

TO: City of Milwaukie

FROM: Brian Meunier, PE, CFM

DATE: 08/12/2021

SUBJECT: Coho Point – Floodplain Analysis

This memo outlines the proposed earthwork within the floodplain on the Coho Point development in the City of Milwaukie, Oregon (City). The site is located on the north side of Kellogg Creek, approximately 300 feet upstream from Kellogg Creek’s confluence with Willamette River at river mile 18.5.

The existing property is partially within the 100-yr floodplain as identified by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 41005C0009D (Effective 6/17/2008). The City noted in the Pre-Application Filing that the observed river stage of the 1996 flood (38.0 feet) should be used for analysis purposes rather than the FEMA 100-year Base Flood Elevation (36.3 feet) listed in the FIRM. The observed river stage from the 1996 flood has been used for the purpose of analyzing cut and fill within the floodplain for conservatism. References to ‘floodplain’ in the following paragraphs and attached documentation refer to the area below elevation 38.0 feet, unless specifically noted otherwise. All noted elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

The Coho Point development proposes to fill the on-site areas within the floodplain to allow for construction of the building. The site is impractical to develop without filling these areas, as the floodplain extends across the majority of the site and would encroach on the proposed building footprint. The proposed site plan partially fills the site and compensates for the lost floodplain volume by excavating in available space within the right-of-way (ROW) approximately 200 feet upstream of the project site. The total floodplain fill volume for the project is 3,442 cubic yards (cy). The proposed compensatory excavation will provide 3,576 cy of storage. Cross sections of the cut and fill areas are provided in the attached exhibits. The cut area will be planted with mitigation vegetation per City standards.

Compensatory storage is proposed to be provided by constructing a gabion wall, which would also allow for the construction of the Coho Point mixed-use building, as shown on Figure 1 through Figure 3. The proposed building, plaza, walkway, and park areas will be a minimum of approximately 7 feet above the floodplain elevation. The cut area along Kellogg Creek will be graded at a 2% slope starting slightly above the Ordinary High Water mark up to the gabion wall. Figure 2 and Figure 3 provide cross-sections that show the relationship between the existing channel grades and the FEMA 10-, 50-, and 100-year elevations, as well as the 1996 flooding elevation. The proposed floodplain cut is anticipated to be activated during events slightly more severe than the 2-year event, which is loosely equated to the OHW mark. This configuration is closer to a more natural condition than the current floodplain, with the floodplain being more accessible to flood flows and providing storage during more frequent events. The proposed grading will also protect against potential fish entrapment in the floodplain area as flooding recedes. The slope will cause the water depths to be shallower at the edge so that as the water recedes, the fish are naturally ‘nudged’ closer to the channel, decreasing the risk of entrapment.

The Effective Flood Insurance Study (FIS) was used to evaluate the potential impacts of relocating a portion of the floodplain volume upstream. The FIS flood profiles (39P and 40P) show that Kellogg Creek is backwatered by Willamette River from the mouth of Kellogg Creek to a point approximately 5,600 feet upstream; this reach of Kellogg Creek contains both the cut and fill sites. No increase in the FEMA 100-year flood or 1996 flood-equivalent flooding elevations is expected to result from the cut and fill as the areas are both within the Willamette backwater and in areas that would be modeled as ineffective flow areas

in a traditional one-dimensional, steady-state flow model. No fill is proposed to take place within the regulatory floodway.

The proposed floodplain ‘shelf’ has the potential to temporarily or permanently accumulate sediment. It is not possible to completely prevent sediment accumulation in the project area as a result of being within the Willamette backwater. Suspended sediments are expected to settle out of the water column above the floodplain shelf when the Willamette stage is elevated above the shelf. The rising and falling limb of the Willamette hydrograph is long/slow and will not allow for an appreciable flow velocity over the floodplain shelf that would prevent sediment accumulation. The existing floodplain is subject to this same issue; however, the fact that it is activated in much less frequent events and at a higher elevation suggests that the risk of sediment accumulation is lower. A conservative estimate of the amount of sediment accumulation within the proposed cut area is 6 – 12 inches, which is representative of what might be observed along a stream with a heavy sediment load. This equates to between 120 and 240 cy of accumulation, assuming an even thickness of sediment accumulation. Should the accumulation reach these conservative levels, the net amount of floodplain storage provided is negligibly different from the existing floodplain volume.

In summary, this analysis confirms no adverse effects or impacts to surrounding properties are expected to result from the proposed project. The proposed floodplain cut/fill is expected to provide an overall net benefit to the system, while allowing for the development of the project site.

I, Brian Meunier, am a duly certified Professional Engineer and Certified Floodplain Manager with more than 10-years of experience working in and around rivers and streams of various sizes, hydrologic settings, and physiographic regions. My educational background and professional experience have focused on hydrology, hydraulics, geomorphology, and stream restoration, all of which are entirely relevant to the proposed project and the subject matter of this memorandum.

Please feel free to contact me with any questions.



Brian Meunier, PE, CFM









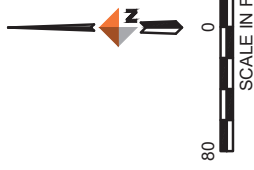
Attachments:

- ◆ Coho Point Exhibits
 - ◆ Figure 1: Existing Conditions
 - ◆ Figure 2: Proposed Conditions
 - ◆ Figure 3 – 5: Cut and Fill Area Cross Sections
- ◆ Clackamas County Flood Insurance Study Maps
 - ◆ Kellogg Creek (Maps 39P and 40P)
 - ◆ Willamette River (Map 163P)
- ◆ Clackamas County Flood Insurance Rate Maps
 - ◆ Panel 0009D
 - ◆ Panel 0017D



LEGEND

-  PROPOSED FLOODPLAIN FILL: 3,442 CY
-  PROPOSED FLOODPLAIN CUT: 3,576 CY
-  PROPOSED GABION WALL
-  POST PROJECT FLOODPLAIN; ELEVATION: 38.0 FEET
-  ORDINARY HIGH WATER LINE (SURVEYED BY AKS IN 2018)
-  FEMA FLOODWAY BOUNDARY

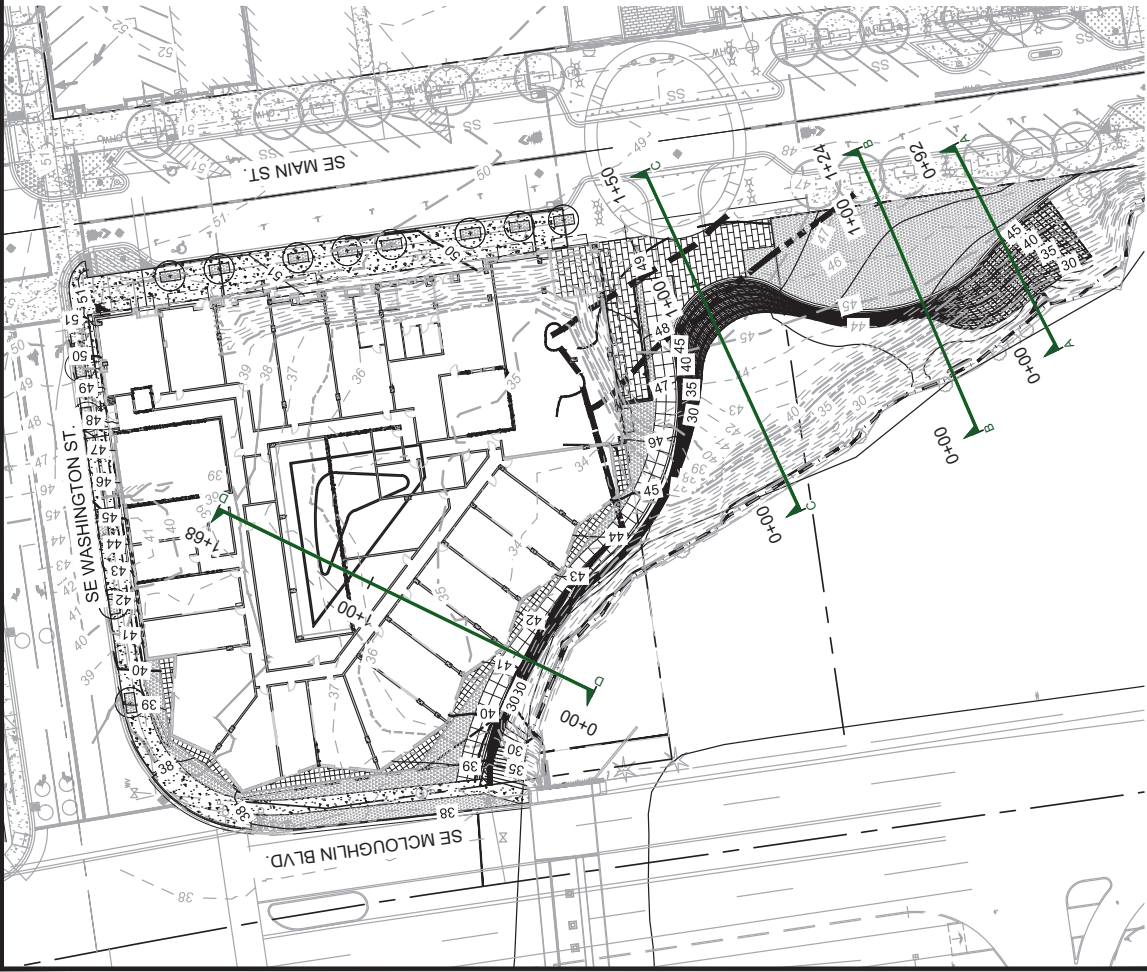



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**COHO POINT
 PROPOSED CONDITIONS
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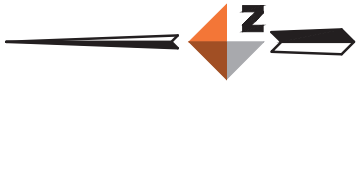
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FIGURE 2



LEGEND

- EXISTING MAJOR CONTOUR ——— 180
- EXISTING MINOR CONTOUR - - - - - 181
- PROPOSED MAJOR CONTOUR ——— 181
- PROPOSED MINOR CONTOUR ——— 180
- EXISTING RIGHT-OF-WAY LINE ———
- VEGETATED CORRIDOR ———
- FIELD VERIFIED HCA LINE ———
- ORDINARY HIGH WATER LINE (24.0') ———
- CITY MAPPED HCA LINE ———
- PROPOSED CONCRETE SIDEWALK ———
- PROPOSED PERVIOUS PLAZA ———
- PROPOSED PERVIOUS (GRATE) WALKWAY ———
- EXISTING FEMA 100-YR FLOODPLAIN (36.3') ———
- EXISTING 1996 FLOODPLAIN BOUNDARY (38.0') ———
- FEMA FLOODWAY BOUNDARY ———



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COHO POINT
 SITE SECTIONS
 CITY OF MILWAUKIE, OREGON

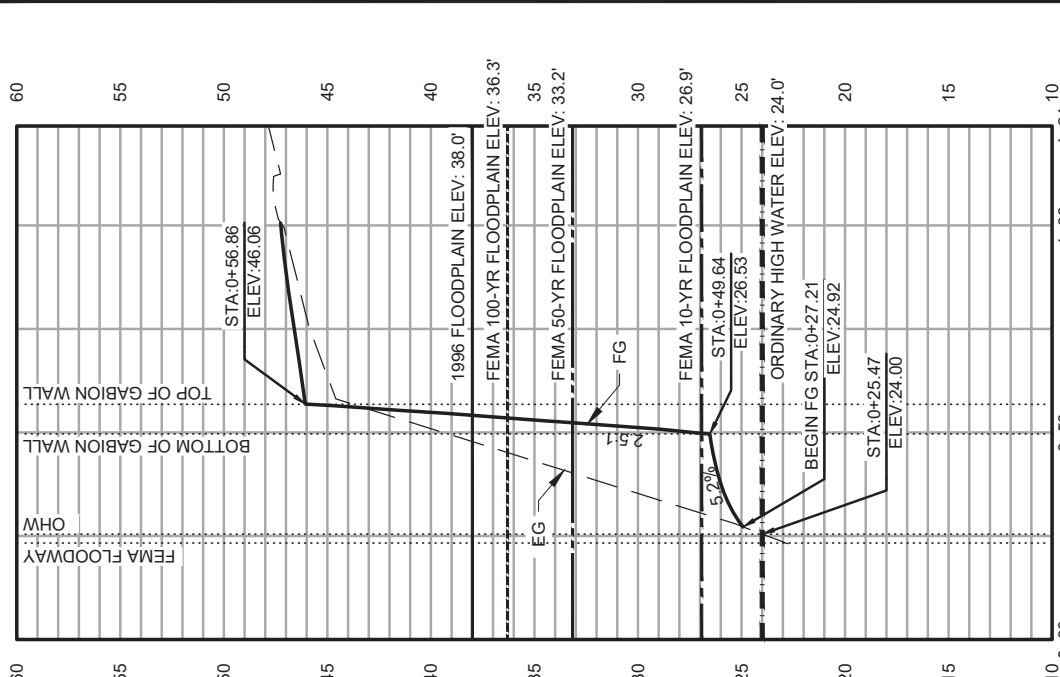
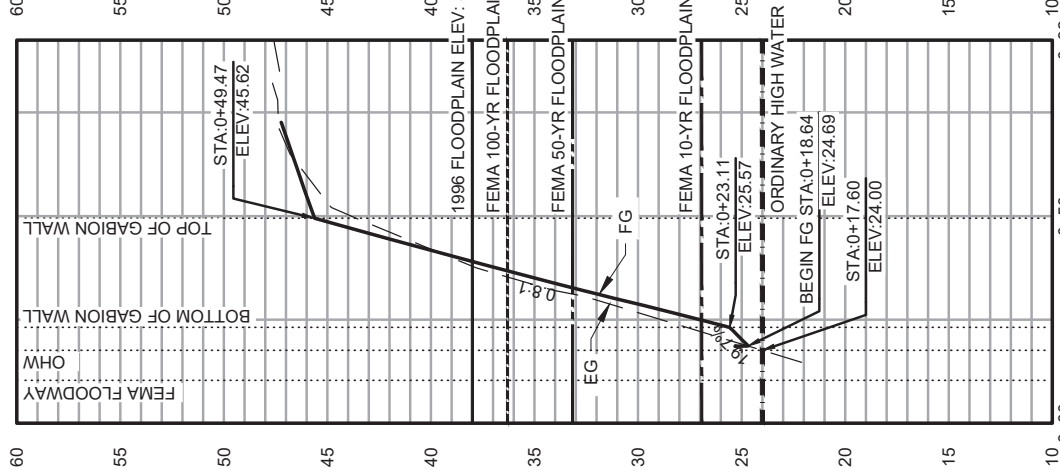
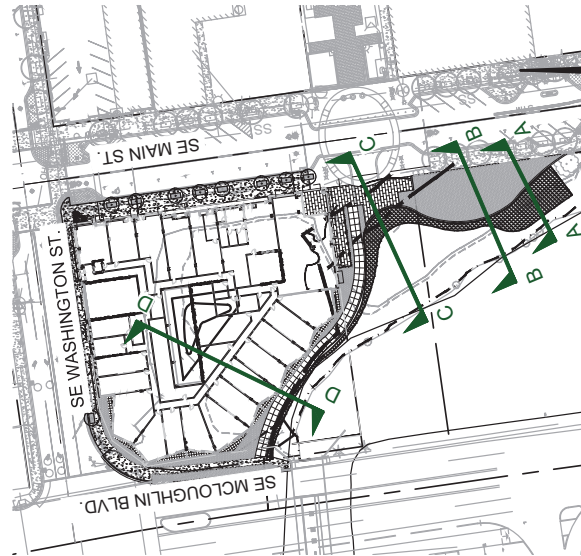
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FIGURE 3

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LEGEND

	PROPOSED FINISHED GRADE
	EXISTING GRADE
	ORDINARY HIGH WATER LINE (24.0')
	EXISTING 1996 FLOODPLAIN BOUNDARY (38.0')
	EXISTING FEMA 100-YR FLOODPLAIN (36.3')
	EXISTING FEMA 50-YR FLOODPLAIN (33.2')
	EXISTING FEMA 10-YR FLOODPLAIN (26.9')



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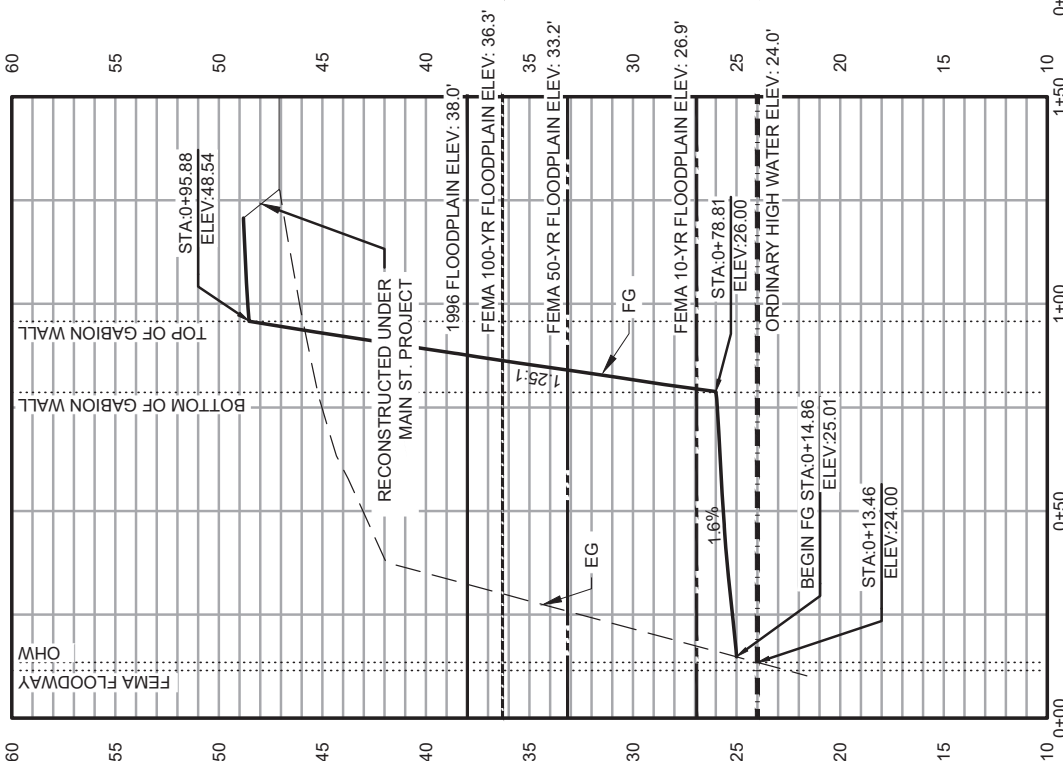
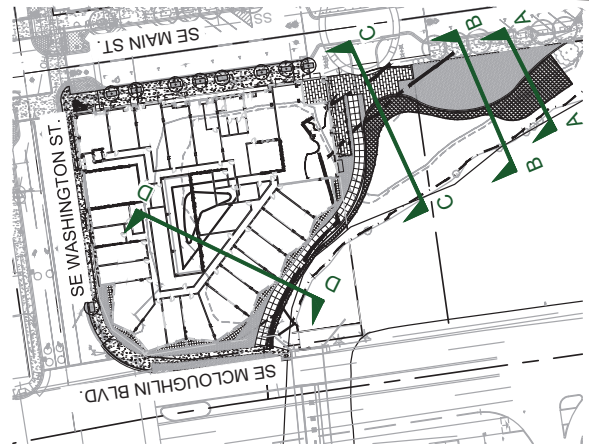
COHO POINT
SITE SECTIONS - PROFILES A-A & B-B
CITY OF MILWAUKIE, OREGON

FIGURE 4

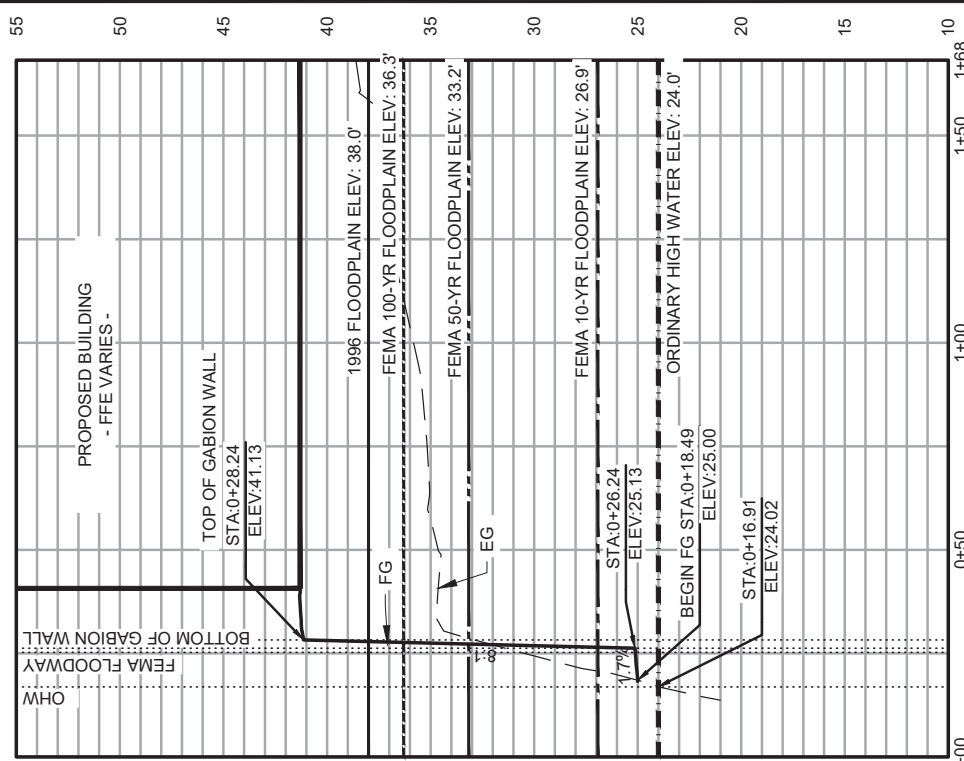
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SECTION C-C
 HORIZONTAL SCALE: 1" = 30'
 VERTICAL SCALE: 1" = 6'



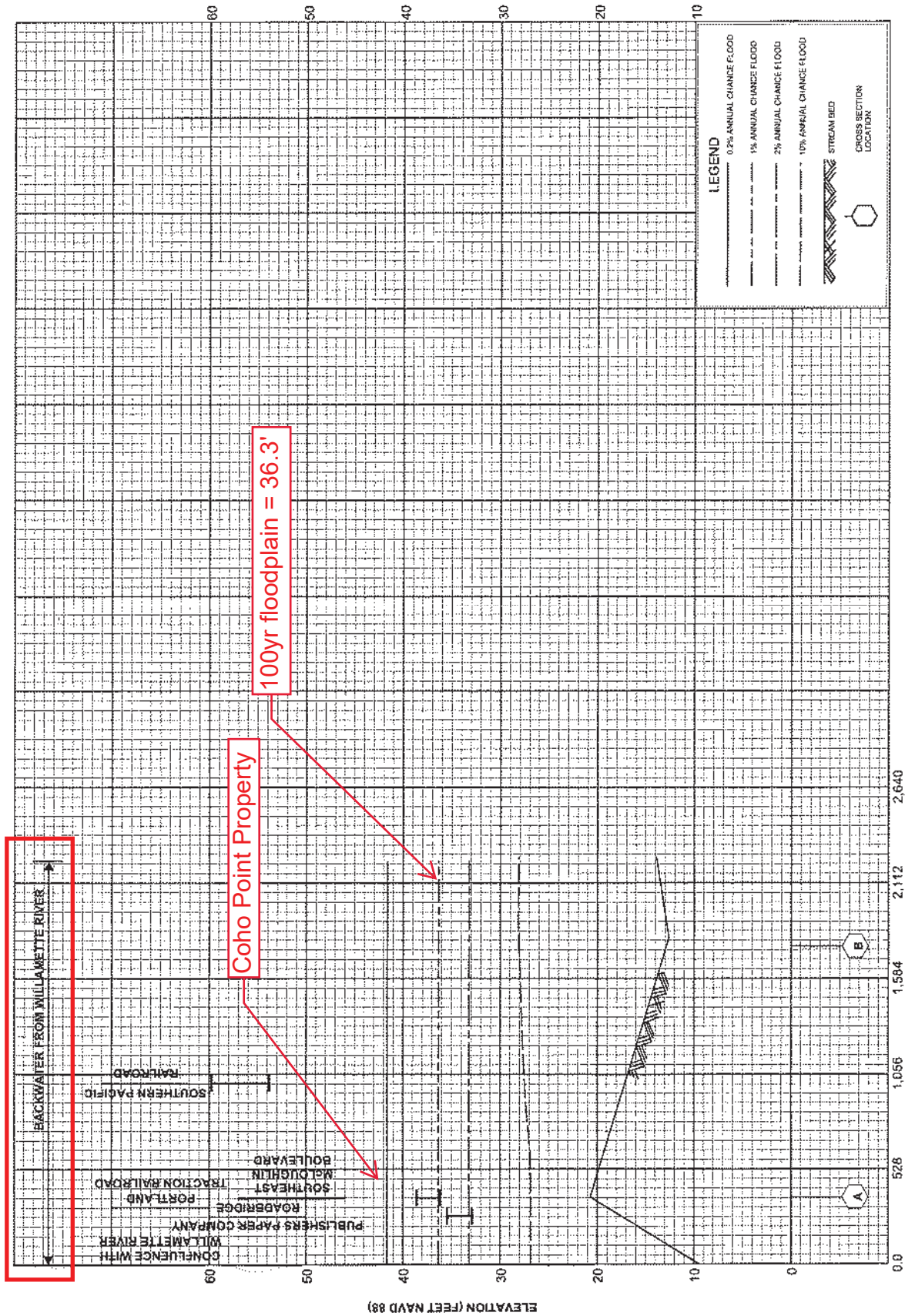
SECTION D-D
 HORIZONTAL SCALE: 1" = 30'
 VERTICAL SCALE: 1" = 6'

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COHO POINT
SITE SECTIONS - PROFILES C-C & D-D
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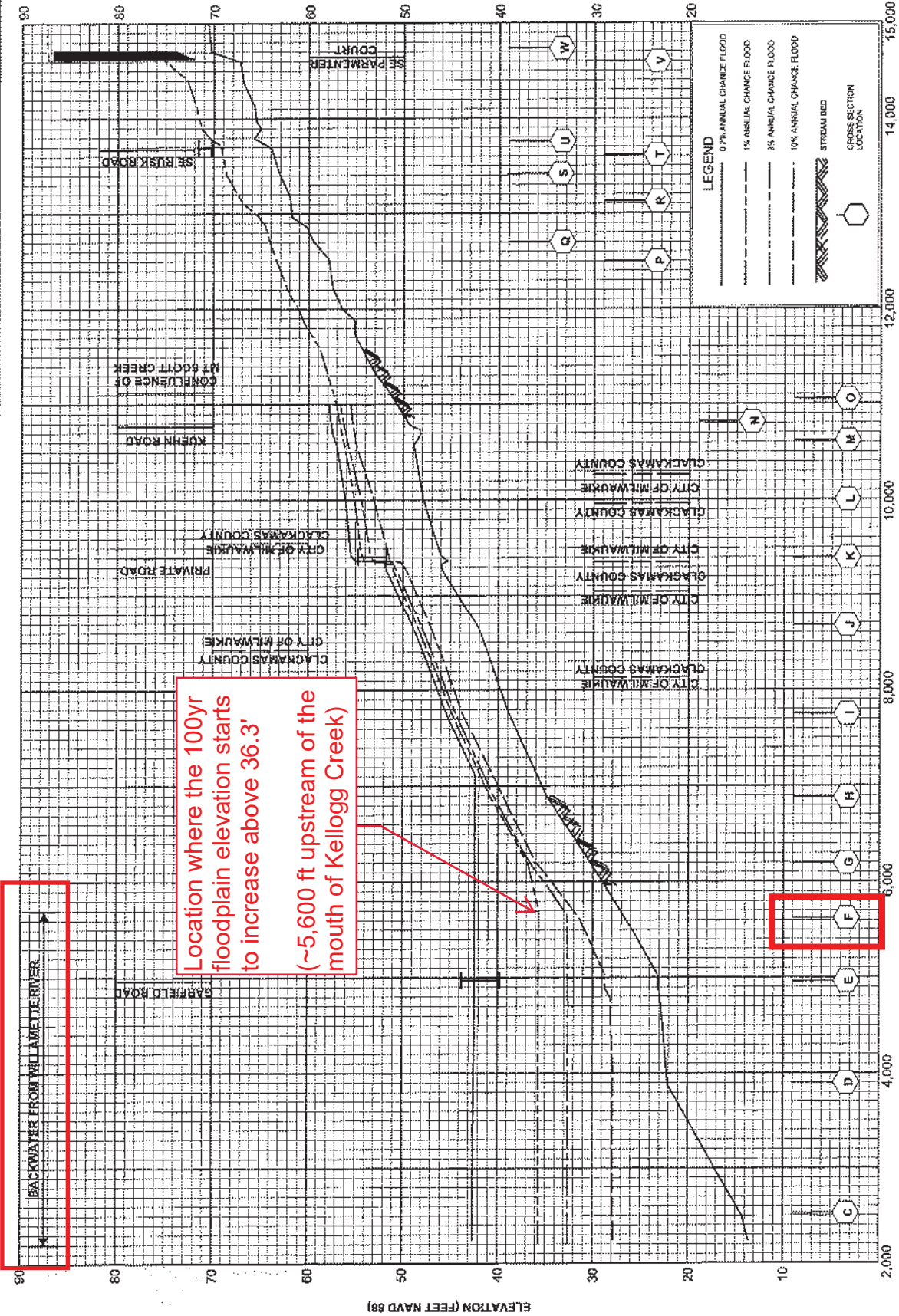
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WILLAMETTE RIVER

100yr floodplain = 36.3'

Coho Point Property

BACKWATER FROM WILLAMETTE RIVER

ELEVATION (FEET NAVD 88)

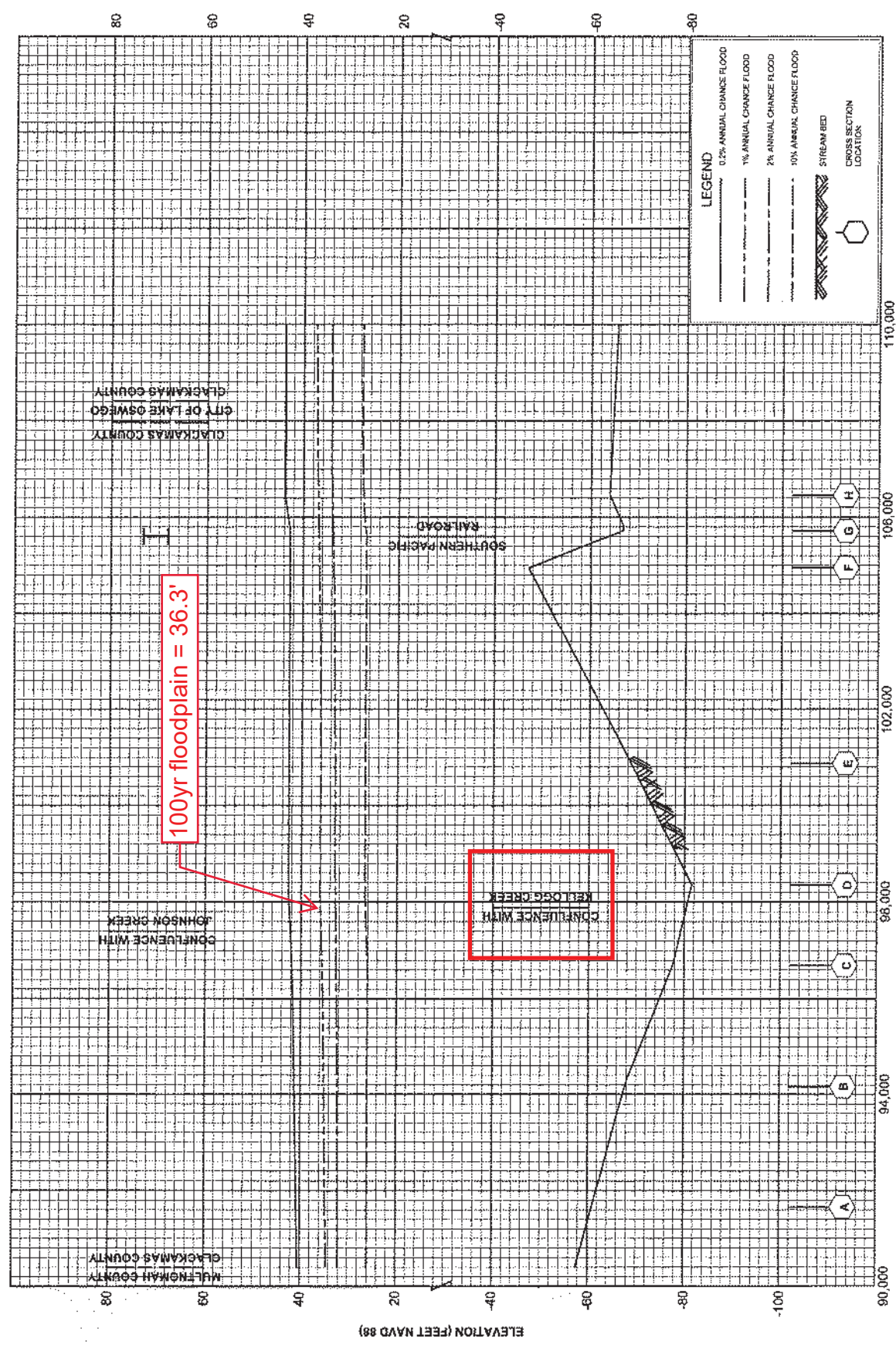


Location where the 100yr floodplain elevation starts to increase above 36.3' (~5,600 ft upstream of the mouth of Kellogg Creek)

BACKWATER FROM WILLAMETTE RIVER

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WILLAMETTE RIVER

ELEVATION (FEET NAVD 88)



100yr floodplain = 36.3'

CONFLUENCE WITH
KELLOGG CREEK

CONFLUENCE WITH
JOHNSON CREEK

SOUTHERN PACIFIC
RAILROAD

CLACKAMAS COUNTY
CITY OF LAKE OSWEGO
CLACKAMAS COUNTY

MULTNOMAH COUNTY
CLACKAMAS COUNTY

STREAM DISTANCE IN FEET ABOVE MOUTH

ELEVATION (FEET NAVD 88)

