



City of Tualatin

TUALATIN CITY COUNCIL

Monday, OCTOBER 10, 2016

JUANITA POHL CENTER

8513 SW Tualatin Road

Tualatin, OR 97062

WORK SESSION begins at 5:00 p.m.

BUSINESS MEETING begins at 7:00 p.m.

Mayor Lou Ogden

Council President Monique Beikman

Councilor Wade Brooksby

Councilor Frank Bubenik

Councilor Joelle Davis

Councilor Nancy Grimes

Councilor Ed Truax

Welcome! By your presence in the City Council Chambers, you are participating in the process of representative government. To encourage that participation, the City Council has specified a time for your comments on its agenda, following Announcements, at which time citizens may address the Council concerning any item not on the agenda or to request to have an item removed from the consent agenda. If you wish to speak on a item already on the agenda, comment will be taken during that item. Please fill out a Speaker Request Form and submit it to the Recording Secretary. You will be called forward during the appropriate time; each speaker will be limited to three minutes, unless the time limit is extended by the Mayor with the consent of the Council.

Copies of staff reports or other written documentation relating to each item of business referred to on this agenda are available for review on the City website at www.tualatinoregon.gov/meetings, the Library located at 18878 SW Martinazzi Avenue, and on file in the Office of the City Manager for public inspection. Any person with a question concerning any agenda item may call Administration at 503.691.3011 to make an inquiry concerning the nature of the item described on the agenda.

In compliance with the Americans With Disabilities Act, if you need special assistance to participate in this meeting, you should contact Administration at 503.691.3011. Notification thirty-six (36) hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting.

Council meetings are televised *live* the day of the meeting through Washington County Cable Access Channel 28. The replay schedule for Council meetings can be found at www.tvctv.org. Council meetings can also be viewed by live *streaming video* on the day of the meeting at www.tualatinoregon.gov/meetings.

Your City government welcomes your interest and hopes you will attend the City of Tualatin Council meetings often.

PROCESS FOR LEGISLATIVE PUBLIC HEARINGS

A **legislative** public hearing is typically held on matters which affect the general welfare of the entire City rather than a specific piece of property.

1. Mayor opens the public hearing and identifies the subject.
2. A staff member presents the staff report.
3. Public testimony is taken.
4. Council then asks questions of staff, the applicant, or any member of the public who testified.
5. When the Council has finished questions, the Mayor closes the public hearing.
6. When the public hearing is closed, Council will then deliberate to a decision and a motion will be made to either *approve*, *deny*, or *continue* the public hearing.

PROCESS FOR QUASI-JUDICIAL PUBLIC HEARINGS

A **quasi-judicial** public hearing is typically held for annexations, planning district changes, conditional use permits, comprehensive plan changes, and appeals from subdivisions, partitions and architectural review.

1. Mayor opens the public hearing and identifies the case to be considered.
2. A staff member presents the staff report.
3. Public testimony is taken:
 - a) In support of the application
 - b) In opposition or neutral
4. Council then asks questions of staff, the applicant, or any member of the public who testified.
5. When Council has finished its questions, the Mayor closes the public hearing.
6. When the public hearing is closed, Council will then deliberate to a decision and a motion will be made to either *approve*, *approve with conditions*, or *deny the application*, or *continue* the public hearing.

TIME LIMITS FOR PUBLIC HEARINGS

The purpose of time limits on public hearing testimony is to provide all interested persons with an adequate opportunity to present and respond to testimony. All persons providing testimony **shall be limited to 3 minutes**, subject to the right of the Mayor to amend or waive the time limits.

EXECUTIVE SESSION INFORMATION

An Executive Session is a meeting of the City Council that is closed to the public to allow the City Council to discuss certain confidential matters. An Executive Session may be conducted as a separate meeting or as a portion of the regular Council meeting. No final decisions or actions may be made in Executive Session. In many, but not all, circumstances, members of the news media may attend an Executive Session.

The City Council may go into Executive Session for certain reasons specified by Oregon law. These reasons include, but are not limited to: ORS 192.660(2)(a) employment of personnel; ORS 192.660(2)(b) dismissal or discipline of personnel; ORS 192.660(2)(d) labor relations; ORS 192.660(2)(e) real property transactions; ORS 192.660(2)(f) information or records exempt by law from public inspection; ORS 192.660(2)(h) current litigation or litigation likely to be filed; and ORS 192.660(2)(i) employee performance of chief executive officer.



OFFICIAL AGENDA OF THE TUALATIN CITY COUNCIL MEETING FOR OCTOBER 10, 2016

A. CALL TO ORDER

Pledge of Allegiance

B. ANNOUNCEMENTS

1. Update on the Tualatin Youth Advisory Council's Activities for October
2. West Coast Giant Pumpkin Regatta Announcement
3. New Employee Introduction- Veronica Montenergro, Library Assistant I

C. CITIZEN COMMENTS

This section of the agenda allows anyone to address the Council regarding any issue not on the agenda, or to request to have an item removed from the consent agenda. The duration for each individual speaking is limited to 3 minutes. Matters requiring further investigation or detailed answers will be referred to City staff for follow-up and report at a future meeting.

D. CONSENT AGENDA

The Consent Agenda will be enacted with one vote. The Mayor will ask Councilors if there is anyone who wishes to remove any item from the Consent Agenda for discussion and consideration. If you wish to request an item to be removed from the consent agenda you should do so during the Citizen Comment section of the agenda. The matters removed from the Consent Agenda will be considered individually at the end of this Agenda under, Items Removed from the Consent Agenda. The entire Consent Agenda, with the exception of items removed from the Consent Agenda to be discussed, is then voted upon by roll call under one motion.

1. Consideration of Approval of the Minutes for the Work Session and Regular Meeting of September 12, 2016
2. Consideration of Approval of a New Liquor License Application for Saint Irene's
3. Consideration of Approval of a New Liquor License for Tualatin Gas & Food
4. Consideration of Approval of a New Liquor License Application for La Sen Vietnamese Grill
5. Consideration of Approval of a New Liquor License Application for Walden Selections
6. Consideration of **Resolution No. 5300-16** Authorizing a One-Year Extension of the Street Sweeping Contract with Great Western Sweeping, Inc.

7. Consideration of **Resolution No. 5301-16** Amending the City of Tualatin Fee Schedule and Rescinding Resolution No. 5284-16

E. SPECIAL REPORTS

1. Annual Report of the Juanita Pohl Center Advisory Committee

F. PUBLIC HEARINGS – Legislative or Other

1. Consideration to Amend the Tualatin Development Code Chapter 70: Flood Plain District to Meet Minimum National Flood Insurance Program Requirements

G. ITEMS REMOVED FROM CONSENT AGENDA

Items removed from the Consent Agenda will be discussed individually at this time. The Mayor may impose a time limit on speakers addressing these issues.

H. COMMUNICATIONS FROM COUNCILORS

I. ADJOURNMENT

City Council Meeting

Meeting Date: 10/10/2016

ANNOUNCEMENTS: Tualatin Youth Advisory Council
Update

ANNOUNCEMENTS

Update on the Tualatin Youth Advisory Council's Activities for October

SUMMARY

A. YAC Update



October 10, 2016

**TUALATIN YOUTH ADVISORY
COUNCIL**



West Coast Giant Pumpkin Regatta



- October 15, 2016
- 10:00am – 4:00pm
- Concessions
- Pumpkin crafts
- Face painting
- T-shirt decorating
- Pumpkin bowling



Haunted House

- October 21, 22, 28, 29
- 7:00 to 10:00 pm
- Van Raden Community Center
- \$4 youth/\$5 adults



Haunted
School

City Council Meeting

Meeting Date: 10/10/2016

ANNOUNCEMENTS: West Coast Giant Pumpkin
Regatta Announcement

ANNOUNCEMENTS

West Coast Giant Pumpkin Regatta Announcement

A. Pumpkin Regatta Announcement

13TH ANNUAL WEST COAST GIANT PUMPKIN REGATTA

Saturday, October 15, 2016
Lake of the Commons
10:00am-4:00pm

Giant Pumpkin Races * 5k
Regatta Run* Terminator
Weigh Off * Family
Entertainment * Pie Eating
Contests * Costume Contests
* Crafts * Food * and more!

Rain or Shine!



THE CITY OF TUALATIN'S
13TH ANNUAL
WEST COAST GIANT PUMPKIN REGATTA



SATURDAY, OCTOBER 15, 2016, 10AM-4PM

THE LAKE OF THE COMMONS • 8325 SW NYBERG STREET, TUALATIN, OREGON



17TH ANNUAL TERMINATOR WEIGH OFF!
5K REGATTA RUN



FREE ADMISSION • WWW.TUALATINOREGON.GOV • RAIN OR SHINE





STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Nicole Morris, Deputy City Recorder

DATE: 10/10/2016

SUBJECT: Consideration of Approval of the Minutes for the Work Session and Regular Meeting of September 12, 2016

ISSUE BEFORE THE COUNCIL:

The issue before the Council is to approve the minutes for the Work Session and Regular Meeting of September 12, 2016 .

RECOMMENDATION:

Staff respectfully recommends that the Council adopt the attached minutes.

Attachments: [City Council Work Session Minutes of September 12, 2016](#)
[City Council Regular Meeting Minutes of September 12, 2016](#)



Present: Mayor Lou Ogden; Council President Monique Beikman; Councilor Frank Bubenik; Councilor Joelle Davis; Councilor Nancy Grimes; Councilor Ed Truax

Absent: Councilor Wade Brooksby

Staff Present: City Manager Sherilyn Lombos; City Attorney Sean Brady; Police Chief Bill Steele; Finance Director Don Hudson; Planning Manager Aquilla Hurd-Ravich; Deputy City Recorder Nicole Morris; Assistant to the City Manager Tanya Williams; Assistant City Manager Alice Cannon

CALL TO ORDER

Mayor Ogden called the meeting to order at 6:35 p.m.

1. ***Allocation of Funds to Outside Agencies.***

City Manager Sherilyn Lombos presented the Outside Agency Grant applications. She noted proposals were solicited through the City's grant process that opened July 1 and \$30,000 has been allocated in the budget this year for grant awards. After review and discussion, Council determined the award amounts. They left \$5,000 in funding available to use throughout the year as non-profit projects come up.

2. ***Request for Proclamation.***

Mayor Ogden stated he would sponsor the resolution request for National Red Ribbon Week. Council consensus was reached to place the resolution on the October 24 agenda.

3. ***Council Meeting Agenda Review, Communications & Roundtable.***

Councilor Bubenik asked for a update on the Basalt Creek Project. City Manager Lombos stated a update is scheduled for the first meeting in October. Councilor Bubenik asked for a quick progress update on the project. Assistant City Manager Cannon stated both sides are moving in a good direction. Mayor Ogden asked if there was another open house schedule. Planning Manager Aquilla Hurd- Ravich stated one is in not scheduled at this time.

ADJOURNMENT

The work session adjourned at 6:51 p.m.

Sherilyn Lombos, City Manager

_____ / Nicole Morris, Recording Secretary

_____ / Lou Ogden, Mayor



OFFICIAL MINUTES OF THE TUALATIN CITY COUNCIL MEETING FOR SEPTEMBER 12, 2016

Present: Mayor Lou Ogden; Council President Monique Beikman; Councilor Frank Bubenik; Councilor Joelle Davis; Councilor Nancy Grimes; Councilor Ed Truax

Absent: Councilor Wade Brooksby

Staff Present: City Manager Sherilyn Lombos; City Attorney Sean Brady; Police Chief Bill Steele; Community Services Director Paul Hennon; Finance Director Don Hudson; Planning Manager Aquilla Hurd-Ravich; Deputy City Recorder Nicole Morris; Teen Program Specialist Julie Ludemann; Assistant to the City Manager Tanya Williams; Assistant City Manager Alice Cannon; Parks and Recreation Manager Rich Mueller; Human Resources Director Janet Newport; Economic Development Manager Melinda Anderson

A. **CALL TO ORDER**

Pledge of Allegiance

Mayor Ogden called the meeting to order at 7:01 p.m.

B. **ANNOUNCEMENTS**

1. Update on the Tualatin Youth Advisory Council's Activities for September

Members of the Youth Advisory Committee (YAC) presented a PowerPoint on their latest activities and upcoming events. YAC is currently undergoing new member recruitment. There are five openings and applications will be accepted through September 16. YAC sold concessions at the Movies on the Commons over the summer to raise funds to send YAC seniors to the National League of Cities Conference. It was another successful summer with over 1,700 people attending. Upcoming events include the West Coast Giant Pumpkin Regatta, the Haunted House, Van Raden Teen Nights, and Park After Dark.

Councilor Grimes asked how someone could submit a committee application. A YAC Member stated applications could be downloaded online.

Councilor Bubenik asked for an update on the Coffee House project. A YAC Member stated there was not a good initial turnout so the project was converted to the once monthly Park After Dark event.

2. New Employee Introduction- Gladys Gomez, Court Clerk

Finance Director Don Hudson introduced Court Clerk Gladys Gomez. The Council welcomed her.

3. New Employee Introduction- Michelle Weseman, Building Inspector

Assistant City Manager Alice Cannon introduced Building Inspector Michelle Weseman. The Council welcomed her.

4. Basalt Creek Project Update

Planning Manager Aquilla Hurd-Ravich presented a brief update on the Basalt Creek Project. She noted the IGA presented tonight is to extend current work being done on the project. A full update on the project will be presented at the work session on October 10.

C. CITIZEN COMMENTS

This section of the agenda allows anyone to address the Council regarding any issue not on the agenda, or to request to have an item removed from the consent agenda. The duration for each individual speaking is limited to 3 minutes. Matters requiring further investigation or detailed answers will be referred to City staff for follow-up and report at a future meeting.

Grace Lucini requested the Basalt Creek Concept Planning Area IGA be removed from the consent agenda for further discussion. She presented concerns with the financial impacts of the project exceeding its deadline.

Linda Weiland asked for assistance in the removal of debris from a homeless camp behind her house. Councilor Davis stated she should seek assistance from ODOT since it is in their right-of way. Police Chief Bill Steele stated the site is scheduled for clean-up.

D. CONSENT AGENDA

The Consent Agenda will be enacted with one vote. The Mayor will ask Councilors if there is anyone who wishes to remove any item from the Consent Agenda for discussion and consideration. If you wish to request an item to be removed from the consent agenda you should do so during the Citizen Comment section of the agenda. The matters removed from the Consent Agenda will be considered individually at the end of this Agenda under, Items Removed from the Consent Agenda. The entire Consent Agenda, with the exception of items removed from the Consent Agenda to be discussed, is then voted upon by roll call under one motion.

MOTION by Council President Monique Beikman, SECONDED by Councilor Nancy Grimes to adopt the consent agenda.

Aye: Mayor Lou Ogden, Council President Monique Beikman, Councilor Frank Bubenik, Councilor Joelle Davis, Councilor Nancy Grimes, Councilor Ed Truax

Other: Councilor Wade Brooksby (Absent)

MOTION CARRIED

1. Consideration of Approval of the Minutes for the Regular Meeting and Work Session of August 22, 2016

2. Consideration of Approval of a New Liquor License Application for Stickmen Brewing Company
3. Consideration of **Resolution No. 5298-16** Authorizing the Reinstatement of an Intergovernmental Agreement for the Basalt Creek Planning Area
4. Consideration of **Resolution No. 5299-16** Authorizing Application and Acceptance of a Community Development Block Grant to Design and Renovate the Kitchen at the Juanita Pohl Center
5. Consideration of **Resolution No. 5284-16** Amending the City of Tualatin Fee Schedule and Rescinding Resolution No. 5240-15

E. SPECIAL REPORTS

1. Update on Programs and Activities Offered this Summer by the City of Tualatin and Partners, and a Preview of Fall Programs

Recreation Supervisor Julie Ludemann and Public Services Manager Sarah Jesudason presented the summer recap and fall preview. The summer reading program at the library proved to be successful once again with over 50,000 hours read by participants. Summer reading at the Commons hosted events June through August with over 2,000 attendees. The summer camp program hosted 1,560 kids ages four through eleven. The teen adventure camp program hosted 648 teens over nine weeks. Concerts and Movies on the Commons ran July through August and were up nearly 25% in attendance. ArtSplash was held in July and allowed 44 artists to showcase their work. Teen volunteers participated in TEAM Tualatin, assisted in the library, and served on the Youth Advisory Council. The Police Department held National Night Out in August and hosted 215 students in the Gang Resistance Education and Training (GREAT) Camp. The Juanita Pohl center hosted over 4,000 participants in fitness, enrichment, and wellness programs while also serving nearly 5,000 meals. Recreation partners over the summer included the Tualatin Crawfish Festival, Tigard-Tualatin School District free lunch program, Tualatin Heritage Center, Browns Ferry Park Kayak and Canoe Rentals, and Willowbrook Arts Camps.

Upcoming fall activities at the Library include new story time for toddlers, STEAM after-school program, Hispanic Heritage Month, music programs, and a Knight of Murder event. The Juanita Pohl Center will be hosting Oktoberfest, the Annual Veterans' Recognition Breakfast, and Active Aging Week. Community Services will be hosting the West Coast Giant Pumpkin Regatta and the YAC Haunted House. Look for more information about all of these events on the city's website.

F. ITEMS REMOVED FROM CONSENT AGENDA

Items removed from the Consent Agenda will be discussed individually at this time. The Mayor may impose a time limit on speakers addressing these issues.

G. COMMUNICATIONS FROM COUNCILORS

None.

H. ADJOURNMENT

Mayor Ogden adjourned the meeting at 7:41 p.m.

Sherilyn Lombos, City Manager

_____ / Nicole Morris, Recording Secretary

_____ / Lou Ogden, Mayor



STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Nicole Morris, Deputy City Recorder

DATE: 10/10/2016

SUBJECT: Consideration of Approval of a New Liquor License Application for Saint Irene's

ISSUE BEFORE THE COUNCIL:

The issue before the Council is to approve a new liquor license application for Saint Irene's.

RECOMMENDATION:

Staff respectfully recommends that the Council approve endorsement of the liquor license application for Saint Irene's.

EXECUTIVE SUMMARY:

Saint Irene's has submitted a new liquor license application under the category of full on-premises. This would permit them to sell and serve distilled spirits, malt beverages, wine, and cider for consumption at their location. They would also be permitted to sell malt beverages for off-site consumption in securely covered containers provided by the customer. The business is located at 20175 SW 112 Avenue. The application is in accordance with provisions of Ordinance No.680-85 which establishes procedures for liquor license applicants. Applicants are required to fill out a City application form, from which a review by the Police Department is conducted, according to standards and criteria established in Section 6 of the ordinance. The Police Department has reviewed the new liquor license application and recommended approval. According to the provisions of Section 5 of Ordinance No. 680-85 a member of the Council or the public may request a public hearing on any of the liquor license requests. If such a public hearing request is made, a hearing will be scheduled and held on the license. It is important that any request for such a hearing include reasons for said hearing.

FINANCIAL IMPLICATIONS:

A fee has been paid by the applicant.

Attachments: [Attachment A - Vicinity Map](#)
[Attachment B- License Types](#)
[Attachment C- Application](#)



OREGON LIQUOR CONTROL COMMISSION LICENSE TYPES

FULL ON-PREMISES SALES

- **Commercial Establishment**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location (*this is the license that most “full-service” restaurants obtain*). Sell malt beverages for off-site consumption in securely covered containers provided by the customer. Food service required. Must purchase distilled liquor **only** from an Oregon liquor store, or from another Full On- Premises Sales licensee who has purchased the distilled liquor from an Oregon liquor store.
- **Caterer**
Allows the sale of distilled spirits, malt beverages, wine, and cider by the drink to individuals at off-site catered events. Food service required.
- **Passenger Carrier**
An airline, railroad, or tour boat may sell and serve distilled spirits, malt beverages, wine, and cider for consumption on the licensed premises. Food service required.
- **Other Public Location**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, where the predominant activity is not eating or drinking (for example an auditorium; music, dance, or performing arts facility; banquet or special event facility; lodging fairground; sports stadium; art gallery; or a convention, exhibition, or community center). Food service required.
- **Private Club**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, but only for members and guests. Food service required.

LIMITED ON-PREMISES SALES

Sell and serve malt beverages, wine, and cider for onsite consumption. Allows the sale of malt beverages in containers (kegs) for off-site consumption. Sell malt beverages for off-site consumption in securely covered containers provided by the customer.

OFF-PREMISES SALES

Sell factory-sealed containers of malt beverages, wine, and cider at retail to individuals in Oregon for consumption off the licensed premises. Eligible to provide sample tastings of malt beverages, wine, and cider for consumption on the premises. Eligible to ship manufacturer-sealed containers of malt beverages, wine, or cider directly to an Oregon resident.

BREWERY PUBLIC HOUSE

Make and sell malt beverages. Import malt beverages into and export from Oregon. Distribute malt beverages directly to retail and wholesale licensees in Oregon. Sell malt beverages made at the business to individuals for consumption on or off-site.

WINERY

Must principally produce wine or cider in Oregon. Manufacture, store, and export wine and cider. Import wine or cider *If bottled, the brand of wine or cider must be owned by the licensee*. Sell wine and cider to wholesale and retail licensees in Oregon. Sell malt beverages, wine, and cider to individuals in Oregon for consumption on or off-site.



CITY OF TUALATIN
LIQUOR LICENSE APPLICATION

Return Completed form to:
City of Tualatin
Attn: Deputy City Recorder
18880 SW Martinazzi Ave
Tualatin, OR 97062

Date 9-15-16 520 Paid

IMPORTANT: This is a three-page form. You are required to complete all sections of the form.
If a question does not apply, please indicate N/A. Please include full names (last, first middle) and full dates of birth (month/day/year). Incomplete forms shall receive an unfavorable recommendation.
Thank you for your assistance and cooperation. CK# 1660

SECTION 1: TYPE OF APPLICATION

- Original (New) Application - \$100.00 Application Fee.
Change in Previous Application - \$75.00 Application Fee.
Renewal of Previous License - \$35.00 Application Fee. Applicant must possess current business license. License #
Temporary License - \$35.00 Application Fee.

SECTION 2: DESCRIPTION OF BUSINESS

Name of business (dba): Saint Irene's

Business address 20175 SW 112th Ave City Tualatin State OR Zip Code 97062

Mailing address 20185 SW 112th Ave City Tualatin State OR Zip Code 97062

Telephone # 503 869 5713 Fax #

Name(s) of business manager(s) First Avery Middle Lee Last Houser

Date of birth Social Security # ODL# M F x

Home address (attach additional pages if necessary)

Type of business Tasting Room - conference room - event space

Type of food served small plates

Type of entertainment (dancing, live music, exotic dancers, etc.) live music

Days and hours of operation 11am 11pm

Food service hours: Breakfast sometimes Lunch X Dinner X

Restaurant seating capacity 32 and 81 Outside or patio seating capacity N/A

How late will you have outside seating? How late will you sell alcohol? 11pm

How many full-time employees do you have? 3 ~~4~~ Part-time employees? 6

SECTION 3: DESCRIPTION OF LIQUOR LICENSE

Name of Individual, Partnership, Corporation, LLC, or Other applicants Saint Irene Inc.

Type of liquor license (refer to OLCC form) full on premises

Form of entity holding license (check one and answer all related applicable questions):

INDIVIDUAL: If this box is checked, provide full name, date of birth, and residence address.
Full name _____ Date of birth _____
Residence address _____

PARTNERSHIP: If this box is checked, provide full name, date of birth and residence address for each partner. If more than two partners exist, use additional pages. If partners are not individuals, also provide for each partner a description of the partner's legal form and the information required by the section corresponding to the partner's form.
Full name _____ Date of birth _____
Residence address _____
Full name _____ Date of birth _____
Residence address _____

CORPORATION: If this box is checked, complete (a) through (c).
(a) Name and business address of registered agent.
Full name Saint Irene Inc. DBA Saint-Irene's
Business address 20175 SW 112th Ave Tualatin OR 97062

no (b) Does any shareholder own more than 50% of the outstanding shares of the corporation? If yes, provide the shareholder's full name, date of birth, and residence address.
Full name _____ Date of birth _____
Residence address _____

(c) Are there more than 35 shareholders of this corporation? Yes X No. If 35 or fewer shareholders, identify the corporation's president, treasurer, and secretary by full name, date of birth, and residence address.
Full name of president: Douglas John Lee Date of birth: [REDACTED]
Residence address: [REDACTED]
Full name of treasurer: Wendy Warner Lee Date of birth: [REDACTED]
Residence address: [REDACTED]
Full name of secretary: Avery LEE Houser Date of birth: [REDACTED]
Residence address: [REDACTED]

LIMITED LIABILITY COMPANY: If this box is checked, provide full name, date of birth, and residence address of each member. If there are more than two members, use additional pages to complete this question. If members are not individuals, also provide for each member a description of the member's legal form and the information required by the section corresponding to the member's form.
Full name: _____ Date of birth: _____
Residence address: _____

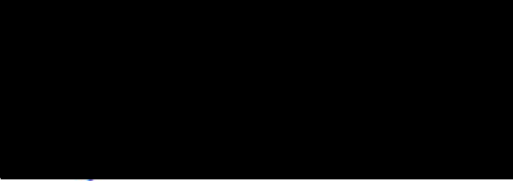
Full name: _____ Date of birth: _____

Residence address: _____

OTHER: If this box is checked, use a separate page to describe the entity, and identify with reasonable particularity every entity with an interest in the liquor license.

SECTION 4: APPLICANT SIGNATURE

A false answer or omission of any requested information on any page of this form shall result in an unfavorable recommendation.



9-15-16
Date

For City Use Only

Sources Checked:

- DMV by BST LEDS by BST TuPD Records by BST
- Public Records by BST

- Number of alcohol-related incidents during past year for location.
- Number of Tualatin arrest/suspect contacts for _____

It is recommended that this application be:

- Granted
- Denied

Cause of unfavorable recommendation: _____



9-16-16

Signature

Date

Bill Steele
Chief of Police
Tualatin Police Department



STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Nicole Morris, Deputy City Recorder

DATE: 10/10/2016

SUBJECT: Consideration of Approval of a New Liquor License for Tualatin Gas & Food

ISSUE BEFORE THE COUNCIL:

The issue before the Council is to approve a new liquor license application for Tualatin Gas & Food.

RECOMMENDATION:

Staff respectfully recommends that the Council approve endorsement of the liquor license application for Tualatin Gas & Food.

EXECUTIVE SUMMARY:

Tualatin Gas & Food has submitted a new liquor license application under the category of off-premises sales. Under the category of off-premise sales, they may sell factory-sealed containers of malt beverages, wine, and cider at retail to individuals in Oregon for consumption off the licensed premises. In addition this category allows for providing sample tastings of malt beverages, wine, and cider for consumption on the premises. The business is located at 7004 SW Nyberg Street. The application is in accordance with provisions of Ordinance No.680-85 which establishes procedures for liquor license applicants. Applicants are required to fill out a City application form, from which a review by the Police Department is conducted, according to standards and criteria established in Section 6 of the ordinance. The Police Department has reviewed the new liquor license application and recommended approval. According to the provisions of Section 5 of Ordinance No. 680-85 a member of the Council or the public may request a public hearing on any of the liquor license requests. If such a public hearing request is made, a hearing will be scheduled and held on the license. It is important that any request for such a hearing include reasons for said hearing.

FINANCIAL IMPLICATIONS:

A fee has been paid by the applicant.

Attachments: [Attachment A- Application](#)
[Attachment B - Vicinity Map](#)

Attachment C- License Types



REC'D
CITY OF TUALATIN
SEP 02 2016
LIQUOR LICENSE APPLICATION

Return Completed form to:
City of Tualatin
Attn: Deputy City Recorder
18880 SW Martinazzi Ave
Tualatin, OR 97062

MAYOR _____ COUNCIL _____ POLICE _____ ADM _____
FINANCE _____ COMM/DEV _____ LEGAL _____ OPER _____
COMMSVCS _____ ENG & BLDG _____ LIBRARY _____

Date 09/02/2016

IMPORTANT: *This is a three-page form. You are required to complete all sections of the form.* If a question does not apply, please indicate N/A. Please include full names (last, first middle) and full dates of birth (month/day/year). Incomplete forms shall receive an unfavorable recommendation.
Thank you for your assistance and cooperation.

SECTION 1: TYPE OF APPLICATION

- Original (New) Application - \$100.00 Application Fee.
- Change in Previous Application - \$75.00 Application Fee.
- Renewal of Previous License - \$35.00 Application Fee. Applicant must possess current business license. License # _____
- Temporary License - \$35.00 Application Fee.

SECTION 2: DESCRIPTION OF BUSINESS

Name of business (dba): Tualatin, Gas & Food

Business address 7004 SW Nyberg Rd. City Tualatin State OR Zip Code 97062

Mailing address [REDACTED]

Telephone # 503-473-1489 Fax # _____

Name(s) of business manager(s) First Bikas Middle _____ Last Ragnubansh

Date of birth [REDACTED] Social Security # [REDACTED] ODL# [REDACTED]

Home address [REDACTED]
(attach additional pages if necessary)

Type of business Convenience Store & Gas

Type of food served _____

Type of entertainment (dancing, live music, exotic dancers, etc.) N/A

Days and hours of operation Everyday 5-12

Food service hours: Breakfast N/A Lunch _____ Dinner _____

Restaurant seating capacity N/A Outside or patio seating capacity _____

How late will you have outside seating? N/A How late will you sell alcohol? _____

How many full-time employees do you have? 2 Part-time employees? 6

SECTION 3: DESCRIPTION OF LIQUOR LICENSE

Name of Individual, Partnership, Corporation, LLC, or Other applicants BR 3 SM Incorporated

Type of liquor license (refer to OLCC form) Off-Premises Sales w/ Fuel Pumps

Form of entity holding license (check one and answer all related applicable questions):

INDIVIDUAL: If this box is checked, provide full name, date of birth, and residence address.
Full name _____ Date of birth _____
Residence address _____

PARTNERSHIP: If this box is checked, provide full name, date of birth and residence address for each partner. If more than two partners exist, use additional pages. If partners are not individuals, also provide for each partner a description of the partner's legal form and the information required by the section corresponding to the partner's form.
Full name _____ Date of birth _____
Residence address _____
Full name _____ Date of birth _____
Residence address _____

CORPORATION: If this box is checked, complete (a) through (c).
(a) Name and business address of registered agent.
Full name BR 3 SM INC
Business address _____

(b) Does any shareholder own more than 50% of the outstanding shares of the corporation? If yes, provide the shareholder's full name, date of birth, and residence address.
Full name _____ Date of birth _____
Residence address _____

(c) Are there more than 35 shareholders of this corporation? Yes No If 35 or fewer shareholders, identify the corporation's president, treasurer, and secretary by full name, date of birth, and residence address.
Full name of president: Bikas Babubansh Date of birth: _____
Residence address: _____
Full name of treasurer: _____ Date of birth: _____
Residence address: _____
Full name of secretary: Sugandh S. Munnakanni Date of birth: _____
Residence address: _____

LIMITED LIABILITY COMPANY: If this box is checked, provide full name, date of birth, and residence address of each member. If there are more than two members, use additional pages to complete this question. If members are not individuals, also provide for each member a description of the member's legal form and the information required by the section corresponding to the member's form.
Full name: _____ Date of birth: _____
Residence address: _____

Full name: _____ Date of birth: _____

Residence address: _____

OTHER: If this box is checked, use a separate page to describe the entity, and identify with reasonable particularity every entity with an interest in the liquor license.

SECTION 4: APPLICANT SIGNATURE

A false answer or omission of any requested information on any page of this form shall result in an unfavorable recommendation.

Sig  _____ Date 9/2/2016

For City Use Only

Sources Checked:

- DMV by [Signature]
- LEDS by [Signature]
- TuPD Records by [Signature]
- Public Records by [Signature]

Number of alcohol-related incidents during past year for location.

Number of Tualatin arrest/suspect contacts for _____

It is recommended that this application be:

Granted

Denied

Cause of unfavorable recommendation: _____

 _____ Date 9-12-16

~~Kent W. Barker~~ Bill Steele
Chief of Police
Tualatin Police Department



SW Nyberg St

Tualatin Gas & Food



Attachment A
Vicinity Map

OREGON LIQUOR CONTROL COMMISSION LICENSE TYPES

FULL ON-PREMISES SALES

- **Commercial Establishment**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location (*this is the license that most “full-service” restaurants obtain*). Sell malt beverages for off-site consumption in securely covered containers provided by the customer. Food service required. Must purchase distilled liquor **only** from an Oregon liquor store, or from another Full On- Premises Sales licensee who has purchased the distilled liquor from an Oregon liquor store.
- **Caterer**
Allows the sale of distilled spirits, malt beverages, wine, and cider by the drink to individuals at off-site catered events. Food service required.
- **Passenger Carrier**
An airline, railroad, or tour boat may sell and serve distilled spirits, malt beverages, wine, and cider for consumption on the licensed premises. Food service required.
- **Other Public Location**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, where the predominant activity is not eating or drinking (for example an auditorium; music, dance, or performing arts facility; banquet or special event facility; lodging fairground; sports stadium; art gallery; or a convention, exhibition, or community center). Food service required.
- **Private Club**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, but only for members and guests. Food service required.

LIMITED ON-PREMISES SALES

Sell and serve malt beverages, wine, and cider for onsite consumption. Allows the sale of malt beverages in containers (kegs) for off-site consumption. Sell malt beverages for off-site consumption in securely covered containers provided by the customer.

OFF-PREMISES SALES

Sell factory-sealed containers of malt beverages, wine, and cider at retail to individuals in Oregon for consumption off the licensed premises. Eligible to provide sample tastings of malt beverages, wine, and cider for consumption on the premises. Eligible to ship manufacturer-sealed containers of malt beverages, wine, or cider directly to an Oregon resident.

BREWERY PUBLIC HOUSE

Make and sell malt beverages. Import malt beverages into and export from Oregon. Distribute malt beverages directly to retail and wholesale licensees in Oregon. Sell malt beverages made at the business to individuals for consumption on or off-site.

WINERY

Must principally produce wine or cider in Oregon. Manufacture, store, and export wine and cider. Import wine or cider *If bottled, the brand of wine or cider must be owned by the licensee*. Sell wine and cider to wholesale and retail licensees in Oregon. Sell malt beverages, wine, and cider to individuals in Oregon for consumption on or off-site.



STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos

FROM: Nicole Morris, Deputy City Recorder

DATE: 10/10/2016

SUBJECT: Consideration of Approval of a New Liquor License Application for La Sen Vietnamese Grill

ISSUE BEFORE THE COUNCIL:

The issue before the Council is to approve a new liquor license application for La Sen Vietnamese Grill.

RECOMMENDATION:

Staff respectfully recommends that the Council approve endorsement of the liquor license application for La Sen Vietnamese Grill.

EXECUTIVE SUMMARY:

La Sen Vietnamese Grill has submitted a new liquor license application under the category of limited on-premises sales. Under the category of limited on-premise sales, this would permit them to sell factory-sealed containers of malt beverages, wine, and cider for on-site consumption. The business is located at 7628 SW Nyberg Street. The application is in accordance with provisions of Ordinance No.680-85 which establishes procedures for liquor license applicants. Applicants are required to fill out a City application form, from which a review by the Police Department is conducted, according to standards and criteria established in Section 6 of the ordinance. The Police Department has reviewed the new liquor license application and recommended approval. According to the provisions of Section 5 of Ordinance No. 680-85 a member of the Council or the public may request a public hearing on any of the liquor license requests. If such a public hearing request is made, a hearing will be scheduled and held on the license. It is important that any request for such a hearing include reasons for said hearing.

FINANCIAL IMPLICATIONS:

A fee has been paid by the applicant.

Attachments: [Attachment A - Vicinity Map](#)
[Attachment B- License Types](#)

Attachment C- Application



SW Tualatin Sherwood Rd

SW Nyberg St

La Sen Vietnamese Grill



OREGON LIQUOR CONTROL COMMISSION LICENSE TYPES

FULL ON-PREMISES SALES

- **Commercial Establishment**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location (*this is the license that most “full-service” restaurants obtain*). Sell malt beverages for off-site consumption in securely covered containers provided by the customer. Food service required. Must purchase distilled liquor **only** from an Oregon liquor store, or from another Full On- Premises Sales licensee who has purchased the distilled liquor from an Oregon liquor store.
- **Caterer**
Allows the sale of distilled spirits, malt beverages, wine, and cider by the drink to individuals at off-site catered events. Food service required.
- **Passenger Carrier**
An airline, railroad, or tour boat may sell and serve distilled spirits, malt beverages, wine, and cider for consumption on the licensed premises. Food service required.
- **Other Public Location**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, where the predominant activity is not eating or drinking (for example an auditorium; music, dance, or performing arts facility; banquet or special event facility; lodging fairground; sports stadium; art gallery; or a convention, exhibition, or community center). Food service required.
- **Private Club**
Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, but only for members and guests. Food service required.

LIMITED ON-PREMISES SALES

Sell and serve malt beverages, wine, and cider for onsite consumption. Allows the sale of malt beverages in containers (kegs) for off-site consumption. Sell malt beverages for off-site consumption in securely covered containers provided by the customer.

OFF-PREMISES SALES

Sell factory-sealed containers of malt beverages, wine, and cider at retail to individuals in Oregon for consumption off the licensed premises. Eligible to provide sample tastings of malt beverages, wine, and cider for consumption on the premises. Eligible to ship manufacturer-sealed containers of malt beverages, wine, or cider directly to an Oregon resident.

BREWERY PUBLIC HOUSE

Make and sell malt beverages. Import malt beverages into and export from Oregon. Distribute malt beverages directly to retail and wholesale licensees in Oregon. Sell malt beverages made at the business to individuals for consumption on or off-site.

WINERY

Must principally produce wine or cider in Oregon. Manufacture, store, and export wine and cider. Import wine or cider *If bottled, the brand of wine or cider must be owned by the licensee*. Sell wine and cider to wholesale and retail licensees in Oregon. Sell malt beverages, wine, and cider to individuals in Oregon for consumption on or off-site.



CITY OF TUALATIN

LIQUOR LICENSE APPLICATION

Return Completed form to:
City of Tualatin
Attn: Deputy City Recorder
18880 SW Martinazzi Ave
Tualatin, OR 97062

Date 9-7-2016 SJO

IMPORTANT: *This is a three-page form. You are required to complete all sections of the form.* If a question does not apply, please indicate N/A. Please include full names (last, first middle) and full dates of birth (month/day/year). Incomplete forms shall receive an unfavorable recommendation.

Thank you for your assistance and cooperation.

SECTION 1: TYPE OF APPLICATION

- Original (New) Application - \$100.00 Application Fee.
- Change in Previous Application - \$75.00 Application Fee.
- Renewal of Previous License - \$35.00 Application Fee. Applicant must possess current business license. License # _____
- Temporary License - \$35.00 Application Fee.

SECTION 2: DESCRIPTION OF BUSINESS

Name of business (dba): LA SEN VIETNAMESE GRILL

Business address 7628 SW NYBERG ST City TUALATIN State OR Zip Code 97062

Mailing address CAME City _____ State _____ Zip Code _____

Telephone # (503) 734-8622 Fax # ---

Name(s) of business manager(s) First TIAN Middle --- Last LAM

Date of birth _____ Social Security # _____ ODL# _____ M F

Home address _____
(attach additional pages if necessary)

Type of business RESTAURANT

Type of food served VIETNAMESE CUISINES & BEEF NOODLE, ROLLS, SANDWICH

Type of entertainment (dancing, live music, exotic dancers, etc.) N/A

Days and hours of operation Mon - SAT 11:00 AM - 9:00 PM, SUNDAYS CLOSED

Food service hours: Breakfast --- Lunch 11:00 - 4:00 Dinner 4:00 - 9:00

Restaurant seating capacity 42 Outside or patio seating capacity 8

How late will you have outside seating? 9:00 PM How late will you sell alcohol? 9:00 PM

How many full-time employees do you have? 6 Part-time employees? 2

SECTION 3: DESCRIPTION OF LIQUOR LICENSE

Name of Individual, Partnership, Corporation, LLC, or Other applicants _____

TTNC GROUP LLC
Type of liquor license (refer to OLCC form) LIMITED ON-PREMISES SALES

Form of entity holding license (check one and answer all related applicable questions):

INDIVIDUAL: If this box is checked, provide full name, date of birth, and residence address.

Full name _____ Date of birth _____

Residence address _____

PARTNERSHIP: If this box is checked, provide full name, date of birth and residence address for each partner. If more than two partners exist, use additional pages. If partners are not individuals, also provide for each partner a description of the partner's legal form and the information required by the section corresponding to the partner's form.

Full name _____ Date of birth _____

Residence address _____

Full name _____ Date of birth _____

Residence address _____

CORPORATION: If this box is checked, complete (a) through (c).

(a) Name and business address of registered agent.

Full name _____

Business address _____

(b) Does any shareholder own more than 50% of the outstanding shares of the corporation? If yes, provide the shareholder's full name, date of birth, and residence address.

Full name _____ Date of birth _____

Residence address _____

(c) Are there more than 35 shareholders of this corporation? Yes No. If 35 or fewer shareholders, identify the corporation's president, treasurer, and secretary by full name, date of birth, and residence address.

Full name of president: _____ Date of birth: _____

Residence address: _____

Full name of treasurer: _____ Date of birth: _____

Residence address: _____

Full name of secretary: _____ Date of birth: _____

Residence address: _____

LIMITED LIABILITY COMPANY: If this box is checked, provide full name, date of birth, and residence address of each member. If there are more than two members, use additional pages to complete this question. If members are not individuals, also provide for each member a description of the member's legal form and the information required by the section corresponding to the member's form.

Full name: TUAN LAM Date of birth: [REDACTED]

Residence address: [REDACTED]

Full name: N/A Date of birth: _____
Residence address: _____

OTHER: If this box is checked, use a separate page to describe the entity, and identify with reasonable particularity every entity with an interest in the liquor license.

SECTION 4: APPLICANT SIGNATURE

A false answer or omission of any requested information on any page of this form shall result in an unfavorable recommendation.

Signature:  Date: 09/06/17

For City Use Only

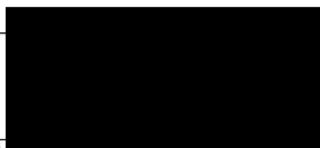
Sources Checked:

- DMV by [Signature]
- LEADS by [Signature]
- TuPD Records by [Signature]
- Public Records by [Signature]

- Number of alcohol-related incidents during past year for location.
- Number of Tualatin arrest/suspect contacts for _____

It is recommended that this application be:

- Granted**
- Denied**
Cause of unfavorable recommendation: _____

Signature:  Date: 9-12-16

~~Kent W. Barker~~ Bill Steele
Chief of Police
Tualatin Police Department



STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Nicole Morris, Deputy City Recorder

DATE: 10/10/2016

SUBJECT: Consideration of Approval of a New Liquor License Application for Walden Selections

ISSUE BEFORE THE COUNCIL:

The issue before the Council is to approve a new liquor license application for Walden Selections.

RECOMMENDATION:

Staff respectfully recommends that the Council approve endorsement of the liquor license application for Walden Selections.

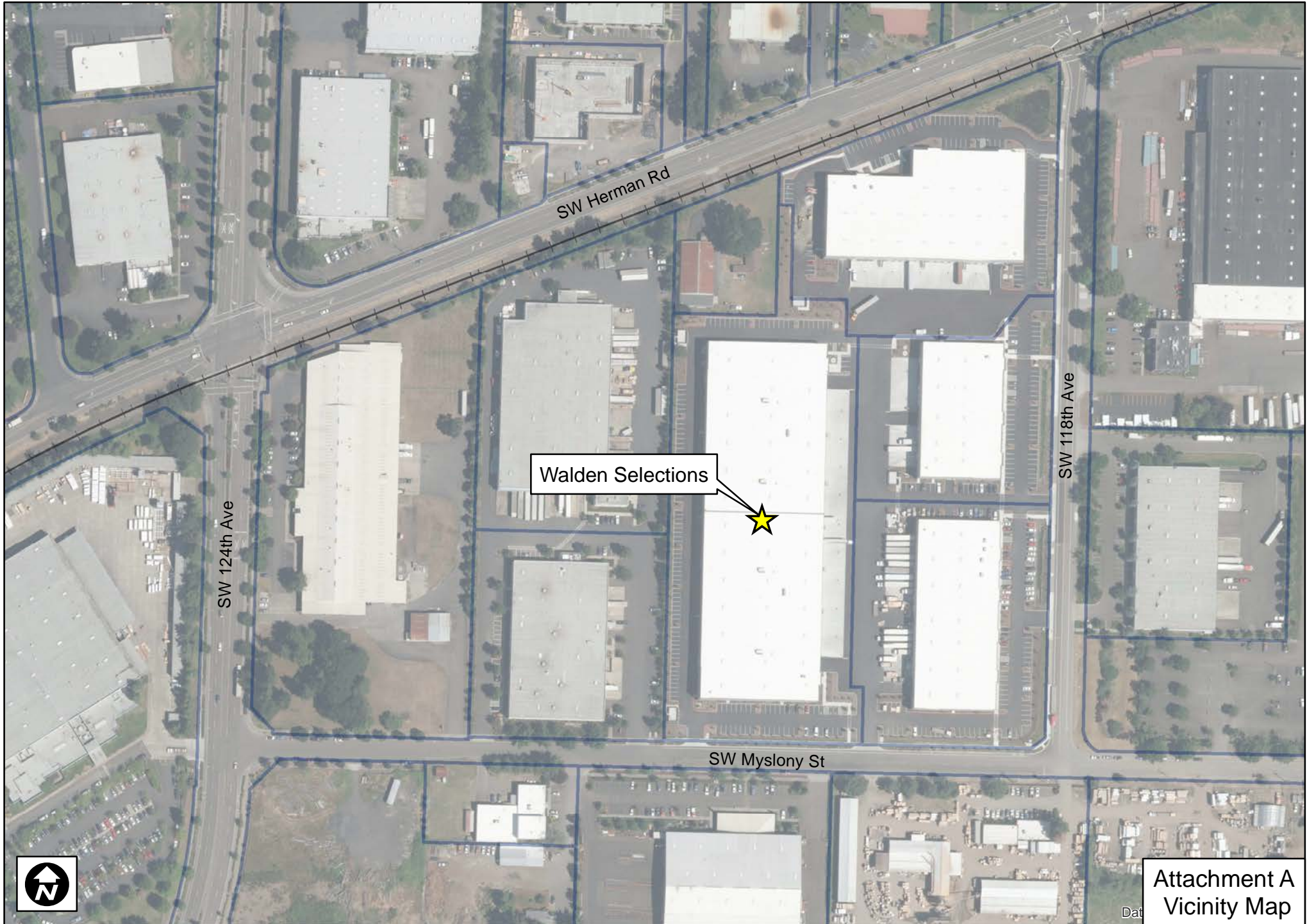
EXECUTIVE SUMMARY:

Walden Selections has submitted a new liquor license application under the category of Wholesale Malt Beverage and Wine. Under the category of wholesale malt beverage and wine, they may store, import, export, and sell malt beverages, wine, and cider at wholesale to Oregon retail licensees. The business is located at 12085 Myslony St. The application is in accordance with provisions of Ordinance No.680-85 which establishes procedures for liquor license applicants. Applicants are required to fill out a City application form, from which a review by the Police Department is conducted, according to standards and criteria established in Section 6 of the ordinance. The Police Department has reviewed the new liquor license application and recommended approval. According to the provisions of Section 5 of Ordinance No. 680-85 a member of the Council or the public may request a public hearing on any of the liquor license requests. If such a public hearing request is made, a hearing will be scheduled and held on the license. It is important that any request for such a hearing include reasons for said hearing.

FINANCIAL IMPLICATIONS:

A fee has been paid by the applicant.

Attachments: [Attachment A - Vicinity Map](#)
[Attachment B- License Types](#)
[Attachment C- Application](#)



Walden Selections



OREGON LIQUOR CONTROL COMMISSION

LICENSE TYPES

FULL ON-PREMISES SALES

- **Commercial Establishment**

Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location (*this is the license that most “full-service” restaurants obtain*). Sell malt beverages for off-site consumption in securely covered containers provided by the customer. Food service required. Must purchase distilled liquor **only** from an Oregon liquor store, or from another Full On- Premises Sales licensee who has purchased the distilled liquor from an Oregon liquor store.
- **Caterer**

Allows the sale of distilled spirits, malt beverages, wine, and cider by the drink to individuals at off-site catered events. Food service required.
- **Passenger Carrier**

An airline, railroad, or tour boat may sell and serve distilled spirits, malt beverages, wine, and cider for consumption on the licensed premises. Food service required.
- **Other Public Location**

Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, where the predominant activity is not eating or drinking (for example an auditorium; music, dance, or performing arts facility; banquet or special event facility; lodging fairground; sports stadium; art gallery; or a convention, exhibition, or community center). Food service required.
- **Private Club**

Sell and serve distilled spirits, malt beverages, wine, and cider for consumption at that location, but only for members and guests. Food service required.

LIMITED ON-PREMISES SALES

Sell and serve malt beverages, wine, and cider for onsite consumption. Allows the sale of malt beverages in containers (kegs) for off-site consumption. Sell malt beverages for off-site consumption in securely covered containers provided by the customer.

OFF-PREMISES SALES

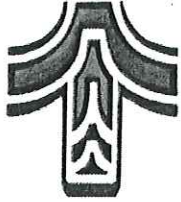
Sell factory-sealed containers of malt beverages, wine, and cider at retail to individuals in Oregon for consumption off the licensed premises. Eligible to provide sample tastings of malt beverages, wine, and cider for consumption on the premises. Eligible to ship manufacturer-sealed containers of malt beverages, wine, or cider directly to an Oregon resident.

BREWERY PUBLIC HOUSE

Make and sell malt beverages. Import malt beverages into and export from Oregon. Distribute malt beverages directly to retail and wholesale licensees in Oregon. Sell malt beverages made at the business to individuals for consumption on or off-site.

WINERY

Must principally produce wine or cider in Oregon. Manufacture, store, and export wine and cider. Import wine or cider *If bottled, the brand of wine or cider must be owned by the licensee*. Sell wine and cider to wholesale and retail licensees in Oregon. Sell malt beverages, wine, and cider to individuals in Oregon for consumption on or off-site.



CITY OF TUALATIN
LIQUOR LICENSE APPLICATION

Return Completed form to:
City of Tualatin
Attn: Deputy City Recorder
18880 SW Martinazzi Ave
Tualatin, OR 97062

Date 16 September 2016

IMPORTANT: This is a three-page form. You are required to complete all sections of the form.
If a question does not apply, please indicate N/A. Please include full names (last, first middle) and full
dates of birth (month/day/year). Incomplete forms shall receive an unfavorable recommendation.

Thank you for your assistance and cooperation.

REC'D
CITY OF TUALATIN
SEP 20 2016

SECTION 1: TYPE OF APPLICATION

- Original (New) Application - \$100.00 Application Fee.
Change in Previous Application - \$75.00 Application Fee.
Renewal of Previous License - \$35.00 Application Fee. Applicant must possess current business
license. License #
Temporary License - \$35.00 Application Fee.

MAYOR_COUNCIL_POLICE_ADM
FINANCE_COMM DEV_LEGAL_OPER
COMM SVCS_ENG & BLDG_LIBRARY

SECTION 2: DESCRIPTION OF BUSINESS

Name of business (dba): WALDEN SELECTIONS

Business address 12085 MYSLONY ST City TUALATIN State OR Zip Code 97062

Mailing address 1631 16TH AVE UNIT 216 City SEATTLE State WA Zip Code 98122

Telephone # 206.484.9655 Fax # N/A

Name(s) of business manager(s) First SEE ATTACHMENT A Middle Last

Date of birth Social Security # ODL# M F

Home address City State Zip Code
(attach additional pages if necessary)

Type of business WMBW - WHOLESALER

Type of food served N/A

Type of entertainment (dancing, live music, exotic dancers, etc.) N/A

Days and hours of operation MON-FRI 8:30 AM - 4:30 PM

Food service hours: Breakfast N/A Lunch N/A Dinner N/A

Restaurant seating capacity N/A Outside or patio seating capacity N/A

How late will you have outside seating? N/A How late will you sell alcohol? N/A

Full name: _____ Date of birth: _____

Residence address: _____

OTHER: If this box is checked, use a separate page to describe the entity, and identify with reasonable particularity every entity with an interest in the liquor license.

SECTION 4: APPLICANT SIGNATURE

A false answer or omission of any requested information on any page of this form shall result in an unfavorable recommendation.

 _____ 16 September 2016
Signature of Applicant Date

For City Use Only

Sources Checked:

- DMV by [Signature]
- LEDS by [Signature]
- TuPD Records by [Signature]
- Public Records by [Signature]

- Number of alcohol-related incidents during past year for location.
- Number of Tualatin arrest/suspect contacts for _____

It is recommended that this application be:

- Granted
- Denied

Cause of unfavorable recommendation: _____

 _____ 9-22-16
Signature Date

~~Kent W. Barker~~ Bill Steele
Chief of Police
Tualatin Police Department

City of Tualatin
Liquor License Application

Attachment A

1)

Name(s) of business manager(s) First Luke Middle Andrew Last Wohlers

Date of birth [REDACTED] Social Security # [REDACTED] ODL# M x F

Home address [REDACTED]

2)

Name(s) of business manager(s) First Trinie Middle N/A Last Thai-Parker

Date of birth [REDACTED] Social Security # [REDACTED] ODL# M F x

Home address [REDACTED]

City of Tualatin
Liquor License Application

Attachment B

Limited Liability Company

1)

Full Name Luke Andrew Wohlers Date of birth [REDACTED]

Residence address [REDACTED]

2)

Full Name Trinie Thai-Parker Date of birth [REDACTED]

Residence address [REDACTED]



STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Kathy Kaatz, Program Coordinator
Jerry Postema, Public Works Director

DATE: 10/10/2016

SUBJECT: Consideration of **Resolution No. 5300-16** Authorizing a One-Year Extension of the Street Sweeping Contract with Great Western Sweeping, Inc.

ISSUE BEFORE THE COUNCIL:

Extending the original street sweeping contract for one additional year as allowed by the Personal Services Agreement entered into in September of 2013.

RECOMMENDATION:

Staff requests that City Council extend the renewal of the existing Personal Services Agreement with Great Western Sweeping for one year, retroactive to September 23, 2016. This renewal would allow Great Western Sweeping to provide an additional year of services to the City, modify the price and account for a change in Oregon law.

EXECUTIVE SUMMARY:

The City has an existing three-year contract with Great Western Sweeping which was awarded at the September 23, 2013 meeting. This Agreement allows for an option of two, one-year extensions. The multi-year contract allows for sweeping of approximately 151 curb miles of roads and streets that are swept on a regular monthly schedule, including sweeping of the City Parks and public parking areas. The street sweeping will be performed within the city limits of Tualatin. Great Western Sweeping continues to provide the City with excellent services as well as responding without delay to unscheduled needs.

Due to a change in Oregon law, the following was added to the Personal Services Agreement as noted in Section 2 of the Amendment:

Certification of Compliance with Tax Laws. As required by ORS 279B, 110(2)(e), Contractor represents and warrants that Contractor has complied with the tax laws of this state, the City, and applicable political subdivisions of this state, including but not limited to ORS 305.620 and ORS Chapters 316, 317 and 318, hereafter ("Tax Laws"). Contractor further covenants to continue to comply with the Tax Laws during the term of this Agreement and Contractor covenants and acknowledges that the failure to comply with the Tax Laws is a default for which

City may terminate this Agreement and seek damages.

This first amendment to the Contract is effective upon the date of the last signature below and the term ends on September 23, 2017.

FINANCIAL IMPLICATIONS:

The financial implications of this extension would allow for a price increase from the existing \$121.00 per hour to \$122.00 per hour and an increase in debris disposal cost from \$24.50 to \$25.50 per yard, with a total net to not exceed costs of \$217,000.00. The 2016/17 budget includes street sweeping costs of \$217,658.00.

Attachments: A - Resolution 5300-16
 B - Contract Extension Letter 2016/17

RESOLUTION NO. 5300-16

A RESOLUTION AUTHORIZING A ONE-YEAR EXTENSION OF THE STREET SWEEPING CONTRACT WITH GREAT WESTERN SWEEPING, INC.

WHEREAS, the City needs street sweeping services; and

WHEREAS, in 2013, the City entered into a street sweeping services contract with Great Western Sweeping, Inc., which had a three-year term, with two one-year extensions; and

WHEREAS, the City wishes to extend the contract for a period of one-year;

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TUALATIN, OREGON, that:

Section 1. The City Manager is authorized to sign a one-year extension of the street sweeping services contract with Great Western Sweeping, Inc.

Section 2. The City Manager is authorized to approve changes to the contract scope and may make modifications to the contract price up to an addition of 10 percent of the total contract amount.

Section 3. This resolution is effective upon adoption.

INTRODUCED AND ADOPTED this 10th day of October, 2016.

CITY OF TUALATIN OREGON

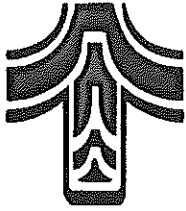
BY _____
Mayor

APPROVED AS TO LEGAL FORM

ATTEST

BY _____
City Attorney

BY _____
City Recorder



City of Tualatin

www.ci.tualatin.or.us

FIRST AMENDMENT TO THE PERSONAL SERVICES AGREEMENT WITH GREAT WESTERN SWEEPING

This First Amendment to the Personal Services Agreement (First Amendment) is entered into by and between the City of Tualatin, Oregon ("City") and Great Western Sweeping ("Provider"), and are collectively referred to as the "Parties."

- A. On or about September 23, 2013, the Parties entered into a Personal Services Agreement.
- B. Whereas, the terms of the Personal Services Agreement allows for renewal of the Personal Services Agreement;
- C. The Parties wish to enter into this First Amendment to amend the Personal Services Agreement to renew the agreement, modify the price, and account for a change in Oregon law.

NOW THEREFORE, the Parties agree as follows:

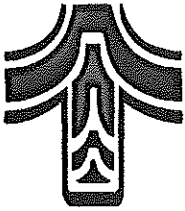
Section 1. The Personal Services Agreement is amended to provide a modification of the price as follows:

- a. City agrees to pay Provider \$122.00 per hour.
- b. City agrees to pay Provider \$ 25.50 per yard of debris.
- c. The total not to exceed price of \$217,000.00

Section 2. Due to a change in Oregon law, the following is added to the Personal Services Agreement:

Certification of Compliance with Tax Laws. As required by ORS 279B.110(2)(e), Contractor represents and warrants that Contractor has complied with the tax laws of this state, the City, and applicable political subdivisions of this state, including but not limited to ORS 305.620 and ORS chapters 316, 317 and 318, hereafter ("Tax Laws"). Contractor further covenants to continue to comply with the Tax Laws during the term of this Agreement and Contractor covenants and acknowledges that the failure to comply with the Tax Laws is a default for which City may terminate this Agreement and seek damages.

Section 3. Except to the extent modified by this First Amendment, the Personal Services Agreement remains in full force and effect. To the extent that any provision of the



City of Tualatin

www.ci.tualatin.or.us

FIRST AMENDMENT TO THE PERSONAL SERVICES AGREEMENT WITH GREAT WESTERN SWEEPING

Personal Services Agreement and this First Amendment conflict, this First Amendment controls.

Section 4. This First Amendment is effective upon the date of the last signature below and the term ends on September 23, 2017.

Great Western Sweeping

CITY OF TUALATIN

By: *Manuel J. Rodson*
President

By: _____
Sherilyn Lombos
City Manager

Date: *9/08/16*

Date: _____

APPROVED AS TO LEGAL FORM

Sean Brady
City Attorney



STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Don Hudson, Finance Director

DATE: 10/10/2016

SUBJECT: Consideration of **Resolution No. 5301-16** Amending the City of Tualatin Fee Schedule and Rescinding Resolution No. 5284-16

ISSUE BEFORE THE COUNCIL:

City Council will consider whether to update and amend the City of Tualatin Fee Schedule

RECOMMENDATION:

Staff recommends adoption of the attached resolution amending the City of Tualatin Fee Schedule and rescinding Resolution No. 5284-16

EXECUTIVE SUMMARY:

On September 12, 2016, the City Council adopted Resolution No. 5284-16, amending the City's fee schedule. After the resolution was adopted, staff found two errors in the schedule, in the Community Development - Engineering & Building section. The first is the fee for Engineering Copies (36"x48") was inadvertently changed from a previous amount of \$5 to \$3. The second is the deposit amount for a Water Quality Permit. The City of Tualatin Construction Code is the authority for this deposit amount of 5% of estimated value of work, but not less than \$500. When this deposit was included on the fee schedule this year, it was inadvertently labeled as \$540. The attached resolution corrects these typographical errors.

In addition, the attached resolution includes the Transportation Development Tax, which is indexed annually by Washington County per Washington County Code, Section 3.17. We have included this reference on the fee schedule included as Exhibit A to Resolution No. 5301-16.

Attachments: Resolution No. 5301-16

RESOLUTION NO. 5301-16

A RESOLUTION AMENDING THE CITY OF TUALATIN FEE SCHEDULE AND
RESCINDING RESOLUTION NO. 5284-16

WHEREAS, the Council has the authority to set fees for materials and services provided by the City ; and

WHEREAS, the Council previously adopted the fee schedule by Resolution No. 5284-16 ; and

WHEREAS, the City Council wishes to amend the fees related to Community Development.

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TUALATIN, OREGON, that:

Section 1. The City of Tualatin fee schedule is established and adopted as set forth in "Exhibit A," which is attached and incorporated by reference.

Section 2. This resolution is effective October 11, 2016.

Section 3. Resolution No. 5284-16 is rescinded effective October 11, 2016.

INTRODUCED AND ADOPTED this 10th Day of October, 2016.

CITY OF TUALATIN, OREGON

BY _____
Mayor

APPROVED AS TO FORM

ATTEST:

BY _____
City Attorney

BY _____
City Recorder

City of Tualatin Fee Schedule

Fees Effective October 11, 2016

Administration Department	
Agenda Packet	same as photocopy rate
Ordinances or Portions Thereof	same as photocopy rate
Photocopies:	
Per page/side (up to 8.5"x14")	0.25
Per page/side (11"x17")	0.50
Color - per page/side (up to 8.5"x14")	1.00
Color - per page/side (11"x17")	1.50
Certified Copies - per document	5.00
Thumb Drive (2 GB)	10.00
CD/DVD	20.00
Storage Retrieval Fee	25.00
Staff Time:	
-Up to 30 minutes	no charge
-Over 30 minutes	employee cost
Community Development - Engineering & Building	
Engineering Copies:	
1987 and earlier, aerial/contour maps	8.00
36" x 48"	5.00
24" x 36"	4.00
18" x 24" and 11" x 17"	3.00
Erosion Control Fees:	
a. Non-Site Development	
1. New construction	325.00
2. Additions, remodels and demolitions disturbing less than 1,000 s.f.	105.00
b. Development Sites without infrastructure or vegetated corridor improvements	325.00 plus 325.00 prorated for each acre over 1/2 acre

Community Development - Engineering & Building (continued)

c. Subsequent Site Development (Early EC Inspection Fee)	\$325.00 or 1/2 of the EC Only Fee, whichever is greater
Plan check fee	
Single family home in subdivision	70.00
commercial, industrial, multi-family or large homesites not in an existing subdivision	955.00
Hydraulic Modeling for Commerical/Industrial Retail and Multi-family units	300.00/bldg
Hydraulic Modeling for New Subdivisions with 50 or more lots	1,000.00
Partition,* Nonexpedited & Expedited Processes	440.00
Partition,* Nonexpedited & Expedited Extension/Modification	145.00
Partition,* Nonexpedited, Appeal Proceeding to Council	145.00
Partition,* Expedited, Appeal to Referee, Deposit per ORS 197.375	325.00
Partition,* Minor Variance included & primary use is a single family dwelling in RL or RML	Add 145.00
Partition,* Minor Variance included & primary use is not a single family dwelling & not in RL or RML	Add 220.00
Property Line Adjustment,* primary use is a single family dwelling in RL or RML	75.00
Property Line Adjustment,* Minor Variance included & primary use is a single family dwelling in RL or RML	Add 145.00
Property Line Adjustment,* primary use is not a single family dwelling in RL or RML	325.00
Property Line Adjustment,* Minor Variance included & primary use is not a single family dwelling in RL or RML	Add 145.00
Property Line Adjustment,* Appeal Proceeding to Council	145.00
Public Works Construction Permit Deposit	5% of est. value of work but not less than 500.00
Public Works Construction Code	55.00
Subdivision,* Nonexpedited and Expedited Processes	2,900.00
Subdivision,* Variance included & primary use is a single family dwelling in RL or RML	Add 290.00

Community Development - Engineering & Building (continued)	
Subdivision,* Variance included & primary use is not a single family dwelling in RL or RML	Add 365.00
Subdivision,* Minor Variance included & primary use is a single family dwelling in RL or RML	Add 145.00
Subdivision,* Minor Variance included & primary use is not a single family dwelling in RL or RML	Add 220.00
Subdivision,* Nonexpedited, Extension/Modification By Council	665.00
Subdivision,* Expedited, Extension/Modification By City Engineer	170.00
Subdivision,* Nonexpedited, Appeal Proceeding to Council	145.00
Subdivision,* Expedited Appeal to Referee, Deposit per ORS 197.375	325.00
Street Name Change	145.00
Street Vacation Application Deposit	365.00
Temporary Certificate of Occupancy	100.00
Transportation Development Tax	Indexed annually per Washington County Code, Section 3.17
Zone of Benefit Application Fee	725.00
Water Quality Permit Deposit	5% of est. value of work but not less than 500.00
<p><i>* Subdivision, Partition and Property Line Adjustment applicants shall contact the Finance Department for a determination of L.I.D. assessment apportionment for the property proposed to be divided or adjusted.</i></p>	
Community Development - Planning	
Amendment to Comprehensive Plan Map	2,245.00
Amendment to Comprehensive Plan Text/Landmark Designation/Removal of Landmark Designation	2,245.00
Annexation	1,530.00
Appeal Proceeding to Council	145.00
Appeal Expedited Process to Referee, Deposit per ORS 197.375	325.00

Community Development - Planning (continued)

Architectural Review Application, Nonexpedited Process:	
Estimated Project Value:	
Under \$5,000	125.00
\$5,000 - \$24,999.99	590.00
\$25,000 - \$99,999.99	1,065.00
\$100,000 - 499,999.99	1,765.00
\$500,000 and greater	2,590.00
Architectural Review, Minor	100.00
Architectural Review, Single-family Level I (Clear & Objective)	100.00
Architectural Review, Single-family Level II (Discretionary)	785.00
Conditional Use Permit	1,530.00
Conditional Use Permit Renewal	1,530.00
Extension Request Reviewed by Staff	215.00
Extension Request Reviewed by Architectural Review Board	1,235.00
Interpretation of Development Code	100.00
Industrial Master Plans	1,955.00
Landmark Alteration/New Construction Review	120.00
Central Urban Renewal Master Plan	1,955.00
Landmark Demolition Review	130.00
Landmark Relocation Review	60.00
License to Keep Chickens	50.00
Pre-Application Meeting	220.00
Reinstatement of Nonconforming Use	1,530.00
Request for Council Rehearing	180.00
Sign Ordinance	8.00
Sign Code Variance	725.00
Sign Permit:	
New Sign or Structural Change to Existing Sign	145.00
Temporary Sign or Each Face Change to Existing Sign	75.00

Community Development - Planning (continued)

Temporary Uses: 1 - 3 days 4 - 180 days Over 3 days	55.00 55.00 + 1.50/day not to exceed 200.00 total
Transitional Use Permit	1,645.00
Tree Removal Permit, 1 tree each additional tree, \$10.00 not to exceed a total of	310.00 340.00
Variance: When primary use is a single family dwelling in RL or RML When primary use is not a single family dwelling in RL or RML	310.00 1,530.00
Variance, Minor: When primary use is a single family dwelling in RL or RML When primary use is not a single family dwelling in RL or RML	310.00 1,050.00
All Other Actions	350.00

Community Services

Browns Ferry Park Community Center

Area	Time	Class 1 & 2	Class 3	Class 4	
				Resident	Non-Resident
Meeting Rooms	1 hour	None	\$15.00	25.00	60.00
Garage	1 hour	None	\$15.00	25.00	60.00
Studio Structure	1 hour	None	\$15.00	25.00	60.00
Sun Room	1 hour	None	\$15.00	25.00	60.00
River Shelter	4 hour	None	\$15.00	25.00	60.00
Alcohol Permit:	Individual		None	10.00	30.00
	Group		None	25.00	50.00
	Special Events		None	50.00	100.00

Reservations must be made for a minimum of two (2) hours.

\$10.00 handling fee for cancellations

Classification of Users

For the purpose of scheduling reservations and determining fees, groups will be classified as shown below:

Class 1: Activities sponsored by the City of Tualatin.

Class 2: Activities co-sponsored by the City of Tualatin.

Class 3: Non-profit organizations and public agencies serving the youth of Tualatin.

Class 4: All other groups, organizations and individuals are categorized by resident or non-resident for the purpose of determining fees.

Cleaning & Security Deposit - Brown's Ferry Community Center

Groups for meeting only	50.00
Groups for kitchen storage and building use	100.00
Groups using full kitchen facilities	285.00

The Community Services Director will determine the amount of the cleaning/security deposit to be refunded based on the building monitor's report.

Community Services (continued)

Picnic Shelters and Sports Fields

Area	Time	Class 1 & 2	Class 3	Class 4	
				Resident	Non-Resident
Rustic	4 hours	None	\$15.00	25.00	60.00
Patio	4 hours	None	\$15.00	25.00	60.00
Main-South	4 hours	None	\$15.00	25.00	60.00
Main-North	4 hours	None	\$15.00	25.00	60.00
Main-Full	4 hours	None	\$15.00	50.00	120.00
Trestle	4 hours	None	\$15.00	25.00	60.00
River Shelter	4 hours	None	\$15.00	25.00	60.00
Horseshoe Pits	4 hours	None	None	15.00	30.00
Sports Fields	2 hours	None	None	20.00	45.00
Sports Fields Lights	2 hours	None	None	20.00	45.00
Turf Fields-TuHS	1 hour	None	None	20.00	40.00
Lights-TuHS	1 hour	None	None	40.00	40.00
Alcohol Permit:	Individual		None	10.00	30.00
	Group		None	25.00	50.00
	Special Events		None	50.00	100.00

\$10.00 handling fee for cancellations

Classification of Users

For the purpose of scheduling reservations and determining fees, groups will be classified as shown below:

Class 1: Activities sponsored by the City of Tualatin.

Class 2: Activities co-sponsored by the City of Tualatin.

Class 3: Non-profit organizations and public agencies serving the youth of Tualatin.

Class 4: All other groups, organizations and individuals are categorized by resident or non-resident for the purpose of determining fees.

Community Services (continued)

Juanita Pohl Center					
Area	Time	Class 1 & 2	Class 3	Class 4	
				Resident	Non-Resident
E or W Dining Rm	1hour	None	15.00	30.00	75.00
Full Dining Rm	1 hour	None	20.00	40.00	95.00
Kitchen -Warming only	1 hour	None	15.00	10.00	35.00
Kitchen -Full Svc	1 hour	None	15.00	20.00	40.00
Multipurpose Rm	1 hour	None	15.00	25.00	65.00
E or W Dinning & W Activity	1 hour	None	15.00	40.00	95.00
Small Classrooms	1 hour	None	5.00	10.00	20.00
Alcohol Permit: Individual			None	10.00	30.00
Group			None	25.00	50.00
Special Events			None	50.00	100.00

Reservations must be made for a minimum of two (2) hours.

\$10.00 handling fee for cancellations

Classification of Users

For the purpose of scheduling reservations and determining fees, groups will be classified as shown below:

Class 1: Activities sponsored by the City of Tualatin, City of Durham official meetings, and Meals on Wheels People, for official center functions.

Class 2: Activities co-sponsored by the City of Tualatin.

Class 3: Non-profit organizations and public agencies serving the youth and general public of Tualatin. Rosters of organization members and 501c3 information required.

Class 4: All other groups, including religious and political organizations and individuals are categorized by resident/non-resident for the purpose of determining fees.

Cleaning & Security Deposit - Juanita Pohl Community Center	
Groups for meeting only	50.00
Groups for kitchen storage and building use	100.00
Groups using full kitchen facilities	285.00

The Community Services Director will determine the amount of the cleaning/security deposit to be refunded based on the building monitor's report.

Community Services (continued)

Tualatin Library Community Room

Area	Time	Class 1 & 2	Class 3		Class 4	
			Resident	Non-Resident	Resident	Non-Resident
Community Room	1 hour	None	10.00	20.00	15.00	30.00

\$10.00 handling fee for cancellations

Classification of Users

For the purpose of scheduling reservations and determining fees, groups will be given classified as shown below.

Class 1: Activities sponsored by the Tualatin Public Library and/or City of Tualatin

Class 2: Activities co-sponsored by the Tualatin Public Library and/or City of Tualatin

Class 3: Non-profit organizations

Class 4: All other organizations, including religious and political groups, are categorized by resident/nonresident for the purpose of determining fees.

Finance Department

L.I.D. Assessment Apportionment Fee	108.75
Lien Search Fee (per tax lot)	29.85
Passport Photo	16.00
Recovery Charge Installment Payment Plan Application Fee	228.20
Returned Checks (per check for processing NSF check)	36.25
Zone of Benefit Recovery Charge Administration Fee	120.50

Geographic Information System

Citywide aerial photo, 36" x 42"	30.00
Subdivision street map, 34" x 36"	15.00
Street map, 22" x 22"	8.00
Planning Districts, 34" x 44"	15.00
Planning Districts, 18" x 24"	8.00
Custom Mapping	\$55.00/hr, plus materials
Mailing Lists	30.00

Legal Services Department

Development Code (hard copy)	70.00 each + postage
Updates (hard copy) 8.5" x 11" 11" x 17" Color - 8.5" x 11" Color - 11" x 17"	0.25 per page/side + postage 0.50 per page/side + postage 1.00 per page/side + postage 1.50 per page/side + postage
Tualatin Municipal Code (hard copy)	55.00 each + postage
Thumb Drive (2GB) containing electronic copies of Tualatin Municipal Code and/or Development Code	10.00 + postage

Municipal Court

Traffic School and Compliance Program Fees:	
Class A	275.00
Class B	155.00
Class C	125.00
Class D	100.00
Seat Belt Class	65.00
Vehicle Compliance Program	35.00
Collection Fee	25% of ordered amount
License Restatement Fee	70.00
Overdue Payment Letter Fee	10.00
Failure to Appear – Arraignments	40.00
Failure to Appear – Trials	100.00

Police

Copies of Audio CDs	15.00 including CD
Copies of Video CDs	15.00 including CD
Copies of Photographs on CD	15.00 including CD
Copies of Police Reports (no charge to victims):	
1 - 10 pages	10.00
plus each page over 10	0.25

Police (Continued)

Alarm Permit, Initial Application	23.00
Alarm Permit, Annual Renewal	23.00
Alarm Permit, 1st False Alarm	No charge
Alarm Permit, 2nd False Alarm	No charge
Alarm Permit, 3rd False Alarm	85.00
Alarm Permit, 4th False Alarm	113.00
Alarm Permit, 5th False Alarm	169.00
Alarm Permit, 6 th and More False Alarms	225.00 per alarm
Alarm Permit, 10 or more False Alarms	500.00 Civil Infraction
Release of Towed (impounded) Vehicles	100.00
Fingerprinting cards Each additional card	(first two) 25.00 each 2.00

Public Works

Street Tree and Installation (Single Family Only)	175.00
Street Tree Removal (excluding Stump Grinding)	300.00
Street Tree Stump Grinding	125.00
Tree-for-a-Fee Program	75.00
New Tree Grates – Full set of 2 halves	400.00
New Tree Grates – Half set	200.00
Tree Grates – Leveling Stone and fastening hardware	25.00
Tree Grates Improvements	175.00
Core Area Parking District Tax Appeal	135.00

City Council Meeting

Meeting Date: 10/10/2016

SPECIAL Annual Report of the Juanita Pohl
REPORTS: Center Advisory Committee

SPECIAL REPORTS

Annual Report of the Juanita Pohl Center Advisory Committee

JPC Advisory Committee Annual Report
Power Point Presentation



2015-16 ANNUAL REPORT

Juanita Pohl Center Advisory Committee

1. BACKGROUND

The Juanita Pohl Center Advisory Committee (JPCAC) was established in March 2013. The bylaws indicate that the JPCAC file an annual report with the Council including a summary of the committee's activities during the previous year.

Members of the JPCAC include Connie Dover, Marjene Freiley, Bob Grable, Stephanie Jones, Del Judy, Candice Kelly, Bob Leveton, Susan Noack and Marilyn Ogorzaly.

2. ROLE OF THE COMMITTEE

- a. Listen to ideas and discuss suggestions with participants, general public and center staff.
- b. Provide input and advise center staff regarding matters of the operation for the center.

3. ACTIONS AND ACCOMPLISHMENTS IN SUPPORT OF ROLES

a. Healthy Aging Programs

Supported efforts to increase utilization of the center through new healthy active aging programs, services and events that include:

- **Fitness & Wellness Programs**
The center offered 1,011 classes annually that included yoga, strength, balance, stretching and dance six days a week. Total annual participation was 10,753. Highlights included SilverSneakers® exercise classes, bilingual fitness, Veterans' yoga, and pickleball.
- **Nutrition Program**
Meals on Wheels People lunch program served 9,265 congregate meals at the center and delivered 8,993 meals to home bound clients.
- **Social Programs**
There were 620 programs offered that promoted socialization at the center with a total annual participation of 4,658. Highlights included Veterans' Recognition Breakfast (150), Oktoberfest (60), Brain Awareness Week (100), Bingo (884), Billiards (1,085) and Tuesday Night Social (641).
- **Visitations**
The center had 67,928 visits last fiscal year. This is a 12,008 visit increase from the previous year.



SilverSneakersClassic

This Monday, Wednesday and Friday class is a popular class at the center.

b. Partnerships

- Increased and maintained partnerships and collaboration to assure quality programs and reduce duplication with the following valued partners:

Meals on Wheels People

AARP

Alzheimer Association

Parkinson's Association

Portland Community College

New Horizons Big Band

Volunteers for the Emotional Wellbeing of Seniors



Meals on Wheels People volunteer driver to deliver home meals. The meal program has been a valued partner providing essential healthy nutritional meals for over 34 years at the center.

2015-16 Annual Report of the Juanita Pohl Center Advisory Committee

c. Rentals

- The center accommodated 250 private parties, meetings or events for residents and businesses.
- The total estimated rental attendance was 17,585.
- Pohl Center rental revenue increased by over \$22,000 during the past three years.
- The center continues to be popular gathering place for our diverse community members.



The center is normally booked on Saturdays and Sundays during the year for citizen and business activities and events.

d. Improved Circulation and Ambiance

Enhance the center's circulation and appearance with an improved layout and updated furniture that included:

- Furniture replacement providing a functional furniture concept and plan was developed and approved by the Juanita Pohl Center Advisory Committee.
- The main goal of this project is to provide safe, accessible and appealing furnishings for older adults with a consistent theme throughout the building.
- The informal lounge (phase 1) included new chairs, coffee tables, computer area, puzzle tables and game storage unit that was completed in June of 2016.
- The west activity area (phase 2) was completed in September of 2016 and included new game tables, chairs and a book case.



Newly Installed Furnishings

4. **ACTION PLAN FOR 2016-17**

a. Programs and Services

Continue to support and grow active aging programs, services and events in the community which include:

Active Aging Week
Brain Awareness Week
Bilingual Programs
Hiking/Walking Programs
Meals on Wheels People
Pickleball Drop-in/Tournaments & Classes
SilverSneakers® & Silver & Fit® Insurance Reimbursement Programs
Veterans' Recognition Breakfast

b. Furniture Replacement

Recommend support for the completion of the center's furniture replacement plan.



Playing Pickleball at Tualatin Community Park

Juanita Pohl Center Advisory Committee 2015-16 Annual Report



Committee Members

- Candice Kelly, Chair
- Connie Dover
- Marjene Freiley
- Bob Grable
- Stephanie Jones
- Del Judy
- Bob Leveton
- Susan Noack
- Marilyn Ogorzaly



Committee Role

- Listen for and discuss suggestions and ideas
- Input and advise staff on operation of the center



Increase Utilization

- Programs

- Fitness & Wellness

- Nutrition

- Social

- Center Visits

- 12,008 more visits 2015-16



Partnerships

- AARP
- Alzheimer Association
- Parkinson Association
- Portland Community College
- Meals on Wheels People
- New Horizons Big Band
- Volunteers for the Emotional Wellbeing of Seniors



Benefits

- Promote healthy lifestyles
- Intellectual engagement
- Increase quality of life
- Social interaction



Rentals

- Business Meetings
- Private Parties
- Special Events



- Building rented 250 times
- 17,585 guests attending
- \$43,342 in revenue

Enhance Center's Appearance

- Furniture Phase 1 – Informal Lounge (June 2016)
- Furniture Phase 2 – Active Game Area (September 2016)



Action Plan for 2016-17

- Support and grow active aging programs and events
- Recommend furniture replacement for phase 3



Questions/Comments?





STAFF REPORT

CITY OF TUALATIN

TO: Honorable Mayor and Members of the City Council

THROUGH: Sherilyn Lombos, City Manager

FROM: Tony Doran, Engineering Associate
Jeff Fuchs, City Engineer

DATE: 10/10/2016

SUBJECT: Consideration to Amend the Tualatin Development Code Chapter 70: Flood Plain District to Meet Minimum National Flood Insurance Program Requirements

ISSUE BEFORE THE COUNCIL:

City Council consideration of a Plan Text Amendment to update Tualatin Development Code Chapter 70: Flood Plain District to meet minimum National Flood Insurance Program requirements.

RECOMMENDATION:

Staff recommends the City Council consider the staff report, draft language, and analysis and findings. The Planning Commission considered this proposal at their September 15, 2016 meeting and voted 6-0 (1 absent) to recommend approval of the amendment.

EXECUTIVE SUMMARY:

The letters described below are Federal Emergency Management Agency's official notification that Tualatin has until November 4, 2016 to adopt and/or submit a floodplain management ordinance that meets or exceeds the minimum National Flood Insurance Program requirements and request approval from the Federal Emergency Management Agency Regional Office by the effective date. Approval by the Federal Emergency Management Agency Regional Office by November 4, 2016 will enable Tualatin to avoid suspension from the National Flood Insurance Program.

A letter dated May 4, 2016 to The Honorable Lou Ogden, Mayor of the City of Tualatin, was sent from Luis Rodriguez, P.E. Chief, Engineering Management Branch, Federal Insurance and Mitigation Administration. Additionally, a letter and adoption booklet dated July 22, 2016 to The Honorable Lou Ogden, Mayor of the City of Tualatin, was sent from Rachel Sears, Director of the Floodplain Management Division, Mitigation Directorate, Federal Emergency Management Agency.

These letters identified November 4, 2016 as the effective date for the new Flood Insurance Study and Flood Insurance Rate Map that has been completed for Tualatin. By this date the

Department of Homeland Security's Federal Emergency Management Agency Regional Office is required to approve the legally enforceable floodplain management measures Tualatin adopts in accordance with Title 44 Code of Federal Regulations Section 60.3(d).

Tualatin's City Attorney has compared Federal Emergency Management Agency's model ordinance with the current Tualatin Development Code Chapter 70: Flood Plain District text and proposed code language to update Tualatin's code to meet the minimum National Flood Insurance Program requirements.

PREVIOUS STEPS

August 31st - Draft ordinance and analysis emailed to Department of Land Conservation and Development

September 9th - Public Notice Letter mailed to all properties located within floodplain

September 9th - Public Notice requested to be published in Oregonian newspaper (between 20 and 40 days prior to 1st City Council meeting, which is the Public Hearing)

September 15th - Tualatin Planning Commission provided a recommendation to City Council to adopt the proposed ordinance. Review and approval of meeting minutes are to be considered at the next meeting.

NEXT STEPS

October 10th - First City Council meeting, which is the Public Hearing

October 24th - Second City Council meeting, which is to adopt the Ordinance

November 4th - Federal Emergency Management Agency's deadline

OUTCOMES OF DECISION:

A decision to approve the Plan Text Amendment would result in the following changes to Tualatin Development Code Chapter 70: Flood Plain District:

- Section 70.050 will be amended to adopt Flood Insurance Rate Map, Washington County, Oregon and Incorporated Areas," effective date November 4, 2016.
- Section 70.135 Provide Base Flood Elevation and Freeboard to Building Official will be added.
- Section 70.180 Specific Standards will be amended to provide specifics as to how residential construction with fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.
- Section 70.200 Alterations to Floodplain, Drainage, or Watercourses will be added to provide specifics for Applicants proposing to increase the Base Flood Elevation by more than one foot or alter a watercourse to obtain a Conditional Letter of Map Revision (CLOMR) from FEMA.

A decision to deny the Plan Text Amendment would result in the following:

- The Tualatin Development Code will not be updated and Tualatin would be suspended from the National Flood Insurance Program.
- Flood insurance will no longer be available in Tualatin. No resident or business will be able to purchase or renew a flood insurance policy.
- No federal grants or loans for buildings would be made in identified flood hazard areas. Includes all federal agencies such as HUD, EDA, Small Business Administration, HHS, etc.
- No federal disaster assistance would be provided in the form of loans for repair or reconstruction of buildings in identified flood hazard areas.
- No federal mortgage insurance would be provided in identified flood hazard areas. This

includes FHA, VA, Farmers Home, etc.

- No Fannie Mae, Freddie Mac, and GMNA purchase of mortgages in the secondary market would be made if the properties that are the subject of these mortgages are located in Special Flood Hazard Areas of nonparticipating communities.
- Lenders of conventional loans would be required to notify the buyer or lessee that property is in a flood hazard area and would be required to notify the buyer or lessee that property in flood hazard area is not eligible for federal disaster relief in a declared disaster.
- If flooding occurs, it is possible that the local government could be held liable by residents and/or businesses who could not get flood insurance because of the decision not to participate in the National Flood Insurance Program.

ALTERNATIVES TO RECOMMENDATION:

The alternatives to the Planning Commission recommendation are:

1. Approve the proposed Plan Text Amendment with alterations to the draft language.
2. Deny the proposed Plan Text Amendment.

FINANCIAL IMPLICATIONS:

The FY 2016/2017 budget accounts for the costs of City initiated code amendments.

-
- Attachments:**
- A - Adoption Notice to Mayor May 4th
 - B - Adoption Notice to Mayor July 22nd
 - C - Adoption Booklet From Notice to Mayor September 22nd
 - D - FEMA Model Ordinance
 - E - Proposed Ordinance
 - F - Analysis and Findings
 - G - FIRM Area Comparison 1987 to Current
 - H - Tax Lots With Floodplain
 - I - FIS Volume 1
 - J - FIS Volume 2
 - K - FIS Volume 3
 - L - FIRM Index
 - M - FIRM Panel 539E
 - N - FIRM Panel 543E
 - O - FIRM Panel 544E
 - P - FIRM Panel 563E
 - Q - FIRM Panel 606E
 - R - TPC Mtg Notes



Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
19P

May 4, 2016

The Honorable Lou Ogden
Mayor, City of Tualatin
18880 Southwest Martinazzi Avenue
Tualatin, Oregon 97062

Community: City of Tualatin,
Washington County, Oregon
Community No.: 410277
Map Panels Affected: See FIRM Index

Dear Mayor Ogden:

This is to formally notify you of the final flood elevation determination for the City of Tualatin, Washington County, Oregon, in compliance with Title 44, Chapter I, Part 67, Section 67.11, Code of Federal Regulations (CFR). This section requires that notice of final flood elevations shall be sent to the Chief Executive Officer of the community, all individual appellants, and the State Coordinating Agency, and shall be published in the *Federal Register*.

On February 19, 1987, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issued a Flood Insurance Rate Map (FIRM) that identified the Special Flood Hazard Areas (SFHAs), the areas subject to inundation by the base (1-percent-annual-chance) flood, in your community. Recently, FEMA completed a re-evaluation of flood hazards in your community. On September 28, 2007, FEMA provided you with Preliminary copies (and with Revised Preliminary copies on December 4, 2009) of the FIRM and Flood Insurance Study (FIS) report that identify existing flood hazards in your community, including Base Flood Elevations (BFEs). The proposed BFEs for your community were published in the *The Times* on October 25, 2012 and November 1, 2012, and in the *Federal Register*, at Part 67, Volume 77, Pages 21516 through 21521, on April 10, 2012.

The statutory 90-day appeal period, which was initiated on the second newspaper publication date cited above, has ended. FEMA did not receive any appeals of the proposed BFEs during that time. Accordingly, the BFEs for your community are considered final. The final rule for BFEs will be published in the *Federal Register* as soon as possible. The FIRM for your community will become effective on November 4, 2016. Before the effective date, FEMA will send you final printed copies of the FIRM and FIS report.

Because the FIS report establishing the BFEs for your community has been completed, certain additional requirements must be met under Section 1361 of the National Flood Insurance Act of 1968, as amended, within 6 months from the date of this letter. Prior to November 4, 2016, your community is required, as a condition of continued eligibility in the National Flood Insurance Program (NFIP), to adopt or show evidence of adoption of floodplain management regulations that meet the standards of Paragraph 60.3(d) of the enclosed NFIP regulations (44 CFR 59, etc.) by the effective date of the FIRM. These standards are the minimum requirements and do not supersede any State or local requirements of a more stringent nature.

It must be emphasized that all the standards specified in Paragraph 60.3(d) of the NFIP regulations must be enacted in a legally enforceable document. This includes adoption of the current effective FIRM and FIS report to which the regulations apply and other modifications made by this map revision. Some of the standards should already have been enacted by your community in order to establish initial eligibility in the NFIP. Your community can meet any additional requirements by taking one of the following actions:

1. Amending existing regulations to incorporate any additional requirements of Paragraph 60.3(d);
2. Adopting all the standards of Paragraph 60.3(d) into one new, comprehensive set of regulations; or
3. Showing evidence that regulations have previously been adopted that meet or exceed the minimum requirements of Paragraph 60.3(d).

Communities that fail to enact the necessary floodplain management regulations will be suspended from participation in the NFIP and subject to the prohibitions contained in Section 202(a) of the Flood Disaster Protection Act of 1973 (Public Law 93-234) as amended.

In addition to your community using the FIRM and FIS report to manage development in the floodplain, FEMA will use the FIRM and FIS report to establish appropriate flood insurance rates. On the effective date of the revised FIRM, actuarial rates for flood insurance will be charged for all new structures and substantial improvements to existing structures located in the identified SFHAs. These rates may be higher if structures are not built in compliance with the floodplain management standards of the NFIP. The actuarial flood insurance rates increase as the lowest elevations (including basement) of new structures decrease in relation to the BFEs established for your community. This is an important consideration for new construction because building at a higher elevation can greatly reduce the cost of flood insurance.

To assist your community in maintaining the FIRM, we have enclosed a Summary of Map Actions to document previous Letter of Map Change (LOMC) actions (i.e., Letters of Map Amendment (LOMAs), Letters of Map Revision (LOMRs)) that will be superseded when the revised FIRM panels referenced above become effective. Information on LOMCs is presented in the following four categories:

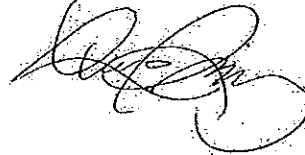
(1) LOMCs for which results have been included on the revised FIRM panels; (2) LOMCs for which results could not be shown on the revised FIRM panels because of scale limitations or because the LOMC issued had determined that the lots or structures involved were outside the SFHA as shown on the FIRM; (3) LOMCs for which results have not been included on the revised FIRM panels because the flood hazard information on which the original determinations were based are being superseded by new flood hazard information; and (4) LOMCs issued for multiple lots or structures where the determination for one or more of the lots or structures cannot be revalidated through an administrative process like the LOMCs in Category 2 above. LOMCs in Category 2 will be revalidated through a single letter that reaffirms the validity of a previously issued LOMC; the letter will be sent to your community shortly before the effective date of the revised FIRM and will become effective 1 day after the revised FIRM becomes effective. For the LOMCs listed in Category 4, we will review the data previously submitted for the LOMA or LOMR request and issue a new determination for the affected properties after the revised FIRM becomes effective.

The FIRM and FIS report for your community have been prepared in our countywide format, which means that flood hazard information for all jurisdictions within Washington County has been combined into one FIRM and FIS report. When the FIRM and FIS report are printed and distributed, your community will receive only those panels that present flood hazard information for your community. We will provide complete sets of the FIRM panels to county officials, where they will be available for review by your community.

The FIRM panels have been computer-generated. Once the FIRM and FIS report are printed and distributed, the digital files containing the flood hazard data for the entire county can be provided to your community for use in a computer mapping system. These files can be used in conjunction with other thematic data for floodplain management purposes, insurance purchase and rating requirements, and many other planning applications. Copies of the digital files or paper copies of the FIRM panels may be obtained by calling our FEMA Map Information eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). In addition, your community may be eligible for additional credits under our Community Rating System if you implement your activities using digital mapping files.

If your community is encountering difficulties in enacting the necessary floodplain management measures required to continue participation in the NFIP, we urge you to call the Director, Mitigation Division of FEMA in Bothell, Washington, at (425) 487-4600 for assistance. If you have any questions concerning mapping issues in general or the enclosed Summary of Map Actions, please call FMIX at the telephone number shown above. Additional information and resources your community may find helpful regarding the NFIP and floodplain management, such as *The National Flood Insurance Program Code of Federal Regulations*, *Answers to Questions About the NFIP*, *Frequently Asked Questions Regarding the Effect that Revised Flood Hazards have on Existing Structures*, *Use of Flood Insurance Study (FIS) Data as Available Data*, and *National Flood Insurance Program Elevation Certificate and Instructions*, can be found on our website at <http://www.floodmaps.fema.gov/lfid>. Paper copies of these documents may also be obtained by calling FMIX.

Sincerely,



Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Enclosure:

Final Summary of Map Actions

cc: Community Map Repository
Tony Doran, Engineering Department, City of Tualatin
Dayna Webb, Engineering Department, City of Tualatin

FINAL SUMMARY OF MAP ACTIONS

Community: TUALATIN, CITY OF

Community No: 410277

To assist your community in maintaining the Flood Insurance Rate Map (FIRM), we have summarized below the previously issued Letter of Map Change (LOMC) actions (i.e., Letters of Map Revision (LOMRs) and Letters of Map Amendment (LOMAs)) that will be affected when the revised FIRM becomes effective on November 4, 2016.

1. LOMCs Incorporated

The modifications effected by the LOMCs listed below will be reflected on the revised FIRM. In addition, these LOMCs will remain in effect until the revised FIRM becomes effective.

LOMC	Case No.	Date Issued	Project Identifier	Old Panel	New Panel
			NO CASES RECORDED		

2. LOMCs Not Incorporated

The modifications effected by the LOMCs listed below will not be reflected on the revised FIRM panels because of scale limitations or because the LOMC issued had determined that the lot(s) or structure(s) involved were outside the Special Flood Hazard Area, as shown on the FIRM. These LOMCs will remain in effect until the revised FIRM becomes effective. These LOMCs will be revalidated free of charge 1 day after the revised FIRM becomes effective through a single revalidation letter that reaffirms the validity of the previous LOMCs.

LOMC	Case No.	Date Issued	Project Identifier	Old Panel	New Panel
LOMA	95-R10-109	05/05/1995	UNKNOWN	4102770000	41067C0544E
LOMA	96-R10-092	01/23/1996	TRACT 5, TUALATIN COMMONS IN SECTION 24, T2S, R1W	4102770002D	41067C0544E
LOMA	98-10-201A	05/15/1998	19300 SW BOONES FERRY ROAD--A PORTION OF SECTION 24, T2S, R1W, W.M.	4102770002D	41067C0544E
LOMA	98-10-484A	11/02/1998	19255 SW 65TH AVE-- A PORTION OF SECTION 24, T2S, R1W, W.M.	4102770002D	41067C0563E
LOMA	00-10-088A	01/10/2000	19300 SW BOONES FERRY ROAD -- PORTION OF SECTION 24, T2S, R1W, W.M.	4102770002D	41067C0544E
LOMR-F	00-10-086A	01/28/2000	HEDGES GREENE APT. HOMES, BLDGS. 1-17 & CLUBHOUSE -- 8900 SW SWEET DRIVE	4102770002D	41067C0544E
LOMA	03-10-0199A	02/04/2003	FOX HILL III, LOT 152 -- 19095 SW MOBILE PLACE	4102770002D	41067C0563E
LOMA	04-10-0837A	10/29/2004	STONES THROW APARTMENTS -- 6455 SW NYBERG LANE, PORTION OF SECTION 19, T2S, R1E, W.M.	4102770002D	41067C0563E

FINAL SUMMARY OF MAP ACTIONS

Community: TUALATIN, CITY OF

Community No: 410277

LOMC	Case No.	Date Issued	Project Identifier	Old Panel	New Panel
LOMR-F	04-10-0868A	11/17/2004	LIBERTY OAKS TOWNHOMES, LOT 86 -- 9279 CASCARA LANE	4102770002D	41067C0544E
LOMA	04-10-0815A	01/10/2005	EMERY ZIDELL COMMONS, LOTS 3-4	4102770002D	41067C0544E
LOMA	05-10-0563A	07/01/2005	LIBERTY OAKS TOWNHOMES, LOT 39 -- 18608 SW 92ND TERRACE	4102770002D	41067C0544E
LOMA	12-10-1585X	10/11/2012	FOX HILL III, LOT 172 -- 5585 SOUTHWEST OMAHA COURT	4102770002D	41067C0563E
LOMA	13-10-0445A	01/15/2013	5916 SOUTHWEST NYBERG LANE (BUILDING B)	4102770002D	41067C0563E
LOMA	13-10-0462A	01/15/2013	5916 SOUTHWEST NYBERG LANE (BUILDINGS C & D)	4102770002D	41067C0563E
LOMA	13-10-0526A	02/12/2013	LOT 163, FOX HILL III -- 19025 SOUTHWEST 57TH AVENUE	4102770002D	41067C0563E
LOMR-F	13-10-0848A	04/09/2013	10300 SOUTHWEST HERMAN ROAD, 10350 SOUTHWEST HERMAN ROAD & 10360 SOUTHWEST SPOKANE COURT	4102770001D	41067C0543E
LOMA	15-10-1183A	07/15/2015	Lot 16 and part 1, Premier Industrial Park Subdivision - 19400 SW Teton Ave	4102770001D	41067C0543E

3. LOMCs Superseded

The modifications effected by the LOMCs listed below have not been reflected on the Final revised FIRM panels because they are being superseded by new detailed flood hazard information or the information available was not sufficient to make a determination. The reason each is being superseded is noted below. These LOMCs will no longer be in effect when the revised FIRM becomes effective.

LOMC	Case No.	Date Issued	Project Identifier	Reason Determination Will be Superseded
LOMR-F	199104531FIA	12/14/1988	STONES THROW APARTMENTS	4
LOMR-F	199107109FIA	09/26/1991	POR. LOT 14,15& VACATED CHESAPEAKE DR.	4
LOMR-F	98-10-318A	07/23/1998	TETON PARK, PHASE 1, BLDGS 10-A, 10-B, & 10-C, PREMIER INDUSTRIAL PARK, LOTS 9-10 -- 19155 SW TETON	4
LOMR-F	98-10-469A	12/31/1998	PARCEL 3; 10255 SW SPOKANE CT.	2
LOMR-F	01-10-152A	02/09/2001	PREMIER INDUSTRIAL PARK, PARCEL 3 -- 19201 SW TETON AVENUE	2

FINAL SUMMARY OF MAP ACTIONS

Community: TUALATIN, CITY OF

Community No: 410277

LOMC	Case No.	Date Issued	Project Identifier	Old Panel	New Panel
LOMR-F	04-10-0868A	11/17/2004	LIBERTY OAKS TOWNHOMES, LOT 86 -- 9279 CASCARA LANE	4102770002D	41067C0544E
LOMA	04-10-0815A	01/10/2005	EMERY ZIDELL COMMONS, LOTS 3-4	4102770002D	41067C0544E
LOMA	05-10-0563A	07/01/2005	LIBERTY OAKS TOWNHOMES, LOT 39 -- 18608 SW 92ND TERRACE	4102770002D	41067C0544E
LOMA	12-10-1585X	10/11/2012	FOX HILL III, LOT 172 -- 5585 SOUTHWEST OMAHA COURT	4102770002D	41067C0563E
LOMA	13-10-0445A	01/15/2013	5916 SOUTHWEST NYBERG LANE (BUILDING B)	4102770002D	41067C0563E
LOMA	13-10-0462A	01/15/2013	5916 SOUTHWEST NYBERG LANE (BUILDINGS C & D)	4102770002D	41067C0563E
LOMA	13-10-0526A	02/12/2013	LOT 163, FOX HILL III -- 19025 SOUTHWEST 57TH AVENUE	4102770002D	41067C0563E
LOMR-F	13-10-0848A	04/09/2013	10300 SOUTHWEST HERMAN ROAD, 10350 SOUTHWEST HERMAN ROAD & 10360 SOUTHWEST SPOKANE COURT	4102770001D	41067C0543E
LOMA	15-10-1183A	07/15/2015	Lot 16 and part 1, Premier Industrial Park Subdivision - 19400 SW Teton Ave	4102770001D	41067C0543E

3. LOMCs Superseded

The modifications effected by the LOMCs listed below have not been reflected on the Final revised FIRM panels because they are being superseded by new detailed flood hazard information or the information available was not sufficient to make a determination. The reason each is being superseded is noted below. These LOMCs will no longer be in effect when the revised FIRM becomes effective.

LOMC	Case No.	Date Issued	Project Identifier	Reason Determination Will be Superseded
LOMR-F	199104531FIA	12/14/1988	STONES THROW APARTMENTS	4
LOMR-F	199107109FIA	09/26/1991	POR. LOT 14,15& VACATED CHESAPEAKE DR.	4
LOMR-F	98-10-318A	07/23/1998	TETON PARK, PHASE 1, BLDGS 10-A, 10-B, & 10-C, PREMIER INDUSTRIAL PARK, LOTS 9-10 -- 19155 SW TETON	4
LOMR-F	98-10-469A	12/31/1998	PARCEL 3; 10255 SW SPOKANE CT.	2
LOMR-F	01-10-152A	02/09/2001	PREMIER INDUSTRIAL PARK, PARCEL 3 -- 19201 SW TETON AVENUE	2

FINAL SUMMARY OF MAP ACTIONS

Community: TUALATIN, CITY OF

Community No: 410277

LOMC	Case No.	Date Issued	Project Identifier	Reason Determination Will be Superseded
LOMR-F	01-10-455A	10/03/2001	TUALATIN MEADOWS APTS, BLDGS A-L, REC BLDG, GARAGES M-U -- 18755 SW 90TH AVENUE	4
LOMR-F	02-10-175A	01/31/2002	7550 SW NYBERG STREET, BLDGS 1 & 2 -- PORTION OF SECTION 24, T2S, R1W, W.M.	2
LOMA	03-10-0039A	11/15/2002	FOX HILL III, LOT 155 -- 19000 SW MOBIL PLACE	4
LOMR-F	05-10-0093A	12/28/2004	TETON PARK PHASE 1, BLDG 10B -- 19095 SW TETON AVENUE	2
LOMA	05-10-0470A	05/26/2005	19450 SW CIPOLE ROAD -- PORTION OF SECTION 21, T2S, R1W, W. M.	4
LOMR	10-10-0006P	05/10/2010	Riverhouse Commons Bridge	4
LOMA	10-10-0833A	07/22/2010	TUALATIN GREENS CONDOMINIUMS -- 8720 SOUTHWEST TUALATIN ROAD	2
LOMA	11-10-0922A	05/12/2011	LOT 3, PACIFIC STATES INDUSTRIAL PARK -- 9850 SOUTHWEST HERMAN ROAD	4

1. Insufficient information available to make a determination.
2. Lowest Adjacent Grade and Lowest Finished Floor are below the proposed Base Flood Elevation.
3. Lowest Ground Elevation is below the proposed Base Flood Elevation.
4. Revised hydrologic and hydraulic analyses.
5. Revised topographic information.

4. LOMCs To Be Redetermined

The LOMCs in Category 2 above will be revalidated through a single revalidation letter that reaffirms the validity of the determination in the previously issued LOMC. For LOMCs issued for multiple lots or structures where the determination for one or more of the lots or structures has changed, the LOMC cannot be revalidated through this administrative process. Therefore, we will review the data previously submitted for the LOMC requests listed below and issue a new determination for the affected properties after the effective date of the revised FIRM.

LOMC	Case No.	Date Issued	Project Identifier	Old Panel	New Panel
			NO CASES RECORDED		



FEMA

JUL 22 2016

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Lou Ogden
Mayor, City of Tualatin
18880 Southwest Martinazzi Avenue
Tualatin, Oregon 97062

REC'D
CITY OF TUALATIN
JUL 25 2016

MAYOR _____ COUNCIL _____ POLICE _____ ADM _____
FINANCE _____ COMMDEV _____ LEGAL _____ OPER _____
COMMSVCS _____ ENG & BLDG _____ LIBRARY _____

Dear Mayor Ogden:

I commend you for the efforts that have been put forth in implementing the floodplain management measures for the City of Tualatin, Oregon, to participate in the National Flood Insurance Program (NFIP). As you implement these measures, I want to emphasize the following:

- a Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) have been completed for your community;
- the FIS and FIRM will become effective on November 4, 2016; and
- by the FIS and FIRM effective date, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) Regional Office is required to approve the legally enforceable floodplain management measures your community adopts in accordance with Title 44 Code of Federal Regulations Section 60.3(d).

As noted in FEMA's letter dated May 4, 2016, no significant changes have been made to the flood hazard data on the Preliminary and/or revised Preliminary copies of the FIRM for Washington County. Therefore, the City of Tualatin should use the Preliminary and/or revised Preliminary copies of the FIRM as the basis for adopting the required floodplain management measures. Final printed copies of the FIRM for the City of Tualatin will be sent to you within the next few months.

If you encounter difficulties in enacting the measures, I recommend you contact the Department of Land Conservation and Development. You may contact Christine Shirley, CFM, the NFIP State Coordinator, by telephone at (503) 373-0050, in writing at 635 Capitol Street, Northeast, Suite 150, Salem, Oregon 97301-2540, or by electronic mail at christine.shirley@state.or.us.

The FEMA Regional staff in Bothell, Washington, is also available to provide technical assistance and guidance in the development of floodplain management measures. The adoption of compliant floodplain management measures will provide protection for the City of Tualatin and will ensure its participation in the NFIP. The Regional Office may be contacted by telephone at (425) 487-4600 or in writing. Please send your written inquiries to the Director, Federal Insurance and Mitigation Division, FEMA Region X, at 130 - 228th Street, Southwest, Bothell, Washington 98021-8627.

The Honorable Lou Ogden

Page 2

You may have already contacted the NFIP State Coordinator and/or the FEMA Regional Office, and may be in the final adoption process or recently adopted the appropriate measures. However, in the event your community has not adopted the appropriate measures, this letter is FEMA's official notification that you only have until November 4, 2016, to adopt and/or submit a floodplain management ordinance that meets or exceeds the minimum NFIP requirements, and request approval from the FEMA Regional Office by the effective date. Your community's adopted measures will be reviewed upon receipt and the FEMA Regional Office will notify you when the measures are approved.

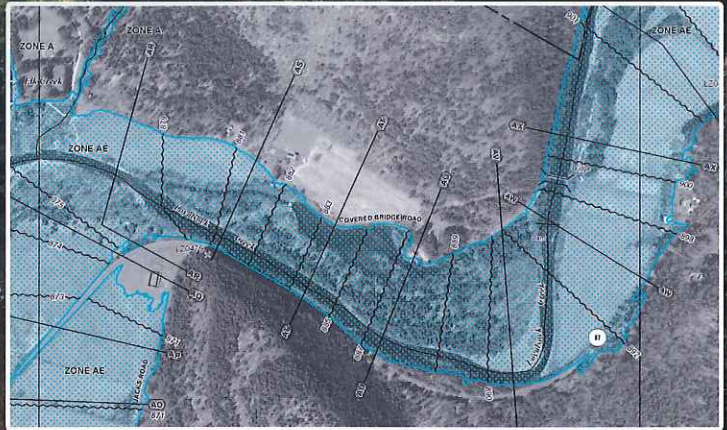
I appreciate your cooperation to ensure that your community's floodplain management measures are approved by the FEMA Regional Office by November 4, 2016. Your compliance with these mandatory program requirements will enable your community to avoid suspension from the NFIP.

Sincerely,

A handwritten signature in black ink, appearing to read "Rachel Sears". The signature is fluid and cursive, with a long horizontal stroke at the end.

Rachel Sears, Director
Floodplain Management Division
Mitigation Directorate | FEMA

cc: Kenneth Murphy, Regional Administrator, FEMA Region X
Christine Shirley, CFM, NFIP State Coordinator, Department of Land Conservation and
Development
Tony Doran, EIT, Engineering Associate, City of Tualatin



of Flood Rate Maps by ting Communities

Adoption of Flood Insurance Rate Maps by Participating Communities

The National Flood Insurance Program (NFIP) was established with the passage of the National Flood Insurance Act of 1968. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Over 21,000 communities participate in the Program.

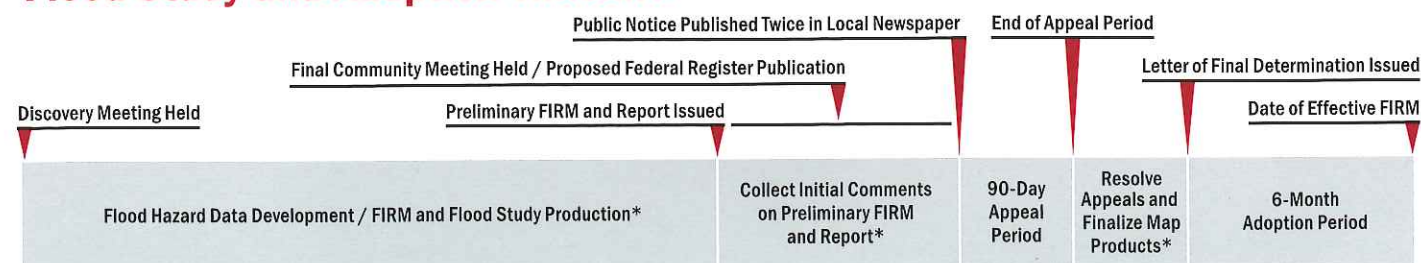
This brochure addresses several questions about community adoption of the Flood Insurance Rate Map (FIRM). As a participating community in the NFIP, your community is responsible for making sure that its floodplain management regulations meet or exceed the minimum requirements of the NFIP. By law, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) cannot offer flood insurance in communities that do not have regulations that meet or exceed these minimum requirements. These regulations can be found in **Title 44** of the **Code of Federal Regulations (44 CFR) Section 60.3**. You can also find them in model ordinances developed by most States and by FEMA Regional Offices.

The basis of your community's floodplain management regulations is the flood hazard data provided to the community by FEMA. FEMA identifies flood hazards nationwide and publishes and periodically updates flood hazard data in support of the NFIP. Flood hazard data is provided to communities in the form of a FIRM and Flood Insurance Study (FIS) report, typically prepared in a countywide format. Please be aware that while an FIS report accompanies most FIRMs, it is not created for all flood studies.

The identification of flood hazards serves many important purposes. Identifying flood hazards creates an awareness of the hazard, especially for those who live and work in floodprone areas. The FIRM and FIS report provide States and communities with the information needed for land use planning and to reduce flood risk to floodplain development and implement other health and safety requirements through codes and regulations. States and communities can also use the information for emergency management.

Each time FEMA provides your community with additional flood hazard data, your community must adopt new floodplain management regulations or amend existing regulations to incorporate the new data and meet any additional requirements that result from any changes in the data, such as the designation of a regulatory floodway for the first time. Your floodplain management regulations must also meet any additional State requirements and be adopted through a process that complies with any procedural requirements established in your State for the adoption of ordinances or regulations.

Flood Study and Adoption Timeline



*The timeframe for completing these activities may vary.

What is the process for developing new flood hazard data or revising existing data?

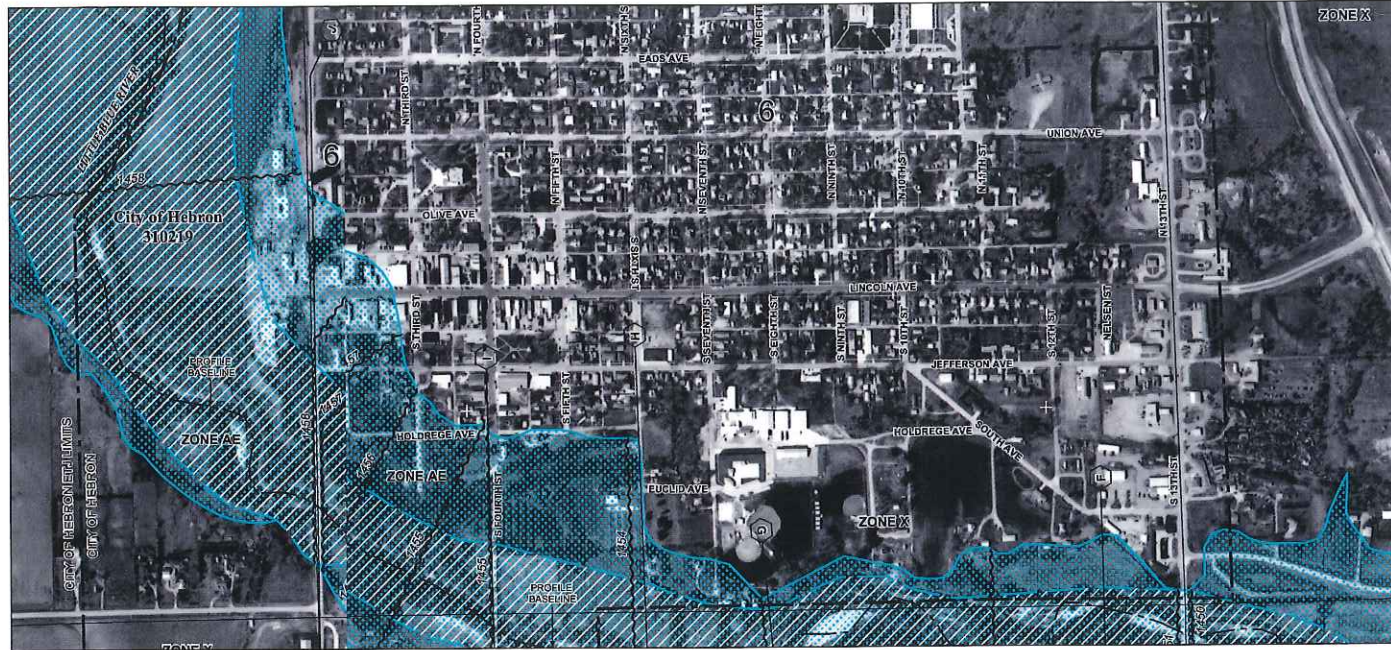
FEMA coordinates closely with communities to develop new flood risk data or revise existing data during the flood study process. This coordination may lead to new or updated flood hazard mapping (i.e., the update of a community's FIRM and FIS report), flood risk assessment projects, and/or mitigation planning assistance. In general, the process includes the following activities:

- Under FEMA's Risk MAP program, FEMA engages in a Discovery process with communities and other local stakeholders to obtain a comprehensive picture of flooding issues, flood risk, and the potential for the performance of additional flood mitigation activities, including the adoption of more restrictive floodplain management criteria by communities. Stakeholders may include, but are not limited to, local officials, citizen associations, representatives of levee boards, conservation districts, Tribal Nations, and economic development organizations. Information obtained during the Discovery meeting helps determine whether a flood risk assessment project, including new or updated flood hazard data and a corresponding FIRM and FIS report, is needed.
- Once it is determined that the creation or revision of flood hazard data, including an update to the FIRM and FIS report, is needed, FEMA works with communities and other Discovery stakeholders to determine the parameters of the project, including flooding sources and the type and extent (number of stream or coastline miles) of the study.
- The mapping process typically includes development of Base Flood Elevations (BFEs) and floodways for the project area. In addition, the mapping process includes activities such as obtaining the digital base map, developing the FIRM flood hazard database and, when appropriate, incorporating or revalidating previously issued Letters of Map Change, or LOMCs. LOMCs, which include Letters of Map Revision (LOMRs), Letters of Map Revision Based on Fill and Letters of Map Amendment, serve to officially revise the effective FIRM and FIS report without requiring the physical revision and republication of these materials.

- When the study is completed, FEMA provides the community with a preliminary FIRM and FIS report for review. In addition, FEMA may hold public meetings—often referred to as the Final Meeting and Open House—to explain and obtain comments on the preliminary FIRM and FIS report.

- FEMA provides a 90-day appeal period for all new or modified flood hazard information shown on a FIRM, including additions or modifications of any BFEs, base flood depths, Special Flood Hazard Area (SFHA) boundaries or zone designations, or regulatory floodways. SFHAs are areas subject to inundation by the base (1-percent-annual-chance) flood and include the following flood zones: A, AO, AH, A1-A30, AE, A99, AR, AR/A1-A30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-V30, VE, and V. The regulatory floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Before the appeal period is initiated, FEMA will publish a notice of proposed flood hazard determinations in the Federal Register and notify the community's Chief Executive Officer of the determination. FEMA will then publish information about the flood hazard determinations at least twice in a local newspaper. The appeal period provides the community and owners or lessees of property in the community an opportunity to submit scientific or technical information if they believe the flood hazard determinations are scientifically or technically incorrect.
- Following the 90-day appeal period, FEMA resolves all appeals and finalizes all changes to the FIRM and FIS report.
- FEMA then issues a Letter of Final Determination (LFD), which establishes the final flood hazard data and the effective date of the new FIRM and FIS report for the community. The LFD also initiates the six-month adoption period during which the community must adopt or amend its floodplain management regulations to reference the new FIRM and FIS report.
- The FIRM and FIS report become effective at the end of the six-month period. The effective date is also the date when flood insurance rates will be based on the new flood data for new construction built after this date. The effective FIRM will be used by Federally insured or regulated lenders to determine if flood insurance is required as a condition of a loan.

FEMA has entered into agreements with nearly 250 communities, States, and regional agencies to be active partners in FEMA's flood hazard mapping program under the Cooperating Technical Partners (CTP) Program. These agencies are participating with FEMA in developing and updating FIRMs. (See the box on the inside of the back cover page for a brief description of the CTP program.)



FIRM

What must an NFIP participating community do when FEMA provides new or revised flood hazard data?

Each time FEMA provides a community with new or revised flood hazard data, the community must either adopt new floodplain management regulations, or amend its existing regulations to reference the new FIRM and FIS report. In some cases, communities may have to adopt additional floodplain management requirements if a new type of flood hazard data is provided, such as a new flood zone (e.g., going from a Zone A without BFEs to a Zone AE with BFEs or going from a Zone AE to a Zone VE – the coastal high hazard area), or with the addition of a regulatory floodway designation.

The following guide is to help you determine whether changes need to be made in your community’s floodplain management regulations when a new or revised FIRM and FIS report are provided:

- If the community’s floodplain management regulations are compliant with the NFIP requirements when the LFD is issued, the community needs to amend only the map reference section of their floodplain management regulations to identify the new FIRM and FIS report.
- If the community has a legally valid automatic adoption clause established in the map reference section of the regulations and the community’s regulations are otherwise compliant with the NFIP requirements, then the floodplain management

regulations do not need to be amended. Automatic adoption clauses adopt all future revisions to the FIRM without further action by the community. However, keep in mind that the FIRM and FIS report update process outlined above still applies for communities with automatic adoption clauses. Automatic adoption clauses are not permitted in many States.

- If the community is provided a new type of flood hazard data, the community will need to either adopt new regulations or amend existing regulations to include the appropriate NFIP requirements, in addition to referencing the new FIRM and FIS report.

The LFD indicates the sections of the NFIP floodplain management requirements at 44 CFR Section 60.3 that a community must adopt based on the type of flood hazard data provided to the community.

You can contact the FEMA Regional Office or your State NFIP Coordinating Agency for assistance on the specific requirements your community will need to adopt. (See “For Assistance” on the back cover page for contact information.)

If your community has adopted higher standards than the minimum requirements of the NFIP, your community may qualify for a reduction in flood insurance premiums for your citizens under the Community Rating System (CRS). (See the box on the inside of the back cover for a brief description of the CRS.)



Janesville, Wisconsin, 2008

When must a community adopt the new or revised flood hazard data?

Your community must amend its existing floodplain management regulations or adopt new regulations before the effective date of the FIRM and FIS report, which is identified in the LFD. The LFD initiates the six-month adoption period.

Communities are encouraged to adopt the appropriate floodplain management regulations as soon as possible after the LFD is issued. The adopted regulations must be submitted to FEMA or the State and be approved by FEMA before the effective date of the FIRM and FIS report.

FEMA will send two letters notifying the community that it must have approved floodplain management regulations in place before the effective date of the FIRM. The first letter is a reminder letter and is sent to the community 90 days before the effective date. The second letter is sent to the community 30 days before the effective date of the FIRM. This letter is FEMA’s final notification that the community will be suspended from the NFIP if it does not adopt the FIRM before the effective date. Notice of the suspension is also published in the *Federal Register*.

If the community adopts or amends its floodplain management regulations prior to the effective date of the FIRM and FIS report and the FEMA Regional Office approves the community’s regulations, the suspension will not go into effect and the community will remain eligible for participation in the NFIP.

What happens if a community does not adopt the appropriate floodplain management regulations during the six-month adoption period?

If a community does not adopt new floodplain management regulations or amend its existing regulations before the effective date of the FIRM and FIS report, the community will be suspended from the NFIP.

The following sanctions apply if a community is suspended from the NFIP:

- Property owners will not be able to purchase NFIP flood insurance policies and existing policies will not be renewed.
- Federal grants or loans for development will not be available in identified flood hazard areas under programs administered by Federal agencies such as the Department of Housing and Urban Development, the Environmental Protection Agency, and the Small Business Administration.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- Federal mortgage insurance or loan guarantees will not be provided in identified flood hazard areas such as those written by the Federal Housing Administration and the Department of Veteran Affairs.
- Federally insured or regulated lending institutions, such as banks and credit unions, are allowed to



Elevated home on pile foundation



Elevated home on crawl space foundation

make conventional loans for insurable buildings in flood hazard areas of non-participating communities. However, the lender must notify applicants that the property is in a flood hazard area and that the property is not eligible for Federal disaster assistance. Some lenders may voluntarily choose not to make these loans.

If a community is suspended, it may regain its eligibility in the NFIP by enacting the floodplain management measures established in 44 CFR Section 60.3 of the NFIP regulations. If development takes place in your community during suspension that does not meet the minimum NFIP requirements, your community will be asked to take actions to reduce the increased flood hazard prior to reinstatement.

Digital Flood Hazard Information Resources

In accordance with the Flood Insurance Reform Act of 2004, FEMA has implemented a policy that allows the use of digital data for official NFIP purposes. All FEMA's flood mapping products are now prepared digitally, and a number of different digital options are available to view the flood hazard information shown on community FIRMs. All digital flood hazard resources referenced below can be accessed through FEMA's Map Service Center (MSC) at <http://msc.fema.gov>.

- Once effective, copies of the FIRM panels in digital format will be provided to your community and will also be available through the MSC. Note that Letters of Map Change (LOMCs) are also available through the MSC in .pdf format.
- FIRMettes show a desired section of a FIRM panel specified by a user, plus map scale, and other legend information from the FIRM. FIRMettes can be created online through the MSC, and printed or saved in .pdf format at no cost.
- The FIRM database is designed for use with specialized Geographic Information System (GIS) software. Users are able to integrate local data sets with the FEMA flood hazard data in the FIRM database to assist with floodplain management or mitigation planning measures. The FIRM

database is provided to your community once the FIRM becomes effective and is also available for download through the MSC.

- The National Flood Hazard Layer (NFHL) contains all effective digital flood hazard information from FIRM databases and LOMRs produced by FEMA in one integrated nationwide dataset. It also contains point locations of other LOMCs, such as Letters of Map Revision Based on Fill and Letters of Map Amendment. The NFHL is available for viewing through FEMA's online map viewer which can be accessed through the MSC. The NFHL can also be viewed as a layer in Google Earth or accessed via Web Map Service (WMS), a web-based method of viewing map information using commercial GIS software, such as ESRI's ArcGIS. Additional information on these services is available through the MSC.

Note for communities that do not yet have digitally produced FIRMs: scanned digital versions of the paper FIRM panels are available through the MSC. However, since the FIRMs were not produced digitally, a FIRM database will not be available and the flood hazard information shown on the FIRMs will not be included in the NFHL.

Becoming a Cooperating Technical Partner



FEMA established the Cooperating Technical Partner (CTP) program to increase local involvement in, and

ownership of, the flood study process and the flood hazard data developed as part of that process. This program enables communities, and regional and State agencies that have the interest, capabilities, and resources to be active partners in FEMA's flood hazard mapping program.

One of the major objectives of the CTP program is to recognize States, regional agencies, and communities with proactive floodplain management programs that include identifying the flood risk and getting the information incorporated into official FEMA flood hazard data. The CTP Program maintains national standards consistent with the NFIP Regulations. The following are some of the benefits of being a CTP.

- CTPs are given an opportunity to develop more detailed maps by making local geospatial data a part of the FIRM

- CTPs receive support such as access to existing data, access to custom-made FEMA tools, technical assistance, and national recognition
- CTPs receive mentoring support, online examples of "best practices," and free training
- Communities that participate in the Community Rating System (CRS) that also become CTPs or are in an area covered by a regional or State CTP may be eligible to receive CRS credit for CTP activities

Another major objective and benefit of the CTP Program is the ability to leverage available funding and local data to make the most of limited resources. Communities, States, and regional agencies can take advantage of these benefits by entering into an agreement with FEMA that formalizes the types of mapping activities and support the CTP will provide. Nearly 250 communities, States, and regional agencies are currently participating in the CTP Program.

To learn more about becoming a CTP, visit www.fema.gov/plan/prevent/fhm/ctp_main.shtm or contact your FEMA regional office (see back page for contact information)

Becoming an NFIP Community Rating System Community



The NFIP Community Rating System (CRS) recognizes community floodplain management practices that exceed the minimum requirements of the NFIP. CRS recognizes these efforts by

reducing the cost of flood insurance premiums from 5 percent to 45 percent for flood insurance policies in communities that participate in the CRS.

Many communities may already be doing activities that would earn credit under the CRS which would reduce flood insurance premiums for their citizens. Here are a few examples:

- Adopting and enforcing more protective building standards that result in safer new construction
- Informing the public about flood hazards and flood insurance and how to reduce flood damage
- Preserving open space in the floodplain

To receive CRS credit, a community must submit a CRS application to FEMA which identifies floodplain management practices being implemented by the community. FEMA can help with the application. After FEMA reviews and verifies the application, the flood insurance premium discounts will go into effect. The amount of flood insurance policy premium discount depends on the number of CRS-credited activities a community performs.

Community participation in the CRS has many benefits:

- Discounts for flood insurance premiums from 5 percent to 45 percent
- Enhanced public safety
- Reduced flood damage
- Increased environmental protection
- Informed community residents supporting improved flood protection measures that will make communities safer from flood risks.

To learn more about CRS, visit www.fema.gov/business/nfip/crs.shtm or call 317-848-2898

For Assistance

If your community needs assistance in adopting the FIRM, you may contact the FEMA Regional Offices listed below. You may also contact your State Coordinating Agency for the NFIP.

Additional information is available at www.fema.gov/rm-main/regional-contact-information.

REGION I

CT, ME, MA, NH, RI, VT
99 High Street, 6th Floor
Boston, MA 02110
617-956-7506

REGION II

NJ, NY, PR, VI
26 Federal Plaza, Suite 1337
New York, NY 10278-0002
212-680-3600

REGION III

DE, DC, MD, PA, VA, WV
615 Chestnut Street
1 Independence Mall, 6th Floor
Philadelphia, PA 19106-4404
215-931-5500

REGION IV

AL, FL, GA, KY, MS, NC, SC, TN
3003 Chamblee-Tucker Road
Atlanta, GA 30341
770-220-5200

REGION V

IL, IN, MI, MN, OH, WI
536 South Clark Street, 6th Floor
Chicago, IL 60605
312-408-5500

REGION VI

AR, LA, NM, OK, TX
Federal Regional Center
800 North Loop 288
Denton, TX 76209-3698
940-898-5399

REGION VII

IA, KS, MO, NE
9221 Ward Parkway, Suite 300
Kansas City, MO 64114-3372
816-283-7061

REGION VIII

CO, MT, ND, SD, UT, WY
Denver Federal Center, Building 710, Box 25267
Denver, CO 80225-0267
303-235-4800

REGION IX

AZ, CA, HI, NV, American Samoa, Guam,
Marshall Islands and Northern Mariana Islands
1111 Broadway, Suite 1200
Oakland, CA 94607
510-627-7100

REGION X

AK, ID, OR, WA
Federal Regional Center
130 228th Street SW
Bothell, WA 98021-8627
425-487-4600



FEMA

SEP 22 2016

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Lou Ogden
Mayor, City of Tualatin
18880 Southwest Martinazzi Avenue
Tualatin, Oregon 97062

CITY OF TUALATIN
RECEIVED
SEP 27 2016
ENGINEERING &
BUILDING DEPARTMENT

Dear Mayor Ogden:

I am writing this letter as an official reminder that the City of Tualatin, Oregon, has until November 4, 2016, to adopt and have the Department of Homeland Security's Federal Emergency Management Agency (FEMA) Regional Office approve floodplain management measures that satisfy 44 Code of Federal Regulations (CFR) Section 60.3(d) of the National Flood Insurance Program (NFIP) regulations.

The City of Tualatin must adopt floodplain management measures, such as a floodplain management ordinance, that meet or exceed the minimum NFIP requirements (copy enclosed) by November 4, 2016, to avoid suspension from the NFIP. If suspended, your community becomes ineligible for flood insurance through the NFIP, new insurance policies cannot be sold, and existing policies cannot be renewed.

Under the Flood Disaster Protection Act of 1973, as amended, flood insurance must be purchased by property owners seeking any Federal financial assistance for construction or acquisition of buildings in Special Flood Hazard Areas (SFHAs). This financial assistance includes certain federally guaranteed mortgages and direct loans, federal disaster relief loans and grants, as well as other similarly described assistance from FEMA and other agencies.

In addition, all loans individuals obtain from Federally regulated, supervised, or insured lending institutions that are secured by improved real estate located in SFHAs are also contingent upon the borrower obtaining flood insurance coverage on the building. However, purchasing and maintaining flood insurance coverage on a voluntary basis is frequently recommended for properties located outside SFHAs.

Your NFIP State Coordinator and FEMA would like to assist the City of Tualatin to ensure it remains in good standing with the NFIP and avoids suspension from the Program. If your community is suspended, it may regain its eligibility in the NFIP by enacting the floodplain management measures established in 44 CFR Section 60.3 of the NFIP regulations. As stated in my previous correspondence, I recommend you contact your NFIP State Coordinator or the FEMA Regional Office if the City of Tualatin is encountering difficulties in enacting its measures.

The Honorable Lou Ogden

Page 2

I recognize that your community may be in the final adoption process or may have recently adopted the appropriate floodplain management measures. Please submit these measures to the Floodplain Management Program at the Oregon Department of Land Conservation and Development. Christine Shirley, CFM, the NFIP State Coordinator, is accessible by telephone at (503) 373-0050, in writing at 635 Capitol Street, Northeast, Suite 150, Salem, Oregon 97301-2540, or by electronic mail at christine.shirley@state.or.us.

The FEMA Regional staff in Bothell, Washington, is also available to assist you with your floodplain management measures. The FEMA Regional Office may be contacted by telephone at (425) 487-4600 or in writing. Please send your written inquiries to the Director, Federal Insurance and Mitigation Division, FEMA Region X, at 130 – 228th Street, Southwest, Bothell, Washington 98021-8627.

In the event your community does not adopt and/or submit the necessary floodplain management measures that meet or exceed the minimum NFIP requirements, I must take the necessary steps to suspend your community from the NFIP. This letter is FEMA's final notification before your community is suspended from the Program.

Sincerely,

A handwritten signature in black ink, appearing to read "Rachel Sears", with a long horizontal flourish extending to the right.

Rachel Sears, Director
Floodplain Management Director
Mitigation Directorate | FEMA

Enclosure

cc: Kenneth Murphy, Regional Administrator, FEMA Region X
Christine Shirley, CFM, NFIP State Coordinator, Oregon Department of Land Conservation
and Development
Tony Doran, EIT, Engineering Associate, City of Tualatin

§ 59.24 Suspension of community eligibility.

(a) A community eligible for the sale of flood insurance shall be subject to suspension from the Program for failing to submit copies of adequate flood plain management regulations meeting the minimum requirements of paragraphs (b), (c), (d), (e) or (f) of § 60.3 or paragraph (b) of §§ 60.4 or 60.5, within six months from the date the Federal Insurance Administrator provides the data upon which the flood plain regulations for the applicable paragraph shall be based. Where there has not been any submission by the community, the Federal Insurance Administrator shall notify the community that 90 days remain in the six month period in order to submit adequate flood plain management regulations. Where there has been an inadequate submission, the Federal Insurance Administrator shall notify the community of the specific deficiencies in its submitted flood plain management regulations and inform the community of the amount of time remaining within the six month period. If, subsequently, copies of adequate flood plain management regulations are not received by the Administrator, no later than 30 days before the expiration of the original six month period the Federal Insurance Administrator shall provide written notice to the community and to the state and assure publication in the FEDERAL REGISTER under part 64 of this subchapter of the community's loss of eligibility for the sale of flood insurance, such suspension to become effective upon the expiration of the six month period. Should the community remedy the defect and the Federal Insurance Administrator receive copies of adequate flood plain management regulations within the notice period, the suspension notice shall be rescinded by the Federal Insurance Administrator. If the Federal Insurance Administrator receives notice from the State that it has enacted adequate flood plain management regulations for the community within the notice period, the suspension notice shall be rescinded by the Federal Insurance Administrator. The community's eligibility shall remain terminated after suspension until copies of adequate flood plain management regulations have been received and approved by the Federal Insurance Administrator.

(b) A community eligible for the sale of flood insurance which fails to adequately enforce flood plain management regulations meeting the minimum requirements set forth in §§ 60.3, 60.4 and/or 60.5 shall be subject to probation. Probation shall represent formal notification to the community that the Federal Insurance Administrator regards the community's flood plain management program as not compliant with NFIP criteria. Prior to imposing probation, the Federal Insurance Administrator (1) shall inform the community upon 90 days prior written notice of the impending probation and of the specific program deficiencies and violations relative to the failure to enforce, (2) shall, at least 60 days before probation is to begin, issue a press release to local media explaining the reasons for and the effects of probation, and (3) shall, at least 90 days before probation is to begin, advise all policyholders in the community of the impending probation and the additional premium that will be charged, as provided in this paragraph, on policies sold or renewed during the period of probation. During this 90-day period the community shall have the opportunity to avoid probation by demonstrating compliance with Program requirements, or by correcting Program deficiencies and remedying all violations to the maximum extent possible. If, at the end of the 90-day period, the Federal Insurance Administrator determines that the community has failed to do so, the probation shall go into effect. Probation may be continued for up to one year after the community corrects all Program deficiencies and remedies all violations to the maximum extent possible. Flood insurance may be sold or renewed in the community while it is on probation. Where a policy covers property located in a community placed on probation on or after October 1, 1986, but prior to October 1, 1992, an additional premium of \$25.00 shall be charged on each such policy newly issued or renewed during the one-year period beginning on the date the community is placed on probation and during any successive one-year periods that begin prior to October 1, 1992. Where a community's probation begins on or after October 1, 1992, the additional premium described in the preceding sentence shall be \$50.00, which shall also be charged during any successive one-year periods during which the community remains on probation for any part thereof. This \$50.00 additional premium shall further be charged during any successive one-year periods that begin on or after October 1, 1992, where the preceding one-year probation period began prior to October 1, 1992.

(c) A community eligible for the sale of flood insurance which fails to adequately enforce its flood plain management regulations meeting the minimum requirements set forth in §§ 60.3, 60.4 and/or 60.5

and does not correct its Program deficiencies and remedy all violations to the maximum extent possible in accordance with compliance deadlines established during a period of probation shall be subject to suspension of its Program eligibility. Under such circumstances, the Federal Insurance Administrator shall grant the community 30 days in which to show cause why it should not be suspended. The Federal Insurance Administrator may conduct a hearing, written or oral, before commencing suspensive action. If a community is to be suspended, the Federal Insurance Administrator shall inform it upon 30 days prior written notice and upon publication in the FEDERAL REGISTER under part 64 of this subchapter of its loss of eligibility for the sale of flood insurance. In the event of impending suspension, the Federal Insurance Administrator shall issue a press release to the local media explaining the reasons and effects of the suspension. The community's eligibility shall only be reinstated by the Federal Insurance Administrator upon his receipt of a local legislative or executive measure reaffirming the community's formal intent to adequately enforce the flood plain management requirements of this subpart, together with evidence of action taken by the community to correct Program deficiencies and remedy to the maximum extent possible those violations which caused the suspension. In certain cases, the Federal Insurance Administrator, in order to evaluate the community's performance under the terms of its submission, may withhold reinstatement for a period not to exceed one year from the date of his receipt of the satisfactory submission or place the community on probation as provided for in paragraph (b) of this section.

(d) A community eligible for the sale of flood insurance which repeals its flood plain management regulations, allows its regulations to lapse, or amends its regulations so that they no longer meet the minimum requirements set forth in §§ 60.3, 60.4 and/or 60.5 shall be suspended from the Program. If a community is to be suspended, the Federal Insurance Administrator shall inform it upon 30 days prior written notice and upon publication in the FEDERAL REGISTER under part 64 of this subchapter of its loss of eligibility for the sale of flood insurance. The community eligibility shall remain terminated after suspension until copies of adequate flood plain management regulations have been received and approved by the Federal Insurance Administrator.

(e) A community eligible for the sale of flood insurance may withdraw from the Program by submitting to the Federal Insurance Administrator a copy of a legislative action that explicitly states its desire to withdraw from the National Flood Insurance Program. Upon receipt of a certified copy of a final legislative action, the Federal Insurance Administrator shall withdraw the community from the Program and publish in the FEDERAL REGISTER under part 64 of this subchapter its loss of eligibility for the sale of flood insurance. A community that has withdrawn from the Program may be reinstated if it submits the application materials specified in § 59.22(a).

(f) If during a period of ineligibility under paragraphs (a), (d), or (e) of this section, a community has permitted actions to take place that have aggravated existing flood plain, mudslide (i.e., mudflow) and/or flood related erosion hazards, the Federal Insurance Administrator may withhold reinstatement until the community submits evidence that it has taken action to remedy to the maximum extent possible the increased hazards. The Administrator may also place the reinstated community on probation as provided for in paragraph (b) of this section.

(g) The Federal Insurance Administrator shall promptly notify the servicing company and any insurers issuing flood insurance pursuant to an arrangement with the Federal Insurance Administrator of those communities whose eligibility has been suspended or which have withdrawn from the program. Flood insurance shall not be sold or renewed in those communities. Policies sold or renewed within a community during a period of ineligibility are deemed to be voidable by the Federal Insurance Administrator whether or not the parties to sale or renewal had actual notice of the ineligibility.

[41 FR 46968, Oct. 26, 1976. Redesignated at 44 FR 31177, May 31, 1979, and amended at 48 FR 44543 and 44552, Sept. 29, 1983; 49 FR 4751, Feb. 8, 1984; 50 FR 36023, Sept. 4, 1985; 57 FR 19540, May 7, 1992; 59 FR 53598, Oct. 25, 1994; 62 FR 55715, Oct. 27, 1997]

§ 60.3 Flood plain management criteria for flood-prone areas.

The Federal Insurance Administrator will provide the data upon which flood plain management regulations shall be based. If the Federal Insurance Administrator has not provided sufficient data to furnish a basis for these regulations in a particular community, the community shall obtain, review and reasonably utilize data available from other Federal, State or other sources pending receipt of data from the Federal Insurance Administrator. However, when special flood hazard area designations and water surface elevations have been furnished by the Federal Insurance Administrator, they shall apply. The symbols defining such special flood hazard designations are set forth in § 64.3 of this subchapter. In all cases the minimum requirements governing the adequacy of the flood plain management regulations for flood-prone areas adopted by a particular community depend on the amount of technical data formally provided to the community by the Federal Insurance Administrator. Minimum standards for communities are as follows:

(a) When the Federal Insurance Administrator has not defined the special flood hazard areas within a community, has not provided water surface elevation data, and has not provided sufficient data to identify the floodway or coastal high hazard area, but the community has indicated the presence of such hazards by submitting an application to participate in the Program, the community shall:

(1) Require permits for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within flood-prone areas;

(2) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334;

(3) Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with materials resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damages, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(4) Review subdivision proposals and other proposed new development, including manufactured home parks or subdivisions, to determine whether such proposals will be reasonably safe from flooding. If a subdivision proposal or other proposed new development is in a flood-prone area, any such proposals shall be reviewed to assure that (i) all such proposals are consistent with the need to minimize flood damage within the flood-prone area, (ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and (iii) adequate drainage is provided to reduce exposure to flood hazards;

(5) Require within flood-prone areas new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems; and

(6) Require within flood-prone areas (i) new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and (ii) onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.

(b) When the Federal Insurance Administrator has designated areas of special flood hazards (A zones) by the publication of a community's FHBM or FIRM, but has neither produced water surface elevation data nor identified a floodway or coastal high hazard area, the community shall:

(1) Require permits for all proposed construction and other developments including the placement of manufactured homes, within Zone A on the community's FHBM or FIRM;

(2) Require the application of the standards in paragraphs (a) (2), (3), (4), (5) and (6) of this section to development within Zone A on the community's FHBM or FIRM;

(3) Require that all new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data;

(4) Obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other source, including data developed pursuant to paragraph (b)(3) of this section, as criteria for requiring that new construction, substantial improvements, or other development in Zone A on the community's FHBM or FIRM meet the standards in paragraphs (c)(2), (c)(3), (c)(5), (c)(6), (c)(12), (c)(14), (d)(2) and (d)(3) of this section;

(5) Where base flood elevation data are utilized, within Zone A on the community's FHBM or FIRM:

(i) Obtain the elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures, and

(ii) Obtain, if the structure has been floodproofed in accordance with paragraph (c)(3)(ii) of this section, the elevation (in relation to mean sea level) to which the structure was floodproofed, and

(iii) Maintain a record of all such information with the official designated by the community under § 59.22 (a)(9)(iii);

(6) Notify, in riverine situations, adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the Federal Insurance Administrator;

(7) Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained;

(8) Require that all manufactured homes to be placed within Zone A on a community's FHBM or FIRM shall be installed using methods and practices which minimize flood damage. For the purposes of this requirement, manufactured homes must be elevated and anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable State and local anchoring requirements for resisting wind forces.

(c) When the Federal Insurance Administrator has provided a notice of final flood elevations for one or more special flood hazard areas on the community's FIRM and, if appropriate, has designated other special flood hazard areas without base flood elevations on the community's FIRM, but has not identified a regulatory floodway or coastal high hazard area, the community shall:

(1) Require the standards of paragraph (b) of this section within all A1-30 zones, AE zones, A zones, AH zones, and AO zones, on the community's FIRM;

(2) Require that all new construction and substantial improvements of residential structures within Zones A1-30, AE and AH zones on the community's FIRM have the lowest floor (including basement) elevated to or above the base flood level, unless the community is granted an exception by the Federal Insurance Administrator for the allowance of basements in accordance with § 60.6 (b) or (c);

(3) Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community's firm (i) have the lowest floor (including basement) elevated to or above the base flood level or, (ii) together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

(4) Provide that where a non-residential structure is intended to be made watertight below the base flood level, (i) a registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the applicable provisions of paragraph (c)(3)(ii) or (c)(8)(ii) of this section, and (ii) a record of such certificates which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained with the official designated by the community under § 59.22(a)(9)(iii);

(5) Require, for all new construction and substantial improvements, that fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

(6) Require that manufactured homes that are placed or substantially improved within Zones A1-30, AH, and AE on the community's FIRM on sites

(i) Outside of a manufactured home park or subdivision,

(ii) In a new manufactured home park or subdivision,

(iii) In an expansion to an existing manufactured home park or subdivision, or

(iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist floatation collapse and lateral movement.

(7) Require within any AO zone on the community's FIRM that all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified);

(8) Require within any AO zone on the community's FIRM that all new construction and substantial improvements of nonresidential structures (i) have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's

FIRM (at least two feet if no depth number is specified), or (ii) together with attendant utility and sanitary facilities be completely floodproofed to that level to meet the floodproofing standard specified in § 60.3(c)(3)(ii);

(9) Require within any A99 zones on a community's FIRM the standards of paragraphs (a)(1) through (a)(4)(i) and (b)(5) through (b)(9) of this section;

(10) Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

(11) Require within Zones AH and AO, adequate drainage paths around structures on slopes, to guide floodwaters around and away from proposed structures.

(12) Require that manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A-1-30, AH, and AE on the community's FIRM that are not subject to the provisions of paragraph (c)(6) of this section be elevated so that either

(i) The lowest floor of the manufactured home is at or above the base flood elevation, or

(ii) The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately anchored foundation system to resist floatation, collapse, and lateral movement.

(13) Notwithstanding any other provisions of § 60.3, a community may approve certain development in Zones A1-30, AE, and AH, on the community's FIRM which increase the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional FIRM revision, fulfills the requirements for such a revision as established under the provisions of § 65.12, and receives the approval of the Federal Insurance Administrator.

(14) Require that recreational vehicles placed on sites within Zones A1-30, AH, and AE on the community's FIRM either

(i) Be on the site for fewer than 180 consecutive days,

(ii) Be fully licensed and ready for highway use, or

(iii) Meet the permit requirements of paragraph (b)(1) of this section and the elevation and anchoring requirements for "manufactured homes" in paragraph (c)(6) of this section.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

(d) When the Federal Insurance Administrator has provided a notice of final base flood elevations within Zones A1-30 and/or AE on the community's FIRM and, if appropriate, has designated AO zones, AH zones, A99 zones, and A zones on the community's FIRM, and has provided data from which the community shall designate its regulatory floodway, the community shall:

(1) Meet the requirements of paragraphs (c) (1) through (14) of this section;

(2) Select and adopt a regulatory floodway based on the principle that the area chosen for the regulatory floodway must be designed to carry the waters of the base flood, without increasing the water surface elevation of that flood more than one foot at any point;

(3) Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge;

(4) Notwithstanding any other provisions of § 60.3, a community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that the community first applies for a conditional FIRM and floodway revision, fulfills the requirements for such revisions as established under the provisions of § 65.12, and receives the approval of the Federal Insurance Administrator.

(e) When the Federal Insurance Administrator has provided a notice of final base flood elevations within Zones A1-30 and/or AE on the community's FIRM and, if appropriate, has designated AH zones, AO zones, A99 zones, and A zones on the community's FIRM, and has identified on the community's FIRM coastal high hazard areas by designating Zones V1-30, VE, and/or V, the community shall:

(1) Meet the requirements of paragraphs (c)(1) through (14) of this section;

(2) Within Zones V1-30, VE, and V on a community's FIRM, (i) obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures, and whether or not such structures contain a basement, and (ii) maintain a record of all such information with the official designated by the community under § 59.22(a)(9)(iii);

(3) Provide that all new construction within Zones V1-30, VE, and V on the community's FIRM is located landward of the reach of mean high tide;

(4) Provide that all new construction and substantial improvements in Zones V1-30 and VE, and also Zone V if base flood elevation data is available, on the community's FIRM, are elevated on pilings and columns so that (i) the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level; and (ii) the pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable State or local building standards. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of paragraphs (e)(4) (i) and (ii) of this section.

(5) Provide that all new construction and substantial improvements within Zones V1-30, VE, and V on the community's FIRM have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purposes of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

(i) Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and,

(ii) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable State or local building standards.

Such enclosed space shall be useable solely for parking of vehicles, building access, or storage.

(6) Prohibit the use of fill for structural support of buildings within Zones V1-30, VE, and V on the community's FIRM;

(7) Prohibit man-made alteration of sand dunes and mangrove stands within Zones V1-30, VE, and V on the community's FIRM which would increase potential flood damage.

(8) Require that manufactured homes placed or substantially improved within Zones V1-30, V, and VE on the community's FIRM on sites

(i) Outside of a manufactured home park or subdivision,

(ii) In a new manufactured home park or subdivision,

(iii) In an expansion to an existing manufactured home park or subdivision, or

(iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, meet the standards of paragraphs (e)(2) through (7) of this section and that manufactured homes placed or substantially improved on other sites in an existing manufactured home park or subdivision within Zones V1-30, V, and VE on the community's FIRM meet the requirements of paragraph (c)(12) of this section.

(9) Require that recreational vehicles placed on sites within Zones V1-30, V, and VE on the community's FIRM either

(i) Be on the site for fewer than 180 consecutive days,

(ii) Be fully licensed and ready for highway use, or

(iii) Meet the requirements in paragraphs (b)(1) and (e) (2) through (7) of this section.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

(f) When the Federal Insurance Administrator has provided a notice of final base flood elevations within Zones A1-30 or AE on the community's FIRM, and, if appropriate, has designated AH zones, AO zones, A99 zones, and A zones on the community's FIRM, and has identified flood protection restoration areas by designating Zones AR, AR/A1-30, AR/AE, AR/AH, AR/AO, or AR/A, the community shall:

(1) Meet the requirements of paragraphs (c)(1) through (14) and (d)(1) through (4) of this section.

(2) Adopt the official map or legal description of those areas within Zones AR, AR/A1-30, AR/AE, AR/AH, AR/A, or AR/AO that are designated developed areas as defined in § 59.1 in accordance with the eligibility procedures under § 65.14.

(3) For all new construction of structures in areas within Zone AR that are designated as developed areas and in other areas within Zone AR where the AR flood depth is 5 feet or less:

(i) Determine the lower of either the AR base flood elevation or the elevation that is 3 feet above highest adjacent grade; and

(ii) Using this elevation, require the standards of paragraphs (c)(1) through (14) of this section.

(4) For all new construction of structures in those areas within Zone AR that are not designated as developed areas where the AR flood depth is greater than 5 feet:

(i) Determine the AR base flood elevation; and

(ii) Using that elevation require the standards of paragraphs (c)(1) through (14) of this section.

(5) For all new construction of structures in areas within Zone AR/A1-30, AR/AE, AR/AH, AR/AO, and AR/A:

(i) Determine the applicable elevation for Zone AR from paragraphs (a)(3) and (4) of this section;

(ii) Determine the base flood elevation or flood depth for the underlying A1-30, AE, AH, AO and A Zone; and

(iii) Using the higher elevation from paragraphs (a)(5)(i) and (ii) of this section require the standards of paragraphs (c)(1) through (14) of this section.

(6) For all substantial improvements to existing construction within Zones AR/A1-30, AR/AE, AR/AH, AR/AO, and AR/A:

(i) Determine the A1-30 or AE, AH, AO, or A Zone base flood elevation; and

(ii) Using this elevation apply the requirements of paragraphs (c)(1) through (14) of this section.

(7) Notify the permit applicant that the area has been designated as an AR, AR/A1-30, AR/AE, AR/AH, AR/AO, or AR/A Zone and whether the structure will be elevated or protected to or above the AR base flood elevation.

[41 FR 46975, Oct. 26, 1976]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 60.3, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.fdsys.gov.

01/21/2021

OREGON MODEL FLOOD DAMAGE PREVENTION ORDINANCE

**Effective January 2009
Modified August 2009
Modified January 2014
Modified March 2015**

Adoption of this ordinance will ensure compliance with the standards for participation in the National Flood Insurance Program (NFIP). The model includes standards and provisions that encourage sound flood plain management and if implemented allows property owners to obtain flood insurance at a more affordable rate.

Development Permits

NFIP requires that a permit be issued for all development (see DEFINITIONS) in the regulatory floodplain. A floodplain development permit is intended to provide a mechanism for jurisdictions to review all proposed development in the regulatory floodplain. A floodplain development permit is not the same as a building permit.

Association with Building Codes

On October 1, 2014 a new residential building code went into effect that relies on the local flood plain administrator to provide building officials with key information needed to administer the building code in Special Flood Hazard Areas. Specifically, the authority to establish the base flood elevation and any required freeboard rests with the flood plain administrator. Furthermore, the Building Code Division added the following note to the residential code:

Local communities may choose to designate their local building official as the Flood Plain Administrator or may designate other staff. When a building official functioning in the capacity of Flood Plain Administrator exercises authority under the NFIP, such decisions are not part of this code nor subject to the building official duties and responsibilities as adopted by the Oregon Building Codes Division.

Per ORS 455.210(3(c), local communities are prohibited from using building permit monies for any matter other than administration and enforcement of the State Building Code. Administration and implementation of NFIP requirements are not part of the State Building Code.

Below-grade Crawlspace

Below-grade refers to the inside of the crawlspace being below-grade on all sides, similar to how FEMA defines basement. FEMA would prefer that NFIP communities prohibit below-grade crawl spaces in Special Flood Hazard Areas. If, however, your community decides to allow below grade crawl spaces, specific language must be included in your code. The model code contained herein was derived from Technical Bulletin 11-01: Crawlspace Construction for Buildings located in Special Flood Hazard Areas.

If crawlspace standards are not included in local code, FEMA considers crawlspaces to be basements, which are not allowed as new construction or substantial improvements.

Manufactured Dwellings

The 2011 Oregon Manufactured Dwelling and Park Specialty Code requires that manufactured dwellings be elevated such that the bottom of the chassis is at base flood elevation. The Code also requires that electrical cross-over connections be elevated at least 12" above Base Flood Elevation. Furthermore, the Code makes no distinction between existing and new manufactured dwelling parks. All new installations, repair of substantial damage, or substantial improvements must be elevated above the base flood elevation.

Accessory and Agricultural Buildings

Finally, the NFIP requires that accessory structures, including agricultural buildings be elevated or floodproofed. Agricultural buildings located in the Special Flood Hazard Area are not exempt from building codes.

Agricultural Buildings:

ORS 455.315 exempts certain agricultural buildings from application of the Oregon Structural Specialty Code, however, **the exemption does not apply to:**

- (A) A dwelling;
- (B) A structure used for a purpose other than growing plants in which 10 or more persons are present at any one time;
- (C) A structure regulated by the State Fire Marshal pursuant to ORS chapter 476;
- (D) A structure used by the public; or

(E) A structure subject to sections 4001 to 4127, title 42, United States Code (the National Flood Insurance Act of 1968) as amended, and regulations promulgated thereunder.

If you have any questions concerning adoption of this model or participation in the NFIP, please contact our Regional Office at (425) 487-4677.

KEY

Items in *underlined italics* (on electronic copies) or *underlined italics* (on paper copies) of the ordinance need to be filled in by the community.

Highlighted text recommended but not required

Blue means V-zone only requirement

**OREGON MODEL
FLOOD DAMAGE PREVENTION ORDINANCE**

	SECTION 1.0 AUTHORIZATION, FINDINGS OF FACT, PURPOSE, AND OBJECTIVES
	1.1 AUTHORIZATION The State of Oregon has delegated ¹ the responsibility to local governmental to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the <i>city/town/county</i> , does ordain as follows: <i>{change for tribal government}</i>
	1.2 FINDINGS OF FACT
	(1) The <i>{city/ county/tribe}</i> has the primary responsibility for planning, adoption and enforcement of land use regulations to accomplish proper management of special flood hazard areas. [44 CFR Part 59.22]
	(2) The special flood hazard areas of <i>city/town/county/tribe</i> are subject to periodic inundation which results in loss of life and property, health, and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.
	(3) These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.
	1.3 STATEMENT OF PURPOSE The purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed. Specific objectives are:
	(1) To protect human life and health;
	(2) To minimize expenditure of public money and costly flood control

¹ Almost all Oregon cities and some Oregon counties will derive their authority to adopt a flood damage prevention ordinance from the home rule provisions of the Oregon Constitution. See Article XI, Section 2 of the Oregon Constitution and your local government charter, if applicable. All counties, including those without home rule charters, have been granted authority to enact ordinances under Oregon Revised Statute 203.035.

	projects;
	(3) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
	(4) To minimize prolonged business interruptions;
	(5) To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard;
	(6) To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
	(7) To ensure that potential buyers are notified that property is in an area of special flood hazard; and,
	(8) To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.
	(9) To manage the alteration of special flood hazard areas, stream channels and shorelines to maintain their natural and beneficial functions.
	1.4 METHODS OF REDUCING FLOOD LOSSES In order to accomplish these objectives, this ordinance includes methods and provisions for:
	(1) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
	(2) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
	(3) Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
	(4) Controlling filling, grading, dredging, and other development which may increase flood damage;
	(5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

	<p>SECTION 2.0 DEFINITIONS Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.</p>
	<p>“<u>APPEAL</u>” means a request for a review of the interpretation of any provision of this ordinance or a request for a variance.</p>
	<p>“<u>AREA OF SHALLOW FLOODING</u>” means a designated AO, or AH Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and, velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.</p>
	<p>“<u>AREA OF SPECIAL FLOOD HAZARD</u>” means the land in the flood plain within a community subject to a one percent or greater chance of flooding in any given year. Designation on maps always includes the letters A or V.</p>
	<p>“<u>BASE FLOOD</u>” means the flood having a one percent chance of being equaled or exceeded in any given year. Also referred to as the “100-year flood.” Designation on maps always includes the letters A or V.</p>
	<p>“<u>BASEMENT</u>” means any area of the building having its floor subgrade (below ground level) on all sides.</p>
	<p>“<u>BELOW-GRADE CRAWL SPACE</u>” means an enclosed area below the base flood elevation in which the interior grade is not more than two feet below the lowest adjacent exterior grade and the height, measured from the interior grade of the crawlspace to the top of the crawlspace foundation, does not exceed 4 feet at any point</p> <p><i>Note: this definition and appropriate crawlspace code must be included in the flood hazard development ordinance if below grade crawlspaces are allowed, otherwise below grade crawlspaces will be considered to be basements. Structures built with below grade crawlspaces will have higher insurance premiums.</i></p>
	<p>“<u>BREAKAWAY WALL</u>” means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.</p>
	<p>“<u>COASTAL HIGH HAZARD AREA</u>” means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on the FIRM as Zone V1-V30, VE or V.</p>

<u>NEW</u>	“ <u>CONDITIONAL LETTER OF MAP REVISION (CLOMR)</u> ” means a letter from FEMA commenting on whether a proposed project, if built as proposed, would meet the minimum NFIP standards or proposed hydrology changes.
	“ <u>CRITICAL FACILITY</u> ” means a facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals police, fire and emergency response installations, installations which produce, use or store hazardous materials or hazardous waste.
	“ <u>DEVELOPMENT</u> ” means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials located within the area of special flood hazard.
	“ <u>ELEVATED BUILDING</u> ” means for insurance purposes, a nonbasement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, post, piers, pilings, or columns.
	“ <u>FLOOD</u> ” OR “ <u>FLOODING</u> ” means a general and temporary condition of partial or complete inundation of normally dry land areas from: (1) The overflow of inland or tidal waters and/or (2) The unusual and rapid accumulation of runoff of surface waters from any source.
	“ <u>FLOOD INSURANCE RATE MAP (FIRM)</u> ” means the official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.
	“ <u>FLOOD INSURANCE STUDY</u> ” means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Boundary-Floodway Map, and the water surface elevation of the base flood.
	“ <u>FLOODWAY</u> ” means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.
<u>NEW</u>	“ <u>HIGHEST ADJACENT GRADE</u> ” means the highest natural elevation of the ground surface prior to construction, adjacent to the proposed walls of a structure.

NEW	<p>"HISTORIC STRUCTURE" means a structure that is:</p> <ul style="list-style-type: none"><li>(1) Listed individually in the National Register of Historic Places (a listing maintained by the U.S. Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;<li>(2) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or to a district preliminarily determined by the Secretary to qualify as a registered historic district;<li>(3) Individually listed on a state inventory of historic places which have been approved by the Secretary of the Interior, or;<li>(4) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:<ul style="list-style-type: none"><li>i. by an approved state program as determined by the Secretary of the Interior, or;<li>ii. directly by the Secretary of the Interior in states without approved programs. <p><i>[Note: Oregon has an approved state program]</i></p>
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<p><u>NEW</u></p>	<p><u>“LETTER OF MAP CHANGE (LOMC)”</u> means an official FEMA determination, by letter, to amend or revise effective Flood Insurance Rate Maps and/or Flood Insurance Studies. LOMCs are issued in the following categories:</p> <p style="padding-left: 40px;"><u>(1) Letter of Map Amendment (LOMA)</u></p> <p>An amendment to the Flood Insurance Rate Maps based on technical data showing that an existing structure or parcel of land that has not been elevated by fill (natural grade) was inadvertently included in the special flood hazard area because of an area of naturally high ground above the base flood.</p> <p style="padding-left: 40px;"><u>(2) Letter of Map Revision (LOMR)</u></p> <p style="padding-left: 80px;">i. <u>LOMR-F (Letter of Map Revision based on Fill) is a letter from FEMA stating that an existing structure or parcel of land that has been elevated by fill would not be inundated by the base flood.</u></p> <p style="padding-left: 80px;">ii. <u>A LOMR revises the current Flood Insurance Rate Map and/or Flood Insurance Study to show changes to the floodplains, Floodways or flood elevations. LOMRs are generally based on manmade alterations that affected the hydrologic or hydraulic characteristics of a flooding source and thus result in modification to the existing regulatory Floodway, the effective Base Flood Elevation, or the Special Flood Hazard Area. It is recommended a Conditional Letter of Map Revision be approved by FEMA prior to issuing a permit to start a project if the project has a potential to affect the special flood hazard area. (See Conditional Letter of Map Revision)</u></p>
	<p><u>“LOWEST FLOOR”</u> means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building’s lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance found at Section 5.2-1(2).</p>
	<p><u>“MANUFACTURED DWELLING”</u> means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured dwelling” does not include a “recreational vehicle.”</p>

	<p><u>“MANUFACTURED HOME PARK OR SUBDIVISION”</u> means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.</p>
	<p><u>“NEW CONSTRUCTION”</u> means structures for which the “start of construction” commenced on or after the effective date of this ordinance.</p>
	<p><u>“RECREATIONAL VEHICLE”</u> means a vehicle which is:</p> <ul style="list-style-type: none"> (1) Built on a single chassis; (2) 400 square feet or less when measured at the largest horizontal projection; (3) Designed to be self-propelled or permanently towable by a light duty truck; and (4) Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.
	<p><u>“START OF CONSTRUCTION”</u> includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.</p>
	<p><u>“STRUCTURE”</u> means a walled and roofed building, a modular or temporary building, or a gas or liquid storage tank that is principally above ground.</p>
	<p><u>“SUBSTANTIAL DAMAGE”</u> means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.</p>

	<p><u>“SUBSTANTIAL IMPROVEMENT”</u> means any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:</p> <ul style="list-style-type: none"> (1) Before the improvement or repair is started; or (2) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition, “substantial improvement” is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. <p>The term does not, however, include either:</p> <ul style="list-style-type: none"> (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or (2) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.
	<p><u>“VARIANCE”</u> means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.</p>
	<p><u>“WATER DEPENDENT”</u> means a structure for commerce or industry which cannot exist in any other location and is dependent on the water by reason of the intrinsic nature of its operations.</p>

	SECTION 3.0
	GENERAL PROVISIONS
	<p>3.1 LANDS TO WHICH THIS ORDINANCE APPLIES This ordinance shall apply to all areas of special flood hazards within the jurisdiction of <u>city/town/county/tribe</u>.</p>
	<p>3.2 BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for the <u>city/town/county/tribe – use county if FIRMs are in countywide format</u>," dated <u>month day</u>, 20<u>yr</u>, with accompanying Flood Insurance Maps are hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study is on file at <u>location</u>. The best available information for flood hazard area identification as outlined in Section 4.3-2 shall be the basis for regulation until a new FIRM is issued which incorporates the data utilized under section 4.3-2.</p> <p><i>Note: Jurisdictions may regulate a larger area than that depicted on the FIRM. Any larger area (such as an historic inundation area) must be identified in this ordinance. Add the expanded area description to this section.</i></p>
	<p>3.3 PENALTIES FOR NONCOMPLIANCE No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violations of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than <u>\$ amount</u> or imprisoned for not more than <u>number</u> days, or both, for each violation, and in addition shall pay all costs and expenses involved in the case. Nothing herein contained shall prevent the <u>city/town/county/tribe</u> from taking such other lawful action as is necessary to prevent or remedy any violation.</p>

	<p>3.4 ABROGATION AND SEVERABILITY This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail. If any section clause, sentence, or phrase of the Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.</p>
	<p>3.5 INTERPRETATION In the interpretation and application of this ordinance, all provisions shall be:</p> <ul style="list-style-type: none"> (1) Considered as minimum requirements; (2) Liberally construed in favor of the governing body; and, (3) Deemed neither to limit or repeal any other powers granted under State statutes.
	<p>3.6 WARNING AND DISCLAIMER OF LIABILITY The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of <u>city/town/county/tribe</u>, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.</p>

	SECTION 4.0
	ADMINISTRATION
	4.1 ESTABLISHMENT OF DEVELOPMENT PERMIT
	<p>4.1-1 <u>Development Permit Required</u> A development permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 3.2. The permit shall be for all structures including manufactured homes, as set forth in the “DEFINITIONS,” and for all development including fill and other activities, also as set forth in the “DEFINITIONS.”</p>
	<p>4.1-2 <u>Application for Development Permit</u> Application for a development permit shall be made on forms furnished by the <u>dept., e.g. Planning, Engineering, etc.</u> and may include but not be limited to plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:</p> <ul style="list-style-type: none"> (1) Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures; (2) Elevation in relation to mean sea level of floodproofing in any structure; (3) Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 5.2-2; and (4) Description of the extent to which a watercourse will be altered or relocated as a result of proposed development.
	<p>4.2 DESIGNATION OF THE LOCAL FLOODPLAIN ADMINISTRATOR The _____ is hereby appointed to administer and implement this ordinance by granting or denying development permit applications in accordance with its provisions.</p>

	<p>4.3 DUTIES AND RESPONSIBILITIES OF THE LOCAL ADMINISTRATOR</p> <p>Duties of the local administrator shall include, but not be limited to:</p>
<p>NEW</p> <p>SB COMMENTS : NOT IN CURRENT CODE</p>	<p>4.3-1 <u>Provide Base Flood Elevation and Freeboard</u></p> <p>(1) When base flood elevation has been provided in accordance with Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD, the local floodplain administrator shall provide it to the Building Official along with any freeboard requirements established in Section 5.2 SPECIFIC STANDARDS.</p> <p>(2) When base flood elevation data has not been provided (A and V Zones) in accordance with Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD, the local floodplain administrator shall obtain, review, and provide any base flood elevation and floodway data available from a Federal, State or other source, in order to administer Sections 5.2, SPECIFIC STANDARDS, and 5.3 FLOODWAYS and the Building Codes.</p>
	<p>4.3-2 <u>Permit Review</u></p> <p>(1) Review all development permits to determine that the permit requirements of this ordinance have been satisfied.</p> <p>(2) Review all development permits to determine that all necessary permits have been obtained from those Federal, State, or local governmental agencies from which prior approval is required.</p> <p>(3) Review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the encroachment provisions of Section 5.4 are met.</p>

	<p>4.3-3 <u>Information to be Obtained and Maintained</u></p> <ul style="list-style-type: none"> (1) Maintain for public inspection all records pertaining to the provisions of this ordinance. (2) Where base flood elevation data is provided through the Flood Insurance Study, FIRM, or required as in Section 4.3-1, obtain and record the actual elevation (in relation to mean sea level) of the lowest floor (including basements and below-grade crawlspaces) of all new or substantially improved structures, and whether or not the structure contains a basement. (3) For all new or substantially improved floodproofed structures where base flood elevation data is provided through the Flood Insurance Study, FIRM, or as required in Section 4.3-1: <ul style="list-style-type: none"> (i) Verify and record the actual elevation (in relation to mean seal level), and (ii) Maintain the floodproofing certifications required in Section 4.1-2(3). (4) Maintain for public inspection all records pertaining to the provisions of this ordinance.
<p>(4) NEW SB COMMENTS : Subsection 4 not in current code</p>	<p>4.3-4 <u>Alteration of Watercourses</u></p> <ul style="list-style-type: none"> (1) Development shall not diminish the flood carrying capacity of a watercourse. If any watercourse will be altered or relocated as a result of the proposed development the applicant must submit certification by a registered professional engineer that the flood carrying capacity of the watercourse will not be diminished. (2) Notify adjacent communities, the Department of Land Conservation and Development and other appropriate state and federal agencies, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration. (3) Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished. (4) Applicants shall obtain a Conditional Letter of Map Revision (CLOMR) from FEMA before any encroachment, including fill, new construction, substantial improvement, or other development, in the regulatory floodway is permitted. The applicant shall be responsible for preparing technical data to support the CLOMR application and paying any processing or application fees to FEMA. .

	<p>4.3-5 <u>Requirement to Submit New Technical Data</u></p> <p>(1) Notify FEMA within six months of project completion when an applicant had obtained a Conditional Letter of Map Revision (CLOMR) from FEMA, or when development altered a watercourse, modified floodplain boundaries, or modified Base Flood Elevations. This notification shall be provided as a Letter of Map Revision (LOMR).</p> <p>(2) The applicant shall be responsible for preparing technical data to support the LOMR application and paying any processing or application fees to FEMA.</p> <p>(3) The Floodplain Administrator shall be under no obligation to sign the Community Acknowledgement Form, which is part of the CLOMR/LOMR application, until the applicant demonstrates that the project will or has met the requirements of this code and all applicable State and Federal laws.</p>
NEW	<p>4-3-6 <u>Non-Conversion of Enclosed Areas below the Lowest Floor</u></p> <p>To ensure that enclosed areas below the lowest floor continue to be used solely for parking vehicles, limited storage, or access to the building and not be finished for use as human habitation/recreation/bathrooms, etc., the Floodplain Administrator shall:</p> <p>(1) Determine which applicants for new construction and/or substantial improvements have fully enclosed areas below the lowest floor that are 5 feet or higher;</p> <p>(2) Require such applicants to enter into a “NON-CONVERSION DEED DECLARATION FOR CONSTRUCTION WITHIN FLOOD HAZARD AREAS” or equivalent. The deed declaration shall be recorded with {city, county, tribe}, and shall be in a form acceptable to the Floodplain Administrator.</p>

	<p>4.3-7 Interpretation of FIRM Boundaries Make interpretations where needed, as to exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in Section 4.4.</p> <p><i>If you do not include Section 4.4 (Variance Procedure), end the above sentence after the word "interpretation," and add the following sentence: "such appeals shall be granted consistent with the standards of Section 60.6 of the Rules and Regulations of the National Flood Insurance Program (44 CFR 59-76)."</i></p>
	<p>4.4 VARIANCE PROCEDURE</p>
	<p>4.4-1 Appeal Board</p>
	<p>(1)The _____ as established by <u>ordinance</u> shall hear and decide appeals and requests for variances from the requirements of this ordinance.</p>
	<p>(2)The _____ shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the <u>city/town/county/tribe</u> in the enforcement or administration of this ordinance.</p>
	<p>(3)Those aggrieved by the decision of the _____, or any taxpayer, may appeal such decision to the _____, as provided in <u>ordinance</u>.</p>

	<p>(4) In passing upon such applications, the _____ shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:</p> <ul style="list-style-type: none"> (i) The danger that materials may be swept onto other lands to the injury of others; (ii) The danger to life and property due to flooding or erosion damage; (iii) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner; (iv) The importance of the services provided by the proposed facility to the community; (v) The necessity to the facility of a waterfront location, where applicable; (vi) The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage; (vii) The compatibility of the proposed use with existing and anticipated development; (viii) The relationship of the proposed use to the comprehensive plan and flood plain management program for that area; (ix) The safety of access to the property in times of flood for ordinary and emergency vehicles; (x) The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and, (xi) The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.
	<p>(5) Upon consideration of the factors of Section 4.4-1(4) and the purposes of this ordinance, the _____ may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.</p>
	<p>(6) The <i>local floodplain administrator</i> shall maintain the records of all appeal actions and report any variances to the Federal Insurance Administration upon request.</p>

	<p>4.4-2 <u>Conditions for Variances</u></p>
	<p>(1) Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing items (i-xi) in Section 4.4-1(4) have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.</p>
	<p>(2) Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the Statewide Inventory of Historic Properties, without regard to the procedures set forth in this section.</p>
	<p>(3) Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.</p>
	<p>(4) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.</p>
	<p>(5) Variances shall only be issued upon:</p> <ul style="list-style-type: none"> (i) A showing of good and sufficient cause; (ii) A determination that failure to grant the variance would result in exceptional hardship to the applicant; (iii) A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in Section 4.1-4(4), or conflict with existing local laws or ordinances.
	<p>(6) Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece or property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.</p>

	<p>(7) Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except 4.4-2(1), and otherwise complies with Sections 5.1-1 through 5.1-3 of the GENERAL STANDARDS.</p>
	<p>(8) Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.</p>
	<p>SECTION 5.0</p>
	<p>PROVISIONS FOR FLOOD HAZARD REDUCTION</p>
	<p>5.1 GENERAL STANDARDS</p>
	<p>5.1-1 <u>Anchoring</u></p> <p>(1) All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.</p> <p>(2) All manufactured homes must likewise be anchored to prevent flotation, collapse, or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA’s “Manufactured Home Installation in Flood Hazard Areas” guidebook for additional techniques).</p>

	<p>5.1-2 <u>Construction Materials and Methods</u></p> <ul style="list-style-type: none"> (1) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage. (2) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage. (3) Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
	<p>5.1-3 <u>Utilities</u></p> <ul style="list-style-type: none"> (1) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system; (2) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and, (3) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding consistent with the Oregon Department of Environmental Quality.
	<p>5.1-4 <u>Subdivision Proposals</u></p> <ul style="list-style-type: none"> (1) All subdivision proposals shall be consistent with the need to minimize flood damage; (2) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage; (3) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage; and, (4) Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).

	<p>5.1-5 <u>Review of Building Permits</u> Where elevation data is not available either through the Flood Insurance Study, FIRM, or from another authoritative source (Section 4.3-2), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.</p>
	<p>5.1-6 <u>AH Zone Drainage</u> Adequate drainage paths are required around structures on slopes to guide floodwaters around and away from proposed structures.</p>
	<p>5.2 SPECIFIC STANDARDS In all areas of special flood hazards where base flood elevation data has been provided (Zones A1-30, AH, and AE) as set forth in Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD or Section 4.3-2, Use of Other Base Flood Data (In A and V Zones), the following provisions are required:</p>
<p><u>SB COMMENTS: SUBSECTION (2) IS NOT IN CURRENT CODE FOR RESIDENTIAL STRUCTURES</u></p>	<p>5.2-1 <u>Residential Construction</u></p> <ol style="list-style-type: none"> (1) New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to a minimum of one foot above the base flood elevation. (2) Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must be either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: <ol style="list-style-type: none"> (i) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. (ii) The bottom of all openings shall be no higher than one foot above grade. (iii) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

	<p>5.2-2 <u>Nonresidential Construction</u></p> <p>(1) Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;</p> <p>(2) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;</p> <p>(3) Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 4.3-3(2);</p> <p>(4) Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in 5.2-1(2);</p> <p>(5) Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building floodproofed to the base flood level will be rated as one foot below.</p>
	<p>(6) Applicants shall supply a Maintenance Plan for the entire structure to include but not limited to: exterior envelope of structure; all penetrations to the exterior of the structure; all shields, gates, barriers, or components designed to provide floodproofing protection to the structure; all seals or gaskets for shields, gates, barriers, or components; and, the location of all shields, gates, barriers, and components as well as all associated hardware, and any materials or specialized tools necessary to seal the structure.</p> <p>(7) Applicants shall supply an Emergency Action Plan (EAP) for the installation and sealing of the structure prior to a flooding event that clearly identifies what triggers the EAP and who is responsible for enacting the EAP.</p>

	<p>5.2-3 <u>Manufactured Dwellings</u></p> <ul style="list-style-type: none"> (1) Manufactured dwellings supported on solid foundation walls shall be constructed with flood openings that comply with 5.1-1(2) above; (2) The bottom of the longitudinal chassis frame beam in A zones, shall be at or above BFE; (3) The manufactured dwelling shall be anchored to prevent flotation, collapse, and lateral movement during the base flood. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques), and; (4) Electrical crossover connections shall be a minimum of 12 inches above BFE.
	<p>5.2-4 <u>Recreational Vehicles</u></p> <p>Recreational vehicles placed on sites are required to:</p> <ul style="list-style-type: none"> (1) Be on the site for fewer than 180 consecutive days, and (2) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or (3) Meet the requirements of 5.2-3 above and the elevation and anchoring requirements for manufactured homes.

5.2-5 Small Accessory Structures

Relief from elevation or floodproofing as required in 5.2-1 or 5-2-2 above may be granted for small accessory structures that are:

- (1) Less than 200 square feet and do not exceed one story;
- (2) Not temperature controlled;
- (3) Not used for human habitation and are used solely for parking of vehicles or storage of items having low damage potential when submerged;
- (4) Not used to store toxic material, oil or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality shall unless confined in a tank installed in compliance with this ordinance or stored at least one foot above Base Flood Elevation
- (5) Located and constructed to have low damage potential;
- (6) Constructed with materials resistant to flood damage;
- (7) Anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the base flood;
- (8) Constructed to equalize hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater. Designs for complying with this requirement must be certified by a licensed professional engineer or architect or
 - (i) provide a minimum of two openings with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;
 - (ii) the bottom of all openings shall be no higher than one foot above the higher of the exterior or interior grade or floor immediately below the opening;
 - (iii) openings may be equipped with screens, louvers, valves or other coverings or devices provided they permit the automatic flow of floodwater in both directions without manual intervention.
- (9) Have electrical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.

5.2-6 Below-grade crawl spaces

Below-grade crawlspaces are allowed subject to the following standards as found in FEMA Technical Bulletin 11-01, *Crawlspace Construction for Buildings Located in Special Flood Hazard Areas*:

- (1) The building must be designed and adequately anchored to resist flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy. Hydrostatic loads and the effects of buoyancy can usually be addressed through the required openings stated in Section B below. Because of hydrodynamic loads, crawlspace construction is not allowed in areas with flood velocities greater than five (5) feet per second unless the design is reviewed by a qualified design professional, such as a registered architect or professional engineer. Other types of foundations are recommended for these areas.
- (2) The crawlspace is an enclosed area below the base flood elevation (BFE) and, as such, must have openings that equalize hydrostatic pressures by allowing the automatic entry and exit of floodwaters. The bottom of each flood vent opening can be no more than one (1) foot above the lowest adjacent exterior grade.
- (3) Portions of the building below the BFE must be constructed with materials resistant to flood damage. This includes not only the foundation walls of the crawlspace used to elevate the building, but also any joists, insulation, or other materials that extend below the BFE. The recommended construction practice is to elevate the bottom of joists and all insulation above BFE.
- (4) Any building utility systems within the crawlspace must be elevated above BFE or designed so that floodwaters cannot enter or accumulate within the system components during flood conditions. Ductwork, in particular, must either be placed above the BFE or sealed from floodwaters.
- (5) The interior grade of a crawlspace below the BFE must not be more than two (2) feet below the lowest adjacent exterior grade.
- (6) The height of the below-grade crawlspace, measured from the interior grade of the crawlspace to the top of the crawlspace foundation wall must not exceed four (4) feet at any point. The height limitation is the maximum allowable unsupported wall height according to the engineering analyses and building code requirements for flood hazard areas.

- (7) There must be an adequate drainage system that removes floodwaters from the interior area of the crawlspace. The enclosed area should be drained within a reasonable time after a flood event. The type of drainage system will vary because of the site gradient and other drainage

<p><u>SB</u> <u>COMMENTS:</u> <u>NOT IN</u> <u>CURRENT</u> <u>CODE</u></p>	<p>5.3 BEFORE REGULATORY FLOODWAY</p> <p>(1) In areas where a regulatory floodway has not been designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.</p> <p>(2) Applicants of proposed projects that increase the Base Flood Elevation more than one foot shall obtain from FEMA a Conditional Letter of Map Revision (CLOMR) before the project may be permitted. As soon as possible, but no later than 6 months after project completion, an application for a Letter of Map Revision (LOMR) shall be submitted by the applicant to FEMA. The applicant is responsible for paying any costs associated with the CLOMR and LOMR process.</p>
	<p>5.4 FLOODWAYS</p> <p>Located within areas of special flood hazard established in Section 3.2 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply:</p> <p>(1) Except as provided in paragraph (3), prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.</p> <p>(2) If Section 5.4(1) is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Section 5.0, PROVISIONS FOR FLOOD HAZARD REDUCTION.</p>

	<p>(3) Projects for stream habitat restoration may be permitted in the floodway provided:</p> <p>(i) The project qualifies for a Department of the Army, Portland District <i>Regional General Permit for Stream Habitat Restoration</i> (NWP-2007-1023); and,</p> <p>(ii) A qualified professional (a Registered Professional Engineer; or staff of NRCS; the county; or fisheries, natural resources, or water resources agencies) has provided a feasibility analysis and certification that the project was designed to keep any rise in 100-year flood levels as close to zero as practically possible given the goals of the project; and,</p> <p>(iii) No structures would be impacted by a potential rise in flood elevation; and,</p> <p>(iv) An agreement to monitor the project, correct problems, and ensure that flood carrying capacity remains unchanged is included as part of the local approval.</p>
	<p>(4) Temporary structures placed in the floodway: Relief from no-rise evaluation, elevation or dry flood-proofing standards may be granted for a non-residential structure placed during the dry season (June – October) and for a period of less than 90 days. A plan for the removal of the temporary structure after the dry season or when a flood event threatens shall be provided. The plan shall include disconnecting and protecting from water infiltration and damage all utilities servicing the temporary structure.</p>
	<p>(5) Temporary storage of goods and materials, not including hazardous materials, is allowed in the floodway for a period of less than 90 days within the dry season (June – October).</p>
<p>SB COMMENTS: NOT IN CURRENT CODE</p>	<p>5.5 STANDARDS FOR SHALLOW FLOODING AREAS (AO ZONES) Shallow flooding areas appear on FIRMs as AO zones with depth designations. The base flood depths in these zones range from 1 to 3 feet above ground where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas, the following provisions apply:</p>

	<p>(1) New construction and substantial improvements of residential structures and manufactured homes within AO zones shall have the lowest floor (including basement) elevated above the highest grade adjacent to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet if no depth number is specified).</p>
	<p>(2) New construction and substantial improvements of nonresidential structures within AO zones shall either:</p> <ul style="list-style-type: none"> (i) Have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, one foot or more above the depth number specified on the FIRM (at least two feet if no depth number is specified); or (ii) Together with attendant utility and sanitary facilities, be completely flood proofed to or above that level so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect as in section 5.2-2(3).
	<p>(3) Require adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.</p>
	<p>(4) Recreational vehicles placed on sites within AO Zones on the community's FIRM either:</p> <ul style="list-style-type: none"> (i) Be on the site for fewer than 180 consecutive days, and (ii) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or (iii) Meet the requirements of 5.5 above and the elevation and anchoring requirements for manufactured homes.

	<p>5.6 COASTAL HIGH HAZARD AREAS Located within areas of special flood hazard established in Section 3.2 are Coastal High Hazard Areas, designated as Zones V1-V30, VE and/or V. These areas have special flood hazards associated with high velocity waters from surges and, therefore, in addition to meeting all provisions in this ordinance the following provisions shall also apply:</p>
	<p>(1) All new construction and substantial improvements in Zones V1-V30 and VE (V if base flood elevation data is available) shall be elevated on pilings and columns so that:</p> <ul style="list-style-type: none"> (i) The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated a minimum of one foot above the base flood level; and (ii) The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Wind and water loading values shall each have a one percent chance of being equaled or exceeded in and given year (100-year mean recurrence interval);
	<p>(2) A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of (i) and (ii) of this Section.</p>
	<p>(3) Obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures in Zones V1-30, VE, and V, and whether or not such structures contain a basement. The local administrator shall maintain a record of all such information.</p>
	<p>(4) All new construction shall be located landward of the reach of mean high tide.</p>

	<p>(5) Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purpose of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:</p> <ul style="list-style-type: none"> (i) Breakaway wall collapse shall result from water load less than that which would occur during the base flood; and (ii) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).
	<p>(6) If breakaway walls are utilized, such enclosed space shall be useable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.</p>
	<p>(7) Prohibit the use of fill for structural support of buildings.</p>
	<p>(8) Prohibit man-made alteration of sand dunes which would increase potential flood damage.</p>
	<p>(9) All manufactured homes to be replaced or substantially improved within Zones V1-V30, V, and VE on the community's FIRM shall meet the standards of paragraphs 5.6(1) through (8) of this section.</p>

	<p>(10) Recreational vehicles placed on sites within Zones V1-30, V, and VE on the community's FIRM either:</p> <ul style="list-style-type: none"> (i) Be on the site for fewer than 180 consecutive days, (ii) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or (iii) Meet the requirements of Section 4.1-1(Permitting requirements) and paragraphs 5.6(1) through (8) of this section.
	<p>5.7 CRITICAL FACILITY</p> <p>Construction of new critical facilities shall be, to the extent possible, located outside the limits of the Special Flood Hazard Area (SFHA) (100-year floodplain). Construction of new critical facilities shall be permissible within the SFHA if no feasible alternative site is available. Critical facilities constructed within the SFHA shall have the lowest floor elevated three feet above BFE or to the height of the 500-year flood, whichever is higher. Access to and from the critical facility should also be protected to the height utilized above. Floodproofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters. Access routes elevated to or above the level of the base flood elevation shall be provided to all critical facilities to the extent possible.</p>

ORDINANCE NO. 1397-16

AN ORDINANCE RELATING TO THE FLOODPLAIN DISTRICT AND AMENDING TUALATIN DEVELOPMENT CODE CHAPTER 70 TO ADOPT FEDERAL EMERGENCY MANAGEMENT AGENCY REQUIREMENTS FOR DEVELOPMENT OF THE FLOODPLAIN

WHEREAS, in order to receive flood insurance through the Federal Emergency Management Agency (FEMA), the City is required to adopt current FEMA requirements with respect to development within the floodplain; and

WHEREAS, the Community Development Director initiated Plan Text Amendment PTA16-0001; and

WHEREAS, the City provided notice of PTA16-0001 to the Oregon Department of Land Conservation and Development, as provided by ORS 197.610; and

WHEREAS, the City provided notice of the public hearing to all property owners in compliance with ORS 227.186 (Ballot Measure 56); and

WHEREAS, notice of public hearing of PTA16-0001 was given as required by Tualatin Development Code (TDC) 1.031; and

WHEREAS, Council approved PTA16-0001 after a public hearing was held where Council heard and considered the testimony and evidence presented by City staff, and those appearing at the public hearing.

THE CITY OF TUALATIN ORDAINS AS FOLLOWS:

Section 1. TDC 70.050 is amended to read as follows:

The City of Tualatin adopts the maps entitled "Flood Insurance Rate Map, Washington County, Oregon and Incorporated Areas," effective date November 4, 2016 together with the "Flood Insurance Study for Washington County Oregon and Incorporated Areas," dated November 4, 2016. The Flood Boundary and Floodway Maps, as provided for in the regulations of the Federal Emergency Management Agency (FEMA) (44 CFR part 59-60) are adopted by reference as establishing the floodplain, floodway, and drainage hazard areas of the City of Tualatin. Where the maps are not available or where the City Engineer determines more accurate information is available, the City Engineer may use any base flood elevation and floodway data available from a federal or state source, or from a licensed professional engineer, to determine the boundaries of the floodplain, floodway, and drainage hazard areas of the City of Tualatin, as provided in TDC 70.140.

~~The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for the City of Tualatin," dated February 19, 1987, with accompanying Flood Insurance Maps is hereby adopted by reference and declared to be a part of this chapter. The Flood Insurance Study is on file at the City Center, 18880 SW Martinazzi Avenue, Tualatin, Oregon 97062.~~

Section 2. TDC 70.135 is added to the Tualatin Development Code as follows:

TDC 70.135 Provide Base Flood Elevation and Freeboard to Building Official.

The City Engineer will provide the base flood elevation information to the Building Official along with any freeboard requirements in order to administer the Building Codes.

Section 3. TDC 70.180 is amended to read as follows:

Section 70.180 Specific Standards.

In all areas of special flood hazards where base flood elevation data has been provided as set forth in TDC 70.050, "BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD," or TDC 70.140(2), "USE OF OTHER BASE FLOOD DATA," the following provisions are required:

(1) Residential Construction.

(a) New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated at least one foot above the base flood elevation.

(b) New public streets providing vehicle access to residences, including residences within mixed use developments, shall be constructed at or above the base flood elevation. Public street rights-of-way in existence as of January 14, 1993, shall not be subject to this requirement.

(c) Below grade crawl-space construction in the floodplain shall comply with all NFIP specifications and applicable Building Code Requirements.

(d) Elevated structures that are not floodproofed, but that have fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

(i) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

(ii) The bottom of all openings shall be no higher than one foot above grade.

(iii) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of flood waters.

(2) Nonresidential Construction.

New construction and substantial improvement of any commercial, industrial or other

nonresidential structure shall either have the lowest floor, including basement, elevated at least one foot above the base flood elevation; or, together with attendant utility and sanitary facilities, shall:

(a) Be floodproofed so that below the base flood level the structure is watertight, with walls substantially impermeable to the passage of water.

(b) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

(c) Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and review of the structural design, specifications and plans. Such certification shall be provided to the official as set forth in TDC 70.140(3)(b).

(d) **Elevated structures that are not floodproofed, but that have** fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

(i) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

(ii) The bottom of all openings shall be no higher than one foot above grade.

(iii) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of flood waters.

(e) Applicants flood proofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the flood proofed level (e.g. a building constructed to the base flood level will be rated as one foot below that level).

(3) **Manufactured Dwellings.** Manufactured dwellings placed or substantially improved within Zones A1-30, AH, and AE shall be on a permanent foundation and shall have the lowest floor, including basement, elevated at least one foot above the base flood elevation and shall be securely anchored to a foundation system in accordance with TDC 70.170(1)(b).

(4) **Recreational Vehicles.** **Recreational vehicles placed on sites are required to:**

(a) Be on the site for fewer than 180 consecutive days, and

(b) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or

(c) Recreational vehicles that are permanently placed or substantially improved within Zones A1-30, AH, and AE shall be on a permanent foundation and shall have the lowest floor, including basement, elevated at least one foot above the base flood elevation and shall

be securely anchored to a foundation system in accordance with TDC 70.170(1)(b).

Section 4. TDC 70.200 is added to the Tualatin Development Code as follows:

TDC 70.200 Alterations to Floodplain, Drainage, or Watercourses

(1) Applicants proposing to increase the Base Flood Elevation by more than one foot or alter a watercourse must obtain a Conditional Letter of Map Revision (CLOMR) from FEMA before any encroachment, including fill, new constructions, substantial improvement, or other development, in the regulatory floodway is permitted.

(2) Within six months of project completion, an applicant for a Letter of Map Revision (LOMR) must submit a completed application to FEMA and submit evidence to the City that a Letter of Map Revision (LOMR) has been requested that reflects the as-built changes to the Flood Insurance Study (FIS) and/or Flood Insurance Rate Map (FIRM).

(3) The applicant must prepare and submit technical data to support the Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR) application and pay any processing or application fees to FEMA.

Section 5. The Council adopts as its findings the *Analysis and Findings* set forth in Exhibit 1, which is attached and incorporated by reference.

Section 6. Severability. Each section of this ordinance, and any part thereof, is severable. If any part of this ordinance is held invalid by a court of competent jurisdiction, the remainder of this ordinance remains in full force and effect.

Section 7. Emergency Clause. This ordinance is necessary of the immediate protection of the public peace, health, safety and welfare and takes effect on November 6, 2016.

ADOPTED this ____ day of _____, 2016.

CITY OF TUALATIN OREGON

BY _____
Mayor

APPROVED AS TO LEGAL FORM

ATTEST

BY _____
City Attorney

BY _____
City Recorder

PTA16-0001: ANALYSIS AND FINDINGS

FLOODPLAIN ORDINANCE UPDATE 2016

Plan Text Amendment 16-0001 (PTA16-0001) amends the Tualatin Development Code to adopt Federal Emergency Management Agency (FEMA) Requirements for Development in the Floodplain. The purpose of these amendments is to facilitate local implementation of the National Flood Insurance Program requirements and to adopt the best available geographic data defining locations that are at a high risk of flooding.

Amendments are proposed to the following chapter and section:

Chapter 70 Flood Plain District

Background

The National Flood Insurance Program (NFIP) is a federal program created in 1968 through passage of the National Insurance Act and administered by the Federal Emergency Management Agency (FEMA). The program allows owners of property in a 100-year floodplain to obtain federally-backed flood insurance for their property in jurisdictions that have adopted land use ordinances to regulate floodplain development.

The Flood Insurance Rate Map (FIRM) is an official map on which FEMA has delineated both the Special Flood Hazard Area (SFHA) and other flood zones within a community. The SFHA is the area where floodplain management regulations of the NFIP must be enforced and where the mandatory purchase of flood insurance applies. The FIRM also notes the Base Flood Elevations (BFEs) for maps areas. BFEs inform both insurance rates and aid in identifying where flood plain development can occur.

On May 4, 2016 the City received a letter from FEMA which requires the City “to adopt or show” prior to November 4, 2016 “evidence of adoption of floodplain management regulations that meet [certain] standards” (Exhibit 1). This requirement is a condition of continued eligibility in the National Flood Insurance Program (NFIP). The letter provides pertinent background information as follows:

“On February 19, 1987, the Department of Homeland Security’s FEMA issued a FIRM that identified the SFHAs, the areas subject to inundation by the base (1-percent-annual-chance) flood in [our] community. [The City of Tualatin adopted the Study and FIRMs into the Development Code in 1998.] FEMA has recently completed a re-evaluation of flood hazards in [our] community. On September 28, 2007 FEMA provided [the City] with Preliminary copies (and Revised Preliminary copies on December 4, 2009) of the FIRM and Flood Insurance Study report that

identify existing flood hazards in Tualatin, including Base Flood Elevations (BFEs). The proposed BFEs for Tualatin were published in *The Times* on October 25, 2012 and November 1, 2012 and in the *Federal Register*, at part 67, Volume 77, Pages 21516 through 21521, on April 10, 2012.

The statutory 90-day appeal period, which was initiated on the second newspaper publication date cited above, has ended. FEMA did not receive any appeals of the proposed BFEs during that time. Accordingly, the BFEs for Tualatin are considered final. The final rule for BFEs will be published in the *Federal Register* as soon as possible. The FIRM for Tualatin will become effective on November 4, 2016.

It must be emphasized that all the standards specified in Paragraph 60.3(d) of the NFIP regulations must be enacted in a legally enforceable document. This includes adoption of the current effect FIRM and FIS report to which the regulations apply and other modifications made by this map revision. Some of the standards should already have been enacted by your community in order to establish initial eligibility in the NFIP. Your community can meet any additional requirements by taking one of the following actions:

1. Amending existing regulations to incorporate any additional requirements of Paragraph 60.3(d);
2. Adopting all the standards of paragraph 60.3(d) into one new, comprehensive set of regulations; or
3. Showing evidence that regulations have previously been adopted that meet or exceed the minimum requirements of Paragraph 60.(d)

Communities that fail to enact the necessary floodplain management regulations will be suspended from participation in the NFIP and subject to the prohibitions contained in Section 202(a) of the Flood Disaster Protection Act of 1973 (Public Law 93-234) as amended.

In addition to your community using the FIRM and FIS report to manage development in the floodplain, FEMA will use the FIRM and FIS report to establish appropriate flood insurance rates. On the effective date of the revised FIRM, actuarial rates for flood insurance will be charged for all new structures and substantial improvements to existing structures located in the identified SFHAs. These rates may be higher if structures are not built in compliance with the floodplain management standards of the NFIP. The actuarial flood insurance rates increase as the lowest elevations (including basement) of new structures decrease in relation to the BFEs established for your community. This is an important consideration for new construction because building at a higher elevation can greatly reduce the cost of flood insurance.”

The City of Tualatin proposes legislative amendments to the Tualatin Development Code (TDC) to amend existing regulations to incorporate any additional requirements of Paragraph

60.3(d) of the National Flood Insurance Program regulations. Amendments are proposed to Chapter 70 Flood Plain District of the Tualatin Development Code.

The Analysis and Findings presented here pertain only to the Plan Text Amendment proposed to amend language in the Tualatin Development Code.

Plan Amendment Criteria (TDC Section 1.032)

The approval criteria of the Tualatin Development Code (TDC), Section 1.032, must be met if the proposed PTA is to be granted. The plan amendment criteria are addressed below.

1. Granting the amendment is in the public interest.

Finding: Floodplain boundaries do not stay constant but rather undergo change over time due to the effects of erosion, development impacts such as increased run off, vegetation removal that can affect flood water retention and release, changes in weather patterns and other factors. To account for flood plain boundary changes, FEMA periodically adjusts the 100-year floodplain maps used by local jurisdictions. The City does not conduct flood plain inventories but relies on FEMA for the determination of the 100-year floodplain boundary. Mortgage lenders will typically notify homeowners whose property is in the flood plain that they are required to carry flood insurance. Homeowners without a mortgage are not required by law to obtain flood insurance but will not be covered for any property damage caused by flooding.

FEMA periodically amends the regulatory requirements of the NFIP through updates to the local FIRM and a corresponding Flood Insurance Study Report. Prior to amending the FIRM and/or developing new or revised flood plain requirements as part of the NFIP updates, FEMA coordinates with local jurisdictions (known as “discovery” process) to determine local flood area conditions, including areas of flood risk and potential mitigation for development.

As stated in the May 4, 2016 letter from FEMA, the City is required to update its floodplain management regulations to meet standards set out in the NFIP as a condition of continued eligibility in the National Flood Insurance Program (NFIP). Communities that fail to enact the necessary floodplain management regulations will be suspended from participation in the NFIP and subject to the prohibitions contained in Section 202(a) of the Flood Disaster Protection Act of 1973 (Public Law 93-234) as amended.

The floodplain affects a large portion of the City of Tualatin (755 acres AND 556 Parcels) with residential and employment uses. If the City does not adopt these amendments prior to November 4, 2016, private property owners are not eligible for flood insurance which could endanger a mortgage if the lender requires flood insurance as a term of the loan. Therefore, it is in the public interest to adopt these amendments at this time.

Granting the amendment is in the public interest.

Criterion “1” is met.

2. The public interest is best protected by granting the amendment at this time.

FINDING: According to the May 4, 2016 letter from FEMA the City of Tualatin is required to adopt floodplain management regulations that meet the standards of Paragraph 60.3(d) by the effective date of the FIRM which is November 4, 2016, as a condition of continued eligibility in the National Flood Insurance Program.

Granting the amendment at this time best protects the public interest.

Criterion “2” is met.

3. The proposed amendment is in conformity with the applicable objectives of the Tualatin Community Plan.

The applicable objectives of the Tualatin Community Plan are discussed below:

**Chapter 3 Technical Memoranda
Section 3.030 Natural Resources**

(1) Geology

(c) Tualatin River. The Tualatin River originates on the eastern slope of the Coast Range. The watershed averages 40 miles long and 25 miles wide, draining 711 square miles before entering the Willamette River. About ½ of the watershed is in the valley, where the stream is flat with wide flood plains.

(3) Wildlife...

(c) Tualatin River. The Tualatin River and its floodplain from the western boundary of the Study Area to just past its junction with Fanno Creek has been identified as a wetland and marsh area. The River itself is an important fish migration route. The river and its associated vegetation are important natural habitats.

Section 3.040 Natural Hazards

(1) Flooding. The last 3 miles of the Tualatin River, about 5 ½ miles downstream from the City of Tualatin, consists of a narrow gorge with a vertical drop of nearly 40 feet. Natural reefs occurring upstream limit the River’s ability to pass flood flows. The reefs create a natural dam, forcing water to back up and flood into the Tualatin Valley.

- a. Season. Flooding usually occurs between mid-November and mid-February, due to rainfall and snow melt. Unlike most Oregon streams, the wide, flat flood plains of the Tualatin Valley store large volumes of water that cause the River to peak slowly and remain above flood stage for several days.
- b. Area. The core of the City of Tualatin is highly vulnerable to flooding of the Tualatin River. A 100-year frequency flood would cause extensive flooding in the City of Tualatin. It would also flood a large area west and east of the City's downtown and a large area in the northwest portion of the Study Area.
- c. Existing flood control. Present flood control projects on the Willamette River do not appreciably affect flood conditions of the City of Tualatin. Upstream flood control measure on the Tualatin River will provide only limited benefits to the Tualatin Valley, as key physical constraints occur at the natural reefs downstream.

Chapter 4 Community Growth

Section 4.050 General Growth Objectives.

(11) Coordinate development plans with regional, state, and federal agencies to assure consistency with statutes, rules, and standards concerning air, noise, water quality, and solid waste. Cooperate with the U.S. Fish and Wildlife Service to minimize adverse impacts to the Tualatin River National Wildlife Refuge from development in adjacent areas of Tualatin.

(12) Adopt measures protecting life and property from natural hazards such as flooding, high groundwater, weak foundation soils and steep slopes.

FINDING: The sections from the Tualatin Comprehensive Plan indicate that flooding from the Tualatin River could cause extensive damage. The 1996 floods in Tualatin did cause damage to private and public structures. Adopting the amendment to the Chapter 70 Flood Plain adopts new Base Flood Elevations which are the regulatory benchmark for development in a flood plain. Local jurisdictions are required to adopt new floodplain regulations or amend existing floodplain regulations to incorporate the updated information into their local documents. Adopting updated FEMA requirements will enable local communities (and private property owners) to participating in the National Flood Insurance Program.

The proposed amendment is in conformity with the applicable objectives of the Tualatin Community Plan.

Criterion "3" is met.

4. The following factors were consciously considered:

The various characteristics of the areas in the City.

FINDING: The amendments are intended to implement, through the City's Development Code Chapter 70 Flood Plain, regulations on development in areas of the city that FEMA has deemed to be at high risk of inundation under the 100-year flood. Approximately 556 tax lots contain some 755 acres in the 100-year floodplain. The Floodplain requirements would be applied to all new structures and substantial improvements in said high-risk areas.

The suitability of the area for particular land uses and improvements.

Not applicable

Trends in land improvement and development.

FINDING: Tualatin Development Code Chapter 70 regulates development in the floodplain. Adjustments to the FIRM map will not alter how development in the flood plain is currently reviewed and processed.

Property Values.

FINDING: Property values could be affected by the owner's ability to obtain flood insurance. Mortgage lenders will typically notify homeowners whose property is in the floodplain that they are required to carry flood insurance. Homeowners without a mortgage are not required by law to obtain flood insurance but will not be covered for any property damage caused by flooding. Property owners can apply for flood insurance if their local jurisdiction participates in the National Flood Insurance Program and in order to continue Tualatin's participation the City must adopt new the Flood Insurance Rate Maps and Flood Insurance Study.

The needs of economic enterprises and the future development of the area.

FINDING: The 100-year floodplain covers some residential land but most of it covers employment land in industrial and commercial Planning Districts. New buildings or substantial improvements in these areas, which could lead to increased economic activity, will be affected by actuarial rates for flood insurance.

Needed right-of-way and access for and to particular sites in the area.

Not applicable.

Natural resources of the City and the protection and conservation of said resources.

Not applicable.

Prospective requirements for the development of natural resources in the City.

Not applicable.

And the public need for healthful, safe, aesthetic surroundings and conditions.

FINDING: The National Flood Insurance Program allows owners of property in a 100-year flood plain to obtain federally-backed flood insurance for their property in jurisdictions that have adopted land use ordinances to regulate flood plain development. This opportunity provides assurance to property owners that if a flood causes damages the property can be restored.

Proof of change in a neighborhood or area.

FINDING: The City does not assert proof of change in a neighborhood or area.

Mistake in the Plan Text or Plan Map.

FINDING: There is no mistake in the Plan Text or Plan Map.

The above factors were consciously considered.

Criterion “4” is met.

5. The criteria in the Tigard-Tualatin School District Facility Plan for school facility capacity have been considered when evaluating applications for a comprehensive plan amendment or for a residential land use regulation amendment.

Because the PTA does not result in a change to plans or development regulations that would impact school facility capacity, Criterion “5” is not applicable.

6. Granting the amendment is consistent with the applicable State of Oregon Planning Goals and applicable Oregon Administrative Rules.

Of the 19 statewide planning goals, staff determined three goals are applicable.

Goal 1, “Citizen Involvement,” states, “To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.”

FINDING: This goal will be met by complying with Tualatin Development Code 1.031

Notice Requirements for Plan Amendments. A notice was published in the Tualatin Times 10 City business days prior to the public hearing. Notices were posted in two conspicuous places within the City. And a measure 56 notice was mailed to all property owners within the floodplain.

The Tualatin Planning Commission held a public meeting on September 15, 2016. This public meeting gave citizens and members of the public an opportunity to comment on the proposed text and the Planning Commission considered these comments when making a recommendation to the City Council. A public hearing before the City Council will occur tonight (October 10, 2016), during which the public can give input on the proposed amendment. All work session agendas and minutes are available to the public through the City website.

This Goal is satisfied.

Goal 2, “Land Use Planning”, states, “To establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions.”

The Department of Land Conservation and Development (DLCD) has acknowledged the City’s Comprehensive Plan as being consistent with the statewide planning goals. The Development Code implements the Community Plan and both pieces combine to make the Comprehensive Plan. The Community Plan establishes a process and standards to review changes to the Tualatin Development Code in compliance with the Community Plan and other applicable state requirements. As discussed above under Criteria “3”, the applicable Community Plan standards have been applied to the proposed amendment.

This Goal is satisfied

Goal 7, “Areas Subject To Natural Hazards” Implementation Measure #4, reads as follows: Local governments will be deemed to comply with Goal 7 for coastal and riverine flood hazards by adopting and implementing local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements.

FINDING: The proposed amendments are designed to adopt and implement local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements. This requirement will be met.

Ballot Measure 56 Notice to property owners of hearing on certain zone change; form of notice; exceptions; reimbursement of cost. (ORS 227.186)

Section (3) Except as provided in subsection (6) of this section, at least 20 days but not more than 40 days before the date of the first hearing on an ordinance that proposes to amend an existing comprehensive plan or any element thereof, or to adopt a new com-

prehensive plan, a city shall cause a written individual notice of a land use change to be mailed to each owner whose property would have to be rezoned in order to comply with the amended or new comprehensive plan if the ordinance becomes effective.

Section (4) At least 20 days but not more than 40 days before the date of the first hearing on an ordinance that proposes to rezone property, a city shall cause a written individual notice of a land use change to be mailed to the owner of each lot or parcel of property that the ordinance proposes to rezone.

- (9) For purposes of this section, property is rezoned when the city:**
- (a) Changes the base zoning classification of the property; or**
 - (b) Adopts or amends an ordinance in a manner that limits or prohibits land uses previously allowed in the affected zone.**

FINDING: Measure 56 requires local jurisdictions to notify property owners when a change to a comprehensive plan or zoning ordinance could result in a rezone of property. As stated above, ORS 227.186 (9) defines rezone as a change to the base zoning classification or a change that limits or prohibits previously allowed land uses. The proposed amendments in this application will not change the base zoning classification of any properties. The City of Tualatin does not have a zoning ordinance but instead relies on Planning Districts to implement land use. No Planning Districts are proposed to change as a result of these amendments. Additionally, the proposed amendments do not limit or prohibit currently allowed land uses.

As stated in the May 4, 2016 letter from FEMA “ On the effective date of the revised FIRM, actuarial rates for flood insurance will be charged for all new structures and substantial improvements to existing structures located in the identified SFHAs (Special Flood Hazard Areas). These rates may be higher if the structures are not built in compliance with the floodplain management standards for the NFIP.”

Based on the findings above, the City finds that the proposed amendments will not change the base zoning or limit or prohibit currently or previously allowed land uses but rather affect the type of building development in the affected area which is the Floodplain. Therefore a Measure 56 notice is not required.

The PTA complies with Goals 1, 2 and 7, and it complies with Measure 56.

Criterion “6” is met.

7. Granting the amendment is consistent with the Metropolitan Service District’s Urban Growth Management Functional Plan.

TITLE 3: WATER QUALITY AND FLOOD MANAGEMENT,

3.07.340 Performance Standards

A. Flood Management Performance Standards.

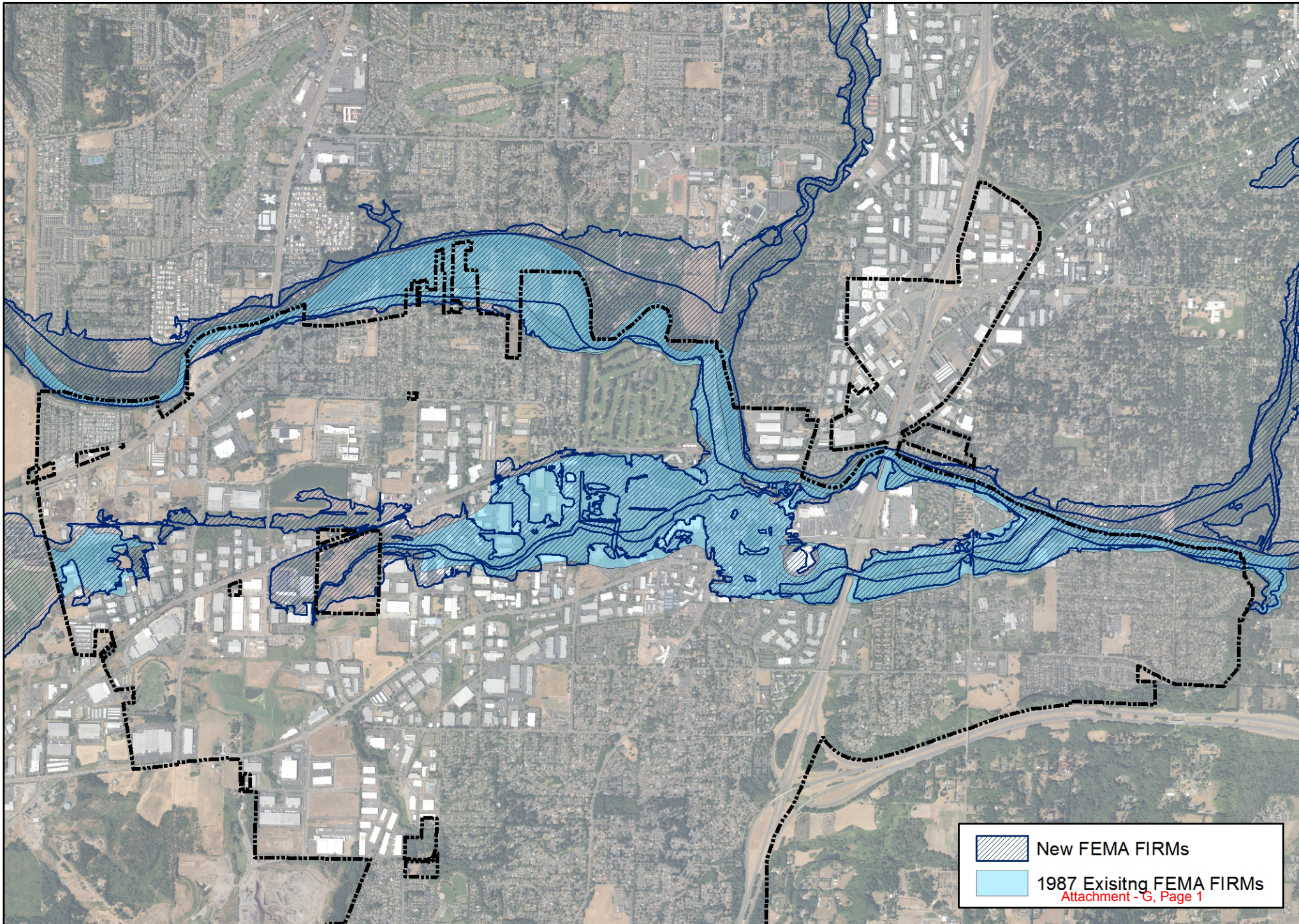
- 1. The purpose of these standards is to reduce the risk of flooding, prevent or reduce risk to human life and property, and maintain functions and values of floodplains such as allowing for the storage and conveyance of stream flows through existing and natural flood conveyance systems.**
- 2. All development, excavation and fill in the Flood Management Areas shall conform to the following performance standards:**
 - a. Development, excavation and fill shall be performed in a manner to maintain or increase flood storage and conveyance capacity and not increase design flood elevations.**
 - b. All fill placed at or below the design flood elevation in Flood Management Areas shall be balanced with at least an equal amount of soil material removal.**
 - c. Excavation shall not be counted as compensating for fill if such areas will be filled with water in non-storm winter conditions.**
 - d. Minimum finished floor elevations for new habitable structures in the Flood Management Areas shall be at least one foot above the design flood elevation.**
 - e. Temporary fills permitted during construction shall be removed.**
 - f. Uncontained areas of hazardous materials as defined by DEQ in the Flood Management Area shall be prohibited.**



FINDING: The proposed amendments include language to ensure that, in the Tualatin Development Code Chapter 70: Flood Plain, the carrying capacity of the floodplain is maintained, finished floors are one foot above the Base Flood Elevation, and uncontained areas of hazardous materials as defined by DEQ are prohibited. The proposed amendments are consistent with this goal, and this requirement is met.

8. Granting the amendment is consistent with Level of Service F for the p.m. peak hour and E for the one-half hour before and after the p.m. peak hour for the Town Center 2040 Design Type (TDC Map 9-4), and E/E for the rest of the 2040 Design Types in the City's planning area.

Because the PTA does not relate to vehicle trip generation, Criterion “8” is not applicable.

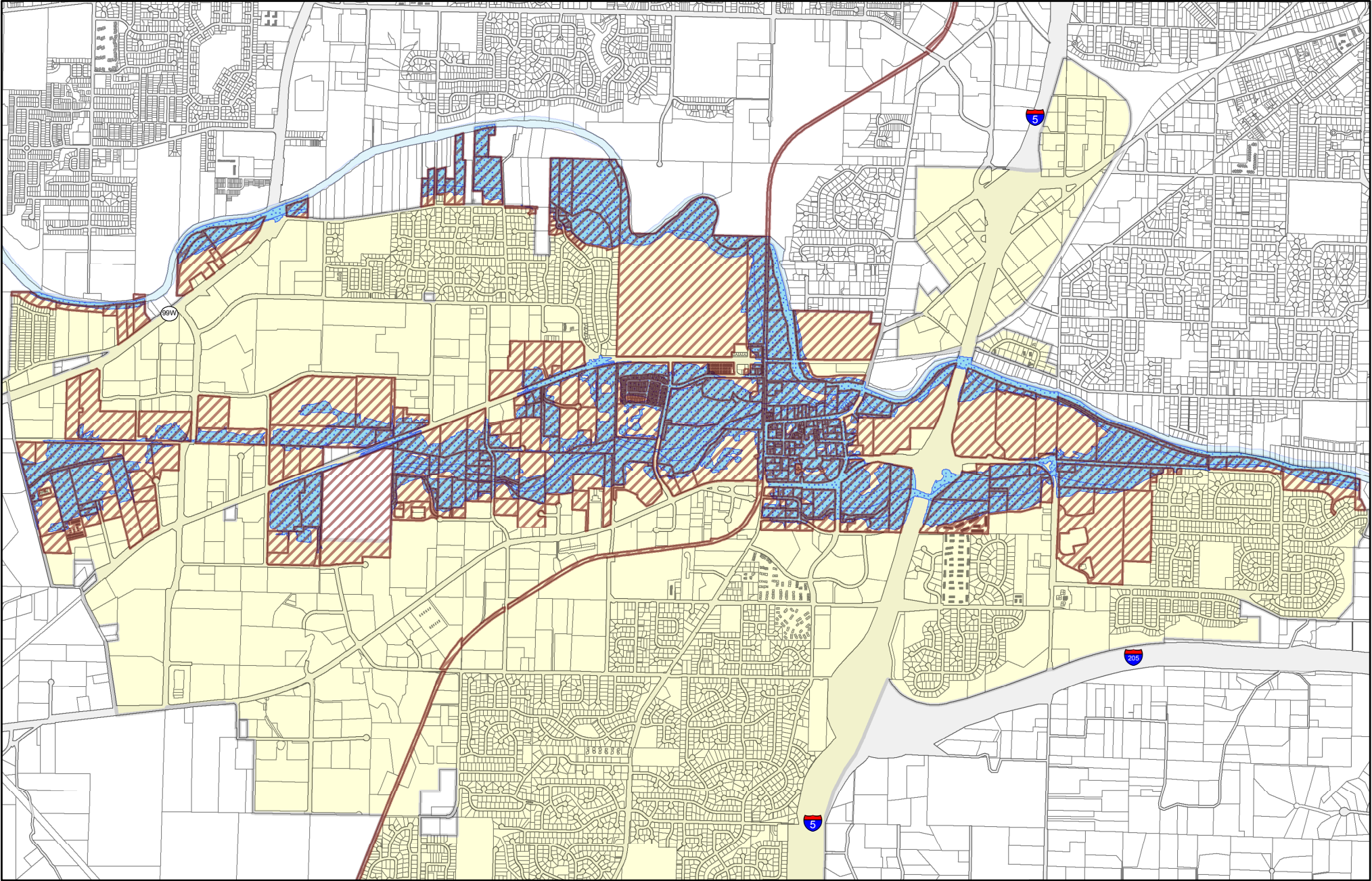
Exhibit 1- May 4, 2016 letter from FEMA



	New FEMA FIRMs
	1987 Existing FEMA FIRMs

Attachment - G, Page 1

100 Year Floodplain within Tualatin



 Taxlots in Floodplain  100 Year Floodplain



This map is derived from various digital database sources. While an attempt has been made to provide an accurate map, the City of Tualatin, OR assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is" - US Dept.

FLOOD INSURANCE STUDY



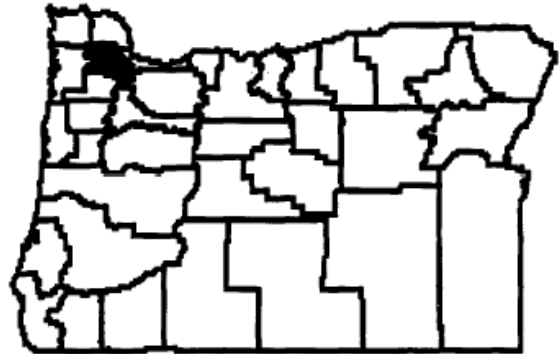
WASHINGTON COUNTY, OREGON AND INCORPORATED AREAS

VOLUME 1 OF 3

**COMMUNITY
NAME**

**COMMUNITY
NUMBER**

BANKS, CITY OF	410239
BEAVERTON, CITY OF	410240
CORNELIUS, CITY OF	410261
DURHAM, CITY OF	410263
FOREST GROVE, CITY OF	410241
GASTON, CITY OF	410242
HILLSBORO, CITY OF	410243
KING CITY, CITY OF	410269
NORTH PLAINS, CITY OF	410270
SHERWOOD, CITY OF	410273
TIGARD, CITY OF	410276
TUALATIN, CITY OF	410277
WASHINGTON COUNTY UNINCORPORATED AREAS	410238



Effective: November 4, 2016



Federal Emergency Management Agency

Flood Insurance Study Number

41067CV001A

**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 (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Selected Flood Insurance Rate Map panels for the community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

<u>Old Zone</u>	<u>New Zone</u>
A1 through A30	AE
V1 through V30	VE
B	X
C	X

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by a Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS report components.

Users should refer to Section 10.0, Revisions Descriptions. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this FIS report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Effective Date: November 4, 2016

Revised FIS Report Dates:

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PUBLISHED SEPARATELY

Flood Insurance Rate Map Index

Flood Insurance Rate Map

**FLOOD INSURANCE STUDY
WASHINGTON COUNTY, OREGON AND INCORPORATED AREAS**

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Washington County, including the Cities of Banks, Beaverton, Cornelius, Durham, Forest Grove, Gaston, Hillsboro, King City, North Plains, Sherwood, Tigard, and Tualatin; and the unincorporated areas of Washington County (referred to collectively herein as Washington 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 to 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.

Please note that the Cities of Rivergrove, Tualatin, and Wilsonville are geographically located in Washington and Clackamas Counties. The City of Tualatin is included in its entirety in this FIS report. The flood-hazard information for the Cities of Rivergrove and Wilsonville are mapped entirely within Clackamas County. See the separately published FIS report and Flood Insurance Rate Map (FIRM) for Clackamas County, OR and Incorporated Areas.

Please note that the Cities of Lake Oswego and Portland are geographically located in Multnomah, Clackamas, and Washington Counties. The flood-hazard information for the City of Lake Oswego is mapped entirely within Clackamas County. The flood-hazard information for the City of Portland is mapped independently. See the separately published FIS reports and FIRMs for Clackamas County, OR and Incorporated Areas, and the City of Portland, OR.

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 FIS report 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 the U.S. Army Corps of Engineers (USACE), Portland District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement Nos. H-7-76 and H-10-77. This work, which was completed in November 1980, covered all significant flooding sources affecting Washington County.

The Unincorporated study was revised on March 18, 1987, to incorporate existing conditions on overbank areas adjacent to Cedar Mill Creek between Southeast Murray Boulevard and Southwest Jenkins Road (Cross Sections H and J). The width of the floodway for this reach was narrowed by 64 feet at Cross Section H and by 6 feet at Cross Section I. In addition, the corporate limits of the county were revised on the FIRMs and Flood Boundary and Floodway Map (FBFMs) to indicate areas annexed by the City of Beaverton. These annexations placed a reach of Willow Creek just south of Interstate Highway 26 within the City of Beaverton.

The final coordination meeting for the original study for the Tualatin River was held on February 1, 1981, and was attended by representatives of FEMA, the Study Contractor, and the Washington County Departments of Public Works and Planning. No requests for changes were made at that time. A coordination meeting, attended by representatives of the USACE, Portland District, and FEMA, was held on July 20, 1984. This meeting resulted in the reanalysis of the Tualatin River and Nyberg Slough.

In 2005 a restudy was done to incorporate new floodplain data for Ash Creek, Fanno Creek, and Summer Creek, and to incorporate the channel improvement project within the reach of the Tualatin River. The hydrologic and hydraulic analyses for the Ash Creek, Fanno Creek, and Summer Creek restudy were performed by Pacific Water Resources Inc., for Clean Water Services (formerly Unified Sewerage Agency) of Washington County and submitted to FEMA under the Cooperating Technical Partners program. This restudy was completed on June 30, 2000. This revision was requested by Washington County because of the effects of the largest flood since 1980, which occurred along Fanno Creek in February 1996. The February 1996 flood had an estimated recurrence interval of approximately 25 years.

1.3 Coordination

Consultation Coordination Officer’s (CCO) meetings may be held for each jurisdiction in this countywide FIS. An initial CCO meeting is held typically with representatives of FEMA, the community, the state, and the study contractor to explain the nature and purpose of a FIS and to identify the streams to be studied by detailed methods. A final CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to review the results of the study. All problems raised at these meetings have been addressed in this study.

The dates of the initial and final CCO meetings held for Washington County and the incorporated communities within its boundaries are shown in Table 1, “Initial and Final CCO Meetings.”

Table 1. Initial and Final CCO Meetings

Community	Initial CCO Date	Final CCO Date
Beaverton, City of	September 10, 1976	October 29, 1982
Cornelius, City of	September 8, 1976	January 29, 1981
Durham, City of	September 10, 1976	April 18, 1980
Forest Grove, City of	September 9, 1976	April 10, 1981
Gaston, City of	September 9, 1976	July 21, 1981
Hillsboro, City of	September 8, 1976	September 12, 1980
King City, City of	September 9, 1976	February 1, 1981
North Plains, City of	October 22, 1976	April 10, 1981
Portland, City of	September 25, 1974	April 30, 1980
Rivergrove, City of	June 1977	August 21, 1986
Sherwood, City of	September 10, 1976	January 29, 1981
Tigard, City of	September 9, 1976	April 9, 1981
Tualatin, City of	September 9, 1976	February 1, 1981

The results of this revised study were reviewed at two final CCO meetings. The first CCO meeting was held on November 6, 2007, and attended by representatives of Washington County and the cities of Banks, Cornelius, Forest Grove, Hillsboro, North Plains, and by FEMA’s Region X representatives. The second meeting was held on November 7, 2007 and attended by representatives of Washington County and the cities of Beaverton, Durham, Sherwood, and Tualatin, and by FEMA’s Region X representatives. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Washington County, Oregon, including the incorporated communities listed in Section 1.1. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development.

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 the communities.

This initial countywide FIS (November 4, 2016) incorporated the determination letters issued by FEMA resulting in map changes (Letters of Map Change, or LOMCs). All Letters of Map Revision (LOMRs) incorporated into this FIS are summarized in Table 2. The Letter of Map Change (LOMC) actions for previously-issued LOMCs for Washington County are summarized in the Summary of Map Amendment (SOMA) included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the TSDN may be obtained from the Community Map Repository.

Table 2. Incorporated LOMRs

Community	LOMC Case No.	Flooding Source(s)	Date Issued	LOMC Type
Beaverton, City of	06-10-B213P	Fanno Creek	11/6/2006	LOMR
Tigard, City of	07-10-0375A	Redrock Creek	4/10/2007	LOMR-F
Hillsboro, City of	14-10-1241P	Waible Creek – South Tributary	8/15/2014	LOMR
Hillsboro, City of Washington County, Unincorporated Areas	14-10-1501P	Waible Creek, Waible Creek Tributary 1, Waible Creek Tributary 2	12/29/2014	LOMR

2.2 Community Description

Washington County is located in northwestern Oregon. It is bordered on the north by Columbia County, on the south by Yamhill and Clackamas Counties, on the west by Tillamook County, and on the east by Multnomah and Clackamas Counties. Because of its location adjacent to the City of Portland, Washington County experienced rapid growth during the mid-20th century; the population increased from 39,194 in 1940 to

215,000 in 1978 (Reference 1). Most of that increase occurred in the southeastern part of the county. The estimated population in 2010 was 529,710 (Reference 2).

All of the streams considered in this study are part of the Tualatin River drainage basin. The Tualatin River originates in the Coast Range at an elevation of 3,400 feet. The basin has an area of 711 square miles (sq. mi.) and is oval; it is approximately 40 miles long and 25 miles wide. The Tualatin River basin is located in central Washington County. The major portion of the Tualatin River floodplain is widest in the stream length located 7 miles upstream of the mouth to 70 miles upstream of the mouth.

The climate in Washington County is characterized by cool, wet winters and warm, dry summers. Maritime influences mostly dominate the area throughout the year. The average temperature in January is 38°F, and in July the average temperature rises to 66.5°F.

The average annual precipitation for the county is 38.0 inches, which primarily occurs during the months of October through March. Snowfall occurs only a few days each year. Snow on the ground does not last long, and depths seldom exceed 6 inches (Reference 1).

The Tualatin River valley is a broad synclinal valley, and the area of the valley floor represents a large percentage of the total watershed. The upland areas are underlain with basaltic lavas and volcanics, shale, sandstone, and conglomerates, all of which are deeply weathered and covered with loam and clay loam soils capable of supporting dense growths of vegetation. Exceptionally heavy and extended periods of rainfall cause excessive runoff and severe erosion, especially in cleared and burned areas. Two soil groups, the older valley filling and the recent alluvial soil, are represented on the valley floor where drainage, both on the surface and internal, varies from good to poor. Poor drainage at the lower end of the valley can be attributed, in part, to the existence of reefs or ledges of basaltic rock, which have established a temporary base level for the valley (Reference 3).

The uplands of the basin are generally covered with heavy fir timber that has a thick undergrowth and a mat of ferns. Extensive timber cutting has taken place in this part of the basin; however, after a few years, the previous undergrowth reestablishes itself and is supplemented by ferns and wild blackberry vines. Further down the slopes, the timber thins out on the valley floor until it is limited to small, scattered areas. Within the floodplain, scattered scrub oak trees with bands of willow, alder, and brush, as many as several hundred yards in width, parallel both banks of all major watercourses (Reference 3).

City of Beaverton

The City of Beaverton is on the eastern edge of Washington County. It is approximately 11 miles southwest of Portland, Oregon. The city, which was incorporated in 1893, grew to an estimated population of 89,803 in 2010 (Reference 2). Beaverton is bordered by the City of Tigard on the south and by the unincorporated areas of Washington County on all other sides.

Beaverton is a fast-growing community, with a diversified economic base centered around numerous offices and several light industries, including electronics and food processing. In addition, its proximity to Portland gives it many characteristics of a bedroom community. Commercial development is centered in the northern portion of Beaverton, specifically along Cedar Hills Boulevard, Tualatin-Valley Highway, Canyon Road, and Beaverton-Hillsdale Highway. .

City of Cornelius

The City of Cornelius is located in central Washington County. It is situated approximately 15 miles west of Portland. Cornelius was incorporated in 1893 and has grown from a population of 3,450 in 1978 to an estimated 11,869 in 2010 (References 4 and 2, respectively).

Very little development has taken place within the flood plains of Cornelius. The majority of development is south of Council Creek in east-central Cornelius. Commercial and industrial properties are primarily along major transportation routes. These routes include Tualatin Valley Highway, Burlington Northern Railroad, and Southern Pacific Railroad.

City of Durham

The City of Durham is located in the southeastern corner of Washington County. It is approximately 5 miles southwest of the City of Portland, Oregon. The city had an estimated population of 1,351 in 2010 (Reference 2).

The Tualatin River originates in the Coast Range at an elevation of 3,400 feet. The watershed has an area of 711 sq. mi., is oval in shape, and is approximately 40 miles long and 25 miles wide. The topography abruptly changes to a very flat valley and a wide floodplain in the area where Tualatin River emerges from the foothills. The river flows southeasterly through Durham, forming a portion of the southern corporate limits of the city.

Economic activity for this small community is diversified and characterized by non-retail commercial and light industrial uses. For

example, the headquarters for a building contractor and a distribution/trucking depot are located in Durham. In addition, several businesses and office park developments have been constructed on the east side of the Southwest Upper Boones Ferry Road, which serves as the principal transportation corridor through the city. Residential development is characterized by low density single family housing located primarily west of the Southwest Upper Boones Ferry Road. A high density 210 unit apartment development is located in southeast Durham. Floodplains are virtually undeveloped and are planned to remain as permanent open space for park and recreation purposes.

City of Forest Grove

Forest Grove is in central Washington County. It is approximately 21 miles west of Portland, Oregon. The city was incorporated in 1872 and has grown to a population of 21,083 in 2010 (Reference 2).

Forest Grove has a stable economic base, revolving around food processing and wood-products industries. Commercial development is primarily along Tualatin Valley Highway. Due to its proximity to Portland, Forest Grove has also developed into a suburban community. The flood plains are relatively undeveloped. Considerable open space for future development exists outside of the flood plains of Tualatin River, Gales Creek, and Council Creek.

City of Gaston

Gaston is located on the southern border of Washington County. It is approximately 29 miles west of Portland, Oregon. The City of Gaston was incorporated in 1914. The population in 2010 was estimated to be 637 (Reference 2). It is bordered by unincorporated Washington County land to the north, east, and west, and by unincorporated Yamhill County land to the south.

Economic activity in Gaston is centered around forestry and agricultural industries, with food processing playing an especially key role. Commercial development is located primarily along the Tualatin Valley Highway/South Pacific Railroad corridor through the town. Residential development is generally limited to the western portion of Gaston. Only the eastern edge of Gaston is considered flood prone. Several residences in that portion of the community are in the Tualatin River flood plain.

City of Hillsboro

Hillsboro is in central Washington County. The city is approximately 17 miles west of Portland, Oregon. Hillsboro was incorporated in 1876 and had a population of 91,611 in 2010 (Reference 2).

Hillsboro has a rapidly expanding and diversified economy centered around numerous light manufacturing plants. In particular, the electronics industry is becoming more important in the economy of Hillsboro. Due to its proximity to Portland, Hillsboro also has characteristics of a bedroom, or suburban, community. Commercial development in Hillsboro is extensive, with a well-developed business district in the west-central portion of the city and heavy commercial development along Tualatin Valley Highway. Residential areas are scattered throughout the city but are concentrated in the northern and eastern portions of Hillsboro. Important transportation routes in the city include Tualatin Valley Highway (State Highway 8), Sunset Highway (U.S. 26), Cornell Road, State Highway 219, Burlington Northern Railroad, and Southern Pacific Railroad. The flood plains are relatively undeveloped.

City of King City

The City of King City is located in the North Willamette Valley in Washington County. The nearest major highway is Interstate 5 and the nearest major city is Tigard. King City was incorporated in 1966 and had a population of 3,111 in 2010 (Reference 2).

City of North Plains

North Plains is located in north-central Washington County. It is approximately 20 miles west of Portland, Oregon. The city was incorporated in 1963 and had a population of 1,947 in 2010 (Reference 2).

The economy of North Plains is based primarily on agriculture and forestry. Soil types in the city consist of the Woodburn, Aloha, and Willamette Associations. Vegetation consists of grass, Douglas fir, oak, ash, willow, cedar, hazelbrush, maple, and rosebushes. The floodplains in the community are generally undeveloped.

City of Sherwood

Sherwood is located in the southeast corner of Washington County. It is approximately 13 miles southwest of Portland, Oregon. The population in 2010 was 18,194 (Reference 2).

Economic activity in Sherwood is diversified and growing. Industrial facilities in the community include a wood products plant, a leather tannery, and a machine manufacturing plant. In addition, agriculture and support services augment the income of the community. Commercial development is primarily in the central section of Sherwood. Residential development is spread throughout the city. Important transportation routes are Pacific Highway West (State Highway 99), Edy Road, Sherwood

Road, and the Southern Pacific Railroad. There is no development in the flood plain.

City of Tigard

Tigard is in the southeast corner of Washington County. It is approximately 8 miles southwest of Portland, Oregon, and is adjacent to the City of Beaverton to the north and to the City of Durham to the south. Unincorporated areas of Washington County also border Tigard, along with some small county areas that are within the city. Tigard was incorporated in 1961; the estimated population in 2010 was 48,035 (Reference 2).

Economic activity in Tigard is diversified and growing. Industrial facilities in the community are varied and are located along Pacific Highway West (State Highway 99W) and State Highway 217 (US217). Commercial development is located primarily along Pacific Highway West and Southwest Main Street. Residential development in Tigard is mostly west of Fanno Creek. Important transportation routes in the city are Pacific Highway West, US217, Hall Boulevard, and the Burlington Northern and Southern Pacific Railroads. The floodplains of several areas along the studied stream reaches are undergoing development. One such area is along Summer Creek between Southwest 113th and Southwest 121st Avenues, where several residences are in the floodplain. Another flood-prone area includes commercial and residential development along a 1-mile reach of Fanno Creek from Pacific Highway West upstream to Southwest Tiedeman Avenue.

City of Tualatin

Tualatin is in the southeastern corner of Washington County and the northwestern portion of Clackamas County. It is bordered by the City of Durham, to the north, by the City of Lake Oswego to the east, and by unincorporated areas of Washington and Clackamas Counties to the west and south. Tualatin is approximately 5 miles southwest of the City of Portland. The population was estimated to be 26,054 in 2010 (Reference 2).

The broad-based economy of Tualatin is subject to strong growth. Most of the economic activity centers in the central business district, where commercial development is interspersed with local industries. In the central business district, development includes new large retail chain stores. Industrial development in this area includes a food-processing plant and several warehouses. Residential development is concentrated in the northwestern and southwestern portions of Tualatin. New development is occurring throughout the southern portion of Tualatin on the benchlands above the Nyberg Slough flood plain.

2.3 Principal Flood Problems

The past history of flooding of the streams within Washington County indicates that, for a particular storm, flooding usually occurs on many streams throughout the study area. Flooding is caused by heavy rainfall augmented by snowmelt at a time when the soil is near saturation. Damaging floods may occur any time between late October and late April. The most severe floods occur in December, January, and February.

The largest flood recorded on the Tualatin River at West Linn since the U.S. Geological Survey (USGS) established a stream gage there in 1928 occurred in December 1933. The peak discharge at the gage was 23,300 cubic feet per second (cfs) with a 1.4-percent-annual-chance of flooding. The January 1974 flood on the Tualatin River also caused considerable damage to the study area. That flood had an estimated discharge of 22,300 cfs with a 4-percent-annual-chance of flooding. The flood occurred before the operation of the Henry Hagg Lake Project (Reference 6). The operation of the Henry Hagg Lake Project has decreased the frequency of a flood of 21,500 cfs to a 2-percent-annual-chance of flooding for the Tualatin River at West Linn.

Other major Tualatin River flood occurred in December 1937, December 1955, December 1964, January 1974, and February 1996. Before 1928, flooding was not well documented, but major floods occurred in February 1890, November 1896, February 1904, January 1905, and January 1914.

The February 1996 flood on the Tualatin River was the largest flood flow ever recorded with an estimated 84-year return interval and an annual probability of recurrence of 1.2%. However, for almost all of the smaller urbanized Tualatin River tributaries that were studied, the November 1996 flood is thought to be the largest flood ever observed with an estimated 25-year return interval and an annual probability of recurrence of 4%.

Records of past flood on the remaining study reaches in Washington County are not well documented. Flood damages have been small in these unincorporated areas because their floodplains are sparsely developed.

However, the floodplain of Nyberg Slough is not sparsely developed. In the 1974 flood, a business district sustained heavy damage when the Tualatin River overtopped its banks and entered Nyberg Slough, an overflow channel. A Tualatin River flood with a recurrence interval greater than 15 years would be expected to flow through Nyberg Slough.

City of Beaverton

No gaging stations are located along Beaverton Creek, Fanno Creek, South Johnson Creek, Erickson Creek, or Cedar Mill Creek. However, history indicates that Beaverton has had recurrent and substantial flood problems from these streams. The largest flood along the creeks in the study area since 1970 occurred in December 1977. The 1977 flood had an estimated recurrence interval of approximately 10 years. Flood damage in Beaverton was moderate; most occurred near the intersections of SH 217 with SH 8 and SH 10.

The potential for property damage from Beaverton Creek overflows is especially severe for several reasons. The inadequate size and moderate grade of the channel through the study segment causes overbank flooding during even mild storms. Beaverton Creek flow is constricted by many culverts and bridges, resulting in increased upstream flood heights. Finally, the potential for property damage is significant because of the extensive commercial and residential development within the Beaverton Creek floodplain.

Fanno Creek, South Johnson Creek, Erickson Creek, and Cedar Mill Creek also have flooding problems. However, the flood damage potential from these streams is not as large as that from Beaverton Creek. Generally, the floodplains along these streams have not been extensively developed. The only area with a major flooding problem is a residential development in the Fanno Creek floodplain just upstream of SH 217.

City of Cornelius

Since October 1939, the USGS has maintained a stream gage on Tualatin River near Dilley, Oregon. The largest flood at that gage occurred in December 1964, when a flow of 17,100 cfs was observed. The average return interval for the 1964 flood was 190 years. Major floods were also recorded at Dilley in December 1955, January 1964, January 1972, and January 1974. All peak discharges after 1974 were affected by regulation or diversion, and are thus not considered major floods. Prior to 1939, flooding was not well documented in the upper Tualatin River basin. However, records from a gage on Tualatin River near West Linn, Oregon, indicate major floods occurred in December 1933 and December 1937.

Generally, Cornelius is free of flood damage by riverine sources because there is almost no development in the flood plain.

City of Durham

Five major floods have occurred on the Tualatin River at Durham since the USGS established a stream gage at West Linn in 1928. Those floods

occurred in December 1933, December 1937, December 1955, December 1964, and January 1974, and had return intervals of approximately 90, 45, 20, 10, and 25 years, respectively. These floods had peak discharges of 28,300; 25,300; 21,400; 17,700; and 22,000 cfs, respectively, at the West Linn gage. All peak discharges after 1974 were affected by regulation or diversion, and are thus not considered major floods. Considerable development in Durham took place on high ground, resulting in only minor flood damage to property.

Fanno Creek has flooded low areas downstream of Durham Road. However, damage has been slight because of minimal development in the floodplain. Fanno Creek has no major obstructions that aggravate flooding problems in Durham.

City of Forest Grove

The USGS has maintained two stream gages on Gales Creek periodically since 1935; one near the Town of Gales Creek, period of record 1936 to 1945 and 1964 to 1970, and the other near Forest Grove, period of record 1941 to 1956 and 1971 to 1980. The largest recorded flood at either station occurred in February 1949 when a discharge of 6410 cfs, a 5.9-percent-annual-chance flood, was recorded near Forest Grove. Other major floods have been recorded in December 1955, January 1964, December 1964, January 1972, and December 1977. There are no stream gages on Council Creek.

Due to the undeveloped or lightly developed state of the flood plains within Forest Grove, damages caused by flooding have been minimal. Water-related damage in the city generally results from high ground water and local drainage problems.

City of Gaston

The largest recorded flood on Tualatin River in the vicinity of the City of Gaston occurred in December 1964. The peak discharge at the USGS stream gage near Dilley, 4 miles downstream of City of Gaston, was 17,100 cfs. The 1964 flood was a 0.5-percent-annual-chance flood. That flood caused minor damage to residences located east of Tualatin Valley Highway in Gaston. There have been numerous other large floods on Tualatin River, including those which occurred in 1933, 1937, 1955, 1972, and 1974.

The largest flood on Wapato Creek occurred in 1949. Although stream gage records are not available, it is estimated that the 1949 flood was a 2-percent-annual-chance flood. Flood damages in Gaston were light because development in the flood plain had been avoided.

City of Hillsboro

The City of Hillsboro is generally free of flood damage from riverine sources. Most damage in the city results from higher ground water and ineffective local drainage.

City of King City

Intense rainfall runoff from massive winter storms moving inland from the Pacific Ocean has combined with snowmelt runoff to produce large Tualatin River floods. The largest flood recorded at the City of West Linn since the USGS established a stream gage there in 1928 occurred in December 1933. The peak discharge at the gage was 23,300 cfs, with an approximate recurrence interval of a 1-percent-annual-chance flood.

The city of King City is affected by the Tualatin River but damage is small because of the limited development in the flood plain. Past damages in the city resulted from high ground water and ineffective local drainage.

City of North Plains

Flooding in North Plains is caused by intense rainfall from massive winter storms moving inland from the Pacific Ocean. This often results in simultaneous flooding on all streams in the study area, as in the flood of December 1964. Flooding on the unnamed tributary downstream of Glencoe Road at River Mile (RM) 0.27 is greatly accentuated by coincident flooding on McKay Creek. Flooding upstream of Glencoe Road is also influenced by the backwater effect of McKay Creek. The 1.8-mile study reach has several highly constrictive culverts that cause substantial ponding. This includes the culvert crossing at Glencoe Road (RM 0.27) and the Burlington Northern Railroad (BNRR) culvert crossing at RM 1.20. At the BNRR culvert crossing, backwater from the 10-percent-annual-chance flood and greater floodflows would overflow the right bank at Gordon Road.

There are no stream gage stations on either McKay Creek or Unnamed Tributary of McKay Creek, but local officials and residents have substantial knowledge of flooding conditions through the study reach. Local officials indicate that floods rise quickly following a rainstorm and may last a full day. Coincident flooding on McKay Creek is primarily responsible for this relatively long flood duration for a small stream of 2.5 square miles drainage area. The constrictive culverts at RM 0.27 and RM 1.20 also contribute to the extended duration.

The most recent flood on January 31, 1987, closely followed this pattern of flood duration and coincident flooding on McKay Creek. Based on numerous high water marks, flood photographs, and interviews with local

officials and residents, the January 31, 1987, flood was estimated to be greater than a 10-year recurrence interval. Flood damages were minor, however, consisting of numerous closed roads and isolation for several property owners. Flooding has occurred on a fairly regular basis on the Unnamed Tributary, and that knowledge has discouraged development in the floodplain.

City of Sherwood

Flooding from Cedar Creek and Rock Creek South is generally caused by rainfall in the winter, the period of greatest storm activity. Flood rise quickly following a heavy rainstorm and usually last less than 1 day.

The largest flood on both streams in the last 30 years occurred in December 1977. Heavy rains at that time caused some shallow flooding along the Rock Creek South flood plain. Sherwood Road, the main arterial to the City of Tualatin, was under approximately 1 foot of floodwater from Rock Creek South. No structures located along Rock Creek South were reported flooded. Flood damage from Cedar Creek was negligible because that stream is in a ravine.

City of Tigard

Flooding on the Tualatin River, Fanno Creek, Ash Creek, and Summer Creek is primarily caused by rainstorms in the winter, the period of greatest storm activity. Floods rise quickly following a heavy rainstorm and usually last less than 1 day on Fanno Creek and half a day on Ash and Summer Creeks.

Flooding in Tigard is not well documented. During the last 30 years, the largest flood on Fanno, Ash, and Summer Creeks occurred in December 1977. Although stream gage records are not available, it is estimated that the 1977 flood recurrence interval was approximately a 10-percent-annual-chance flood for the three streams. Flood damages in Tigard were minor because the areas susceptible to flooding were known and development was avoided in those areas. Flooding along Summer Creek is accentuated by a high ground water table, which causes nuisance flooding that affects numerous residences.

City of Tualatin

Intense rainfall runoff from massive winter storms moving inland from the Pacific Ocean has combined with snowmelt runoff to produce large Tualatin River floods. The largest flood recorded at the City of West Linn since the USGS established a stream gage there in 1928 occurred in December 1933. The peak discharge at the gage was 23,300 cfs, with an approximate recurrence interval of a 1-percent-annual-chance flood. The

central business district of Tualatin sustained heavy damage when the Tualatin River overtopped its banks and entered Nyberg Slough. A Tualatin River flood with greater than a 6.6-percent-annual-chance flood would be expected to flow through Nyberg Slough and inundate much of the central business district.

The January 1974 flood on the Tualatin River caused considerable damage to the study area. That flood had an estimated discharge at Tualatin of 22,340 cfs, which was estimated to be a 2.5-percent-annual-chance flood. The central business district, located on Nyberg Slough, was hit especially hard. Peak Nyberg Slough flow was approximately 2,600 cfs.

Flooding on Hedges Creek is often elevated by Tualatin River backwater flooding. Urbanization of the Hedges Creek drainage basin could increase future flood problems.

2.4 Flood Protection Measures

The Tualatin River basin has one multipurpose flood-control storage project. The Henry Hagg Lake Project, located northwest of the City of Gaston, was constructed by the U.S. Bureau of Reclamation (USBR). That project began operation in the 1974-75 flood season. It provides 30,000 acre-feet of flood storage starting in November of each year. Flood storage capacity is reduced as the winter flood season terminates, and the reservoir is filled each spring in anticipation of the summer irrigation demand. This storage would reduce the discharge of a flood, such as the flood of 1964, by approximately 3,000 cfs. The effect of Henry Hagg Lake Project flood storage has been considered in the calculation of water-surface profiles for the Tualatin River reach in the following communities: Cornelius, Durham, Forest Grove, Gaston, Hillsboro, King City, Tigard, and Tualatin.

The USBR has completed a draft feasibility study of two alternative storage projects on the Tualatin River near Gaston, which could provide additional flood storage in the Tualatin River Basin. Those projects, however, are still in the planning stages and are not reflected in the data presented (Reference 6).

Nonstructural measures are also being used to aid in the prevention of future flood damage. These measures are based on a flood hazard zoning ordinance for controlling development within the 1-percent-annual-chance floodplain. This ordinance requires the county or the city to review all proposed development within the 1-percent-annual-chance floodplain to ensure that it is reasonably safe from flooding. The FEMA guidelines for controlling development within the flood plain are followed (Reference 7).

City of Beaverton

No structural flood protection measures are being used to help prevent future flood damage in Beaverton, but several culverts have been enlarged on Beaverton Creek to improve the flooding situation. The Southern Pacific Railroad culvert was improved, as were numerous culverts in the Canyon Road area.

City of Gaston

There is a levee along the right bank of Wapato Creek which was considered in the analysis of flood elevations. However, the levee does not provide 1-percent-annual-chance flood protection.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods 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 that is 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 that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); 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 methods affecting the community. Some of the flooding sources in the discussion below are superseded with new studies. Please refer to section 10 for details of updates.

Tualatin River stream-gage records were analyzed statistically, using the log-Pearson Type III distribution, as outlined by the U.S. Water Resources Council (Reference 8). Discharge-frequency curves for USGS stream gages at West Linn, Dilley, and Farmington were developed utilizing records from 1938 to 1976, 1940 to 1975, and 1939 to 1958, respectively.

As a result of the relatively short record, Farmington gage data were adjusted using the long-term station data at West Linn. All downstream discharges were adjusted for flood control furnished by the Henry Hagg Lake Project.

Peak Tualatin River discharges near the downstream corporate limits of Tualatin were reduced to reflect flows into Oswego Canal by way of a diversion dam and outlet works. The Oregon Iron and Steel Dam at RM 3.4 and its outlet work at RM 6.7 divert flow from the Tualatin River into Oswego Canal to stabilize the Lake Oswego water level. A stream gage on

Oswego Canal has been maintained by the USGS since 1928 to measure this outflow from the Tualatin River.

The USGS has maintained two stream gages on Gales Creek periodically since 1935; one near the Town of Gales Creek, with periods of record from 1936 to 1945 and from 1964 to 1970, and the other near the City of Forest Grove, with periods of record from 1941 to 1956 and from 1971 to the present. The U.S. Water Resources Council guidelines (Reference 8) for broken record stations were applied to these sets of data, and discharge-frequency curves were prepared for both stations.

Peak discharge-drainage area relationships for selected recurrence intervals on Dairy Creek, West Fork Dairy Creek, McKay Creek, and Unnamed Tributary of McKay Creek were obtained from a Myer's rating curve developed from several nearby stream gages. These gages included three on the Tualatin River, one on Gales Creek, and one on Johnson Creek in Multnomah County, respectively.

The frequency discharges for the Unnamed Tributary of McKay Creek were developed by the regional analysis presented in "Magnitude and Frequency of Floods in Western Oregon," U.S. Geological Survey Open-File Report 79-553, dated 1979 (Reference 9). The frequency discharges developed by this procedure were checked for reasonableness of results.

The U.S. Natural Resources Conservation Service, formerly the Soil Conservation Service (SCS), method for rainfall-runoff and unit hydrograph determination (Reference 10) was used in conjunction with USACE computer programs (Reference 11, 12, and 13) for hydrograph computing, combining, and routing, for the purpose of generating flood hydrographs for selected recurrence intervals on the remaining detailed study streams in Washington County.

Peak flows from the July 1981 FIS report for the City of Durham (Reference 15) were used for the Fanno Creek restudy. The discharges used for the Tualatin River are taken from the channel improvement restudy of the Tualatin River, completed in 1983 by the USACE, as shown in the February 1987 FIS report for the City of Tualatin.

Peak discharge-drainage area relationships for Washington County are shown in Table 3, Summary of Discharges.

Table 3 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent- Annual-Chance	2-Percent- Annual-Chance	1-Percent- Annual-Chance	0.2-Percent- Annual-Chance
Ash Creek					
At mouth	4.0	750	950	1,000	1,250
At Hall Boulevard	2.5	450	600	650	800
Beaverton Creek					
Upstream of Bronson Creek Confluence	31.4	3,943	5,063	5,518	6,605
At Cedar Hills Boulevard	6.5	1,039	1,353	1,480	1,771
Bronson Creek					
At mouth	5.0	518	656	714	855
At Northwest Kaiser Road	3.2	351	443	482	577
Butternut Creek					
At mouth	5.0	682	865	941	1,116
At Southwest 198th Avenue	2.9	498	628	680	801
At Southwest 185th Avenue	1.8	302	380	412	484
Cedar Creek					
At mouth	8.9	744	863	909	1,028
At State Highway 99 W	8.3	753	851	897	1,016
At Sunset Blvd	6.6	844	1,208	1,359	1,732
Cedar Mill Creek					
At mouth	8.4	1,050	1,289	1,384	1,588
At Northwest Barnes	3.0	467	585	632	699
Cedar Mill Creek - North overflow	3.4	65	181	230	306
Cedar Mill Creek - South Overflow					
At mouth	3.5	9	84	120	180
Cedar Mill Creek - Upper North Overflow	3.4	57	141	164	198
Celebrity Creek					
At mouth	0.8	150	188	203	238
US of Rosa park pedestrian bridge	0.7	127	158	171	200

Table 3 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent- Annual-Chance	2-Percent- Annual-Chance	1-Percent- Annual-Chance	0.2-Percent- Annual-Chance
Chicken Creek					
At mouth	15.6	1125	1429	1580	1959
US of Cedar Creek confluence	8.9	744	863	909	1028
At Wilsonville road	6.5	939	1,321	1,502	1889
Chicken Creek - West Tributary					
At mouth	1.6	309	425	477	611
Council Creek					
At Hobbs Road	10.8	1,089	1,819	1,952	2,264
At Cornelius Schefflin Road	7.2	875	1,408	1,502	1,722
At Martin Road	5.0	609	1,005	1,077	1,245
At Beal Road	206.0	240	407	438	514
Dairy Creek					
Downstream of McKay Creek Confluence	296.4	19,513	30,176	32,847	37,816
Downstream of McKay Creek Confluence	230.2	15,104	23,793	25,396	29,247
Dawson Creek					
At mouth	4.3	601	755	819	976
At N.W. Brookwood Avenue	3.7	517	652	706	836
Erickson Creek					
At mouth	1.7	278	352	382	451
Farmington road	1.5	99	162	188	249
SW 9th Ave	0.7	115	146	158	186
Fanno Creek					
At mouth	32.0	2,950	3,850	4,250	5,150
At Southwest Tiedeman Avenue	24.0	2,750	3,500	3,850	4,700
At Southwest Dakota Street	17.0	1,900	2,450	2,700	3,250
At State Highway 217	10.0	1,400	1,800	1,970	2,400
At Washington-Clackamas County boundary	5.0	950	1,150	1,300	1,550

Table 3 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent- Annual-Chance	2-Percent- Annual-Chance	1-Percent- Annual-Chance	0.2-Percent- Annual-Chance
Gales Creek					
At Stringtown Road	69.0	6,000	8,400	9,450	12,000
At Roderick Road Gage	66.0	5,800	8,150	9,150	11,600
Glencoe Swale					
At mouth	3.78	266	337	349	368
Shannon road	2.6	346	599	645	753
Jackson school road	2.3	321	552	594	692
15th Avenue	1.9	247	432	464	543
Sewell Avenue	0.8	98	171	185	217
Golf Creek					
At mouth	1.4	317	389	419	488
Gordon Creek					
At mouth	1.5	157	191	205	236
Hall Creek					
At mouth	4	720	923	1001	1179
Hwy 217 & 114th Ave	2.9	540	686	741	872
Kennedy St	2.4	490	611	660	774
Near 99th Ave	1	182	229	249	294
Hall Creek - 106th Tributary					
At mouth	0.2	50	63	68	80
Hall Creek - North Fork					
At mouth	1.0	189	239	259	306
Hall Creek - South Fork					
At mouth	0.3	22	38	46	62
Hedges Creek					
At mouth	4.1	304	509	595	802
Upstream end	2.0	447	583	636	760

Table 3 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent- Annual-Chance	2-Percent- Annual-Chance	1-Percent- Annual-Chance	0.2-Percent- Annual-Chance
Holcomb Creek					
At mouth	4.9	370	477	524	634
McKay Creek					
At mouth	66.0	4,409	6,983	7,451	8,569
At Hornecker Road	61.0	4,168	6,681	7,136	8,236
At West Union	38.7	2,811	4,328	4,603	5,271
North Johnson Creek					
At mouth	3.5	425	501	530	598
North Johnson Creek - East Tributary					
At mouth	0.3	42	52	57	67
North Johnson Creek - North Tributary					
At mouth	0.5	94	118	127	150
Nyberg Slough					
At Southwest 65th Street	694.0	16,000	23,900	33,600	48,500
Rock Creek North					
At mouth1	76.0	6,765	8,682	9,492	11,432
Downstream of Dawson Creek confluence	70.0	6,412	8,213	8,971	10,779
At S.W. 231st Avenue (Below Beaverton Creek Confluence)	63.8	5,995	7,680	8,387	10,076
Upstream of Beaverton Creek confluence	26.0	1,872	2,411	2,640	3,210
At West Union Road	19.0	1,470	1,904	2,085	2,530
Rock Creek South					
At mouth	6.2	520	660	718	873
At Sherwood Road	3.7	410	546	616	786
South Johnson Creek					
At mouth	3.6	577	730	793	940
Storey Creek					
At mouth	5.0	396	657	706	828

Table 3 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent- Annual-Chance	2-Percent- Annual-Chance	1-Percent- Annual-Chance	0.2-Percent- Annual-Chance
Storey Creek - East Tributary At mouth	1.309	105	176	189	222
Storey Creek - Middle Tributary At mouth	1.323	100	165	176	206
Summer Creek At mouth	6.2	1,050	1,300	1,450	1,750
At Southwest 135th Avenue	4.0	800	1,000	1,100	1,350
Tualatin River At rail road crossing	690.8	16,000	26,900	33,500	48,400
At Farmington	550.9	13,800	23,200	29,000	41,800
DS of Rock creek confluence	548.6	13,700	23,100	28,900	41,700
DS of Dairy Creek confluence	462.0	12,100	20,300	25,400	36,700
DS of Golf Course Tributary	221.4	7,400	12,400	15,500	22,400
Upper end of the Tualatin River	214.3	7,200	12,100	15,200	21,900
Tualatin River - Golf Course Overflow At mouth	NA	1,665	2,970	3,859	5,285
Tualatin River - LaFolette Overflow At mouth	NA	978	1,711	2,056	3,387
Turner Creek At mouth	2.0	320	406	441	522
Waible Creek At mouth	12.0	1,045	1,692	1,815	2,113
At NW Groveland Drive (Highway 26)	3.2	180	234	297	380
At NW West Union Road	2.0	112	161	222	349
Waible Creek - Uqwj Tributary At mouth	1.2	220	362	387	443
At Brookwood Parkway	1.0	173	208	266	387
Waible Creek Vributary"3 At mouth	0.4	45	56	66	80

Table 3 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent- Annual-Chance	2-Percent- Annual-Chance	1-Percent- Annual-Chance	0.2-Percent- Annual-Chance
Waible Creek Tributary ⁴					
At mouth	0.5	49	86	92	109
At NW West Union Road	0.4	33	47	54	56
Wapato Creek					
At mouth	22.0	650	1,150	1,400	2,000
At Washington/Yamhill County Line	13.0	550	850	1,000	1,350
West Fork Dairy Creek					
At Banks Road	46	4,200	6,090	7,010	9,630
Willow Creek					
At mouth	5.1	799	1,022	1,115	1,328
At Northwest 173rd Avenue	2.6	432	547	595	704

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. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Many flooding sources discussed in sections below have been revised with new revised studies. Refer to Section 10 – Revision Descriptions for details.

Hydraulic analyses for all streams studied in detail were performed using the USACE HEC-2 step-backwater computer program (Reference 16). Cross-section data used in the program came from a number of sources. Cross sections are composites of data from USACE field surveys, city topographic maps (References 17 through 21), the USGS topographic information. All bridges, dams, and culverts were field checked to obtain elevation data and structural geometry.

Digital methods were used wherever possible to reduce redundant work effort and automate the direct transfer of data. They were used to directly convert a network of sections and alignments into section positions and distances, to convert survey data to the model cross sections, and to automatically map the 1- and 0.2-percent annual chance floodplain boundaries based on widths from the model output and to use those same data for the Floodway Data tables in a spreadsheet.

Water-surface profile computations at bridges are based on present normal bridge openings. Consideration was not given either to the possible blockage of bridge openings by sediment and debris or to future bridge enlargement.

Field surveys were made to establish stream channel profiles, cross sections, and a few high-water elevations for approximately 13.5 miles of Fanno Creek, 1.5 miles of Ash Creek, and 2.1 miles of Summer Creek. The original field surveys began in September 1997 and were completed in March 1998. Additional field surveyed cross sections on both Fanno Creek and Ash Creek were obtained by crews from the Cities of Beaverton

and Tigard and Washington County, Oregon, during the winter months of 1998-99.

The model for Unnamed Tributary of McKay Creek was calibrated using engineering judgment and information about past flooding events from local officials and residents along the Unnamed Tributary. Numerous high water marks from the January 31, 1987 flood were used in the model calibration for the entire 1.8-mile study reach.

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 FIRM. Where appropriate, backwater elevations from the Tualatin River were shown on the final Flood Profiles for Fanno Creek.

Hydraulic roughness (Manning's "n" values) for the channel and overbanks were first estimated from field observations. The "n" values were then adjusted to match high-water marks where available. Tabulated "n" values are shown in Table 4 for all streams studied in detail.

Table 4. Roughness Coefficient - Manning's "n" Values

<u>Stream</u>	<u>Overbank</u>	<u>Channel</u>
Ash Creek	0.040 - 0.180	0.030 - 0.065
Beal Creek	0.02 - 0.07	0.07 - 0.08
Beaverton Creek	0.001 - 0.200	0.012 - 0.080
Bethany Creek	0.035 - 0.060	0.035 - 0.040
Bronson Creek	0.06 - 0.15	0.04 - 0.11
Butternut Creek	0.03 - 0.07	0.03 - 0.07
Cedar Creek	0.020 - 0.150	0.030 - 0.060
Cedar Mill Creek and tributaries	0.02 - 0.25	0.02 - 0.08
Celebrity	0.08	0.05
Chicken Creek and West Tributary	0.02 - 0.10	0.02 - 0.10
Council Creek	0.04 - 0.10	0.042 - 0.085
Dairy Creek	0.04 - 0.10	0.04 - 0.10
Dawson Creek	0.06 - 0.10	0.035 - 0.055
Deer Creek	0.035 - 0.400	0.035
Erickson Creek	0.030 - 0.065	0.03 - 0.05
Fanno Creek	0.040 - 0.120	0.043 - 0.080
Gales Creek	0.077 - 0.110	0.050 - 0.057
Glencoe Swale	0.055 - 0.100	0.030 - 0.055
Gordon Creek	0.04 - 0.06	0.035 - 0.050
Hall Creek and tributaries	0.012 - 0.100	0.02 - 0.09
Hedges Creek	0.02 - 0.10	0.02 - 0.10
Holcomb Creek	0.04 - 0.08	0.04 - 0.05
North Johnson Creek and tributaries	0.02 - 0.25	0.02 - 0.08
McKay Creek and Unnamed Tributary	0.058 - 0.110	0.058 - 0.110
Nyberg Slough	0.050 - 0.095	0.40 - 0.05
Rock Creek North	0.04 - 0.07	0.04 - 0.07
Rock Creek South	0.02 - 1.00	0.04 - 0.08
South Johnson Creek	0.05 - 0.10	0.06 - 0.08
Storey Creek and tributaries	0.04 - 0.12	0.045 - 0.065
Summer Creek	0.04 - 0.30	0.045 - 0.085
Tualatin River and overflows	0.063 - 0.120	0.047 - 0.050
Turner Creek	0.04 - 0.08	0.045 - 0.070
Waible Creek and tributaries	0.035 - 0.100	0.050 - 0.065
Wapato Creek	0.080 - 0.090	0.050 - 0.052
West Fork Dairy Creek	0.08 - 0.11	0.055 - 0.057
Willow Creek	0.04 - 0.08	0.030 - 0.065

Overbank roughness factors were based on digital aerial orthophotographs flown in 1999 by Washington County (Reference 22). Base map references of similar roughness were identified electronically as an AutoCAD layer on the aerial orthophotographs. Geographic Information System techniques were used to compute the weighted average “n” values at each of the overbanks for the surveyed cross sections. Using the techniques described above, overbank roughness values ranged from 0.04 to 0.120.

Water-surface profile computations at bridges are based on present normal bridge openings. Consideration was not given either to the possible blockage of bridge openings by sediment and debris or to future bridge enlargement.

Starting water-surface elevations (WSELs) for the Tualatin River were obtained from a hydraulic analysis performed by the USACE for the West Linn FIS (Reference 23).

Starting WSELs for Ash Creek and Summer Creek were obtained from those modeled for Fanno Creek at the point of each creek’s respective confluence. Starting WSELs for Fanno Creek were based on the slope-area method; backwater from the Tualatin River taken from the City of Durham FIS report (Reference 15) is reflected on the water-surface profiles.

Both upstream and downstream elevations for the Tualatin River Side Channel and Nyberg Slough were obtained from Tualatin River profiles located at the entrance and exit of the overbank channels. For Nyberg Slough, overflow from the Tualatin River does not reach the slough for floods with less than a 6.6-percent-annual-chance frequency. Thus, the 10-percent-annual-chance flood is not shown on the profile for Nyberg Slough.

For all other streams studied in detail, starting WSELs were obtained using the normal-depth routine of the HEC-2 program.

Results of the hydraulic analyses for Council Creek showed that the 1-percent-annual-chance flood elevations for the entire reach studied in the community are below the 1-percent-annual-chance flood elevation on Dairy Creek at its confluence with Council Creek as presented in the Washington County, Oregon, Flood Insurance Study (Reference 5). Therefore, the 1- and 0.2-percent-annual-chance flood elevations and boundaries along Council Creek, as presented on the profiles and maps, are the result of backwater from Dairy Creek.

Flood profiles were drawn showing computed WSELs to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

Elevations along Wapato Creek and Rock Creek are controlled by Tualatin River during a 1-percent-annual-chance flood. The profiles for the creek reflect that analysis.

New 2-foot contour maps were developed by David Smith and Associates, Inc., for Ash Creek, Fanno Creek and Summer Creek. They are based on aerial photography flown in December 1997 (Reference 24).

Approximate flood boundaries were based upon the existing Flood Plain Delineation Maps (Reference 25) and Flood Hazard Boundary Map (FHBM) (Reference 26).

Because of stream meanders, distances on the FIRM, published separately, may not agree exactly with distances on the profiles (Exhibit 1).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the completion of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

To accurately convert flood elevations from the current NGVD29 datum to the newer NAVD88 datum, the following procedure was implemented. Use CORPSCON to determine whether it is necessary to use a Stream-by-

Stream or Countywide factor in the conversion. Using the FEMA protocol for determining the conversion factor (*FEMA Guidelines & Specifications – Appendix B*) the decision was made that a single, countywide conversion factor was acceptable to use in performing the datum conversion for Washington County, OR. The average datum conversion factor for Washington County is calculated to be +3.52 ft. The final NAVD88 elevations were computed by adding the calculated value to the existing NGVD29 data.

All previous elevations in Washington County have been converted from NGVD to NAVD by adding 3.52 feet. Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD.

Flood elevations shown in this FIS report and on the FIRM are referenced to NAVD. These flood elevations must be compared to structure and ground elevation referenced to the same vertical datum. For information regarding conversion between the NGVD and NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242
(301) 713-4172 (fax)

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevation; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance 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 1:2,400 with contour intervals of 2 feet and 4 feet (References 18, 19, 20, and 21).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance 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.

The approximate 1-percent-annual-chance flood boundaries were obtained from the Floodplain Delineation Maps published by Washington County (Reference 25) and the FHBM for Washington County (Reference 26).

The approximate 1-percent-annual-chance floodplain boundaries for Hedges Creek were delineated on a topographic map at a scale of 1:24,000, with a contour interval of 10 feet (Reference 27).

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM.

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 1-percent-annual-chance 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 base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 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. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross section (see Table 5, Floodway Data). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 1-percent-annual-chance 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 (WSEL) or the base flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

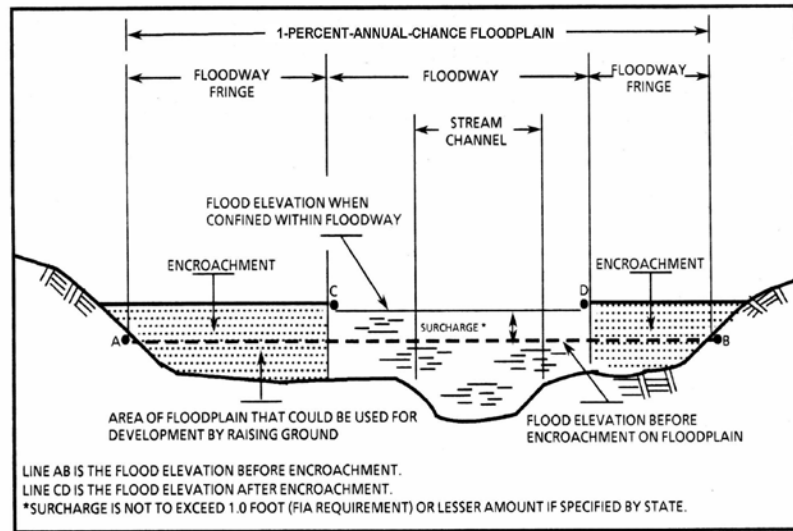


Figure 1. Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ASH CREEK								
A	0.10	60	301	3.4	164.1	160.5 ²	161.4 ²	0.9
B	0.19	26	147	7.0	164.1	162.5 ²	162.8 ²	0.3
C	0.33	116	716	1.3	164.1	164.1	164.8	0.7
D	0.41	96	440	2.1	164.2	164.2	164.9	0.7
E	0.55	70	229	4.0	164.9	164.9	165.6	0.7
F	0.72	106	441	1.9	166.0	166.0	166.7	0.7
G	0.91	66	180	4.7	167.9	167.9	168.8	0.9
H	1.08	50	248	3.1	173.3	173.3	174.3	1.0
I	1.28	18	129	5.6	177.5	177.5	178.4	0.9
J	1.39	36	158	4.6	180.6	180.6	181.5	0.9
K	1.52	56	238	2.7	184.5	184.5	185.1	0.6

¹Stream distance in miles above confluence with Fanno Creek

²Elevations computed without consideration of backwater effects from Fanno Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ASH CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAL CREEK								
A	417	145	431	1.6	169.1	168.6 ²	169.3 ²	0.7
B	637	47	181	3.2	169.1	168.9 ²	169.6 ²	0.7
C	1,024	273	1,200	0.5	169.4	169.4	170.2	0.8
D	1,608	125	746	0.6	171.3	171.3	171.8	0.5
E	1,785	93	529	0.8	171.3	171.3	171.8	0.5
F	2,082	24	118	3.5	171.6	171.6	172.2	0.6
G	2,227	53	228	1.8	172.0	172.0	172.6	0.6
H	2,468	76	325	1.2	172.1	172.1	172.9	0.8
I	2,757	67	247	1.6	172.2	172.2	173.1	0.9

¹Feet above confluence with Council Creek

²Elevations computed without consideration of backwater effects from Council Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BEAL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAVERTON CREEK								
A	1,017	210	1,179	7.5	149.5	145.1 ²	146.1 ²	1.0
B	1,411	90	737	10.6	149.5	148.5 ²	148.7 ²	0.2
C	1,918	214	2,248	3.4	150.1	150.1	151.0	0.9
D	2,885	225	2,042	3.8	150.6	150.6	151.5	0.9
E	3,469	214	2,040	3.4	151.2	151.2	152.1	0.9
F	4,172	158	1,832	3.5	152.1	152.1	152.9	0.8
G	4,643	188	2,076	3.4	152.5	152.5	153.3	0.8
H	4,881	189	2,164	2.7	152.6	152.6	153.4	0.8
I	5,501	161	1,682	4.1	152.9	152.9	153.8	0.9
J	5,667	172	1,957	3.6	153.6	153.6	154.4	0.8
K	5,941	190	2,217	3.0	153.8	153.8	154.6	0.8
L	6,388	193	2,195	3.5	154.0	154.0	154.9	0.9
M	6,501	71	918	6.8	155.5	155.5	155.8	0.3
N	7,041	190	2,565	2.7	156.6	156.6	157.1	0.5
O	7,386	200	2,636	1.9	156.7	156.7	157.1	0.4
P	7,870	195	2,632	2.5	156.8	156.8	157.3	0.5
Q	8,519	204	2,537	2.6	156.9	156.9	157.5	0.6
R	9,367	198	2,718	2.4	157.1	157.1	157.8	0.7
S	10,104	198	2,561	2.2	157.3	157.3	158.0	0.7
T	10,576	270	3,367	2.0	157.4	157.4	158.2	0.8
U	11,391	329	3,870	1.5	157.5	157.5	158.4	0.9
V	12,068	300	3,716	1.8	158.0	158.0	158.8	0.8
W	13,094	240	2,508	2.4	158.0	158.0	158.9	0.9
X	13,970	230	2,422	2.5	158.2	158.2	159.1	0.9
Y	14,307	220	2,306	2.5	158.3	158.3	159.2	0.9
Z	14,753	216	2,121	2.8	158.5	158.5	159.4	0.9

¹Feet above confluence with Rock Creek North

²Elevations computed without consideration of backwater effects from Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
BEAVERTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAVERTON CREEK								
AA	15,159	214	2,395	2.4	158.7	158.7	159.6	0.9
AB	15,551	220	2,306	2.7	158.8	158.8	159.8	1.0
AC	15,936	220	2,283	2.6	159.0	159.0	159.9	0.9
AD	16,368	120	1,225	5.1	159.3	159.3	160.1	0.8
AE	16,554	156	1,824	3.3	160.0	160.0	160.8	0.8
AF	17,052	158	1,816	3.2	160.2	160.2	161.0	0.8
AG	17,214	209	2,411	2.4	161.1	161.1	162.0	0.9
AH	18,009	215	2,497	2.4	161.2	161.2	162.2	1.0
AI	18,324	184	2,156	2.8	161.3	161.3	162.3	1.0
AJ	18,630	198	2,251	2.9	161.5	161.5	162.4	0.9
AK	18,926	190	2,212	2.6	161.5	161.5	162.5	1.0
AL	19,473	169	2,099	2.7	161.7	161.7	162.7	1.0
AM	20,062	226	1,959	2.9	162.0	162.0	162.9	0.9
AN	21,311	285	2,545	2.2	162.3	162.3	163.3	1.0
AO	21,903	276	2,331	2.4	162.4	162.4	163.4	1.0
AP	22,411	213	1,975	2.3	162.6	162.6	163.6	0.9
AQ	22,864	187	2,241	1.9	162.8	162.8	163.8	0.9
AR	23,366	166	1,764	2.9	163.0	163.0	163.9	0.9
AS	23,533	69	791	5.5	163.1	163.1	164.0	0.9
AT	24,090	281	2,549	2.2	164.0	164.0	164.8	0.8
AU	24,594	254	2,100	2.8	164.1	164.1	164.9	0.8
AV	26,374	83	602	9.3	164.7	164.7	165.4	0.7
AW	27,108	213	1,715	3.3	166.9	166.9	167.3	0.4
AX	27,789	224	1,832	3.5	167.2	167.2	167.6	0.4
AY	28,237	264	2,008	3.1	167.4	167.4	167.7	0.3
AZ	28,773	251	1,762	3.7	167.6	167.6	167.9	0.3

¹Feet above confluence with Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BEAVERTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAVERTON CREEK								
BA	30,064	327	1,959	3.5	167.8	167.8	168.2	0.4
BB	31,158	241	1,331	4.6	168.3	168.3	168.6	0.3
BC	31,555	64	520	8.8	168.7	168.7	168.8	0.1
BD	31,751	112	876	6.7	170.0	170.0	170.2	0.2
BE	32,190	199	1,700	3.1	170.3	170.3	171.2	0.9
BF	32,458	186	1,362	4.8	170.3	170.3	171.2	0.9
BG	33,321	332	2,531	1.7	170.7	170.7	171.6	0.9
BH	33,852	339	2,378	1.6	170.7	170.7	171.6	0.9
BI	34,114	243	2,264	1.6	170.8	170.8	171.7	0.9
BJ	34,661	204	2,069	1.7	170.8	170.8	171.7	0.9
BK	35,077	207	1,959	1.8	170.9	170.9	171.8	0.9
BL	35,351	211	2,033	1.7	170.9	170.9	171.8	0.9
BM	35,580	205	1,924	1.8	170.9	170.9	171.8	0.9
BN	36,047	203	1,953	2.0	171.0	171.0	171.9	0.9
BO	36,530	213	2,013	1.8	171.0	171.0	171.9	0.9
BP	37,255	117	1,089	2.5	171.1	171.1	172.0	0.9
BQ	37,487	127	1,221	3.0	171.2	171.2	172.0	0.8
BR	37,868	135	735	3.7	171.4	171.4	172.2	0.8
BS	38,285	382	3,522	1.0	171.9	171.9	172.9	1.0
BT	39,137	211	1,824	1.5	171.9	171.9	172.9	1.0
BU	39,433	98	712	2.7	171.9	171.9	172.8	0.9
BV	39,765	82	1,118	1.7	172.6	172.6	173.5	0.9
BW	40,440	90	832	2.2	172.7	172.7	173.6	0.9
BX	40,624	70	837	1.9	173.2	173.2	174.1	0.9
BY	40,845	84	671	3.4	173.2	173.1	174.0	0.9
BZ	41,120	77	637	3.5	173.2	173.2	174.1	0.9

¹Feet above confluence with Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BEAVERTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAVERTON CREEK								
CA	41,285	86	264	5.9	173.2	173.2	174.0	0.8
CB	41,535	96	520	3.0	174.8	174.8	175.6	0.8
CC	41,898	120	1,514	1.4	177.4	177.4	178.0	0.6
CD	42,010	60	587	2.6	177.4	177.4	178.0	0.6
CE	42,363	60	582	2.7	177.4	177.4	178.1	0.7
CF	42,547	53	519	3.0	177.6	177.6	178.3	0.7
CG	42,653	80	753	2.0	177.7	177.7	178.4	0.7
CH	43,303	181	1,269	1.3	177.8	177.8	178.5	0.7
CI	43,417	181	1,270	1.3	177.8	177.8	178.5	0.7
CJ	43,569	175	1,467	1.7	178.1	178.1	179.1	1.0
CK	44,047	176	1,443	1.8	178.1	178.1	179.1	1.0
CL	44,963	187	1,347	1.2	178.2	178.2	179.2	1.0
CM	45,438	46	414	3.6	178.2	178.2	179.1	0.9
CN	45,632	65	457	3.3	178.5	178.5	179.4	0.9
CO	46,148	134	698	2.1	179.5	179.5	180.2	0.7
CP	46,252	53	452	3.5	179.5	179.5	180.2	0.7
CQ	46,810	63	491	3.1	179.7	179.7	180.5	0.8
CR	46,949	61	503	2.9	179.9	179.9	180.8	0.9
CS	47,249	91	797	1.9	180.0	180.0	180.9	0.9
CT	47,459	146	1,857	0.8	180.1	180.1	181.0	0.9
CU	48,022	35	485	2.9	180.2	180.2	181.1	0.9
CV	48,402	95	618	2.4	180.5	180.5	181.5	1.0
CW	48,694	103	653	4.2	180.6	180.6	181.4	0.8
CX	49,093	46	105	1.4	182.2	182.2	182.9	0.7
CY	49,415	65	180	0.8	182.3	182.3	182.9	0.6
CZ	49,688	30	121	0.2	182.3	182.3	182.9	0.6

¹Feet above confluence with Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BEAVERTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAVERTON CREEK								
DA	49,807	30	15	1.3	182.7	182.7	182.9	0.2
DB	50,296	13	5	3.7	183.3	183.3	183.4	0.1
DC	50,513	82	315	0.1	183.3	183.3	183.7	0.4
DD	50,857	39	150	0.1	183.3	183.3	183.7	0.4
DE	51,109	34	144	0.1	183.3	183.3	183.7	0.4
DF	51,446	115	627	0.7	183.3	183.3	183.7	0.4
DG	51,730	45	255	1.3	183.4	183.4	183.7	0.3
DH	52,007	34	178	1.9	183.4	183.4	183.8	0.4
DI	52,457	28	349	0.5	189.1	189.1	189.5	0.4
DJ	52,670	25	324	0.7	189.1	189.1	189.5	0.4
DK	52,780	32	303	0.8	189.1	189.1	189.5	0.4
DL	53,025	30	59	2.4	189.1	189.1	189.6	0.5
DM	53,626	30	26	5.3	195.6	195.6	195.8	0.2
DN	53,795	30	26	5.3	196.9	196.9	197.3	0.4
DO	54,275	30	27	5.0	200.2	200.2	200.6	0.4
DP	54,598	89	59	5.6	203.2	203.2	203.3	0.1
DQ	54,946	105	52	5.3	208.5	208.5	208.6	0.1
DR	55,219	30	67	2.1	208.8	208.8	209.0	0.2
DS	55,483	30	128	1.1	208.8	208.8	209.1	0.3
DT	55,702	9	80	2.1	208.8	208.8	209.1	0.3
DU	56,057	69	200	1.7	208.8	208.8	209.3	0.5
DV	56,143	63	260	1.3	208.8	208.8	209.4	0.6
DW	56,362	17	44	3.9	208.9	208.9	209.3	0.4
DX	56,513	15	63	3.0	210.6	210.6	211.5	0.9
DY	56,796	13	44	4.4	211.4	211.4	212.2	0.8
DZ	56,883	23	18	5.1	215.6	215.6	215.8	0.2

¹Feet above confluence with Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BEAVERTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BEAVERTON CREEK								
EA	56,987	30	26	3.5	216.2	216.2	216.4	0.2
EB	57,104	31	35	2.6	216.8	216.8	217.0	0.2
EC	57,389	36	53	1.7	218.8	218.8	219.0	0.2
ED	57,711	14	74	1.2	222.3	222.3	222.9	0.6
EE	57,794	11	74	2.3	222.3	222.3	222.9	0.6
EF	57,958	24	92	1.8	222.3	222.3	223.1	0.8
EG	59,692	56	377	0.2	244.9	244.9	245.0	0.1
EH	59,945	23	72	1.1	245.1	245.1	245.2	0.1
EI	60,121	20	46	1.7	245.4	245.4	245.5	0.1
EJ	60,420	6	20	3.9	247.0	247.0	247.2	0.2
EK	60,531	6	21	3.7	247.3	247.3	247.4	0.1
EL	60,725	8	18	4.3	250.5	250.5	251.0	0.5
EM	60,916	16	65	1.3	259.1	259.1	259.4	0.3
EN	61,362	6	11	7.4	260.4	260.4	260.4	0.0
EO	61,511	7	23	3.5	264.0	264.0	264.7	0.7
EP	61,774	7	28	2.8	266.6	266.6	267.4	0.8

¹Feet above confluence with Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BEAVERTON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BETHANY CREEK								
A	351	279	1,382	0.4	173.5	172.5 ²	173.3 ²	0.8
B	675	279	1,507	0.3	173.5	172.5 ²	173.3 ²	0.8
C	1,250	182	989	0.5	173.5	172.5 ²	173.3 ²	0.8
D	1,907	20	98	5.2	173.5	173.4 ²	173.6 ²	0.2
E	2,917	60	158	3.3	175.9	175.9	176.8	0.9
F	3,449	41	115	4.0	176.5	176.5	177.5	1.0
G	4,110	40	145	3.4	180.9	180.9	180.9	0.0
H	4,558	56	154	2.5	181.3	181.3	181.5	0.2
I	4,764	33	122	3.8	181.8	181.8	182.6	0.8
J	5,105	40	86	5.6	182.6	182.6	183.3	0.7
K	5,618	39	70	3.1	184.7	184.7	185.0	0.3
L	5,946	44	40	5.8	187.9	187.9	187.9	0.0

¹Feet above confluence with Rock Creek North

²Elevations computed without consideration of backwater effects from Rock Creek North

TABLE 5	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	WASHINGTON COUNTY, OR AND INCORPORATED AREAS	BETHANY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BRONSON CREEK								
A	419	145	443	2.0	158.0	151.5 ²	151.5 ²	0.0
B	751	85	274	2.4	158.0	151.9 ²	152.2 ²	0.3
C	977	18	261	3.8	160.3	160.3	160.9	0.6
D	1,483	190	1,760	0.6	160.4	160.4	161.2	0.8
E	1,776	225	1,774	0.6	160.5	160.5	161.2	0.7
F	2,053	191	1,134	0.7	160.5	160.5	161.2	0.7
G	2,326	199	995	0.8	160.6	160.6	161.2	0.6
H	2,619	157	645	1.3	160.7	160.7	161.3	0.6
I	3,148	130	491	1.5	161.1	161.1	161.6	0.5
J	3,681	125	410	2.2	161.7	161.7	162.2	0.5
K	3,947	113	284	3.0	162.4	162.4	162.8	0.4
L	4,009	60	237	3.3	167.3	167.3	167.8	0.5
M	4,598	81	544	1.4	167.7	167.7	168.2	0.5
N	5,179	139	696	1.4	167.8	167.8	168.7	0.9
O	5,968	34	234	2.8	172.0	172.0	172.0	0.0
P	6,155	58	410	1.7	172.5	172.5	173.3	0.8
Q	6,540	133	1,351	0.5	172.6	172.6	173.3	0.7
R	6,878	85	314	2.3	172.6	172.6	173.3	0.7
S	7,266	85	529	1.3	172.8	172.8	173.7	0.9
T	7,486	30	196	3.4	173.1	173.1	173.9	0.8
U	7,727	80	519	1.2	173.6	173.6	174.3	0.7
V	7,954	20	90	7.2	173.6	173.6	174.3	0.7
W	8,166	40	177	3.8	176.8	176.8	177.0	0.2
X	8,545	175	1,023	0.6	178.2	178.2	178.8	0.6
Y	8,805	199	793	0.8	183.3	183.3	183.5	0.2
Z	9,283	266	1,468	0.4	183.3	183.3	183.6	0.3

¹Feet above confluence with Beaverton Creek

²Elevations computed without consideration of backwater effects from Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BRONSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BRONSON CREEK								
AA	9,660	196	1,049	0.6	183.3	183.3	183.6	0.3
AB	10,101	236	1,878	0.3	185.0	185.0	185.3	0.3
AC	10,422	130	914	0.7	185.0	185.0	185.3	0.3
AD	10,764	24	135	4.6	185.0	185.0	185.2	0.2
AE	10,966	21	162	4.4	187.2	187.2	187.6	0.4
AF	11,260	76	563	1.2	187.2	187.2	188.1	0.9
AG	11,712	65	223	3.2	187.7	187.7	188.5	0.8
AH	11,880	36	152	4.5	188.3	188.3	188.9	0.6
AI	12,114	20	115	5.7	192.7	192.7	193.3	0.6
AJ	12,244	52	327	1.9	194.3	194.3	194.6	0.3
AK	12,333	106	630	1.3	194.9	194.9	195.7	0.8
AL	12,534	162	843	0.9	195.0	195.0	195.7	0.7
AM	12,902	172	693	1.1	195.1	195.1	195.8	0.7
AN	13,149	161	518	1.6	195.2	195.2	196.0	0.8
AO	13,518	118	380	1.5	195.6	195.6	196.5	0.9
AP	13,979	115	227	2.5	197.1	197.1	197.6	0.5
AQ	14,303	118	356	1.7	198.0	198.0	198.6	0.6
AR	15,312	126	308	2.1	199.8	199.8	200.8	1.0
AS	15,464	132	310	2.2	200.6	200.6	201.6	1.0
AT	15,757	114	318	2.4	201.8	201.8	202.8	1.0
AU	16,548	113	290	2.3	204.4	204.4	205.2	0.8
AV	16,802	134	361	1.6	205.1	205.1	206.0	0.9
AW	17,402	161	336	2.2	206.6	206.6	207.6	1.0
AX	17,846	163	236	3.3	209.1	209.1	210.0	0.9
AY	18,225	97	235	2.5	212.2	212.2	213.2	1.0
AZ	18,477	70	228	3.1	213.6	213.6	214.4	0.8

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BRONSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BRONSON CREEK								
BA	19,047	97	310	1.9	216.7	216.7	217.3	0.6
BB	19,314	104	282	1.6	217.0	217.0	217.9	0.9
BC	19,741	89	213	2.1	218.2	218.2	219.2	1.0
BD	20,519	142	360	1.5	220.7	220.7	221.7	1.0
BE	20,946	26	81	6.5	223.1	223.1	223.9	0.8
BF	21,117	44	105	5.0	225.0	225.0	225.5	0.5
BG	21,674	92	282	1.9	227.4	227.4	228.4	1.0
BH	22,346	151	279	2.0	229.0	229.0	229.9	0.9
BI	22,974	172	255	1.5	232.7	232.7	233.2	0.5
BJ	23,737	224	326	1.1	237.3	237.3	237.3	0.0
BK	24,134	26	71	5.5	238.2	238.2	239.0	0.8
BL	24,705	40	148	2.9	243.4	243.4	244.2	0.8
BM	25,210	50	132	3.3	246.2	246.2	246.6	0.4
BN	25,470	56	136	3.6	247.9	247.9	248.5	0.6
BO	25,871	80	166	2.4	249.6	249.6	250.2	0.6
BP	26,223	149	248	2.0	250.3	250.3	251.4	1.1
BQ	26,398	17	53	6.2	251.1	251.1	252.1	1.0
BR	26,734	90	228	1.6	255.0	255.0	255.5	0.5
BS	27,268	18	55	6.0	256.2	256.2	257.2	1.0
BT	27,968	31	117	2.8	264.1	264.1	264.3	0.2
BU	28,532	120	207	2.3	266.7	266.7	267.0	0.3
BV	28,736	39	106	3.4	272.4	272.4	272.6	0.2

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BRONSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BUTTERNUT CREEK								
A	971	27	111	9.1	144.3	125.5 ²	125.9 ²	0.4
B	1,193	88	638	2.0	144.3	133.3 ²	133.4 ²	0.1
C	1,891	49	344	2.8	144.3	133.5 ²	133.5 ²	0.0
D	3,023	169	454	2.8	144.3	134.2 ²	134.6 ²	0.4
E	3,976	107	318	3.8	144.3	135.9 ²	136.3 ²	0.4
F	4,505	101	326	3.2	144.3	137.0 ²	137.9 ²	0.9
G	5,376	91	274	3.9	144.3	139.4 ²	140.3 ²	0.9
H	6,023	74	207	5.2	144.3	141.5 ²	142.5 ²	1.0
I	6,698	80	288	3.7	144.3	143.8 ²	144.5 ²	0.7
J	6,882	72	719	1.3	150.7	150.7	151.4	0.7
K	7,450	88	773	1.2	150.7	150.7	151.5	0.8
L	8,584	99	717	1.4	150.7	150.7	151.6	0.9
M	9,293	97	574	1.8	150.8	150.8	151.7	0.9
N	9,447	50	399	2.5	151.1	151.1	152.1	1.0
O	10,251	77	512	2.0	151.5	151.5	152.5	1.0
P	11,130	44	197	4.3	152.1	152.1	153.1	1.0
Q	11,679	89	419	2.3	153.6	153.6	154.4	0.8
R	12,503	85	372	2.4	154.2	154.2	155.2	1.0
S	13,904	68	219	4.0	157.5	157.5	158.3	0.8
T	14,725	70	286	2.8	160.9	160.9	161.5	0.6
U	15,861	61	211	4.4	163.3	163.3	164.2	0.9
V	16,842	46	204	3.8	166.5	166.5	166.9	0.4
W	17,104	51	240	3.4	167.0	167.0	167.5	0.5
X	17,378	58	439	1.3	170.5	170.5	171.4	0.9
Y	17,706	69	480	1.1	170.6	170.6	171.5	0.9
Z	17,942	70	404	1.8	170.7	170.7	171.6	0.9

¹Feet above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	WASHINGTON COUNTY, OR AND INCORPORATED AREAS	BUTTERNUT CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BUTTERNUT CREEK								
AA	18,222	64	190	3.8	171.1	171.1	171.8	0.7
AB	18,906	91	451	1.5	172.3	172.3	173.0	0.7
AC	19,059	55	287	2.4	173.1	173.1	173.5	0.4
AD	19,340	54	254	2.9	173.5	173.5	173.9	0.4
AE	19,850	70	177	4.7	174.9	174.9	175.3	0.4
AF	20,452	24	95	4.6	177.2	177.2	177.8	0.6
AG	20,933	25	118	4.0	179.5	179.5	180.1	0.6
AH	21,396	32	125	3.7	180.7	180.7	181.7	1.0
AI	21,945	36	124	3.6	182.9	182.9	183.8	0.9
AJ	22,200	45	208	2.0	185.1	185.1	186.0	0.9
AK	22,384	54	191	2.2	185.4	185.4	186.3	0.9
AL	22,964	12	40	10.6	187.5	187.5	188.0	0.5
AM	23,466	27	88	5.1	192.3	192.3	193.3	1.0
AN	24,440	23	118	2.3	195.4	195.4	195.6	0.2
AO	24,666	20	75	3.9	195.5	195.5	195.8	0.3
AP	25,050	18	68	4.2	196.3	196.3	197.3	1.0
AQ	25,448	38	113	1.6	197.7	197.7	198.2	0.5
AR	25,601	33	113	1.6	198.7	198.7	199.1	0.4
AS	25,799	20	85	2.2	198.8	198.8	199.3	0.5
AT	25,881	23	81	2.3	199.0	199.0	199.4	0.4
AU	26,063	31	123	1.5	199.5	199.5	200.5	1.0
AV	26,502	49	146	1.4	199.9	199.9	200.8	0.9
AW	26,728	48	236	0.7	199.9	199.9	200.8	0.9
AX	26,909	16	50	3.1	200.1	200.1	201.1	1.0

¹Feet above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

BUTTERNUT CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR CREEK								
A	445	20	148	6.5	144.2	139.3 ²	139.9 ²	0.6
B	939	40	227	5.4	144.2	143.4 ²	143.9 ²	0.5
C	1,319	40	305	4.3	145.2	145.2	145.6	0.4
D	1,682	100	625	2.1	145.8	145.8	146.2	0.4
E	2,125	65	423	3.1	146.1	146.1	146.5	0.4
F	2,440	60	386	3.3	146.4	146.4	146.9	0.5
G	2,964	57	378	3.0	147.2	147.2	147.7	0.5
H	3,190	50	518	2.2	150.2	150.2	150.7	0.5
I	3,588	151	1,232	1.1	150.6	150.6	151.2	0.6
J	3,958	125	943	1.5	150.6	150.6	151.2	0.6
K	4,584	70	517	2.6	150.9	150.9	151.5	0.6
L	5,291	61	516	1.7	151.5	151.5	152.1	0.6
M	5,646	32	441	2.0	156.8	156.8	157.4	0.6
N	6,789	82	763	2.1	157.6	157.6	158.2	0.6
O	7,311	130	1,334	1.4	157.8	157.8	158.4	0.6
P	8,229	135	990	2.0	158.1	158.1	158.7	0.6
Q	9,142	82	559	2.9	158.9	158.9	159.4	0.5
R	9,731	38	331	4.5	160.4	160.4	160.8	0.4
S	9,913	96	855	1.5	162.0	162.0	162.9	0.9
T	10,462	195	1,567	1.3	162.1	162.1	163.0	0.9
U	10,824	168	1,353	1.4	162.2	162.2	163.1	0.9
V	11,560	141	617	3.0	162.6	162.6	163.6	1.0
W	12,407	189	1,178	1.5	163.8	163.8	164.4	0.6
X	12,767	42	756	2.1	173.6	173.6	174.2	0.6
Y	13,440	86	1,303	1.0	173.7	173.7	174.4	0.7
Z	14,785	58	693	1.8	173.7	173.7	174.6	0.9
AA	14,886	170	1,011	1.7	175.4	175.4	175.7	0.3
AB	15,431	242	2,483	1.0	175.5	175.5	175.8	0.3

¹Feet above confluence with Chicken Creek

²Elevations computed without consideration of backwater effects from Chicken Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
CEDAR CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR MILL CREEK								
A	720	176	476	3.3	170.7	168.9 ²	169.6 ²	0.7
B	1,309	130	472	3.4	170.7	170.8	171.7	0.9
C	1,680	163	639	3.0	171.4	171.4	172.5	1.1
D	2,500	177	591	3.2	172.8	172.8	173.7	0.9
E	3,458	293	456	3.2	173.7	173.7	174.6	0.9
F	3,796	44	393	3.6	181.1	181.1	181.1	0.0
G	4,106	40	399	3.4	181.1	181.1	181.6	0.5
H	4,418	198	1,304	1.1	181.1	181.1	181.8	0.7
I	4,815	326	1,907	0.7	181.2	181.2	181.9	0.7
J	5,163	301	736	2.4	182.1	182.1	182.4	0.3
K	5,723	52	403	3.3	182.2	182.2	182.6	0.4
L	6,062	91	644	1.9	182.7	182.7	183.3	0.6
M	6,216	56	422	2.7	182.8	182.8	183.4	0.6
N	6,600	77	551	2.1	183.0	183.0	183.7	0.7
O	7,283	127	615	2.1	183.4	183.4	184.0	0.6
P	7,435	98	410	3.2	183.5	183.5	184.1	0.6
Q	7,705	100	395	3.7	184.0	184.0	184.5	0.5
R	7,979	124	642	2.0	184.4	184.4	185.0	0.6
S	8,218	173	735	1.8	184.5	184.5	185.2	0.7
T	8,448	153	847	1.8	184.9	184.9	185.4	0.5
U	8,652	181	956	1.2	184.9	184.9	185.5	0.6
V	8,961	64	266	4.8	186.0	186.0	186.0	0.0
W	9,310	80	468	1.6	188.8	188.8	189.7	0.9
X	9,651	90	392	2.2	188.9	188.9	189.8	0.9
Y	9,896	96	317	2.4	189.2	189.2	190.1	0.9
Z	10,161	60	221	3.3	191.0	191.0	191.7	0.7

¹Feet above confluence with Beaverton Creek

²Elevations computed without consideration of backwater effects from Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR MILL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR MILL CREEK								
AA	10,496	31	154	4.7	194.6	194.6	194.6	0.0
AB	10,683	55	180	4.7	195.9	195.9	196.2	0.3
AC	11,213	31	184	4.0	198.3	198.3	199.1	0.8
AD	11,440	58	186	4.7	198.9	198.9	199.9	1.0
AE	11,740	60	168	5.3	201.9	201.9	202.5	0.6
AF	12,247	29	215	3.4	204.7	204.7	205.6	0.9
AG	13,193	19	101	4.7	207.7	207.1	207.7	0.6
AH	13,629	20	112	4.2	210.0	210.0	210.0	0.0
AI	13,787	27	84	5.6	212.4	212.3	212.4	0.1
AJ	13,897	30	203	2.3	213.0	213.0	213.0	0.0
AK	14,316	31	169	4.1	213.8	213.7	213.8	0.1
AL	14,823	29	202	3.5	215.4	215.1	215.4	0.3
AM	15,007	19	104	6.1	216.0	215.4	216.0	0.6
AN	15,250	18	118	5.3	218.2	217.7	218.2	0.5
AO	15,639	20	137	4.6	220.9	220.6	220.9	0.3
AP	15,851	8	80	7.9	224.0	223.4	224.0	0.6
AQ	16,173	34	233	2.7	225.3	224.9	225.3	0.4
AR	16,540	69	264	2.4	227.6	226.7	227.6	0.9
AS	16,746	17	124	5.1	229.0	228.5	229.0	0.5
AT	16,880	46	240	2.9	229.7	228.9	229.7	0.8
AU	17,053	145	299	2.8	232.7	231.8	232.7	0.9
AV	17,712	19	109	6.4	234.2	233.7	234.2	0.5
AW	18,405	29	179	4.0	239.4	239.0	239.4	0.4
AX	18,853	32	144	5.7	242.2	241.4	242.2	0.8
AY	19,549	45	193	3.6	248.7	247.7	248.7	1.0
AZ	20,008	25	124	5.6	252.5	252.2	252.5	0.3

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR MILL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR MILL CREEK								
BA	20,278	78	363	2.0	280.4	280.1	280.4	0.3
BB	20,395	59	381	1.7	280.5	280.2	280.5	0.3
BC	20,793	82	355	2.1	280.8	280.3	280.8	0.5
BD	21,460	60	161	4.9	282.3	282.0	282.3	0.3
BE	21,641	44	176	4.0	283.3	282.7	283.3	0.6
BF	21,851	21	72	8.2	284.5	284.2	284.5	0.3
BG	22,052	18	89	6.5	288.7	287.7	288.7	1.0
BH	22,199	24	154	3.5	292.7	291.9	292.7	0.8
BI	22,453	126	195	4.3	300.3	300.3	300.3	0.0

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR MILL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR MILL CREEK NORTH OVERFLOW								
A	83	169	340	0.7	206.6	206.6	207.3	0.7
B	336	35	62	3.7	207.2	207.2	207.8	0.6
C	427	31	37	6.2	208.0	208.0	208.1	0.1
D	799	24	34	6.8	210.9	210.9	211.0	0.1
E	1,133	104	67	3.4	211.9	211.9	212.2	0.3

¹Feet above confluence with Cedar Mill Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR MILL CREEK NORTH OVERFLOW

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CELEBRITY CREEK								
A	326	21	94	2.2	179.2	179.2	179.9	0.7
B	526	14	60	3.4	179.6	179.6	180.2	0.6
C	710	7	41	6.3	179.9	179.9	180.6	0.7
D	1,020	19	73	2.8	181.5	181.5	181.7	0.2
E	1,134	21	97	2.1	182.0	182.0	182.6	0.6
F	1,445	18	84	2.4	182.4	182.4	182.9	0.5
G	1,568	19	58	3.5	183.1	183.1	183.7	0.6
H	1,714	21	88	2.3	183.6	183.6	184.1	0.5
I	1,917	19	77	2.6	183.8	183.8	184.3	0.5
J	2,070	19	65	3.1	184.2	184.2	184.7	0.5
K	2,328	13	46	4.4	186.4	186.4	186.7	0.3
L	2,517	18	55	3.1	187.7	187.7	188.0	0.3
M	2,666	21	94	1.8	188.6	188.6	189.1	0.5
N	2,796	19	53	3.3	188.8	188.8	189.5	0.7
O	3,115	20	48	5.2	191.7	191.7	192.7	1.0
P	3,431	23	51	4.7	194.2	194.2	195.1	0.9
Q	3,718	19	47	4.2	195.6	195.6	196.5	0.9
R	3,939	12	35	4.4	197.2	197.2	197.6	0.4
S	4,074	12	37	4.0	197.8	197.8	198.6	0.8
T	4,255	12	38	3.9	199.1	199.1	200.1	1.0
U	4,459	12	35	4.9	201.2	201.2	201.4	0.2
V	4,831	23	37	5.0	204.5	204.5	204.7	0.2
W	5,215	14	24	7.0	206.1	206.1	206.4	0.3
X	5,550	25	34	4.9	211.8	211.8	211.8	0.0

¹Feet above confluence with Butternut Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

CELEBRITY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHICKEN CREEK								
A	2,316	45	381	4.1	134.4	132.0 ³	132.5 ³	0.5
B	2,540	93	409	3.9	134.4	134.0 ³	134.1 ³	0.1
C	3,065	117	596	2.9	134.9	134.9	135.0	0.1
D	4,074	110	694	3.5	135.9	135.9	136.1	0.2
E	7,110	130	634	4.1	139.5	139.5	139.9	0.4
F	7,299	57	363	5.7	141.1	141.1	141.2	0.1
G	8,632	50	473	4.0	144.1	144.1	144.8	0.7
H	11,383	109	305	4.8	149.6	149.6	150.4	0.8
I	12,425	165	1,119	1.9	151.0	151.0	151.6	0.6
J	13,121	200	1,105	1.4	151.2	151.2	151.9	0.7
K	13,273	67	581	2.1	153.8	153.8	154.5	0.7
L	14,049	92	632	1.8	153.8	153.8	154.6	0.8
M	15,132	70	356	4.1	154.1	154.1	154.8	0.7
N	15,243	92	239	4.6	157.2	157.2	158.0	0.8
CHICKEN CREEK WEST TRIBUTARY								
A	751 ²	32	185	3.1	153.3	153.3	154.1	0.8
B	1,512 ²	32	140	3.2	156.3	156.3	157.1	0.8

¹Feet above confluence with Tualatin River

²Feet above confluence with Chicken Creek

³Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

CHICKEN CREEK - CHICKEN CREEK WEST TRIBUTARY

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COUNCIL CREEK								
A	2,783	248	1,107	1.9	156.3	143.3 ²	144.1 ²	0.8
B	3,662	298	1,196	1.4	156.3	143.6 ²	144.5 ²	0.9
C	4,250	63	285	5.9	156.3	143.6 ²	144.6 ²	1.0
D	4,432	57	310	5.8	156.3	146.7 ²	146.9 ²	0.2
E	5,015	97	792	2.5	156.3	148.2 ²	149.0 ²	0.8
F	7,942	166	1,074	1.6	156.3	149.6 ²	150.6 ²	1.0
G	8,348	164	968	2.6	156.3	149.9 ²	150.8 ²	0.9
H	8,543	71	482	3.6	156.3	150.5 ²	151.3 ²	0.8
I	8,958	128	779	1.7	156.3	151.1 ²	152.0 ²	0.9
J	10,928	172	968	1.5	156.3	151.9 ²	152.6 ²	0.7
K	13,467	44	339	4.9	156.3	153.7 ²	154.3 ²	0.6
L	13,968	114	658	2.8	156.3	155.3 ²	155.9 ²	0.6
M	16,971	139	1,052	1.9	156.3	155.8 ²	156.5 ²	0.7
N	18,557	139	840	1.8	156.3	156.3	156.9	0.6
O	19,373	39	408	4.4	157.1	157.1	157.8	0.7
P	21,282	57	562	2.8	160.1	160.1	160.3	0.2
Q	22,478	145	1,196	1.3	160.6	160.6	160.9	0.3
R	22,671	106	727	2.1	160.8	160.8	161.1	0.3
S	23,311	76	828	1.9	165.0	165.0	166.0	1.0
T	23,641	183	823	2.2	165.1	165.1	166.1	1.0
U	24,727	169	869	1.9	165.5	165.5	166.5	1.0
V	25,111	174	1,182	0.9	165.6	165.6	166.5	0.9
W	28,143	175	794	0.8	165.8	165.8	166.8	1.0
X	30,233	180	444	3.3	169.0	169.0	169.9	0.9
Y	31,294	227	857	0.3	169.3	169.3	170.2	0.9
Z	32,610	22	149	2.9	172.1	172.1	172.7	0.6

¹Feet above confluence with Dairy Creek

²Elevations computed without consideration of backwater effects from Dairy Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

COUNCIL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COUNCIL CREEK								
AA	33,061	120	778	0.7	172.1	172.1	172.9	0.8
AB	33,727	103	627	0.8	172.1	172.1	173.0	0.9
AC	34,070	82	486	0.3	172.2	172.2	173.0	0.8
AD	35,087	116	519	0.3	172.2	172.2	173.0	0.8
AE	35,235	101	389	0.3	172.2	172.2	173.0	0.8

¹Feet above confluence with Dairy Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

COUNCIL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
DAIRY CREEK								
A	3,512	984	15,983	1.4	152.3	152.3	153.1	0.8
B	5,485	1,222	17,350	1.7	152.3	152.3	153.2	0.9
C	9,167	345	6,445	6.8	153.1	153.1	154.1	1.0
D	9,713	661	10,203	3.3	153.7	153.7	154.6	0.9
E	11,136	380	5,003	7.9	153.7	153.7	154.7	1.0
F	11,438	370	6,628	4.1	155.6	155.6	156.4	0.8
G	11,842	1,078	20,232	1.2	156.0	156.0	156.9	0.9
H	12,157	1,362	12,460	2.9	156.1	156.1	157.0	0.9
I	14,863	1,576	29,815	0.5	156.3	156.3	157.2	0.9
J	16,220	1,587	21,143	0.9	156.3	156.3	157.2	0.9
K	19,998	1,624	22,317	0.9	156.3	156.3	157.2	0.9
L	24,827	1,362	20,267	0.8	156.3	156.3	157.3	1.0
M	27,542	770	9,691	1.6	156.4	156.4	157.4	1.0
N	29,088	1,437	10,703	1.0	156.6	156.6	157.7	1.1
O	32,530	1,017	10,678	0.4	156.9	156.9	158.0	1.1
P	33,566	1,036	10,309	1.5	158.9	158.9	159.7	0.8

¹ Feet Above Confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

DAIRY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
DAWSON CREEK								
A	398	143	573	3.3	147.1	137.3 ²	138.3 ²	1.0
B	1,563	82	217	7.1	147.1	138.5 ²	139.5 ²	0.9
C	1,959	45	289	4.9	147.1	145.7 ²	145.7 ²	0.0
D	2,616	65	383	2.7	147.1	146.2 ²	146.6 ²	0.4
E	3,277	80	325	3.9	147.1	146.7 ²	147.3 ²	0.6
F	3,699	80	320	3.9	147.5	147.5	148.1	0.6
G	4,034	139	809	1.6	151.3	151.3	152.2	0.9
H	4,602	160	846	1.3	151.4	151.4	152.3	0.9
I	5,709	151	613	1.9	151.8	151.7	152.5	0.8
J	6,366	70	286	3.3	152.3	152.3	153.0	0.7
K	6,985	55	213	4.6	154.3	154.3	155.1	0.8
L	7,343	54	254	2.9	155.0	155.0	156.0	1.0
M	7,726	58	220	4.3	155.9	155.9	156.7	0.8
N	8,397	93	321	4.3	158.2	158.2	159.0	0.8
O	9,067	12	101	5.7	163.1	163.0	163.4	0.4
P	9,743	45	241	3.0	163.9	163.8	164.5	0.7
Q	9,973	55	237	3.6	164.0	163.9	164.8	0.9
R	10,291	95	351	2.6	164.3	164.3	165.3	1.0
S	10,853	102	465	1.8	164.8	164.8	165.7	0.9
T	11,409	28	111	4.9	168.1	168.1	168.2	0.1
U	11,586	79	342	2.5	169.8	169.8	170.8	1.0
V	12,375	60	168	5.1	171.7	171.5	172.1	0.6
W	12,715	50	153	4.0	172.9	173.0	173.8	0.8
X	12,955	44	150	4.4	173.7	173.7	174.7	1.0
Y	13,426	75	183	3.8	176.0	176.0	176.4	0.4
Z	14,649	42	153	2.1	181.0	181.0	181.4	0.4
AA	15,630	80	226	2.4	182.6	182.5	183.6	1.1
AB	16,130	70	163	2.6	183.9	184.0	184.7	0.7

¹Feet above confluence with Rock Creek North

²Elevations computed without consideration of backwater effects from Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

DAWSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
DEER CREEK								
A	319	15	38	2.2	175.7	175.7	175.9	0.2
B	592	15	27	3.0	176.1	176.1	176.4	0.3
C	864	10	13	6.1	176.3	176.3	176.4	0.1
D	1,298	13	26	3.1	178.4	178.4	179.2	0.8
E	1,520	14	22	3.6	179.7	179.7	179.8	0.1
F	2,377	9	19	4.2	187.7	187.7	187.7	0.0
G	2,741	7	11	7.3	192.0	192.0	192.1	0.1
H	3,185	9	17	4.8	197.6	197.6	198.0	0.4
I	3,439	8	12	7.0	202.2	202.2	202.2	0.0

¹Feet above confluence with Bethany Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

DEER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ERICKSON CREEK								
A	379	34	122	4.3	172.6	168.9 ²	169.4 ²	0.5
B	680	27	91	5.3	172.6	170.4 ²	170.7 ²	0.3
C	1,023	17	90	4.4	172.6	172.0 ²	172.5 ²	0.5
D	1,412	28	209	1.9	173.3	173.3	174.0	0.7
E	1,626	26	156	2.8	173.4	173.4	174.2	0.8
F	1,874	67	235	2.2	173.7	173.7	174.4	0.7
G	2,270	31	69	2.7	177.8	177.8	178.3	0.5
H	2,527	40	35	5.4	181.9	181.9	182.4	0.5
I	2,773	40	148	1.3	182.2	182.2	183.0	0.8
J	3,346	24	46	4.1	187.7	187.7	187.7	0.0
K	3,799	41	35	5.4	188.6	188.6	189.1	0.5
L	4,289	39	58	3.2	189.6	189.6	190.2	0.6
M	4,658	35	96	2.0	190.8	190.8	191.0	0.2
N	5,009	21	143	1.5	190.8	190.8	191.1	0.3
O	5,297	19	67	3.1	190.8	190.8	191.2	0.4
P	5,650	10	18	1.3	194.1	194.1	194.8	0.7
Q	5,914	9	22	1.0	194.5	194.5	195.5	1.0
R	6,215	5	18	1.7	197.3	197.3	198.0	0.7
S	6,452	7	10	5.9	198.0	198.0	198.9	0.9
T	6,781	34	204	0.8	198.9	198.9	199.9	1.0
U	6,897	33	178	1.0	198.9	198.9	199.9	1.0
V	7,086	52	220	0.7	199.0	199.0	200.0	1.0
W	7,410	39	155	1.0	199.1	199.1	200.0	0.9
X	7,617	40	147	1.2	199.2	199.2	200.1	0.9
Y	7,993	24	74	1.8	199.6	199.6	200.3	0.7
Z	8,330	15	41	3.9	200.2	200.2	200.8	0.6
AA	8,637	16	32	4.3	202.8	202.8	202.8	0.0

¹Feet above confluence with Beaverton Creek

²Elevations computed without consideration of backwater effects from Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ERICKSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
FANNO CREEK								
A	0.02	251	2,242	1.9	130.8	120.8 ²	121.8 ²	1.0
B	0.20	351	2,723	1.6	130.8	121.4 ²	122.3 ²	0.9
C	0.53	411	2,308	1.8	130.8	122.2 ²	123.2 ²	1.0
D	0.99	221	1,218	3.5	130.8	126.7 ²	127.6 ²	0.9
E	1.30	126	987	4.2	131.3	131.3	132.0	0.7
F	1.45	98	901	4.7	133.2	133.2	134.2	1.0
G	1.76	271	2,285	1.8	135.2	135.2	136.1	0.9
H	2.25	281	1,770	2.4	136.6	136.6	137.6	1.0
I	2.73	191	793	5.2	141.0	141.0	141.4	0.4
J	3.02	301	2,048	2.0	142.2	142.2	142.7	0.5
K	3.43	311	2,417	1.7	143.8	143.8	144.7	0.9
L	3.80	301	876	4.7	145.3	145.3	146.2	0.9
M	4.08	256	1,206	3.4	147.8	147.8	148.5	0.7
N	4.41	410	1,825	2.2	149.4	149.4	150.0	0.6
O	4.91	161	789	5.1	155.9	155.9	156.8	0.9
P	5.16	256	2,707	1.5	158.6	158.6	159.4	0.8
Q	5.73	331	2,447	1.6	159.5	159.5	160.3	0.8
R	5.99	201	1,998	1.9	161.6	161.6	162.2	0.6
S	6.25	191	1,649	2.0	162.3	162.3	163.2	0.9
T	6.40	191	992	3.3	163.2	163.2	163.9	0.7
U	6.66	226	1,420	1.9	163.9	163.9	164.8	0.9
V	7.11	226	1,280	2.1	165.7	165.7	166.7	1.0
W	7.48	321	1,718	1.6	169.0	169.0	169.3	0.3
X	7.75	331	1,570	1.5	169.5	169.5	170.0	0.5
Y	8.11	601	1,877	1.3	170.6	170.6	171.1	0.5
Z	8.29	351	1,120	2.1	171.8	171.8	172.7	0.9

¹Miles above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	WASHINGTON COUNTY, OR AND INCORPORATED AREAS	FANNO CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
FANNO CREEK								
AA	8.67	206	1,364	1.6	180.7	180.7	181.0	0.3
AB	8.91	95	605	3.7	182.1	182.1	182.5	0.4
AC	9.42	311	1,194	1.9	186.1	186.1	186.6	0.5
AD	9.55	96	529	4.2	189.0	189.0	189.7	0.7
AE	9.97	146	1,490	1.4	192.2	192.2	193.2	1.0
AF	10.17	141	806	2.5	194.1	194.1	194.8	0.7
AG	10.62	76	549	3.6	198.0	198.0	199.0	1.0
AH	10.76	176	871	2.3	201.0	201.0	201.8	0.8
AI	11.03	151	1,234	1.6	204.0	204.0	204.8	0.8
AJ	11.38	190	493	4.0	207.8	207.8	208.3	0.5
AK	11.58	176	425	4.5	210.7	210.7	211.3	0.6
AL	11.87	206	532	3.6	214.4	214.4	215.4	1.0
AM	12.18	141	315	5.9	220.0	220.0	220.3	0.3
AN	12.36	236	863	1.8	221.1	221.1	222.1	1.0
AO	12.81	96	346	3.7	230.8	230.8	231.8	1.0
AP	13.16	91	498	2.6	236.4	236.4	237.4	1.0
AQ	13.32	76	360	3.5	239.1	239.1	239.8	0.7
AR	13.49	80	416	3.1	240.3	240.3	241.3	1.0

¹Miles above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

FANNO CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
GALES CREEK								
A	0.80	2,000	4,233	2.4	167.3	162.3 ²	163.2 ²	0.9
B	1.49	1,500	3,744	2.7	167.7	167.7	168.5	0.8
C	1.64	900	6,145	1.6	169.4	169.4	170.3	0.9
D	1.88	1,620	8,828	1.1	171.8	171.8	172.5	0.7
E	2.03	1,590	7,884	1.3	172.3	172.3	173.1	0.8
F	2.39	1,300	9,133	1.1	175.0	175.0	175.5	0.5
G	2.52	1,212	8,651	1.2	175.4	175.4	176.0	0.6
H	2.98	1,950	11,580	0.9	175.6	175.6	176.3	0.7
I	3.35	2,000	7,884	1.3	175.8	175.8	176.5	0.7
J	4.18	410	1,199	8.3	178.5	178.5	179.3	0.8
K	4.28	180	1,951	5.1	182.7	182.7	182.9	0.2
L	4.38	350	2,727	3.6	183.6	183.6	183.9	0.3
M	4.98	2,120	9,893	1.0	184.9	184.9	185.9	1.0
N	5.20	2,450	7,252	1.4	185.2	185.2	186.2	1.0
O	5.68	2,370	5,147	1.9	186.8	186.8	187.7	0.9
P	6.13	1,900	5,113	1.9	189.4	189.4	189.9	0.5
Q	6.51	1,600	3,240	3.0	191.4	191.4	192.4	1.0
R	6.93	1,260	3,861	2.5	196.8	196.8	197.8	1.0
S	7.16	660	4,170	2.3	198.8	198.8	199.5	0.7
T	7.55	570	2,044	4.8	201.2	201.2	202.0	0.8
U	7.92	190	1,826	5.2	205.5	205.5	206.4	0.9
V	7.98	225	2,229	4.2	207.0	207.0	207.6	0.6
W	8.06	470	3,750	2.5	207.3	207.3	208.3	1.0
X	8.42	350	3,469	2.7	208.9	208.9	209.8	0.9
Y	8.72	210	2,188	4.3	211.3	211.3	211.9	0.6
Z	8.98	350	2,632	3.6	214.4	214.4	215.1	0.7

¹Miles above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

GALES CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
GALES CREEK								
AA	9.48	350	3,515	2.7	219.0	219.0	219.9	0.9
AB	9.58	90	1,215	7.5	219.8	219.8	220.5	0.7
AC	17.38	81	739	7.6	464.4	464.4	465.4	1.0
AD	17.72	75	631	8.9	477.1	477.1	477.7	0.6
AE	17.89	88	841	6.6	483.3	483.3	483.5	0.2
AF	17.97	60	383	14.5	486.6	486.6	486.6	0.0
AG	18.28	67	703	6.0	504.2	504.2	504.2	0.0

¹Miles above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

GALES CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
GLENCOE SWALE								
A	1,011	119	351	2.0	156.2	140.5 ²	141.5 ²	1.0
B	1,511	61	143	3.7	156.2	141.3 ²	142.1 ²	0.8
C	2,038	40	125	3.8	156.2	143.0 ²	143.7 ²	0.7
D	2,647	22	104	3.6	156.2	144.5 ²	145.3 ²	0.8
E	3,158	22	79	5.1	156.2	146.5 ²	147.1 ²	0.6
F	3,469	22	144	2.3	159.2	159.2	160.0	0.8
G	4,337	79	973	1.1	159.3	159.3	160.3	1.0
H	4,943	36	615	1.2	166.4	166.4	167.4	1.0
I	5,336	96	1,711	0.4	166.4	166.4	167.4	1.0
J	5,920	91	1,392	0.5	166.4	166.4	167.4	1.0
K	7,051	120	1,522	0.7	166.4	166.4	167.4	1.0
L	7,915	128	1,306	0.8	166.4	166.4	167.4	1.0
M	8,545	143	1,285	0.8	166.4	166.4	167.4	1.0
N	9,149	160	1,148	0.9	166.4	166.4	167.4	1.0
O	9,635	79	490	2.0	166.6	166.6	167.6	1.0
P	10,051	71	411	2.3	166.8	166.8	167.7	0.9
Q	10,548	80	360	3.2	167.2	167.2	168.0	0.8
R	10,653	25	245	3.7	172.6	172.6	173.0	0.4
S	11,112	96	709	1.3	172.6	172.6	173.4	0.8
T	11,598	54	271	2.6	172.7	172.7	173.5	0.8
U	12,055	109	344	2.5	173.2	173.2	173.8	0.6
V	12,680	48	91	5.1	173.3	173.3	173.7	0.4
W	13,235	39	179	2.6	175.6	175.6	175.9	0.3
X	13,733	25	66	11.2	177.4	177.4	177.4	0.0
Y	14,329	67	305	2.4	183.7	183.7	184.3	0.6
Z	15,222	79	311	1.6	183.9	183.9	184.6	0.7

¹Feet above confluence with McKay Creek

²Elevations computed without consideration of backwater effects from McKay Creek and Dairy Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

GLENCOE SWALE

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
GLENCOE SWALE								
AA	15,713	73	301	1.5	187.3	187.3	187.5	0.2
AB	16,182	42	178	2.4	187.3	187.3	187.6	0.3
AC	16,700	58	216	2.0	187.4	187.4	187.9	0.5
AD	17,233	36	74	4.7	188.0	188.0	188.7	0.7
AE	18,004	42	283	1.0	194.6	194.6	195.5	0.9
AF	18,713	97	361	1.0	194.6	194.6	195.6	1.0
AG	18,924	88	297	0.5	194.6	194.7	195.6	0.9
AH	19,541	28	60	2.3	194.7	194.7	195.7	1.0
AI	20,023	16	35	3.6	197.0	197.0	197.0	0.0
AJ	20,496	18	35	3.1	198.8	198.8	199.4	0.6
AK	20,981	23	55	2.1	199.9	199.9	200.8	0.9
AL	21,477	22	49	2.3	200.9	200.9	201.8	0.9

¹Feet above confluence with McKay Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

GLENCOE SWALE

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
GOLF CREEK								
A	338	80	225	1.6	198.3	198.3	199.3	1.0
B	713	26	112	3.9	199.8	199.8	200.7	0.9
C	950	31	103	4.1	200.9	200.9	201.6	0.7
D	1,092	62	281	1.5	202.6	202.6	203.6	1.0
E	1,226	35	125	3.5	202.8	202.8	203.7	0.9
F	1,330	29	117	3.2	203.0	203.0	204.0	1.0
G	1,436	10	49	8.6	203.3	203.3	204.0	0.7
H	1,639	29	162	2.6	210.1	210.1	210.9	0.8
I	2,028	21	160	2.6	213.9	213.9	214.8	0.9
J	2,094	60	415	1.0	214.0	214.0	214.9	1.0
K	2,280	34	217	1.9	214.0	214.0	214.9	0.9
L	2,448	34	182	2.1	214.0	214.0	215.0	1.0
M	2,663	66	341	1.2	214.2	214.2	215.2	1.0
N	2,819	18	71	5.9	214.2	214.2	215.2	1.0
O	2,967	61	501	1.1	221.6	221.6	222.5	0.9
P	3,224	43	297	1.5	221.7	221.7	222.5	0.8
Q	3,393	55	252	1.7	221.7	221.7	222.6	0.9
R	3,576	18	72	5.0	223.1	223.1	223.4	0.3

¹Feet above confluence with Hall Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

GOLF CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
GORDON CREEK								
A	521	8	22	9.5	146.2	128.4 ²	128.5 ²	0.1
B	1,817	25	80	2.6	146.2	136.0 ²	136.7 ²	0.7
C	2,497	17	27	7.1	146.2	141.1 ²	141.1 ²	0.0
D	3,358	32	92	2.5	152.9	152.9	153.6	0.7
E	3,913	20	96	2.0	153.0	153.0	153.9	0.9
F	4,822	16	36	5.3	154.3	154.3	154.7	0.4
G	5,383	19	61	3.8	160.2	160.2	160.4	0.2
H	5,898	45	93	1.8	160.7	160.7	161.4	0.7
I	6,178	30	26	3.6	161.8	161.8	161.8	0.0
J	6,732	19	29	2.7	165.4	165.4	165.5	0.1
K	6,818	12	42	1.8	168.6	168.6	168.6	0.0
L	7,653	13	14	6.6	172.9	172.9	172.9	0.0
M	8,514	9	21	3.3	181.7	181.7	182.6	0.9
N	8,595	12	38	1.5	182.7	182.7	183.5	0.8
O	9,360	17	6	3.5	191.6	191.6	191.6	0.0
P	9,990	23	13	1.2	196.3	196.3	196.3	0.0

¹Feet above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

GORDON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HALL CREEK								
A	319	48	423	2.4	181.1	181.0	181.2	0.2
B	641	31	264	2.8	181.1	181.1	181.2	0.1
C	846	58	163	3.1	181.7	181.7	182.7	1.0
D	1,184	116	304	1.6	182.1	182.1	183.1	1.0
E	1,546	44	264	2.8	182.9	182.9	183.8	0.9
F	1,906	93	725	1.0	183.8	183.8	184.8	1.0
G	2,024	73	427	1.8	183.9	183.9	184.9	1.0
H	2,256	88	518	1.5	184.4	184.4	185.3	0.9
I	2,491	64	352	2.1	184.6	184.6	185.4	0.8
J	2,654	37	201	3.7	185.4	185.4	186.0	0.6
K	2,807	226	627	1.3	185.8	185.8	186.3	0.5
L	3,303	47	269	2.7	190.0	190.0	190.0	0.0
M	3,747	15	137	5.0	191.3	191.3	191.8	0.5
N	3,929	26	147	4.6	192.2	192.2	192.6	0.4
O	4,133	24	168	4.0	193.4	193.4	194.3	0.9
P	4,339	73	298	2.1	194.5	194.5	195.4	0.9
Q	4,603	71	389	1.9	195.1	195.1	195.9	0.8
R	4,909	25	131	5.4	198.0	198.0	198.2	0.2
S	5,264	126	552	0.5	198.4	198.4	199.4	1.0
T	5,551	126	469	0.6	198.4	198.4	199.4	1.0
U	5,864	103	438	0.7	198.3	198.3	199.4	0.9
V	6,148	13	51	4.9	198.5	198.5	199.4	0.9
W	6,253	23	122	2.2	201.7	201.7	202.7	1.0
X	6,572	49	235	1.1	202.0	202.0	202.9	0.9
Y	6,883	23	71	3.6	202.1	202.1	203.1	1.0
Z	7,157	26	68	3.7	205.2	205.2	205.2	0.0

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

HALL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HALL CREEK								
AA	7,308	26	60	5.2	206.8	206.8	207.0	0.2
AB	7,542	36	29	5.1	207.8	207.8	208.0	0.2
AC	7,784	23	94	1.1	210.4	210.4	210.5	0.1
AD	8,001	10	54	3.1	210.4	210.4	210.7	0.3
AE	8,196	13	46	3.9	210.7	210.7	211.6	0.9
AF	8,325	14	42	4.0	213.4	213.4	213.6	0.2
AG	8,514	18	103	1.6	219.6	219.6	220.6	1.0
AH	8,644	21	91	1.8	219.7	219.7	220.7	1.0
AI	8,749	39	131	1.1	219.8	219.8	220.8	1.0
AJ	8,921	22	61	2.7	220.1	220.1	220.9	0.8
AK	9,111	15	30	5.0	222.0	222.0	222.0	0.0
AL	9,295	55	231	0.7	227.3	227.3	228.1	0.8
AM	9,536	19	38	4.3	227.3	227.3	228.0	0.7
AN	9,846	13	35	5.3	231.9	231.9	231.9	0.0
AO	9,966	9	32	5.2	235.8	235.8	236.2	0.4
AP	10,091	15	45	3.9	236.1	236.1	237.0	0.9
AQ	10,306	10	40	3.6	238.0	238.0	238.3	0.3
AR	10,448	36	150	0.9	243.0	243.0	243.9	0.9
AS	10,681	21	64	2.4	243.0	243.0	244.0	1.0
AT	10,842	18	45	3.5	244.4	244.4	244.7	0.3
AU	10,952	11	34	4.3	245.4	245.4	245.8	0.4
AV	11,073	253	1,274	0.1	250.4	250.4	251.1	0.7
AW	11,228	314	1,569	0.1	250.4	250.4	251.1	0.7
AX	11,326	58	90	0.8	250.4	250.4	251.1	0.7
AY	11,434	102	195	1.3	255.4	255.4	256.1	0.7
AZ	11,558	13	84	1.7	255.5	255.5	256.2	0.7

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

HALL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HALL CREEK - 106TH TRIBUTARY								
A	138	10	5	4.0	191.6	191.6	191.8	0.2
B	449	10	5	4.0	195.2	195.2	195.4	0.2
C	616	10	5	3.9	200.3	200.3	200.5	0.2
D	766	10	5	4.0	205.2	205.2	205.2	0.0
E	912	10	5	4.0	208.4	208.4	208.4	0.0
F	1,215	7	27	2.6	209.7	209.7	209.9	0.2
G	1,357	10	20	1.7	209.9	209.9	210.4	0.5
H	1,507	14	12	2.9	211.9	211.9	211.9	0.0
I	1,812	7	4	8.0	218.5	218.5	218.5	0.0
J	2,162	22	43	0.8	226.1	226.1	226.2	0.1
K	2,372	10	12	2.7	231.0	231.0	231.3	0.3
L	2,436	5	17	2.0	231.1	231.1	231.4	0.3
M	2,647	10	19	1.8	231.7	231.7	232.1	0.4
N	2,937	3	5	6.9	245.1	245.1	245.1	0.0

¹Feet above confluence with Hall Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

HALL CREEK - 106TH TRIBUTARY

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HALL CREEK - NORTH FORK								
A	182	9	16	3.2	181.1	181.1	181.2	0.1
B	475	30	18	2.7	181.1	181.1	181.4	0.3
C	553	30	78	0.6	182.3	182.3	182.4	0.1
D	668	24	220	1.1	182.4	182.4	182.4	0.0
E	804	13	135	1.9	182.4	182.4	182.4	0.0
F	1,224	39	300	0.8	182.5	182.5	182.7	0.2
G	1,428	10	98	2.4	182.5	182.5	182.7	0.2
H	1,576	10	103	2.2	182.5	182.5	183.0	0.5
I	1,699	18	166	1.5	182.5	182.5	183.2	0.7
J	2,005	30	209	1.4	182.5	182.5	183.3	0.8
K	2,101	37	256	1.1	182.5	182.5	183.4	0.9
L	2,245	32	244	1.0	182.5	182.5	183.4	0.9
M	2,382	43	258	0.9	182.6	182.6	183.4	0.8
N	2,739	54	328	0.8	182.6	182.6	183.5	0.9
O	3,056	61	231	0.9	182.6	182.6	183.5	0.9
P	3,245	62	178	1.3	182.6	182.6	183.6	1.0

¹Feet above confluence with Hall Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
HALL CREEK - NORTH FORK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HALL CREEK - SOUTH FORK								
A	147	27	12	3.9	212.4	212.4	212.4	0.0
B	378	23	11	4.0	218.1	218.1	218.1	0.0
C	612	8	22	3.4	218.3	218.3	218.5	0.2
D	902	30	87	0.9	220.7	220.7	221.0	0.3
E	1,017	40	56	0.8	221.2	221.2	221.3	0.1
F	1,161	15	17	2.6	224.2	224.2	224.2	0.0
G	1,365	42	42	1.0	227.7	227.7	227.8	0.1
H	1,764	10	16	2.7	231.3	231.3	231.9	0.6
I	2,088	10	15	2.8	235.1	235.1	235.9	0.8
J	2,434	30	8	3.0	239.5	239.5	239.6	0.1
K	2,621	27	52	0.5	241.1	241.1	241.2	0.1
L	2,747	7	25	2.1	241.8	241.8	242.6	0.8
M	2,852	12	36	1.2	241.9	241.9	242.8	0.9
N	2,999	7	7	5.9	243.1	243.1	243.1	0.0
O	3,121	17	35	1.2	245.9	245.9	246.6	0.7
P	3,258	15	42	1.0	247.9	247.9	248.7	0.8
Q	3,374	22	16	1.4	249.7	249.7	250.1	0.4
R	3,534	13	6	3.9	252.1	252.0	252.0	0.0
S	3,580	22	14	1.7	253.1	253.1	253.1	0.0
T	3,836	5	4	7.2	258.1	258.1	258.1	0.0
U	3,990	10	9	3.5	259.8	259.8	259.8	0.0
V	4,035	22	68	0.4	260.1	260.1	260.1	0.0

¹Feet above confluence with Hall Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

HALL CREEK - SOUTH FORK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HEDGES CREEK								
A	823	40	359	1.7	128.9	122.1 ²	123.0 ²	0.9
B	1,384	72	474	1.5	128.9	122.4 ²	123.3 ²	0.9
C	1,442	78	555	0.9	128.9	122.4 ²	123.3 ²	0.9
D	1,895	141	823	0.6	128.9	122.4 ²	123.3 ²	0.9
E	1,998	177	1,017	0.3	128.9	122.4 ²	123.4 ²	1.0
F	2,137	190	1,066	0.3	128.9	122.4 ²	123.4 ²	1.0
G	2,330	188	1,391	0.5	128.9	125.1 ²	125.9 ²	0.8
H	2,642	205	1,547	0.6	128.9	125.1 ²	125.9 ²	0.8
I	3,164	117	753	1.7	128.9	125.1 ²	126.0 ²	0.9
J	3,267	215	1,171	0.9	128.9	125.2 ²	126.0 ²	0.8
K	4,288	188	1,122	1.0	128.9	125.7 ²	126.2 ²	0.5
L	4,664	117	562	1.8	128.9	126.7 ²	127.1 ²	0.4
M	5,002	116	623	1.4	128.9	126.9 ²	127.3 ²	0.4
N	5,577	84	359	2.9	128.9	127.4 ²	127.8 ²	0.4
O	6,148	87	530	1.7	128.9	127.8 ²	128.5 ²	0.7
P	6,681	76	597	2.0	128.9	128.1 ²	128.9 ²	0.8
Q	7,162	66	252	3.5	129.3	129.3	129.7	0.4
R	7,699	27	152	6.3	133.1	133.1	133.2	0.1
S	7,918	136	770	1.3	133.9	133.9	134.4	0.5
T	8,365	171	1,202	0.8	133.9	133.9	134.5	0.6
U	8,742	72	495	1.6	133.9	133.9	134.5	0.6
V	9,353	74	418	1.9	134.4	134.4	134.9	0.5
W	9,554	61	348	2.3	134.6	134.6	135.1	0.5
X	10,016	50	133	6.0	136.1	136.1	136.2	0.1
Y	10,959	36	294	2.8	139.9	139.9	140.4	0.5
Z	11,919	32	143	5.2	142.1	142.1	142.8	0.7

¹Feet above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

HEDGES CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HOLCOMB CREEK								
A	207	71	222	2.9	178.3	175.3 ²	176.2 ²	0.9
B	800	203	885	0.6	178.3	175.5 ²	176.4 ²	0.9
C	1,476	132	632	0.7	178.3	175.5 ²	176.5 ²	1.0
D	2,453	64	139	5.2	178.3	177.7 ²	178.3 ²	0.6
E	2,817	68	193	2.6	178.3	178.2 ²	179.2 ²	1.0
F	3,105	68	180	3.1	178.7	178.7	179.7	1.0
G	3,653	59	155	3.6	180.2	180.2	181.1	0.9
H	4,537	48	295	2.7	185.9	185.9	186.8	0.9
I	5,445	78	205	2.5	186.0	186.0	187.0	1.0
J	6,416	98	141	3.3	189.5	189.5	190.1	0.6
K	7,335	81	148	2.3	192.9	192.9	193.8	0.9
L	8,277	252	91	4.5	198.1	198.1	199.2	1.1
M	8,664	307	101	2.7	199.9	199.9	200.8	0.9
N	9,176	262	78	4.0	203.1	203.1	204.1	1.0
O	9,724	75	65	5.7	207.2	207.2	208.1	0.9
P	10,539	19	85	3.7	211.5	211.5	211.8	0.3

¹Feet above confluence with Rock Creek North

²Elevations computed without consideration of backwater effects from Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

HOLCOMB CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
McKAY CREEK								
A	2,402	904	4,578	3.2	156.2	144.0 ²	144.4 ²	0.4
B	5,424	904	5,385	2.9	156.2	144.9 ²	145.6 ²	0.7
C	6,713	755	4,047	3.6	156.2	145.5 ²	146.5 ²	1.0
D	7,267	174	1,674	4.7	156.2	146.6 ²	147.5 ²	0.9
E	8,284	324	2,321	4.8	156.2	148.3 ²	149.1 ²	0.8
F	9,134	285	2,552	4.8	156.2	149.2 ²	150.2 ²	1.0
G	12,500	120	1,318	7.3	156.2	152.6 ²	153.1 ²	0.5
H	12,932	514	6,106	1.7	156.2	153.9 ²	154.8 ²	0.9
I	13,841	643	7,219	1.6	156.2	154.0 ²	154.9 ²	0.9
J	14,898	635	6,836	1.8	156.2	154.1 ²	155.0 ²	0.9
K	17,641	686	5,548	2.7	156.2	154.7 ²	155.5 ²	0.8
L	20,386	307	3,335	3.4	156.4	156.4	157.1	0.7
M	21,680	480	4,812	2.4	156.9	156.9	157.6	0.7
N	23,639	652	6,149	1.9	157.4	157.4	158.0	0.6
O	24,798	635	5,002	2.2	158.7	158.7	159.4	0.7
P	29,941	362	3,400	2.9	160.0	160.0	160.8	0.8
Q	33,869	465	3,999	2.2	161.4	161.4	162.2	0.8
R	35,617	202	2,466	3.4	161.9	161.9	162.8	0.9
S	35,775	96	1,175	4.7	162.0	162.0	163.0	1.0
T	35,822	119	1,381	4.7	162.4	162.4	163.2	0.8
U	37,420	338	3,128	2.7	163.5	163.5	164.4	0.9
V	38,688	531	4,696	1.9	164.0	164.0	164.8	0.8
W	45,547	106	1,071	5.0	167.5	167.5	168.4	0.9
X	45,679	83	1,002	5.4	168.5	168.5	169.2	0.7
Y	46,698	390	3,322	2.3	169.9	169.9	170.6	0.7
Z	48,055	95	808	7.9	170.4	170.4	171.3	0.9

¹Feet above confluence with Dairy Creek

²Elevations computed without consideration of backwater effects from Dairy Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

McKAY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
McKAY CREEK								
AA	49,626	405	3,798	1.9	172.5	172.5	173.2	0.7
AB	52,091	409	3,146	2.7	172.9	172.9	173.6	0.7
AC	53,646	415	3,427	2.2	173.3	173.3	174.1	0.8
AD	54,233	105	972	4.7	173.6	173.6	174.4	0.8
AE	54,337	223	2,103	3.5	174.5	174.5	175.1	0.6

¹Feet above confluence with Dairy Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

McKAY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
NORTH JOHNSON CREEK								
A	112	45	222	2.4	187.0	187.0	187.0	0.0
B	534	14	119	4.4	187.5	187.5	187.7	0.2
C	680	24	189	2.8	187.9	187.9	188.1	0.2
D	898	26	196	2.7	188.2	188.2	188.4	0.2
E	1,198	41	170	3.9	188.6	188.6	188.8	0.2
F	1,680	36	197	2.7	189.4	189.4	189.6	0.2
G	2,152	27	180	2.9	189.9	189.9	190.2	0.3
H	3,041	189	1,284	0.3	190.1	190.1	190.7	0.6
I	3,280	204	1,524	0.1	190.1	190.1	190.7	0.6
J	3,884	233	1,230	0.2	190.1	190.1	190.7	0.6
K	4,609	32	129	3.0	190.7	190.7	191.1	0.4
L	4,796	20	176	2.6	196.3	196.3	197.0	0.7
M	4,942	34	272	1.6	196.3	196.3	197.2	0.9
N	5,334	35	235	1.8	196.4	196.4	197.3	0.9
O	5,747	57	232	1.8	196.4	196.4	197.4	1.0
P	6,259	167	264	1.9	198.0	198.0	198.6	0.6
Q	6,560	8	32	11.4	201.7	201.7	201.7	0.0
R	6,814	8	64	5.8	206.4	206.4	206.4	0.0
S	6,913	13	119	3.1	207.1	207.1	207.1	0.0
T	7,393	41	234	1.4	207.1	207.1	207.7	0.6
U	7,911	49	307	1.4	208.2	208.2	208.9	0.7
V	8,465	193	134	5.5	209.8	209.8	210.4	0.6
W	9,065	110	92	4.4	212.4	212.4	212.7	0.3
X	9,269	152	143	2.2	214.6	214.6	214.6	0.0
Y	10,057	40	79	4.9	218.9	218.9	219.6	0.7
Z	10,520	15	254	1.2	237.0	237.0	237.0	0.0

¹Feet above confluence with Cedar Mill Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
NORTH JOHNSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
NORTH JOHNSON CREEK								
AA	10,929	73	465	0.7	237.1	237.1	237.1	0.0
AB	11,252	29	76	4.0	237.6	237.6	237.8	0.2
AC	11,657	110	181	1.7	242.1	242.1	242.1	0.0
AD	12,030	60	90	3.5	245.9	245.9	245.9	0.0
AE	12,426	110	165	1.9	249.4	249.4	249.4	0.0
AF	12,613	42	88	3.9	250.7	250.7	250.9	0.2
AG	12,996	30	84	4.0	254.4	254.4	255.0	0.6
AH	13,320	21	47	5.5	259.6	259.6	259.8	0.2
AI	13,770	15	39	7.1	276.4	276.4	277.0	0.6
AJ	14,136	14	26	6.0	293.6	293.6	293.7	0.1
AK	14,419	23	30	4.6	306.9	306.9	307.2	0.3

¹Feet above confluence with Cedar Mill Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
NORTH JOHNSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
NORTH JOHNSON EAST TRIBUTARY								
A	376	32	15	3.9	252.0	252.0	252.0	0.0
B	619	8	29	2.0	254.5	254.5	255.3	0.8
C	921	9	10	5.9	258.8	258.8	258.8	0.0
D	1,224	16	15	3.8	281.1	281.1	281.1	0.0
E	1,505	20	21	2.8	290.4	290.4	290.4	0.0
F	1,909	9	10	5.9	327.1	327.1	327.1	0.0
NORTH JOHNSON NORTH TRIBUTARY								
A	544	61	31	4.1	222.0	222.0	222.0	0.0
B	873	37	50	3.0	229.9	229.9	230.0	0.1
C	1,165	8	37	3.5	237.3	237.3	237.4	0.1
D	1,338	15	62	2.4	242.7	242.7	242.7	0.0
E	1,576	15	19	6.6	252.0	252.0	252.0	0.0
F	1,803	21	57	2.2	255.8	255.8	255.8	0.0
G	1,981	10	17	7.5	262.5	262.5	262.5	0.0
H	2,089	4	31	4.1	270.9	270.9	270.9	0.0
I	2,603	24	22	6.3	290.2	290.2	290.2	0.0
J	3,157	7	13	7.8	343.3	343.3	343.3	0.0

¹Feet above confluence with North Johnson Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

NORTH JOHNSON CREEK - EAST AND NORTH TRIBUTARIES

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH ² (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
NYBERG SLOUGH								
A	643	504	6,898	0.4	126.0	126.0	126.2	0.2
B	755	559	6,993	0.3	126.0	126.0	126.3	0.3
C	994	403	5,518	0.5	126.0	126.0	126.3	0.3
D	1,593	146	1,306	3.6	126.0	126.0	126.2	0.2
E	1,744	109	1,593	2.5	126.6	126.6	126.9	0.3
F	2,193	349	5,407	0.3	126.6	126.6	127.0	0.4
G	2,926	349	5,097	0.8	126.6	126.6	127.0	0.4
H	3,550	393	5,605	0.5	126.6	126.6	127.0	0.4
I	3,938	90	768	5.7	126.6	126.6	126.9	0.3
J	4,219	131	1,614	4.3	127.9	127.9	128.1	0.2
K ²	5,081	226	2,108	1.0	127.9	127.9	128.2	0.3

¹ Feet above confluence with Tualatin River

² Floodway does not exist upstream of cross section K

This table shows the Nyberg Slough in Clakamas County and Washington County

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

NYBERG SLOUGH (IN WASHINGTON COUNTY AND CLAKAMAS COUNTY)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROCK CREEK NORTH								
A	1,801	264	2,586	4.1	147.0	135.0 ²	136.0 ²	1.0
B	2,680	205	2,542	4.9	147.0	136.0 ²	136.8 ²	0.8
C	3,167	194	2,130	6.1	147.0	136.7 ²	137.5 ²	0.8
D	3,652	182	2,192	6.1	147.0	137.1 ²	138.1 ²	1.0
E	4,131	130	1,674	5.6	147.0	137.6 ²	138.7 ²	1.1
F	4,854	196	2,562	4.0	147.0	139.5 ²	140.3 ²	0.8
G	6,139	199	2,667	3.5	147.0	140.3 ²	141.2 ²	0.9
H	7,342	158	2,131	5.1	147.0	141.0 ²	141.9 ²	0.9
I	7,860	169	2,359	4.8	147.0	142.0 ²	142.7 ²	0.7
J	8,444	228	3,025	4.2	147.0	142.1 ²	143.1 ²	1.0
K	9,629	324	4,237	2.7	147.0	142.5 ²	143.5 ²	1.0
L	12,191	278	3,626	2.8	147.0	143.0 ²	143.9 ²	0.9
M	12,943	237	2,933	4.4	147.0	143.1 ²	144.1 ²	1.0
N	13,574	290	3,527	3.5	147.0	143.4 ²	144.4 ²	1.0
O	14,222	290	3,461	3.8	147.0	143.6 ²	144.6 ²	1.0
P	15,554	342	4,275	2.9	147.0	144.0 ²	144.9 ²	0.9
Q	16,515	294	3,401	3.6	147.0	144.2 ²	145.1 ²	0.9
R	16,792	159	2,205	5.3	147.0	145.2 ²	145.7 ²	0.5
S	17,307	285	3,609	3.4	147.0	145.6 ²	146.1 ²	0.5
T	18,596	337	3,940	3.3	147.0	145.9 ²	146.3 ²	0.4
U	19,348	289	2,883	4.4	147.0	146.1 ²	146.6 ²	0.5
V	19,960	354	3,664	3.4	147.0	146.4 ²	146.9 ²	0.5
W	20,736	299	3,177	3.8	147.0	146.7 ²	147.2 ²	0.5
X	21,420	279	3,249	2.9	147.0	146.8 ²	147.4 ²	0.6
Y	22,301	332	3,667	2.8	147.0	147.0	147.7	0.7
Z	23,050	475	4,709	3.0	147.2	147.2	147.9	0.7

¹Feet above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK NORTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROCK CREEK NORTH								
AA	24,285	510	4,185	3.2	147.3	147.3	148.1	0.8
AB	25,237	322	3,422	3.5	147.7	147.7	148.5	0.8
AC	25,901	314	3,101	4.0	147.9	147.9	148.7	0.8
AD	26,555	262	2,960	3.9	148.3	148.3	148.9	0.6
AE	27,322	333	3,492	3.5	148.6	148.6	149.2	0.6
AF	27,982	319	3,051	3.2	148.8	148.8	149.6	0.8
AG	28,569	311	3,369	2.6	149.2	149.2	149.9	0.7
AH	29,231	316	3,521	2.7	149.3	149.3	150.1	0.8
AI	30,496	182	1,957	1.7	150.2	150.2	151.1	0.9
AJ	31,289	187	1,771	1.6	150.3	150.3	151.2	0.9
AK	32,472	140	1,207	2.4	150.6	150.6	151.4	0.8
AL	32,569	86	781	3.4	150.8	150.8	151.5	0.7
AM	33,632	217	1,697	1.4	151.2	151.2	151.9	0.7
AN	34,811	191	1,220	2.3	151.5	151.5	152.1	0.6
AO	34,933	193	1,229	2.5	151.5	151.5	152.2	0.7
AP	35,540	163	1,107	2.6	151.8	151.8	152.4	0.6
AQ	36,100	81	626	5.0	152.2	152.2	152.8	0.6
AR	36,608	105	876	3.3	152.6	152.6	153.6	1.0
AS	36,845	170	1,181	2.9	152.7	152.7	153.7	1.0
AT	37,890	58	557	4.7	153.3	153.3	154.1	0.8
AU	38,726	121	942	3.5	154.4	154.4	155.1	0.7
AV	39,009	118	967	3.0	154.5	154.5	155.3	0.8
AW	39,491	128	932	3.2	154.9	154.9	155.7	0.8
AX	40,071	138	1,031	2.9	155.3	155.3	156.1	0.8
AY	40,497	150	1,185	2.3	155.5	155.5	156.3	0.8
AZ	41,004	153	949	3.2	155.6	155.6	156.6	1.0

¹Feet above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK NORTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROCK CREEK NORTH								
BA	41,826	180	1,176	2.5	156.2	156.2	157.2	1.0
BB	42,399	191	1,053	2.8	156.4	156.4	157.4	1.0
BC	43,433	167	968	3.0	157.1	157.1	158.1	1.0
BD	43,494	166	960	3.0	157.1	157.1	158.1	1.0
BE	44,078	127	683	4.2	157.8	157.8	158.6	0.8
BF	44,294	38	404	6.3	158.2	158.2	159.0	0.8
BG	44,929	170	1,098	2.7	159.3	159.3	160.3	1.0
BH	45,210	250	1,608	1.8	159.4	159.4	160.4	1.0
BI	45,511	204	1,381	2.1	160.1	160.1	161.0	0.9
BJ	45,974	192	1,127	2.6	160.2	160.2	161.2	1.0
BK	46,447	172	952	2.7	160.5	160.5	161.5	1.0
BL	46,971	120	686	4.3	161.0	161.0	161.8	0.8
BM	47,734	146	727	4.3	162.2	162.2	162.9	0.7
BN	48,162	250	1,149	2.6	162.7	162.7	163.5	0.8
BO	48,824	200	1,263	2.1	163.2	163.2	163.8	0.6
BP	49,146	300	1,748	1.3	163.9	163.9	164.4	0.5
BQ	49,469	190	622	4.8	164.0	164.0	164.5	0.5
BR	49,684	89	656	4.1	167.5	167.5	168.1	0.6
BS	50,249	111	932	3.1	168.9	168.9	169.4	0.5
BT	50,580	263	1,530	1.8	169.1	169.1	169.6	0.5
BU	50,692	268	1,345	1.8	169.2	169.2	169.9	0.7
BV	51,156	263	1,624	1.3	169.3	169.3	170.0	0.7
BW	51,639	264	1,685	1.2	169.4	169.4	170.1	0.7
BX	52,074	262	1,467	1.5	169.4	169.4	170.2	0.8
BY	52,397	253	1,024	3.1	169.5	169.5	170.3	0.8
BZ	52,907	233	1,042	2.5	169.8	169.8	170.6	0.8

¹Feet above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK NORTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROCK CREEK NORTH								
CA	53,015	190	882	2.9	170.0	170.0	170.8	0.8
CB	53,916	109	626	4.5	170.6	170.6	171.5	0.9
CC	54,557	77	500	4.8	172.1	172.1	172.6	0.5
CD	54,787	61	383	6.7	172.6	172.6	173.2	0.6
CE	56,122	67	597	3.5	176.3	176.3	177.2	0.9
CF	57,202	110	814	2.9	177.7	177.7	178.4	0.7
CG	57,448	313	2352	1.1	178.2	178.2	179.1	0.9
CH	58,279	335	2384	1.0	178.3	178.3	179.1	0.9
CI	59,447	435	2644	0.9	178.3	178.3	179.2	0.9
CJ	60,194	510	2383	1.3	178.3	178.3	179.3	1.0
CK	61,015	870	3210	0.5	178.4	178.4	179.3	0.9
CL	62,388	593	1303	1.3	178.4	178.4	179.4	1.0
CM	64,142	169	365	5.0	181.4	181.4	181.5	0.1
CN	65,206	82	350	2.6	184.1	184.1	184.3	0.2
CO	65,969	432	1060	1.7	185.5	185.5	186.0	0.5
CP	66,713	702	725	3.6	186.2	186.2	187.2	1.0
CQ	68,130	220	690	2.4	189.1	189.1	190.0	0.9
CR	69,186	87	299	5.8	191.1	191.1	192.0	0.9
CS	69,972	198	526	3.8	194.0	194.0	194.9	0.9
CT	70,736	336	935	1.1	195.0	195.0	195.7	0.7
CU	71,262	26	193	5.5	195.8	195.8	196.4	0.6
CV	72,384	226	527	2.7	198.7	198.7	199.1	0.4
CW	72,943	115	289	4.9	199.7	199.7	200.2	0.5
CX	74,073	186	514	3.0	202.3	202.3	202.8	0.5
CY	75,339	290	463	3.4	204.8	204.8	204.9	0.1
CZ	76,654	105	359	3.5	206.7	206.7	207.3	0.6

¹Feet above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK NORTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROCK CREEK NORTH								
DA	77,165	188	545	2.3	207.1	207.1	208.0	0.9
DB	77,983	32	149	6.3	209.7	209.7	209.7	0.0
DC	79,349	308	512	2.7	213.5	213.5	214.3	0.8
DD	80,907	323	505	2.3	216.1	216.1	216.7	0.6
DE	81,790	188	184	6.4	219.2	219.2	220.0	0.8
DF	83,164	243	500	2.2	223.4	223.4	224.2	0.8
DG	84,509	50	184	4.9	226.7	226.7	226.8	0.1
DH	84,692	39	192	4.0	227.8	227.8	227.9	0.1
DI	86,000	100	204	4.0	230.6	230.6	230.7	0.1
DJ	86,763	26	113	6.5	235.2	235.2	235.2	0.0
DK	87,401	30	81	8.7	237.7	237.7	238.0	0.3
DL	87,916	20	111	6.8	243.9	243.9	243.9	0.0
DM	88,425	16	104	6.5	247.2	247.2	247.4	0.2

¹Feet above confluence with Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK NORTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ROCK CREEK SOUTH								
A	1,478	50	326	2.3	134.3	120.1 ²	120.9 ²	0.8
B	1,985	61	655	0.8	134.3	120.1 ²	121.1 ²	1.0
C	2,473	36	297	2.5	134.3	120.1 ²	121.1 ²	1.0
D	2,688	67	568	1.5	134.3	120.5 ²	121.4 ²	0.9
E	3,583	50	436	1.0	134.3	120.7 ²	121.6 ²	0.9
F	4,716	40	350	1.6	134.3	120.9 ²	121.8 ²	0.9
G	5,036	55	401	1.2	134.3	121.0 ²	121.9 ²	0.9
H	6,297	35	158	3.3	134.3	121.8 ²	122.6 ²	0.8
I	7,030	33	121	3.7	134.3	125.1 ²	125.7 ²	0.6
J	7,710	35	106	4.4	134.3	130.8 ²	130.9 ²	0.1
K	7,917	37	118	3.3	134.3	132.1 ²	132.1 ²	0.0
L	8,242	37	194	2.0	136.3	136.3	136.4	0.1
M	8,907	66	361	1.8	136.9	136.9	137.1	0.2
N	9,096	33	247	3.1	137.8	137.8	138.0	0.2
O	10,139	88	626	1.1	138.3	138.3	138.5	0.2
P	10,613	35	231	2.7	138.4	138.4	138.7	0.3
Q	10,739	31	227	3.1	138.6	138.6	139.0	0.4

¹Feet above confluence with Tualatin River

²Elevations computed without consideration of backwater effects from Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK SOUTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SOUTH JOHNSON CREEK								
A	304	175	531	1.5	171.9	166.1 ²	166.7 ²	0.6
B	616	48	107	9.0	171.9	167.2 ²	167.3 ²	0.1
C	928	24	163	4.9	172.6	172.6	173.1	0.5
D	1,047	52	393	2.7	173.5	173.5	173.9	0.4
E	1,508	90	640	1.6	173.6	173.6	174.1	0.5
F	2,037	86	556	1.6	173.7	173.7	174.3	0.6
G	2,520	87	543	1.7	173.7	173.7	174.5	0.8
H	2,826	92	591	1.4	173.8	173.8	174.6	0.8
I	3,100	88	677	1.2	176.1	176.1	176.9	0.8
J	3,599	78	543	2.0	176.2	176.2	177.1	0.9
K	3,961	89	564	1.8	176.4	176.4	177.3	0.9
L	4,254	77	509	1.9	176.6	176.6	177.6	1.0
M	4,696	103	561	1.8	177.0	177.0	177.9	0.9
N	4,923	81	553	1.5	177.2	177.2	178.1	0.9
O	5,405	103	580	1.5	177.4	177.4	178.4	1.0
P	5,694	68	481	1.9	179.4	179.4	180.2	0.8
Q	5,954	58	405	2.0	179.4	179.4	180.3	0.9
R	6,327	47	283	2.6	179.6	179.6	180.5	0.9
S	6,506	57	355	1.7	180.5	180.5	181.3	0.8
T	6,631	55	323	2.2	180.5	180.5	181.4	0.9
U	6,869	47	263	2.7	180.7	180.7	181.5	0.8
V	7,155	57	398	1.7	180.9	180.9	181.8	0.9
W	7,411	71	420	1.5	181.0	181.0	181.9	0.9
X	7,646	28	141	4.5	181.9	181.9	182.4	0.5
Y	8,176	35	226	2.8	183.3	183.3	184.0	0.7
Z	8,326	35	273	2.3	183.4	183.4	184.3	0.9

¹Feet above confluence with Beaverton Creek

²Elevations computed without consideration of backwater effects from Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
SOUTH JOHNSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SOUTH JOHNSON CREEK								
AA	8,827	65	266	2.8	184.3	184.3	185.2	0.9
AB	9,166	69	243	2.6	185.1	185.1	186.0	0.9
AC	9,349	54	262	2.4	185.6	185.6	186.6	1.0
AD	9,830	60	196	3.6	187.0	187.0	188.0	1.0
AE	10,279	40	143	4.4	190.1	190.1	191.0	0.9
AF	10,649	50	189	3.3	192.5	192.5	193.5	1.0
AG	10,929	55	171	3.7	193.9	193.9	194.9	1.0
AH	11,267	21	56	9.2	205.3	205.3	205.3	0.0
AI	11,357	75	429	1.2	208.3	208.3	208.4	0.1
AJ	11,730	30	136	4.3	215.4	215.4	215.8	0.4
AK	12,096	34	165	2.9	218.2	218.2	218.7	0.5
AL	12,352	48	153	3.3	218.6	218.6	219.6	1.0

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA
SOUTH JOHNSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
STOREY CREEK								
A	269	105	358	2.1	163.9	163.9	164.7	0.8
B	766	124	307	2.2	164.2	164.2	165.0	0.8
C	1,727	67	167	3.6	166.3	166.3	167.0	0.7
D	2,589	87	597	1.4	172.4	172.4	173.2	0.8
E	3,788	142	435	1.1	172.5	172.5	173.4	0.9
F	4,460	15	66	7.5	172.8	172.8	173.4	0.6
G	4,776	7	62	7.9	178.6	178.6	178.7	0.1
H	5,843	35	258	1.9	180.3	180.3	181.0	0.7
I	7,014	12	31	9.3	181.5	181.5	181.5	0.0
J	7,967	31	90	3.6	187.5	187.5	188.5	1.0
K	9,467	22	59	5.4	193.1	193.1	193.7	0.6
L	10,349	22	76	3.9	197.4	197.4	197.8	0.4

¹Feet above confluence with Waible Gulch

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

STOREY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
STOREY CREEK EAST TRIBUTARY								
A	1,478	21	30	6.9	174.0	174.0	174.0	0.0
B	2,489	72	477	0.4	184.7	184.7	184.7	0.0
C	3,701	17	61	2.6	185.7	185.7	186.0	0.3
D	4,398	14	31	5.4	187.9	187.9	188.0	0.1
STOREY CREEK MIDDLE TRIBUTARY								
A	806	14	46	5.1	180.2	180.2	181.2	1.0
B	1,041	18	56	3.1	181.7	181.7	182.4	0.7
C	1,741	44	58	4.0	184.7	184.7	184.7	0.0
D	1,861	20	93	1.9	186.0	186.0	186.6	0.6
E	3,103	12	23	8.1	188.9	188.9	188.9	0.0
F	4,063	31	119	1.8	196.0	196.0	196.8	0.8

¹Feet above confluence with Storey Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

FLOODWAY DATA

STOREY CREEK - EAST AND MIDDLE TRIBUTARIES

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SUMMER CREEK								
A	0.02	161	1,365	1.1	161.2	159.9 ²	160.3 ²	0.4
B	0.09	66	385	3.8	161.2	159.9 ²	160.3 ²	0.4
C	0.17	46	369	3.9	161.7	161.7	162.7	1.0
D	0.40	101	528	2.7	163.8	163.8	164.7	0.9
E	0.80	191	922	1.6	167.1	167.1	167.6	0.5
F	1.19	186	1,457	0.9	173.6	173.6	174.5	0.9
G	1.23	186	1,827	0.7	173.6	173.6	174.5	0.9
H	1.28	186	1,803	0.7	173.7	173.7	174.6	0.9
I	1.32	186	1,995	0.7	173.7	173.7	174.7	1.0
J	1.36	186	1,532	0.9	173.7	173.7	174.7	1.0
K	1.45	65	238	5.6	173.6	173.6	174.6	1.0
L	1.56	48	269	4.7	175.2	175.2	175.8	0.6
M	1.70	101	542	2.4	175.8	175.8	176.6	0.8
N	1.75	61	322	3.7	177.1	177.1	177.6	0.5
O	1.93	126	553	2.2	178.1	178.1	179.0	0.9
P	1.97	111	498	2.4	178.4	178.4	179.4	1.0
Q	2.10	86	445	2.7	180.3	180.3	181.3	1.0

¹Miles above confluence with Fanno Creek

²Elevations computed without consideration of backwater effects from Fanno Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

SUMMER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH ² (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER								
AC	35,845	250/410	1,359	5.5	125.0	125.0	125.1	0.1
AD	37,920	284/509	446	6.3	125.3	125.3	125.4	0.1
AE	38,516	253/446	659	6.4	125.5	125.5	125.5	0.0
AF	40,752	126/380	895	5.9	125.9	125.9	126.1	0.2

¹Feet above confluence with Willamette River

²Floodway width within City of Tualatin/Total floodway width

This FWDT shows the Tualatin River reach within city of Tualatin in Clakamas County

TABLE 5	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	WASHINGTON COUNTY, OR AND INCORPORATED AREAS	TUALATIN RIVER (WITHIN CITY OF TUALATIN IN WASHINGTON COUNTY)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER								
A	41,903	255/392 ²	5,412	6.6	126.3	126.3	126.6	0.3
B	42,412	102/208 ²	4,425	7.6	126.6	126.6	126.9	0.3
C	42,588	200	4,446	7.8	126.8	126.8	127.2	0.4
D	43,443	374	6,532	5.3	127.9	127.9	128.6	0.7
E	44,042	419	5,825	6.0	128.3	128.3	129.0	0.7
F	44,631	286	6,050	5.5	128.9	128.9	129.6	0.7
G	45,713	235	5,458	6.3	129.1	129.1	129.9	0.8
H	46,125	586	8,671	3.9	129.7	129.7	130.6	0.9
I	46,325	609	8,920	4.3	129.7	129.7	130.6	0.9
J	47,537	638	8,638	4.4	130.2	130.2	131.1	0.9
K	47,907	555	8,688	4.3	130.4	130.4	131.3	0.9
L	48,547	1,038	17,752	1.8	130.8	130.8	131.7	0.9
M	51,159	1,308	20,386	2.3	131.0	131.0	131.9	0.9
N	53,386	1,290	16,561	3.2	131.1	131.1	132.1	1.0
O	55,226	1,335	20,165	1.5	131.5	131.5	132.5	1.0
P	59,644	498	10,118	3.9	132.4	132.4	133.3	0.9
Q	60,256	384	10,395	3.1	132.8	132.8	133.7	0.9
R	60,906	589	10,774	3.6	132.9	132.9	133.8	0.9
S	64,281	711	12,200	3.4	133.4	133.4	134.3	0.9
T	65,552	763	13,107	2.8	133.7	133.7	134.6	0.9
U	68,762	1,583	28,462	1.1	134.1	134.1	135.0	0.9
V	69,084	1,774	30,924	1.4	134.1	134.1	135.0	0.9
W	71,178	3,154	50,166	0.8	134.2	134.2	135.0	0.8
X	75,994	3,768	50,759	1.3	134.2	134.2	135.1	0.9
Y	80,096	3,862	52,093	0.5	134.3	134.3	135.2	0.9
Z	80,604	3,398	46,024	0.7	134.3	134.3	135.2	0.9

¹Feet above confluence with Willamette River

²Floodway width within City of Tualatin/Total floodway width

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

TUALATIN RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER								
AA	82,845	2,528	34,746	0.8	134.4	134.4	135.2	0.8
AB	83,267	2,483	33,631	1.1	134.4	134.4	135.3	0.9
AC	84,848	1,681	22,437	2.1	134.4	134.4	135.4	1.0
AD	85,487	792	9,994	3.0	134.6	134.6	135.5	0.9
AE	85,696	1,058	15,927	2.3	134.8	134.8	135.8	1.0
AF	86,585	846	15,373	2.4	135.1	135.1	136.0	0.9
AG ⁴	189,211	1,859	21,962	1.5	144.3	141.6 ³	142.5 ³	0.9
AH	189,986	1,640	18,134	1.9	144.3	141.7 ³	142.6 ³	0.9
AI	190,800	1,424	16,228	2.2	144.3	141.9 ³	142.8 ³	0.9
AJ	192,431	1,760	22,170	1.4	144.3/144.3 ²	142.5 ³	143.4 ³	0.9
AK	193,436	2,289	24,940	1.4	144.8/144.3 ²	142.7 ³	143.5 ³	0.8
AL	196,851	1,941	20,385	1.7	145.6	143.2	144.0	0.8
AM	198,810	1,626	21,928	1.4	145.7	143.4	144.2	0.8
AN	200,975	1,278	16,681	2.0	146.2/146.1 ²	143.9	144.7	0.8
AO	201,438	1,208	14,856	2.5	146.2/146.2 ²	144.0	144.8	0.8
AP	201,868	1,089	13,267	2.8	146.4/146.3 ²	144.2	145.0	0.8
AQ	203,771	1,223	17,092	2.1	146.9/146.8 ²	145.0	145.8	0.8
AR	204,855	1,188	18,094	1.6	147.1/146.9 ²	145.3	146.1	0.8
AS	206,088	533	9,683	3.4	147.5	145.8	146.6	0.8
AT	207,184	1,298	15,646	2.3	147.9	146.3	147.1	0.8
AU	208,622	1,602	22,317	1.6	148.2	146.6	147.4	0.8
AV	209,541	974	15,152	2.1	148.3	146.8	147.5	0.7
AW	210,609	1,865	23,939	1.4	148.5	147.0	147.7	0.7
AX	211,885	1,807	27,553	1.3	148.5	147.1	147.8	0.7
AY	212,955	2,237	30,875	1.2	148.6	147.2	147.8	0.6
AZ	214,791	2,579	34,801	1.1	148.6	147.2	147.9	0.7

¹Feet above confluence with Willamette River

²Riverward of levees / Landward of levees

³Elevations computed without consideration of effective water surface elevations downstream of detailed study limit.

⁴Break in detailed study reach between this and previous (downstream) reach

TABLE 5	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	WASHINGTON COUNTY, OR AND INCORPORATED AREAS	TUALATIN RIVER

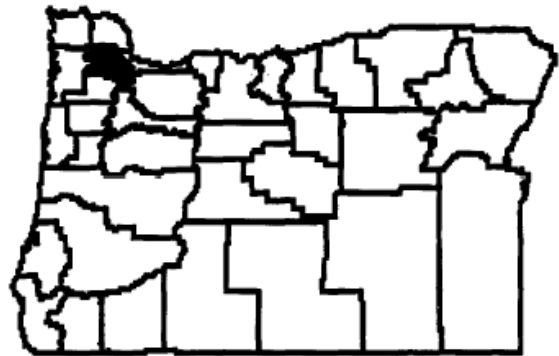
FLOOD INSURANCE STUDY



WASHINGTON COUNTY, OREGON AND INCORPORATED AREAS

VOLUME 2 OF 3

COMMUNITY NAME	COMMUNITY NUMBER
BANKS, CITY OF	410239
BEAVERTON, CITY OF	410240
CORNELIUS, CITY OF	410261
DURHAM, CITY OF	410263
FOREST GROVE, CITY OF	410241
GASTON, CITY OF	410242
HILLSBORO, CITY OF	410243
KING CITY, CITY OF	410269
NORTH PLAINS, CITY OF	410270
SHERWOOD, CITY OF	410273
TIGARD, CITY OF	410276
TUALATIN, CITY OF	410277
WASHINGTON COUNTY UNINCORPORATED AREAS	410238



Effective: November 4, 2016



Federal Emergency Management Agency

Flood Insurance Study Number

41067CV002A

**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 (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Selected Flood Insurance Rate Map panels for the community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

<u>Old Zone</u>	<u>New Zone</u>
A1 through A30	AE
V1 through V30	VE
B	X
C	X

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by a Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS report components.

Users should refer to Section 10.0, Revisions Descriptions. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this FIS report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Effective Date: November 4, 2016

Revised FIS Report Dates:

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PUBLISHED SEPARATELY

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER								
BA	217,311	2,233	28,663	1.2	148.7	147.3	147.9	0.6
BB	219,323	1,422	17,707	2.0	148.8	147.5	148.1	0.6
BC	221,593	1,174	17,034	1.8	149.1	147.9	148.4	0.5
BD	222,726	871	13,154	2.5	149.3	148.2	148.7	0.5
BE	223,235	806	13,426	2.3	149.5	148.4	148.9	0.5
BF	223,741	336	6,492	4.1	149.7	148.7	149.2	0.5
BG	224,390	1,467	22,664	1.3	150.0	149.0	149.5	0.5
BH	226,730	1,699	25,504	1.1	150.1	149.1	149.6	0.5
BI	228,021	2,418	40,601	0.6	150.2	149.2	149.6	0.4
BJ	231,304	1,773	29,358	1.0	150.2	149.2	149.7	0.5
BK	232,523	1,313	23,429	1.2	150.2	149.2	149.7	0.5
BL	232,955	1,403	25,216	1.0	150.2	149.3	149.8	0.5
BM	234,067	1,813	25,375	1.2	150.3	149.4	149.8	0.4
BN	235,438	4,157	63,549	0.5	150.4	149.4	149.9	0.5
BO	238,320	4,292	65,509	0.4	150.4	149.4	149.9	0.5
BP	239,100	4,048	53,848	0.6	150.6	149.7	150.1	0.4
BQ	241,242	2,841	43,797	0.4	150.6	149.7	150.2	0.5
BR	242,479	2,200	29,224	0.6	150.6	149.7	150.2	0.5
BS	244,011	1,646	18,860	1.1	150.7	149.8	150.3	0.5
BT	245,122	2,416	33,005	0.6	150.7	149.8	150.3	0.5
BU	246,362	3,129	37,738	0.5	150.7	149.9	150.4	0.5
BV	247,863	2,139	24,909	0.8	150.7	149.9	150.4	0.5
BW	249,989	1,499	17,142	1.3	150.8	150.0	150.5	0.5
BX	253,163	1,924	22,644	0.8	150.9	150.1	150.7	0.6
BY	254,474	1,922	21,616	0.9	151.0	150.2	150.7	0.5
BZ	255,565	1,461	13,740	1.6	151.0	150.3	150.9	0.6

¹Feet above confluence with Willamette River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

TUALATIN RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER								
CA	256,798	1,466	11,816	1.9	151.2	150.5	151.2	0.7
CB	259,904	2,269	20,512	1.0	151.5	150.9	151.5	0.6
CC	263,831	3,160	30,727	0.6	151.6	151.0	151.7	0.7
CD	267,035	2,897	20,735	0.9	151.6	151.0	151.7	0.7
CE	269,601	1,729	11,283	1.7	151.7	151.1	152.2	1.1
CF	272,457	2,370	10,495	2.4	152.5	152.2	152.8	0.6
CG	276,344	2,662	9,017	2.9	153.3	153.2	153.7	0.5
CH	279,491	2,041	11,179	1.9	155.1/154.5 ²	154.5	155.0	0.5
CI	280,650	442	3,867	3.0	155.8/155.2 ²	155.2	155.7	0.5
CJ	281,006	640	5,281	2.4	156.3	155.7	156.2	0.5
CK	282,345	1,287	10,297	1.2	156.5	156.0	156.5	0.5
CL	283,089	1,404	11,281	1.2	156.6	156.1	156.6	0.5
CM	285,799	1,407	7,629	1.8	157.0	156.6	157.2	0.6
CN	287,595	1,861	15,381	0.6	157.1/157.1 ²	156.7	157.4	0.7
CO	288,740	1,807	9,067	1.4	157.4/157.1 ²	156.8	157.5	0.7
CP	290,160	1,573	7,443	1.7	157.8/157.4 ²	157.1	157.7	0.6
CQ	290,683	1,210	5,774	2.2	158.0/157.5 ²	157.3	157.9	0.6
CR	291,511	1,336	5,457	2.7	158.4	157.8	158.4	0.6
CS	293,163	1,350	8,189	1.3	158.8	158.4	158.8	0.4
CT	294,353	1,181	5,293	2.2	159.0	158.6	159.1	0.5
CU	297,418	1,297	6,084	2.1	159.9	159.7	160.5	0.8
CV	298,748	1,634	9,627	1.2	160.3	160.2	160.8	0.6
CW	300,165	1,816	10,214	1.2	160.5	160.4	161.0	0.6
CX	301,036	2,116	11,015	1.1	160.7/160.6 ²	160.5	161.2	0.7
CY	301,979	3,473	20,188	0.8	162.1/160.8 ²	160.7	161.3	0.6
CZ	302,900	3,125	16,297	1.1	162.6/162.3 ²	160.8	161.5	0.7

¹Feet above confluence with Willamette River

²Riverward of levees / Landward of levees

TABLE 5	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	WASHINGTON COUNTY, OR AND INCORPORATED AREAS	TUALATIN RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER								
DA	303,252	2,724	12,480	1.2	163.1/162.3 ³	160.9	161.6	0.7
DB	304,049	3,134	15,878	1.1	163.7	163.3	163.4	0.1
DC	304,981	2,612	14,634	1.2	164.1/164.1 ³	163.8	164.1	0.3
DD	306,932	2,971	14,323	1.4	165.2/164.4 ³	164.1	164.4	0.3
DE	308,600	3,879	16,894	1.1	165.8/164.5 ³	164.3	164.7	0.4
DF	310,184	3,657	11,906	2.1	166.5/164.8 ³	164.6	165.0	0.4
DG	310,864	3,369	9,088	2.6	167.3/165.3 ³	165.2	165.5	0.3
DH	313,202	4,766	NA	NA	167.8	166.0	166.3	0.3
DI	315,004	3,626	NA	NA	167.8	166.1	166.4	0.3
DJ	317,283	2,352	23,065	0.3	167.8	166.1	166.4	0.3
DK	319,756	2,414	20,992	0.3	167.8	166.1	166.5	0.4
DL	321,765	2,275	12,707	0.6	167.8	166.1	166.5	0.4
DM	324,141	1,650	5,730	2.3	167.9	166.2	167.2	1.0
DN	328,153	730	4,239	2.3	170.1	170.4	170.7	0.3
DO	62.26 ²	660	4,062	2.8	170.6	170.6	171.4	0.8
DP	62.55 ²	1,700	12,197	0.9	171.5	171.5	172.5	1.0
DQ	63.20 ²	2,800	16,863	0.7	171.8	171.8	172.7	0.9
DR	63.69 ²	1,930	9,323	1.2	172.5	172.5	173.4	0.9
DS	63.75 ²	1,910	10,738	1.1	172.7	172.7	173.5	0.8
DT	64.29 ²	1,650	8,886	0.9	173.8	173.8	174.4	0.6
DU	64.74 ²	1,600	7,285	1.1	174.6	174.6	175.3	0.7
DV	65.15 ²	1,320	5,207	1.3	175.6	175.6	176.4	0.8
DW	65.62 ²	930	4,020	1.7	177.0	177.0	178.0	1.0
DX	65.73 ²	235	2,838	2.4	181.6	181.6	181.9	0.3
DY	65.75 ²	240	3,976	1.7	182.1	182.1	182.4	0.3
DZ	65.80 ²	230	1,181	5.8	182.2	182.2	182.6	0.4
EA	65.89 ²	650	3,480	2.0	184.6	184.6	185.0	0.4
EB	66.49 ²	600	2,961	2.3	187.4	187.4	188.1	0.7

¹Feet above confluence with Willamette River

²Miles above confluence with Willamette River

³Riverward of levees / Landward of levees

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

TUALATIN RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TUALATIN RIVER - GOLF COURSE OVERFLOW								
A	463	400	1813	1.8	155.3	154.7 ³	155.2	0.5
B	860	178	876	4.5	155.9	155.6 ³	156.3	0.7
C	1088	115	939	4.1	157.8	157.7 ³	157.9	0.2
D	1290	131	1066	3.7	158.7	158.6 ³	158.9	0.3
E	1805	335	2398	1.9	159.5	159.5 ³	159.9	0.4
F	2100	303	2546	2.2	159.7	159.7 ³	160.1	0.4
G	3352	622	3605	1.6	160.6	160.6 ³	161.1	0.5
H	4210	658	3739	1.5	161.1	161.1 ³	161.7	0.6
I	4999	854	4416	1.2	161.4	161.4 ³	162.1	0.7
J	5791	1081	6054	0.8	161.5	161.5 ³	162.4	0.9
TUALATIN RIVER - LaFOLETTE OVERFLOW								
A	852 ²	215	1,465	1.3	156.7	156.2 ³	156.8	0.6
B	1,535 ²	162	1,016	1.9	157.1	156.7 ³	157.3	0.6
C	2,203 ²	143	1,000	2.1	157.8	157.6 ³	158.2	0.6
D	2,650 ²	165	1,234	1.6	158.2	158.0 ³	158.7	0.7
E	3,194 ²	91	728	2.8	159.8	159.7 ³	160.2	0.5

¹Feet above confluence with Tualatin River

²Feet above confluence with Tualatin River

³Elevations computed without consideration of levees along Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

TUALATIN RIVER - GOLF COURSE AND LaFOLETTE OVERFLOWS

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TURNER CREEK								
A	201	55	337	1.2	147.0	133.5 ²	134.4 ²	0.9
B	580	45	183	2.8	147.0	133.6 ²	134.6 ²	1.0
C	1,214	40	136	3.5	147.0	135.6 ²	136.0 ²	0.4
D	1,437	20	126	3.3	147.0	139.0 ²	139.1 ²	0.1
E	1,846	39	213	2.2	147.0	139.3 ²	139.9 ²	0.6
F	2,048	40	207	2.3	147.0	139.4 ²	140.2 ²	0.8
G	2,451	51	237	2.3	147.0	139.7 ²	140.7 ²	1.0
H	3,149	84	273	1.5	147.0	140.5 ²	141.2 ²	0.7
I	3,734	42	64	7.3	147.0	142.6 ²	142.8 ²	0.2
J	4,079	43	142	3.2	147.0	144.8 ²	145.4 ²	0.6
K	4,341	47	140	3.0	147.0	145.4 ²	146.1 ²	0.7
L	4,704	85	204	1.9	147.0	146.2 ²	146.8 ²	0.6
M	4,868	35	123	3.4	149.7	149.7	149.7	0.0
N	5,162	53	237	1.4	149.9	149.9	150.0	0.1
O	5,524	42	140	2.3	150.0	150.0	150.4	0.4
P	5,782	70	200	1.6	150.3	150.3	150.8	0.5
Q	6,219	47	102	3.5	151.2	151.2	151.6	0.4
R	6,421	16	54	4.3	152.3	152.3	152.8	0.5
S	6,788	25	84	3.0	153.2	153.2	154.1	0.9
T	6,997	15	53	4.3	154.0	154.0	155.0	1.0
U	7,302	43	194	0.9	157.2	157.2	157.6	0.4
V	7,565	23	100	1.7	157.2	157.2	157.7	0.5
W	7,729	5	25	8.7	157.1	157.1	157.4	0.3
X	7,837	21	115	1.7	158.3	158.3	158.5	0.2
Y	8,201	10	43	4.5	158.4	158.4	158.9	0.5
Z	8,356	9	37	5.2	160.9	160.9	161.3	0.4

¹Feet above confluence with Rock Creek North

²Elevations computed without consideration of backwater effects from Rock Creek North and Tualatin River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

TURNER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TURNER CREEK								
AA	8,593	24	85	2.1	161.8	161.8	162.5	0.7
AB	8,861	23	69	1.9	162.0	162.0	163.0	1.0
AC	9,390	23	47	2.8	163.7	163.7	164.7	1.0
AD	9,900	72	184	0.8	164.6	164.6	165.2	0.6
AE	10,123	26	33	2.9	164.7	164.7	165.2	0.5
AF	10,373	11	24	4.0	166.7	166.7	167.1	0.4
AG	10,483	12	26	3.7	168.1	168.1	168.1	0.0

¹Feet above confluence with Rock Creek North

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

TURNER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
UNNAMED TRIBUTARY OF McKAY CREEK								
A	32	142	504	0.6	172.9	172.9 ²	173.8 ²	0.9
B	434	70	866	0.4	172.9	172.9 ²	173.9 ²	1.0
C	1370	6	72	4.4	172.9	172.9 ²	173.9 ²	1.0
D	1440	25	333	1.0	175.1	175.1	176.1	1.0
E	3080	160	1,137	0.3	175.2	175.2	176.2	1.0
F	3820	21	116	2.8	176.2	176.2	177.0	0.8
G	4610	60	241	1.3	176.7	176.7	177.6	0.9
H	4990	27	106	2.6	177.2	177.2	178.0	0.8
I	5340	80	180	1.5	178.9	178.9	179.5	0.6
J	5590	100	311	0.9	179.1	179.1	179.6	0.5
K	6060	100	675	0.4	179.3	179.3	180.2	0.9
L	6210	8	59	4.7	180.8	180.8	181.8	1.0
M	6450	200	1,057	0.3	183.0	183.0	184.0	1.0
N	6750	160	699	0.4	183.0	183.0	184.0	1.0

¹Feet above confluence with McKay Creek

²Elevations computed with consideration of backwater effects from McKay Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

UNNAMED TRIBUTARY OF McKAY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
WAIBLE CREEK								
A	1,795	147	875	3.3	160.0	154.8 ²	155.4 ²	0.6
B	3,661	125	729	3.7	160.0	156.9 ²	157.8 ²	0.9
C	5,017	174	1,061	2.9	160.0	158.3 ²	159.3 ²	1.0
D	7,646	250	1,380	2.5	160.0	159.8 ²	160.8 ²	1.0
E	8,074	41	323	6.0	160.8	160.8	161.5	0.7
F	11,056	260	1,077	3.0	163.5	163.5	164.0	0.5
G	12,421	161	533	3.6	165.9	165.9	166.3	0.4
H	13,228	166	566	3.0	167.6	167.6	168.1	0.5
I	14,305	69	332	4.0	170.0	170.0	170.7	0.7
J	14,377	85	455	3.8	173.1	173.1	173.1	0.0
K	15,962	80	301	3.1	174.5	174.5	175.4	0.9
L	16,532	90	282	3.7	175.4	175.4	176.4	1.0
M	16,633	103	318	3.3	175.6	175.6	176.6	1.0
N	17,540	124	363	2.8	177.3	177.3	178.0	0.7
O	18,524	139	359	3.0	178.9	178.9	179.4	0.5
P	19,742	27	87	5.8	179.8	179.8	180.0	0.2
Q	20,829	10	79	9.5	184.0	184.0	184.5	0.5

¹Feet above confluence with McKay Creek

²Elevations computed without consideration of backwater effects from McKay Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

WAIBLE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
WAIBLE CREEK - SOUTH TRIBUTARY								
A	1,457	22	71	5.6	182.9	182.9	183.9	1.0
B	1,610	70	207	2.1	185.7	185.7	186.4	0.7
C	2,523	80	130	3.8	187.1	187.1	187.6	0.5

¹Feet above confluence with Waible Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

WAIBLE CREEK - SOUTH TRIBUTARY

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
WAPATO CREEK								
A	0.37	778	4,817	0.3	173.9	173.3 ³	174.3 ³	1.0
B	1.34	520	3,152	0.4	174.6	173.4 ³	174.4 ³	1.0
C	1.76	312	1,962	0.6	175.5	173.4 ³	174.4 ³	1.0
D	1.90	110	1,045	1.1	175.6	173.5 ³	174.5 ³	1.0
E ⁴	NA	NA	NA	NA	NA	NA	NA	NA
F ⁴	NA	NA	NA	NA	NA	NA	NA	NA
G ⁴	NA	NA	NA	NA	NA	NA	NA	NA
WEST FORK DAIRY CREEK								
A	15.70 ²	1,995	10,690	0.8	189.8	189.8	190.8	1.0
B	16.02 ²	1,941	12,626	0.7	193.9	193.9	194.8	0.9
C	16.28 ²	2,300	21,187	0.4	194.6	194.6	195.6	1.0
D	16.84 ²	2,700	17,943	0.4	194.8	194.8	195.8	1.0
E	17.82 ²	2,450	16,122	0.4	200.3	200.3	201.3	1.0
F	18.68 ²	1,200	6,645	1.1	206.3	206.3	207.2	0.9
G	18.98 ²	1,500	10,148	0.7	206.5	206.5	207.4	0.9
H	19.41 ²	690	1,305	5.4	206.9	206.9	207.5	0.6

¹Miles above confluence with Tualatin River

²Miles above confluence with Dairy Creek

³Elevations computed without consideration of backwater effects from Tualatin River

⁴Cross sections are located in Yamhill County, OR

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

WAPATO CREEK - WEST FORK DAIRY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANGE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
WILLOW CREEK								
A	634	72	245	7.4	161.7	154.2 ²	155.2 ²	1.0
B	1,055	80	382	4.7	161.7	157.1 ²	157.5 ²	0.4
C	1,475	67	252	5.7	161.7	158.1 ²	158.9 ²	0.8
D	1,812	25	138	8.6	161.7	160.0 ²	160.8 ²	0.8
E	2,550	89	534	2.4	163.2	163.2	163.6	0.4
F	3,099	91	478	2.3	163.5	163.5	163.9	0.4
G	3,671	75	418	2.7	164.1	164.1	164.7	0.6
H	4,056	75	359	3.6	164.6	164.6	165.4	0.8
I	4,578	34	178	7.2	166.7	166.7	167.2	0.5
J	4,723	57	421	2.6	168.8	168.8	169.4	0.6
K	5,268	62	360	2.4	169.1	169.1	169.8	0.7
L	5,930	39	197	3.2	169.2	169.2	170.1	0.9
M	6,344	22	110	5.8	170.1	170.1	171.1	1.0
N	6,455	33	241	2.8	176.3	176.3	176.9	0.6
O	6,754	49	406	2.0	176.3	176.3	177.0	0.7
P	7,352	50	248	3.4	176.5	176.5	177.3	0.8
Q	7,688	53	250	2.7	177.0	177.0	177.8	0.8
R	8,186	69	226	3.2	177.7	177.7	178.6	0.9
S	8,383	16	133	4.5	182.2	182.2	182.2	0.0
T	9,009	50	221	3.1	182.9	182.9	183.6	0.7
U	9,433	50	246	2.5	183.3	183.3	184.0	0.7
V	9,850	42	165	3.9	183.9	183.9	184.6	0.7
W	10,334	44	196	3.0	185.0	185.0	185.8	0.8
X	11,481	43	112	5.5	189.3	189.3	189.8	0.5
Y	11,652	34	164	3.4	191.3	191.3	192.1	0.8
Z	12,000	61	191	3.4	192.1	192.1	193.1	1.0

¹Feet above confluence with Beaverton Creek

²Elevations computed without consideration of backwater effects from Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

WILLOW CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
WILLOW CREEK								
AA	12,444	60	124	5.4	194.8	194.8	195.1	0.3
AB	12,686	135	311	2.7	195.7	195.7	196.2	0.5
AC	12,965	116	196	3.9	196.6	196.6	196.9	0.3
AD	13,396	55	137	3.7	198.4	198.4	198.9	0.5
AE	13,596	14	105	4.0	202.7	202.7	202.8	0.1
AF	13,865	16	114	3.7	202.8	202.8	203.2	0.4
AG	14,652	23	95	4.4	205.0	205.0	205.2	0.2
AH	15,104	46	124	3.5	207.4	207.4	207.9	0.5
AI	15,441	32	99	4.9	209.3	209.3	210.0	0.7
AJ	15,823	19	78	5.2	212.4	212.4	213.3	0.9
AK	16,327	26	111	4.0	216.0	216.0	216.7	0.7
AL	16,644	32	117	3.6	217.2	217.2	218.0	0.8
AM	16,766	29	114	2.9	218.2	218.2	219.0	0.8
AN	16,911	56	304	1.7	220.7	220.7	221.5	0.8
AO	17,222	30	100	3.6	221.1	221.1	221.6	0.5
AP	17,530	33	110	3.0	222.2	222.2	223.2	1.0
AQ	17,840	24	81	4.0	223.7	223.7	224.3	0.6
AR	18,331	13	49	7.5	227.4	227.4	227.9	0.5
AS	18,609	18	66	5.4	230.4	230.4	230.9	0.5
AT	18,907	27	90	4.4	232.0	232.0	232.8	0.8
AU	19,203	13	46	6.9	233.9	233.9	234.6	0.7
AV	19,541	48	204	1.5	235.6	235.6	236.5	0.9
AW	19,595	45	204	1.5	235.7	235.7	236.5	0.8
AX	19,789	49	170	1.8	236.2	236.2	236.9	0.7
AY	19,871	75	244	1.2	238.0	238.0	238.1	0.1
AZ	20,085	48	127	2.4	238.1	238.1	238.2	0.1
BA	20,282	36	125	2.4	238.9	238.9	239.0	0.1

¹Feet above confluence with Beaverton Creek

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

FLOODWAY DATA

WILLOW CREEK

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 1-percent-annual-chance floodplains that are determined in the FIS report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base (1-percent-annual-chance) Flood Elevations (BFEs) or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 sq. mi., and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The FIRM 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 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use zones and BFEs 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 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Washington County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on the FBFMs, where applicable. Historical data relating to the maps prepared for each community are presented in Table 6, "Community Map History."

7.0 OTHER STUDIES

In 1969, the USACE prepared a Floodplain Information report for Washington County (Reference 28). The 1-percent-annual-chance flood profiles of the Tualatin River tributary streams in this report are based on available data at scattered locations along those Streams. The 1-percent-annual-chance flood profiles of this study are based on mathematical computer analyses using topographic maps and field surveys. Thus, the difference in flood heights is a result of two factors: (1) improved data obtained for the FISs; and (2) lower frequency-discharges that reflect the 1974 completion of the upstream Henry Hagg Lake Project.

FISs have been published for the adjacent Counties of Clackamas (Reference 29) and Tillamook (Reference 30). FHBM's have been published for Columbia County (Reference 31) and the City of Lake Oswego (Reference 32). This FIS is in agreement with these studies.

The published FIS for the City of Portland (Reference 33) does not match this FIS concerning the southwestern corporate limits of Portland. Three "finger" areas of Portland extend into Washington County where flooding is shown in the Washington County study but not studied for the Portland study. The Portland study will be revised to match the adjacent flooded areas in Washington County.

An FHBM for Washington County has been previously published (Reference 26). This FIS is more detailed; therefore, the FIRM supersedes that map.

The engineering consulting firm Kramer, Chin and Mayo, Inc., prepared the Beaverton Creek Flood Study for the City of Beaverton in April 1979 (Reference 34). The study included flood profiles for the 10-, 2-, and 1-percent-annual-chance floods. In August 1982, an updated study was prepared to reflect differences in hydrology and hydraulics resulting from culvert improvements at the SPRR and in the Canyon Road area (Reference 14).

An FIS for the unincorporated areas of Yamhill County, Oregon, is being prepared (Reference 35). Wapato Creek was studied by approximate methods in that study and the 1-percent-annual-chance flood boundaries generally agree between the Yamhill County study and this study.

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
* Banks, City of	N/A	N/A	N/A	-
Beaverton, City of	February 1, 1974	June 25, 1976	September 28, 1984	February 4, 1987 February 8, 2005
Cornelius, City of	November 5, 1976	N/A	January 6, 1982	-
Durham, City of	November 12, 1976	N/A	January 6, 1982	February 18, 2005
Forest Grove, City of	March 1, 1974	April 16, 1976	March 15, 1982	-
Gaston, City of	July 5, 1982	N/A	July 5, 1982	-
Hillsboro, City of	April 12, 1974	April 15, 1977	May 17, 1982	-
King City, City of	February 18, 2005	N/A	February 18, 2005	-
North Plains, City of	July 16, 1976	N/A	April 1, 1982	March 16, 1989
Sherwood, City of	August 13, 1976	N/A	January 6, 1982	-
Tigard, City of	February 14, 1978	N/A	March 1, 1982	February 18, 2005
Tualatin, City of	May 20, 1977	May 2, 1978	February 17, 1982	February 19, 1987
Washington County, Unincorporated Areas	January 24, 1975	September 13, 1977	September 30, 1982	March 18, 1987 February 18, 2005

* This community does not have map history prior to the first countywide mapping.

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, OR

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region X, Federal Regional Center, 130 228th Street, SW, Bothell, Washington 98021-9796.

9.0 **BIBLIOGRAPHY AND REFERENCES**

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Federal Emergency Management Agency, Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995

10.0 REVISIONS DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original FIS reports for the individual communities were printed. Future revisions may be made that do not result in the republishing of the FIS report. To assure that user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data located at the Department of Land and Water Resources, 201 South Jackson Street, Suite 600, Seattle, Washington 981-3855.

10.1 First Revision

Countywide Update

The countywide update was performed by Black & Veatch Corporation for the Federal Emergency Management Agency (FEMA), under Contract No. HSFEHQ-04-D-0025 and was completed in September 2010.

This update combined the Flood Insurance Rate Maps and Flood Insurance Study reports for Washington County and incorporated communities into the countywide format. Under the countywide format, Flood Insurance Rate Map panels have been produced using a single layout format for the entire area within the County instead of separate layout formats for each community. The single-layout format facilitates the matching of adjacent panels and depicts the flood-hazard area within the entire panel border, even in areas beyond a community's corporate boundary line. In addition, under the countywide format, this single Flood Insurance Study report provides all Flood Insurance Study information and data for the entire County area.

All flood elevations shown in this FIS report and on the FIRM panels were converted from NGVD 29 to NAVD 88. The conversion factor from NGVD to NAVD for all streams in this report is +3.52 feet.

As apart of the countywide format, Tualatin River and its major tributaries were studied. Approximately 167.20 miles of waterways located in Washington County, Oregon were either newly studied or restudied. A total of 46.68 miles were redelineated from the effective flood insurance rate maps.

Tualatin River and its tributaries study was completed by Pacific Water Resources, Inc. (PWR) under contract to Clean Water Services (CWS) in January 2006. Table 7 shows the streams that were studied and restudied in Washington County.

In June 2000, as part of a comprehensive project called Watersheds 2000, CWS contracted with three consulting engineering firms to create HEC-HMS and HEC-RAS models of streams in its service area. CWS divided the streams into three regions: East, Central, and South. PWR created models in the East region plus the upper Tualatin River, TetraTech/KCM (TTKCM) created models in the Central region, and Phil Williams & Associates, Inc. (PWA) created models in the South region plus the lower Tualatin River.

In November 2001, as part of the Tualatin Basin Floodplain Mapping project, CWS contracted with PWR to take about 167.2 miles of the HEC-RAS models in Washington County developed for the Watersheds 2000 project and complete a detailed riverine flood insurance restudy for all three regions plus the upper and lower Tualatin River. This work included incorporating models originally developed by TTKCM and PWA and developing floodway models, then creating the mapping layers and the compiling the FEMA submission.

The February 1996 flood on the Tualatin River was the largest flood flow ever recorded with an estimated 1.2-percent-annual-chance flood. However, for almost all of the smaller urbanized Tualatin River tributaries that were studied, the November 1996 flood is thought to be the largest flood ever observed with an estimated 25-year return interval and an annual probability of recurrence of 4 percent.

Table 7 - Revised Waterway Study Reaches

<u>Reach Name</u>	<u>Reach Location</u>	<u>Approximate Reach Miles</u>
Beal Creek	Mouth to 700 feet above Main St	0.52
Beaverton Creek	Mouth to SW 78th Ave	11.70
Bethany Creek	Mouth to 1200 feet above NW 174th Ave	1.13
Bronson Creek	Mouth to below NW Laidlaw Road	5.45
Butternut Creek	Mouth to SW Farmington Road	5.11
Cedar Creek	Mouth to above SW Sunset Blvd	2.93
Cedar Mill Creek	Mouth to 800 feet upstream of NW 113th Ave	4.90
Celebrity Creek	Mouth to below SW Farmington Road	1.05
Chicken Creek	Mouth to SW Edy Road	2.90
Chicken Creek - West Fork	Mouth to to 1500 feet upstream	0.29
Council Creek	Mouth to Purdin Road (Verboort Road)	6.68
Dairy Creek	Mouth to mile 4.7	4.71
Dawson Creek	Mouth to 1500 feet above NE Shute Road	3.06
Deer Creek	Mouth to NW 174th Ave	0.65
Erickson Creek	Mouth to 350 feet above SW 10th Ave	1.64
Glencoe Swale	Mouth to 2800 feet above NW Sewell Road	4.07
Golf Creek	Mouth to SW Canyon Road	0.67
Gordon Creek	Mouth to to 500 feet below T.V. Hwy	1.91
Hall Creek	Mouth to SW 99th Ave	2.20
Hall - Middle Fork	Mouth (SW 99th Ave) to SW 87th Ave	0.76
Hall - North Fork	Mouth to below Hwy 217 Ramp	0.61
Hall - South Fork	Mouth (SW 99th Ave) to SW 86th Ave	0.80
Hall - SW 106th Ave Trib	Mouth to below SW Walker Road	0.54
Hedges Creek	Mouth to edge of mapping near SW Myslony Street	2.69
Holcomb Creek	Mouth to below gravel road 2800 feet below Dick Rd.	2.02
Johnson Creek North	Mouth to 800 feet below SW Brookside Drive	2.73
Johnson Creek North - East Trib	Mouth to 600 feet SW 99th Ave	0.36
Johnson Creek North – N. Trib	Mouth to below SW 107th Ave	0.60
Johnson Creek South	Mouth to SW Hart Road	2.37
McKay Creek	Mouth to P&W Railroad, above NW West Union Rd	10.30
Nyberg Creek	Mouth to below SW Boones Ferry Road	2.54
Rock Creek	Mouth to below P&W Railroad	16.80
Rock Creek South	Mouth to Oregon Street	2.05
Storey Creek	Mouth to mile 2.0	1.97
Storey Creek - East Trib	Mouth to mile 0.8	0.84
Storey Creek - Middle Trib	Mouth to NW West Union Road	0.77
Tualatin River	Mouth to to River Mile 17.1	17.11
Tualatin River	500 feet below Butternut Creek to 7500 feet above Gales Creek	26.78
Turner Creek	Mouth to below NE Cornell Rd. near Hillwood Dr.	1.99
Waible Creek	Mouth to NW West Union Road	4.93
Waible - North Trib	Mouth to NW West Union Road	0.60
Waible - South Trib	Mouth to NW Jacobson Road	1.62
Willow Creek	Mouth to NW 141st Place	3.85

The flood peak discharges used for mapping the flooding along the mainstem of the Tualatin River including the Rivergrove Gap and Oswego Canals were based on a flood frequency analysis of historic gaged annual peak flows after accounting for the effect of the upstream regulation at Hagg Lake. This analysis was documented in the report entitled “Estimated Flood Peak Discharges of the Tualatin River” dated May 2003 (revised), prepared for CWS of Washington County Oregon by Roger Sutherland, PE and Seth Jelen, PE of PWR. The flood peak discharges for mapping the flooding along the tributary waterways of the Tualatin River were based on HEC-HMS hydrologic modeling of these watersheds. The hydrologic modeling techniques used were documented in the report entitled “Hydrologic Modeling for the Watersheds 2000 Project” (Tributary Report) dated June 2, 2003, prepared for CWS of Washington County Oregon by Phillip Pommier, PE, of PWR.

The proposed discharges for the Tualatin tributary stream, which were developed from HEC-HMS modeling and account for snowmelt and antecedent moisture conditions, are reasonable and appropriate.

The Peak discharge for the February 1996 flood along the Tualatin River was recorded at the following USGS gaging stations: Dilley; Golf Course Road; Road Bridge; Farmington; and West Linn.

Digital methods were used wherever possible to reduce redundant work effort and automate the direct transfer of data. They were used to directly convert a network of sections and alignments into section positions and distances, and to convert survey and data to the model ground cross sections, and to automatically map the 1- and 0.2-percent-annual-chance floodplain boundaries using digital three-dimensional face data. Digital methods were used to directly map the floodway boundaries based on widths from the model output and to use that same data for the floodway data table in a spreadsheet.

Analyses for water surface profiles were done with the USACE HEC-RAS Version 3.11 and PWR confirmed that reaches can be executed in Version 3.12.

In keeping with NFIP standard methods, PWR used normal depth (using average floodplain slope at the bottom) as the downstream boundary condition for modeling the base and encroached-floodway profiles, then applied backwater from downstream sources to obtain the regulatory 1-percent-annual-chance flood elevation used for the floodway data table, the profiles, and the floodplain mapping. This is also consistent with the downstream condition used in the effective profiles for those streams being restudied.

In some cases, PWR concluded that two stream systems were so near each other and so similar in size and orientation that it would be more appropriate to model their flood peak as coincident in time from the same flooding source. In these cases, the models were combined into a single HEC-RAS model and the hydraulics of their junction modeled within HEC-RAS automatically. These streams include the Cedar Mill-North Johnson Creek system, the Storey Creek system, the Waible Creek system, and the Beaverton-Hall Creek system. Even in these cases, the downstream boundary condition of the primary creek was modeled using normal depth with backwater from its receiving water as described above.

Note that the City of Tualatin is a multi-county community with areas in Washington and Clackamas counties. The Washington County DFIRM was previously clipped to the Washington County boundary, and as a result the City of Tualatin was split between Washington County and Clackamas County. In order to avoid having two reference maps and FIS reports for the City of Tualatin, and also considering the FEMA guidelines for multi-county communities, the Washington County DFIRM was extended into Clackamas County to include the full extent of the City of Tualatin. This inclusion adds a 5541 ft reach of the Tualatin River and a 1805 ft reach of Nyberg Slough to the Washington County DFIRM and FIS. Cross section lettering along the Tualatin River matches the Clackamas County DFIRM to cross section “AF” (county boundary), at which point the cross section lettering sequence resets to “A”. The cross section lettering on the Nyberg Slough is continuous.

Note that with the Beaverton-Hall Creek system the junction involved a hydraulically complex underground junction modeled externally using the Water Surface Pressure Gradient for Windows (WSPGW) model with overflow balanced using HEC-RAS. Although Hall and Beaverton Creeks share hydraulics of this junction as if they were tributaries to a single larger watershed, Hall Creek is modeled as a separate HEC-RAS model using a starting (downstream) condition rating curve developed from the WSPGW model at that junction.

As noted in the April 2003 Guidelines, PWR did check water surface elevations in each tributary that was modeled separately from its main stream and found that the main stream was always higher.

Channel and overbank roughness factors (Mannings “n” values) were assigned based on field visits and recent high resolution aerial photos. The range of both channel and overbank “n” values used in each of the hydraulic models are shown in Table 4. In 2000, PWR submitted the Fanno Creek FIS restudy, which is also in the Tualatin Basin (between the East and South regions). The calibration of Fanno Creek hydraulic model supported much higher “n” values than those that are generally found in

common literature sources such as Chow and USGS, the “n” values were ultimately lowered to a more reasonable range.

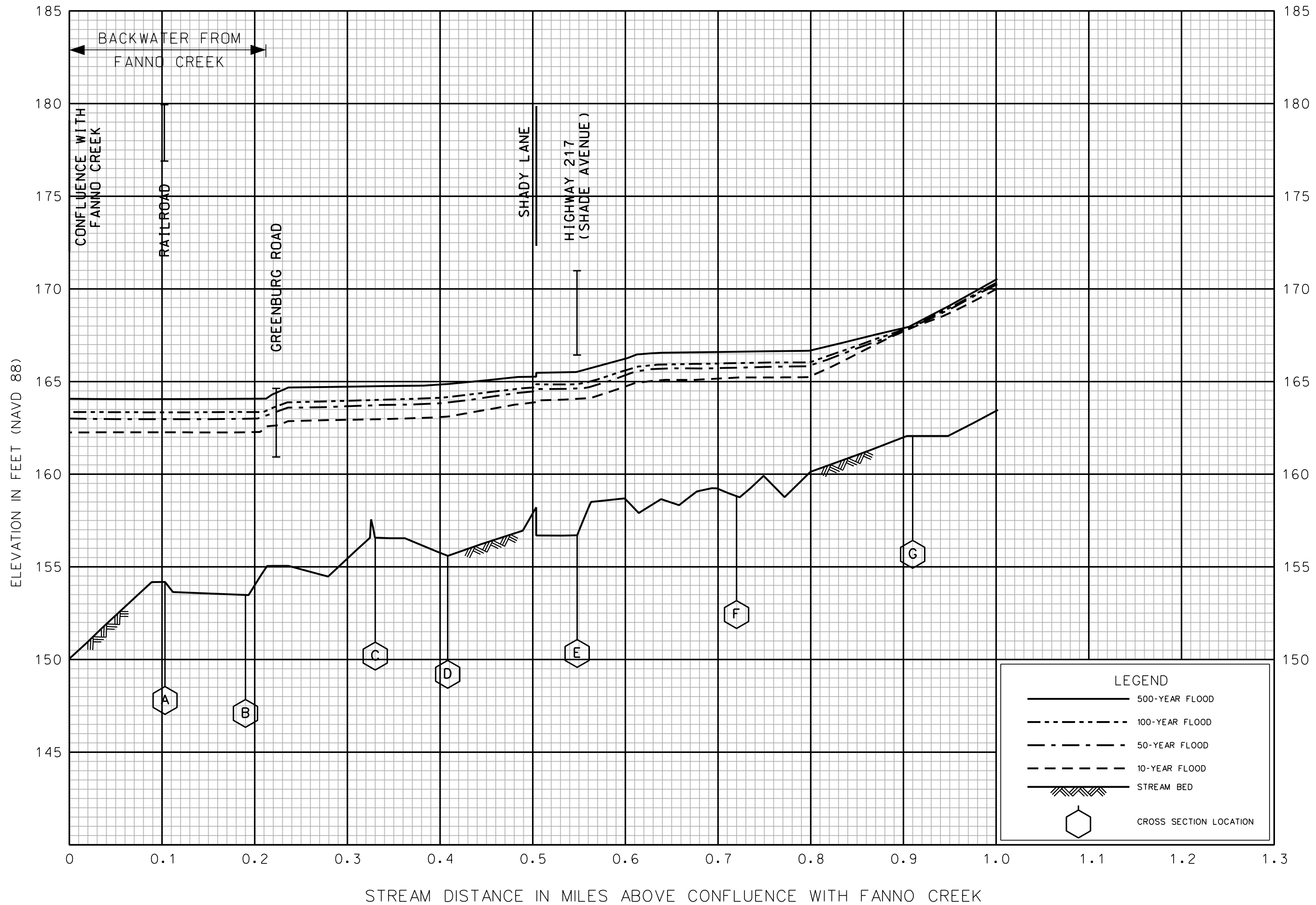
The “n” values used for the Tualatin Basin Floodplain Mapping Project were based on a tabulation of values and their corresponding description of channel and overbank characteristics. The three modeling teams (from the Watersheds 2000 work) for this project coordinated and agreed based on professional engineering judgment to use these “n” value tables.

Water surface profile computations at bridges are based on present normal bridge openings. Consideration was not given either to the possible blockage of bridge openings by sediment and debris or to future bridge enlargement.

All elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88).

New 2-foot contour maps for Ash Creek, Fanno Creek and Summer Creek, based on aerial photography taken in December, 1997 (Reference 24), were developed by David Smith and Associates.

This study matches downstream backwater elevations from the existing published FIS for the Tualatin River. An additional study for areas of Fanno Creek upstream of Washington County (i.e., City of Portland) has not been published yet.

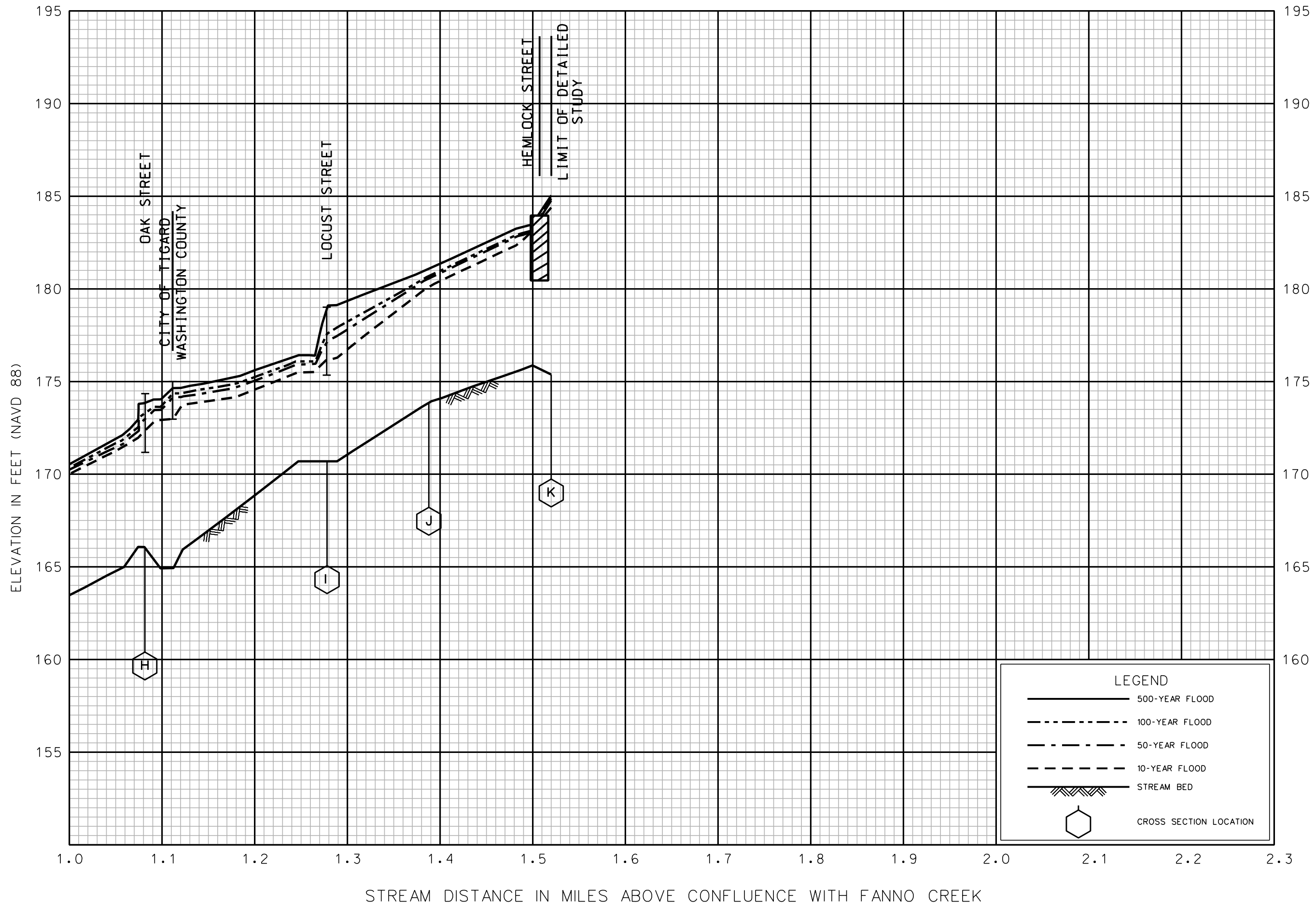


FLOOD PROFILES

ASH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

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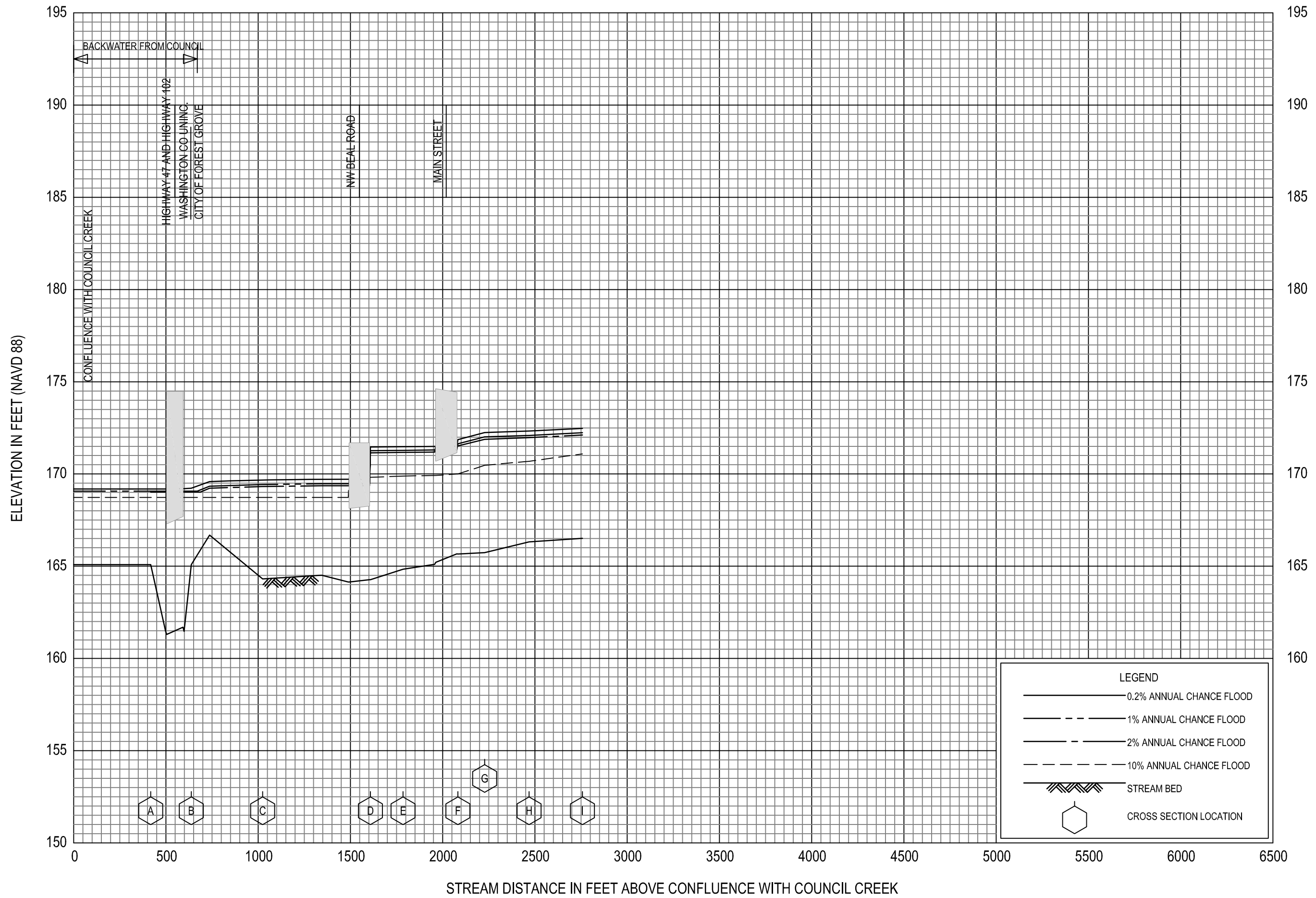


FLOOD PROFILES

ASH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

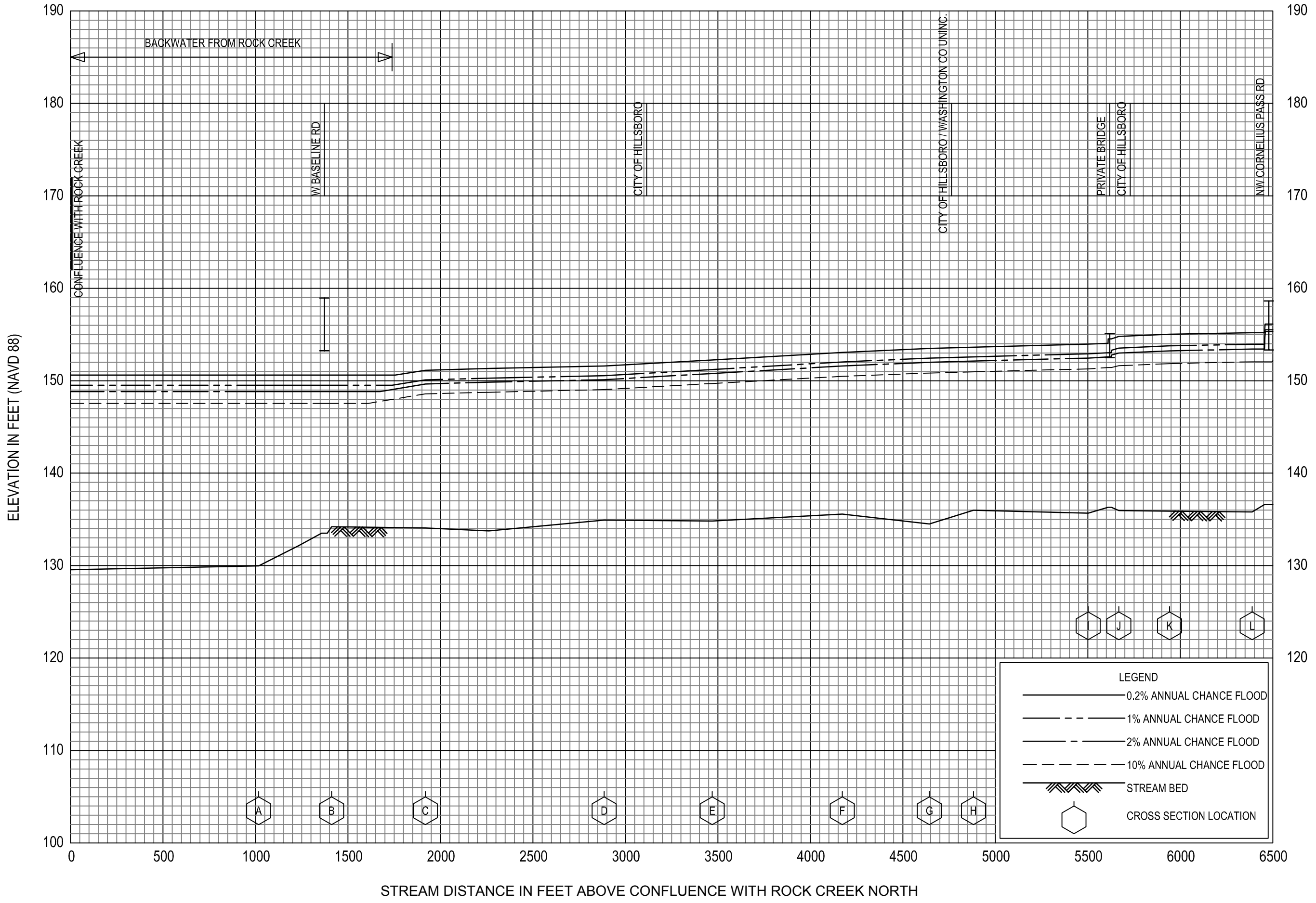
02P



FLOOD PROFILES
BEAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

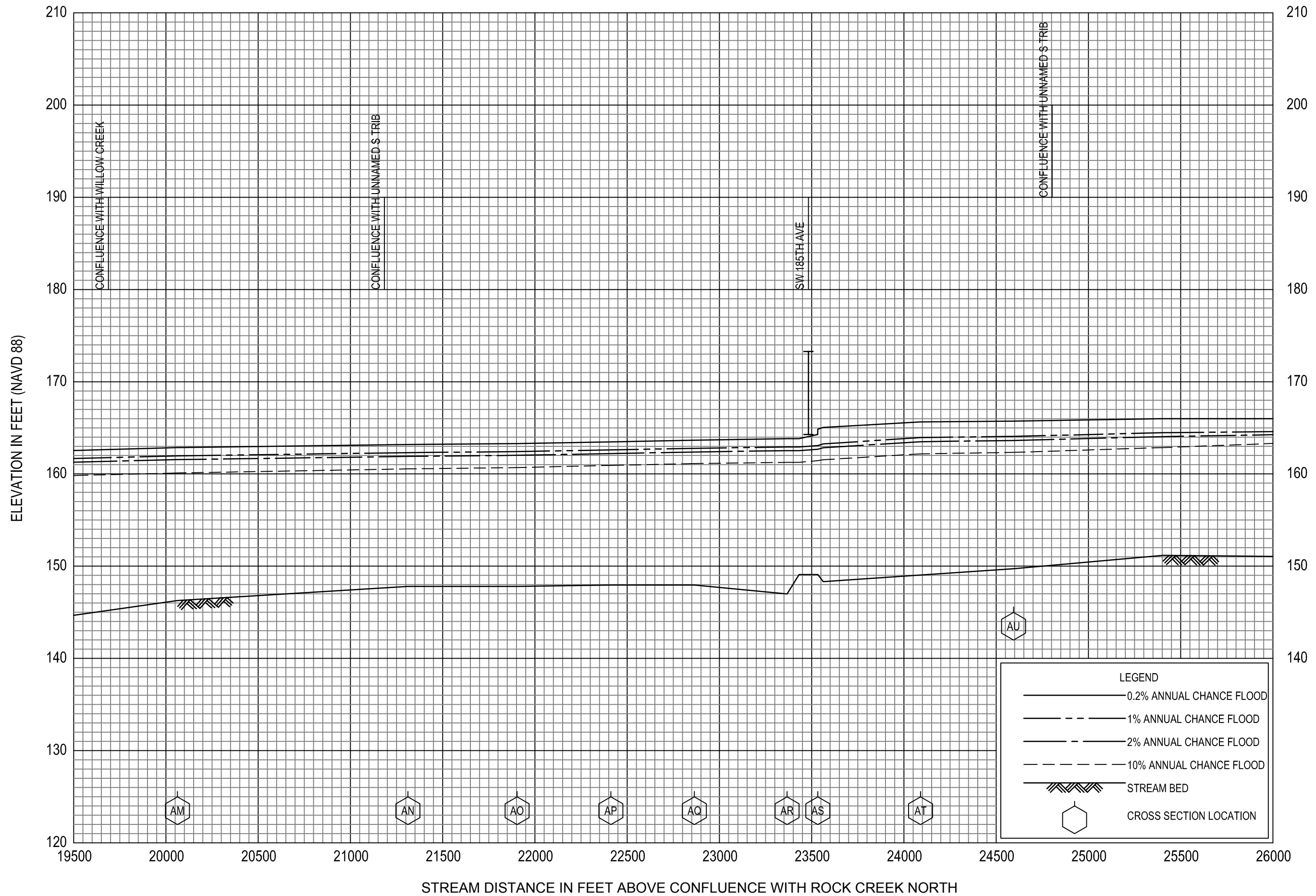
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FLOOD PROFILES
BEAVERTON CREEK

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

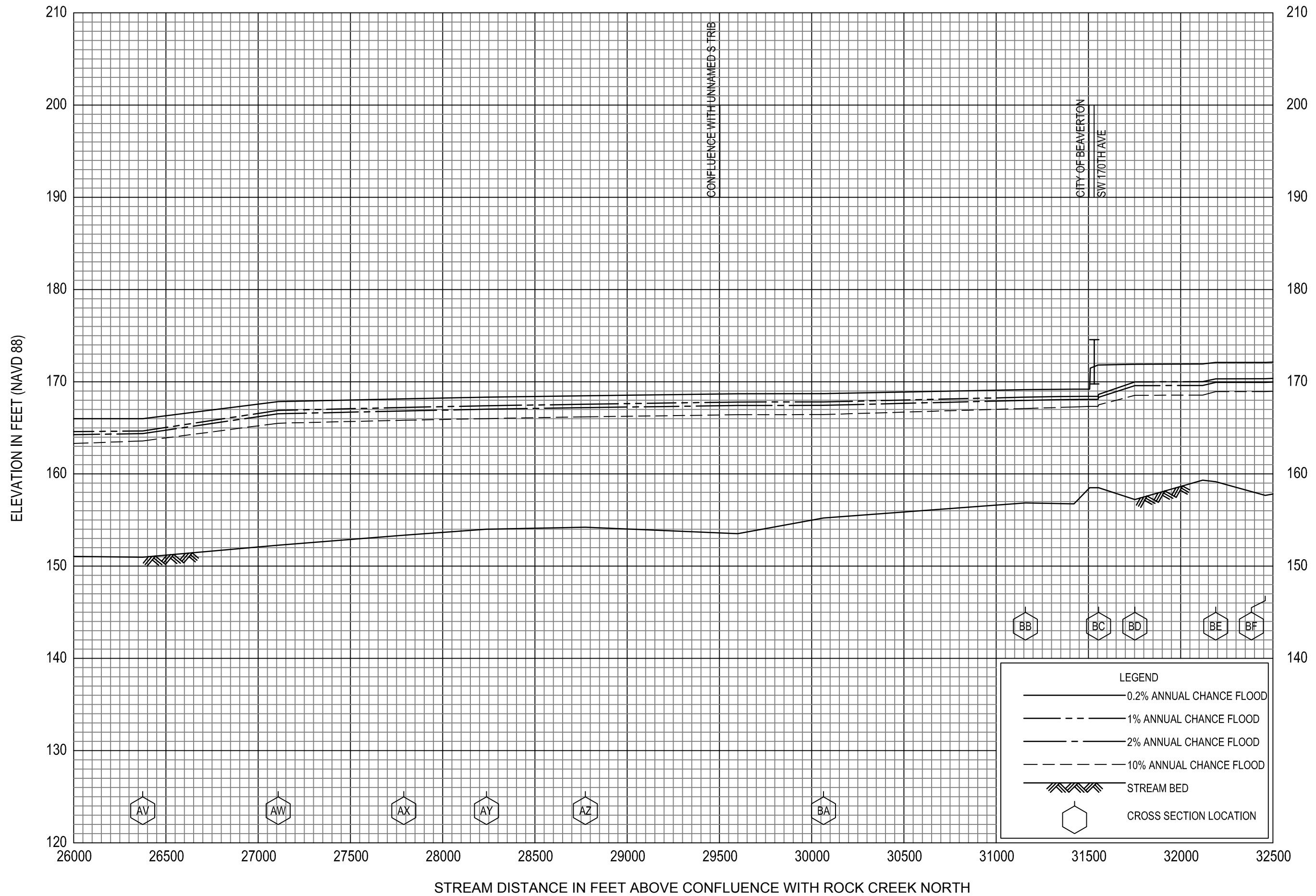
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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

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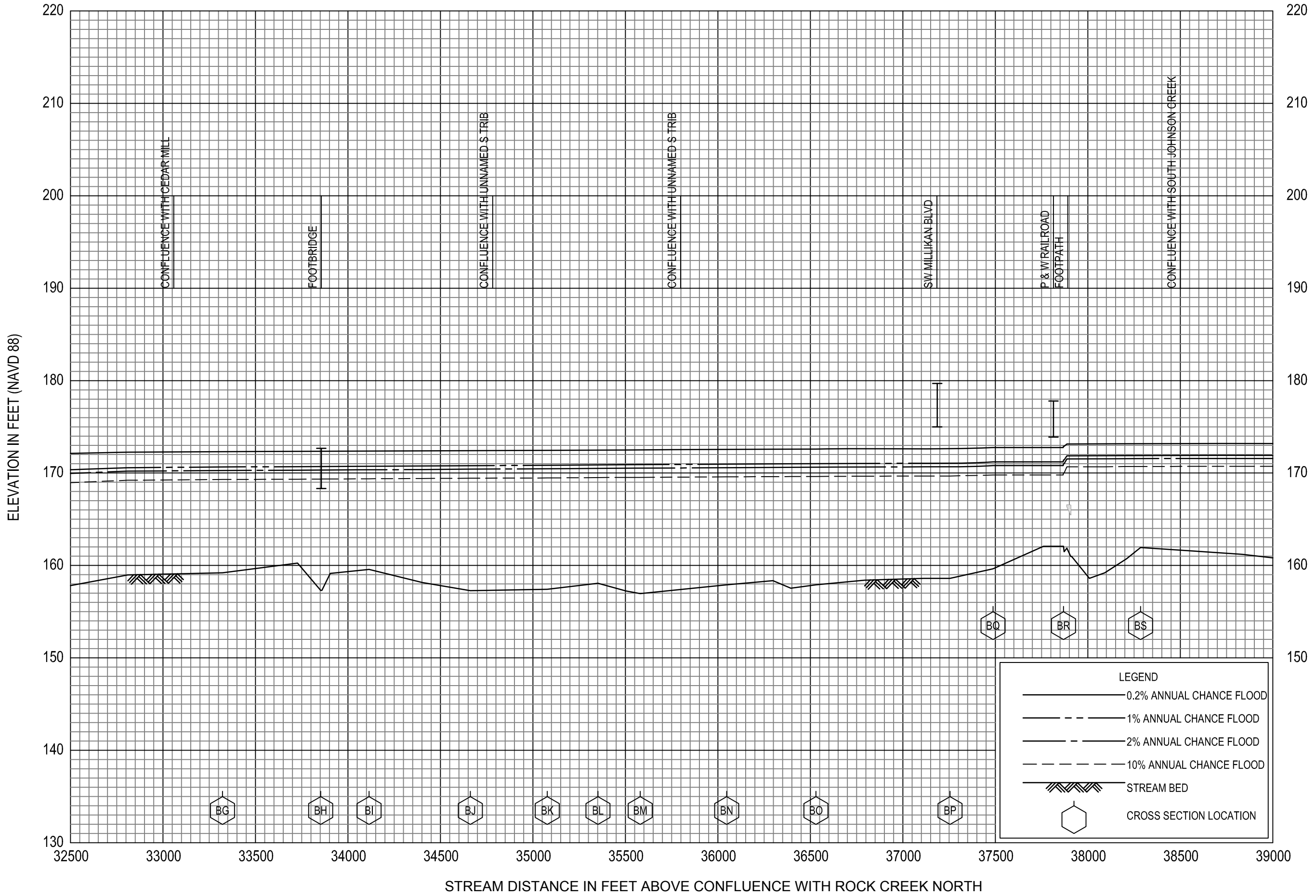


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BEAVERTON CREEK

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AND INCORPORATED AREAS**

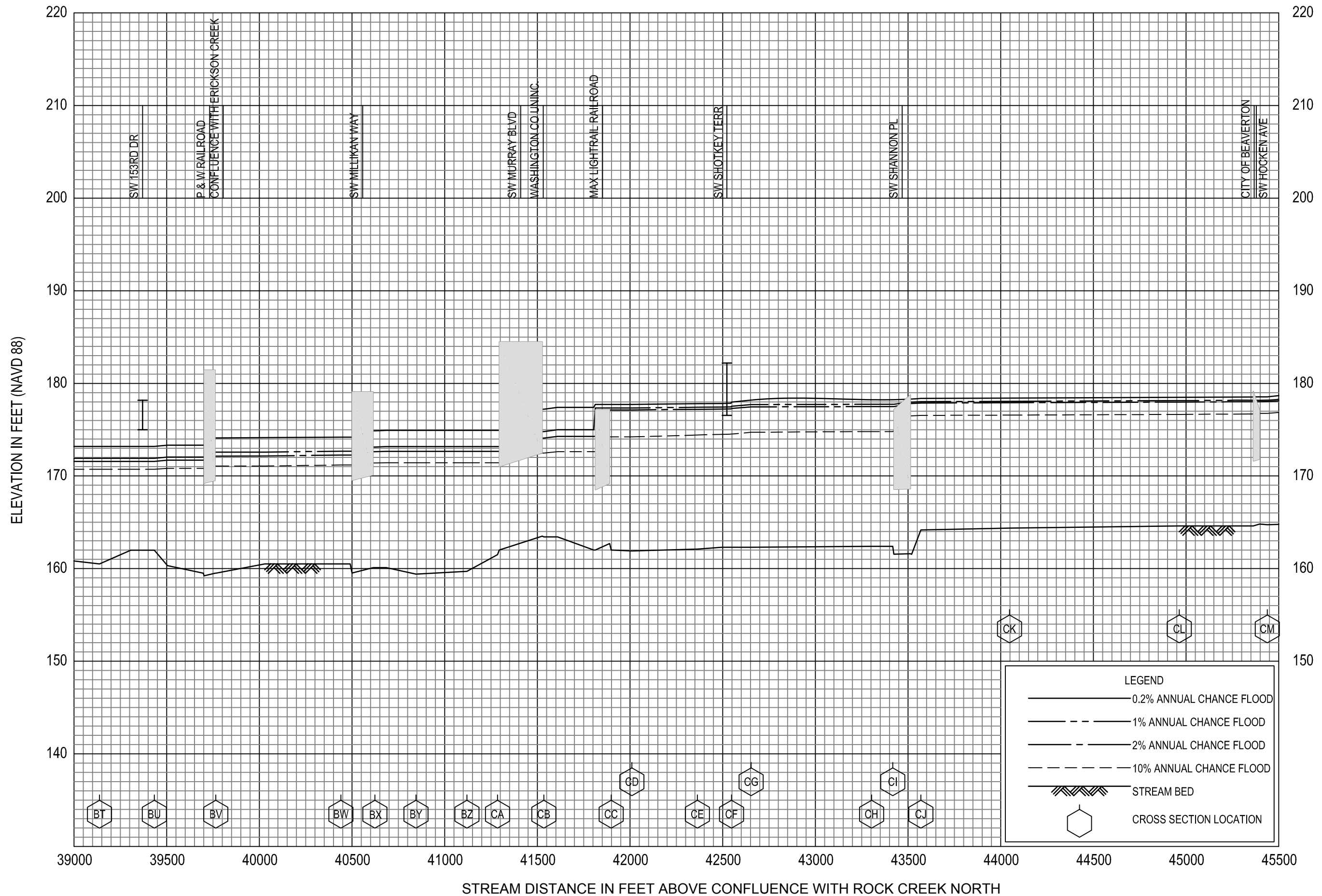
LEGEND	
	0.2% ANNUAL CHANCE FLOOD
	1% ANNUAL CHANCE FLOOD
	2% ANNUAL CHANCE FLOOD
	10% ANNUAL CHANCE FLOOD
	STREAM BED
	CROSS SECTION LOCATION

08P



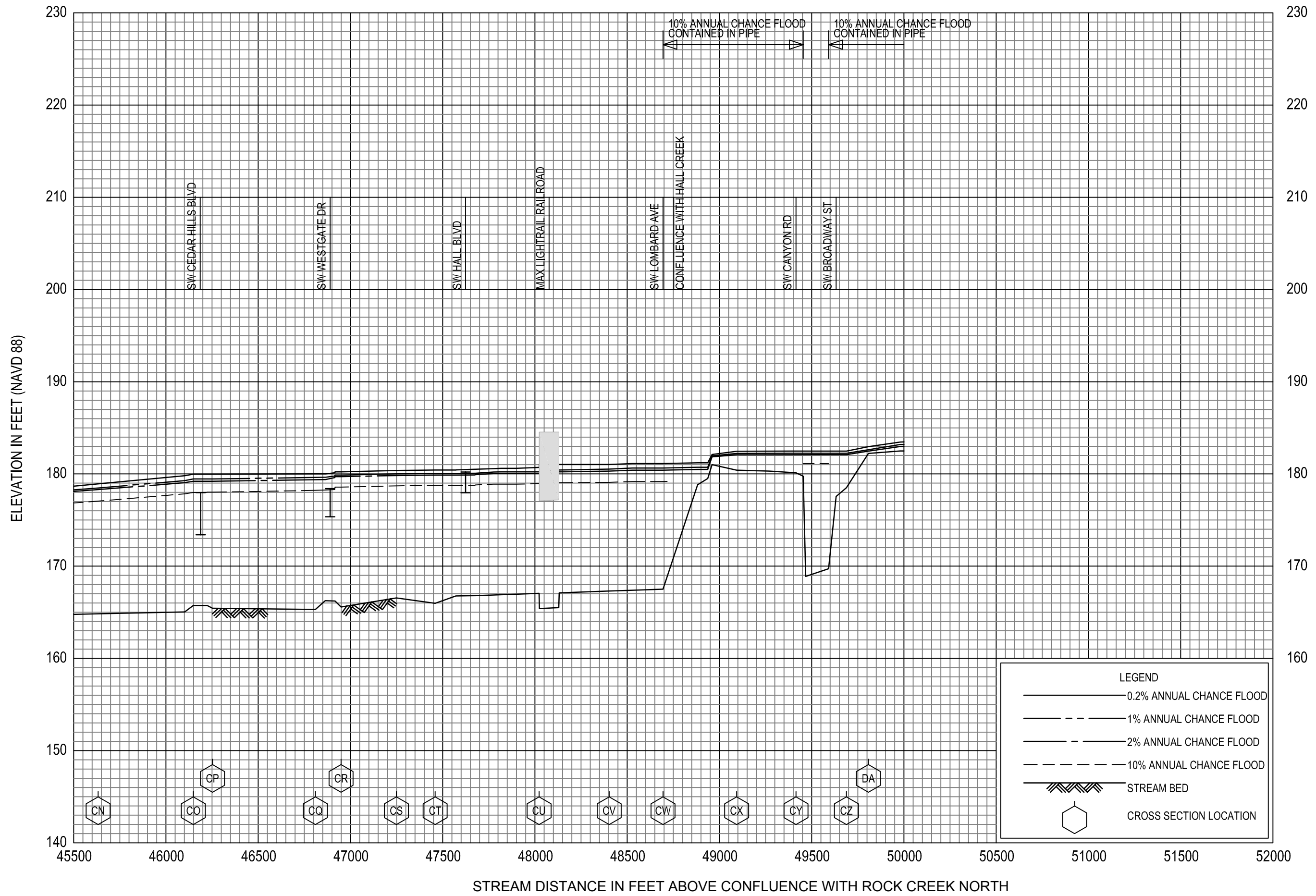
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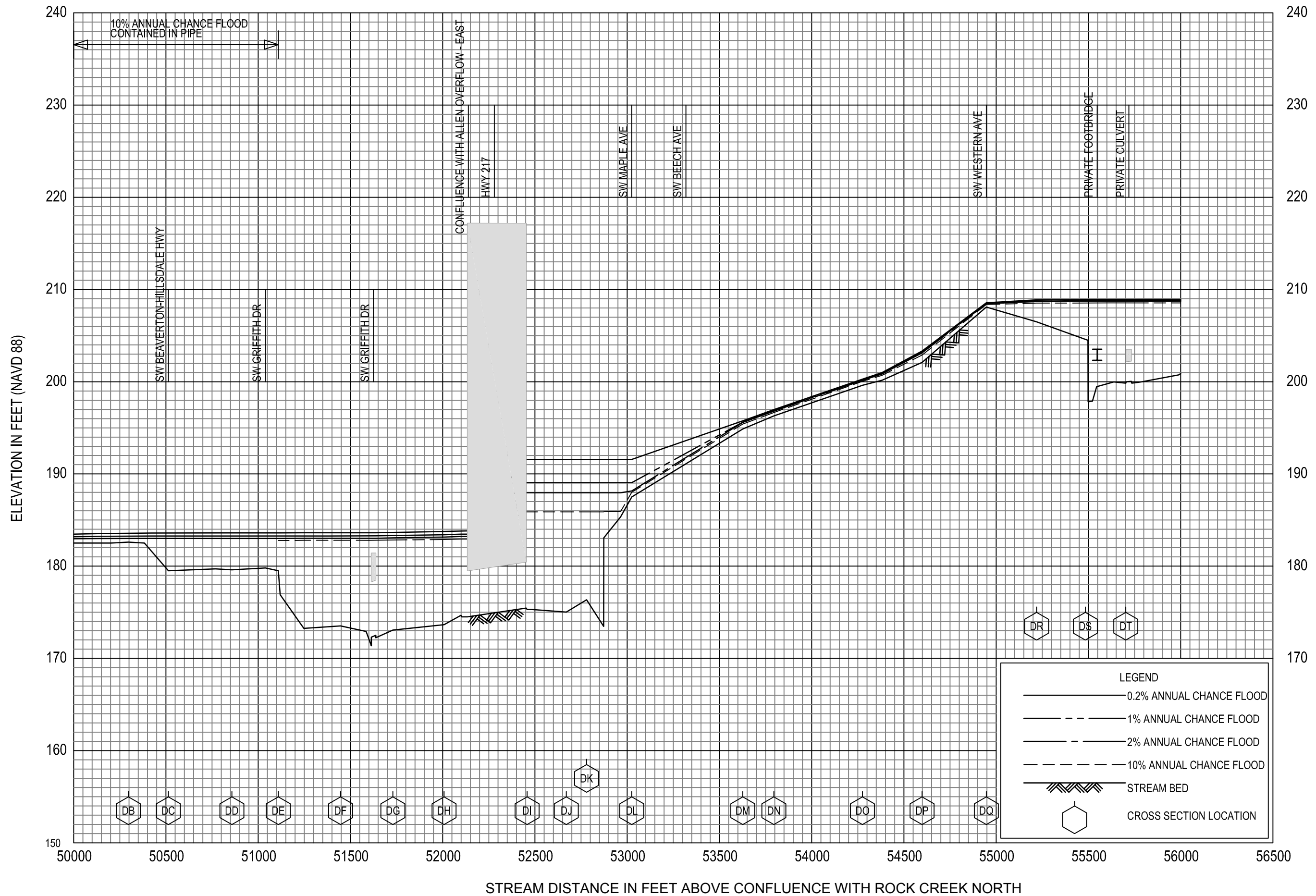
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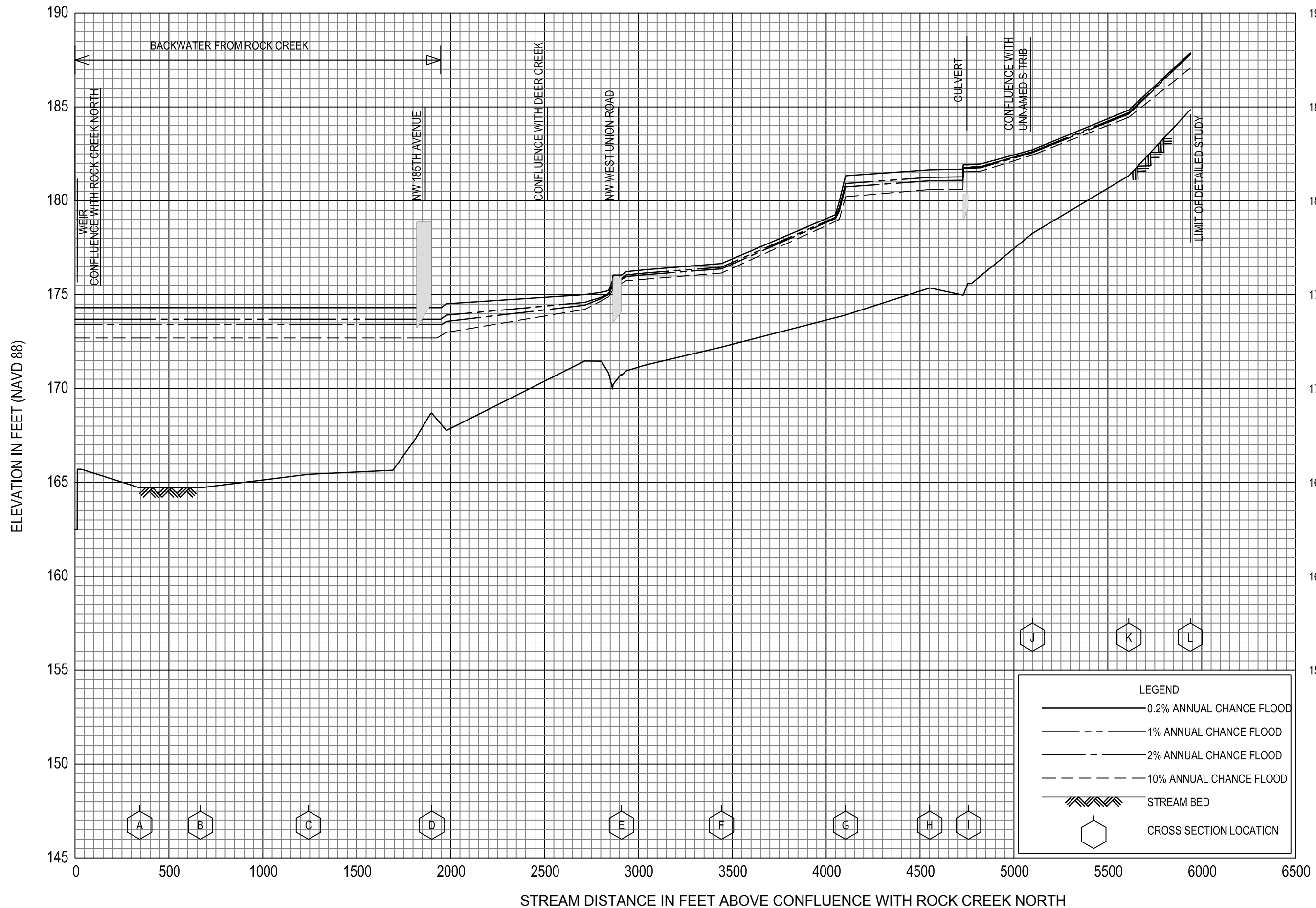
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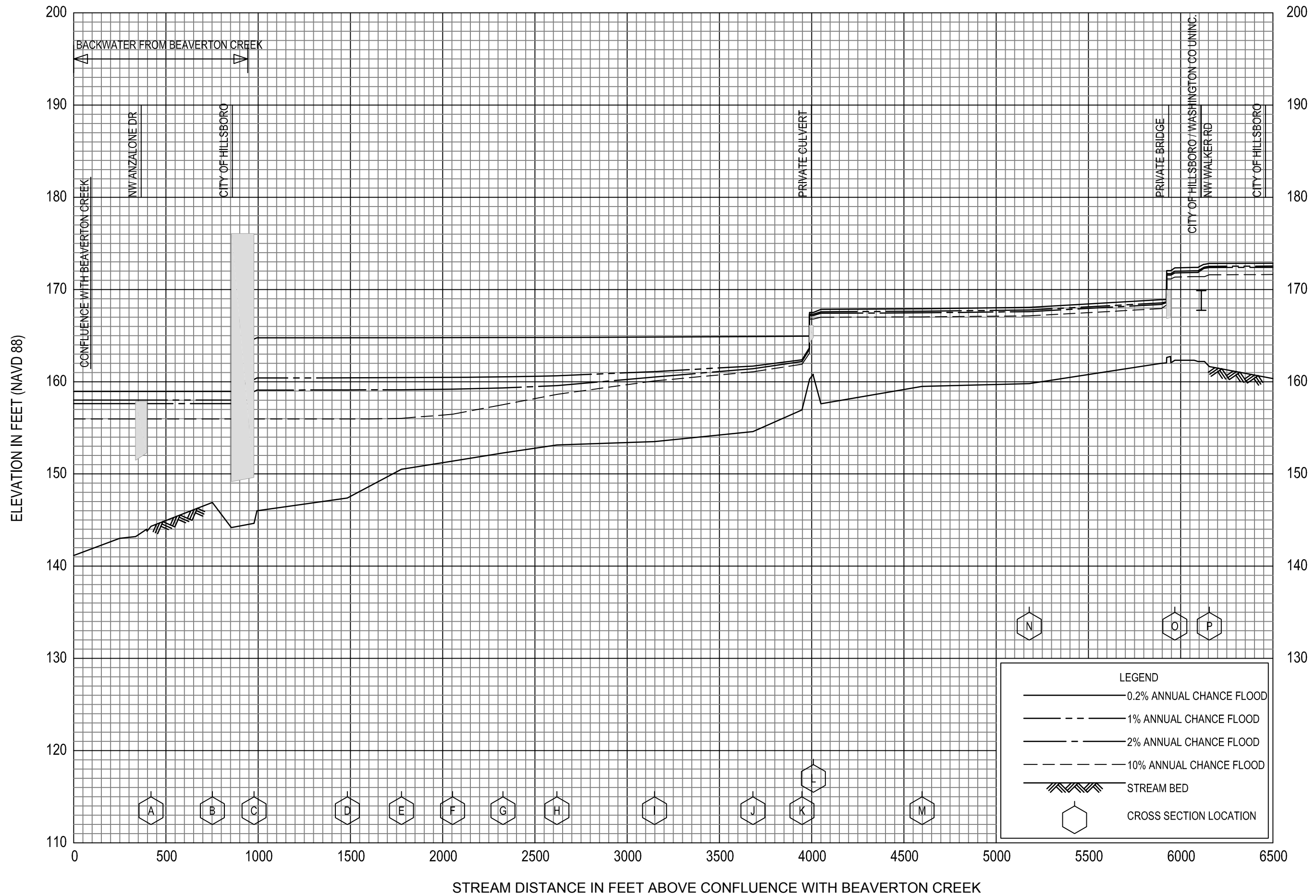
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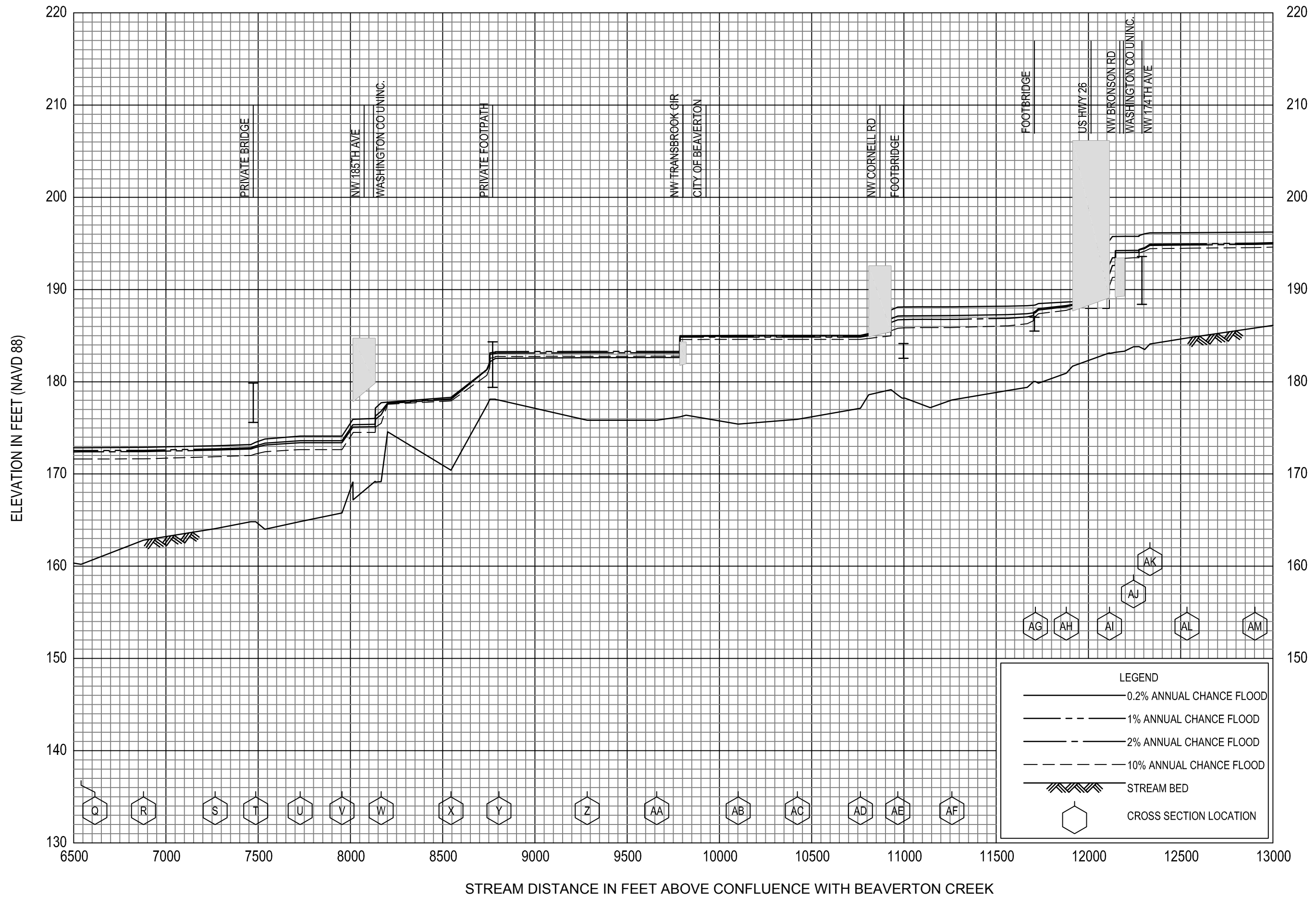
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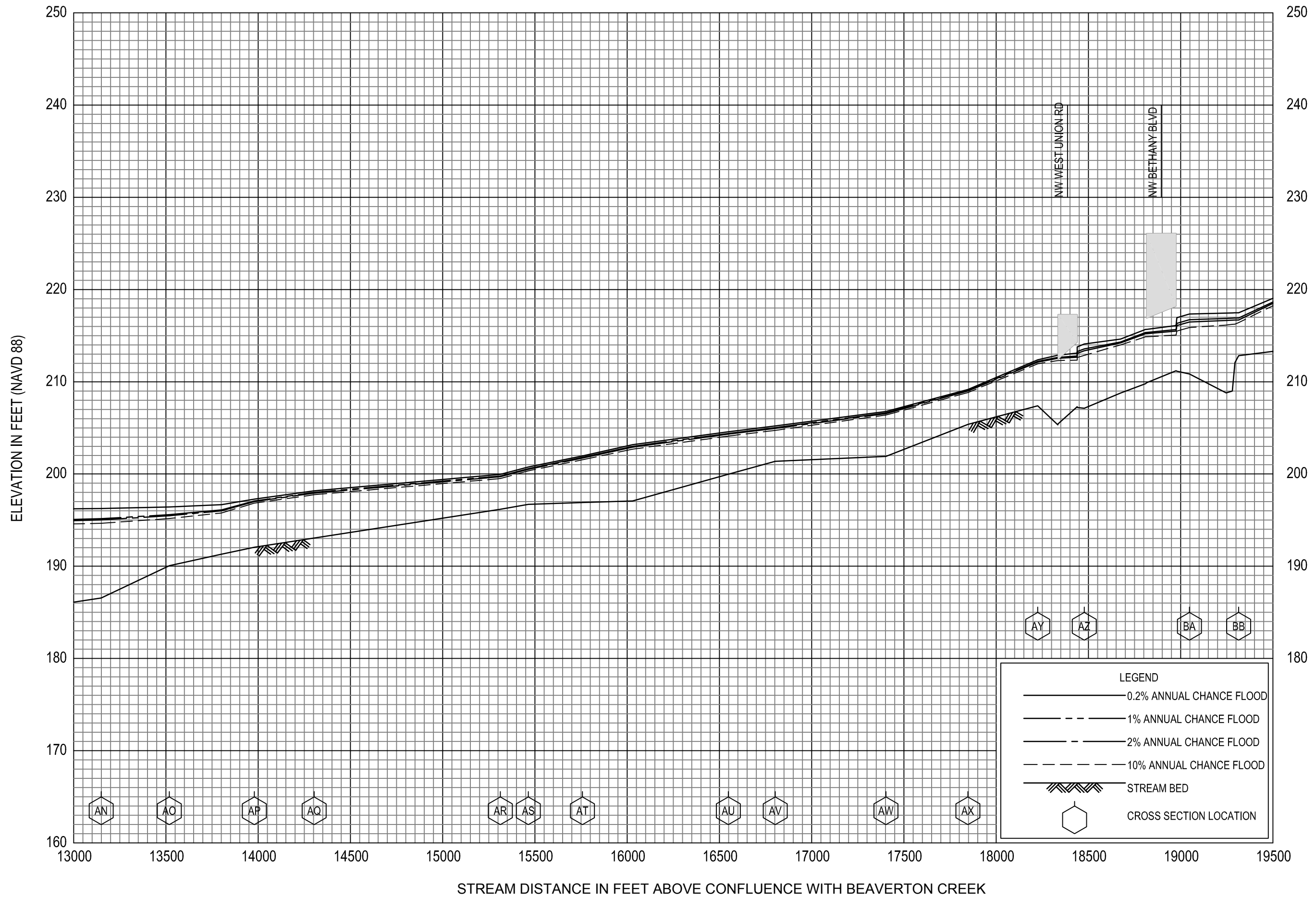
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AND INCORPORATED AREAS



FLOOD PROFILES
BRONSON CREEK

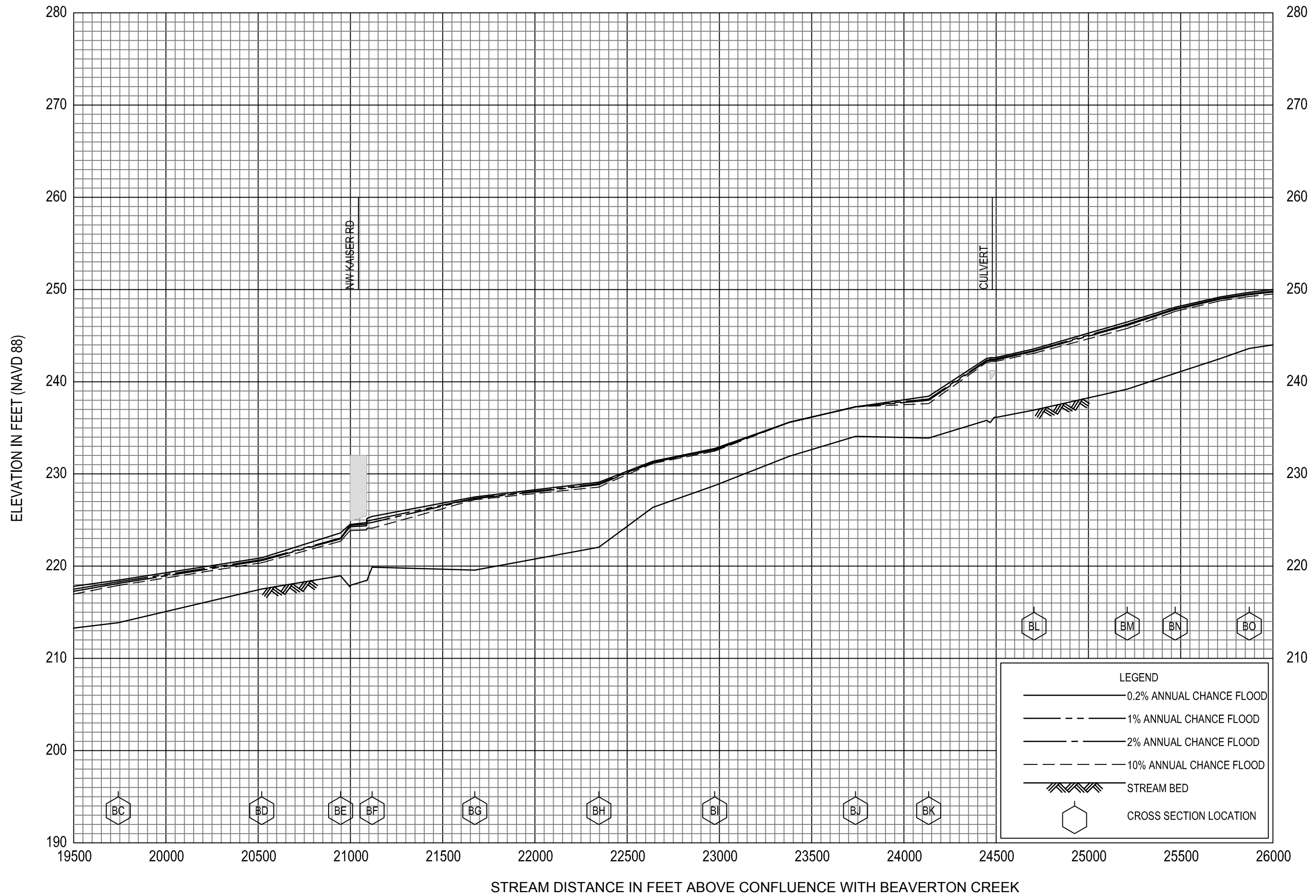
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AND INCORPORATED AREAS**





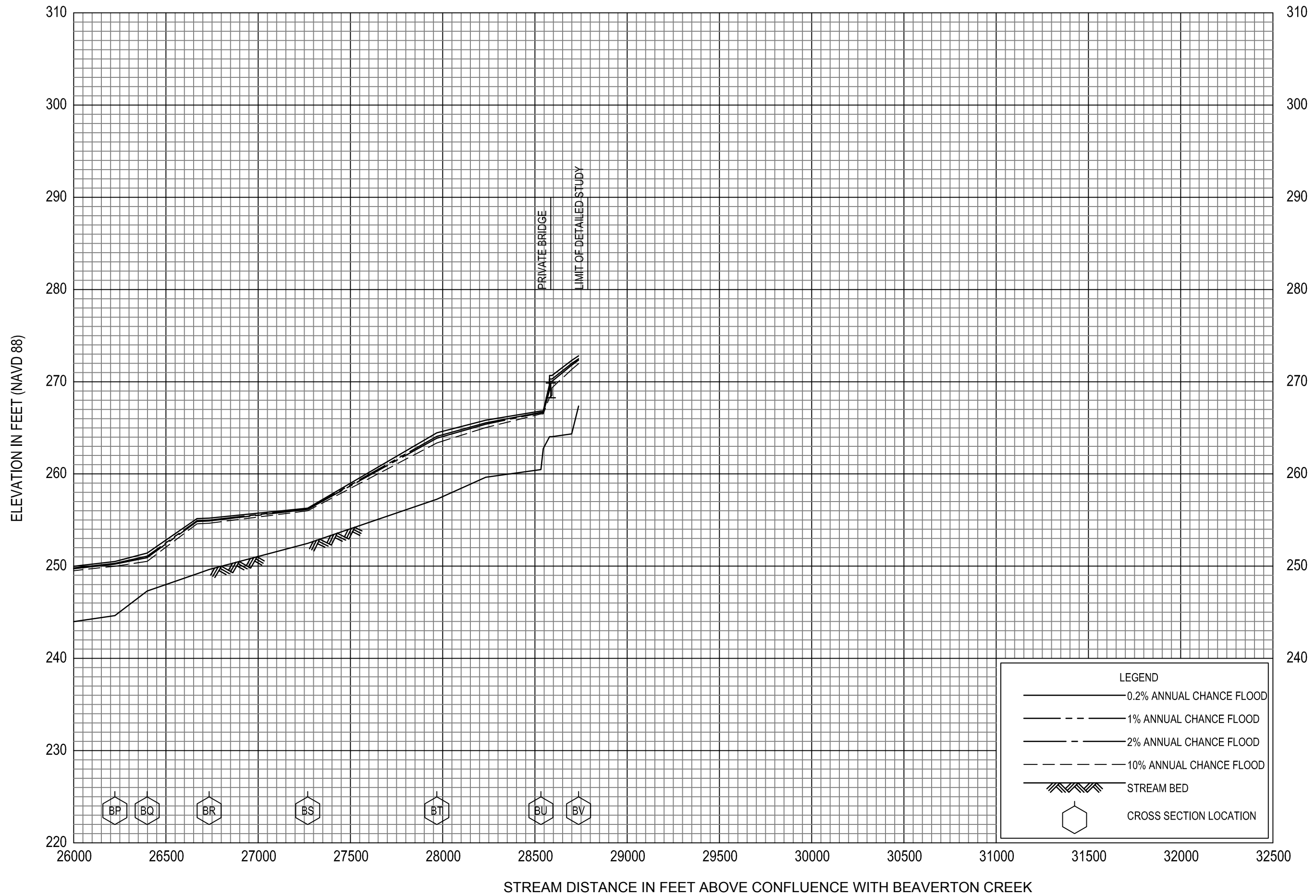
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



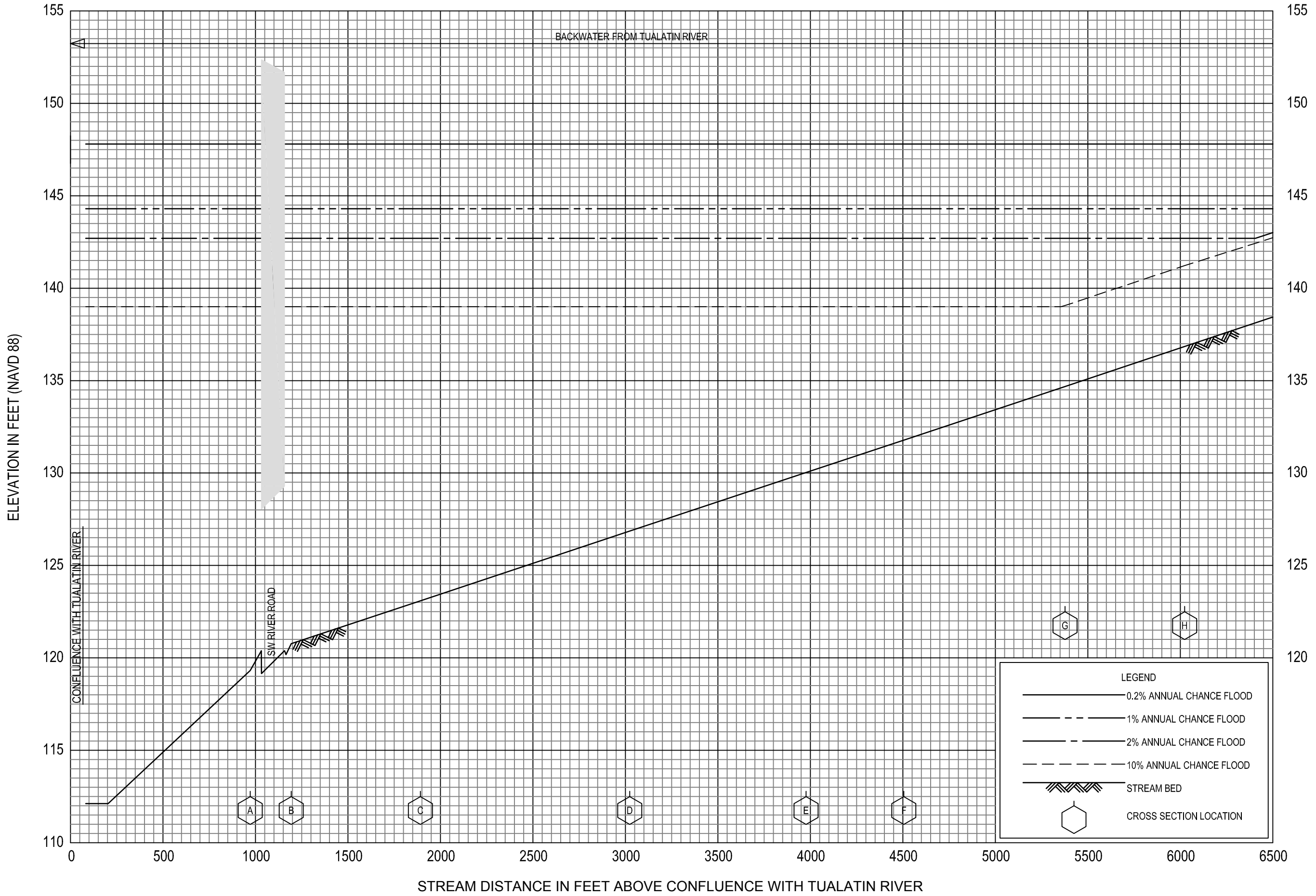
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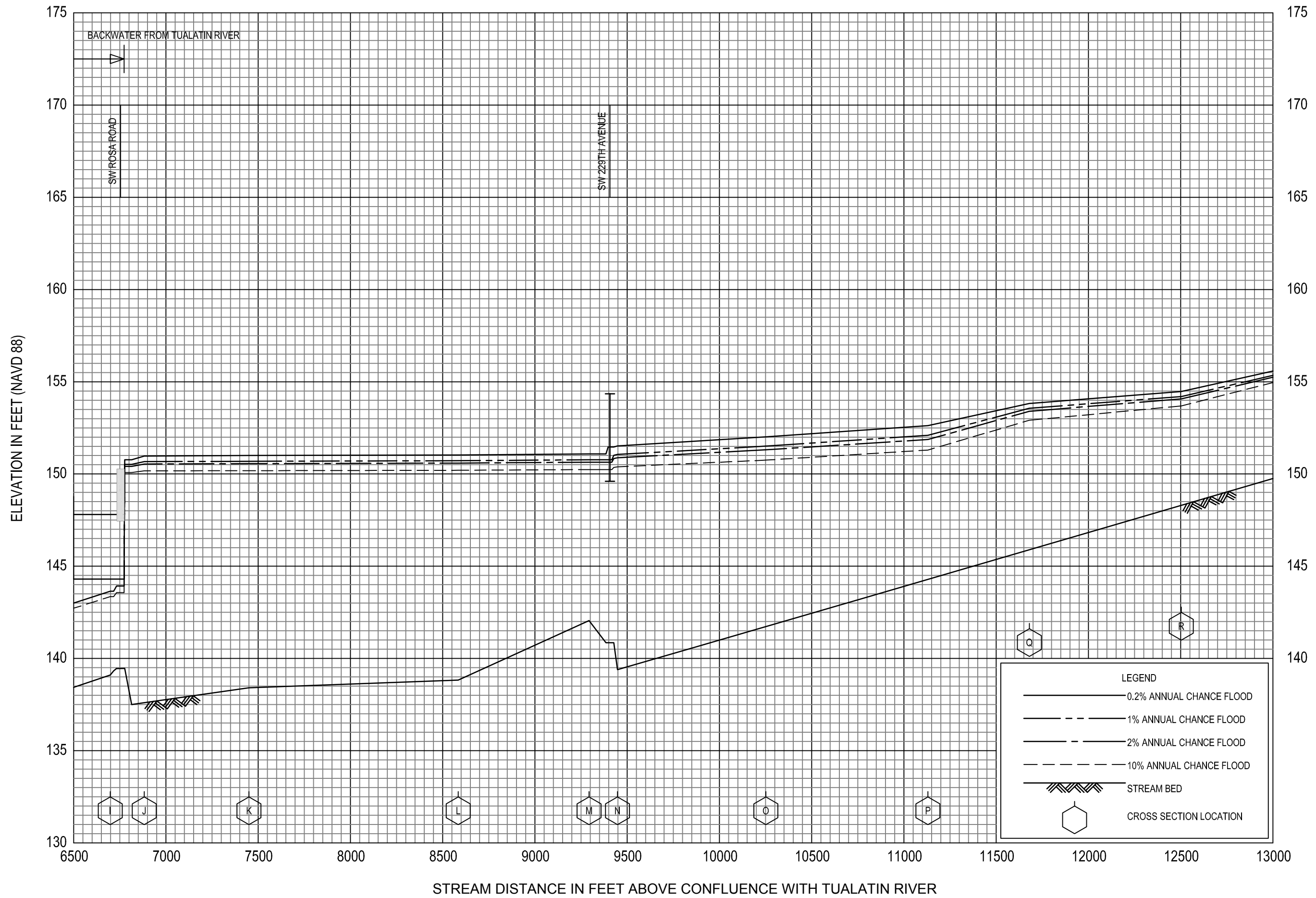
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AND INCORPORATED AREAS



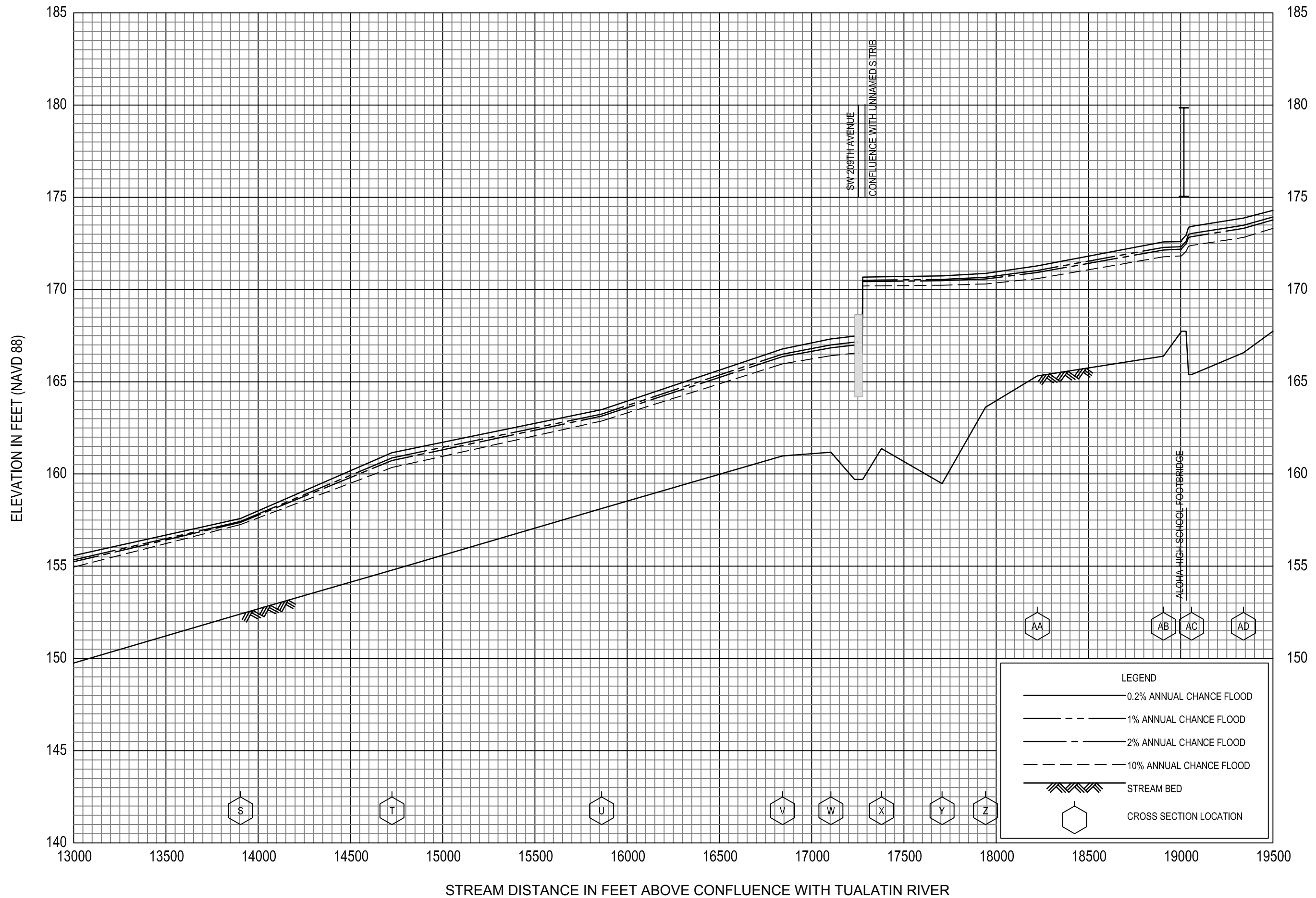
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FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



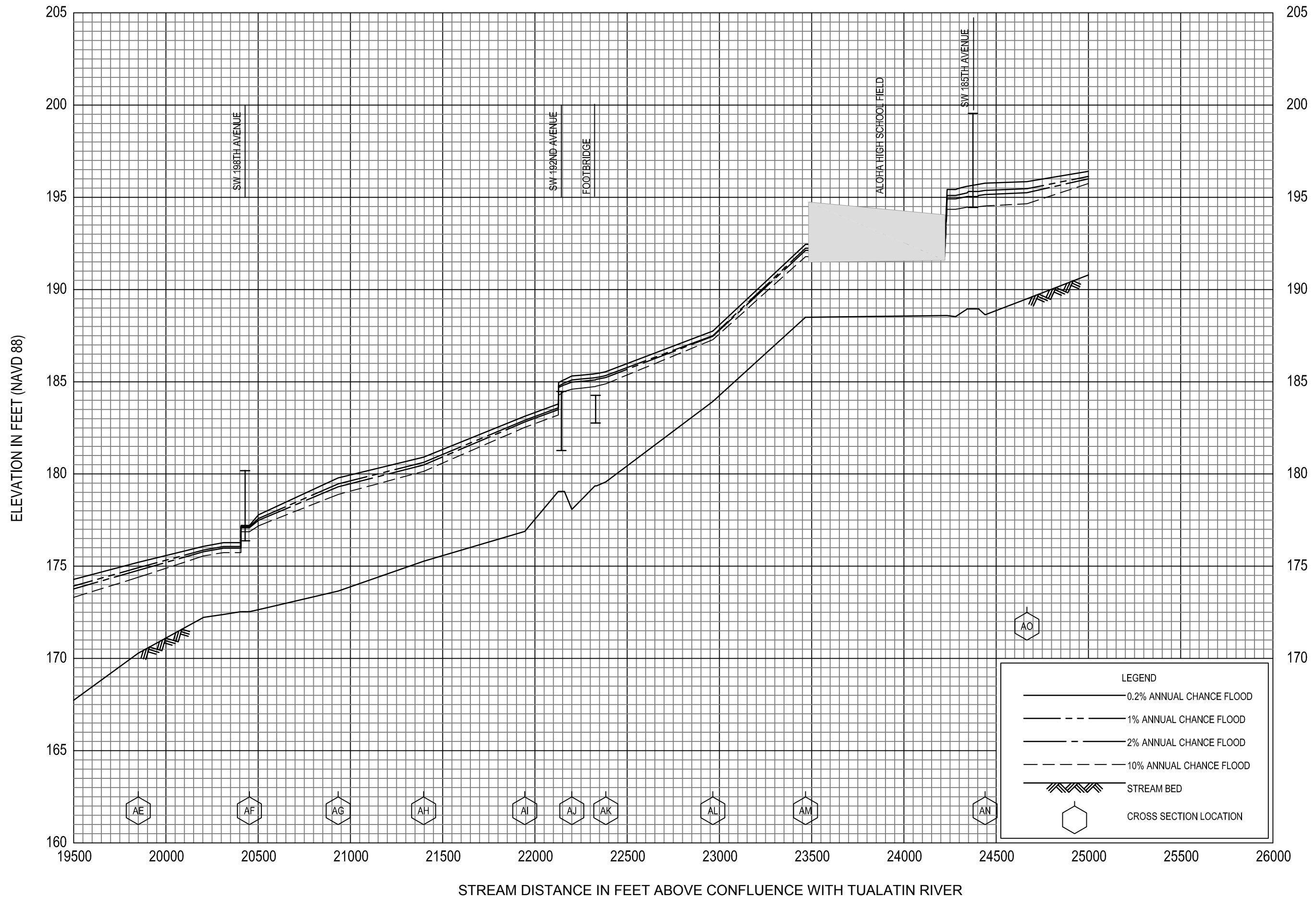
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



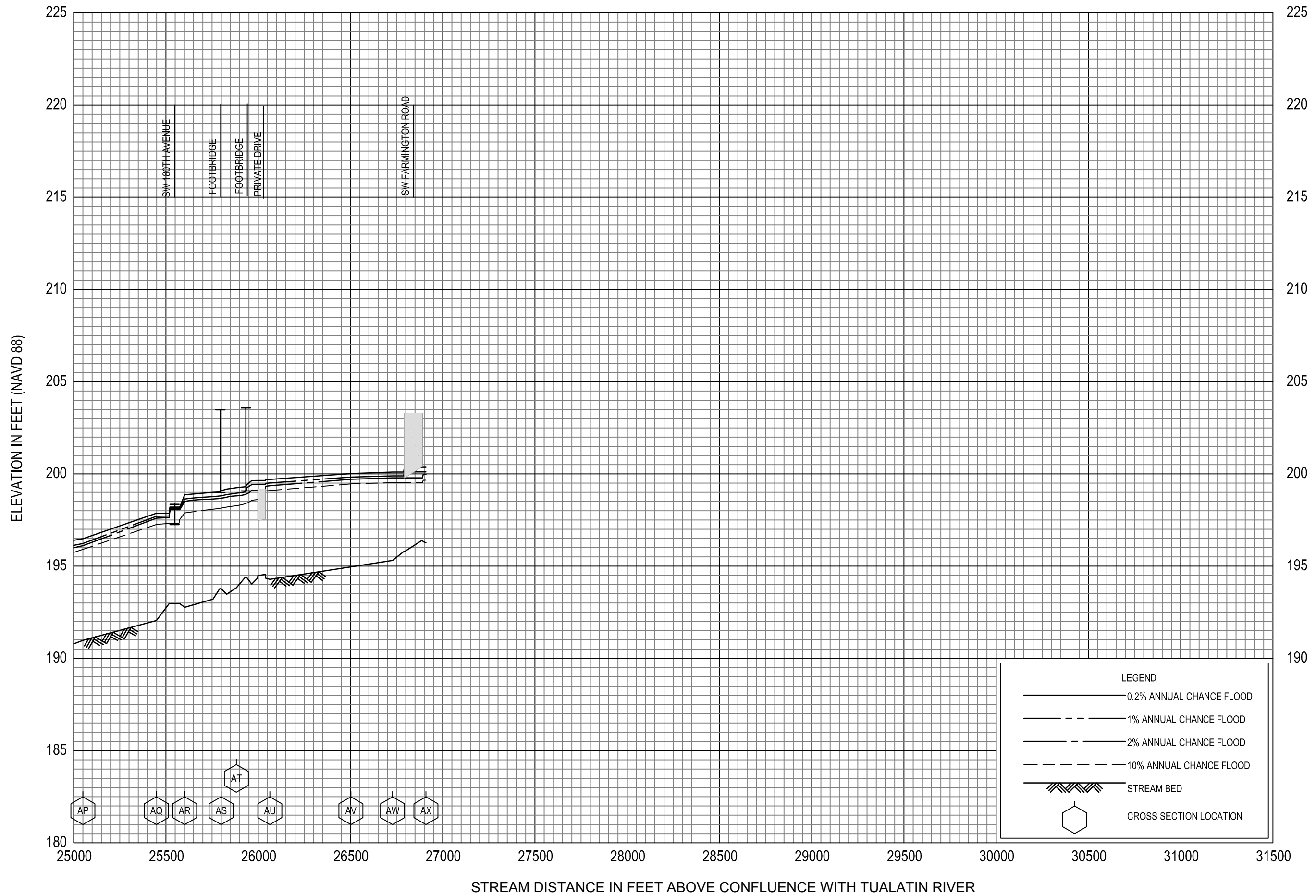
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BUTTERNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



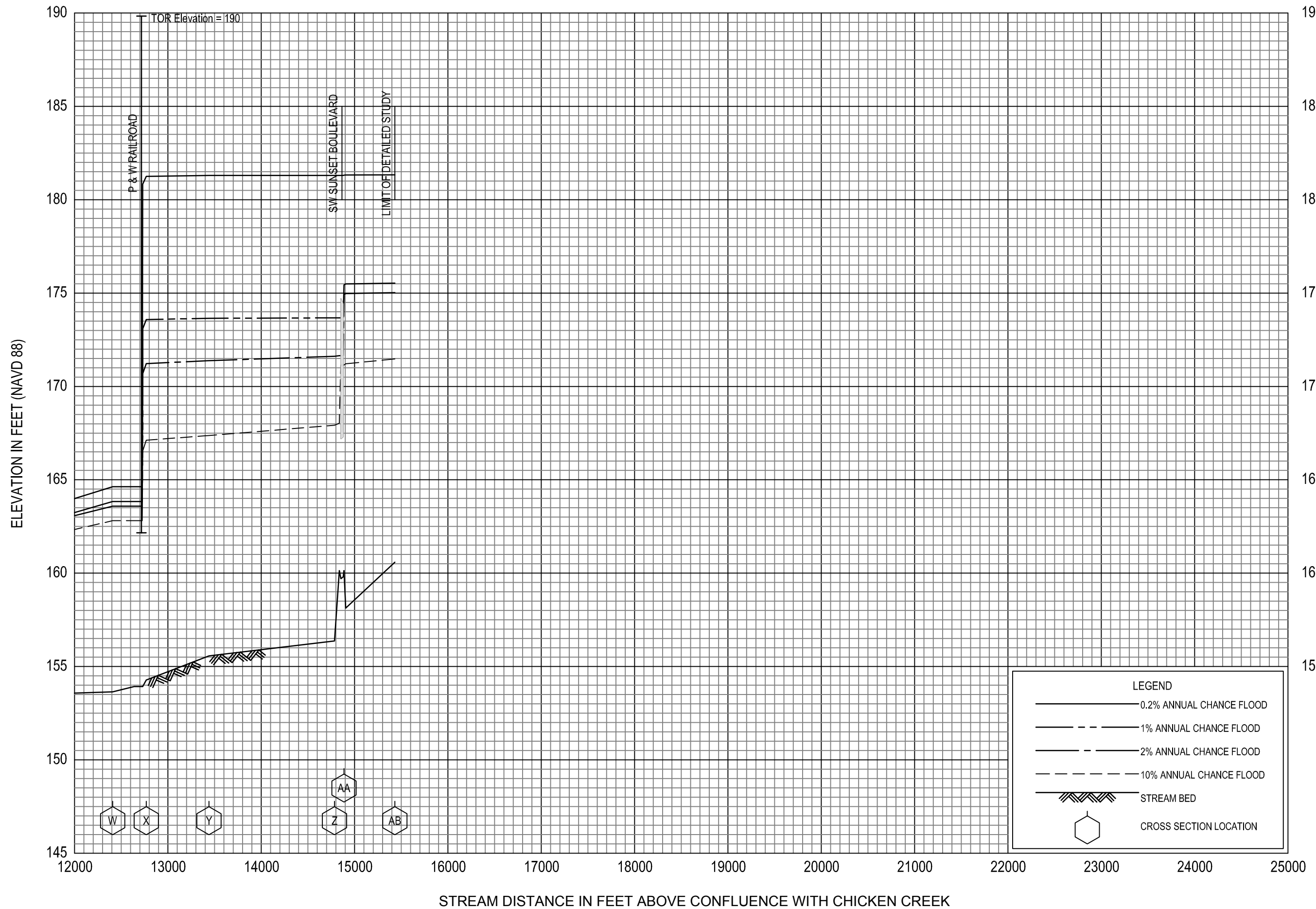
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BUTTERNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES
BUTTERNUT CREEK

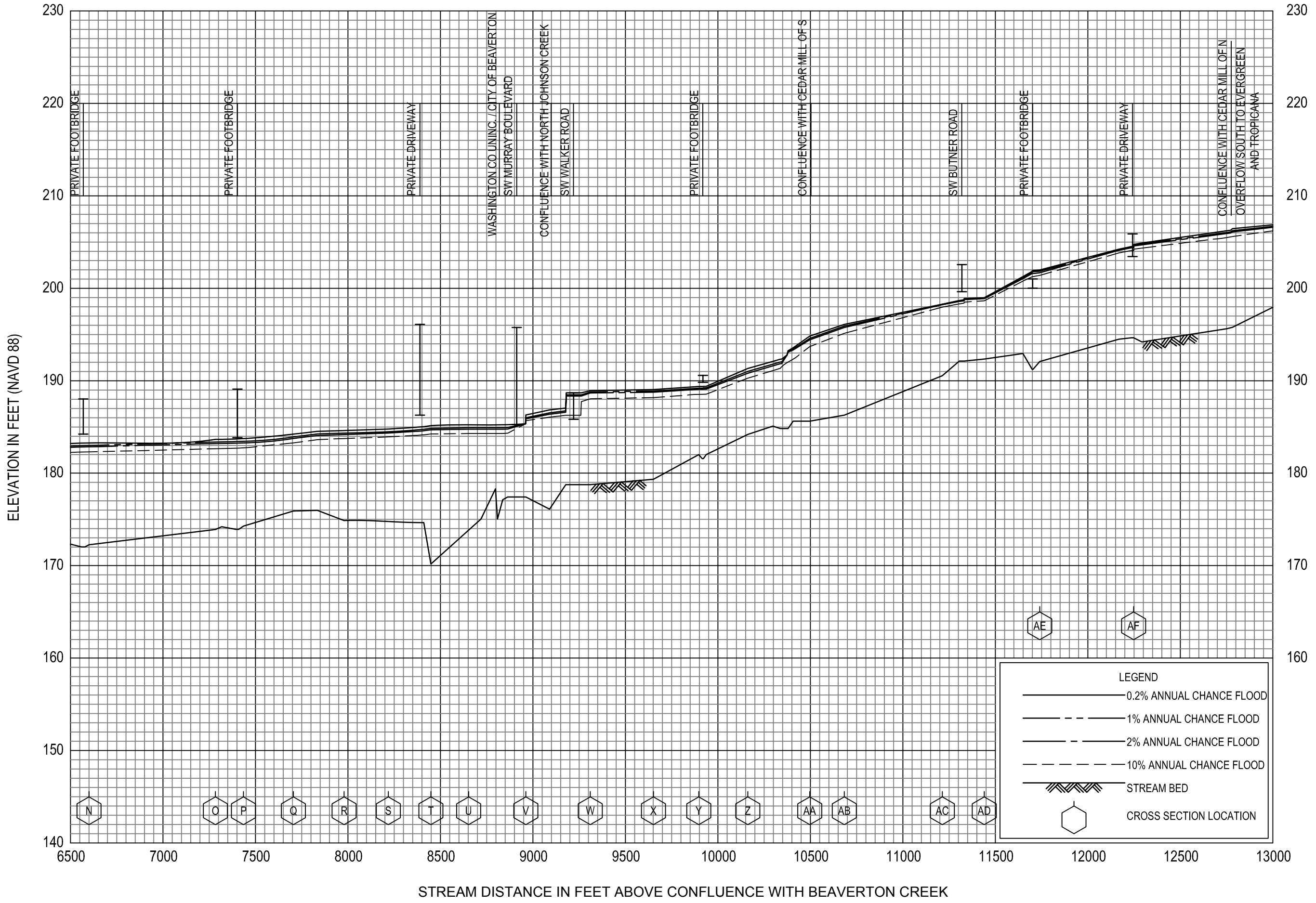
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AND INCORPORATED AREAS



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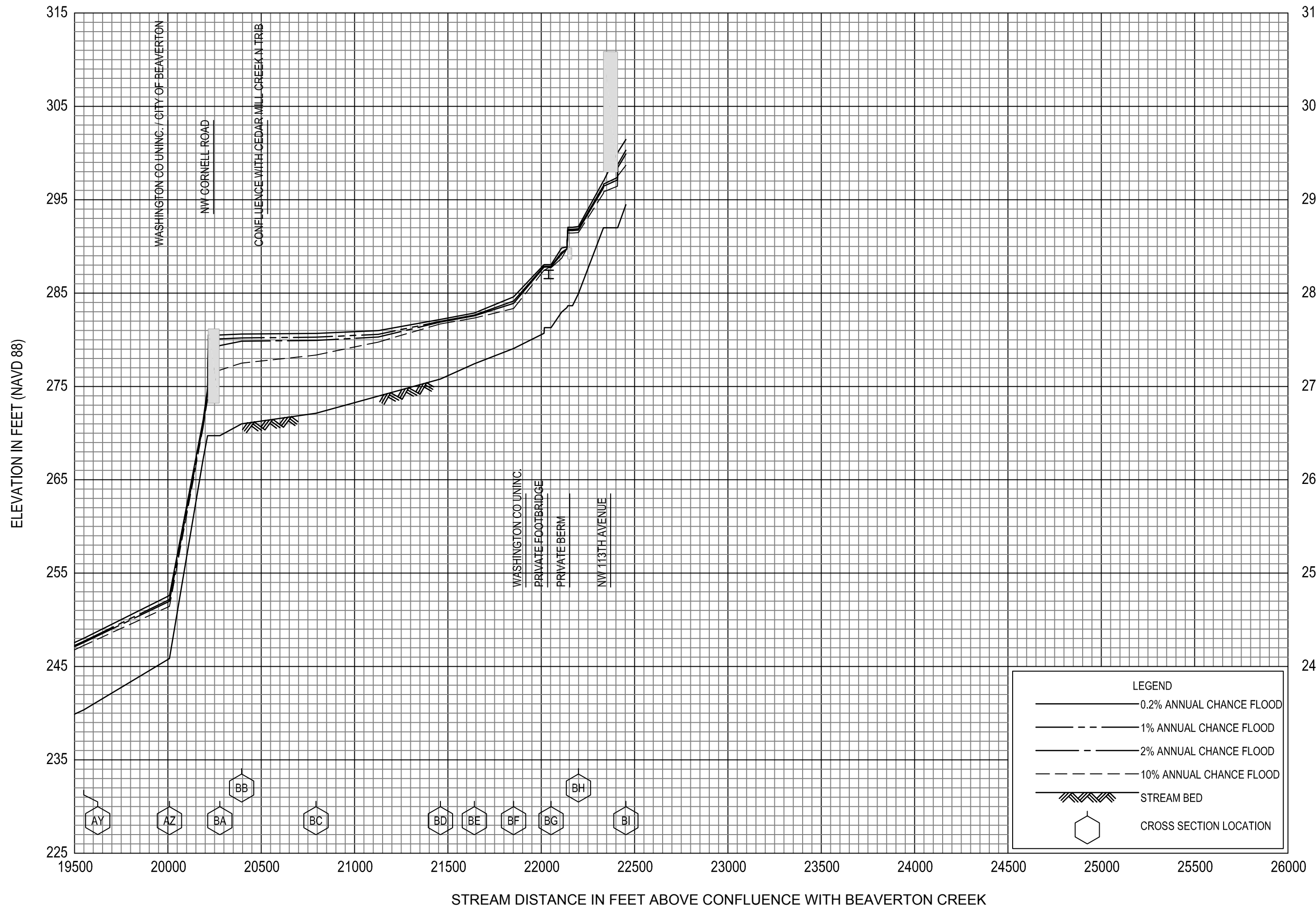
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FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS**



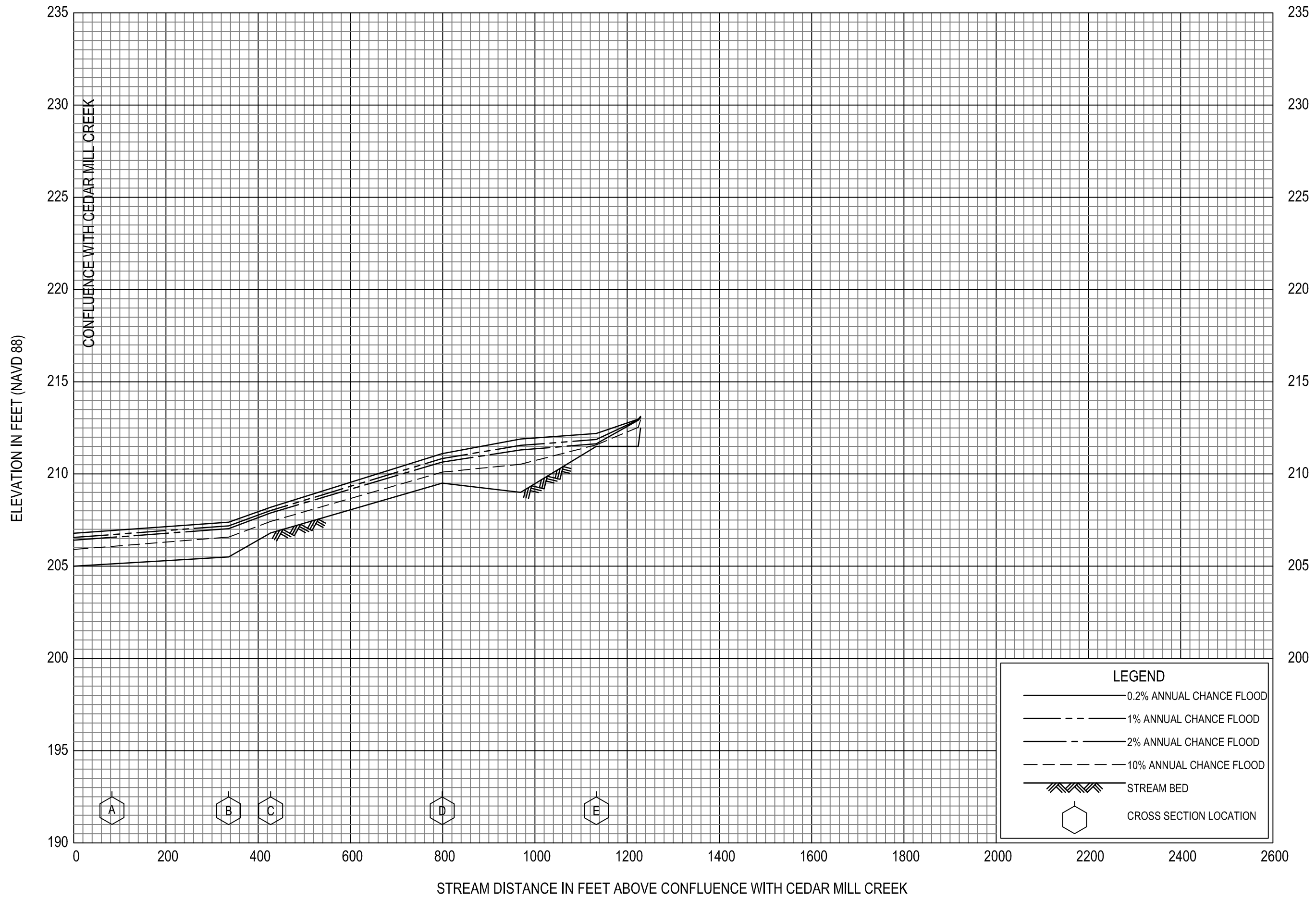
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CEDAR MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
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CEDAR MILL CREEK

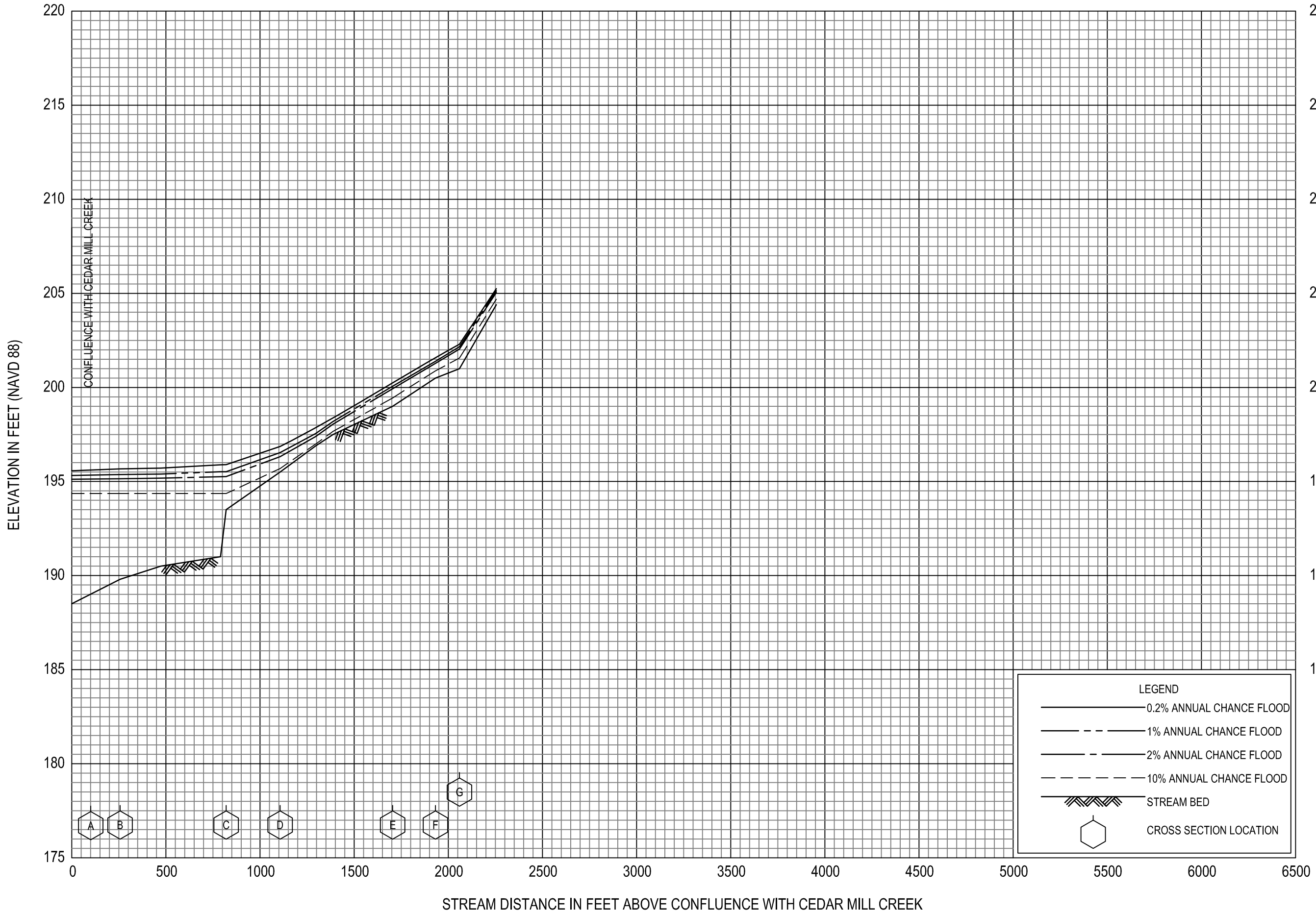
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FLOOD PROFILES

CEDAR MILL CREEK - NORTH OVERFLOW

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WASHINGTON COUNTY, OR
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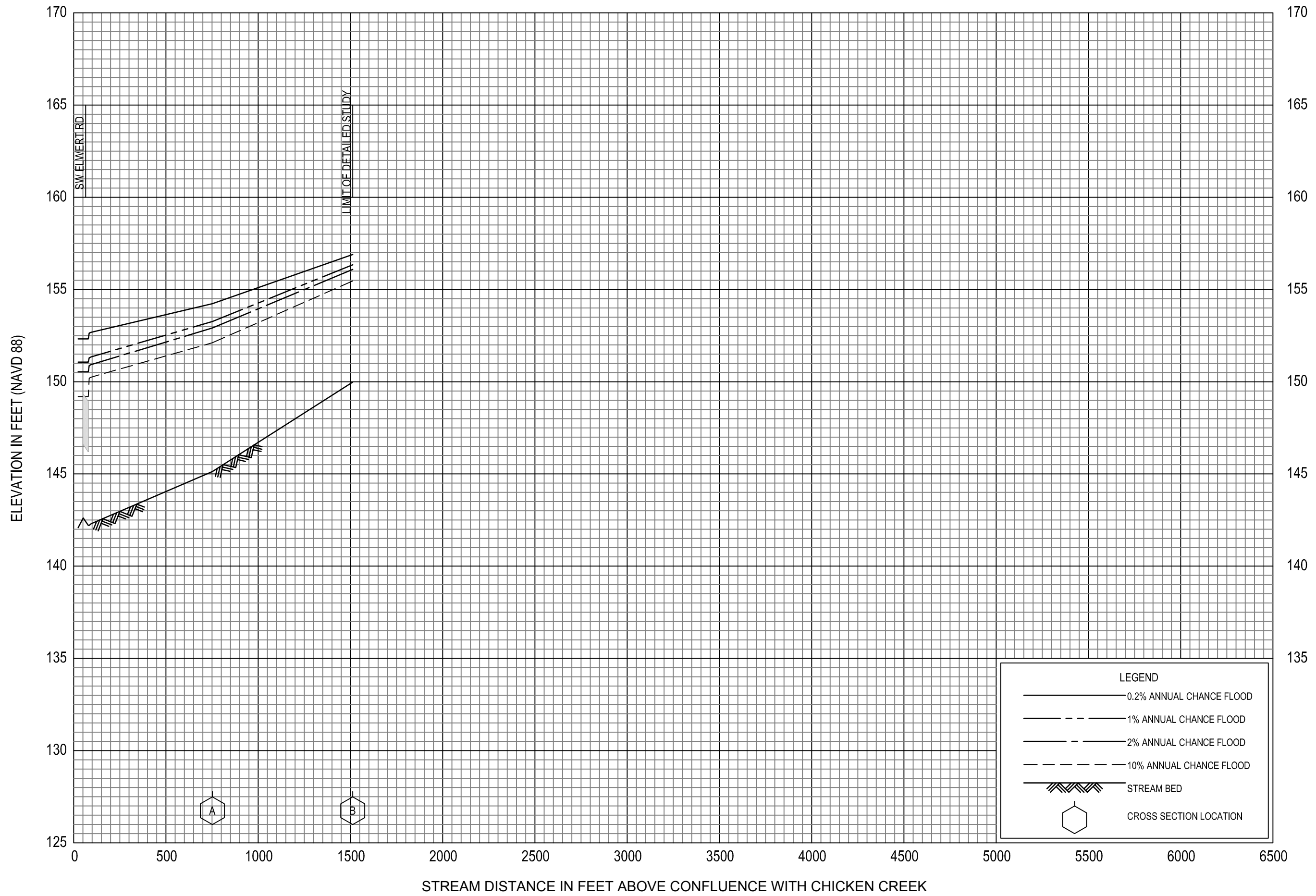
LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- · - 2% ANNUAL CHANCE FLOOD
- - - - 10% ANNUAL CHANCE FLOOD
- ▨ STREAM BED
- ⬡ CROSS SECTION LOCATION

FLOOD PROFILES

CEDAR MILL CREEK - SOUTH OVERFLOW

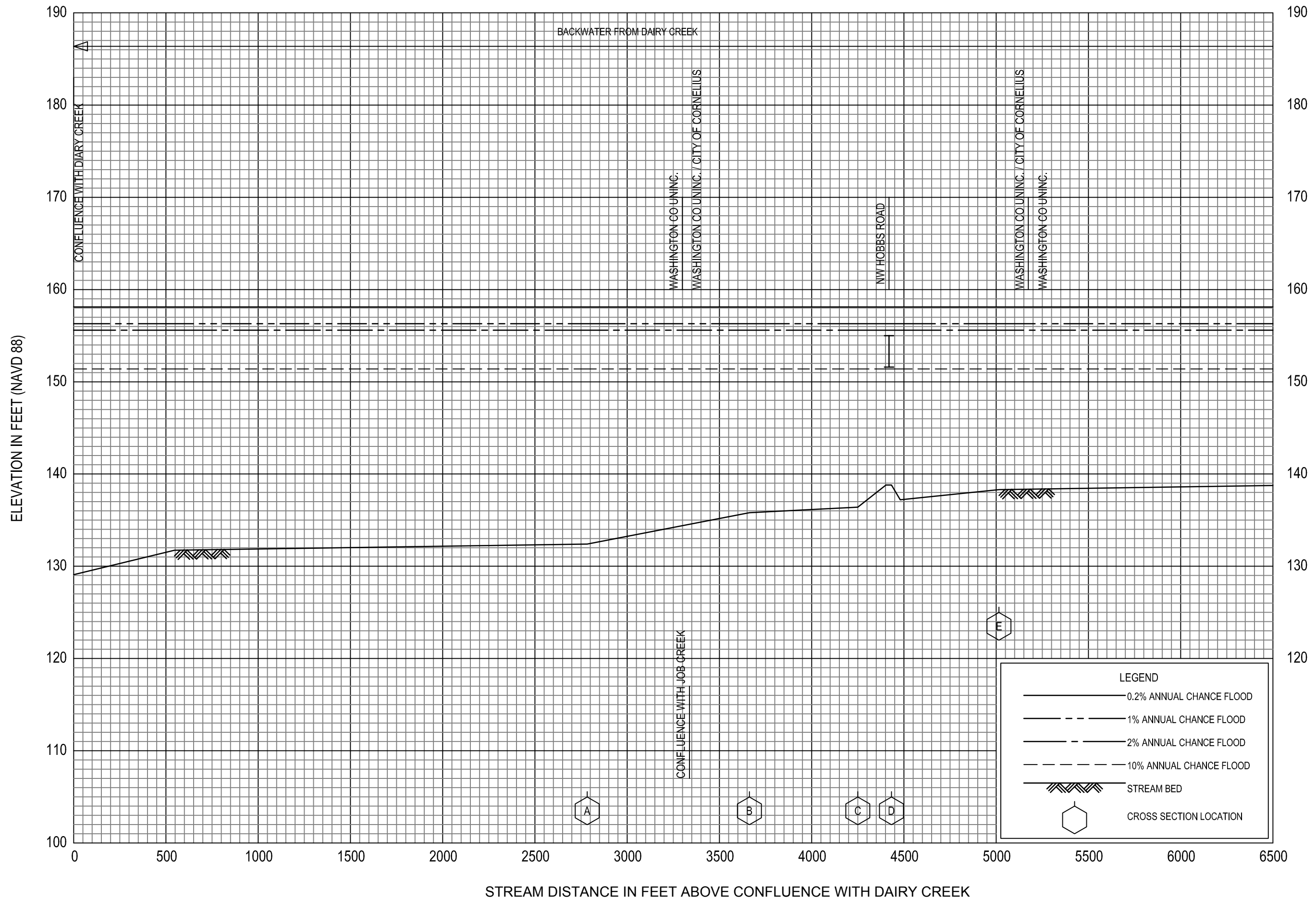
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FLOOD PROFILES
CHICKEN CREEK - WEST TRIBUTARY

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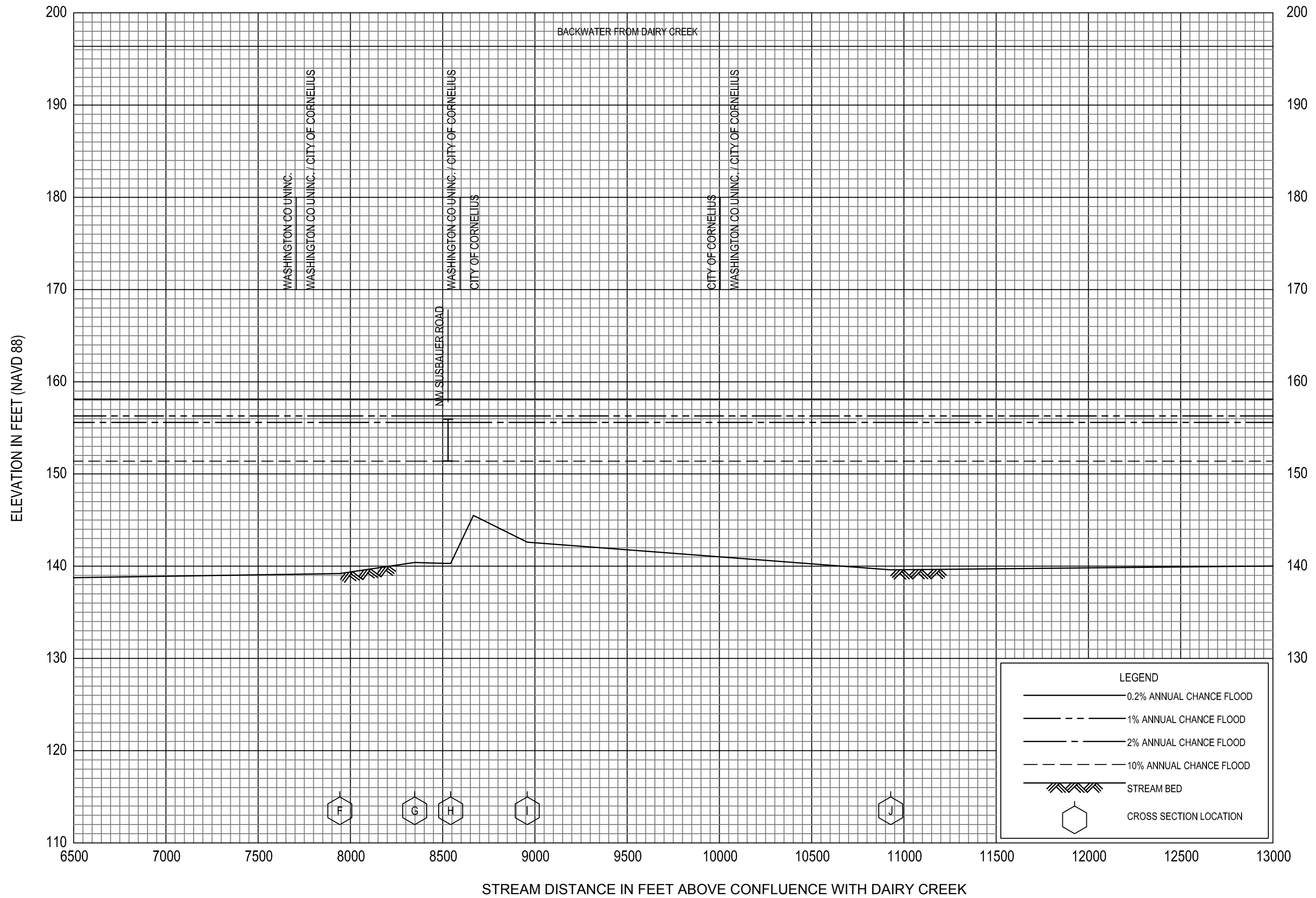
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FLOOD PROFILES

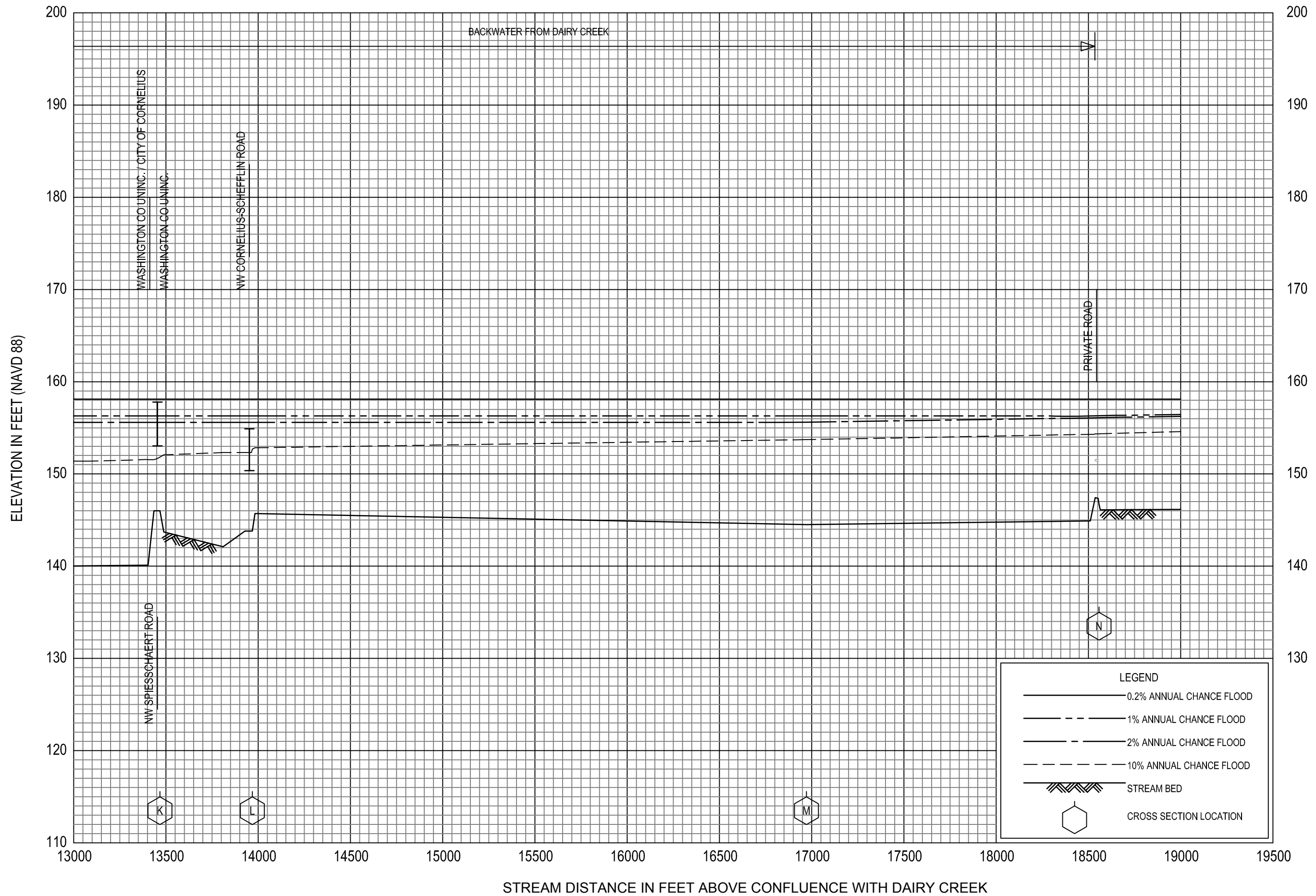
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FEDERAL EMERGENCY MANAGEMENT AGENCY
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 AND INCORPORATED AREAS



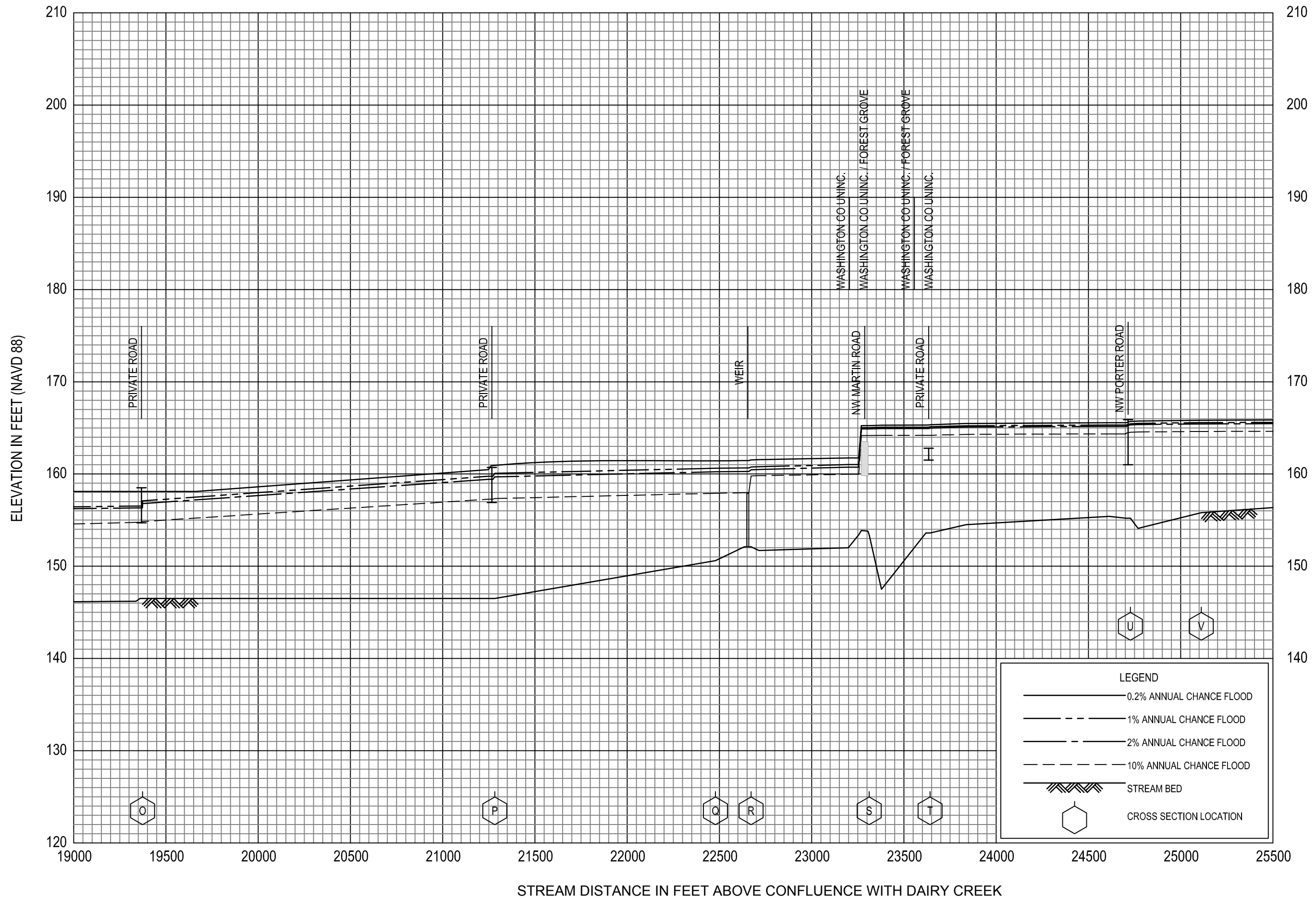
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COUNCIL CREEK

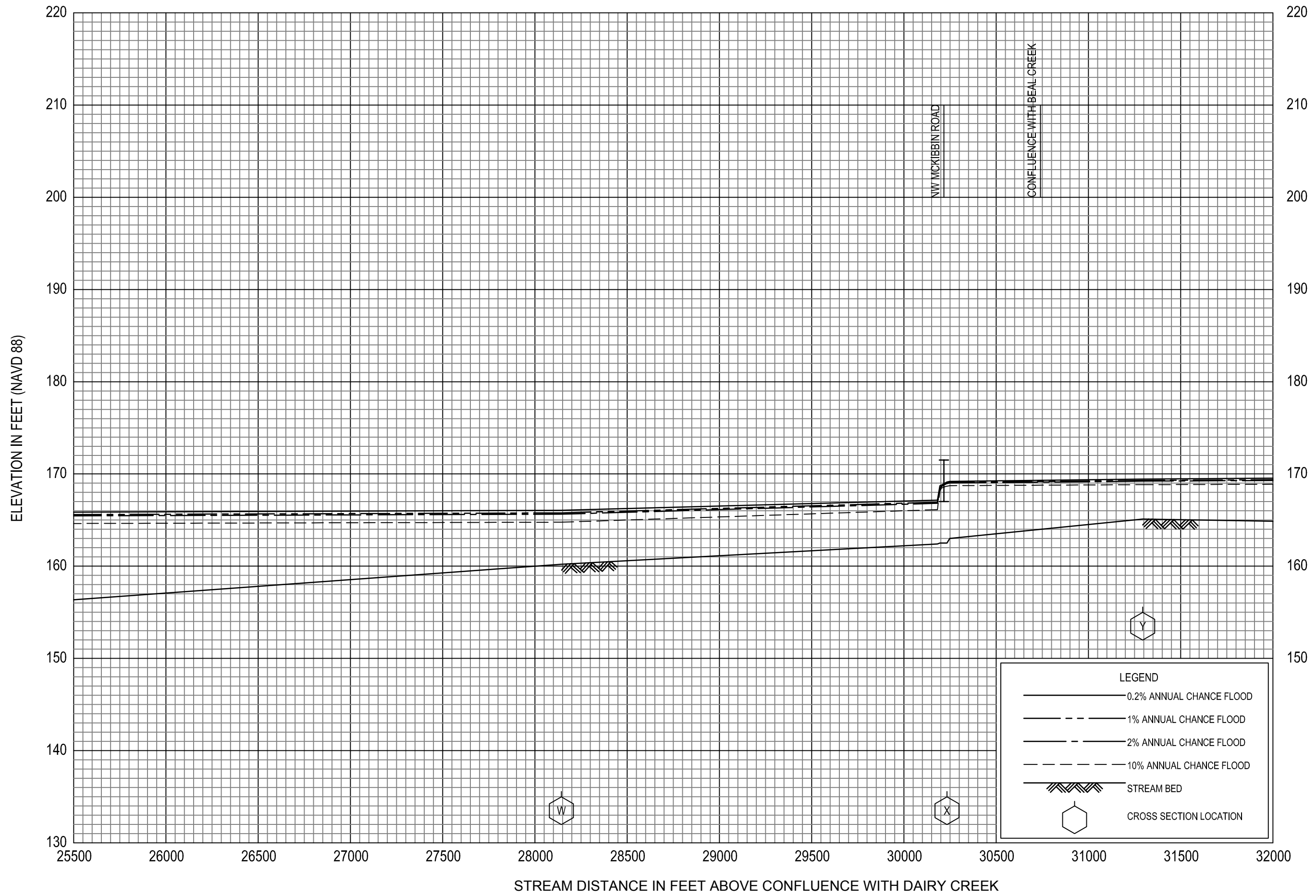
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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

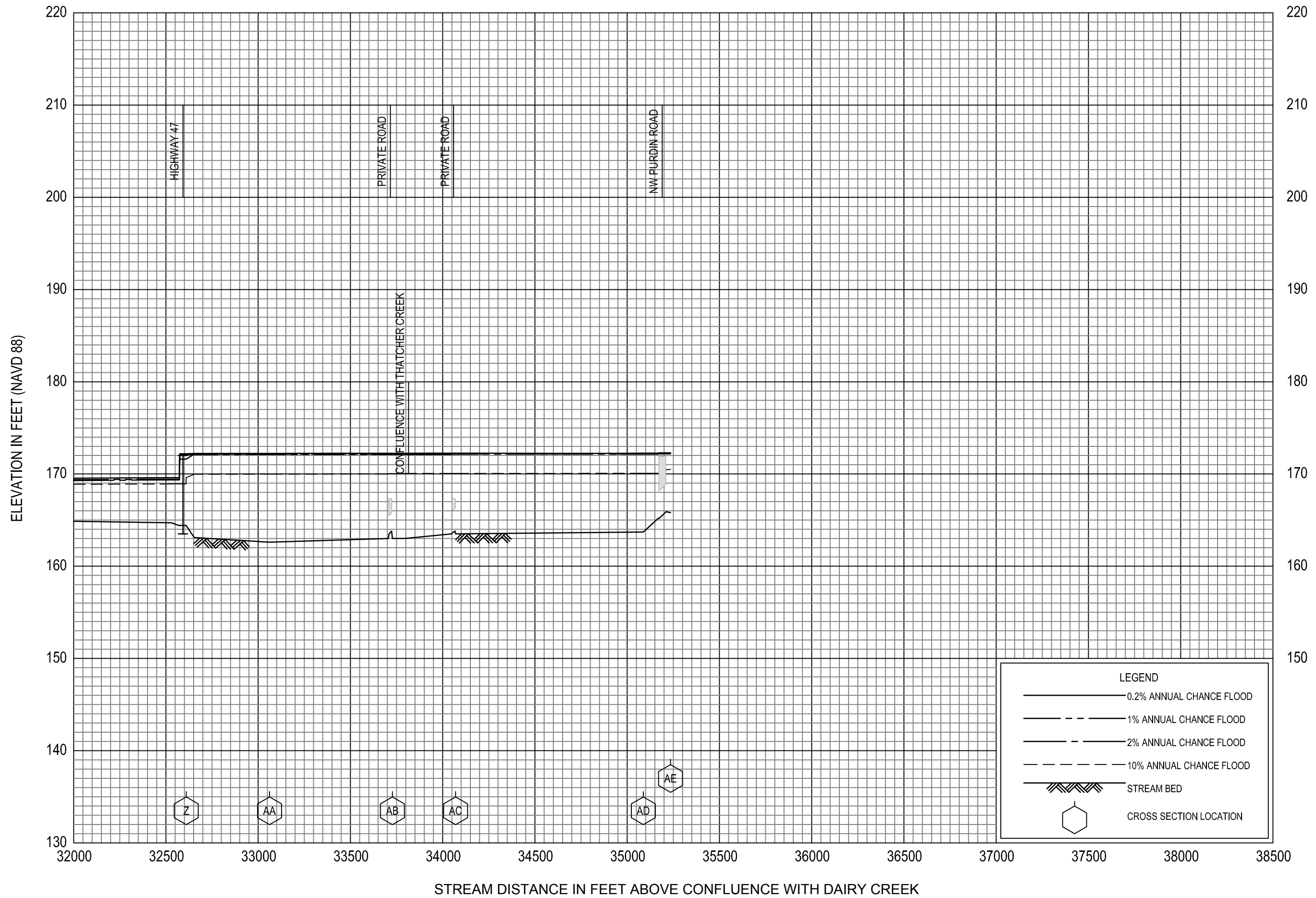


FLOOD PROFILES
COUNCIL CREEK

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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

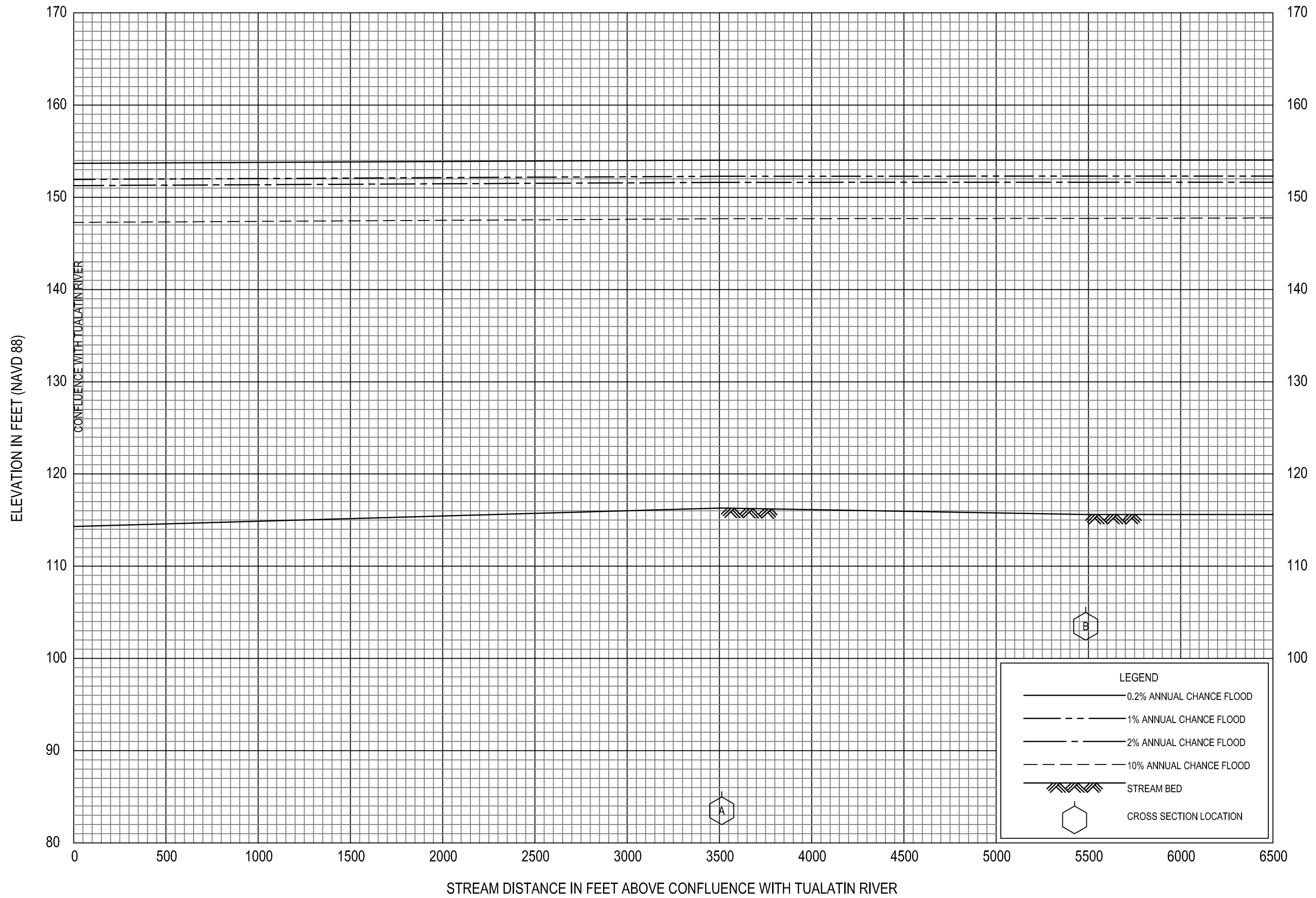






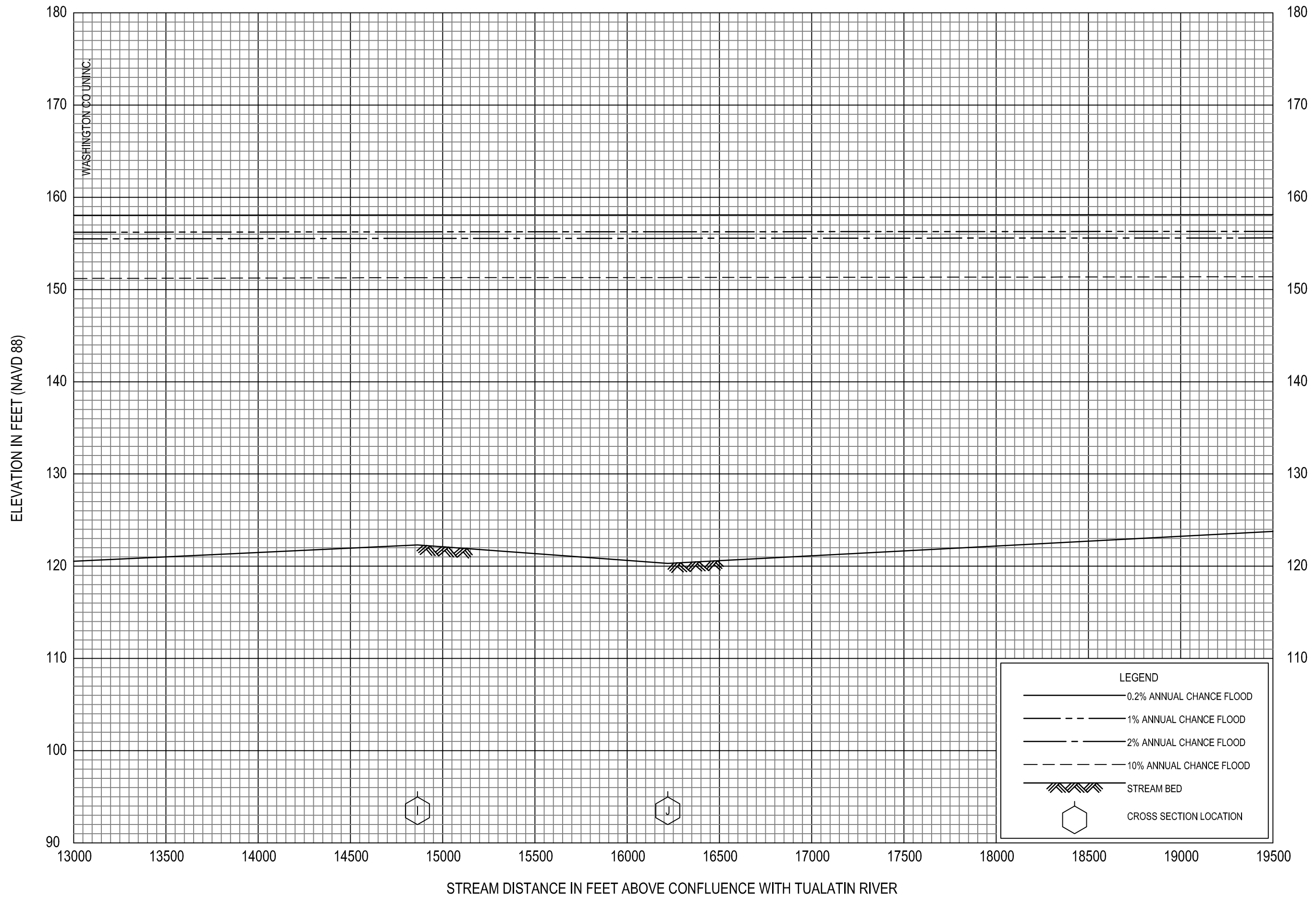
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COUNCIL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES
DAIRY CREEK

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



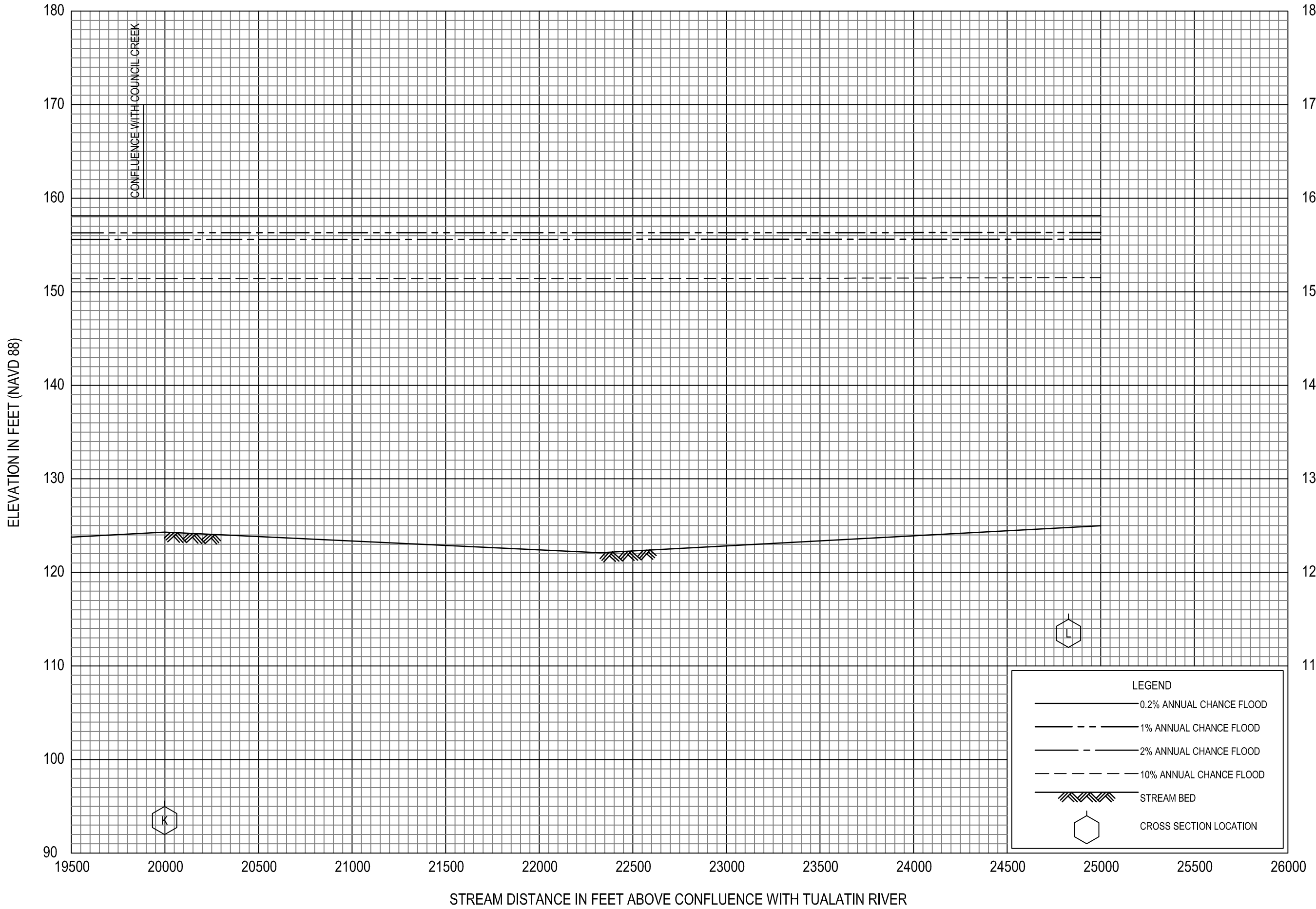
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DAIRY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

46P

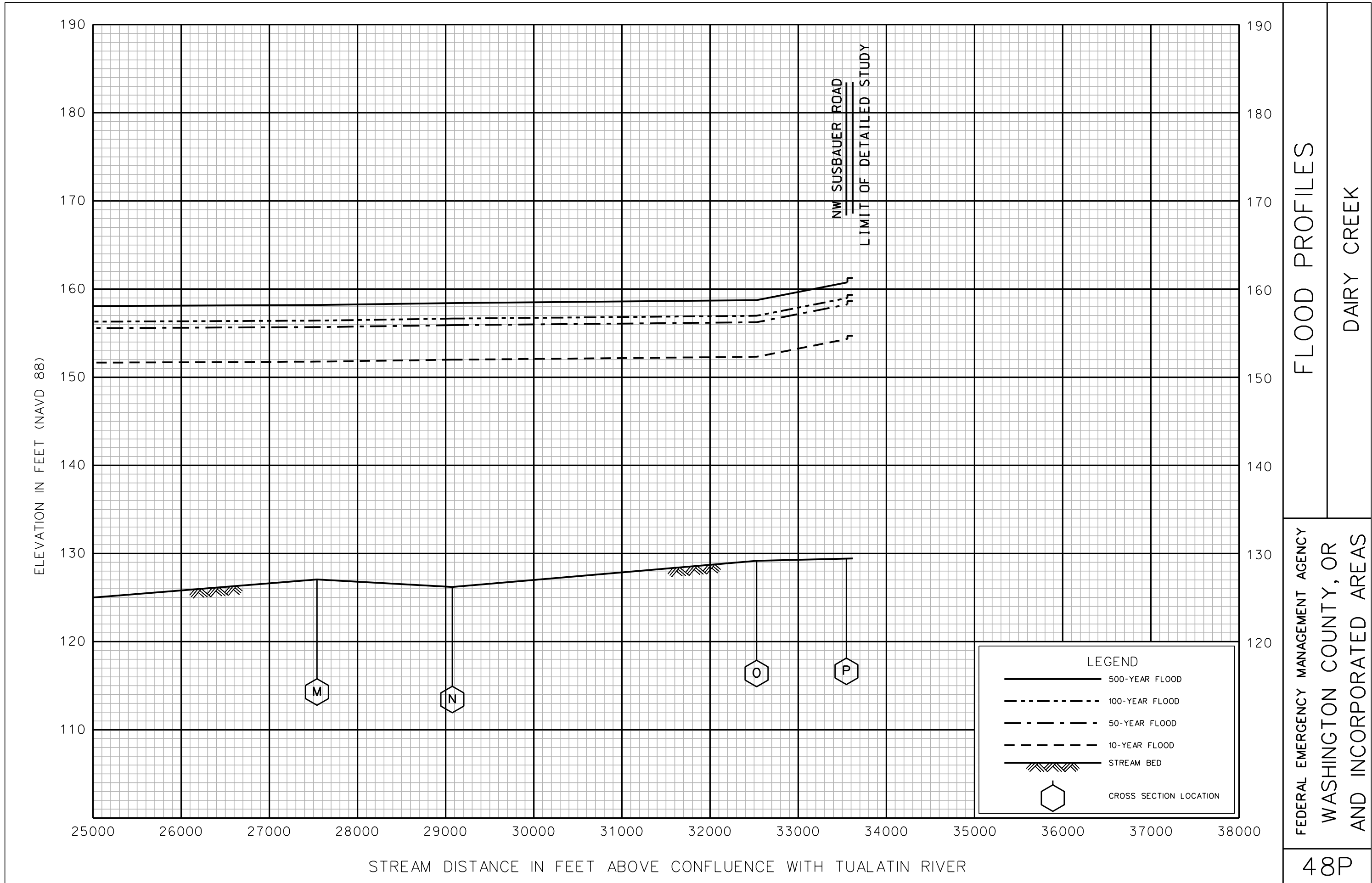


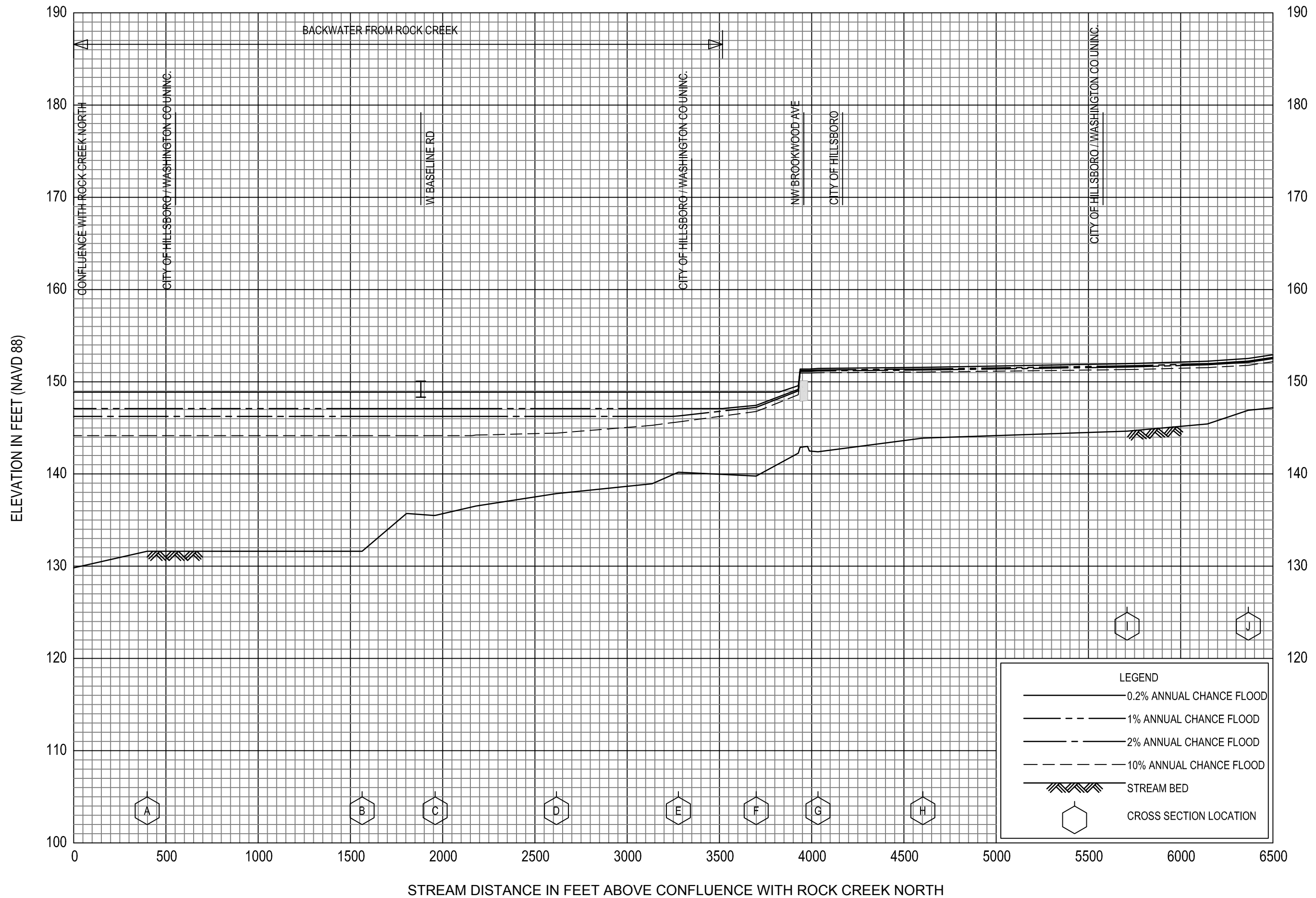
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DAIRY CREEK

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 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

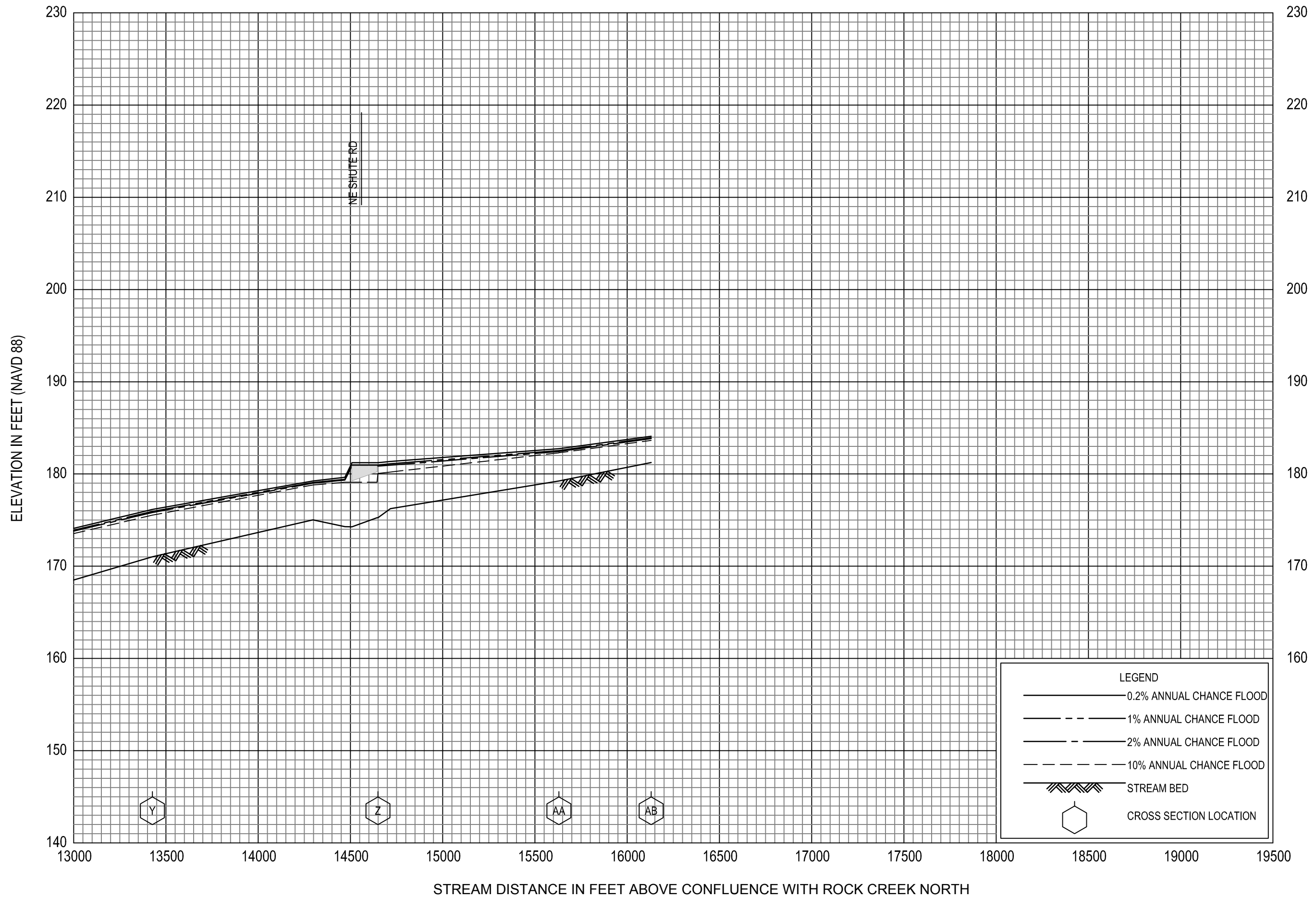
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FLOOD PROFILES
DAWSON CREEK

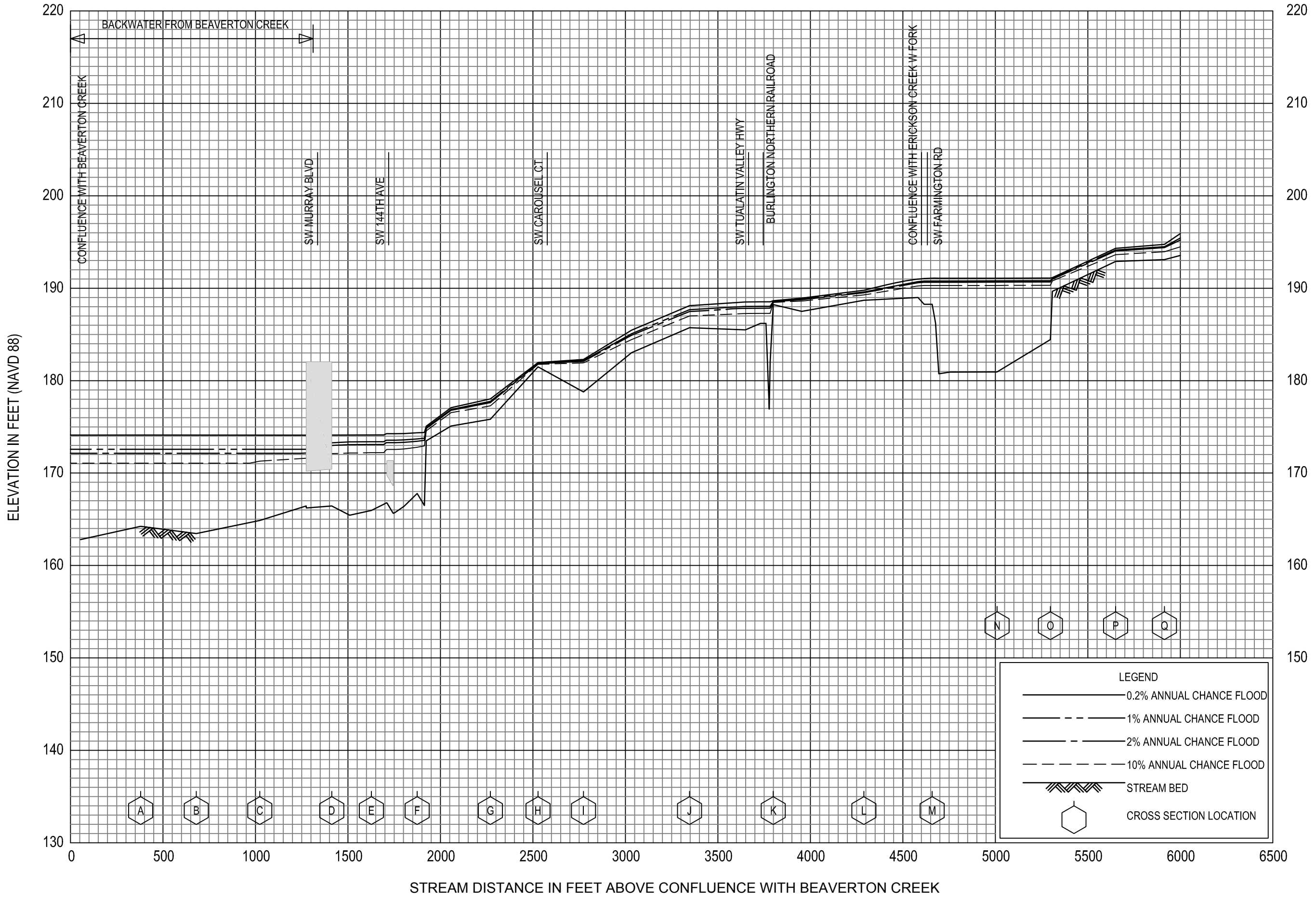
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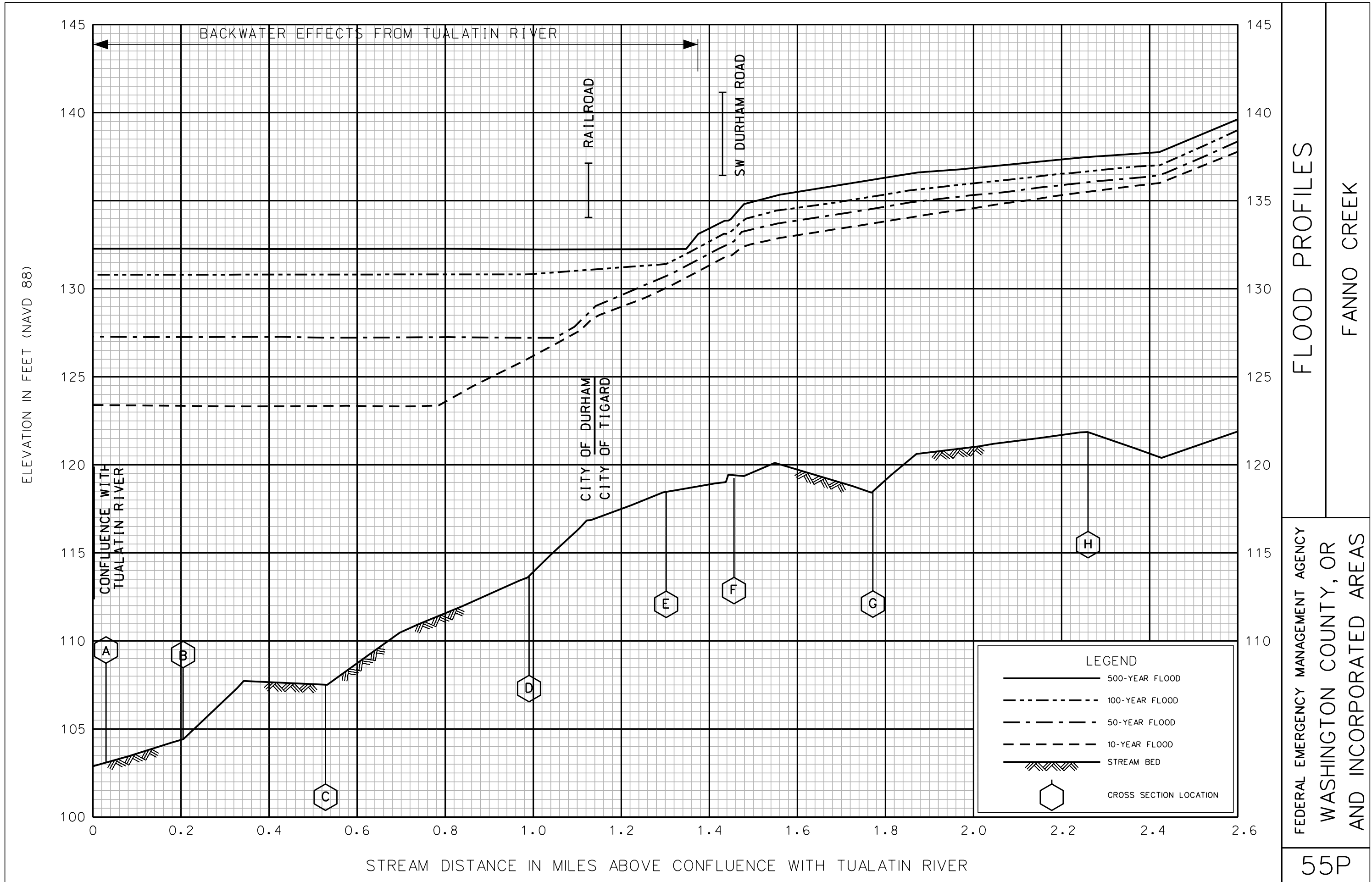
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AND INCORPORATED AREAS

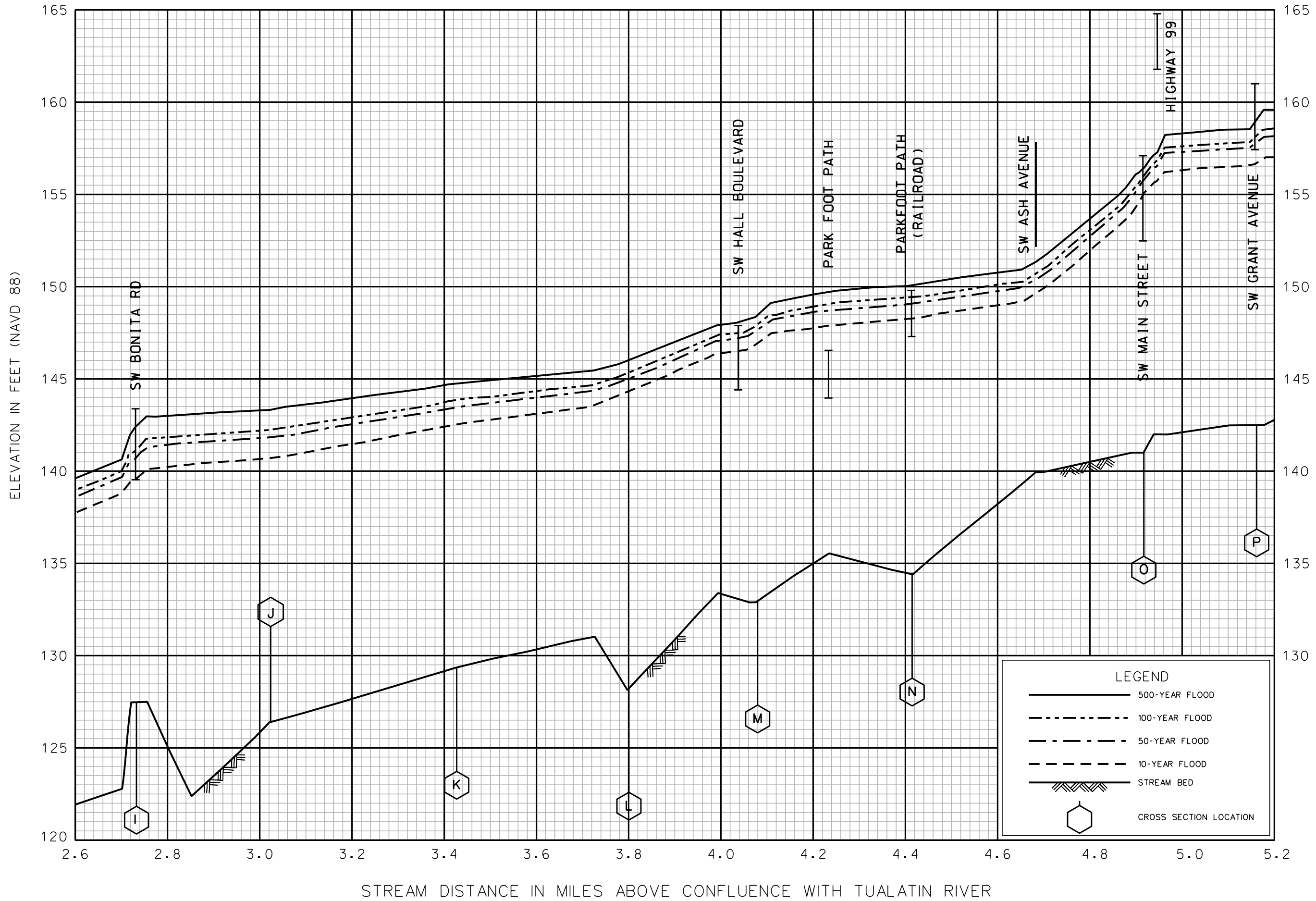
51P



FLOOD PROFILES
ERICKSON CREEK

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AND INCORPORATED AREAS

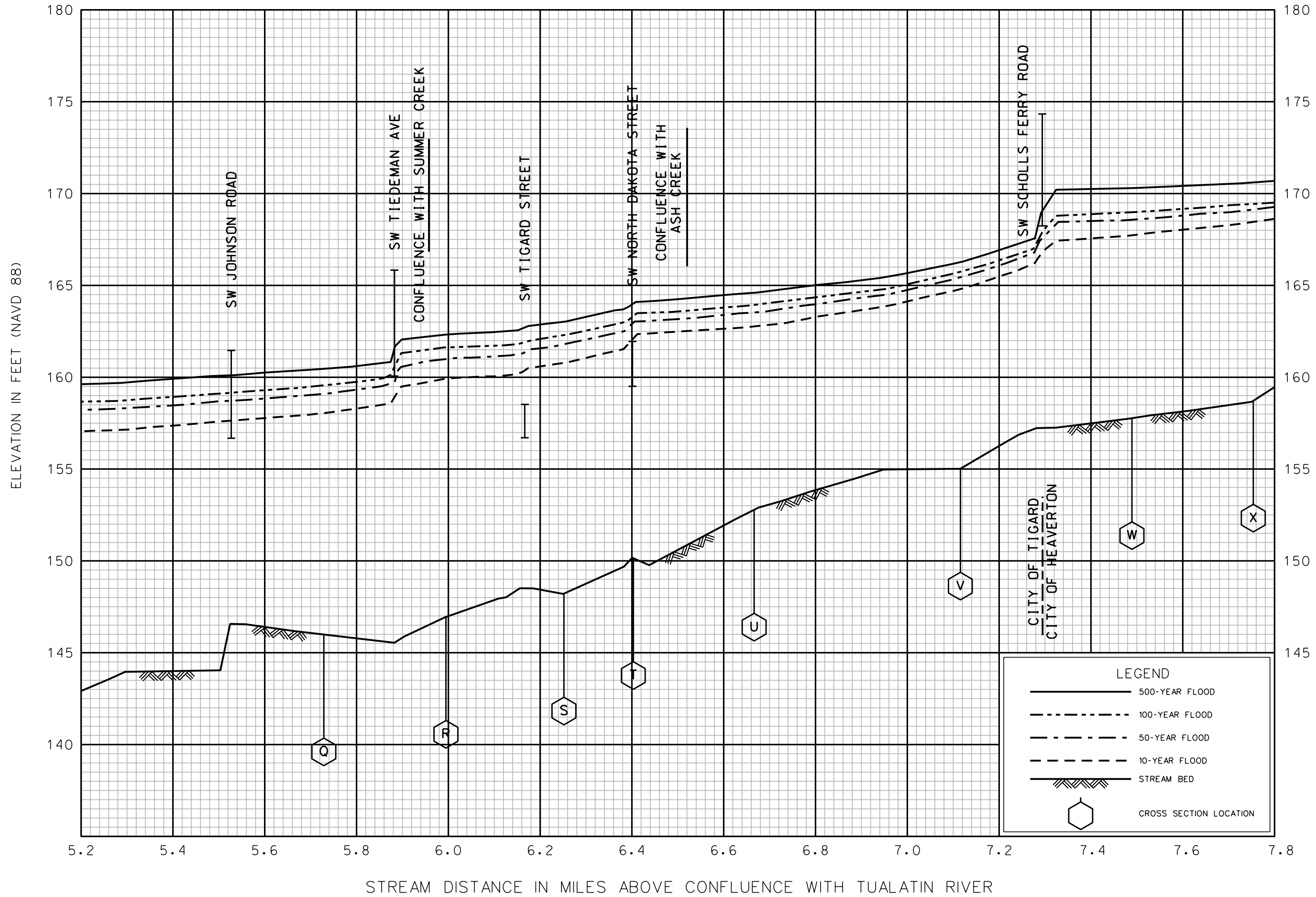




FLOOD PROFILES
FANNO CREEK

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

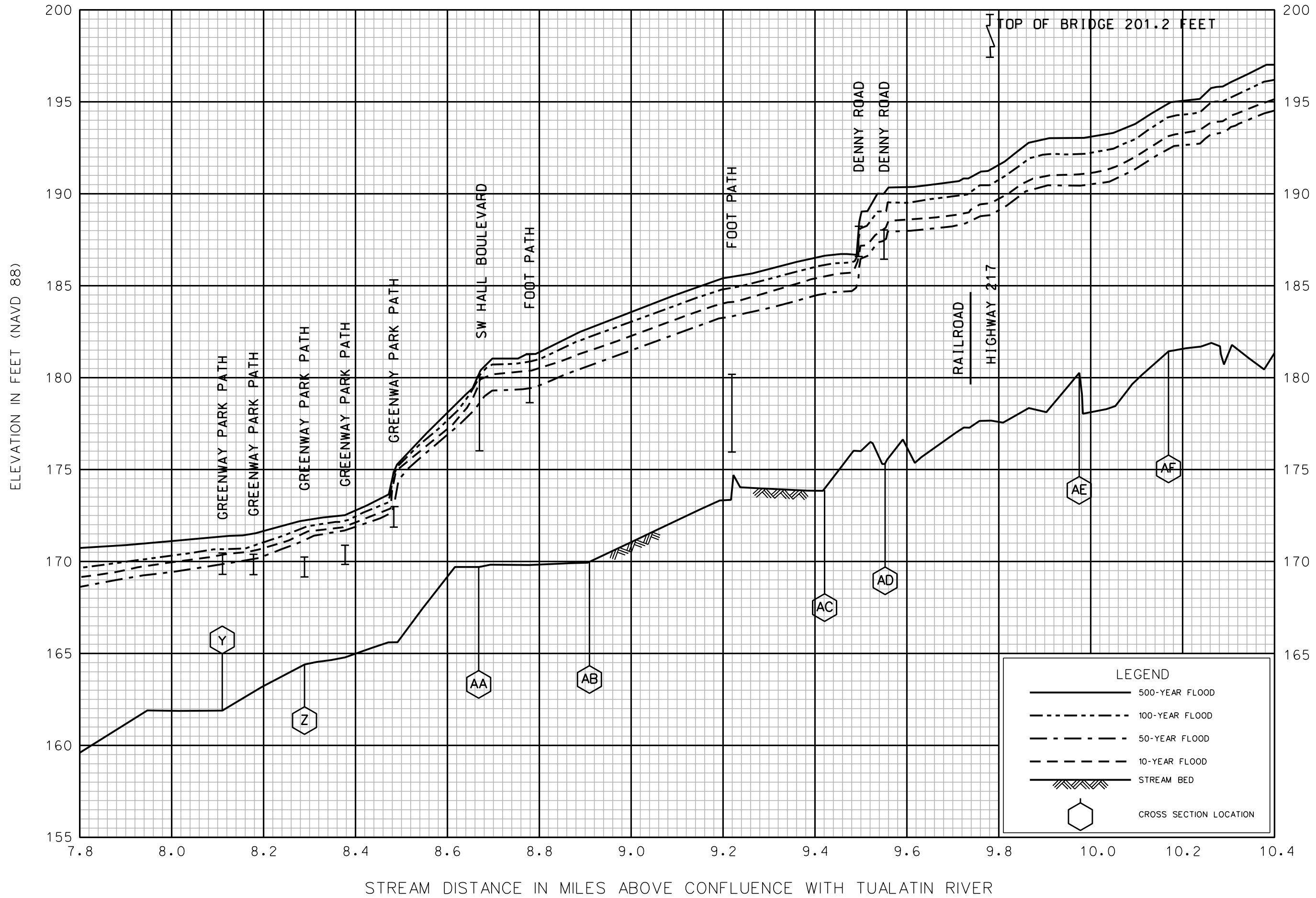
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FLOOD PROFILES
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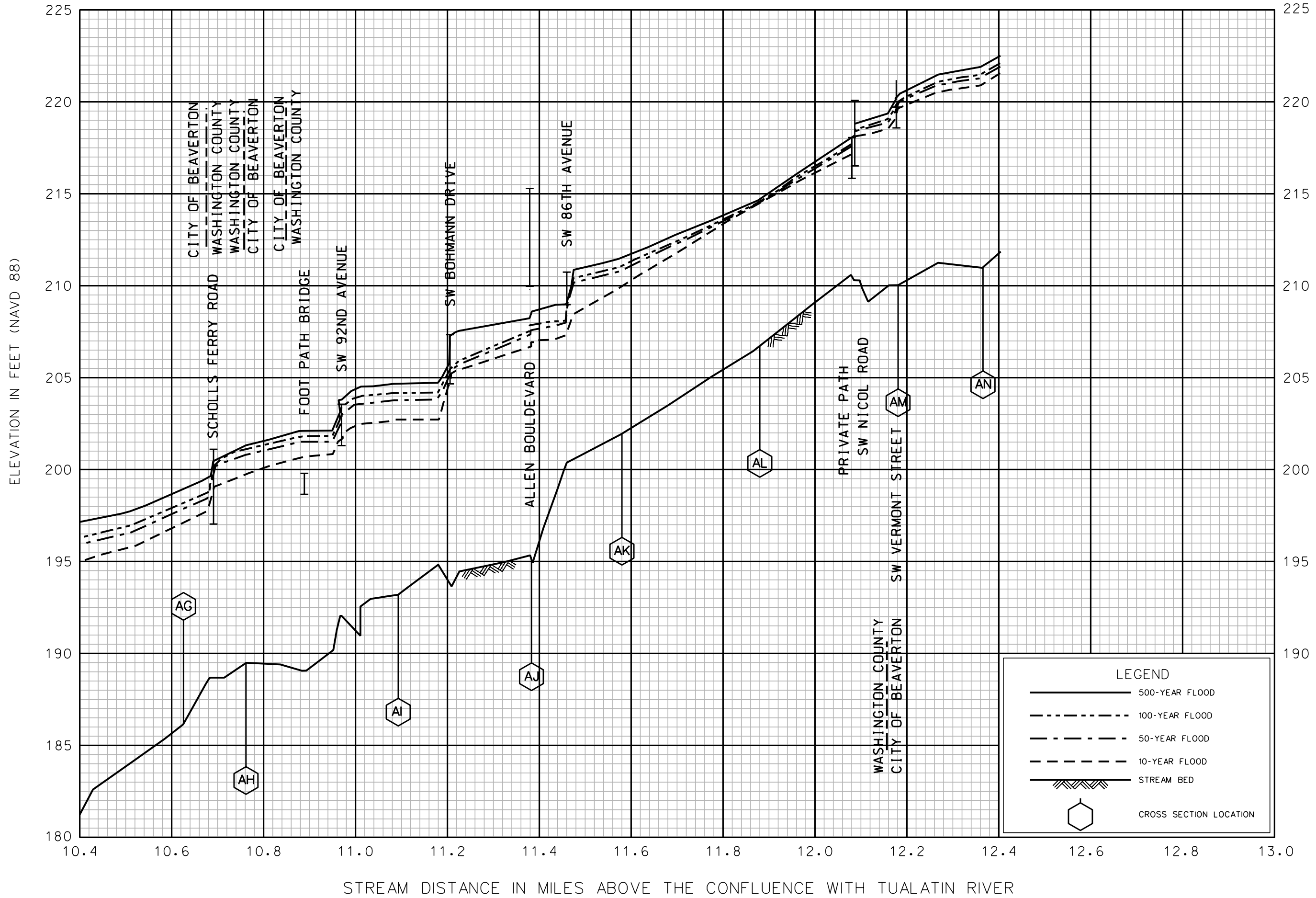
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FLOOD PROFILES
FANNO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
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AND INCORPORATED AREAS

58P



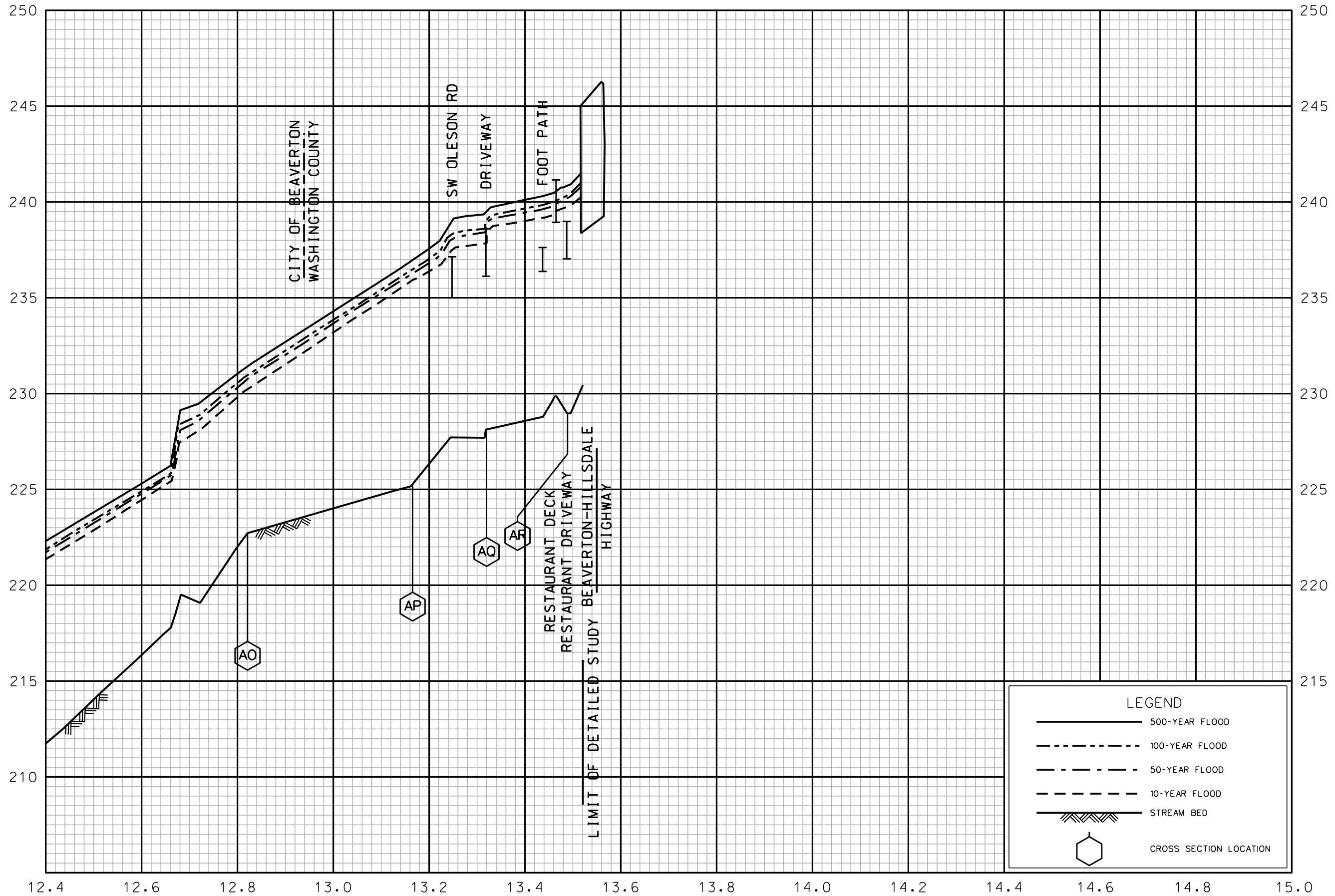
FLOOD PROFILES

FANNO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
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59P

ELEVATION IN FEET (NAVD 88)



STREAM DISTANCE IN MILES ABOVE THE CONFLUENCE WITH TUALATIN RIVER

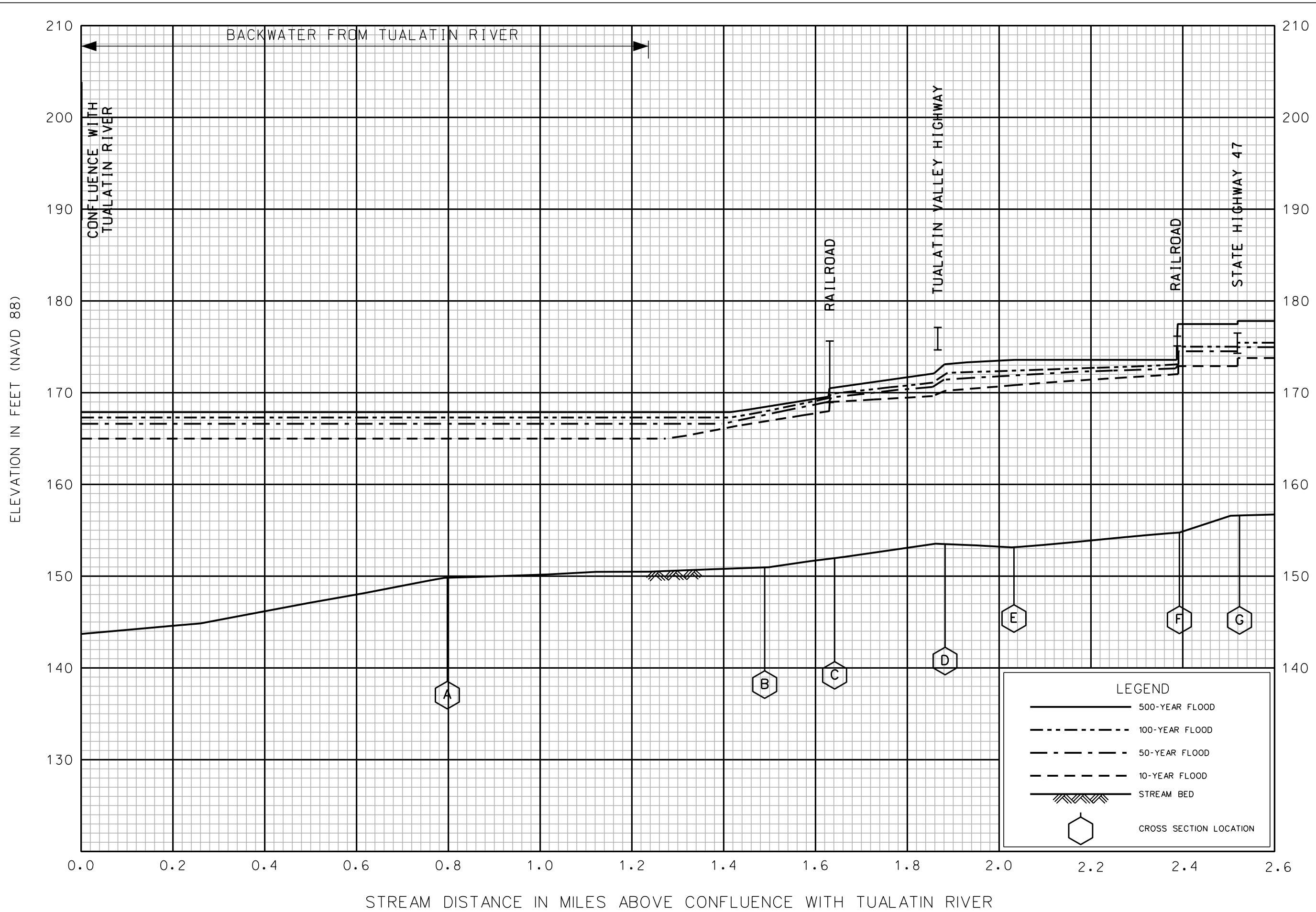
LEGEND

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

FLOOD PROFILES

FANNO CREEK

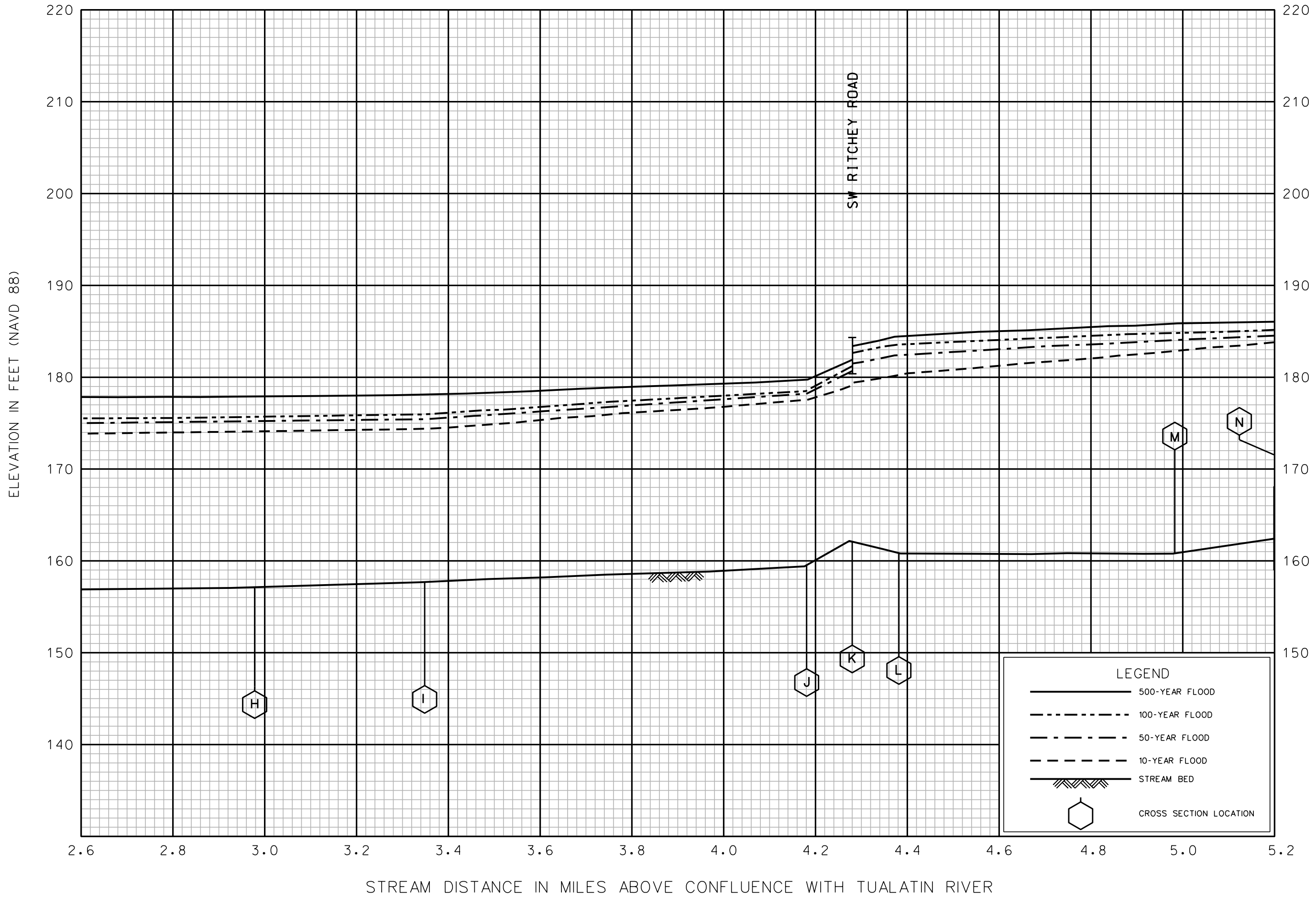
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FLOOD PROFILES
GALES CREEK

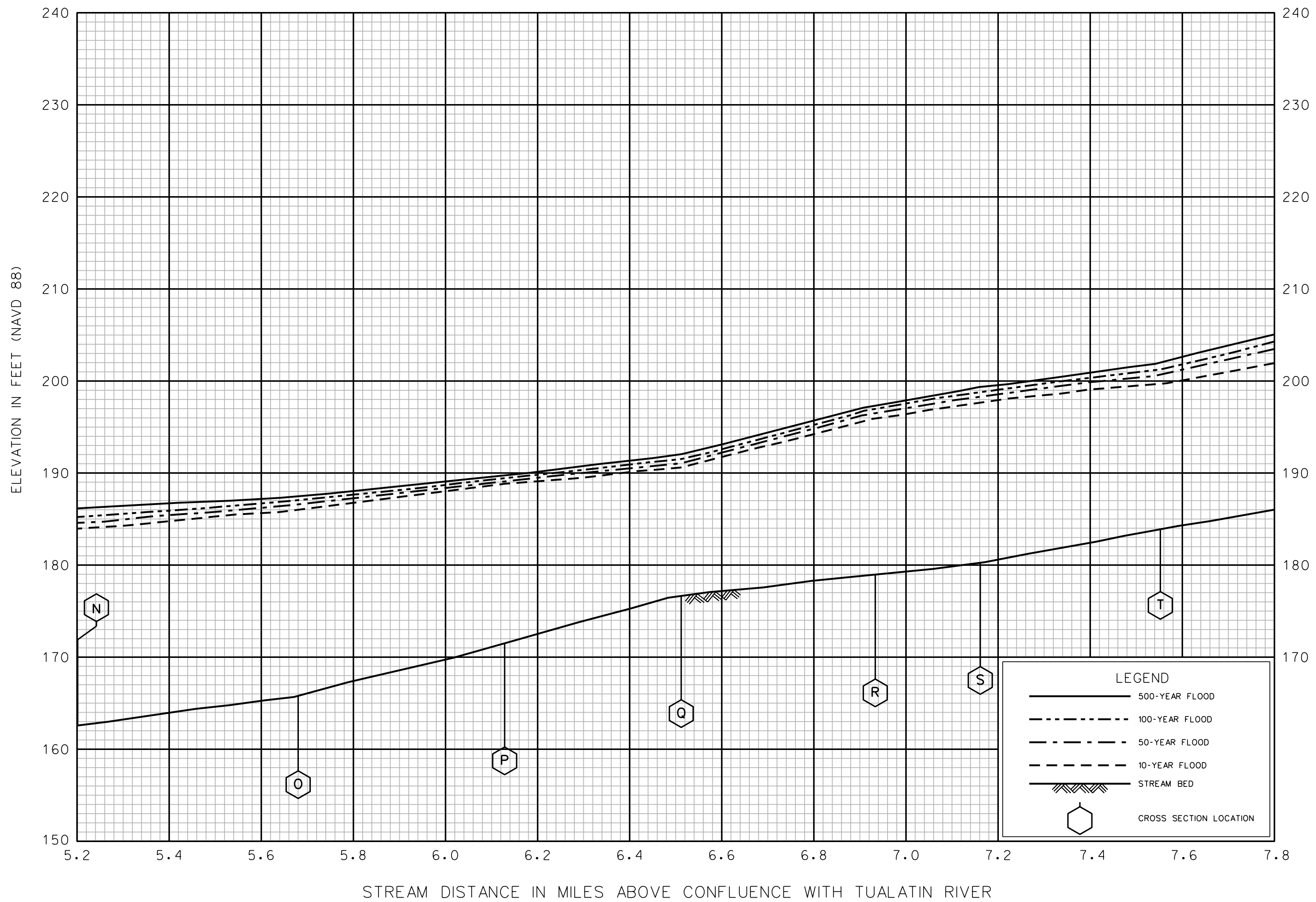
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AND INCORPORATED AREAS

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FLOOD PROFILES
GALES CREEK

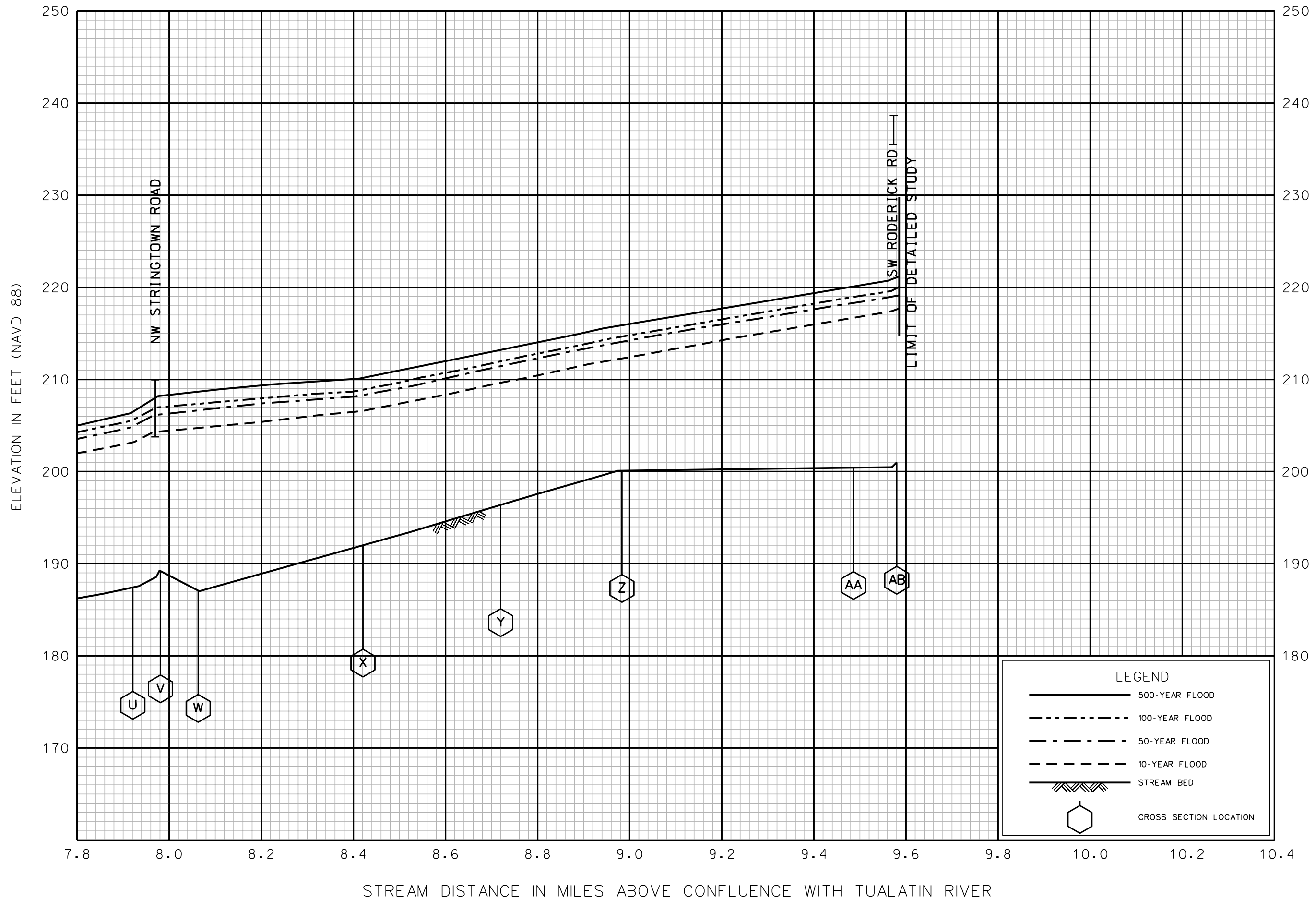
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FLOOD PROFILES
GALES CREEK

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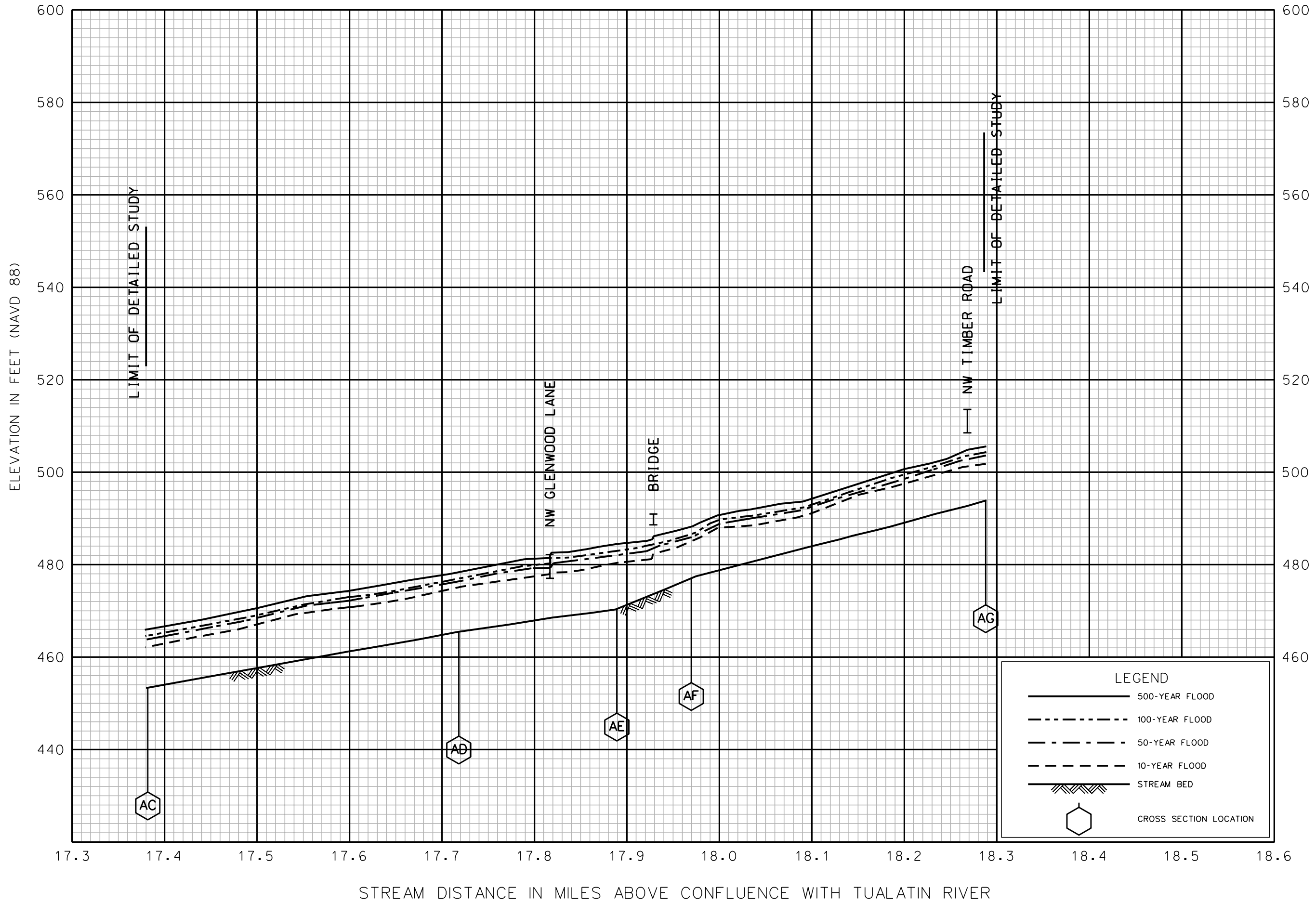
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FLOOD PROFILES

GALES CREEK

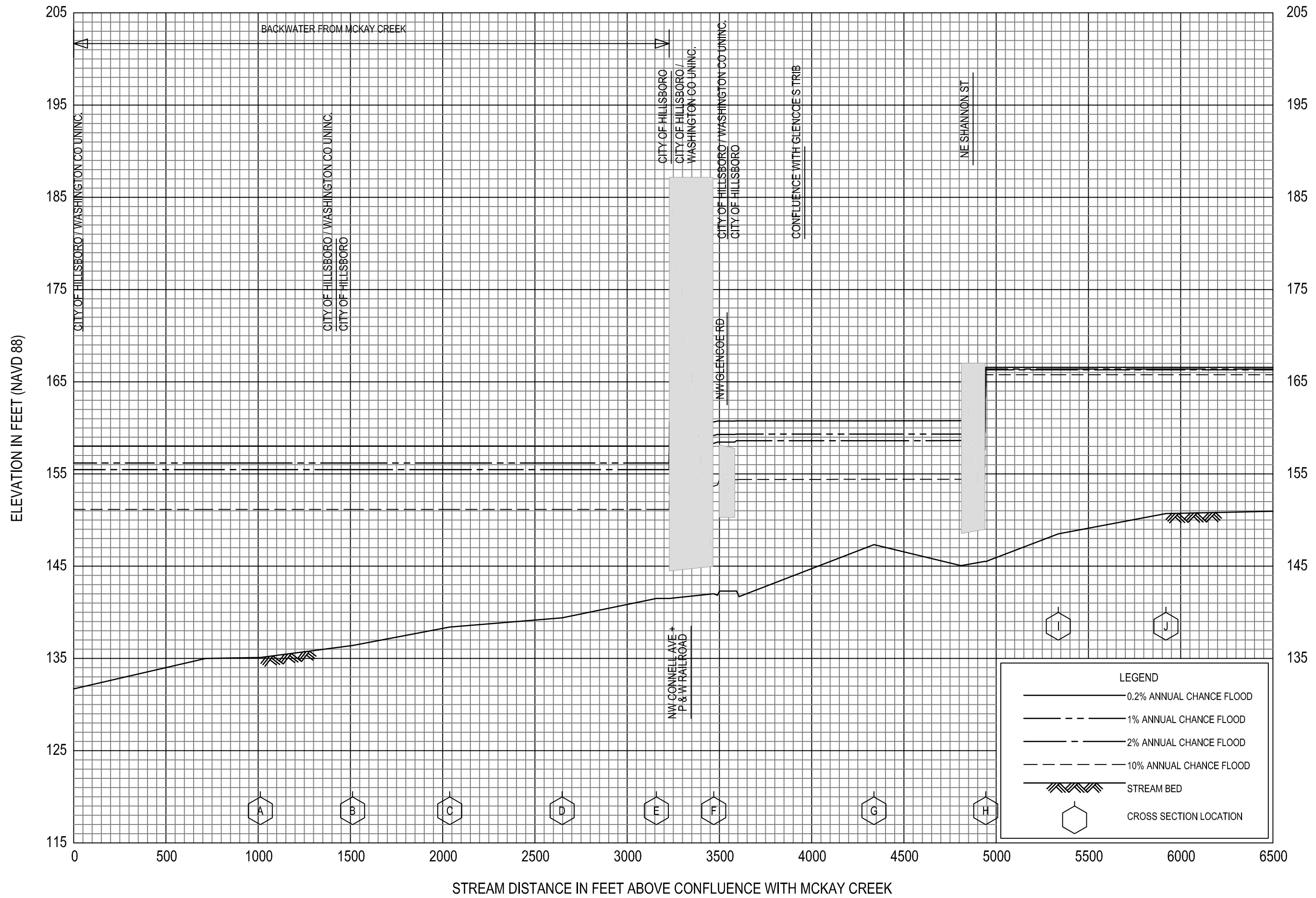
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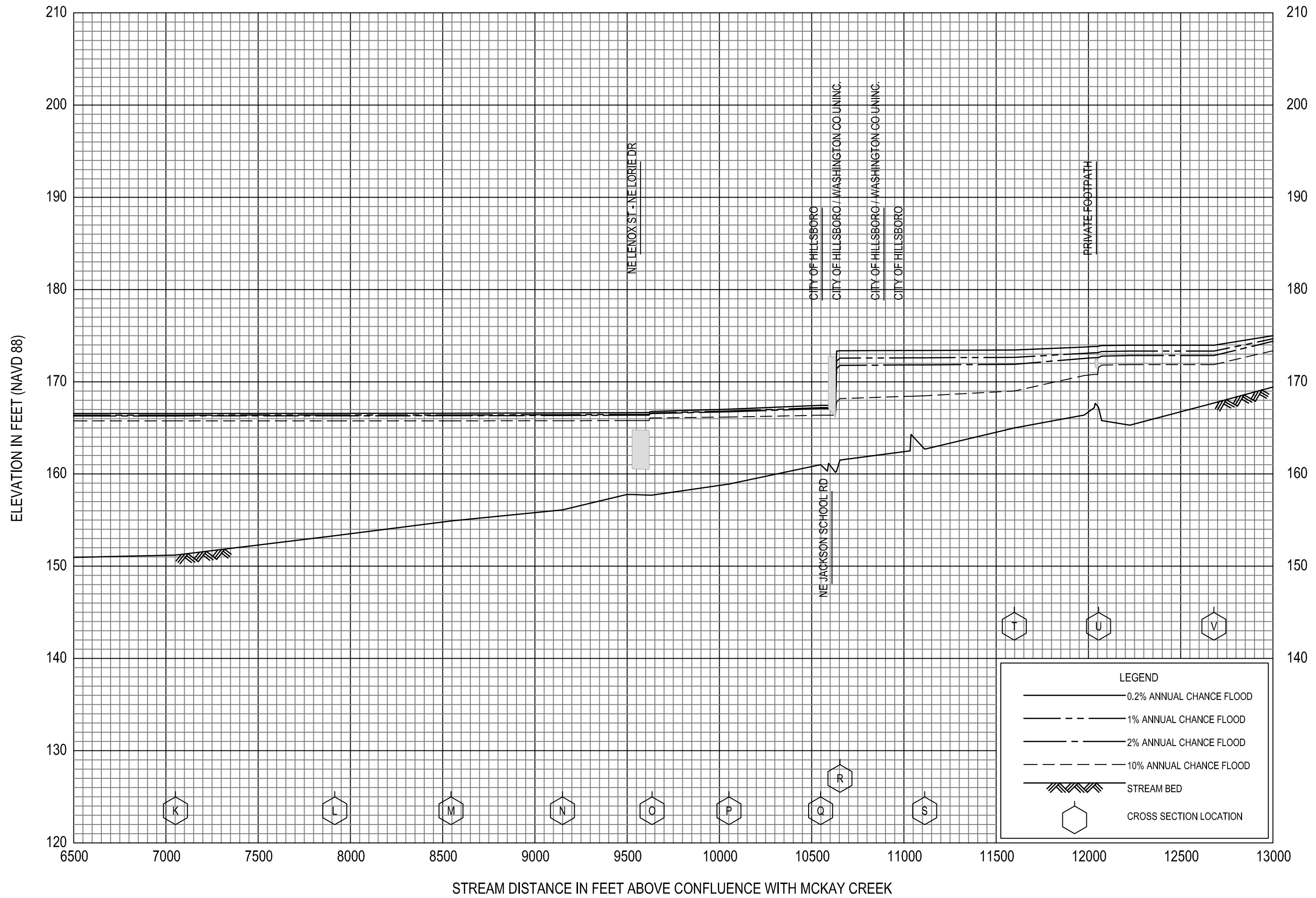
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AND INCORPORATED AREAS

65P



FLOOD PROFILES
GLENCOE SWALE

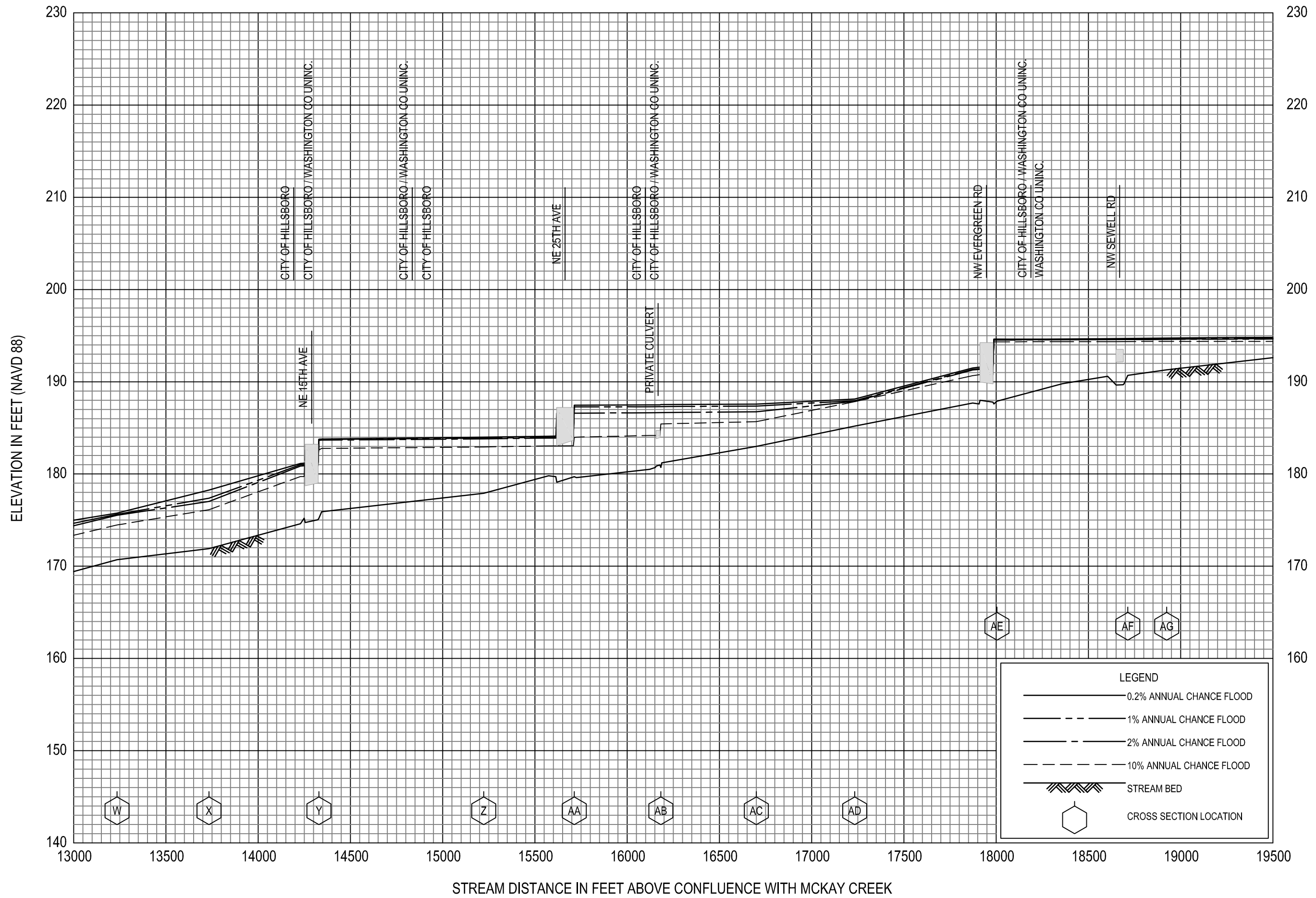
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AND INCORPORATED AREAS



FLOOD PROFILES
GLENCOE SWALE

FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS**

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FLOOD PROFILES

GLENCOE SWALE

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, OR

AND INCORPORATED AREAS

FLOOD INSURANCE STUDY



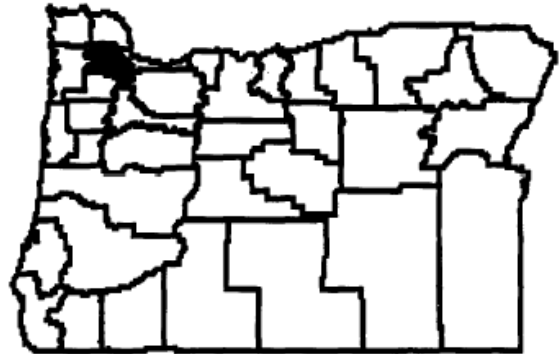
WASHINGTON COUNTY, OREGON AND INCORPORATED AREAS

VOLUME 3 OF 3

**COMMUNITY
NAME**

**COMMUNITY
NUMBER**

BANKS, CITY OF	410239
BEAVERTON, CITY OF	410240
CORNELIUS, CITY OF	410261
DURHAM, CITY OF	410263
FOREST GROVE, CITY OF	410241
GASTON, CITY OF	410242
HILLSBORO, CITY OF	410243
KING CITY, CITY OF	410269
NORTH PLAINS, CITY OF	410270
SHERWOOD, CITY OF	410273
TIGARD, CITY OF	410276
TUALATIN, CITY OF	410277
WASHINGTON COUNTY UNINCORPORATED AREAS	410238



Effective: November 4, 2016



Federal Emergency Management Agency

Flood Insurance Study Number

41067CV003A

**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 (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Selected Flood Insurance Rate Map panels for the community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

<u>Old Zone</u>	<u>New Zone</u>
A1 through A30	AE
V1 through V30	VE
B	X
C	X

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by a Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS report components.

Users should refer to Section 10.0, Revisions Descriptions. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this FIS report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Effective Date: November 4, 2016

Revised FIS Report Dates:

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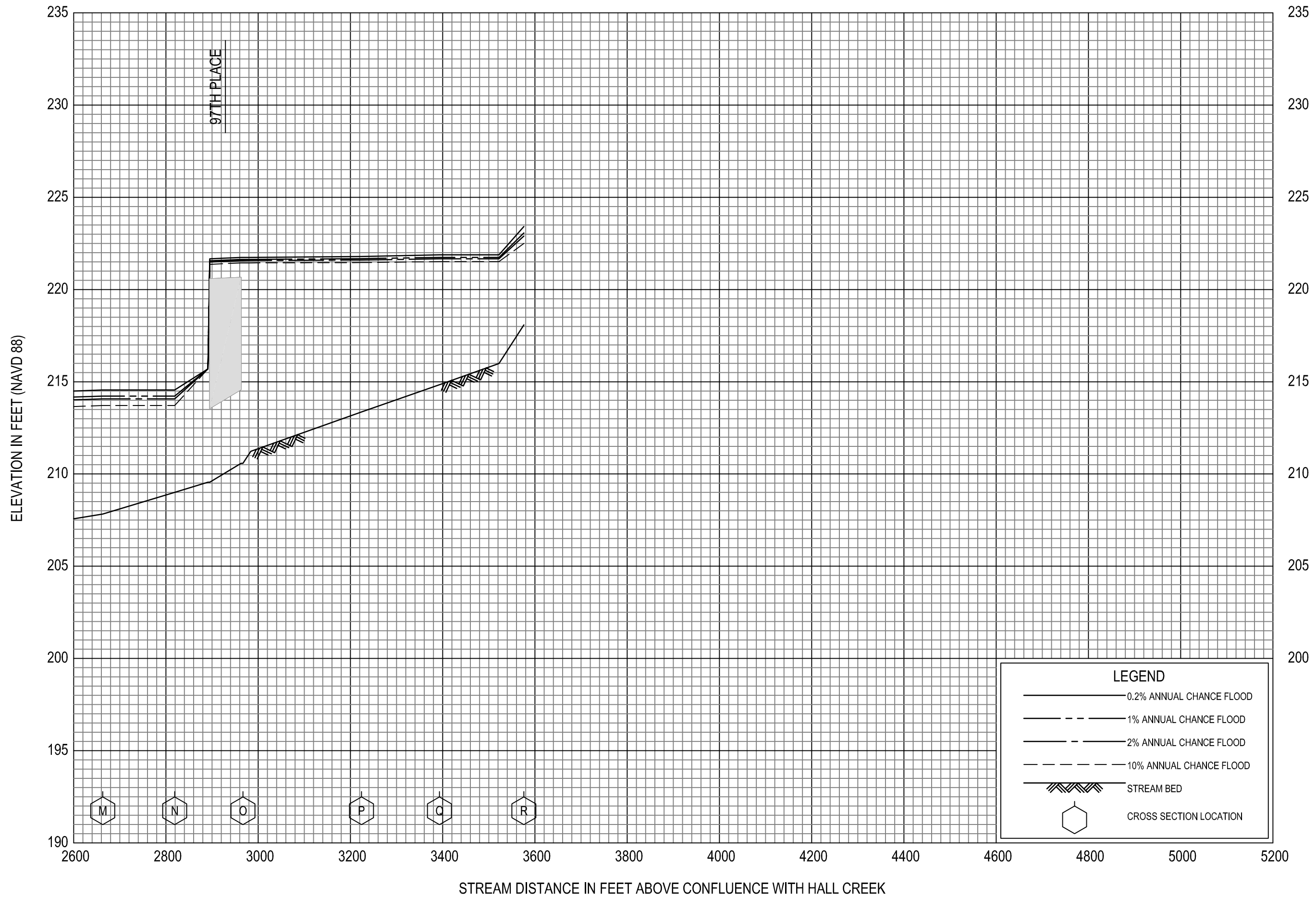
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Flood Insurance Rate Map Index

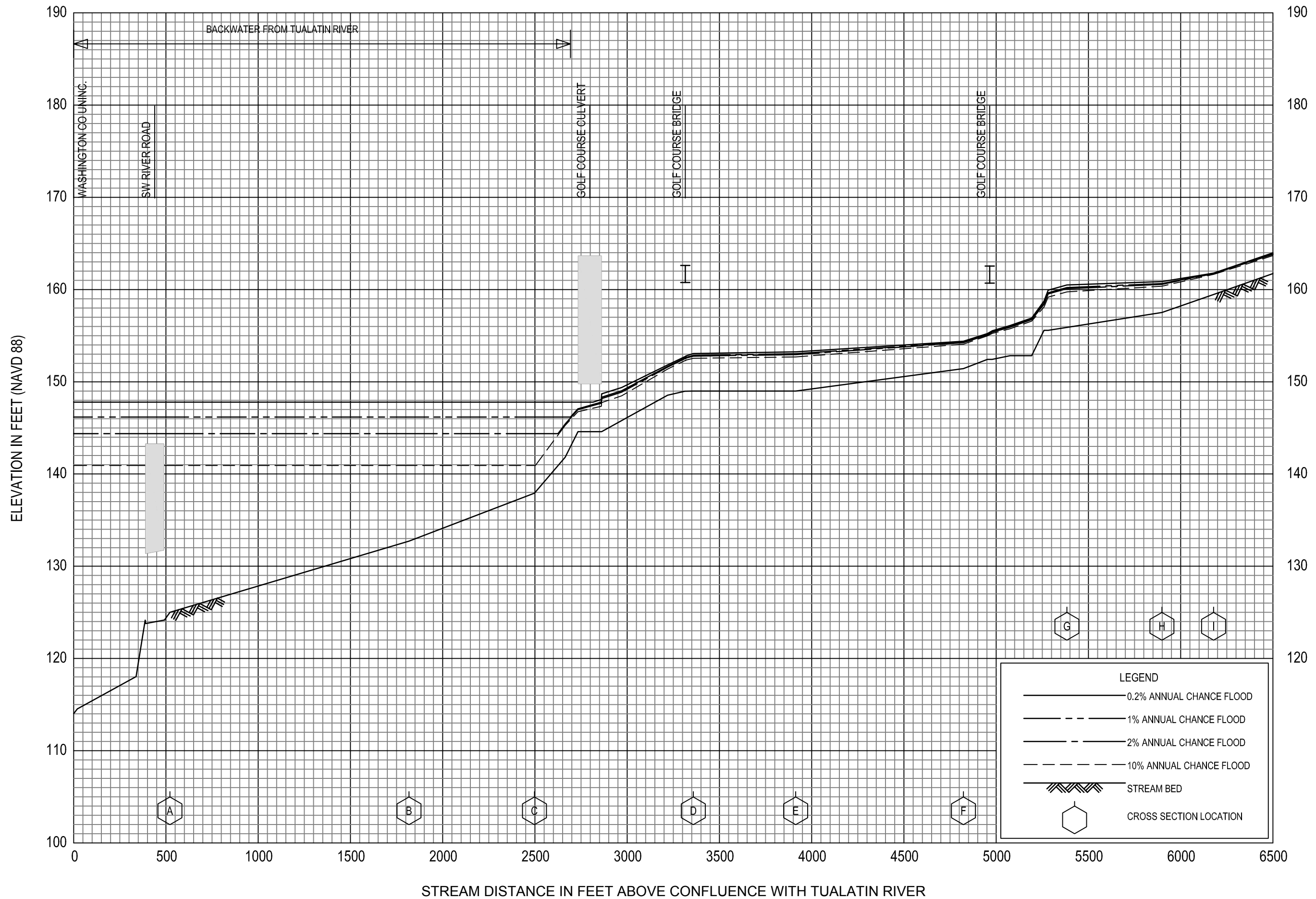
Flood Insurance Rate Map



FLOOD PROFILES
GOLF CREEK

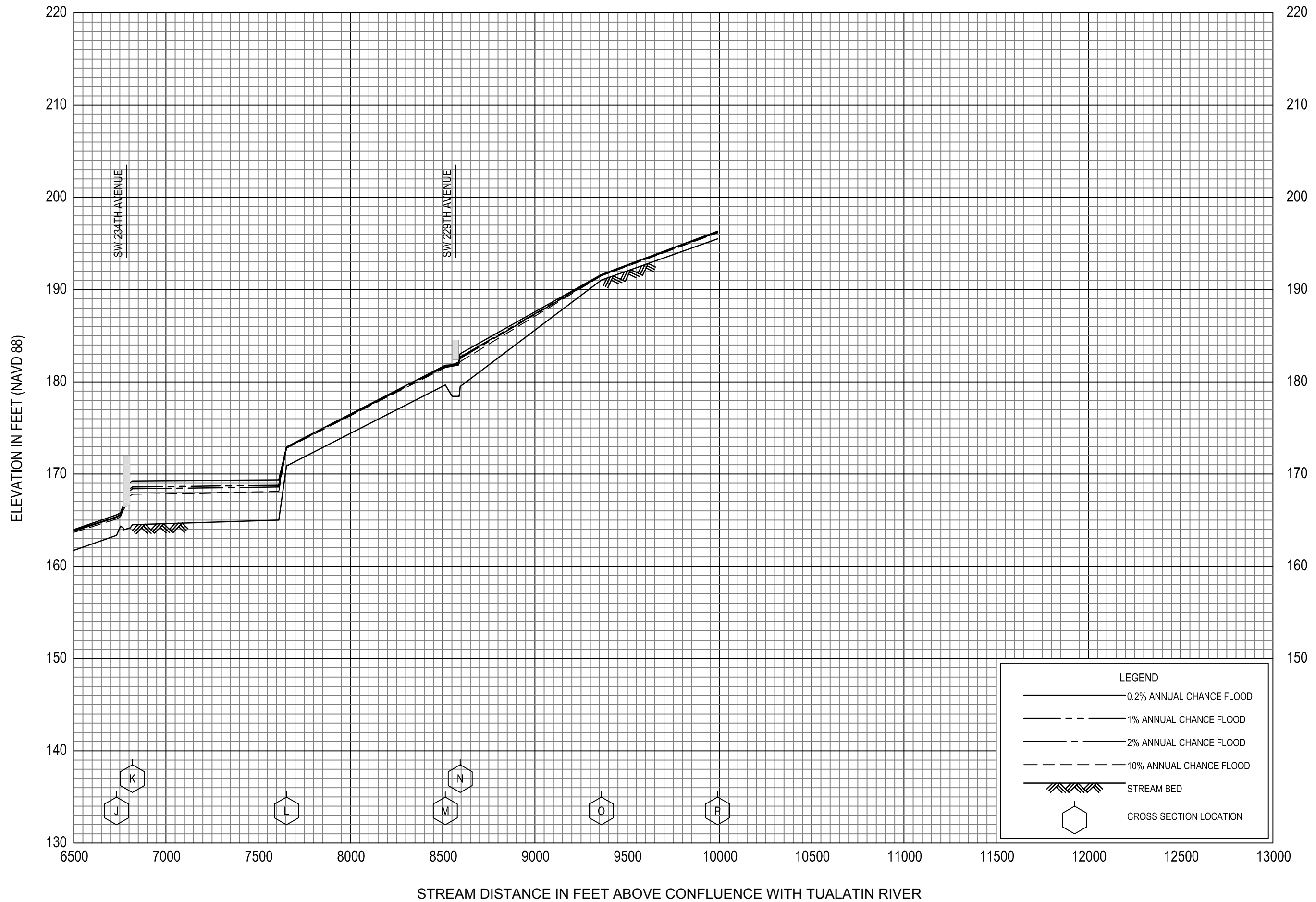
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

71P



FLOOD PROFILES
GORDON CREEK

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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

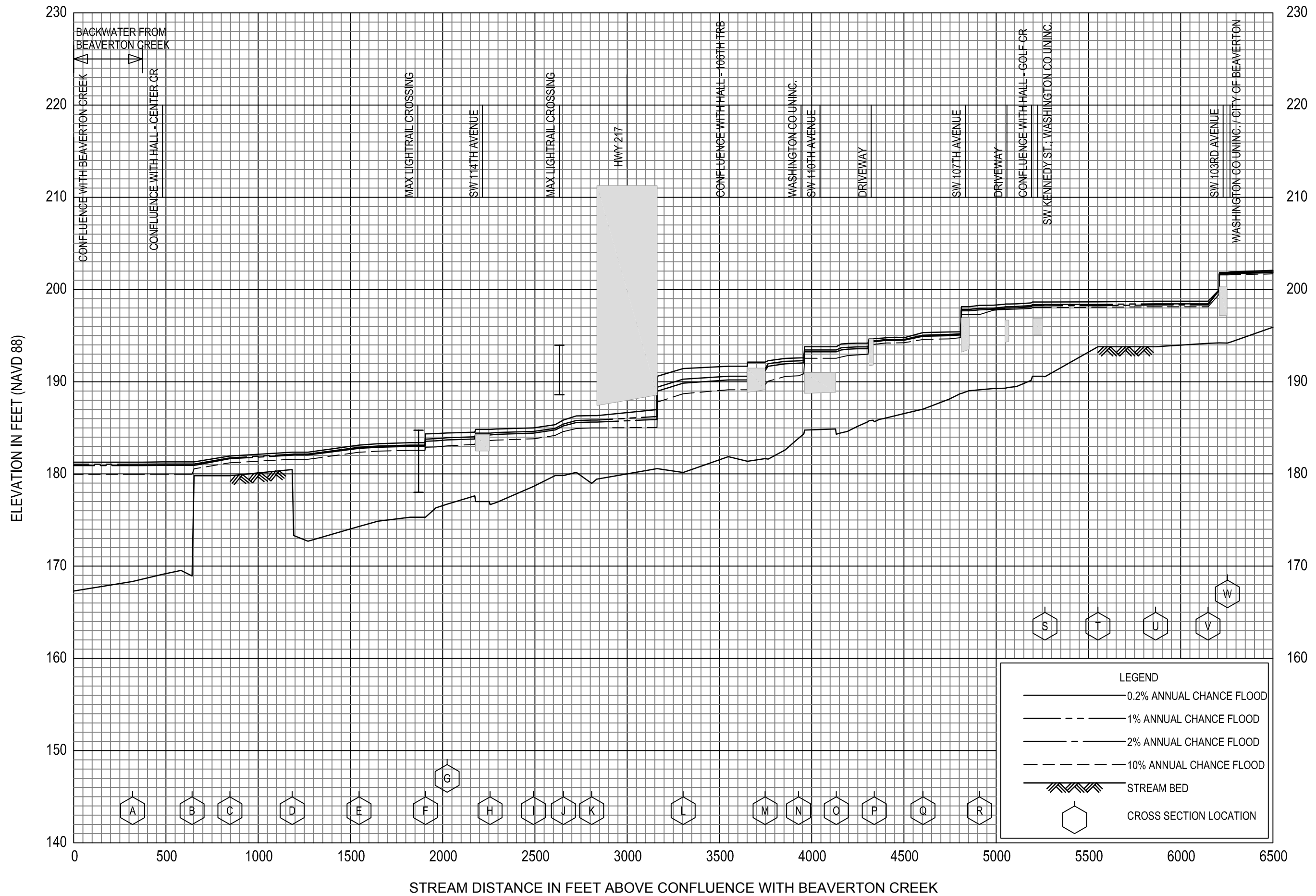


FLOOD PROFILES

GORDON CREEK

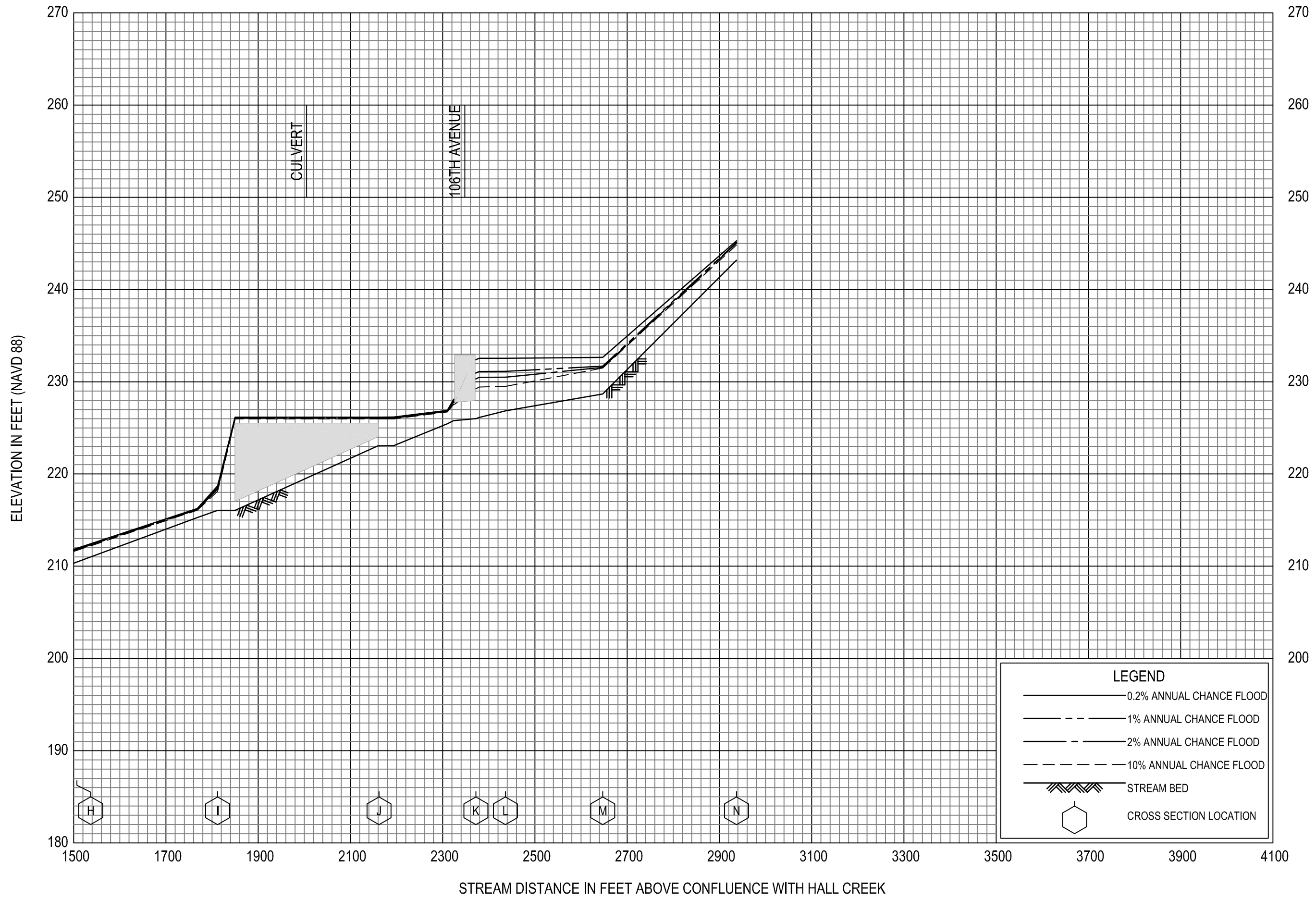
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**WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS**

73P



FLOOD PROFILES
HALL CREEK

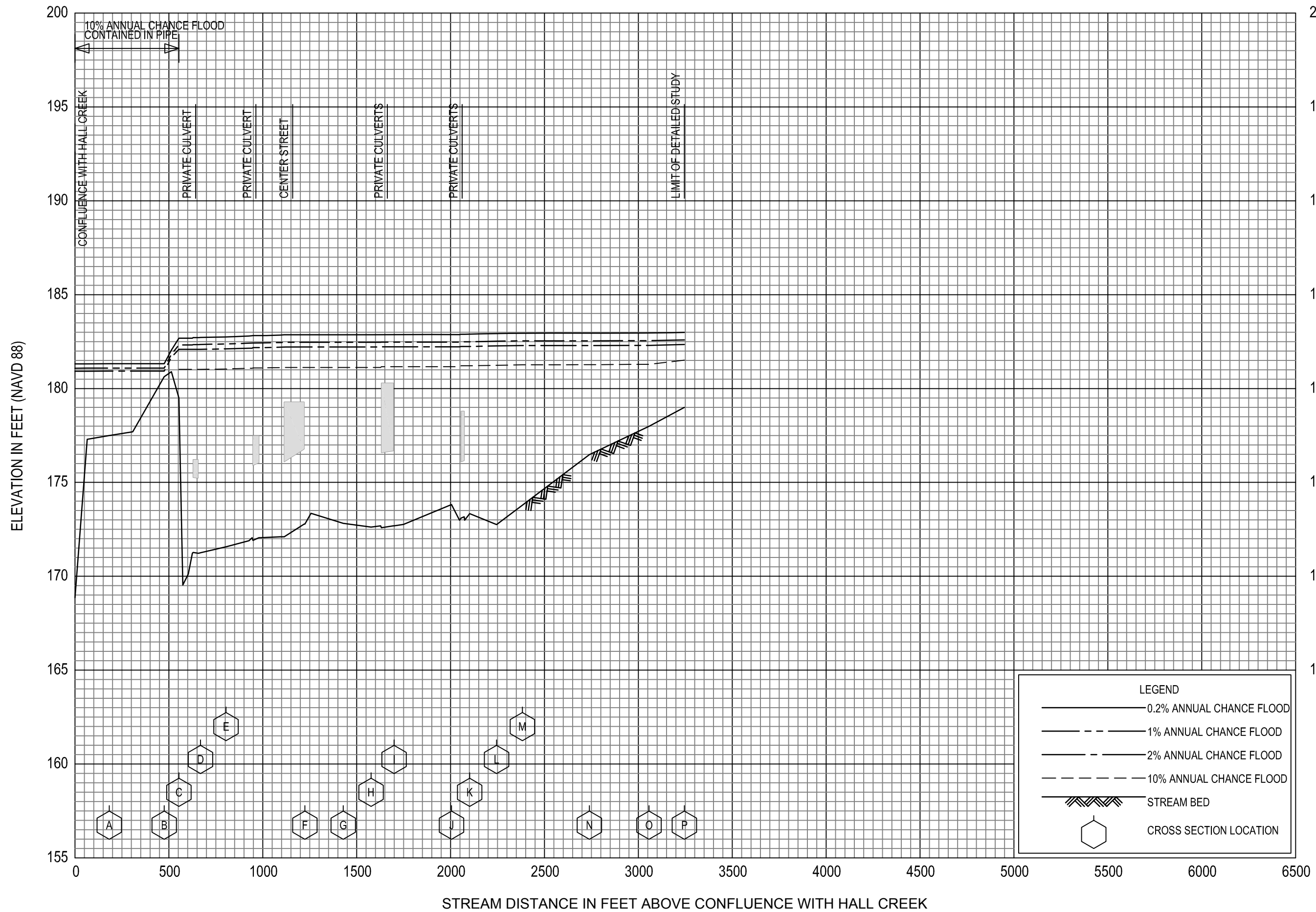
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
(AND INCORPORATED AREAS)



FLOOD PROFILES
HALL CREEK - 106TH TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

77P



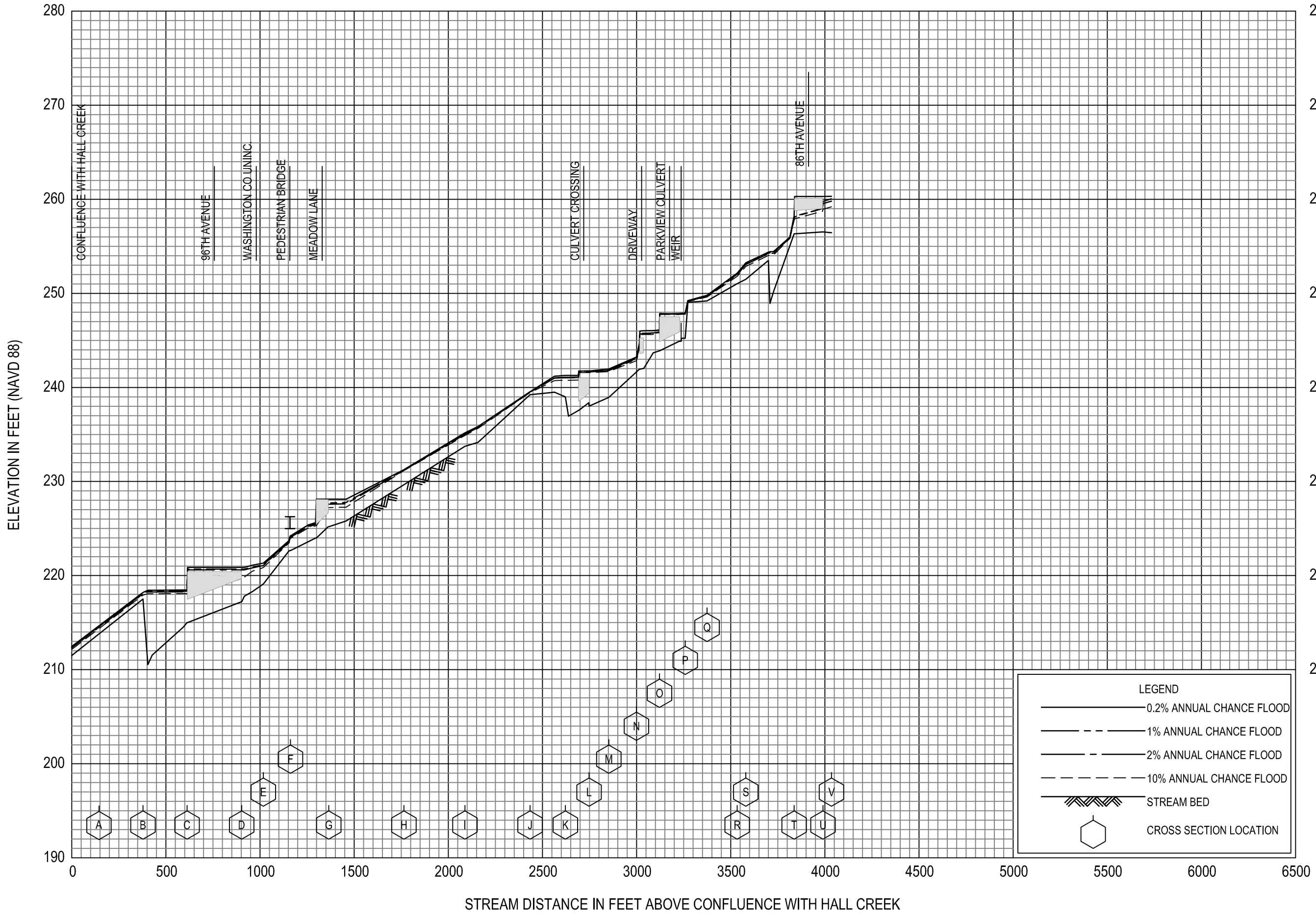
LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- · - 2% ANNUAL CHANCE FLOOD
- - - - 10% ANNUAL CHANCE FLOOD
- ▨ STREAM BED
- ⬡ CROSS SECTION LOCATION

FLOOD PROFILES

HALL CREEK - NORTH FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 (AND INCORPORATED AREAS)



LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- - - 2% ANNUAL CHANCE FLOOD
- - - 10% ANNUAL CHANCE FLOOD
- ▨ STREAM BED
- ⬡ CROSS SECTION LOCATION

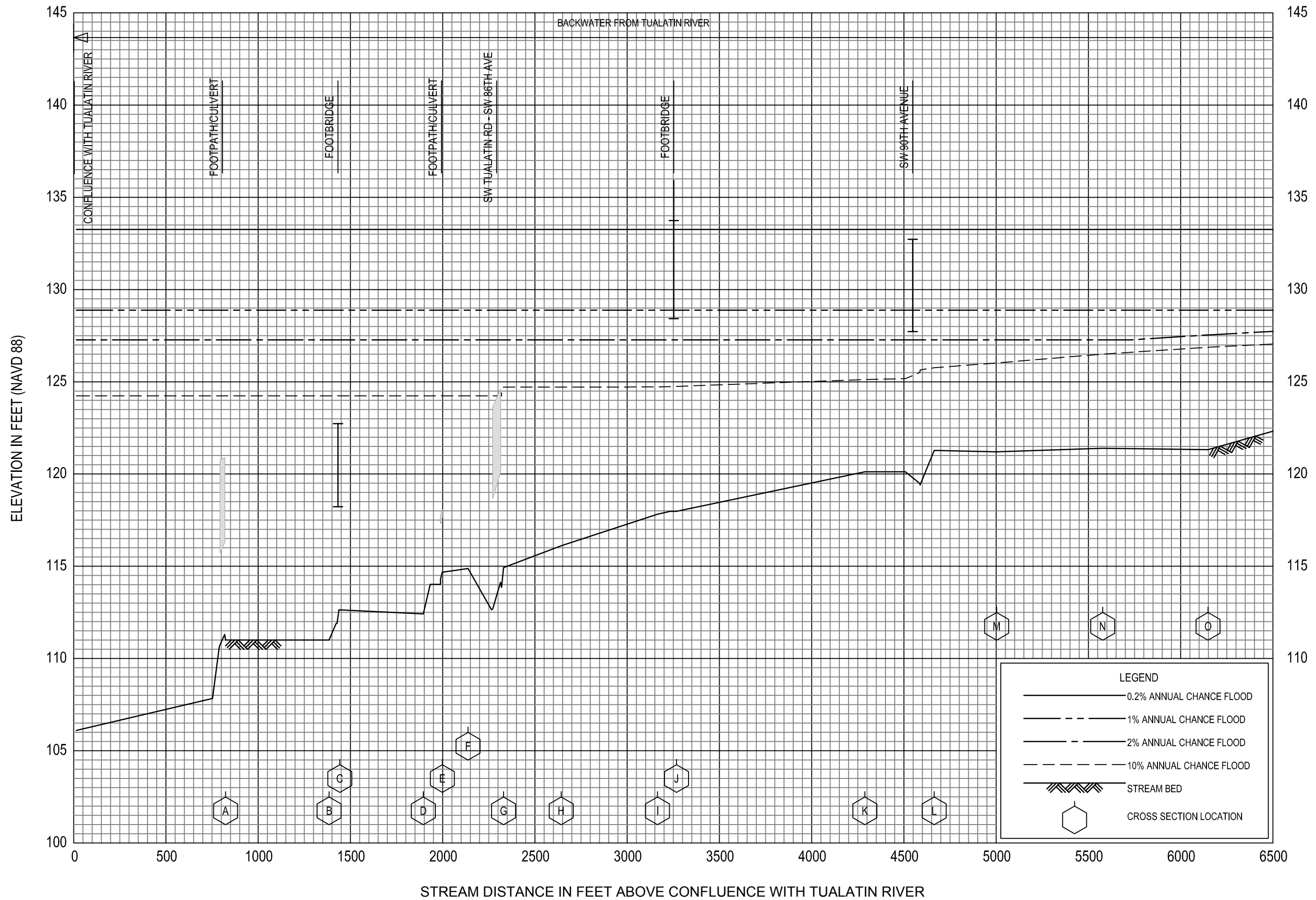
FLOOD PROFILES

HALL CREEK - SOUTH FORK

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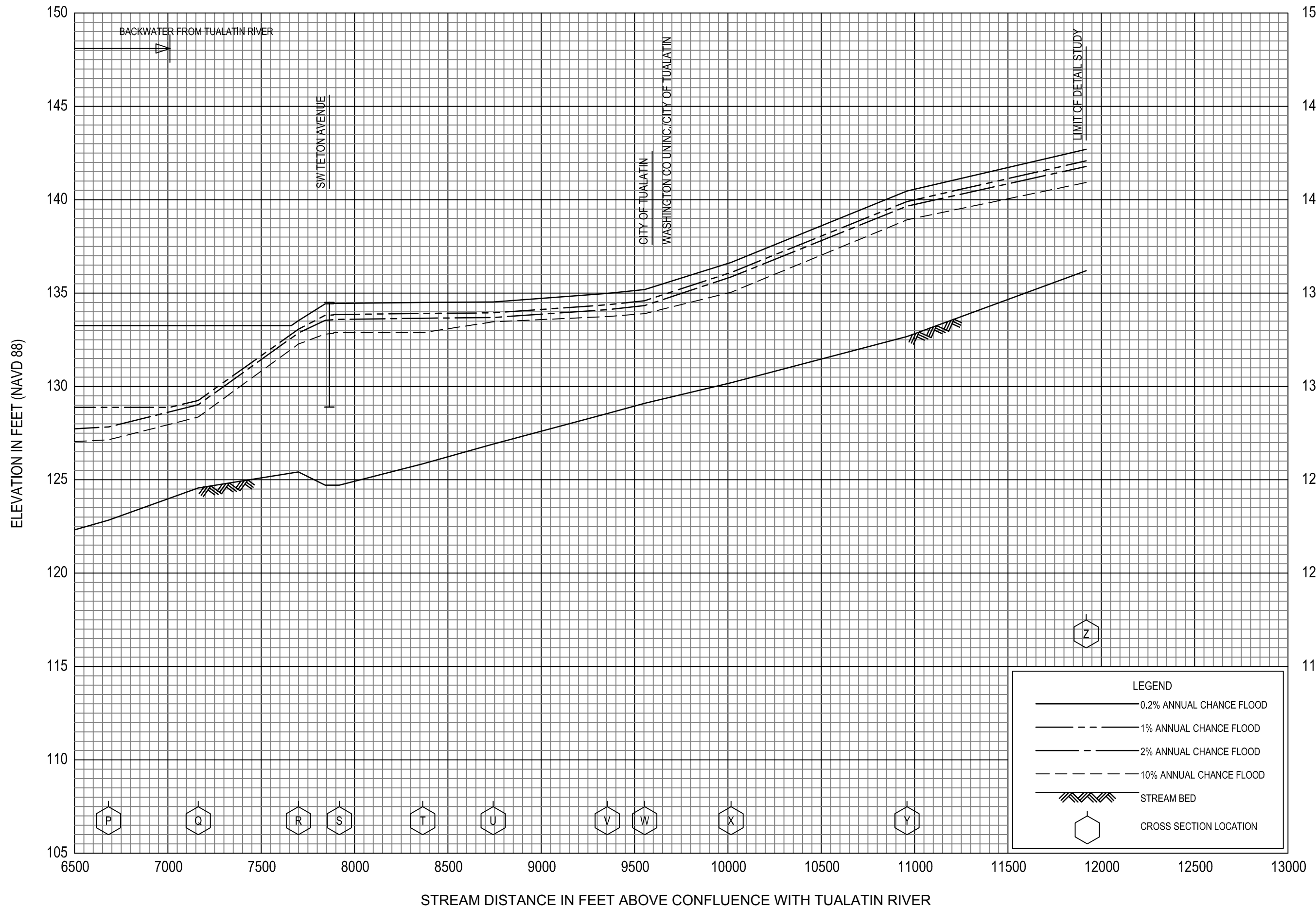
WASHINGTON COUNTY, OR
(AND INCORPORATED AREAS)

79P



FLOOD PROFILES
HEDGES CREEK

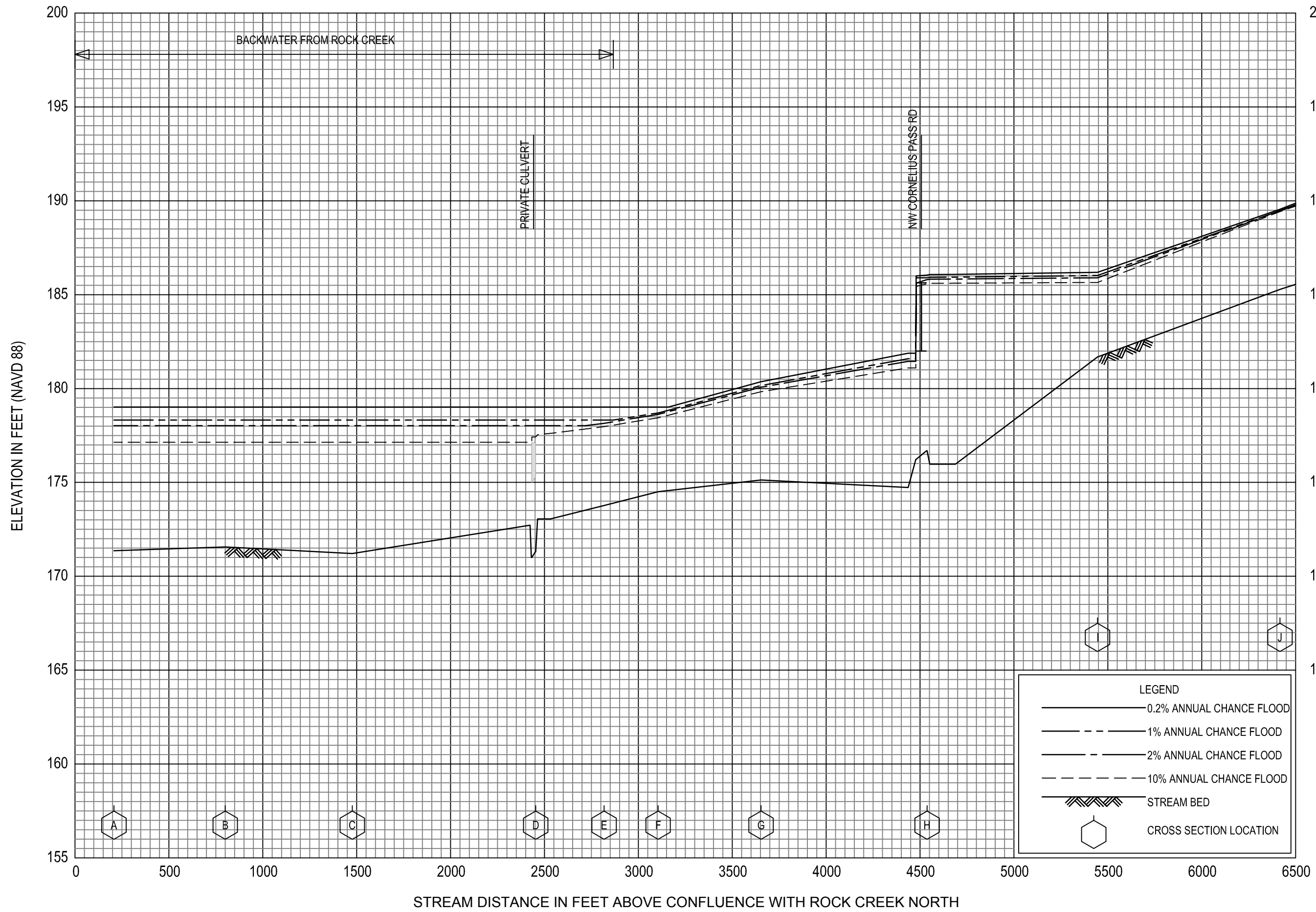
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES
HEDGES CREEK

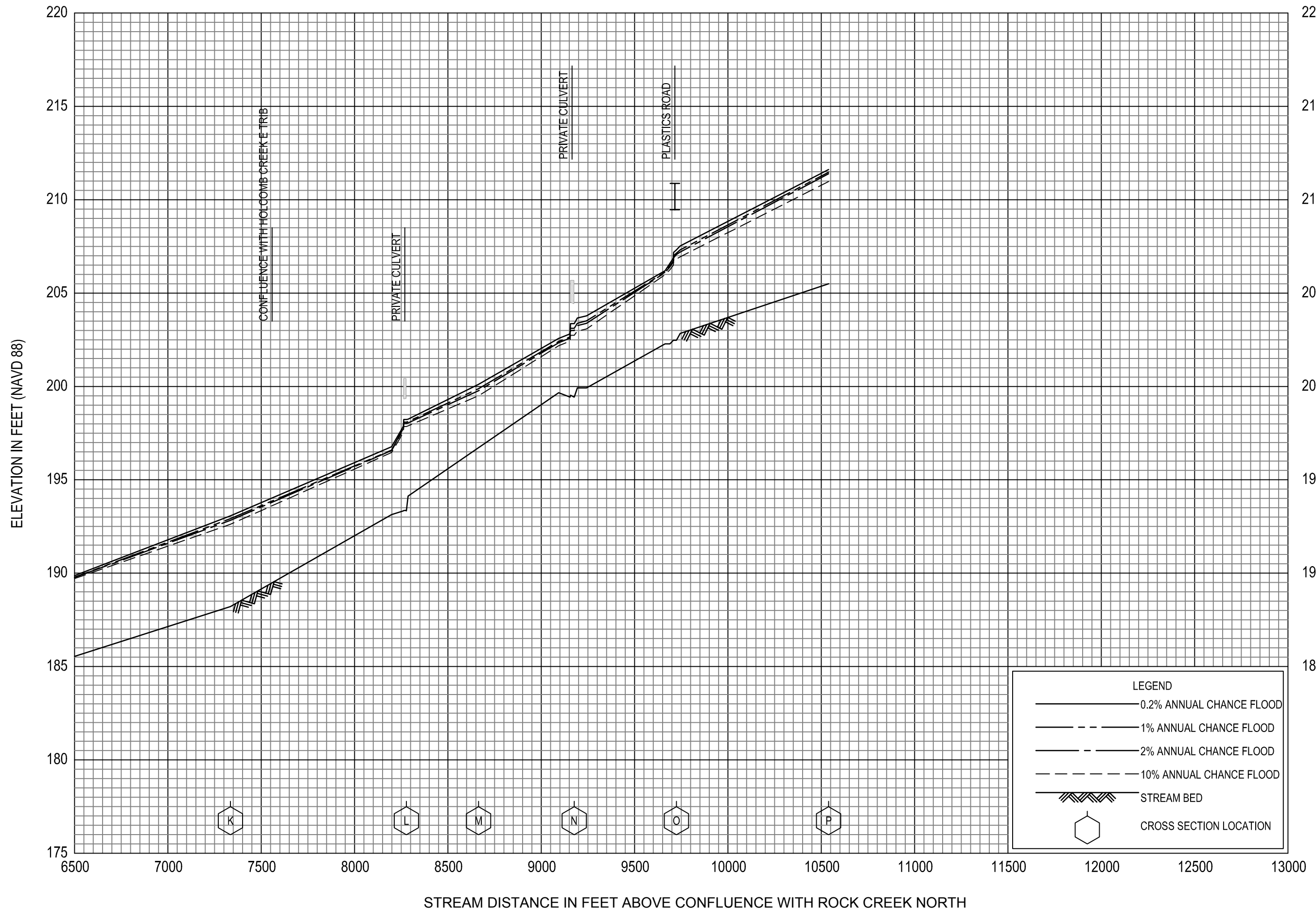
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

81P



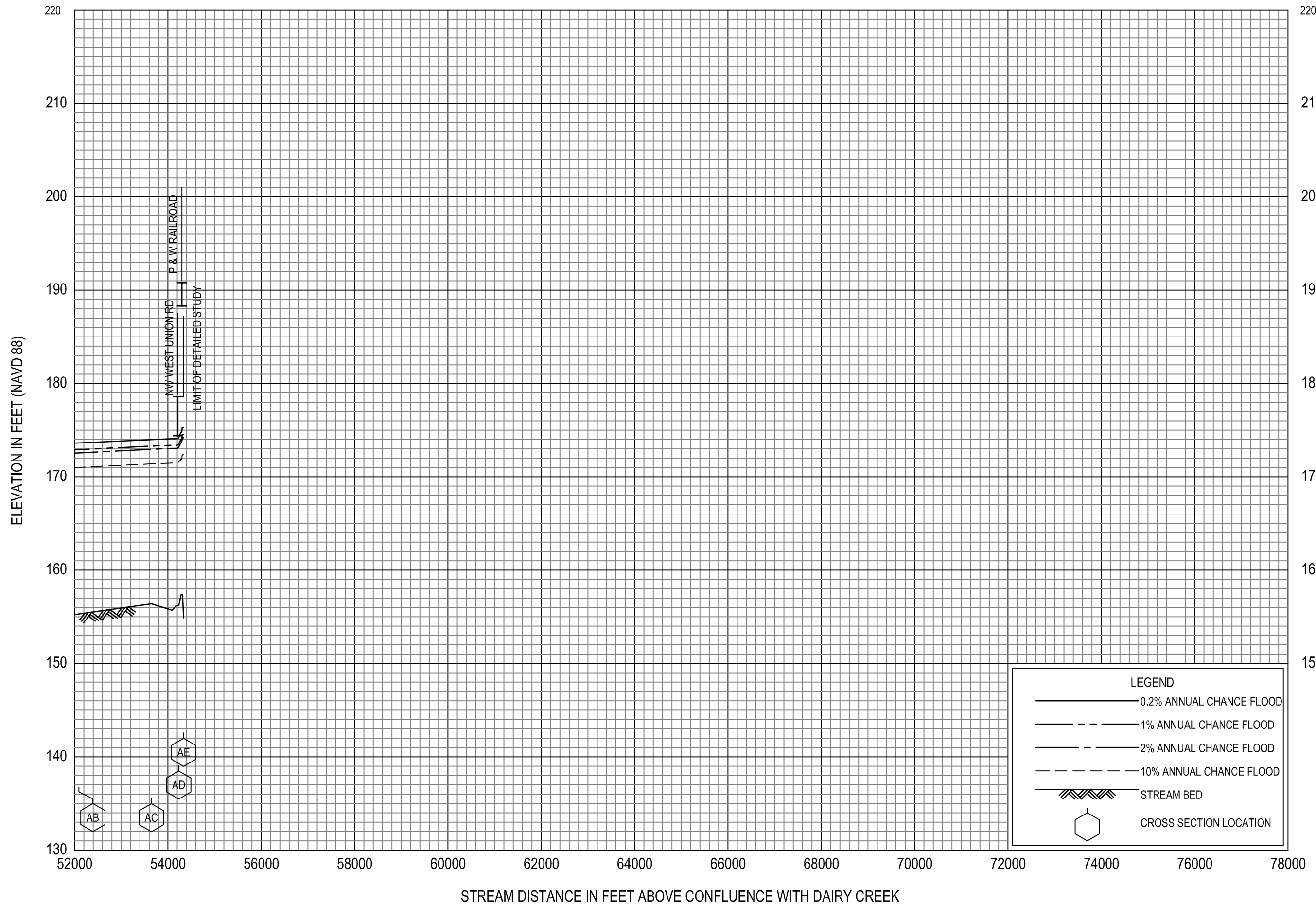
FLOOD PROFILES
HOLCOMB CREEK

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

83P

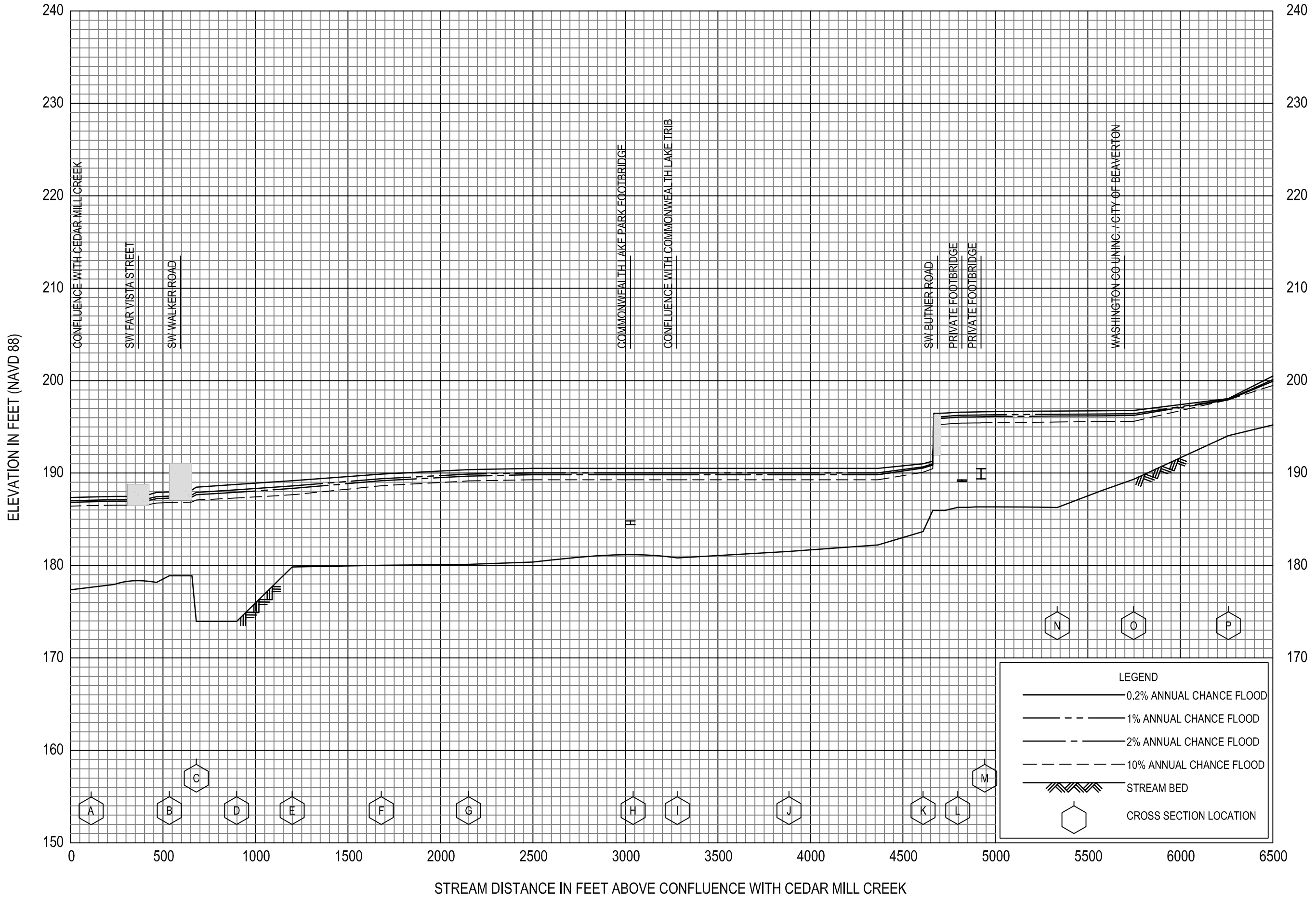


FLOOD PROFILES

MCKAY CREEK

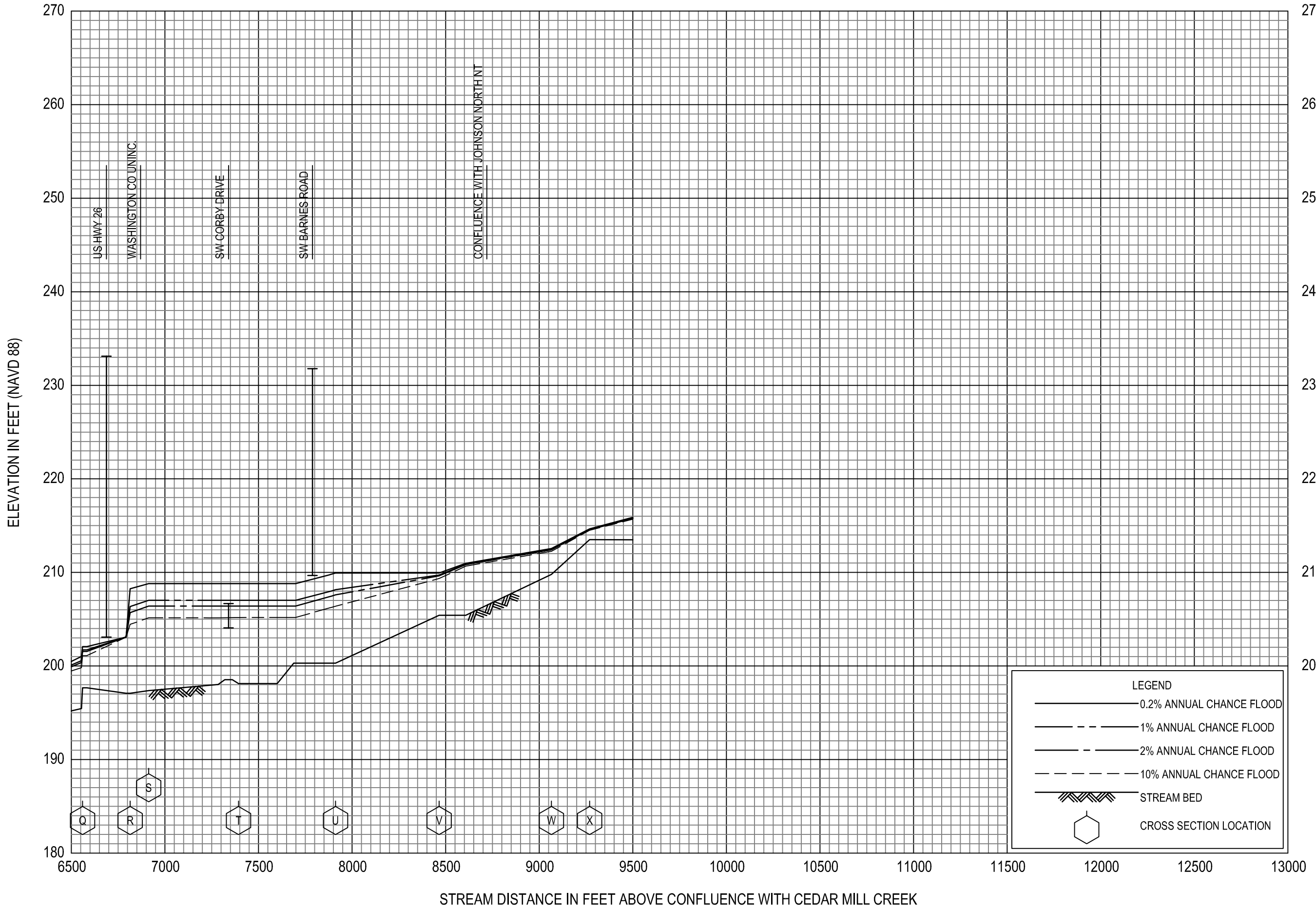
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**WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS**

86P



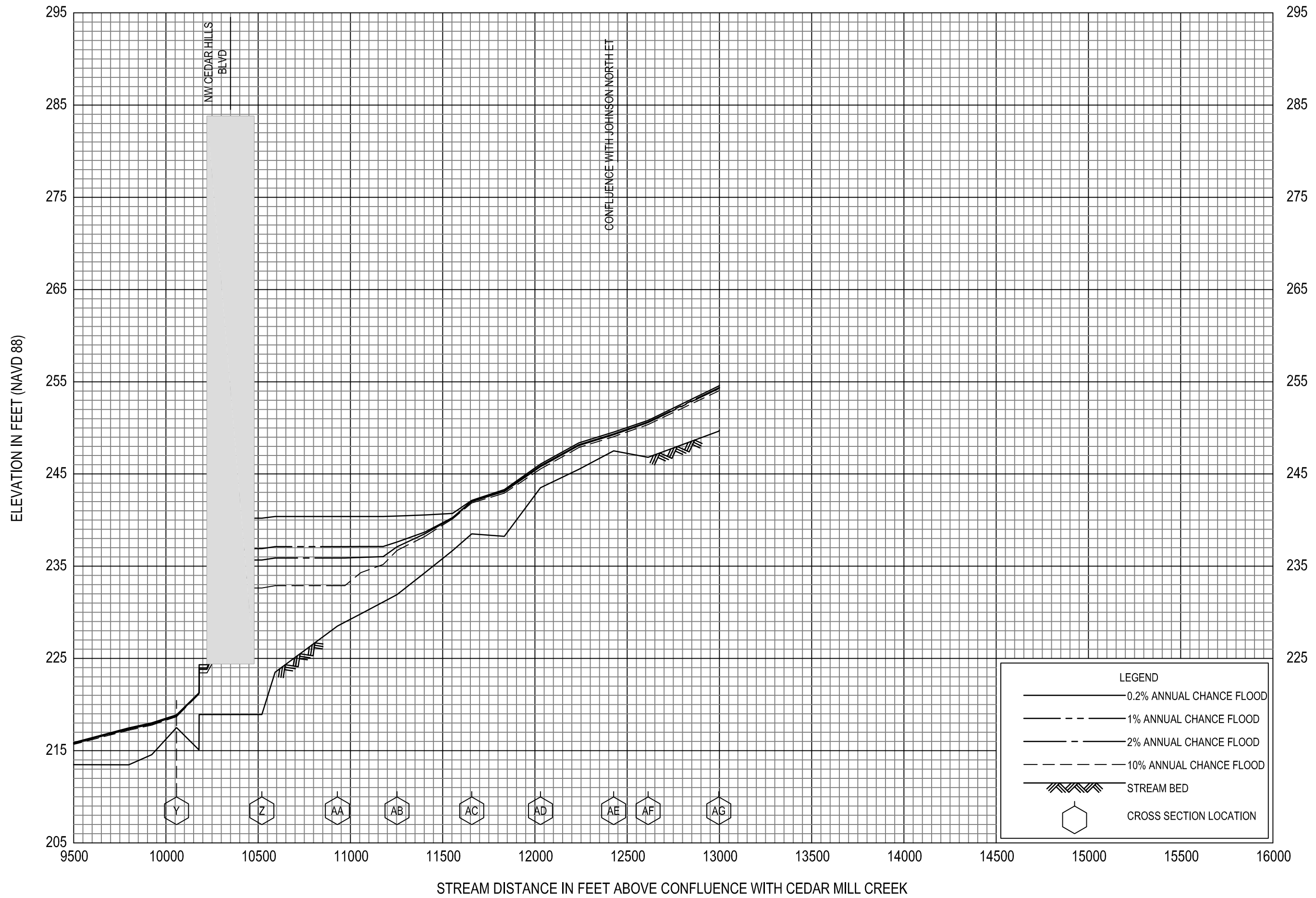
FLOOD PROFILES
NORTH JOHNSON CREEK

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



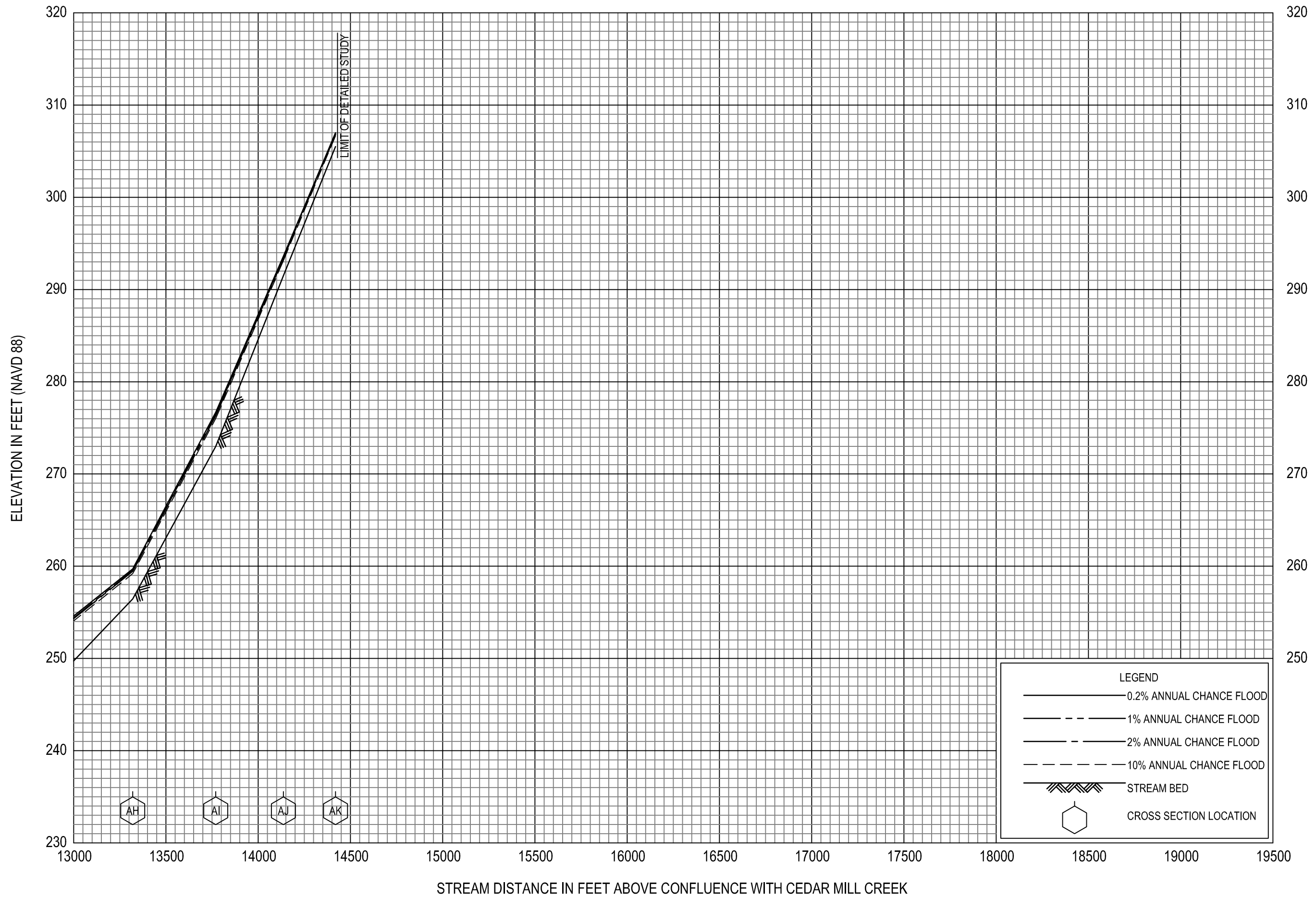
FLOOD PROFILES
NORTH JOHNSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



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NORTH JOHNSON CREEK

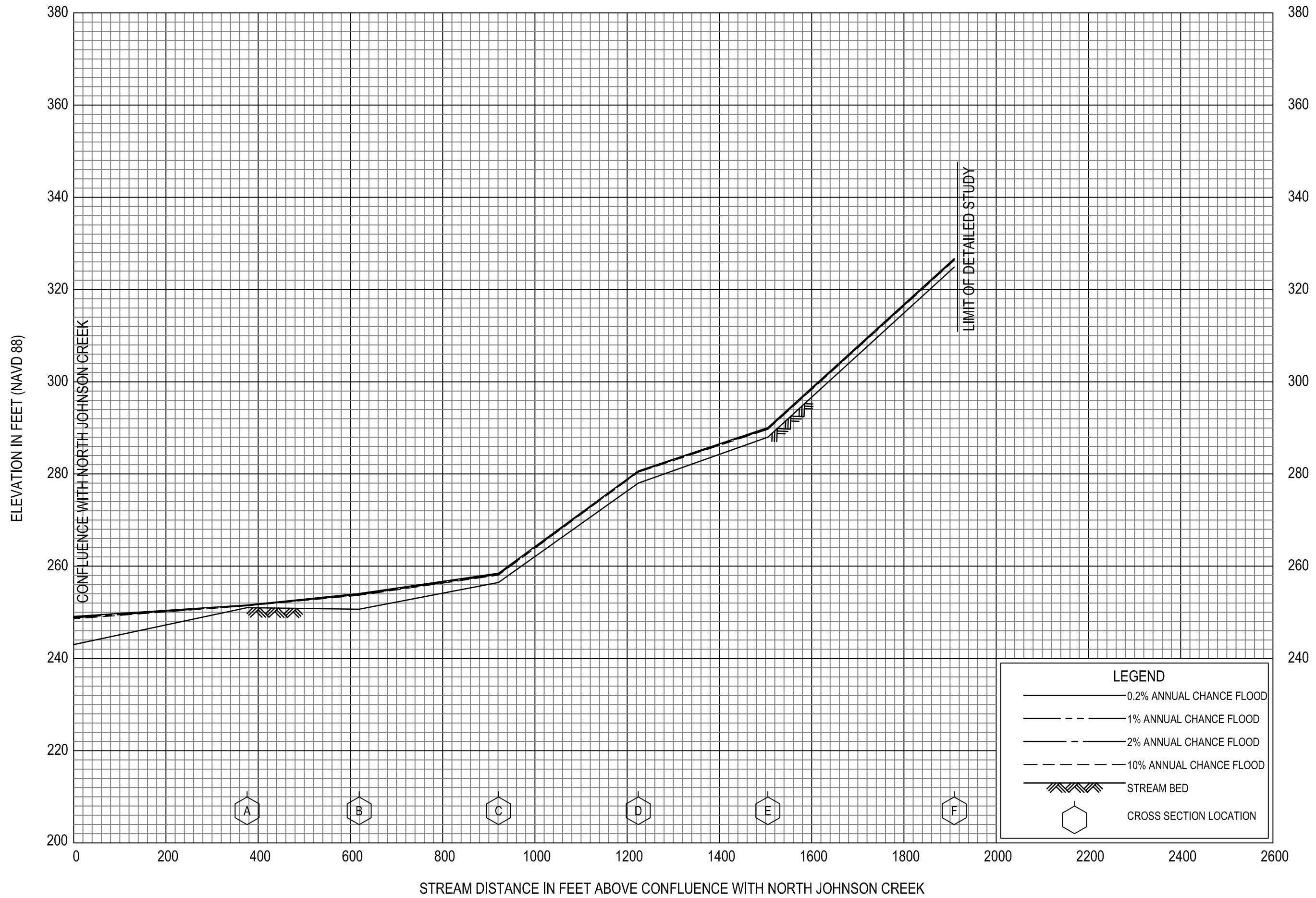
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES
NORTH JOHNSON CREEK

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

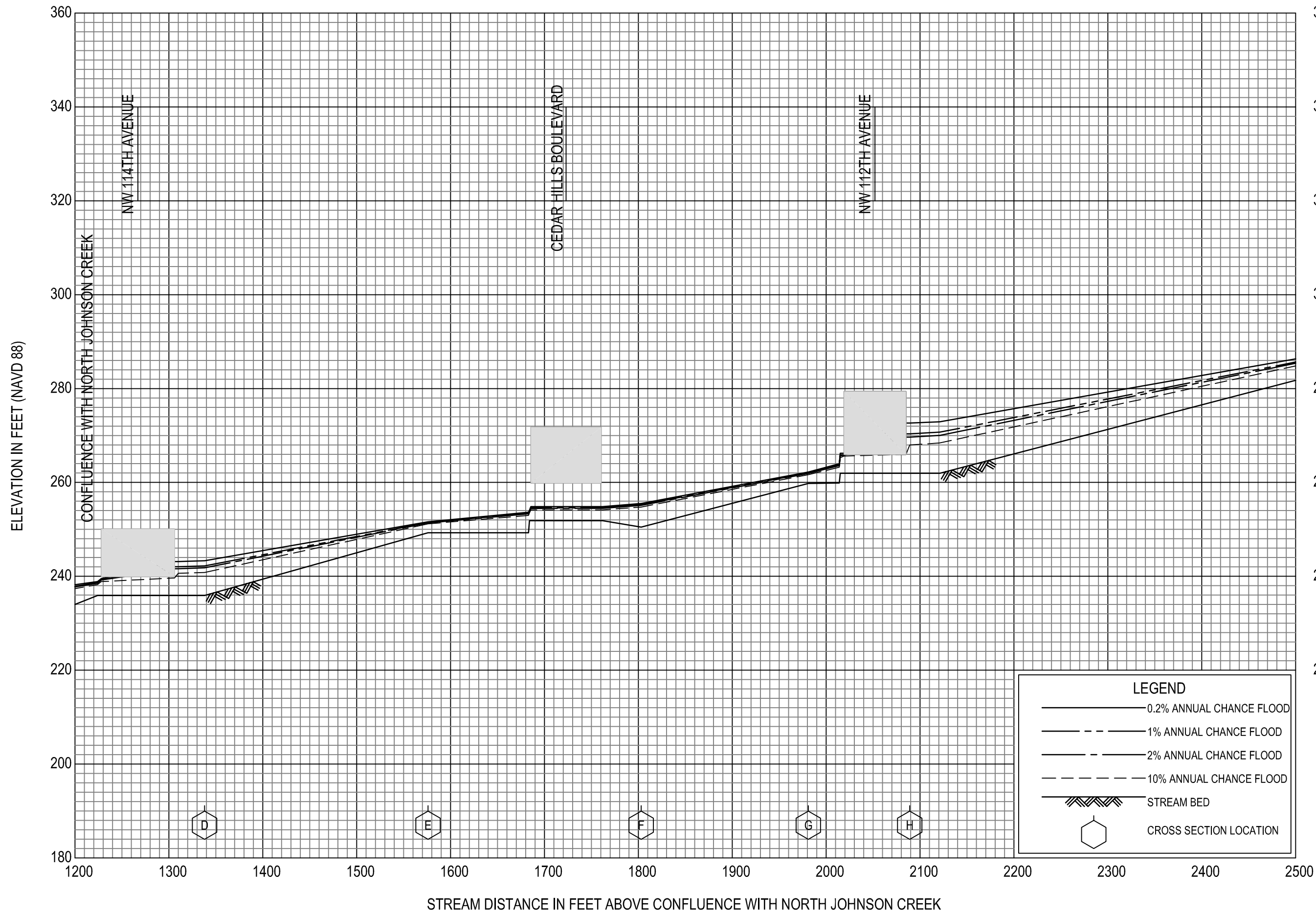
90P



FLOOD PROFILES
NORTH JOHNSON CREEK - EAST TRIBUTARY

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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

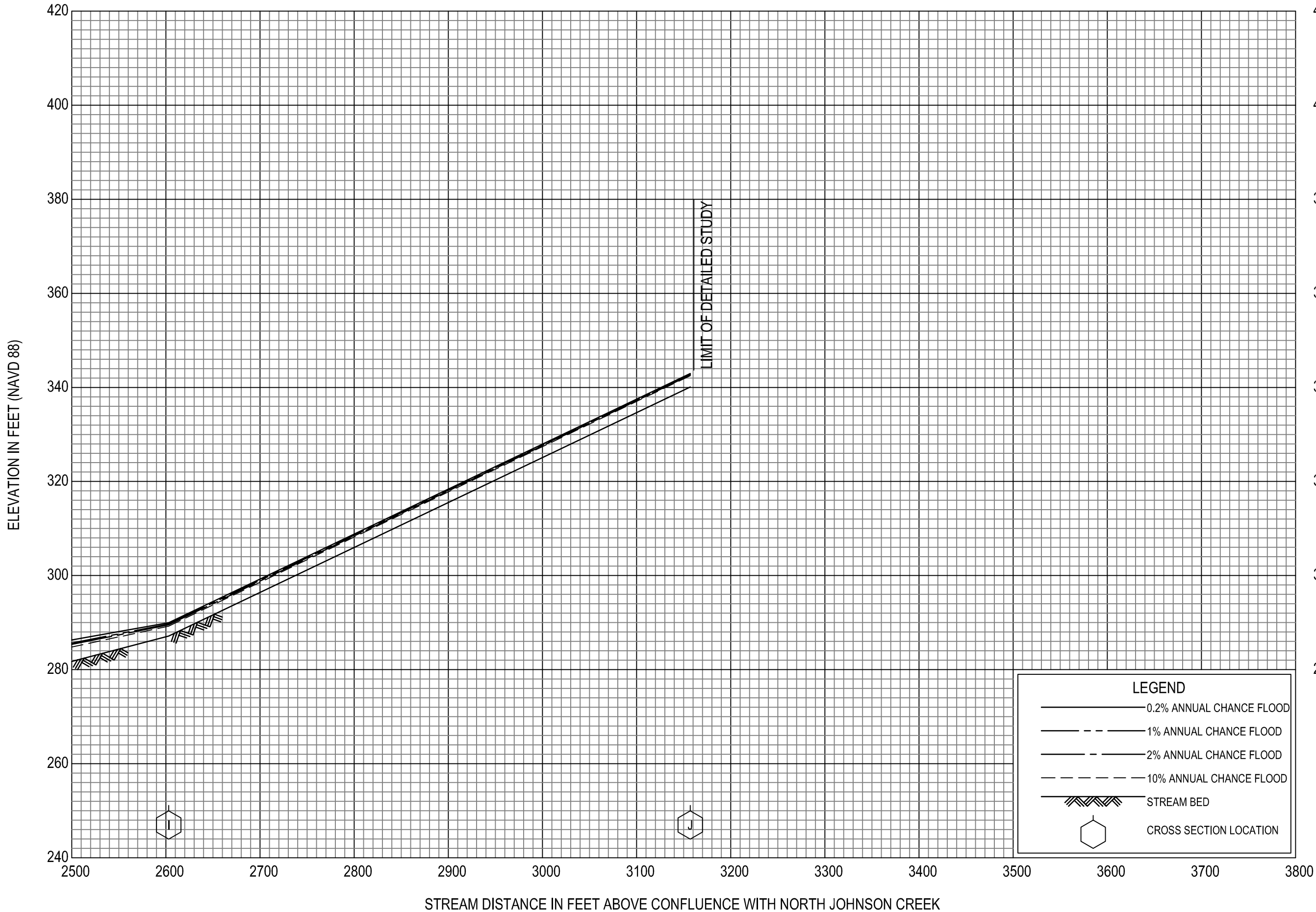
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FLOOD PROFILES

NORTH JOHNSON CREEK - NORTH TRIBUTARY

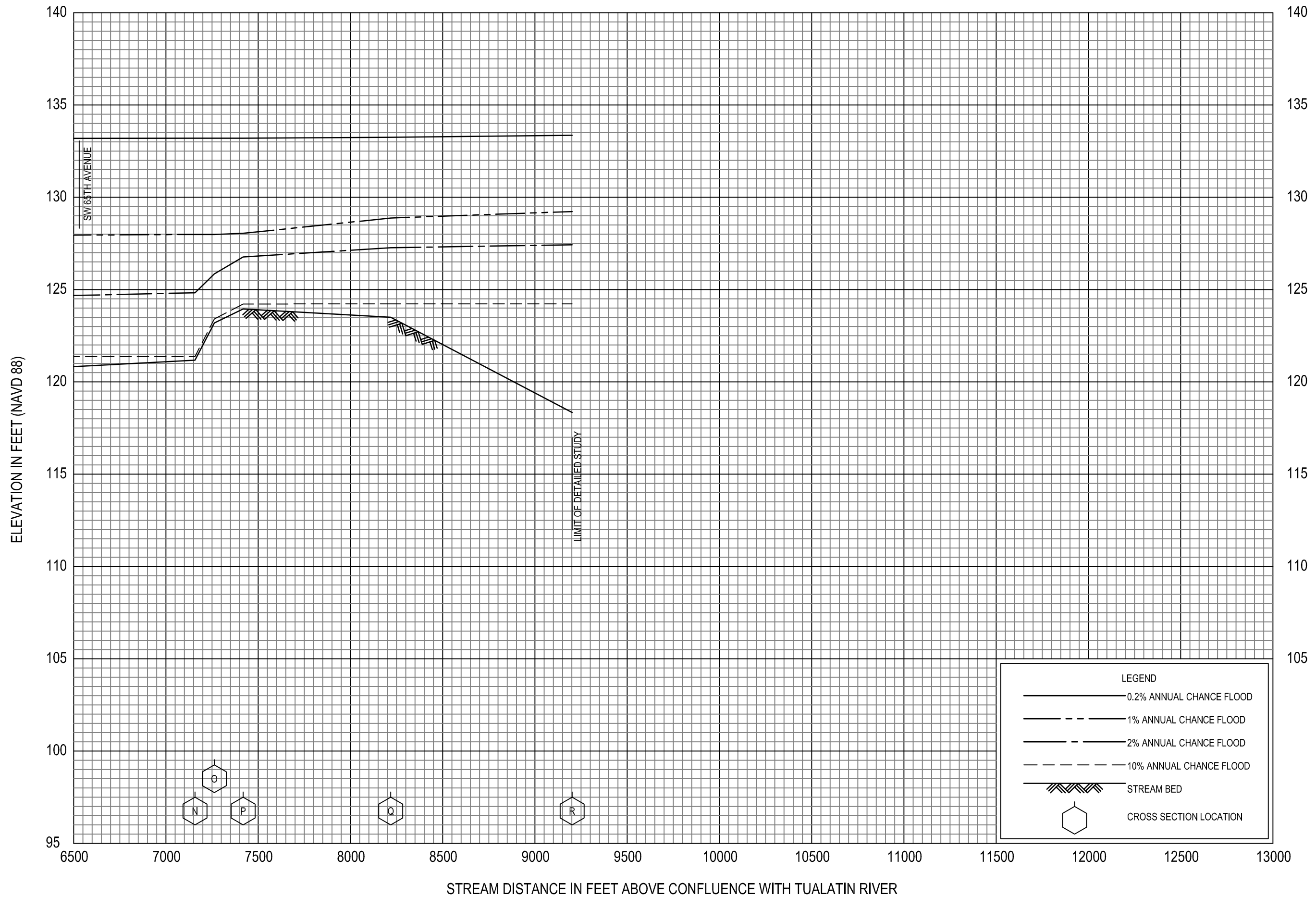
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 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES

NORTH JOHNSON CREEK - NORTH TRIBUTARY

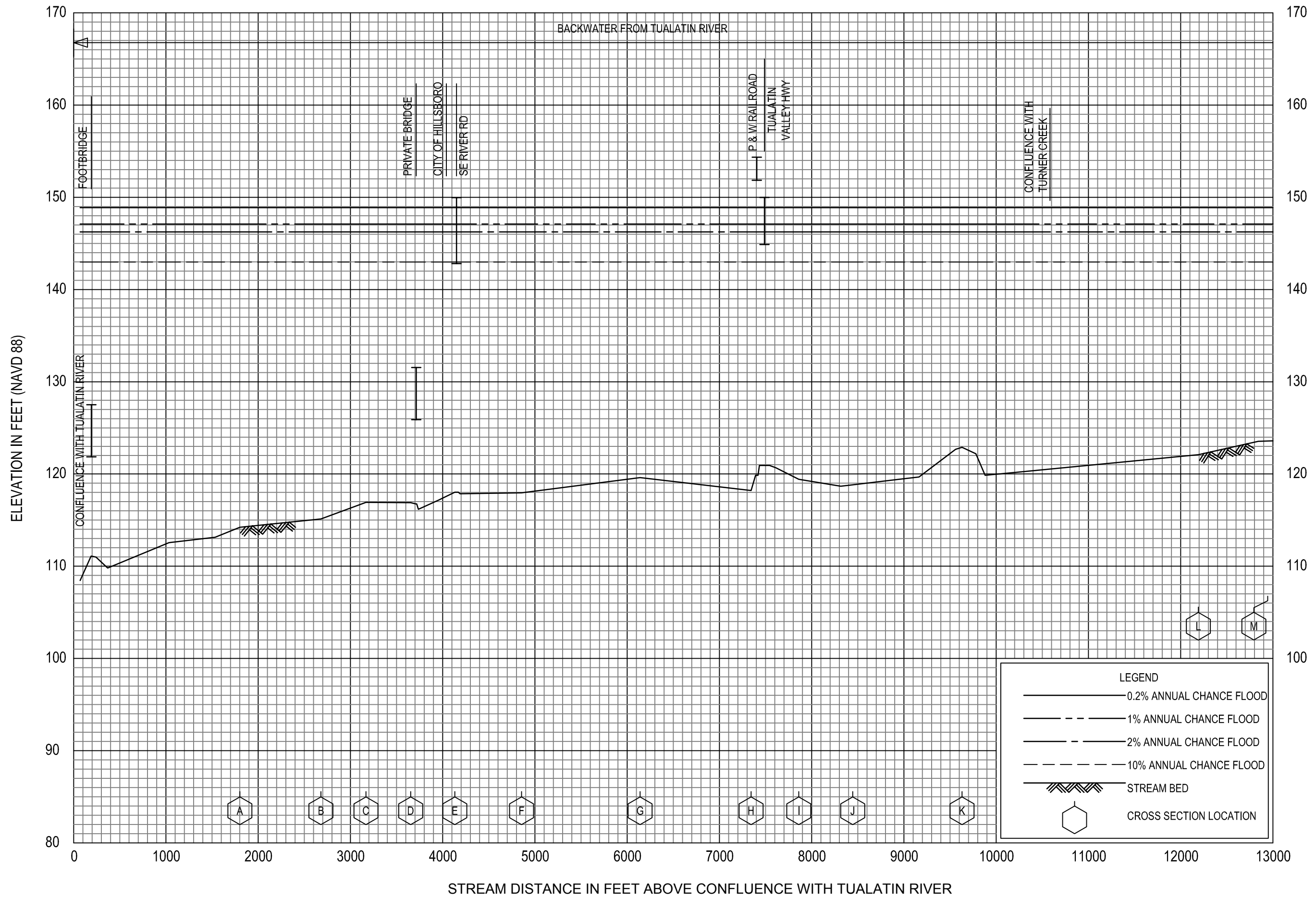
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 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES
 NYBERG SLOUGH (IN WASHINGTON AND CLAKAMAS COUNTY)

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 AND INCORPORATED AREAS

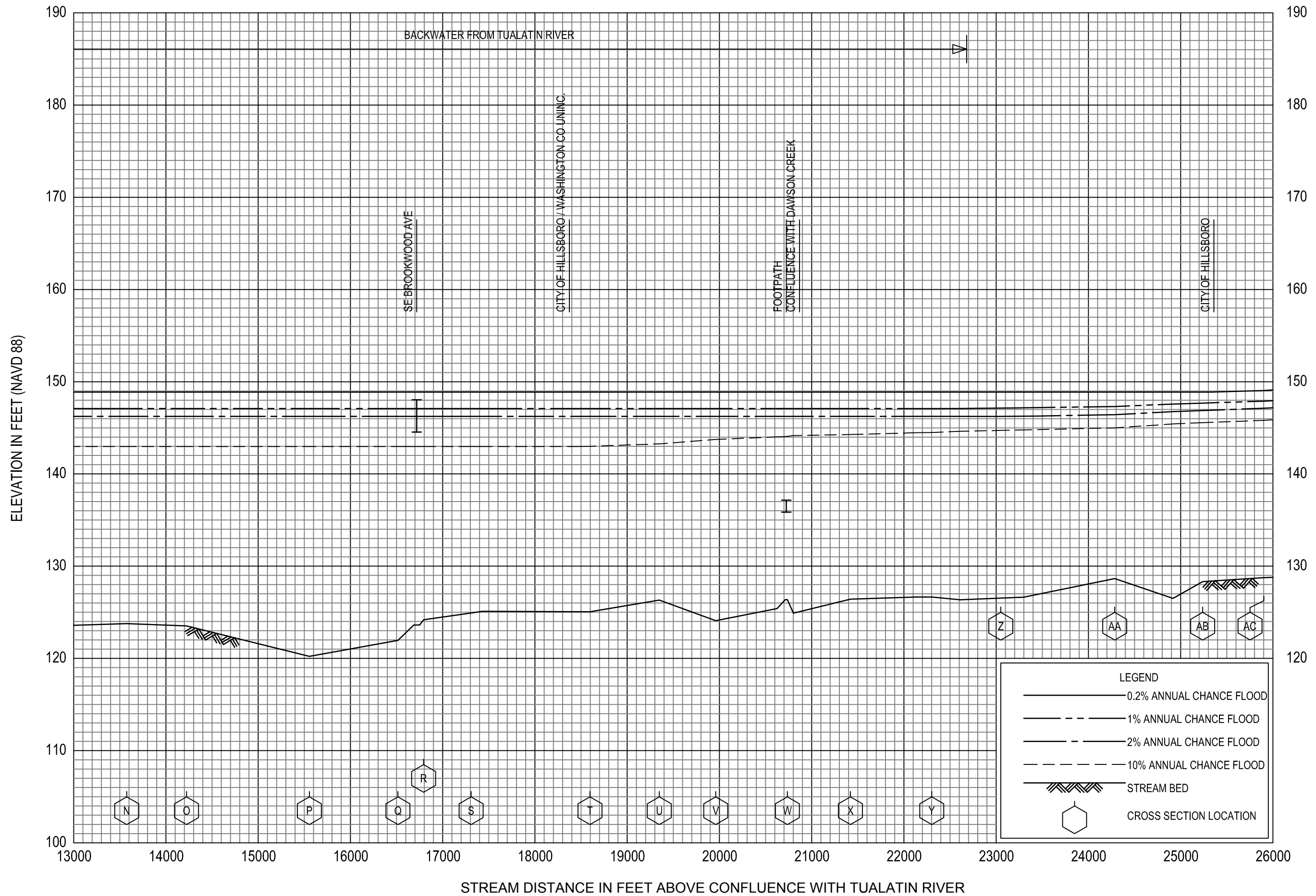
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FLOOD PROFILES
ROCK CREEK NORTH

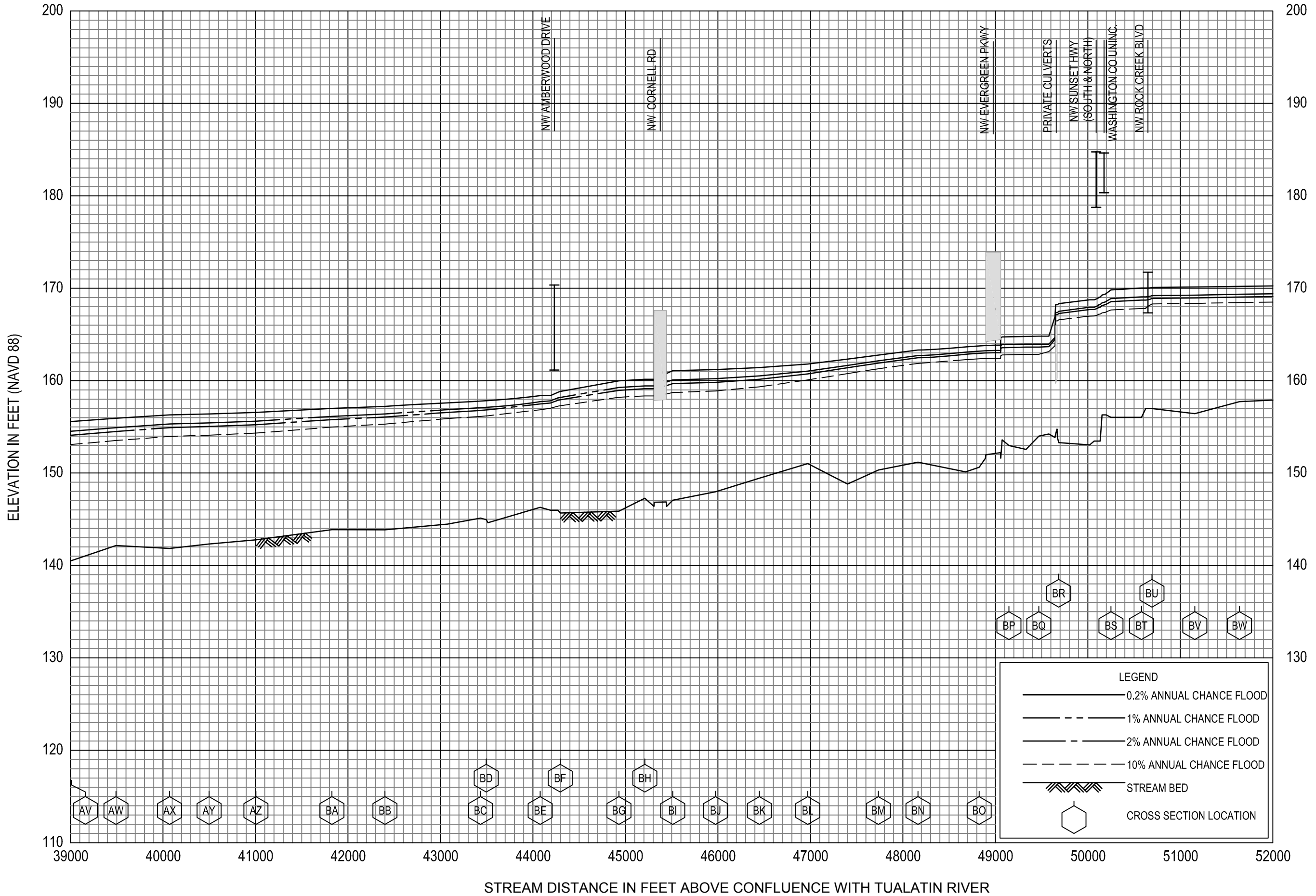
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

97P



FLOOD PROFILES
ROCK CREEK NORTH

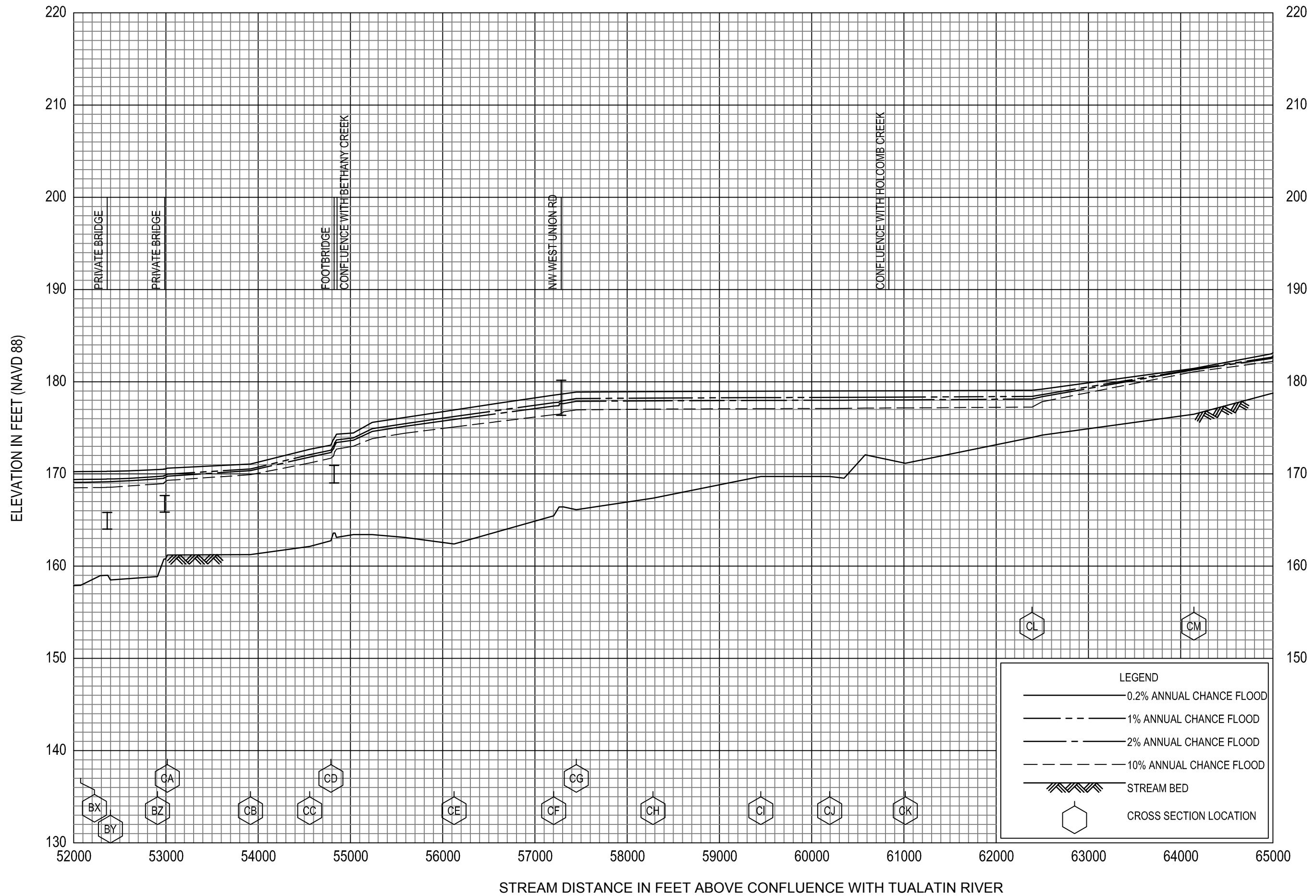
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FLOOD PROFILES
ROCK CREEK NORTH

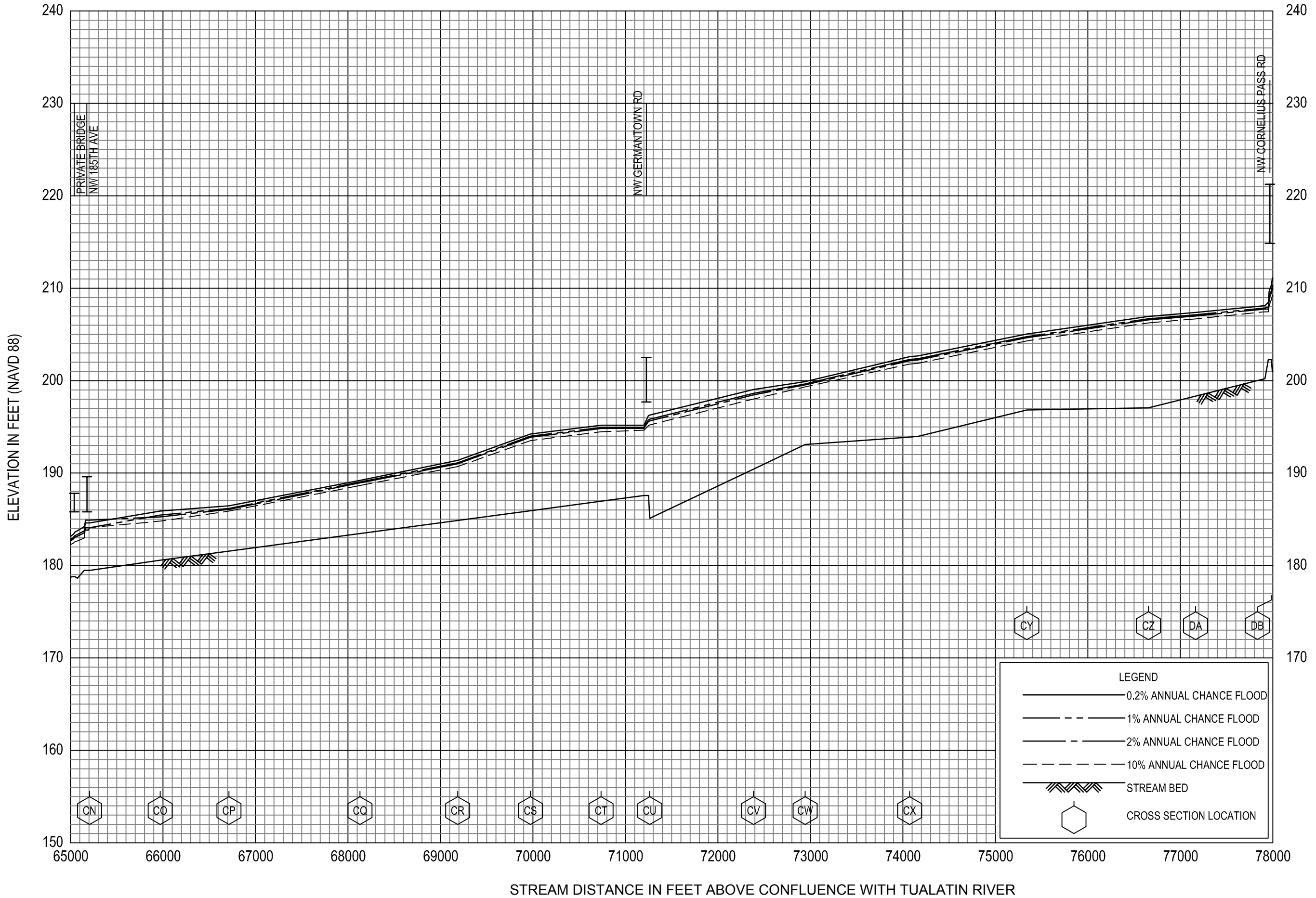
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

100P



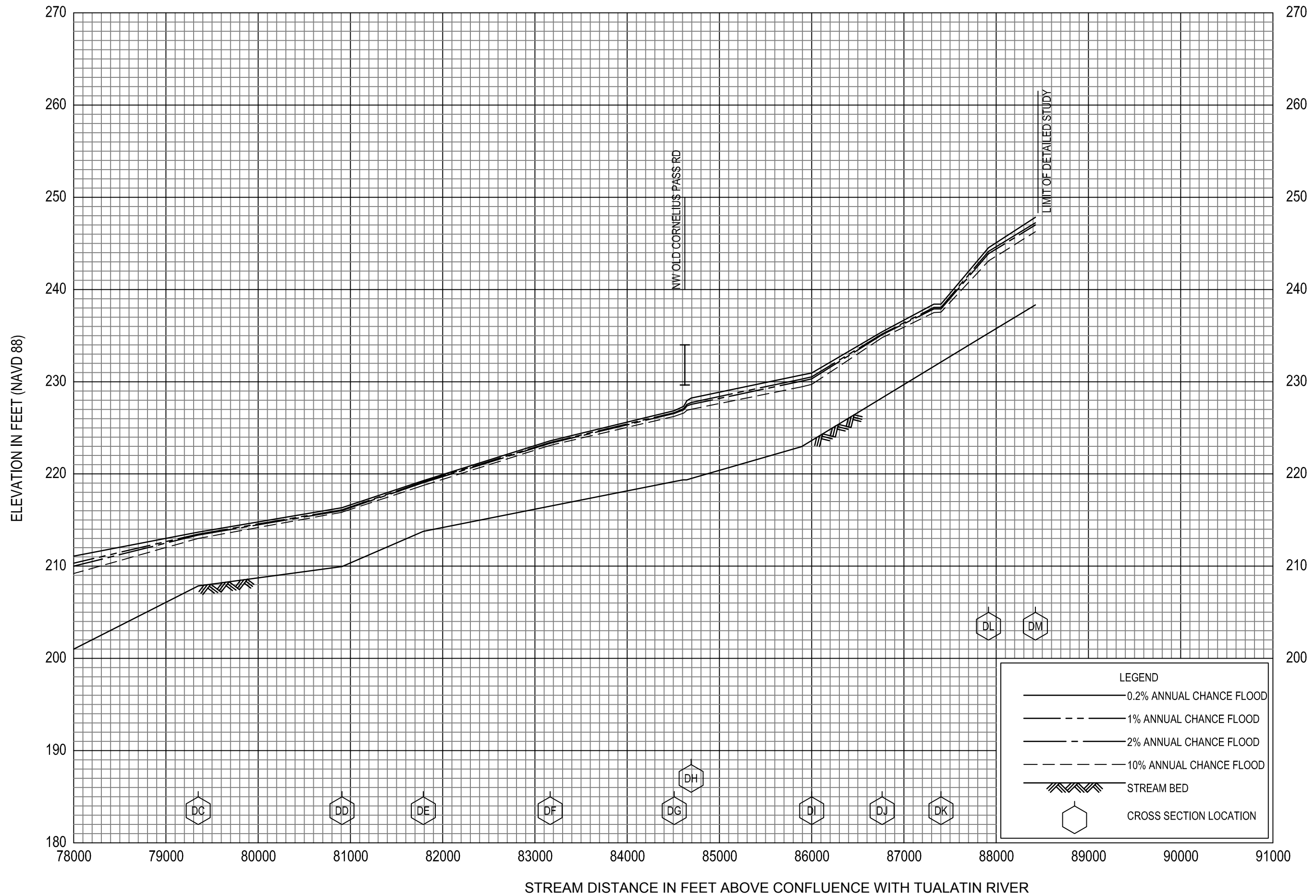
FLOOD PROFILES
ROCK CREEK NORTH

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
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FLOOD PROFILES
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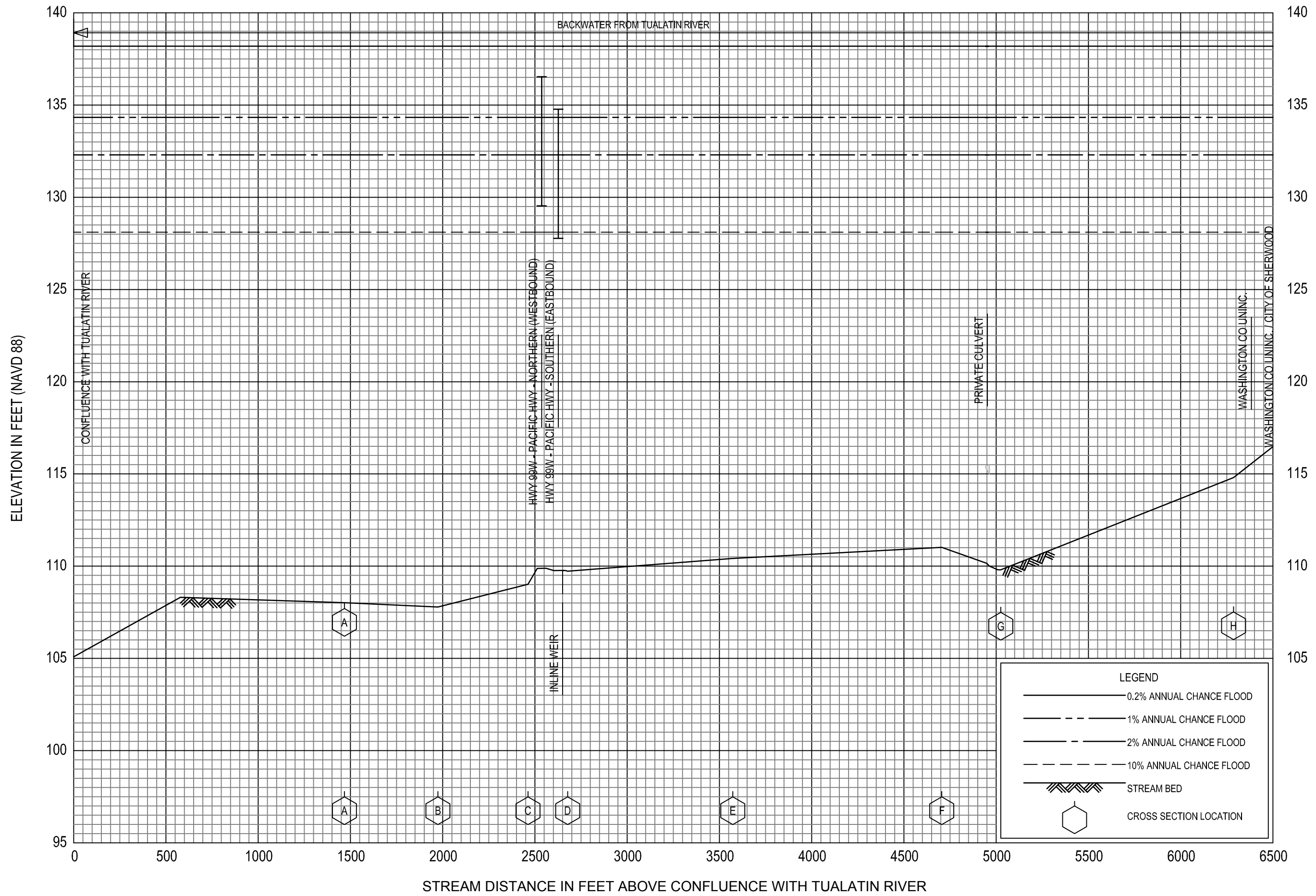
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FLOOD PROFILES
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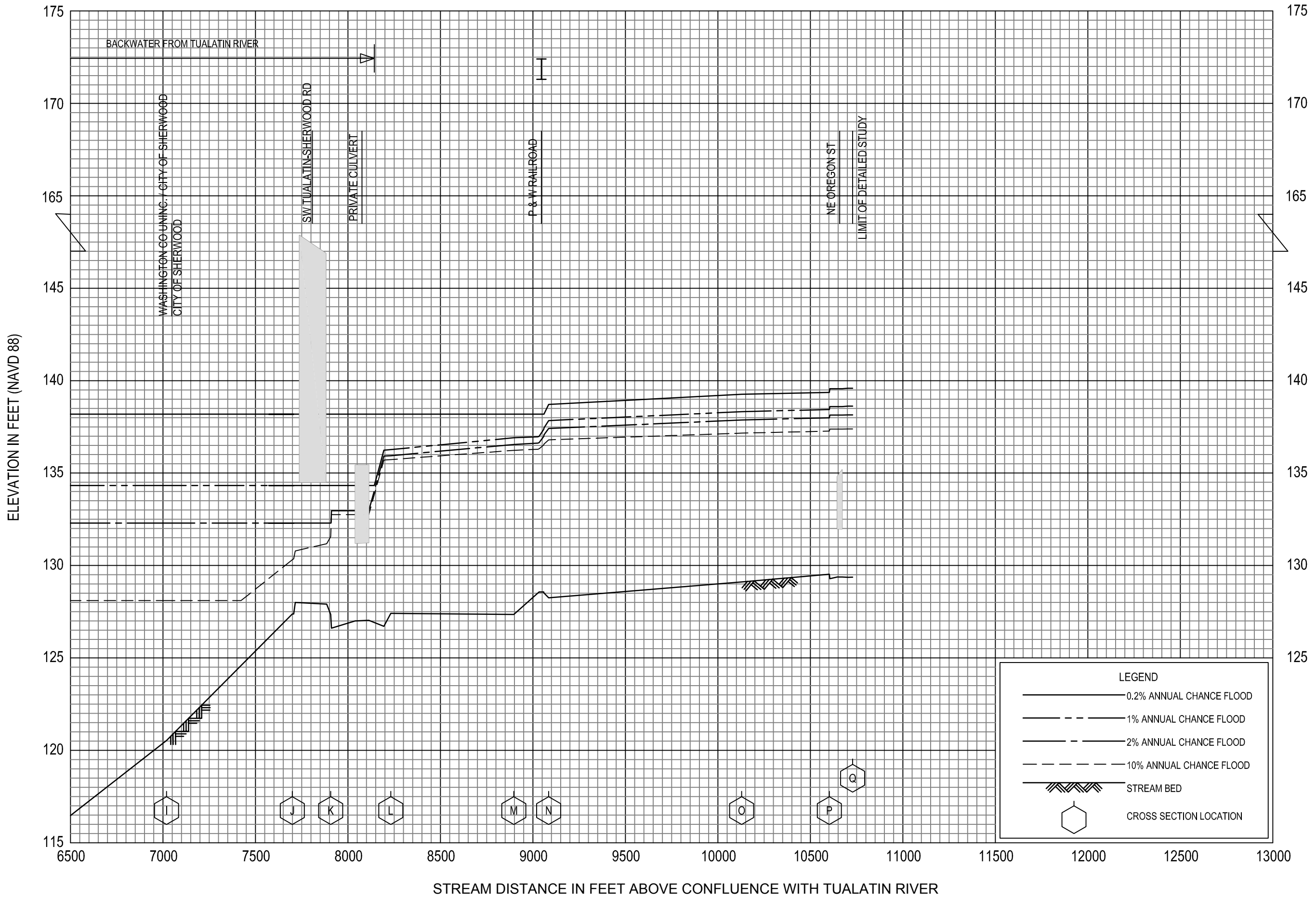
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103P



FLOOD PROFILES
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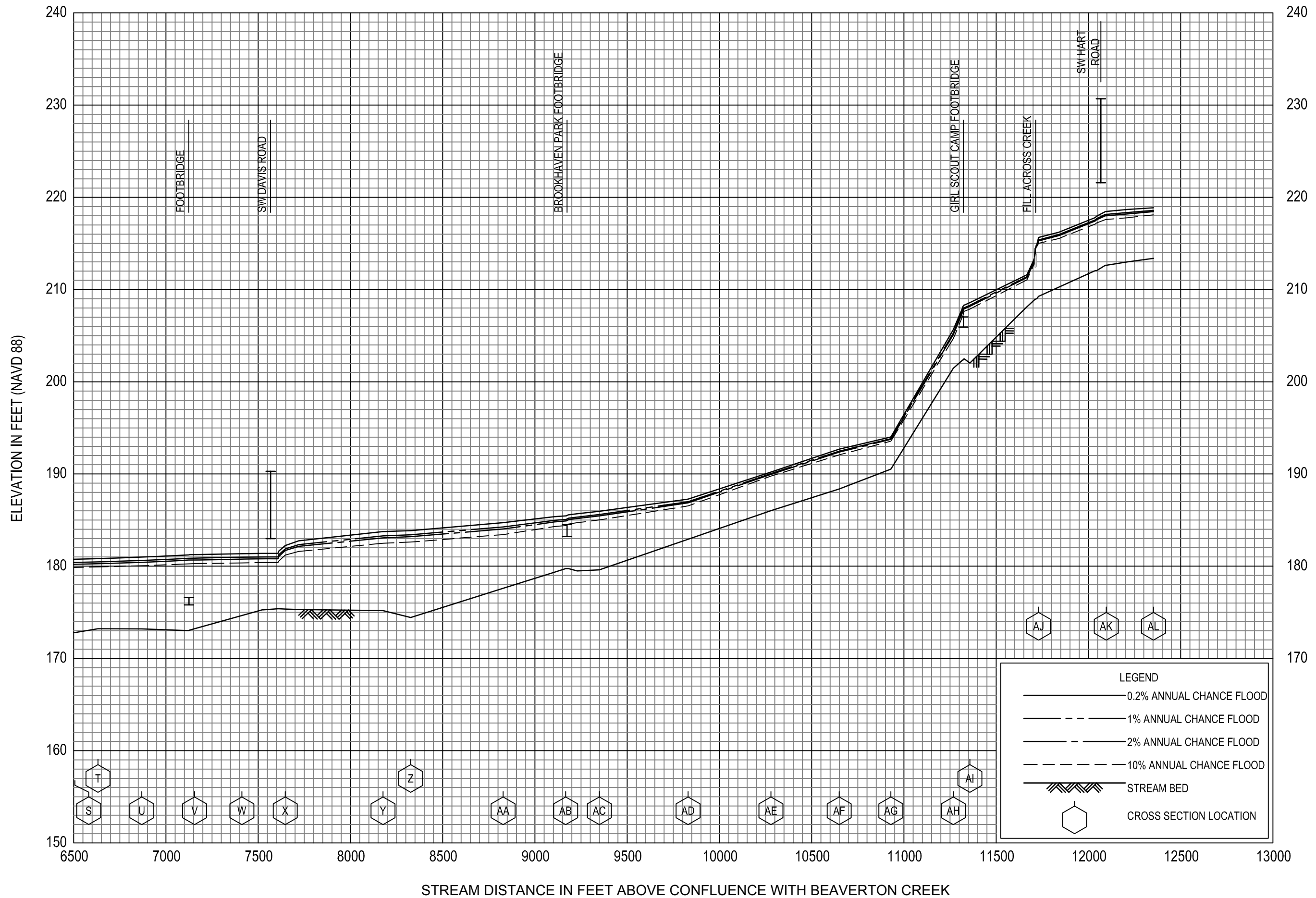
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WASHINGTON COUNTY, OR
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FLOOD PROFILES
ROCK CREEK SOUTH

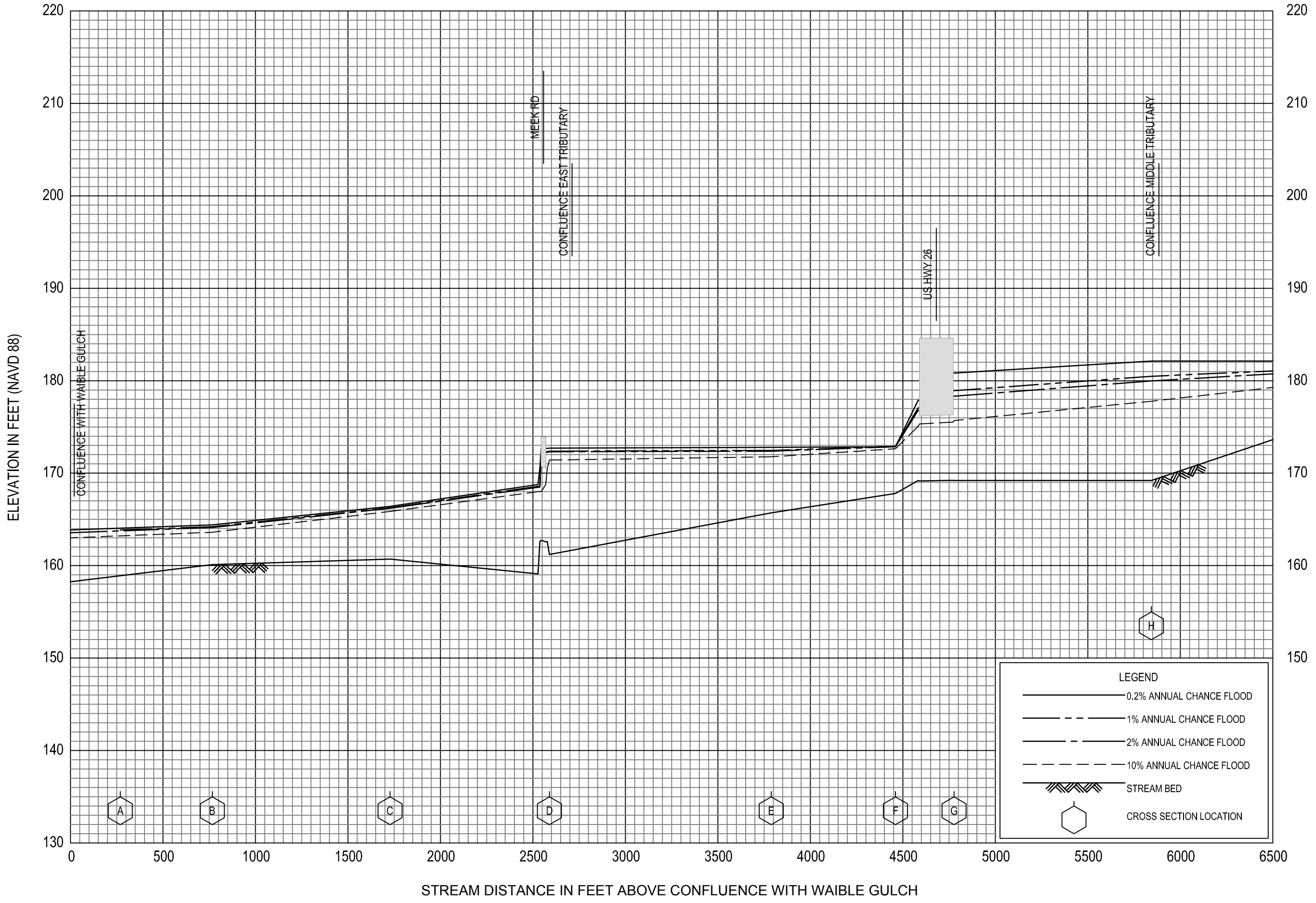
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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

105P



FLOOD PROFILES
SOUTH JOHNSON CREEK

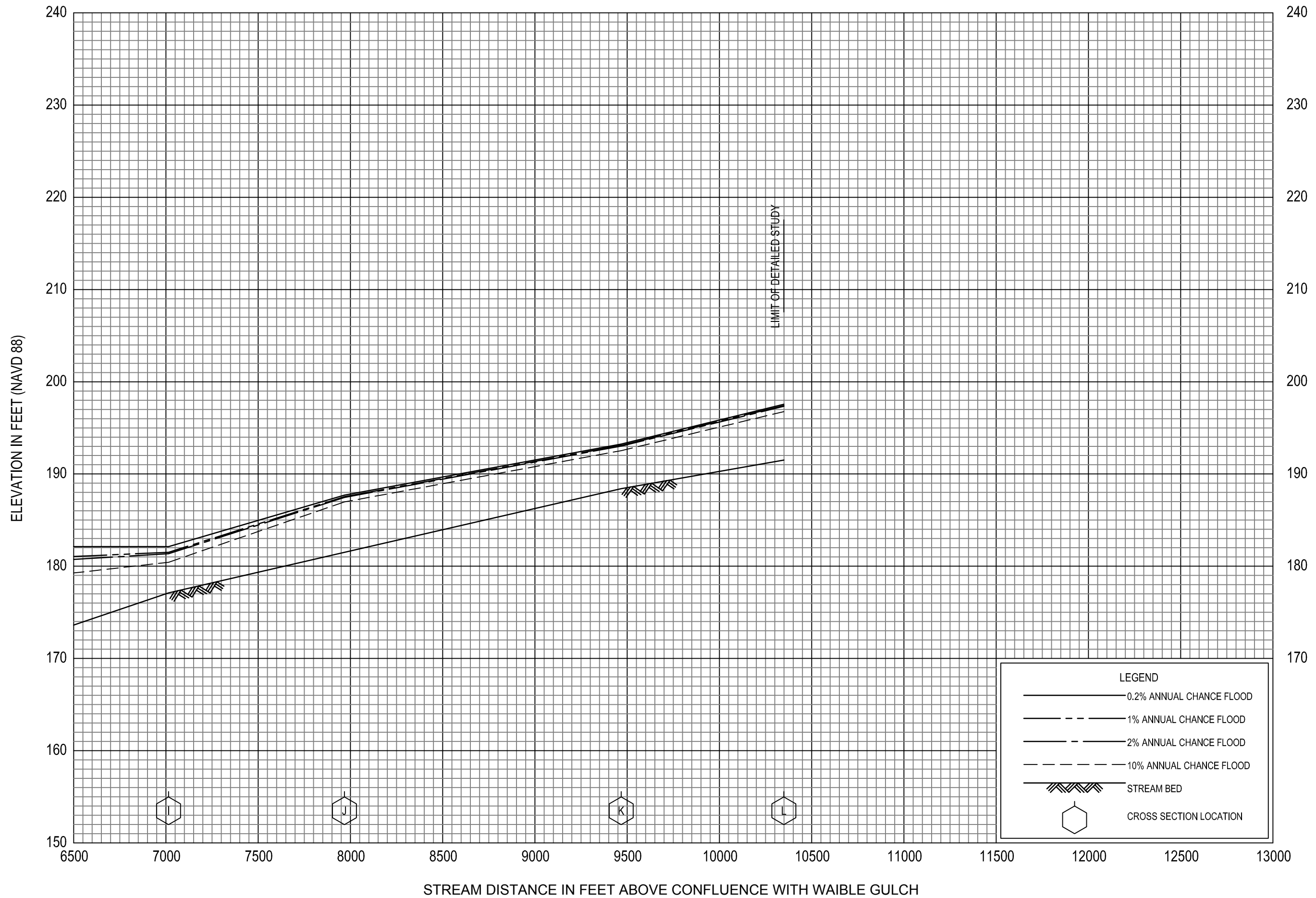
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FLOOD PROFILES

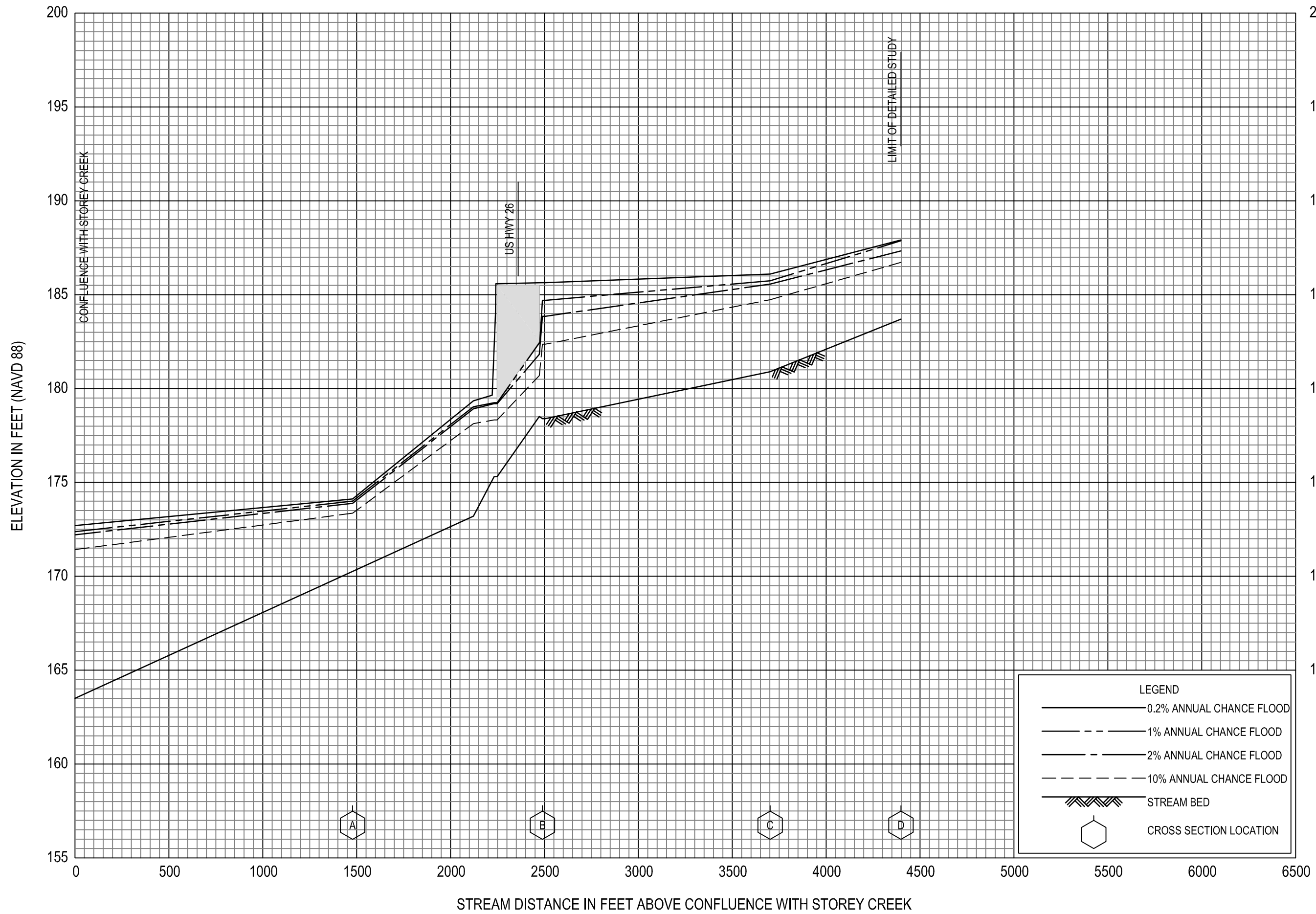
STOREY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES
STOREY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

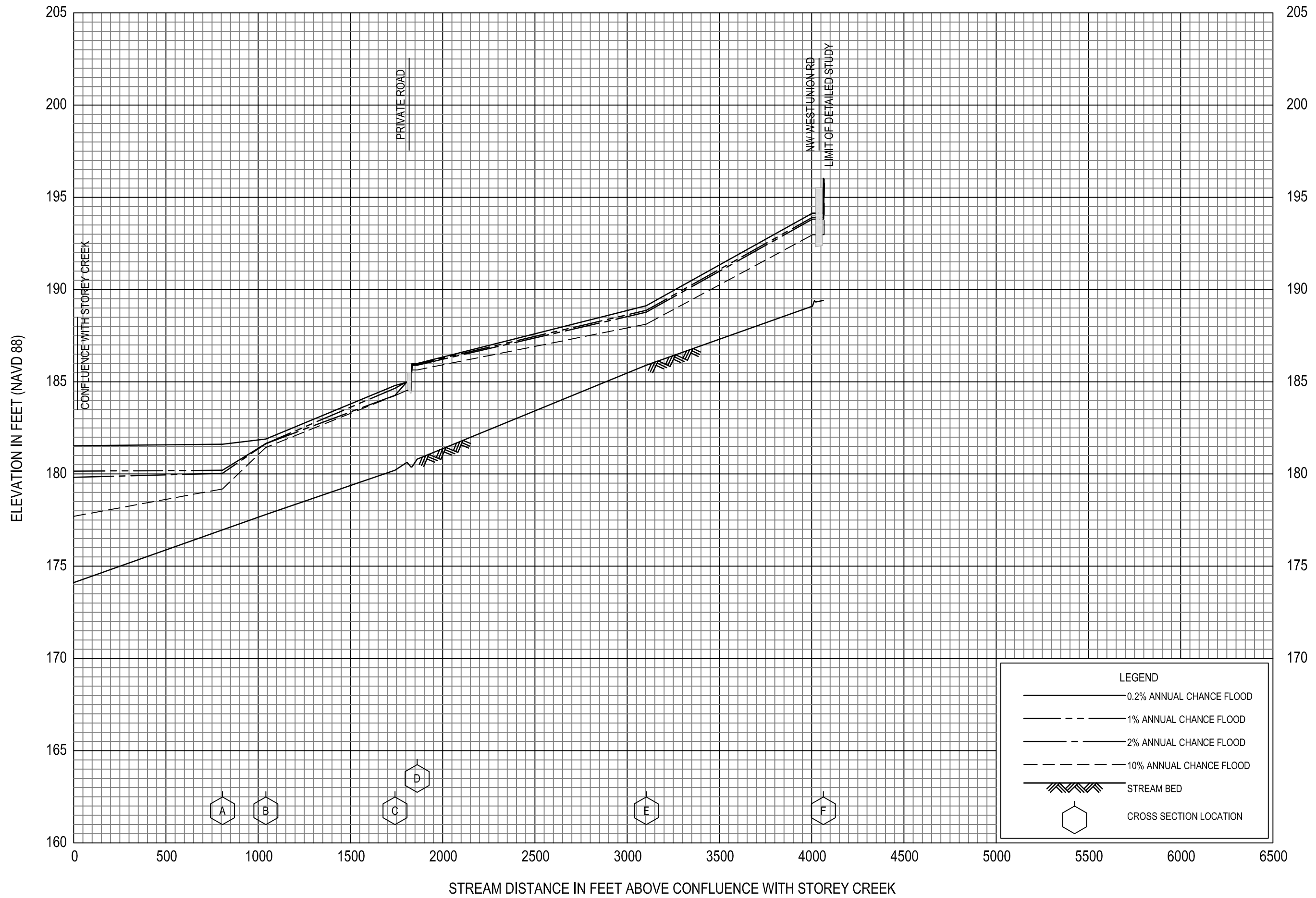


FLOOD PROFILES

STOREY CREEK - EAST TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

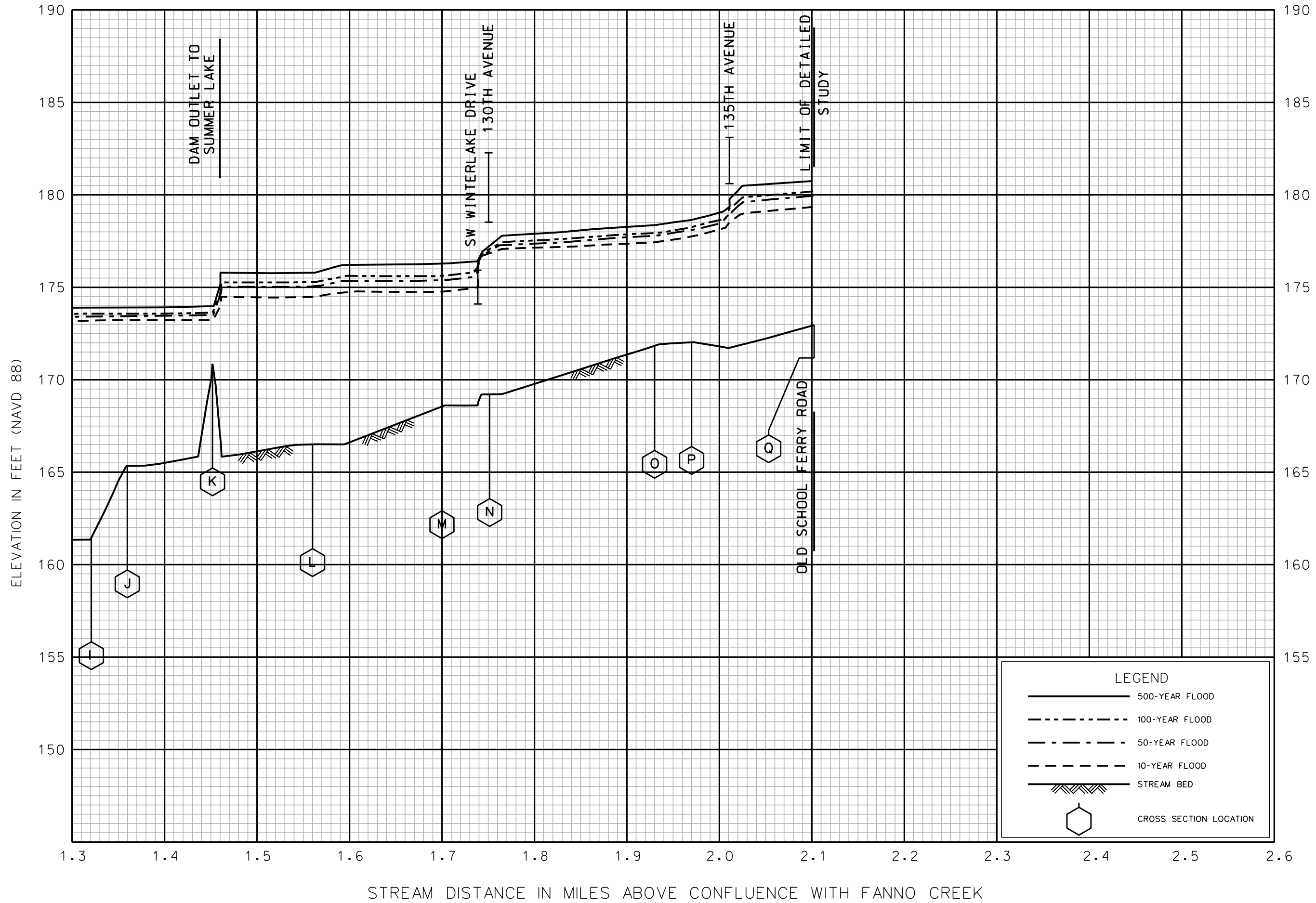
110P



FLOOD PROFILES
STOREY CREEK - MIDDLE TRIBUTARY

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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

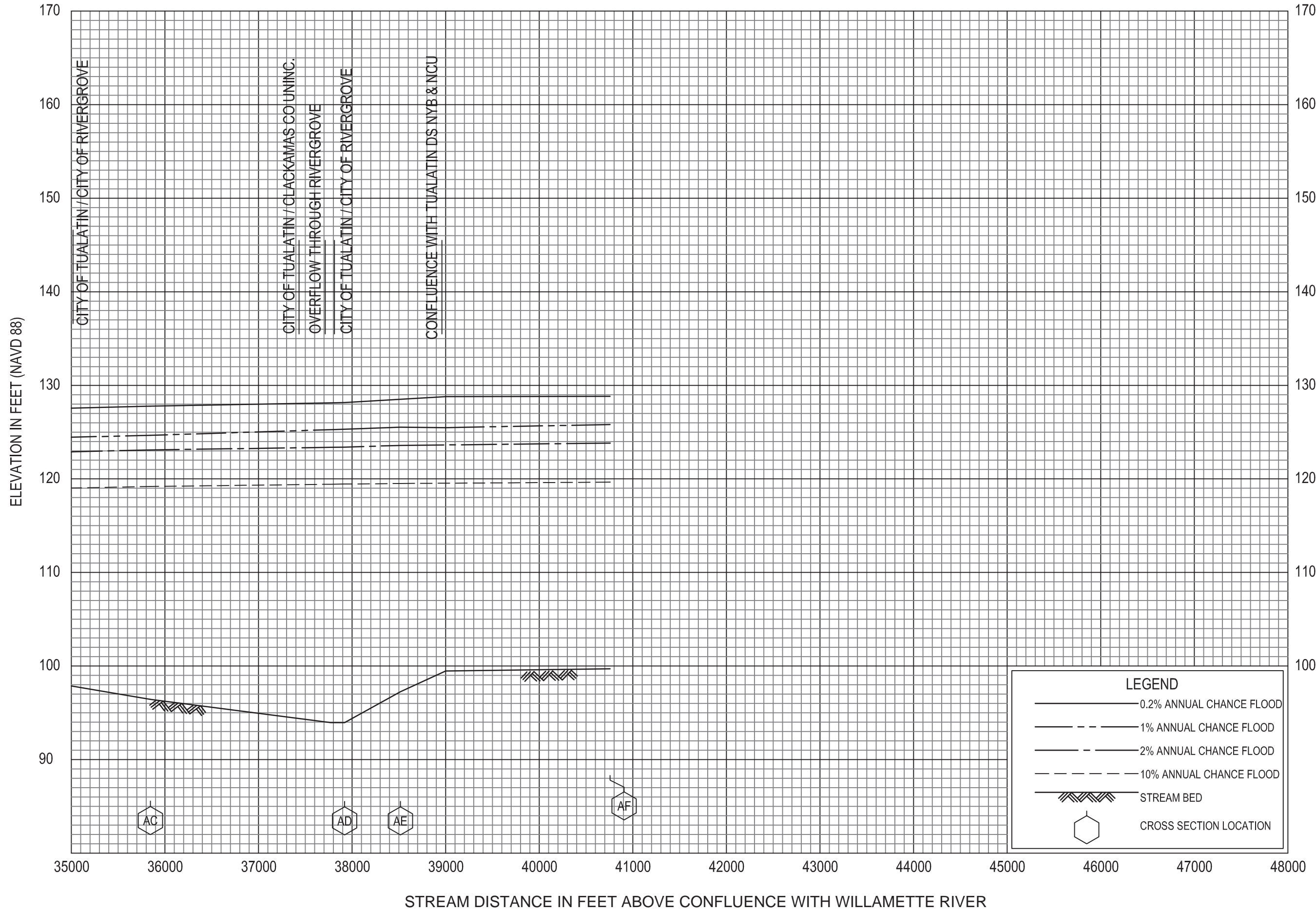
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FLOOD PROFILES
SUMMER CREEK

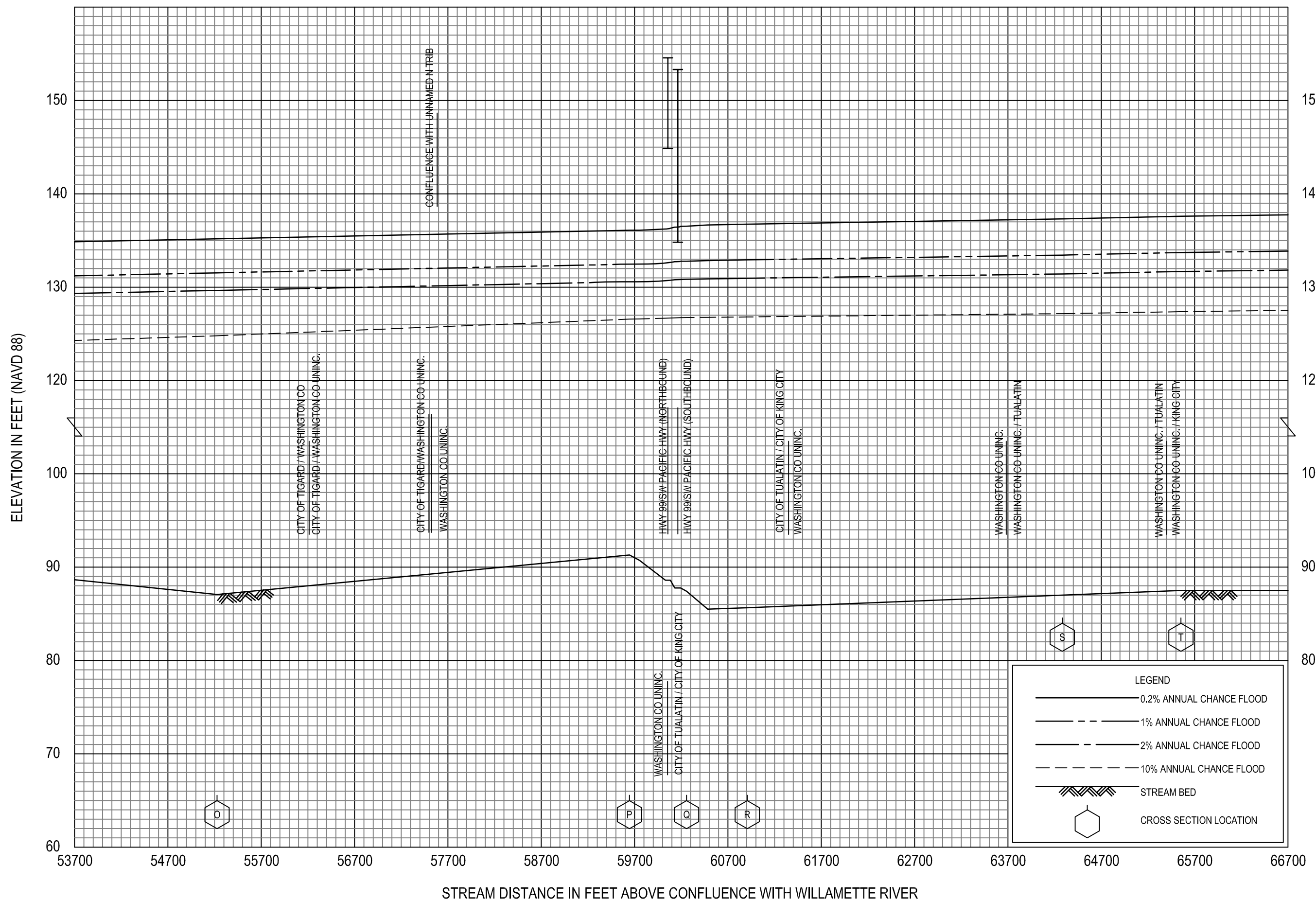
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

113P



FLOOD PROFILES
TUALATIN RIVER (WITHIN CITY OF TUALATIN IN CLACKAMAS COUNTY)

FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

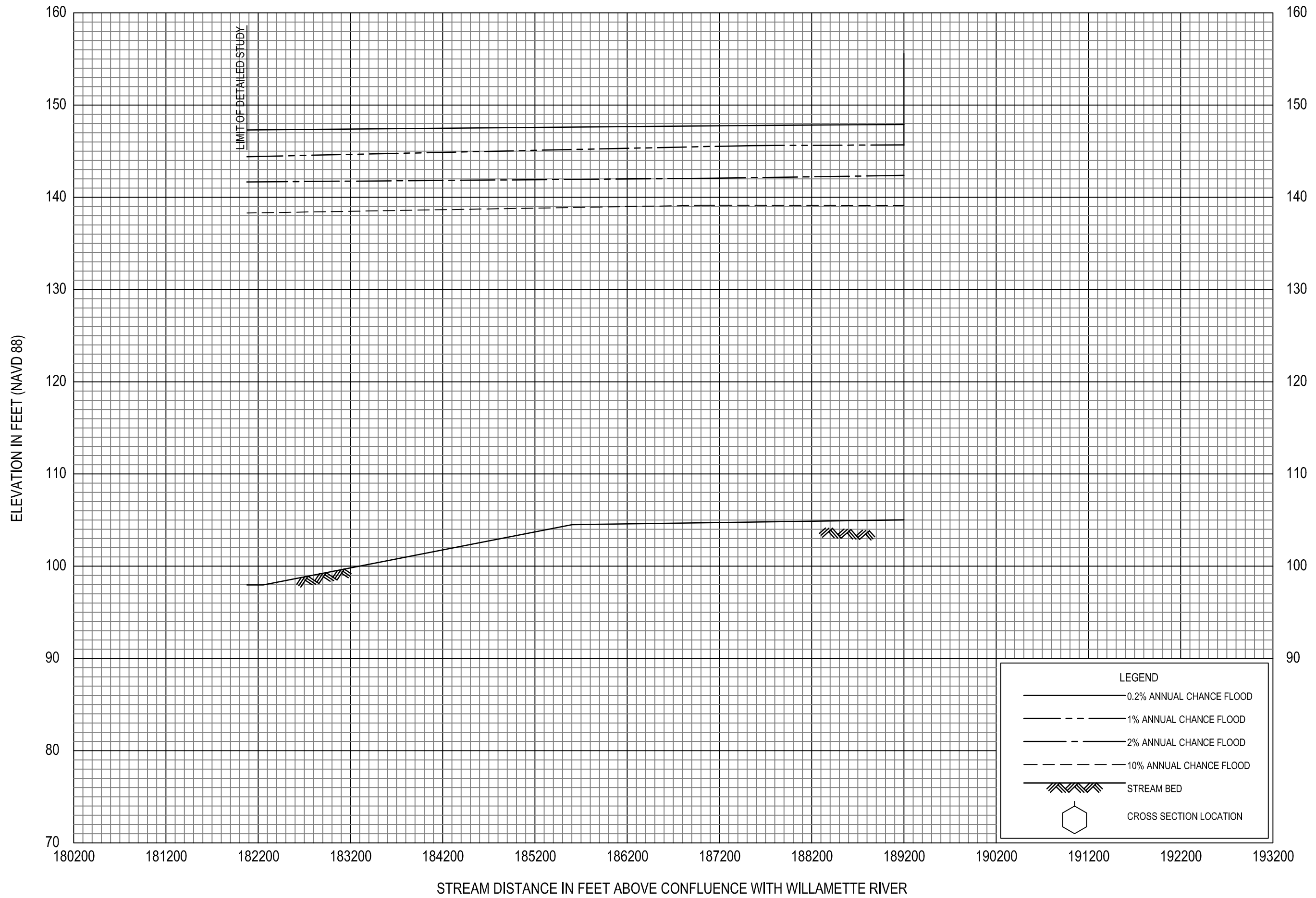


FLOOD PROFILES

TUALATIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS**

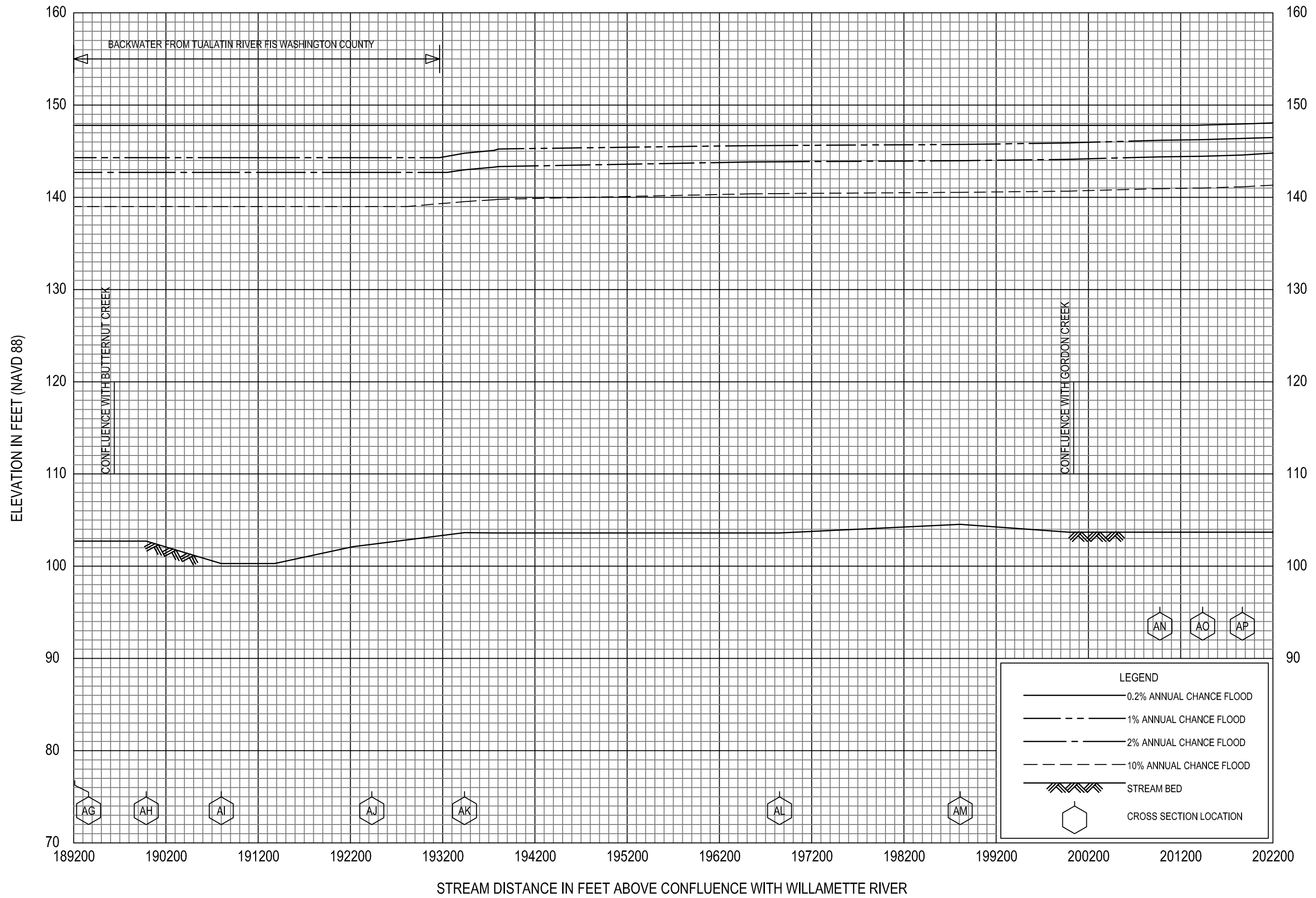
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FLOOD PROFILES
TUALATIN RIVER

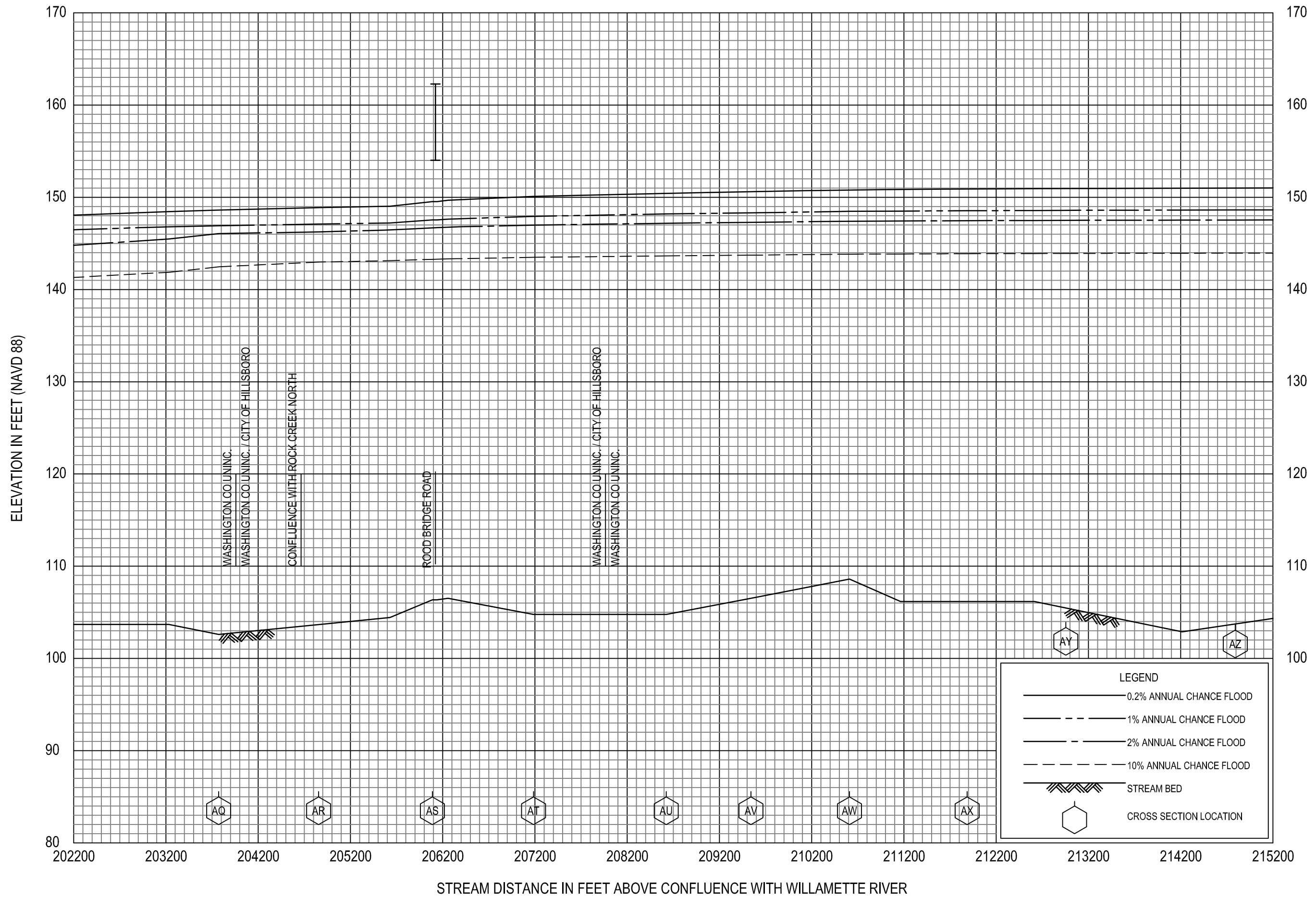
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

119P



FLOOD PROFILES
TUALATIN RIVER

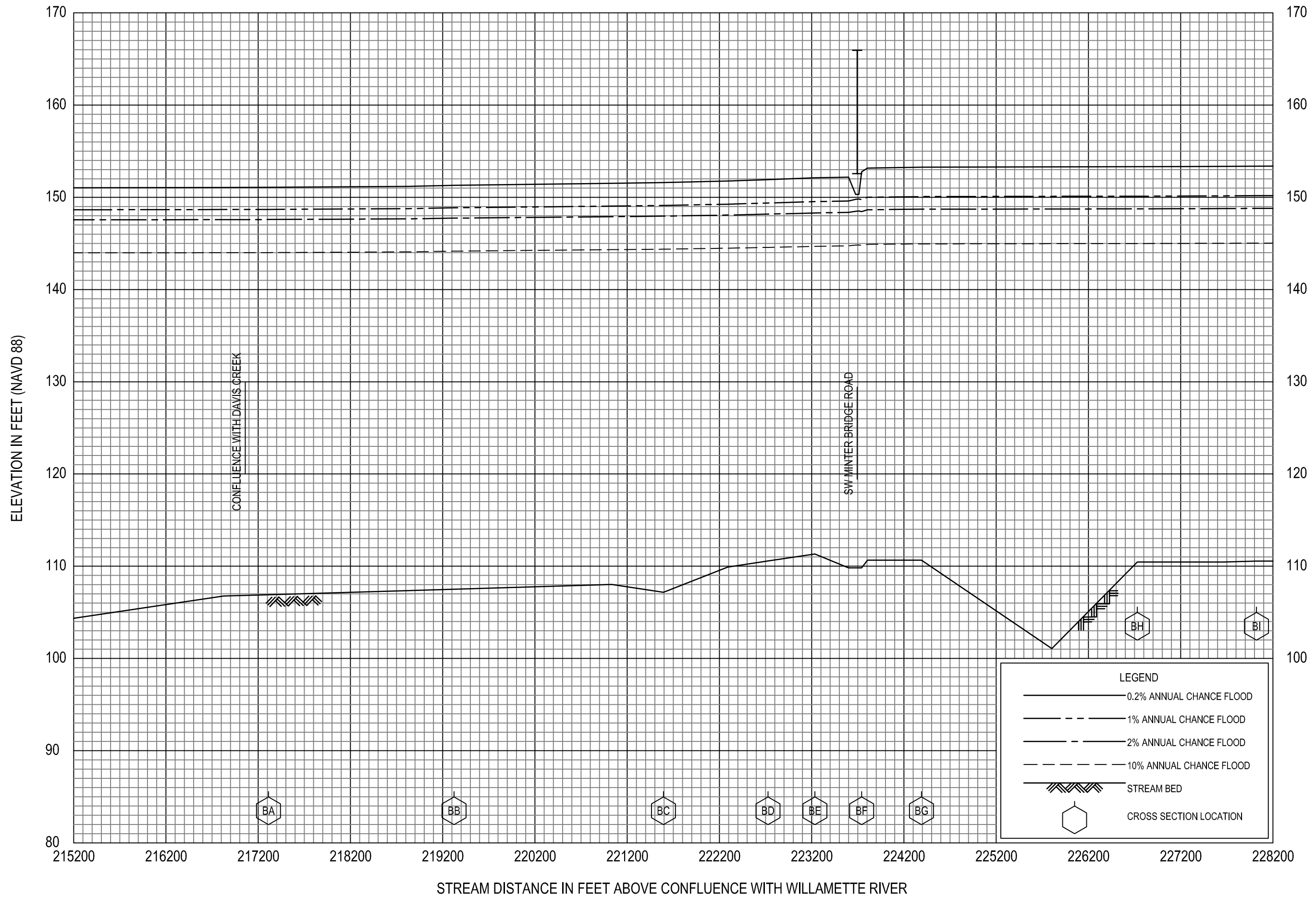
FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**



FLOOD PROFILES
TUALATIN RIVER

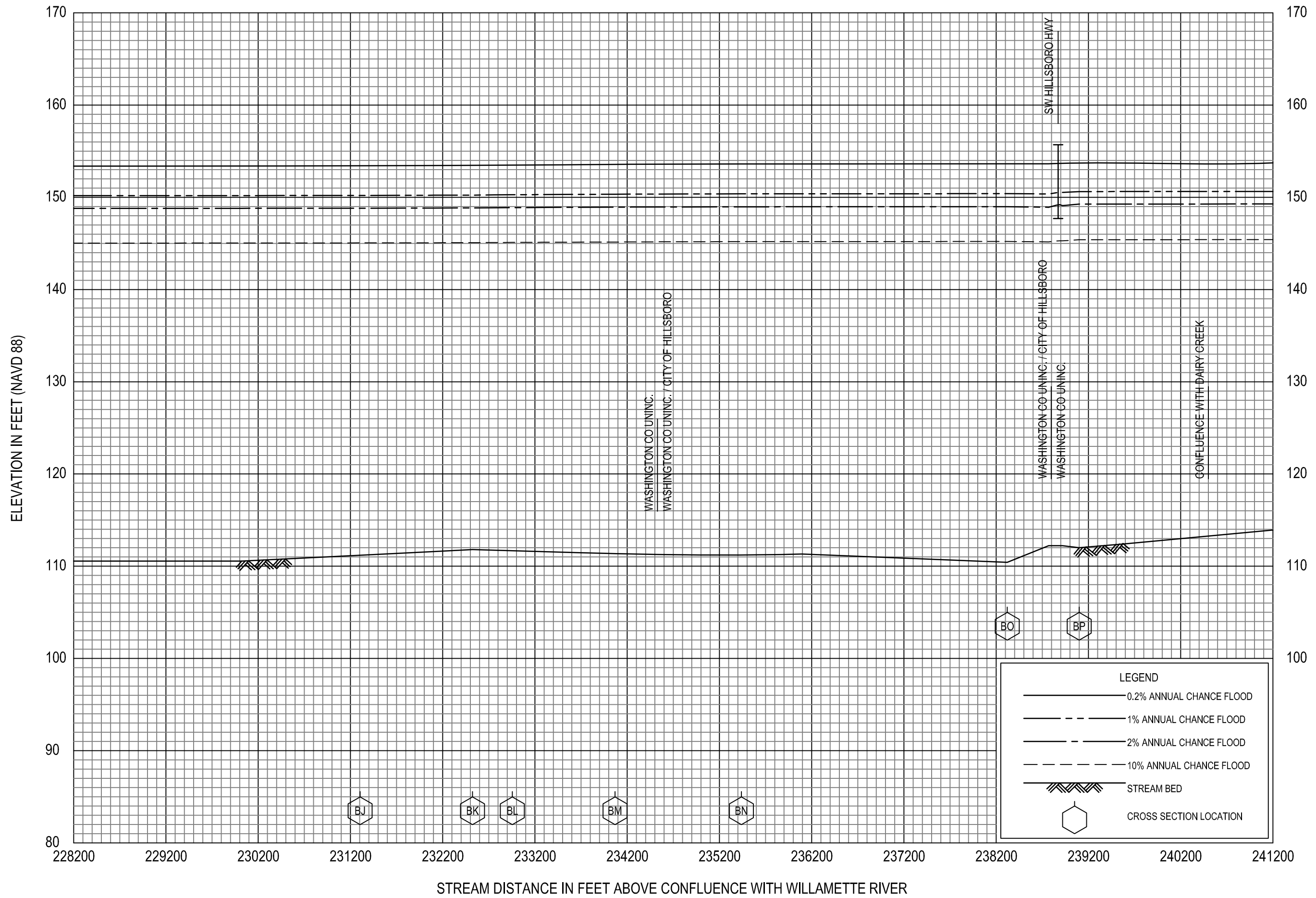
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

121P



FLOOD PROFILES
TUALATIN RIVER

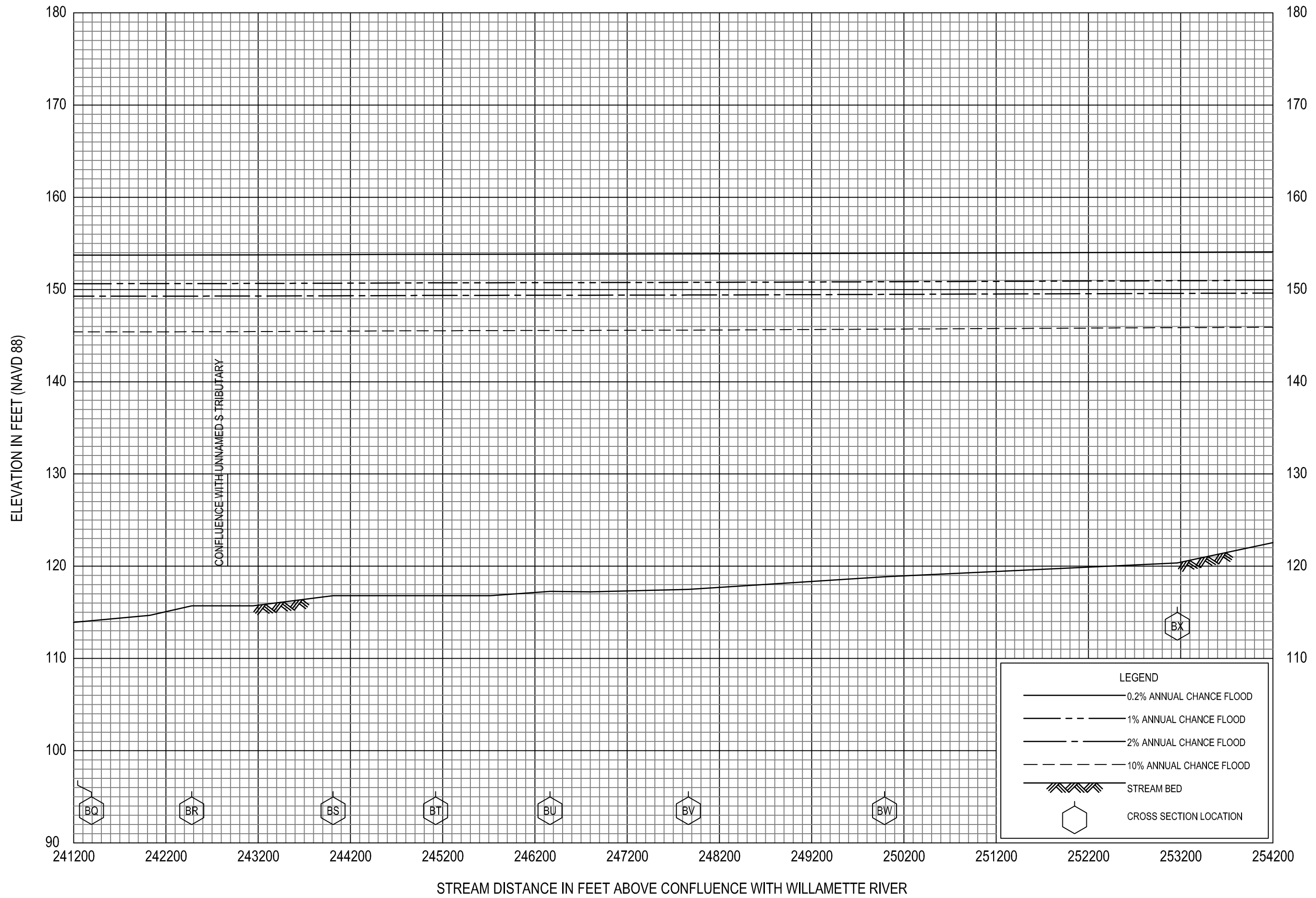
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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**



FLOOD PROFILES

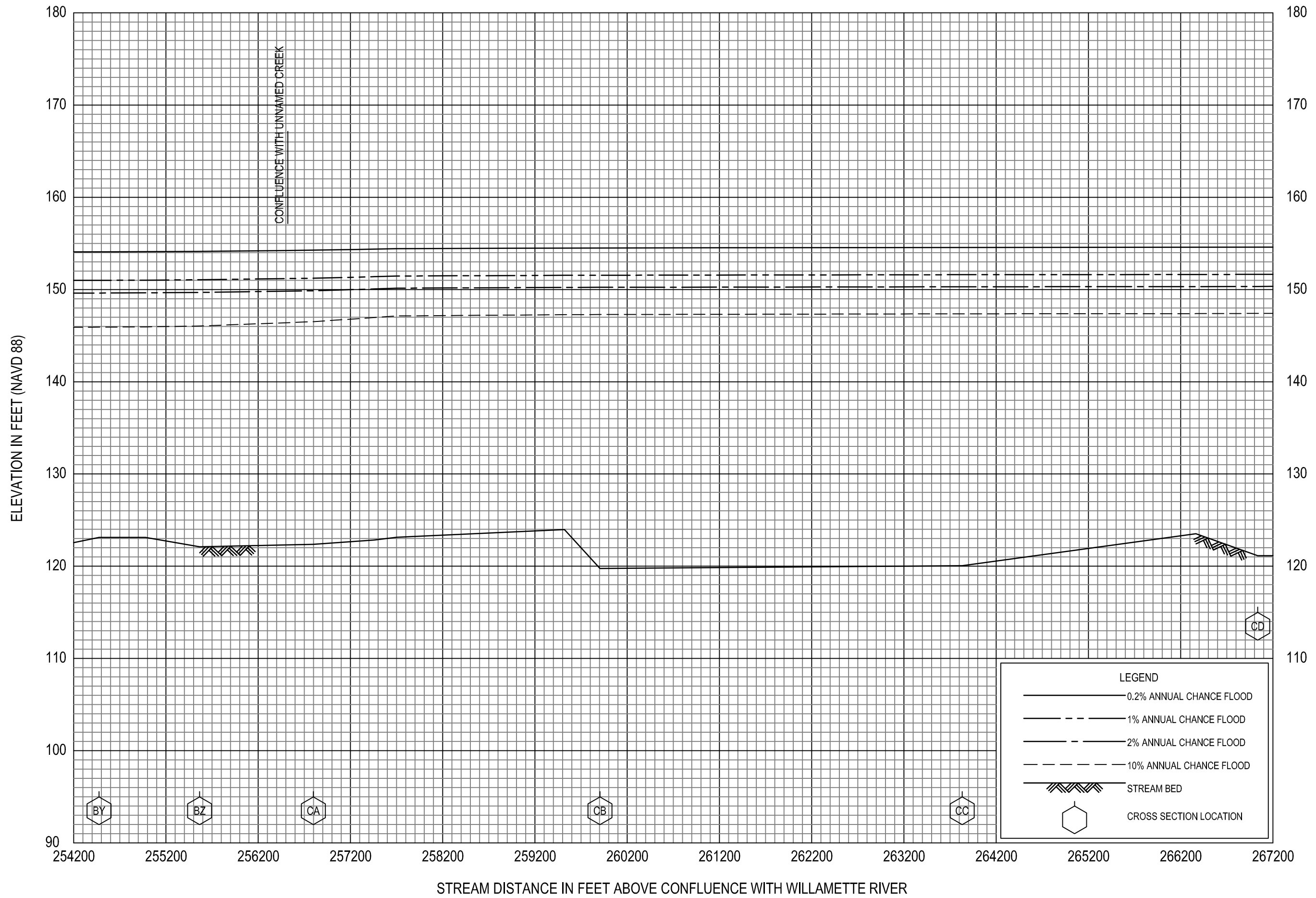
TUALATIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES
TUALATIN RIVER

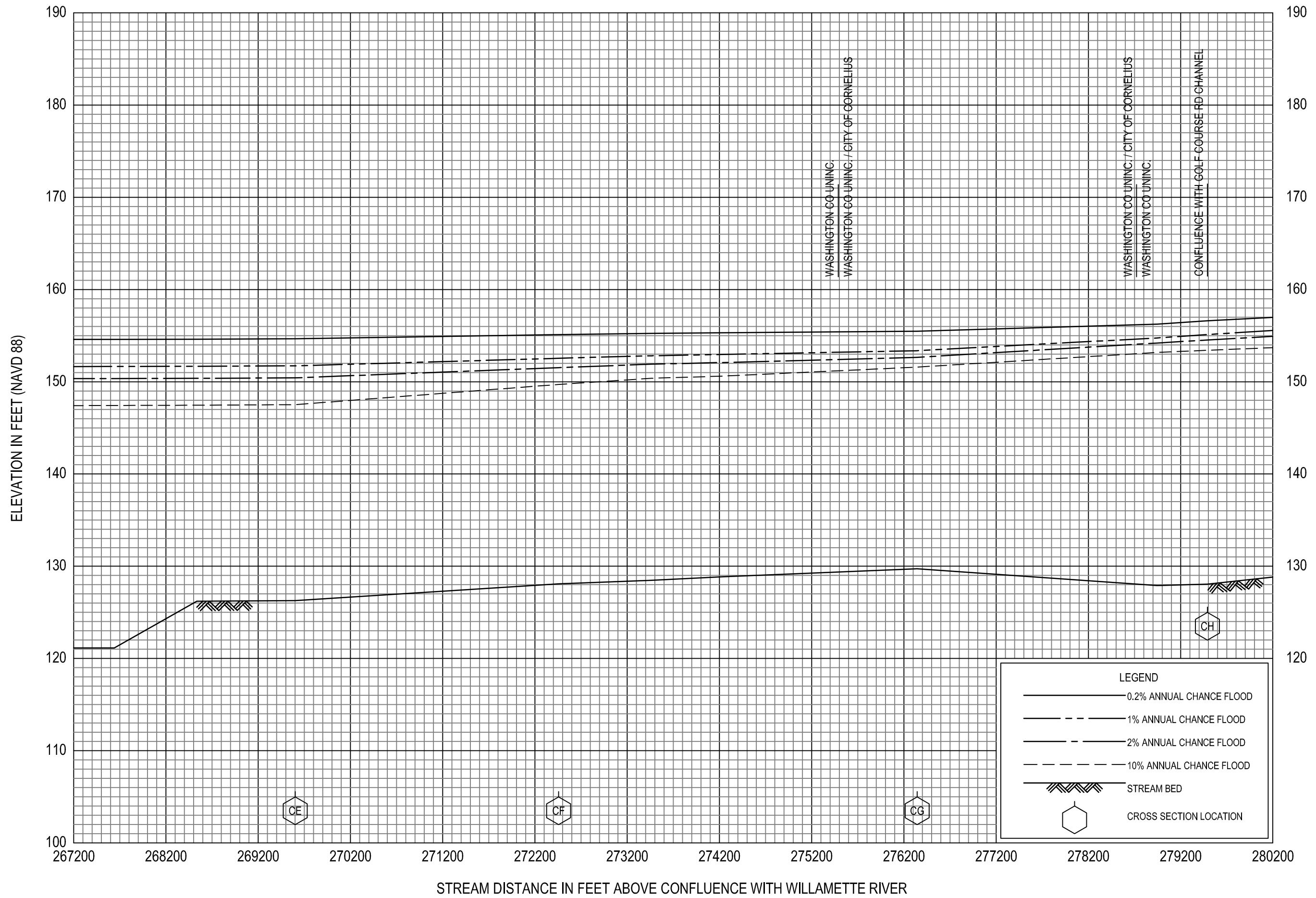
FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**



FLOOD PROFILES

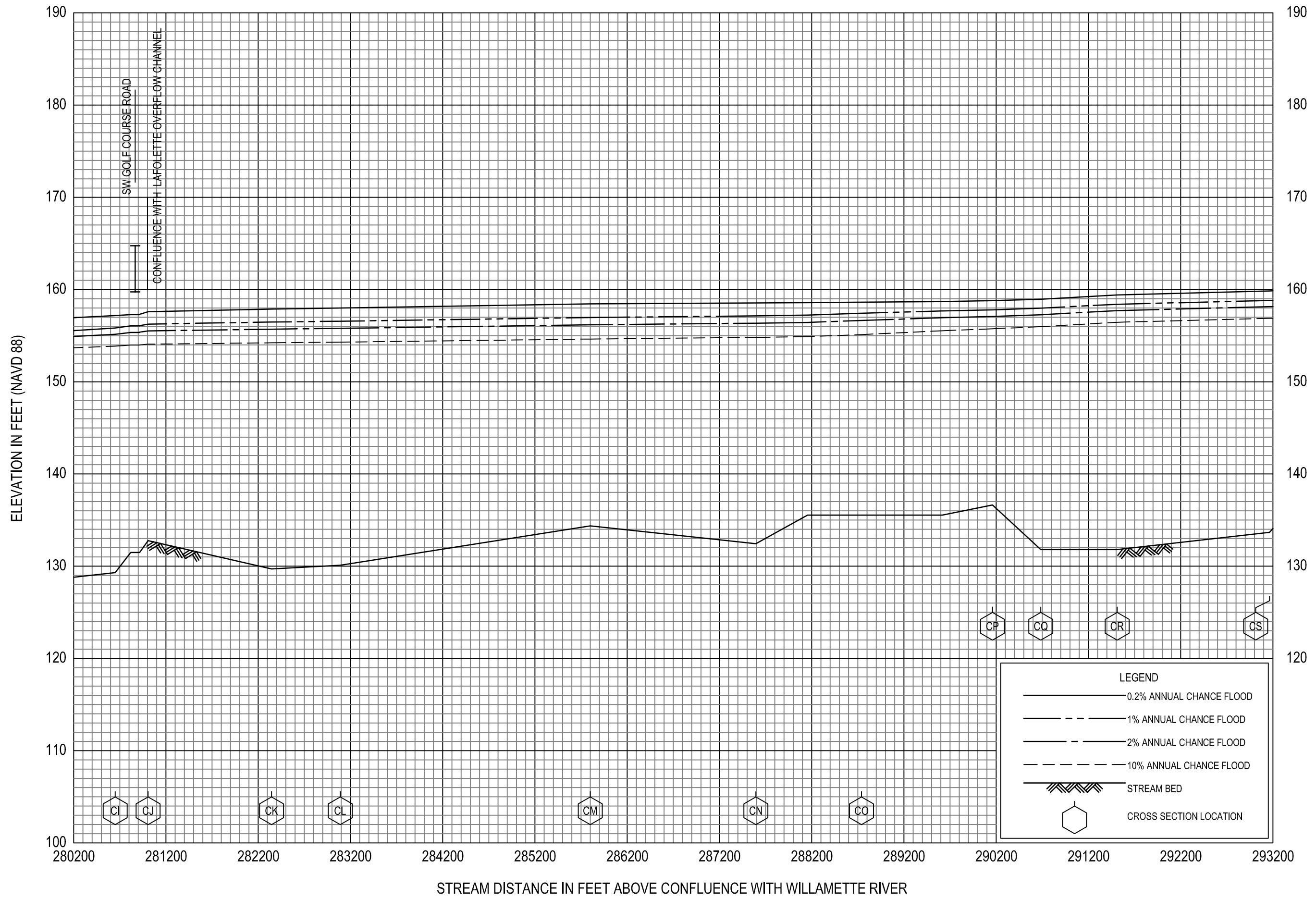
TUALATIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES
TUALATIN RIVER

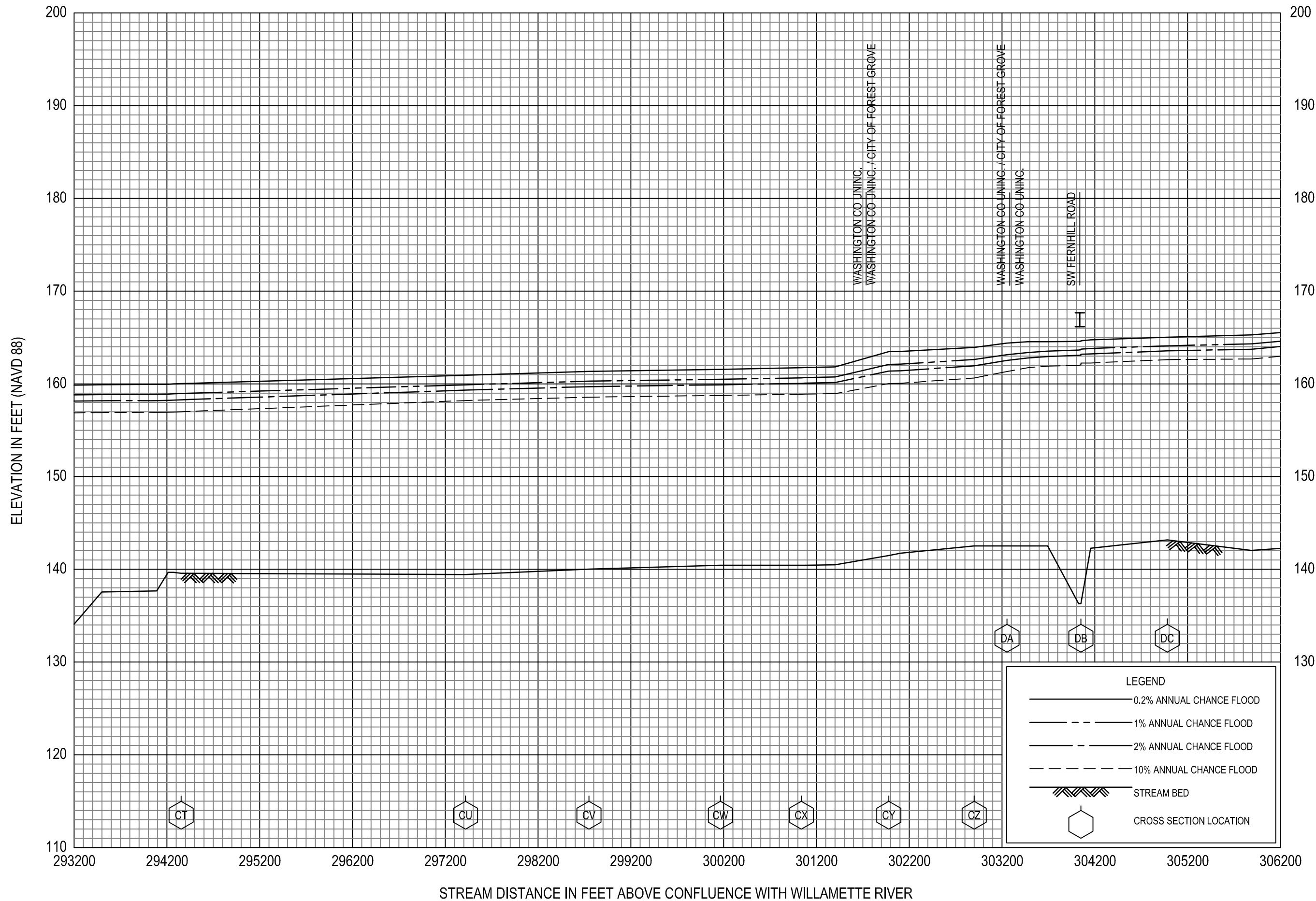
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES

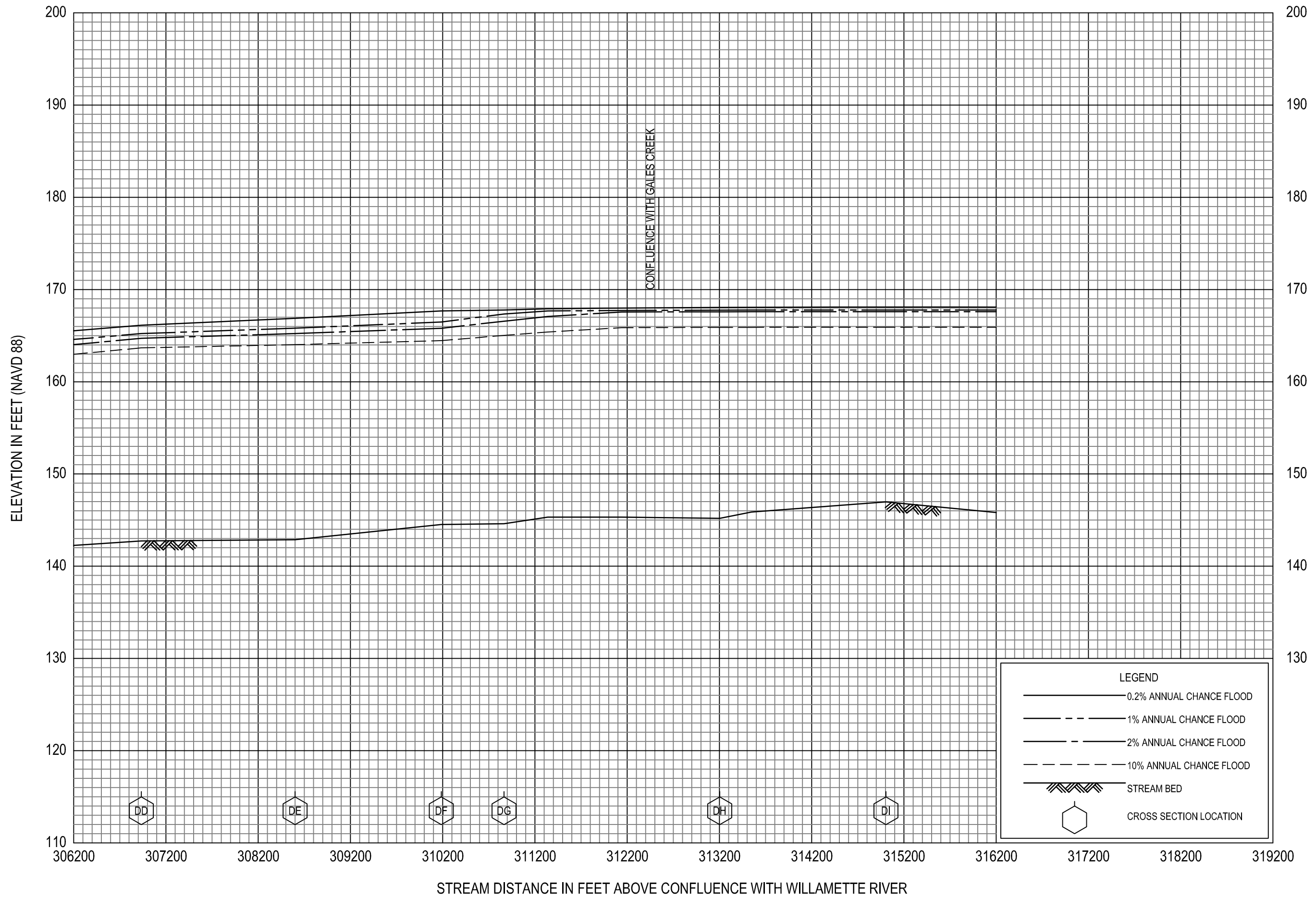
TUALATIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES
TUALATIN RIVER

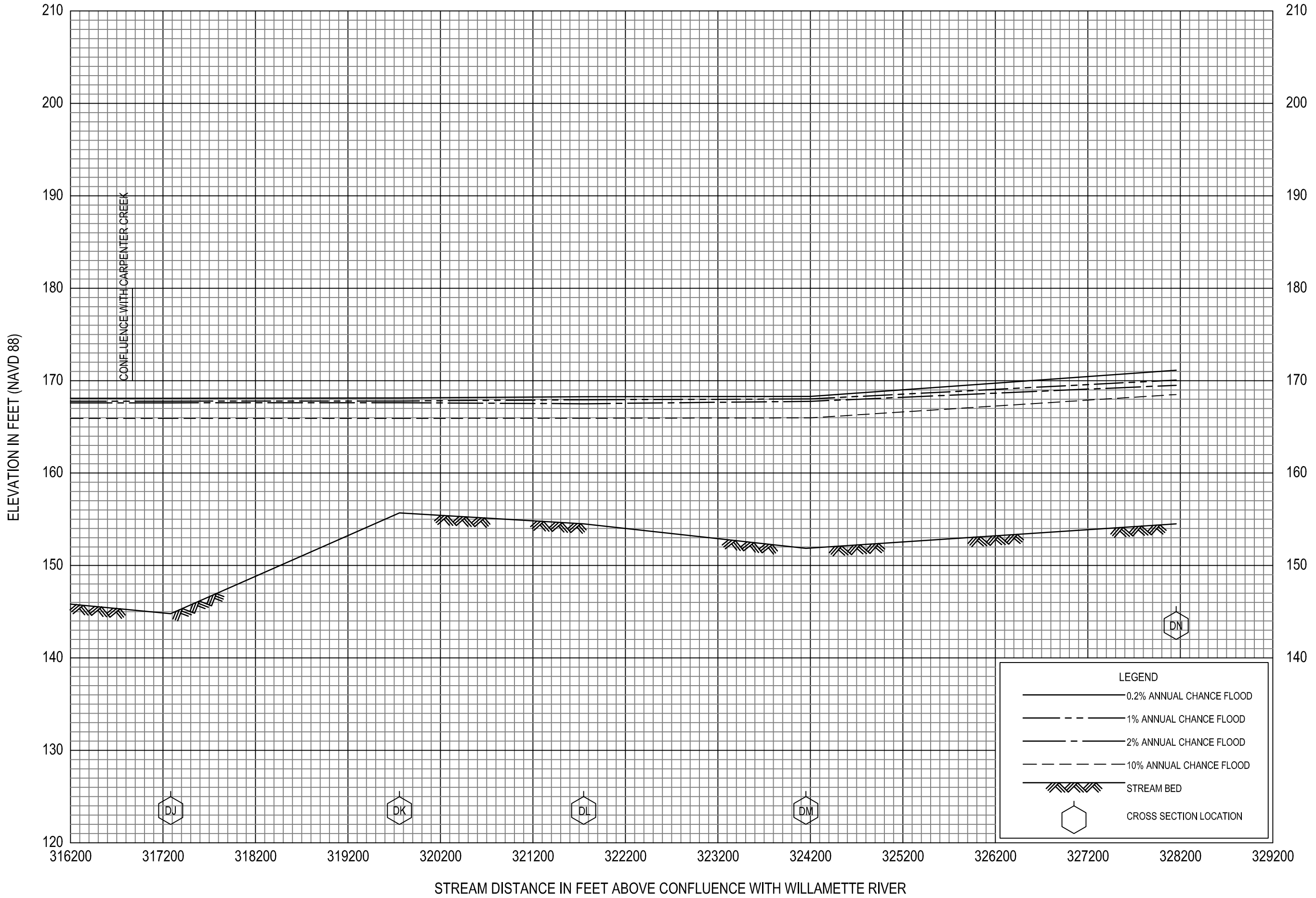
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES

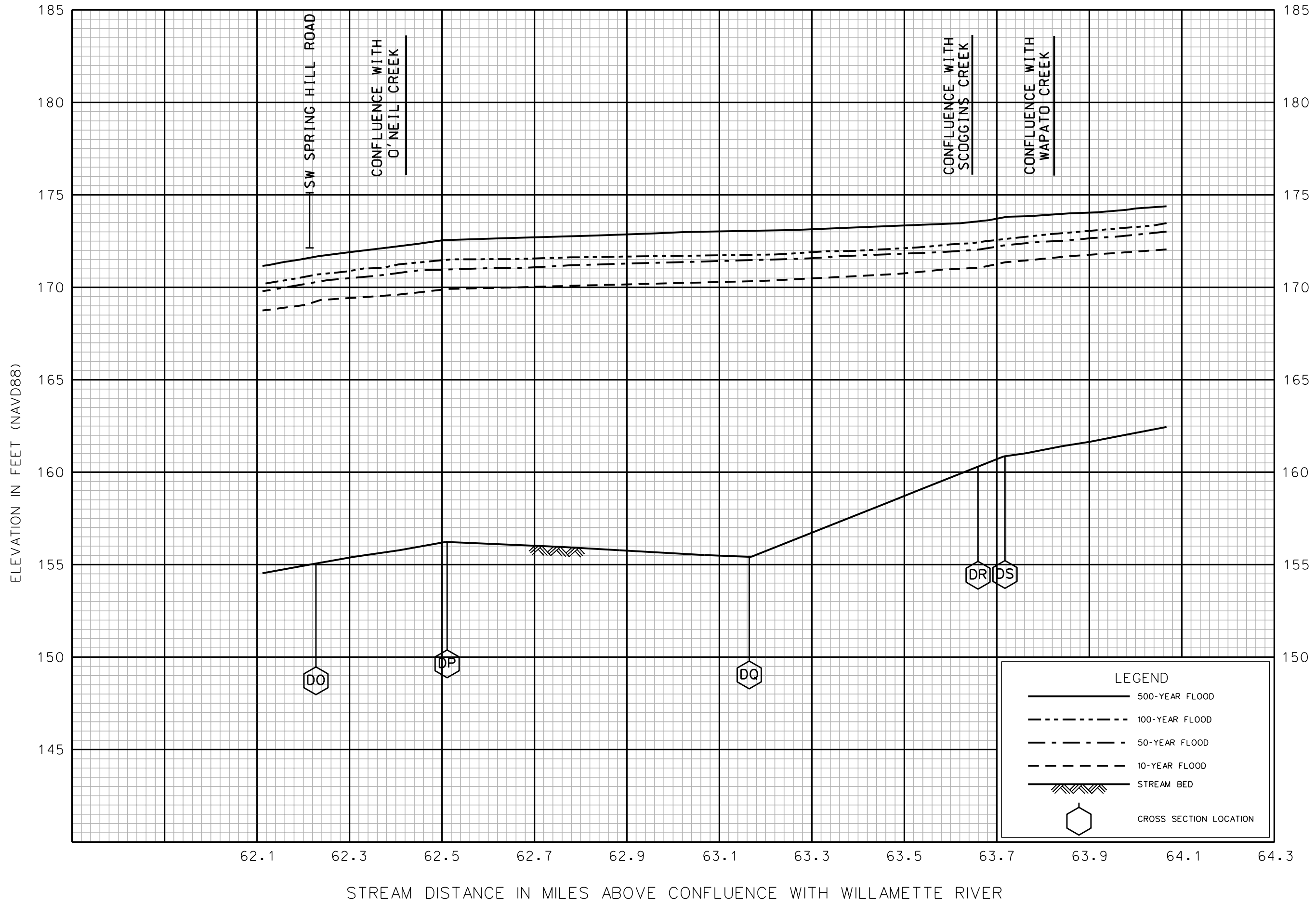
TUALATIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS



FLOOD PROFILES
TUALATIN RIVER

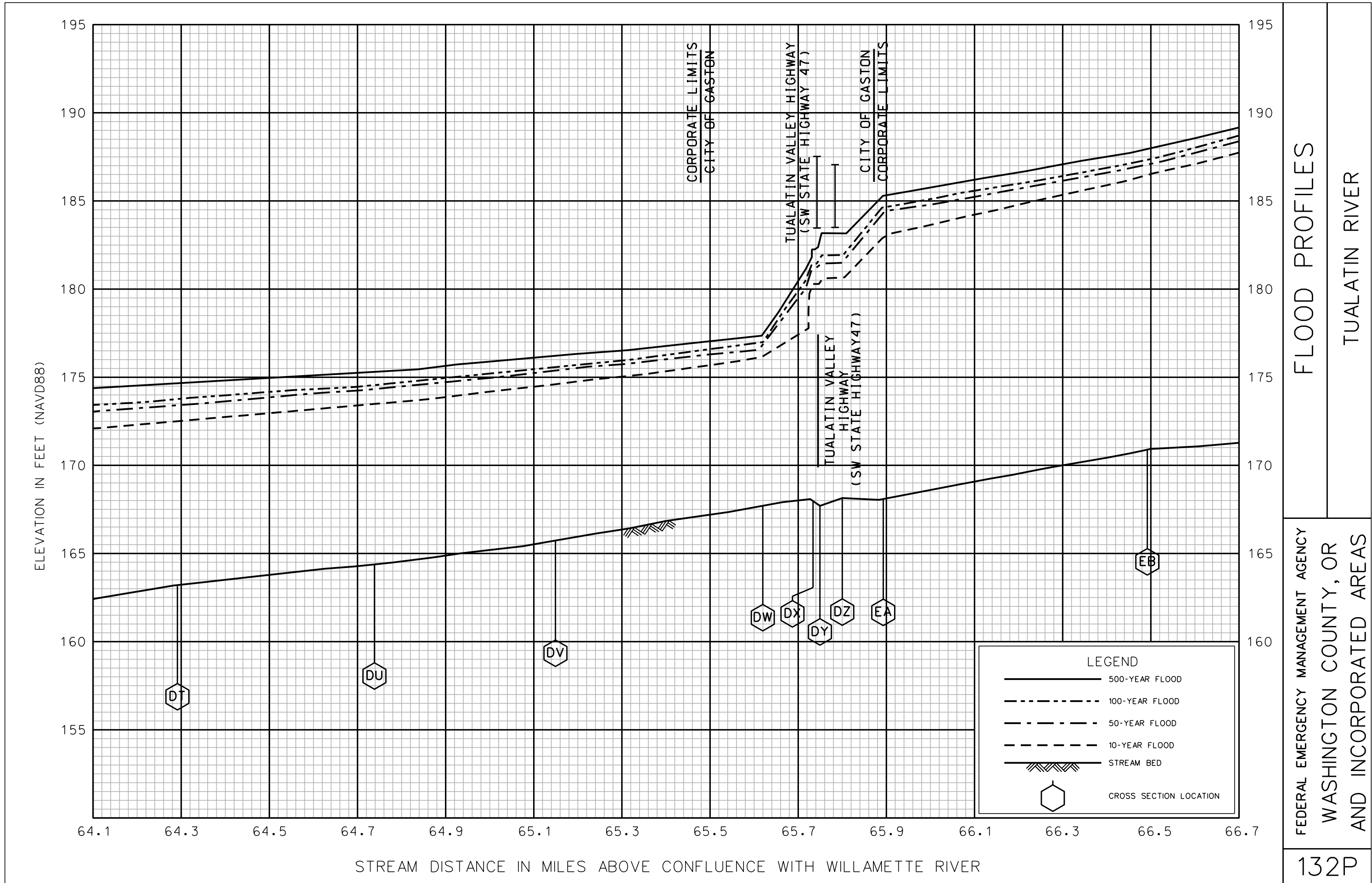
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

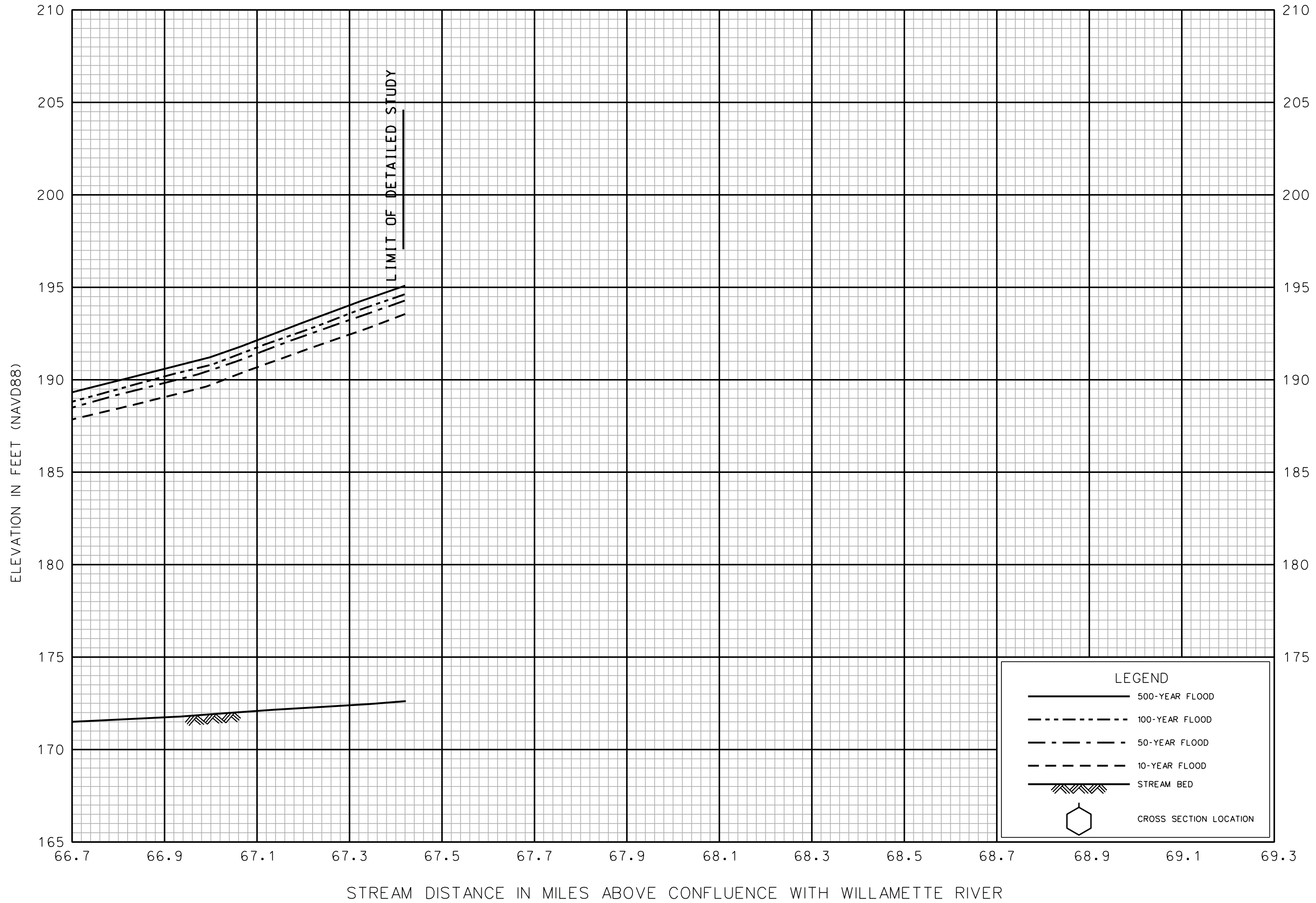


FLOOD PROFILES

TUALATIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

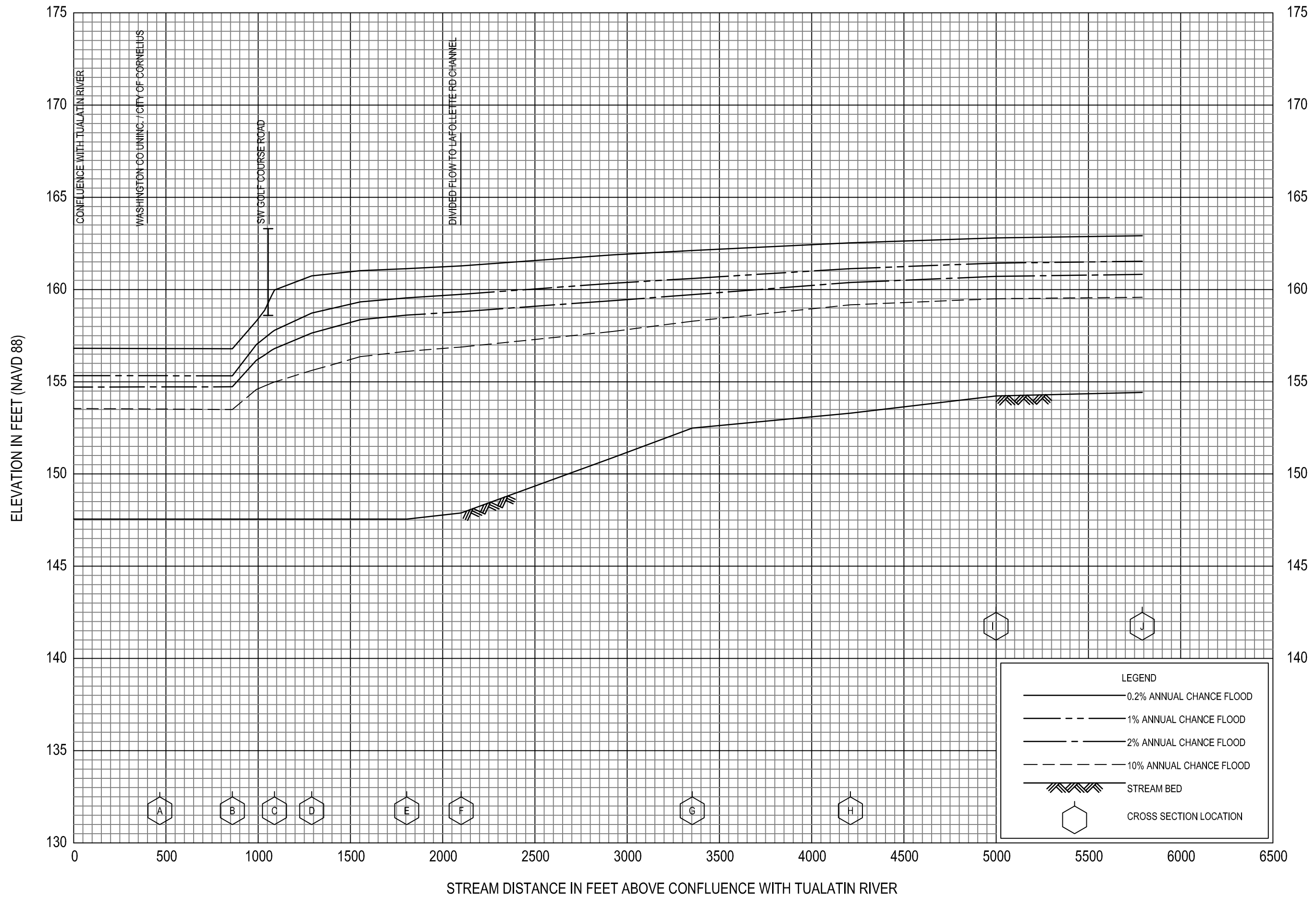




FLOOD PROFILES
TUALATIN RIVER

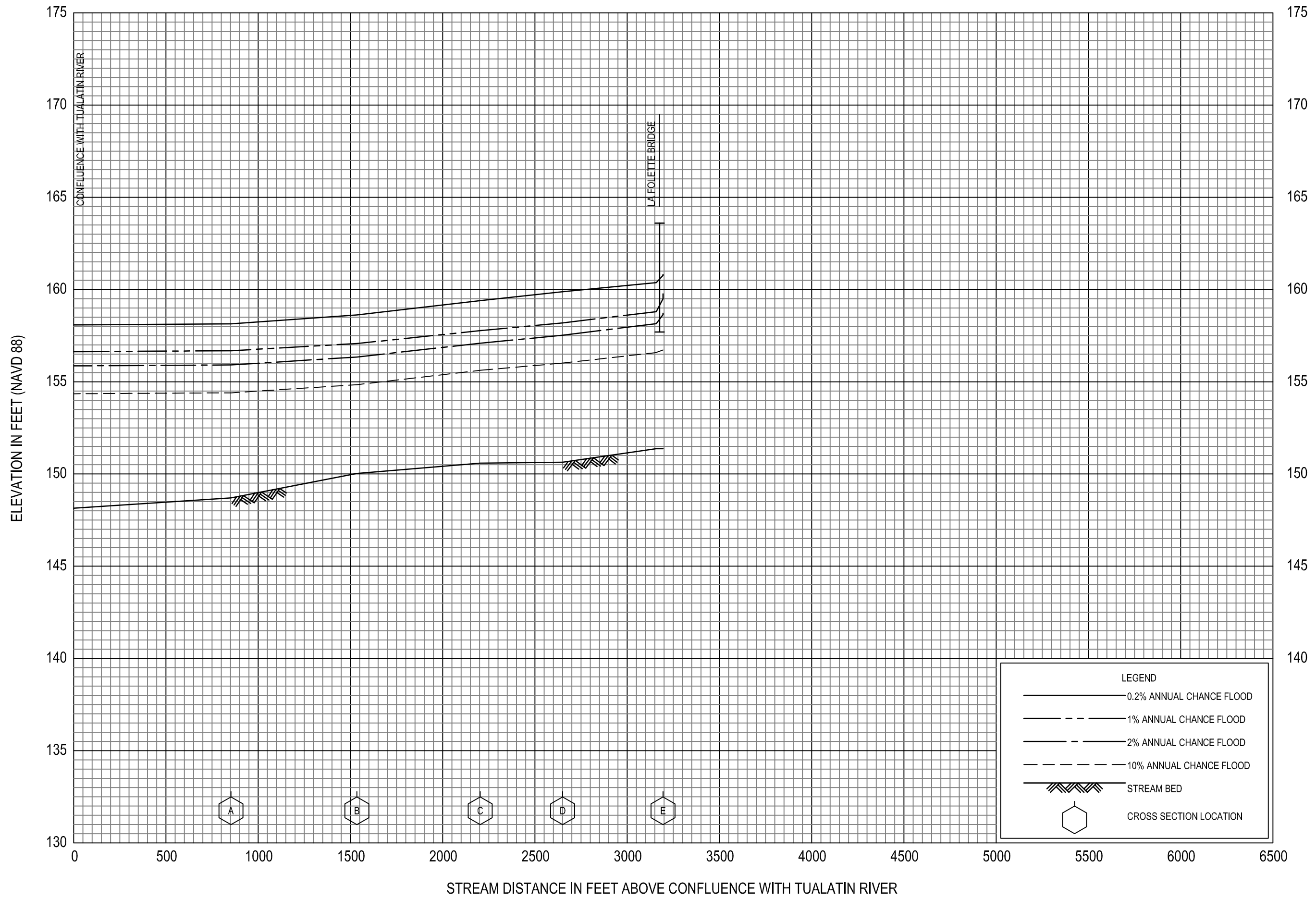
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
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FLOOD PROFILES
TUALATIN RIVER - GOLF COURSE OVERFLOW

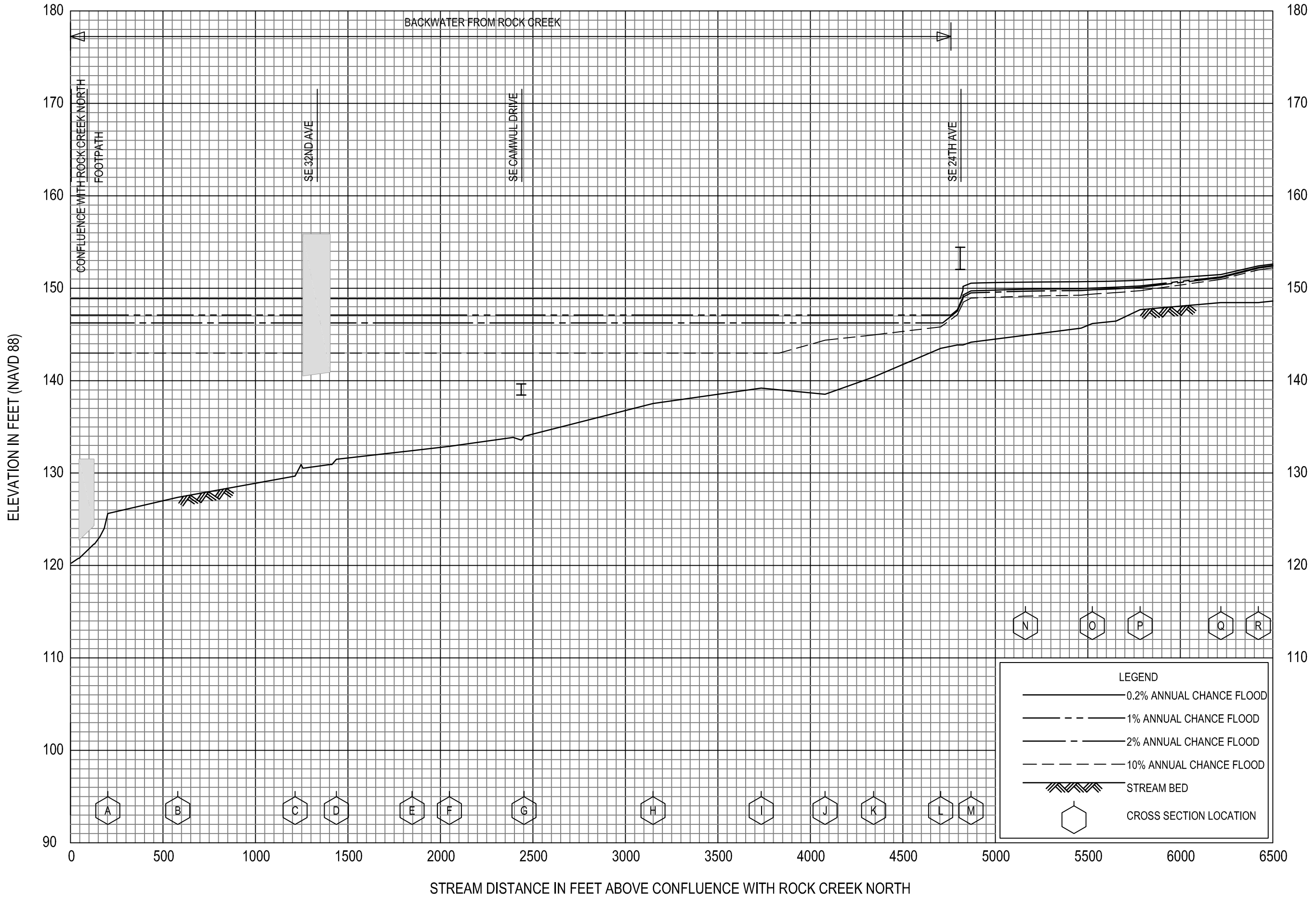
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**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**



FLOOD PROFILES
TUALATIN RIVER - LA FOLETTE OVERFLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

135P

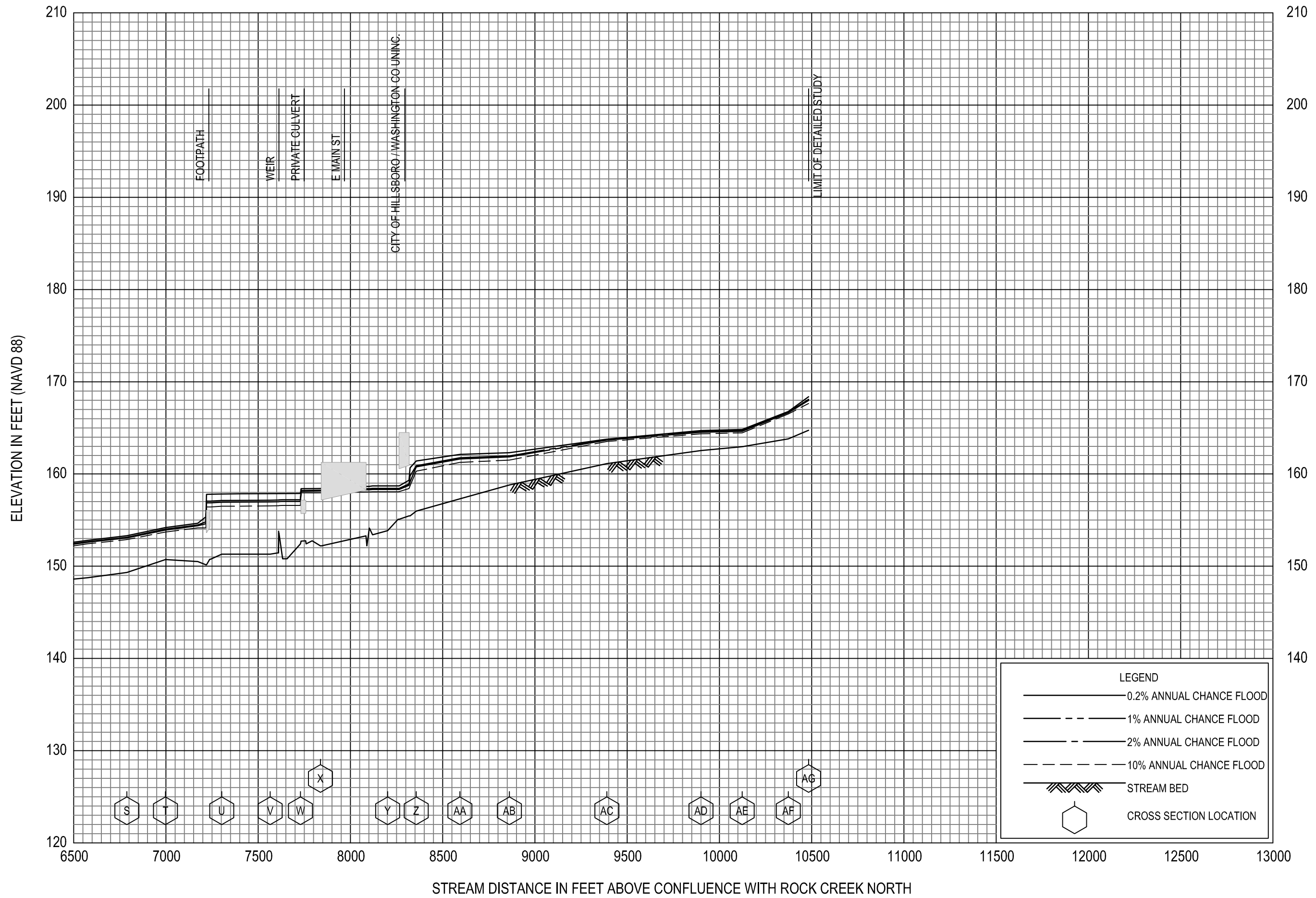


FLOOD PROFILES

TURNER CREEK

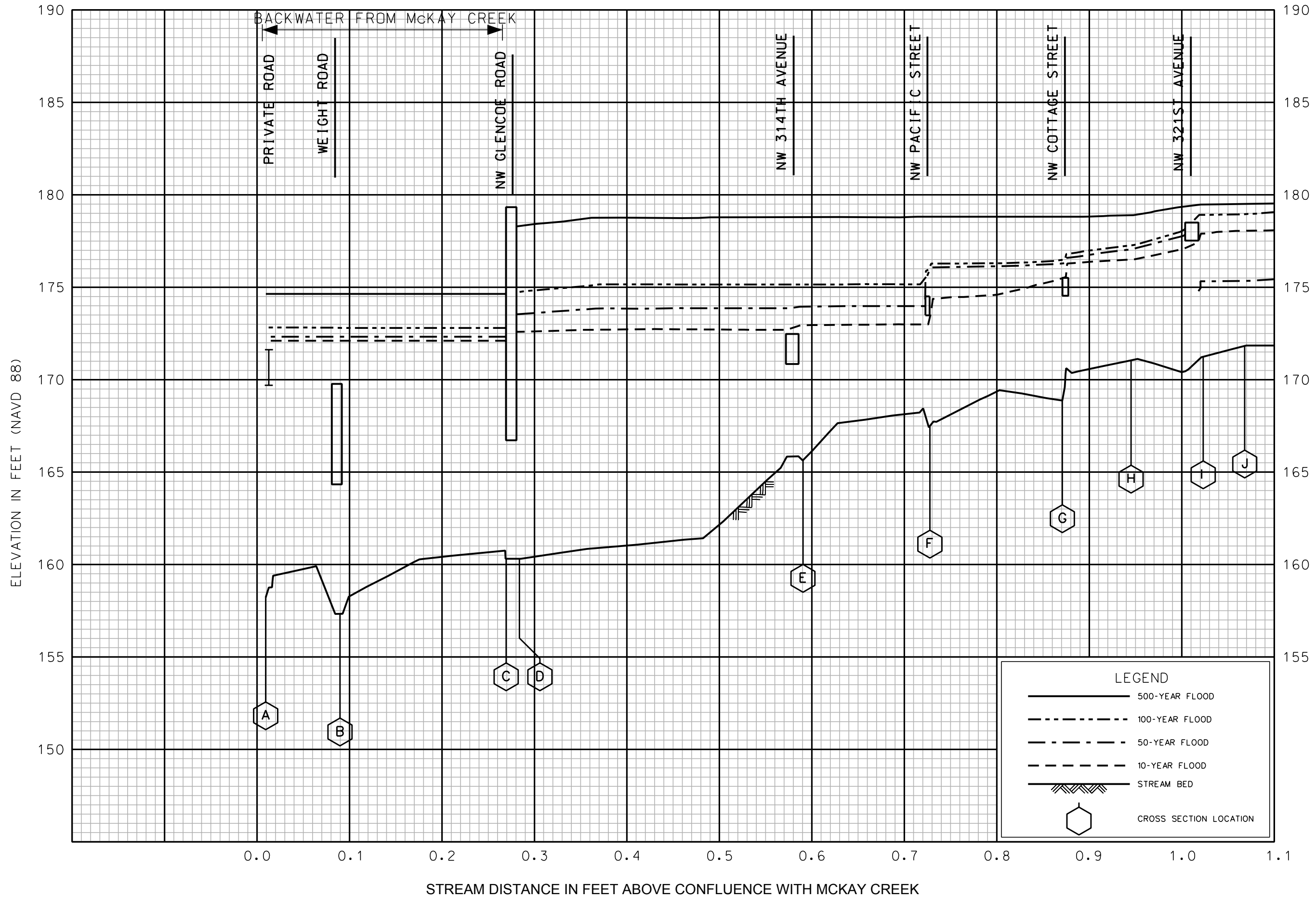
FEDERAL EMERGENCY MANAGEMENT AGENCY
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136P



FLOOD PROFILES
TURNER CREEK

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WASHINGTON COUNTY, OR
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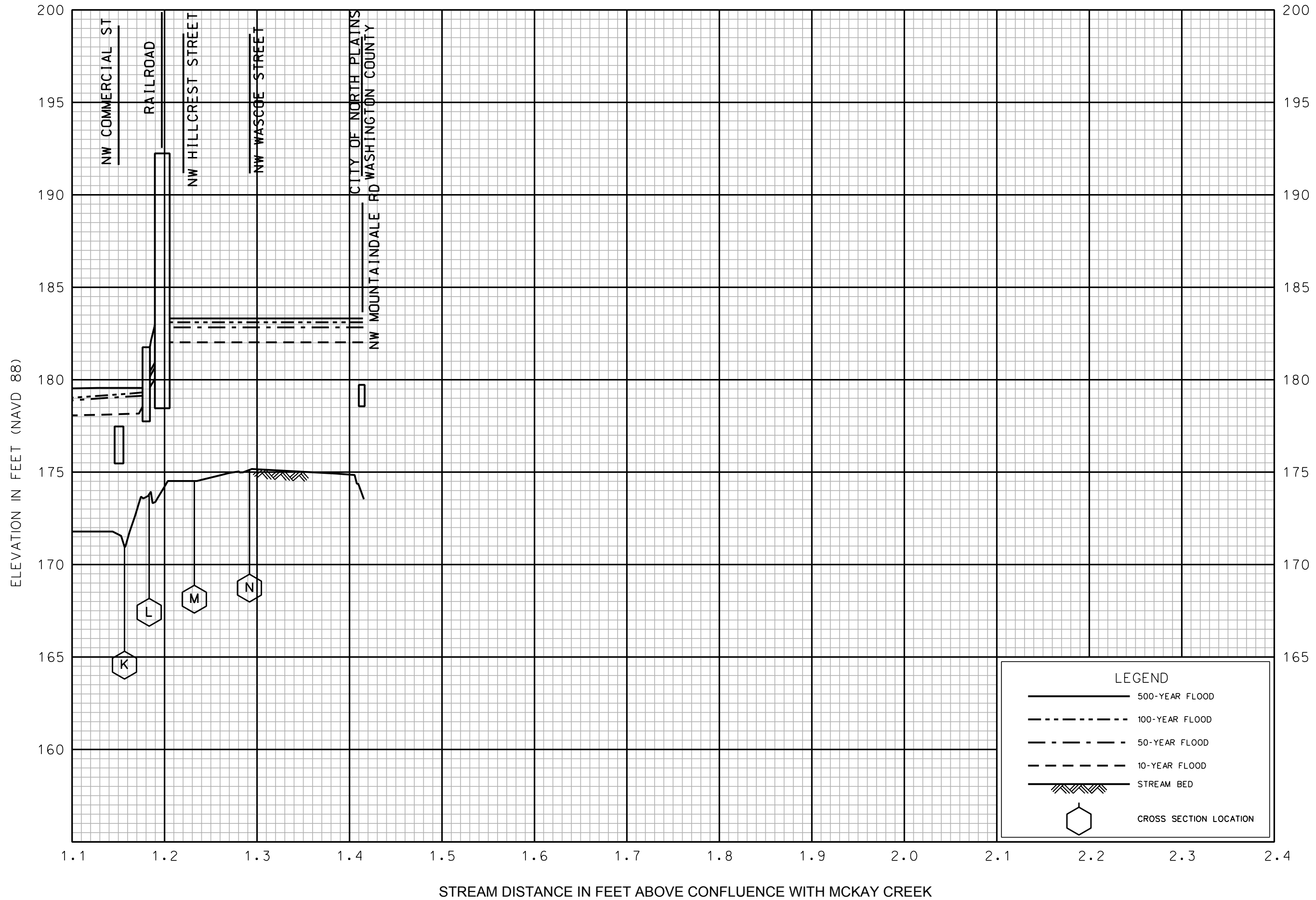


FLOOD PROFILES

UNNAMED TRIBUTARY TO MCKAY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
 WASHINGTON COUNTY, OR
 AND INCORPORATED AREAS

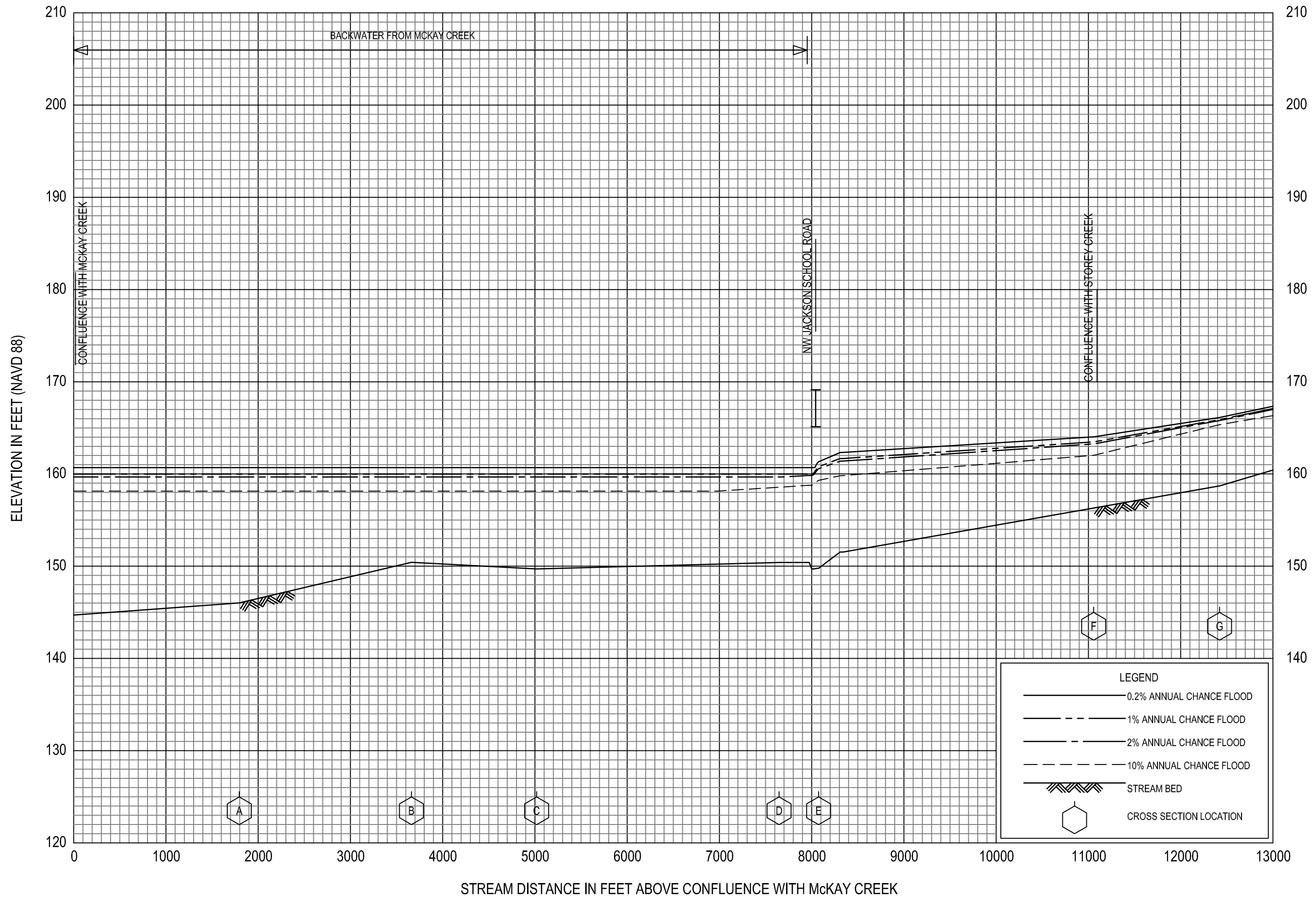
138P



FLOOD PROFILES
UNNAMED TRIBUTARY TO MCKAY CREEK

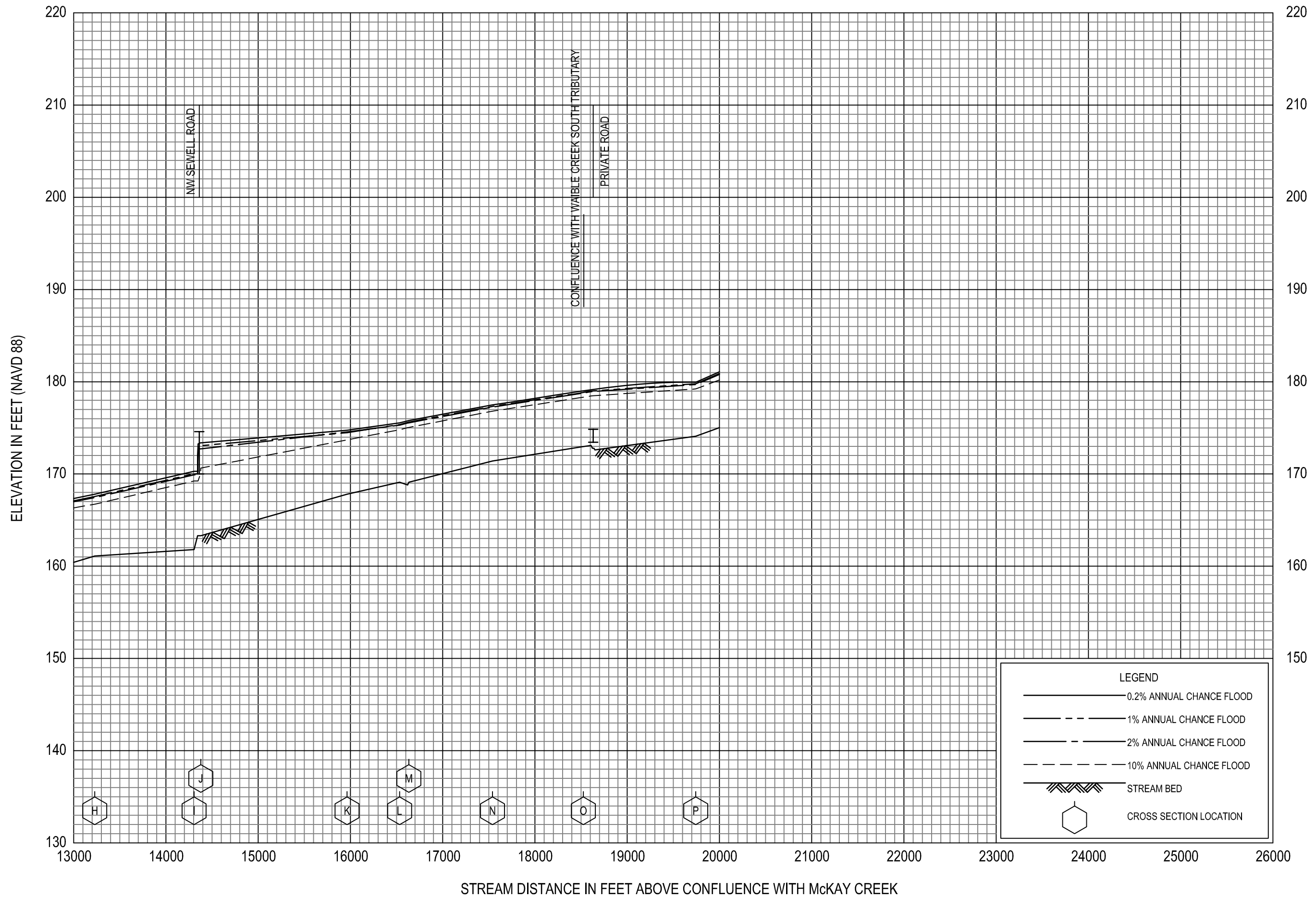
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

139P



FLOOD PROFILES
WAIBLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

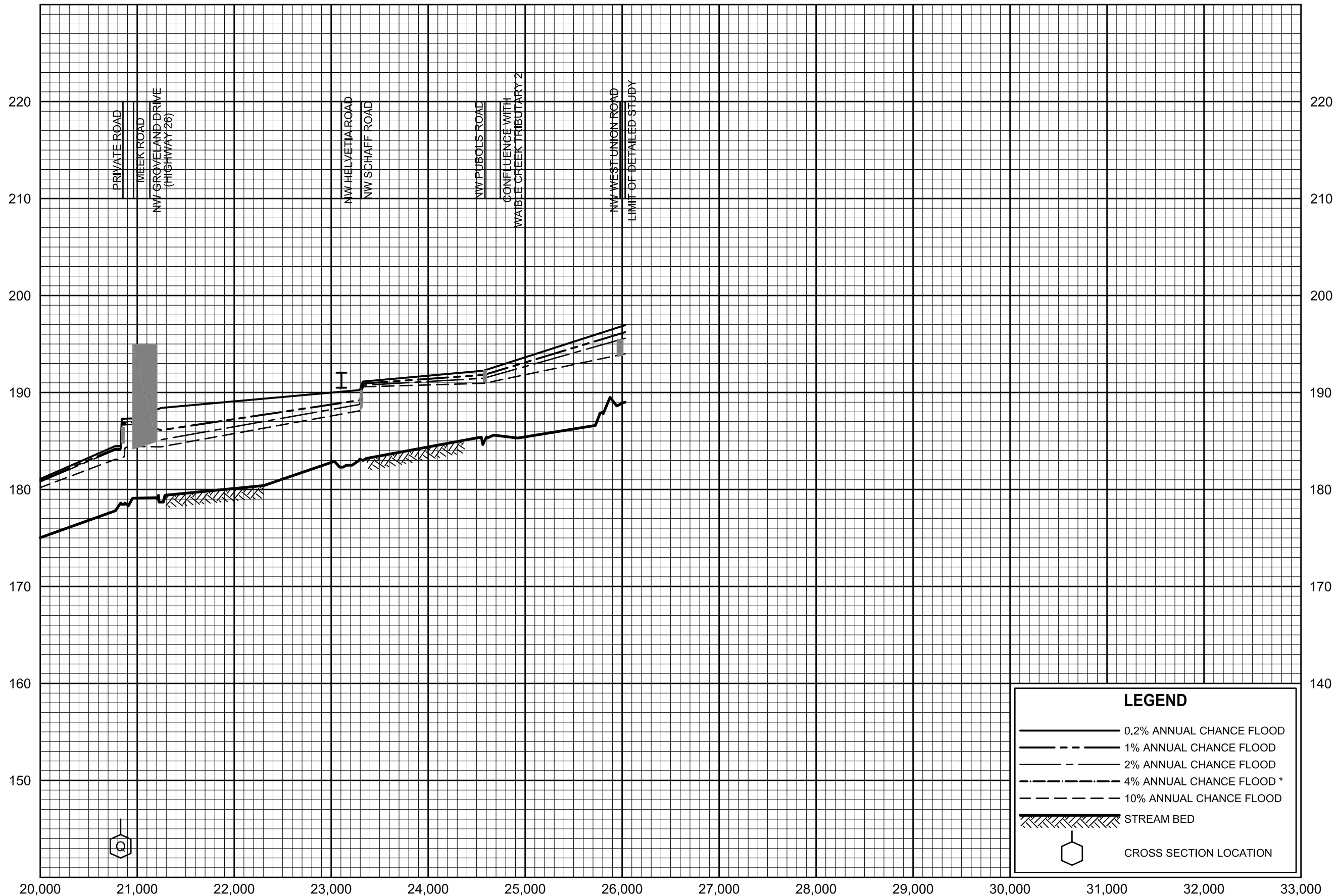


FLOOD PROFILES
WAIBLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

141P

ELEVATION IN FEET (NAVD 88)



LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- · - 2% ANNUAL CHANCE FLOOD
- - - - 4% ANNUAL CHANCE FLOOD *
- - - - 10% ANNUAL CHANCE FLOOD
- ▨ STREAM BED
- ⬡ CROSS SECTION LOCATION

* DATA NOT AVAILABLE

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH MCKAY CREEK

**FLOOD PROFILES
WAIBLE CREEK**

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

142P

ELEVATION IN FEET (NAVD 88)



STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WAIBLE CREEK

* DATA NOT AVAILABLE

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD *
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

WAIBLE CREEK - SOUTH TRIBUTARY

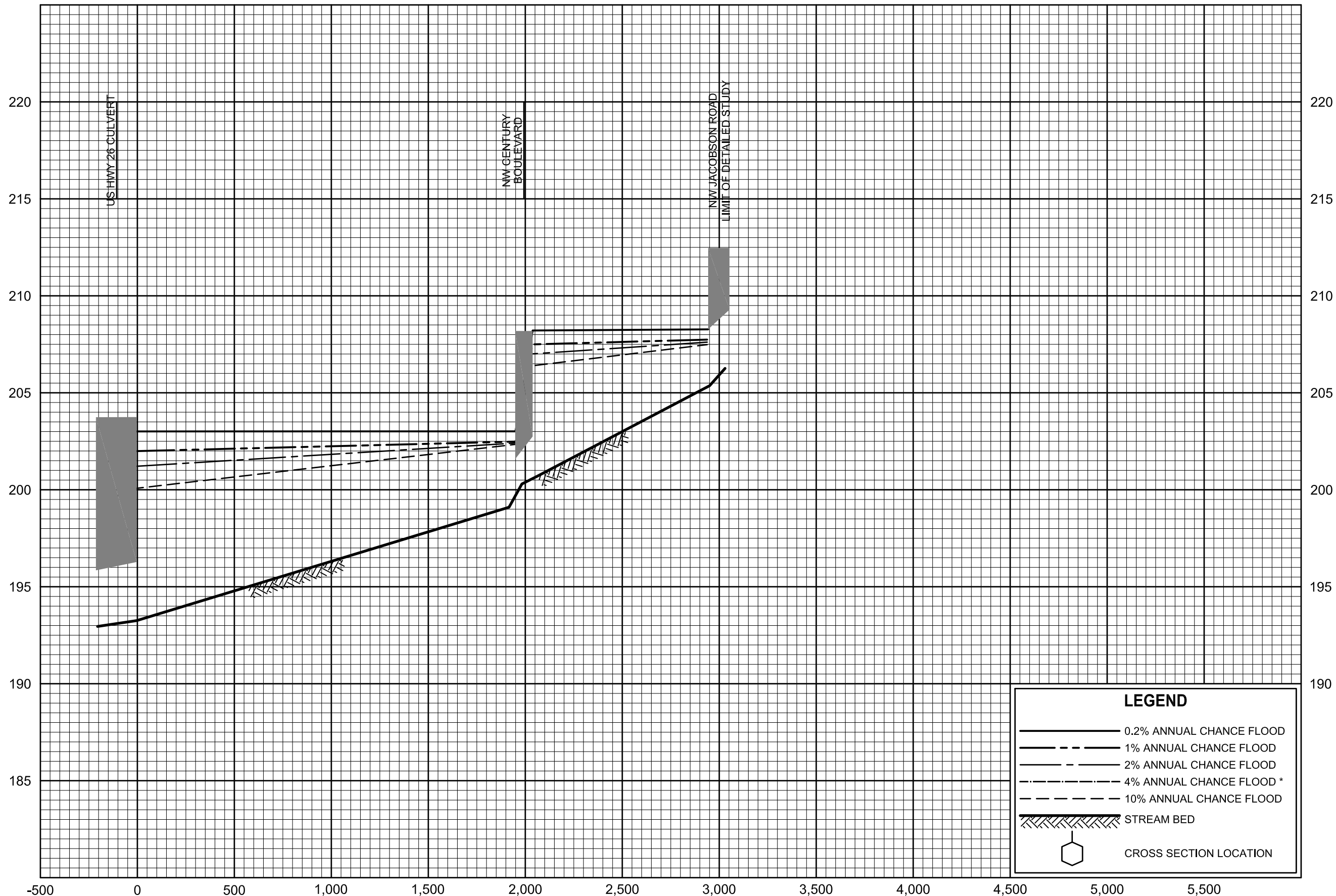
FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, OR

AND INCORPORATED AREAS

143P

ELEVATION IN FEET (NAVD 88)



LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD *
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WAIBLE CREEK - SOUTH TRIBUTARY

* DATA NOT AVAILABLE

FLOOD PROFILES

WAIBLE CREEK TRIBUTARY 1

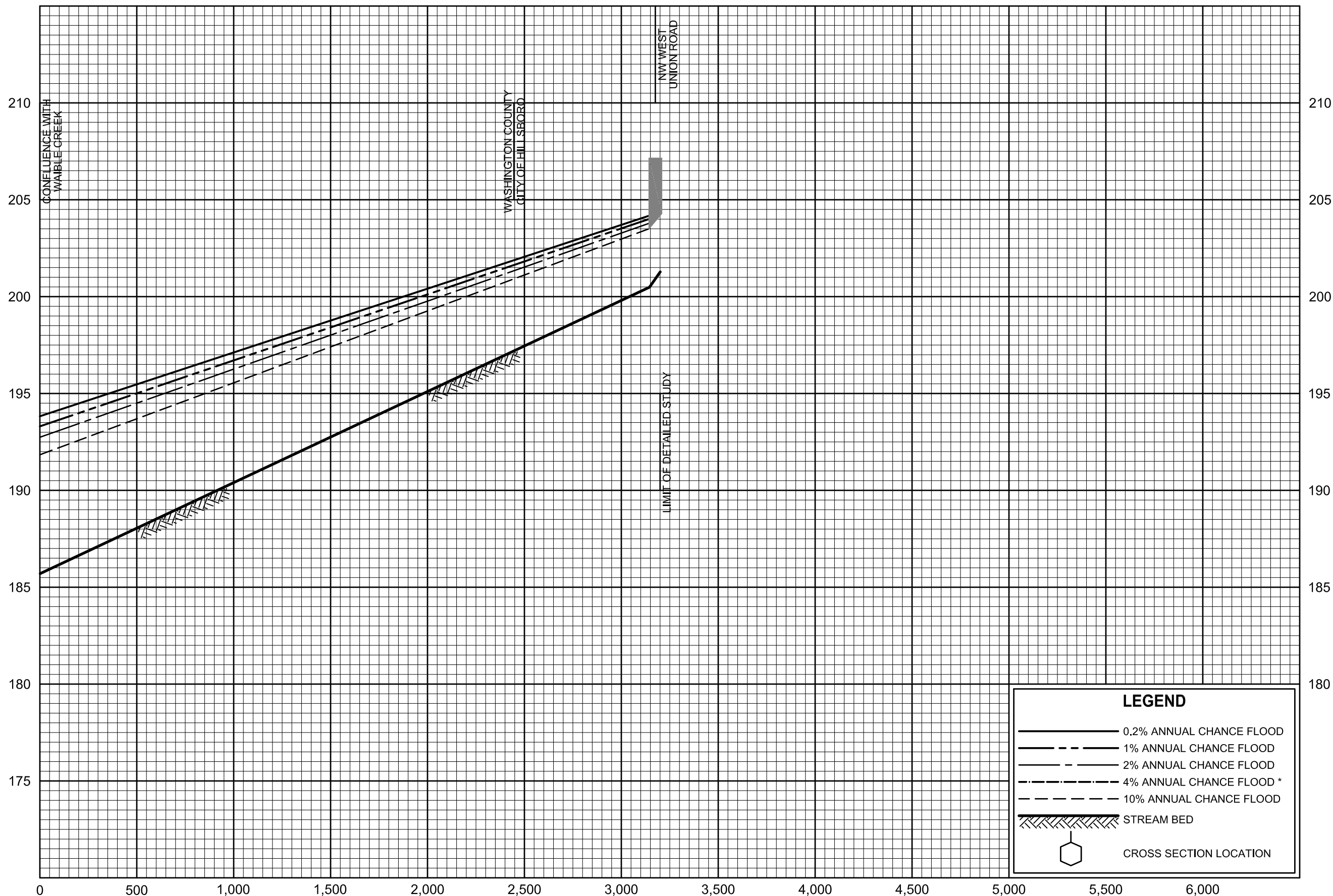
FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, OR

AND INCORPORATED AREAS

144P

ELEVATION IN FEET (NAVD 88)



STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WAIBLE CREEK

* DATA NOT AVAILABLE

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- · - · 2% ANNUAL CHANCE FLOOD
- · - · - 4% ANNUAL CHANCE FLOOD *
- · - · - 10% ANNUAL CHANCE FLOOD
- ▨ STREAM BED
- ⬡ CROSS SECTION LOCATION

FLOOD PROFILES

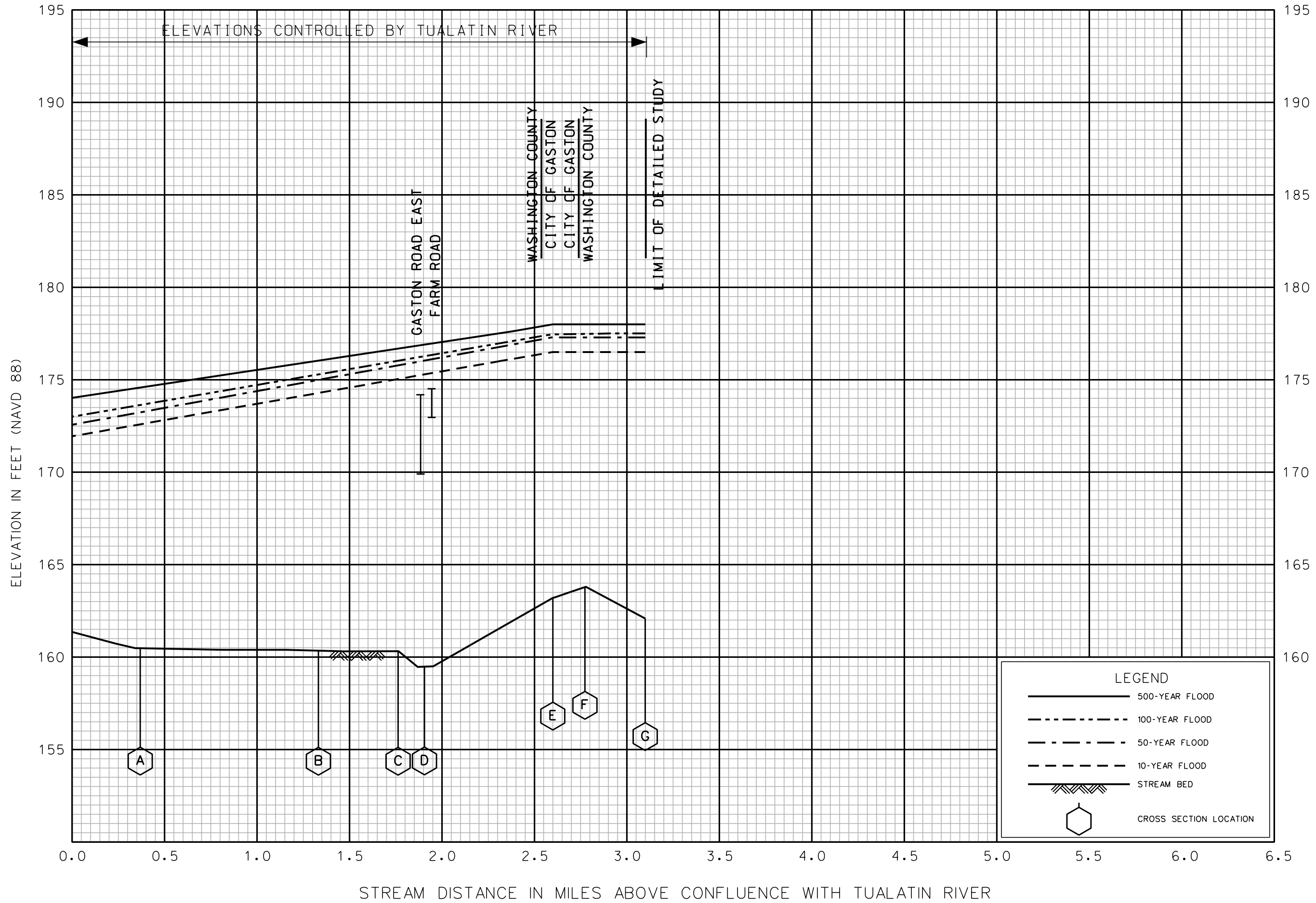
WAIBLE CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, OR

AND INCORPORATED AREAS

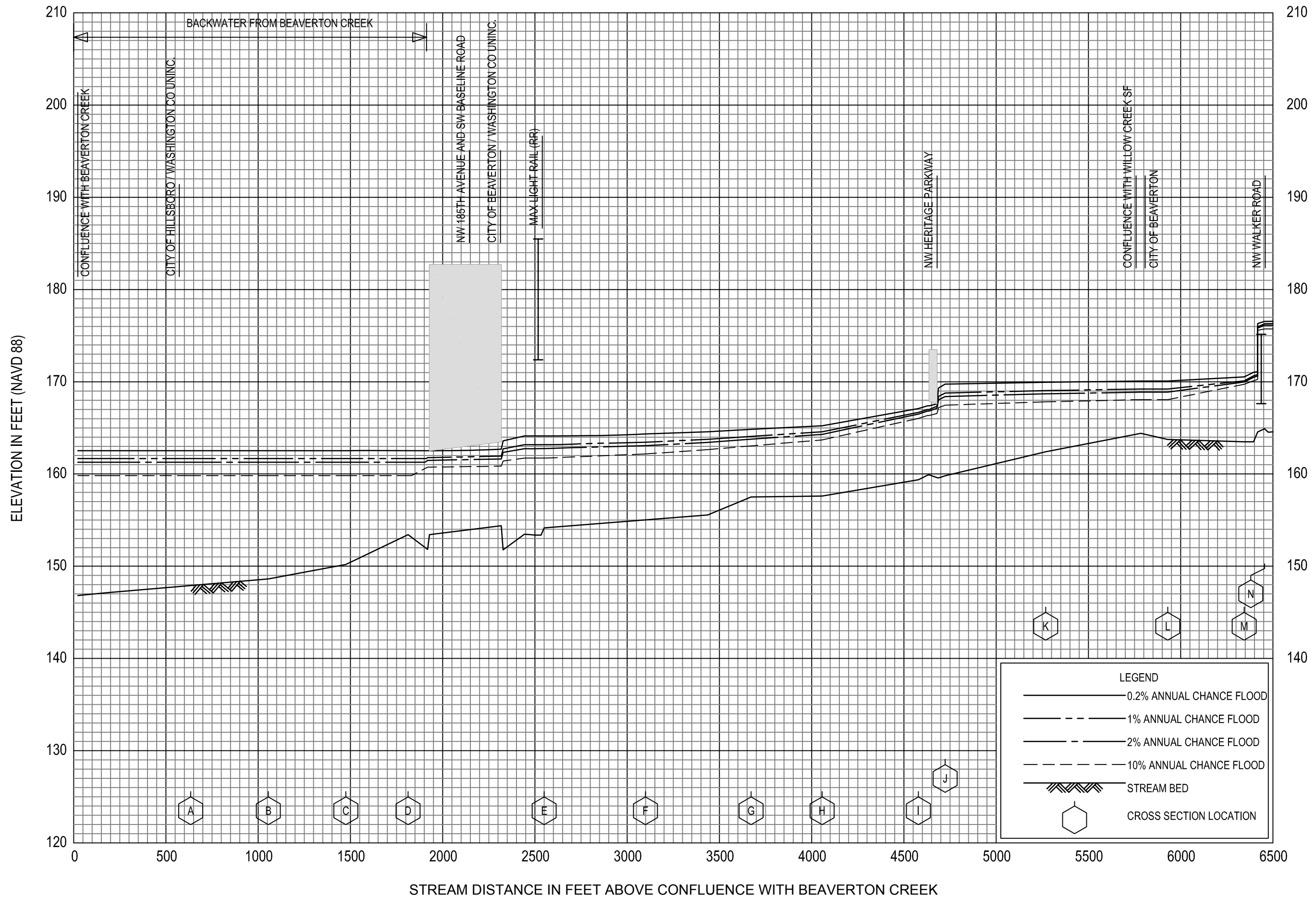
145P



FLOOD PROFILES
WAPATO CREEK

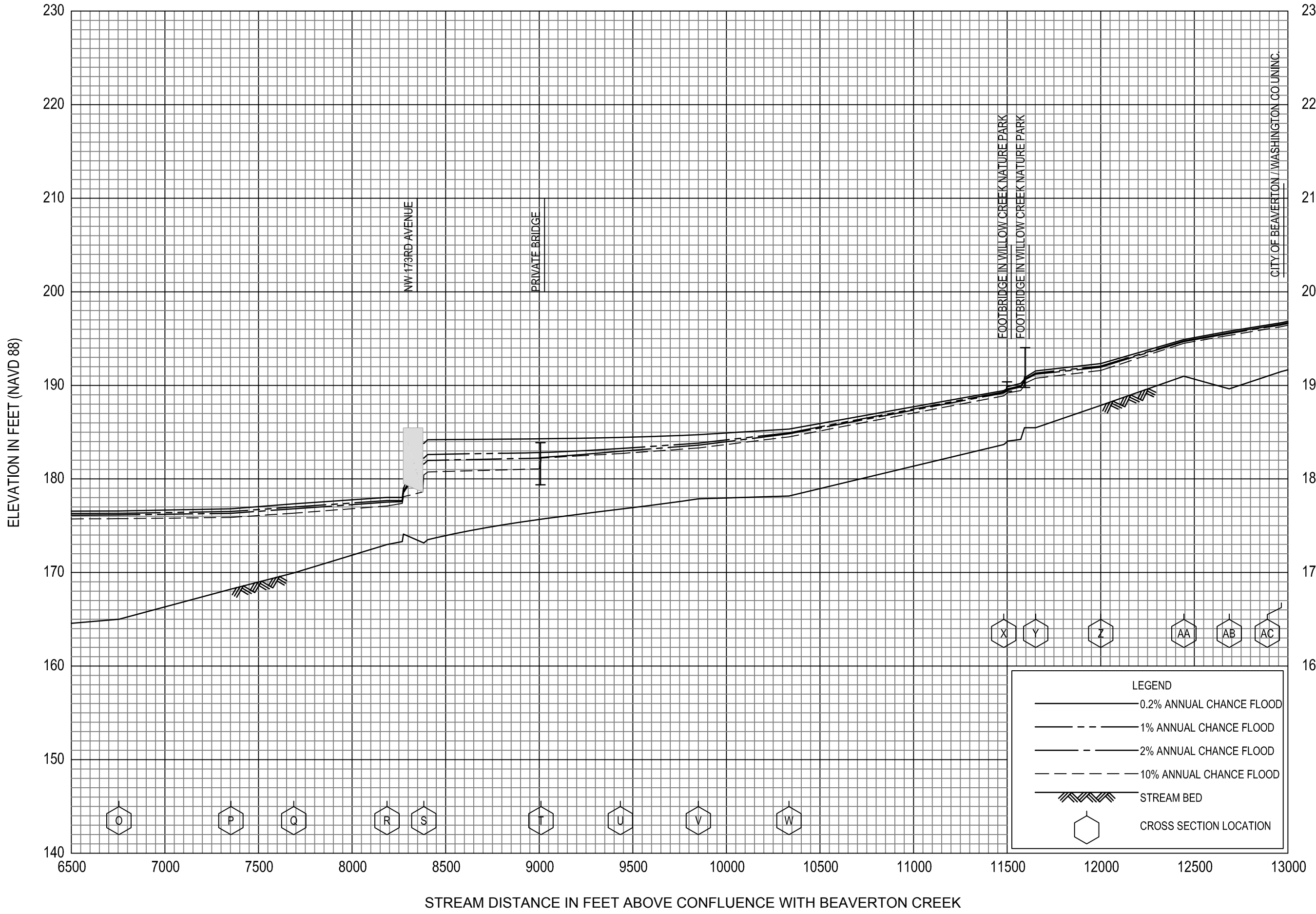
FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
AND INCORPORATED AREAS

146P



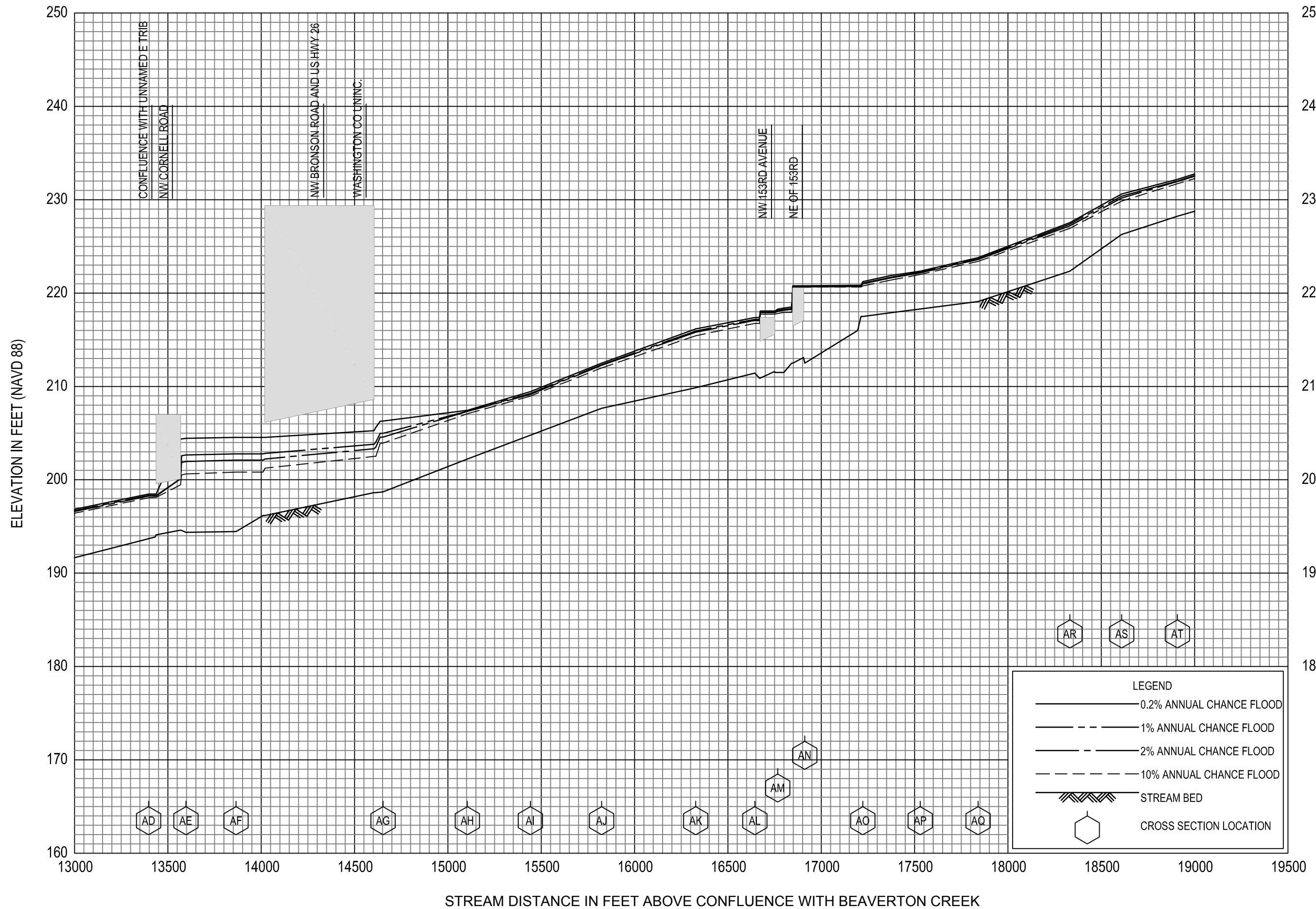
FLOOD PROFILES
WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**



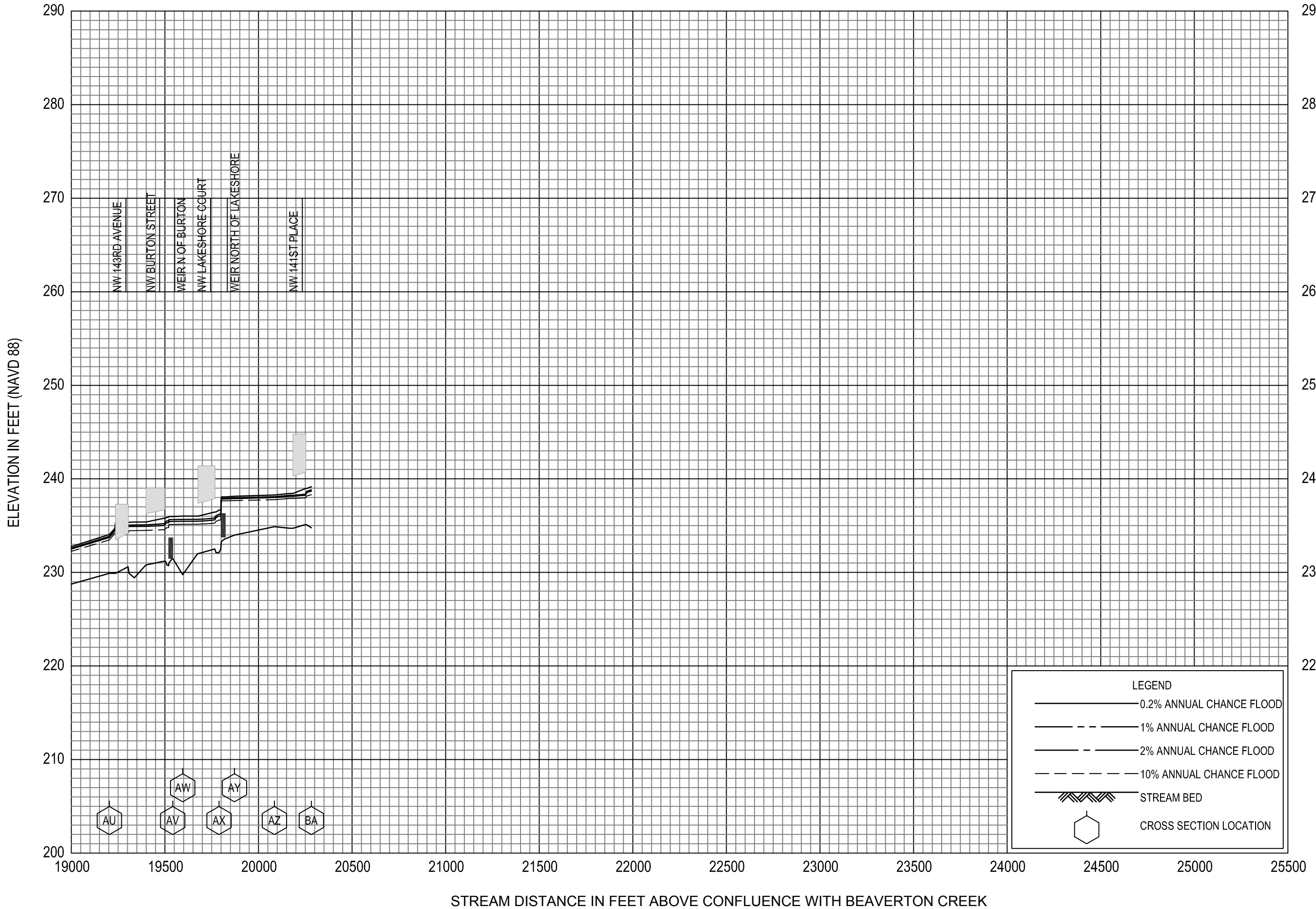
FLOOD PROFILES
WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
WASHINGTON COUNTY, OR
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FLOOD PROFILES
WILLOW CREEK

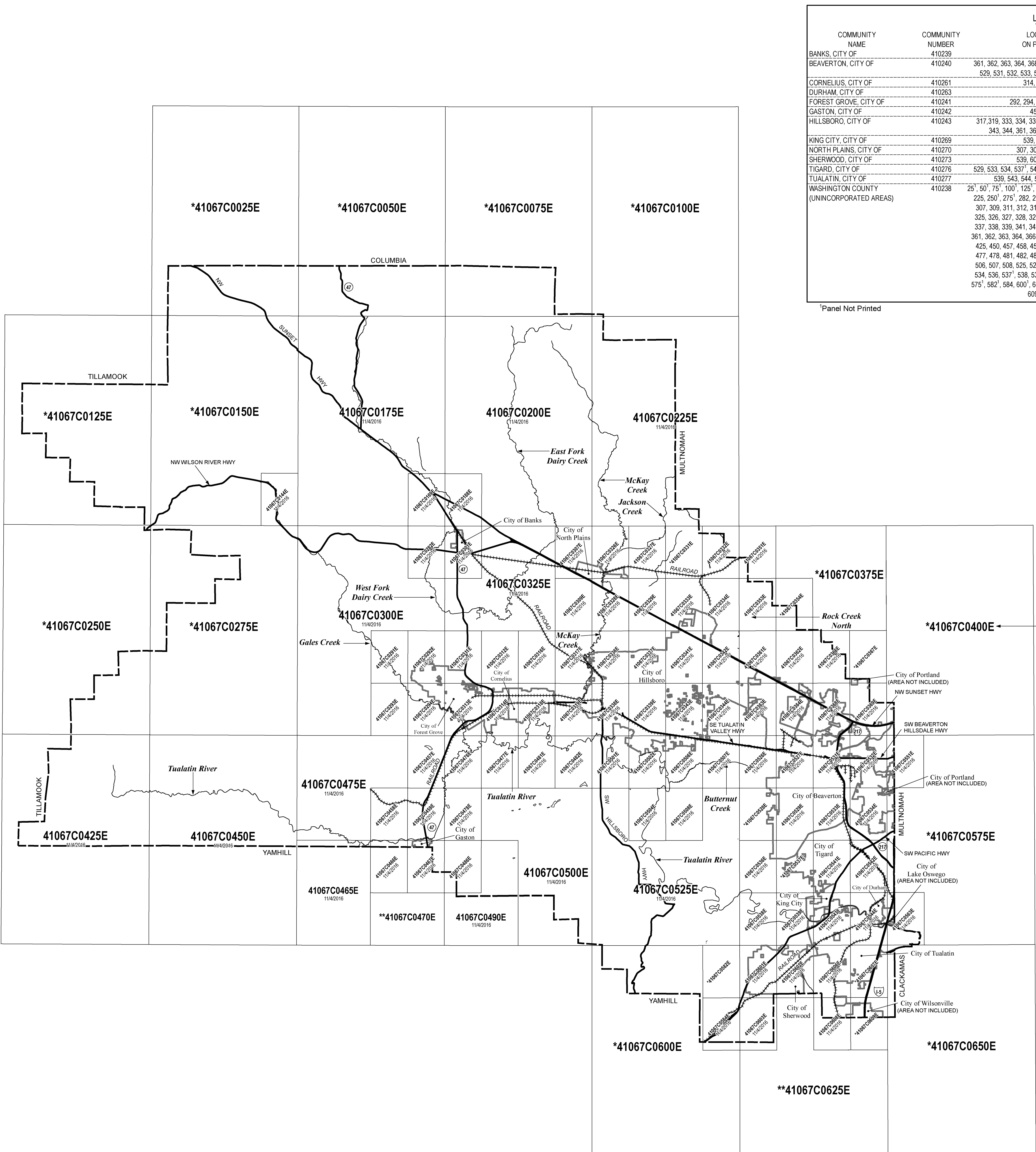
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WASHINGTON COUNTY, OR
AND INCORPORATED AREAS



FLOOD PROFILES
WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
**WASHINGTON COUNTY, OR
AND INCORPORATED AREAS**

151P



LISTING OF COMMUNITIES						
COMMUNITY NAME	COMMUNITY NUMBER	LOCATED ON PANEL(S)	INITIAL NFIP MAP DATE	INITIAL FIRM DATE	MOST RECENT FIRM PANEL DATE	
BANKS, CITY OF	410239	301	November 4, 2016	November 4, 2016	November 4, 2016	
BEAVERTON, CITY OF	410240	361, 362, 363, 364, 368, 369, 400, 526, 527, 528, 529, 531, 532, 533, 534, 536, 537, 551, 575	February 1, 1974	September 28, 1984	November 4, 2016	
CORNELIUS, CITY OF	410261	314, 318, 319	November 5, 1976	January 6, 1982	November 4, 2016	
DURHAM, CITY OF	410263	544	November 12, 1976	January 6, 1982	November 4, 2016	
FOREST GROVE, CITY OF	410241	292, 294, 311, 313, 314	March 1, 1974	March 15, 1982	November 4, 2016	
GASTON, CITY OF	410242	459, 467	July 5, 1982	July 5, 1982	November 4, 2016	
HILLSBORO, CITY OF	410243	317, 319, 333, 334, 336, 337, 338, 339, 341, 342, 343, 344, 361, 363, 501, 502, 506, 507	April 12, 1974	May 17, 1982	November 4, 2016	
KING CITY, CITY OF	410269	539, 541, 543	February 18, 2005	February 18, 2005	November 4, 2016	
NORTH PLAINS, CITY OF	410270	307, 309, 326, 328	July 16, 1976	April 11, 1982	November 4, 2016	
SHERWOOD, CITY OF	410273	539, 601, 602, 606	August 13, 1976	January 6, 1982	November 4, 2016	
TIGARD, CITY OF	410276	529, 533, 534, 537, 541, 542, 543, 544, 563, 575	February 14, 1978	March 1, 1982	November 4, 2016	
TUALATIN, CITY OF	410277	539, 543, 544, 563, 606, 607, 650	May 20, 1977	February 17, 1982	November 4, 2016	
WASHINGTON COUNTY (UNINCORPORATED AREAS)	410238	25, 50, 75, 100, 125, 144, 150, 169, 175, 188, 200, 225, 250, 275, 282, 291, 292, 293, 294, 300, 301, 307, 309, 311, 312, 313, 314, 316, 317, 318, 319, 325, 326, 327, 328, 329, 331, 332, 333, 334, 336, 337, 338, 339, 341, 342, 343, 344, 351, 353, 354, 361, 362, 363, 364, 366, 367, 368, 369, 375, 400, 425, 450, 457, 458, 459, 465, 466, 467, 475, 476, 477, 478, 481, 482, 488, 490, 500, 501, 502, 504, 506, 507, 508, 526, 528, 527, 528, 529, 531, 532, 534, 536, 537, 538, 539, 541, 543, 544, 551, 563, 575, 582, 584, 600, 601, 602, 603, 606, 607, 608, 609, 650	January 24, 1975	September 30, 1982	November 4, 2016	

Panel Not Printed

MAP DATES

This FIRM Index displays the map date for each FIRM panel at the time that this Index was printed. Because this index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center (MSC) website at <http://msc.fema.gov> or by calling the MSC via the FEMA Map Information eXchange (FMX) at 1-877-335-2827.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

NOTE TO USERS

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated November 4, 2016 or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the Listing of Communities table to determine the most recent FIRM index date for each community.

ELEVATION DATUM

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
 NOAA, NIMS12
 National Geodetic Survey
 SSMC-3, #6202
 1315 East-West Highway
 Silver Spring, Maryland 20910-3282
 (301) 713-3242
 (301) 713-4172 (fax)

BASE MAP SOURCE

Base map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by the Metro Data Resources Center. This information was compiled from many local sources and includes transportation features, water features, political boundaries, and Public Land Survey System features.

MAP REPOSITORIES

(Maps available for reference only, not for distribution)

BANKS, CITY OF
 City Administrative Offices
 13680 Northwest Main Street
 Banks, Oregon 97106

BEAVERTON, CITY OF
 Community Development Department
 4755 Southwest Griffith Drive
 Beaverton, Oregon 97005

CORNELIUS, CITY OF
 Planning Department
 1300 South Kodiak Circle
 Cornelius, Oregon 97113

DURHAM, CITY OF
 City Hall
 17160 Southwest Upper Boones Ferry Road
 Durham, Oregon 97224

FOREST GROVE, CITY OF
 City Hall
 1924 Council Street
 Forest Grove, Oregon 97116

GASTON, CITY OF
 City Hall
 116 Front Street
 Gaston, Oregon 97119

HILLSBORO, CITY OF
 City Hall
 150 East Main Street
 Hillsboro, Oregon 97123

KING CITY, CITY OF
 City Hall
 15300 Southwest 116th Avenue
 King City, Oregon 97224

NORTH PLAINS, CITY OF
 City Hall
 31360 Northwest Commercial Street
 North Plains, Oregon 97133

SHERWOOD, CITY OF
 City Hall
 22560 Southwest Pine Street
 Sherwood, Oregon 97140

TIGARD, CITY OF
 City Hall
 13125 Southwest Hall Boulevard
 Tigard, Oregon 97223

TUALATIN, CITY OF
 City Hall
 18880 Southwest Martinazzi Avenue
 Tualatin, Oregon 97062

WASHINGTON COUNTY (Unincorporated Areas)
 County Public Services Building
 155 North First Avenue
 Suite 350
 Hillsboro, Oregon 97124

MAP INDEX

FIRM FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY, OREGON
 AND INCORPORATED AREAS
 (SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

PANELS PRINTED : 144, 169, 175, 188, 200, 225, 282, 291, 292, 293, 294, 300, 301, 307, 309, 311, 312, 313, 314, 316, 317, 318, 319, 325, 326, 327, 328, 329, 332, 333, 334, 336, 337, 338, 339, 341, 342, 343, 344, 351, 353, 361, 362, 363, 364, 366, 368, 369, 425, 450, 457, 458, 459, 465, 466, 467, 475, 476, 477, 478, 481, 482, 488, 490, 500, 501, 502, 504, 506, 507, 508, 526, 527, 529, 531, 532, 533, 534, 536, 538, 539, 541, 542, 543, 544, 551, 563, 584, 601, 602, 603, 606, 608

MAP NUMBER
41067CIND0A

EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
 ** PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **Floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator zone 10. The **horizontal datum** was NAD 83, GRS 80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA NINGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

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This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on this map.

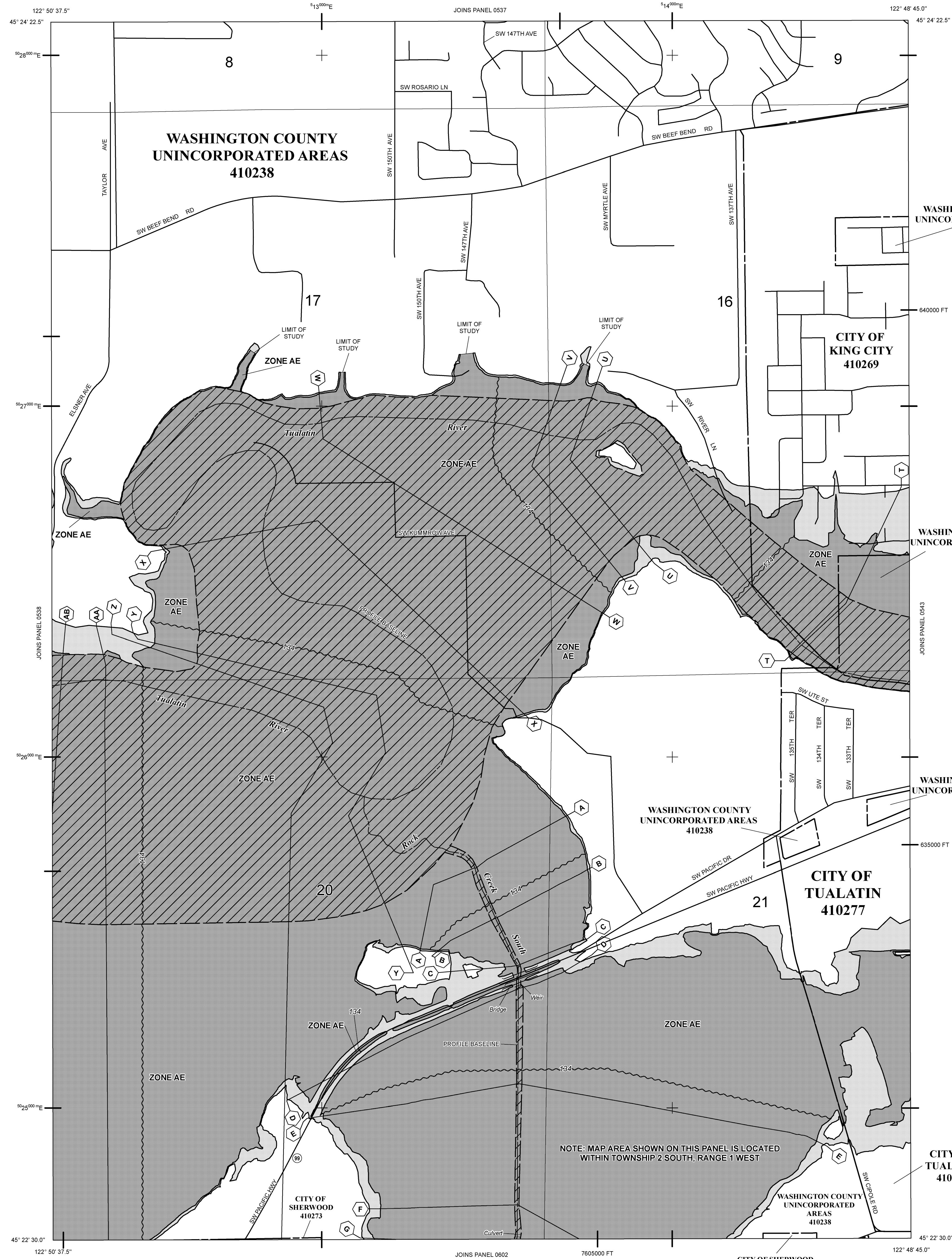
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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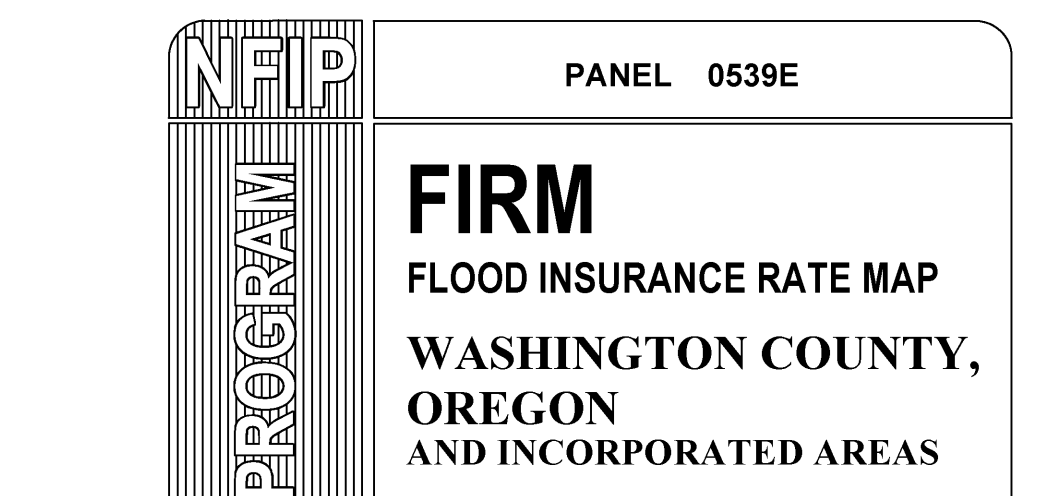
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If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/fmif>.



LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Area of special hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance of greater flood event.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet + (EL 978)
- Cross section line
- Transect line
- Geographic coordinates referenced to North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 10
- 5000-foot grid ticks; Oregon State Plane coordinate system, North zone (FIPSZONE 3601), Lambert Conformal Conic projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
- Road or Railroad Bridge
- MAP REPOSITORY
- Refer to listing of Map Repositories on Map Index.
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- November 4, 2016
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0539E

FIRM
FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 539 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	KING CITY, CITY OF	410268	0539	E
	SHERWOOD, CITY OF	410273	0539	E
	TUALATIN, CITY OF	410277	0539	E
	WASHINGTON COUNTY	410238	0539	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
41067C0539E

EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

NOTES TO USERS

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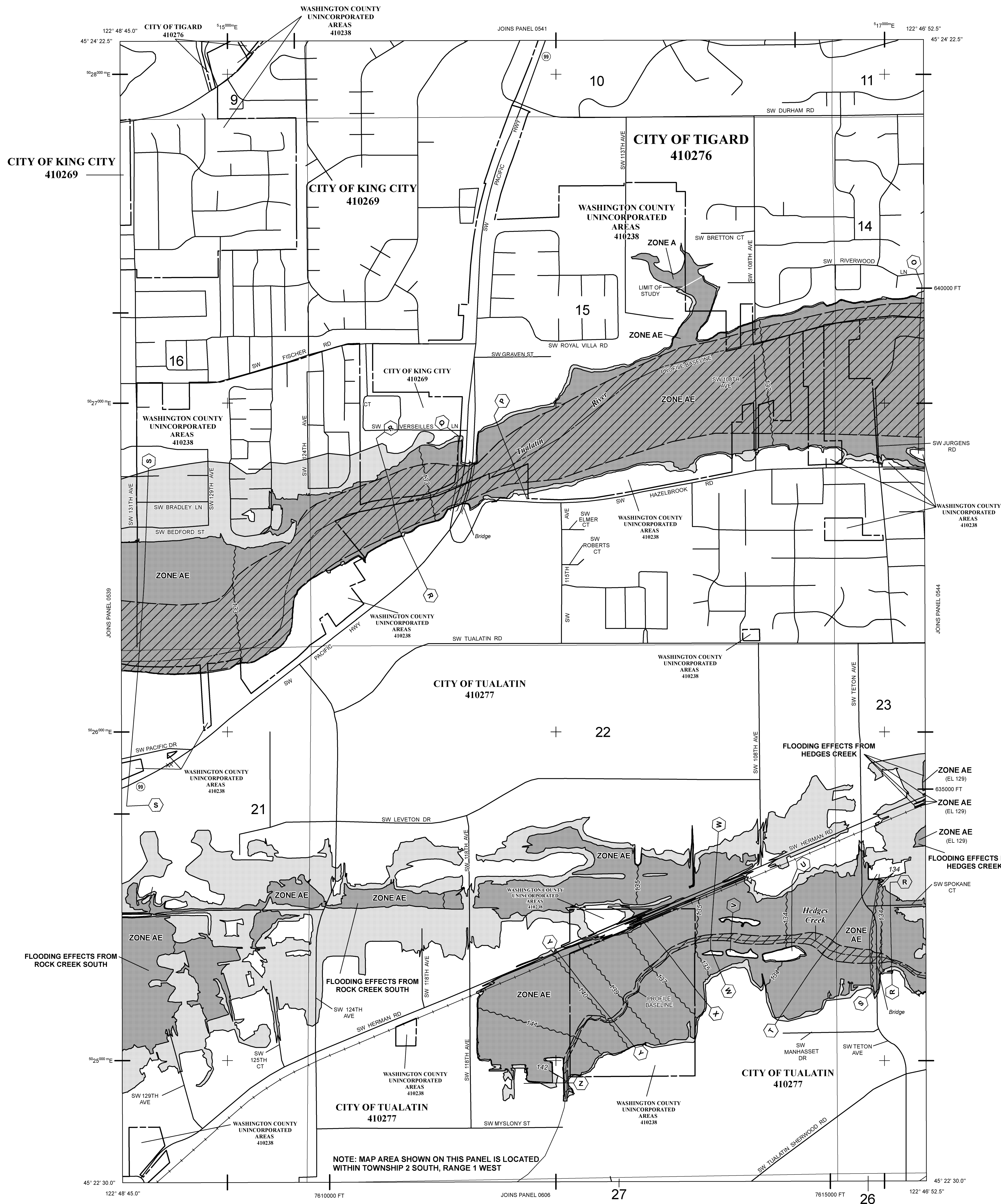
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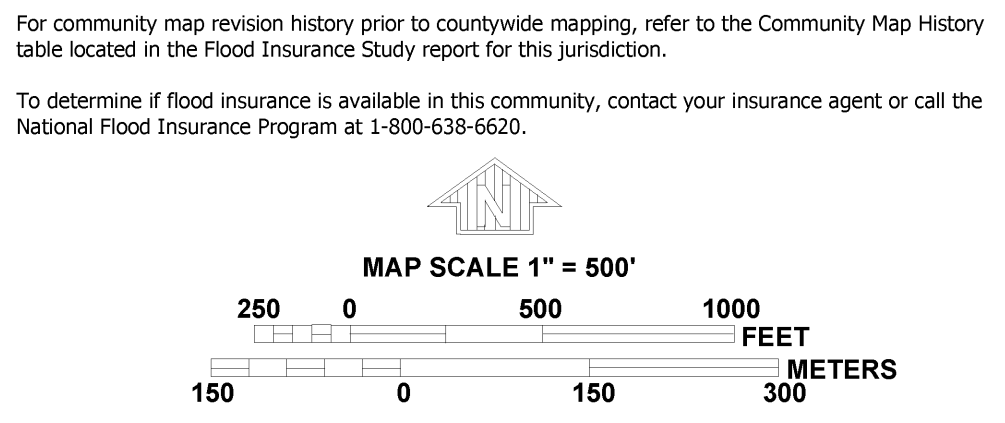


LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Area of special hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decreed. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance of greater flood event.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations Determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE D** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet + (EL 978)
- Base Flood Elevation value where uniform within zone; elevation in feet +

* Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- 97°10'30.5" 32°10'30.5"
- 42°26'00.0"E
- 600000 FT
- MG5510
- M1.5
- River Mile
- Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
- Road or Railroad Bridge
- MAP REPOSITORY
- Refer to listing of Map Repositories on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- November 4, 2016
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL



PANEL 0543E

FIRM
FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 543 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	TIGARD, CITY OF	410276	0543	E
	KING CITY, CITY OF	410269	0543	E
	TUALATIN, CITY OF	410277	0543	E
	WASHINGTON COUNTY	410238	0543	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
41067C0543E
EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 2 SOUTH, RANGE 1 WEST

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator zone 10. The **horizontal datum** was NAD 83, GRS 80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base Map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by the Metro Data Resources Center. This information was compiled from many local sources and includes transportation features, water features, political boundaries, and Public Land Survey System features.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on this map.

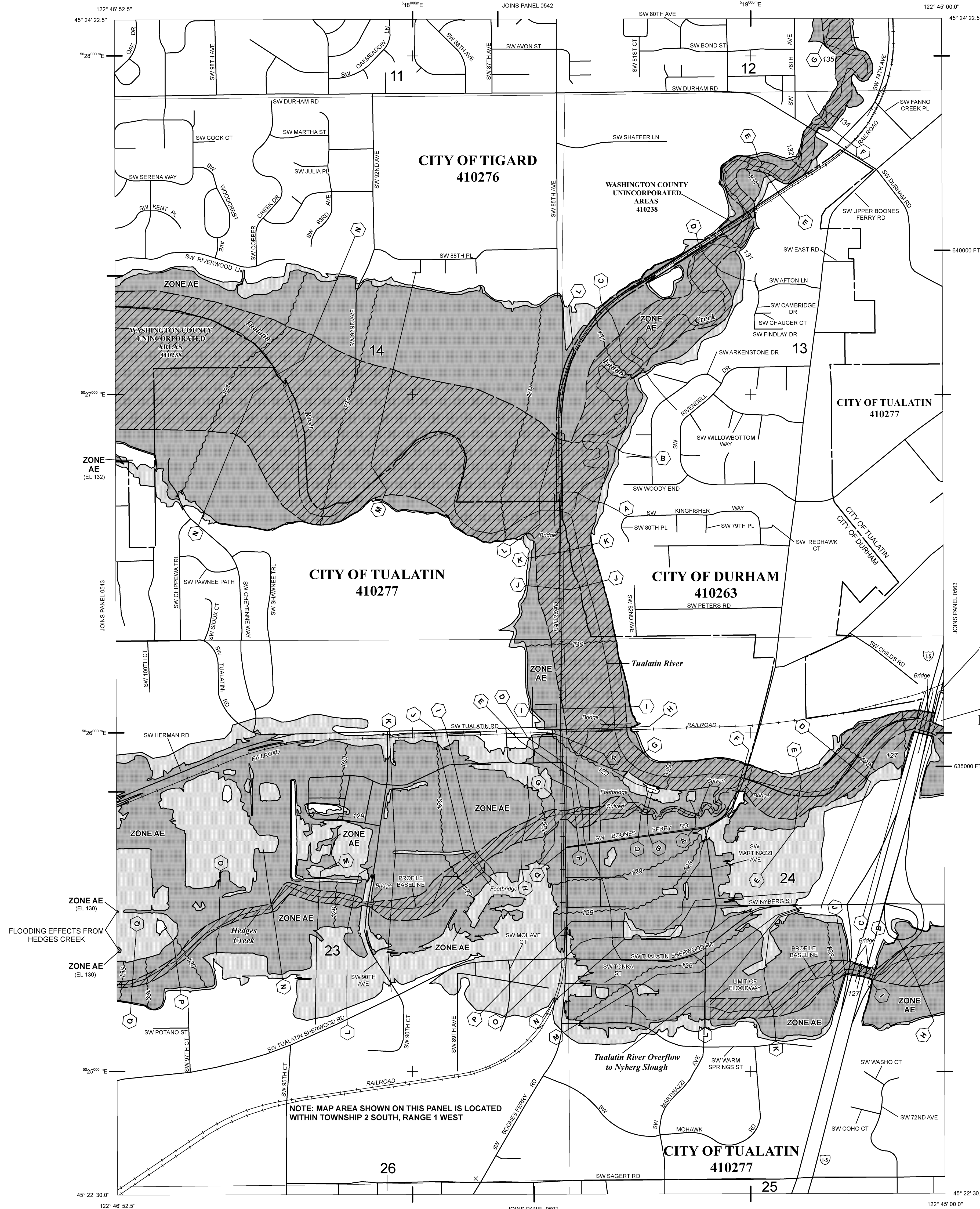
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The **profile base lines** depicted on this map represent the hydraulic modeling base lines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile base line**, in some cases may deviate significantly from the channel centerline or appear outside the SFHA.

For information on available products associated with this FIRM visit the **FEMA Flood Map Service Center (MSC)** website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
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- ZONE AR** Area of special hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance of greater flood event.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE D Areas determined to be outside the 0.2% annual chance floodplain.

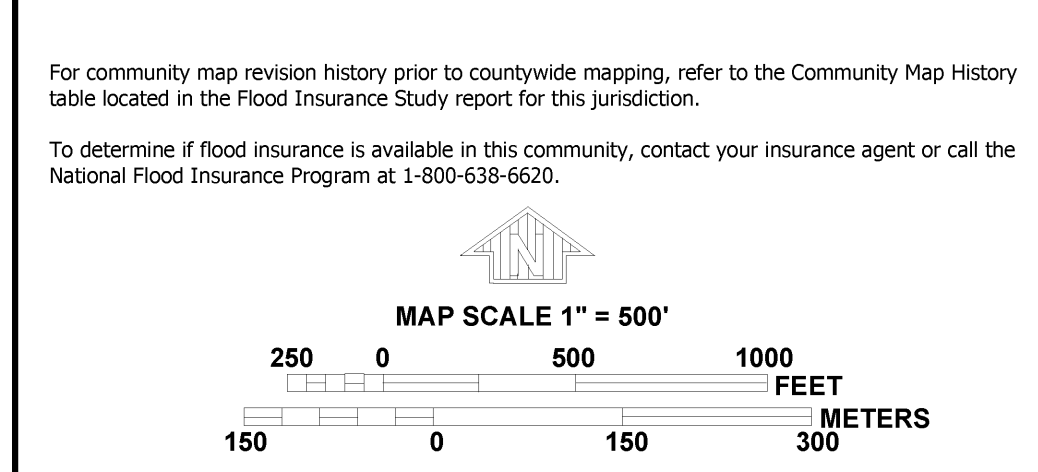
ZONE B Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation value where uniform within zone; elevation in feet * (EL 978)

- * Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Geographic coordinates referenced to North American Datum of 1983 (NAD 83)
- 600000 FT
- 600000 FT
- MG5510
- M1.5
- River Mile
- Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
- Road or Railroad Bridge
- MAP REPOSITORY
- Refer to listing of Map Repositories on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- November 4, 2016
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL



PANEL 0544E

FIRM
FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 544 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	DURHAM, CITY OF	410263	0544	E
	TIGARD, CITY OF	410276	0544	E
	TUALATIN, CITY OF	410277	0544	E
	WASHINGTON COUNTY	410238	0544	E

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MAP NUMBER
41067C0544E
EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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The **projection** used in the preparation of this map was Universal Transverse Mercator zone 10. The **horizontal datum** was NAD 83, GRS 80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services
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National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on this map.

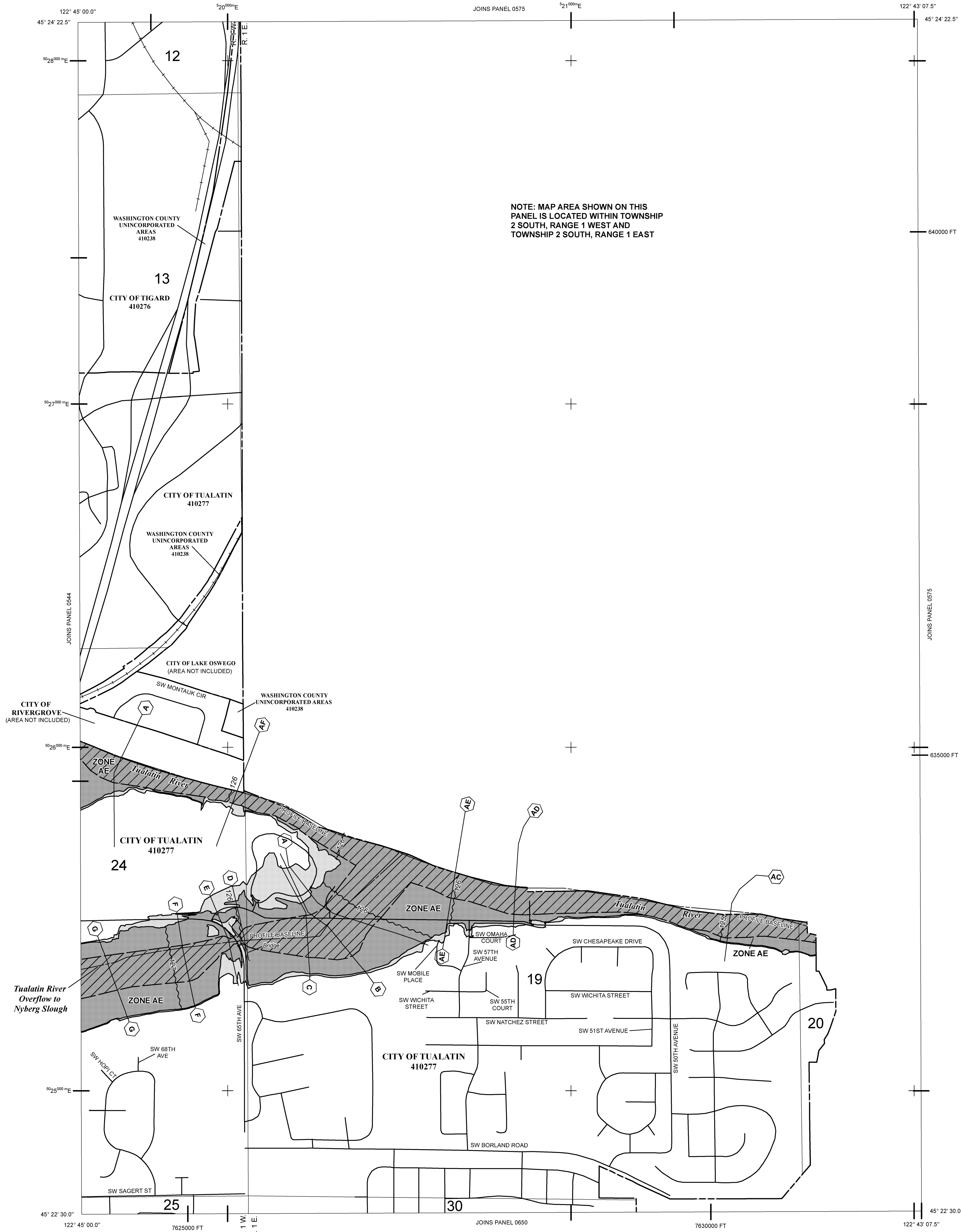
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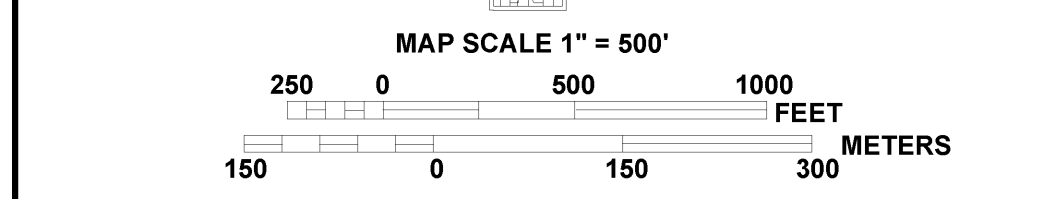
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LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
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- ZONE A** No Base Flood Elevations determined.
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- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
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- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
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- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet + (EL 978)
- Cross section line
- Transect line
- Geographic coordinates referenced to North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 10
- 5000-foot grid ticks; Oregon State Plane coordinate system, North zone (FIPSZONE 3601), Lambert Conformal Conic projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
- Road or Railroad Bridge
- MAP REPOSITORY
- Refer to listing of Map Repositories on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- November 4, 2016
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
- For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
- To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



PANEL 0563E

FIRM
FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 563 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	NUMBER	PANEL	SUFFIX
COMMUNITY			
TIGARD, CITY OF	410276	0563	E
TUALATIN, CITY OF	410277	0563	E
WASHINGTON COUNTY	410238	0563	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
41067C0563E

EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

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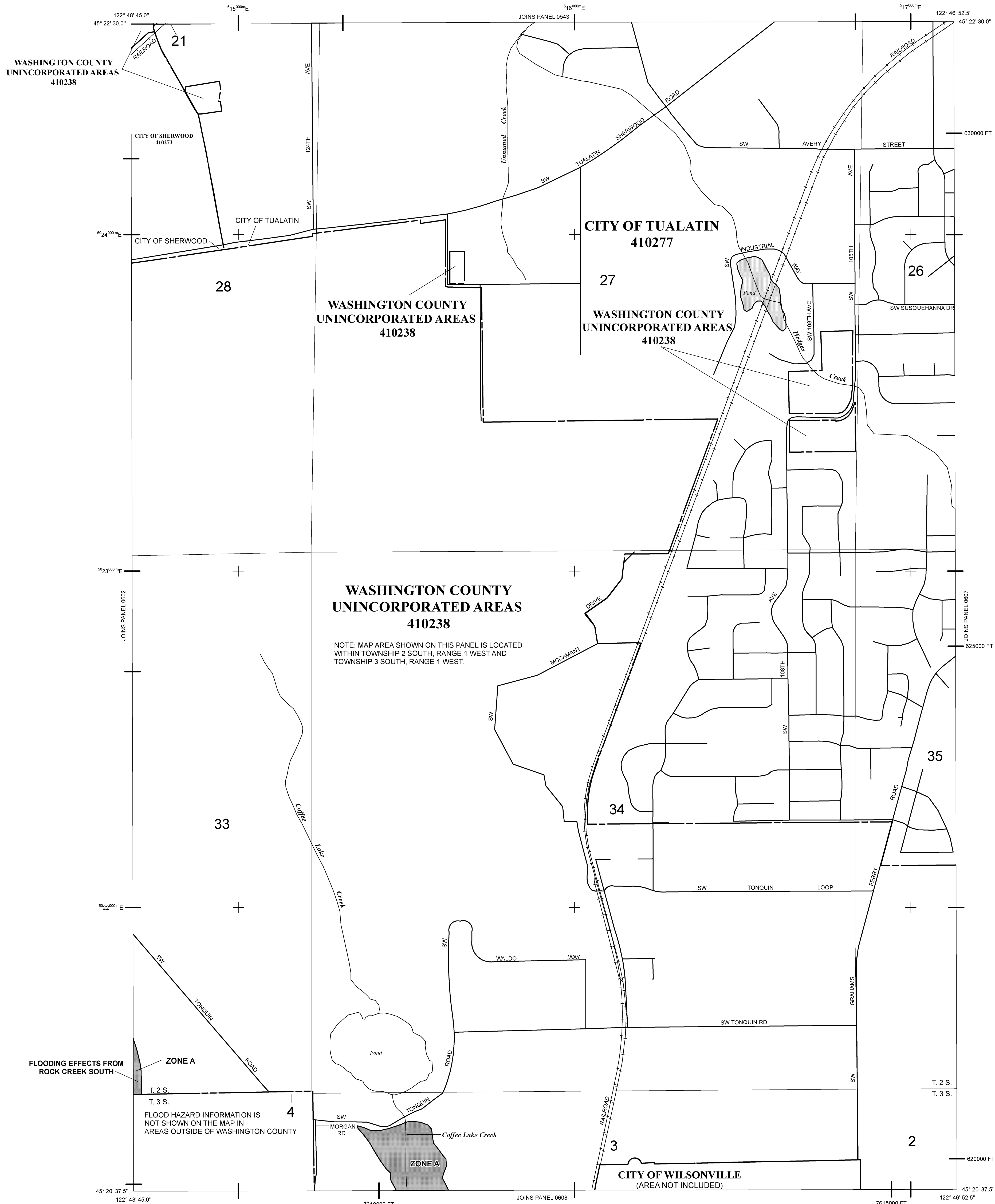
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LEGEND

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- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet *
(EL 978)
Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Geographic coordinates referenced to North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid values, zone 10

5000-foot grid ticks: Oregon State Plane coordinate system, North zone (FIPSZONE 3601), Lambert Conformal Conic projection

Bench mark (see explanation in Notes to Users section of this FIRM panel)

River Mile

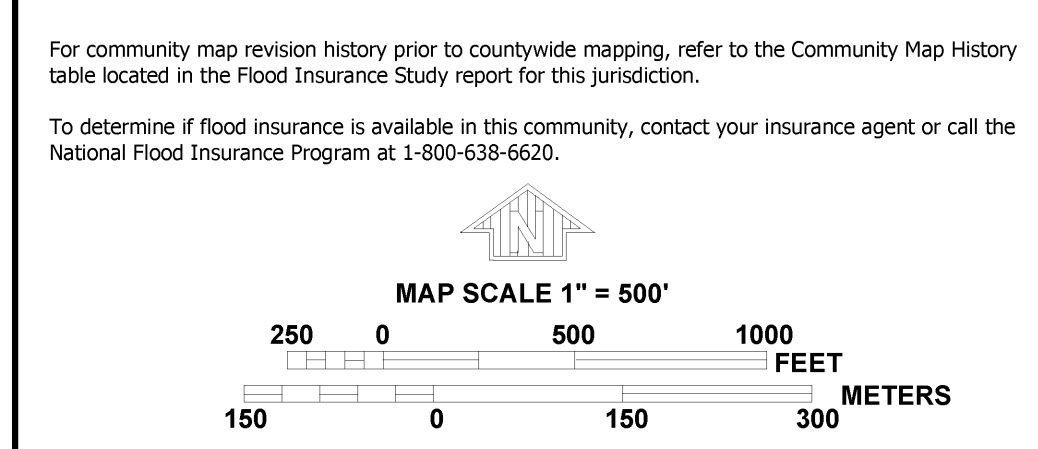
Aqueduct, Culvert, Flume, Penstock, or Storm Sewer

Road or Railroad Bridge

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
November 4, 2016

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL



PANEL 0606E

FIRM
FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 606 OF 650
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	SUFFIX
SHERWOOD, CITY OF	410273	0606	E
TUALATIN, CITY OF	410277	0606	E
WASHINGTON COUNTY	410238	0606	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
41067C0606E

EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency



City of Tualatin

www.tualatinoregon.gov

UNOFFICIAL

TUALATIN PLANNING COMMISSION -

MINUTES OF September 15, 2016

TPC MEMBERS PRESENT:

Alan Aplin
Kenneth Ball
Angela Demeo
Travis Stout
Mona St. Clair
Janelle Thompson

STAFF PRESENT

Aquilla Hurd-Ravich
Charles Benson
Tony Doran
Lynette Sanford

TPC MEMBER ABSENT: Bill Beers

GUESTS: None.

1. CALL TO ORDER AND ROLL CALL:

Alan Aplin, Chair, called the meeting to order at 6:30 pm and reviewed the agenda. Roll call was taken.

2. APPROVAL OF MINUTES:

Mr. Aplin asked for review and approval of the May 19, 2016 TPC minutes. MOTION by Thompson SECONDED by Demeo to approve the minutes as written. MOTION PASSED 6-0.

Aquilla Hurd-Ravich, Planning Manager, introduced our two new Planning Commissioners, Kenneth Ball and Travis Stout.

3. COMMUNICATION FROM THE PUBLIC (NOT ON THE AGENDA):

None

4. ACTION ITEMS:

A. Consideration to Amend the Tualatin Development Code Chapter 70: Flood Plain District to meet minimum National Flood Insurance Program requirements. Plan Text Amendment 16-0001 is a legislative matter.

Tony Doran, Engineering Associate, presented consideration of a Plan Text Amendment to update Tualatin Development Code Chapter 70: Flood Plain District,

These minutes are not verbatim. The meeting was recorded, and copies of the recording are retained for a period of one year from the date of the meeting and are available upon request.

which included a PowerPoint presentation. Staff recommends the Planning Commission consider the staff report, draft language, and analysis and findings to make a recommendation to the City Council.

Mr. Doran stated that he is representing Jeff Fuchs, City Engineer, to present Plan Text Amendment 16-01 to update the Tualatin Development Code to meet new Federal Emergency Management Agency's (FEMA) minimum National Flood Insurance Program requirements. Mr. Doran noted that FEMA mailed a notice to the Mayor on May 4, 2016. The letter was from the Chief Engineering Management Branch, Federal Insurance and Mitigation Administration. Staff sent the Department of Land Conservation Development (DLCD) notice of the proposed code changes on August 31, 2016. The Planning Commission recommendation will be brought to City Council on September 15, 2016.

Mr. Doran stated that the codes to be amended are: Section 70.050 and Section 70.180. Section 70.050 will be amended to adopt the Flood Insurance Rate Map with an effective date of November 4, 2016. Section 70.180 will be amended to provide specifics as how residential construction with fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.

Mr. Doran added that the proposed Plan Text Amendment will add TDC Chapter 70.135. This will require the City Engineer to provide the Base Flood Elevation and Freeboard to the Building Official. Section 70.200 will be added to require alterations to Floodplain, Drainage, or Watercourses increasing the Base Flood Elevation or alter watercourses to obtain a Conditional Letter of Map Revision.

Mr. Doran presented a map that compared the FEMA Flood Insurance Rate Maps (FIRM) from 1987 vs. 2016. There are areas that are now recognized to be in the flood plain that were previously not known. Mr. Doran also presented a map that shows the new FEMA FIRM map which showed approximately 556 tax lots containing 755 acres which are in the floodplain.

Mr. Doran stated that there are two directions for the Commission – recommend approval or denial. If approved, the proposed Plan Text Amendment will make changes to TDC Chapter 70: Flood Plain District. If denied, Tualatin will be suspended from the NFIP. If suspended:

- Flood insurance will no longer be available.
- No federal grants or loans for buildings within floodplain. This includes all federal agencies such as Housing and Urban Development, Economic Development Administration, Small Business Administration, and the Department of Health and Human Services.
- No federal disaster assistance loans for repair or reconstruction of building within floodplain.

- No federal mortgage insurance for buildings within floodplain. This includes FHA, VA, and Farmers Home.
- No Fannie Mae, Freddie Mac, or Government National Mortgage Association purchase of mortgages in the secondary market may be made if the properties that are the subject of these mortgages are located in Special Flood Hazard Areas of nonparticipating communities.
- Lenders of conventional loans must notify that: property is within the floodplain; and the property is not eligible for federal disaster relief in a declared disaster
- If flooding occurs, it is possible that the local government could be held liable.

Mr. Doran explained that the next steps include a Public Hearing to City Council on October 10th. On October 24, the second City Council meeting is scheduled to adopt the Ordinance. On November 4, the Ordinance will be in effect.

Mr. Aplin asked if the 1996 flooding affects the main map with a 100 year flood plain. Mr. Doran answered that the 1996 flood was actually an 84 year flood, which is a 1.2 percent chance per year of occurrence. The 100 year flood is a 1 percent chance of occurrence per year. Mr. Doran explained that Clean Water Services was given a half million dollars to survey the 1996 flood in 2005 in order to provide information to FEMA to update the FIRM maps.

Mr. Ball asked if it would affect utilities such as substations and railroads that cross the flood plains. Mr. Doran answered affirmatively that the code would need to be followed and that current and proposed code would have similar affect.

MOTION by St. Clair to approve and recommend adoption, SECONDED by Ball.
MOTION PASSED 6-0.

5. **COMMUNICATION FROM CITY STAFF:**

A. Mobile Food Units (Food Carts): Research Results and Regional Examples.

Charles Benson, Associate Planner, provided an update to the Planning Commission on food cart activity in Tualatin since adoption of temporary rules per Ordinance 1393-16, and to review and discuss research results from recently adopted ordinances in the Portland metro area.

Mr. Benson stated that late last year one of the businesses in town wanted to start a food cart business but our code did not allow it at the time. That business asked the City Council to enact an ordinance to allow food carts. Mr. Benson added that Portland is known for their food carts and Tualatin wanted to look at what other jurisdictions are doing and get an idea of what could work for our City.

Mr. Benson noted that at the June 2016 City Council meeting, staff presented a project framework including a timeline with milestones. The Council agreed that the

timeline seemed appropriate and directed staff to move forward with the steps necessary to bring an ordinance for mobile food units to the Council by the end of the calendar year.

Mr. Benson stated that after adoption of Ordinance 1393-16 in June 2016, staff created a frequently asked questions (FAQ) web page on the City of Tualatin web site to inform the public about temporary mobile food cart provisions included in the Tualatin Municipal Code. Information regarding these new provisions was also highlighted in the August 2016 issue of Tualatin Today.

With the exception of the PuPu Shack, staff is not aware of other food carts or pods operating in the City at this time. Mr. Benson noted that we received a few calls, but no permit applications have been submitted.

Mr. Benson stated that staff identified five cities that have recently adopted ordinances regulating mobile food carts: Beaverton, Gresham, Hillsboro, Milwaukie, and Tigard. These ordinances were reviewed to determine the status of the most recent regulatory examples and similarities for mobile food arts. Some generalizations among these five ordinances include the following:

- Local business licenses required.
- County health or food handler licenses required.
- Food cart operations allowed in commercial, industrial, and mixed-use planning districts.
- All jurisdictions emphasize the “vehicular” and “eating and drinking establishment” characteristics of mobile food carts.
- Food cart/pod sites must have paved/improved surfaces.
- Few restraints on hours of operations.

The five ordinances differ in the following manner:

- Regulations incorporated within municipal codes vs. development codes.
- Legal definition of mobile food unit/cart/pod.
- Accessory use requirements.
- Utility/Infrastructure connection guidelines.
- Signage regulations.
- Site conditions, on-site restrictions, and operational interactions with adjacent uses.

Mr. Benson noted that based on review of the regional examples presented above, staff has the following suggestions:

- Add food cart/pod regulations to Tualatin Municipal Code as opposed to the Development Code.
- Adopt operational definition as found in current temporary Ordinance 1393-16.

- Restrict food cart/pod operations to sites that have previously undergone Architectural Review and prohibit operations on vacant/unimproved sites.
- Require food carts to be self-contained and not require connections to City infrastructure.
- Require food carts/pods to be responsible for their own trash/recycling collection and removal.
- Restrict signage to vehicle itself.

Other policy considerations include adopting specific permit/license for food cart operation, requiring accessory uses such as restrooms, seating and parking, restrict number of food carts at any one location, regulate overall hours of operation, or to adopt City of Gresham's food and beverage cart design guidelines. Mr. Benson noted that the City of Gresham seemed to have the most robust guidelines.

Aquilla Hurd-Ravich, Planning Manager, added that the timeline has changed. Our next step is wrapping up the public outreach which will include local businesses and manufacturers along with the collecting responses from the online survey. In October we will be incorporating policy recommendations from both City Council and the Planning Commission. In November, we will ask for a recommendation on an ordinance. In December, there will be a public hearing at City Council.

Ms. Hurd-Ravich noted that staff presented to the Commercial Citizen Involvement Organization (CIO) group, which consists of small business and restaurant owners. The general sentiment was that food carts would be unfair competition because they would not be paying the same taxes as the small business owners.

Mr. Aplin inquired if the Commercial CIO was against having the food carts in the industrial areas where there is a limited supply of places to eat. Ms. Hurd-Ravich responded that they were not in favor of food carts in general.

Mr. Ball asked if Tualatin Valley Fire & Rescue (TVF&R) is involved. He noted that food carts in Portland have to relocate every 90 days to avoid fire protection systems. Ms. Hurd-Ravich responded that there have been discussions with the Building department, but not the fire department with that detail. Mr. Ball suggested that fire safety requirements on temporary structures should be written in the code. Mr. Benson added that out of the five cities he researched, the City of Gresham was the only City that addressed fire safety.

Mr. Aplin noted that the food pods in Happy Valley are different from the Portland food carts. Ms. Hurd-Ravich acknowledged that Happy Valley Station is on a privately owned lot with outdoor seating. Mr. Benson stated that we are currently focusing on having food trucks on private property, not public property, and it doesn't affect typical catering trucks that usually serve for three hours or less.

Mr. Aplin inquired if the other cities had a limit on how large a pod can be. Mr. Benson replied that it is self-regulating, but they have to meet setbacks on the site.

Mr. Aplin asked if there is something written in the current code that regulates a company setting up an outdoor cafeteria. Ms. Hurd-Ravich responded that under current code, they can have a temporary catering truck. In the proposed ordinance, part of the reason to look at sites with a previous architectural review is because landscaping, parking, and storm water, and impervious surface conditions have to be met.

Ms. Demeo asked about the signage on the food trucks and if it will have to conform to current City sign regulations. Ms. Hurd-Ravich responded that we do have code that addresses signs on vehicles, but we'll have to explore it further. Mr. Aplin added that it should conform to the same standards.

Ms. Thompson inquired about restrooms for the food cart employees and patrons. Mr. Benson replied that they have temporary restrooms (honey buckets) for the Portland food carts. Ms. Hurd-Ravich noted that there are state and county health rules around that and in order to get a health permit there has to be a restroom within a five minute walk.

6. **FUTURE ACTION ITEMS**

Ms. Hurd-Ravich stated that we will be busy in the upcoming months. In October, there will be an update on Basalt Creek land uses. There will also be a presentation on public outreach of food carts. At some point, we may be bringing a preview on a Plan Map Amendment for the RV Park of Portland site. They have to rezone the southern portion of the property to high-density residential, which is approximately 5-10 percent of the site. Mr. Ball asked if the site was medium-high density. Ms. Hurd-Ravich answered that the rest of the site is high-density. Ms. Hurd-Ravich added that in November, we intend to have an action item on the food cart amendment and possibly a recommendation on the Plan Map Amendment.

7. **ANNOUNCEMENTS/PLANNING COMMISSION COMMUNICATION**

None.

8. **ADJOURNMENT**

MOTION by Mr. Aplin to adjourn the meeting at 7:36 pm.

_____ Lynette Sanford, Office Coordinator