

Elevation Certificates

Presented by Wendy Lathrop, PLS, CFM

NFIP Objectives & Purpose

Reduce the exposure to flood damages through the use of minimum standards for the placement and design of structures located in flood hazard areas.

- Identify and map flood hazard areas
- Provide a framework for floodplain management regulations
- Make flood insurance available in communities participating in the NFIP

Phasing out since BW-12

- Existing (Pre-FIRM)/New (Post-FIRM)
 - Business (non-residential)
 - Non-primary residences
 - Claims exceeding market value

Ongoing floodplain management tools:

- Substantially improved construction
- Severe Repetitive Loss structures (SRL)

Homeowners' Flood Insurance Affordability Act

- P.L. 113-89 (3/21/2014) modifies BW-12
- Restores grandfathered rates (Sec. 4)

Elevation matters!

- Elevation of predicted water levels
- Elevation of ground surface
- Elevation of structures
- Elevation of floodproofing measures
- Elevation after development ("no rise")

Is it "in" or "out"?

- Land use regulation
- Mandatory flood insurance
- Disaster assistance

Water Surface Elevation

"... the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the flood plains of coastal or riverine areas."

(44 CFR 59.1)

Base Flood Elevation

"... the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum of 1929, the North American Vertical Datum of 1988, or other datum referenced in the Flood

Insurance Study report, or average depth of the base flood, usually in feet, above the ground surface.”

(FAQ on fema.gov)

Elevation matters!

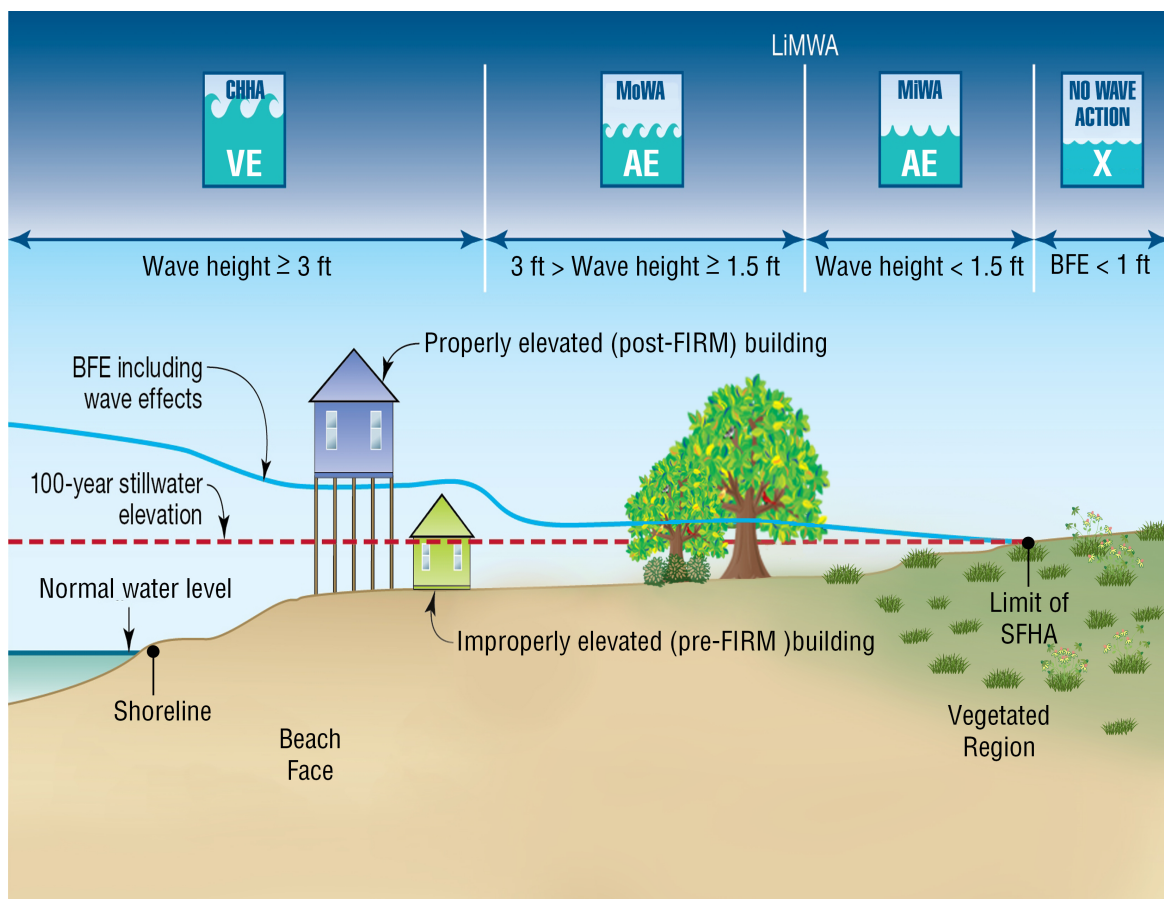
- Where is “zero”?
- Height of lowest floor
- Height of water
- Infrastructure
- Inherent uncertainties
- Benefits / costs

“In” or “out”

- Base Flood Elevation
- Base Flood Depth
- Lowest Adjacent Grade
- Highest Adjacent Grade
- Lowest Floor Elevation

Remember the datum!

Identifying the hazard & risk



NFIP Zones: 44 CFR 64.3

- Zone A
- Zone A1 through A30, Zone AE
- Zone AO, Zone AH
- Zone AR, Zone 99
- Zone B, Shaded Zone X
- Zone C, Unshaded Zone X
- Zone V
- Zone V1 through V30, Zone VE
- Zone VO
- Zone D
- Zone E
- Zone M

Definition of Lowest Floor

“... the lowest floor of the lowest enclosed area, including basement. An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building’s lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.”

(44 CFR 59.1)

Why Lowest Floor Elevation Matters

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

Minimum standards for communities

- Requirements for Zone A1-A30, AE, AH:
- (c)(2) Residential structures
- (c)(3) Non-residential structures
- “lowest floor (including basement) elevated to or above the base flood level”

Requirements for Zone AO:

- (c)(7) Residential structures
- (c)(8) Non-residential structures
- “lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified)”

Title 44 CFR, Section 60.3 - Flood plain management criteria for flood-prone areas

1% annual chance flooding	BFEs	Floodway	V Zone	Land Use Classification
No	No	No	No	60.3 (a)
Yes	No	No	No	60.3 (b)
Yes	Yes	No	No	60.3 (c)
Yes	Yes	Yes	No	60.3 (d)
Yes	Yes	No	Yes	60.3 (e)
Yes	Yes	Yes	Yes	60.3 (d) & (e)

So what is an Elevation Certificate?

- Standardized form
- Comparison of elevations

The various uses of Elevation Certificates

- Rating insurance (the “I” in NFIP)
- Community compliance with NFIP
- Community records of LFE
- CRS requires use of EC for LFE
- Applications for LOMC

Floodplain Management Bulletin: Elevation Certificate (FEMA 467-1, May 2004)

- www.fema.gov/pdf/fima/fema467-6-10-04.pdf
- www.cadcon.com/floods.html

Section A

- Location of site
- Building information
- Openings

Building Types

Three basic types

- Slab on grade
- Basement
- Elevated

Building diagrams (enter ID No. on A-7)

- 1A, 2A/B through 4 = Slab on grade and basement foundation
- 1B, 5 through 9 = Elevated

Enclosure

That portion of an elevated building below the lowest elevated floor that is either partially or fully closed in by rigid walls.

Building Diagrams 1A and 1B

- Diagram 1A for slab on grade
- Diagram 1B for raised foundation

Diagrams 2A and 2B

- Use only for basements
- Use Diagram 9 for subgrade crawlspace

Diagram 9

- Check dimensions for crawlspace vs. basement

Definition of Basement

- **“Basement** means any area of the building having its floor subgrade (below ground level) on all sides”. (44 CFR 59.1)

- “Any area of the building, including any sunken room or sunken portion of a room, having its floor below ground level (subgrade) on all sides.” (NFIP Insurance Agent’s Manual, DEFINITIONS 1)

What’s a crawlspace?

- Not specifically defined by federal NFIP statute or regulation
- Who cares?
- “NFIP rules and regulations specify that a crawlspace with its interior floor below grade on all sides is considered a ‘basement’.” (NFIP Insurance Agent’s Manual, RATE 25)

Crawlspace (TB-11)

- Relation of crawlspace to LAG and BFE affects insurance **and** structural integrity
- For a crawlspace **not** to be considered a basement, drainage and velocity also must be considered.

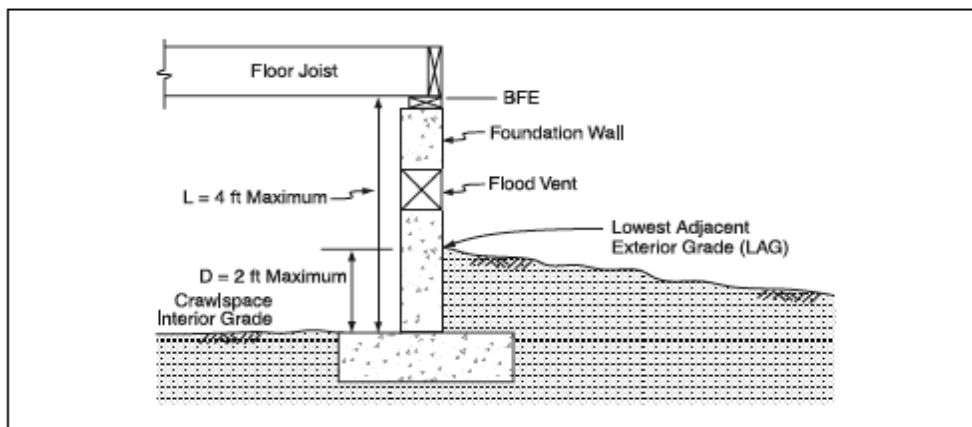


Figure 3 Requirements regarding below-grade crawlspace construction.

Diagram 3

- For split level “walk outs”, slab on grade

Diagram 4

- Not for subgrade crawlspaces (use Diagram 9)

Diagrams 5 and 6

- LFE/LHSM drives insurance rating – enclosure use limited as to size, use, construction

What’s an obstruction? (TB 5)

- | | | |
|----------------------------|------------------|----------------------|
| • Access stairs, elevators | • Concrete pads | • Foundation bracing |
| • Accessory buildings | • Decks, patios | • Grade beams |
| • Bulkheads | • Enclosed areas | • Septic systems |
| | • Fences | • Swimming pools |
| | • Fill | |

Diagrams 7 and 8

- 7 is elevated on full story foundation
- 8 is elevated on crawlspace

Flood openings (TB 1)

- Enter for Lines A8, A9
- Description below Building Diagrams

Vent or Flood Opening

- Permanent opening in a wall that allows the free passage of water in both directions, automatically, without human intervention.
- A window, a door, or a garage door is ***not*** considered a proper vent.

Dry Floodproofing (TB 3)

Wet Floodproofing (TB 7)

- Required in residential structures
- Optional in non-residential buildings
- Planning and design considerations

Improper Venting affects LFE

What is a “separate area”?

- Square footage separate to reflect structure type
- Enclosure/ crawl space and attached garage

Engineered Openings

- Insurance Agent’s Manual
- Lowest Floor Guide, pages 1-2

www.ICC-ES.org

- “Evaluation Report” - “Search Reports” - “ICC-ES” - “manufacturer”
- “Product” - “flood vent”

Building Photos

- Minimum of two photos (insurance)
- Date and ID
- See Line A-6

Section B

- Document map used
- Document elevation(s) and source(s)
- See instructions regarding effective map at time of building construction
- Identify CBRS and OPA restrictions

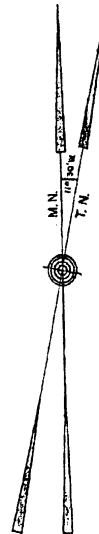
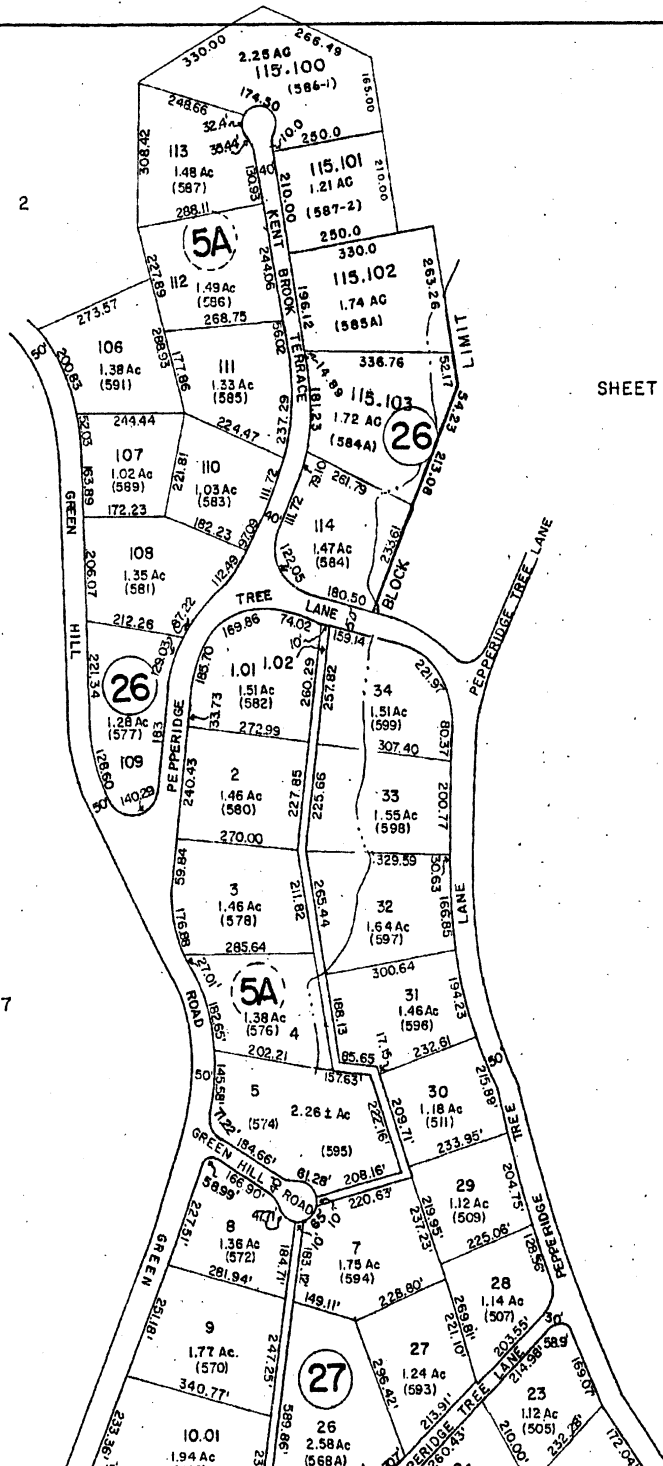
6 Kent Brook Terrace. Kinnelon, NJ
Tax Block 26, Lot 114

6 Kent Brook Terrace. Kinnelon, NJ
Tax Block 26, Lot 114

SHEET 2

SHEET 19

SHEET 17



**Federal Emergency Management Agency
Community Status Book Report
NEW JERSEY
Communities Participating in the National Flood Program**

CID	Community Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date	Tribal
340040#	HARRINGTON PARK, BOROUGH OF	BERGEN COUNTY	06/28/74	04/15/81	09/30/05	04/15/81	No
340221#	HARRISON, TOWN OF	HUDSON COUNTY	06/28/74	09/30/77	08/16/06	09/30/77	No
340205B	HARRISON, TOWNSHIP OF	GLOUCESTER COUNTY	07/26/74	04/01/83	04/01/83(M)	04/01/83	No
345296#	HARVEY CEDARS, BOROUGH OF	OCEAN COUNTY	05/26/70	04/02/71	09/29/06	04/02/71	No
340041#	HASBROUCK HEIGHTS, BOROUGH OF	BERGEN COUNTY	11/30/73	06/30/76	09/30/05	06/30/76	No
340042#	HAWORTH, BOROUGH OF	BERGEN COUNTY	01/25/74	10/15/81	09/30/05	10/15/81	No
340400#	HAWTHORNE, BOROUGH OF	PASSAIC COUNTY	11/30/73	09/17/80	09/28/07	09/17/80	No
340298#	HAZLET, TOWNSHIP OF	MONMOUTH COUNTY	12/28/73	12/01/82	12/01/82	12/01/82	No
340262#	HELMETTA, BOROUGH OF	MIDDLESEX COUNTY	06/28/74	10/16/84	10/16/84	10/16/84	No
340508#	HIGH BRIDGE, BOROUGH OF	HUNTERDON COUNTY	06/21/74	09/30/81	09/30/81	09/30/81	No
340263A	HIGHLAND PARK, BOROUGH OF	MIDDLESEX COUNTY	04/20/73	06/01/77	06/01/77	06/01/77	No
345297#	HIGHLANDS, BOROUGH OF	MONMOUTH COUNTY	12/15/70	09/03/71	12/22/88	09/03/71	No
340247#	HIGHTSTOWN, BOROUGH OF	MERCER COUNTY	01/09/74	03/15/77	03/15/77	03/15/77	No
340436#	HILLSBOROUGH, TOWNSHIP OF	SOMERSET COUNTY	07/26/74	03/02/81	09/28/07	03/02/81	No
340043#	HILLSDALE, BOROUGH OF	BERGEN COUNTY	01/16/74	12/15/81	09/30/05	12/15/81	No
340465#	HILLSIDE, TOWNSHIP OF	UNION COUNTY	01/09/74	09/14/79	09/20/06	09/14/79	No
340044#	HO-HO-KUS, BOROUGH OF	BERGEN COUNTY	06/22/73	06/01/77	09/30/05	06/01/77	No
340222#	HOBOKEN, CITY OF	HUDSON COUNTY	06/28/74	11/17/82	08/16/06	11/17/82	No
340509#	HOLLAND, TOWNSHIP OF	HUNTERDON COUNTY	07/26/74	03/16/81	06/06/01	03/16/81	No
340300#	HOLMDEL, TOWNSHIP OF	MONMOUTH COUNTY	01/25/74	03/01/82	03/01/82	03/01/82	No
340452#	HOPATCONG, BOROUGH OF	SUSSEX COUNTY	06/28/74	04/01/83	04/01/83(M)	04/01/83	No
340486#	HOPE, TOWNSHIP OF	WARREN COUNTY	08/09/74	03/04/83	08/19/91	03/04/83	No
340248#	HOPEWELL, BOROUGH OF	MERCER COUNTY	06/28/74	02/15/78	04/15/79	02/15/78	No
340170#	HOPEWELL, TOWNSHIP OF	CUMBERLAND COUNTY	08/09/74	12/15/78	08/18/92	12/15/78	No
345298#	HOPEWELL, TOWNSHIP OF	MERCER COUNTY	06/15/73	07/01/74	06/06/01	06/15/73	No
340301#	HOWELL, TOWNSHIP OF	MONMOUTH COUNTY	03/22/74	01/06/83	01/06/83	01/06/83	No
340487#	INDEPENDENCE, TOWNSHIP OF	WARREN COUNTY	07/26/74	04/08/83	04/08/83(M)	04/08/83	No
340302#	INTERLAKEN, BOROUGH OF	MONMOUTH COUNTY	03/15/74	01/02/81	01/02/81(M)	01/02/81	No
340184#	IRVINGTON, TOWN OF	ESSEX COUNTY	12/28/73	09/26/75	06/04/07	12/04/79	No
340374#	ISLAND HEIGHTS, BOROUGH OF	OCEAN COUNTY	07/19/74	06/15/79	09/29/06	06/15/79	No
340375#	JACKSON, TOWNSHIP OF	OCEAN COUNTY	01/24/75	09/16/82	09/29/06	09/16/82	No
340264#	JAMESBURG, BOROUGH OF	MIDDLESEX COUNTY	06/28/74	05/15/84	05/15/84	05/15/84	No
340522#	JEFFERSON, TOWNSHIP OF	MORRIS COUNTY	10/25/74	07/05/83	07/05/83	07/05/83	No
340223#	JERSEY CITY, CITY OF	HUDSON COUNTY	07/25/75	03/01/84	08/16/06	03/01/84	No
340303#	KEANSBURG, BOROUGH OF	MONMOUTH COUNTY	04/20/73	05/16/83	05/16/83	05/16/83	No
340224#	KEARNY, TOWN OF	HUDSON COUNTY	06/28/74	12/01/77	08/16/06	12/01/77	No
	Spoke with Jo Waller the new Borough Clerk regarding the Map/Ordinance adoption. Left Message for Michael Martello (201) 955-788-3005 re permit process. Mike Negila Town engineer Negila Engineering (201) 933-8805.						No
340466#	KENILWORTH, BOROUGH OF	UNION COUNTY	10/26/73	03/02/83	09/20/06	03/02/83	No
340304#	KEYPORT, BOROUGH OF	MONMOUTH COUNTY	01/23/74	07/02/79	07/15/92	07/02/79	No
340499#	KINGWOOD, TOWNSHIP OF	HUNTERDON COUNTY	03/15/74	11/04/81	11/04/81	11/04/81	No
340488#	KNOWLTON, TOWNSHIP OF	WARREN COUNTY	08/16/74	01/06/83	01/06/83	01/06/83	No
340376#	LACEY, TOWNSHIP OF	OCEAN COUNTY	01/24/75	09/01/77	09/29/06	09/01/77	No
340532#	LAFAYETTE, TOWNSHIP OF	SUSSEX COUNTY	12/20/74	03/05/90	03/05/90	03/18/83	No
340377#	LAKEHURST, BOROUGH OF	OCEAN COUNTY	06/28/74	12/15/82	09/29/06	12/15/82	No
340378#	LAKEWOOD, TOWNSHIP OF	OCEAN COUNTY	01/16/74	03/15/77	09/29/06	03/15/77	No
340237#	LAMBERTVILLE, CITY OF	HUNTERDON COUNTY	01/18/74	04/01/81	04/01/81	04/01/81	No
340547#	LAUREL SPRINGS, BOROUGH OF	CAMDEN COUNTY	02/21/75	05/13/77	09/28/07(M)	05/13/77	No

Kinnelon Elevation Certificate

- The house has a basement; which diagram best fits?
- If this were in an AE zone, where would the lowest floor be?

What should we do?

- Can the lender require flood insurance?
- What advice might you give to the homeowner, who wants to expand his house into the back yard where the stream is?

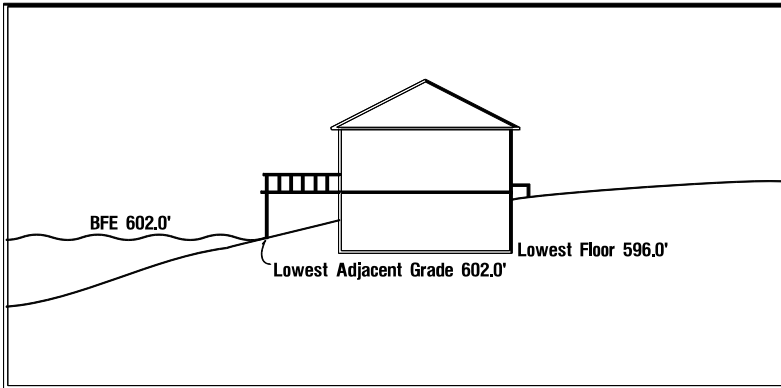
Section C

- C2 addresses BFE datum; instructions for GPS
- C2e instructions re: machinery/equipment
- C2f and C2g are “next to building”
- C2h specifically for LOMA LAG

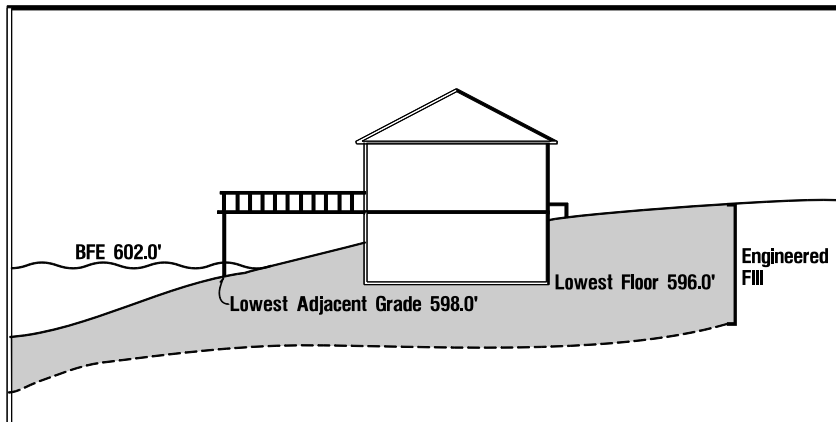
Mechanical and Electrical Equipment (line C2e)

- Safety, insurance

Cross-Sectional View of a LOMA Request (C2h)



Cross-Sectional View of a LOMR-F Request



Section D

- Boxes regarding attachments, latitude/longitude
- Signature, seal, comments

Section E

- For Zone AO and A (no BFE)
- Relative heights, not elevations
- **“Highest adjacent grade** means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.” (44 CFR 59.1)

Areas of shallow flooding and/or unpredictable flow paths

- Zone AO or VO in areas of low relief
- Depth in whole feet (1, 2, 3) on FIRM
- Regulatory height, not Design Elevation

Section G

- Line G10 – Design Flood Elevation (not BFE)

44 CFR 65.2(c)

“‘Reasonably safe from flooding’ means base flood waters will not inundate the land or damage structures to be removed from the SFHA and that any subsurface waters related to the base flood will not damage existing or *proposed* buildings.”

From Technical Bulletin 10-01

Warning

In filled areas adjacent to floodplains, floods can still greatly influence the groundwater at the filled site. High groundwater at a site with a basement can result in water infiltrating the basement or greatly increased hydrostatic pressures on the walls and basement slab that can cause failure or permanent deformation. Even when floods have not reached houses with basements, FEMA has seen numerous examples of flooded basements, bowed basement floors, and collapsed basement walls that have resulted from the effects of high groundwater caused by flooding. In addition, the collapse of flooded basements has also occurred when water is rapidly pumped from basements surrounded by saturated soils whose pressure exceeds the capacity of the basement walls.

Technical compliance does not waive insurance requirements!

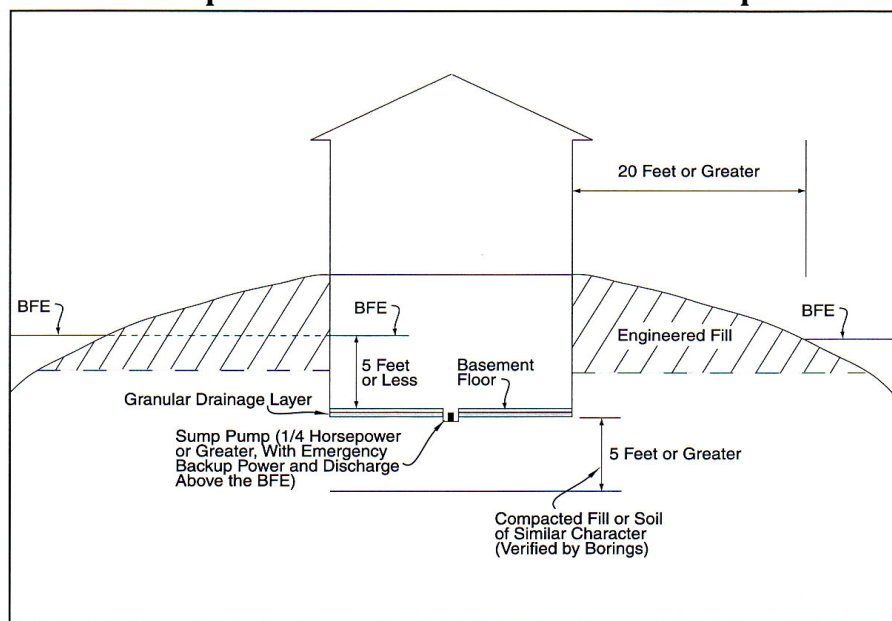


Figure 10 Requirements for use of the simplified approach to basement construction.

Determining BFE

- 44 CFR 60.3 requires that the “lowest floor of all new construction and substantial improvements be elevated to or above the base flood elevation”
- BFEs are required per 44 CFR 60.3(b)(3) when > 50 lots or 5 acres, whichever is less

The FIRM takes precedence over elevation.

If the grade is above BFE, request a LOMA.

Typical Sources of BFEs

- FEMA Flood Insurance Study Report
- FEMA Flood Insurance Rate Map
- Other 1% annual-chance Flood Study
- FEMA Quick-2 software
- Stream gauge data
- Extrapolation of detailed study upstream
- Historical high water marks + safety factor
- Water control structure + freeboard
- “Contour” method (a.k.a. “point on boundary”)



FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Cumberland River (continued)								
K	178.50	1,151	32,416	4.8	410.1	410.1	411.1	1.0
L	179.78	1,217	33,018	4.7	410.8	410.8	411.8	1.0
M	180.68	1,835	40,556	3.8	411.1	411.1	412.1	1.0
N	181.50	1,561	38,013	4.1	411.4	411.4	412.4	1.0
O	182.05	948	27,848	5.6	411.6	411.6	412.6	1.0
P	183.12	589	26,304	5.9	412.4	412.4	413.3	0.9
Q	184.33	1,008	35,690	4.3	413.0	413.0	413.9	0.9
R	185.22	589	29,155	5.3	413.2	413.2	414.2	1.0
S	185.87	568	27,175	5.7	413.4	413.4	414.4	1.0
T	187.12	581	27,345	5.7	414.1	414.1	415.0	0.9
U	188.92	693	32,450	4.8	415.2	415.2	416.1	0.9
V	189.56	706	32,169	4.8	415.5	415.5	416.4	0.9
W	190.09	680	28,643	5.4	415.7	415.7	416.6	0.9
X	190.43	610	30,327	5.1	415.9	415.9	416.8	0.9
Y	190.65	599	25,168	6.2	415.9	415.9	416.8	0.9
Z	190.74	526	22,636	6.8	415.9	415.9	416.8	0.9
AA	191.18	610	27,458	5.6	416.6	416.6	417.5	0.9
AB	192.10	665	28,384	5.5	417.3	417.3	418.2	0.9
AC	193.15	670	29,201	5.3	418.0	418.0	418.8	0.8
AD	195.48	630	28,277	5.5	419.3	419.3	420.2	0.9
AE	196.70	673	29,466	5.3	419.9	419.9	420.9	1.0
AF	197.36	800	31,475	4.9	420.3	420.3	421.3	1.0
AG	198.10	624	28,267	5.5	420.6	420.6	421.6	1.0
AH	198.75	586	28,770	5.4	421.0	421.0	421.9	0.9
AI	200.00	602	25,050	6.2	421.5	421.5	422.5	1.0
AJ	200.81	533	25,773	6.0	422.3	422.3	423.2	0.9
AK	202.11	752	25,972	6.0	423.1	423.1	424.0	0.9

¹Miles above mouth

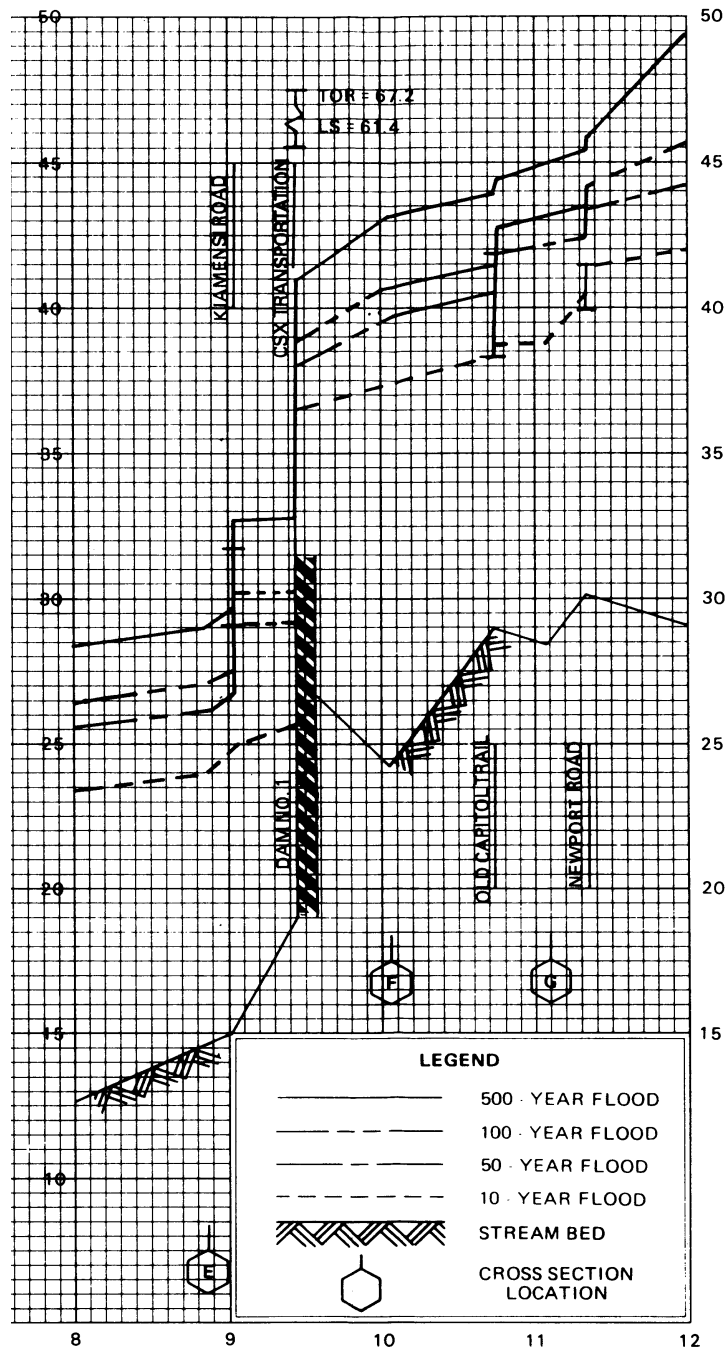
FEDERAL EMERGENCY MANAGEMENT AGENCY

METROPOLITAN GOVERNMENT OF
NASHVILLE AND DAVIDSON COUNTY, TN
AND INCORPORATED AREAS

TABLE 7

FLOODWAY DATA

CUMBERLAND RIVER



Y CREEK

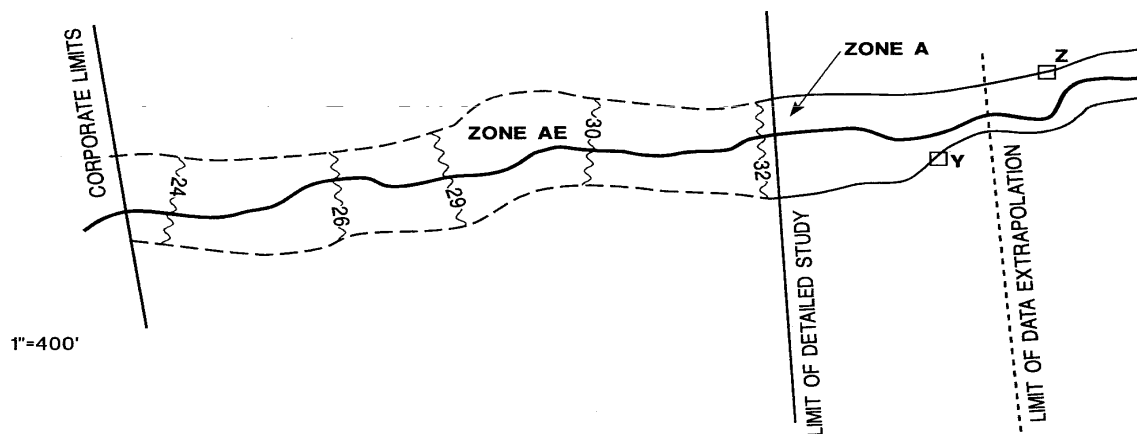
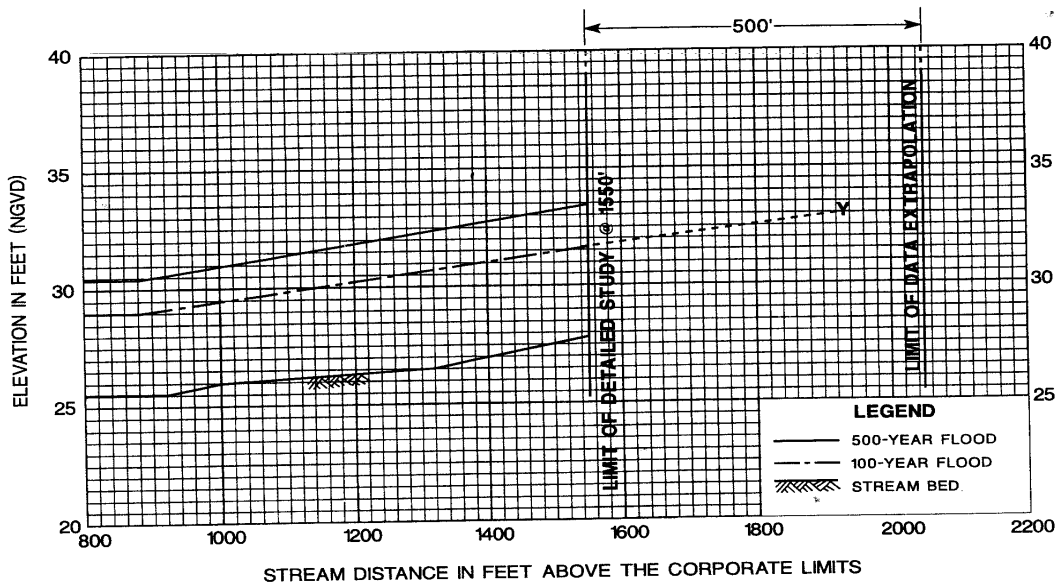
FLOOD PROFILES

RED CLAY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**NEW CASTLE COUNTY, DE
AND INCORPORATED AREAS**

49P



Coastal elevations

TABLE 6 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) NAVD88			
	10-Percent- Annual-Chance	2-Percent- Annual- Chance	1-Percent- Annual- Chance	0.2-Percent- Annual- Chance
CHESAPEAKE BAY				
At Tilghman Island	3.1	4.8	5.4	7.1
At Claiborne	3.1	5.0	5.8	7.8
EASTERN BAY	3.2	5.0	6.0	7.9

No BFE! Now what?

FEMA Publication 265 (1995):

"Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations"

- Simplified versus technical methods

The changing world - ABFEs

Designing post-disaster freeboard after Sandy's mess

- Floodwaters sometimes peaking more than 2 feet above BFE
- Technical requirements?
- Logistics – building access?
- Professional ethics?

Practice - Moving North -Chena River, Fairbanks, Alaska

- Find the Base Flood Elevation for each of the three sites indicated on the Flood Insurance Rate Map

Resources:

- FIRM
- FIS data table
- FIS profile

CFS or CFM?

CFM

- National (ASFPM, www.floods.org)
- Exam
- Continuing ed
- Code of Ethics

CFS

- State (NC now, TN possibly soon)
- Exam
- Continuing ed
- NC: expedited LOMA

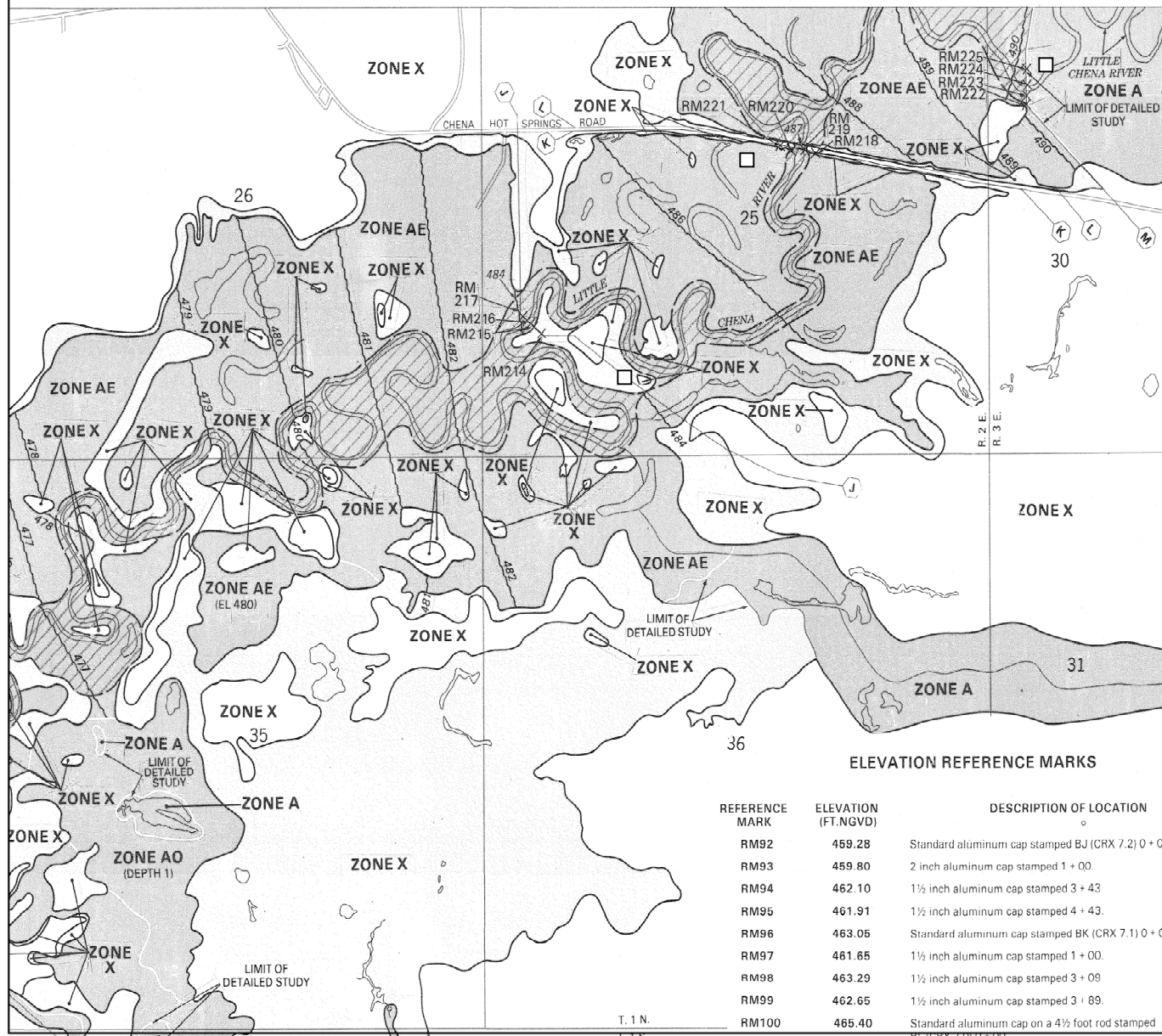
Ms. Alpha

- Her house is a wood-frame structure with FFE of 712.3 NGVD, a basement elevation of 702.8, LAG is 711.2.
- Fill was placed for construction in 1999. The flood insurance map (then a FHBM) was first printed 1997, but Walnut Creek (flooding source) wasn't shown as a flood hazard until 2003.
- A new study will include a restudy of Walnut Creek. Current BFE is 710.5, while restudy shows 711.2
- Which LOMC? Should it be approved? What about after the new study is published?

Mr. Beta

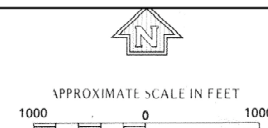
- His house is a brick structure with a FFE of 858.2 NGVD, a crawl space elevation of 849.00, and LAG is 853.4. Engineered fill was placed during construction of the home in 2014.
- The FIRM for this community is dated 1995, and it is the first NFIP map showing SFHAs in this area. Mr. Beta previously submitted and received a conditional letter in 2013.
- Should his house be removed from SFHA? What type of letter should he apply for?

1 2 3



ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM92	459.28	Standard aluminum cap stamped BJ (CRX 7.2) 0 + 0.0
RM93	459.80	2 inch aluminum cap stamped 1 + 00.
RM94	462.10	1½ inch aluminum cap stamped 3 + 43
RM95	461.91	1½ inch aluminum cap stamped 4 + 43.
RM96	463.05	Standard aluminum cap stamped BK (CRX 7.1) 0 + 00.
RM97	461.65	1½ inch aluminum cap stamped 1 + 00.
RM98	463.29	1½ inch aluminum cap stamped 3 + 09
RM99	462.65	1½ inch aluminum cap stamped 3 + 69.
RM100	465.40	Standard aluminum cap on a 4½ foot rod stamped BJ (CRX 7.0) 0 + 00.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

FAIRBANKS
NORTH STAR BOROUGH,
ALASKA

PANEL 202 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)



COMMUNITY-PANEL NUMBER
025009 0202 G

MAP REVISED:
JANUARY 2, 1992



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
(FEET NGVD)								
Little Chena River								
A	0	310	1,833	3.7	457.8	457.8	458.8	1.0
B	459	310	1,314	5.1	457.9	457.9	458.9	1.0
C	1,865	103	1,170	5.8	459.1	459.1	459.8	0.7
D	2,025	185	1,567	4.3	459.4	459.4	460.2	0.8
E	11,815	231	1,591	4.3	462.8	462.8	463.1	0.3
F	15,720	970	2,293	3.1	464.3	464.3	464.5	0.2
G	32,593	1,330	5,374	1.5	469.1	469.1	469.7	0.6
H	45,872	1,729	6,535	1.4	471.7	471.7	472.1	0.4
I	56,995	120	1,291	6.9	474.9	474.9	475.4	0.5
J	80,483	1,739	5,125	1.7	484.2	484.2	485.2	1.0
K	88,080	212	1,986	4.5	486.8	486.8	487.4	0.6
L	88,163	660	3,157	2.8	487.2	487.2	487.6	0.4
M	98,957	1,450	5,338	1.7	489.5	489.5	490.5	1.0

¹Feet above confluence with Chena River

T
A
B
L
E

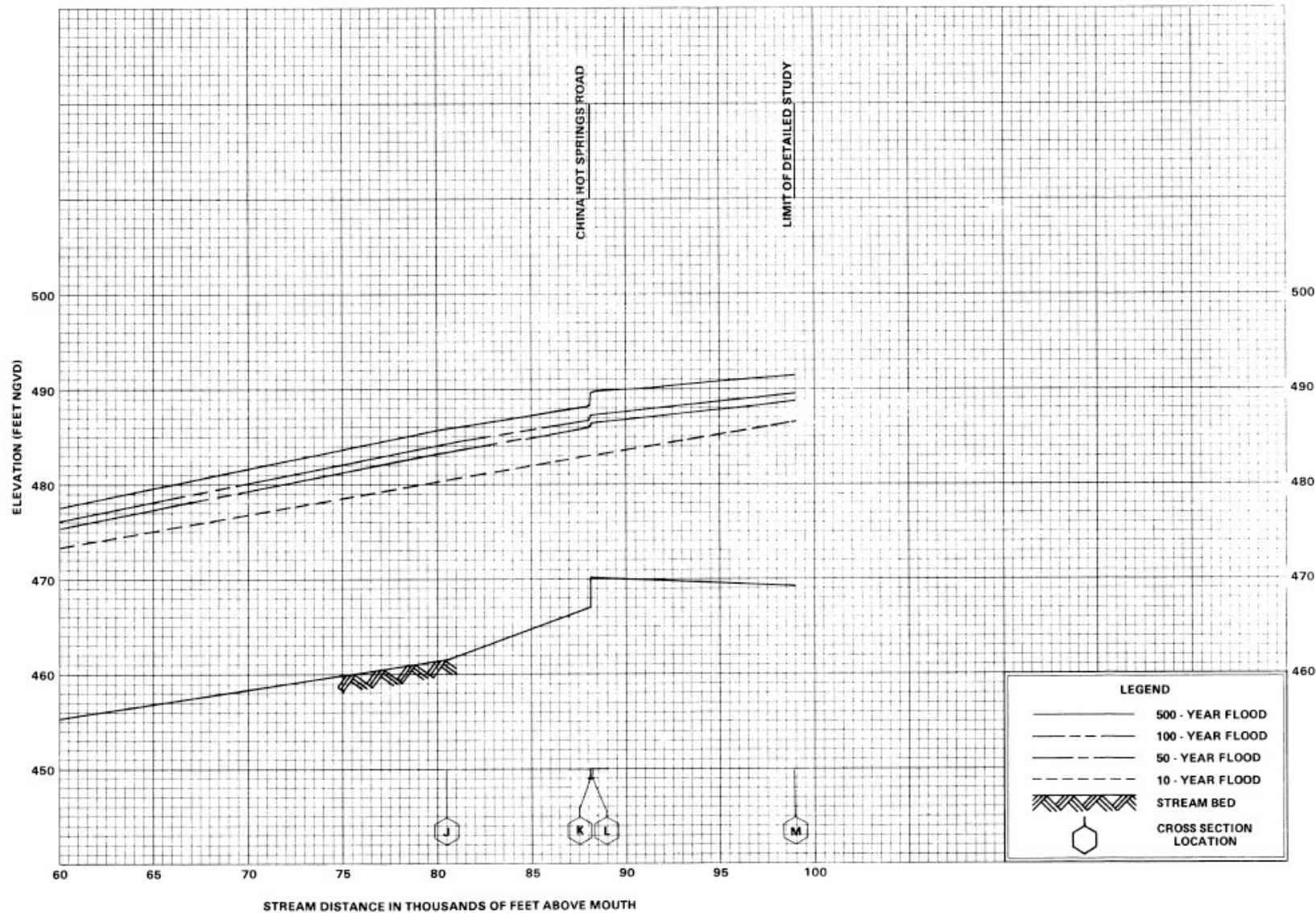
3

FEDERAL EMERGENCY MANAGEMENT AGENCY

**FAIRBANKS NORTH STAR
BOROUGH, ALASKA**

FLOODWAY DATA

LITTLE CHENA RIVER



FLOOD PROFILES

LITTLE CHENA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
FAIRBANKS NORTH STAR BOROUGH, AK

06P