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June 9, 2022

NOVAGOLD Resources, Inc.
201 South Main Street, Suite 400
Salt Lake City, Utah 84111

Attention: Ron Rimelman
Vice President, Environment, Health, Safety & Sustainability

Subject: Hydraulic Report
Former New Gold House Facility
Nome, Alaska
File No. 19726-001-00

Dear Mr. Rimelman:

GeoEngineers is pleased to submit for review the attached design and hydraulics report used to develop some of the key design criteria and assumptions for the engineered fill cap at the Former New Gold House (FNGH) in Nome, Alaska. The design addresses the implementation of the proposed remedial action and rationale outlined in NOVAGOLD's March 11, 2020 letter to ADEC. The key overriding criteria the design addresses, as described in the report, are:

1. Eliminates potential for direct exposure to or erosion of contaminants remaining at the FNGH site (largely limited to the surface and near surface),
2. No excavation,
3. Withstand potential flooding, and
4. The cap covers the area where mercury is greater than 0.36 mg/kg (which is conservative as the impact to groundwater criteria), and 151 mg/kg for arsenic (proposed background). Note that methylmercury is not a contaminant of concern for the cap.

Factors that were considered in developing the draft design that are not explicitly detailed in the report, but are of crucial importance, include the following:

1. Movement of soil at the FNGH kept to the absolute feasible minimum.
2. All materials for the cap be locally sourced (i.e., within the immediate Nome vicinity).
3. Water displaced from the backfilling of the pond is handled as efficiently as possible.
4. Placement of the cap will not 'squeeze' out existing petroleum contamination beneath the FNGH and mobilize it towards Dry Creek.



The original scope called for the development of a hydrological model to evaluate 25- and 200-year flood events, but the models were also run for typical (2-year) all the way through a hypothetical 500-year event for completeness. The key conclusions about the area of Dry Creek between Bering Street and the Nome Bypass Road are:

- a. Under even the most extreme conditions, Dry Creek and its floodplain act as a giant ‘bathtub’ that drains comparatively very slowly. The outcome of this is that only the finest of silts (not suitable for capping material) would ever mobilize under every modeled flooding scenario. This provides a wide range of suitable material for capping, and eliminates the need for any type of armoring of the cap.
- b. Furthermore, the hydrological model was run under a scenario of there being a second equivalent sized culvert running under Bering Street (proposed by ADOT). The intent was to see if increased flow velocities would mobilize cap material and threaten the cap’s integrity. The model concluded that while a second conduit would increase flow velocity slightly in Dry Creek, it would not be nearly sufficient to mobilize any cap material. The model did show that flood elevations would drop considerably (reducing potential for cap inundation in a flood), but that in normal creek conditions, a second culvert would result in the flood plain retreating slightly away from the cap and moving closer to the main creek channel.
- c. One of the most important findings from the survey and modeling is that the pond is not stagnant; in fact, rather than looking at it as a pond, it should instead be considered a deep ‘pool’ in a flowing channel within the floodplain. What this means is that it would be extraordinarily difficult to dewater the pond unless extreme measures were taken, such as damming a large portion of Dry Creek upstream or building a coffer dam type structure around the pond to dewater it. This may seem like a significant challenge, but the outcome of the design is that there is a practical field workaround that will eliminate the need for pumping any water out of the pond at all during construction. The proposed solution is to install a temporary turbidity curtain along the drainage to the west of the pond and monitor turbidity levels with a handheld monitor while filling the pond very gradually (i.e., placing riprap and fill into the pond void carefully rather than bulldozing material in all at once), so that the actual amount of displaced water in the flowing channel will be quite small. GeoEngineers believes this is very feasible to implement in the field but will develop specific field implementation instructions in the final design. The benefit, according to the model, is that this channel will cease to flow near the cap and will gradually reroute to the north before joining Dry Creek west of the site. It is noteworthy that all water samples collected in Dry Creek to date as part of the monitoring program have met water quality standards for surface water for all constituents, even arsenic. And while sediment in the pond exceeds soil cleanup values for mercury and arsenic, this approach will minimize any movement of sediment and filling the pond will eliminate it as an attractive nuisance and potential exposure route for these chemicals to human receptors (no fish have ever been observed in the pond).

There are two other key conclusions developed from the hydrologic modeling work:

First, the ‘squeezing’ of petroleum hydrocarbons. The test pits, along with a review of over a dozen historic boring and well logs in the cap area show petroleum hydrocarbons are limited to being present only in a nearly uniform and thin vertical layer ranging from approximately 2 feet to 4 feet below ground surface, and



almost exclusively in a sandy formation. The 2 feet above this zone (surface to 2 feet below) is an equally uniform zone of organic materials that compress easily and will act as 'shock absorbers' in effect to prevent any further subsurface compression.

Second, construction duration and cost. The cap is proposed to be a minimum average thickness of 2 feet, consisting of uniform fill material that will be suitable for the placement and sustainment of vegetation. This cap thickness should be more than sufficient to prevent exposure to surface soil contamination present at the site. GeoEngineers included replacing the existing fence as a key component of the remedy, as well as bordering portions of the cap with larger riprap as a trespassing deterrent. This design can be constructed quickly during the short period of favorable weather in Nome and done so cost effectively.

On behalf of GeoEngineers, we look forward to working with NOVAGOLD and ADEC in refining and completing the final cap design for this project. We appreciate the opportunity to be part of this effort. Please do not hesitate to contact me directly if you have any questions or require additional information.

Sincerely,
GeoEngineers, Inc.



Phil Welker, PE
Principal

PW:leh

Attachment (submitted electronically)

Final Hydrology Report, Former New Gold House Site



Final Hydraulic Report

Former New Gold House Site
Nome, Alaska

for

NOVAGOLD Resources, Inc.

NOVAGOLD

June 9, 2022



Final Hydraulic Report

Former New Gold House Site
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Former New Gold House Site
Nome, Alaska

File No. 19726-001-00

June 9, 2022

Prepared for:

NOVAGOLD

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1.0 INTRODUCTION AND SCOPE OF SERVICES

This Hydraulic Report documents GeoEngineers, Inc's (GeoEngineers) hydrologic, hydraulic, and stability analyses in conjunction to the proposed remedial capping effort at NOVAGOLD Resources, Inc.'s (NOVAGOLD) Former New Gold House (FNGH) site (Figure A1).

GeoEngineers has previously completed various environmental investigations into the historic contamination at NOVAGOLD's FNGH site, located in Nome, Alaska. Mercury was used as a component of gold processing operations. Additionally, arsenic (which is known to be present at high background concentrations throughout Nome) was concentrated because of the physical consolidation of ore and waste materials around the FNGH site. Following the preferred remedial action, GeoEngineers has designed an engineered fill cap to limit future exposure to the historic contamination. The site investigations and cap design were both completed separately from this report.

1.1. Scope

The objective of the hydraulic modeling is to estimate water surface elevations and velocities during flood events in Dry Creek to identify how flooding may affect the remedial design. Our scope of services included:

- Determine Dry Creek peak flow events to be used in the hydraulic modeling efforts.
- Develop a one-dimensional hydraulic model of Dry Creek through the project reach using topographic survey data.
- Analyze the stability of the proposed engineered cap material sizing using results from the proposed hydraulic model.
- Prepare a memorandum documenting the findings and results of the hydrologic, hydraulic, and stability analyses to help inform the engineered cap design.

1.2. Site Conditions

Dry Creek generally flows east to west through the half mile project reach. The site is positioned between two road crossings, Nome Bypass Road (upstream) and Nome-Teller Highway/Bering Street (downstream) (Figure A1). The Nome Bypass Road culvert is an approximately 7-foot- diameter corrugated metal pipe (CMP). The Nome-Teller Highway/Bering Street culvert is an approximately 10-foot diameter CMP. The stream slope through the site is approximately 0.002 foot/foot. The site's floodplain is confined between the Nome-Teller Highway road embankment (to the north) and a hillslope associated with previous development activities (to the south). Dry Creek's active channel width is approximately 8 feet wide. Soggy wetland zones extend 30 feet from the edge of bank into the floodplain. Most of the floodplain is covered with mature grass and sedges.

1.3. Proposed Engineered Fill Cap

At the date of this hydraulic report, the proposed engineered fill cap design footprint covers approximately 42,295 square feet. The cap is to begin along the southern hillslope and extend approximately 200 feet north, covering the contained site (refer to Draft Soil Cover Design, Nome, Alaska, Sheet 2.0). The proposed engineered fill cap is designed as a 24-inch-thick layer of import fill soil. It is proposed that the

existing ground surface will be brush-hogged prior to placement of the fill cap, but the intention is to leave the existing vegetation's roots intact.

Per the ASTM D422 standard specifications, the import fill soil gradation is defined as 95 – 100 percent passing through a 25-millimeter standard sieve and 10 – 30 percent passing through a No. 200 sieve (0.075 mm).

2.0 HYDROLOGY

A desktop study of federal and state hydrologic sources did not yield evidence of historical or present-day stream gaging of Dry Creek. To determine peak flow rates for Dry Creek at the NOVAGOLD property, the United States Geological Survey (USGS) regional regression equations for Alaska were utilized (USGS 2016) (Table 1). The regression equations estimate peak design flow rates for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year flood events for unregulated streams in Alaska. Regression equation inputs include drainage area and mean annual precipitation. GeoEngineers delineated Dry Creek's contributing basin area to include 7.494 square miles. USGS's regression equations require mean annual precipitation data from 1971 – 2000 PRISM data. Dry Creek is not included in the database; the two closest gages were used and averaged. The closest gaged basins are Snake River and Dexter Creek. An Average precipitation of 20 inches was used.

TABLE 1. DRY CREEK PEAK FLOWS AT NOVAGOLD PROPERTY

Mean Recurrence Interval (Year)	Flow (cfs)
2	109
5	191
10	255
25	345
50	415
100	491
200	570
500	681

Note:

cfs = cubic feet per second

3.0 HYDRAULIC MODELING

GeoEngineers developed a one-dimensional, steady-state hydraulic analysis of the FNGH site using the US Army Corps of Engineers' (USACE) Hydrologic Engineering Center's River Analysis System (HEC RAS). HEC-RAS 1-D computes stream water surface profiles using a step-wise methodology. Computations are based around the one-dimensional energy equation while evaluating various energy losses through Manning's equation and deploying the momentum equation where water surface profiles rapidly vary (USACE 2019). Natural and built features and obstructions such as large wood inputs, fishways, dams, levees, culverts, etc. can all be evaluated within the software.

3.1. Hydraulic Model Development

HEC-RAS version 5.0.7 was utilized to analyze existing, proposed, and future compatibility conditions of the FNGH site, the results of which were used to analyze material stability of the proposed remedial efforts. See Appendix B (Figure B1) for a schematic of the hydraulic model layout.

Manning’s n is a parameter used to represent the relative roughness of surfaces in the models. Manning’s n values are defined within the HEC-RAS cross sections. Roughness values were estimated using photographic guidance, engineering judgement, and standard Manning’s n tables. Table 2 presents Manning’s n values used in the hydraulic models.

TABLE 2. MANNING’S N VALUES

Coverage	n Value
Main Channel	0.036
Vegetated Floodplains	0.078
Bering Street Culvert	0.025
Nome Bypass Road Culvert	0.02
Proposed Engineered Fill Cap	0.04

3.1.1. Existing Conditions

Topographic and bathymetric survey of the entire FNGH site was originally collected in 2016. The survey included culverts up and downstream of the site, the failed bridge crossing, adjacent infrastructure, as well as other points of interest. Additional topographic and bathymetric survey data within the direct vicinity of the FNGH site along with select cross sections up and downstream of the site were provided by NOVAGOLD in November 2021. Cross sectional data were extracted from the survey data and imported into HEC-RAS. Topographic data from 2021 were prioritized where both 2016 and 2021 data were available.

The existing conditions model includes approximately 3,667 feet of Dry Creek’s channel (including culvert lengths), extending approximately 440 and 600 feet up and downstream of the site, respectively. The upstream culvert was included within the model as a 7-foot CMP. The downstream culvert was defined within the model as a 10-foot CMP.

The peak flows shown in Table 1 define the steady-state upstream boundary conditions for all hydraulic models discussed in this report. A normal depth energy slope of 0.0016 feet/foot defines the downstream boundary condition for all flows and geometric configurations. This slope is approximately equal to the downstream channel gradient.

3.1.2. Proposed Conditions

The proposed conditions model includes three modified cross sections at river stations 1100, 1192 and 1288 to account for the proposed engineered fill cap thickness and associated change to the left floodplain Manning’s roughness coefficients (Figure B2). All other proposed modeling components are consistent with the existing conditions model.

3.1.3. Future Compatibility

Future development of the project site may include increasing the conveyance capacity of the downstream crossing at Nome-Teller Highway/Bering Street. To test future compatibility of the proposed cap design, an additional 10-foot CMP was added adjacent to the existing 10-foot CMP. All other future compatibility modeling components are consistent with the proposed conditions model.

3.2. Hydraulic Model Results

Table 3 and Table 4 show hydraulic model results for the 2- and 200-year flow recurrence interval events, respectively, at the modified cross section locations that include the proposed fill cap under the proposed and future compatibility conditions. The flat gradient through the site and the undersized downstream crossing result in a backwater condition evident in the uniform water surface elevations (WSELs) at the three cross section locations for any particular configuration and flow event. Calculated water surface profiles included in Appendix B (Figure B2, Figure B3, Figure B5, and Figure B7) show this backwater effect. Model results indicate that the proposed cap will have no effect on WSELs through the remediation site because the calculated WSELs shown in Table 3 and Table 4 are identical between existing and proposed conditions. Proposed conditions will result in an increase of at most 0.3 feet per second (fps) in average main channel velocities, occurring during the 2-year event at river station 1,288. This is because the cap results in less flow being conveyed through the left floodplain at this location, resulting in more flow in the main channel. The future compatibility condition model results show a reduction in the backwater condition caused by the Bering Street crossing. The calculated depths within the proposed cap area are expected to decrease by 1 foot during the 2-year event and by 3.1 feet during the 200-year event. This decrease in water depths corresponds to the increases in average main channel velocities shown in Table 3 and Table 4 for the future compatibility condition.

TABLE 3. 2-YEAR EVENT HYDRAULIC MODEL RESULTS AT CROSS SECTIONS THROUGH THE PROPOSED FILL CAP

River Station (feet)	Existing Conditions			Proposed Conditions (cap in place)			Future Compatibility (second culvert below Bering Street)		
	WSEL (ft, NAVD88)	Maximum Main Channel Depth (feet)	Average Main Channel Velocity (fps)	WSEL (ft, NAVD88)	Maximum Main Channel Depth (feet)	Average Main Channel Velocity (fps)	WSEL (ft, NAVD88)	Maximum Main Channel Depth (feet)	Average Main Channel Velocity (fps)
1,100	10.4	4.3	0.4	10.4	4.3	0.5	9.4	3.2	0.9
1,192	10.4	4.0	0.5	10.4	4.0	0.5	9.4	2.9	1.0
1,288	10.4	2.8	0.2	10.4	2.8	0.5	9.4	1.8	0.8

TABLE 4. 200-YEAR EVENT HYDRAULIC MODEL RESULTS AT CROSS SECTIONS THROUGH THE PROPOSED FILL CAP

River Station (feet)	Existing Conditions			Proposed Conditions (cap in place)			Future Compatibility (second culvert below Bering Street)		
	WSEL (ft, NAVD88)	Maximum Main Channel Depth (feet)	Average Main Channel Velocity (fps)	WSEL (ft, NAVD88)	Maximum Main Channel Depth (feet)	Average Main Channel Velocity (fps)	WSEL (ft, NAVD88)	Maximum Main Channel Depth (feet)	Average Main Channel Velocity (fps)
1,100	16.2	10.1	0.5	16.2	10.1	0.5	13.1	7.0	0.9
1,192	16.2	9.7	0.4	16.2	9.7	0.4	13.1	6.6	0.9
1,288	16.2	8.6	0.2	16.2	8.6	0.4	13.1	5.5	0.8

4.0 STABILITY ANALYSIS

4.1. Modified Shield’s Equation

We used the modified Shield’s stress equation (USFS 2008) to calculate critical shear velocities for the range of particle sizes that comprise the import fill soil’s gradation. Figure B9 and Figure B10 depict the stability analyses for the 2-, 100-, 200-, and 500-year flow recurrence interval events for both the proposed and future compatibility designs, respectively. These critical shear velocities represent the minimum flow induced shear stress necessary to mobilize a sediment particle of a given size. The proposed cap will be subjected to shear stresses of effectively zero under both the proposed and future compatibility conditions for all flow events considered in the stability calculations. Hydraulics through the site are such that the 2- and 100-year events effectively describe the range of solutions for the peak flows between them; therefore, we expect the full range of particle sizes for the cap to be stable for all flows shown in Table 1.

Additionally, we calculated a minimum, stable D_{50} (particle size for which 50 percent of a sediment gradation is smaller than) for the designed cap for the 200-year flow events for both the proposed and the future compatibility conditions and compared these to the design D_{50} . Table 5 shows the results of this analysis and that both calculated D_{50} ’s are much smaller than the proposed D_{50} , indicating that the proposed import fill soil is appropriate for the designed cap. We performed these calculations by applying the methodology described in the Federal Highway Administration (FHWA) document “Hydraulic Engineering Circular No. 23 (HEC-23), Volume 2” (FHWA 2009) integrated into the FHWA Hydraulic Toolbox version 5.1 application (FHWA 2021) (Figure B11) shows the inputs and results of these calculations within the Hydraulic Toolbox. We derived the hydraulic inputs necessary to complete these sizing calculations from the appropriate HEC-RAS model scenarios described in Section 3.1, using the HEC-RAS results corresponding to the highest 200-year flood velocities over the proposed cap.

TABLE 5. MINIMUM, STABLE SIZING FOR THE 200-YEAR FLOW EVENT

Proposed Conditions (cap in place) D₅₀ (inches)	Future Compatibility (second culvert below Bering Street) D₅₀ (inches)	Proposed Cap D₅₀ (inches)
0.0008	0.0045	6.30

4.2. Ice Considerations

The Alaska Highway Drainage Manual recommends layers should be the greater thickness of either the equivalent spherical diameter of the D₁₀₀ or at least two times the spherical diameter of the D₅₀ (Alaska Department of Transportation 1996). Thickness should be increased by 50 percent when placed underwater and/or increased by one foot when subject to attack by floating debris or ice (Alaska Department of Transportation 1996).

Shear stress values and velocities are low in the vicinity of the proposed engineered fill cap (Section 4.1). Floating ice is not expected to impinge on the proposed soil fill layer as it is located on the floodplain rather than in the primary flow path of Dry Creek. Due to the hydraulic conditions of the site and the proposed soil fill layer thickness, the proposed engineered fill cap meets the Alaska Highway Drainage Manual guidance for increased layer thickness to account for floating debris and ice.

5.0 LIMITATIONS

We have prepared this report for NOVAGOLD Resources, Inc. for the Former New Gold House Site. Client may distribute copies of this report to their authorized agents and regulatory agencies as may be required for the project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of Geomorphology, Hydrology and Hydraulic engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile, or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

6.0 REFERENCES

Alaska Department of Transportation. 1996. Highway Drainage Manual Chapter 17. Bank Protection.

Alaska Department of Transportation. 2020. Standard Specifications for Highway Construction.

Federal Highway Administration (FHWA). 2009. *Hydraulic Engineering Circular No. 23 (HEC-23) Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance – Third Edition, Volume 2.*

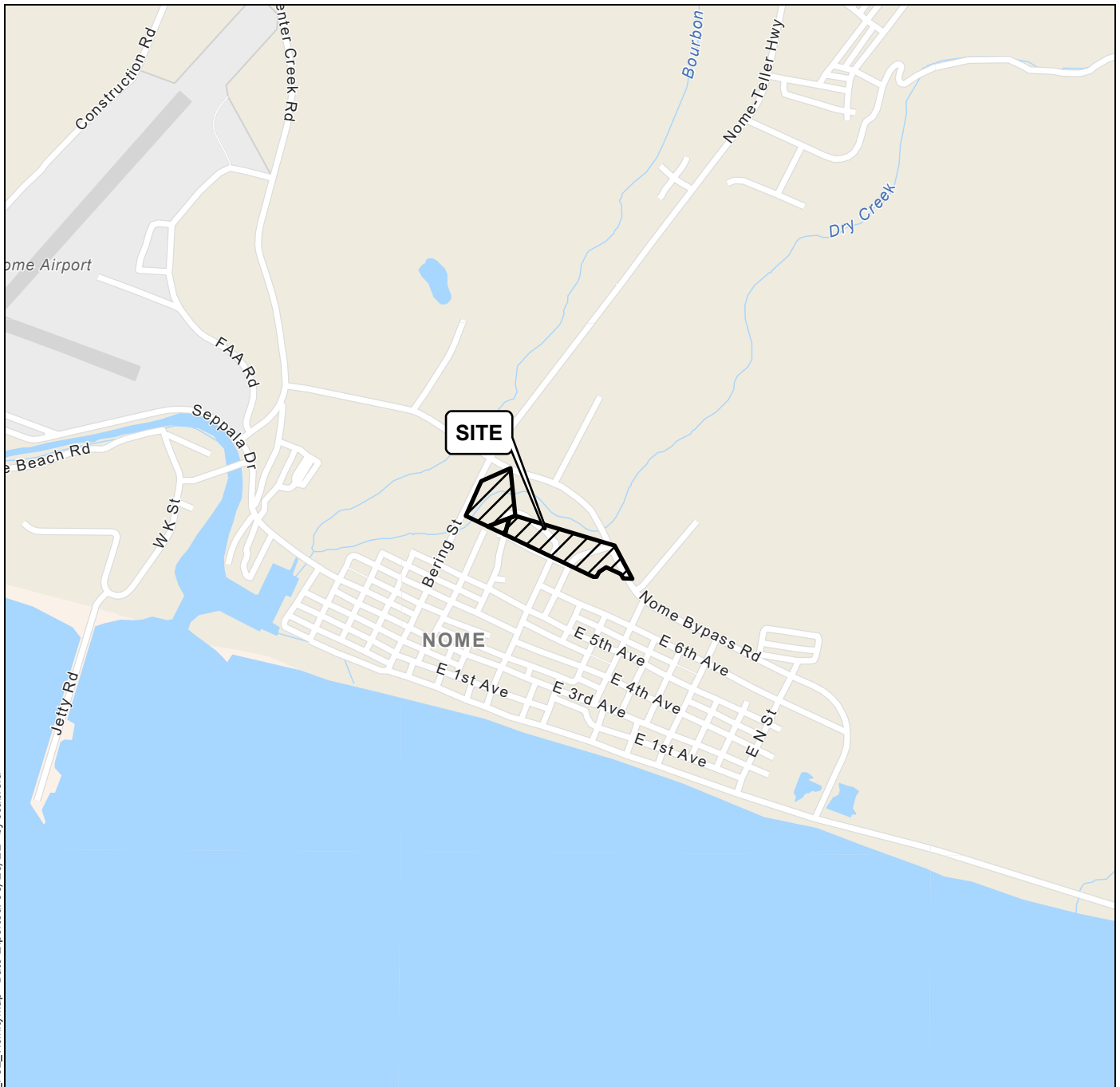
Federal Highway Administration (FHWA). 2021. Hydraulic Toolbox Version 5.1.
<https://www.fhwa.dot.gov/engineering/hydraulics/software/toolbox404.cfm>

United States Army Corps of Engineers (USACE). 2019. Hydrologic Engineering Center - River Analysis System (HEC-RAS) Version 5.0.7.

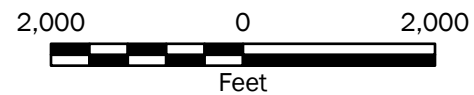
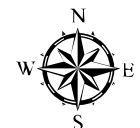
United States Department of Agriculture, Forest Service (USFS). 2008. Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings, Appendix E.

United States Geological Survey (USGS). 2016. Flood-Frequency Applications Tool for Use on Unregulated Streams in Alaska and Conterminous Basins in Canada. Version 1.1.

APPENDIX A
Vicinity Map



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Vicinity Map

Former New Gold House and 6th Avenue Sites
Nome, Alaska



Figure 1

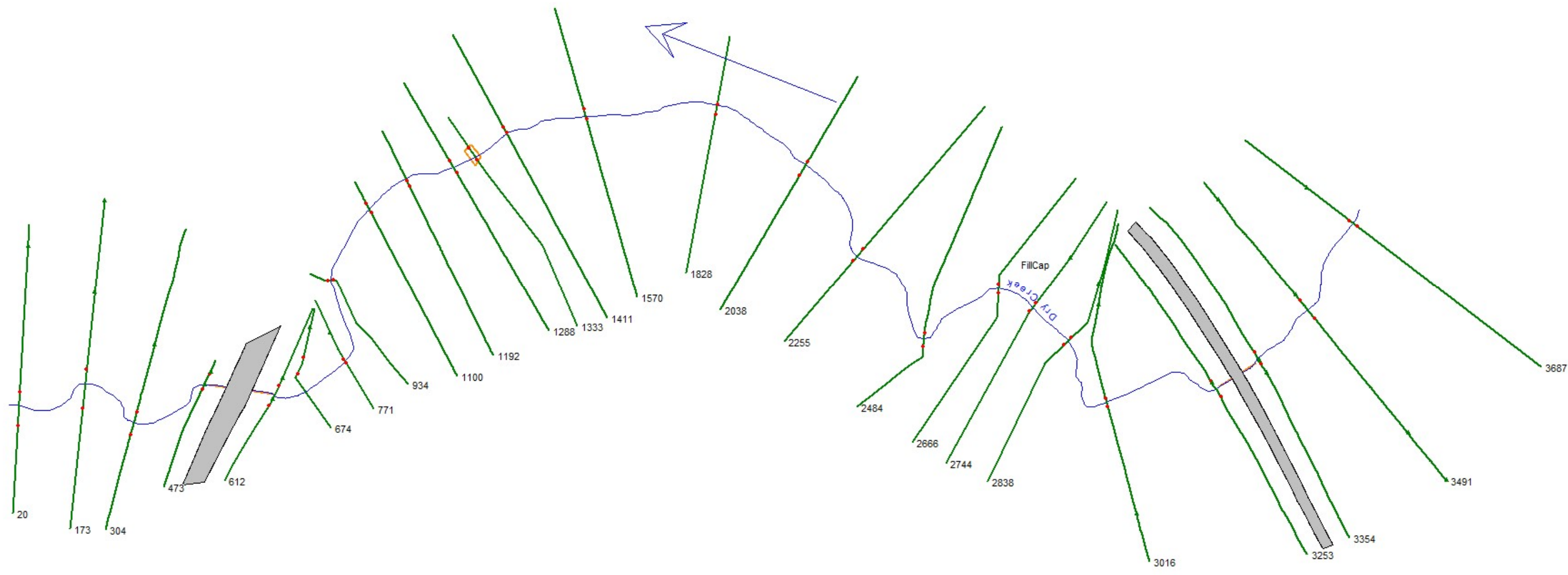
Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 UTM Zone 3N


APPENDIX B
Hydrologic, Hydraulic, and Stability Calculations

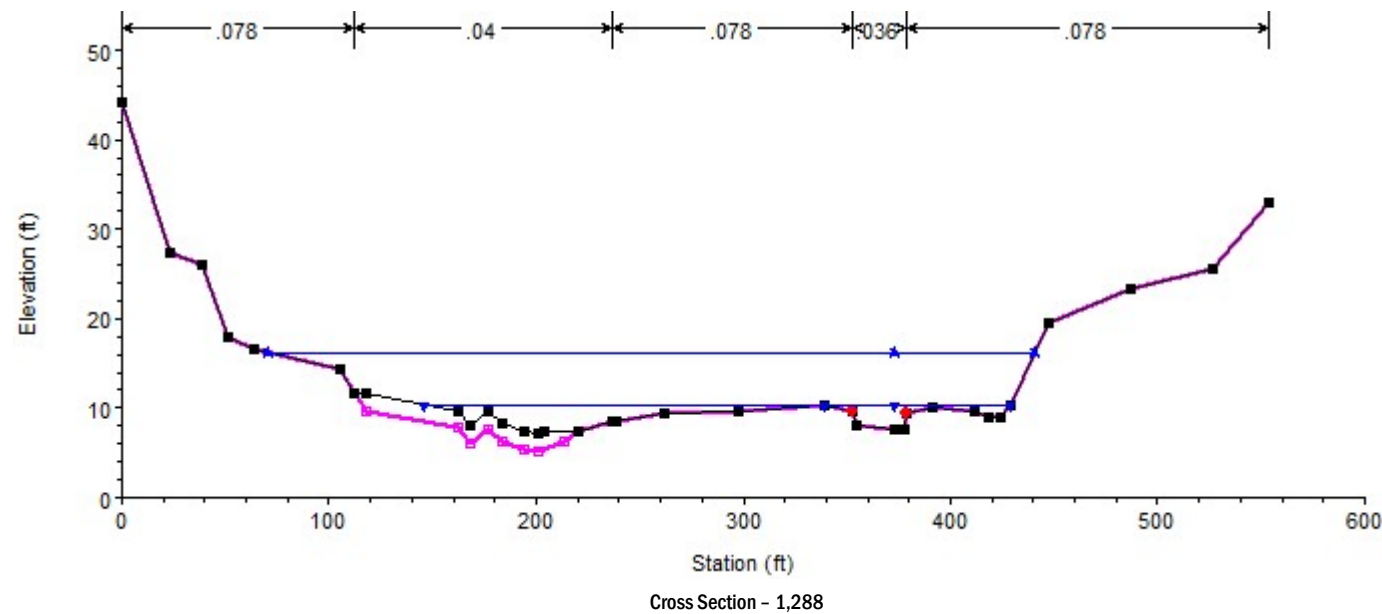
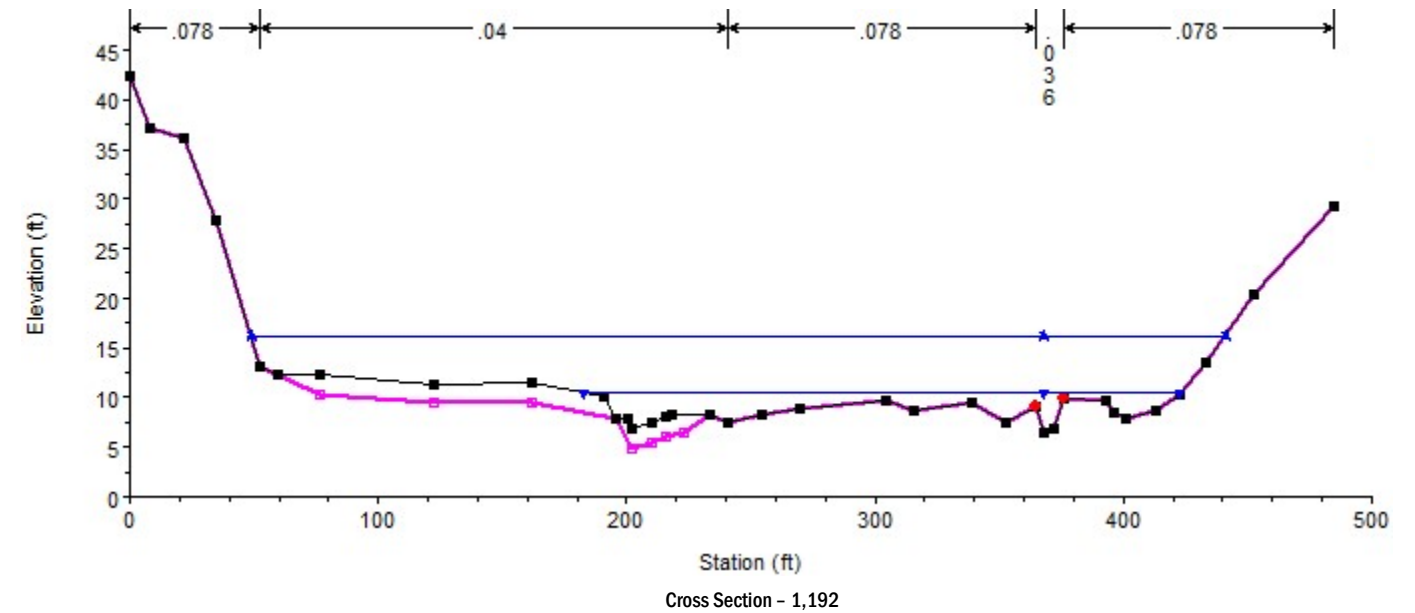
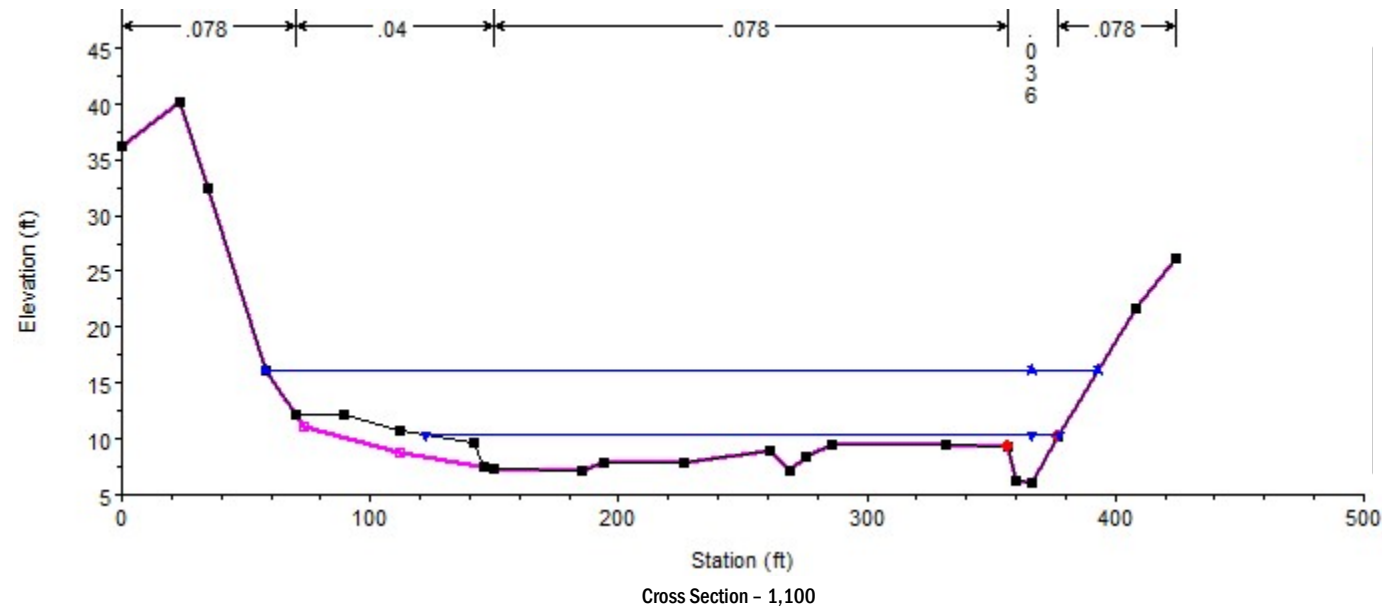


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Data Source: HEC-RAS version 5.0.7

Hydraulic Model Schematic	
Former New Gold House Cap Design Nome, Alaska	
	Figure B1



Legend	
WS 200-year - Existing Conditions	Blue line with triangle marker
WS 200-year - Proposed Conditions	Blue line with square marker
WS 2-year - Proposed Conditions	Blue line with diamond marker
WS 2-year - Existing Conditions	Blue line with circle marker
Ground - Comp Geom 3	Magenta line with square marker
Bank Sta - Comp Geom 3	Red line with diamond marker
Merge Range	Black line with square marker
Ground	Black line with square marker
Bank Sta	Red line with diamond marker

Notes:

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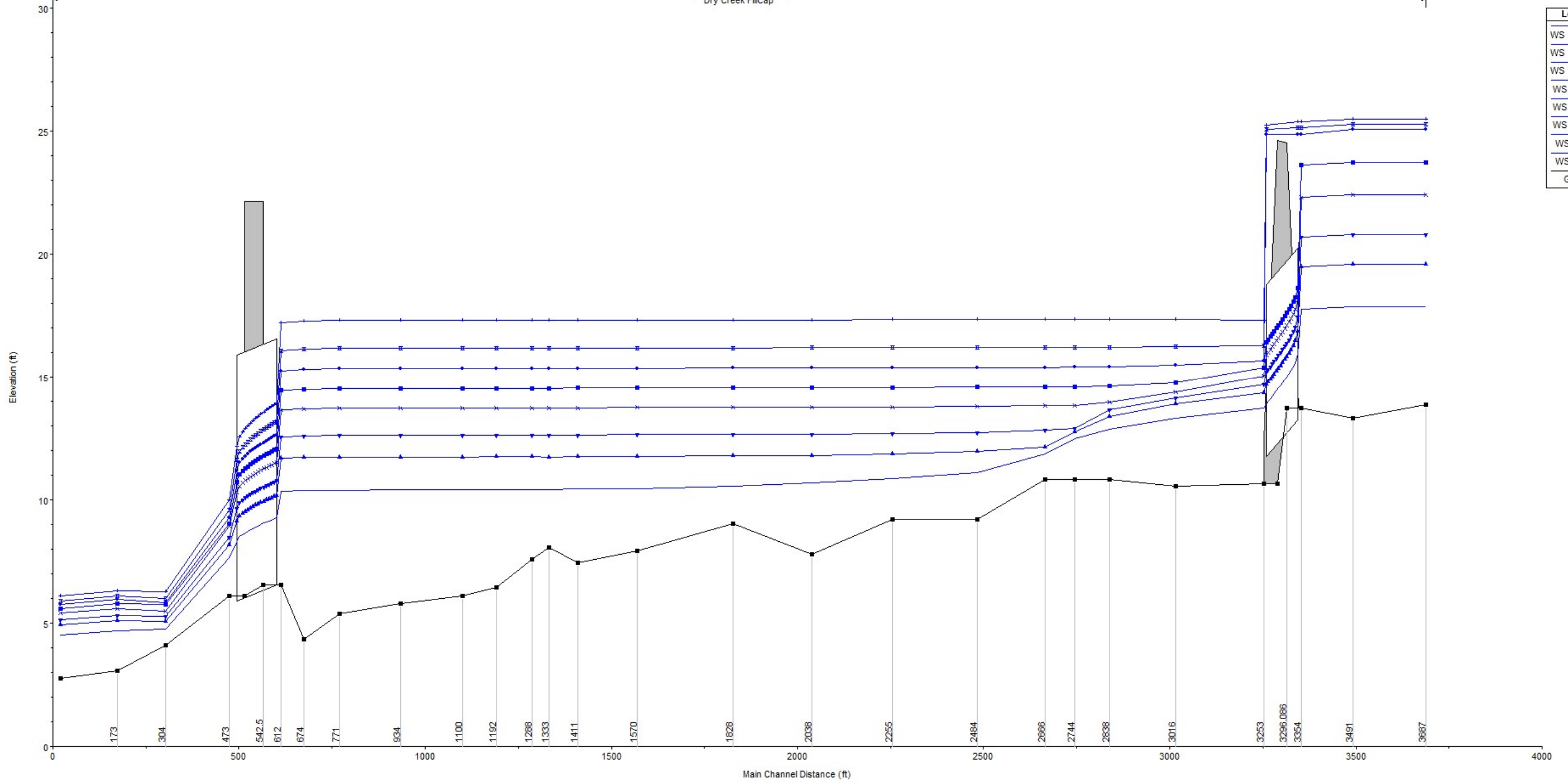
Data Source: HEC-RAS version 5.0.7

Fill Cap Cross Section Comparisons to Existing

Former New Gold House Cap Design
Nome, Alaska



Figure B2



Legend	
WS 500-year	(Black line with square markers)
WS 200-year	(Dark blue line with square markers)
WS 100-year	(Medium blue line with square markers)
WS 50-year	(Light blue line with square markers)
WS 25-year	(Very light blue line with square markers)
WS 10-year	(Lightest blue line with square markers)
WS 5-year	(Lightest blue line with square markers)
WS 2-year	(Lightest blue line with square markers)
Ground	(Black line with square markers)

Notes:

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Data Source: HEC-RAS version 5.0.7

Existing Conditions Water Surface Profiles

Former New Gold House Cap Design
 Nome, Alaska



Figure B3

HEC-RAS Plan: Existing Conditions River: Dry Creek Reach: FillCap

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	3687	2-year	109.00	13.85	17.88	15.18	17.88	0.000029	0.53	544.85	373.63	0.05
FillCap	3687	5-year	191.00	13.85	19.59	15.82	19.59	0.000009	0.39	1391.11	476.56	0.03
FillCap	3687	10-year	255.00	13.85	20.79	16.06	20.79	0.000006	0.35	1978.21	500.19	0.02
FillCap	3687	25-year	345.00	13.85	22.43	16.28	22.43	0.000004	0.32	2818.13	526.65	0.02
FillCap	3687	50-year	415.00	13.85	23.72	16.43	23.72	0.000003	0.31	3513.78	550.02	0.02
FillCap	3687	100-year	491.00	13.85	25.07	16.57	25.07	0.000002	0.30	4272.65	577.19	0.02
FillCap	3687	200-year	570.00	13.85	25.28	16.67	25.28	0.000003	0.33	4397.39	582.00	0.02
FillCap	3687	500-year	681.00	13.85	25.49	16.79	25.49	0.000004	0.39	4518.51	586.64	0.02
FillCap	3491	2-year	109.00	13.31	17.87	15.00	17.87	0.000038	0.57	344.19	445.47	0.05
FillCap	3491	5-year	191.00	13.31	19.59	15.31	19.59	0.000018	0.51	746.01	483.45	0.04
FillCap	3491	10-year	255.00	13.31	20.79	15.49	20.79	0.000003	0.24	2363.77	504.46	0.02
FillCap	3491	25-year	345.00	13.31	22.42	15.71	22.43	0.000002	0.24	3213.14	534.75	0.01
FillCap	3491	50-year	415.00	13.31	23.72	15.88	23.72	0.000002	0.24	3920.88	560.34	0.01
FillCap	3491	100-year	491.00	13.31	25.07	16.04	25.07	0.000001	0.23	4692.29	583.08	0.01
FillCap	3491	200-year	570.00	13.31	25.28	16.21	25.28	0.000002	0.26	4818.08	586.33	0.01
FillCap	3491	500-year	681.00	13.31	25.49	16.44	25.49	0.000002	0.31	4939.87	589.45	0.02
FillCap	3354	2-year	109.00	13.71	17.74	15.83	17.83	0.000777	2.78	67.67	431.51	0.25
FillCap	3354	5-year	191.00	13.71	19.47	16.56	19.56	0.000497	2.86	116.59	481.11	0.21
FillCap	3354	10-year	255.00	13.71	20.68	16.75	20.76	0.000406	2.94	150.62	503.43	0.20
FillCap	3354	25-year	345.00	13.71	22.31	17.55	22.40	0.000322	3.03	196.80	544.65	0.19
FillCap	3354	50-year	415.00	13.71	23.60	17.83	23.69	0.000272	3.07	233.32	566.68	0.17
FillCap	3354	100-year	491.00	13.71	24.87	18.12	25.02	0.001806	3.86	345.67	589.04	0.38
FillCap	3354	200-year	570.00	13.71	25.15	18.38	25.25	0.001257	3.41	513.72	595.24	0.32
FillCap	3354	500-year	681.00	13.71	25.38	18.76	25.46	0.001093	3.31	650.47	600.53	0.30
FillCap	3296.086		Culvert									
FillCap	3253	2-year	109.00	10.67	13.71	12.42	13.79	0.001330	2.23	48.93	26.18	0.29
FillCap	3253	5-year	191.00	10.67	14.34	12.90	14.47	0.001663	2.88	66.25	29.31	0.33
FillCap	3253	10-year	255.00	10.67	14.67	13.20	14.85	0.001964	3.36	75.88	30.97	0.37
FillCap	3253	25-year	345.00	10.67	15.04	13.58	15.29	0.002398	3.97	86.80	32.79	0.41
FillCap	3253	50-year	415.00	10.67	15.38	13.84	15.67	0.002465	4.26	97.31	36.54	0.42
FillCap	3253	100-year	491.00	10.67	15.67	14.09	16.00	0.002610	4.61	111.43	178.42	0.44
FillCap	3253	200-year	570.00	10.67	16.27	14.33	16.57	0.001930	4.42	153.20	275.61	0.39
FillCap	3253	500-year	681.00	10.67	17.33	14.64	17.54	0.001076	3.86	249.18	369.80	0.30
FillCap	3016	2-year	109.00	10.56	13.32	12.24	13.40	0.002003	2.62	60.64	50.81	0.34
FillCap	3016	5-year	191.00	10.56	13.89	12.71	14.01	0.002220	3.31	95.94	73.09	0.38
FillCap	3016	10-year	255.00	10.56	14.14	12.98	14.30	0.002685	3.89	116.42	108.76	0.42
FillCap	3016	25-year	345.00	10.56	14.38	13.37	14.61	0.003350	4.61	146.57	240.30	0.48
FillCap	3016	50-year	415.00	10.56	14.77	13.64	15.00	0.003007	4.75	223.80	318.84	0.46
FillCap	3016	100-year	491.00	10.56	15.47	13.88	15.53	0.000881	2.93	522.93	390.87	0.26
FillCap	3016	200-year	570.00	10.56	16.25	14.11	16.27	0.000338	2.04	838.31	419.34	0.17
FillCap	3016	500-year	681.00	10.56	17.36	14.40	17.37	0.000133	1.48	1328.95	466.35	0.11
FillCap	2838	2-year	109.00	10.82	12.87	12.11	13.00	0.002475	2.96	44.99	39.27	0.39
FillCap	2838	5-year	191.00	10.82	13.37	12.58	13.56	0.002842	3.74	83.14	161.91	0.44
FillCap	2838	10-year	255.00	10.82	13.67	12.88	13.84	0.002503	3.82	155.26	271.19	0.42
FillCap	2838	25-year	345.00	10.82	13.97	13.55	14.11	0.002154	3.81	237.45	280.89	0.40
FillCap	2838	50-year	415.00	10.82	14.63	13.75	14.69	0.000850	2.75	438.34	412.97	0.26
FillCap	2838	100-year	491.00	10.82	15.41	13.86	15.43	0.000284	1.82	820.01	467.00	0.15
FillCap	2838	200-year	570.00	10.82	16.22	13.95	16.23	0.000128	1.37	1199.98	473.88	0.11
FillCap	2838	500-year	681.00	10.82	17.35	14.08	17.35	0.000060	1.07	1737.74	483.44	0.08
FillCap	2744	2-year	109.00	10.82	12.47	11.99	12.68	0.004732	3.70	34.37	51.09	0.53
FillCap	2744	5-year	191.00	10.82	12.75	12.53	13.13	0.007365	5.17	54.49	93.11	0.68
FillCap	2744	10-year	255.00	10.82	12.91	12.91	13.41	0.008987	6.05	71.00	117.48	0.77
FillCap	2744	25-year	345.00	10.82	13.83	13.28	13.92	0.001589	3.30	321.03	388.75	0.34
FillCap	2744	50-year	415.00	10.82	14.60	13.48	14.62	0.000416	1.98	632.46	425.85	0.18
FillCap	2744	100-year	491.00	10.82	15.40	13.60	15.41	0.000166	1.43	984.82	434.47	0.12
FillCap	2744	200-year	570.00	10.82	16.21	13.71	16.22	0.000088	1.16	1341.96	443.23	0.09
FillCap	2744	500-year	681.00	10.82	17.34	13.81	17.34	0.000047	0.97	1848.39	455.54	0.07
FillCap	2666	2-year	109.00	10.82	11.87	11.87	12.10	0.012681	4.56	48.88	123.56	0.81
FillCap	2666	5-year	191.00	10.82	12.13	12.13	12.38	0.011915	5.17	91.63	187.74	0.82
FillCap	2666	10-year	255.00	10.82	12.82	12.82	12.87	0.001853	2.74	253.37	283.51	0.35
FillCap	2666	25-year	345.00	10.82	13.83	13.83	13.84	0.000376	1.64	616.95	427.03	0.17
FillCap	2666	50-year	415.00	10.82	14.59	14.59	14.60	0.000150	1.21	946.39	439.98	0.11
FillCap	2666	100-year	491.00	10.82	15.40	15.40	15.40	0.000078	0.99	1304.90	451.13	0.08
FillCap	2666	200-year	570.00	10.82	16.21	16.21	16.21	0.000048	0.87	1676.55	460.41	0.07
FillCap	2666	500-year	681.00	10.82	17.34	17.34	17.34	0.000029	0.77	2203.44	473.62	0.05
FillCap	2484	2-year	109.00	9.21	11.09	11.09	11.11	0.001060	1.66	120.76	130.00	0.25
FillCap	2484	5-year	191.00	9.21	11.95	11.95	11.97	0.000496	1.57	245.45	159.35	0.18

HEC-RAS Plan: Existing Conditions River: Dry Creek Reach: FillCap (Continued)

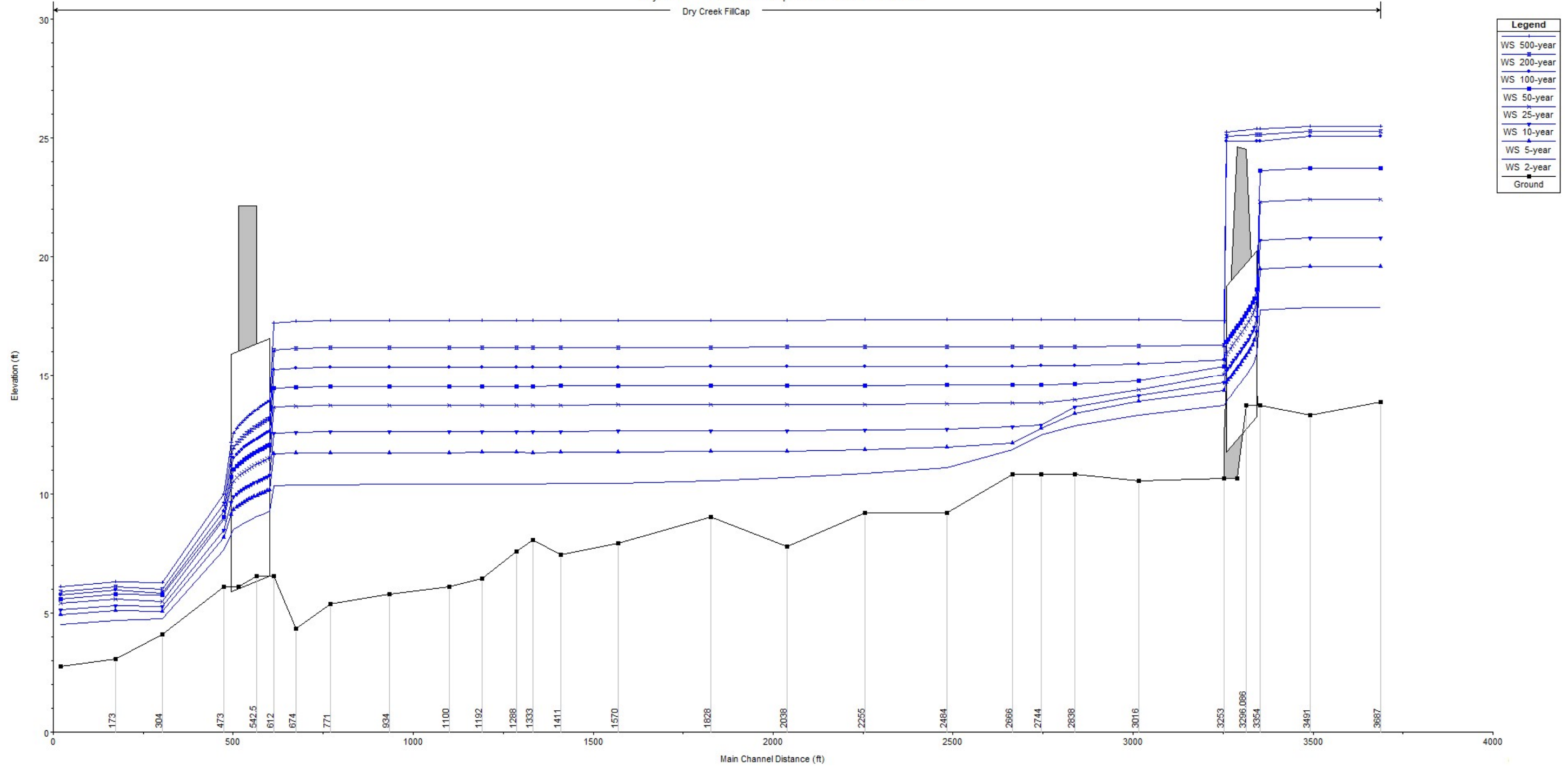
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	2484	10-year	255.00	9.21	12.73		12.75	0.000294	1.47	390.58	221.80	0.15
FillCap	2484	25-year	345.00	9.21	13.79		13.80	0.000150	1.29	715.31	385.15	0.11
FillCap	2484	50-year	415.00	9.21	14.57		14.58	0.000087	1.10	1042.99	438.80	0.09
FillCap	2484	100-year	491.00	9.21	15.38		15.39	0.000052	0.94	1407.37	457.55	0.07
FillCap	2484	200-year	570.00	9.21	16.20		16.21	0.000034	0.84	1788.11	468.65	0.06
FillCap	2484	500-year	681.00	9.21	17.33		17.34	0.000022	0.75	2322.15	475.61	0.05
FillCap	2255	2-year	109.00	9.21	10.85		10.88	0.000972	1.68	121.13	160.41	0.24
FillCap	2255	5-year	191.00	9.21	11.87		11.88	0.000291	1.30	309.35	209.72	0.14
FillCap	2255	10-year	255.00	9.21	12.69		12.70	0.000155	1.15	506.20	280.65	0.11
FillCap	2255	25-year	345.00	9.21	13.77		13.78	0.000078	0.98	855.27	357.98	0.08
FillCap	2255	50-year	415.00	9.21	14.56		14.56	0.000051	0.88	1152.38	384.33	0.07
FillCap	2255	100-year	491.00	9.21	15.37		15.38	0.000035	0.81	1470.00	392.92	0.06
FillCap	2255	200-year	570.00	9.21	16.20		16.20	0.000026	0.76	1796.63	401.57	0.05
FillCap	2255	500-year	681.00	9.21	17.33		17.33	0.000019	0.72	2258.35	413.49	0.04
FillCap	2038	2-year	109.00	7.78	10.68		10.71	0.000632	1.51	113.04	114.75	0.19
FillCap	2038	5-year	191.00	7.78	11.81		11.82	0.000254	1.30	329.93	269.26	0.13
FillCap	2038	10-year	255.00	7.78	12.66		12.67	0.000116	1.03	595.56	333.90	0.09
FillCap	2038	25-year	345.00	7.78	13.76		13.76	0.000057	0.85	984.09	371.69	0.07
FillCap	2038	50-year	415.00	7.78	14.55		14.55	0.000038	0.77	1281.58	380.20	0.06
FillCap	2038	100-year	491.00	7.78	15.37		15.37	0.000028	0.72	1594.57	383.22	0.05
FillCap	2038	200-year	570.00	7.78	16.19		16.19	0.000022	0.68	1911.38	386.02	0.04
FillCap	2038	500-year	681.00	7.78	17.33		17.33	0.000016	0.65	2351.39	389.87	0.04
FillCap	1828	2-year	109.00	9.04	10.56		10.57	0.000621	1.31	199.72	272.20	0.19
FillCap	1828	5-year	191.00	9.04	11.78		11.79	0.000102	0.80	583.03	330.08	0.09
FillCap	1828	10-year	255.00	9.04	12.65		12.65	0.000053	0.69	873.61	339.71	0.07
FillCap	1828	25-year	345.00	9.04	13.75		13.75	0.000031	0.64	1253.95	351.92	0.05
FillCap	1828	50-year	415.00	9.04	14.54		14.55	0.000024	0.63	1536.50	360.73	0.05
FillCap	1828	100-year	491.00	9.04	15.36		15.37	0.000020	0.63	1844.75	380.07	0.04
FillCap	1828	200-year	570.00	9.04	16.19		16.19	0.000016	0.62	2159.80	384.18	0.04
FillCap	1828	500-year	681.00	9.04	17.32		17.32	0.000013	0.61	2599.01	389.82	0.04
FillCap	1570	2-year	109.00	7.92	10.45		10.46	0.000323	1.04	252.66	272.67	0.14
FillCap	1570	5-year	191.00	7.92	11.76		11.76	0.000067	0.69	675.38	337.32	0.07
FillCap	1570	10-year	255.00	7.92	12.64		12.64	0.000039	0.62	977.23	350.78	0.05
FillCap	1570	25-year	345.00	7.92	13.74		13.74	0.000025	0.58	1369.58	359.49	0.05
FillCap	1570	50-year	415.00	7.92	14.54		14.54	0.000020	0.57	1657.54	365.41	0.04
FillCap	1570	100-year	491.00	7.92	15.36		15.36	0.000016	0.56	1960.18	370.55	0.04
FillCap	1570	200-year	570.00	7.92	16.18		16.19	0.000014	0.56	2267.10	373.32	0.04
FillCap	1570	500-year	681.00	7.92	17.32		17.32	0.000011	0.56	2693.21	377.13	0.03
FillCap	1411	2-year	109.00	7.44	10.43		10.43	0.000070	0.60	448.15	287.48	0.07
FillCap	1411	5-year	191.00	7.44	11.76		11.76	0.000032	0.53	842.04	304.66	0.05
FillCap	1411	10-year	255.00	7.44	12.63		12.64	0.000024	0.53	1113.91	313.80	0.04
FillCap	1411	25-year	345.00	7.44	13.74		13.74	0.000018	0.53	1466.86	324.80	0.04
FillCap	1411	50-year	415.00	7.44	14.54		14.54	0.000016	0.54	1728.20	332.71	0.04
FillCap	1411	100-year	491.00	7.44	15.36		15.36	0.000014	0.55	2005.06	340.89	0.04
FillCap	1411	200-year	570.00	7.44	16.18		16.18	0.000013	0.56	2289.85	349.10	0.03
FillCap	1411	500-year	681.00	7.44	17.32		17.32	0.000011	0.57	2692.81	360.40	0.03
FillCap	1333	2-year	109.00	8.07	10.40		10.42	0.000402	1.27	141.73	91.65	0.16
FillCap	1333	5-year	191.00	8.07	11.74		11.75	0.000187	1.23	276.57	123.61	0.12
FillCap	1333	10-year	255.00	8.07	12.62		12.63	0.000152	1.30	438.16	214.76	0.11
FillCap	1333	25-year	345.00	8.07	13.73		13.74	0.000087	1.15	696.05	244.27	0.09
FillCap	1333	50-year	415.00	8.07	14.52		14.53	0.000064	1.09	896.97	260.27	0.08
FillCap	1333	100-year	491.00	8.07	15.35		15.36	0.000050	1.04	1121.03	278.93	0.07
FillCap	1333	200-year	570.00	8.07	16.18		16.18	0.000040	1.01	1359.47	298.40	0.06
FillCap	1333	500-year	681.00	8.07	17.31		17.32	0.000030	0.96	1710.43	315.59	0.06
FillCap	1288	2-year	109.00	7.60	10.41		10.41	0.000041	0.22	554.42	312.70	0.02
FillCap	1288	5-year	191.00	7.60	11.74		11.74	0.000020	0.20	976.07	319.58	0.02
FillCap	1288	10-year	255.00	7.60	12.62		12.62	0.000015	0.20	1259.20	323.75	0.02
FillCap	1288	25-year	345.00	7.60	13.73		13.73	0.000012	0.20	1621.12	329.01	0.01
FillCap	1288	50-year	415.00	7.60	14.53		14.53	0.000010	0.21	1885.13	336.78	0.01
FillCap	1288	100-year	491.00	7.60	15.35		15.35	0.000010	0.22	2169.11	353.36	0.01
FillCap	1288	200-year	570.00	7.60	16.18		16.18	0.000009	0.22	2467.91	370.01	0.01
FillCap	1288	500-year	681.00	7.60	17.32		17.32	0.000008	0.23	2898.79	385.87	0.01
FillCap	1192	2-year	109.00	6.45	10.41		10.41	0.000040	0.47	589.79	347.15	0.05
FillCap	1192	5-year	191.00	6.45	11.74		11.74	0.000019	0.42	1063.62	362.81	0.04
FillCap	1192	10-year	255.00	6.45	12.62		12.62	0.000015	0.42	1387.69	373.14	0.03
FillCap	1192	25-year	345.00	6.45	13.73		13.73	0.000012	0.42	1807.74	382.13	0.03
FillCap	1192	50-year	415.00	6.45	14.53		14.53	0.000010	0.43	2113.40	385.37	0.03
FillCap	1192	100-year	491.00	6.45	15.35		15.35	0.000009	0.44	2431.97	388.72	0.03

HEC-RAS Plan: Existing Conditions River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	1192	200-year	570.00	6.45	16.18		16.18	0.000008	0.44	2754.53	392.08	0.03
FillCap	1192	500-year	681.00	6.45	17.31		17.32	0.000007	0.45	3202.88	396.70	0.03
FillCap	1100	2-year	109.00	6.12	10.40		10.40	0.000031	0.44	572.85	292.65	0.05
FillCap	1100	5-year	191.00	6.12	11.74		11.74	0.000018	0.44	978.41	310.03	0.04
FillCap	1100	10-year	255.00	6.12	12.62		12.62	0.000015	0.44	1253.79	315.13	0.03
FillCap	1100	25-year	345.00	6.12	13.73		13.73	0.000012	0.46	1606.96	321.54	0.03
FillCap	1100	50-year	415.00	6.12	14.53		14.53	0.000011	0.47	1864.93	326.14	0.03
FillCap	1100	100-year	491.00	6.12	15.35		15.35	0.000010	0.49	2135.34	330.90	0.03
FillCap	1100	200-year	570.00	6.12	16.18		16.18	0.000009	0.50	2410.72	335.50	0.03
FillCap	1100	500-year	681.00	6.12	17.31		17.31	0.000008	0.51	2794.81	340.18	0.03
FillCap	934	2-year	109.00	5.81	10.40		10.40	0.000026	0.48	536.46	206.59	0.04
FillCap	934	5-year	191.00	5.81	11.74		11.74	0.000022	0.54	830.62	230.13	0.04
FillCap	934	10-year	255.00	5.81	12.62		12.62	0.000019	0.57	1034.99	233.61	0.04
FillCap	934	25-year	345.00	5.81	13.73		13.73	0.000017	0.60	1296.67	237.99	0.04
FillCap	934	50-year	415.00	5.81	14.52		14.53	0.000016	0.62	1487.51	241.07	0.04
FillCap	934	100-year	491.00	5.81	15.35		15.35	0.000015	0.65	1687.26	244.22	0.04
FillCap	934	200-year	570.00	5.81	16.17		16.18	0.000015	0.67	1890.39	247.39	0.04
FillCap	934	500-year	681.00	5.81	17.31		17.31	0.000013	0.69	2174.14	251.74	0.04
FillCap	771	2-year	109.00	5.37	10.38	7.61	10.39	0.000143	1.16	213.54	175.15	0.10
FillCap	771	5-year	191.00	5.37	11.72	8.60	11.73	0.000103	1.17	372.50	189.11	0.09
FillCap	771	10-year	255.00	5.37	12.60	8.81	12.61	0.000088	1.19	479.97	190.52	0.08
FillCap	771	25-year	345.00	5.37	13.71	9.07	13.72	0.000076	1.22	616.94	192.30	0.08
FillCap	771	50-year	415.00	5.37	14.51	9.22	14.52	0.000070	1.25	716.46	193.57	0.07
FillCap	771	100-year	491.00	5.37	15.34	9.41	15.34	0.000065	1.28	820.35	194.89	0.07
FillCap	771	200-year	570.00	5.37	16.16	9.58	16.17	0.000060	1.30	925.72	196.21	0.07
FillCap	771	500-year	681.00	5.37	17.30	9.79	17.31	0.000054	1.33	1072.49	198.04	0.07
FillCap	674	2-year	109.00	4.33	10.37	6.45	10.38	0.000070	0.89	187.60	119.75	0.07
FillCap	674	5-year	191.00	4.33	11.71	7.05	11.72	0.000069	1.05	301.97	121.79	0.08
FillCap	674	10-year	255.00	4.33	12.59	7.41	12.60	0.000067	1.14	378.81	123.13	0.08
FillCap	674	25-year	345.00	4.33	13.70	7.87	13.72	0.000065	1.25	477.18	124.81	0.08
FillCap	674	50-year	415.00	4.33	14.50	8.18	14.51	0.000063	1.31	548.95	126.02	0.08
FillCap	674	100-year	491.00	4.33	15.32	8.63	15.34	0.000061	1.37	624.12	127.27	0.08
FillCap	674	200-year	570.00	4.33	16.14	8.88	16.16	0.000059	1.43	700.62	128.53	0.08
FillCap	674	500-year	681.00	4.33	17.28	9.17	17.30	0.000055	1.49	807.59	130.25	0.08
FillCap	612	2-year	109.00	6.54	10.35	8.23	10.37	0.000235	1.26	93.82	200.72	0.13
FillCap	612	5-year	191.00	6.54	11.68	8.62	11.71	0.000197	1.49	139.56	214.03	0.13
FillCap	612	10-year	255.00	6.54	12.55	8.85	12.59	0.000185	1.64	169.65	231.59	0.13
FillCap	612	25-year	345.00	6.54	13.65	9.13	13.70	0.000175	1.82	207.51	253.65	0.13
FillCap	612	50-year	415.00	6.54	14.44	9.33	14.50	0.000168	1.93	234.67	269.02	0.13
FillCap	612	100-year	491.00	6.54	15.26	9.54	15.32	0.000162	2.04	262.75	284.91	0.13
FillCap	612	200-year	570.00	6.54	16.08	9.74	16.14	0.000156	2.14	290.95	300.78	0.13
FillCap	612	500-year	681.00	6.54	17.21	10.01	17.28	0.000147	2.26	329.78	309.27	0.13
FillCap	542.5		Culvert									
FillCap	473	2-year	109.00	6.09	7.64	7.41	8.01	0.009535	4.85	22.47	154.62	0.74
FillCap	473	5-year	191.00	6.09	8.17	7.90	8.74	0.009509	6.07	31.49	176.75	0.79
FillCap	473	10-year	255.00	6.09	8.47	8.23	9.23	0.010250	6.96	36.62	181.90	0.84
FillCap	473	25-year	345.00	6.09	8.95	8.66	9.87	0.009666	7.72	44.68	189.98	0.84
FillCap	473	50-year	415.00	6.09	9.04	8.97	10.29	0.012456	8.97	46.26	191.56	0.96
FillCap	473	100-year	491.00	6.09	9.29	9.28	10.76	0.013024	9.73	50.49	195.66	0.99
FillCap	473	200-year	570.00	6.09	9.59	9.59	11.22	0.012716	10.25	55.61	198.50	1.00
FillCap	473	500-year	681.00	6.09	10.00	10.00	11.84	0.012216	10.87	62.63	202.38	1.00
FillCap	304	2-year	109.00	4.10	4.77	4.60	5.03	0.040925	4.18	26.58	29.67	1.23
FillCap	304	5-year	191.00	4.10	5.07	5.01	5.50	0.053566	5.27	36.35	38.00	1.44
FillCap	304	10-year	255.00	4.10	5.29	5.29	5.77	0.052243	5.47	45.97	48.20	1.45
FillCap	304	25-year	345.00	4.10	5.47	5.45	6.10	0.082663	7.46	55.49	68.35	1.86
FillCap	304	50-year	415.00	4.10	5.75	5.75	6.28	0.046676	7.16	76.60	78.35	1.48
FillCap	304	100-year	491.00	4.10	5.83	5.79	6.48	0.051119	7.95	83.44	84.81	1.58
FillCap	304	200-year	570.00	4.10	6.00	6.00	6.69	0.045515	8.30	99.16	103.28	1.53
FillCap	304	500-year	681.00	4.10	6.29	6.29	6.92	0.032046	8.01	133.64	139.64	1.33
FillCap	173	2-year	109.00	3.07	4.68	3.85	4.70	0.000604	1.14	115.99	175.06	0.18
FillCap	173	5-year	191.00	3.07	5.10	4.07	5.12	0.000583	1.37	198.12	214.05	0.19
FillCap	173	10-year	255.00	3.07	5.33	4.19	5.36	0.000607	1.53	248.80	228.99	0.20
FillCap	173	25-year	345.00	3.07	5.60	4.36	5.64	0.000633	1.71	314.17	244.84	0.21
FillCap	173	50-year	415.00	3.07	5.80	4.49	5.85	0.000647	1.84	370.77	306.60	0.21
FillCap	173	100-year	491.00	3.07	5.96	4.62	6.01	0.000679	1.97	420.70	318.67	0.22
FillCap	173	200-year	570.00	3.07	6.11	4.75	6.16	0.000709	2.09	469.33	330.01	0.23
FillCap	173	500-year	681.00	3.07	6.31	4.90	6.36	0.000747	2.25	534.72	347.69	0.24

HEC-RAS Plan: Existing Conditions River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	20	2-year	109.00	2.75	4.52	3.83	4.56	0.001600	1.71	75.12	106.41	0.29
FillCap	20	5-year	191.00	2.75	4.92	4.10	4.98	0.001601	1.99	126.69	148.59	0.30
FillCap	20	10-year	255.00	2.75	5.14	4.27	5.21	0.001601	2.21	162.05	172.38	0.31
FillCap	20	25-year	345.00	2.75	5.41	4.52	5.49	0.001601	2.45	211.87	207.51	0.32
FillCap	20	50-year	415.00	2.75	5.60	4.66	5.69	0.001602	2.62	260.49	284.87	0.33
FillCap	20	100-year	491.00	2.75	5.76	4.79	5.85	0.001600	2.76	306.04	303.77	0.33
FillCap	20	200-year	570.00	2.75	5.90	4.90	6.00	0.001603	2.88	351.48	321.52	0.33
FillCap	20	500-year	681.00	2.75	6.09	5.06	6.20	0.001603	3.04	415.20	358.87	0.34



Legend	
WS 500-year	(Blue line with diamond markers)
WS 200-year	(Blue line with square markers)
WS 100-year	(Blue line with triangle markers)
WS 50-year	(Blue line with cross markers)
WS 25-year	(Blue line with asterisk markers)
WS 10-year	(Blue line with dot markers)
WS 5-year	(Blue line with plus markers)
WS 2-year	(Blue line with x markers)
Ground	(Black line with square markers)

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: HEC-RAS version 5.0.7

Proposed Conditions Water Surface Profiles	
Former New Gold House Cap Design Nome, Alaska	
	Figure B5

HEC-RAS Plan: Proposed Conditions River: Dry Creek Reach: FillCap

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	3687	2-year	109.00	13.85	17.88	15.18	17.88	0.000029	0.53	544.85	373.63	0.05
FillCap	3687	5-year	191.00	13.85	19.59	15.82	19.59	0.000009	0.39	1391.11	476.56	0.03
FillCap	3687	10-year	255.00	13.85	20.79	16.06	20.79	0.000006	0.35	1978.21	500.19	0.02
FillCap	3687	25-year	345.00	13.85	22.43	16.28	22.43	0.000004	0.32	2818.13	526.65	0.02
FillCap	3687	50-year	415.00	13.85	23.72	16.43	23.72	0.000003	0.31	3513.78	550.02	0.02
FillCap	3687	100-year	491.00	13.85	25.07	16.57	25.07	0.000002	0.30	4272.65	577.19	0.02
FillCap	3687	200-year	570.00	13.85	25.28	16.67	25.28	0.000003	0.33	4397.39	582.00	0.02
FillCap	3687	500-year	681.00	13.85	25.49	16.79	25.49	0.000004	0.39	4518.51	586.64	0.02
FillCap	3491	2-year	109.00	13.31	17.87	15.00	17.87	0.000038	0.57	344.19	445.47	0.05
FillCap	3491	5-year	191.00	13.31	19.59	15.31	19.59	0.000018	0.51	746.01	483.45	0.04
FillCap	3491	10-year	255.00	13.31	20.79	15.49	20.79	0.000003	0.24	2363.77	504.46	0.02
FillCap	3491	25-year	345.00	13.31	22.42	15.71	22.43	0.000002	0.24	3213.14	534.75	0.01
FillCap	3491	50-year	415.00	13.31	23.72	15.88	23.72	0.000002	0.24	3920.88	560.34	0.01
FillCap	3491	100-year	491.00	13.31	25.07	16.04	25.07	0.000001	0.23	4692.29	583.08	0.01
FillCap	3491	200-year	570.00	13.31	25.28	16.21	25.28	0.000002	0.26	4818.08	586.33	0.01
FillCap	3491	500-year	681.00	13.31	25.49	16.44	25.49	0.000002	0.31	4939.87	589.45	0.02
FillCap	3354	2-year	109.00	13.71	17.74	15.83	17.83	0.000777	2.78	67.67	431.51	0.25
FillCap	3354	5-year	191.00	13.71	19.47	16.56	19.56	0.000497	2.86	116.59	481.11	0.21
FillCap	3354	10-year	255.00	13.71	20.68	16.75	20.76	0.000406	2.94	150.62	503.43	0.20
FillCap	3354	25-year	345.00	13.71	22.31	17.55	22.40	0.000322	3.03	196.80	544.65	0.19
FillCap	3354	50-year	415.00	13.71	23.60	17.83	23.69	0.000272	3.07	233.32	566.68	0.17
FillCap	3354	100-year	491.00	13.71	24.87	18.12	25.02	0.001806	3.86	345.67	589.04	0.38
FillCap	3354	200-year	570.00	13.71	25.15	18.38	25.25	0.001257	3.41	513.72	595.24	0.32
FillCap	3354	500-year	681.00	13.71	25.38	18.76	25.46	0.001093	3.31	650.47	600.53	0.30
FillCap	3296.086		Culvert									
FillCap	3253	2-year	109.00	10.67	13.71	12.42	13.79	0.001330	2.23	48.93	26.18	0.29
FillCap	3253	5-year	191.00	10.67	14.34	12.90	14.47	0.001663	2.88	66.25	29.31	0.33
FillCap	3253	10-year	255.00	10.67	14.67	13.20	14.85	0.001964	3.36	75.88	30.97	0.37
FillCap	3253	25-year	345.00	10.67	15.04	13.58	15.29	0.002398	3.97	86.80	32.79	0.41
FillCap	3253	50-year	415.00	10.67	15.38	13.84	15.67	0.002465	4.26	97.31	36.54	0.42
FillCap	3253	100-year	491.00	10.67	15.67	14.09	16.00	0.002611	4.61	111.41	178.32	0.44
FillCap	3253	200-year	570.00	10.67	16.27	14.33	16.56	0.001931	4.42	153.15	275.57	0.39
FillCap	3253	500-year	681.00	10.67	17.33	14.64	17.54	0.001077	3.86	249.11	369.77	0.30
FillCap	3016	2-year	109.00	10.56	13.32	12.24	13.40	0.002003	2.62	60.64	50.81	0.34
FillCap	3016	5-year	191.00	10.56	13.89	12.71	14.01	0.002220	3.31	95.94	73.09	0.38
FillCap	3016	10-year	255.00	10.56	14.14	12.98	14.30	0.002685	3.89	116.42	108.76	0.42
FillCap	3016	25-year	345.00	10.56	14.38	13.37	14.61	0.003351	4.61	146.54	240.23	0.48
FillCap	3016	50-year	415.00	10.56	14.77	13.64	15.00	0.003009	4.75	223.72	318.81	0.46
FillCap	3016	100-year	491.00	10.56	15.47	13.88	15.53	0.000882	2.93	522.71	390.85	0.26
FillCap	3016	200-year	570.00	10.56	16.25	14.11	16.27	0.000338	2.04	838.03	419.31	0.17
FillCap	3016	500-year	681.00	10.56	17.36	14.40	17.37	0.000134	1.48	1328.63	466.32	0.11
FillCap	2838	2-year	109.00	10.82	12.87	12.11	13.00	0.002475	2.96	44.99	39.27	0.39
FillCap	2838	5-year	191.00	10.82	13.37	12.58	13.56	0.002842	3.74	83.14	161.91	0.44
FillCap	2838	10-year	255.00	10.82	13.67	12.88	13.84	0.002503	3.82	155.26	271.19	0.42
FillCap	2838	25-year	345.00	10.82	13.96	13.55	14.11	0.002163	3.82	236.97	280.68	0.40
FillCap	2838	50-year	415.00	10.82	14.63	13.75	14.69	0.000851	2.75	438.18	412.85	0.26
FillCap	2838	100-year	491.00	10.82	15.41	13.86	15.43	0.000284	1.82	819.73	467.00	0.15
FillCap	2838	200-year	570.00	10.82	16.22	13.95	16.23	0.000128	1.37	1199.66	473.87	0.11
FillCap	2838	500-year	681.00	10.82	17.34	14.08	17.35	0.000060	1.07	1737.41	483.44	0.08
FillCap	2744	2-year	109.00	10.82	12.47	11.99	12.68	0.004732	3.70	34.37	51.09	0.53
FillCap	2744	5-year	191.00	10.82	12.75	12.53	13.13	0.007365	5.17	54.49	93.11	0.68
FillCap	2744	10-year	255.00	10.82	12.91	12.91	13.41	0.008987	6.05	71.00	117.48	0.77
FillCap	2744	25-year	345.00	10.82	13.83	13.28	13.92	0.001578	3.28	320.91	388.71	0.34
FillCap	2744	50-year	415.00	10.82	14.60	13.48	14.62	0.000417	1.98	632.27	425.85	0.18
FillCap	2744	100-year	491.00	10.82	15.40	13.60	15.41	0.000167	1.43	984.55	434.47	0.12
FillCap	2744	200-year	570.00	10.82	16.21	13.71	16.22	0.000088	1.16	1341.66	443.22	0.09
FillCap	2744	500-year	681.00	10.82	17.34	13.81	17.34	0.000047	0.97	1848.07	455.54	0.07
FillCap	2666	2-year	109.00	10.82	11.87	11.87	12.10	0.012681	4.56	48.88	123.56	0.81
FillCap	2666	5-year	191.00	10.82	12.13	12.13	12.38	0.011915	5.17	91.63	187.74	0.82
FillCap	2666	10-year	255.00	10.82	12.82	12.82	12.87	0.001852	2.74	253.43	283.55	0.35
FillCap	2666	25-year	345.00	10.82	13.83	13.83	13.84	0.000376	1.64	616.83	427.03	0.17
FillCap	2666	50-year	415.00	10.82	14.59	14.59	14.60	0.000151	1.21	946.18	439.97	0.11
FillCap	2666	100-year	491.00	10.82	15.39	15.39	15.40	0.000078	0.99	1304.62	451.12	0.08
FillCap	2666	200-year	570.00	10.82	16.21	16.21	16.21	0.000048	0.87	1676.23	460.40	0.07
FillCap	2666	500-year	681.00	10.82	17.34	17.34	17.34	0.000029	0.77	2203.11	473.61	0.05
FillCap	2484	2-year	109.00	9.21	11.09	11.09	11.11	0.001060	1.66	120.77	130.00	0.25
FillCap	2484	5-year	191.00	9.21	11.95	11.95	11.97	0.000496	1.57	245.55	159.37	0.18

HEC-RAS Plan: Proposed Conditions River: Dry Creek Reach: FillCap (Continued)

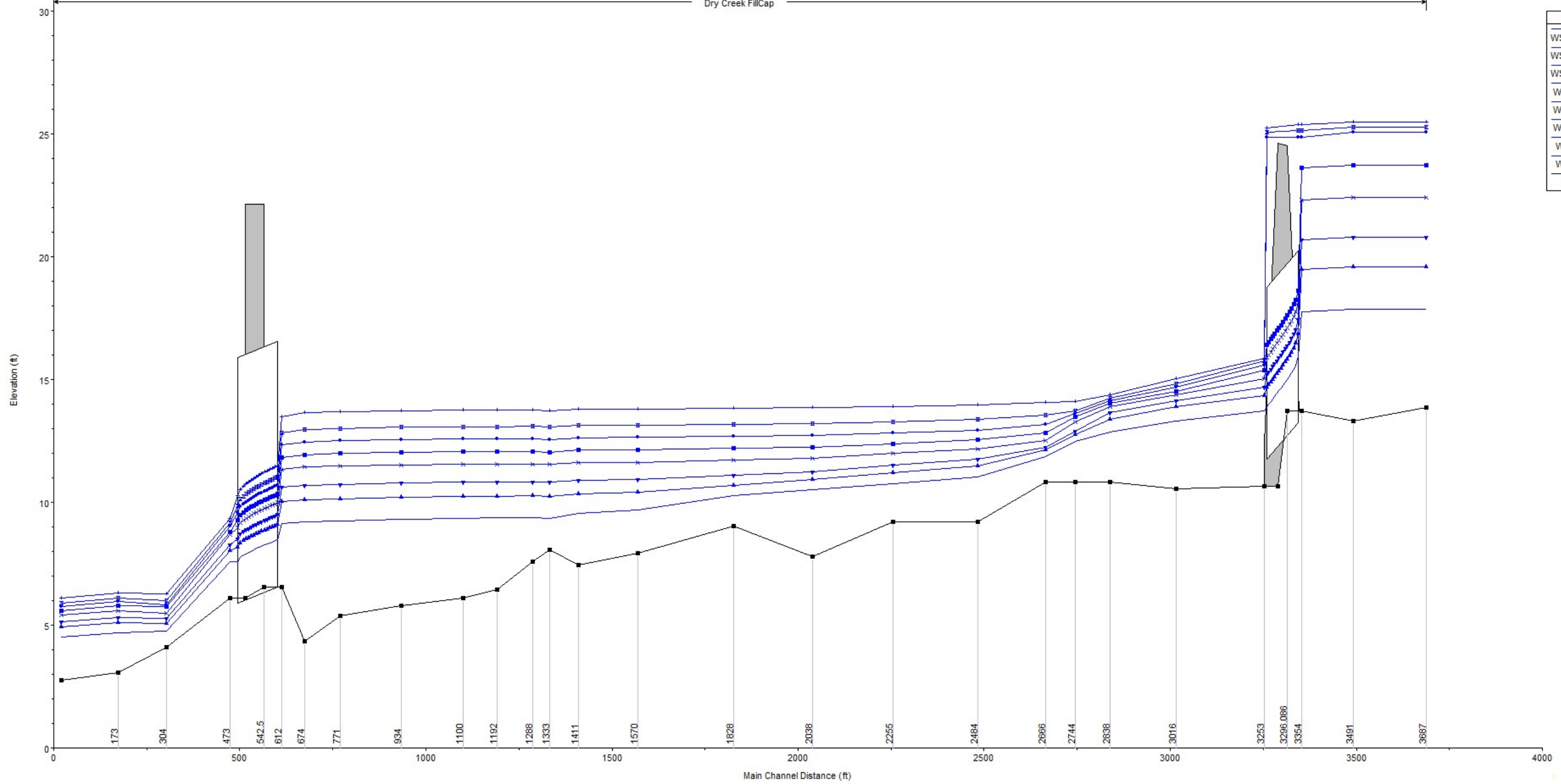
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	2484	10-year	255.00	9.21	12.73		12.75	0.000294	1.47	390.64	221.83	0.15
FillCap	2484	25-year	345.00	9.21	13.79		13.80	0.000150	1.29	715.20	385.14	0.11
FillCap	2484	50-year	415.00	9.21	14.57		14.58	0.000087	1.10	1042.78	438.79	0.09
FillCap	2484	100-year	491.00	9.21	15.38		15.39	0.000052	0.94	1407.09	457.53	0.07
FillCap	2484	200-year	570.00	9.21	16.20		16.21	0.000034	0.84	1787.79	468.65	0.06
FillCap	2484	500-year	681.00	9.21	17.33		17.34	0.000022	0.75	2321.82	475.60	0.05
FillCap	2255	2-year	109.00	9.21	10.85		10.88	0.000971	1.68	121.16	160.42	0.24
FillCap	2255	5-year	191.00	9.21	11.87		11.88	0.000290	1.30	309.51	209.75	0.14
FillCap	2255	10-year	255.00	9.21	12.69		12.70	0.000155	1.15	506.27	280.67	0.11
FillCap	2255	25-year	345.00	9.21	13.77		13.78	0.000078	0.98	855.16	357.95	0.08
FillCap	2255	50-year	415.00	9.21	14.56		14.56	0.000051	0.88	1152.19	384.32	0.07
FillCap	2255	100-year	491.00	9.21	15.37		15.38	0.000035	0.81	1469.76	392.92	0.06
FillCap	2255	200-year	570.00	9.21	16.20		16.20	0.000026	0.76	1796.35	401.57	0.05
FillCap	2255	500-year	681.00	9.21	17.33		17.33	0.000019	0.72	2258.06	413.49	0.04
FillCap	2038	2-year	109.00	7.78	10.68		10.71	0.000632	1.51	113.07	114.78	0.19
FillCap	2038	5-year	191.00	7.78	11.81		11.82	0.000253	1.29	330.16	269.39	0.13
FillCap	2038	10-year	255.00	7.78	12.66		12.67	0.000116	1.03	595.65	333.91	0.09
FillCap	2038	25-year	345.00	7.78	13.76		13.76	0.000057	0.85	983.98	371.69	0.07
FillCap	2038	50-year	415.00	7.78	14.55		14.55	0.000038	0.77	1281.39	380.19	0.06
FillCap	2038	100-year	491.00	7.78	15.37		15.37	0.000028	0.72	1594.33	383.22	0.05
FillCap	2038	200-year	570.00	7.78	16.19		16.19	0.000022	0.68	1911.11	386.02	0.04
FillCap	2038	500-year	681.00	7.78	17.33		17.33	0.000016	0.65	2351.11	389.87	0.04
FillCap	1828	2-year	109.00	9.04	10.56		10.57	0.000620	1.31	199.83	272.23	0.19
FillCap	1828	5-year	191.00	9.04	11.78		11.79	0.000102	0.80	583.32	330.09	0.09
FillCap	1828	10-year	255.00	9.04	12.65		12.65	0.000053	0.69	873.70	339.72	0.07
FillCap	1828	25-year	345.00	9.04	13.75		13.75	0.000031	0.64	1253.84	351.92	0.05
FillCap	1828	50-year	415.00	9.04	14.54		14.54	0.000024	0.63	1536.32	360.72	0.05
FillCap	1828	100-year	491.00	9.04	15.36		15.37	0.000020	0.63	1844.51	380.07	0.04
FillCap	1828	200-year	570.00	9.04	16.19		16.19	0.000016	0.62	2159.53	384.17	0.04
FillCap	1828	500-year	681.00	9.04	17.32		17.32	0.000013	0.61	2598.74	389.82	0.04
FillCap	1570	2-year	109.00	7.92	10.45		10.46	0.000323	1.04	252.82	272.76	0.14
FillCap	1570	5-year	191.00	7.92	11.76		11.77	0.000067	0.69	675.69	337.34	0.07
FillCap	1570	10-year	255.00	7.92	12.64		12.64	0.000039	0.62	977.33	350.78	0.05
FillCap	1570	25-year	345.00	7.92	13.74		13.74	0.000025	0.58	1369.47	359.49	0.05
FillCap	1570	50-year	415.00	7.92	14.54		14.54	0.000020	0.57	1657.35	365.40	0.04
FillCap	1570	100-year	491.00	7.92	15.36		15.36	0.000016	0.56	1959.95	370.54	0.04
FillCap	1570	200-year	570.00	7.92	16.18		16.19	0.000014	0.56	2266.84	373.32	0.04
FillCap	1570	500-year	681.00	7.92	17.32		17.32	0.000011	0.56	2692.95	377.13	0.03
FillCap	1411	2-year	109.00	7.44	10.43		10.43	0.000070	0.60	448.31	287.51	0.07
FillCap	1411	5-year	191.00	7.44	11.76		11.76	0.000032	0.53	842.32	304.67	0.05
FillCap	1411	10-year	255.00	7.44	12.64		12.64	0.000024	0.53	1114.00	313.80	0.04
FillCap	1411	25-year	345.00	7.44	13.74		13.74	0.000018	0.53	1466.76	324.79	0.04
FillCap	1411	50-year	415.00	7.44	14.53		14.54	0.000016	0.54	1728.04	332.70	0.04
FillCap	1411	100-year	491.00	7.44	15.36		15.36	0.000014	0.55	2004.85	340.88	0.04
FillCap	1411	200-year	570.00	7.44	16.18		16.18	0.000013	0.56	2289.61	349.09	0.03
FillCap	1411	500-year	681.00	7.44	17.32		17.32	0.000011	0.57	2692.56	360.40	0.03
FillCap	1333	2-year	109.00	8.07	10.40		10.42	0.000401	1.27	141.79	91.66	0.16
FillCap	1333	5-year	191.00	8.07	11.74		11.75	0.000187	1.23	276.68	123.70	0.12
FillCap	1333	10-year	255.00	8.07	12.62		12.63	0.000152	1.30	438.22	214.77	0.11
FillCap	1333	25-year	345.00	8.07	13.73		13.74	0.000087	1.15	695.97	244.27	0.09
FillCap	1333	50-year	415.00	8.07	14.52		14.53	0.000064	1.09	896.84	260.25	0.08
FillCap	1333	100-year	491.00	8.07	15.35		15.36	0.000050	1.04	1120.85	278.93	0.07
FillCap	1333	200-year	570.00	8.07	16.17		16.18	0.000040	1.01	1359.27	298.38	0.06
FillCap	1333	500-year	681.00	8.07	17.31		17.32	0.000030	0.96	1710.20	315.58	0.06
FillCap	1288	2-year	109.00	7.60	10.41		10.41	0.000038	0.45	378.91	282.14	0.05
FillCap	1288	5-year	191.00	7.60	11.74		11.75	0.000019	0.43	779.83	319.58	0.04
FillCap	1288	10-year	255.00	7.60	12.62		12.63	0.000013	0.40	1062.81	323.75	0.03
FillCap	1288	25-year	345.00	7.60	13.73		13.73	0.000010	0.40	1424.57	329.01	0.03
FillCap	1288	50-year	415.00	7.60	14.53		14.53	0.000008	0.40	1688.54	336.77	0.03
FillCap	1288	100-year	491.00	7.60	15.35		15.35	0.000007	0.40	1972.47	353.35	0.03
FillCap	1288	200-year	570.00	7.60	16.18		16.18	0.000006	0.41	2271.26	370.00	0.02
FillCap	1288	500-year	681.00	7.60	17.31		17.32	0.000005	0.41	2702.13	385.86	0.02
FillCap	1192	2-year	109.00	6.45	10.41		10.41	0.000044	0.49	413.95	239.71	0.05
FillCap	1192	5-year	191.00	6.45	11.74		11.74	0.000029	0.52	770.05	322.60	0.04
FillCap	1192	10-year	255.00	6.45	12.62		12.62	0.000020	0.48	1078.19	373.15	0.04
FillCap	1192	25-year	345.00	6.45	13.73		13.73	0.000012	0.43	1498.15	382.13	0.03
FillCap	1192	50-year	415.00	6.45	14.53		14.53	0.000009	0.41	1803.76	385.37	0.03
FillCap	1192	100-year	491.00	6.45	15.35		15.35	0.000008	0.40	2122.30	388.72	0.03

HEC-RAS Plan: Proposed Conditions River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	1192	200-year	570.00	6.45	16.18		16.18	0.000006	0.39	2444.85	392.08	0.02
FillCap	1192	500-year	681.00	6.45	17.31		17.32	0.000005	0.38	2893.19	396.70	0.02
FillCap	1100	2-year	109.00	6.12	10.40		10.41	0.000038	0.49	488.96	255.81	0.05
FillCap	1100	5-year	191.00	6.12	11.74		11.74	0.000021	0.47	852.62	285.44	0.04
FillCap	1100	10-year	255.00	6.12	12.62		12.62	0.000017	0.47	1118.63	315.12	0.04
FillCap	1100	25-year	345.00	6.12	13.73		13.73	0.000012	0.47	1471.78	321.53	0.03
FillCap	1100	50-year	415.00	6.12	14.53		14.53	0.000011	0.47	1729.73	326.14	0.03
FillCap	1100	100-year	491.00	6.12	15.35		15.35	0.000009	0.47	2000.15	330.89	0.03
FillCap	1100	200-year	570.00	6.12	16.18		16.18	0.000008	0.47	2275.53	335.49	0.03
FillCap	1100	500-year	681.00	6.12	17.31		17.31	0.000007	0.47	2659.61	340.18	0.03
FillCap	934	2-year	109.00	5.81	10.40		10.40	0.000026	0.48	536.46	206.59	0.04
FillCap	934	5-year	191.00	5.81	11.74		11.74	0.000022	0.54	830.62	230.13	0.04
FillCap	934	10-year	255.00	5.81	12.62		12.62	0.000019	0.57	1034.99	233.61	0.04
FillCap	934	25-year	345.00	5.81	13.73		13.73	0.000017	0.60	1296.67	237.99	0.04
FillCap	934	50-year	415.00	5.81	14.52		14.53	0.000016	0.62	1487.51	241.07	0.04
FillCap	934	100-year	491.00	5.81	15.35		15.35	0.000015	0.65	1687.26	244.22	0.04
FillCap	934	200-year	570.00	5.81	16.17		16.18	0.000015	0.67	1890.39	247.39	0.04
FillCap	934	500-year	681.00	5.81	17.31		17.31	0.000013	0.69	2174.14	251.74	0.04
FillCap	771	2-year	109.00	5.37	10.38	7.61	10.39	0.000143	1.16	213.54	175.15	0.10
FillCap	771	5-year	191.00	5.37	11.72	8.60	11.73	0.000103	1.17	372.50	189.11	0.09
FillCap	771	10-year	255.00	5.37	12.60	8.81	12.61	0.000088	1.19	479.97	190.52	0.08
FillCap	771	25-year	345.00	5.37	13.71	9.07	13.72	0.000076	1.22	616.94	192.30	0.08
FillCap	771	50-year	415.00	5.37	14.51	9.22	14.52	0.000070	1.25	716.46	193.57	0.07
FillCap	771	100-year	491.00	5.37	15.34	9.41	15.34	0.000065	1.28	820.35	194.89	0.07
FillCap	771	200-year	570.00	5.37	16.16	9.58	16.17	0.000060	1.30	925.72	196.21	0.07
FillCap	771	500-year	681.00	5.37	17.30	9.79	17.31	0.000054	1.33	1072.49	198.04	0.07
FillCap	674	2-year	109.00	4.33	10.37	6.45	10.38	0.000070	0.89	187.60	119.75	0.07
FillCap	674	5-year	191.00	4.33	11.71	7.05	11.72	0.000069	1.05	301.97	121.79	0.08
FillCap	674	10-year	255.00	4.33	12.59	7.41	12.60	0.000067	1.14	378.81	123.13	0.08
FillCap	674	25-year	345.00	4.33	13.70	7.87	13.72	0.000065	1.25	477.18	124.81	0.08
FillCap	674	50-year	415.00	4.33	14.50	8.18	14.51	0.000063	1.31	548.95	126.02	0.08
FillCap	674	100-year	491.00	4.33	15.32	8.63	15.34	0.000061	1.37	624.12	127.27	0.08
FillCap	674	200-year	570.00	4.33	16.14	8.88	16.16	0.000059	1.43	700.62	128.53	0.08
FillCap	674	500-year	681.00	4.33	17.28	9.17	17.30	0.000055	1.49	807.59	130.25	0.08
FillCap	612	2-year	109.00	6.54	10.35	8.23	10.37	0.000235	1.26	93.82	200.72	0.13
FillCap	612	5-year	191.00	6.54	11.68	8.62	11.71	0.000197	1.49	139.56	214.03	0.13
FillCap	612	10-year	255.00	6.54	12.55	8.85	12.59	0.000185	1.64	169.65	231.59	0.13
FillCap	612	25-year	345.00	6.54	13.65	9.13	13.70	0.000175	1.82	207.51	253.65	0.13
FillCap	612	50-year	415.00	6.54	14.44	9.33	14.50	0.000168	1.93	234.67	269.02	0.13
FillCap	612	100-year	491.00	6.54	15.26	9.54	15.32	0.000162	2.04	262.75	284.91	0.13
FillCap	612	200-year	570.00	6.54	16.08	9.74	16.14	0.000156	2.14	290.95	300.78	0.13
FillCap	612	500-year	681.00	6.54	17.21	10.01	17.28	0.000147	2.26	329.78	309.27	0.13
FillCap	542.5		Culvert									
FillCap	473	2-year	109.00	6.09	7.64	7.41	8.01	0.009535	4.85	22.47	154.62	0.74
FillCap	473	5-year	191.00	6.09	8.17	7.90	8.74	0.009509	6.07	31.49	176.75	0.79
FillCap	473	10-year	255.00	6.09	8.47	8.23	9.23	0.010250	6.96	36.62	181.90	0.84
FillCap	473	25-year	345.00	6.09	8.95	8.66	9.87	0.009666	7.72	44.68	189.98	0.84
FillCap	473	50-year	415.00	6.09	9.04	8.97	10.29	0.012456	8.97	46.26	191.56	0.96
FillCap	473	100-year	491.00	6.09	9.29	9.28	10.76	0.013024	9.73	50.49	195.66	0.99
FillCap	473	200-year	570.00	6.09	9.59	9.59	11.22	0.012716	10.25	55.61	198.50	1.00
FillCap	473	500-year	681.00	6.09	10.00	10.00	11.84	0.012216	10.87	62.63	202.38	1.00
FillCap	304	2-year	109.00	4.10	4.77	4.60	5.03	0.040925	4.18	26.58	29.67	1.23
FillCap	304	5-year	191.00	4.10	5.07	5.01	5.50	0.053566	5.27	36.35	38.00	1.44
FillCap	304	10-year	255.00	4.10	5.29	5.29	5.77	0.052243	5.47	45.97	48.20	1.45
FillCap	304	25-year	345.00	4.10	5.47	5.45	6.10	0.082663	7.46	55.49	68.35	1.86
FillCap	304	50-year	415.00	4.10	5.75	5.75	6.28	0.046676	7.16	76.60	78.35	1.48
FillCap	304	100-year	491.00	4.10	5.83	5.79	6.48	0.051119	7.95	83.44	84.81	1.58
FillCap	304	200-year	570.00	4.10	6.00	6.00	6.69	0.045515	8.30	99.16	103.28	1.53
FillCap	304	500-year	681.00	4.10	6.29	6.29	6.92	0.032046	8.01	133.64	139.64	1.33
FillCap	173	2-year	109.00	3.07	4.68	3.85	4.70	0.000604	1.14	115.99	175.06	0.18
FillCap	173	5-year	191.00	3.07	5.10	4.07	5.12	0.000583	1.37	198.12	214.05	0.19
FillCap	173	10-year	255.00	3.07	5.33	4.19	5.36	0.000607	1.53	248.80	228.99	0.20
FillCap	173	25-year	345.00	3.07	5.60	4.36	5.64	0.000633	1.71	314.17	244.84	0.21
FillCap	173	50-year	415.00	3.07	5.80	4.49	5.85	0.000647	1.84	370.77	306.60	0.21
FillCap	173	100-year	491.00	3.07	5.96	4.62	6.01	0.000679	1.97	420.70	318.67	0.22
FillCap	173	200-year	570.00	3.07	6.11	4.75	6.16	0.000709	2.09	469.33	330.01	0.23
FillCap	173	500-year	681.00	3.07	6.31	4.90	6.36	0.000747	2.25	534.72	347.69	0.24

HEC-RAS Plan: Proposed Conditions River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	20	2-year	109.00	2.75	4.52	3.83	4.56	0.001600	1.71	75.12	106.41	0.29
FillCap	20	5-year	191.00	2.75	4.92	4.10	4.98	0.001601	1.99	126.69	148.59	0.30
FillCap	20	10-year	255.00	2.75	5.14	4.27	5.21	0.001601	2.21	162.05	172.38	0.31
FillCap	20	25-year	345.00	2.75	5.41	4.52	5.49	0.001601	2.45	211.87	207.51	0.32
FillCap	20	50-year	415.00	2.75	5.60	4.66	5.69	0.001602	2.62	260.49	284.87	0.33
FillCap	20	100-year	491.00	2.75	5.76	4.79	5.85	0.001600	2.76	306.04	303.77	0.33
FillCap	20	200-year	570.00	2.75	5.90	4.90	6.00	0.001603	2.88	351.48	321.52	0.33
FillCap	20	500-year	681.00	2.75	6.09	5.06	6.20	0.001603	3.04	415.20	358.87	0.34



Legend	
WS 500-year	Blue line with diamond markers
WS 200-year	Blue line with square markers
WS 100-year	Blue line with triangle markers
WS 50-year	Blue line with cross markers
WS 25-year	Blue line with asterisk markers
WS 10-year	Blue line with inverted triangle markers
WS 5-year	Blue line with plus markers
WS 2-year	Blue line with x markers
Ground	Black line with square markers

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: HEC-RAS version 5.0.7

Future Compatibility Water Surface Profiles	
Former New Gold House Cap Design Nome, Alaska	
	Figure B7

HEC-RAS Plan: Future Compatibility River: Dry Creek Reach: FillCap

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	3687	2-year	109.00	13.85	17.88	15.18	17.88	0.000029	0.53	544.85	373.63	0.05
FillCap	3687	5-year	191.00	13.85	19.59	15.82	19.59	0.000009	0.39	1391.11	476.56	0.03
FillCap	3687	10-year	255.00	13.85	20.79	16.06	20.79	0.000006	0.35	1978.21	500.19	0.02
FillCap	3687	25-year	345.00	13.85	22.43	16.28	22.43	0.000004	0.32	2818.13	526.65	0.02
FillCap	3687	50-year	415.00	13.85	23.72	16.43	23.72	0.000003	0.31	3513.78	550.02	0.02
FillCap	3687	100-year	491.00	13.85	25.07	16.57	25.07	0.000002	0.30	4272.65	577.19	0.02
FillCap	3687	200-year	570.00	13.85	25.28	16.67	25.28	0.000003	0.33	4397.39	582.00	0.02
FillCap	3687	500-year	681.00	13.85	25.49	16.79	25.49	0.000004	0.39	4518.51	586.64	0.02
FillCap	3491	2-year	109.00	13.31	17.87	15.00	17.87	0.000038	0.57	344.18	445.47	0.05
FillCap	3491	5-year	191.00	13.31	19.59	15.31	19.59	0.000018	0.51	746.01	483.45	0.04
FillCap	3491	10-year	255.00	13.31	20.79	15.49	20.79	0.000003	0.24	2363.77	504.46	0.02
FillCap	3491	25-year	345.00	13.31	22.42	15.71	22.43	0.000002	0.24	3213.14	534.75	0.01
FillCap	3491	50-year	415.00	13.31	23.72	15.88	23.72	0.000002	0.24	3920.88	560.34	0.01
FillCap	3491	100-year	491.00	13.31	25.07	16.04	25.07	0.000001	0.23	4692.28	583.08	0.01
FillCap	3491	200-year	570.00	13.31	25.28	16.21	25.28	0.000002	0.26	4818.08	586.33	0.01
FillCap	3491	500-year	681.00	13.31	25.49	16.44	25.49	0.000002	0.31	4939.87	589.45	0.02
FillCap	3354	2-year	109.00	13.71	17.74	15.82	17.83	0.000777	2.78	67.67	431.51	0.25
FillCap	3354	5-year	191.00	13.71	19.47	16.56	19.56	0.000497	2.86	116.59	481.11	0.21
FillCap	3354	10-year	255.00	13.71	20.68	16.75	20.76	0.000406	2.94	150.62	503.43	0.20
FillCap	3354	25-year	345.00	13.71	22.31	17.55	22.40	0.000322	3.03	196.80	544.65	0.19
FillCap	3354	50-year	415.00	13.71	23.60	17.83	23.69	0.000272	3.07	233.32	566.68	0.17
FillCap	3354	100-year	491.00	13.71	24.87	18.12	25.02	0.001806	3.86	345.67	589.04	0.38
FillCap	3354	200-year	570.00	13.71	25.15	18.38	25.25	0.001257	3.41	513.72	595.24	0.32
FillCap	3354	500-year	681.00	13.71	25.38	18.76	25.46	0.001093	3.31	650.47	600.53	0.30
FillCap	3296.086		Culvert									
FillCap	3253	2-year	109.00	10.67	13.71	12.42	13.79	0.001330	2.23	48.93	26.18	0.29
FillCap	3253	5-year	191.00	10.67	14.34	12.90	14.47	0.001663	2.88	66.25	29.31	0.33
FillCap	3253	10-year	255.00	10.67	14.67	13.20	14.85	0.001964	3.36	75.88	30.97	0.37
FillCap	3253	25-year	345.00	10.67	15.04	13.58	15.28	0.002404	3.98	86.72	32.78	0.41
FillCap	3253	50-year	415.00	10.67	15.37	13.84	15.65	0.002502	4.29	96.83	34.60	0.43
FillCap	3253	100-year	491.00	10.67	15.60	14.09	15.95	0.002794	4.71	107.56	156.87	0.46
FillCap	3253	200-year	570.00	10.67	15.75	14.33	16.17	0.003220	5.20	116.70	219.19	0.49
FillCap	3253	500-year	681.00	10.67	15.85	14.64	16.41	0.004178	6.03	122.70	242.20	0.56
FillCap	3016	2-year	109.00	10.56	13.32	12.24	13.40	0.002003	2.62	60.64	50.81	0.34
FillCap	3016	5-year	191.00	10.56	13.89	12.71	14.01	0.002220	3.31	95.94	73.09	0.38
FillCap	3016	10-year	255.00	10.56	14.14	12.98	14.30	0.002685	3.89	116.43	108.78	0.42
FillCap	3016	25-year	345.00	10.56	14.38	13.37	14.61	0.003371	4.62	145.96	238.95	0.48
FillCap	3016	50-year	415.00	10.56	14.53	13.64	14.86	0.004484	5.52	172.90	278.55	0.56
FillCap	3016	100-year	491.00	10.56	14.68	13.88	15.06	0.005044	6.04	203.64	311.19	0.60
FillCap	3016	200-year	570.00	10.56	14.83	14.11	15.21	0.005054	6.23	237.28	323.83	0.60
FillCap	3016	500-year	681.00	10.56	15.03	14.40	15.30	0.003965	5.74	356.36	341.13	0.54
FillCap	2838	2-year	109.00	10.82	12.87	12.11	13.00	0.002475	2.96	44.99	39.27	0.39
FillCap	2838	5-year	191.00	10.82	13.37	12.58	13.56	0.002843	3.74	83.09	161.60	0.44
FillCap	2838	10-year	255.00	10.82	13.67	12.88	13.84	0.002509	3.82	155.00	271.16	0.42
FillCap	2838	25-year	345.00	10.82	13.91	13.55	14.07	0.002494	4.04	220.58	277.70	0.43
FillCap	2838	50-year	415.00	10.82	14.03	13.75	14.21	0.002692	4.32	254.89	288.72	0.45
FillCap	2838	100-year	491.00	10.82	14.15	13.86	14.34	0.002871	4.59	288.89	303.46	0.46
FillCap	2838	200-year	570.00	10.82	14.25	13.95	14.46	0.003093	4.87	319.24	317.88	0.49
FillCap	2838	500-year	681.00	10.82	14.37	14.08	14.61	0.003618	5.40	354.01	347.37	0.53
FillCap	2744	2-year	109.00	10.82	12.47	11.99	12.68	0.004735	3.70	34.36	51.04	0.53
FillCap	2744	5-year	191.00	10.82	12.75	12.53	13.13	0.007335	5.17	54.65	93.36	0.68
FillCap	2744	10-year	255.00	10.82	12.91	12.91	13.41	0.008854	6.01	71.73	118.62	0.76
FillCap	2744	25-year	345.00	10.82	13.28	13.28	13.69	0.006780	5.90	136.11	255.15	0.68
FillCap	2744	50-year	415.00	10.82	13.48	13.48	13.83	0.005779	5.77	196.33	320.74	0.64
FillCap	2744	100-year	491.00	10.82	13.60	13.60	13.95	0.005832	5.98	236.95	354.48	0.65
FillCap	2744	200-year	570.00	10.82	13.71	13.71	14.05	0.005903	6.17	275.36	372.00	0.66
FillCap	2744	500-year	681.00	10.82	14.11	13.81	14.28	0.003095	4.89	431.54	413.76	0.49
FillCap	2666	2-year	109.00	10.82	11.87	11.87	12.10	0.012676	4.56	48.89	123.59	0.81
FillCap	2666	5-year	191.00	10.82	12.13	12.13	12.38	0.011915	5.17	91.63	187.74	0.82
FillCap	2666	10-year	255.00	10.82	12.25	12.25	12.52	0.012739	5.68	114.72	203.12	0.86
FillCap	2666	25-year	345.00	10.82	12.52	12.52	12.72	0.008453	5.23	174.62	239.53	0.72
FillCap	2666	50-year	415.00	10.82	12.84	12.84	12.96	0.004690	4.39	258.48	286.90	0.56
FillCap	2666	100-year	491.00	10.82	13.18	13.18	13.26	0.002809	3.79	364.54	322.97	0.44
FillCap	2666	200-year	570.00	10.82	13.56	13.56	13.62	0.001806	3.36	502.36	407.61	0.36
FillCap	2666	500-year	681.00	10.82	14.08	14.08	14.11	0.000904	2.68	724.91	429.97	0.27
FillCap	2484	2-year	109.00	9.21	11.05	11.05	11.07	0.001184	1.72	115.60	128.64	0.26
FillCap	2484	5-year	191.00	9.21	11.47	11.47	11.51	0.001254	2.12	173.81	143.22	0.28

HEC-RAS Plan: Future Compatibility River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	2484	10-year	255.00	9.21	11.77		11.82	0.001224	2.33	217.62	153.28	0.29
FillCap	2484	25-year	345.00	9.21	12.19		12.24	0.001106	2.50	285.10	171.84	0.28
FillCap	2484	50-year	415.00	9.21	12.55		12.61	0.000972	2.57	352.67	201.32	0.27
FillCap	2484	100-year	491.00	9.21	12.95		13.00	0.000840	2.61	441.23	249.97	0.26
FillCap	2484	200-year	570.00	9.21	13.37		13.42	0.000705	2.59	560.12	327.52	0.24
FillCap	2484	500-year	681.00	9.21	13.97		14.00	0.000461	2.32	783.17	401.22	0.20
FillCap	2255	2-year	109.00	9.21	10.75		10.79	0.001277	1.85	106.61	147.71	0.27
FillCap	2255	5-year	191.00	9.21	11.20		11.24	0.001138	2.09	179.22	170.90	0.27
FillCap	2255	10-year	255.00	9.21	11.51		11.56	0.001033	2.22	237.15	195.39	0.27
FillCap	2255	25-year	345.00	9.21	11.99		12.03	0.000768	2.18	334.83	213.42	0.24
FillCap	2255	50-year	415.00	9.21	12.38		12.42	0.000634	2.18	423.99	256.86	0.22
FillCap	2255	100-year	491.00	9.21	12.82		12.85	0.000485	2.08	542.44	290.53	0.20
FillCap	2255	200-year	570.00	9.21	13.27		13.30	0.000376	1.99	683.35	332.89	0.18
FillCap	2255	500-year	681.00	9.21	13.89		13.92	0.000268	1.85	900.61	370.32	0.15
FillCap	2038	2-year	109.00	7.78	10.53		10.56	0.000882	1.68	96.78	98.26	0.22
FillCap	2038	5-year	191.00	7.78	10.93		10.99	0.001179	2.23	145.82	149.83	0.27
FillCap	2038	10-year	255.00	7.78	11.26		11.32	0.001129	2.40	203.28	197.87	0.27
FillCap	2038	25-year	345.00	7.78	11.80		11.85	0.000838	2.35	327.84	268.07	0.24
FillCap	2038	50-year	415.00	7.78	12.25		12.29	0.000575	2.14	462.10	314.74	0.20
FillCap	2038	100-year	491.00	7.78	12.73		12.75	0.000394	1.92	616.70	336.23	0.17
FillCap	2038	200-year	570.00	7.78	13.20		13.23	0.000289	1.78	780.68	355.49	0.15
FillCap	2038	500-year	681.00	7.78	13.85		13.87	0.000200	1.62	1018.28	372.68	0.13
FillCap	1828	2-year	109.00	9.04	10.28		10.30	0.001793	1.93	127.04	227.61	0.32
FillCap	1828	5-year	191.00	9.04	10.71		10.73	0.001193	1.94	240.37	285.50	0.27
FillCap	1828	10-year	255.00	9.04	11.10		11.12	0.000733	1.76	360.93	321.82	0.22
FillCap	1828	25-year	345.00	9.04	11.71		11.73	0.000375	1.51	560.62	329.33	0.17
FillCap	1828	50-year	415.00	9.04	12.20		12.21	0.000253	1.39	720.47	334.67	0.14
FillCap	1828	100-year	491.00	9.04	12.68		12.69	0.000188	1.32	885.11	340.09	0.12
FillCap	1828	200-year	570.00	9.04	13.17		13.18	0.000148	1.28	1051.93	345.49	0.11
FillCap	1828	500-year	681.00	9.04	13.82		13.83	0.000115	1.24	1280.15	352.75	0.10
FillCap	1570	2-year	109.00	7.92	9.68		9.71	0.003008	2.20	96.48	133.52	0.38
FillCap	1570	5-year	191.00	7.92	10.41		10.43	0.001098	1.90	242.40	266.49	0.25
FillCap	1570	10-year	255.00	7.92	10.94		10.96	0.000552	1.60	404.02	324.45	0.19
FillCap	1570	25-year	345.00	7.92	11.64		11.64	0.000267	1.33	632.84	335.34	0.14
FillCap	1570	50-year	415.00	7.92	12.14		12.15	0.000187	1.24	804.54	343.28	0.12
FillCap	1570	100-year	491.00	7.92	12.64		12.65	0.000144	1.19	978.66	350.82	0.10
FillCap	1570	200-year	570.00	7.92	13.14		13.14	0.000116	1.15	1153.43	354.99	0.10
FillCap	1570	500-year	681.00	7.92	13.80		13.80	0.000092	1.13	1389.63	359.91	0.09
FillCap	1411	2-year	109.00	7.44	9.55		9.56	0.000448	1.15	217.80	228.08	0.16
FillCap	1411	5-year	191.00	7.44	10.35		10.36	0.000251	1.11	424.73	283.22	0.12
FillCap	1411	10-year	255.00	7.44	10.90		10.91	0.000176	1.06	586.00	295.58	0.11
FillCap	1411	25-year	345.00	7.44	11.61		11.62	0.000123	1.02	798.02	303.11	0.09
FillCap	1411	50-year	415.00	7.44	12.12		12.13	0.000101	1.01	954.44	308.56	0.09
FillCap	1411	100-year	491.00	7.44	12.63		12.63	0.000088	1.01	1111.50	313.72	0.08
FillCap	1411	200-year	570.00	7.44	13.12		13.13	0.000078	1.02	1268.75	318.67	0.08
FillCap	1411	500-year	681.00	7.44	13.79		13.79	0.000069	1.04	1482.18	325.27	0.08
FillCap	1333	2-year	109.00	8.07	9.35		9.46	0.005576	3.07	54.75	71.33	0.54
FillCap	1333	5-year	191.00	8.07	10.25		10.31	0.001682	2.47	127.32	89.41	0.33
FillCap	1333	10-year	255.00	8.07	10.82		10.87	0.001083	2.38	180.57	96.37	0.27
FillCap	1333	25-year	345.00	8.07	11.53		11.59	0.000766	2.39	253.60	108.41	0.24
FillCap	1333	50-year	415.00	8.07	12.03		12.10	0.000830	2.75	320.64	189.56	0.26
FillCap	1333	100-year	491.00	8.07	12.55		12.61	0.000608	2.57	424.05	212.35	0.22
FillCap	1333	200-year	570.00	8.07	13.06		13.11	0.000463	2.43	537.40	230.99	0.20
FillCap	1333	500-year	681.00	8.07	13.74		13.78	0.000334	2.26	698.45	244.46	0.17
FillCap	1288	2-year	109.00	7.60	9.40		9.40	0.000227	0.79	157.40	132.36	0.11
FillCap	1288	5-year	191.00	7.60	10.27		10.28	0.000145	0.85	339.78	269.03	0.10
FillCap	1288	10-year	255.00	7.60	10.84		10.85	0.000106	0.84	503.17	294.07	0.09
FillCap	1288	25-year	345.00	7.60	11.56		11.57	0.000076	0.83	721.84	313.09	0.08
FillCap	1288	50-year	415.00	7.60	12.07		12.07	0.000061	0.81	883.71	321.12	0.07
FillCap	1288	100-year	491.00	7.60	12.58		12.59	0.000050	0.79	1049.80	323.56	0.06
FillCap	1288	200-year	570.00	7.60	13.09		13.09	0.000043	0.78	1213.74	325.95	0.06
FillCap	1288	500-year	681.00	7.60	13.76		13.76	0.000036	0.78	1433.25	329.13	0.06
FillCap	1192	2-year	109.00	6.45	9.37		9.38	0.000308	1.02	186.23	182.22	0.13
FillCap	1192	5-year	191.00	6.45	10.26		10.26	0.000169	0.94	377.69	235.88	0.10
FillCap	1192	10-year	255.00	6.45	10.83		10.84	0.000131	0.93	517.68	249.89	0.09
FillCap	1192	25-year	345.00	6.45	11.55		11.56	0.000120	1.02	710.11	312.43	0.09
FillCap	1192	50-year	415.00	6.45	12.06		12.07	0.000094	0.98	875.81	339.81	0.08
FillCap	1192	100-year	491.00	6.45	12.58		12.58	0.000076	0.95	1061.60	372.63	0.07

HEC-RAS Plan: Future Compatibility River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	1192	200-year	570.00	6.45	13.08		13.09	0.000060	0.90	1251.66	378.56	0.07
FillCap	1192	500-year	681.00	6.45	13.76		13.76	0.000046	0.85	1507.25	382.23	0.06
FillCap	1100	2-year	109.00	6.12	9.35		9.35	0.000202	0.92	242.50	170.75	0.11
FillCap	1100	5-year	191.00	6.12	10.24		10.25	0.000153	0.95	447.47	250.79	0.10
FillCap	1100	10-year	255.00	6.12	10.82		10.83	0.000113	0.93	598.07	268.07	0.09
FillCap	1100	25-year	345.00	6.12	11.54		11.55	0.000085	0.92	797.16	281.75	0.08
FillCap	1100	50-year	415.00	6.12	12.05		12.06	0.000073	0.92	943.15	291.37	0.08
FillCap	1100	100-year	491.00	6.12	12.57		12.58	0.000064	0.93	1103.01	314.83	0.07
FillCap	1100	200-year	570.00	6.12	13.08		13.08	0.000056	0.92	1263.33	317.76	0.07
FillCap	1100	500-year	681.00	6.12	13.75		13.75	0.000048	0.92	1478.20	321.65	0.06
FillCap	934	2-year	109.00	5.81	9.33		9.33	0.000110	0.79	326.71	184.21	0.08
FillCap	934	5-year	191.00	5.81	10.22		10.23	0.000097	0.90	500.06	202.94	0.08
FillCap	934	10-year	255.00	5.81	10.80		10.81	0.000092	0.97	621.75	214.90	0.08
FillCap	934	25-year	345.00	5.81	11.53		11.53	0.000086	1.04	783.21	229.32	0.08
FillCap	934	50-year	415.00	5.81	12.04		12.05	0.000080	1.07	900.83	231.33	0.08
FillCap	934	100-year	491.00	5.81	12.56		12.56	0.000075	1.10	1021.26	233.38	0.08
FillCap	934	200-year	570.00	5.81	13.07		13.07	0.000072	1.14	1140.22	235.38	0.08
FillCap	934	500-year	681.00	5.81	13.74		13.75	0.000068	1.18	1299.45	238.04	0.08
FillCap	771	2-year	109.00	5.37	9.25	7.61	9.29	0.000728	2.15	109.47	145.22	0.21
FillCap	771	5-year	191.00	5.37	10.15	8.60	10.19	0.000587	2.26	189.70	168.21	0.19
FillCap	771	10-year	255.00	5.37	10.74	8.81	10.77	0.000518	2.32	254.11	187.53	0.19
FillCap	771	25-year	345.00	5.37	11.47	9.07	11.50	0.000427	2.31	342.20	188.70	0.17
FillCap	771	50-year	415.00	5.37	11.99	9.22	12.02	0.000385	2.33	404.47	189.53	0.17
FillCap	771	100-year	491.00	5.37	12.51	9.41	12.54	0.000352	2.35	467.94	190.36	0.16
FillCap	771	200-year	570.00	5.37	13.02	9.58	13.05	0.000327	2.38	530.42	191.18	0.16
FillCap	771	500-year	681.00	5.37	13.69	9.79	13.72	0.000301	2.42	613.77	192.26	0.15
FillCap	674	2-year	109.00	4.33	9.22	6.45	9.25	0.000229	1.32	117.31	93.97	0.13
FillCap	674	5-year	191.00	4.33	10.12	7.05	10.15	0.000253	1.63	185.35	119.37	0.14
FillCap	674	10-year	255.00	4.33	10.70	7.41	10.74	0.000251	1.77	240.68	120.26	0.14
FillCap	674	25-year	345.00	4.33	11.43	7.87	11.47	0.000244	1.92	310.31	121.37	0.14
FillCap	674	50-year	415.00	4.33	11.94	8.17	11.99	0.000239	2.02	359.69	122.14	0.15
FillCap	674	100-year	491.00	4.33	12.46	8.68	12.51	0.000235	2.11	410.15	122.93	0.15
FillCap	674	200-year	570.00	4.33	12.97	8.90	13.02	0.000230	2.20	459.90	123.70	0.15
FillCap	674	500-year	681.00	4.33	13.64	9.18	13.70	0.000224	2.31	526.39	124.73	0.15
FillCap	612	2-year	109.00	6.54	9.13	8.23	9.20	0.001485	2.19	57.76	194.13	0.30
FillCap	612	5-year	191.00	6.54	10.03	8.63	10.11	0.000951	2.35	97.78	199.02	0.26
FillCap	612	10-year	255.00	6.54	10.61	8.87	10.70	0.000821	2.50	123.51	202.17	0.25
FillCap	612	25-year	345.00	6.54	11.33	9.14	11.43	0.000728	2.71	155.38	207.10	0.24
FillCap	612	50-year	415.00	6.54	11.83	9.33	11.94	0.000687	2.85	177.69	217.19	0.24
FillCap	612	100-year	491.00	6.54	12.34	9.52	12.46	0.000655	3.00	200.27	227.39	0.24
FillCap	612	200-year	570.00	6.54	12.84	9.70	12.97	0.000630	3.14	222.34	237.36	0.24
FillCap	612	500-year	681.00	6.54	13.50	9.95	13.64	0.000603	3.32	251.53	250.56	0.24
FillCap	542.5		Culvert									
FillCap	473	2-year	109.00	6.09	7.58	7.36	7.84	0.008953	4.11	27.37	151.86	0.70
FillCap	473	5-year	191.00	6.09	8.03	7.74	8.42	0.008400	5.03	39.62	171.98	0.72
FillCap	473	10-year	255.00	6.09	8.29	7.99	8.79	0.008877	5.73	46.55	178.75	0.76
FillCap	473	25-year	345.00	6.09	8.70	8.32	9.30	0.008151	6.30	57.52	185.68	0.75
FillCap	473	50-year	415.00	6.09	8.80	8.55	9.59	0.010137	7.23	60.24	187.40	0.84
FillCap	473	100-year	491.00	6.09	9.02	8.79	9.94	0.010356	7.78	66.32	191.24	0.86
FillCap	473	200-year	570.00	6.09	9.19	9.02	10.27	0.011252	8.46	70.82	194.08	0.91
FillCap	473	500-year	681.00	6.09	9.33	9.33	10.72	0.013469	9.59	74.72	196.07	1.00
FillCap	304	2-year	109.00	4.10	4.77	4.60	5.03	0.040925	4.18	26.58	29.67	1.23
FillCap	304	5-year	191.00	4.10	5.07	5.01	5.50	0.053566	5.27	36.35	38.00	1.44
FillCap	304	10-year	255.00	4.10	5.29	5.29	5.77	0.052243	5.47	45.97	48.20	1.45
FillCap	304	25-year	345.00	4.10	5.47	5.45	6.10	0.082663	7.46	55.49	68.35	1.86
FillCap	304	50-year	415.00	4.10	5.75	5.75	6.28	0.046676	7.16	76.60	78.35	1.48
FillCap	304	100-year	491.00	4.10	5.83	5.79	6.48	0.051119	7.95	83.44	84.81	1.58
FillCap	304	200-year	570.00	4.10	6.00	6.00	6.69	0.045515	8.30	99.16	103.28	1.53
FillCap	304	500-year	681.00	4.10	6.29	6.29	6.92	0.032046	8.01	133.64	139.64	1.33
FillCap	173	2-year	109.00	3.07	4.68	3.85	4.70	0.000604	1.14	115.99	175.06	0.18
FillCap	173	5-year	191.00	3.07	5.10	4.07	5.12	0.000583	1.37	198.12	214.05	0.19
FillCap	173	10-year	255.00	3.07	5.33	4.19	5.36	0.000607	1.53	248.80	226.99	0.20
FillCap	173	25-year	345.00	3.07	5.60	4.36	5.64	0.000633	1.71	314.17	244.84	0.21
FillCap	173	50-year	415.00	3.07	5.80	4.49	5.85	0.000647	1.84	370.77	306.60	0.21
FillCap	173	100-year	491.00	3.07	5.96	4.62	6.01	0.000679	1.97	420.70	318.67	0.22
FillCap	173	200-year	570.00	3.07	6.11	4.75	6.16	0.000709	2.09	469.33	330.01	0.23
FillCap	173	500-year	681.00	3.07	6.31	4.90	6.36	0.000747	2.25	534.72	347.69	0.24

HEC-RAS Plan: Future Compatibility River: Dry Creek Reach: FillCap (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FillCap	20	2-year	109.00	2.75	4.52	3.83	4.56	0.001600	1.71	75.12	106.41	0.29
FillCap	20	5-year	191.00	2.75	4.92	4.10	4.98	0.001601	1.99	126.69	148.59	0.30
FillCap	20	10-year	255.00	2.75	5.14	4.27	5.21	0.001601	2.21	162.05	172.38	0.31
FillCap	20	25-year	345.00	2.75	5.41	4.52	5.49	0.001601	2.45	211.87	207.51	0.32
FillCap	20	50-year	415.00	2.75	5.60	4.66	5.69	0.001602	2.62	260.49	284.87	0.33
FillCap	20	100-year	491.00	2.75	5.76	4.79	5.85	0.001600	2.76	306.04	303.77	0.33
FillCap	20	200-year	570.00	2.75	5.90	4.90	6.00	0.001603	2.88	351.48	321.52	0.33
FillCap	20	500-year	681.00	2.75	6.09	5.06	6.20	0.001603	3.04	415.20	358.87	0.34

Proposed Condition Streambed Stability Analysis

Design Gradation (Riprap Class 1): Critical Shear				
Location:	Proposed Cap			
	D ₁₀₀	D ₈₄	D ₅₀	D ₁₆
ft	1.00	0.71	0.53	0.37
in	12.00	8.50	6.30	4.45
mm	305	216	160.0	113.0

Determining Aggregate Proportions
Per WSDOT Standard Specifications 9-03.11

Rock Size		Streambed Sediment	Streambed Cobbles					Streambed Boulders			D _{size}
[in]	[mm]		4"	6"	8"	10"	12"	12"-18"	18"-28"	28"-36"	
36.0	914								100	0.0	
32.0	813								50	0.0	
28.0	711							100		0.0	
23.0	584							50		0.0	
18.0	457						100			0.0	
15.0	381						50			0.0	
12.0	305					100				0.0	
10.0	254				100	80				0.0	
8.0	203			100	80	68				0.0	
6.0	152			100	80	68	57			0.0	
5.0	127			80	68	57	45			0.0	
4.0	102		100	71	57	45	39			0.0	
3.0	76.2		80	63	45	38	34			0.0	
2.5	63.5	100	65	54	37	32	28			0.0	
2.0	50.8	80	50	45	29	25	22			0.0	
1.5	38.1	73	35	32	21	18	16			0.0	
1.0	25.4	65	20	18	13	12	11			0.0	
0.75	19.1	50	5	5	5	5				0.0	
0.19	4.75	35								0.0	
0.02	0.425	16								0.0	
0.00	0.0750	7								0.0	
% per category		0	0	0	0	0	0	0	0	0	--> 0%
% Cobble & Sediment											0.0%

No. 4
No. 40
No. 200

References:
https://www.fs.fed.us/eng/pubs/pdf/StreamSimulation/lo_res/AppendixE.pdf
 Appendix E--Methods for Streambed Mobility/Stability Analysis

Limitations:
 D₈₄ must be between 0.40 in and 10 in Yes
 Uniform bed material (D_i < 20-30 times D50) Yes
 Slopes less than 5% Yes
 Sand/gravel streams with high relative submergence No

2yr-depth 1.83 ft
 Relative Submergence (D₅₀/Depth): 0.29
 γ_s 165 specific weight of sediment particle (lb/ft³)
 γ 62.4 specific weight of water (lb/ft³)
 τ_{D50} 0.054 dimensionless Shields parameter for D50, use table E.1 of USFS manual or assume 0.045 for poorly sorted channel bed

Link to Hydraulic Model: [P:119\1972600\100\Hydraulics\2021](#)

Flow	2-YR	100-YR	200-year	500-YR
Average Modeled Shear Stress (lb/ft ²)				
	0.0	0.0	0.0	0.0
τ _{Ci}				
4.91	No Motion	No Motion	No Motion	No Motion
4.74	No Motion	No Motion	No Motion	No Motion
4.55	No Motion	No Motion	No Motion	No Motion
4.29	No Motion	No Motion	No Motion	No Motion
3.99	No Motion	No Motion	No Motion	No Motion
3.77	No Motion	No Motion	No Motion	No Motion
3.53	No Motion	No Motion	No Motion	No Motion
3.34	No Motion	No Motion	No Motion	No Motion
3.12	No Motion	No Motion	No Motion	No Motion
2.87	No Motion	No Motion	No Motion	No Motion
2.71	No Motion	No Motion	No Motion	No Motion
2.54	No Motion	No Motion	No Motion	No Motion
2.33	No Motion	No Motion	No Motion	No Motion
2.20	No Motion	No Motion	No Motion	No Motion
2.06	No Motion	No Motion	No Motion	No Motion
1.89	No Motion	No Motion	No Motion	No Motion
1.67	No Motion	No Motion	No Motion	No Motion
1.54	No Motion	No Motion	No Motion	No Motion
1.01	No Motion	No Motion	No Motion	No Motion
0.49	No Motion	No Motion	No Motion	No Motion
D16	4.45	in		
D50	6.30	in		
D84	8.50	in		
D100	12.00	in		

Future Compatibility Streambed Stability Analysis

Design Gradation (Riprap Class 1): Critical Shear

Location:		Proposed Cap			
	D ₁₀₀	D ₈₄	D ₅₀	D ₁₆	
ft	1.00	0.71	0.53	0.37	
in	12.00	8.50	6.30	4.45	
mm	305	216	160.0	113.0	

Determining Aggregate Proportions
Per WSDOT Standard Specifications 9-03.11

Rock Size		Streambed Sediment	Streambed Cobbles				Streambed Boulders			D _{size}	
[in]	[mm]		4"	6"	8"	10"	12"	12"-18"	18"-28"		28"-36"
36.0	914								100	0.0	
32.0	813								50	0.0	
28.0	711								100	0.0	
23.0	584								50	0.0	
18.0	457								100	0.0	
15.0	381								50	0.0	
12.0	305						100			0.0	
10.0	254						100	80		0.0	
8.0	203				100	80	68			0.0	
6.0	152			100	80	68	57			0.0	
5.0	127			80	68	57	45			0.0	
4.0	102		100	71	57	45	39			0.0	
3.0	76.2		80	63	45	38	34			0.0	
2.5	63.5	100	65	54	37	32	28			0.0	
2.0	50.8	80	50	45	29	25	22			0.0	
1.5	38.1	73	35	32	21	18	16			0.0	
1.0	25.4	65	20	18	13	12	11			0.0	
0.75	19.1	50	5	5	5	5	5			0.0	
0.19	4.75	35								0.0	
0.02	0.425	16								0.0	
0.00	0.0750	7								0.0	
% per category		0	0	0	0	0	0	0	0	0	--> 0%
% Cobble & Sediment											0.0%

No. 4
No. 40
No. 200

References:
https://www.fs.fed.us/eng/pubs/pdf/StreamSimulation/lo_res/AppendixE.pdf
Appendix E--Methods for Streambed Mobility/Stability Analysis

Limitations:
D₈₄ must be between 0.40 in and 10 in Yes
Uniform bed material (D_i < 20-30 times D50)

Slopes less than 5% Yes
Sand/gravel streams with high relative submergence No

2yr-depth: 1.33 ft
Relative Submergence (D₅₀/Depth): 0.39
γ_s 165 specific weight of sediment particle (lb/ft³)
γ 62.4 specific weight of water (lb/ft³)
τ_{D50} 0.054 dimensionless Shields parameter for D50, use table E.1 of USFS manual or assume 0.045 for poorly sorted channel bed

Link to Hydraulic Model: <P:19\1972600\100\Hydraulics\2021>

Flow	2-YR	100-YR	200-year	500-YR
Average Modeled Shear Stress (lb/ft ²)				
	0.0	0.0	0.0	0.0
τ _{ci}				
4.91	No Motion	No Motion	No Motion	No Motion
4.74	No Motion	No Motion	No Motion	No Motion
4.55	No Motion	No Motion	No Motion	No Motion
4.29	No Motion	No Motion	No Motion	No Motion
3.99	No Motion	No Motion	No Motion	No Motion
3.77	No Motion	No Motion	No Motion	No Motion
3.53	No Motion	No Motion	No Motion	No Motion
3.34	No Motion	No Motion	No Motion	No Motion
3.12	No Motion	No Motion	No Motion	No Motion
2.87	No Motion	No Motion	No Motion	No Motion
2.71	No Motion	No Motion	No Motion	No Motion
2.54	No Motion	No Motion	No Motion	No Motion
2.33	No Motion	No Motion	No Motion	No Motion
2.20	No Motion	No Motion	No Motion	No Motion
2.06	No Motion	No Motion	No Motion	No Motion
1.89	No Motion	No Motion	No Motion	No Motion
1.67	No Motion	No Motion	No Motion	No Motion
1.54	No Motion	No Motion	No Motion	No Motion
1.01	No Motion	No Motion	No Motion	No Motion
0.49	No Motion	No Motion	No Motion	No Motion
D16	4.45	in		
D50	6.30	in		
D84	8.50	in		
D100	12.00	in		

Parameter	Value	Units	Notes
Channel Parameters			
Select Channel	<Define Local Data>		
	Channel Calculator...		
Input Parameters			
	Transfer Values From Channel Calcu...		
Channel Type	natural channel		
Local Depth of Flow	6.850	ft	
Riprap Shape	angular rock		
Stability Coefficient	0.300		This value is updated by the selected Riprap Shape
Blanket Thickness Coefficient	1.000		
Channel Cross-sectional Average Velocity	0.250	ft/s	
Centerline Radius of Curvature of Channel Bend	999999999	ft	Infinite Radius for straight channels are approximated by using a large number
Width of Water Surface at Upstream End of Channel Bend	100.000	ft	
Bank Angle	2.000	H:V (:1)	.966 < Bank Angle < 4.011
Bank Angle	26.6	degrees	14 < Bank Angle < 46
Protection Location	straight channel		
Specific Gravity of Riprap	2.650		
Safety Factor	1.200		
Results			
Side Slope Correction Factor	0.871		
Velocity Distribution Coefficient	1.000		
Design Velocity	0.250	ft/s	Design velocity never less than average channel velocity
D30	0.018	mm	
D50	0.021	mm	
Riprap Class			
Riprap Class Name	CLASS I		
Riprap Class Order	1		
D15	114.30	mm	This value is an 'average' of the size fraction range for the selected riprap class
D50	165.10	mm	This value is an 'average' of the size fraction range for the selected riprap class
D85	228.60	mm	This value is an 'average' of the size fraction range for the selected riprap class
D100	304.80	mm	This value is an 'average' of the size fraction range for the selected riprap class
Layout			
Minimum Riprap Thickness	12.000	in	

Proposed Conditions Riprap Sizing Calculations

Parameter	Value	Units	Notes
Channel Parameters			
Select Channel	<Define Local Data>		
	Channel Calculator...		
Input Parameters			
	Transfer Values From Channel Calcu...		
Channel Type	natural channel		
Local Depth of Flow	3.440	ft	
Riprap Shape	angular rock		
Stability Coefficient	0.300		This value is updated by the selected Riprap Shape
Blanket Thickness Coefficient	1.000		
Channel Cross-sectional Average Velocity	0.460	ft/s	
Centerline Radius of Curvature of Channel Bend	999999999	ft	Infinite Radius for straight channels are approximated by using a large number
Width of Water Surface at Upstream End of Channel Bend	100.000	ft	
Bank Angle	2.000	H:V (:1)	.966 < Bank Angle < 4.011
Bank Angle	26.6	degrees	14 < Bank Angle < 46
Protection Location	straight channel		
Specific Gravity of Riprap	2.650		
Safety Factor	1.200		
Results			
Side Slope Correction Factor	0.871		
Velocity Distribution Coefficient	1.000		
Design Velocity	0.460	ft/s	Design velocity never less than average channel velocity
D30	0.096	mm	
D50	0.115	mm	
Riprap Class			
Riprap Class Name	CLASS I		
Riprap Class Order	1		
D15	114.30	mm	This value is an 'average' of the size fraction range for the selected riprap class
D50	165.10	mm	This value is an 'average' of the size fraction range for the selected riprap class
D85	228.60	mm	This value is an 'average' of the size fraction range for the selected riprap class
D100	304.80	mm	This value is an 'average' of the size fraction range for the selected riprap class
Layout			
Minimum Riprap Thickness	12.000	in	

Future Compatibility Riprap Sizing Calculations

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: FHWA Hydraulic Toolbox version 5.1

Riprap Sizing Calculations

Former New Gold House Cap Design
Nome, Alaska



Figure B11

