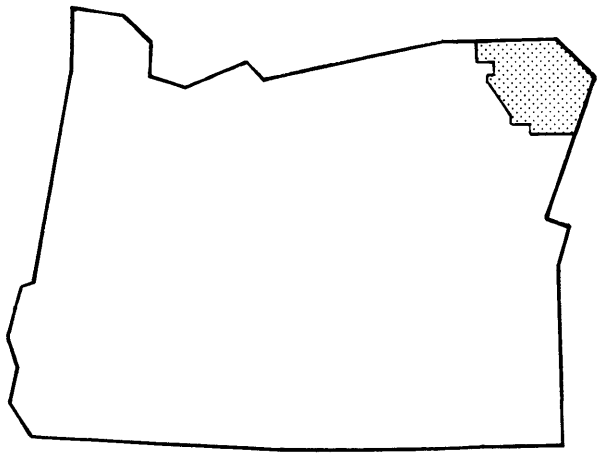
FLOOD INSURANCE STUDY

WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ENTERPRISE, CITY OF	410225
JOSEPH, CITY OF	410226
LOSTINE, CITY OF	410227
WALLOWA CITY, CITY OF	410228
UNINCORPORATED AREAS	410224



FEBRUARY 17, 1988

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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Flood Insurance Rate Map

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FLOOD INSURANCE STUDY
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of Wallowa County, Oregon, including the incorporated cities of Enterprise, Joseph, Lostine, and Wallowa, and the unincorporated areas of Wallowa County (hereinafter referred to collectively as Wallowa County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence; and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by CH2M Hill Northwest, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-84-C-1659. This study was completed in March 1986.

1.3 Coordination

Streams requiring detailed study were identified at a meeting attended by representatives of the study contractor, FEMA, and Wallowa County in April 1984.

Results of the hydrologic analyses were coordinated with the U.S. Army Corps of Engineers (COE) in Walla Walla, Washington; the U.S. Geological Survey (USGS) in Portland, Oregon; and FEMA.

On April 7, 1987, the results of the study were reviewed at the final meeting attended by representatives of the study contractor, FEMA, and community officials. The study was acceptable to the county.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Wallowa County, Oregon. The area of study is shown on the Vicinity Map (Figure 1).

The limits of detailed studies in Wallowa County were determined by FEMA with community and study contractor consultation at the meeting in April 1984.

Areas studied in detail were:

Wallowa River from 500 feet downstream of State Highway 82 Bridge upstream to the southern corporate limit of the City of Wallowa (1.8 miles).

Wallowa River from the City of Enterprise's western urban growth boundary to the outlet dam on Wallowa Lake (13.1 miles).

Wallowa River from the south end of Wallowa Lake to the Wallowa Whitman National Forest boundary (1.3 miles).

Lostine River from the section line between Section 3, T2S, R43E and Section 34, T1S, R43E to the Wallowa National Forest Boundary (2.3 miles).

Hurricane Creek from the confluence with Wallowa River to Little Sheep Creek Highway (6.0 miles).

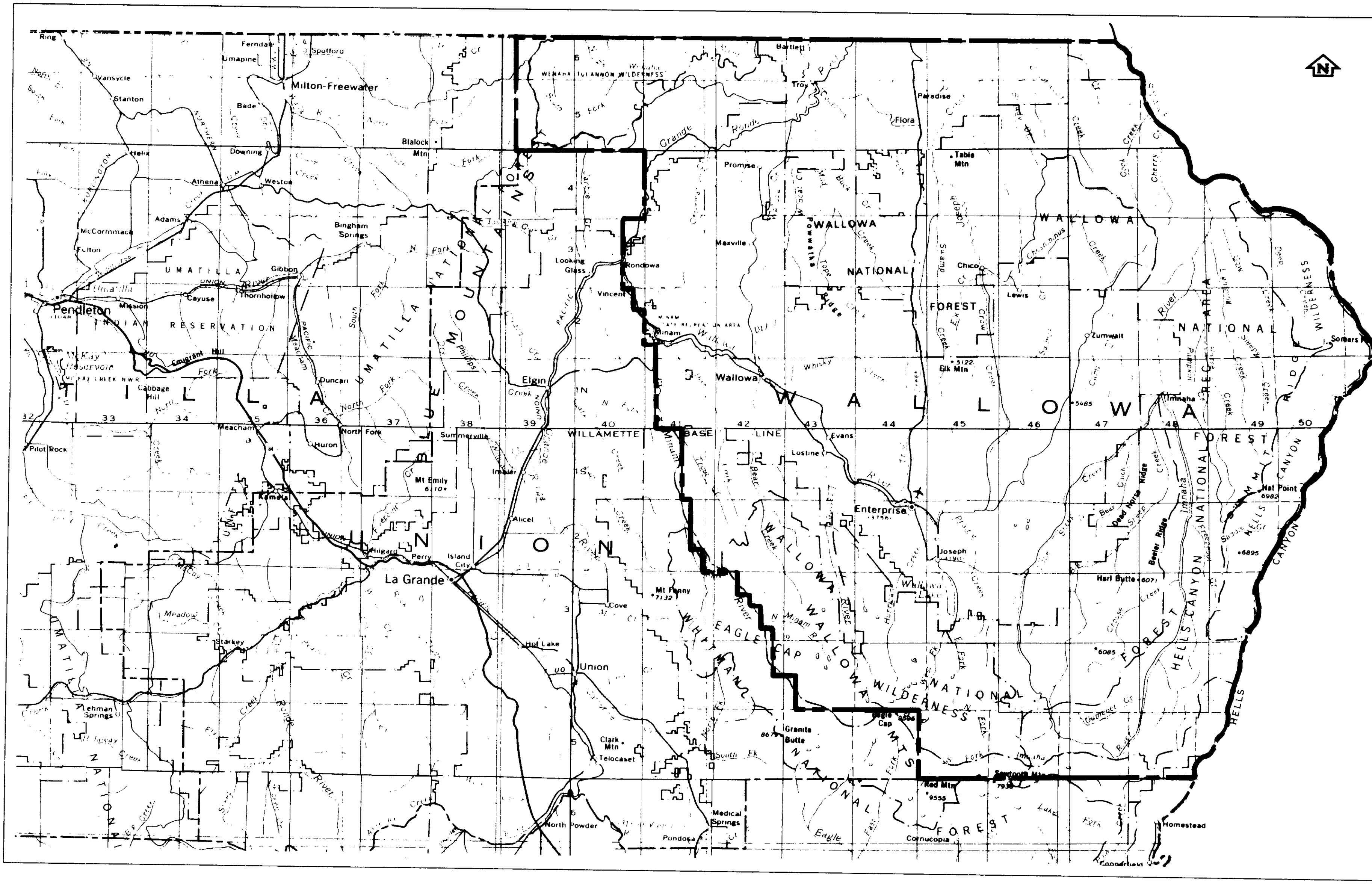
Prairie Creek from the confluence with Wallowa River to 700 feet above the southeastern corporate limit of the City of Enterprise (2.3 miles).

Little Hurricane Creek from the confluence with Wallowa River to a road crossing 3 miles upstream.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through March 1991.

Areas studied by approximate methods include the Lostine River at Lostine, Bear Creek at Wallowa, Wallowa River at Minam, Minam River at Minam, Grande Ronde River at Troy, Wenaha River at Troy, Imnaha River near Imnaha, Imnaha River at Imnaha River Woods.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Wallowa County.



FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

APPROXIMATE SCALE

12 0 12 24 36 MILES

VICINITY MAP

FIGURE 1

Not included in the study are the areas within the state parks and Wallowa-Whitman National Forest.

2.2 Community Description

Wallowa County is located in the northeast corner of the State of Oregon. It is bordered on the west by Umatilla and Union Counties, on the south by Baker County, on the east by the Snake River and the State of Idaho, and on the north by the State of Washington. The county has an area of 3153 square miles, with a third of it being in Wallowa-Whitman National Forest. The 1980 census reports a population of 7,270 in Wallowa County. Census counts for the incorporated areas are as follows (Reference 1):

Community	1970 Population	1980 Population
City of Enterprise	1,680	2,000
City of Joseph	839	1,000
City of Lostine	196	250
City of Wallowa	811	847

During the summer months, the population of the county increases by an additional 3,000 people as a result of recreational activities. Development within the floodplains studied is mostly agricultural, scattered residential, and limited industrial and commercial. The county's economic activities are associated with its climatologic and geographic influences, with its principal industries based on agriculture, livestock, timber, and recreation.

Wallowa County has a semiarid climate, characterized by warm summers and cold winters. Temperature averages range from 22 degrees Fahrenheit in January to the mid-60's in July. Annual average precipitation of the region is 17 inches, ranging from 60 inches in the mountains to 10 inches in the plains. Snowfall averages 48 inches in the plains but can reach over 290 inches in the Wallowa Mountains. Precipitation is fairly uniformly distributed throughout the year with the highest monthly average occurring in June (Reference 2).

The City of Enterprise is located in South-Central Wallowa County. The total land area contained within the corporate limits is 1.3 square miles. The city is situated approximately 3 miles northwest of the City of Joseph and 8.5 miles southeast of the City of Lostine.

Approximately 70 percent of the city has been developed, with the remainder of land being vacant. Within the floodplains studied, development is limited to single-family residences and a few private businesses. The residents of Enterprise are served by State Routes 3 and 82. The economy of the area is based on the agricultural and timber industries and tourism.

The climate of Enterprise is semi-arid, characterized by dry, warm summers and cold winters. Temperature averages range from 23 degrees Fahrenheit in January to 63 degrees Fahrenheit in July. Annual average precipitation of the area is 11.5 inches, with an average recorded snowfall of 44 inches. The precipitation is fairly uniformly distributed throughout the year with the highest monthly average occurring in June (Reference 2).

The City of Joseph is located in South-Central Wallowa County, in Northeastern Oregon. The total land area contained within the corporate limits is 0.8 square miles. The city is situated approximately 3 miles southeast of the City of Enterprise and 0.5 mile north of Wallowa Lake.

Approximately 70 percent of the city has been developed, with the remainder of land being vacant. Within the floodplains studied, development is limited to single-family residences and public park areas. The majority of development is located along State Route 82. The economy of the area is based on the timber and agricultural industries and tourism.

The climate of Joseph is semiarid, characterized by dry, warm summers and cold winters. Temperature averages range from 25 degrees Fahrenheit in January to the mid-60's in July. Annual average precipitation of the region is 15.4 inches, with an average recorded snowfall of 53 inches. The precipitation is fairly uniformly distributed throughout the year with the highest monthly average occurring in June (Reference 2).

The City of Lostine is located in West-Central Wallowa County, in Northeastern Oregon. The total land area contained within the corporate limits is 0.3 square miles. It is situated approximately 8.5 miles northwest of the City of Enterprise and 7.5 miles southeast of the City of Wallowa.

Approximately 70 percent of the city has been developed, with the majority of development located on a ridge above the Lostine River. A few single-family residences are in a flood hazard area south of Wallowa Street. The economy of the area is based on timber and agricultural industries.

The climate of Lostine is semiarid, characterized by dry, warm summers, and cold winters. Temperature averages range from 24 degrees Fahrenheit in January to 66 degrees Fahrenheit in July. Annual average precipitation of the region is approximately 16 inches, with an average snowfall of 50 inches per year. The precipitation is fairly uniformly distributed throughout the year. The highest monthly average occurs in June, and the lowest averages are in July and August (Reference 2).

The City of Wallowa is located in West-Central Wallowa County, in Northeastern Oregon. The total land area contained within corporate limits is 0.6 square miles. It is situated approximately 19 miles east of the City of Elgin and 17 miles northwest of the City of Enterprise.

Approximately 70 percent of the city has been developed, with the remainder of land being vacant. Development, within the floodplains studied, is mostly single-family residential with some commercial. The economy of the area is based on agricultural and timber industries.

The climate of Wallowa is semi-arid, characterized by dry, warm summers and cold winters. Temperature averages range from 24 degrees Fahrenheit in January to 66 degrees Fahrenheit in July. Annual average precipitation of the region is 16.3 inches, with an average recorded snowfall of 48 inches. The precipitation is fairly uniformly distributed throughout the year with the highest monthly average occurring in November. Approximately 1 to 1.5 inches of precipitation per month occurs during the months of December through June (Reference 2).

The Grande Ronde River drains a 3,950 square-mile area. It flows through the northwest quarter of the county and has a length of 209 miles.

The Imnaha River is the principal river in the eastern third of Wallowa County. Its length of 74 miles extends from the headwaters in the Wallowa Mountains north to its confluence with the Snake River. It has a drainage area of 980 square miles.

The Wallowa River is one of the principal rivers in Wallowa County. Its length of 55 miles extends from the headwaters in the Wallowa Mountains northwesterly through the county to its confluence with the Grande Ronde River. Its total drainage area is 933 square miles.

The Wenaha River, a tributary that flows east to the Grande Ronde River, has a length of 22 miles and a drainage area of 295 square miles.

The Minam River flows north along the west county line for a distance of 50 miles to its confluence with the Wallowa River at Minam. Its drainage area is 240 square miles.

The Lostine River is 31 miles long and has a drainage area of 87 square miles. If flows north from Minam Lake to its confluence with the Wallowa River near the City of Wallowa.

Prairie Creek, a tributary to Wallowa River, flows westerly through the central portion of the city. The creek is approximately 18 miles long and has a drainage area of 87 square miles.

Hurricane Creek, a tributary to Wallowa River, flows north to its confluence near the City of Enterprise. It is approximately 19 miles long and has a drainage area of approximately 52 square miles.

Little Hurricane Creek is 3.5 miles long and has a drainage area of 1.0 square mile. The creek flows in a northerly direction to its confluence with Wallowa River near the City of Enterprise.

The topography of Wallowa County is mostly rolling foothills and mountains extending to 9,800 feet National Geodetic Vertical Datum (NGVD). Many of the rivers in the county form deep canyons, with steep channel slopes.

The geologic makeup of Wallowa County is primarily basalt and andesite flows with volcanic tuff and ash deposits on older volcanic rocks. Much of this volcanic material is highly permeable and tends to dampen snowmelt runoff, with many of the areas the source of predominant springs (Reference 3). Most of the floodplain areas are located on alluvium deposits (Reference 4). The vegetation in Wallowa County varies with the climate. Coniferous trees, mostly pine, grow in the mountainous regions. Hills and flat regions are mostly cultivated farms with predominantly deciduous trees and small bushes along the floodplains.

2.3 Principal Flood Problems

Countywide flooding on the streams within Wallowa County usually occurs during June and July as a result of rain combined with a fast snowmelt caused by extreme temperature changes at higher elevations. Minor flooding has occurred in the county as a result of ice jams during the spring thaw.

Portions of the streams studied in Wallowa County are perched on alluvium deposits and have natural normally dry drainage channels that lead away from the stream. During periods of heavy flooding, the natural channels can become flow paths in the event culverts or bridges become blocked by uprooted vegetation. High velocities and steep channel gradiants on the alluvium deposits cause bank erosion and channel shifting, predominantly on the Wallowa River between Enterprise and Joseph, where there are numerous braided channels.

Numerous ditches used for irrigation purposes feed from the upper Wallowa River and its tributaries near the Cities of Wallowa, Enterprise, and Joseph. During heavy flooding these ditches will overflow and cause shallow flooding of one foot or less in isolated areas.

There are no systematic flood reports available for any of the streams in Wallowa County and no recorded high water marks other than USGS gaging stations. Floods covered by local news occurred

in December 1932, June 1933, 1948, 1957, 1974, and July 1984 (Reference 5). Few of them have caused much damage in the past because of the scarcity of development near the streams.

The worst flooding affecting property and people has been from Prairie Creek in the City of Enterprise. Prairie Creek is the major flood source for the city. It caused severe flood damage in two consecutive years approximately 30 years ago but nothing serious since then. Many of the bridges over Prairie Creek have a low channel clearance that restricts high flows, contributing to flooding.

Prairie Creek is a perched stream, and several natural channels that lead away from the stream would likely become flow paths in the event a bridge becomes blocked. However, most of the flooding that occurs is less than one foot in depth.

The Wallowa River has a braided flow pattern with several ditches that receive overflow during periods of high runoff. Some of the overflow enters the Prairie Creek system.

The flood of 1964 in the City of Enterprise was mostly street flooding and ponding less than one foot in depth with little damage to structures. Most recently, a flood occurred in June 1984. Newspaper accounts of this flood reported ponding and shallow flooding in several areas within the City of Enterprise and bank erosion problems at numerous locations (Reference 3).

The highest flow recorded on the Wallowa River at the outlet of Wallowa Lake occurred in June 1969 and was 1,550 cubic feet per second (cfs) (Reference 3). The estimated return period for this flow is 250 years. There are no reports of damage or flooding within the corporate limits of Joseph; however, flooding has occurred in the past in nearby unincorporated areas. The estimated 100-year discharge for Wallowa River at Joseph is 1,340 cfs.

The Lostine River has flooded on a few occasions. In recent memory, the most serious flooding occurred in 1969 when several residences were inundated. The Wallowa County Chieftain, a local newspaper based in Enterprise, recorded a flood in June of 1974 that caused flooding of several residences and washed out portions of roadways (Reference 3).

The USGS gaging station upstream from the City of Lostine recorded a peak flow of 2,550 cfs in June 1974. This flow is equivalent to a 40-year flood.

In 1964, flooding from the Wallowa River affected several homes in the City of Wallowa. Recently, flood damages have been reported in several areas within the city, which resulted from local runoff and drainage problems. Records for the USGS gage on Bear Creek near Wallowa show that the highest flow occurred in June 1974. The

maximum discharge for this flood was 1,730 cfs (Reference 3). The return interval associated with this event is approximately 50 years. There are no known flood losses along Bear Creek or Whiskey Creek.

The highest recorded peak discharges and corresponding recurrence intervals are shown in Table 1 (References 3 and 6).

TABLE 1. RECORDED PEAK FLOWS

USGS Stream Gage Number	USGS Gage Location	Flow (cubic feet per second)	Date	Estimated Frequency
13330000	Lostine River upstream of Lostine	2,550	June 1974	40-year
13329500	Hurricane Creek at National Forest boundary	1,110	June 1948	55-year
13331500	Minam River at Minam	6,260	June 1974	32-year
13333000	Grande Ronde River at Troy	42,200	Dec. 1964	196-year
13330500	Bear Creek near Wallowa	1,730	June 1974	40-year
13292000	Imnaha River at Imnaha	10,110	Jan. 1974	181-year
13327500	Wallowa River at Wallowa Lake Dam	1,550	June 1969	250-year

2.4 Flood Protection Measures

The Wallowa Lake Dam was constructed prior to 1918 for irrigation and recreational use. Because its primary purpose is for irrigation, no flood storage is provided; and there is no operational plan to reduce flood flow peaks. However, the dam reduces flood flow peaks on the upper portion of the Wallowa River because of reservoir routing and storage.

A standard practice in Wallowa County is construction of gravel berms along stream banks to contain flow and reduce erosion. The berms are effective in controlling minor flooding, but are not considered to be flood protection levees and were not included in the hydraulic analysis for this study.

The National Weather Service in Portland, Oregon, is responsible for flood warnings on the Grande Ronde River when near full bank stages are expected. Flood warnings are made for numerous smaller streams in Wallowa County by state, county, and city authorities and the news media (Reference 7).

Nonstructural measures of flood protection are also being used to aid in the prevention of future flood damage. These are in the form of land use regulations, adopted from the Code of Federal Regulations, which control building within areas that have a high risk of flooding (Reference 8).

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed or approximate methods affecting the community.

Flood discharges for areas of detailed and approximate study were based on USGS Water Resources Investigations Report 82-4078, Magnitude and Frequency of Floods in Eastern Oregon (Reference 3). The USGS report represents the 2-, 5-, 10-, 50-, and 100-year discharges based on statistical analyses of discharge records for 162 gaging stations operated by the USGS. The analyses followed the standard Log-Pearson Type III method, as outlined by the U.S. Water Resources Council (Reference 9). Peak discharges of gaged sites were transferred to various points along the study area using the transfer equations and specified limitations from the USGS report.

For ungaged streams, flood discharges were determined using the regional flood-frequency equations included in the USGS report (Reference 3). These regression equations relate drainage area, channel length, temperature index, mean annual precipitation, and forest cover to peak discharges.

The 500-year peak discharges were determined by extrapolation of the frequency-discharge curves for the detailed study areas. Flows determined by the regional flood-frequency equations and by extrapolation were compared to a log-log plot of the USGS discharge data at gaged sites for reasonableness.

Flood discharges of the Wallowa River from the City of Enterprise to Wallowa Lake were determined from the regional flood-frequency equations and adjusted for routing effects of Wallowa Lake Dam. Routing of flood flows through Wallowa Lake was determined by developing inflow hydrographs of Wallowa Lake drainage basin for the 10-, 50-, 100-, and 500-year flood events. Rainfall data were calculated using the National Oceanic and Atmospheric Administration Precipitation-Frequency Atlas of the Western United States, Volume 10-Oregon (Reference 10). The rainfall data were combined with snowmelt and other basin characteristics such as drainage area, infiltration, and time lapse to peak discharge to produce the peak discharge inflow hydrographs. The inflow hydrographs were routed through Wallowa Lake Dam for the 10-, 50-, 100-, and 500-year outflow peak discharges using the U.S. Army Corps of Engineers (COE) HEC-1 Flood Hydrograph Package (Reference 11). The unit hydrograph, storage capacity, outlet rating curve, and other pertinent data for flood routing were obtained from a COE dam safety report for the Wallowa Lake Dam (Reference 12). Since no flood storage is allocated in Wallowa Lake, it was assumed that the lake would be at its maximum irrigation storage elevation and that 4 of the 5 discharge gates would be opened for the flood routing calculations.

Peak discharge-drainage area relationships for each stream studied in detail are shown in Table 2. Peak discharge-drainage area relationships for the approximate study areas are shown in Table 3.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analyses of the Lostine River, Wallowa River downstream of Wallowa Lake, Prairie Creek, Hurricane Creek, and Little Hurricane Creek were obtained from aerial photographs, flown in November 1984 at a negative scale of 1:14,400 (Reference 13). Cross sections for the backwater analysis of Wallowa River upstream of Wallowa Lake were obtained from topographic maps at a scale of 1:1,200 and a contour interval of 2 feet (Reference 14). The below-water sections were obtained by field measurement. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

TABLE 2. SUMMARY OF DISCHARGES FOR DETAILED STUDIES

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Year	50-Year	100-Year	500-year
Wallowa River					
500 feet downstream of State Highway 82 Bridge near City of Wallowa	544.8	6,380	8,490	9,460	11,550
Upstream of Bear Creek	471.3	5,580	7,560	8,490	10,580
1.3 Miles downstream from west corporate limits of Enterprise	208.5	2,780	3,980	4,540	5,840
Upstream of Hurricane Creek	154.7	1,980	2,970	3,440	4,640
Upstream of Little Hurricane and Prairie Creeks	66.6	880	1,200	1,340	1,670
At Island Ditch	64.4	830	1,140	1,340	1,670
At Joseph south corporate limit	51.2	780	1,060	1,340	1,670
At Wallowa Dam	50.9	780	1,060	1,340	1,670
South end of Wallowa Lake	44.0	1,380	1,900	2,350	2,770
West Fork Wallowa River upstream of East Fork Wallowa River	28.9	1,040	1,340	1,460	1,750
Lostine River					
At beginning of study	69.1	2,160	2,600	2,780	3,170
At Silver Creek	62.8	1,970	2,370	2,540	2,870
Hurricane Creek					
At confluence with Wallowa River	52.1	1,190	1,600	1,760	2,150
Upstream study limit	30.5	860	1,110	1,220	1,460
Prairie Creek					
At confluence with Wallowa River	87.1	1,220	2,140	2,620	3,860
At upstream corporate limits	85.7	1,210	2,120	2,580	3,800
Little Hurricane Creek					
At confluence with Wallowa River	1.0	40	80	100	160

TABLE 3. SUMMARY OF DISCHARGES FOR APPROXIMATE STUDIES

Flooding Source and Location	Drainage Area (square miles)	100-Year Peak Discharges (cubic feet per second)
Grande Ronde River		
At Troy (Gage No. 13333000)	3,275.0	38,400
Upstream of Wenaha River	2,980.0	35,740
Wallowa River (Near Minam)		
Beginning of study	906.8	14,600
Upstream of Minam River	665.5	10,450
Imnaha River		
Wallowa National Forest Boundary in Section 16, TLN, R48E	639.8	9,180
Wallowa National Forest Boundary south of Imnaha (Gage No. 132920000)	622.0	9,180
River Mile 39 in Section 27, T3S, R48E	148.9	3,120
At confluence with Spring Creek Tributary	128.1	2,870
Wenaha River		
At confluence with Grande Ronde	295.0	4,980
Minam River (Near Minam)		
Confluence with Wallowa River (Gage No. 133315000)	240.0	7,640
Lostine River		
City of Lostine south corporate limits	80.3	3,060
Bear Creek (Near Wallowa)		
At confluence with Wallowa River	73.5	2,070
At Chamberlin Ditch	71.2	1,950

Roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgement and based on field observations of the streams and floodplain areas. The roughness values used to study the streams of Wallowa County are shown in Table 4.

TABLE 4. RANGE OF MANNING'S ROUGHNESS VALUES

Stream	Channel Values	Overbank Values
Lostine River	0.035	0.045 to 0.080
Wallowa River		
At Wallowa	0.035	0.045
Enterprise to Wallowa Lake	0 .020 to 0.035	0.020 to 0.090
Upstream of Wallowa Lake	0.045	0.060
Hurricane Creek	0.035	0.050 to 0.065
Prairie Creek	0.035	0.045 to 0.065
Little Hurricane Creek	0.035	0.050 to 0.065

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the COE HEC-2 step-backwater computer program (Reference 15).

Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Wallowa River, Lostine River, Hurricane Creek, Prairie Creek, and Little Hurricane Creek were calculated using the slope-area method.

The approximate methods utilize normal depth calculations to determine the water depth (from stream invert to water-surface) at selected cross sections for the 100-year flood.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum (NGVD) of 1929. Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800 and 1:1,200, with a contour interval of 4 and 2 feet (References 14, 16, and 17).

For the streams studied by approximate methods, the 100-year floodplain boundary was developed from normal depth calculations and topographics maps enlarged to a scale of 1:12,000, with contour intervals of 40 and 80 feet (References 18 and 19).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AO, and AE); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2.)

Approximate 100-year floodplain boundaries in some portions of the study area were taken directly from the Flood Hazard Boundary Map (Reference 20).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting

increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Conveyance is not determined using approximately study methods; therefore, a floodway was not computed for the City of Lostine. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated at selected cross sections (Table 5). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

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)			
Wallowa River at Wallowa								
A	- 500	123	929	10.2	2879.1	2879.1	2880.1	1.0
B	- 60	195	1267	6.7	2881.7	2881.7	2882.5	0.8
C	0	242	1434	5.9	2881.8	2881.8	2882.6	0.8
D	140	106	609	13.9	2882.4	2882.4	2882.5	0.1
E	2060	106	898	9.5	2893.9	2893.9	2894.6	0.7
F	3920	123/ 50[2]	727	11.7	2902.6	2902.6	2902.6	0.0
G	4970	275/ 75[2]	1141	7.4	2909.1	2909.1	2909.3	0.2
H	6080	148/ 38[2]	807	10.5	2913.5	2913.5	2914.1	0.6
I	6110	148/ 30[2]	968	8.8	2914.5	2914.5	2915.5	1.0
J	6620	141[2]	797	1.6	2918.4	2918.4	2918.4	0.0
K	7060	184/ 40[3]	677	12.5	2922.0	2922.0	2922.0	0.0
L	7100	184[3]	892	9.5	2923.6	2923.6	2923.6	0.0
M	7500	105[3]	874	9.7	2925.1	2925.1	2926.0	0.9
N	9280	88[3]	581	14.6	2935.2	2935.2	2935.4	0.2

[1] Stream Distance in Feet From Upstream Side of State Highway 82 Bridge at Wallowa
[2] Width/Width Within City of Wallowa Corporate Limits
[3] Floodway Width Lies Within City of Wallowa Corporate Limits

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

WALLOWA RIVER AT WALLOWA

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)			
Wallowa River from Enterprise to Wallowa Lake								
A	1,660	210	575	7.9	3698.2	3698.2	3698.2	0.0
B	2,660	220	621	7.3	3707.1	3707.1	3707.1	0.0
C	3,260	190	601	5.7	3710.8	3710.8	3711.8	1.0
D	3,720	49	118	6.0	3713.7	3713.7	3714.7	1.0
E	3,740	49	133	5.3	3714.4	3714.4	3714.8	0.4
F	3,890	50	134	5.3	3715.4	3715.4	3715.5	0.1
G	4,520	60	148	9.1	3722.2	3722.2	3722.3	0.1
H	5,680	57	177	7.6	3734.0	3734.0	3734.2	0.2
I	6,640	40	128	10.5	3743.7	3743.7	3743.0	0.0
J	7,140	40	162	8.3	3747.2	3747.2	3748.1	0.9
K	7,170	40	162	8.3	3747.3	3747.3	3748.1	0.8
L	7,270	48	148	9.1	3749.4	3749.4	3748.8	0.0
M	8,790	172	250	5.4	3762.1	3762.1	3762.6	0.5
N	9,450	34	89	9.2	3768.3	3768.3	3768.4	0.1
O	9,480	34[2]	121	6.8	3768.8	3768.8	3769.7	0.9
P	9,630	34[2]	124	6.6	3770.2	3770.2	3770.5	0.3
Q	10,730	33	84	9.7	3779.7	3779.7	3779.7	0.0
R	11,030	29	92	8.9	3783.8	3783.8	3783.9	0.1
S	11,050	29	93	8.8	3783.8	3783.8	3783.9	0.1
T	11,150	33	84	9.7	3785.0	3785.0	3785.0	0.0
U	12,690	48	99	8.3	3800.2	3800.2	3800.2	0.0
V	14,980	265	425	3.2	3809.3	3809.3	3810.3	1.0
W	15,600	100	200	6.7	3823.5	3823.5	3824.4	0.9
X	17,350	54	163	8.2	3842.1	3842.1	3842.9	0.8
Y	20,210	170	357	3.8	3864.4	3864.4	3865.3	0.9

[1] Stream Distance in Feet From Upstream Side of State Highway 82 Bridge West of Enterprise

[2] Floodway Width Lies Within City of Enterprise Corporate Limits

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

WALLOWA RIVER FROM ENTERPRISE TO WALLOWA LAKE

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)			
Wallowa River from Enterprise to Wallowa Lake (cont'd)								
Z	21,290	250	348	3.9	3874.4	3874.4	3874.8	0.4
AA	21,690	462	154	7.5	3880.6	3880.6	3880.8	0.2
BB	21,730	462	228	5.9	3881.6	3881.6	3881.9	0.3
AC	21,880	250	378	3.5	3882.6	3882.6	3882.8	0.2
AD	23,490	49	164	8.2	3900.5	3900.5	3901.3	0.8
AE	25,150	176	341	3.9	3916.0	3916.0	3917.0	1.0
AF	26,760	75	194	6.9	3932.6	3932.6	3933.5	0.9
AG	28,030	36	139	9.6	3947.9	3947.9	3948.6	0.7
AH	30,210	74	177	7.6	3972.0	3972.0	3973.0	1.0
AI	31,130	169	151	8.9	3982.5	3982.5	3982.9	0.4
AJ	31,730	385	346	3.9	3990.0	3990.0	3990.8	0.8
AK	31,760	385	623	2.2	3990.6	3990.6	3991.6	1.0
AL	31,910	449	133	10.0	3992.2	3992.2	3992.5	0.3
AM	33,740	107	215	6.2	4013.7	4013.7	4014.7	1.0
AN	34,950	48	146	9.2	4028.1	4028.1	4028.2	0.1
AO	36,100	82	246	5.5	4039.0	4039.0	4040.0	1.0
AP	37,060	32	121	11.1	4055.1	4055.1	4055.7	0.6
AQ	37,780	56	170	7.9	4064.2	4064.2	4064.5	0.3
AR	37,980	50	137	9.8	4067.5	4067.5	4067.8	0.3
AS	38,010	50	199	6.7	4069.4	4069.4	4069.2	0.0
AT	38,060	50	170	7.9	4069.5	4069.5	4069.4	0.0
AU	38,830	50	136	9.8	4077.5	4077.5	4077.8	0.3
AV	39,550	41	133	10.1	4086.8	4086.8	4086.8	0.0
AW	40,720	72	157	8.5	4100.9	4100.9	4101.0	0.1

[1] Stream Distance in Feet Above Upstream Side of State Highway 82 Bridge West of Enterprise

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

WALLOWA RIVER FROM ENTERPRISE TO WALLOWA LAKE

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)			
Wallowa River from Enterprise to Wallowa Lake (cont'd)								
AX	41,120	70	231	5.8	4103.7	4103.7	4104.4	0.7
AY	41,140	70	241	5.6	4104.1	4104.1	4104.6	0.5
AZ	41,240	72	157	8.6	4105.0	4105.0	4104.9	0.0
BA	42,500	96	187	7.2	4127.4	4127.4	4128.4	1.0
BB	43,260	50	152	8.8	4142.6	4142.6	4143.2	0.6
BC	43,460	47	182	7.4	4144.8	4144.8	4145.8	1.0
BD	43,490	49	193	6.9	4146.1	4146.1	4146.1	0.0
BE	43,540	33[2]	121	11.1	4145.9	4145.9	4146.5	0.6
BF	44,040	40[2]	122	10.9	4157.1	4157.1	4157.1	0.0
BG	44,240	20[2]	103	13.0	4162.9	4162.9	4162.9	0.0
BH	44,270	20[2]	114	11.7	4163.5	4163.5	4163.5	0.0
BI	44,320	42[2]	196	6.8	4165.7	4165.7	4165.6	0.0
BJ	44,730	40[2]	130	10.3	4169.1	4169.1	4169.0	0.0
BK	45,160	89[2]	139	9.6	4179.2	4179.2	4179.3	0.1
BL	46,200	69/30[2]	149	9.0	4199.1	4199.1	4199.1	0.0
BM	47,200	148/20[2]	197	6.8	4217.1	4217.1	4218.1	1.0
BN	48,360	77	194	6.9	4239.7	4239.7	4240.7	1.0
BO	49,420	81	127	10.5	4260.8	4260.8	4261.0	0.2
BP	50,700	90	122	11.0	4288.8	4288.8	4288.8	0.0
BQ	50,900	12	87	15.3	4296.0	4296.0	4296.0	0.0
BR	50,940	12	93	14.4	4296.5	4296.5	4296.5	0.0
BS	50,990	90	347	3.9	4300.5	4300.5	4300.5	0.0
BT	52,350	92	150	8.9	4321.3	4321.3	4321.3	0.0
BU	53,750	55	138	9.7	4353.0	4353.0	4353.0	0.0

[1] Stream Distance in Feet Above Upstream Side of State Highway 82 Bridge West of Enterprise
[2] Width/Width Within City of Joseph Corporate Limits

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

WALLOWA RIVER FROM ENTERPRISE TO WALLOWA LAKE

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)			
Wallowa River (South Channel Near Enterprise)								
A	190	172	250	5.4	3762.1	3762.1	3762.6	0.5
B	1810	29	74	6.9	3775.6	3775.6	3775.9	0.3
C	1840	50	89	5.7	3775.6	3775.6	3775.9	0.3
D	1990	55	114	4.5	3776.8	3776.8	3777.3	0.5
E	3210	45	89	5.7	3785.8	3785.8	3785.8	0.0
F	3930	41	98	5.2	3790.8	3790.8	3791.0	0.2
G	3950	41	103	5.0	3790.8	3790.8	3791.1	0.3
H	4100	45	94	5.5	3792.0	3792.0	3792.0	0.0
I	5020	582	123	4.2	3798.1	3798.1	3798.2	0.1

[1] Stream Distance in Feet Above Confluence with Wallowa River Main Channel

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

WALLOWA RIVER (SOUTH CHANNEL NEAR ENTERPRISE)

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)			
Wallowa River Upstream of Wallowa Lake								
A	0	130	454	5.2	4383.9	4383.9	4384.9	1.0
B	760	90	231	10.2	4397.4	4397.4	4397.4	0.0
C	1050	90	237	9.9	4403.2	4403.2	4403.3	0.1
D	1090	90	264	8.9	4403.5	4403.5	4403.6	0.1
E	1165	90	230	10.2	4405.1	4405.1	4405.1	0.0
F	2305	107	237	9.9	4428.5	4428.5	4428.6	0.1
G	3230	62	208	11.3	4455.0	4455.0	4455.0	0.0
H	3415	45	197	11.9	4460.4	4460.4	4460.4	0.0
I	3435	45	197	11.9	4460.4	4460.4	4460.4	0.0
J	3485	62	207	11.3	4462.0	4462.0	4462.0	0.0
K	4120	65	160	9.1	4482.0	4482.0	4482.0	0.0
L	5160	80	155	9.4	4526.1	4526.1	4526.4	0.3
M	6530	73	136	10.7	4584.2	4584.2	4584.2	0.0

[1] Stream Distance in Feet Above Mouth at Wallowa Lake

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

WALLOWA RIVER UPSTREAM OF WALLOWA LAKE

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)			
Lostine River								
A	0	127	559	5.0	3665.7	3665.7	3666.7	1.0
B	1,500	70	255	10.9	3673.0	3673.0	3673.8	0.8
C	2,720	265	779	3.6	3679.2	3679.2	3680.2	1.0
D	4,800	122	348	8.0	3695.7	3695.7	3696.7	1.0
E	6,240	50	228	12.2	3717.1	3717.1	3717.6	0.5
F	6,540	47	222	12.5	3722.6	3722.6	3723.3	0.7
G	6,560	47	233	12.0	3722.6	3722.6	3723.4	0.8
H	6,635	47	223	12.5	3723.8	3723.8	3724.5	0.7
I	7,295	69	226	12.3	3740.3	3740.3	3741.1	0.8
J	7,595	69	226	12.3	3746.9	3746.9	3747.7	0.8
K	7,625	69	228	12.2	3746.9	3746.9	3747.7	0.8
L	7,700	69	226	12.3	3748.5	3748.5	3749.3	0.8
M	9,760	93	267	10.4	3810.8	3810.8	3811.0	0.2
N	12,300	81	252	10.1	3919.6	3919.6	3919.6	0.0

[1] Stream Distance in Feet Above T.1S/T.2S

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

LOSTINE RIVER

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)			
Hurricane Creek								
A	300	60	230	7.7	3709.5	3709.5	3710.5	1.0
B	320	60	247	7.1	3710.5	3710.5	3710.8	0.3
C	395	68	204	8.6	3710.8	3710.8	3711.0	0.2
D	625	68	166	10.6	3718.1	3718.1	3718.1	0.0
E	925	68	167	10.6	3722.1	3722.1	3722.1	0.0
F	955	68	207	8.5	3722.2	3722.2	3722.8	0.6
G	1,030	68	218	8.1	3723.1	3723.1	3724.1	1.0
H	2,210	68	178	9.9	3739.8	3739.8	3739.8	0.0
I	3,120	35	159	11.0	3751.3	3751.3	3752.1	0.8
J	4,805	210	363	4.9	3770.7	3770.7	3770.7	0.0
K	5,105	320	552	3.2	3774.0	3774.0	3774.0	0.0
L	5,135	320	893	2.0	3774.1	3774.1	3775.1	1.0
M	5,185	210	435	4.1	3774.6	3774.6	3774.9	0.3
N	6,440	77	190	9.3	3789.2	3789.2	3789.6	0.4
O	7,640	38	155	11.3	3804.7	3804.7	3804.7	0.0
P	8,980	112	277	6.3	3816.3	3816.3	3817.1	0.8
Q	9,980	42	157	11.2	3831.2	3831.2	3831.2	0.0
R	10,280	42	157	11.2	3835.1	3835.1	3835.1	0.0
S	10,310	42	242	7.3	3836.3	3836.3	3837.2	0.9
T	10,360	42	201	8.8	3836.3	3836.3	3837.2	0.9
U	11,435	42	153	11.5	3848.7	3848.7	3848.7	0.0
V	11,685	42	154	11.4	3852.0	3852.0	3852.0	0.0
W	11,715	42	154	11.4	3852.2	3852.2	3852.2	0.0
X	11,765	42	154	11.4	3853.0	3853.0	3853.0	0.0
Y	12,930	81	224	7.9	3866.3	3866.3	3866.5	0.2
Z	14,240	44	161	10.9	3882.6	3882.6	3883.1	0.5

[1] Stream Distance in Feet Above Confluence With Wallowa River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

HURRICANE CREEK

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)			
Hurricane Creek (cont'd)								
AA	16,260	57	220	6.8	3905.9	3905.9	3906.9	1.0
AB	18,600	90	155	9.6	3932.3	3932.3	3932.3	0.0
AC	18,850	35	134	11.1	3935.6	3935.6	3935.6	0.0
AD	18,880	35	162	9.2	3936.4	3936.4	3936.4	0.0
AE	18,955	90	248	6.0	3937.7	3937.7	3937.7	0.0
AF	20,315	115	177	8.4	3956.7	3956.7	3956.7	0.0
AG	21,255	56	151	9.9	3975.1	3975.1	3975.1	0.0
AH	22,855	99	180	8.2	4004.4	4004.4	4004.4	0.0
AI	24,415	33	126	11.8	4039.3	4039.3	4039.3	0.0
AJ	24,715	25	119	12.5	4046.5	4046.5	4046.5	0.0
AK	24,745	25	149	10.0	4047.4	4047.4	4047.7	0.3
AL	24,820	33	126	11.8	4048.2	4048.2	4048.2	0.0
AM	26,580	33	111	13.5	4086.2	4086.2	4087.2	1.0
AN	27,780	50	131	11.3	4115.0	4115.0	4115.0	0.0
AO	28,080	23	115	12.9	4121.6	4121.6	4121.6	0.0
AP	28,110	23	118	12.6	4121.9	4121.9	4121.9	0.0
AQ	28,185	50	205	7.3	4124.4	4124.4	4124.5	0.1
AR	28,445	41	137	10.8	4129.9	4129.9	4129.9	0.0
AS	28,745	33	131	11.4	4135.9	4135.9	4135.9	0.0
AT	28,775	33	173	8.6	4137.5	4137.5	4137.3	0.0
AU	28,850	41	138	10.8	4137.4	4137.4	4137.4	0.0
AV	30,570	37	119	10.3	4178.2	4178.2	4178.5	0.3
AW	32,370	52	127	9.6	4227.1	4227.1	4227.1	0.0
AX	32,670	52	127	9.6	4234.0	4234.0	4234.0	0.0

[1] Stream Distance in Feet Above Confluence With Wallowa River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

HURRICANE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Prairie Creek								
A	720	92[3]	305	8.6	3715.5	3715.5	3716.1	0.6
B	2180	63	333	7.9	3724.5	3724.5	3724.9	0.4
C	3290	135	366	7.2	3730.4	3730.4	3731.1	0.7
D	3935	165	455	5.8	3734.6	3734.6	3735.5	0.9
E	4325	405	645	4.1	3738.5	3738.5	3738.5	0.0
F	4355	405	1065	2.5	3738.8	3738.8	3739.8	1.0
G	4695	200	496	5.3	3740.7	3740.7	3741.4	0.7
H	4725	200	484	5.4	3740.9	3740.9	3741.6	0.7
I	5045	240	651	4.0	3743.1	3743.1	3744.1	1.0
J	5075	240	486	5.4	3743.7	3743.7	3744.2	0.5
K	5175	240	759	3.5	3744.1	3744.1	3745.0	0.9
L	5725	250	475	5.5	3748.2	3748.2	3748.4	0.2
M	5755	250	810	3.2	3748.8	3748.8	3749.7	0.9
N	6055	268	274	9.6	3750.4	3750.4	3750.6	0.2
O	6085	268	687	3.8	3751.8	3751.8	3752.7	0.9
P	6185	268	543	4.8	3752.1	3752.1	3752.9	0.8
Q	6365	235	524	5.0	3753.3	3753.3	3753.3	0.0
R	6955	275	526	5.0	3757.0	3757.0	3757.2	0.2
S	6985	275	775	3.4	3757.1	3757.1	3758.1	1.0
T	7060	250	524	5.0	3758.0	3758.0	3758.3	0.3
U	7980	350	798	3.3	3762.6	3762.6	3763.6	1.0
V	8620	319	517	5.1	3767.2	3767.2	3767.9	0.7
W	8650	320	575	4.6	3767.5	3767.5	3768.5	1.0
X	9140	57	243	10.8	3772.5	3772.5	3772.6	0.1
Y	9180	57	303	8.6	3773.0	3773.0	3773.9	0.9
Z	9510	230	718	3.6	3775.7	3775.7	3776.6	0.9

[1] Stream Distance in Feet Above Confluence With Wallowa River
[2] Flooding Width Lies Within City of Enterprise Corporate Limits
[3] Floodway Width Lies Within Unincorporated Area

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

PRAIRIE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Prairie Creek (cont'd)								
AA	9540	230	1227	2.1	3777.8	3777.8	3778.8	1.0
AB	9640	139	675	3.8	3777.8	3777.8	3778.8	1.0
AC	10880	70[3]	245	10.6	3784.8	3784.8	3785.1	0.3
AD	11210	58[3]	283	9.1	3796.2	3796.2	3797.1	0.9

[1] Stream Distance in Feet Above Confluence With Wallowa River
[2] Floodway Width Lies Within City of Enterprise Corporate Limits
[3] Floodway Width Lies Within Unincorporated Area

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

PRAIRIE CREEK

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 Hurricane Creek								
A	0	50	64	1.6	3716.1[2]	3712.8	3713.8	1.0
B	1,060	19	14	7.4	3726.8	3726.8	3726.8	0.0
C	1,360	9	12	8.7	3732.2	3732.2	3732.8	0.6
D	1,390	17	46	2.2	3734.2	3734.2	3734.2	0.0
E	1,440	19	33	3.0	3734.3	3734.3	3734.3	0.0
F	2,345	31	16	6.1	3741.6	3741.6	3741.6	0.0
G	2,645	31	24	4.2	3745.3	3745.3	3745.3	0.0
H	2,675	84	124	0.8	3746.5	3746.5	3747.5	1.0
I	2,750	31	49	2.0	3746.6	3746.6	3747.5	0.9
J	4,050	23	14	7.0	3759.5	3759.5	3759.5	0.0
K	4,350	15	27	3.8	3762.5	3762.5	3762.5	0.0
L	4,380	10	34	3.0	3763.2	3763.2	3763.7	0.5
M	4,455	10	28	3.6	3763.3	3763.3	3764.0	0.7
N	6,255	36	19	5.2	3776.9	3776.9	3777.0	0.1
O	6,555	6	25	4.0	3779.9	3779.9	3780.7	0.8
P	6,585	60	211	0.5	3781.8	3781.8	3782.8	1.0
Q	6,660	75	190	0.5	3781.8	3781.8	3782.8	1.0
R	7,860	41	22	4.5	3789.2	3789.2	3789.4	0.2
S	10,180	10	25	4.0	3807.8	3807.8	3808.4	0.6
T	10,480	5	13	7.5	3810.3	3810.3	3810.5	0.2
U	10,510	5	21	4.7	3812.0	3812.0	3812.1	0.1
V	10,585	10	21	4.9	3812.0	3812.0	3812.6	0.6
W	12,635	27	6	5.4	3827.8	3827.8	3827.8	0.0
X	12,935	10	10	3.4	3831.1	3831.1	3831.1	0.0
Y	12,965	10	10	3.4	3831.1	3831.1	3831.1	0.0

[1] Stream Distance in Feet Above Confluence With Wallowa River
[2] Based upon Backwater From Wallowa River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE HURRICANE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Little Hurricane Creek (cont'd)								
Z	13,040[1]	27	8	4.2	3831.7	3831.7	3831.7	0.0
AA	15,190[1]	8	8	4.4	3858.6	3858.6	3858.7	0.1
AB	15,490[1]	10	12	3.0	3863.0	3863.0	3863.0	0.0
Little Hurricane Creek (East Channel)								
A	1,745[2]	38	17	3.9	3836.6	3836.6	3836.9	0.3
B	4,565[2]	6	12	5.3	3867.4	3867.4	3867.7	0.3
C	4,865[2]	4	10	6.7	3870.9	3870.9	3871.0	0.1

[1] Stream Distance in Feet Above Confluence With Wallowa River
[2] Stream Distance in Feet Above Confluence With Little Hurricane Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE HURRICANE CREEK - LITTLE HURRICANE CREEK (EAST CHANNEL)

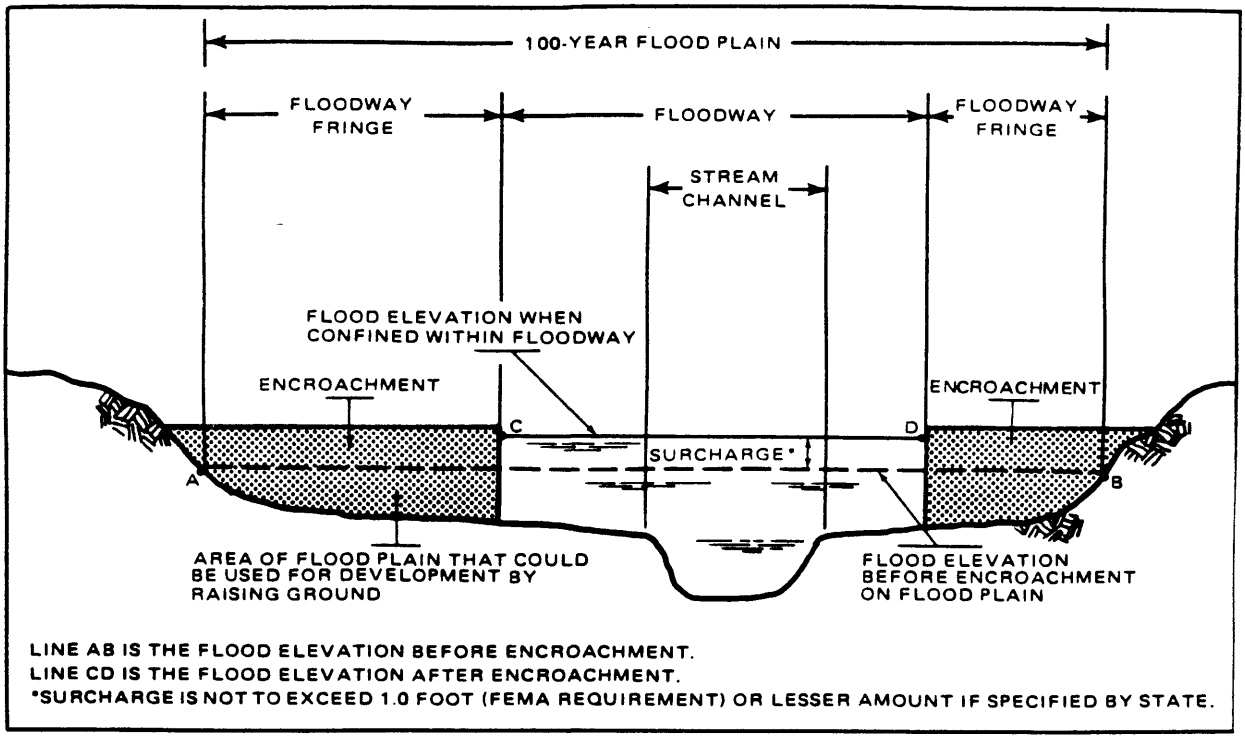


Figure 2. Floodway Schematic

Zone A0

Zone A0 is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The current Flood Insurance Rate Map presents flooding information for the entire geographic area of Wallowa County. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 6, Community Map History.

Due to its more detailed analysis, this Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Maps for the Unincorporated Areas of Wallowa County and the Cities of Enterprise, Joseph, Lostine, and Wallowa (References 20, 21, 22, 23, and 24).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Federal Regional Center, 130 228th Street, S.W., Bothell, Washington 98021-9796.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP	EFFECTIVE DATE(S) OF MAP/PANEL REVISIONS
Enterprise, City of	December 28, 1973	January 23, 1978	February 17, 1988	
Joseph, City of	May 24, 1974	December 5, 1975	February 17, 1988	
Lostine, City of	November 8, 1974	------	February 17, 1988	
Wallowa, City of	January 9, 1974	April 23, 1976	February 17, 1988	
Unincorporated Areas	June 28, 1977	------	February 17, 1988	

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

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EXHIBIT 3 - ELEVATION REFERENCE MARKS
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 1	3725.81	A U.S. Coastal and Geodetic Survey brass disk stamped "P 412 1946" set in concrete post. Located 0.66 mile west of the courthouse in Enterprise, at west dead end of Greenwood Street, 2.8 feet north of a fire hydrant, 0.4 foot above ground.
RM 2	3939.05	A U.S. Coastal and Geodetic Survey disk stamped "L 412 1946." Located 0.58 mile southwest along Greenwood and Montclair Streets from the courthouse in Enterprise, at top of a hill, at Enterprise concrete water reservoir, in top northwest corner of wall.
RM 3	3756.07	A U.S. Geodetic Survey brass disk stamped "3756.6 W 247 1903," set vertically, on the west wall of main entrance to Pioneer Hotel, 7 feet north of southwest corner of building, 15 inches above walk. Located in Enterprise, on the northeast corner of Main and River Streets.
RM 4	3758.81	CH2M Hill set a chiseled square in the top of a concrete guard rail in the southeast corner of the bridge over Prairie Creek. Located ±800 feet south of the courthouse in Enterprise, along River Street.
RM 5	3758.41	A Pacific Power & Light Company brass disk stamped "U 192 1940" set in concrete post. Located 0.28 mile south of courthouse in Enterprise, along Wallowa Lake Highway where highway turns east at a concrete culvert over an irrigation canal, in the north end of the east headwall, 0.6 foot southwest of the northeast end of a wingwall, 18 feet northeast of the centerline of the highway, about one foot above highway.
RM 6	3777.04	CH2M HILL set a chiseled square on a concrete bridge abutment in the northeast corner of the steel bridge over Prairie Creek. Located 0.68 mile southeast of the courthouse in Enterprise along Wallowa-Lake Highway, 150 feet south from intersection with Florence Street.

EXHIBIT 3 - ELEVATION REFERENCE MARKS (cont'd)
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 7	3704.53	An Oregon State Highway Department brass disk stamped "X 532 1954," set in the top of the east end of the retaining wall of the State Hatchery Dam on Spring Creek. Located 1.04 miles west following Depot Street and Fish Hatchery Road from the Union Pacific Railroad Station at Enterprise, on the north side of Fish Hatchery Road.
RM 8	3729.14	CH2M HILL set a chiseled square in concrete on the northwest corner of the bridge over Hurricane Creek. Located 0.08 mile south from the Union Pacific Railroad Station at Enterprise on Depot Street, then 0.64 mile west along Fish Hatchery Road.
RM 9	3750.68	CH2M HILL set a chiseled square in the northeast corner of the bridge over the Wallowa River. Located 0.08 mile south from the Union Pacific Railroad Station at Enterprise on Depot Street, 0.08 mile west along Fish Hatchery Road.
RM 10	3771.11	CH2M HILL set a chiseled square in the northwest concrete guardrail on the bridge over the Wallowa River. Located 0.66 mile south from the courthouse in Enterprise along Hurricane Creek Road.
RM 11	3775.54	CH2M HILL set a chiseled square in the northwest corner of the bridge over Hurricane Creek. Located 0.48 mile south courthouse in Enterprise along Hurricane Creek Road, 0.34 mile west along Fish Hatchery Road, 0.52 mile south along Stockton Road to "T" intersection, on west side.
RM 12	3854.81	CH2M HILL set a chiseled square in concrete on southeast abutment of bridge over Hurricane Creek. Located 2.0 miles south from courthouse in Enterprise along Hurricane Creek Road, 0.12 mile east from four-way intersection.

EXHIBIT 3 - ELEVATION REFERENCE MARKS (cont'd)
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 13	3881.19	A U.S. Coastal and Geodetic Survey brass disk stamped "H 401 1945" in the top of a southeast concrete wingwall of the bridge over Wallowa River. Located 2.0 miles south from the courthouse at Enterprise along Hurricane Creek Road, 1.1 miles east along County Road, 572 ± 400 feet east of County Road Leading south, 25 feet east of the center of the bridge, 21 feet south of the centerline of the road, 8 feet northeast of the edge of Wallowa River, approximately 2 feet lower than the road surface.
RM 14	3975.35	CH2M HILL set a 6 inch spike in northside of power pole, 3.0 miles south from courthouse in Enterprise along Hurricane Creek Road, in southeast corner of "T" intersection with Dorrance Road.
RM 15	3994.36	CH2M HILL set a chiseled square in the southeast corner of the bridge over Wallowa River. Located 1.00 mile southeast of the courthouse in Enterprise along Hurricane Creek Road, 1.57 miles southeast on county road 581, 0.06 mile east on county road 572, 1.55 miles south on county road 755, .13 mile east on Dorrance Road.
RM 16	4239.01	An Oregon State Highway Department disk stamped "E 454 1955," set in concrete walkway at the northwest corner of the bridge over Hurricane Creek. Located 0.13 mile north from post office in Joseph along State Highway 82, 2.1 miles west along Hurricane Creek Road, ± 400 feet southeast of Hurricane Creek Grange Hall.
RM 17	4140.71	A U.S. Coastal and Geodetic Survey brass disk stamped "G 407 1945," on top of 3 inch cast iron pipe set in concrete. Located 0.13 mile north from the post office in Joseph along State Highway 82, 1.2 miles west along Hurricane Creek Road, at Joseph Airport, 95.8 feet south of the southwest corner of and in line with the west end of the office building, 91 feet east of the centerline of the driveway leading to the hangers, 30 feet north of centerline of Hurricane Creek Road.

EXHIBIT 3 - ELEVATION REFERENCE MARKS (cont'd)
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

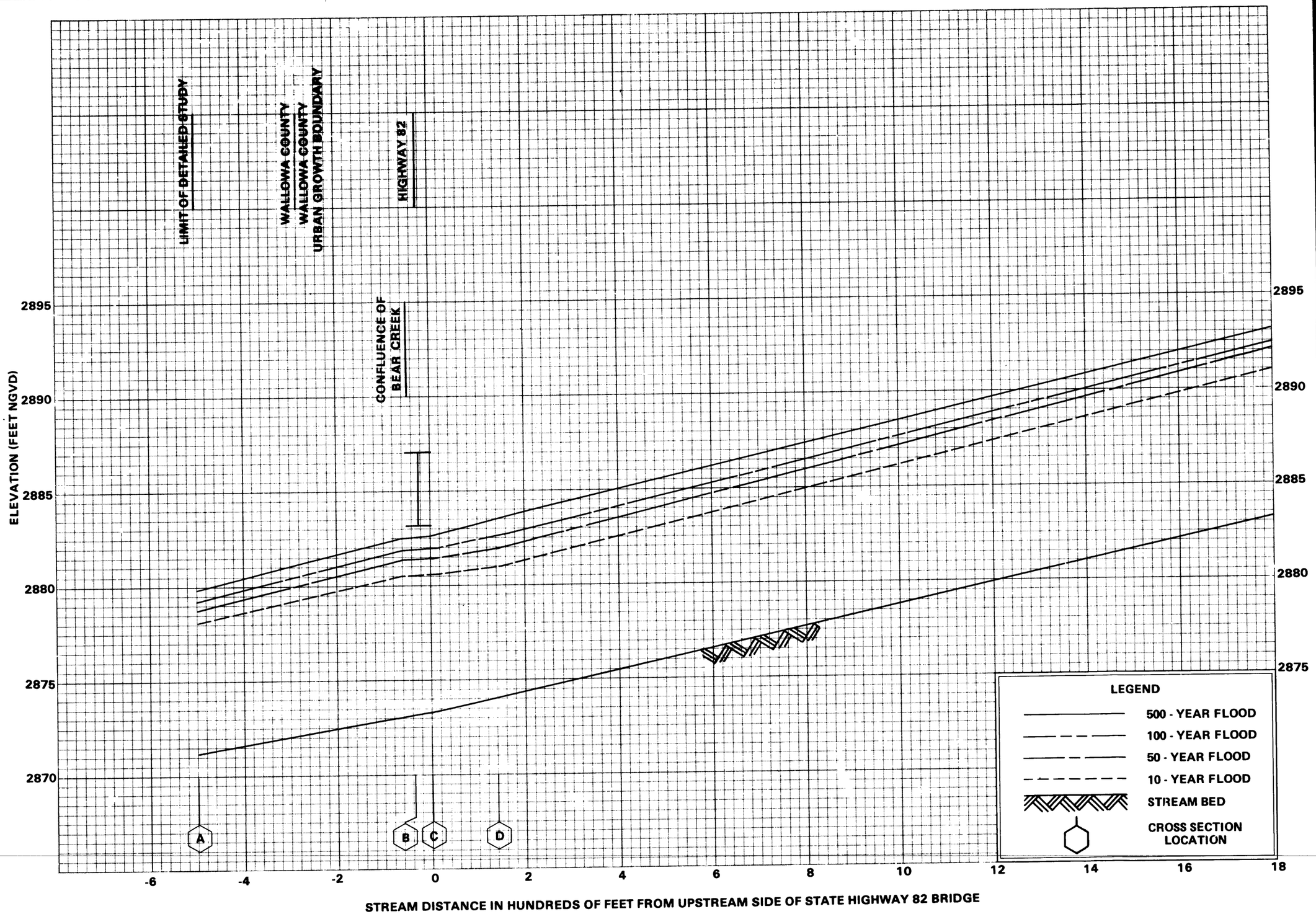
Reference Mark	Elevation (feet NGVD)	Description of Location
RM 18	4133.61	A U.S. Coastal and Geodetic Survey brass disk stamped "L 401 1945," 0.6 mile north from post office in Joseph along State Highway 82, at a triple concrete culvert dividing one large irrigation canal into three small canals, in the center on the top of the west headwall, 15 feet west of the centerline of the highway, and approximately 1.5 feet above the highway.
RM 19	4148.53	An Oregon State Highway Department brass disk stamped "3 B-S 10 1940" set in concrete walkway on the southeast corner of the bridge over the Wallowa River. Located 0.13 mile north from the post office in Joseph along State Highway 82, 0.4 mile west along Hurricane Creek Road, 16 feet south of the centerline of the road, and 0.5 foot west of the southeast of the bridge.
RM 20	4212.76	A Pacific Power & Light Company disk stamped "13 1937" set in concrete. Located .38 mile south of the post office in Joseph at the Joseph substation of Pacific Power & Light Company, at the long flight of steps leading down to the substation, in the west end of the top step, 6 feet north of the steel fence enclosing the power building, and 7 feet northwest of the east corner of the fence.
RM 21	4391.06	A Pacific Power & Light Company bronze disk stamped "4390.2 6 1929" set in concrete. Located 1.4 miles south of the post office in Joseph along Joseph-Wallowa Lake Highway, at dam at north end of Wallowa Lake, on top of west buttress, approximately 10 feet above spillway, 1.5 feet below walk.
RM 22	4403.09	A Pacific Power & Light Company bronze disk stamped "4402.7 1929" set in top of prominent conical boulder. Located 1.6 miles south of the post office in Joseph along Joseph-Wallowa Highway, 0.25 mile south of Chief Joseph Monument, 40 feet southwest of road, and 100 feet from lake.

EXHIBIT 3 - ELEVATION REFERENCE MARKS (cont'd)
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 23	4408.29	An Oregon Highway Department brass disk stamped "Y 537 1956," set in the footpath of the northwest corner of the bridge over the Wallowa River. Located about 6.1 miles south of the post office in Joseph along the Joseph-Wallowa Lake Highway, to intersection at Wallowa Lake Lodge, 790 feet west of the intersection with Powerhouse Road.
RM 24	4465.29	CH2M HILL set a chiseled square on a bridge abutment in the northeast corner of the timber bridge over the Wallowa River. Located about 6.1 miles south of the post office in Joseph along Joseph-Wallowa Lake Highway to intersection at Wallowa Lake Lodge, 0.43 mile South on Powerhouse Road, ± 350 feet west on County Road.
RM 25	2887.82	CH2M HILL set a chiseled square in the northeast corner of a concrete walkway on the bridge over the Wallowa River. Located 1.3 miles north of the post office in Wallowa on Highway 82.
RM 26	2917.73	CH2M HILL set a chiseled square in the southeast corner of a concrete bridge abutment on the railroad bridge over the Wallowa River. Located about .29 mile northwest along railroad tracks from Troy Road to railroad milepost 59.75.
RM 27	2924.52	CH2M HILL set a chiseled square in the southwest corner of a concrete bridge abutment on the bridge over the Wallowa River. Located 480 feet east on Troy Road from the intersection with Highway 82.
RM 28	2922.90	A Pacific Power & Light Company brass disk stamped "F-84 1934" set on foot bridge. 60 feet east of Highway 82 and intersection with Troy Road.
RM 29	3675.41	CH2M HILL set a railroad spike in power pole No. 348000. Located 4.2 miles south of the post office in Lostine along the east side of Lostine River Road.

EXHIBIT 3 - ELEVATION REFERENCE MARKS (cont'd)
WALLOWA COUNTY, OREGON AND INCORPORATED AREAS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 30	3685.49	CH2M HILL set a railroad spike in a 36-inch-diameter pine tree. Located 4.8 miles south of the post office in Lostine along the east side of Lostine River Road in corral.
RM 31	3755.49	CH2M HILL set a chiseled square in the top northeast corner of a concrete abutment of the steel trestle bridge over the Lostine River. 5.85 miles south of the post office in Lostine along Lostine River Road.



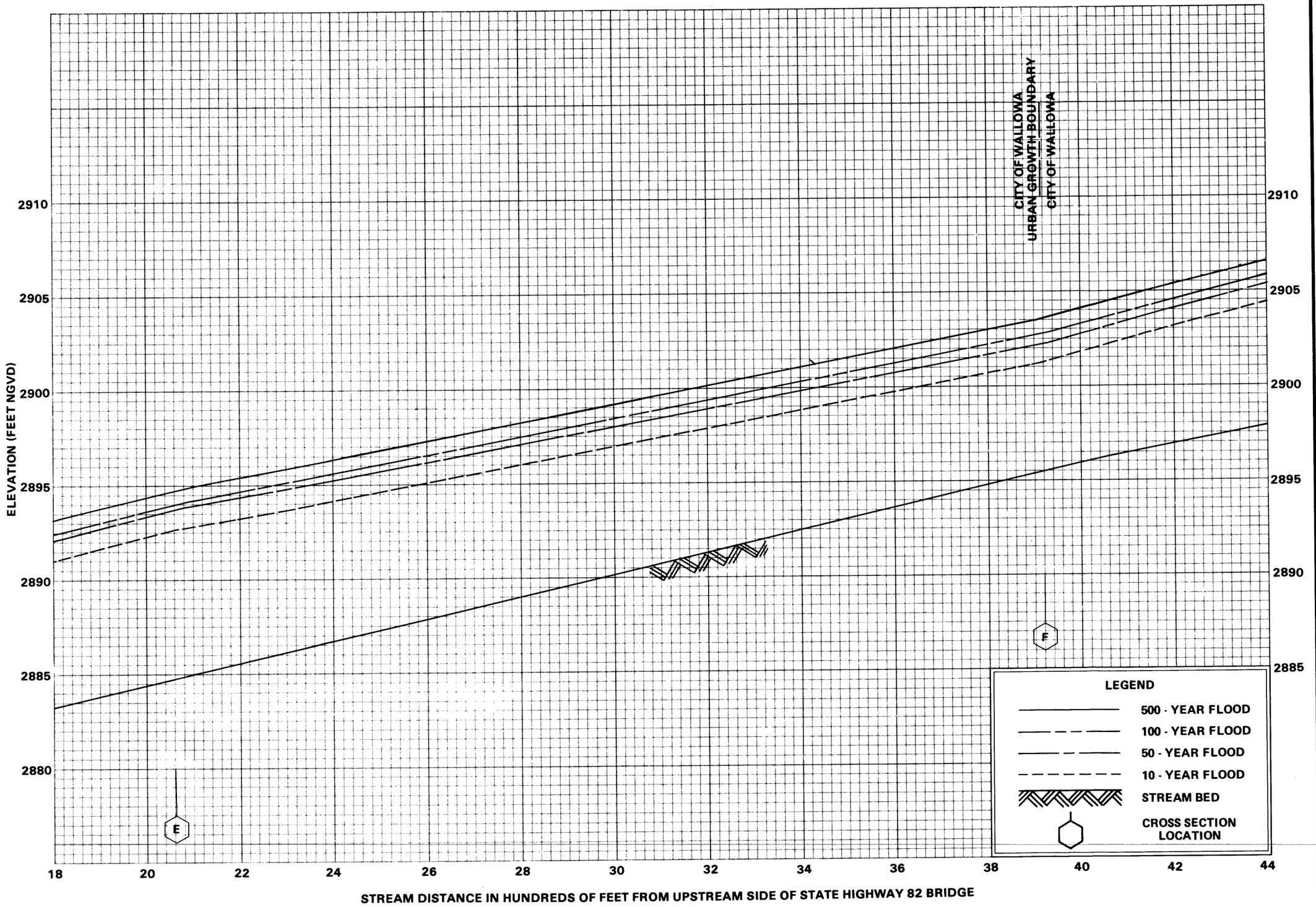
FLOOD PROFILES

WALLOWA RIVER (AT CITY OF WALLOWA)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

01P



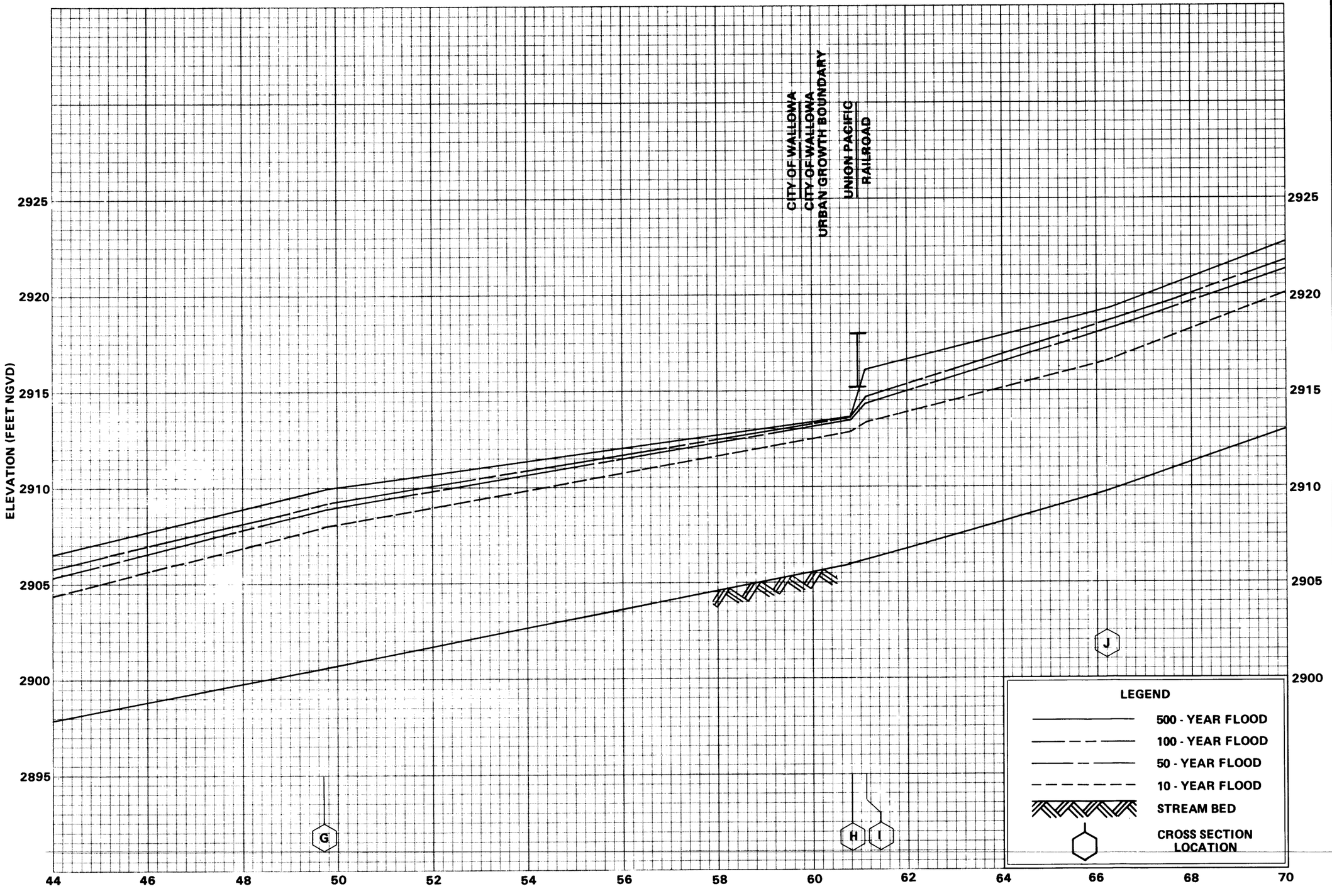
FLOOD PROFILES

WALLOWA RIVER (AT CITY OF WALLOWA)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

02P



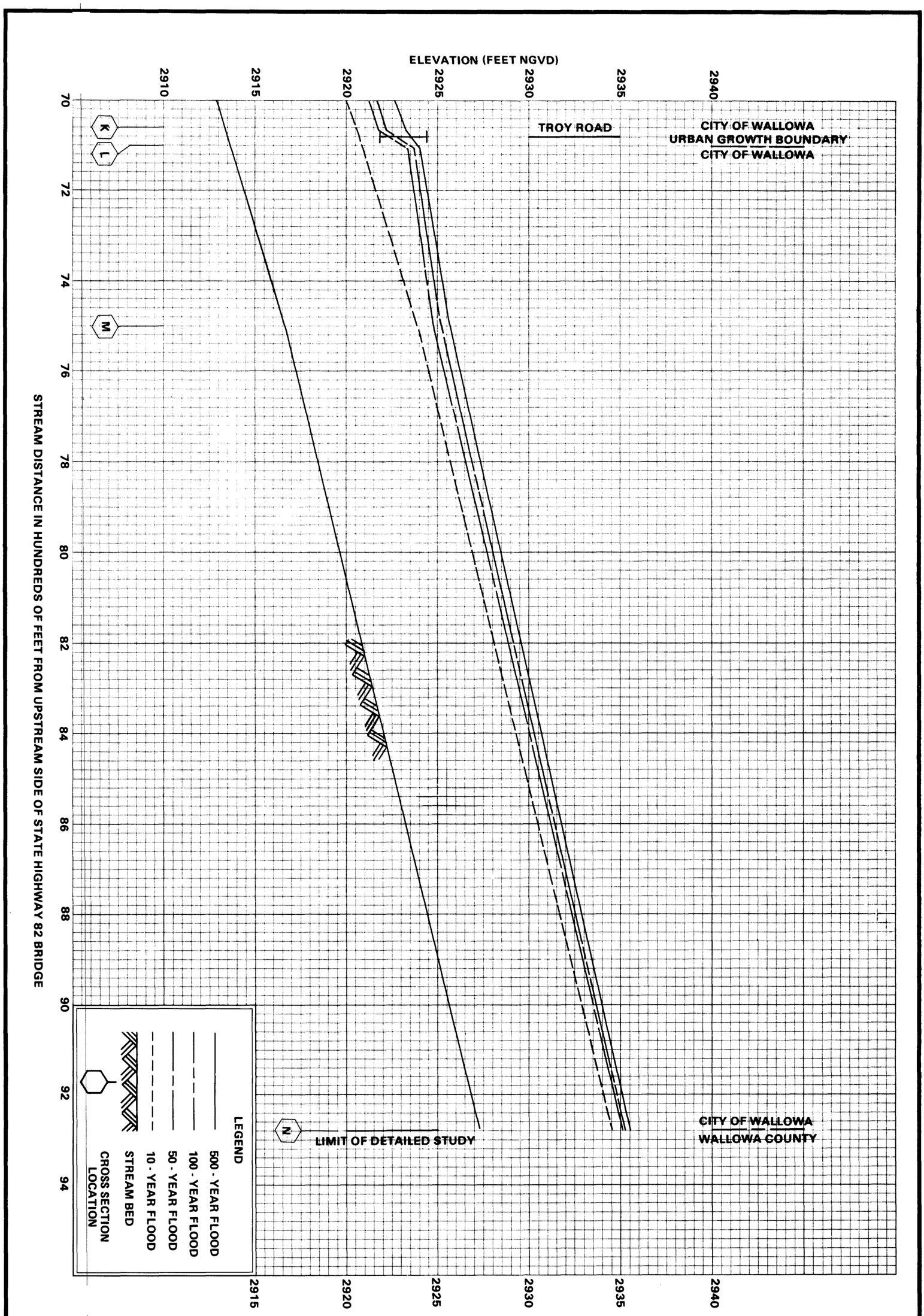
FLOOD PROFILES

WALLOWA RIVER (AT CITY OF WALLOWA)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

03P



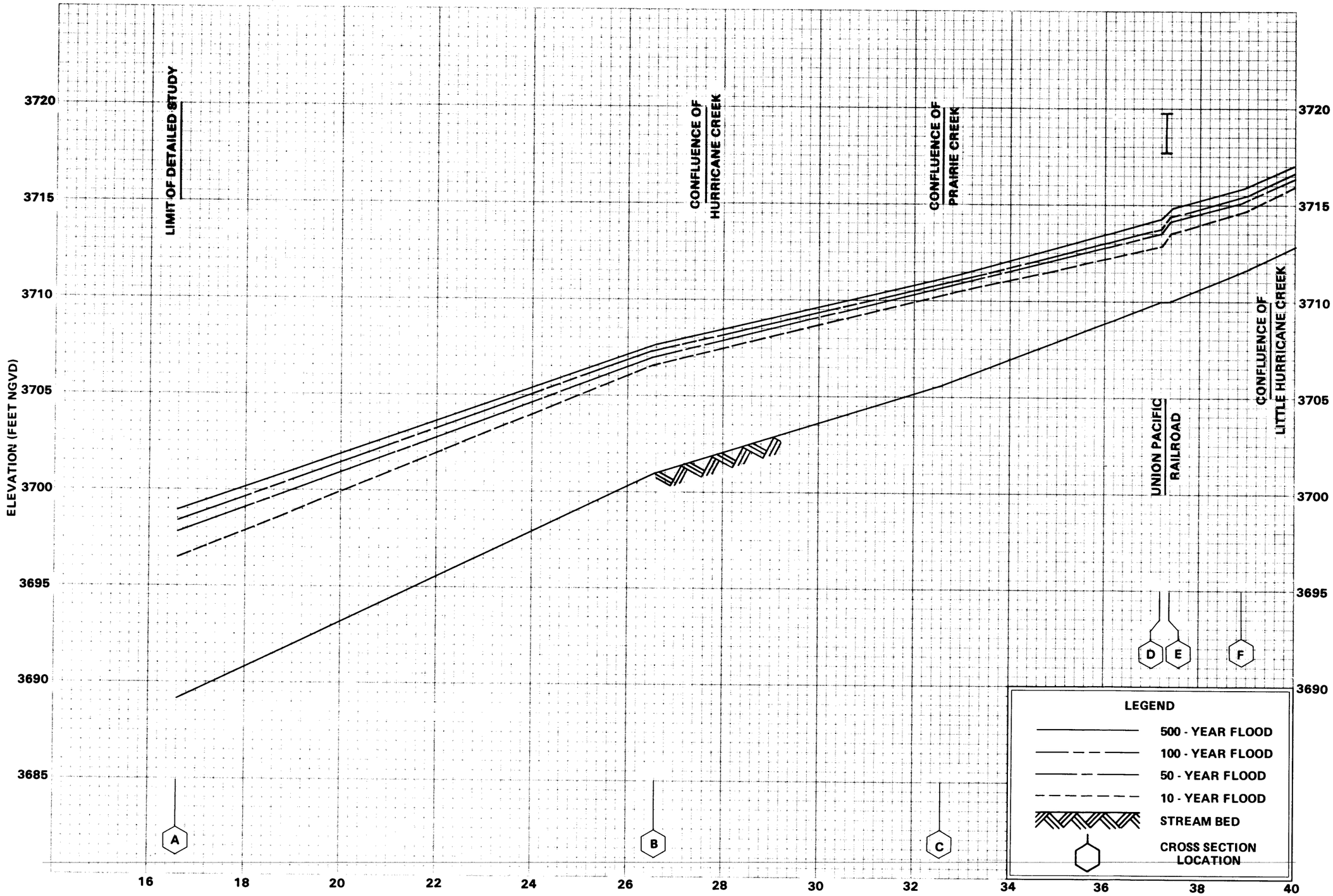
04P

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOOD PROFILES

WALLOWA RIVER (AT CITY OF WALLOWA)



FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

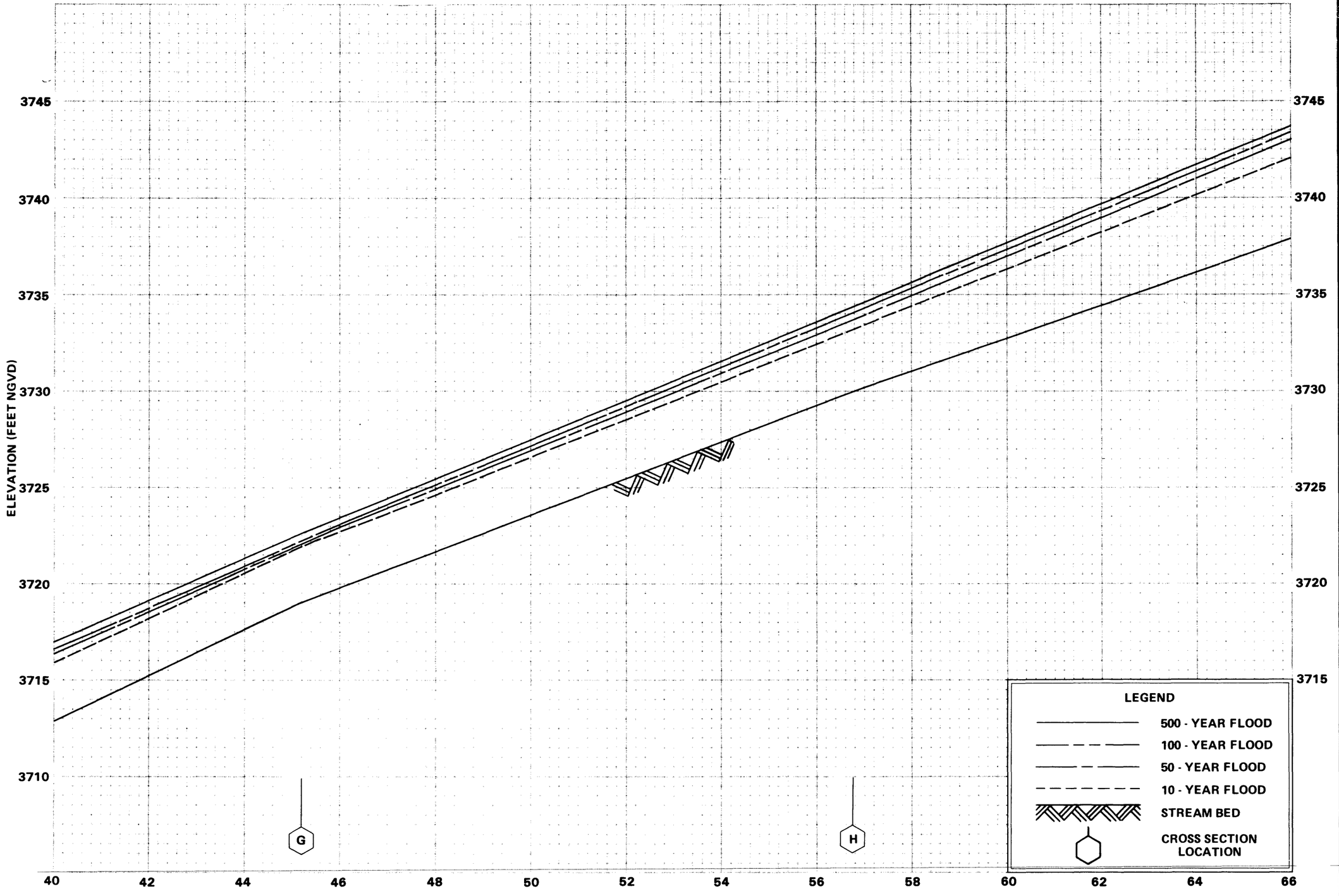
FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

05P

FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

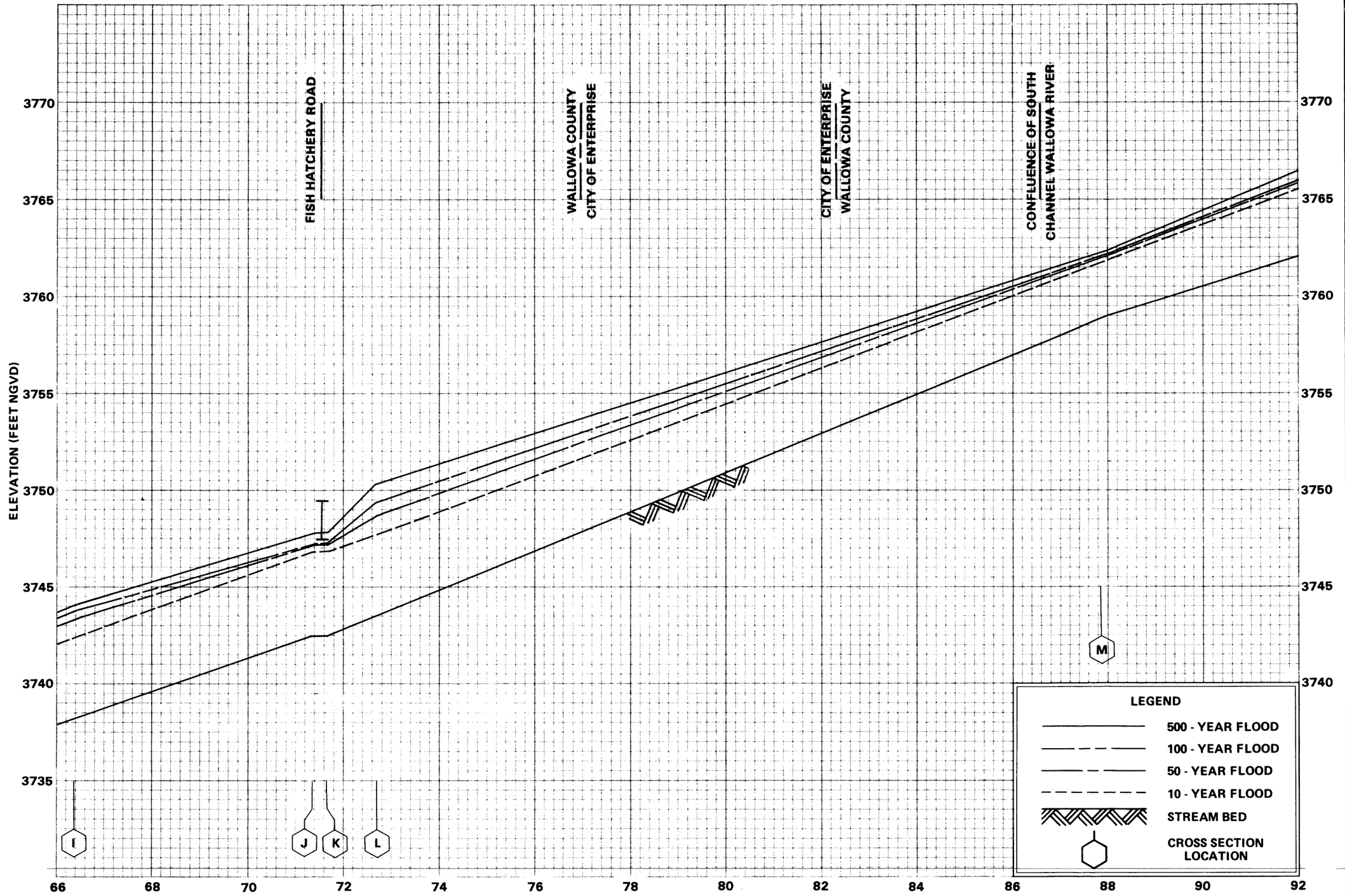


STREAM DISTANCE IN HUNDREDS OF FEET FROM UPSTREAM SIDE OF STATE HIGHWAY 82 BRIDGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

06P



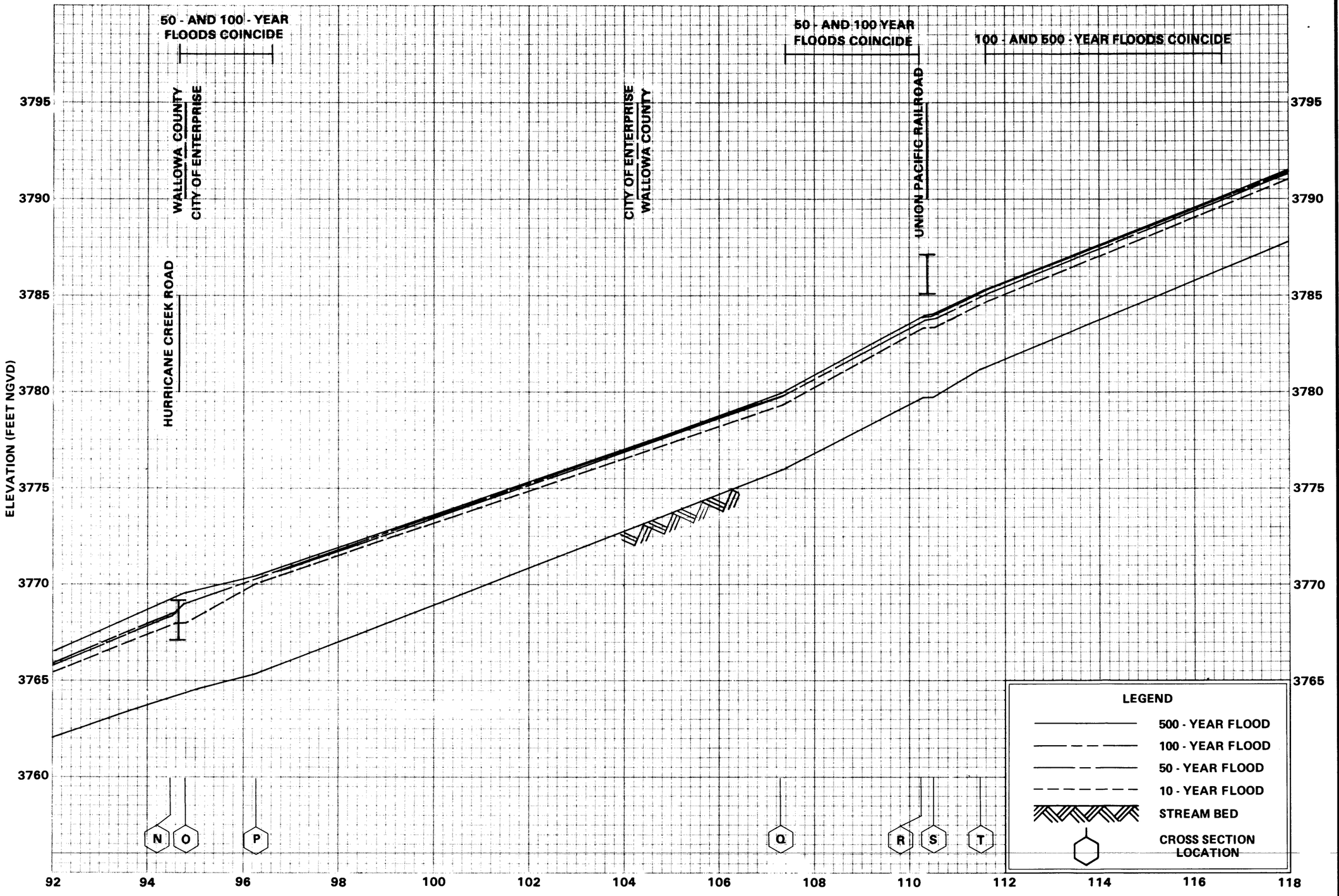
FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

07P

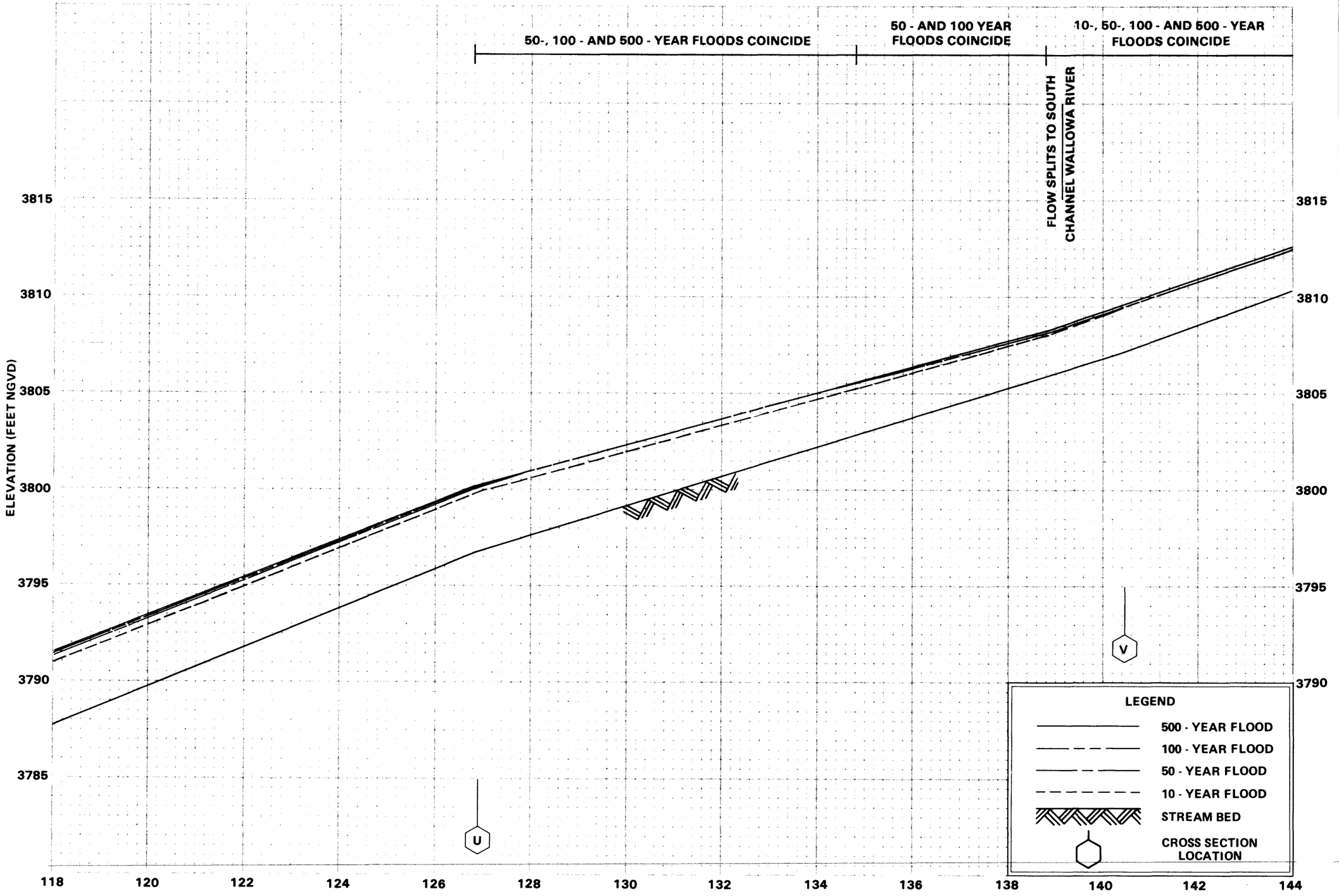


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

50 ,AND 100 - YEAR FLOODS COINCIDE

ELEVATION (FEET NGVD)

3840
3835
3830
3825
3820
3815
3810

144 146 148 150 152 154 156 158 160 162 164 166 168 170

STREAM DISTANCE IN HUNDREDS OF FEET FROM UPSTREAM SIDE OF STATE HIGHWAY 82 BRIDGE

LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

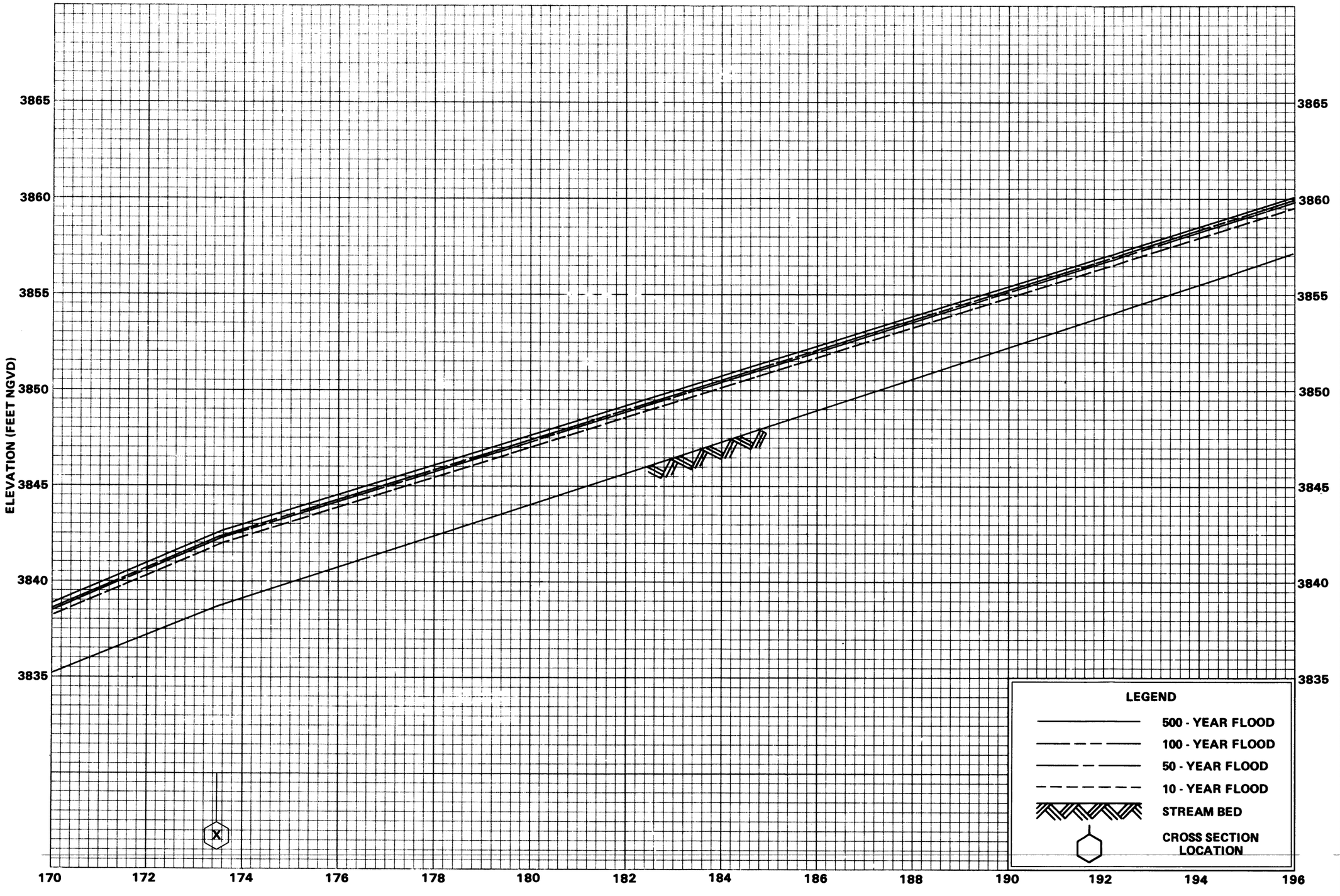
FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

10P

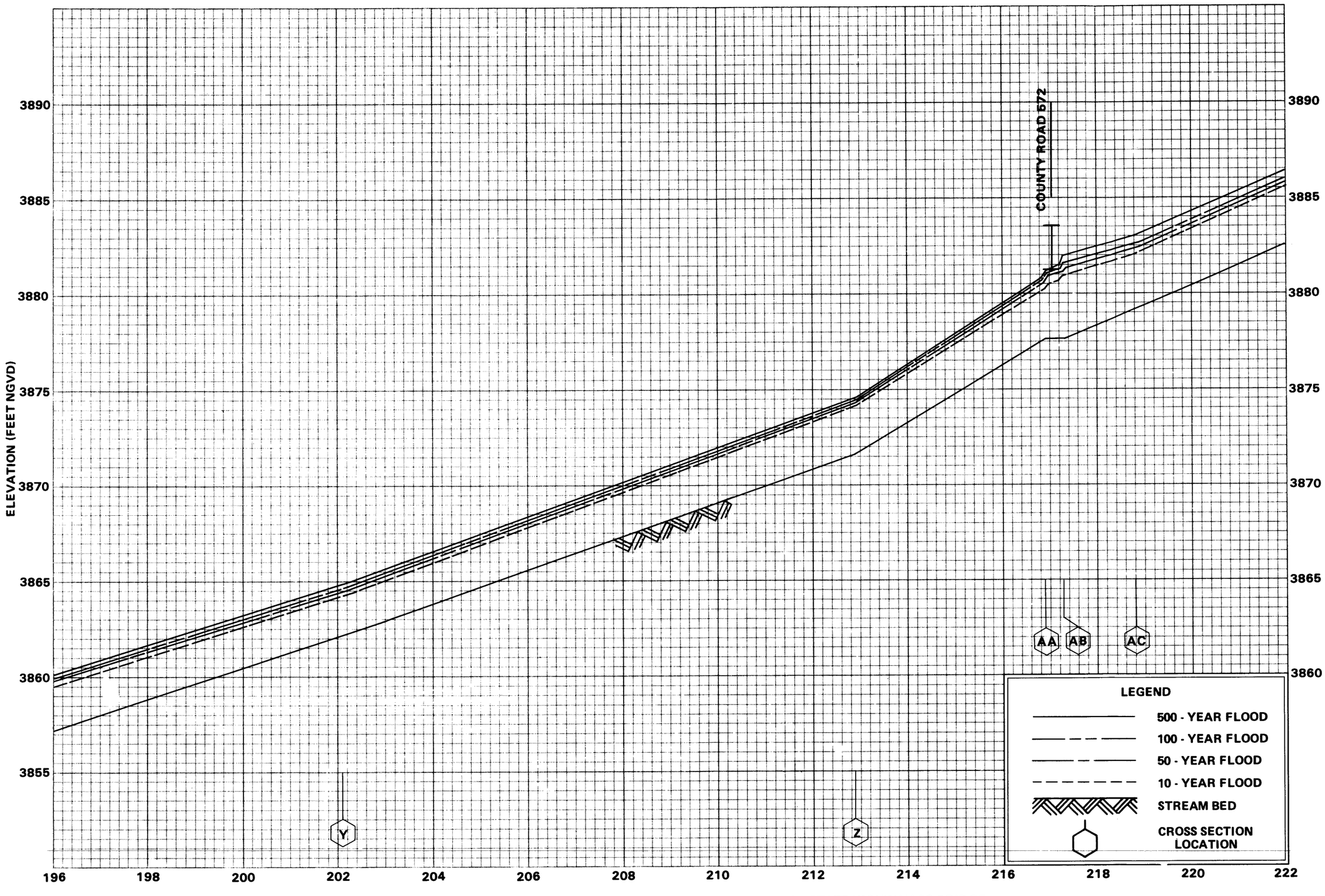


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

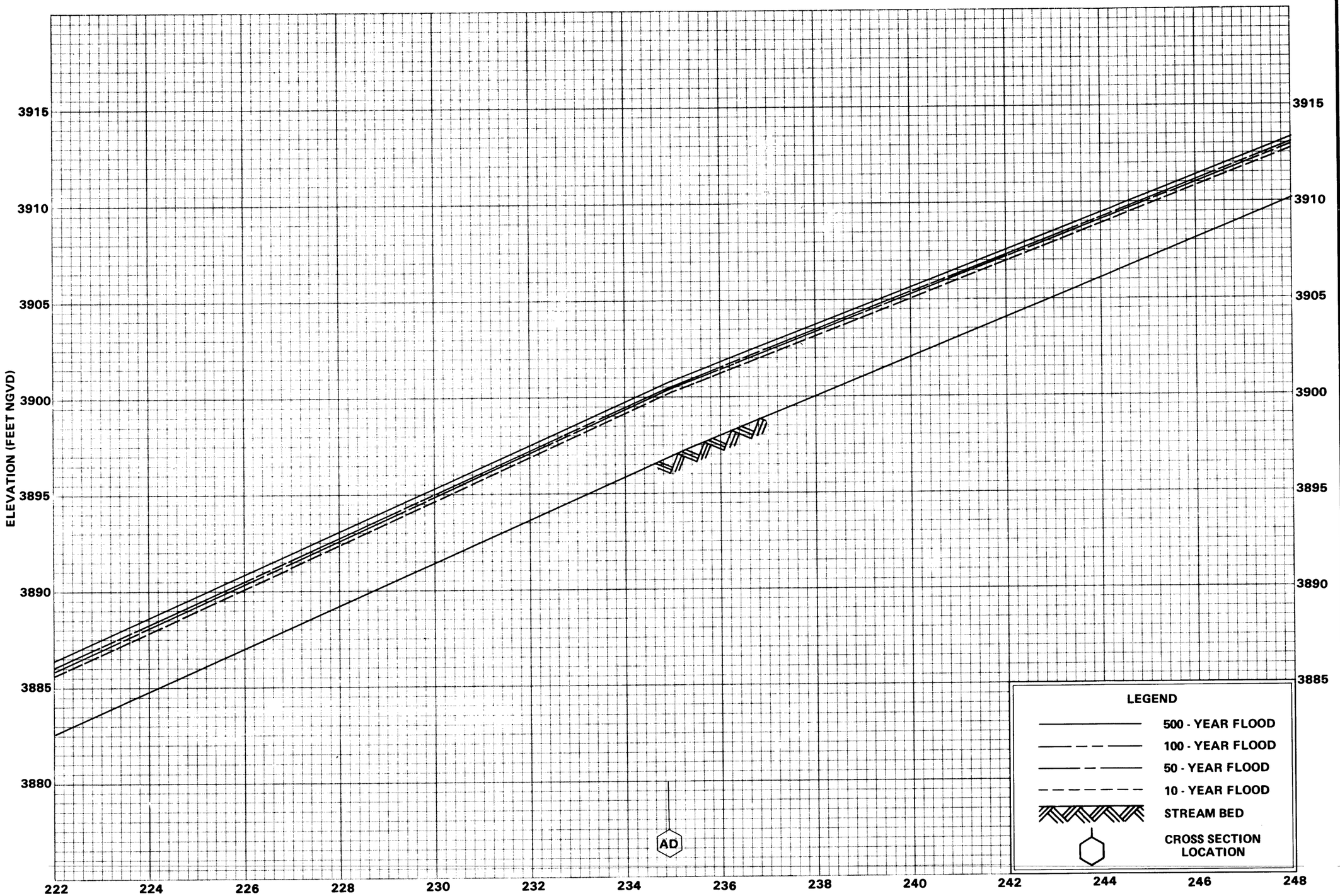


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



STREAM DISTANCE IN HUNDREDS OF FEET FROM UPSTREAM SIDE OF STATE HIGHWAY 82 BRIDGE

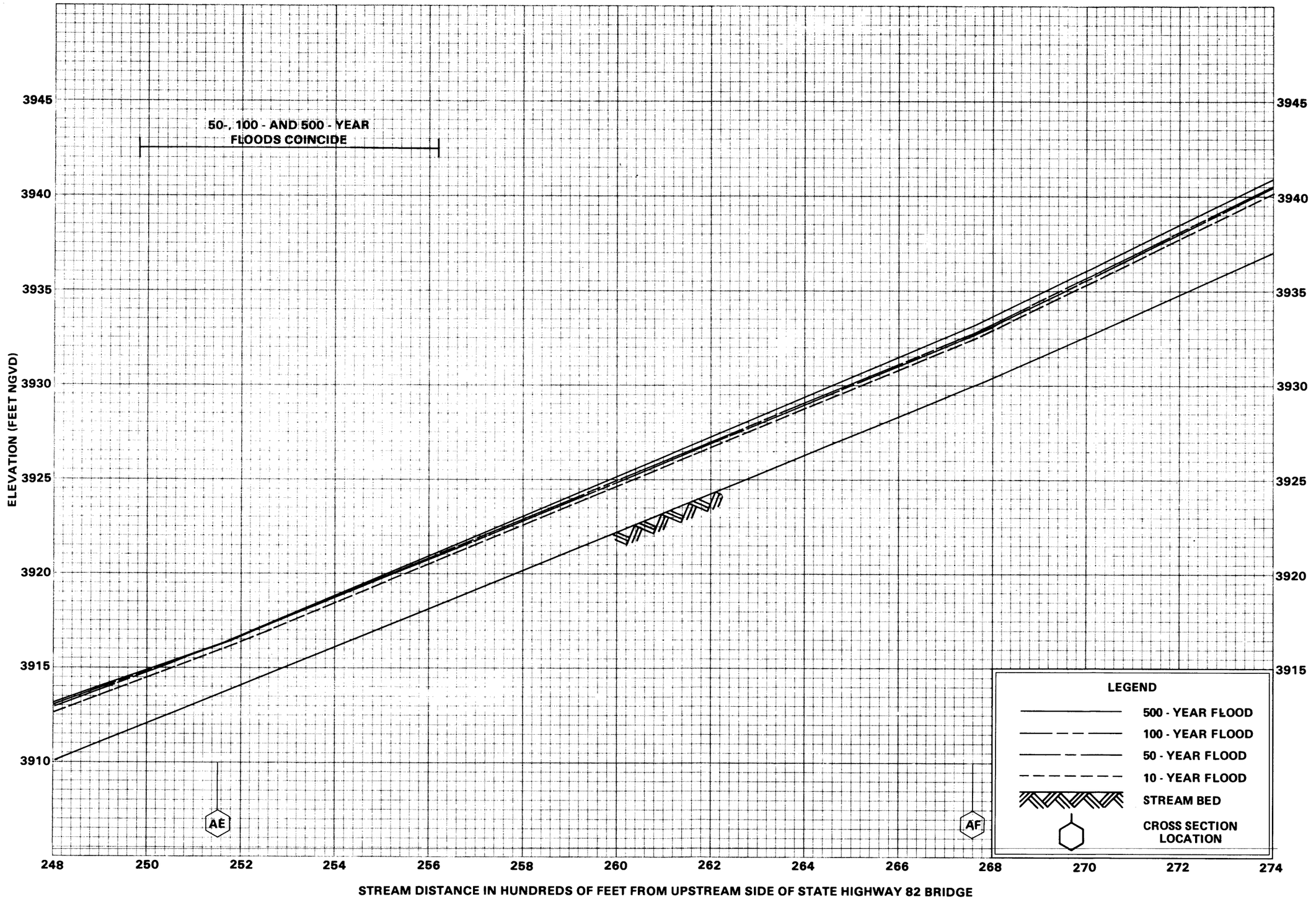
FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

13P

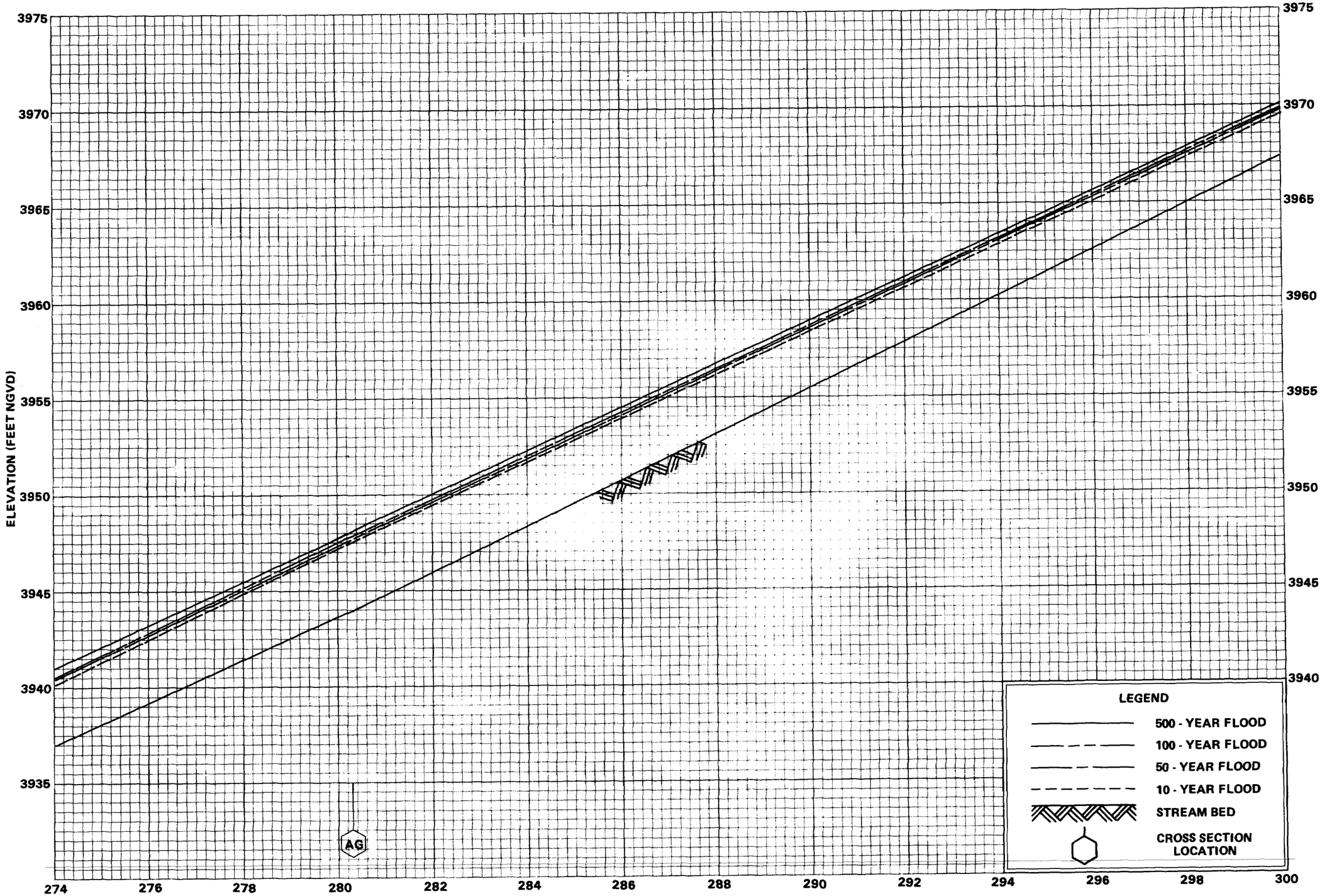


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



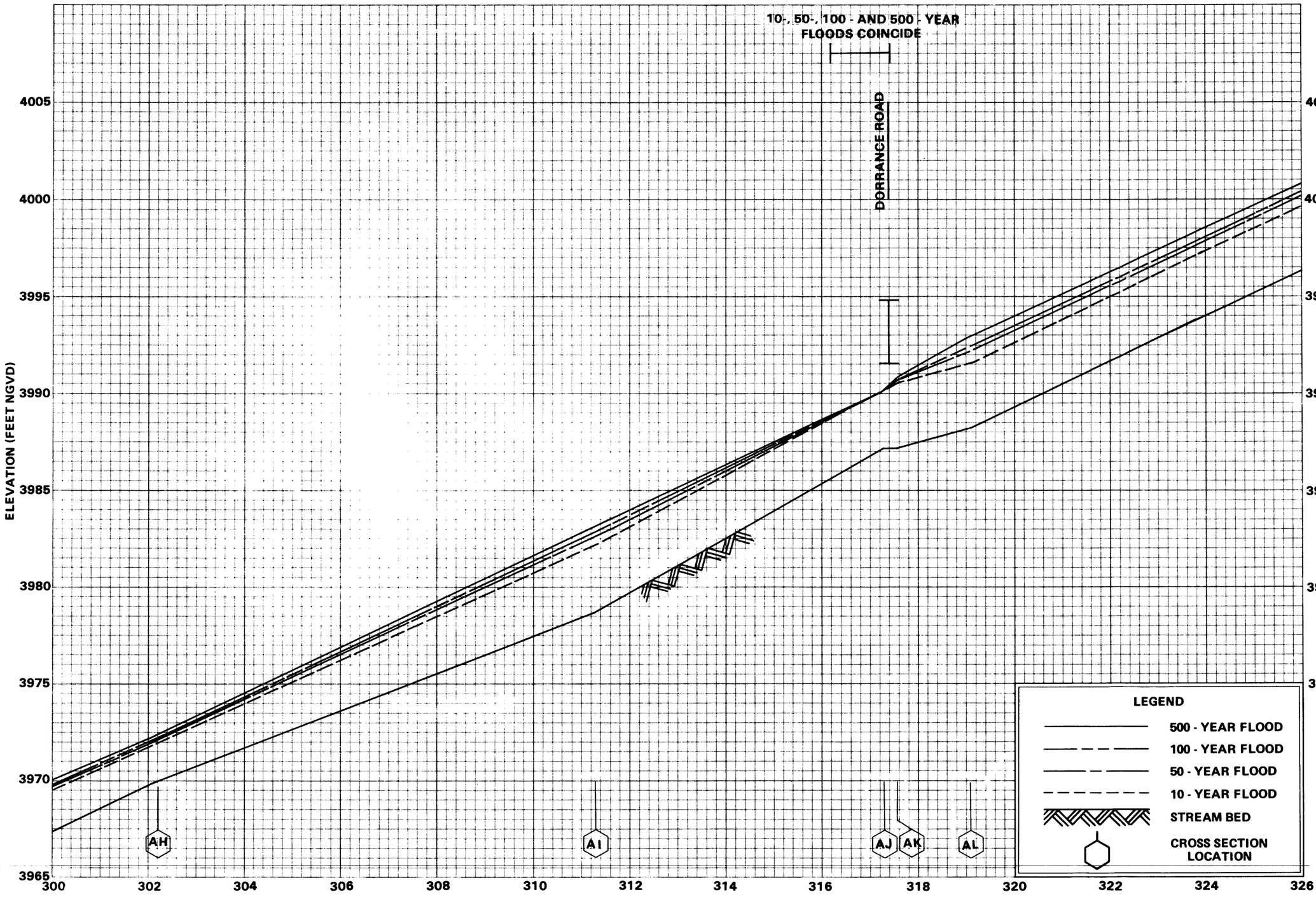
FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

15P



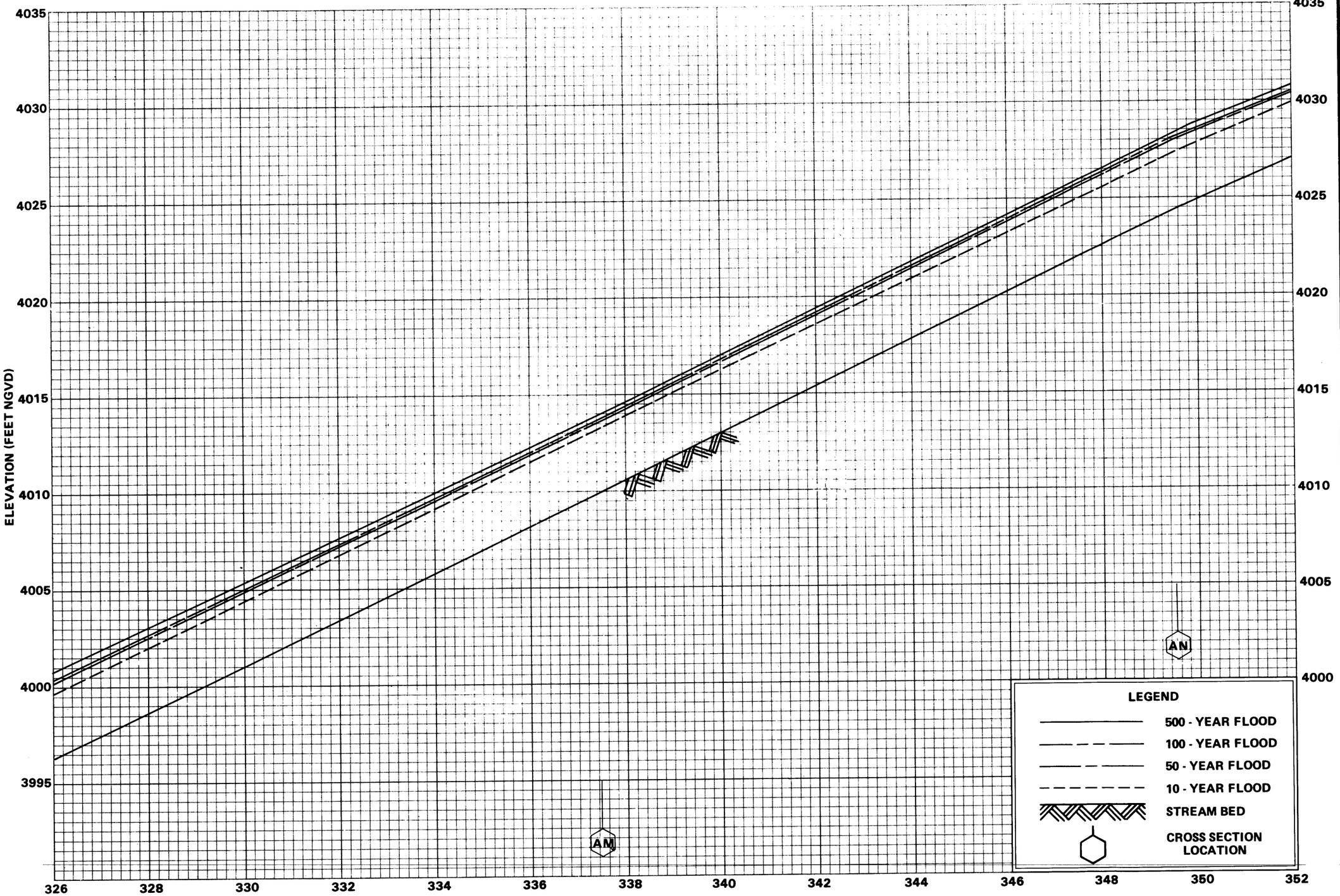
FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

16P

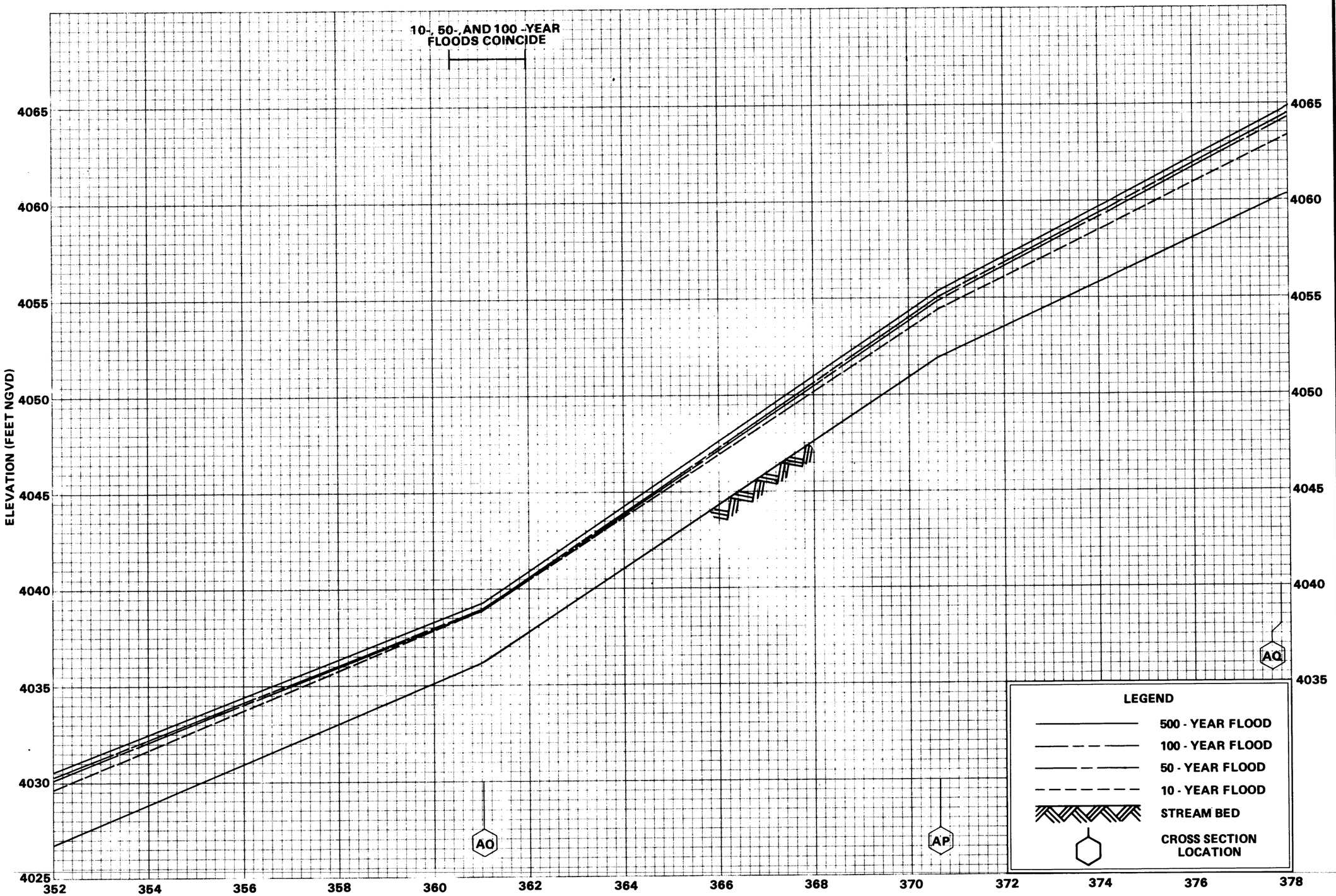


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



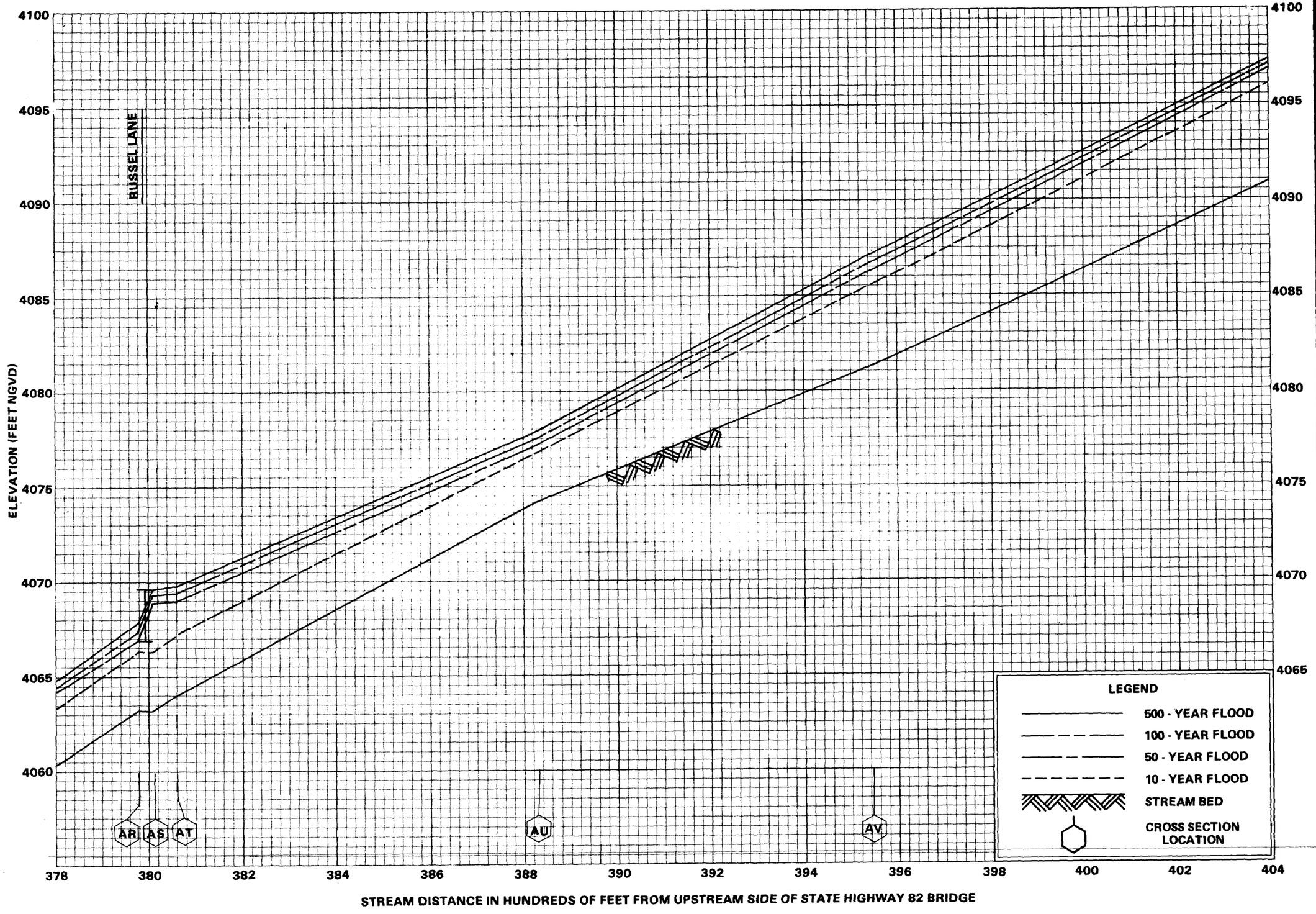
FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

18P

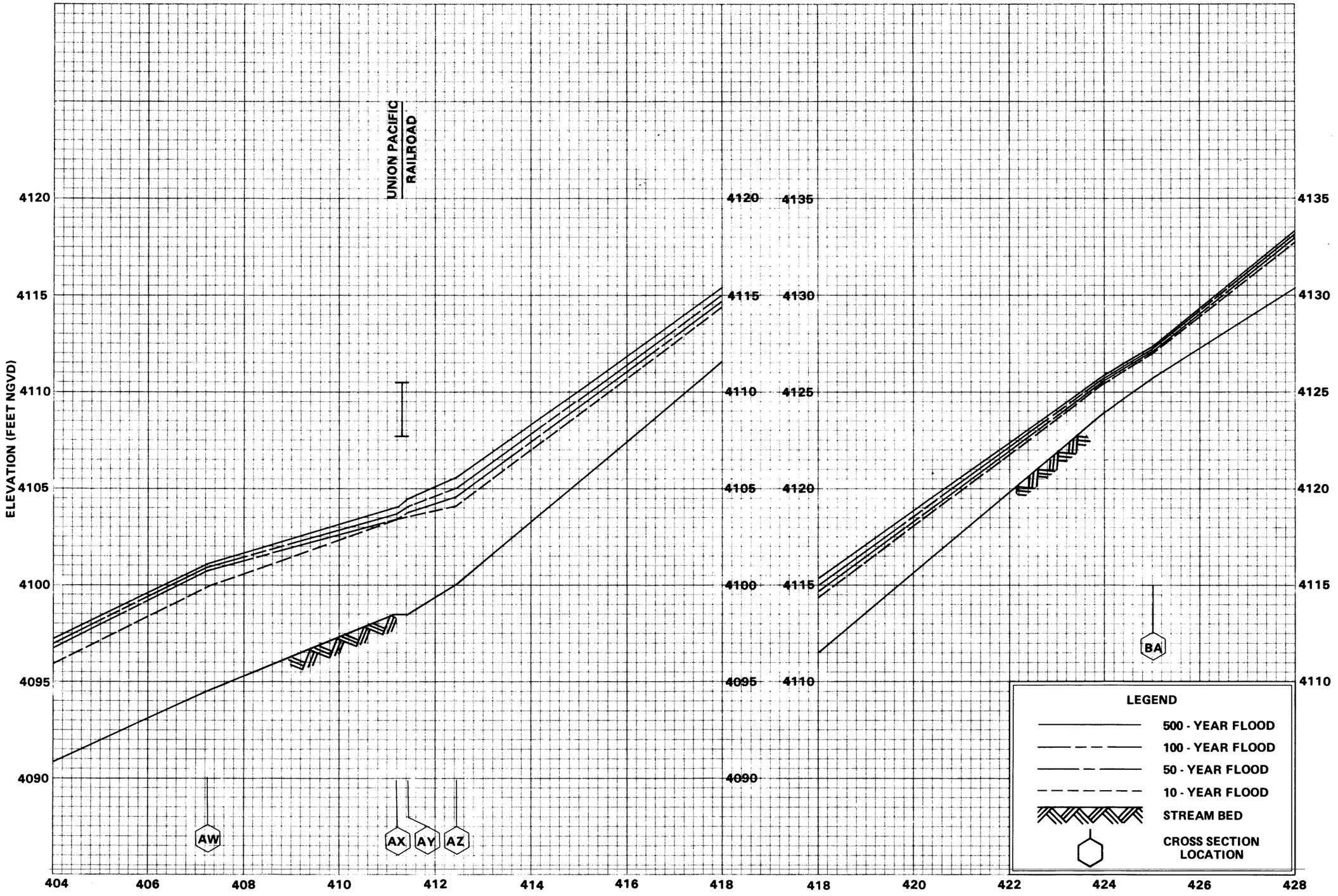


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

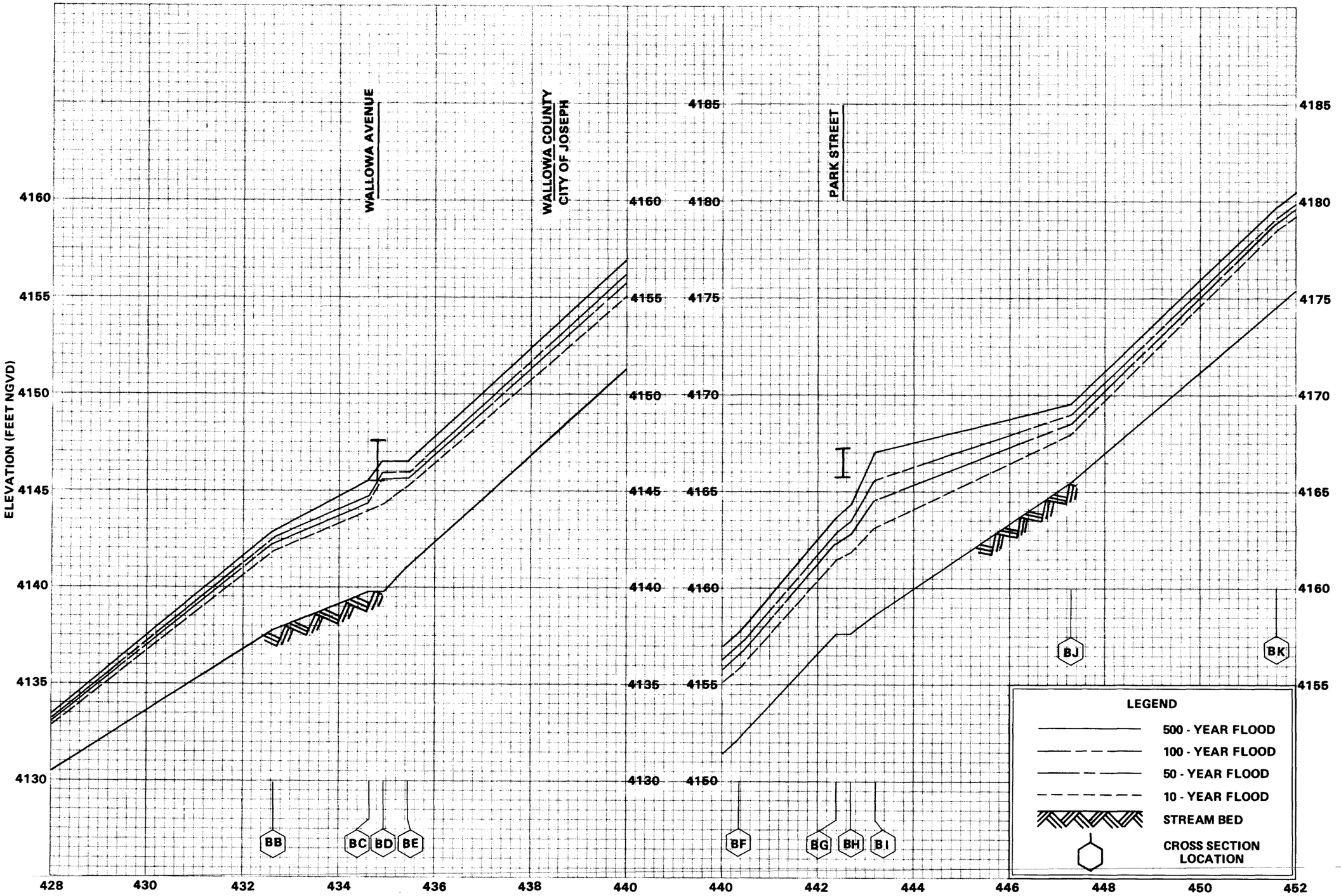


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

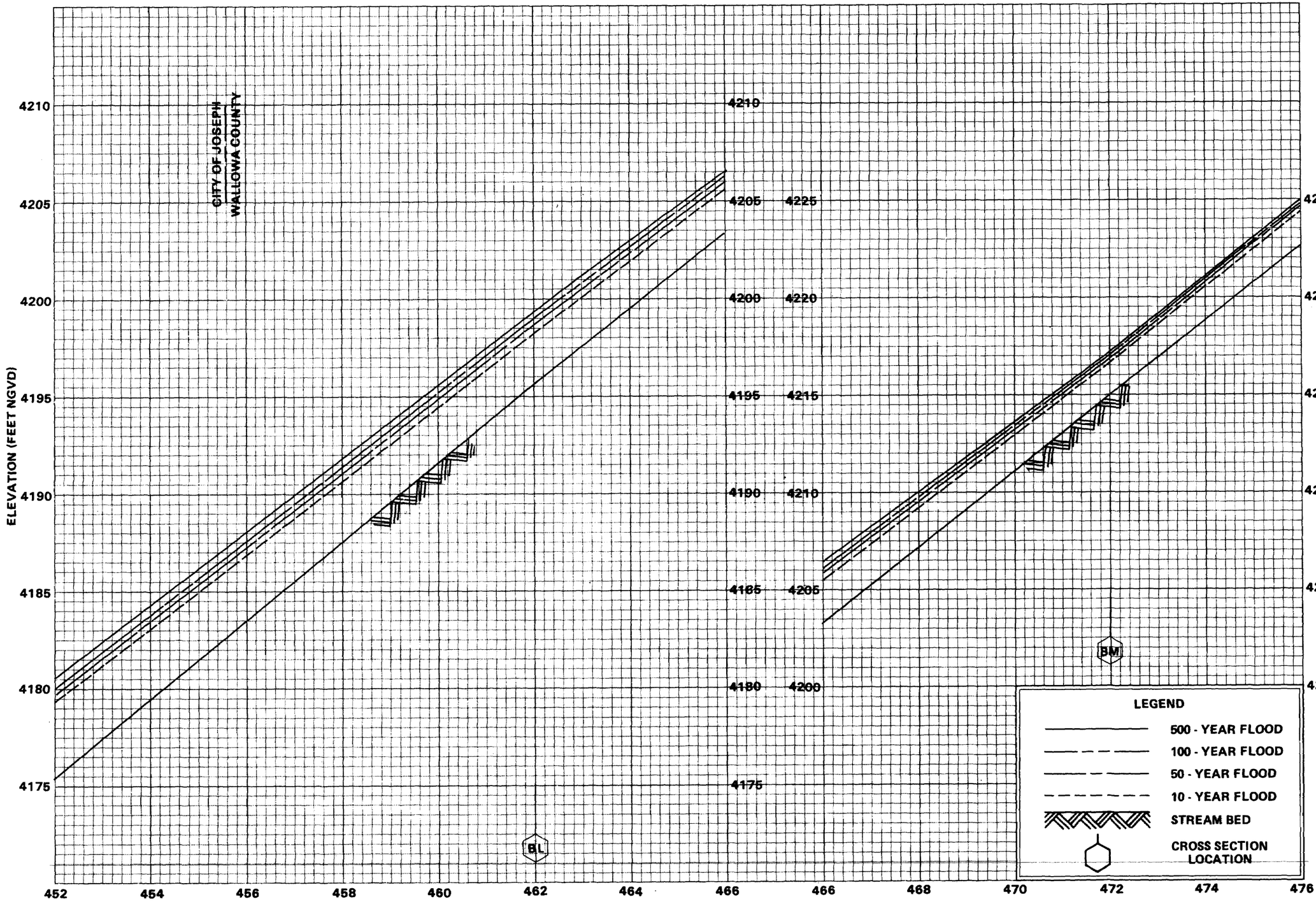


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

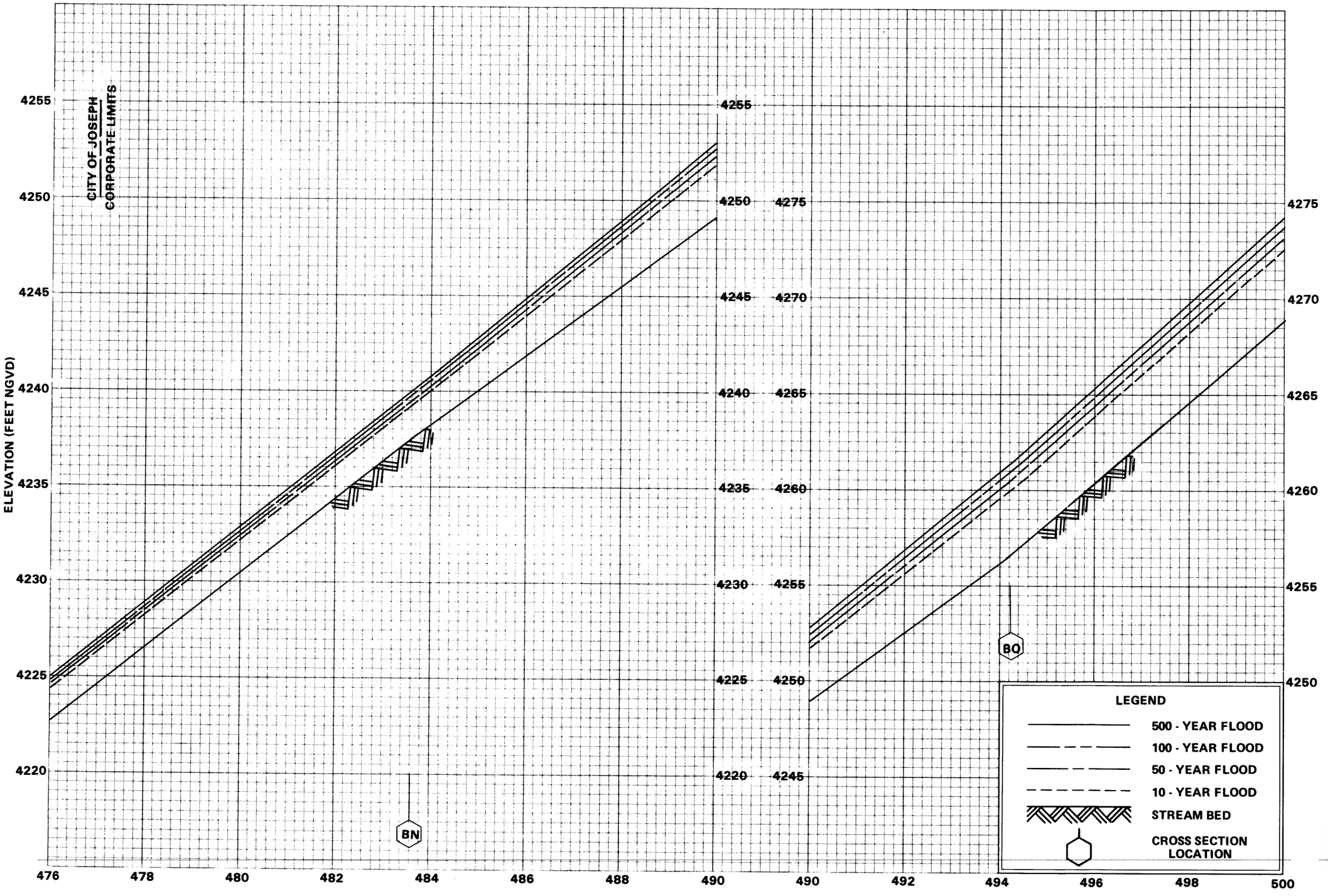


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

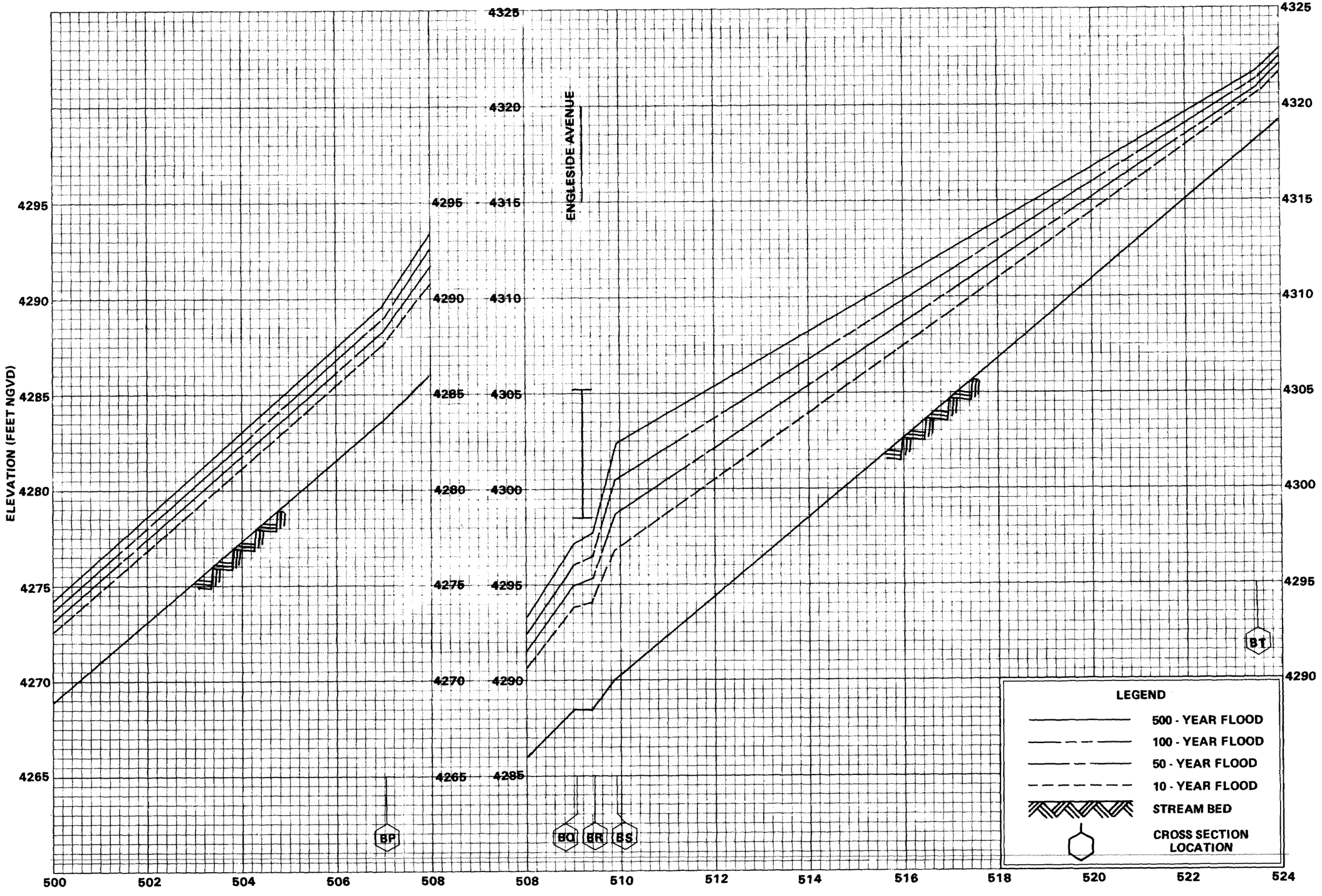


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

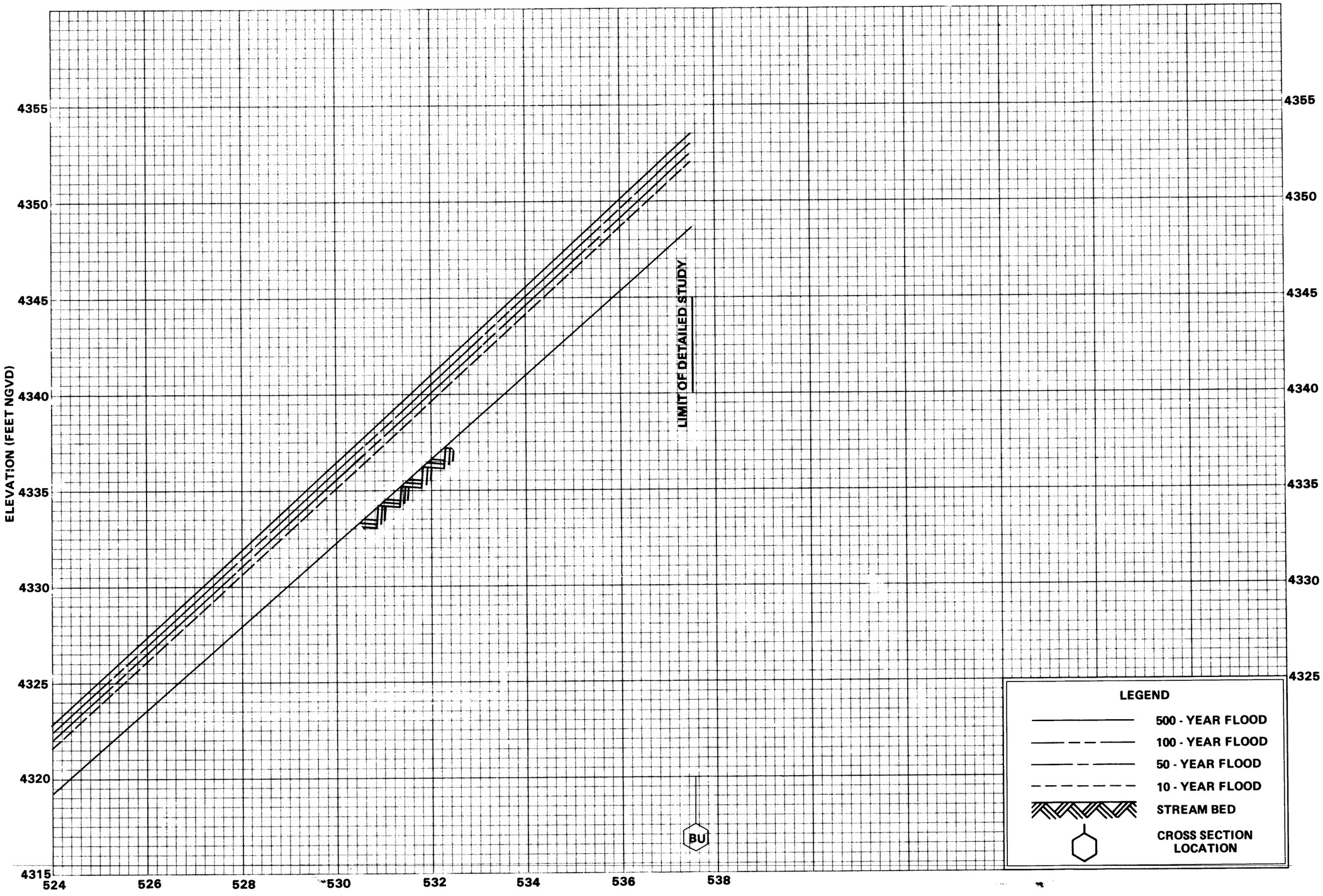


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

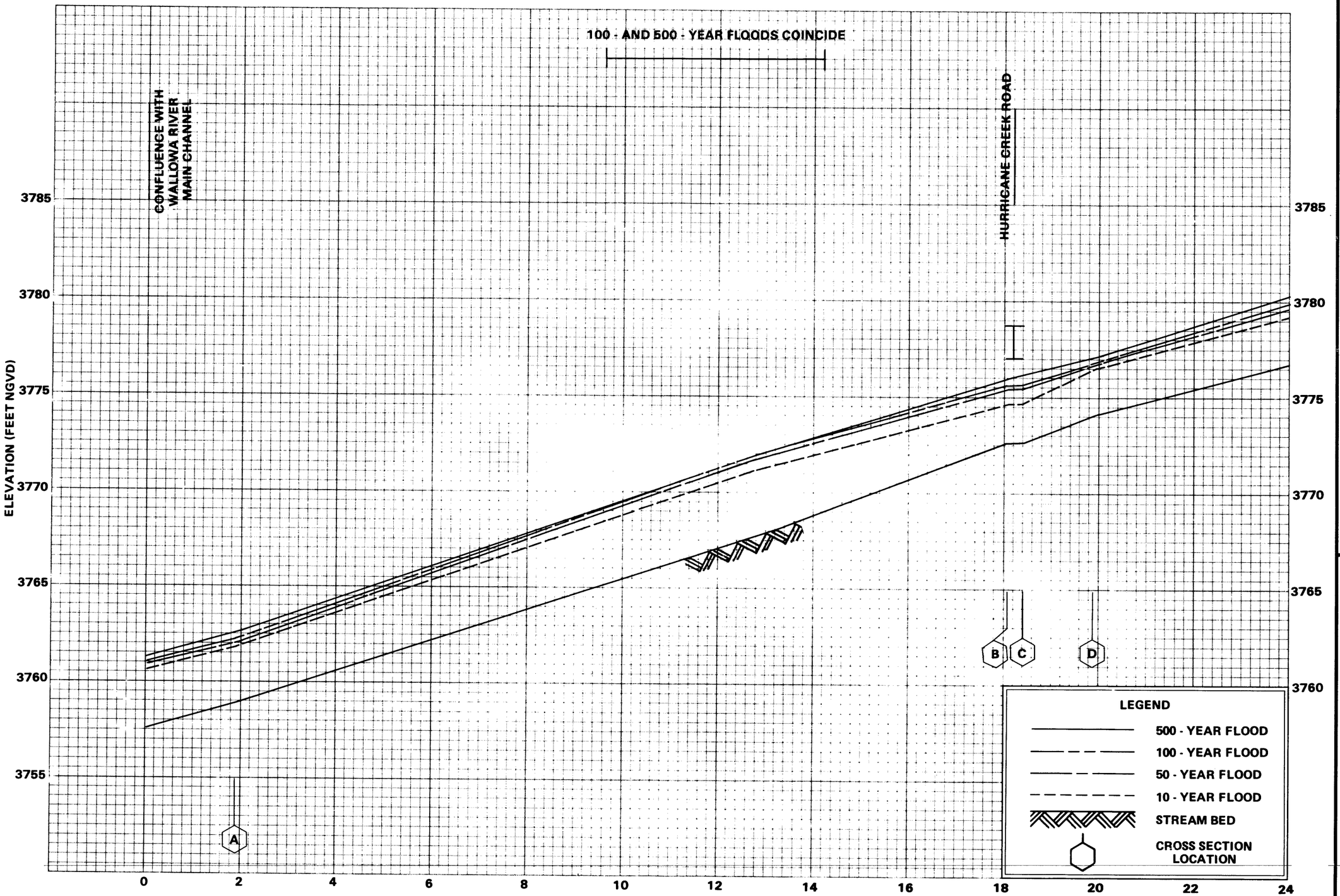


FLOOD PROFILES

WALLOWA RIVER (FROM ENTERPRISE TO WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

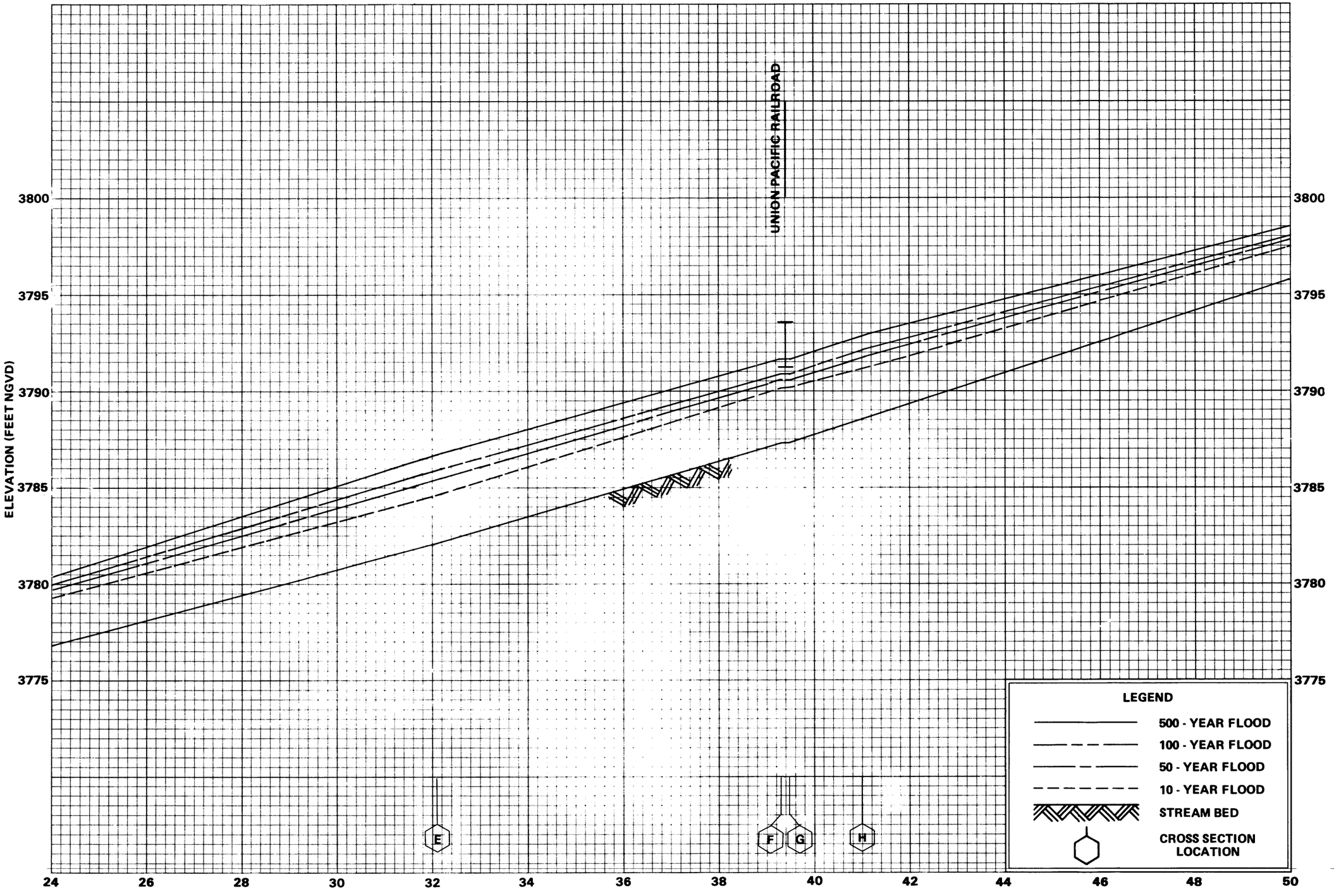


FLOOD PROFILES

WALLOWA RIVER (SOUTH CHANNEL NEAR ENTERPRISE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

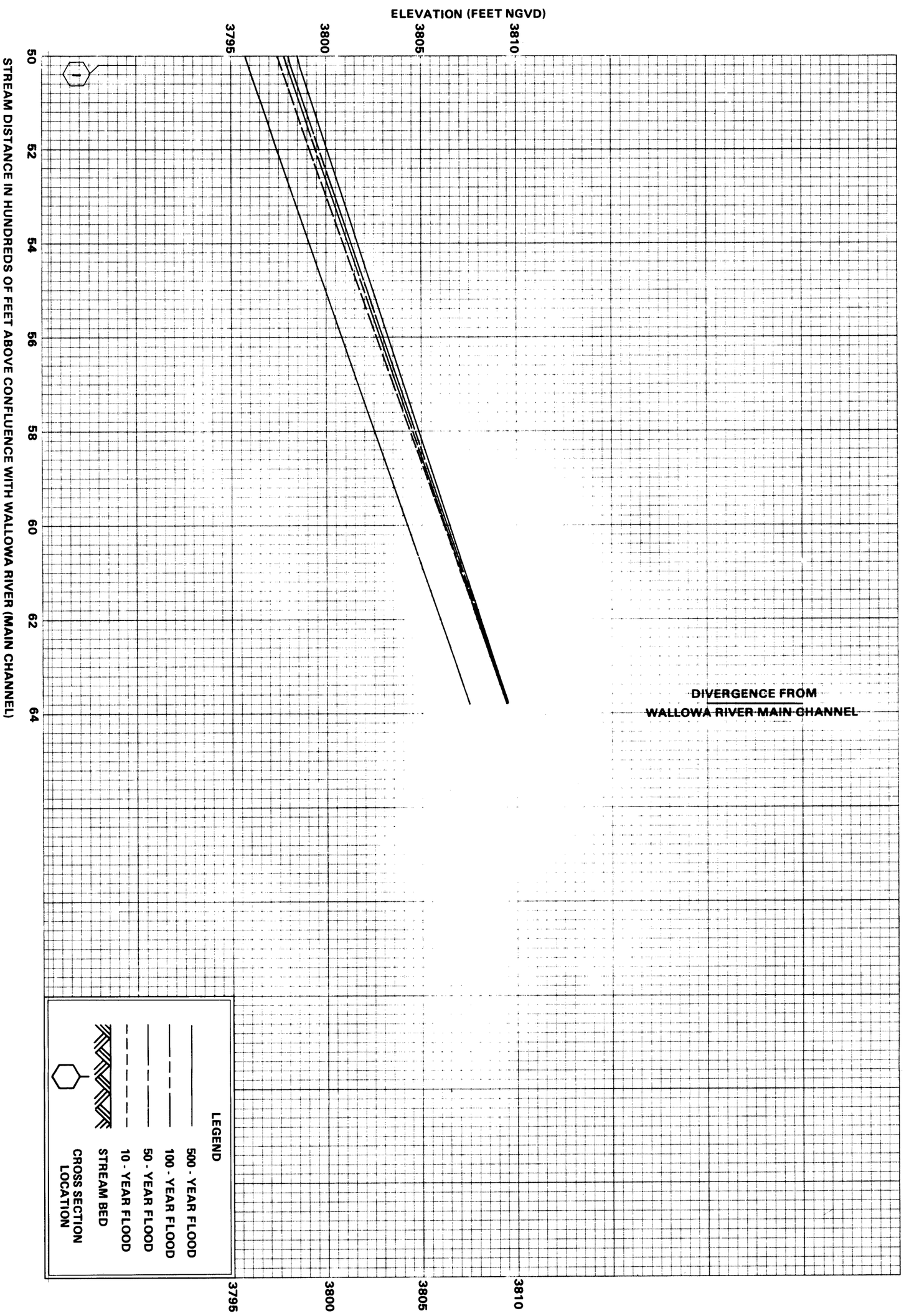


FLOOD PROFILES

WALLOWA RIVER (SOUTH CHANNEL NEAR ENTERPRISE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

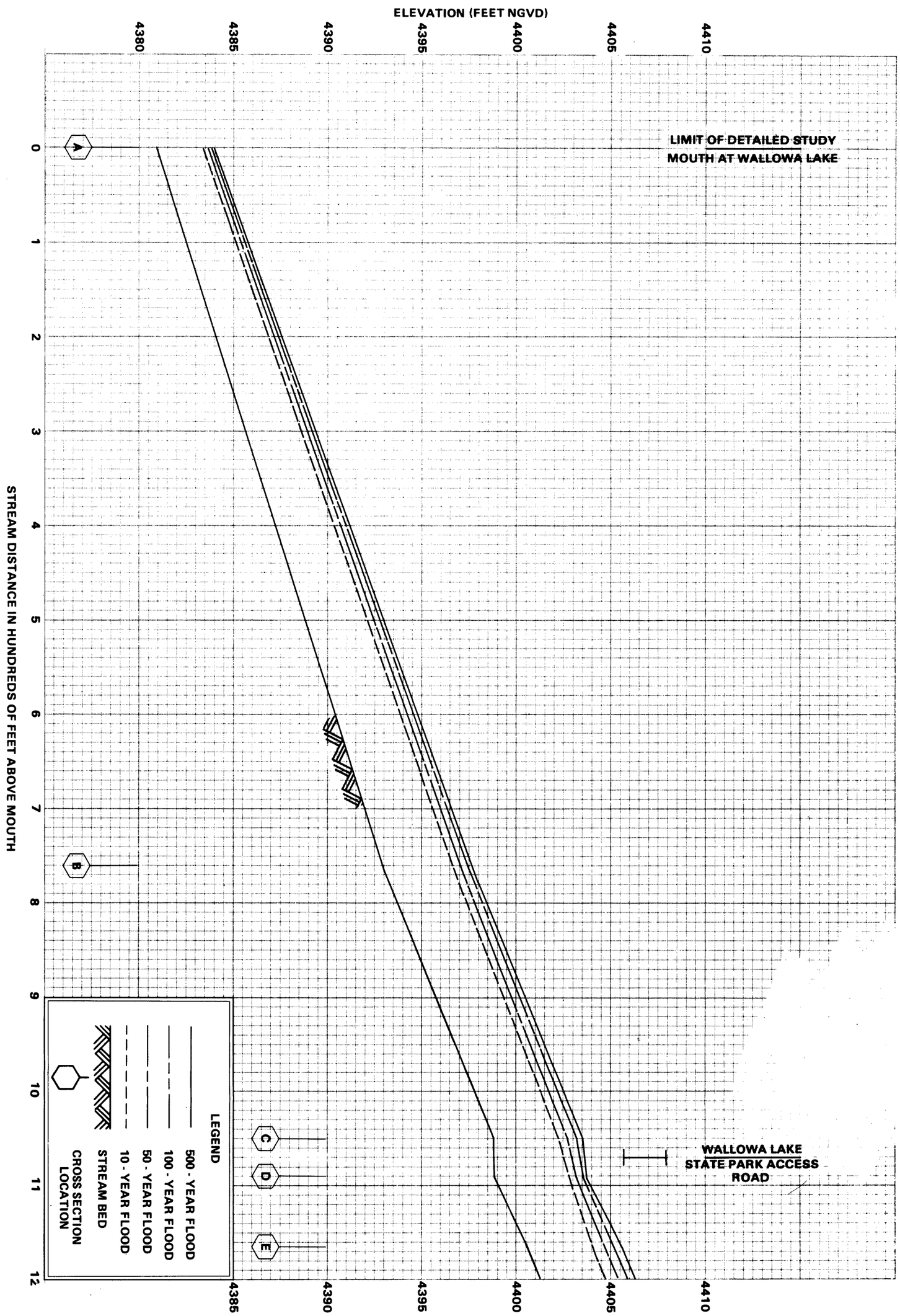


FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOOD PROFILES

WALLOWA RIVER (SOUTH CHANNEL NEAR ENTERPRISE)



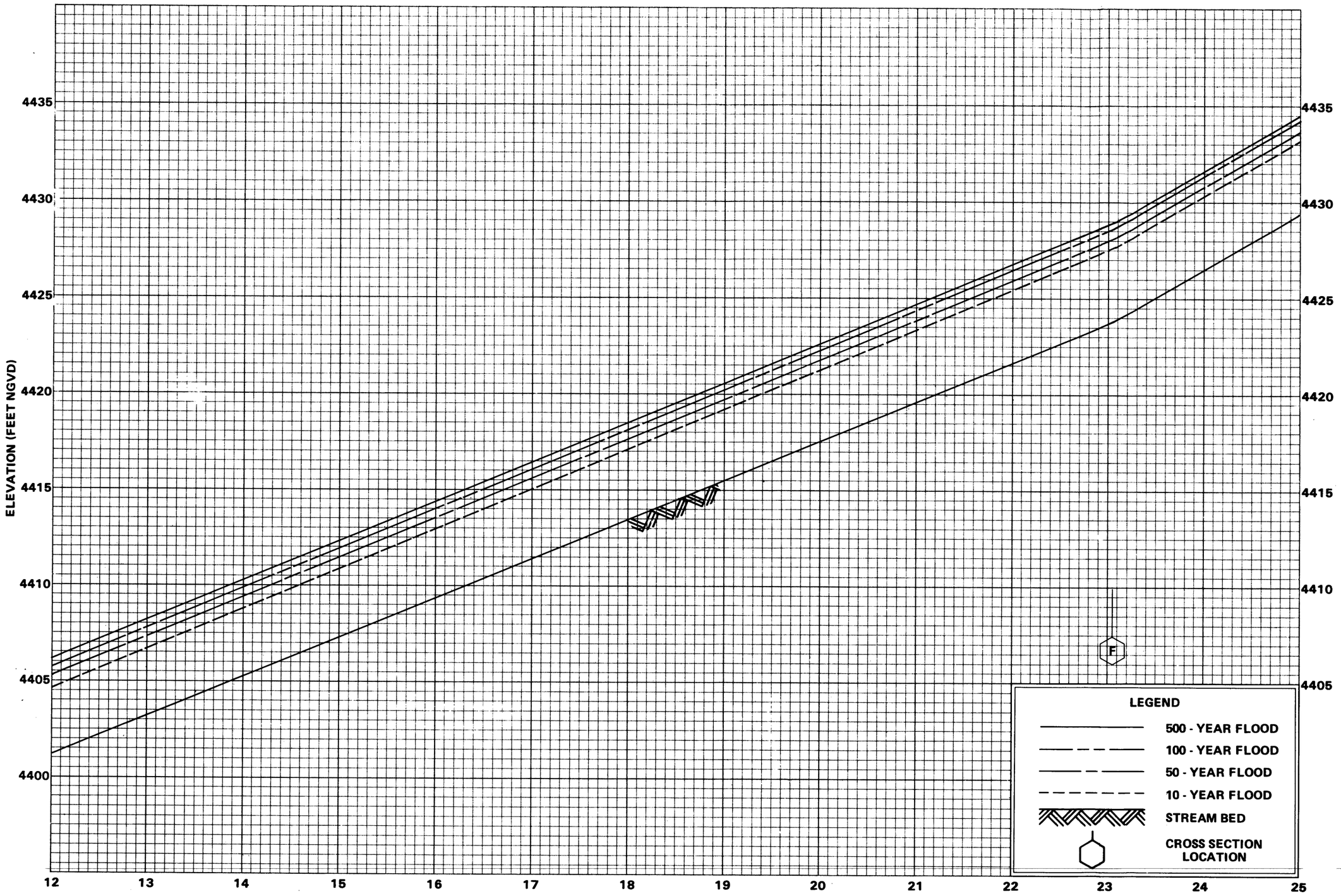
29P

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

FLOOD PROFILES

WALLOWA RIVER (UPSTREAM OF WALLOWA LAKE)

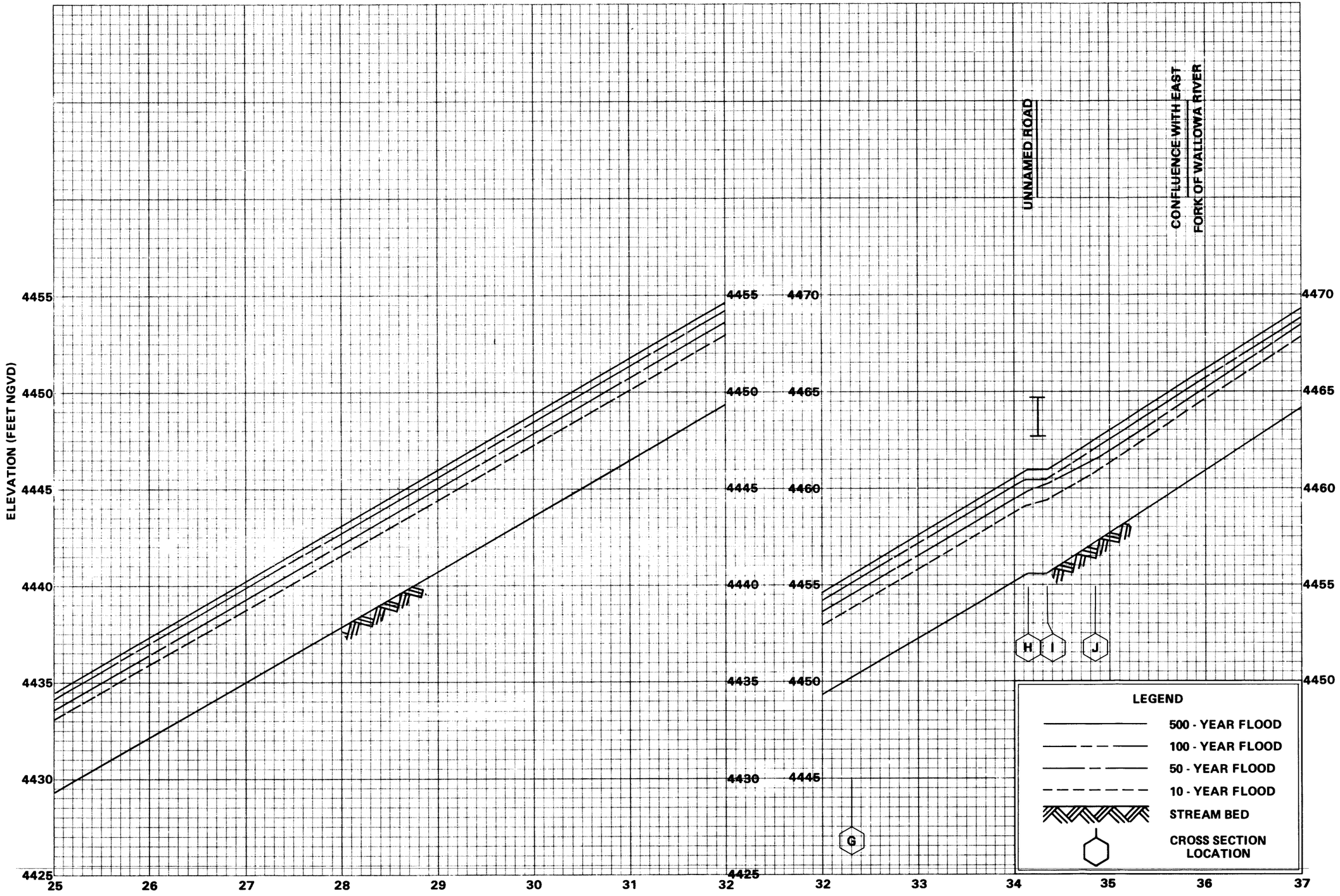


FLOOD PROFILES

WALLOWA RIVER (UPSTREAM OF WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

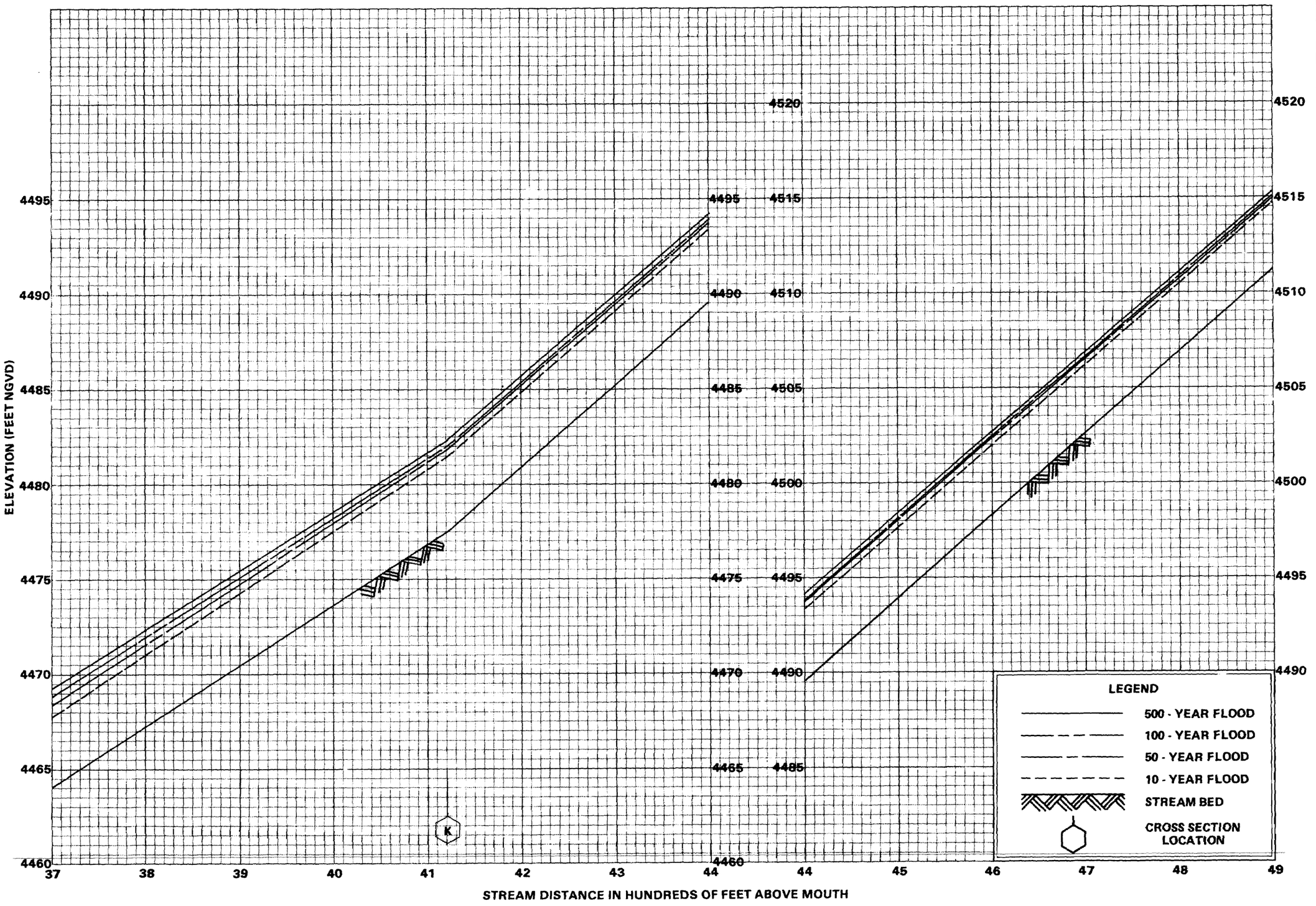


FLOOD PROFILES

WALLOWA RIVER (UPSTREAM OF WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

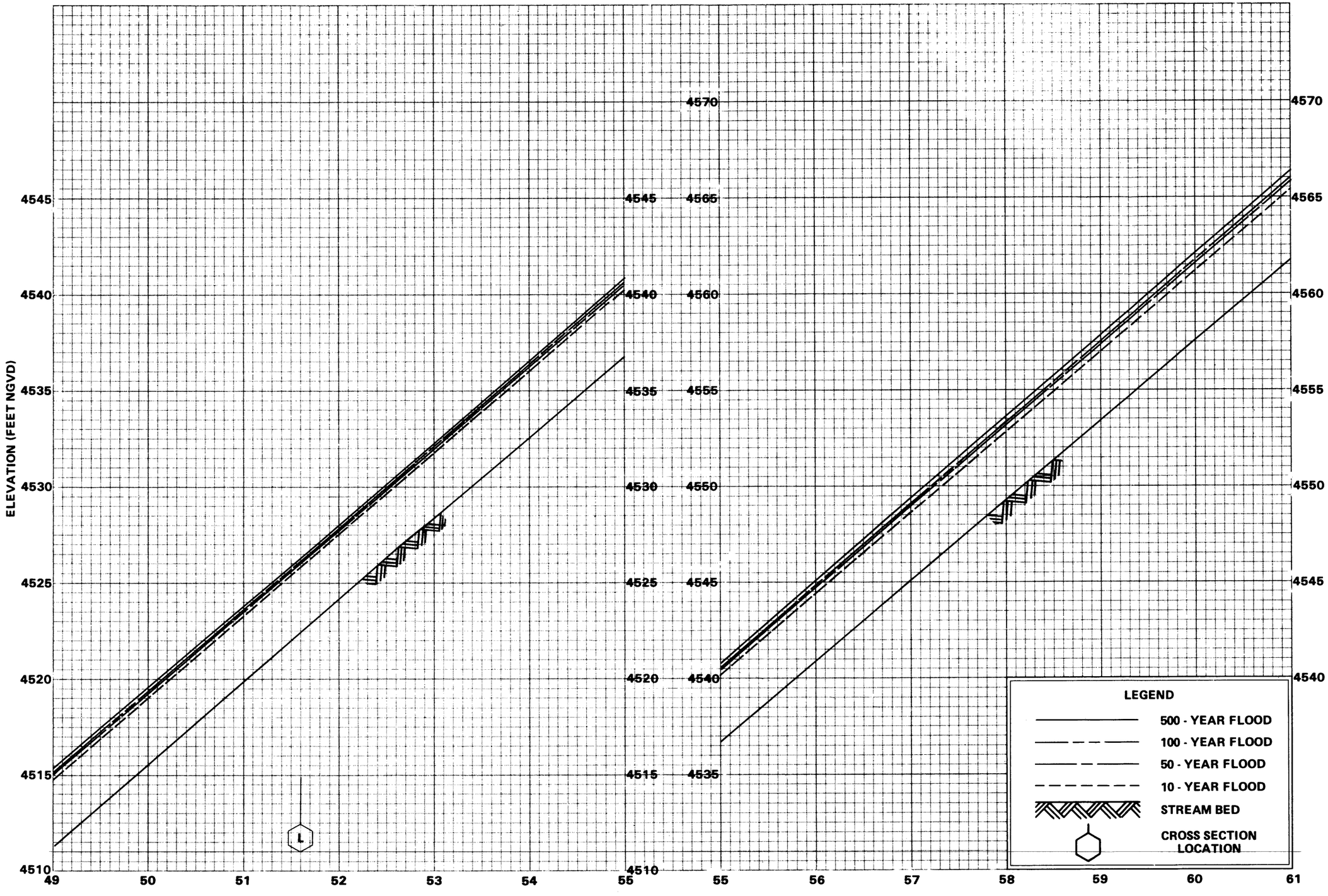


FLOOD PROFILES

WALLOWA RIVER (UPSTREAM OF WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



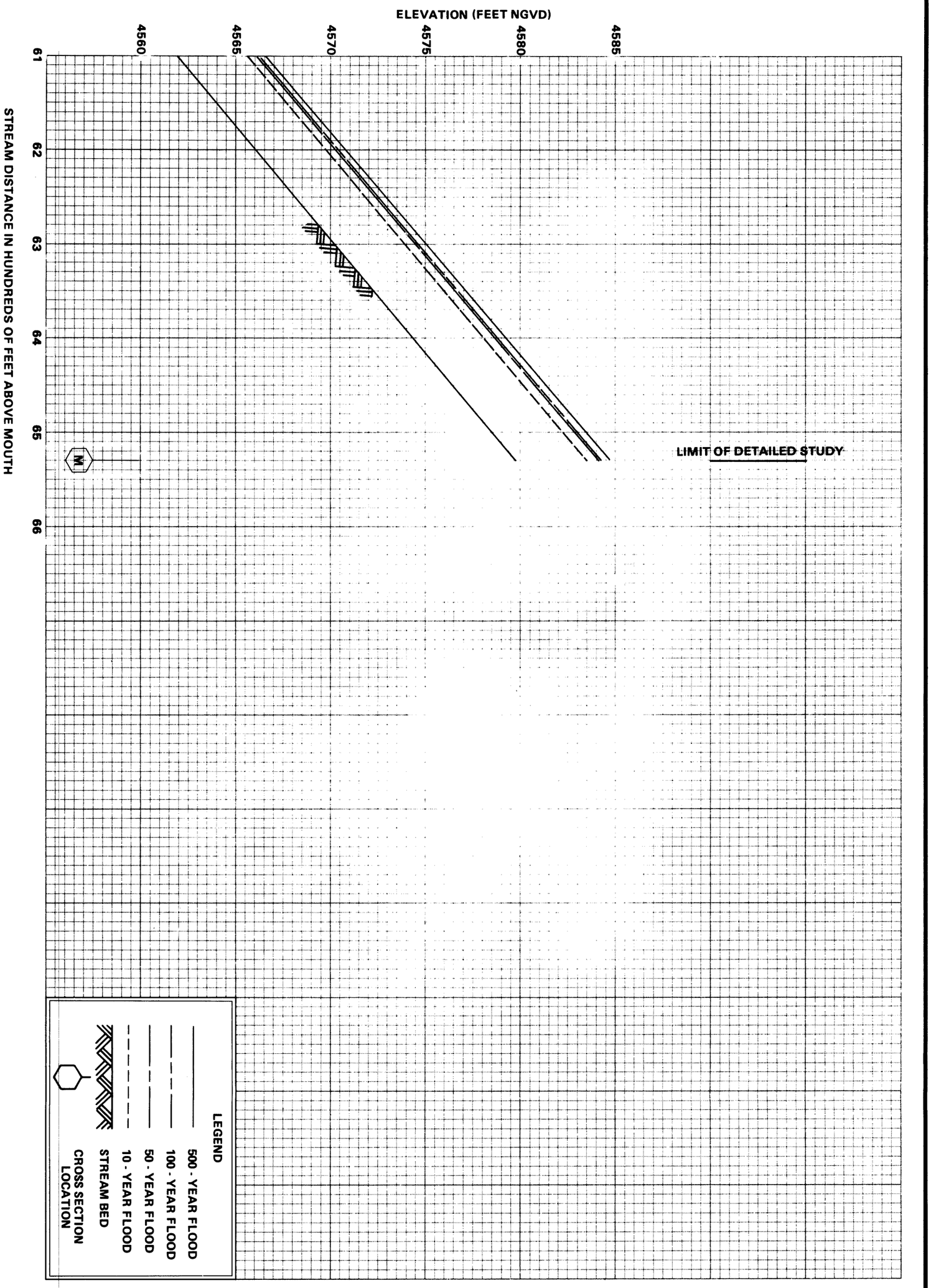
FLOOD PROFILES

WALLOWA RIVER (UPSTREAM OF WALLOWA LAKE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

33P

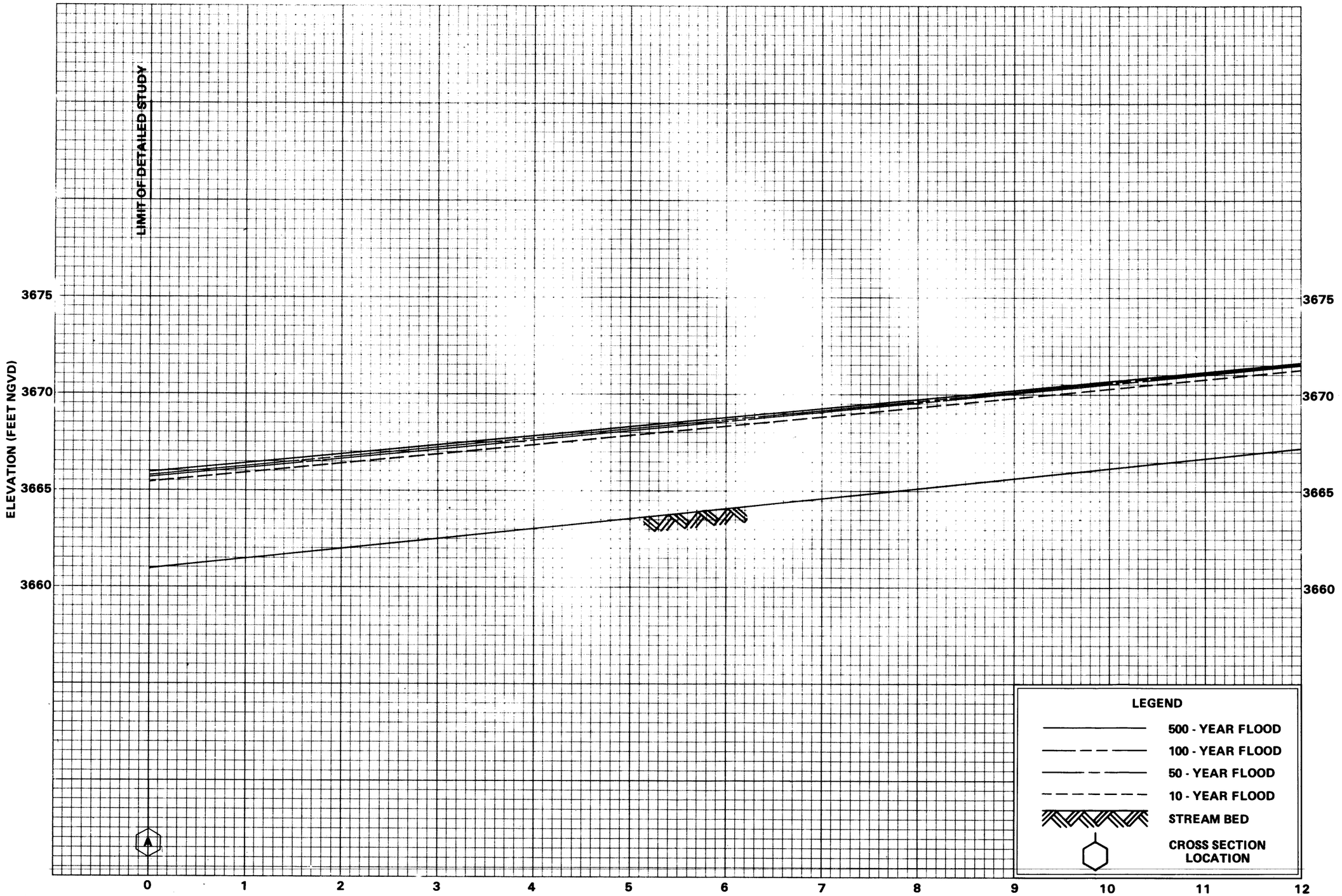


FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOOD PROFILES

WALLOWA RIVER (UPSTREAM OF WALLOWA LAKE)



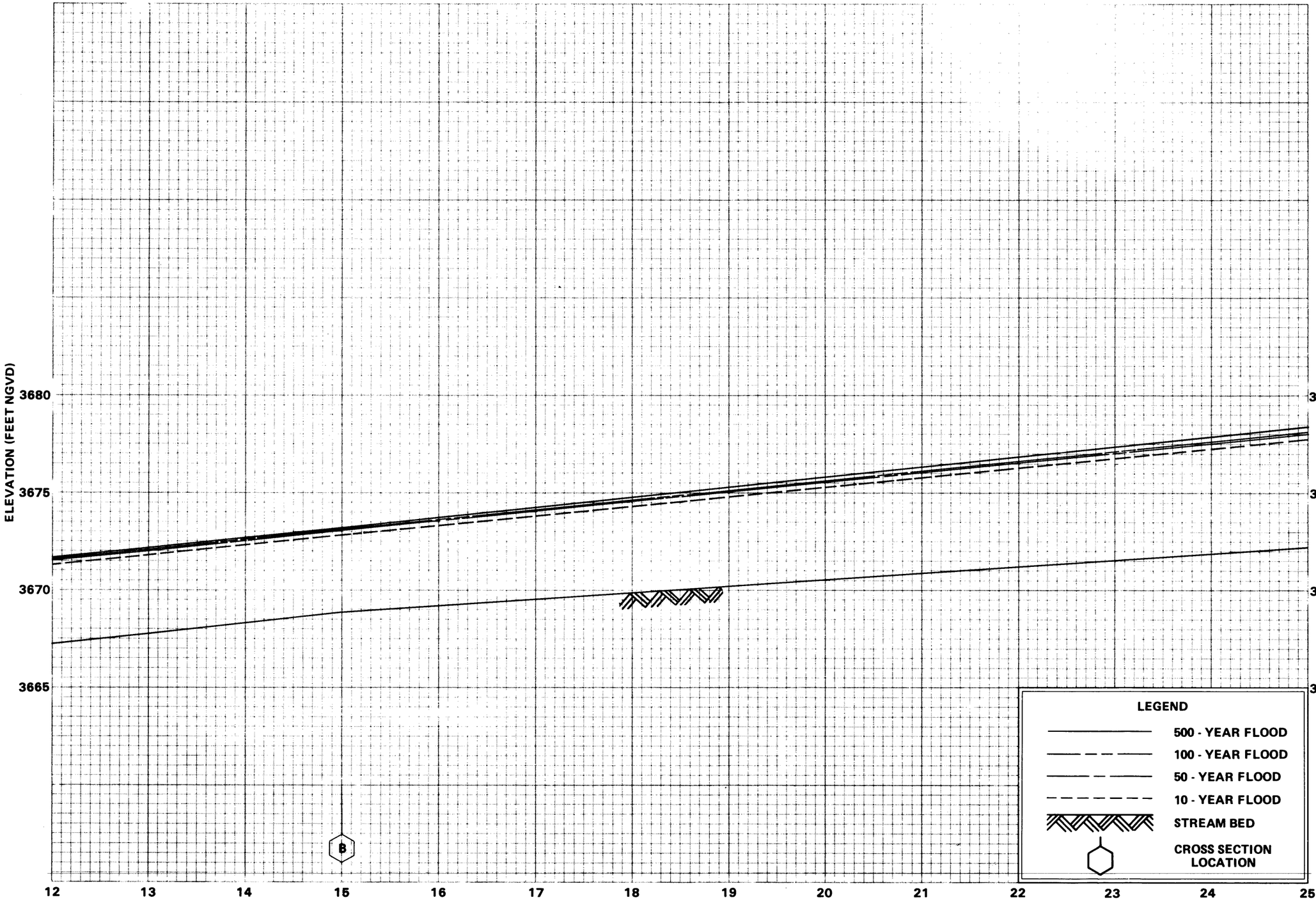
FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

35P



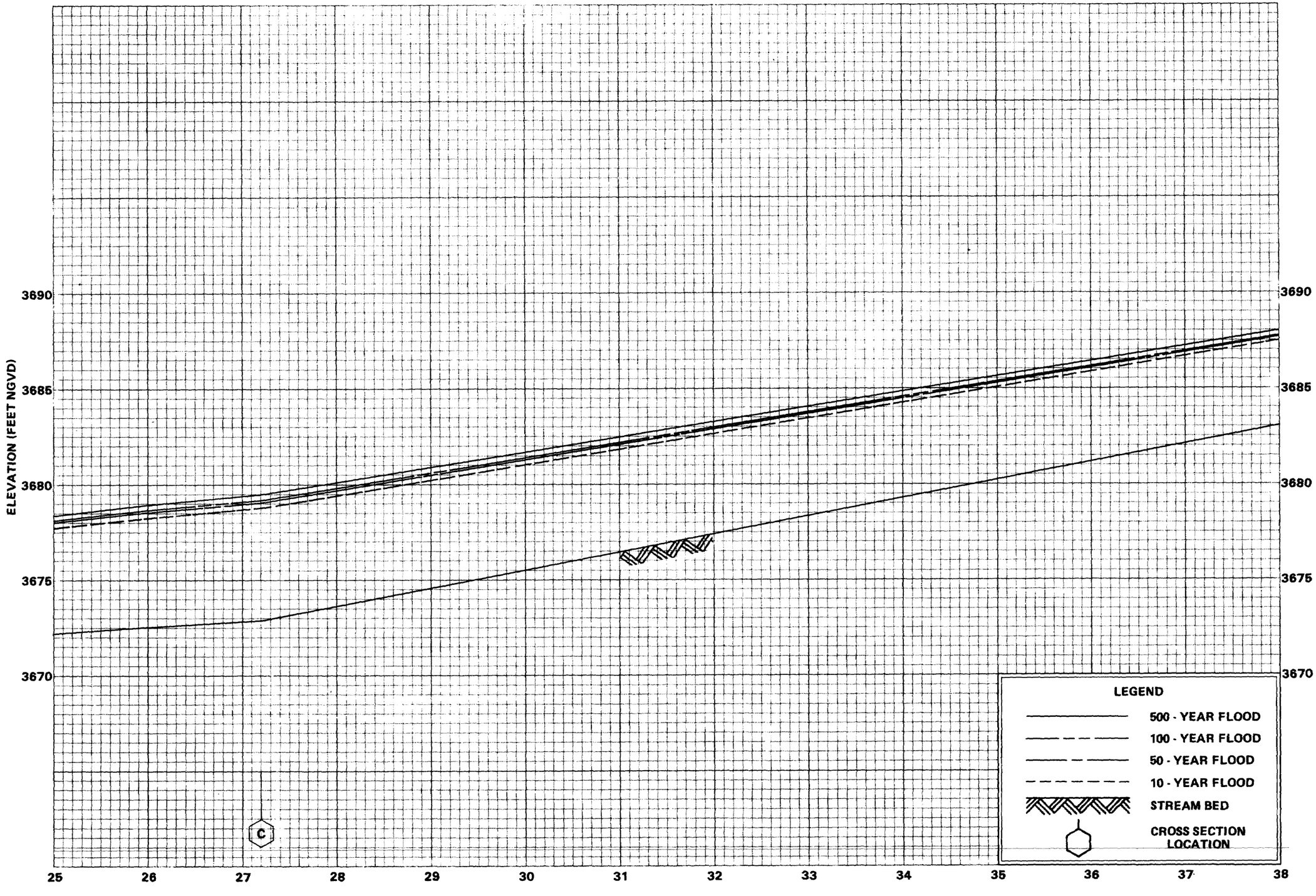
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE T.1S/T.2S

FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



STREAM DISTANCE IN HUNDREDS OF FEET ABOVE T.1S/T.2S

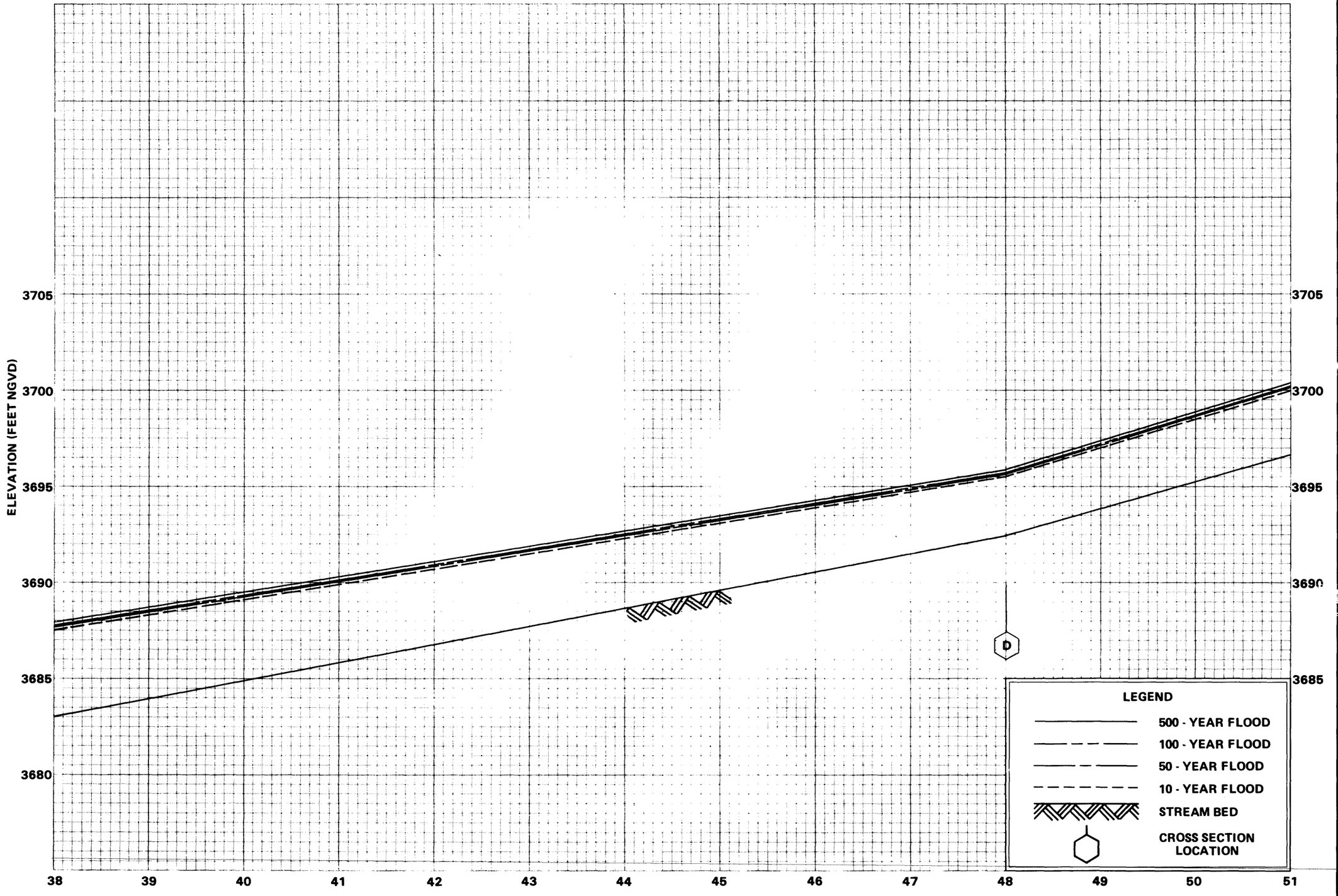
FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

37P



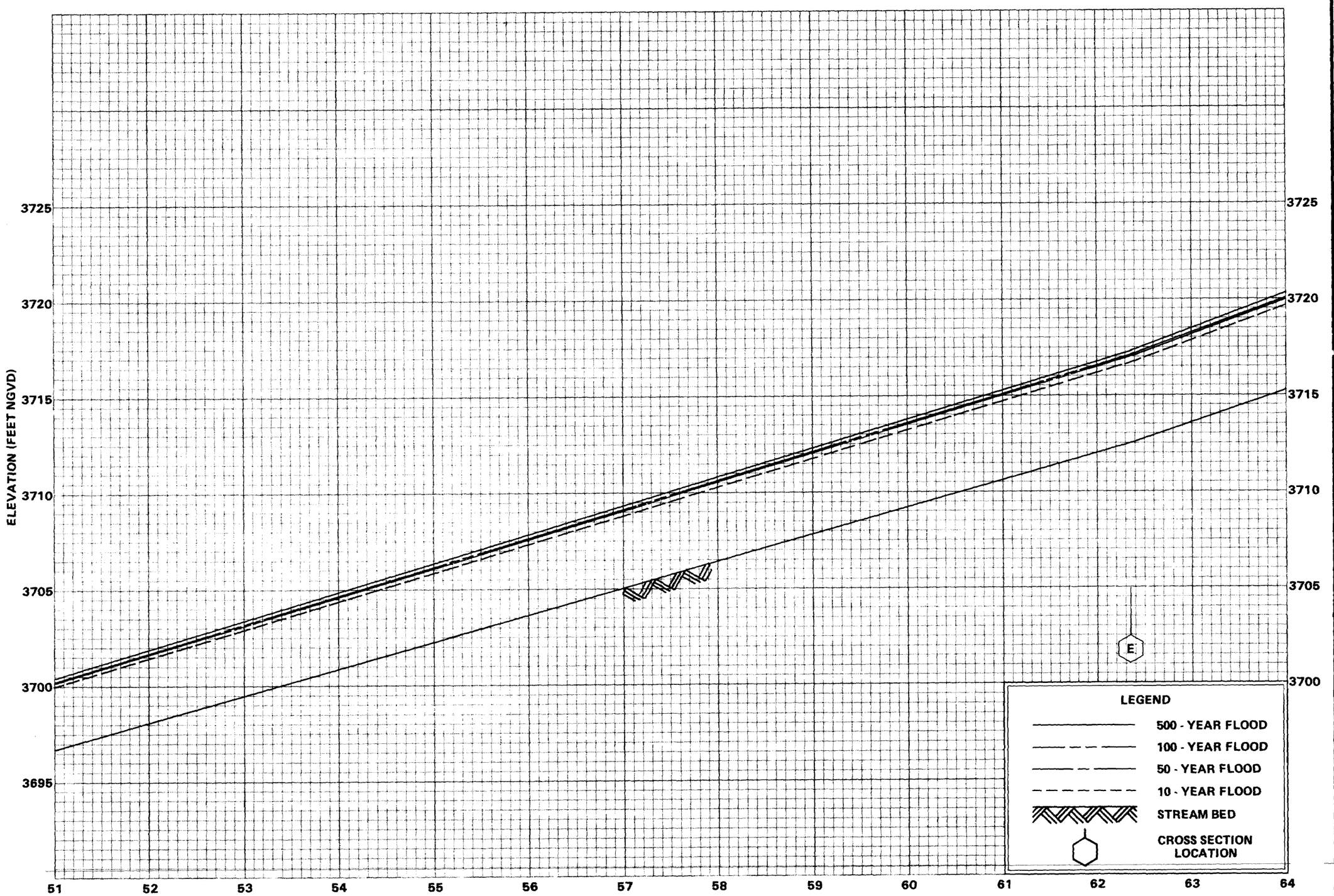
FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

38P

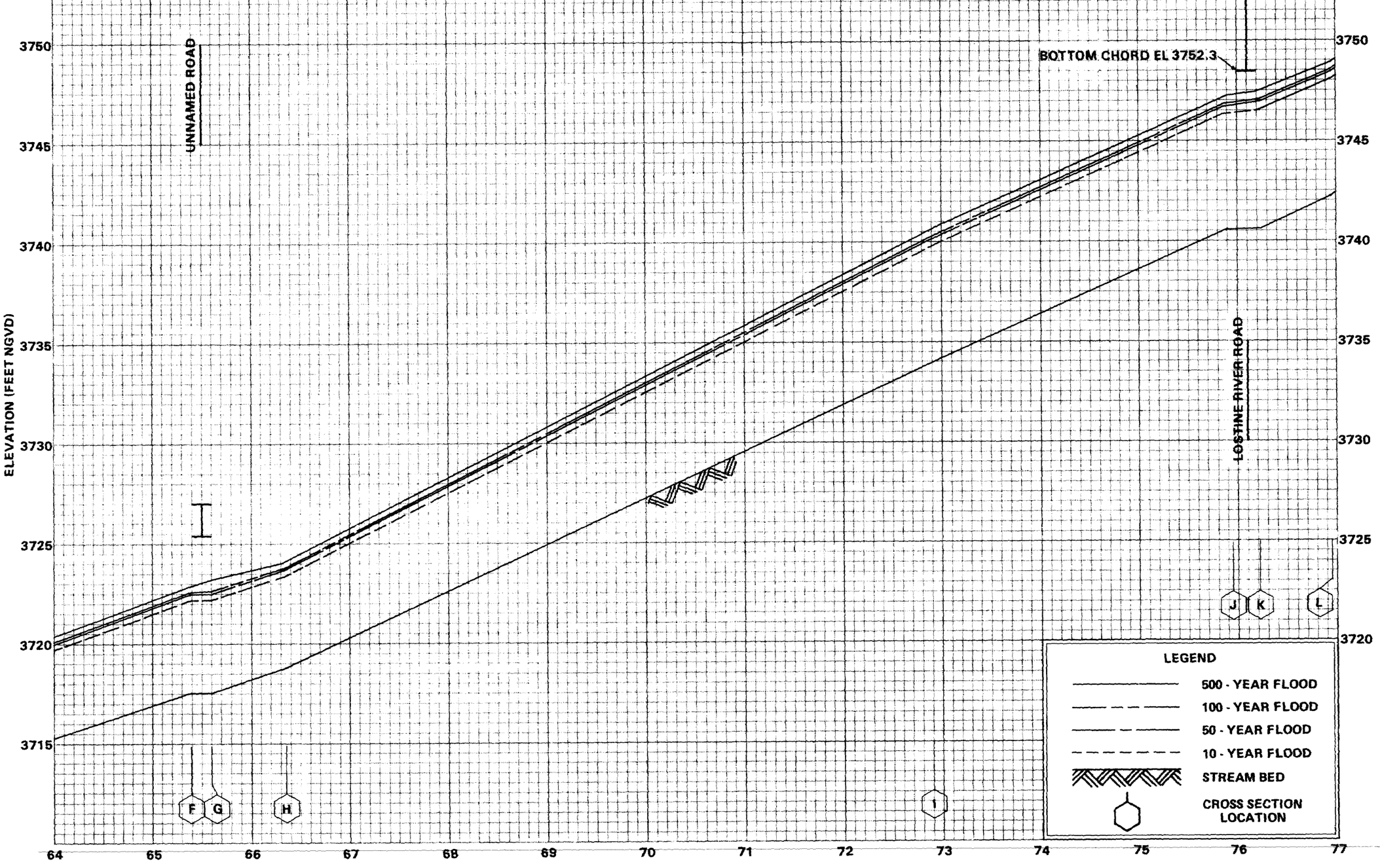


FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



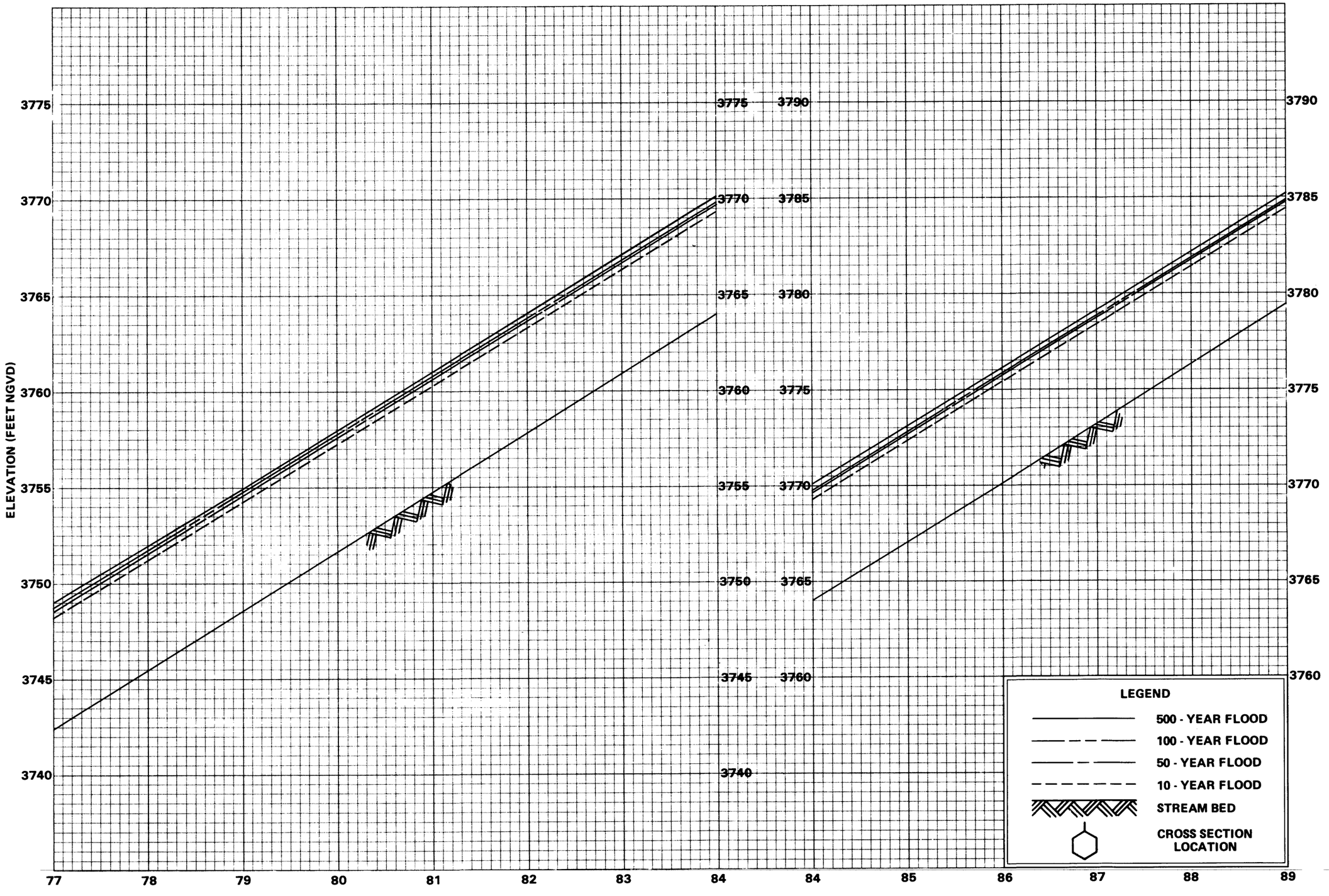
FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

40P



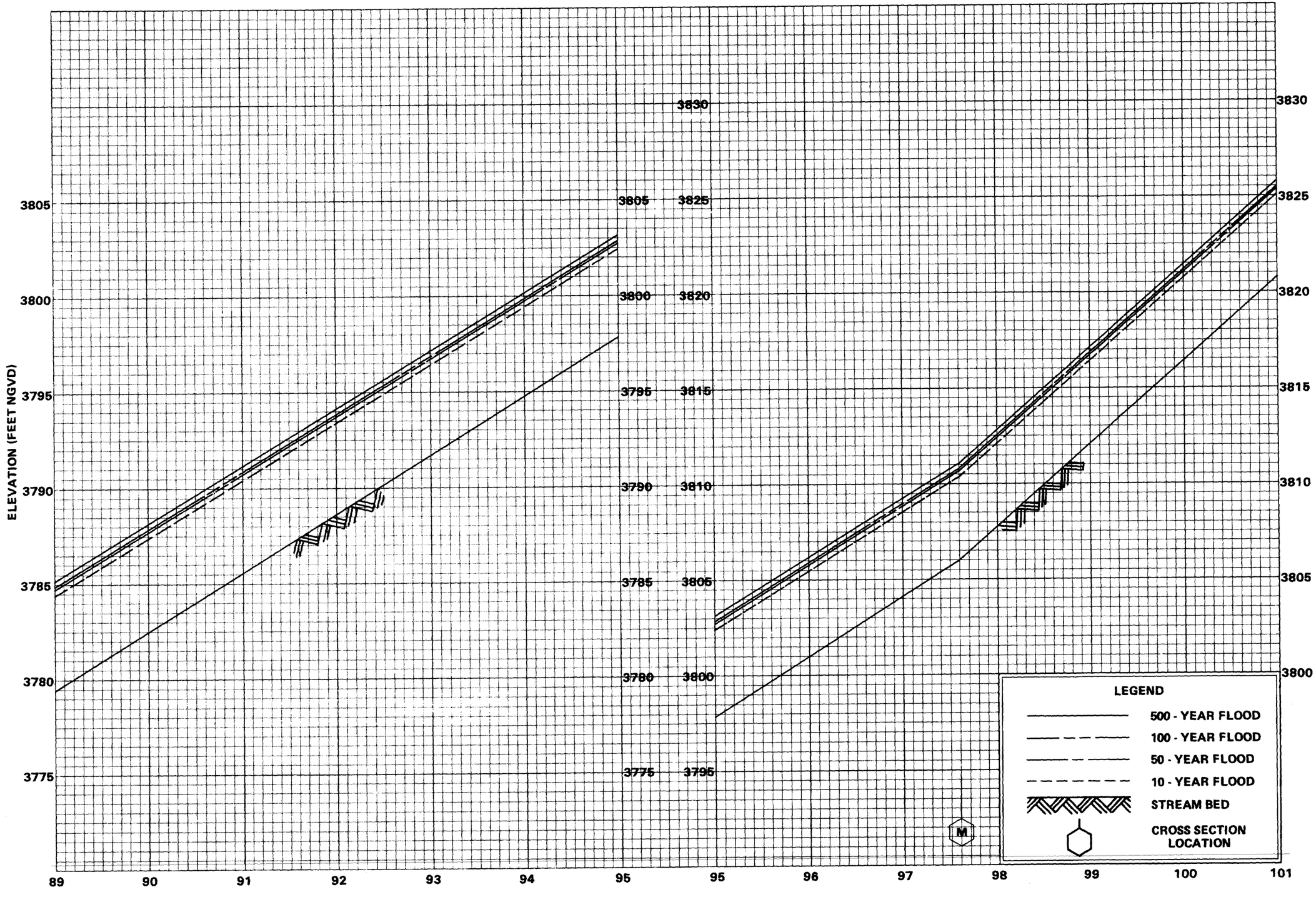
FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

41P



STREAM DISTANCE IN HUNDREDS OF FEET ABOVE T.1S/T.2S

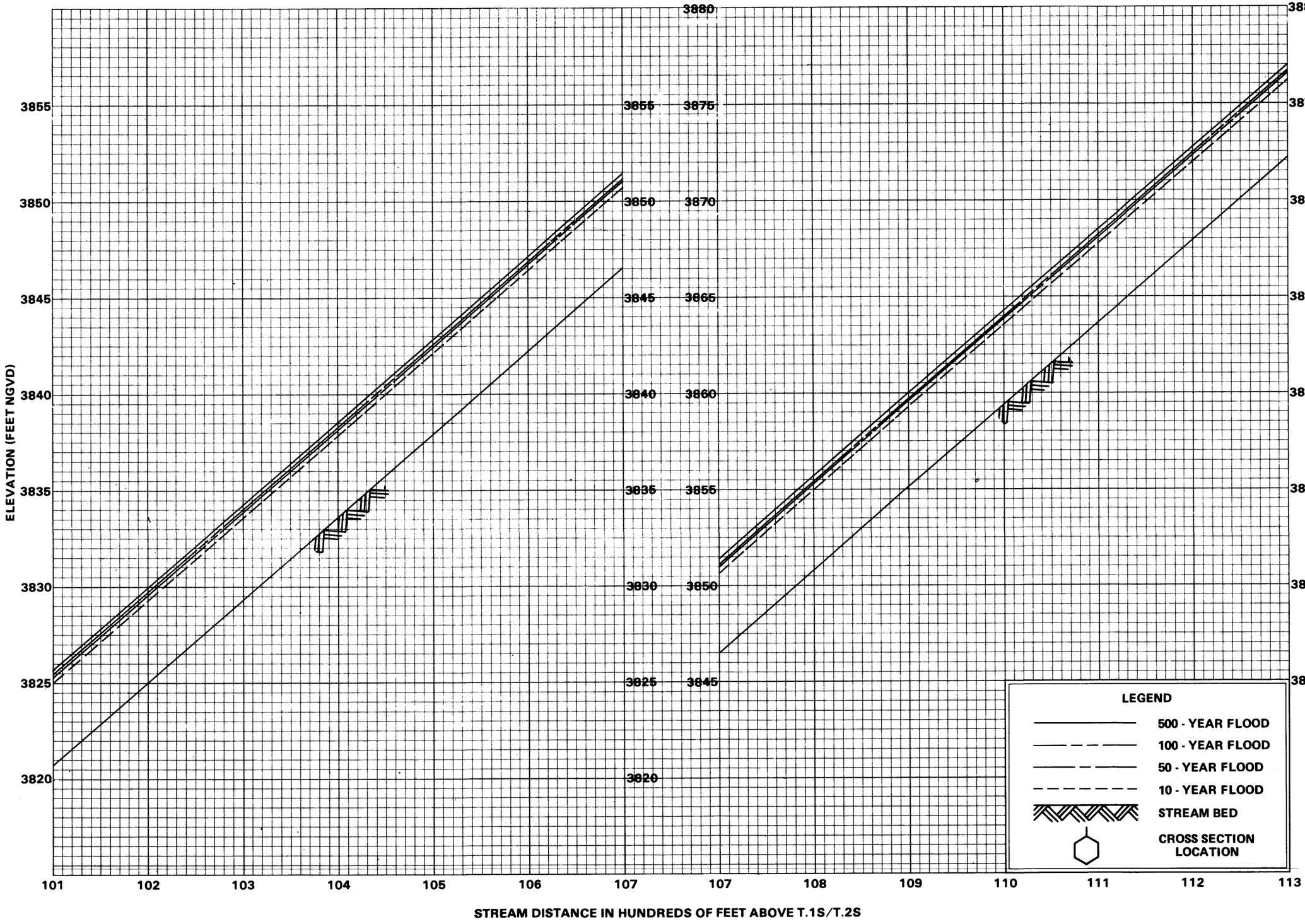
FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

42P

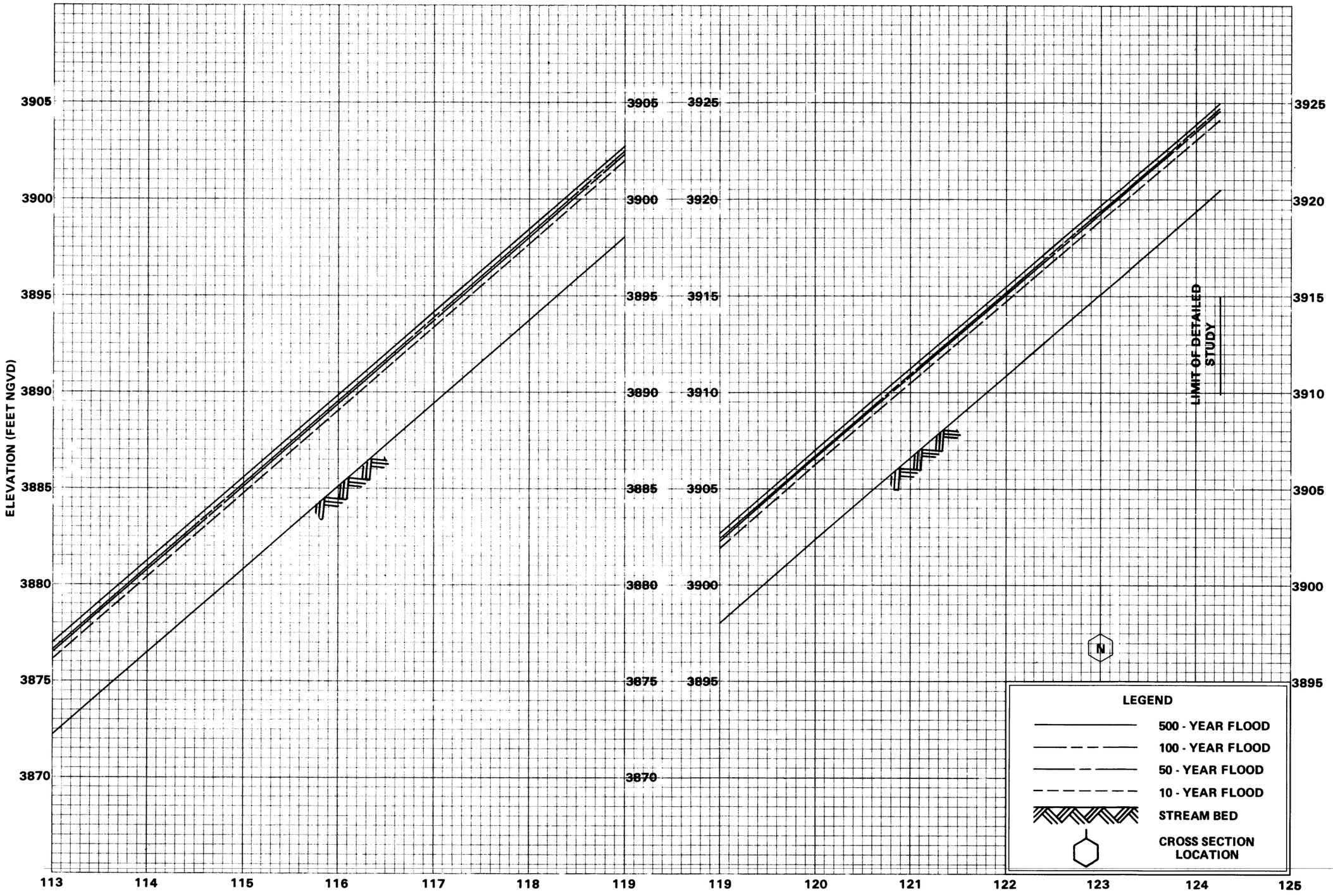


FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

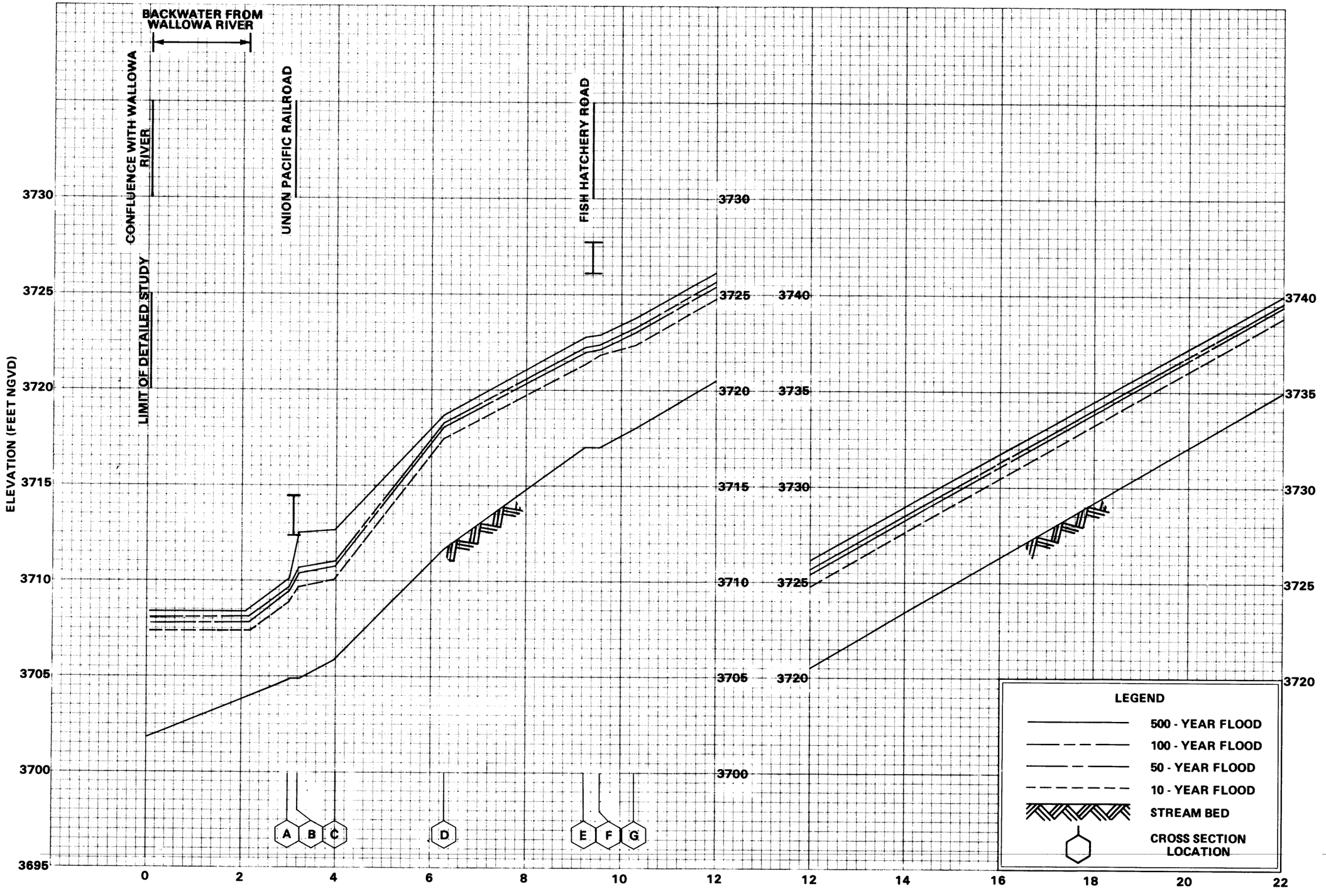


FLOOD PROFILES

LOSTINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



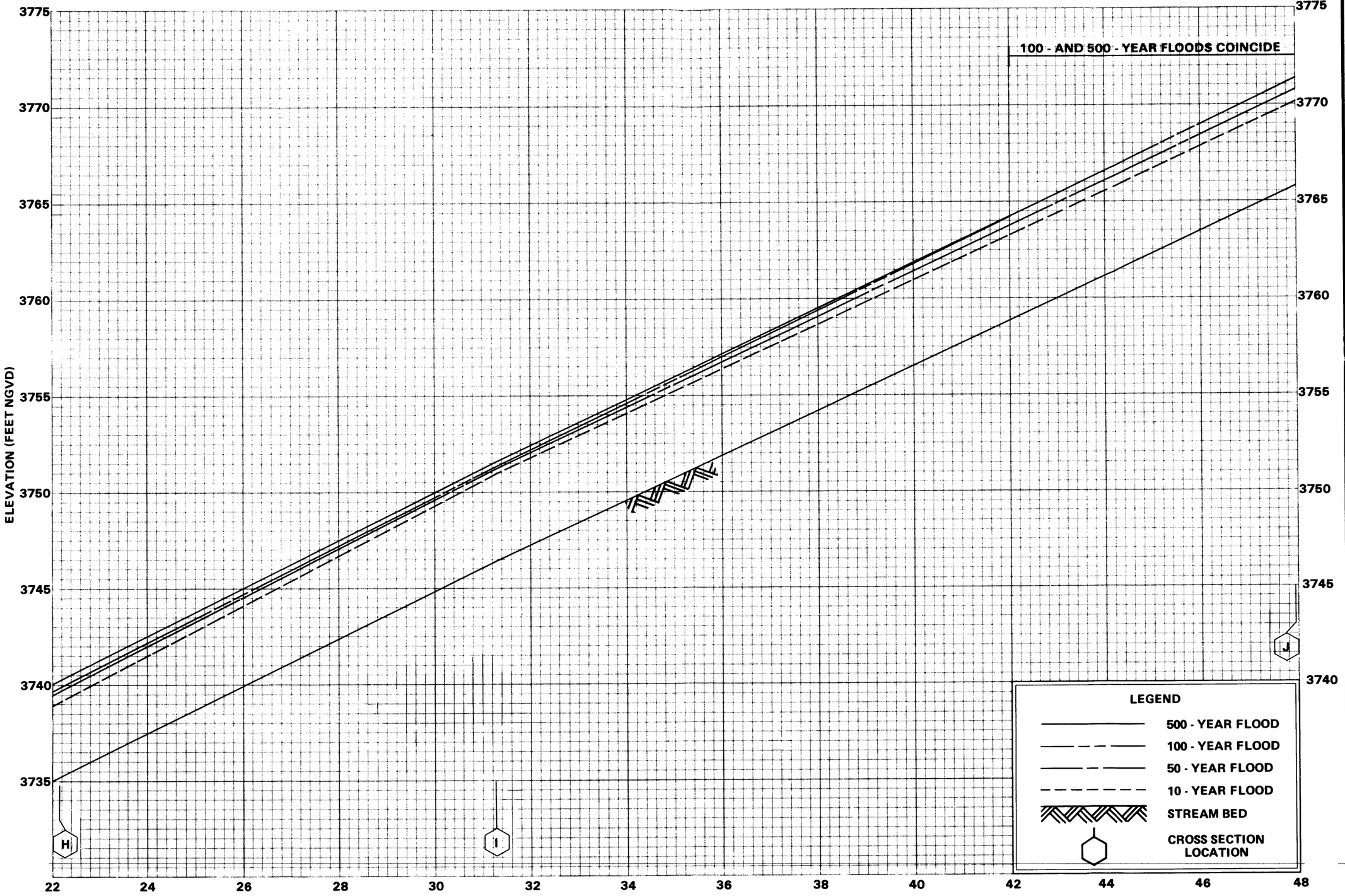
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

45P

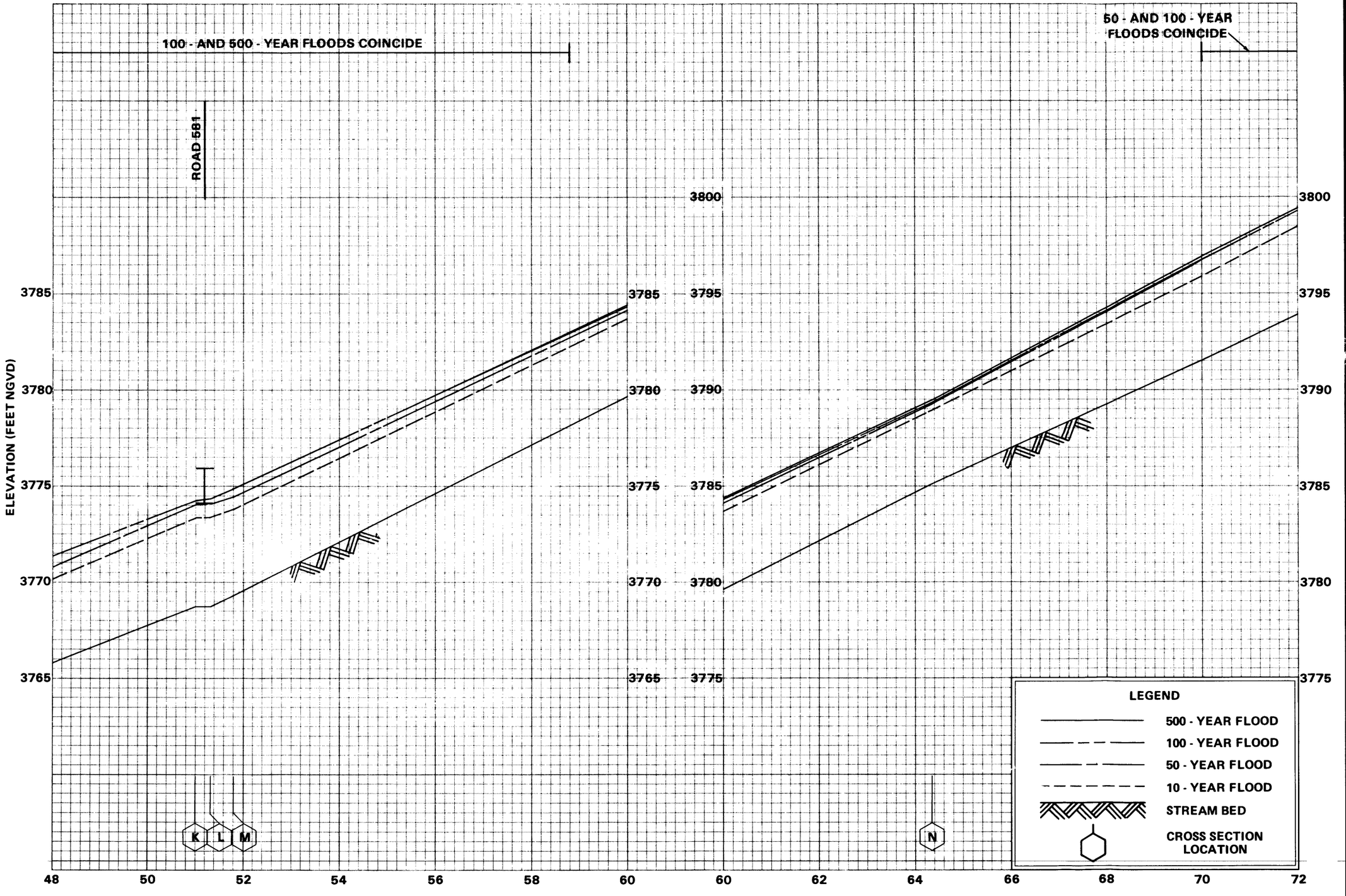


FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



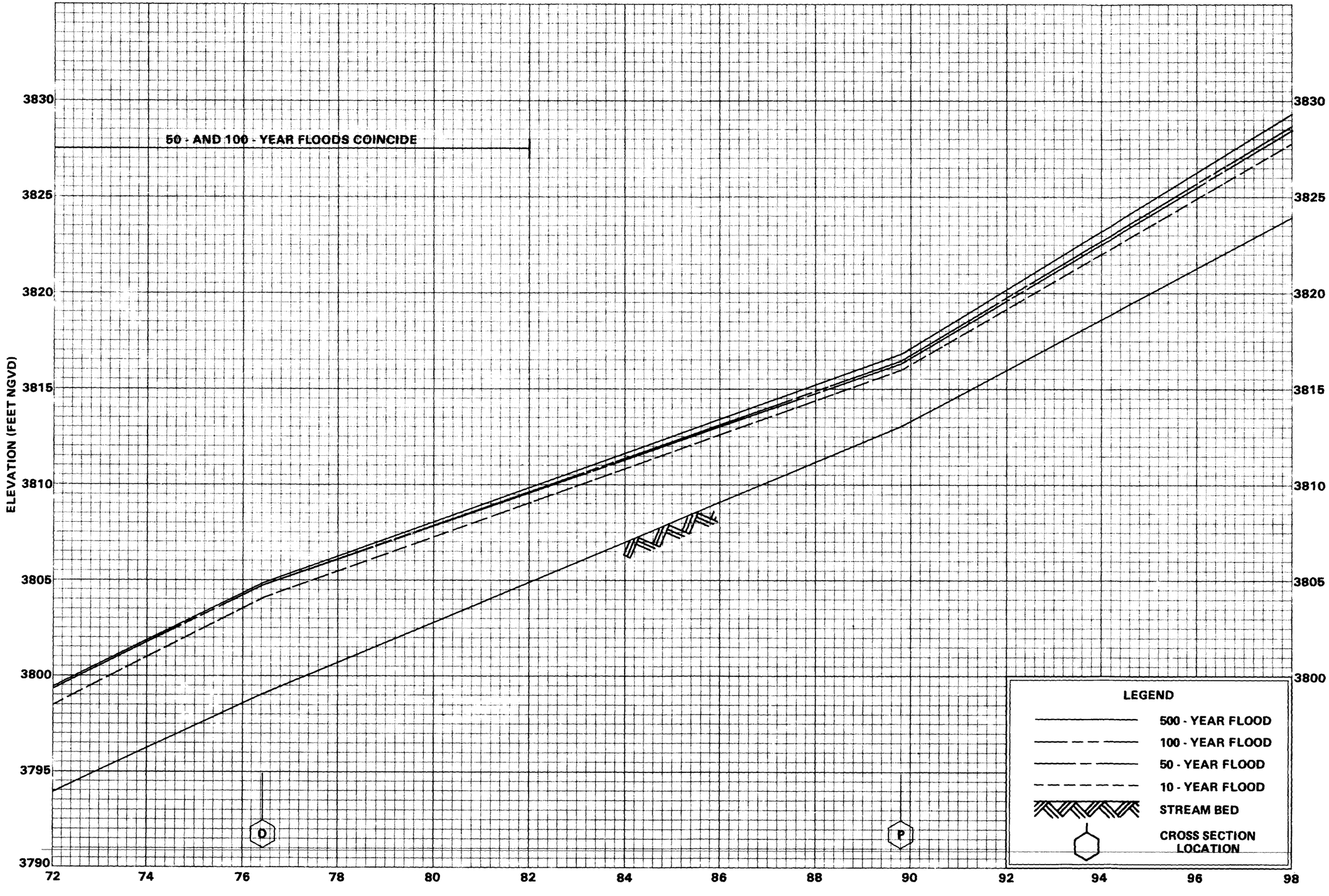
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

47P



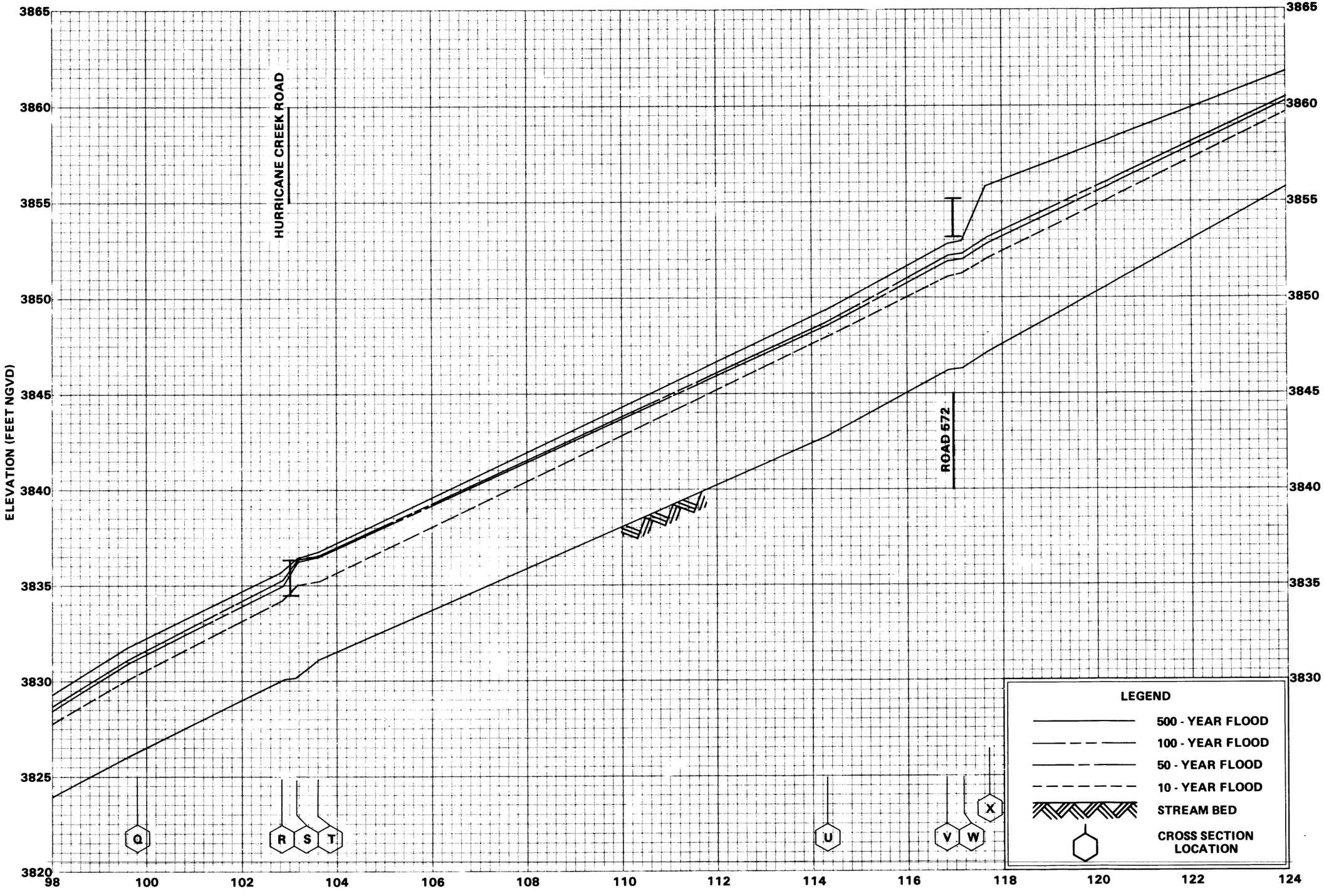
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

48P

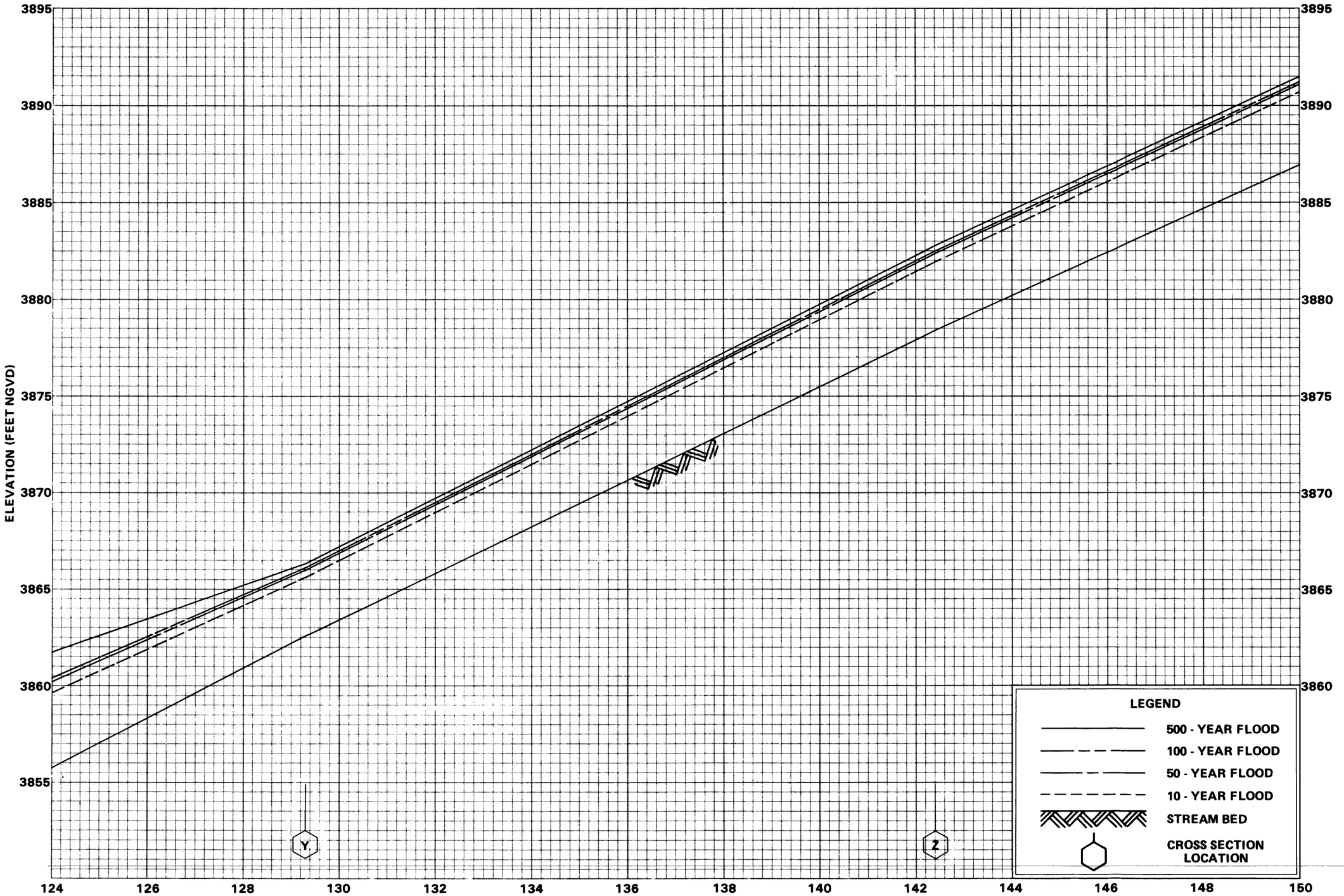


FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



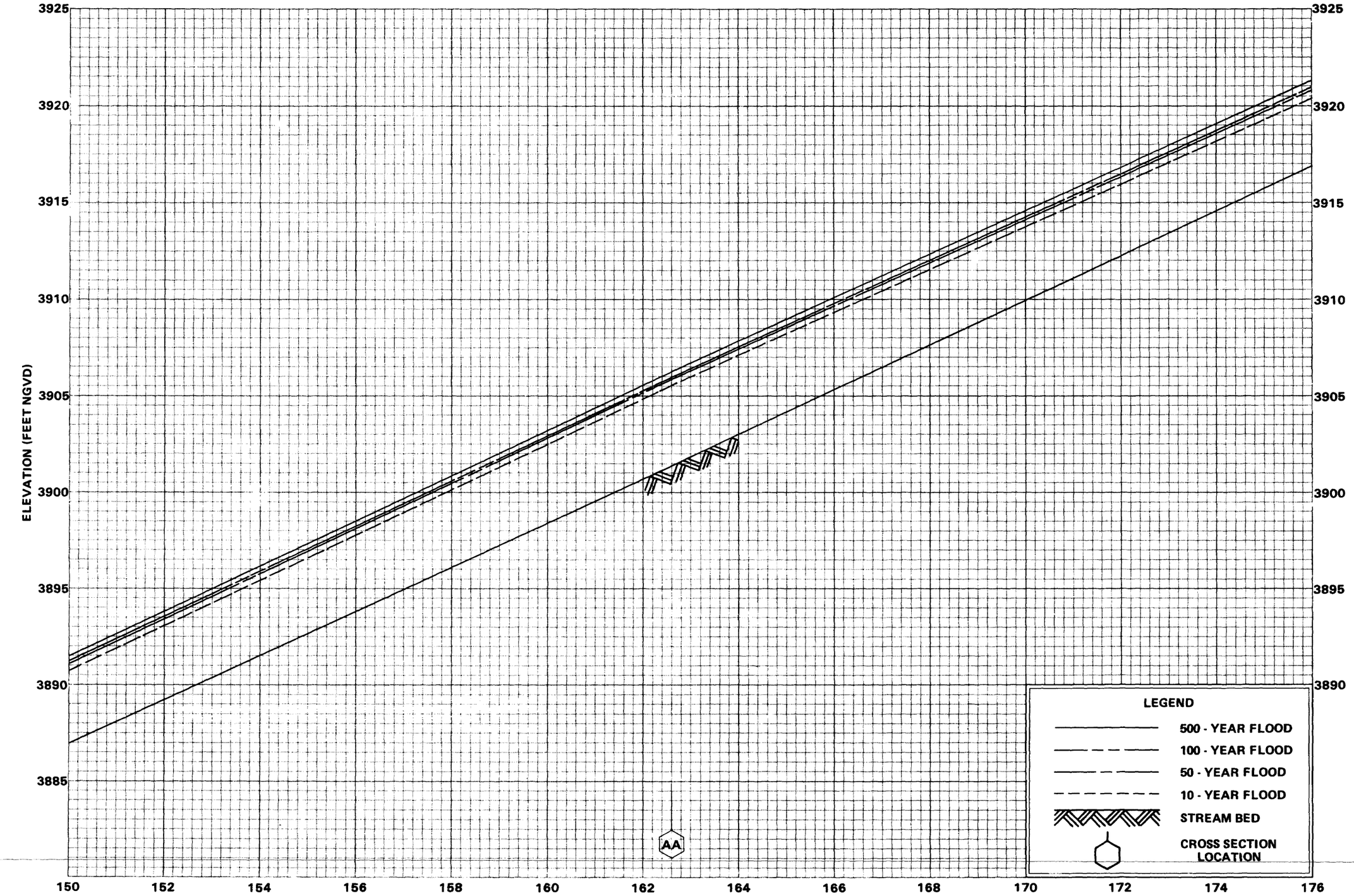
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

50P

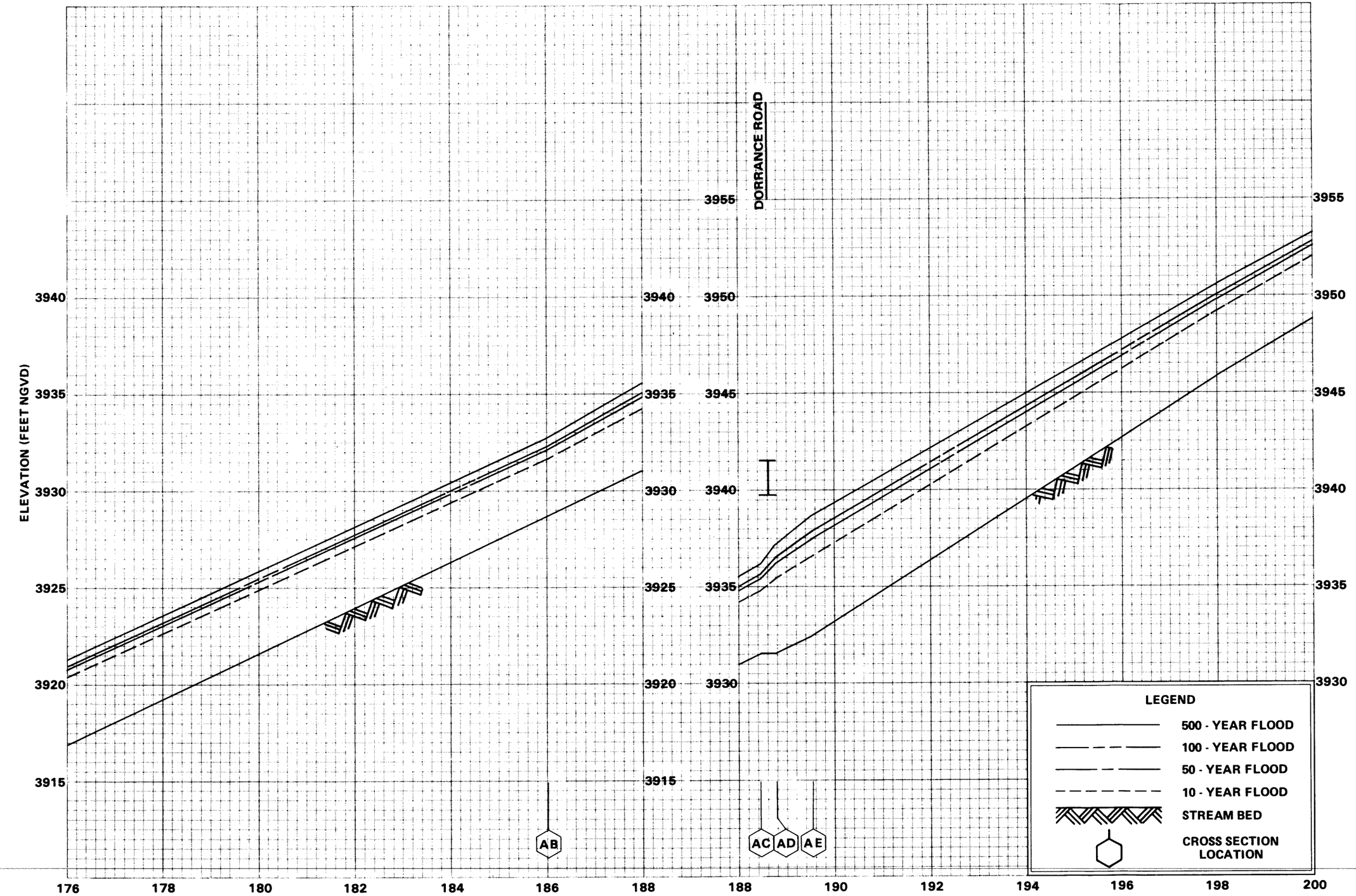


FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



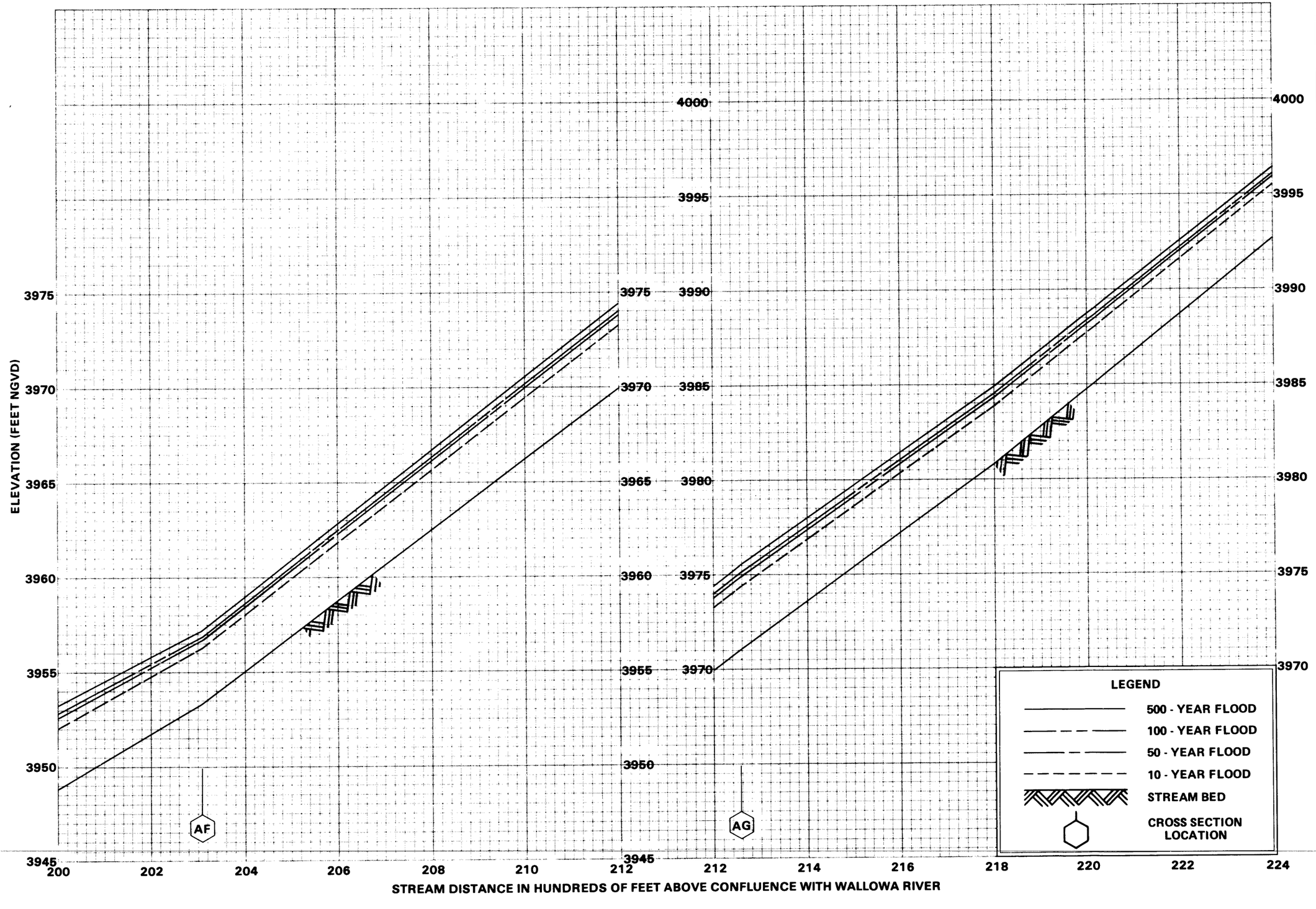
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

52P



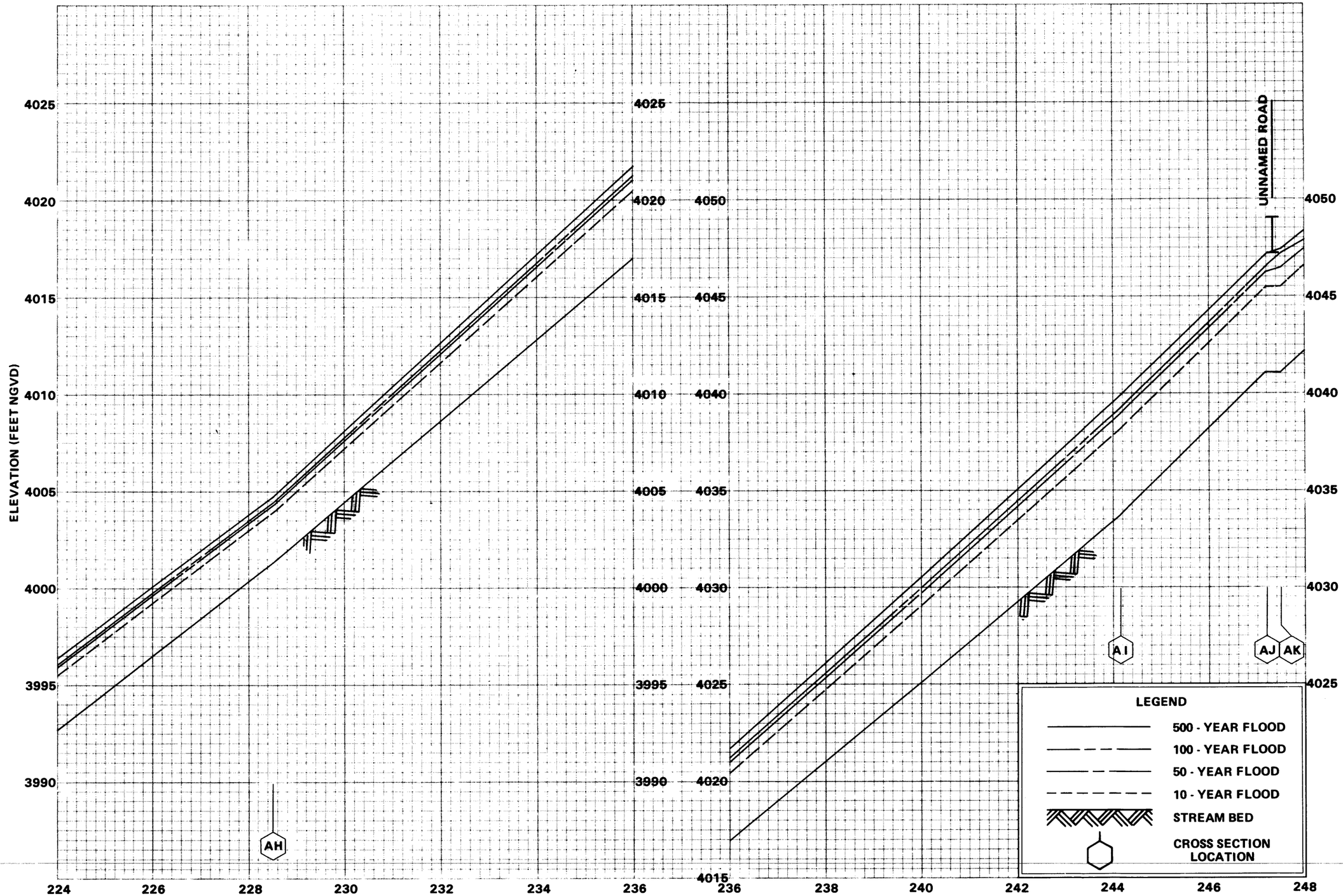
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

53P

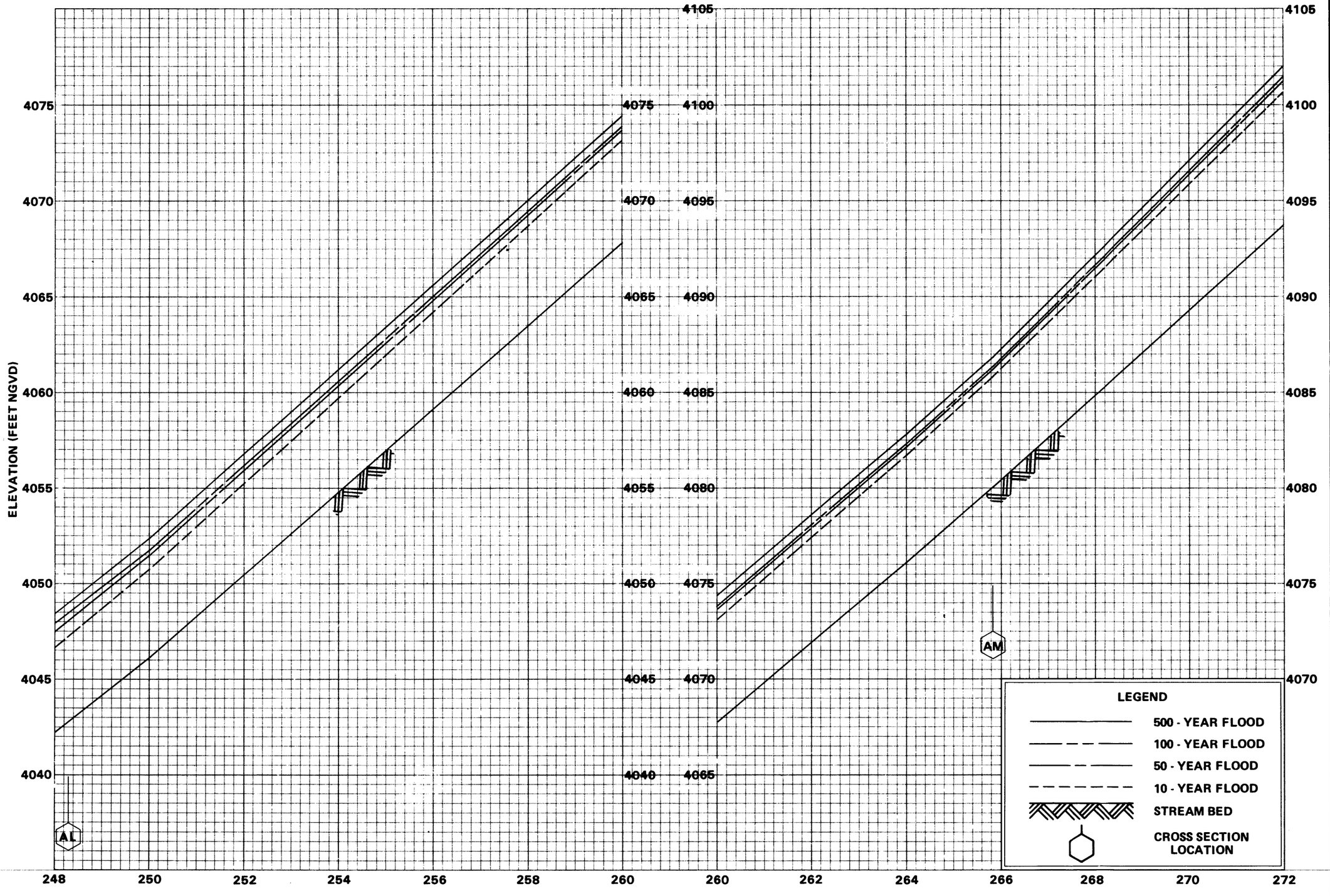


FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



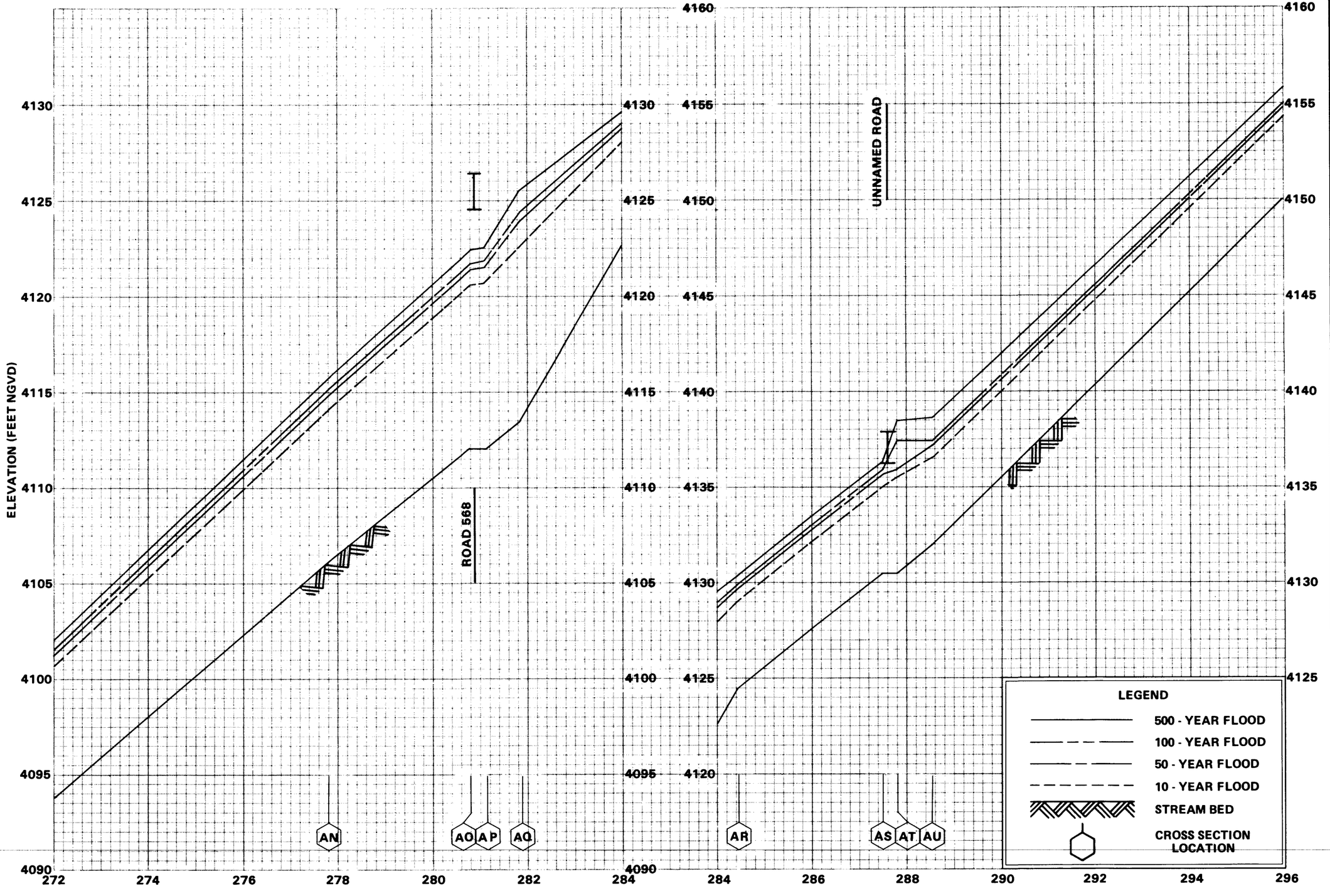
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

55P



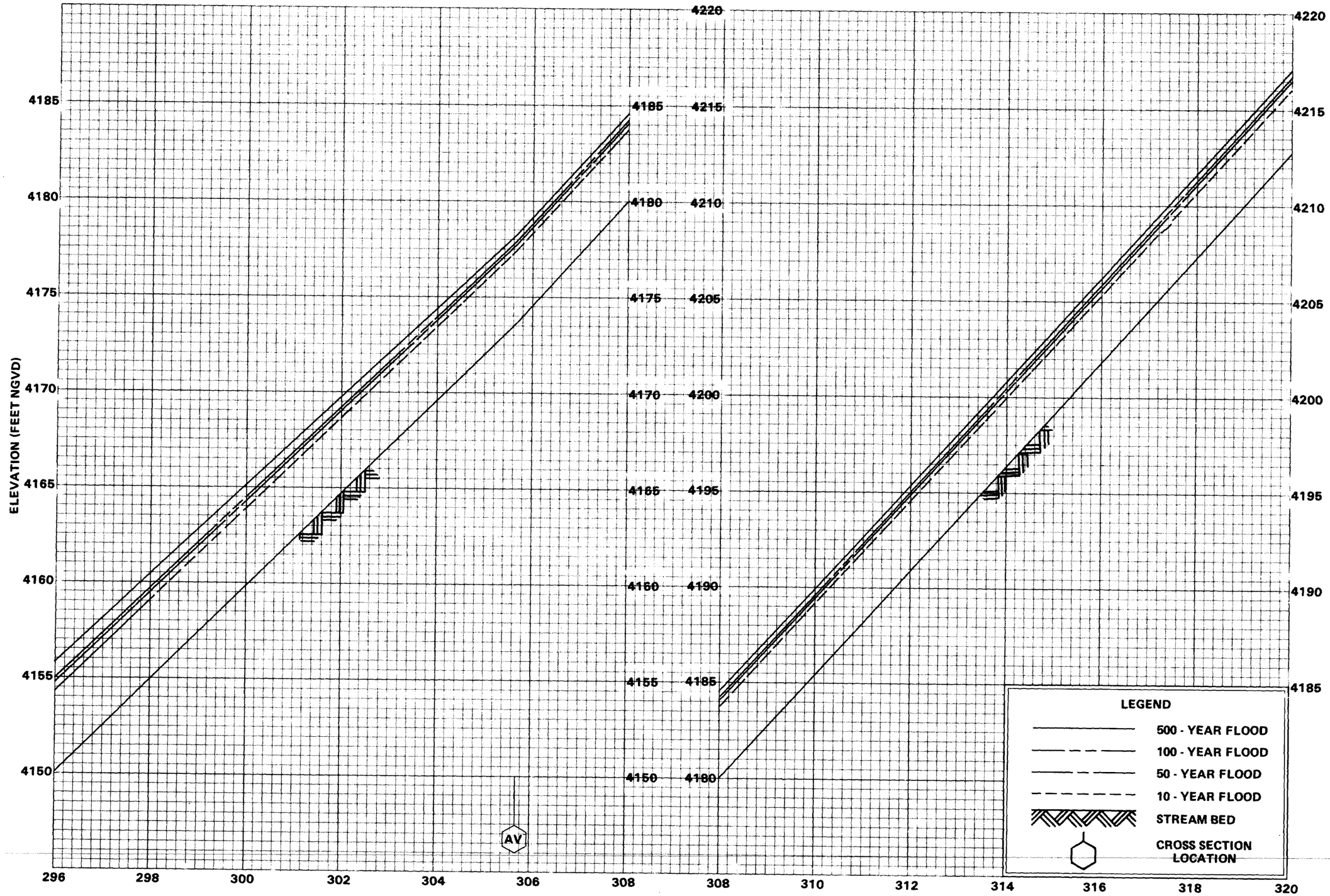
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

56P



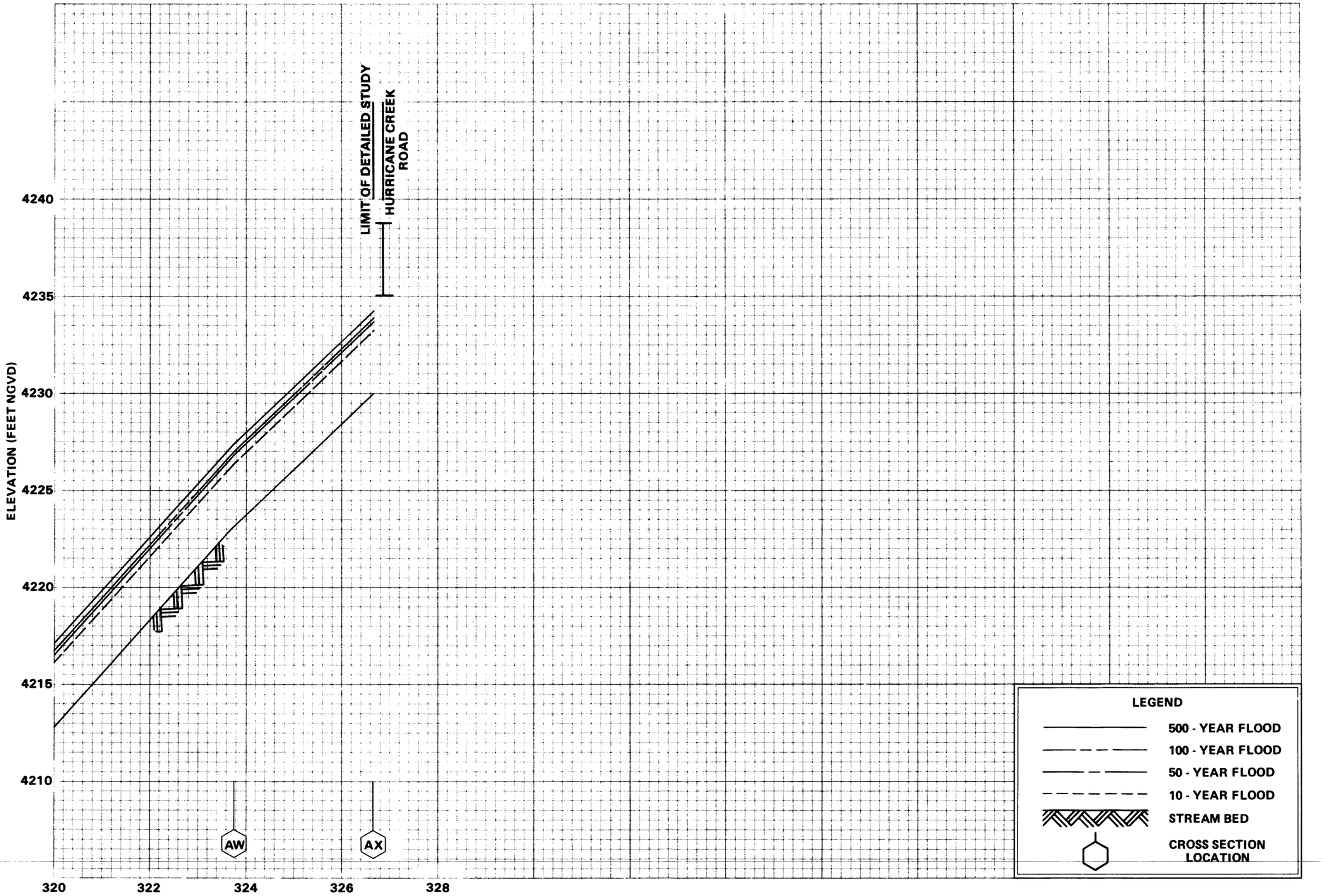
FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

57P

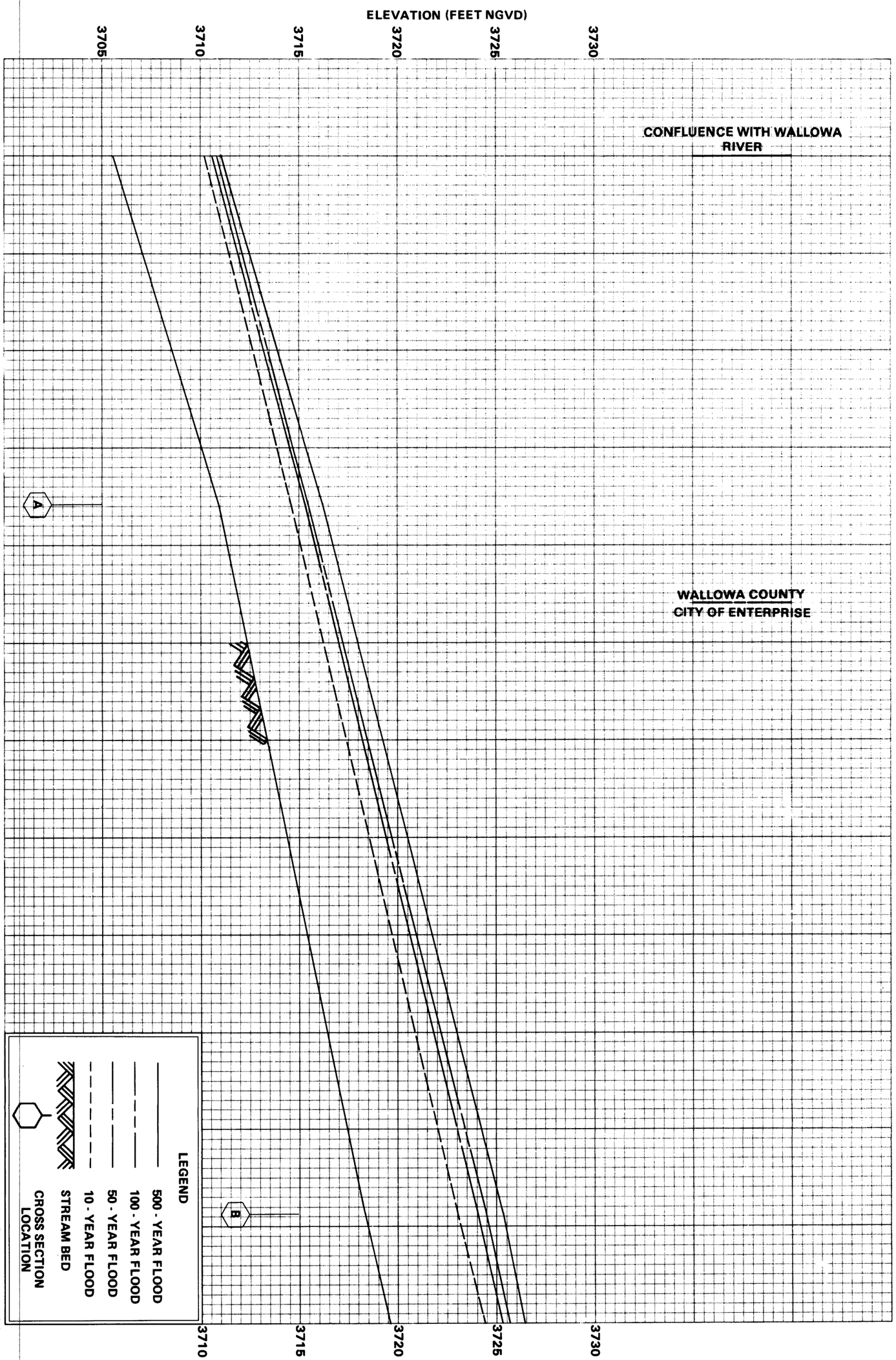


FLOOD PROFILES

HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

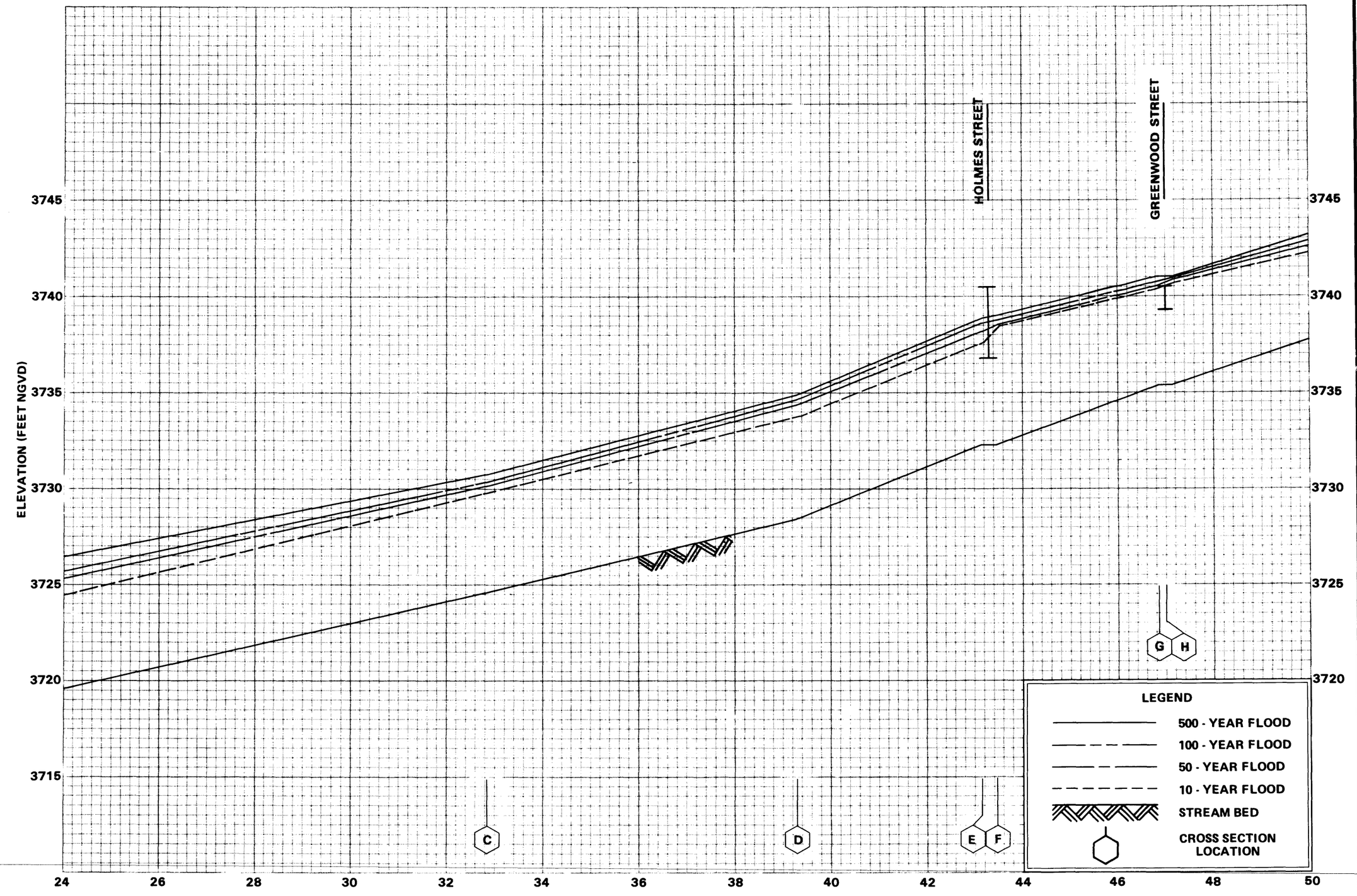


FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

FLOOD PROFILES

PRAIRIE CREEK



FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS

60P

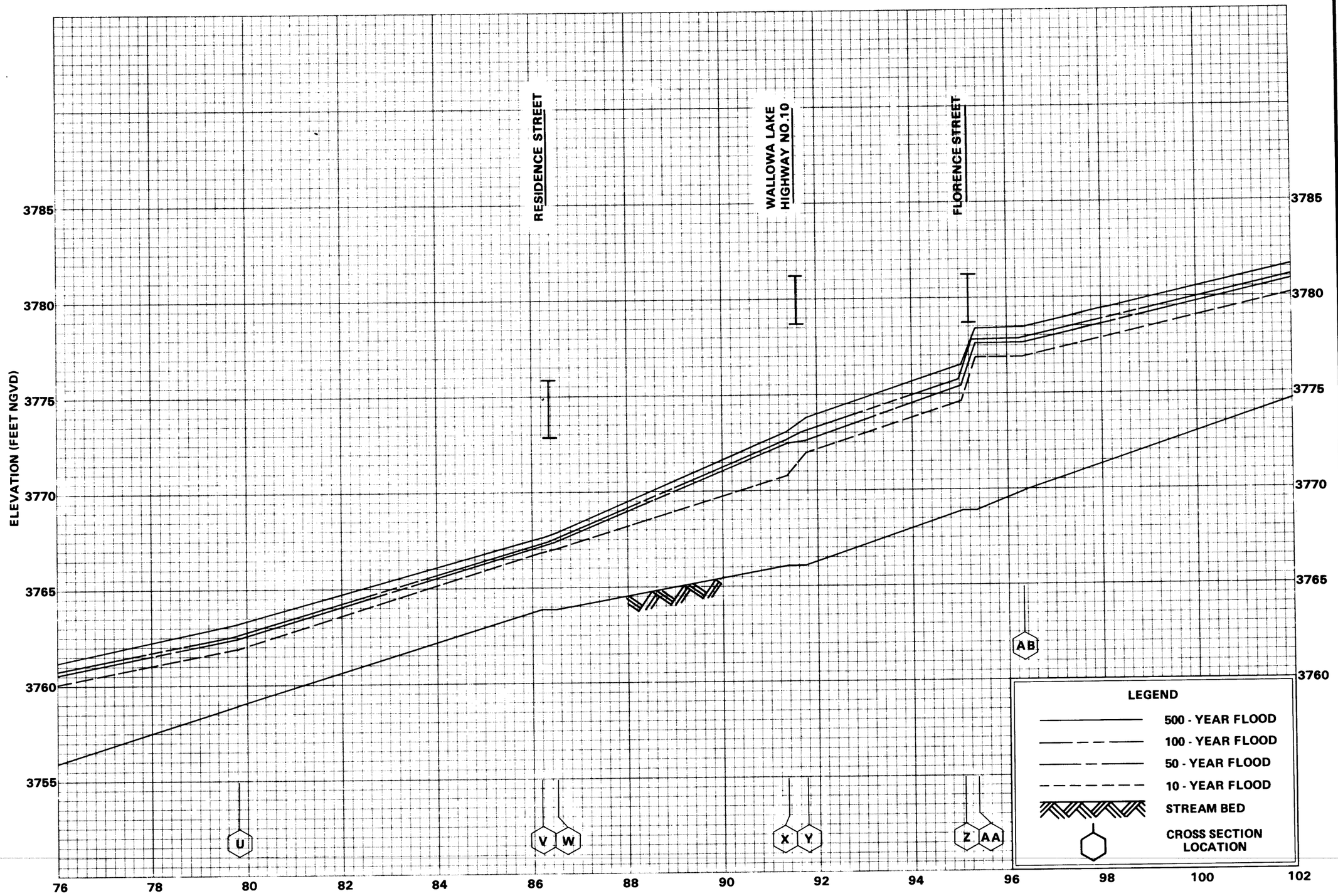
FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

61P



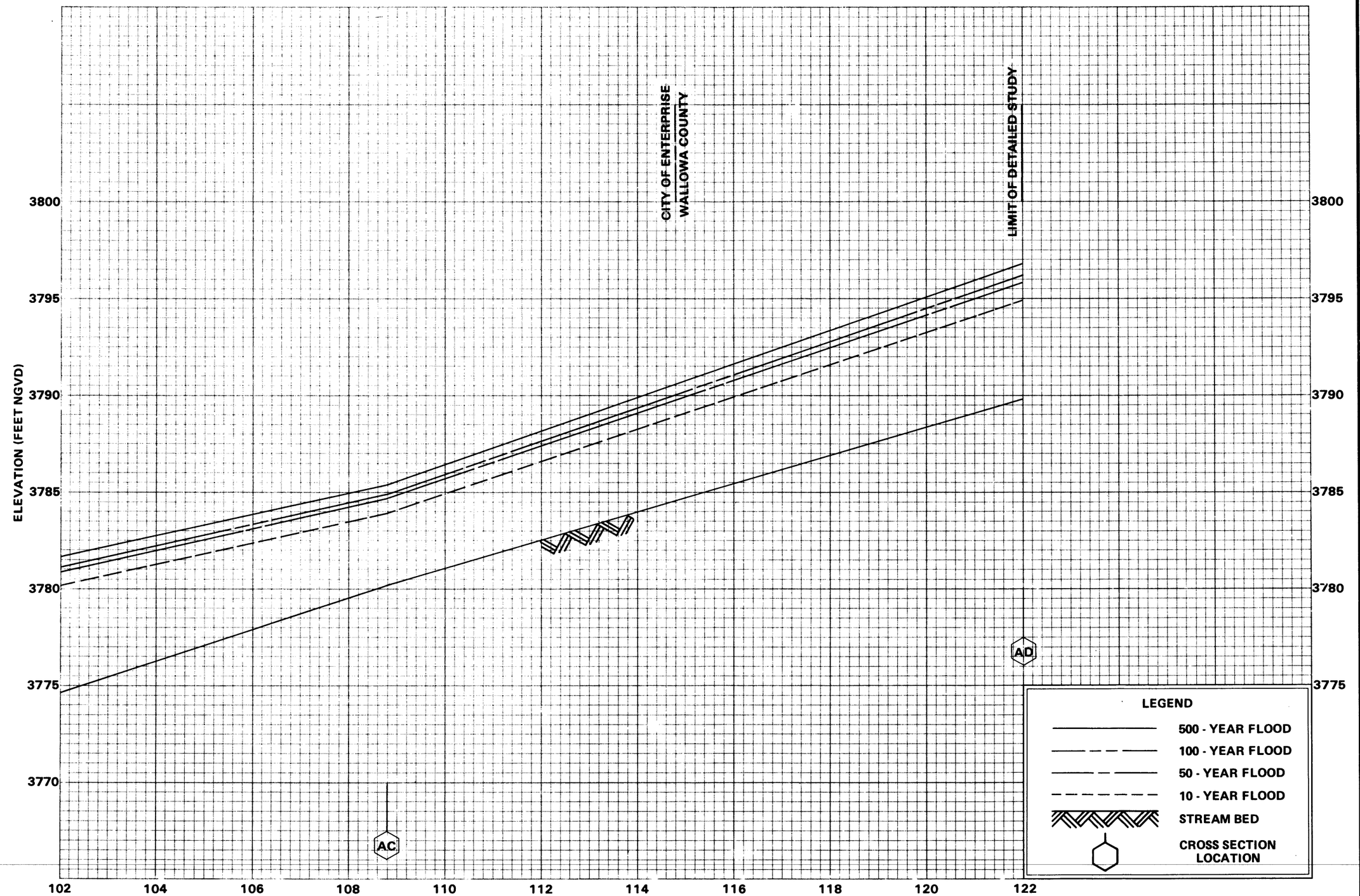
FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

62P

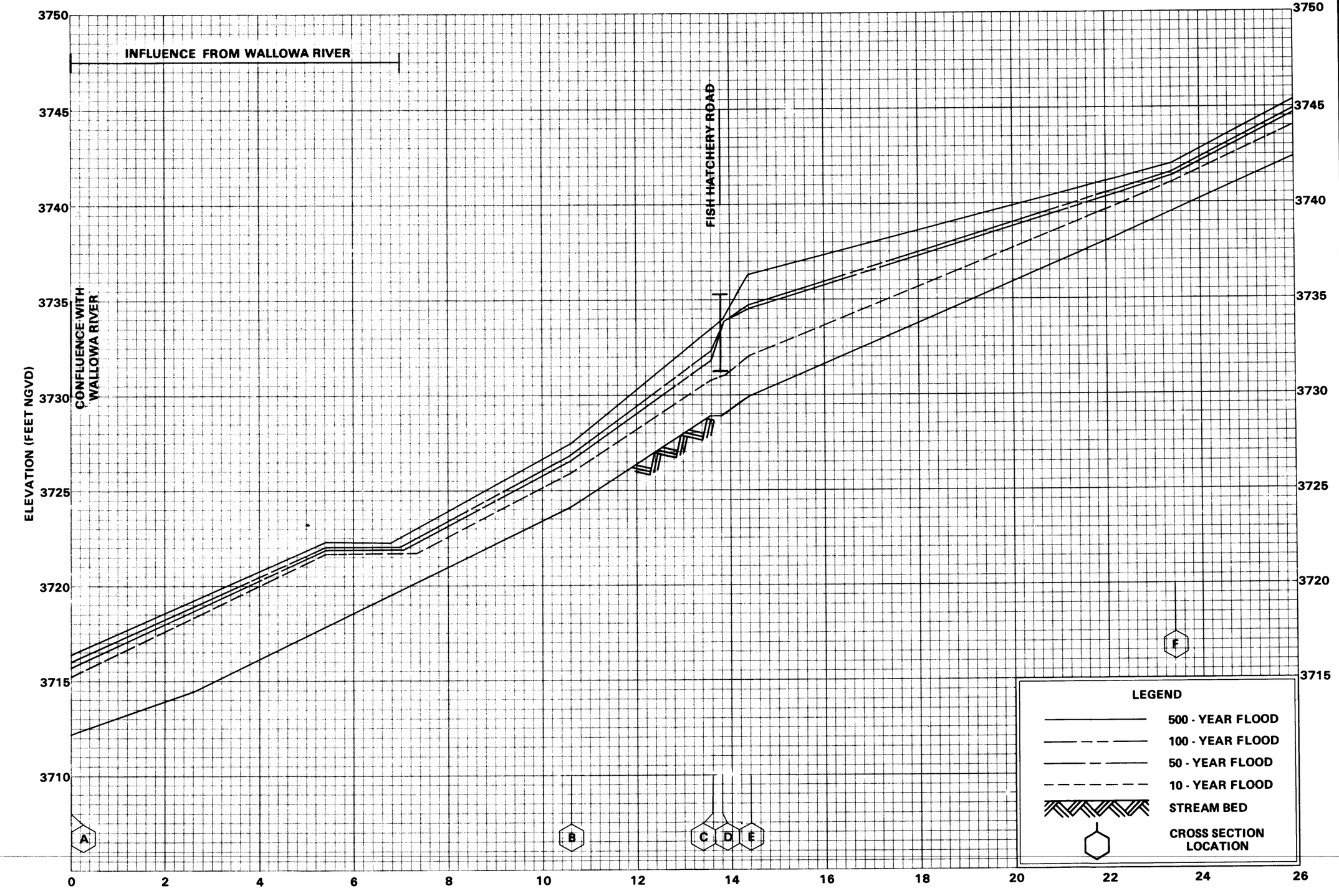


FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR AND INCORPORATED AREAS



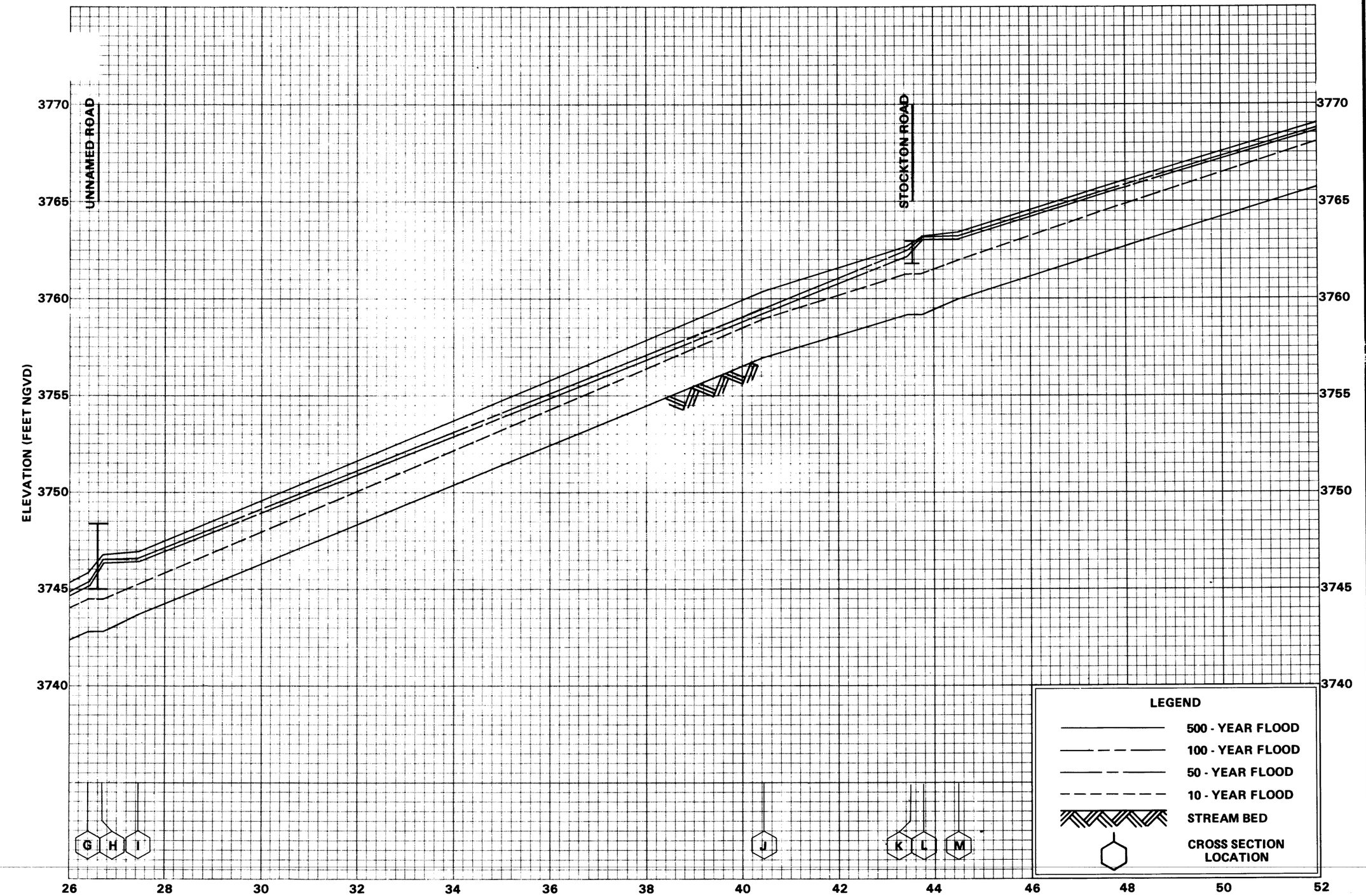
FLOOD PROFILES

LITTLE HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

64P



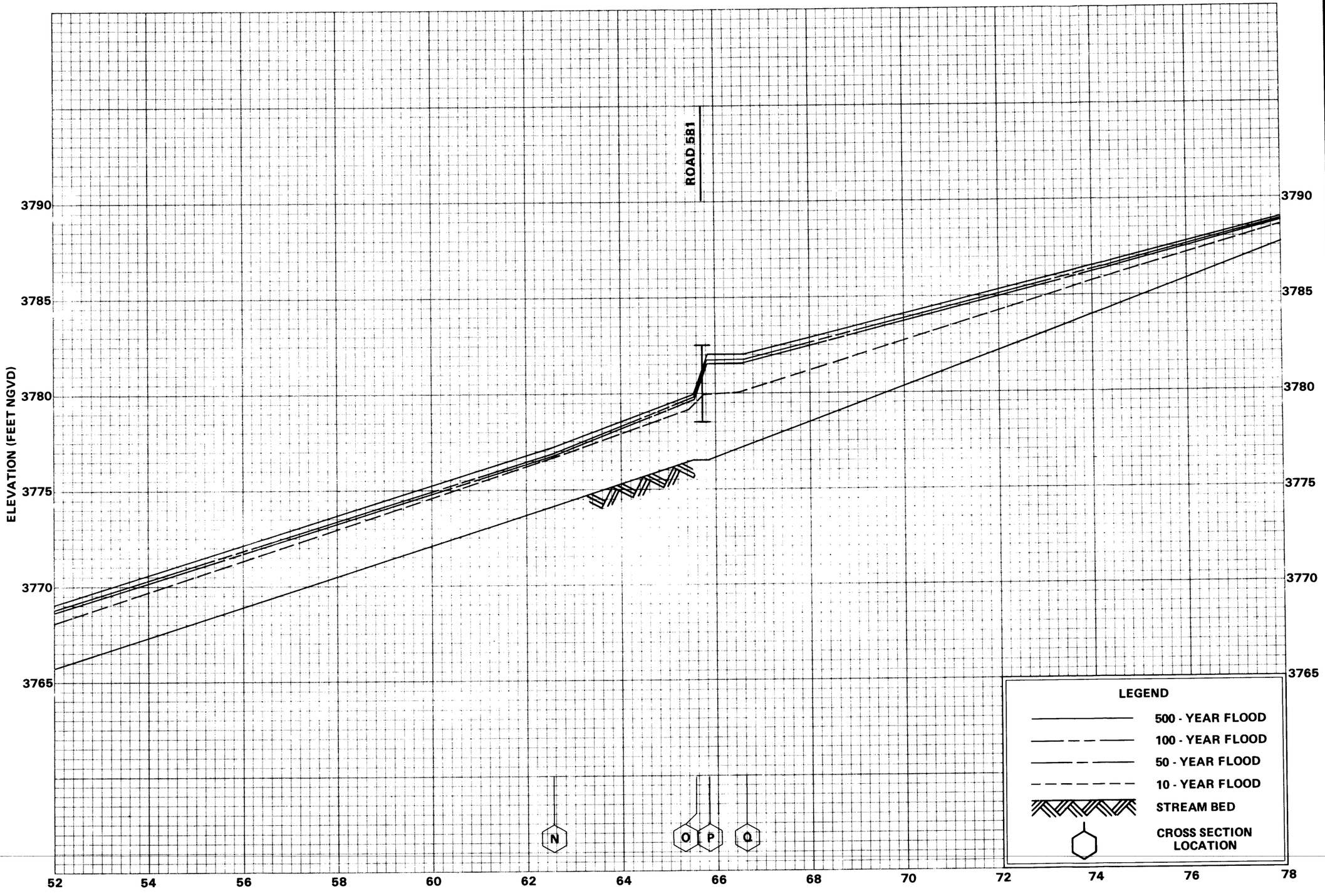
FLOOD PROFILES

LITTLE HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

65P



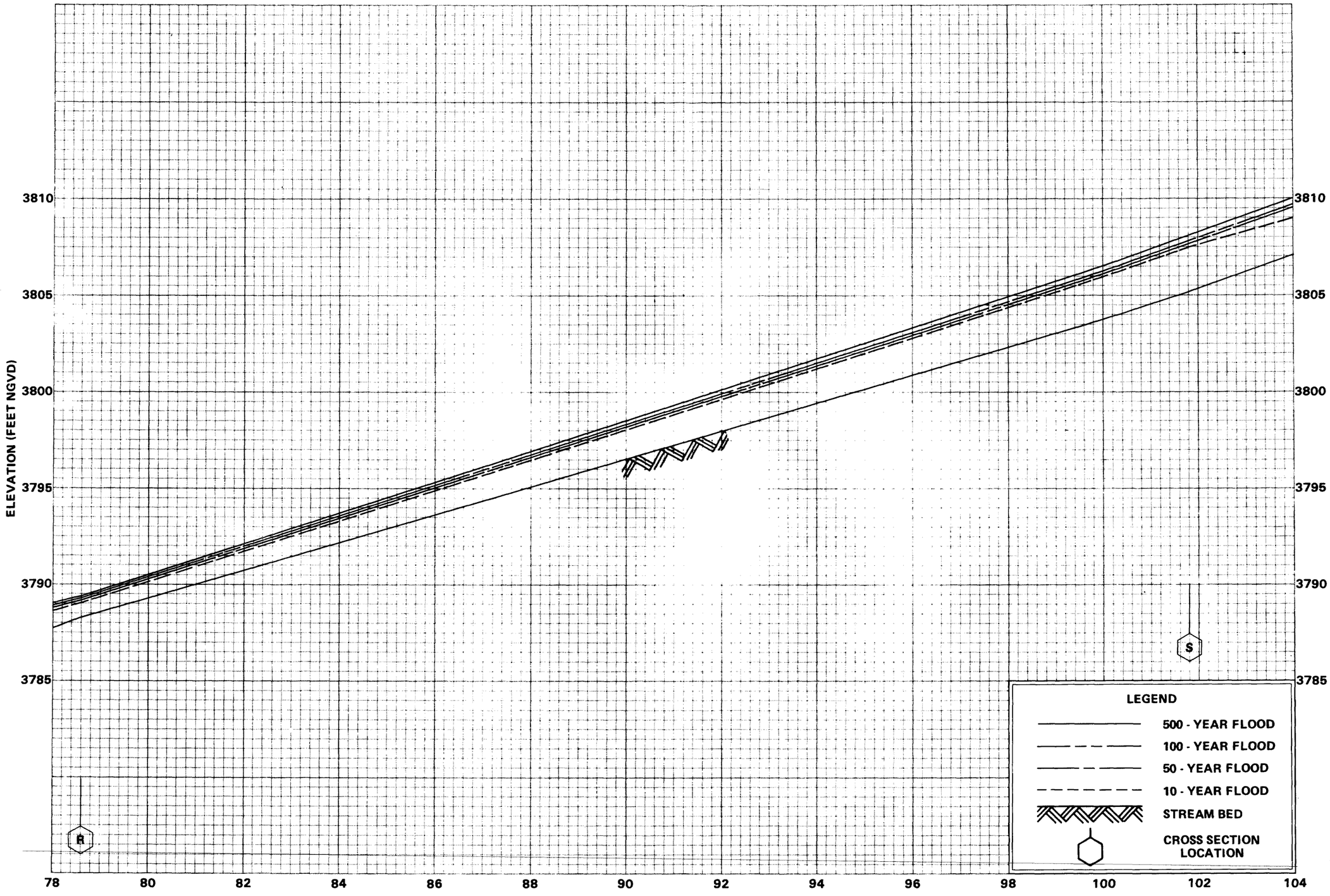
FLOOD PROFILES

LITTLE HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

66P

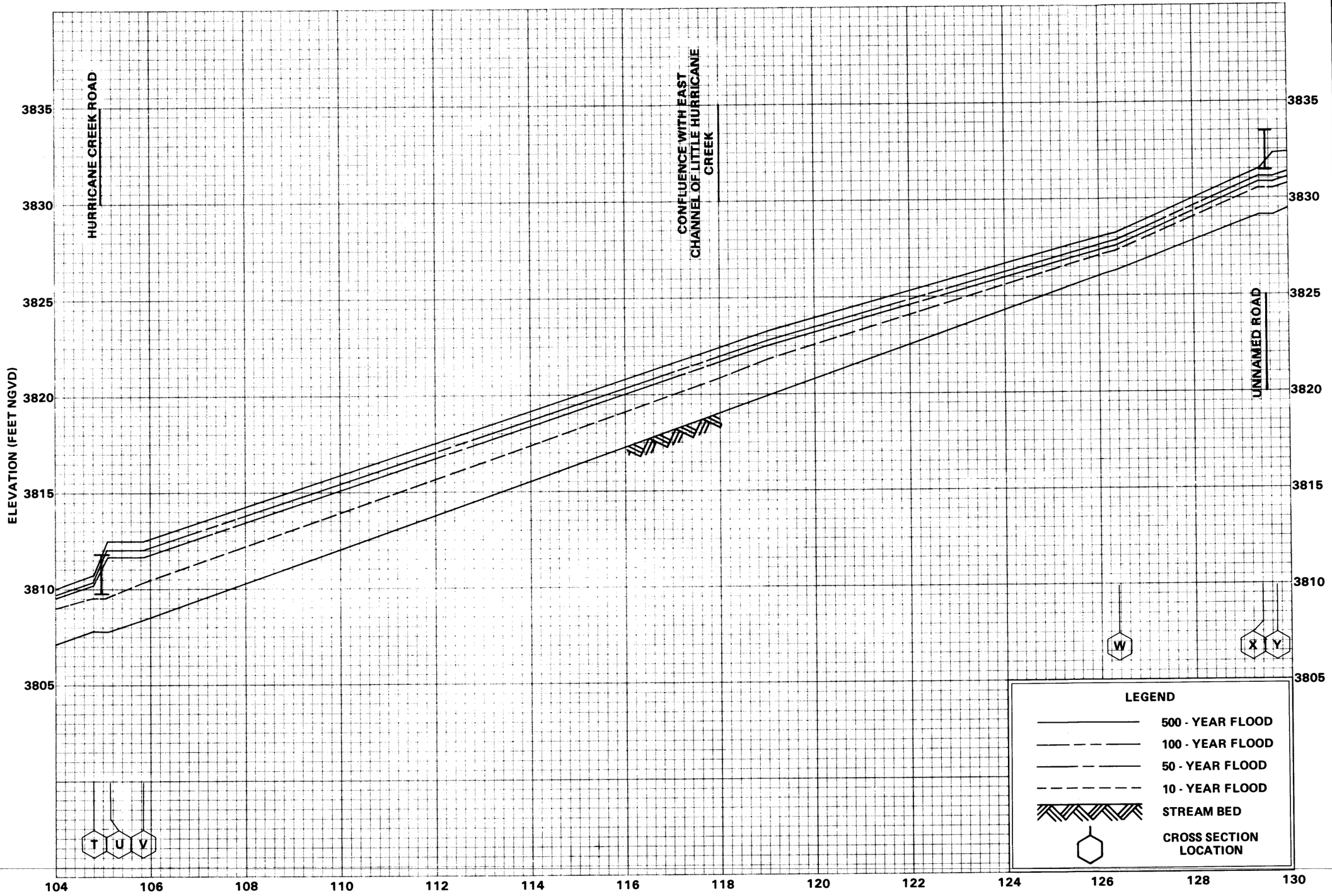


FLOOD PROFILES

LITTLE HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES

LITTLE HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

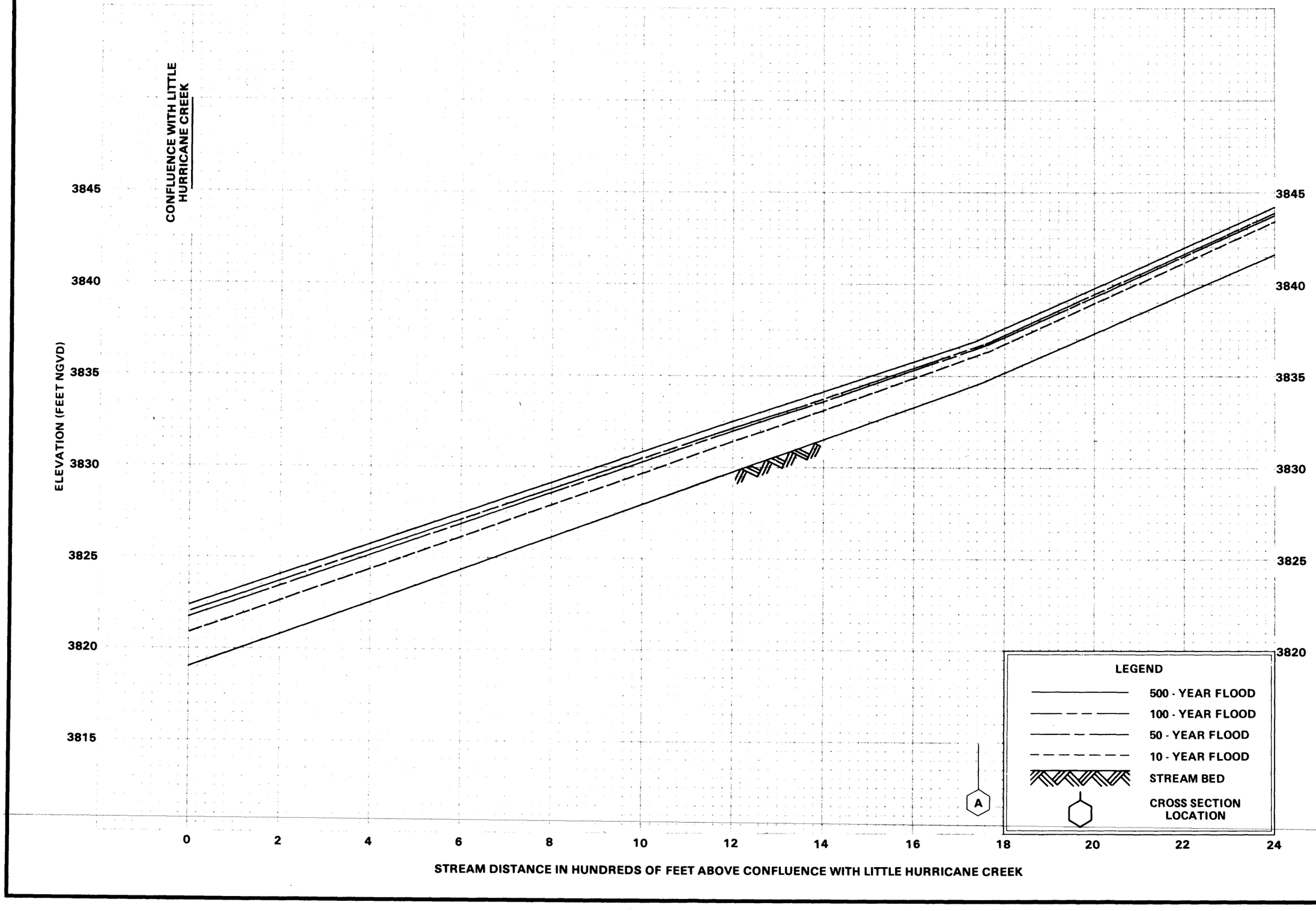
68P

FLOOD PROFILES

LITTLE HURRICANE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS



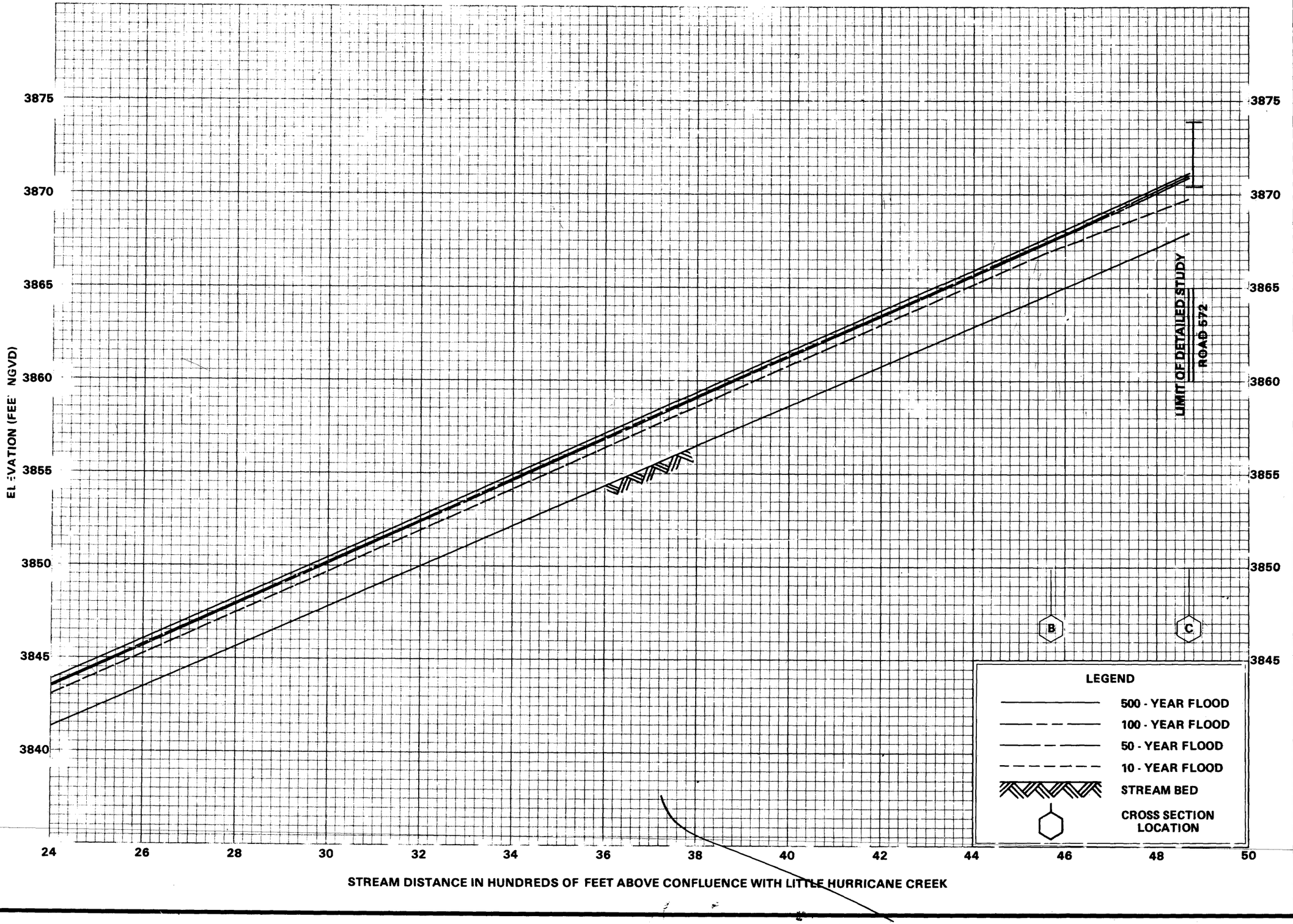
FLOOD PROFILES

LITTLE HURRICANE CREEK (EAST CHANNEL)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

70P



FLOOD PROFILES

LITTLE HURRICANE CREEK (EAST CHANNEL)

FEDERAL EMERGENCY MANAGEMENT AGENCY

WALLOWA COUNTY, OR
AND INCORPORATED AREAS

71P