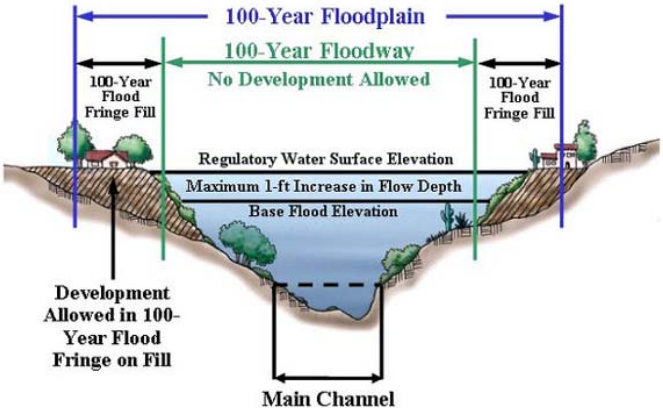
SFHA Boundaries and Elevations

BFE - Height of the 1% annual chance (100 year) flood measured in feet above sea level

Flood profiles in Flood Insurance Studies typically represent BFE for 10, 50, 100, and 500 year floods.



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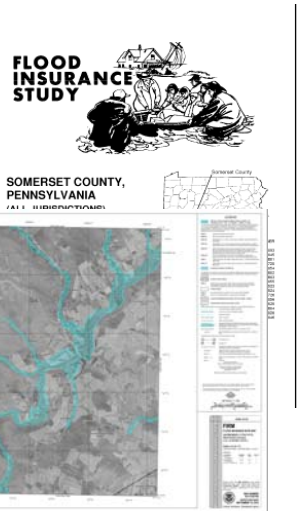
FEMA Maps and Data

- Flood Insurance Rate Map (FIRM)
- Flood Insurance Study (FIS)
- Community Identified Risk
  - Historic high water marks



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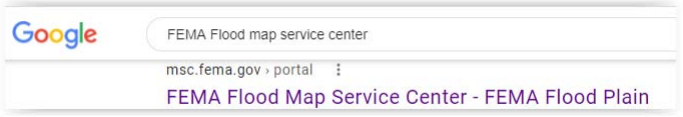
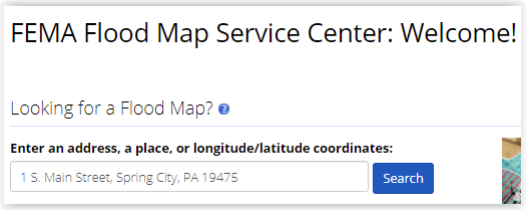
SEARCHING AND READING FEMA MAPS

1. Google search for FEMA Flood Maps: https://msc.fema.gov/portal/home



2. Enter address in search box



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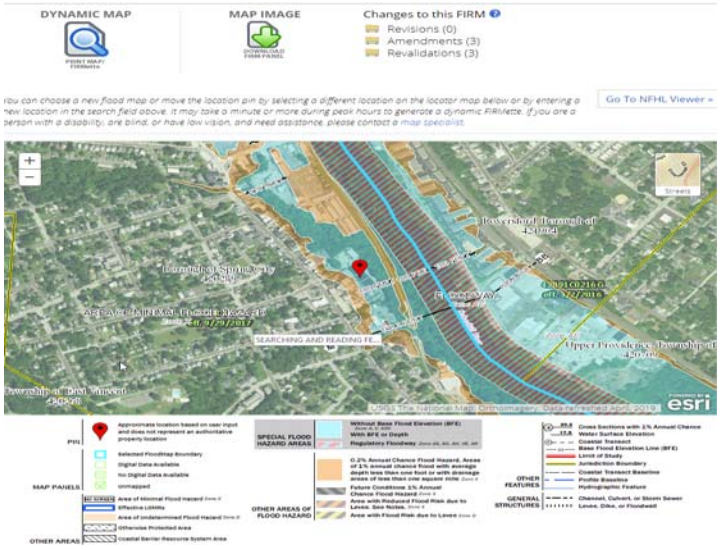
SEARCHING AND READING FEMA MAPS

Select "Dynamic Map" or "Map image" to download
Click "Go to NFHL Viewer"



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SEARCHING AND READING FEMA MAPS

- Enter the address in the search window. Click the Search icon.
- Click the Point icon at the desired location.
- Select Firmette size and pdf format.
- Click Run.

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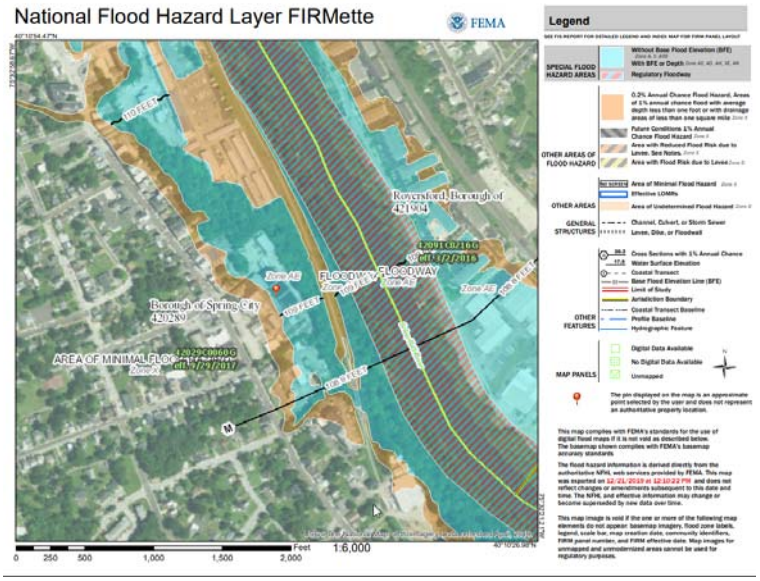
SEARCHING AND READING FEMA MAPS

- Click the link for the output file.



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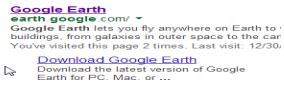
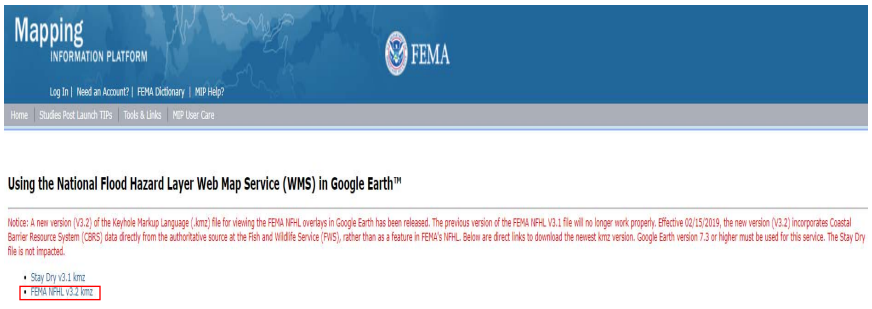
BETTER APPROACH USING GOOGLE EARTH

- Download and install Google Earth (earth.google.com)
- Search for FEMA KMZ (not the Stay Dry file), Note below that previous versions will not work properly. Newest version is 3.2 as of 12/2019.
- Save the file to your desktop
- Double click the kmz file to run inside Google Earth.





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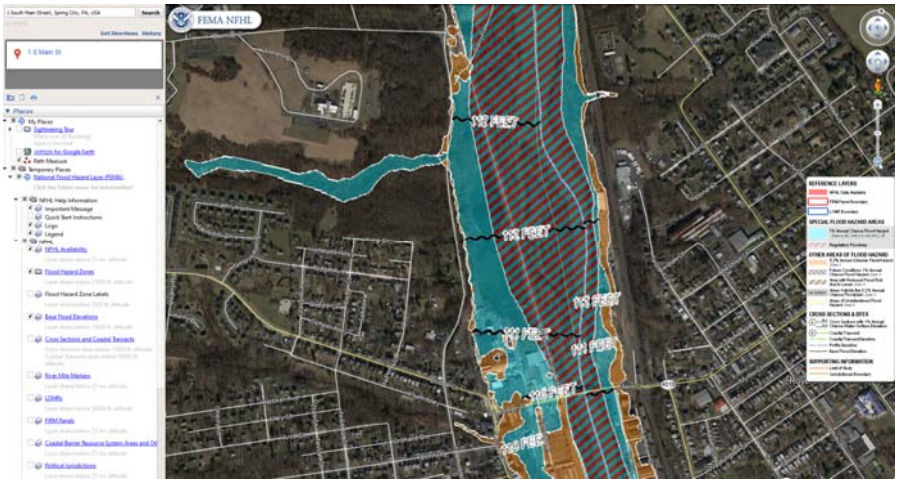
GOOGLE EARTH KMZ SEARCH

- Enter property address or location in search field.
- Under “places”, select the appropriate FEMA check boxes. Use:
  - Legend if needed
  - Flood Hazard Zones
  - Base Flood elevations
  - Cross Sections and Coastal Transects
  - Turn on FIRM Panels as needed.
  - Zoom in or out to pinpoint the location desired.



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ELEVATION CERTIFICATE SECTION E

- Section E – Building Elevation Information for Zone A.
  - Floor elevations shown in feet above or below the HAG OR LAG.

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).

a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ . _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ . _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.

E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ . _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E3. Attached garage (top of slab) is _____ . _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is _____ . _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

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Additional Data Not on FIRMs

- Zone A floodplains present a challenge
  - No BFEs available to inform how high to build
- Automated H&H was run for Zone A
  - Floodplain exists behind the scenes
  - Not detailed enough to be included on the FIRMs but can be used to approximate a 1% flood elevation
- Caveats: bridges and culverts not taken into consideration
  - Requires special skills to interpret data

Zone A cross sections may be available

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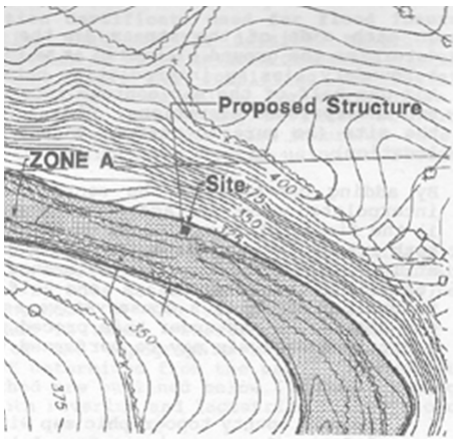
Estimating a 1% – Contour Interpolation

- Obtain site topographic map
- Reduce/enlarge to FIRM scale.
- Overlay Zone A floodplain boundary on the topographic map
- Does floodplain boundary follow contour lines?
  - (Elevations must be within one-half of the contour interval of the map.)
- If accuracy is acceptable, determine the 1%.



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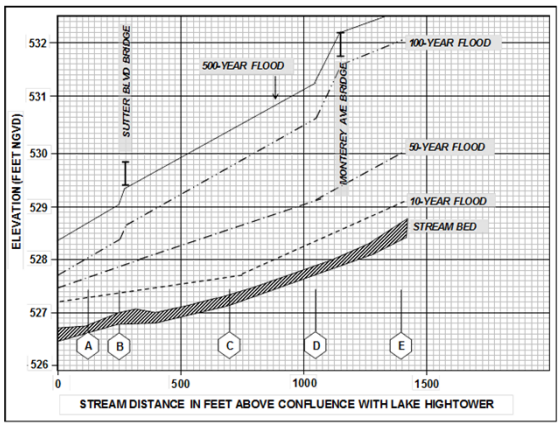
Estimating a 1% – Data Extrapolation

- Be within 500 feet of the detailed study area.
- Have floodplain characteristics similar to the detailed study area.
- Have no hydraulic structures such as dams and bridges.



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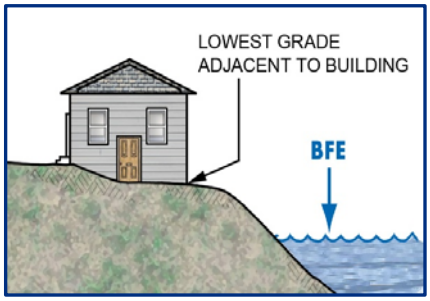
Other Mechanisms to Update FIRMs

Letters of Map Change (LOMCs)



***Caution:** Placement of fill around an existing foundation to increase the LAG could result in non-compliance

- To **remove** the mandatory flood insurance requirement
  - Inadvertent inclusions – structures built on naturally high grade above the SFHA
  - Structures elevated on fill
- To **update the map** due to:
  - Better topographic data
  - A physical change in the floodplain
  - Better modeling

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Why Apply for a LOMC?

- **Most Common Reasons**:
  - Remove the **mandatory flood insurance requirement (at the option of the lender.)**
  - Adjust/refine flood insurance rate information
  - Better understand the flood risk associated with a structure or property
- **Other Reasons**:
  - To support a floodplain development permit application
  - To understand the effects of proposed development in the SFHA
  - To reflect the effects of **recent development in the floodplain**
    - Watercourse alterations/repairs
    - Bridge/culvert/roadway repairs

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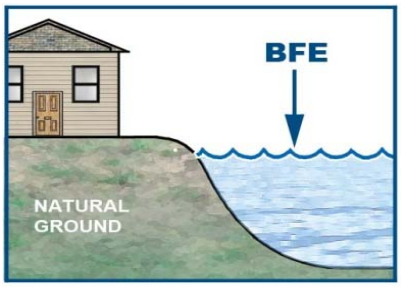
Letters of Map Amendment (LOMAs)



- LOMAs provide flood zone determinations for individual properties and structures
  - Usually used to show structure is **out of the SFHA**
  - Not required by floodplain management regulations
  - Based on **natural ground elevations**
  - No physical change to the FIRM

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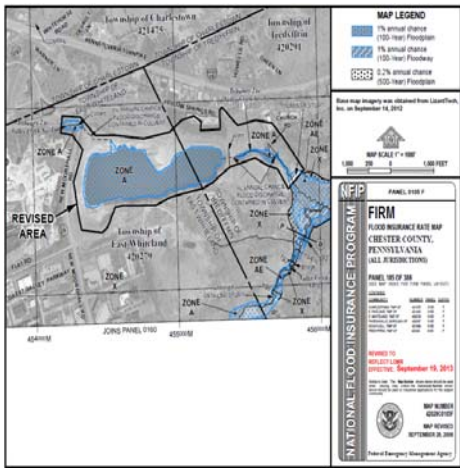
Letters of Map Revision (LOMRs)



- LOMRs **physically update** or refine the flood hazard information on the FIRM
  - Results in adjustments to the height of the BFE or boundaries of the SFHA
  - Ensures that the FIRM is the most accurate reflection of the flood risk
  - Requires engineering analyses and scientific data

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Requirement to Submit New Data

- Development occurring in AE without a designated floodway for proposed increases of more than 1.0 foot
- Floodway encroachment greater than 0.00' of rise (no-rise requirement)
- Submission of new technical or scientific data accepted at any time

The Coordinated Needs Management Strategy (CNMS) tracking tool is used by FEMA to track map update needs. Communities can share needs with FEMA using this tool.

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LOMC Application Forms

MT-EZ
- Single-lot or single-structure residential LOMA requests

MT-1
- Multiple-lot or multiple-structure LOMA requests
- LOMA request for commercial properties
- CLOMAs and CLOMR-Fs
- LOMR-Fs

MT-2
- LOMRs and CLOMRs

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LOMA PROCESS

1. LOMA GOAL – To remove a structure or parcel of land from the flood plain
   - Most often used for ZONE A Streams where no BFE has been determined.
   - No FEMA fees to process LOMA for single property.
2. Hopefully to eliminate the need to purchase flood insurance.
   - Owner may qualify for refund of one-year Flood Insurance premium, if already has insurance.
   - Owner must check with lender to determine if LOMA is successful, they will waive the requirement to purchase flood insurance.

Note that a bank still has the prerogative to require the purchase of a flood insurance policy on a building that has been removed from the SFHA. The bank can require flood insurance as a condition of the loan in order to protect its investment in the property. For example, lenders in Florida typically still require flood insurance coverage for structures determined to be in shaded Zone X or Zone B.

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LOMA PROCESS

- **Form MT-EZ OR MT-1 for Elevation Data.**
- **Elevation Certificate with No BFE indicated.**
- **Tax Map or Recorded Subdivision Plat**
- **Copy of Record Deed with Recording information shown**
- **Survey and plan of stream with Cross-sections of surrounding properties and dwelling to enable BFE to be computed.**
  - **FEMA will compute the BFE at no cost, compare the BFE with the LAG, and then issue a LOMA if the BFE is below the LAG.**
- **LOMA most commonly completed as an On-Line Letter of Map Change. (On-Line LOMC)**
  - **Process takes 45-60 days once submitted to FEMA.**
  - **No guarantee of success**
  - **Google Earth overlay is not necessarily an accurate indication of a successful LOMC (even if GE indicates structure is in the flood plain).**

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COMPUTING A BFE

FIELD SURVEY REQUIREMENTS

- **Tie survey to current FEMA vertical datum.**
- **Three cross-sections minimum plus enough spot grades to prepare a contour map of the survey area.**
  - **One section 50-100′downstream of point of interest.**
  - **One section 50′ downstream of POI.**
  - **One section at POI.**
- **Locate any culverts or bridges downstream of POI (100-200′). Include dimensions inverts and take pictures!**
- **Be sure to survey IN the stream to get lowest point in flow line. Top to top of bank should be perpendicular to flow line.**
- **Survey should extend to beyond the limit of the Zone A line.**
- **Locate edges of wooded areas or changes in the flood plain ground cover.**
- **Locate buildings and grades around buildings and floor elevations.**

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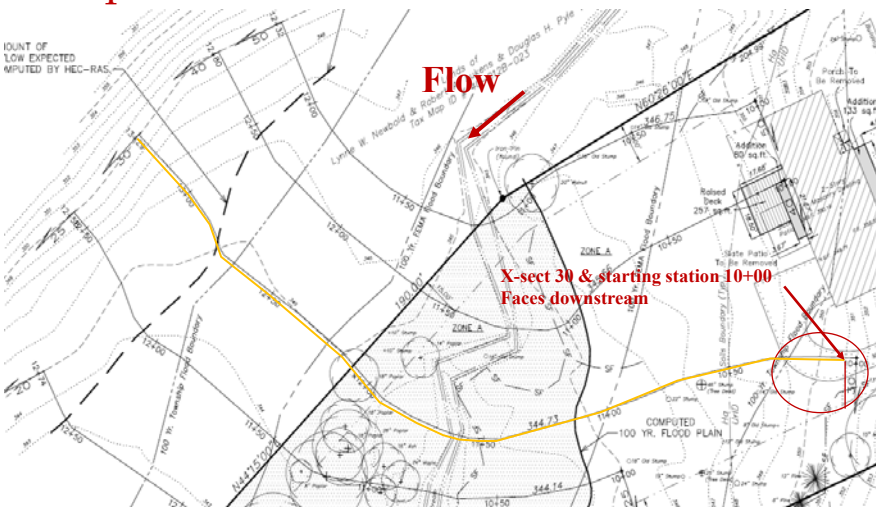
COMPUTING A BFE

Example Plan



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COMPUTING A BFE

MAPPING REQUIREMENTS

- **After completing survey, break down contours to create plan view. Use 10 or 20 scale or larger.**
- **Cut cross-sections perpendicular to flow (bend as necessary).**
- **Plot cross-sections facing downstream.**
- **Number cross-sections starting downstream moving upstream.**
- **Allow gap in numbering to allow for inserting additional cross-sections (10, 20, 30, etc.)**
- **Stationing across cross-section should NOT coincide with elevations to avoid confusion. (For elevations in 300 range, use stationing starting at 1,000, e.g.)**

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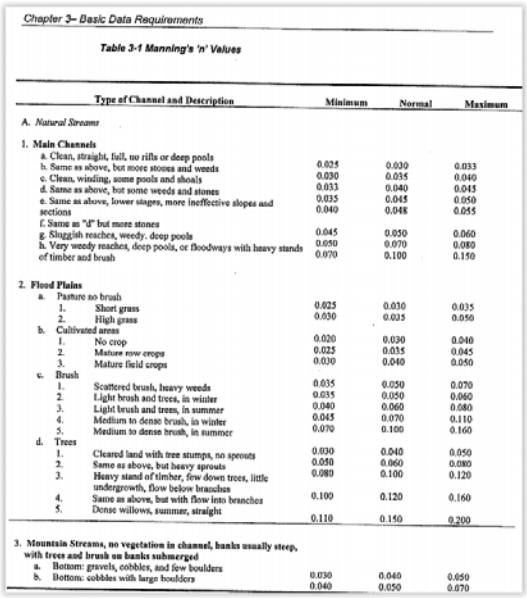
Manning's "n" values



Chapter 3– Basic Data Requirements

Table 3-1 Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
A. *Natural Streams*			
1. **Main Channels**			
a. Clean, straight, full, no rifts or deep pools	0.025	0.030	0.033
b. Same as above, but more stones and weeds	0.030	0.035	0.040
c. Clean, winding, some pools and shoals	0.033	0.040	0.045
d. Same as above, but some weeds and stones	0.035	0.045	0.050
e. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. Same as "d" but more stones	0.045	0.050	0.060
g. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
h. Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.070	0.100	0.150
2. **Flood Plains**			
a. Pasture no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
2. Same as above, but heavy sprouts	0.050	0.060	0.080
3. Heavy stand of timber, few down trees, little undergrowth, flow below branches	0.080	0.100	0.120
4. Same as above, but with flow into branches	0.100	0.120	0.160
5. Dense willows, summer, straight	0.110	0.150	0.200
3. **Mountain Streams, no vegetation in channel, banks usually steep, with trees and brush on banks submerged**			
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. Bottom: cobbles with large boulders	0.040	0.050	0.070

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Manning's "n" values cont'd

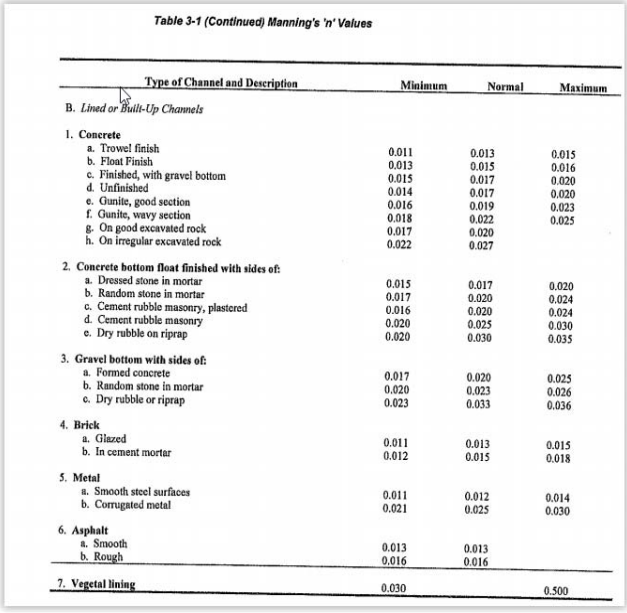

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
B. *Lined or Built-Up Channels*			
1. **Concrete**			
a. Trowel finish	0.011	0.013	0.015
b. Float Finish	0.013	0.015	0.016
c. Finished, with gravel bottom	0.015	0.017	0.020
d. Unfinished	0.014	0.017	0.020
e. Gunite, good section	0.016	0.019	0.023
f. Gunite, wavy section	0.018	0.022	0.025
g. On good excavated rock	0.017	0.020	
h. On irregular excavated rock	0.022	0.027	
2. **Concrete bottom float finished with sides of:**			
a. Dressed stone in mortar	0.015	0.017	0.020
b. Random stone in mortar	0.017	0.020	0.024
c. Cement rubble masonry, plastered	0.016	0.020	0.024
d. Cement rubble masonry	0.020	0.025	0.030
e. Dry rubble on riprap	0.020	0.030	0.035
3. **Gravel bottom with sides of:**			
a. Formed concrete	0.017	0.020	0.025
b. Random stone in mortar	0.020	0.023	0.026
c. Dry rubble or riprap	0.023	0.033	0.036
4. **Brick**			
a. Glazed	0.011	0.013	0.015
b. In cement mortar	0.012	0.015	0.018
5. **Metal**			
a. Smooth steel surfaces	0.011	0.012	0.014
b. Corrugated metal	0.021	0.025	0.030
6. **Asphalt**			
a. Smooth	0.013	0.013	
b. Rough	0.016	0.016	
7. **Vegetal lining**	0.030		0.500

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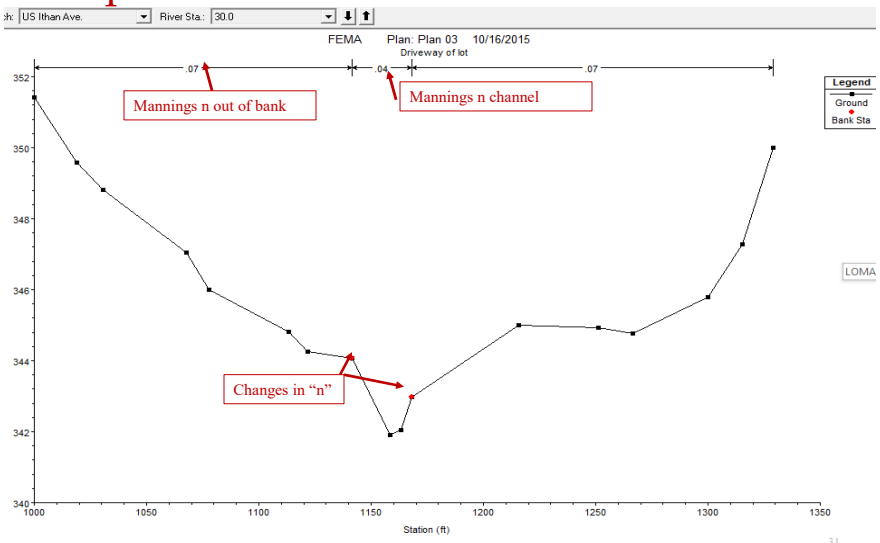
COMPUTING A BFE

Example Cross-section



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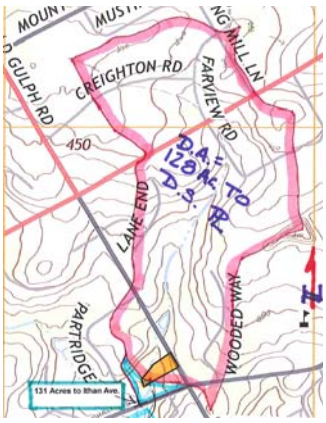
COMPUTING A BFE

Compute 1% Flood Flow using SCS TR-55

- **Delineate Drainage area to POI from USGS Map**
- **Start at downstream cross-section, delineate DA perpendicular to flow.**
- **Planimeter or scale DA from CAD drawing.**
- **PASDA mapping used to determine ground cover/land use.**



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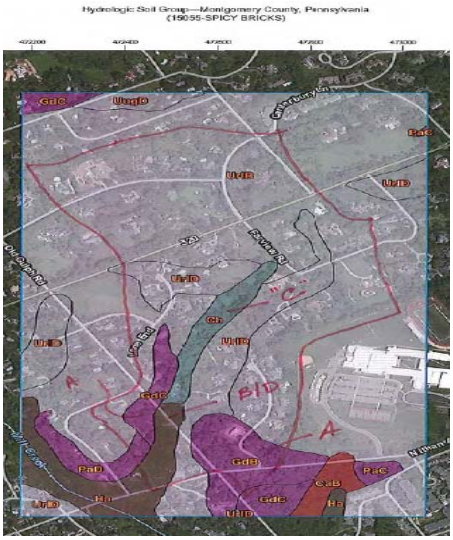
COMPUTING A BFE

Compute 1% Flood Flow using SCS TR-55

- **Use Web soil survey to look up Hydrologic Soil Groups.**
- **Compute weighted CN for each land use and HSG.**
- **Use NOAA Atlas 14 for 24-hour rainfall data**



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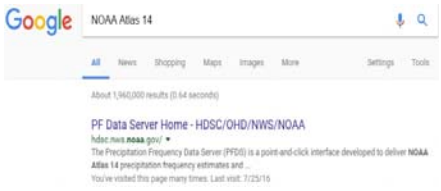
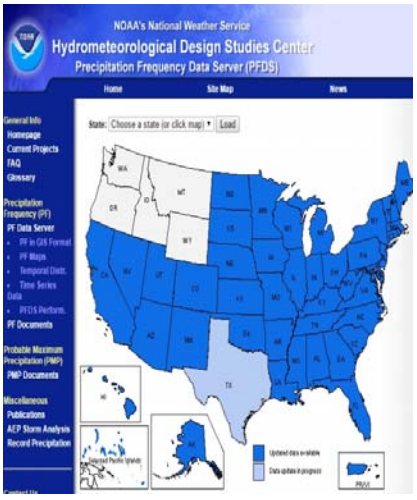
COMPUTING A BFE

Use NOAA Atlas 14 rainfall data or Township ordinance.

- **Web site: hdsc.nws.noaa.gov**
- **Click the map for PA.**
- **Select Precipitation depth, English units and Partial duration.**
- **Type in the address of the site location.**





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Using NOAA Atlas 14 rainfall data.

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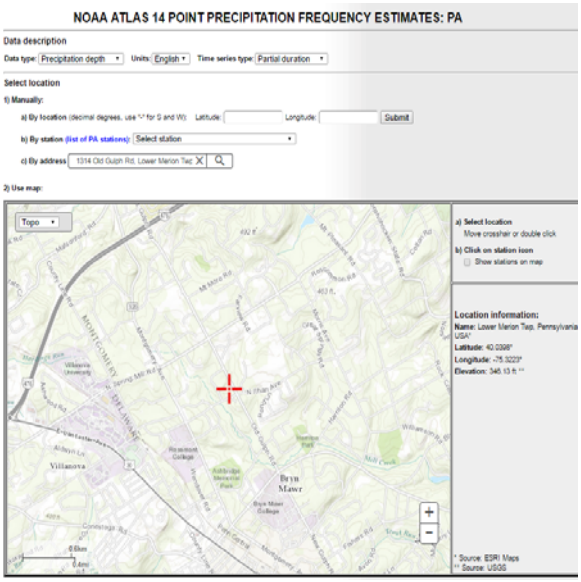

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Using NOAA Atlas 14 rainfall data.

Use 100-year, 24-hour duration storm.
Rainfall = 7.62 "
Township Code required 8.4"
Use 8.4" (conservative)

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.347 (0.320-0.379)	0.414 (0.380-0.451)	0.486 (0.448-0.528)	0.536 (0.491-0.584)	0.597 (0.543-0.649)	0.638 (0.577-0.695)	0.678 (0.611-0.740)	0.713 (0.639-0.781)	0.754 (0.669-0.829)	0.784 (0.690-0.866)
10-min	0.555 (0.511-0.605)	0.662 (0.608-0.721)	0.778 (0.713-0.846)	0.857 (0.785-0.934)	0.951 (0.865-1.03)	1.01 (0.919-1.11)	1.08 (0.971-1.18)	1.13 (1.01-1.24)	1.19 (1.06-1.31)	1.23 (1.09-1.36)
15-min	0.694 (0.638-0.756)	0.832 (0.765-0.906)	0.984 (0.901-1.07)	1.08 (0.993-1.18)	1.21 (1.10-1.31)	1.29 (1.16-1.40)	1.36 (1.23-1.49)	1.43 (1.28-1.56)	1.50 (1.33-1.65)	1.55 (1.38-1.71)
30-min	0.951 (0.875-1.04)	1.15 (1.06-1.25)	1.40 (1.28-1.52)	1.57 (1.44-1.71)	1.78 (1.62-1.94)	1.94 (1.75-2.11)	2.08 (1.88-2.28)	2.22 (1.99-2.43)	2.39 (2.12-2.63)	2.51 (2.21-2.77)
60-min	1.19 (1.09-1.29)	1.44 (1.32-1.57)	1.79 (1.64-1.95)	2.05 (1.87-2.23)	2.38 (2.16-2.59)	2.62 (2.38-2.86)	2.87 (2.59-3.14)	3.11 (2.79-3.41)	3.43 (3.04-3.77)	3.66 (3.23-4.05)
2-hr	1.42 (1.30-1.56)	1.73 (1.58-1.89)	2.16 (1.97-2.36)	2.48 (2.26-2.71)	2.92 (2.63-3.19)	3.26 (2.92-3.56)	3.60 (3.21-3.94)	3.94 (3.49-4.32)	4.40 (3.85-4.84)	4.75 (4.12-5.25)
3-hr	1.56 (1.42-1.71)	1.89 (1.73-2.07)	2.36 (2.15-2.59)	2.73 (2.48-2.99)	3.21 (2.90-3.52)	3.60 (3.23-3.93)	3.99 (3.56-4.37)	4.38 (3.87-4.82)	4.92 (4.28-5.43)	5.33 (4.60-5.91)
6-hr	1.94 (1.78-2.13)	2.35 (2.15-2.58)	2.93 (2.67-3.22)	3.40 (3.09-3.72)	4.05 (3.65-4.44)	4.58 (4.10-5.02)	5.14 (4.56-5.64)	5.73 (5.02-6.29)	6.55 (5.64-7.24)	7.21 (6.12-8.01)
12-hr	2.36 (2.16-2.61)	2.85 (2.61-3.15)	3.58 (3.27-3.95)	4.18 (3.80-4.61)	5.06 (4.55-5.56)	5.80 (5.16-6.38)	6.60 (5.80-7.27)	7.47 (6.47-8.26)	8.74 (7.40-9.70)	9.80 (8.15-10.9)
24-hr	2.73 (2.51-2.97)	3.28 (3.02-3.58)	4.12 (3.79-4.50)	4.82 (4.42-5.26)	5.84 (5.32-6.35)	6.69 (6.07-7.27)	7.62 (6.87-8.26)	8.62 (7.71-9.34)	10.1 (8.91-10.9)	11.3 (9.89-12.2)

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Using NOAA Atlas 14 rainfall data.

- **Use 100-year, 24-hour duration storm.**
- **By selecting the submit button at the bottom of the form, this txt file is created and opened in Excel.**
- **Similarly, you may obtain rainfall intensity data by selecting Precipitation Intensity in the first dropdown box.**

Point precipitation frequency estimates (inches)

NOAA Atlas 14 Volume 2 Version 3

Data type: Precipitation depth
Time series type: Partial duration
Project area: Ohio River Basin

Location name (ESRI Maps): Lower Merion Twp, Pennsylvania, USA
Station Name: -
Latitude: 40.0398°
Longitude: -75.3223°
Elevation (USGS): 346.13 ft

PRECIPITATION FREQUENCY ESTIMATES

by duration for ARI (years):	1	2	5	10	25	50	100	200	500	1000
5-min:	0.35	0.41	0.49	0.54	0.6	0.64	0.68	0.71	0.75	0.78
10-min:	0.56	0.66	0.78	0.86	0.95	1.01	1.08	1.13	1.19	1.23
15-min:	0.69	0.83	0.98	1.08	1.21	1.29	1.36	1.43	1.5	1.55
30-min:	0.95	1.15	1.4	1.57	1.78	1.94	2.08	2.22	2.39	2.51
60-min:	1.19	1.44	1.79	2.05	2.38	2.62	2.87	3.11	3.43	3.66
2-hr:	1.42	1.73	2.16	2.48	2.92	3.26	3.6	3.94	4.4	4.75
3-hr:	1.56	1.89	2.36	2.73	3.21	3.6	3.99	4.38	4.92	5.33
6-hr:	1.94	2.35	2.93	3.4	4.05	4.58	5.14	5.73	6.55	7.21
12-hr:	2.36	2.85	3.58	4.18	5.06	5.8	6.6	7.47	8.74	9.8
24-hr:	2.73	3.28	4.12	4.82	5.84	6.69	7.62	8.62	10.1	11.3
2-day:	3.15	3.8	4.78	5.57	6.71	7.65	8.66	9.73	11.3	12.5
3-day:	3.31	4	5.01	5.84	7.01	7.99	9.02	10.1	11.7	13
4-day:	3.48	4.2	5.25	6.11	7.32	8.32	9.38	10.5	12.1	13.4
7-day:	4.07	4.88	6.04	6.99	8.35	9.47	10.7	11.9	13.8	15.2
10-day:	4.63	5.54	6.75	7.73	9.1	10.2	11.3	12.5	14.2	15.6
20-day:	6.27	7.44	8.87	10	11.5	12.7	13.9	15.2	16.8	18.1
30-day:	7.81	9.2	10.7	11.9	13.5	14.7	15.8	17	18.5	19.6
45-day:	9.93	11.7	13.4	14.7	16.4	17.6	18.8	19.9	21.3	22.3
60-day:	11.9	13.9	15.9	17.4	19.2	20.5	21.8	22.9	24.4	25.4

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COMPUTING A BFE

Compute Time of Concentration to POI

Travel Time D.S. PL

Summary for Travel Time Calculations with 3 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 100 feet
Slope = 0.01 ft/ft
Roughness Coefficient = 0.24
2 Year - 24 Hour Rainfall = 3.2 inches

Travel Time for Segment = 18.83 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 140 feet
Slope = 0.01 ft/ft

Travel Time for Segment = 1.45 minutes

Segment 3: SCS Average Velocity

Grassed waterway
Length = 4375 ft
Slope = 0.0297 ft/ft

Calculated Velocity = 2.62 ft/s
Travel Time for Segment = 27.84 minutes

Composite Travel Time = 48.12 minutes = 0.80 hrs

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COMPUTING A BFE

Compute Peak Flow for 100-year storm

24 Hour Rainfall data from NOAA Atlas 14 (8.4")

SCS TR55 Tabular Method

Watershed Title: Di Felice TP

100 Year Type II Storm: Precipitation = 8.4 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IAP	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	128.000	68.0	0.112	4.67	48.000	45.000	0.000	3.000
Composite	128.000	68.0		4.57				

SCS TR-55 Tabular Method

Watershed Title: Di Felice

100 Year Type II Storm: Precipitation = 8.4 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IAP	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	128.000	68.0	0.112	4.67	48.000	45.000	0.000	3.000
Composite	128.000	68.0		4.57				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	25.0
1	11.17	30.00	92.05	319.28	349.44	167.28	89.59	58.78	33.30	20.70	14.19	0.00
Composite	11.17	30.09	92.05	319.28	349.44	167.28	89.59	58.78	33.30	20.70	14.18	0.00

The peak flow is 367.91 cfs at 12.7 hrs.

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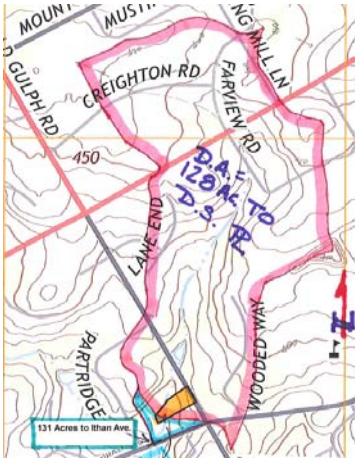
COMPUTING A BFE

Compute 1% Flood Flow using USGS StreamStats

- **Delineate Drainage area to POI from USGS Map**
- **Start at downstream cross-section, delineate DA perpendicular to flow.**
- **Planimeter or scale DA from CAD drawing. 128/640 Acres/Sq. Mile = 0.2 SM**



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Compute 1% Flood Flow using USGS StreamStats

- **Google Search for "streamstats"**

StreamStats - USGS
https://streamstats.usgs.gov/ss/
StreamStats has recently implemented updated regression equations for Washington and Pennsylvania with further information about those equations below.

- **Enter Address in "Search for a place"**
- **Search for 1314 Old Gulph Road, Bryn Mawr, PA 19010**

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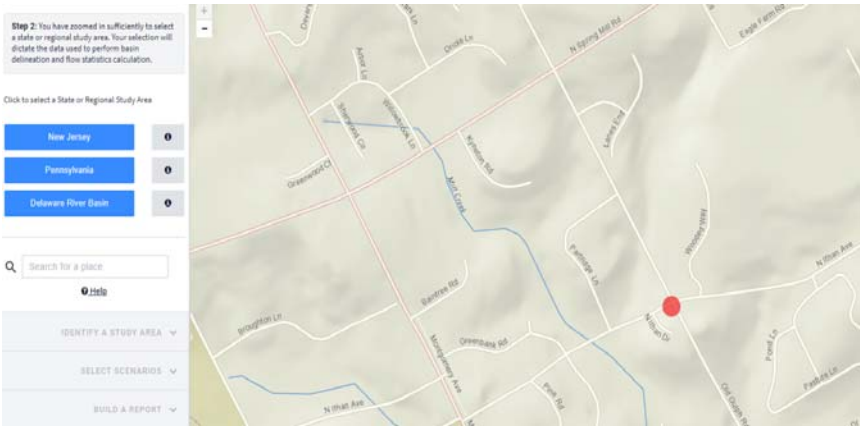
Compute 1% Flood Flow using USGS StreamStats

- **Click Pennsylvania for Regional Study Area**
- **Streamlines will appear on the map.**



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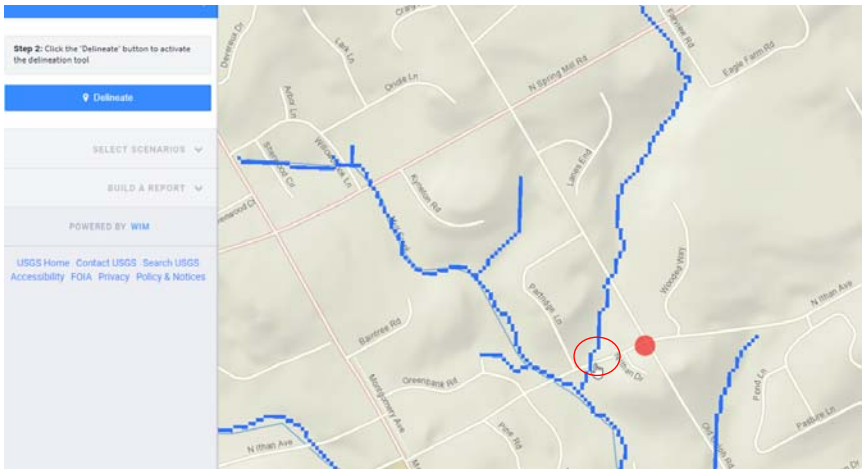
Compute 1% Flood Flow using USGS StreamStats

- **Click on the delineate button**
- **Select a point on the blue stream lines to delineate the study area**
- **Select the Stream crossing at N. Ithan Avenue.**



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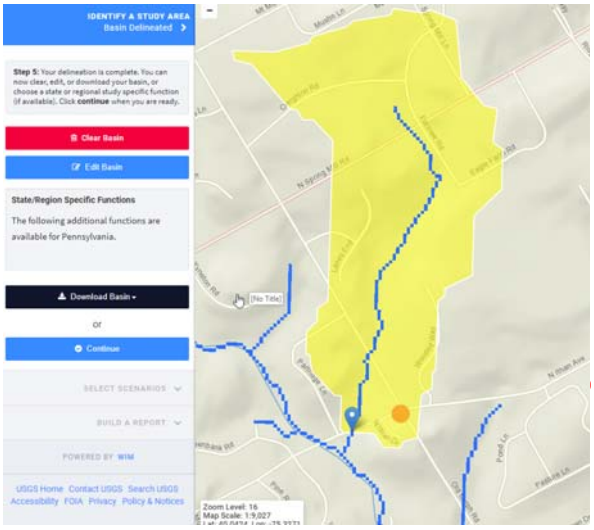
Compute 1% Flood Flow using USGS StreamStats

- **If clicked point is valid, the study area will be delineated.**
- **Click on "Continue" button.**



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Compute 1% Flood Flow using USGS StreamStats

- **Compare the shape of the watershed with the USGS Delineation.**
- **Both fairly Close to USGS map. SS = 134 Ac. USGS = 128 Ac.**

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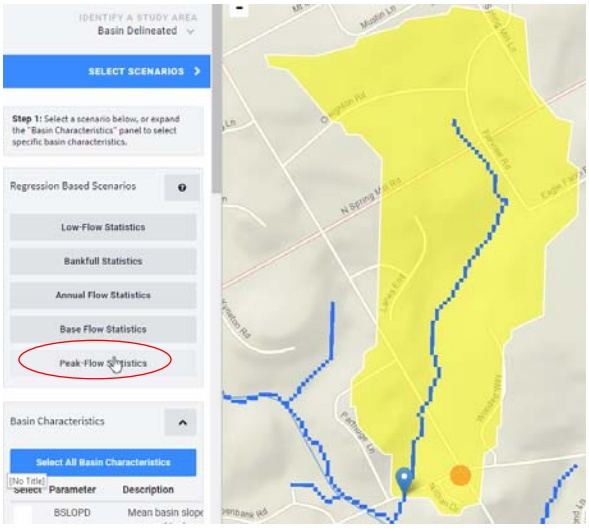
Compute 1% Flood Flow using USGS StreamStats

- **Click on "Peak-Flow Statistics" button.**



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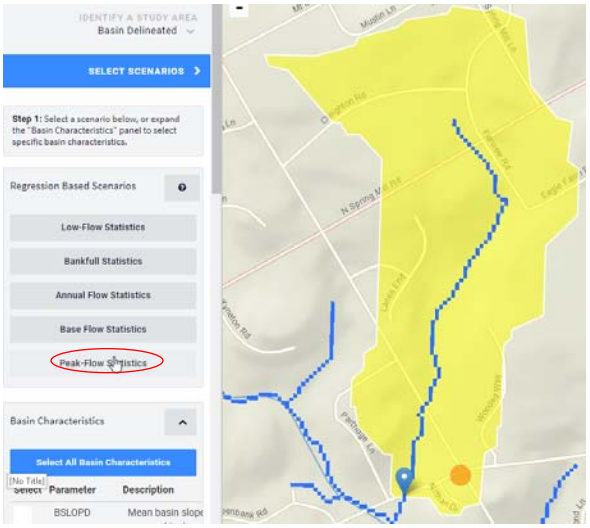
Compute 1% Flood Flow using USGS StreamStats

- **Click on "Peak-Flow Statistics" button.**



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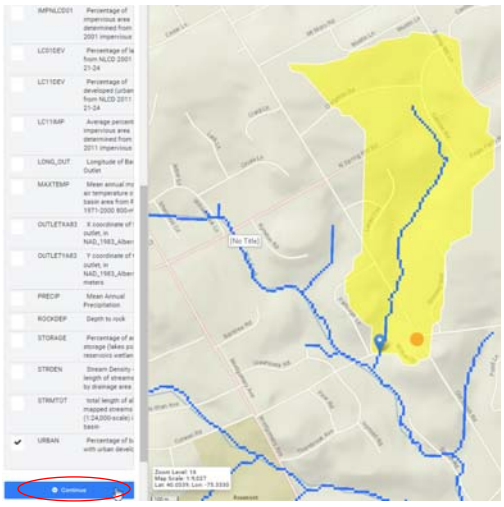
Compute 1% Flood Flow using USGS StreamStats

- **The appropriate basin characteristics should be automatically selected.**
- **Scroll to bottom and Click on "Continue" button.**



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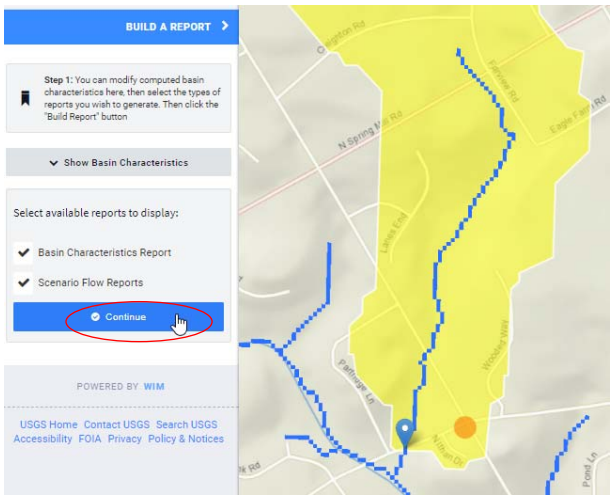
Compute 1% Flood Flow using USGS StreamStats

- **Under build a Report Tab, select available reports to display**
- **Click on "Continue" button.**



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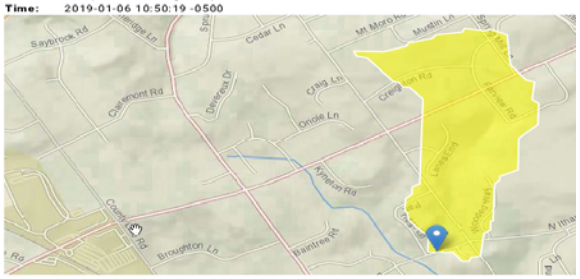
Compute 1% Flood Flow using USGS StreamStats

- **StreamStats Report is displayed**
- **Click Print (I printed to Adobe PDF)**

StreamStats Report - Mill Creek

Region ID: PA
Workspace ID: PA20190106155003161000
Clicked Point (Latitude, Longitude): 40.03879, -75.32297
Time: 2019-01-06 10:50:19 -0500



Test

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.21	square miles
CARBON	Percentage of area of carbonate rock	0	percent
URBAN	Percentage of basin with urban development	59	percent

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Compute 1% Flood Flow using USGS StreamStats

- **Report Contents – NOTE: The drainage area is outside the limits of the Regression Model. Caution is advised using the results.**

StreamStats

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.21	square miles	2.02	1150
CARBON	Percent Carbonate	0	percent	0	67
URBAN	Percent Urban	59	percent	0	94

Peak-Flow Statistics Disclaimers [Peak Flow Region 2]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report [Peak Flow Region 2]

Statistic	Value	Unit
2 Year Peak Flood	82.1	ft^3/s
5 Year Peak Flood	148	ft^3/s
10 Year Peak Flood	203	ft^3/s
50 Year Peak Flood	351	ft^3/s
100 Year Peak Flood	425	ft^3/s
500 Year Peak Flood	635	ft^3/s

Peak-Flow Statistics Citations

Roland, M.A. and Stuckey, M.H., 2008, Regression equations for estimating flood flows at selected recurrence intervals for ungaged streams in Pennsylvania: U.S. Geological Survey Scientific Investigations Report 2008-5102, 57p. (http://pubs.usgs.gov/sir/2008/5102/)

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Compute 1% Flood Flow using USGS StreamStats

- **StreamStats Results – Drainage area = 134 Acres**

Statistic	Value	Unit
2 Year Peak Flood	82.1	ft^3/s
5 Year Peak Flood	148	ft^3/s
10 Year Peak Flood	203	ft^3/s
50 Year Peak Flood	351	ft^3/s
100 Year Peak Flood	425	ft^3/s

- **NRSCS TR-55 Results - Drainage area= 128 Ac., Q_{100} = 368 CFS**
- **15% Lower than StreamStats, but fairly good agreement, considering minimum D.A. = 2.02 S.M.**

SCS TR-55 Tabular Method

Watershed Title: Di Felice
100 Year Type II Storm: Precipitation = 8.4 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	128.000	68.0	0.112	4.57	48.000	45.000	0.000	3.000
Composite	128.000	68.0		4.57				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	11.17	30.09	92.05	319.26	349.44	167.28	89.59	58.78	33.30	20.70	14.16	0.00
Composite	11.17	30.09	92.05	319.26	349.44	167.28	89.59	58.78	33.30	20.70	14.16	0.00

The peak flow is 367.91 cfs at 12.7 hrs.

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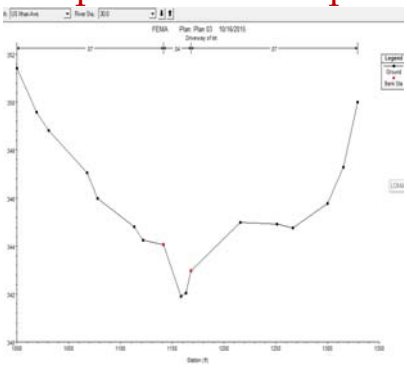
COMPUTING A BFE

Compute normal depth at downstream X-Section



- **Velocity V (ft/sec) = (1.486*$R^{2/3}$*$S^{1/2}$)/n**
- **Flow Q = A*V, where A = area of cross-section.**
- **R=Area/Wetted perimeter (hydraulic radius, in ft).**
- **S= Channel slope in ft/ft from starting x-section to next upstream x-section.**
- **N = Manning's n.**
- **Break up cross-section into each change in n value. (3 parts).**

- **Trial and error procedure**
  - **Slope S is known. (0.014 ft/ft computed from plan) Used 0.0074.**
  - **"n" is known.**
  - **Hydraulic radius computed for given depth.**
  - **Q = the capacity of the channel equal to the computed 100-year flow (370 CFS).**

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COMPUTING A BFE

Compute normal depth at downstream X-Section

Spreadsheet included in notes. (Normal_depth in composite channel, 1-9-17.xlsx)

Normal depth in composite channel — Thomas F. Smith, P.E., P.L.S. — 1/9/2017

Design flow: 370 CFS
Slope: 0.0074 ft/ft

Yellow cells: user input
Green cells: computed values

Computed W. S. Elev: 345.0 ft

Section TRIAL 1	Area sf	P ft	R ft	$R^{2/3}$	n	Velocity fps	Flow cfs	$V^2/2g$	$d+V^2/2g$
Left	22.0	35.0	0.629	0.734	0.070	1.340	29.5		
Center	61.6	28.0	2.200	1.692	0.040	5.406	333.0		
Right	49.0	48.0	1.021	1.014	0.070	1.851	90.7		
	132.6	111.0	1.195	1.126		3.418	453.2	0.18	345.2

Trial 2 Required Area: 108.3

Computed W. S. Elev: 344.5 ft

Section TRIAL 2	Area sf	P ft	R ft	$R^{2/3}$	n	Velocity fps	Flow cfs	$V^2/2g$	$d+V^2/2g$
Left	7.2	24.0	0.298	0.446	0.070	0.815	5.8		
Center	47.8	28.0	1.707	1.428	0.040	4.565	218.2		
Right	27.1	36.0	0.753	0.828	0.070	1.511	41.0		
	82.06	88.0	0.933	0.954		3.229	265.0	0.16	344.7

For Trial 3

Q=	370
V=	3.334
Area=	110.96
WS EL=	344.79

Computed W. S. Elev: 344.8 ft

Section TRIAL 3	Area sf	P ft	R ft	$R^{2/3}$	n	Velocity fps	Flow cfs	$V^2/2g$	$d+V^2/2g$
Left	14.9	29.0	0.514	0.641	0.070	1.171	17.5		
Center	55.8	28.0	1.993	1.584	0.040	5.061	282.4		
Right	38.9	39.0	0.997	0.998	0.070	1.823	70.9		
	109.60	96.0	1.142	1.092		3.383	370.8	0.178	345.0

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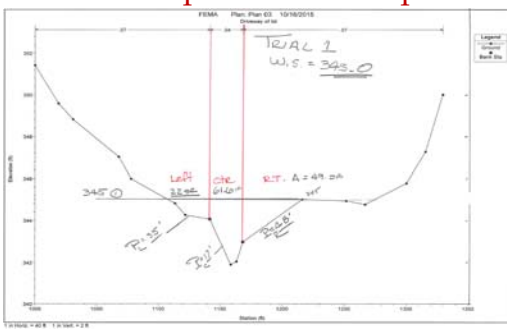
COMPUTING A BFE

Trial 1 - Compute normal depth at downstream X-Section



Design flow	*370 CFS*						
Slope:	*0.014 ft/ft*						
Computed W. S. Elev:	345.0 ft						
Section	Area	P	R	$R^{2/3}$	n	Velocity	Flow
TRIAL 1	sf	ft	ft			fps	cfs
Left	22.0	35.0	0.629	0.734	0.070	1.843	40.5
Center	61.6	28.0	2.200	1.692	0.040	7.435	458.0
Right	49.0	48.0	1.021	1.014	0.070	2.547	124.8
	132.6	111.0	1.195	1.126		**4.701**	**623.4**

Trial 1

- **Assuming Velocity = 4 fps, compute required Area of Cross-section. (93 Sq. Ft.)**
- **Determine depth of flow (try 345.0), then compute area and wetted perimeter**
- **Stationing can be used to compute wetted perimeter.**
- **Using Excel, compute Area, and wetted perimeter.**
- **Spreadsheet computes R, V and flows.**
- **Compare results with Design flow.**
- **Trial 1 overestimated depth. Go to trial 2 with lower elevation.**

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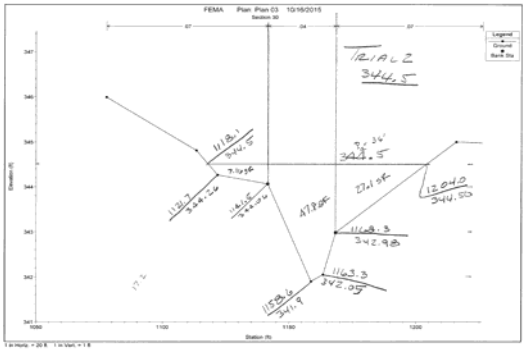
COMPUTING A BFE

Trial 2 - Compute normal depth at downstream X-Section



Trial 2 Required Area:	78.7						
Computed W. S. Elev:	344.5 ft						
Section	Area	P	R	$R^{2/3}$	n	Velocity	Flow
TRIAL 2	sf	ft	ft			fps	cfs
Left	7.2	24.0	0.298	0.446	0.070	1.121	8.0
Center	47.8	28.0	1.707	1.428	0.040	6.279	300.1
Right	27.1	36.0	0.753	0.828	0.070	2.079	56.3
	82.06	88.0	0.933	0.954		**4.442**	**364.5**

- **Trial 2**
  - **Compute required area tor trial 2 using Velocity of Trial**
  - **Try 344.5.**
  - **Compute area and wetted perimeter**
  - **Using Excel, compute Area, and wetted perimeter.**
  - **Spreadsheet computes R, V and flows.**
  - **Compare results with Design flow.**
  - **Trial 2 underestimated depth, but is close enough to 0.1 ft depth.**

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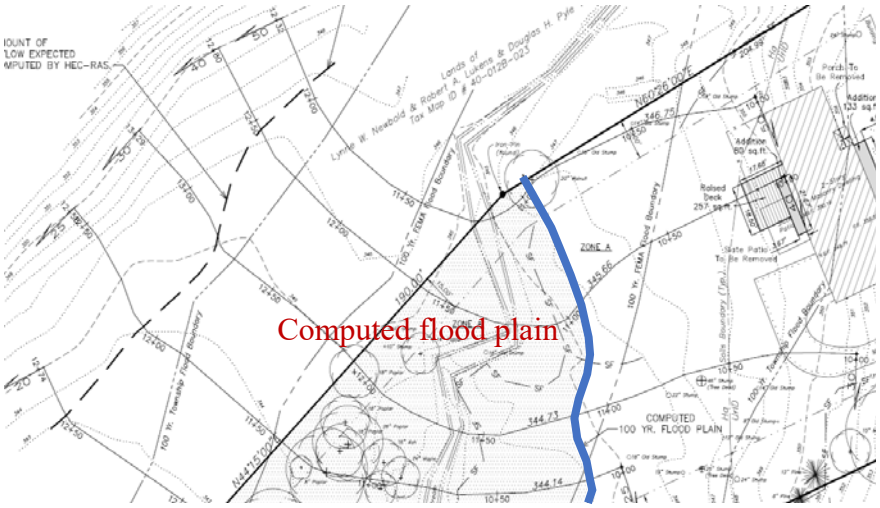
COMPUTING A BFE

Plot the resultant flood depth on the plan



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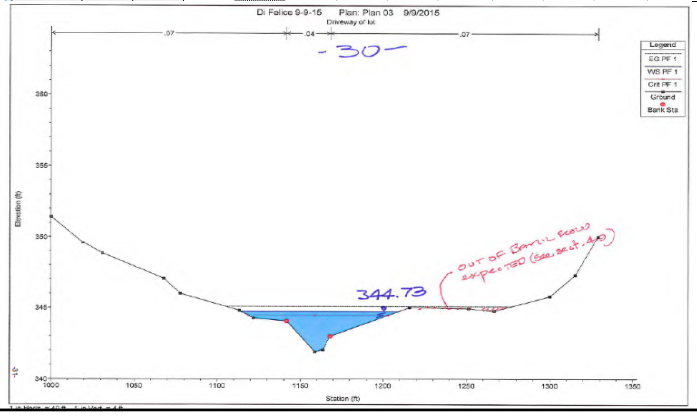
COMPUTING A BFE USING BACKWATER ANALYSIS

Results using HEC-RAS computer software

HEC-RAS Plan: Plan 03 River: Trib. Mill Cr. Reach: US Ithan Ave. Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
US Ithan Ave.	10.0	PF 1	374.00	331.59	338.90	334.62	338.92	0.000130	1.41	472.39	135.96	0.10
US Ithan Ave.	20.0	PF 1	368.00	339.81	343.17	343.17	343.64	0.008776	5.87	99.65	178.75	0.69
US Ithan Ave.	25.0	PF 1	368.00	341.42	344.14	344.14	344.57	0.011946	5.49	92.96	151.52	0.77
US Ithan Ave.	30.0	PF 1	368.00	341.90	344.73	344.46	345.09	0.008276	5.36	102.93	94.93	0.67
US Ithan Ave.	40.0	PF 1	368.00	342.98	345.66	345.57	346.18	0.018439	7.02	83.36	75.51	0.94
US Ithan Ave.	50.0	PF 1	368.00	343.65	346.75	346.30	347.48	0.014305	8.12	92.22	110.03	0.87
US Ithan Ave.	60	PF 1	368.00	344.41	347.49	347.24	347.93	0.008256	5.84	99.55	99.54	0.67
US Ithan Ave.	70	PF 1	368.00	345.22	348.33	348.33	348.86	0.013116	6.55	87.21	86.94	0.82
US Ithan Ave.	80	PF 1	368.00	346.49	349.11	348.98	349.74	0.018693	8.97	76.37	49.10	1.03



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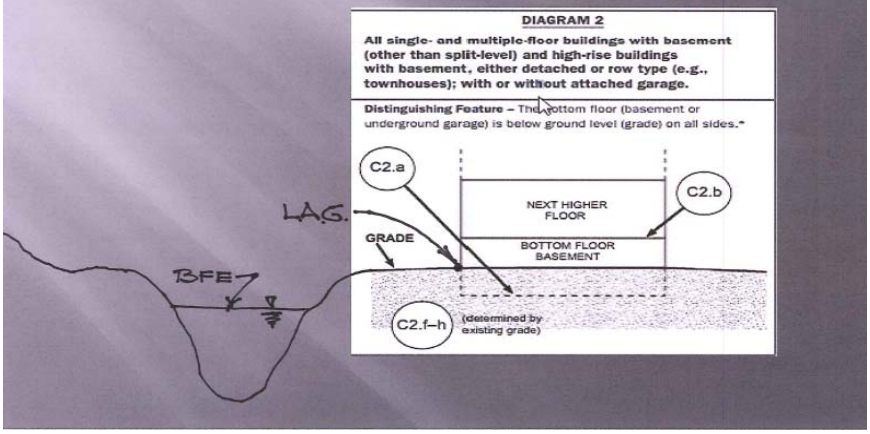
LOMA PROCESS

Sketch showing Relationship of BFE to LAG for successful LOMA

- **BFE is the 100-year flood elevation.**
- **If the BFE is higher than the LAG, then the "flood" touches the dwelling and No LOMA results.**
- **The BFE must be lower than the LAG for LOMA approval.**



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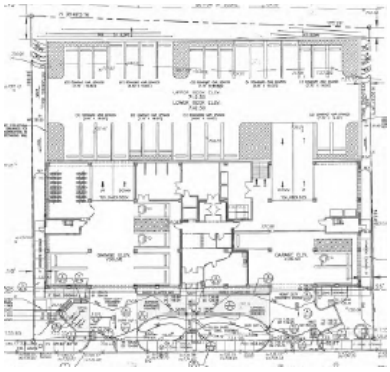
Documentation for a LOMA



Required

- **Recorded** plat map or
- A **recorded** deed accompanied by tax assessor's map

May be Required

- **Certified** metes and bounds description and map
- Elevation Form with the **certified** Lowest Adjacent Grade (LAG) or Lowest Lot elevation(s)
- Other elevation data

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Documentation for a LOMA

FEMA will compute the BFE for single property!

Types of LOMAs

Removal of structure(s) or removal of a portion or all of a property described by metes and bounds.

Required information

In order to analyze the property, an accurate survey tied to FEMA datum is required.

Form MT-EZ (elevation form) used to describe the property elevations.

An elevation certificate is also suggested. Required

- Recorded plat map or
- A recorded deed accompanied by tax assessor's map

May be Required

- **Certified** metes and bounds description and map for portion of property to be removed.

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Form MT-EZ

DEPARTMENT OF HOMELAND SECURITY – FEDERAL EMERGENCY MANAGEMENT AGENCY

APPLICATION FORM FOR SINGLE RESIDENTIAL LOT OR STRUCTURE AMENDMENTS TO NATIONAL FLOOD INSURANCE PROGRAM MAPS

O.M.B. NO. 1660-0015

Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 2.4 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting this form. This collection of information is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015) NOTE: Do not send your completed form to this address.

This form should be used to request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) remove a single structure or legally recorded parcel of land or portion thereof, described by metes and bounds, certified by a registered professional engineer or licensed land surveyor, from a designated Special Flood Hazard Area (SFHA), an area that would be inundated by the flood having a 1% chance of being equaled or exceeded in any given year (base flood), via Letter of Map Amendment (LOMA). It shall not be used for requests submitted by developers, for requests involving multiple structures or lots, for property in alluvial fan areas, for property located within the regulatory floodway, or requests involving the placement of fill. (NOTE: Use MT-1 forms for such requests). Fill is defined as material from any source (including the subject property) placed that raises the grade to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. Also, fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in an SFHA is considered natural grade.

LOMA: A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill would not be inundated by the base flood.

A – This section may be completed by the property owner or by the property owner's agent. In order to process your request, all information on this form must be completed in its entirety, unless stated as optional. Incomplete submissions will result in processing delays.

1. → Has fill been placed on your property to raise ground that was previously below the BFE?

☐ No – ☐ Yes – If Yes, STOP!! – You must complete the MT-1 application forms; visit http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm or call the FEMA Map Information eXchange toll free: (877-FEMA-MAP) (877-336-2627)

2. → Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed) and street address of the Property (required):

3. → Are you requesting that a flood zone determination be completed for (check one):

☐ A structure on your property? What is the date of construction? (MM/YYYY)

☐ A portion of your legally recorded property? (A certified metes and bounds description and map of the area to be removed, certified by a registered professional engineer or licensed land surveyor, are required. For the preferred format of metes and bounds descriptions, please refer to the MT-EZ instructions.)

☐ Your entire legally recorded property?

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Applicant's Name (required):

E-mail address (optional): By checking here you may receive correspondence electronically at the email address provided.

Mailing Address (include Company name if applicable) (required):

Daytime Telephone No. (required):

Fax No. (optional):

Signature of Applicant (required):

Date (required):

End of Section A

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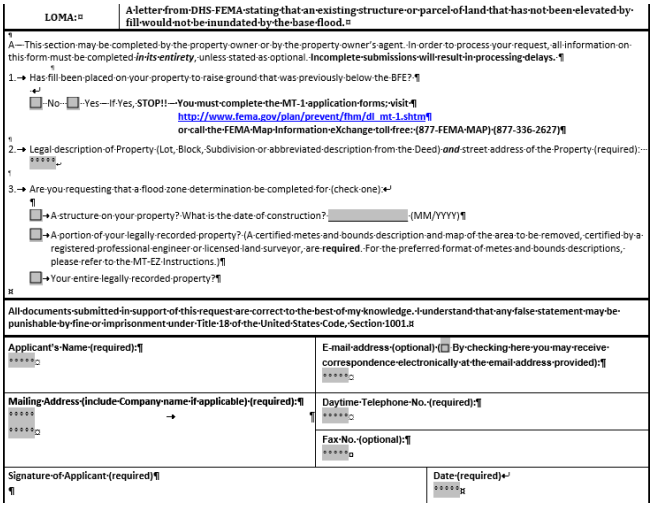
Form MT-EZ

May not be used if fill placed to raise ground below the BFE.
Check the appropriate block for the removal request.



LOMA:	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill would not be inundated by the base flood.

A — This section may be completed by the property owner or by the property owner's agent. In order to process your request, all information on this form must be completed ***in its entirety***, unless stated as optional. **Incomplete submissions will result in processing delays.**

1. → Has fill been placed on your property to raise ground that was previously below the BFE?
   ☐ No ☐ Yes — If Yes, **STOP!! — You must complete the MT-1 application forms; visit** http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm or call the FEMA Map Information eXchange toll free: (877-FEMA MAP) (877-336-2627)
2. → Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed) ***and*** street address of the Property (required):
   *****
3. → Are you requesting that a flood zone determination be completed for (check one):
   ☐ → A structure on your property? What is the date of construction? _____ (MM/YYYY)
   ☐ → A portion of your legally recorded property? (A certified metes and bounds description and map of the area to be removed, certified by a registered professional engineer or licensed land surveyor, are **required**. For the preferred format of metes and bounds descriptions, please refer to the MT-EZ Instructions.)
   ☐ → Your entire legally recorded property?

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Applicant's Name (required): *****	**E-mail address (optional)** ☐ **By checking here you may receive correspondence electronically at the email address provided):** *****
Mailing Address (include Company name if applicable) (required): ***** *****	**Daytime Telephone No. (required):** *****
	Fax No. (optional): *****
Signature of Applicant (required)	**Date (required)** *****

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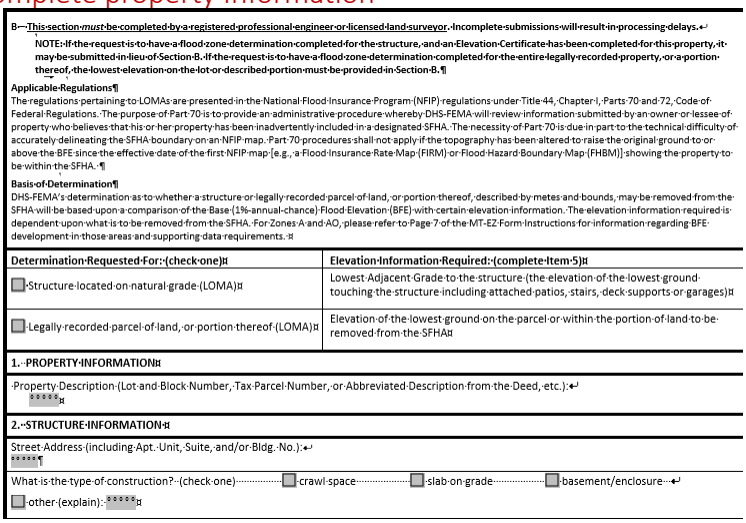
Form MT-EZ

Complete for either structure or land removal.
Complete property Information



B — This section *must* be completed by a registered professional engineer or licensed land surveyor. Incomplete submissions will result in processing delays.

NOTE: If the request is to have a flood zone determination completed for the structure, and an Elevation Certificate has been completed for this property, it may be submitted in lieu of Section B. If the request is to have a flood zone determination completed for the entire legally recorded property, or a portion thereof, the lowest elevation on the lot or described portion must be provided in Section B.

Applicable Regulations
The regulations pertaining to LOMAs are presented in the National Flood Insurance Program (NFIP) regulations under Title 44, Chapter I, Parts 70 and 72, Code of Federal Regulations. The purpose of Part 70 is to provide an administrative procedure whereby DHS-FEMA will review information submitted by an owner or lessee of property who believes that his or her property has been inadvertently included in a designated SFHA. The necessity of Part 70 is due in part to the technical difficulty of accurately delineating the SFHA boundary on an NFIP map. Part 70 procedures shall not apply if the topography has been altered to raise the original ground to or above the BFE since the effective date of the first NFIP map (e.g., a Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map (FHBM)) showing the property to be within the SFHA.

Basis of Determination
DHS-FEMA's determination as to whether a structure or legally recorded parcel of land, or portion thereof, described by metes and bounds, may be removed from the SFHA will be based upon a comparison of the Base (1% annual chance) Flood Elevation (BFE) with certain elevation information. The elevation information required is dependent upon what is to be removed from the SFHA. For Zones A and AO, please refer to Page 7 of the MT-EZ Form Instructions for information regarding BFE development in those areas and supporting data requirements.

Determination Requested For: (check one)	**Elevation Information Required: (complete Item 5)**
☐ Structure located on natural grade (LOMA)	Lowest Adjacent Grade to the structure (the elevation of the lowest ground touching the structure including attached patios, stairs, deck supports or garages)
☐ Legally recorded parcel of land, or portion thereof (LOMA)	Elevation of the lowest ground on the parcel or within the portion of land to be removed from the SFHA

1. PROPERTY INFORMATION

Property Description (Lot and Block Number, Tax Parcel Number, or Abbreviated Description from the Deed, etc.):
*****

2. STRUCTURE INFORMATION

Street Address (including Apt. Unit, Suite, and/or Bldg. No.):
*****

What is the type of construction? (check one) ☐ crawl space ☐ slab on grade ☐ basement/enclosure
☐ other (explain): *****

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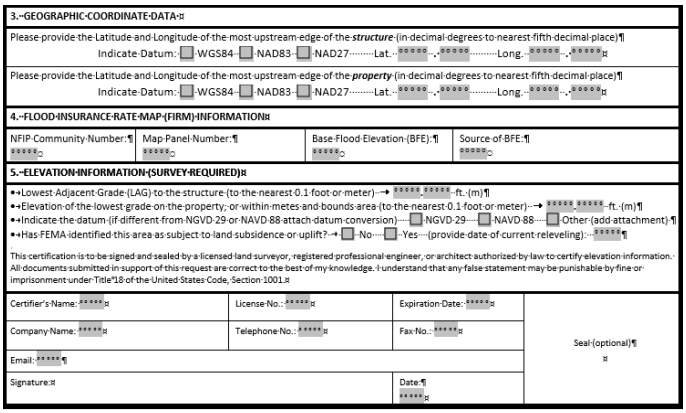
Form MT-EZ

Complete Geographic information using FEMA FIS datum.
Use Google Earth for Latitude and Longitude data or GNSS
Complete FIRM information from your Firmette.
For Zone A, there will be no BFE (indicate none or N/A).
Sign and seal the document.



3.-GEOGRAPHIC-COORDINATE-DATA-¤

Please-provide-the-Latitude-and-Longitude-of-the-most-upstream-edge-of-the-***structure***-(in-decimal-degrees-to-nearest-fifth-decimal-place)¶
Indicate-Datum:-☐-WGS84-☐-NAD83-☐-NAD27·····Lat.··°°°°°.-°°°°°·····Long.·°°°°°.-°°°°°¤

Please-provide-the-Latitude-and-Longitude-of-the-most-upstream-edge-of-the-***property***-(in-decimal-degrees-to-nearest-fifth-decimal-place)¶
Indicate-Datum:-☐-WGS84-☐-NAD83-☐-NAD27·····Lat.··°°°°°.-°°°°°·····Long.·°°°°°.-°°°°°¤

4.-FLOOD-INSURANCE-RATE-MAP-(FIRM)-INFORMATION¤

NFIP-Community-Number:¶	Map-Panel-Number:¶	Base-Flood-Elevation-(BFE)-¶	Source-of-BFE:¶
°°°°°○	°°°°°○	°°°°°○	°°°°°○

5.-ELEVATION-INFORMATION-(SURVEY-REQUIRED)¤

- →Lowest-Adjacent-Grade-(LAG)-to-the-structure-(to-the-nearest-0.1-foot-or-meter)··→ °°°°°.°°°°°-ft.-(m)¶
- →Elevation-of-the-lowest-grade-on-the-property,-or-within-metes-and-bounds-area-(to-the-nearest-0.1-foot-or-meter)··→ °°°°°.°°°°°-ft.-(m)¶
- →Indicate-the-datum-(if-different-from-NGVD-29-or-NAVD-88-attach-datum-conversion)·····☐-NGVD-29·····☐-NAVD-88·····☐-Other-(add-attachment)-¶
- →Has-FEMA-identified-this-area-as-subject-to-land-subsidence-or-uplift?→-☐-No·····☐-Yes····(provide-date-of-current-releveling):··°°°°°¶

This-certification-is-to-be-signed-and-sealed-by-a-licensed-land-surveyor,-registered-professional-engineer,-or-architect-authorized-by-law-to-certify-elevation-information.-All-documents-submitted-in-support-of-this-request-are-correct-to-the-best-of-my-knowledge.-I-understand-that-any-false-statement-may-be-punishable-by-fine-or-imprisonment-under-Title-18-of-the-United-States-Code,-Section-1001.¤

Certifier's-Name:-°°°°°¤	License-No.:-°°°°°¤	Expiration-Date:-°°°°°¤	Seal-(optional)¶ ¤
Company-Name:-°°°°°¤	Telephone-No.:-°°°°°¤	Fax-No.:-°°°°°¤	
Email:-°°°°°¶			
Signature:¤		Date:¶ °°°°°¤	

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Common Application Issues – LOMAs

- Failure to write the legal property description and address on the application
- Failure to enter contact information and sign/date the application
- Submitting a deed or plat map that is not recorded
- Missing vertical datum on the Elevation Form
- Elevations not based on finished construction for an as-built determination

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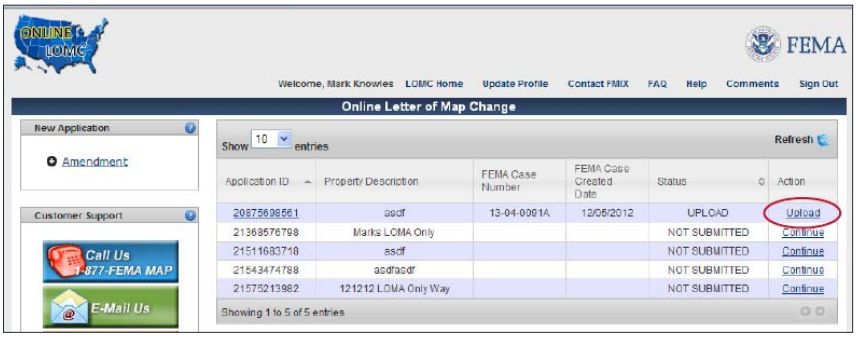
Online LOMC



- Allows a FIRM amendment or revision to be requested through an online platform instead of mailing in an application
- Supporting documentation can be uploaded online and case-related correspondence is e-mailed to the applicant

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eLOMA Eligibility

Eligible for eLOMA	Not Eligible for eLOMA
Structure/lot on natural ground	Structure/lot elevated by fill
Single structure/lot	Multiple structures/lots; condominiums
Existing structure	Proposed construction
Zones A1-30 (except in floodway), AE (except in floodway), and AH	Zones A, V, VE, V1-V30, AO, D, B, C, X
New LOMA requests	Re-issuances or LOMAs in progress
Subject area on FIRM panel has not been revised by a LOMR	Subject area on FIRM panel revised by LOMR
Structure/lot located on land that has not been annexed	Structure/lot located on annexed land

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Resources

- FEMA Map Information eXchange (FMIX)
  - Toll free by phone at 1-877-336-2627
  - By email at FEMAMapSpecialist@riskmapcds.com
- FEMA Map Service Center
- National Flood Hazard Layer – FEMA GeoPortal
- eLOMA (Mapping Information Platform)
- Online LOMC
- Code of Federal Regulations
- LOMC Fee Information
- FEMA Forms
- NFIP Technical Bulletins
- USGS Vertical Datum Conversion Information

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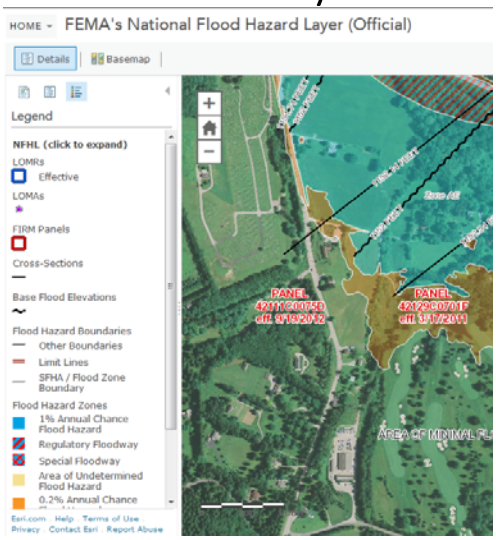
The National Flood Hazard Layer

- FEMA's nationwide geospatial database of all digital **effective** FIRM data
  - Integrates FIRM data including LOMCs nightly
  - Available in GIS format
  - FIRM and FIS are still the official source of data
  - Available in 3 platforms



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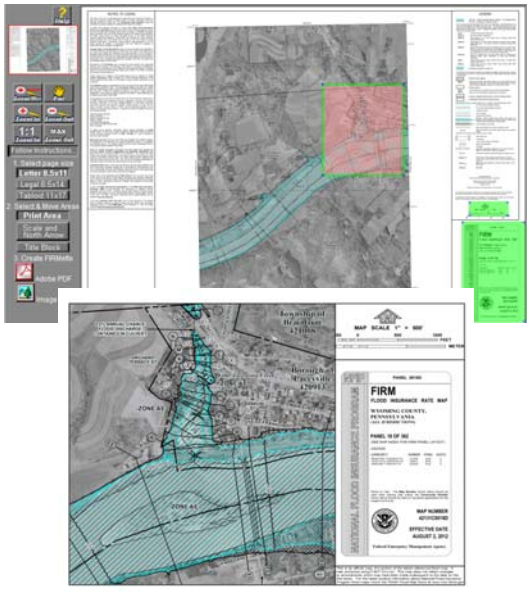
Creating a FIRMette

- Tool on the Map Service Center that takes a snap shot from a larger FIRM
- Captures map panel, scale, and selected area to zoom in on
- Useful for floodplain determinations
- Would you like a demo?



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Questions?

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