Cooling Water Intake System Impingement and Entrainment Study

Kaiser Aluminum Trentwood Works
Spokane Valley, Washington

for
Kaiser Aluminum Washington, LLC

January 27, 2023

GeoEngineers
Earth Science + Technology

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File No. 7839-006-33

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ACRONYMS AND ABBREVIATIONS

AIF – actual intake flow

AOI – area of influence

BTA – best technology available

°C – degrees Celsius

CI – confidence interval

CFR – Code of Federal Regulations

cfs – cubic feet per second

CWA – Clean Water Act

CWIS – Cooling Water Intake System

DIF – design intake flow

Ecology – Washington State Department of Ecology

EPA – U.S. Environmental Protection Agency

ESA – Endangered Species Act

FEMA – Federal Emergency Management Agency

FERC – Federal Energy Regulatory Commission

fps – foot per second

ft^2 – square feet

gpm – gallons per minute

IM – impingement mortality

IM&E - Impingement Mortality and Entrainment

IPaC - Information for Planning and Consultation

MGD – million gallons per day

mi^2 – square miles

MSL – mean seal level

N – number

NPDES – National Pollutant Discharge Elimination System

NOAA – National Oceanic Atmospheric Administration

NWIS – National Water Information System

PHS – Priority Species and Habitats

PLS – Professional Land Surveyor

POTW – publicly owned treatment works

psi – pounds per square inch

RM – river mile

Rule – 40 CFR Parts 122 and 125 §316(b) rule

SVRP – Spokane Valley/Rathdrum Prairie

TSV – through screen velocity

USFWS – U.S. Fish and Wildlife Service

USGS – United States Geological Survey

WDFW – Washington Department of Fish and Wildlife

EXECUTIVE SUMMARY

GeoEngineers is pleased to provide this Cooling Water Intake System (CWIS), source water data, and biological baseline characterization to satisfy requirements under Section 316(b) of the Clean Water Act (CWA) for existing facilities. The CWIS is located at the Kaiser Aluminum Trentwood Works (Kaiser) facility along the Spokane River in Spokane Valley, Washington (site). National CWIS requirements for existing facilities are implemented through National Pollutant Discharge Elimination System (NPDES) permits, 40 Code of Federal Regulations (CFR) Parts 122 and 125 (Subpart J). Kaiser currently operates under NPDES Waste Discharge Permit No. WA 0000892, which is administered by the Washington State Department of Ecology (Ecology). The final 40 CFR Parts 122 and 125 §316(b) rule (Rule) necessitates existing facilities designed to withdraw more than 2 million gallons per day (MGD) of water from waters of the United States and use at least 25 percent of the water they withdraw exclusively for cooling purposes to install best technology available (BTA) to reduce entrainment and impingement mortality.

Section 316(b) of the CWA establishes BTA standards to reduce entrainment and impingement of aquatic organisms at existing facilities. Impingement refers to the condition of aquatic organisms becoming trapped outside a CWIS due to the force of the flowing source water. Entrainment generally refers to the condition in which aquatic organisms enter the CWIS (i.e., within an intake pipe). The purpose of the study is to make recommendations regarding standards for minimizing adverse environmental impacts associated with the CWIS as it applies to fish impingement and entrainment. Analyses and recommendations are based on compliance standards defined in §125.94(c)(1) to (7).

The Kaiser Trentwood facility was originally constructed in 1942 to support aircraft manufacturing efforts for World War II. The CWIS initially included one pumphouse (pumphouse No. 1), designed and authorized to withdraw 44 cubic feet per second (cfs) (28.4 MGD) from the Spokane River for use as once through, cooling water. Pumphouse No. 2 was added to the site in 1967. Between 1994 and 1999, groundwater wells were constructed at the facility to augment and reduce the need for surface water withdrawals from the river. As a result, Kaiser withdrawals are a fraction of the original water right, averaging about 1.91 MGD, with a maximum of 6.4 MGD. Approximately 95 percent of the surface water withdrawal is used exclusively for cooling. The configuration of the intakes includes bar screens (trash racks), followed by mesh (stationary) screens, and travelling screens to remove solid debris.

There are no federal or state-listed fish species expected to be present at the CWIS. Moreover, no critical habitat is mapped for listed species. Washington Priority Species, such as Interior Redband Trout (*Oncorhynchus mykiss gairdnerii*), are present at low densities and Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) are not likely present or present in extremely low densities within this reach of the Spokane River. Impingement rates of Interior Redband Trout and Westslope Cutthroat Trout are expected to be low due to the limited population and strong swimming capabilities of larger specimens.

Impingement

Some low flow facilities that withdraw a small proportion of the mean annual flow of a river may warrant special consideration under Section 316(b) of the CWA. The Rule does not define the concept of *de minimis* impingement. However, US Environmental Protection Agency (EPA) provides the following example: if a facility withdraws less than 50 MGD actual intake flow (AIF), withdraws less than 5 percent of mean annual flow of the river on which it is located (if on a river or stream), and is not co-located with other facilities with CWISs such that it contributes to a larger share of mean annual flow, the Director may determine the facility

warrants consideration under the *de minimis* provisions contained at § 125.94(c)(11). Kaiser's maximum estimated AIF from the river is 6.4 MGD, representing an average of 0.30 percent of river flow. The mean estimated AIF is 1.91 MGD, which is about 0.05 percent of overall river flow.

As a compliance option, the Rule offers a through-screen velocity (TSV) at an intake of 0.5 feet per second (fps) or less, assuming velocities below this threshold would allow most fish specimens to swim freely and avoid impingement. Calculations indicate the TSV at the low water level is approximately 1.3 fps under the design intake flow (DIF), 0.28 fps under the maximum AIF, and 0.08 fps under the mean AIF. As such, the TSV would exceed the 0.5 fps TSV threshold for impingement under the DIF but is below the TSV threshold under the maximum and average AIFs for impingement described in Section 316(b).

The area of influence (AOI) for impingement was calculated at 1.1 feet for the estimated maximum AIF of 6.4 MGD and 0.33 feet for the mean estimated AIF of 1.91 MGD, originating at the center of the intakes at low flow. Therefore, healthy fish within the river would not become susceptible to impingement until they are within 1.1 feet (maximum) and 0.33 feet (mean), respectively, from the face of the CWIS. As such, the AOIs would represent about 0.55 percent (maximum) and 0.2 percent (mean) of the channel width. Thus, 99.45 percent of the channel would be open under the maximum AIF scenario and 99.8 percent of the channel would be open for fish passage under the mean AIF scenario.

Based on the above analysis results, it is our professional opinion the CWIS meets the impingement BTA requirements under §125.94(3): 0.5 fps through-screen actual velocity; and warrants consideration under the *de minimis* provision as described in §125.94(c)(11). Therefore, no additional impingement controls are justified, and Kaiser's existing CWIS should qualify as BTA for impingement.

Entrainment

The BTA for entrainment is determined by the NPDES permitting authority for each site. This can be based on water reuse, fine mesh screens, a closed-cycle recirculating system, a determination the existing CWIS is BTA, or some combination of technologies that constitutes BTA for the individual site.

The Rule provides that any facility with an AIF more than 125 MGD must provide an entrainment study with its permit application. Since the Kaiser facility has an AIF below 125 MGD, no entrainment studies are required. Kaiser's mean estimated AIF averages 0.05 percent of the river flow and the maximum (conservative) estimated AIF from the river is approximately 0.30 percent of river flow. In addition, entrainment for Washington Priority Species (i.e., Interior Redband Trout and Westslope Cutthroat Trout) is expected to be low because population densities are low, screens are in place to prevent entrainment, and both have strong swim performance. As such, it is our professional opinion that the overall low quantity of river water withdrawn and low velocity at the intakes would also justify a *de minimis* condition for entrainment.

1.0 INTRODUCTION

Kaiser owns and operates an aluminum rolling mill and metal finishing plant at the Kaiser Trentwood Works (Kaiser) located in Spokane Valley, Washington (site). Kaiser currently operates a cooling water intake structure (CWIS) at the site, which withdraws water from the Spokane River for use as once through, cooling water for aluminum production. National CWIS requirements for existing facilities are implemented through National Pollutant Discharge Elimination System (NPDES) permits, 40 Code of Federal Regulations (CFR) Parts 122 and 125 (Subpart J). Kaiser currently operates under NPDES Waste Discharge Permit No. WA 0000892, which is administered by the Washington State Department of Ecology (Ecology).

Section 316(b) of the Clean Water Act (CWA) requires the U.S. Environmental Protection Agency (EPA) to issue regulations for the design and operation of a CWIS to minimize adverse environmental impacts. It also establishes best technology available (BTA) standards to reduce impingement and entrainment of aquatic organisms at existing CWIS facilities. Impingement refers to the condition of aquatic organisms becoming trapped outside a CWIS due to the force of the flowing source water. Aquatic species large enough to be blocked by these screens become impinged if the intake velocity exceeds their ability to move away, or if they become entangled in debris at the CWIS. Entrainment generally refers to the condition in which aquatic organisms enter the CWIS (such as within an intake pipe). Entrained organisms are normally small benthic, planktonic, and nektonic organisms, including early life stages of fish and shellfish (EPA 2004).

Ecology must ensure the location, design, construction and capacity of Kaiser's CWIS reflect BTAs for minimizing adverse environmental impacts. The NPDES permit necessitates Kaiser properly operate and maintain existing technologies used to minimize impingement and entrainment and report any significant impingement or entrainment observed. In addition, the permit requires Kaiser to submit an information and compliance report that addresses NPDES permit application requirements for the CWIS, as described in 40 CFR 122.21(r). Ecology will use these data to assess the potential for impingement and entrainment at the CWIS, evaluate the appropriateness of any proposed technologies or mitigation measures, and determine any additional requirements to place on the facility in the next permit cycle.

1.1. Purpose of the Study

GeoEngineers completed this CWIS, source water data, and biological baseline characterization to satisfy NPDES permit requirements for existing facilities. The study was completed in accordance with Section 316(b) of the CWA for existing facilities designed to withdraw more than 2 million gallons per day (MGD) of water from waters of the United States and use at least 25 percent of the water they withdraw exclusively for cooling purposes.

Existing facilities with a design intake flow (DIF) greater than 2 MGD but actual intake flow (AIF) less than 125 MGD are required to meet the impingement mortality (IM) standards of § 125.94(c) and site-specific entrainment requirements under the standards outlined in § 125.94(d). The estimated DIF for the Kaiser CWIS is 28.4 MGD. However, Kaiser withdrawals averaged about 1.91 MGD during the 2020 calendar year (Pitcher 2020). The maximum AIF has been estimated at about 6.4 MGD (Ecology 2016). Approximately 95 percent of the water is used exclusively for cooling. Thus, §122.21(r) information is required for the following:

- (r)(2) – Source Water Physical Data

- (r)(3) – Cooling Water Intake Structure Data
- (r)(4) – Source Water Baseline Biological Characterization Data
- (r)(5) – Cooling Water System Data
- (r)(6) – Chosen Method of Compliance with Impingement Mortality Standard
- (r)(7) – Entrainment Performance Studies
- (r)(8) – Operational Status

Entrainment BTA standards are determined by the NPDES permitting authority on a site-specific basis. These may include variable speed pumps, water reuse, fine mesh screens, closed-cycle recirculating systems, a combination of technologies, or no technologies beyond impingement controls. Facilities with AIF values greater than 125 MGD must develop and submit an Entrainment Characterization Study and other data for the permitting authority's use when establishing site-specific entrainment requirements. Since the AIF at the Kaiser CWIS is below the 125 MGD threshold, it is not subject to those requirements.

The overall purpose of the study is to make recommendations on standards for minimizing adverse environmental impacts associated with the CWIS as it applies to fish entrainment and impingement (§125.90). Our analyses and recommendations are based on compliance standards defined in §125.94(c)(1) to (7). In addition, we provide our professional opinion regarding *de minimis* rate of impingement as described in §125.94(c)(11).

1.2. Site Description

The Kaiser Trentwood Aluminum Rolling Mill is a 512-acre facility located at 15000 East Euclid Avenue in Spokane Valley, Washington (Vicinity Map, Figure 1). The facility produces aluminum sheet, plate and coil through the rolling of aluminum with neat oils and emulsions. Supporting operations include direct chill casting and solution heat treating. Finished products are used mainly in the aerospace industry and for general engineering applications (Ecology 2016).

The CWIS for the mill is comprised of two pumphouses (pumphouse No. 1 and pumphouse No. 2) situated in Township 25 North, Range 44 East, Section 10 of the Willamette Meridian (USGS 2020a). The pumphouses are located along the north bank of the Spokane River at about river mile (RM) 86 (Site Layout, Figure 2). Kaiser withdraws water from the Spokane River for use as once through, cooling water for milling operations. The pumphouses have three intakes associated with the CWIS. The configuration of the intake structures includes bar screens (trash racks), followed by stationary mesh screens, and travelling screens to remove solid debris. A circulating pump system is used to convey the water into two 24-inch and one 12-inch mains, which then travel 2,600 feet to the mill (Appendix A).

The pumphouses for the CWIS are situated at approximately 1,940 feet above mean sea level (MSL) and are constructed of reinforced concrete with suspended slabs over basements open to the river. The foundations for both buildings rest on the riverbed about 28 feet below the floors of the structures.

1.3. Site History

The south pumphouse (pumphouse No. 1) of the Kaiser CWIS was constructed in 1942 by the United Engineering & Foundry Company, acting on behalf of the Defense Plant Corporation. Pumphouse No. 1 was developed with two intakes to withdraw water from the Spokane River to support operations at the

Trentwood aluminum rolling mill. The CWIS originally withdrew 29 cubic feet per second (cfs) from the river for 24-hour operations. However, in 1943, an additional 15 cfs (44 total cfs) was approved by the State Supervisor of Hydraulics for plant operations (Ecology 2020; Appendix B).

In 1947, Permanente Metals Corporation (Permanente) began operating the Trentwood Mill on lease from the War Assets Administration. During the lease period, the machinery was redesigned in the plant to allow for manufacture of flat sheet, coil sheet, coring sheet and plate aluminum products (Hart Crowser 2012). In 1949, the site was purchased by Permanente, the precursor to the Kaiser Aluminum & Chemicals Corporation.

In 1967, the north pumphouse (pumphouse No. 2) was constructed approximately 30 feet to the north of pumphouse No. 1 along the Spokane River. Pumphouse No. 2 was developed with one intake in the river. No additional surface water rights were requested by Kaiser with the addition of pumphouse No. 2.

By the 1990's, concerns over river water withdrawal and the need for a supplemental water source led Kaiser to explore the use of groundwater for cooling water. Between 1994 and 1999, six groundwater wells were installed at the Trentwood mill to supplement and reduce river water withdrawals. The total approved water right for groundwater withdrawal was 31 cfs (Ecology 2020). Since development of the groundwater wells, demand for river water has reduced about 93 percent. As a result, current estimates of river water intake range from a mean of 1.91 MGD (2.96 cfs) to a maximum of 6.4 MGD (9.9 cfs) from the Spokane River.

2.0 §122.21(R)(2) SOURCE WATERBODY PHYSICAL DATA

This section describes the source water body (Spokane River) at the basin-, reach- and site-scales. It provides an evaluation of the waterbody affected by the CWIS. This analysis generally includes areal dimensions, depths, hydrology (discharge recurrence frequency), temperature regimes and geomorphologic conditions.

2.1. Narrative Description of Source Waterbody

The Spokane River originates at the outflow of Coeur d'Alene Lake in northern Idaho and flows 112 miles to the Columbia River. Coeur d'Alene Lake is fed by two main tributary systems that include the Coeur d'Alene River and the St. Joe River (Spokane River Watershed, Figure 3). The overall Spokane River Basin encompasses approximately 6,640 square miles (mi^2) along a roughly elliptical alignment in Benewah, Bonner, Kootenai, Latah, Clearwater and Shoshone Counties in northern Idaho; and Lincoln, Pend Oreille, Spokane, Stevens and Whitman Counties in northeastern Washington (EPA 1975). The drainage basin upstream from the site is about 4,169 mi^2 (USGS 2020b).

The St. Joe River is the largest tributary of the Spokane River system, originating from the westerly slope of Graves Peak in the Bitterroot Mountains along the Idaho/Montana border in Shoshone County at an elevation of approximately 7,700 feet above MSL. It flows in a westerly direction for about 130 miles before emptying into the southern section of Coeur d'Alene Lake. The Coeur d'Alene River is about 110 miles long, with the North and South Fork tributaries originating in Shoshone County. The source of the North Fork Coeur d'Alene River is at approximately 4,500 feet above MSL on Powder Mountain. The South Fork Coeur d'Alene River originates at about 5,800 feet above MSL north of Mullan Pass in the Hunter Mining District in the Bitterroot Mountains (USACE 1948; EPA 2020).

Major tributaries of the mainstem Spokane River include Latah Creek, Little Spokane River and Chamokane Creek (USACE 1948) – all of which flow into the Spokane River downstream of the project site. Latah Creek originates near Charles Butte in Benewah County, Idaho at an elevation of about 3,800 feet above MSL. The source of the Little Spokane River is near Newport, Washington, at an elevation of approximately 2,200 feet above MSL. Chamokane Creek originates at about 2,800 feet above MSL near Bear Mountain in Stevens County, Washington (EPA 2020). The Spokane River confluences with the Columbia River at Franklin D. Roosevelt Lake, approximately 86 river miles downstream from the site (USGS 1986).

Point discharge sources upstream from the site include City of Coeur d'Alene, Hayden Area Regional Sewer Board publicly owned treatment works (POTW), City of Post Falls POTW, and Liberty Lake Sewer & Water District. Downstream point sources are the Inland Empire Paper Company, Spokane County Regional Water Reclamation Facility, and the City of Spokane Advanced Wastewater Treatment Plant. Non-point sources of pollutants to the Spokane River consist of stormwater and combined sewer overflows from the City of Spokane; and agricultural pollution sources from Hangman Creek, Little Spokane River and Coulee/Deep Creeks (Ecology 2016).

Designated uses of the Spokane River from the Idaho/Washington border (RM 96.5) to Nine Mile Dam (RM 58) include spawning/rearing/migration of aquatic life; primary recreational contact; and water supply (domestic, industrial and agricultural). Other miscellaneous uses are comprised of wildlife habitat, harvesting, commerce and navigation, boating and aesthetics (Ecology 2009; Tetra Tech 2009).

2.2. Aerial Dimensions

The site is situated in Spokane Valley, Washington along the northern shoreline of the Spokane River. The site is located approximately 0.85 miles upstream from the Trent Avenue (WA-290) Bridge and 10 miles east of downtown Spokane, Washington (CWIS Location, Figure 4).

The CWIS consists of pumphouse No. 1, originally constructed in 1942, and pumphouse No. 2, built in 1967. Pumphouse No.1 is about 2,265 square feet (ft^2) in size, while pumphouse No. 2 encompasses approximately 1,069 ft^2. The pumphouses are situated on tax parcel 45101.9039, which is about 2.81 acres in size (Spokane County 2021). The river is approximately 200 feet wide at the site and flows in a northwesterly direction (Figure 2).

2.3. Water Depths

Water levels in the Spokane River are affected by seasonal runoff, recharge from the Spokane Valley/Rathdrum Prairie (SVRP) aquifer, hydroelectric dams and freezing temperatures in the winter. Site topography, bathymetry and approximate edge of water were surveyed by a Washington Professional land Surveyor (PLS) on March 24 through 26, 2020. At that time, the water level was measured at 1,927.5 feet above MSL. Maximum water depth near the middle of the channel of the Spokane River was approximately 41 feet during the March 2020 survey (Spokane River Bathymetry, Figure 5). The maximum estimated water depth in the Spokane River during the 2-year flow event in the vicinity of the site is 55.3 feet. The maximum estimated depth during the Federal Emergency Management Agency (FEMA) 100-year recurrence flow event is about 56.5 feet (GeoEngineers 2020).

Based on available data provided by Kaiser, the average water elevation of the river was measured at 1,923 feet above MSL (Appendix A). The high-water elevation was 1,935.3 feet above MSL, and the low water elevation was 1,916 feet above MSL. The riverbed and bottom of the intakes at the CWIS are at

1,910.5 feet above MSL. Based on this, water depths at the intakes of the pumphouses are approximately 25.4 feet during high water, 12.9 feet during normal water, and 5.5 feet during low water.

2.4. River Flows

Spokane River flows at the site are primarily influenced by surface releases at Post Falls Dam (RM 100.7) and recharge from the SVRP aquifer. Surface flows upstream from the site are moderated by gates at Post Falls Dam, which are usually open during high flow periods (between December and June). During the summer, the dam gates are set to maintain specific water levels in Coeur d'Alene Lake. From late September through December, the gates are usually incrementally opened to lower Coeur d'Alene Lake to its natural level (Caldwell and Bowers 2003). The Federal Energy Regulatory Commission (FERC) license for the dam requires a minimum release of 500 cfs to the Spokane River (Ecology 2016).

The SVRP aquifer is highly productive, the result of coarse-grained basin-fill deposits of unconsolidated sand, gravel, cobbles and boulders deposited by glacial outburst floods from Lake Missoula during the Pleistocene Epoch. Sources of recharge to the SVRP aquifer include infiltration from precipitation, return flow from water applied at land surface, seepage from the Spokane and Little Spokane Rivers and adjacent lakes, and surface/groundwater inflow from tributary basins (Kahle et al 2005). A net gain in streamflow occurs between Idaho/Washington border and the gaging station at Spokane (RM 78). Most of the gains in the Spokane River occur downstream from the Greenacres gaging station (RM 90.5), where groundwater from the SVRP aquifer intersects the streambed (Hortness and Covert 2005). Recharge estimates to the river have ranged from 39 cfs to 1,140 cfs between Greenacres (RM 90.5) and Trent Bridge (RM 85.4) (Kahle et al 2005).

Monthly and annual flow data were reviewed from USGS Gage 12419000 at Post Falls, Idaho (RM 100.7); USGS Gage 12420500 at Greenacres (RM 90.5); and USGS Gage 12421500 at Trent Bridge (RM 85.4). Gage 12419000 has been active since 1913, while Gage 12420500 operated from 1948 to 1952 and 1999 to 2011, and Gage 12421500 operated periodically from 1948 to 2014.

Mean annual river flow for the period of record ranges from, 6,621 cfs at Post Falls, to 6,081 cfs at Greenacres, to 7,431 cfs at the Trent Bridge. Mean monthly flow data for the three gaging stations are summarized in Table 1 below (USGS 2020c).

TABLE 1. SUMMARY OF MEAN MONTHLY FLOWS IN THE SPOKANE RIVER

Month	USGS Gage 12419000 at Post Falls (RM 100.7)[1]	USGS Gage 12420500 at Greenacres (RM 90.5)	USGS Gage 12421500 at Trent Bridge (RM 85.4)
	Cubic feet per second (cfs)		
January	5,207	5,200	5,631
February	6,379	5,740	7,768
March	8,389	7,680	8,871
April	14,450	14,200	16,023
May	17,077	17,400	22,171
June	9,492	10,800	13,365
July	2,085	2,090	3,215
August	902	479	1,228

Month	USGS Gage 12419000 at Post Falls (RM 100.7)[1]	USGS Gage 12420500 at Greenacres (RM 90.5)	USGS Gage 12421500 at Trent Bridge (RM 85.4)
	Cubic feet per second (cfs)		
September	1,171	743	1,206
October	1,779	1,690	2,088
November	2,905	2,630	2,946
December	4,815	4,320	4,665
Annual Mean	**6,221**	**6,081**	**7,431**

Notes:

[1] Data obtained from USGS National Water Information System: Web Interface: https://waterdata.usgs.gov/nwis

USGS = U.S. Geological Survey

As shown in Table 1, a net gain in streamflow is apparent from Post Falls downstream to the Trent Bridge. Based on this, streamflow measurements from the Trent Bridge gaging station are likely the most representative estimates of flow at the site.

2.5. Tidal Influence and Salinity

The Spokane River is not a tidally influenced waterbody.

2.6. Water Temperature

Water temperatures in the Spokane River fluctuate with seasonal runoff and groundwater recharge. Warm surface water from Coeur d'Alene Lake flows into the Spokane River during the summer months, which leads to warmer temperatures near the Idaho/Washington border. Downstream, near Sullivan Road (approximately 1 mile upstream from the site), cold water inflow from the SVRP aquifer begins to enter and cool the Spokane River (Avista 2010). The warmest temperatures typically occur in July and August and the coldest temperatures are in the winter months. Temperature data from the Post Falls gaging station (RM 100.7) and the Spokane gaging station (downstream) from the site (RM 78) were obtained from the National Water Information System (NWIS) website (USGS 2020c). Limited temperature data for the Trent Road Bridge (Ecology Station 57A145) were available for the 1973 water year (Ecology 2021). Partial temperature data were obtained for the Sullivan Road (RM 87) from a Golder (2014) study performed for Avista. Available temperature data are compiled in Table 2 below.

TABLE 2. SUMMARY OF MEAN TEMPERATURES BY MONTH IN THE SPOKANE RIVER

Month	USGS Gage 12419000 at Post Falls (RM 100.5)[1]	Sullivan Road Bridge (RM 87)[2]	Ecology Station 57A145 at Trent Road (RM 85.4)[3]	USGS Gage 12422500 at Spokane (RM 78)[1]
	Degrees Celsius (°C)			
January	4.31	--	3.2	4.67
February	3.35	--	4.7	4.06
March	2.99	--	4.6	4.56
April	4.77	--	10.2	7.33
May	9.19	--	--	9.25

Month	USGS Gage 12419000 at Post Falls (RM 100.5)[1]	Sullivan Road Bridge (RM 87)[2]	Ecology Station 57A145 at Trent Road (RM 85.4)[3]	USGS Gage 12422500 at Spokane (RM 78)[1]
	Degrees Celsius (°C)			
June	19	--	18.05	15.63
July	21.45	19.82	15.7	17.57
August	21.6	19.39	17.5	17.7
September	18.76	17.36	15.2	14.6
October	--	--	10	10.25
November	6.5	--	6.4	8.18
December	5.66	--	3.5	3.6

Notes:

[1] Data obtained from USGS National Water Information System: Web Interface: https://waterdata.usgs.gov/nwis

[2] Adopted from the Golder (2014) temperature study of the Spokane River using a simple average between minimum and maximum recorded temperatures.

[3] Data obtained from Ecology (2021) - River & Stream Water Quality Monitoring: https://ecology.wa.gov/Research-Data/Monitoring-assessment/River-stream-monitoring/Water-quality-monitoring

C = degrees Celsius; -- no data available

2.7. Area of Influence

The Area of Influence (AOI) of a CWIS is the portion of the source waterbody affected by the CWIS cooling water withdrawal (i.e., area in the source waterbody where organisms are potentially subject to entrainment or impingement by the CWIS). The AOI for impingement is the area where a healthy fish is not be able to swim against and escape the intake flow. The AOI for entrainment represents the chance of an aquatic organism within the source waterbody becoming entrained.

2.7.1. Impingement AOI

Approach velocity is the velocity of the current in the area approaching the CWIS screen and is measured upstream from the screen face in feet per second (fps) (EPA 2004). The EPA considers the 0.5 fps through-screen intake velocity contour as the *de minimis* value to comply with the impingement mortality standard. Based on this, it is assumed a fish can swim freely in a flow at 0.5 fps and avoid impingement. The approximate area within the 0.5 fps contour at the site was calculated based on the assumption the maximum AOI occurs at the low water level for the Spokane River. Parameters used to calculate the AOI at the site are provided in Table 3 below.

TABLE 3. AOI PARAMETERS FOR THE KAISER CWIS

Intake Flow[1]	Flow	Low Water Level	Intake Invert	Estimated Water Depth (Low Water)
	cfs	Elevation (feet above MSL)		Feet
Estimated Intake (DIF)	44	1,916	1,910.5	5.5
Maximum Intake (AIF)	9.9			
Estimated 2020 Intake (AIF)	2.96			

Notes:

[1]DIF pump operations assume approximately 28.4 MGD (44 cfs); AIF pump operations assumes the estimated maximum AIF of 6.91 MGD (9.9 cfs) (Ecology 2016) and the estimated 2020 flow of 1.91 MGD (2.96 cfs) (Pitcher 2020).

Kaiser has an estimated DIF of 44 cfs (28.4 MGD). However, because supplemental groundwater is available, the full DIF is not necessary. Therefore, the AIF values used for the AOI analysis were based on the 2020 mean AIF volume, which was approximately 2.96 cfs (6.91 MGD), and a maximum AIF volume of 9.9 cfs (1.91 MGD) (Ecology 2016). At 44 cfs, the DIF represents an extremely conservative estimate for the Kaiser CWIS AOI. Nonetheless, for comparison, we estimated the impingement AOI under the DIF, mean AIF, and maximum AIF scenarios as conservative approximations.

For the standard shoreline intakes at the Kaiser CWIS, we assumed a threshold velocity contour can be represented by the radius of a semicircle centered at the intakes. A simple radius calculation can be derived from the following:

$$R_{AOI} = Q_i / (\pi \times d \times V)$$

Where: R_{AOI} = Radius of the AOI
Q_i = Intake Flow (DIF = 44 cfs; maximum AIF = 9.9 cfs; mean AIF 2.96 cfs)
d = Low water depth at R_{AOI} (5.5 feet)
V = Threshold velocity (0.5 fps for impingement AOI)

These calculations indicated the radius of the AOI would extend 5.09 feet into the Spokane River under the DIF scenario; 1.15 feet under the maximum AIF scenario; and 0.34 feet under the mean AIF scenario (Area of Influence, Figure 6; Appendix C). Healthy fish in the river would not become susceptible to impingement until they were within 5.09 feet of the face of the CWIS using the DIF. The width of the Spokane River is about 200 feet at the site, so the AOI under the DIF is about 2.5 percent of the channel width. Therefore, about 97.5 percent of the channel would be open to fish passage outside the DIF (most conservative) impingement AOI.

Under the AIF scenarios, healthy fish within the river would not become susceptible to impingement until they are within 1.1 feet (maximum) and 0.33 feet (mean), respectively, from the face of the CWIS. As such, the AOIs would represent about 0.55 percent (maximum) and 0.2 percent (mean) of the channel. Thus, 99.45 percent of the channel would be open under the maximum AIF scenario and 99.8 percent of the channel would be open for fish passage under the mean AIF scenario (Table 4).

TABLE 4. CALCULATED AREAS OF INFLUENCE (AOIS) FOR THE KAISER CWIS

Intake Flow[1]	Flow	Extent of 0.5 fps Contour	Proportion of Channel	Proportion of River Available for Fish Passage
	cfs	feet	Percent	
Estimated Intake (DIF)	44	5.09	2.5	97.5
Maximum Intake (AIF)	9.9	1.1	0.55	99.45
Mean Estimated 2020 Intake (AIF)	2.96	0.33	0.2	99.8

Notes:

[1]DIF pump operations assume approximately 28.4 MGD (44 cfs); AIF pump operations assumes the estimated maximum AIF of 6.91 MGD (9.9 cfs) (Ecology 2016) and the estimated 2020 flow of 1.91 MGD (2.96 cfs) (Pitcher 2020).

2.7.2. Entrainment AOI

Aquatic species are at their highest risk for entrainment during their early life stages (eggs, yolk-sac larvae, post yolk-sac larvae and juveniles) due to size and limited swimming ability. Eggs and larvae experience high mortality rates because of entrainment (EPA 2004).

The AOI for entrainment considers both intake and river flow. If the quantity of water withdrawn is large relative to the flow of the source waterbody, a larger number of organisms is more likely to be affected by the CWIS.

The lowest recorded daily mean Spokane River flow as recorded at the Trent Avenue (WA-290) Bridge (USGS Gage 12421500) was 602 cfs on three separate days between August 25 and September 4, 2010 (Appendix D). During the lowest recorded flow conditions, Kaiser could withdraw up to 7.31 percent of the Spokane River flow at the CWIS (under the DIF scenario). However, as discussed, supplemental groundwater has reduced intake demand considerably, and Kaiser currently utilizes a fraction of the DIF.

The average percent of the river flow that could be withdrawn based on the DIF is provided in Table 5 below. These data represent a conservative approximation since the estimated AIF in 2020 was only about 7 percent of the DIF for the site.

TABLE 5. PERCENT OF SPOKANE RIVER WITHDRAWN THROUGH CWIS AT THE ESTIMATED DESIGN INTAKE FLOW

Month	Spokane River Flow at Gage 12421500 - Trent Bridge (RM 85.4)[1]	Design Intake Flow[2]	Percent of River Withdrawn Under Design Intake Flow
	Cubic feet per second (cfs)		Percent
January	5,631	44	0.78
February	7,768	44	0.57
March	8,871	44	0.50
April	16,023	44	0.27
May	22,171	44	0.20
June	13,365	44	0.33
July	3,215	44	1.37

Month	Spokane River Flow at Gage 12421500 - Trent Bridge (RM 85.4)[1]	Design Intake Flow[2]	Percent of River Withdrawn Under Design Intake Flow
	Cubic feet per second (cfs)		Percent
August	1,228	44	3.58
September	1,206	44	3.65
October	2,088	44	2.11
November	2,946	44	1.49
December	4,665	44	0.94
Mean	**7,431**	**44**	**1.32**

Notes:

[1] Data obtained from USGS National Water Information System: Web Interface: https://waterdata.usgs.gov/nwis

[2] Based on the original total water right of 44 cfs allotted in 1942 and 1943.

Since supplemental groundwater usage reduces the mean AIF to about 7 percent of the total water right from the river, the AIF is considered a more accurate estimate of river usage. Using 2020 flow estimates, the AIF during the lowest measured river conditions at Trent Road (602 cfs) would have been about 0.5 percent of the river flow.

As a conservative estimate, we also consider the maximum AIF of 9.9 cfs cited by Ecology (2016) for the site. A summary of the average percent of the river flow withdrawn based on the estimated 2020 AIF and maximum reported AIF is provided in Table 6 below.

TABLE 6. PERCENT OF SPOKANE RIVER WITHDRAWN THROUGH CWIS AT THE ACTUAL INTAKE FLOW

Month	Spokane River Flow at Gage 12421500 - Trent Bridge (RM 85.4)[1]	Estimated Mean Actual Intake Flow[2]	Percent of River Withdrawn During Mean Estimated Intake	Maximum Actual Intake Flow[3]	Percent of River Withdrawn During Maximum Estimated Intake
	Cubic feet per second (cfs)		Percent	cfs	Percent
January	5,631	2.27	0.04	9.9	0.18
February	7,768	2.15	0.03	9.9	0.13
March	8,871	2.16	0.02	9.9	0.11
April	16,023	2.28	0.01	9.9	0.06
May	22,171	2.55	0.01	9.9	0.04
June	13,365	2.51	0.02	9.9	0.07
July	3,215	1.79	0.06	9.9	0.31
August	1,228	1.28	0.10	9.9	0.81
September	1,206	1.29	0.11	9.9	0.82
October	2,088	1.37	0.07	9.9	0.47
November	2,946	1.33	0.04	9.9	0.34
December	4,665	N/A	--	9.9	0.21
Mean	**7,431**	**1.91**	**0.05**	**9.9**	**0.30**

Notes:

[1] Data obtained from USGS National Water Information System: Web Interface: https://waterdata.usgs.gov/nwis

[2] Based on the estimated AIF provided by Kaiser during the 2020 calendar year (Pitcher 2020).

[3] Assumes the estimated maximum AIF of 6.4 MGD (Ecology 2016). This is considered a conservative estimate.

Table 5 shows a mean withdrawal of 1.32 percent of the Spokane River under the DIF scenario, an extremely conservative estimate that represents a small proportion of overall flow. Table 6 summarizes the more realistic mean and maximum AIF scenarios, which represent 0.05 percent (mean) and 0.30 percent (maximum) of the river flow. Based on these results, entrainment effects on fish populations in the Spokane River from the Kaiser CWIS are inconsequential and justify a *de minimis* condition for entrainment..

3.0 §122.21(R)(3) COOLING WATER INTAKE STRUCTURE DATA

The CWIS data are used to characterize the intake structure and evaluate the potential for impingement and entrainment of aquatic organisms. A CWIS intake design includes components of the intake structure, comprised of the screening system, passive intake system, fish diversion and avoidance technologies (EPA 1976). After entering the CWIS, water passes through screening devices. Screen mesh size and velocity characteristics are important design features of the screening system influencing potential impingement and entrainment of aquatic organisms withdrawn from the waterbody with cooling water.

A description of the cooling water intake configuration, operation, DIF, AIF and drawings are provided in the following sections. CWIS design drawings are also included in Appendix A.

3.1. CWIS Configuration

Kaiser withdraws water from the Spokane River for use as once through cooling water. The CWIS configuration of the intake structures includes bar screens (trash racks), followed by stationary mesh screens, and travelling screens to remove solid debris. The river pumping station has seven, 3-stage, 400-horespower turbine pumps and two fire pumps. Pumps 1 through 4 and the two fire pumps are in pumphouse No. 1. Pumps 5 through 7 are situated in pumphouse No. 2. Each pump is rated for 5,000 gallons per minute (gpm) (about 11.1 cfs). The line pressure on the discharge side of the pump is 110 pounds per square inch (psi). One of the fire pumps is powered by a diesel engine for use during emergencies. The pump system conveys the surface water into two 24-inch and one 12-inch mains, which send water approximately 2,600 feet to the mill. The 24-inch mains deliver surface water for ingot production. The 12-inch mainline is used for fire suppression (Ecology 2020; Appendix B).

The CWIS has a top deck elevation of 1,938.4 feet above MSL, with the bottom slab of the inlet structure at an elevation of 1,907 feet above MSL. The trash racks are 12.5 feet tall, extending from about 1,910.5 feet above MSL feet to about 1,923 feet above MSL. Debris collected by the screens is removed and are conveyed through a 12-inch trash discharge line to the Spokane River downstream from the CWIS.

3.2. CWIS Operations and Intake Flows

The pumphouse No. 1 intake structure at the site was originally constructed by the United Engineering & Foundry Company (Defense Plant Corporation) in 1942. The initial water right (Permit No. 3564) appropriated 29 cfs (18.7 MGD) from the Spokane River for cooling water. A second authorization (Permit No. 3747) was granted in 1943 for an additional 15 cfs, for a total not to exceed 44 cfs (28.4 MGD) from the Spokane River. As of 1966, 18,000 to 20,000 gpm (about 40 to 44 cfs) were estimated to be pumped

from the river for mill operations (Ecology 2020; Appendix B). Pumphouse No. 2 was constructed at the site in 1967, although no additional surface water rights were requested at that time. In 1976, approximately 10 billion gallons (about 42 cfs) were reportedly pumped from the river during the year through the Kaiser CWIS (Drost and Seitz 1978). Based on available water rights information provided in Appendix B, and abovementioned historical data, the DIF for the facility is assumed to be 28.4 MGD (44 cfs).

Between 1994 and 1999, six groundwater wells were installed at the Kaiser facility to augment and reduce the amount of water withdrawn from the Spokane River. The water right for supplemental groundwater was 31 cfs. Thus, the AIF from the Spokane River with supplemental groundwater for the Kaiser facility is significantly lower than the original DIF. The 2020 mean estimated flow at the Kaiser CWIS was 1.91 MGD (1,593 gpm) (Pitcher 2020), or about seven percent of the original water right. The maximum estimated intake is 6.4 MGD (4,444 gpm) (Ecology 2016). There are no meters on the intake pumps, so the flow is estimated from meters on the groundwater wells and subtracted from the total outfall. The estimated 2020 flow of 1.91 MGD and maximum estimated value of 6.4 MGD were used to develop AIF calculations for the facility in this assessment.

The Kaiser facility operates continuously for 24 hours per day, 7 days per week. Pumps 1 or 3 run continuously, depending on system demands (Yanke 2020).

3.3. Flow Distribution and Water Balance Diagrams

Kaiser has not developed a flow distribution and water balance diagram for the site (Yanke 2020). However, a simplified diagram from the 2015 NPDES Permit Renewal Application (Permit WA0000892) is provided in Appendix E.

4.0 §122.21(R)(4) SOURCE WATER BASELINE BIOLOGICAL CHARACTERIZATION DATA

Existing facilities are required to characterize the biological community in the vicinity of the CWIS and to assess the operation. This includes identification of data that are not available, and efforts made to identify sources of the data; a list of species (or relevant taxa) for all life stages and their relative abundance in the vicinity of the CWIS; and identification of the species and life stages that would be most susceptible to impingement and entrainment.

4.1. List of Taxa and Abundance

A review of fish presence was completed using data compiled from StreamNet (2020); Avista (2005); Washington Department of Fish and Wildlife (WDFW 2020) Priority Species and Habitats (PHS); National Oceanic Atmospheric Administration (NOAA 2020) Fisheries; and the U.S. Fish and Wildlife Service (USFWS 2020) Information for Planning and Consultation (IPaC). Table 7 provides a list of potential fish species, the protective status of each species, relative abundance (if known), native status, and whether critical habitat is present.

TABLE 7. LIST OF FISH SPECIES POTENTIALY PRESENT AT THE SITE

Common Name	Scientific Name	Federal Status	State Status	Relative Abundance[1]	Native	Critical Habitat
Mountain Whitefish	*Prosopium williamsoni*	--	--	Unknown	Yes	No
Largescale Sucker	*Catostomus macrocheilus*	--	--	Common, Stable	Yes	No
Bridgelip Sucker	*Catostomus columbianus*	--	--	Common, Stable	Yes	No
Northern Pikeminow	*Ptycocheilus oregonensis*	--	--	Common, Stable	Yes	No
Redside Shiner	*Richardsonius balteatus*	--	--	Common, Stable	Yes	No
Longnose Dace	*Rhinichthys cataractae*	--	--	Unknown	Yes	No
Bull Trout	*Salvelinus confluentus*	Threatened	Candidate	Occasional, Declining	Yes	No
Brook Trout	*Salvelinus fontinalis*	--	--	Common	No	No
Westslope Cutthroat Trout	*Oncorhynchus clarki lewisi*	--	--	Occasional, Declining	Yes	No
rainbow (redband) trout	*Oncorhynchus mykiss gairdneri*	--	--	Occasional, Declining	Yes	No
rainbow trout (hatchery)	*Oncorhynchus mykiss*	--	--	Unknown	No	No
Brown Trout	*Salmo trutta*	--	--	Common	No	No
Yellow Perch	*Perca flavescens*	--	--	Common	No	No
Pumpkinseed	*Lepomis gibbosus*	--	--	Occasional	No	No
Smallmouth Bass	*Micropterus dolomieu*	--	--	Common, Stable	No	No
Largemouth Bass	*Micropterus salmoides*	--	--	Common, Stable	No	No

Notes:

[1] Based on the information provided in the Spokane Subbasin Assessment (NWPCC 2004).

- Not listed

As shown, Bull Trout are the only federally listed species with potential presence at the site. However, the rare occurrences of Bull Trout in the Spokane River are likely entrained into the Spokane River from Coeur d'Alene Lake (NWPCC 2004). The nearest Bull Trout critical habitat is located upstream from the site at Coeur d'Alene Lake (Bull Trout Habitat Map, Figure 7). No other listed species or critical habitats are present in the Spokane River near the site.

In addition to Bull Trout, juvenile Kokanee (*Oncorhynchus nerka*), Chinook Salmon (*Oncorhynchus tshawytscha*) and Northern Pike (*Esox Lucius*) from Coeur d'Alene Lake have been observed in the upper

Spokane River. However, these specimens were also likely entrained from the lake and passed the dam at Post Falls, Idaho into the lower riverine system (Avista 2005; City of Spokane Valley 2010).

Sculpin (*Cottidae*) may also be present in the upper Spokane River. However, an assessment of the middle Spokane River by Lee and King (2013) did not identify any sculpins in the upper section of the study reach near Upriver Dam.

A comprehensive list of aquatic invertebrate species potentially present at the site is not presented herein. There are three State Candidate gastropod species with potential presence near the site (WDFW 2020). However, invertebrates and other lower trophic organisms are not needed or included as part of this study (Hallinan 2020).

4.2. Evaluation of the Primary Period of Reproduction, Larval Recruitment and Period of Peak Abundance of Relevant Taxa

Site-specific data regarding reproduction, larval recruitment and period of peak abundance at the Kaiser CWIS is not well understood. Scientific investigations within the upper Spokane River have generally focused on system-wide studies or hydroelectric compliance monitoring. Nonetheless, general species information is available for relevant taxa expected to be present at the site.

The evaluation of reproduction, larval recruitment and peak abundance is provided in the following sections for native species (i.e., relevant taxa) potentially present at the site. Non-native species are not considered further in this assessment.

4.2.1. Bull Trout (*Salvelinus confluentus*)

Bull Trout were listed as threatened under the Endangered Species Act (ESA) in 1998. Bull Trout have specific requirements for spawning and rearing in tributaries, which include clean gravel, cold water (10°C) for spawning, colder water (2.2°C to 3.9°C) for incubation, high dissolved-oxygen, and complex channels with cover and pools (DNR 2005). Populations exhibit adfluvial, fluvial and resident life-history strategies. Adfluvial forms rear as juveniles in tributaries, migrate to lakes where most of their growth occurs, then return to the tributaries as adults to spawn. Spawning for fluvial forms occurs in smaller tributaries with major growth and maturation occurring in river mainstems. Resident forms complete all life stages (spawning, rearing, overwintering) in small headwater streams, often upstream of barriers to other salmonids.

Spawning typically occurs in September and October, with an extended incubation period (up to 220 days) (DNR 2005). They mature at about 5 years and live for 12 or more years, usually reproducing in alternate years.

Bull Trout were historically present at low densities in the Spokane River Subbasin and current data suggest they are undetectable in the river. Recent observations of Bull Trout in the upper Spokane River have been of individual specimens most likely entrained downstream, which probably originated upstream from Coeur d' Alene Lake and its tributaries (NWPCC 2004).

4.2.2. Rainbow (Redband) Trout (*Oncorhynchus mykiss gairdneri*)

Interior Redband Trout are a subspecies of rainbow trout. They occupy a variety of freshwater habitats, from small streams to large rivers and lakes. Interior Redband Trout spawning, incubation and emergence

periods are usually between April and June in the Spokane River (McLellan and King 2011). It is estimated 85 to 90 percent of the Interior Redband Trout spawning in the upper Spokane River occurs in three areas: just downstream of Harvard Road (RM 92.5); a gravel bar located near Starr Road (RM 94.7); and the Island Complex near the Washington and Idaho state line (RM 96) (Avista 2014). Parametrix (2003) identified approximately 9 percent of the redds in the upper reach, between Sullivan Road (RM 87) and the Centennial Trail Bridge (RM 84), which encompasses the site at RM 86.

Interior Redband Trout populations exhibit broad phenotypic diversity, including variable age-at-maturity, frequency and timing of spawning, seasonal timing and patterns of migration, longevity, habitat selection, temperature tolerance, among other characteristics (IRCT 2016). Fish mature between 1 to 5 years, depending on growth rate, and feed primarily on bottom-dwelling aquatic insects, amphipods, aquatic worms and fish eggs (DNR 2005).

In Washington, Interior Redband Trout are not listed on the state or federal level, although they are considered a priority species by WDFW (2020). Populations have fluctuated and have generally declined in abundance over the last 20 years (IDFG 2019). Factors leading to this decline presumably include excessive water temperatures, habitat loss and degradation, hybridization, passage barriers, dams and competition with nonnative species (Ecology 2009).

Abundance estimates of Interior Redband Trout have varied in the upper Spokane River, and many of the studies were not directly comparable. Bailey and Saltes (1982) estimated between 7,200 and 13,200 rainbow trout were present in the upper river (between Post Falls Dam and the Upriver Dam) during a 1980/1981 study. A subset of this study estimated 1,170 individuals in 1980 and 811 individuals in 1981 between Sullivan Road (RM 87) and the Trent Road railroad trestle (RM 85.4), which encompasses the site (RM 86). Subsequent assessments indicated the number of Interior Redband Trout in the upper Spokane River declined from approximately 19,000 individuals in 1986 to roughly 4,000 individuals in 1990 (McLellan and King 2011). In 2007, the Interior Redband Trout population was estimated at 1,149 specimens in the Washington reach of the upper Spokane River (McCrosky 2015). Population estimates conducted in 2008 and 2009 from Flora Road (RM 90) and Donkey Island (RM 83.7), which includes the site, indicated approximately 1,243 and 1,368 Interior Redband Trout were present within this reach of the river (McLellan and King 2011). Table 8 provides a summary of Interior Redband Trout population estimates within divergent reaches of the Spokane River that encompass the site at RM 86.

TABLE 8. INTERIOR REDBAND TROUT POPULATION ESTIMATES[1]

Year	Spokane River Section Characteristics			Abundance	
	River Mile	Description	Length of Reach (mi)	N	95 Percent CI
1980	87 – 85.4	Sullivan Road to Trent Road RR	1.6	1,170	264 – 9,718
1981	87 – 85.4	Sullivan Road to Trent Road RR	1.6	811	278 – 2,976
2007	87 – 84.7	Sullivan Road to Plantes Ferry Park	2.3	897	667 – 1.263
2008	90 – 83.8	Flora Road to Donkey Island	6.2	1,243	506 – 8,890
2009	90 – 83.8	Flora Road to Donkey Island	6.2	1,368	936 – 2,182

Notes:

[1] Adopted from McLellan and King (2011)

N = number; mi = miles; RR = railroad; CI = confidence interval

Results from a 2003 WDFW fish survey conducted in the free-flowing middle and upper reaches in the Spokane River found rainbow trout comprised an aggregate total of nine percent and 13 percent of the relative abundance, respectively, during the sample period (NWPCC 2004). Recent data support the hypothesis that the population may have achieved a stable, but low level of abundance in the portion downstream from Sullivan Road (McLellan and King 2011).

4.2.3. Westslope Cutthroat Trout (*Oncorhynchus clarkii*)

Westslope Cutthroat Trout are found throughout northeastern Washington and inhabit cold, nutrient-poor streams. They are non-anadromous and include adfluvial, fluvial and resident stocks (Wydoski and Whitney 2003). In streams, they typically occupy shoreline areas in the summer and move to deeper pools in the winter (BPA 2017).

Westslope Cutthroat Trout begin to mature at age 3 but usually first spawn at age 4 or 5. They spawn from March to July at water temperatures near 10°C. Preferred spawning habitat includes small gravel substrates and mean water depths from 6.7 to 7.9 inches (WDFW 2015). Incubation occurs from April to August, and emergence occurs from May through August. Fry emerge from gravels after yolk sac absorption and at a length of about 0.8 inches. After emergence, fry may spend 1 to 4 years in their natal stream or may disperse downstream (IDFG 2013).

In Washington, Westslope Cutthroat Trout are not listed on the state or federal level, although they are considered a priority species by WDFW (2020). Extremely low numbers of Westslope Cutthroat Trout have been reported in the Spokane River below Post Falls Dam (NWPCC 2000). In addition, Parametrix (2004) reported few Westslope Cutthroat Trout captured in the upper river reach. Lee and King (2013) surmised one specimen captured in the middle reach of the Spokane River may have been entrained from Lake Coeur d'Alene. Poor habitat quality due to unfavorable thermal conditions and flow regimes coupled with species competition has most likely limited Westslope Cutthroat Trout numbers in the mainstem of the river (NWPCC 2004).

4.2.4. Mountain Whitefish (*Prosopium williamsoni*)

Mountain Whitefish are found in streams and in cold, deep lakes. In streams they are found primarily in the riffle areas in summer but prefer large pools during winter (Wydoski and Whitney 2003). They have been found in water with a velocity of about 2.6 fps. The mountain whitefish generally inhabits larger streams, with an average temperature of 8.9°C to 11.1°C.

Mountain Whitefish typically reach sexual maturity between 3 and 4 years of age. They spawn in late October to early November, depending on elevation. Stream populations spawn in riffles over gravel and small rubble. Eggs hatch in the early spring months at temperatures above 2°C (BOR 2008). Juveniles can be found along stream and lake shallows for a few weeks before migrating offshore into deeper water. Mountain Whitefish are typically about 10 to 16 inches in length when mature (DNR 2005).

In general, population studies on Mountain Whitefish in the Spokane River Subbasin are limited. In 2002, WDFW also surveyed the middle Spokane River, which extends from Nine Mile Dam upstream to Spokane Falls, including free-flowing and reservoir habitats. In the free-flowing habitat, Mountain Whitefish represented about 12 percent of the fish surveyed with ages ranging between 2 and 4 years (NWPCC 2004). In 2004, few Mountain Whitefish were captured in the upper river reach (Parametrix 2004).

4.2.5. Largescale Sucker (*Catostomus macrocheilus*)

Largescale Sucker are the predominant sucker species in the Columbia River and tributaries. Spawning occurs from early April into July in shallow water (3 to 9 feet), usually over a gravel substrate embedded with sand or silt (Wydoski and Whitney 2003) in 7.8°C to 8.9°C water. Eggs hatch in about 2 weeks and fry move to shallows to feed by day and to deeper water at night.

Sucker species can tolerate relatively strong currents, with water velocity ranging from 1.3 to 3.6 fps. They can grow up to 2 feet long and weigh 7 pounds at maturity. In a 2003 WDFW survey, Largescale Sucker were the most common fish (71.2 percent) caught between April and May in the upper Spokane River (NWPCC 2004). These data were supported in 2004, when suckers were the dominant fish species observed during electrofishing activities (Parametrix 2004).

4.2.6. Bridgelip Sucker (*Catostomus columbianus*)

The Bridgelip Sucker frequently occurs as a predominant species in a variety of Columbia Basin habitats including lake margins, backwaters or edges of rivers with sand and silt bottoms, and riffles of small-to-medium rivers and creeks with swift (up to 4 fps) cold water and sand, gravel or rocky bottoms (BOR 2008).

Spawning occurs from mid-April until mid-June in shallow (0.5 feet) tributary streams over substrates consisting primarily of pebbles, cobbles and gravel. Eggs settle into or adhere to the substrates. Fry emerge approximately 25 days after spawning and utilize areas inshore of the main channel currents. Bridgelip Suckers can grow up to 15 inches at maturity (Wydoski and Whitney 2003).

4.2.7. Northern Pikeminnnow (*Ptychocheilus oregonensis*)

The Northern Pikeminnow is the largest native member of the minnow family *(Cyprinidae*) in Washington. They can live 15 to 20 years, reaching a length of 25 inches (DNR 2005). Pikeminnow spawn from late May through July; peaking in Washington in early July. Spawning habitat may include clean, rocky substrates in slow-moving water at a wide range of depths in rivers, lake tributaries, lake outlet streams and shallow and deep littoral areas. Eggs settle into the gravel and hatch after about 7 days at 18.3°C (Wydoski and Whitney 2003). Juveniles inhabit the shallow back channels and lake edges, while larger fish dwell along drop-off zones in the summer months (Scott and Crossman 1973). Sexual maturity occurs at 3 to 8 years of age, with males typically maturing sooner than females.

In the 2003 WDFW survey, Northern Pikeminnow were the second most common fish (17.6 percent) caught between April and May in the upper Spokane River. However, during the Parametrix (2004) study, few Northern Pikeminnow were captured in the upper river reach.

4.2.8. Longnose Dace (*Rhinichthys cataractae*)

The Longnose Dace is the most widespread of the *Rhinichthy*s species, occurring throughout Washington. Spawning occurs from May through early July, generally on small rock or rubble in velocities ranging from 1.5 to 3.3 fps. They also spawn in shallow, pebble-bottomed, wave-swept shorelines of lakes, generally spawning when water temperatures exceed 11.7°C. Eggs hatch in 7 to 10 days. After hatching, fry are pelagic, living near the surface in shallow open water along the protected margins of streams, moving to bottom habitats at about 4 months (Wydoski and Whitney 2003). Adult Longnose Dace prefer benthic habitat in swift flowing water up to 3 fps.

4.2.9. Redside Shiner (*Richardsonius balteatus*)

The Redside Shiner is a small minnow (*Cyprinidae*), typically growing to 4 to 5 inches long. They are often abundant in a variety of habitats including lakes, ponds, sloughs, irrigation ditches, headwaters, creeks and small-to-medium rivers where current is slow or lacking; usually over mud or sand and often near vegetation in shallow areas (BOR 2008).

Spawning takes place from April through July over gravel substrate or in submerged vegetation in streams or along lake shorelines. The broadcast eggs sink and adhere to rocks, vegetation and detritus (Wydoski and Whitney 2003). Eggs hatch at 21°C to 23°C approximately 3 to 7 days following fertilization (Gray and Dauble 2001). Juveniles attain sexual maturity approximately 3 years after hatching, and females deposit small, adhesive eggs in multiple lots throughout the breeding season over an unprepared substrate (DNR 2005).

4.3. Impingement and Entrainment Susceptibility

Susceptibility for impingement and entrainment was assessed for native species (i.e., relevant taxa) potentially present at the site. A discussion of previous studies in the Spokane River, as well as potential for impingement and entrainment of native species is provided below.

4.3.1. Previous Studies

There are no known studies of impingement and entrainment at the site. Entrainment and impingement have been assessed at Avista's Post Falls Hydroelectric Dam, located approximately 15 miles upstream from the site. The evaluation assessed the susceptibility of fish at the dam to turbine entrainment and concluded moderate potential for entrainment of smaller specimens of northern pikeminnow and smallmouth bass. Entrainment potential for stocked rainbow trout and Brown Trout was probably higher than native fish, likely due to downstream movements following stocking activities (Avista 2005). As discussed, incidental entrainment has also been documented with Bull Trout, Chinook Salmon, Northern Pike, and Kokanee that originated from Coeur d'Alene Lake.

4.3.2. Impingement Susceptibility

Bull Trout are the only state/federally listed species potentially present in the Upper Spokane River. However, Bull Trout occurrence in the upper Spokane River is considered incidental, and therefore, impingement is not expected.

Other relevant taxa present in the upper Spokane River have the potential to be impinged, especially during periods of migration. However, adult specimens of the species listed are stronger swimmers and are not a high for impingement on the intake screens. Redside Shiners may be an exception, since they are generally smaller in size as adults (4 to 5 inches). Longnose Dace specimens are also smaller in size (2 to 3 inches) but are strong swimmers and prefer faster currents up to 3 fps (DNR 2005). Table 9 provides a qualitative summary of impingement potential for native fish species (relevant taxa) at the site.

4.3.3. Entrainment Susceptibility

Spawning for the only listed species (Bull Trout) in the upper Spokane River is unlikely. Bull Trout require clean, cold (10°C) water for spawning and colder water (2.2°C to 3.9°C) for incubation (DNR 2005). Mean water temperatures in the upper Spokane River range from 10°C to 14.2°C in September/October (Table 2), when Bull Trout would typically be spawning. Based on this, and the low numbers/incidental nature of

Bull Trout in the river, entrainment of Bull Trout eggs and larvae is not considered probable downstream from the Post Falls Dam.

Spawning and rearing habitat is available for Interior Redband Trout and other resident species in the free-flowing section of the Upper Spokane River. However, approximately 85 to 90 percent of the Interior Redband Trout spawning in the upper Spokane River occurs in three areas, the nearest of which (Harvard Road – RM 92.5) is approximately 6.5 river miles upstream from the site. Parametrix (2003) identified approximately 9 percent of the redds in the upper Spokane River between Sullivan Road (RM 87) and Centennial Trail (RM 84), which encompasses the site at RM 86. In addition, redband and Westslope Cutthroat Trout are spring spawners when AIF from the river at the CWIS is lowest (about 0.01 to 0.02 percent of overall flow). Considering the low percentage of redds near the site, low overall numbers of Interior Redband Trout and Westlope Cutthroat Trout in the upper reach of the river, and low percentage of the river withdrawn during spawning, entrainment potential is low for these species.

It is expected eggs and larvae of other native species have the potential to be entrained at the Kaiser intake. A qualitative summary of potential entrainment for native species in the Spokane River near the site is provided in Table 9 below.

TABLE 9. ENTRAINMENT AND IMPINGEMENT POTENTIAL FOR NATIVE SPECIES

Common Name	Initiation of Spawning[1]	End of Incubation / Emergence	Eggs and Larvae Habitat	Potential for Entrainment (Eggs and Larvae)	Juvenile and Adult Habitat	Potential for Impingement (Juveniles and Adults)
Mountain Whitefish	October 1	March 15	Present	Possible	Present	Possible
Largescale Sucker	April 1	July 15	Present	Possible	Present	Possible
Bridgelip Sucker	April 15	June 15	Present	Possible	Present	Possible
Northern Pikeminow	June 1	August 1	Present	Possible	Present	Possible
Redside Shiner	May 1	August 1	Present	Possible	Present	Possible
Longnose Dace	May 1	July 1	Present	Present	Present	Possible
Bull Trout	August 15	March 15	N/A	N/A	Low	Low
Westslope Cutthroat Trout	April 1	July 1	Minimal	Low	Minimal	Low
Rainbow (redband) trout	April 1	June 15	Present	Low	Present	Low

Notes:

[1] Spawning and reproduction information obtained from Avista (2014), BOR (2008), and DNR (2005).

N/A = not applicable since no bull trout spawning is expected in the Spokane River below Post Falls Dam.

4.4. Fragile Species

Fragile species are those species of fish and shellfish that are least likely to survive any form of impingement. Fragile species are defined in §125.92(m) as either one of 14 listed species, or species with an impingement survival rate less than 30 percent. None of the 14 listed fragile species in §125.92(m) are present in the Spokane River.

4.5. Incidental Take Exemption

Incidental take is defined as a take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity under local, State or Federal law" (50 CFR 402.14(i)). The Kaiser Facility does not have an incidental take exemption and no incidental take of listed species is anticipated at this site.

5.0 §122.21(R)(5) COOLING WATER SYSTEM DATA

Facilities use CWIS system data, along with the water balance diagram required by §122.21(r)(3), to demonstrate the extent to which flow reductions have already been achieved at the facility level. The following section provides a description of the operation of the cooling water system and its relationship to the CWIS.

5.1. Cooling Water System Design and Operation

The Kaiser CWIS is a once-through cooling system, withdrawing water from the Spokane River, circulating the water through condensers, and discharging it back to the Spokane River. The configuration of the Kaiser intake structures includes bar screens (trash racks), followed by mesh screens and travelling screens to remove solid debris (Appendix A).

The river pumping station has seven, 3-stage, 400-horespower turbine pumps. Pumps 1 through 4 are in pumphouse No. 1 and pumps 5 through 7 are situated in pumphouse No. 2. There are also two fire pumps located in pumphouse No. 1. The nominal pumping rate of each pump is 5,000 gpm (about 11.1 cfs). The line pressure on the discharge side of the pump is 110 psi. The pump system conveys the surface water into two 24-inch and one 12-inch steel mains, which sends water 2,600 feet to the mill. The 24-inch mains surround the plant, where they deliver surface water for production of ingots. The 12-inch mainline is used for fire suppression (Ecology 2020; Appendix A).

The number of pumps operating depends on the water demand. According to Kaiser, pump 1 or 3 are running continuously (Yanke 2020). Kaiser process water and non-contact cooling water is discharged back to the Spokane River a few hundred yards downstream from the intake through outfall 001 (Appendix E).

5.2. Proportion of the Design Intake Flow for Non-Contact Cooling and Process Uses

The Kaiser CWIS has an estimated DIF of 23,685 gpm (44 cfs; 28.4 MGD). In 2020, the estimated AIF was about 7 percent of the DIF. Approximately 95 percent of the intake water from the Spokane River is used as once through cooling water (Ecology 2016). The remaining 5 percent of the intake water is used for storage for fire suppression and for process water in milling operations.

5.3. Proportion of Source Water Body Withdrawn

Because the intake pumps are not equipped with flow meters, AIF data were obtained from estimates provided by Kaiser and available permitting information from Ecology. Intake flow is estimated based on flow measurements from the groundwater wells, subtracted from the outfall. According to Kaiser, the mean AIF was about 1.91 MGD in 2020 (Pitcher 2020). The maximum AIF has been estimated at 6.4 MGD (Ecology 2016). The mean AIF and maximum AIF were used to calculate the percent of the Spokane River withdrawn by Kaiser.

Mean monthly Spokane River flows were estimated from gaging station No. 12421500 at Trent Bridge (RM 85.4), approximately 0.85 miles downstream from the site, since this station incorporates influence into the river from SVRP. Mean monthly flows were compared to the DIF and mean monthly AIFs to estimate the percent of the river flow withdrawn by Kaiser. The average monthly proportion of the Spokane River that could be withdrawn under the DIF and estimated mean AIF for the 2020 calendar year is provided in Table 10.

TABLE 10. MEAN MONTHLY SPOKANE RIVER FLOW AND PERCENT WITHDRAWN BY KAISER

Month	Mean Spokane River Discharge[1] (cfs)	Design Intake Flow (cfs)	Percent of River Flow (DIF)	Actual Intake Flow in 2020 (cfs)	Percent of River Flow (AIF)
January	5,631	44	0.78	2.27	0.04
February	7,768	44	0.57	2.15	0.03
March	8,871	44	0.50	2.16	0.02
April	16,023	44	0.27	2.28	0.01
May	22,171	44	0.20	2.55	0.01
June	13,365	44	0.33	2.51	0.02
July	3,215	44	1.37	1.79	0.06
August	1,228	44	3.58	1.28	0.10
September	1,206	44	3.65	1.29	0.11
October	2,088	44	2.11	1.37	0.07
November	2,946	44	1.49	1.33	0.05
December	4,665	44	0.94	N/A	--

Notes:

[1] Data obtained from USGS National Water Information System: Web Interface: https://waterdata.usgs.gov/nwis. Measured at the Trent Bridge approximately 0.85 miles downstream from the site.

N/A = not available; -- not calculated

As shown, if Kaiser operated at the estimated DIF, it would withdraw a maximum of 3.65 percent of the monthly Spokane River flow. However, supplemental groundwater development has reduced the demand on river water to approximately 7 percent of the original water right. Therefore, the mean estimated AIF would represent a more accurate approximation of total river usage As shown, the maximum river withdrawal under the AIF is approximately 0.11 percent of the Spokane River flow.

5.4. Intake Velocities

Vertical trash racks are located at the entrance of two bays at pumphouse No. 1 and one bay at pumphouse No. 2. The racks are used to prevent large debris from damaging the stationary and traveling water screens. The face of each of the three trash racks are 7.65 feet wide. The trash racks are 0.5 inch by 4-inch bars spaced 2 inches apart and are 12.5 feet tall, extending from about 1,910.5 feet above MSL feet to about 1,923 feet above MSL (Appendix B). The number and dimensions of the trash racks were verified by a commercial diving company hired by Kaiser in July of 2019.

Velocities at the Kaiser CWIS were calculated approaching the trash racks, through the trash racks, the stationary screens, and the traveling screens. As a conservative measure, we assumed the entire flow occurring through one of pumphouses at any one time. Velocities were calculated at the DIF of 44 cfs, maximum AIF of 9.9 cfs, and mean AIF of 2.96 cfs, all at the low water elevation of 1,916 feet above MSL. The following equations were used to calculate the approach velocity and through-screen velocities (TSVs) for the DIF and AIFs:

$$\text{Approach Velocity: } V_{Approach} = Q_i / A_{screen}$$

$$\text{TSV: } V_{Through\ screen} = V_{Approach} / \text{Screen open area}$$

Where: Q_i = Intake Flow (44 cfs – DIF; 9.9 cfs – maximum AIF; 2.96 – mean AIF)
A_{screen} = Screen area submerged
Screen open area = Percent open area of screen

An open area of 77 percent was calculated for the trash racks, and the open area of the traveling water screen was estimated to be 52 percent, based on design drawings provided by Kaiser (Appendix A). These open areas were used to calculate the TSVs (Appendix C) and are summarized in Table 11.

TABLE 11. CALCULATED KAISER CWIS INTAKE VELOCITIES

	Intake Velocity (fps)					
	Approaching Trash Racks	**Through Trash Racks**	**Approaching Stationary Screens**	**Through Stationary Screens**	**Approaching Travelling Screens**	**Through Travelling Screens**
DIF - Pump Operations[1]	1.2	1.5	1.2	1.6	0.7	1.3
Max AIF - Pump Operations	0.26	0.34	0.27	0.37	0.15	0.28
Mean AIF – Pump Operations	0.08	0.10	0.08	0.11	0.04	0.08

Notes:

[1] DIF pump operations assume approximately 28.4 MGD (44 cfs); AIF pump operations assume the estimated maximum AIF of 6.91 MGD (9.9 cfs).

5.5. Existing Impingement and Entrainment Reduction Measures

Kaiser employs standard through-flow traveling water screens without significant fish protection features to reduce Impingement Mortality and Entrainment (IM&E). However, the estimated mean AIF is about 7 percent of the DIF. Thus, supplemental groundwater usage at the Kaiser CWIS is a significant reduction measure, limiting IM&E by about 93 percent of maximum DIF river withdrawals.

6.0 §122.21(R)(6) CHOSEN METHOD(S) OF COMPLIANCE WITH IMPINGEMENT MOPRTALITY STANDARDS

Under §122.21(r)(6), Kaiser must identify the approach to meet the impingement mortality standards. The Rule is flexible, providing seven different compliance options for meeting impingement mortality requirements. The seven compliance alternatives for meeting national BTA IM standards are summarized in Table 12 below.

TABLE 12. IMPINGEMENT MORTALITY REDUCTION OPTIONS

Compliance Option	Description	Conceptual Evaluation Remarks	Key Monitoring and Reporting Requirements
1. Closed-cycle circulating system	Wet, dry or hybrid cooling towers, a system of impoundments that are not waters of the United States, or any combination thereof.	Not compatible with existing flow-through cooling water system. Would require system redesign and addition of cooling towers.	N/A
2. Maximum design through-screen intake velocity	Maximum design intake velocity as water passes through the screen measured perpendicular to the screen mesh does not exceed 0.5 fps under all intake water conditions.	Assuming the 28.4 MGD DIF and estimated minimum water elevation of 1,916 feet above MSL; the TSV is 1.3 fps, which exceeds the 0.5 fps velocity requirement.	No routine monitoring
3. Maximum actual through-screen intake velocity	Maximum actual operating intake velocity as water passes through the screen measured perpendicular to the screen mesh does not exceed 0.5 fps under all intake water conditions.	Assuming the estimated minimum water elevation of 1,916 feet above MSL; the TSV is 0.28 fps under the maximum AIF (6.4 MGD), and 0.08 fps under the mean AIF (1.91 MGD). Both actual through screen intake velocities are below the 0.5 fps velocity requirement.	Monitor velocities daily
4. Existing offshore velocity cap	Existing offshore velocity cap as defined at 40 CFR 125.92(v) that was installed on or before Oct. 14, 2014.	This option is not feasible since the date is beyond October 14, 2014.	N/A

Compliance Option	Description	Conceptual Evaluation Remarks	Key Monitoring and Reporting Requirements
5. Modified traveling screens	Modified traveling screen as defined in 40 CFR 125.92(s).	Not recommended since system design must be based on two years of monthly biological sample collection and mortality analysis to determine the aquatic life to be collected. The additional equipment to the existing screen would be costly and require substantial operational labor.	Determined by permit
6. Systems of technologies as the BTA for IM	Combination of technologies, management practices and operational measures that reduce impingement.	Requires 2 years of monthly biological sample collection and mortality analysis be completed prior to system design.	Determined by permit
7. Achieve specified IM performance standard	12-month impingement mortality performance standard of all life stages of fish and shellfish of no more than 24 percent mortality, including latent mortality.	This option is not recommended for Kaiser, as it requires one year of monthly biological sample collection and mortality analysis be completed prior to system design.	Monthly biological monitoring or determined by permit

Notes:

N/A = not applicable

As shown, conservative estimates indicate the TSV at the low water level is approximately 0.28 fps under the maximum (6.4 MGD) AIF and 0.08 fps under the mean (1.91 MGD) AIF. Both AIF values are below the 0.5 fps velocity provision as described in §125.94(3).

In addition to the seven IM compliance alternatives, there are several other methods for demonstrating compliance with the IM standard. Among these, the *de minimis* rate of impingement is described under §125.94(c)(11). EPA acknowledged there may be circumstances where flexibility in the application of the Rule may be called for and the Rule so provides. Facilities that withdraw a small proportion of the mean annual flow of a river may warrant special consideration, including a *de minimis* determination.

The Rule does not define the concept of *de minimis* impingement. However, EPA provides the following example: if a facility withdraws less than 50 MGD AIF, withdraws less than five percent of mean annual flow of the river on which it is located (if on a river or stream), and is not co-located with other facilities with CWISs such that it contributes to a larger share of mean annual flow, the Director may determine that the facility is a candidate for consideration under the *de minimis* provisions contained at § 125.94(c)(11). Kaiser's maximum (conservative) estimated AIF from the river ranges from a high of 0.83 percent to a low of 0.04 percent and averages 0.30 percent of river flow. The mean 2020 estimated AIF from the river ranged from a high of 0.11 percent, to a low of 0.01 percent, with an average of 0.05 percent of the river flow (Table 6).

Based on these data, it is our professional opinion that the facility qualifies for a *de minimis* rate of impingement as described in §125.94(c)(11). Therefore, no additional impingement controls are warranted, and Kaiser's existing CWIS could be a BTA for impingement.

6.1. Preferred IM Compliance Methods

Kaiser meets the impingement BTA requirements under § 125.94(3): 0.5 fps through-screen actual velocity; and warrants consideration under *de minimis* rate of impingement in the Rule. conservative estimates indicate the TSV at the low water level is approximately 0.28 fps under the maximum (6.4 MGD) AIF and 0.08 fps under the mean (1.91 MGD) AIF. Both values area below the 0.5 fps velocity threshold under Section 316(b) (Table 12).

A *de minimis* consideration at Kaiser is consistent with the Rule that allows the Director to make this determination for facilities that withdraw a small proportion of the mean annual flow of a river. Using the mean estimated AIF from 2020, the greatest level of withdrawal from the Spokane River is approximated at 0.11 percent of river flow (Tables 6 and 10). Using the maximum estimated AIF from Ecology (2016), the highest level of withdrawal from the Spokane River would be about 0.30 percent of river flow (Table 6).

7.0 §122.21(R)(7) ENTRAINMENT PERFORMANCE STUDIES

The Rule §122(r)(7) requires Kaiser to discuss other biological survival studies conducted at the facility and a summary of any conclusions or results. No prior entrainment studies have been conducted in the immediate vicinity of the site. The Rule also provides that any facility with AIF in excess of 125 MGD must provide an entrainment study with its permit application. Based on this, the Rule is not applicable to the Kaiser Trentwood facility since the maximum estimated AIF is 6.4 MGD and mean estimated AIF is 1.91 MGD at the site.

The upper Spokane River does not support viable populations of federally listed species or critical habitat near the site. Bull Trout are the only listed species potentially present, but specimens observed in reaches of the waterway, downstream from the Post Falls Dam, likely originated from Coeur d'Alene Lake. No Bull Trout reproduction is expected within the Spokane River near the site.

Spawning and rearing habitat is available for other native fish species in the Spokane River. Specifically, spawning for redband (rainbow) trout has been identified throughout the free-flowing portion of the upper Spokane River (McLellan and King 2011). The population may have achieved a stable, but low level of abundance in the portion downstream of Sullivan Road (RM 87). For spring spawners, such as Interior Redband Trout and Westslope Cutthroat Trout, the primary spawning, incubation and emergence periods occur from April through June. During these months, it is estimated Kaiser withdrew a maximum of 0.01 to 0.02 percent of the river flow. As such, it is our opinion the overall low quantity of river water withdrawn and low velocity at the intakes would also justify a *de minimis* condition for entrainment.

8.0 §122.21(R)(8) OPERATIONAL STATUS

Under §122(r)(8), an applicant must submit a description of the operational status of each unit for which a CWIS provides water for cooling. This includes operational status in-terms of age, capacity utilization rate, future plans, extended or unusual outages that could significantly affect current data for flow, impingement and entrainment.

8.1. Operating Status

Kaiser Trentwood is an aluminum manufacturing facility owned and operated by Kaiser Aluminum Washington, LLC. The facility currently produces aluminum sheet, plate and coil through the rolling of aluminum with neat oils and emulsions. Supporting operations include direct chill casting and solution heat treating. Finished products are used mainly in the aerospace industry and for general engineering applications (Ecology 2016. There are two pumphouses associated with the CWIS. Pumphouse No. 1 was constructed in 1942 and pumphouse No. 2 was built in 1967. Additional details describing the CWIS are provided in Sections 1.1 and 5.1.

Concerns over river water withdrawal and the need for a supplemental water source led Kaiser to explore the use of groundwater for cooling water. Between 1994 and 1999, six groundwater wells were installed at the Trentwood mill to supplement and reduce river water withdrawals. The total approved water right for groundwater withdrawal is 31 cfs (Ecology 2020). Since development of the groundwater wells, demand for river water has reduced about 93 percent. Current estimates of river water intake range from a mean of 1.91 MGD (2.96 cfs) to a maximum of 6.4 MGD (9.9 cfs) from the Spokane River.

Production at the site is expected to remain relatively consistent with current levels in the foreseeable future. As such, near term river withdrawals are anticipated to be similar to 2020 estimates.

8.2. Major Upgrades

There have been no major structural or operational changes to the Kaiser CWIS in the last 15 years.

8.3. Other Cooling Water Uses

Approximately 95 percent of the intake water from the Spokane River is used as once through cooling water (Ecology 2016). The remaining 5 percent of the intake water is used for storage for fire suppression and for process water in milling operations.

8.4. Plans or Schedules for New Units

Kaiser has no current plans or schedules for the addition of new CWIS units, or the retirement of any CWIS units in the next 5 years.

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Life History, Distribution and Abundance, Habitat Needs, Stressors, and Conservation Actions Needed. WDFW Olympia, Washington.

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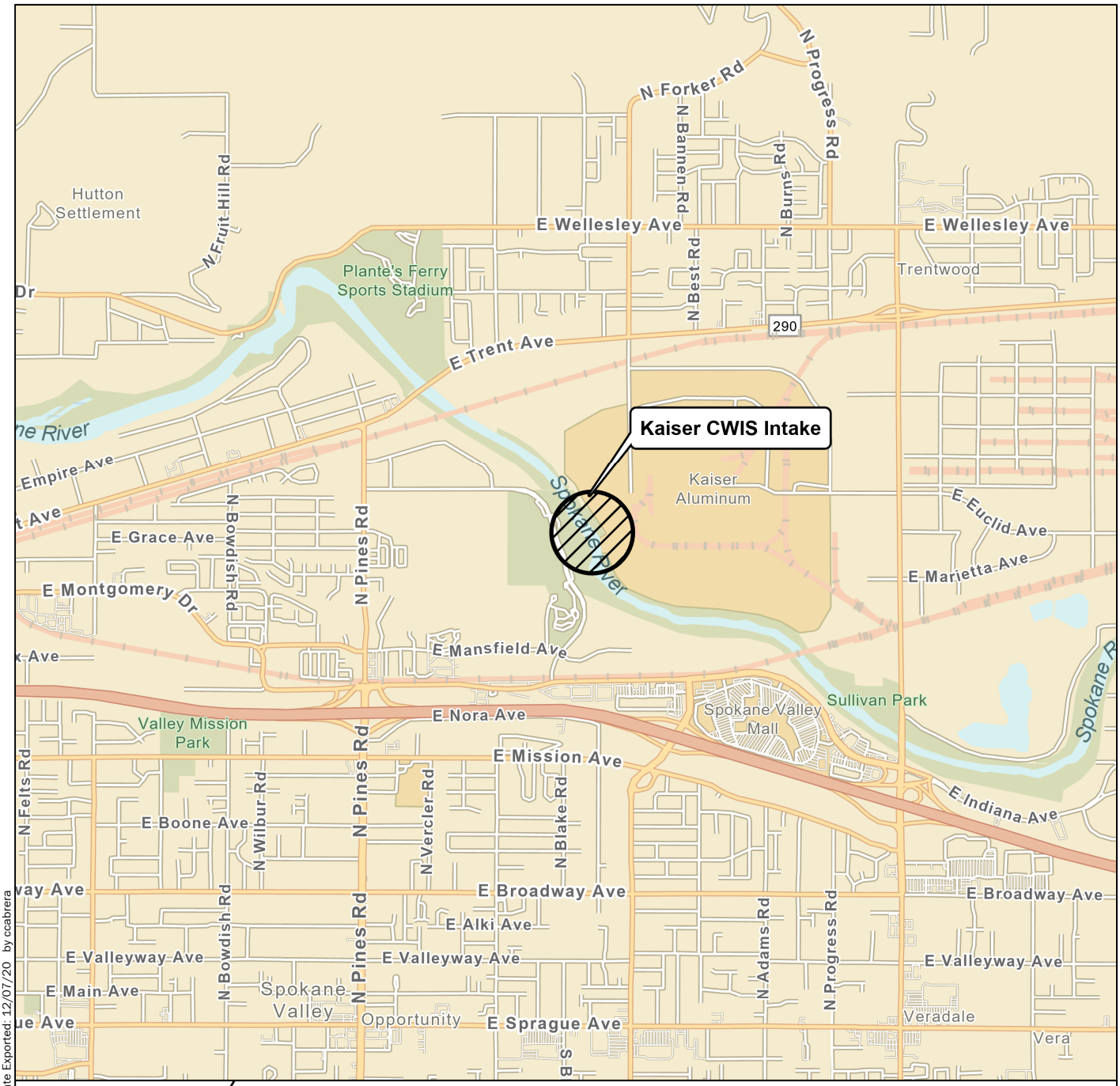
Yanke, Devin 2020. Personal Communication with Devin Yanke, Project Engineer, Kaiser Aluminum, Spokane Valley, Washington, via email, November 9, 2020.

FIGURES

GeoEngineers



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 11N

Vicinity Map

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

Figure 1

P:\7\7839006\GIS\7839006\7839006.aprx\783900633_F01_VicinityMap Date Exported: 12/07/20 by ccabrera

Notes:
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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 World Imagery

Projection: NAD 1983 UTM Zone 11N

Legend

Site Features

N
W E
S

100 0 100
Feet

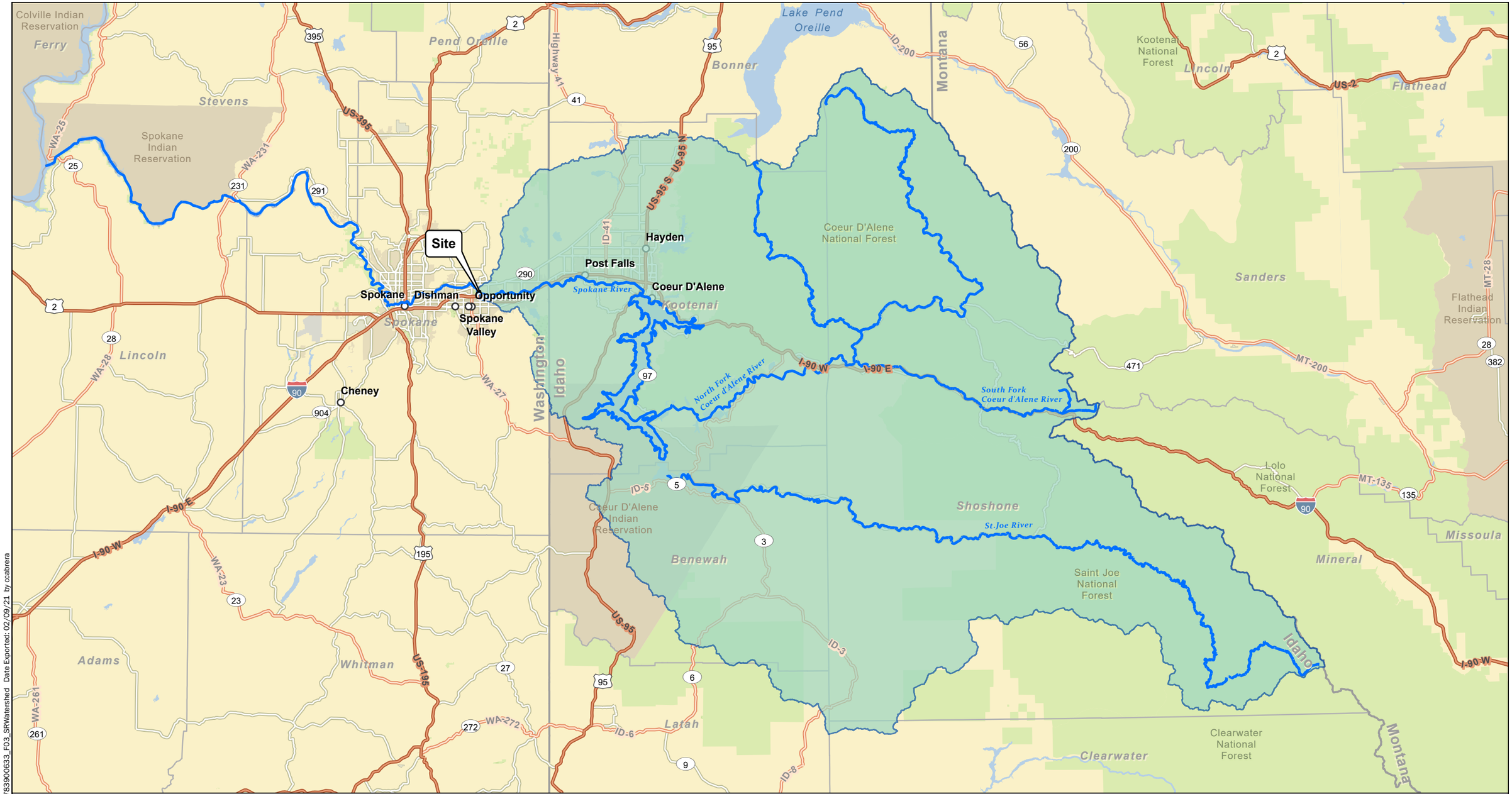
Site Layout

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

Figure 2

P:\7\7839006\GIS\7839006\7839006.aprx\783900633_F02_SiteLayout Date Exported: 02/09/21 by ccabrera



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 Street Map Premium

Projection: NAD 1983 UTM Zone 11N

Legend

Spokane River Watershed

N W E S

11.5 0 11.5

Miles

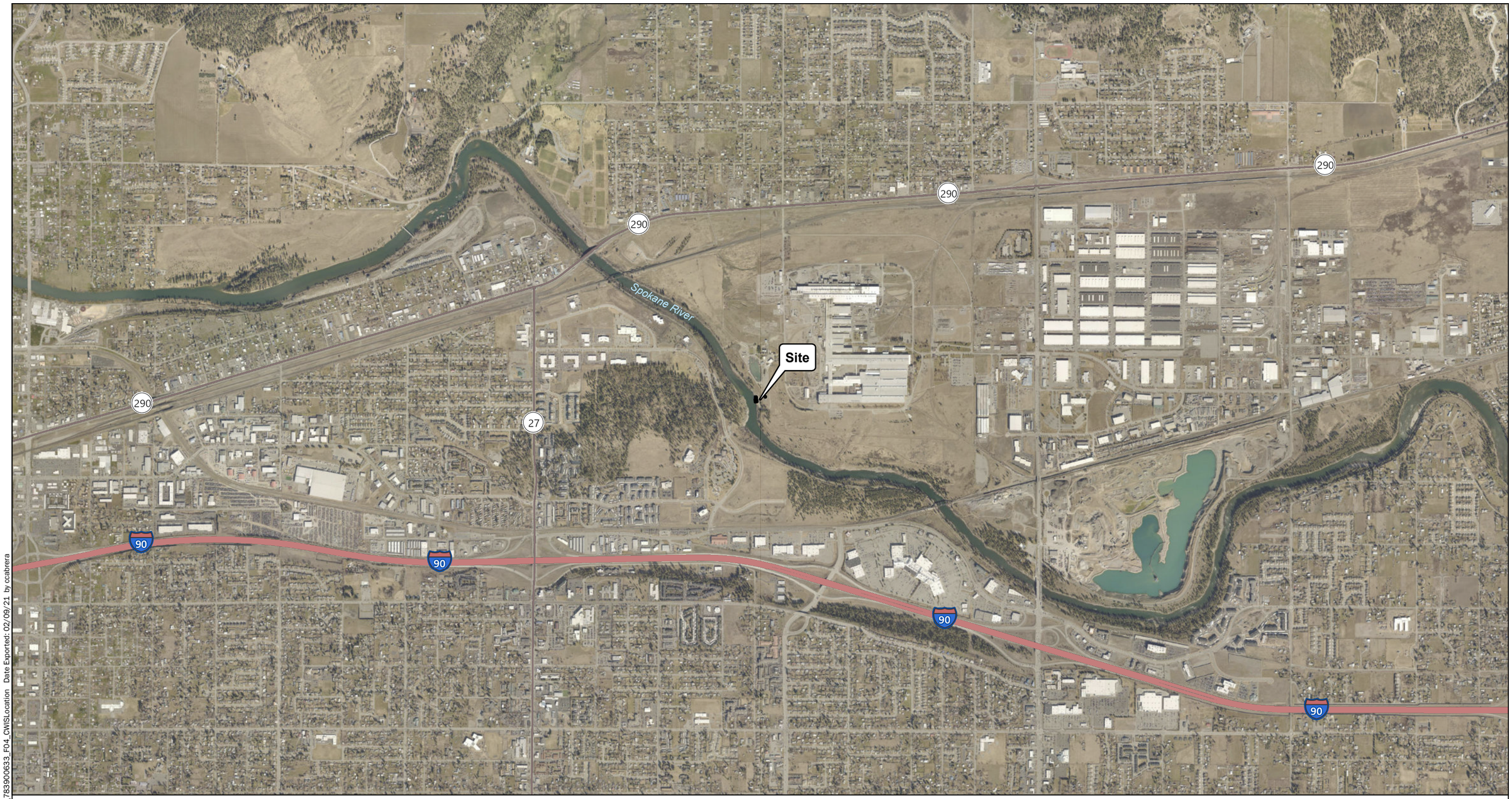
Spokane River Watershed

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

Figure 3

P:\7\7839006\GIS\7839006\7839006.aprx\783900633_F03_SRWatershed Date Exported: 02/09/21 by ccabrera



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 Imagery. USGS Transportation Map Service.

Projection: NAD 1983 UTM Zone 11N

N
W E
S

2,000 0 2,000
Feet

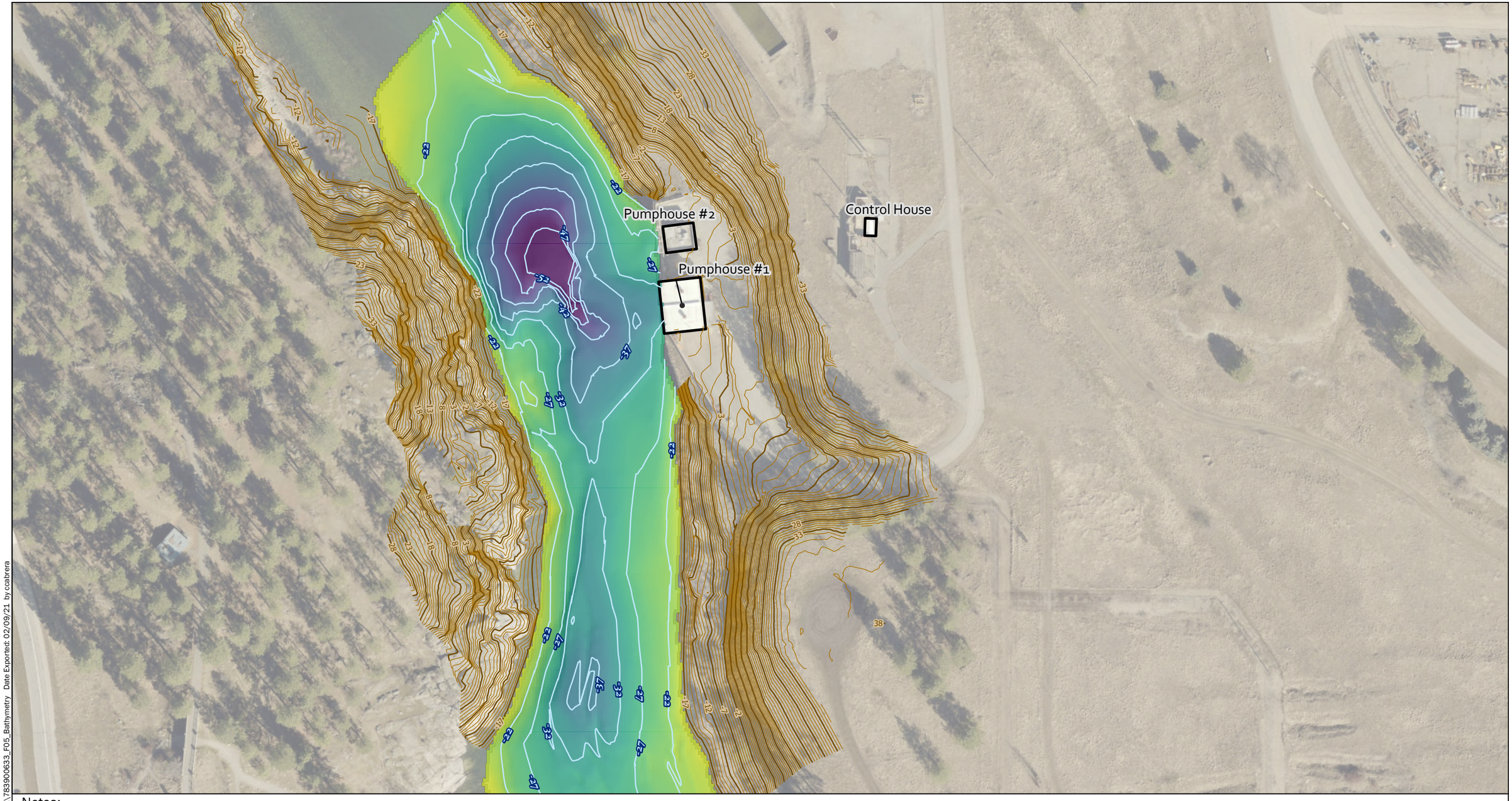
CWIS Location

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

Figure 4

P:\7\7839006\GIS\7839006\7839006.aprx\7839006633_F04_CWISLocation Date Exported: 02/09/21 by ccabrera



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.
3. Land and Bathymetric contours are relative to each other and do not reflect actual elevation values.

Data Source: Topo survey David Evans and Associates.

Projection: NAD 1983 UTM Zone 11N

Legend

Relative Bathymetric Contours[3]

Bathymetry

-14'

-56'

Major Land Contours[3]

Minor Land Contours[3]

N
W E
S

100 0 100
Feet

Spokane River Bathymetry

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

Figure 5

P:\7\7839006\GIS\7839006\7839006.aprx\7839006633_F05_Bathymetry Date Exported: 02/09/21 by ccabrera

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 World Imagery

Projection: NAD 1983 UTM Zone 11N

Legend

- Site Features
- Mean Area of Influence (AIF – 1.91 MGD)
- Maximum Area of Influence (AIF – 6.4 MGD)
- Area of Influence (DIF – 28.4 MGD)

N W E S

20 0 20

Feet

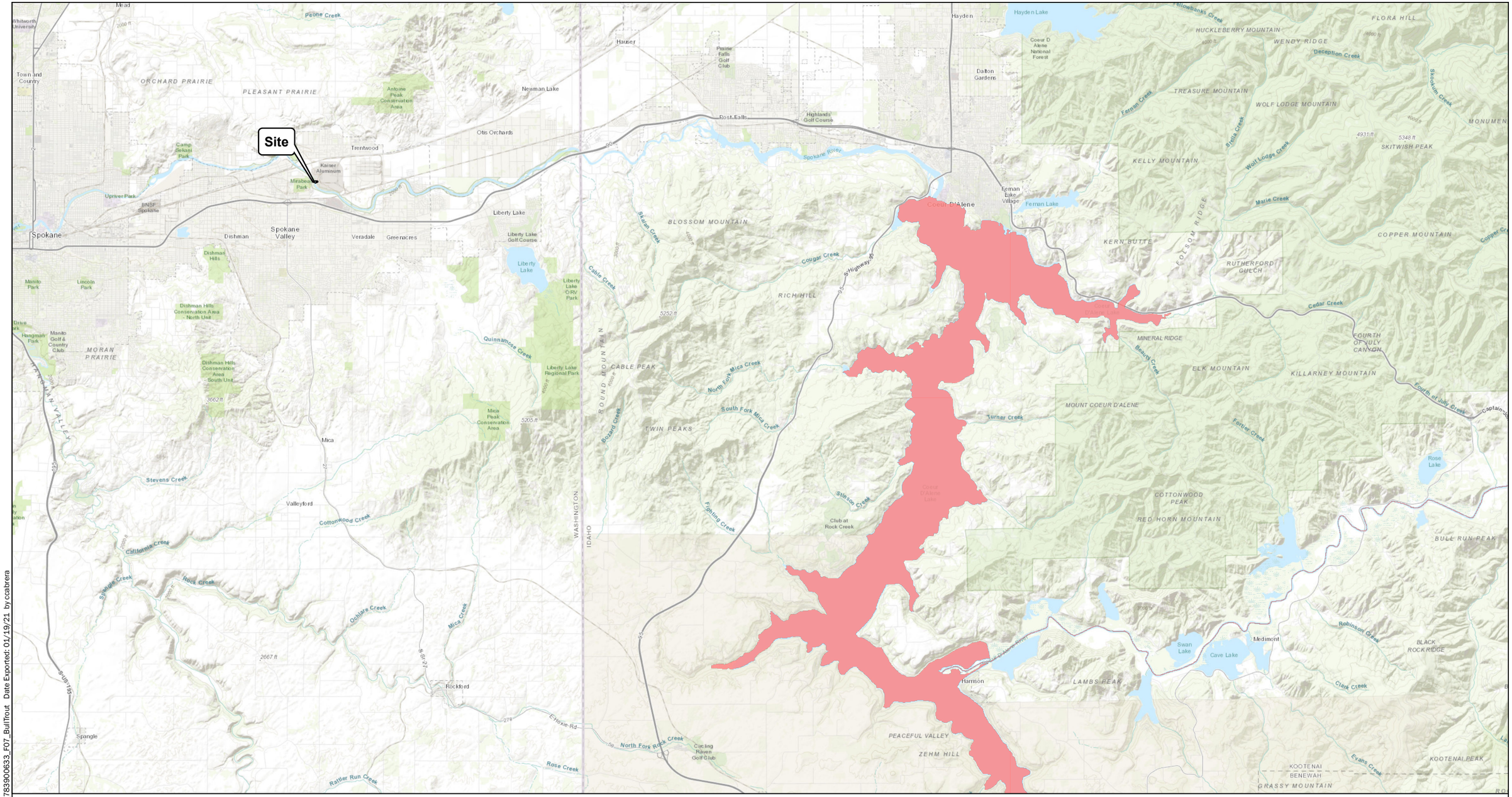
Area of Influence

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

Figure 6

P:\7\7839006\GIS\7839006\7839006.aprx\7839006633_F06_AOI Date Exported: 01/06/21 by ccabrera



P:\7\7839006\GIS\7839006\7839006.aprx\7839006633_F07_BullTrout Date Exported: 01/19/21 by ccabrera

Notes:

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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: U.S. Fish and Wildlife Service.
World Topographic map from ESRI.

Projection: NAD 1983 UTM Zone 11N

Legend

- Site
- Bull Trout Critical Habitat

N
W E
S

3 0 3
Miles

Bull Trout Critical Habitat Map

Kaiser Aluminum – Cooling Water Intake Structure
Spokane Valley, Washington

GeoEngineers

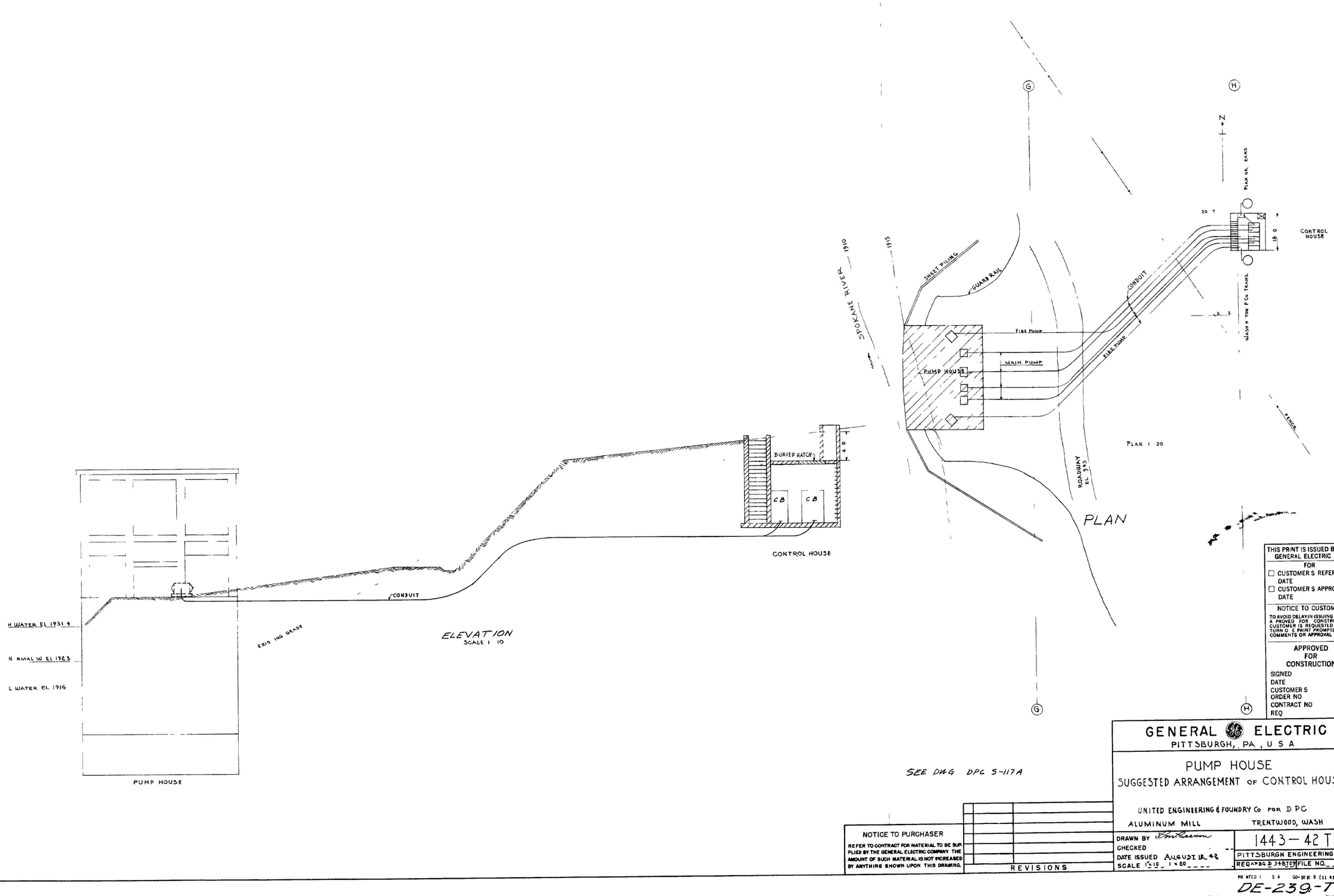
Figure 7

APPENDICES

GeoEngineers

APPENDIX A
CWIS Drawings

1443-42T



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TO AVOID DELAY IN ISSUING PRINTS A PROVED FOR CONSTRUCTION CUSTOMER IS REQUESTED TO RE TURN O E PRINT PROMPTLY WITH COMMENTS OR APPROVAL

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REVISIONS

GENERAL ELECTRIC
PITTSBURGH, PA, U S A

PUMP HOUSE
SUGGESTED ARRANGEMENT OF CONTROL HOUSE

UNITED ENGINEERING & FOUNDRY CO FOR D P C

ALUMINUM MILL TRENTWOOD, WASH

DRAWN BY Tom Reeson

CHECKED

DATE ISSUED AUGUST 12 48

SCALE 1"=10' - 1"=20'

1443-42T

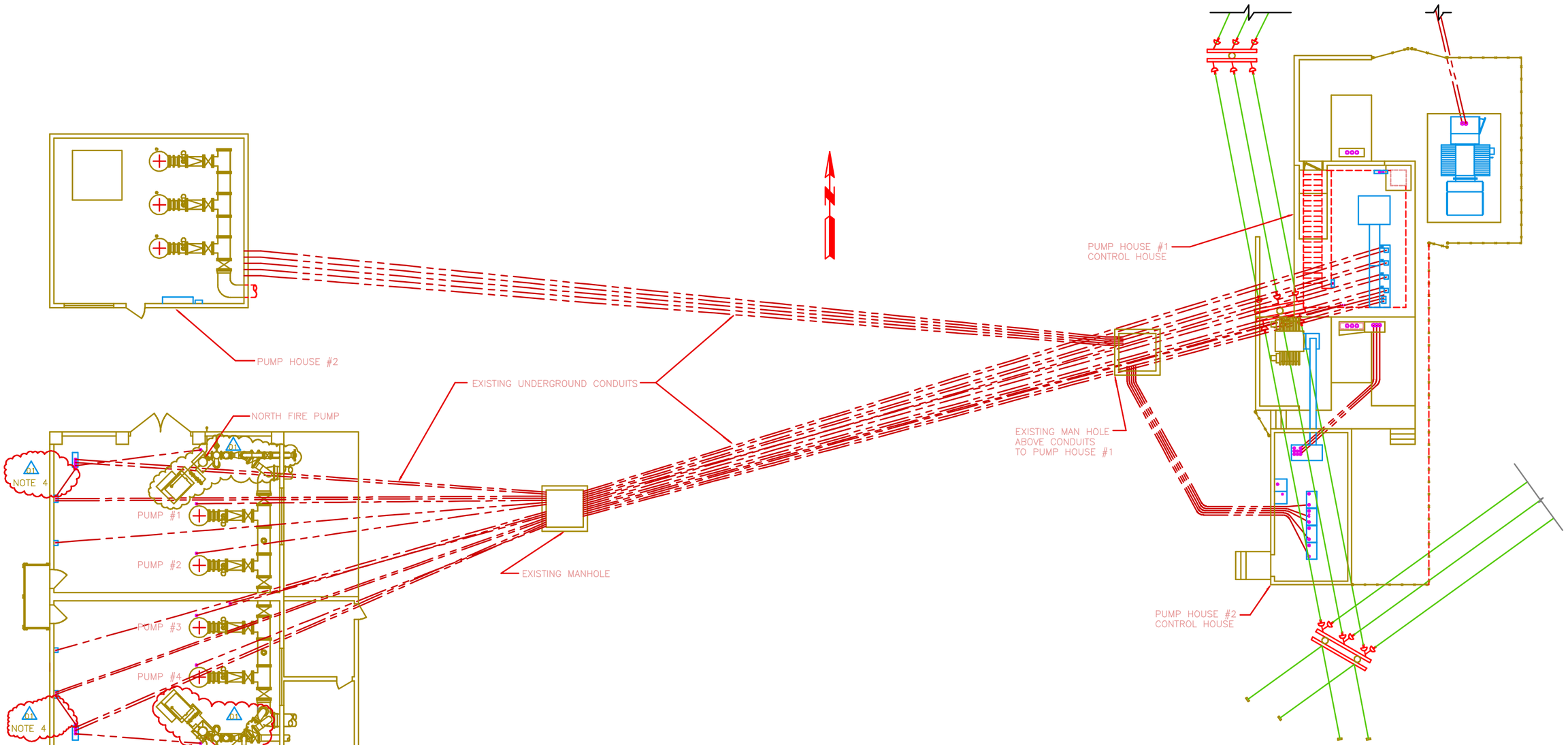
PITTSBURGH ENGINEERING DEPT

REQ AND BG D 548789 FILE NO.

PRINTED IN U S A GO-10 10 8 (11 48) V

DE-239-TW

BILL OF MATERIAL				
SOURCE	ITEM	QTY.	EACH ITEM CONSISTING OF	DESCRIPTION



AREA PLAN

SCALE 1/8" = 1'-0"

GENERAL NOTES

SEE DE-143-TW FOR CONDUIT CROSS SECTION
CONTROL HOUSE TO PUMP HOUSE

1. PROVIDE NEW CONDUCTORS IN EXISTING CONDUITS FOR POWER AND CONTROL IN PUMP HOUSE #1
2. PROVIDE NEW CABLE LADDERS FOR NEW CONDUCTORS IN EXISTING MANHOLE.
3. SEE CE-1839-TW SHT. 1 FOR LIST OF DRAWINGS
4. SEE DE-4858 SHT. 5 FOR DIESEL FIRE PUMP CONTROL PANEL LOCATION.

CK.	BY	DATE	NO.	REVISIONS
BE	JHI	09/19/97	01	REPLACED NORTH & SOUTH FIRE PUMPS

MACHINING INSTRUCTIONS

MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE SPEC: B46.1 1978. ALLOW SURPLUS FOR MACHINING OF THESE SURFACES WITHOUT THE SIGN: ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED: FRACTIONAL DIMENSIONS: ±1/32"

USE WITH DRAWING: ...
EQUIPMENT NO.: ...

SCALE	PROJECT NO.	BUILDING NO.
1/8"=1'-0"	...	...

1. RIVER PUMP HOUSE
2. PUMP HOUSE #1
3. CONTROL HOUSE RENOVATION
4. AREA PLAN

KAISER ALUMINUM

TRENTWOOD WORKS SPOKANE, WA

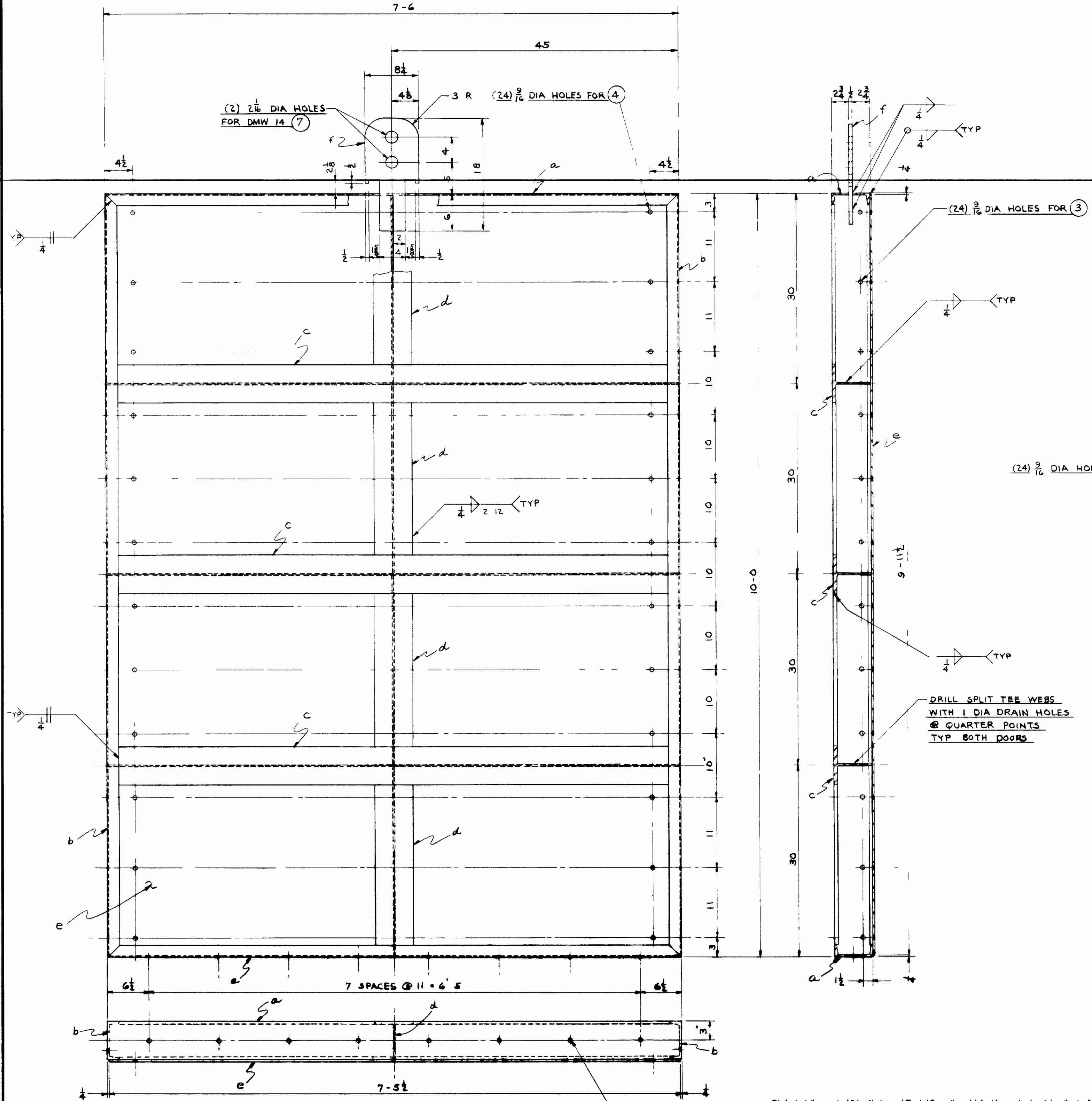
THIS DRAWING IS COMPUTER GENERATED AND IS STORED ON A FLOPPY DISC. NO REVISIONS ARE PERMITTED TO THIS REPRODUCIBLE. ALL REVISIONS MUST BE MADE TO THE ORIGINAL COMPUTER DRAWING.

DRAWN BY — DATE: BNW 7/31/90	CAD FILE NAME: G0238832
APPROVED — ENGINEER / DATE:	MEDIA SIZE: 24" x 36"
APPROVED — ENGRG. SUPERVISOR / DATE:	CAD FILE PLOT SCALE: 1=96
APPROVED — ENGRG. MANAGER / DATE:	CONT. ON SH. 2 SH. NO. 1
	DWG. NO. DEG24980
	REV. 01

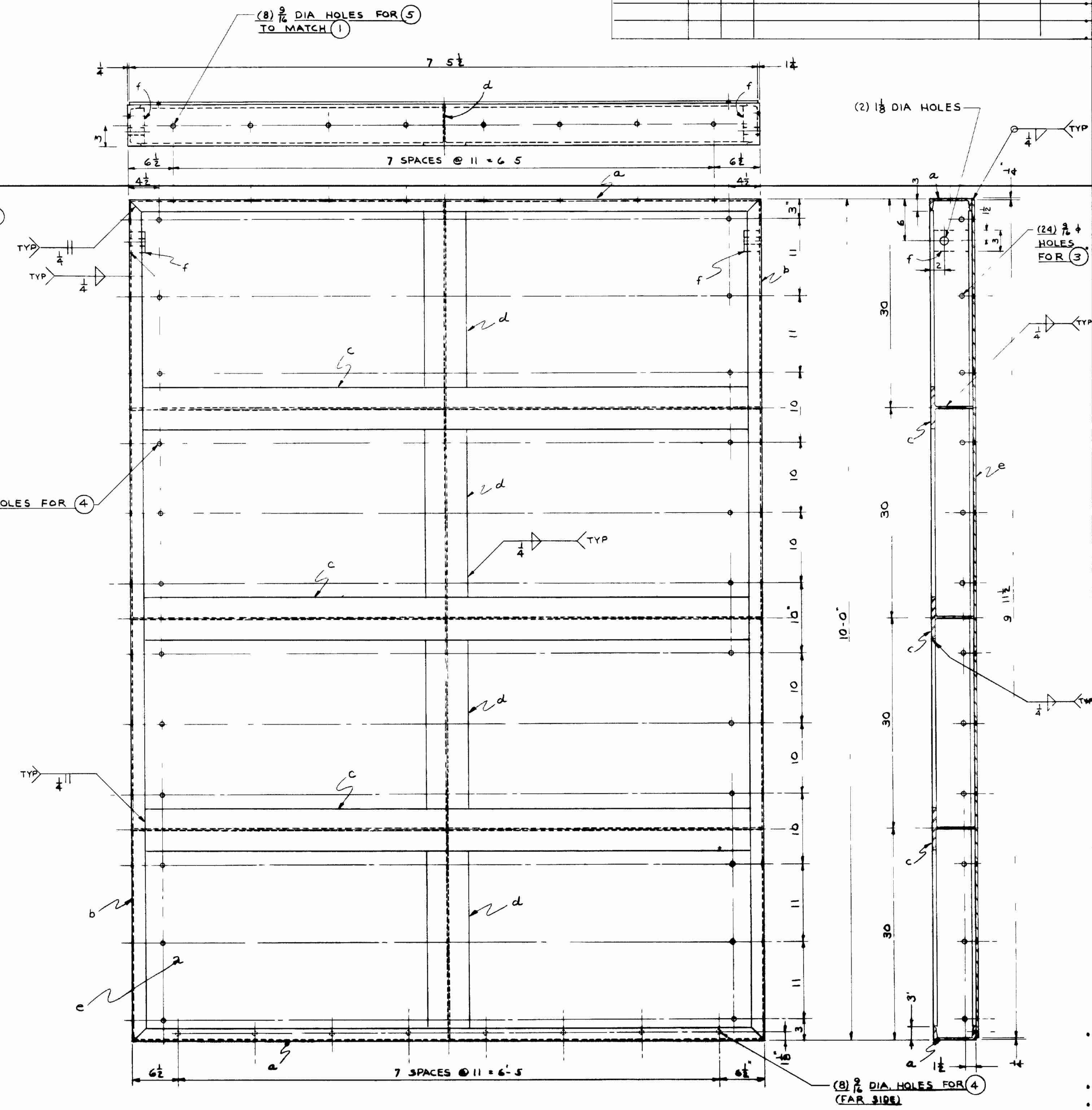
NOTE PAINT ALL OVER WITH ONE COAT OF PRIMER AND 2 COATS FINISH PAINT PER PARAGRAPH 3 10 OF SPEC # TR 10057 INTERMEDIATE AND FINISH COATS SHALL CONFORM TO AASHO SPEC M 70 58 TYPE I, CLASS C COLOR GRAY

BILL OF MATERIAL

SUPPLIER	ITEM	QTY	EACH ITEM CONSISTING OF		DESCRIPTION	MATERIAL	EST WT
REQ Nº 13042	(1)	1			UPPER SLUICE GATE	STEEL	
			a	2	6 ⊔ 15 1 × 7 6 LG OR 1/8" PLATE		
			b	2	6 ⊔ 8 2 × 10-0 LG		
			c	3	6 ST 15 5 × 7' 5 5/8 LG (12 WF 31 MAKES 2)		
			d	4	6 ST 15 5 × 29 5/8 LG (12 WF 31 MAKES 2)		
			e	1	PL 1/4 × 7 5 1/2 × 9-11 1/2 LG		
			f	1	PL 1/2 × 8 1/4 × 18 LG		
	(2)	1			LOWER SLUICE GATE		
			SAME AS ITEM (1) EXCEPT PC f				
			f	2	PL 2 × 3 × 5 LG		
	(3)	48	1/2 NC × 1 1/2 LG FLAT HD SOC CAP SCREW W/NUT & L W			COML	
	(4)	56	1/2 NC × 1 1/2 LG SOC HD CAP SCREW W/NUT & L W			COML	
	(5)	8	1/2 NC × 1 1/2 LG HEX HD BOLT W/NUT & L W			COML	



(1) UPPER SLUICE GATE



(2) LOWER SLUICE GATE

CK	BY	DATE	NO	REVISIONS	CK	BY	DATE	NO	REVISIONS

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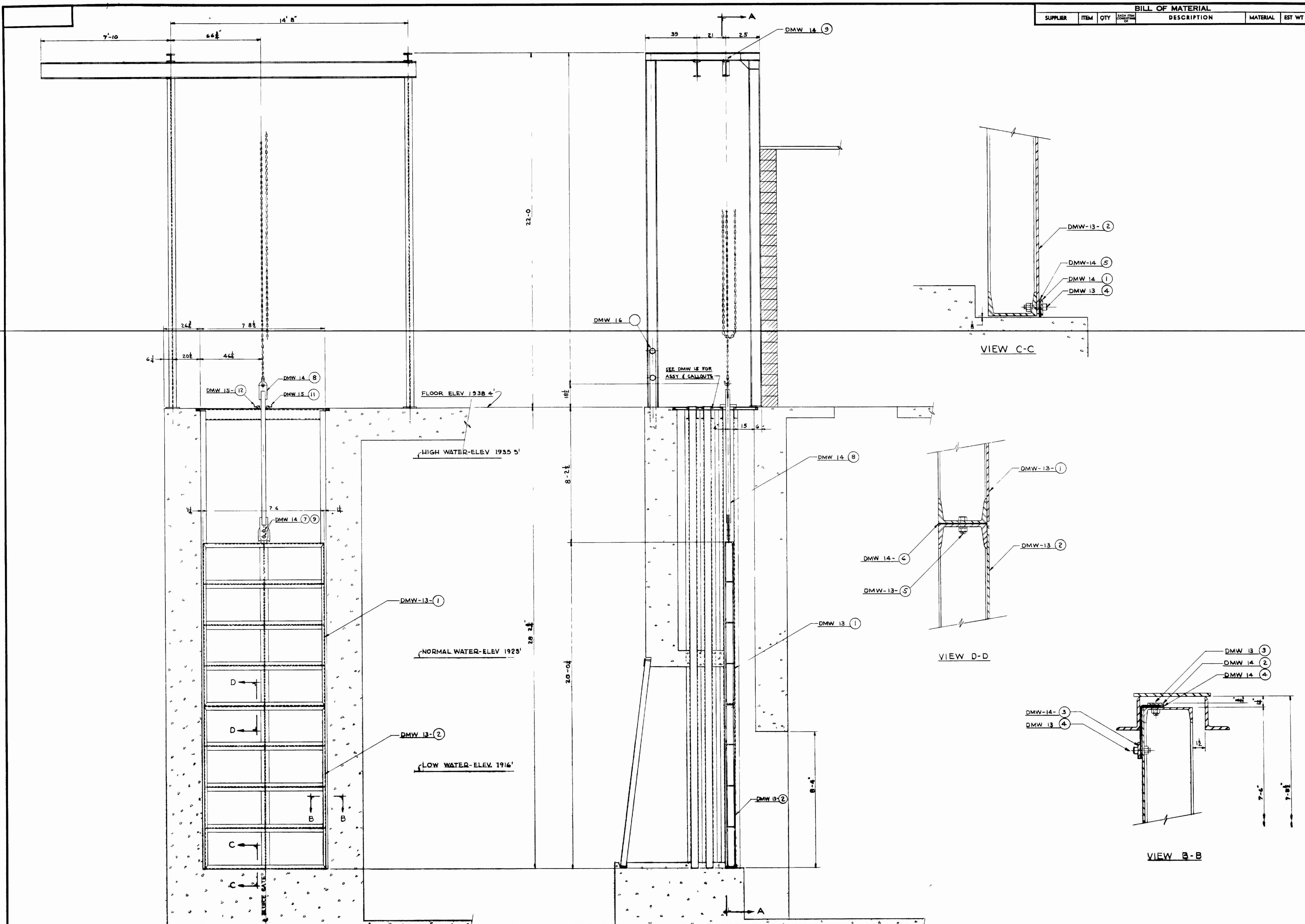
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES
WITHOUT SIGN: ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005"

KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION

TITLE RIVER PUMPHOUSE ADDITION
SLUICE GATE
DETAILS

USED ON DRAWING NO DMW 12-TW
TRENTWOOD WKS BLDG NO 2128
DRAWN BY HUNTER
TRACED BY
CHECKED BY [signature]
APPROVED DESIGN SUPERVISOR [signature]
APPROVED PLANT ENGINEER [signature]
DATE 6-7-67
SCALE 1 1/2 = 1 FT
DWG NO DMW-13-TW

4319



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USED ON DRAWING NO DMW- 6

CK	BY	DATE	NO	REVISIONS
	ERVS	21 JUL 77	△	ADDED HI, NORM, LO WATER ELEVS

MACHINING INSTRUCTIONS

MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN STANDARDS ASSOCIATION SPEC. NO B46-1
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES WITHOUT SIGN ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005"

KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION

TITLE RIVER PUMPHOUSE ADDITION
SLUICE GATE
ASSEMBLY

TRENTWOOD WKS BLDG NO. 2128

DRAWN BY HUNTER
TRACED BY
CHECKED BY
SCALE ½ & 3 = 1 FT
APPROVED DESIGN SUPERVISOR
APPROVED CHIEF DESIGN ENGINEER
DATE 5-1-67
DWG NO DMW- 12

6319

D-MW-9

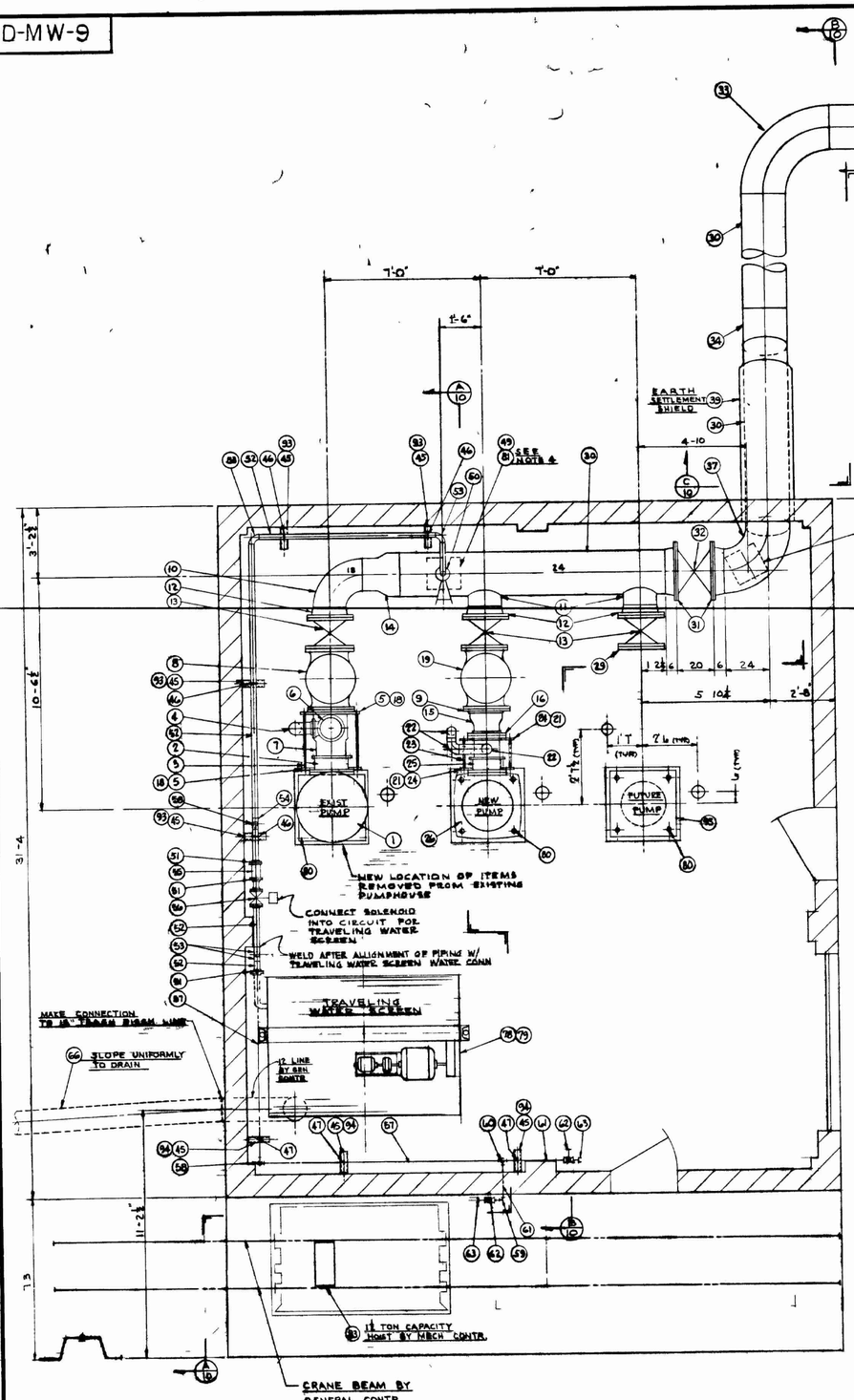
BILL OF MATERIAL					
SUPPLIER	ITEM	QTY	DESCRIPTION	MATERIAL	EST WT
FOR BILL OF MATERIAL, SEE DWG NO D MW-10					

NOTES

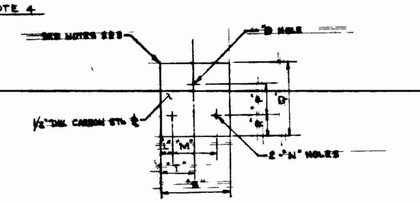
1. SLOPE ALL WATER LINES TO DRAIN EXCEPT PUMP DISCHARGE LINE
2. REMOVE ALL SHARP CORNERS & EDGES
3. PAINT AS DIRECTED BY FIELD ENGINEER.
4. LOCATE AND SET ANCHOR BOLTS (COORDINATE W/ SBH CONTR.)

REFERENCE DOCUMENTS

1. RIVER PUMPHOUSE		DWG NO. DPC-S-1288
2. RIVER PUMPHOUSE ADDITION - MECH. DETAILS		DWG. NO. D-MW-10
3. RIVER PUMPHOUSE ADDITION - STRUCTURAL		DWG NO. D-MW 5
4. RIVER PUMPHOUSE ADDITION - ELECTRICAL		DWG NO DE 7297W
5. PUMP SPECIFICATION		
6. TRAVELING WATER SCREEN	"LINK-BELT"	PROPOSAL NO. 69R-62713

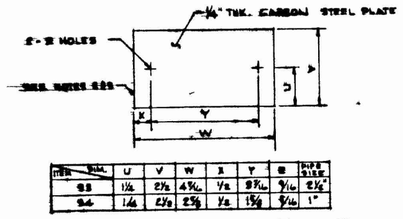


PLAN OF NEW PUMPHOUSE
SCALE: 1/8" = 1'-0"



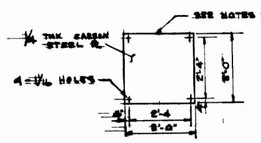
ITEM	DIM	L	M	N	O	P	Q	R	S	T	PIPE SIZE
5		1.250	4.440	1/4	1 9/16	2 1/2	5	1 1/8	7	3 1/2	18"
24		1.075	4.250	1/8	1 1/16	2 1/2	4 1/2	1 1/8	7	3 1/2	16"

DETAIL OF TIE ROD TAB (5) & (24)
SCALE NONE



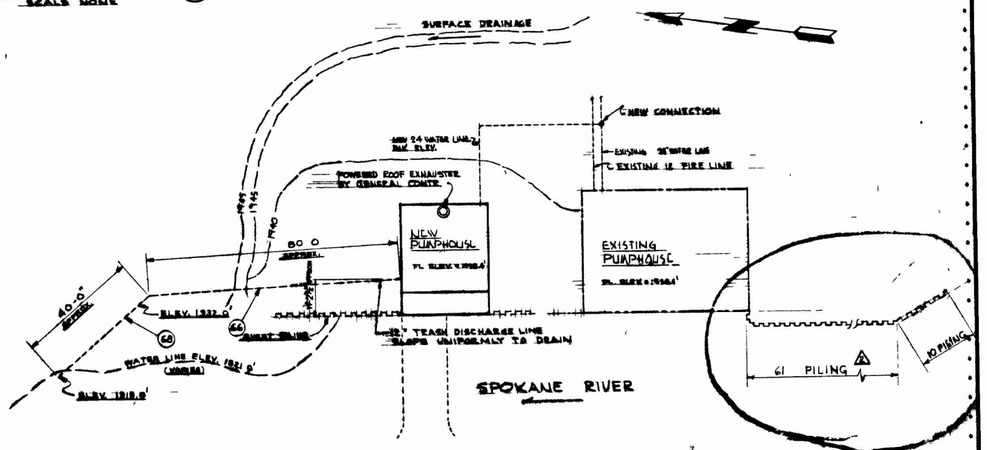
ITEM	DIM	U	V	W	X	Y	Q	PIPE SIZE
93		1 1/2	2 1/2	4 5/16	1/2	8 5/16	9/16	2 1/2"
94		1 1/16	2 1/8	2 5/8	1/2	1 5/8	9/16	1"

DETAIL OF PLATE (93) & (94)
SCALE NONE

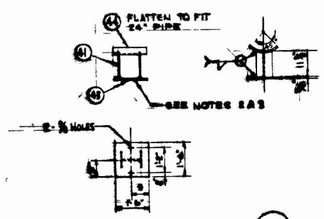


DETAIL OF COVER (95)
SCALE NONE

PARTIAL PLAN OF EXISTING PUMPHOUSE
SCALE: 1/8" = 1'-0"
REF DWG NO DPC-S-1288



PLOT PLAN



DETAIL OF SUPPORT (81)
SCALE 1/8" = 1'-0"

STANLEY N. HOLM REGISTERED PROFESSIONAL ENGINEER

BY	CK	DATE	NO	REVISIONS
JH	REI	8 10 67	1	GENERAL REVISION
TS	MB	3 10 70	2	ADDED 71 PILING

CK	BY	DATE	NO	REVISIONS

MACHINING INSTRUCTIONS

MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN STANDARDS ASSOCIATION SPEC. NO. B46-1
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES WITHOUT SBH ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005"

KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION

TITLE: RIVER PUMPHOUSE ADDITION
MECHANICAL DETAILS
PLAN OF NEW & EXISTING PUMPHOUSE

USED ON DRAWING NO

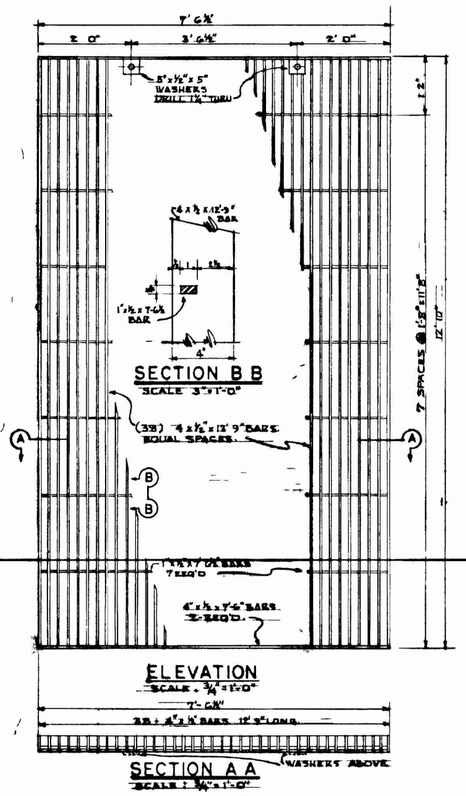
TRENTWOOD WKS BLDG NO.

DRAWN BY: [illegible]
TRACED BY:
CHECKED BY: [illegible] DATE
SCALE AS NOTED = 1 FT

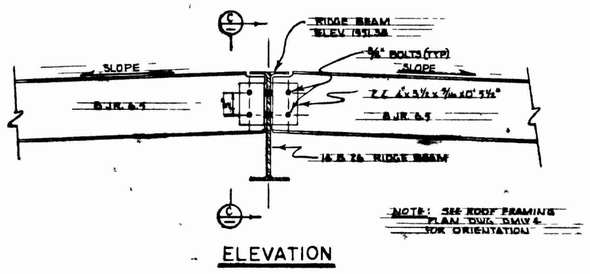
APPROVED DESIGN SUPERVISOR
APPROVED CHIEF DESIGN ENGINEER

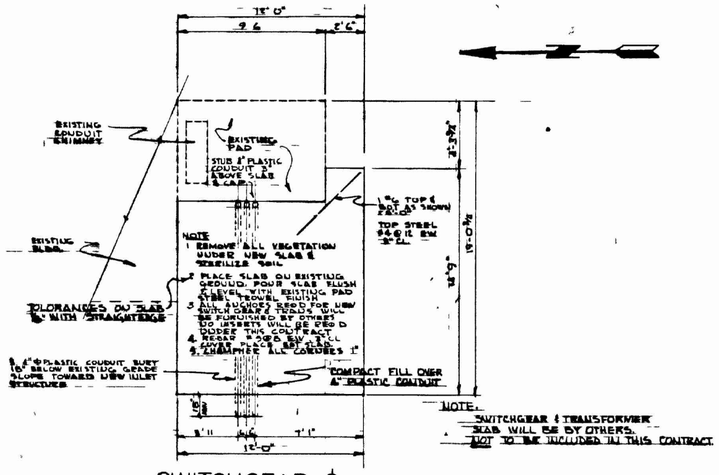
DWG NO D-MW-9

BILL OF MATERIAL					
SUPPLIER	ITEM	QTY	DESCRIPTION	MATERIAL	EST WT

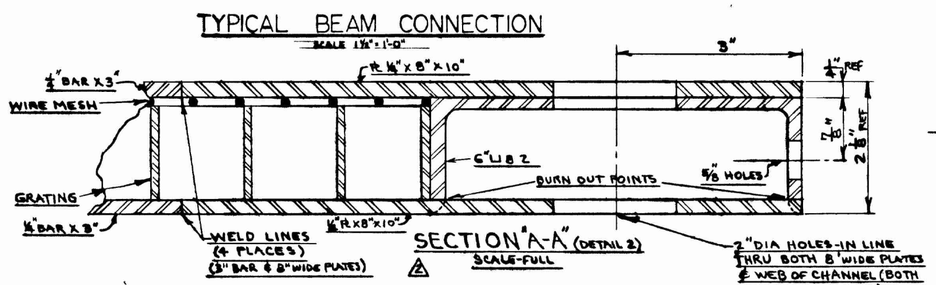


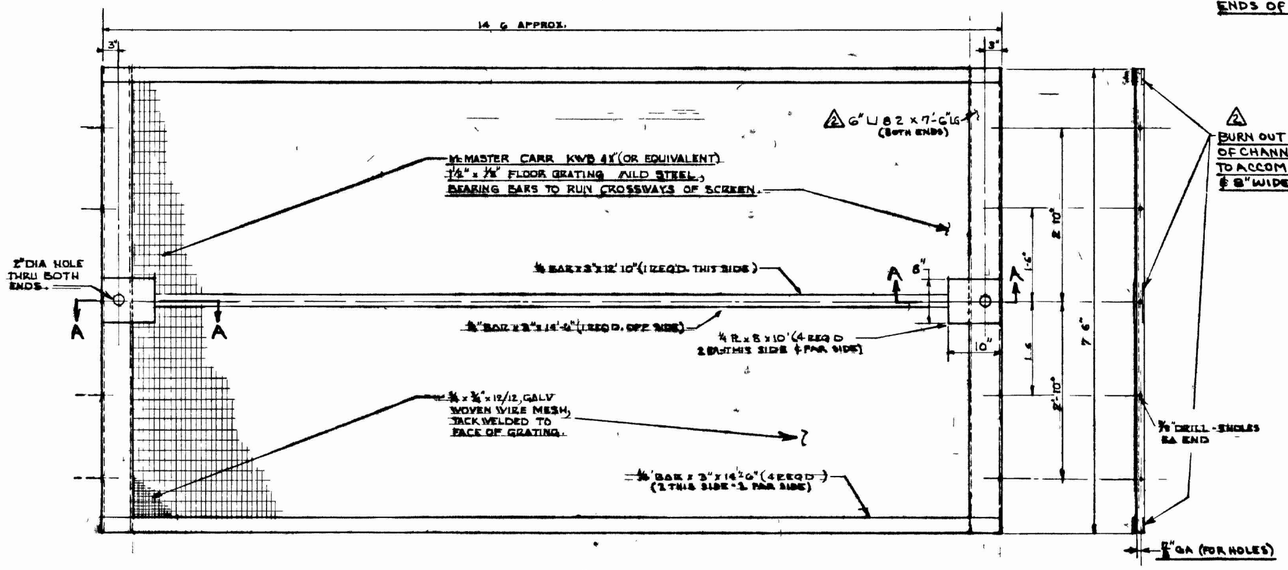
DETAIL-1
TRASH RACK



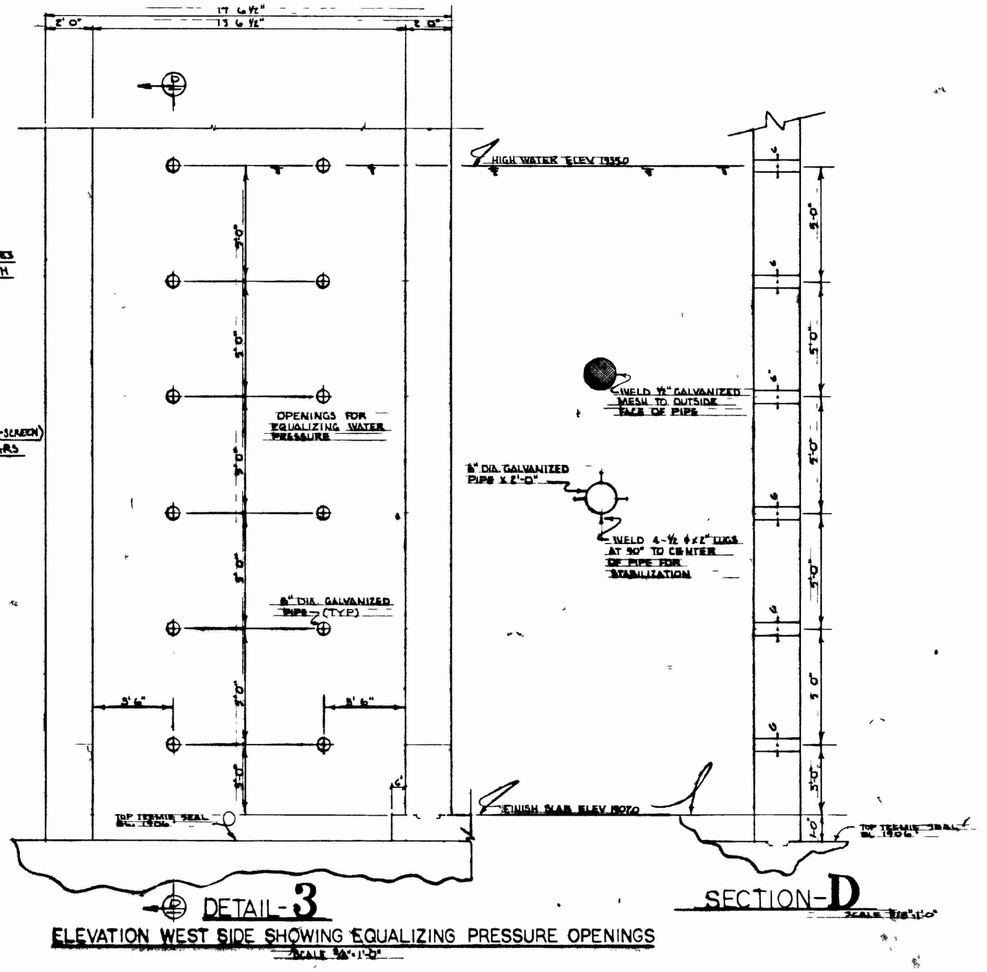


SWITCHGEAR & TRANSFORMER SLAB
SCALE ½"=1'-0"





DETAIL-2
STATIONARY SCREEN
4 REQ'D
SCALE 1"=1'-0"



DETAIL-3
ELEVATION WEST SIDE SHOWING EQUALIZING PRESSURE OPENINGS
SCALE ⅜"=1'-0"

SECTION-D
SCALE ⅜"=1'-0"

BY	CK	DATE	NO	REVISIONS

CK	BY	DATE	NO	REVISIONS
	RDT	11/11/96	1	STATIONARY SCREEN REVISED PER ADDENDUM NO 1
SP		2/10/98	2	ALTERED DETAIL 2 & ADDED NOTES & SECTION A-A

MACHINING INSTRUCTIONS

MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN STANDARDS ASSOCIATION SPEC. NO B46-1
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES WITHOUT SHOW. ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64"
DECIMAL DIMENSIONS ± .005

KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION

TITLE: RIVER PUMPHOUSE ADDITION
SCREENS & MISCELLANEOUS
DETAILS
STRUCTURAL (NEW PUMPHOUSE)

USED ON DRAWING NO

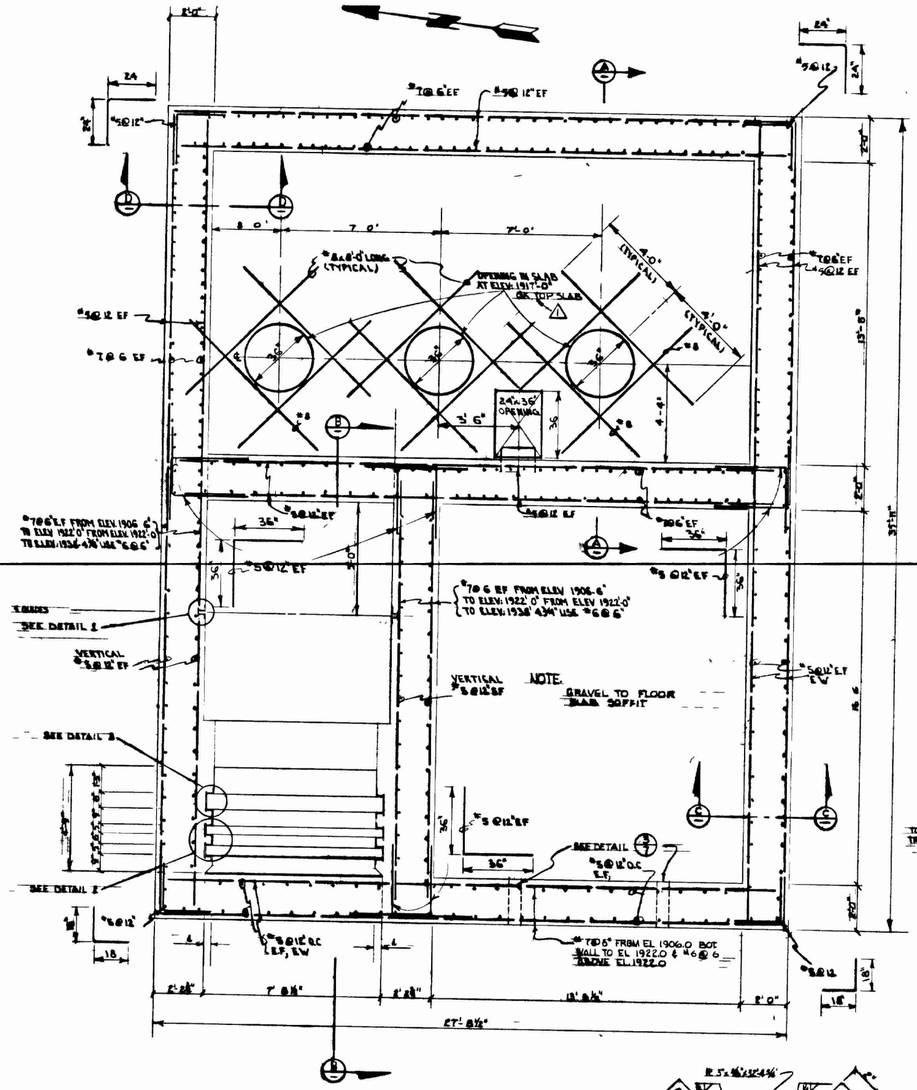
TRENTWOOD WKS BLDG NO. 2128A

DRAWN BY G-W-G
TRACED BY G-W-G
CHECKED BY RKE
SCALE = 1 FT

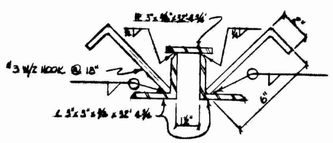
APPROVED DESIGN SUPERVISOR: J. Burgess
APPROVED CHIEF DESIGN ENGINEER:
DATE APPROVED 2-10-98

DWG NO D MW-7-TW

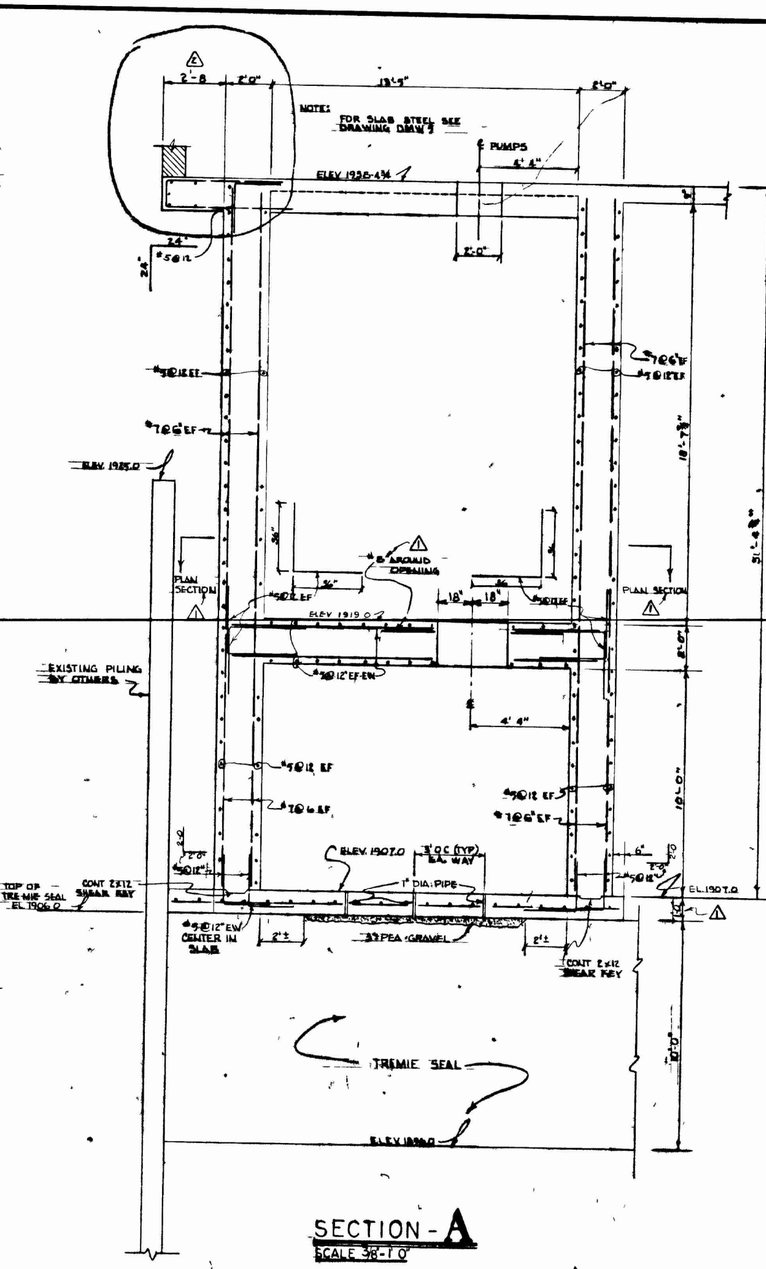
BILL OF MATERIAL					
SUPPLIER	ITEM	QTY	DESCRIPTION	MATERIAL	EST WT



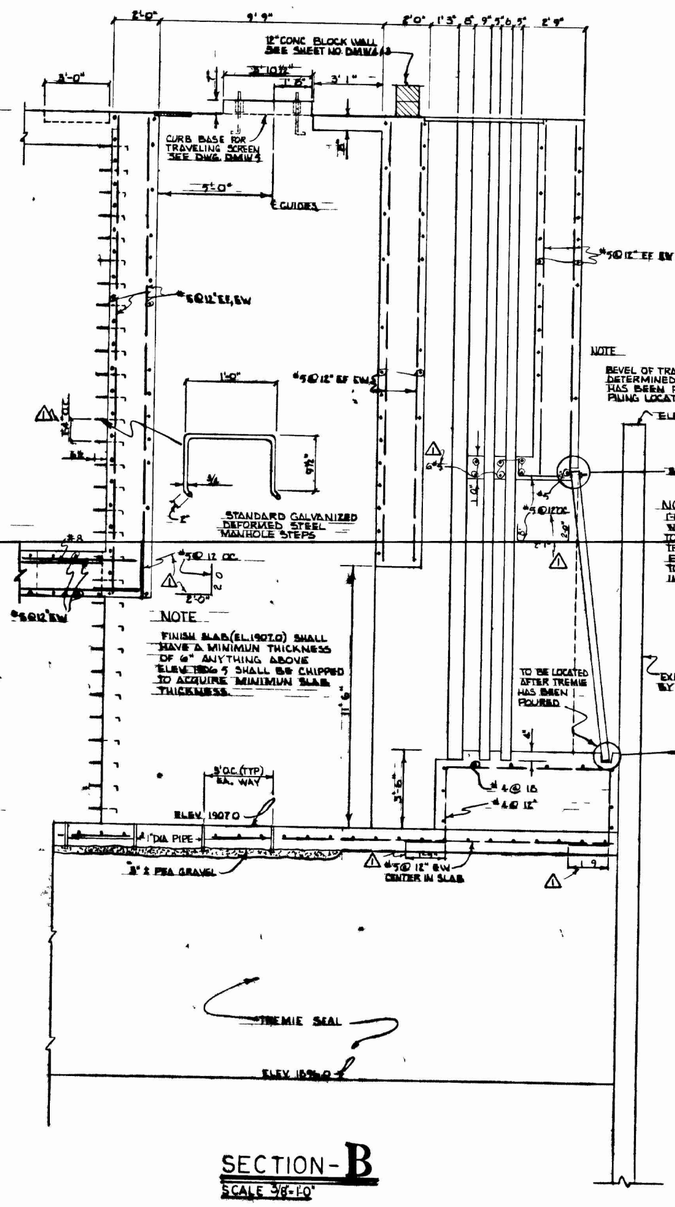
PLAN SECTION
SCALE 3/8"-1'0"



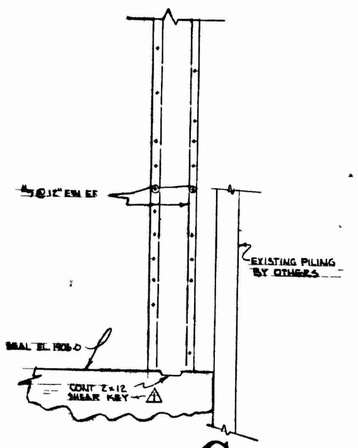
DETAIL - 1
SCALE 3" 1'0"



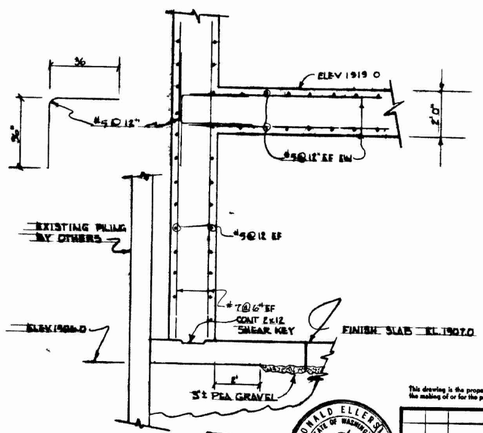
SECTION - A
SCALE 3/8"-1'0"



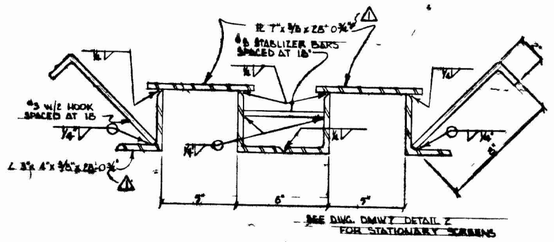
SECTION - B
SCALE 3/8"-1'0"



SECTION - C
SCALE 3/8"-1'0"

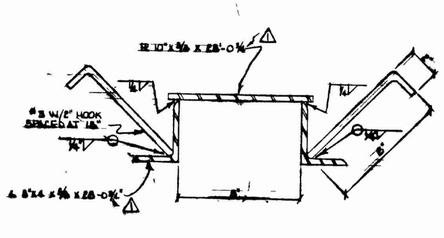


SECTION - D
SCALE 3/8"-1'0"

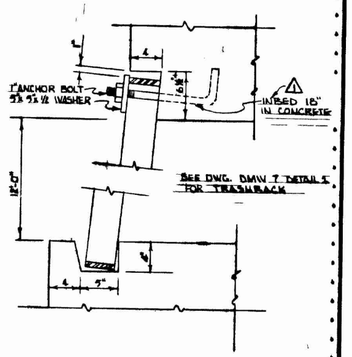


DETAIL - 2
SCALE 3"-1'-0"

NOTE
DATE GUIDES SHALL BE CUT TO PROJECT 3" ABOVE EACH LIFT AND SPLICED AT THESE POINTS



DETAIL - 3
SCALE 3"-1'-0"



DETAIL - 4
SCALE 1½"-1'-0"

BY	CK	DATE	NO	REVISIONS

CK	BY	DATE	NO	REVISIONS
DKE	RDT	11/11/66	1	MINOR REVISIONS ONLY
DKE	BH	8/1/67	2	ADDED 2'8 CANTILEVER

MACHINING INSTRUCTIONS

MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN STANDARDS ASSOCIATION SPEC. NO 946-1
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES
WITHOUT SIGN ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005"

KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION

TITLE RIVER PUMPHOUSE ADDITION
INLET STRUCTURE
PLAN & SECTION
STRUCTURAL

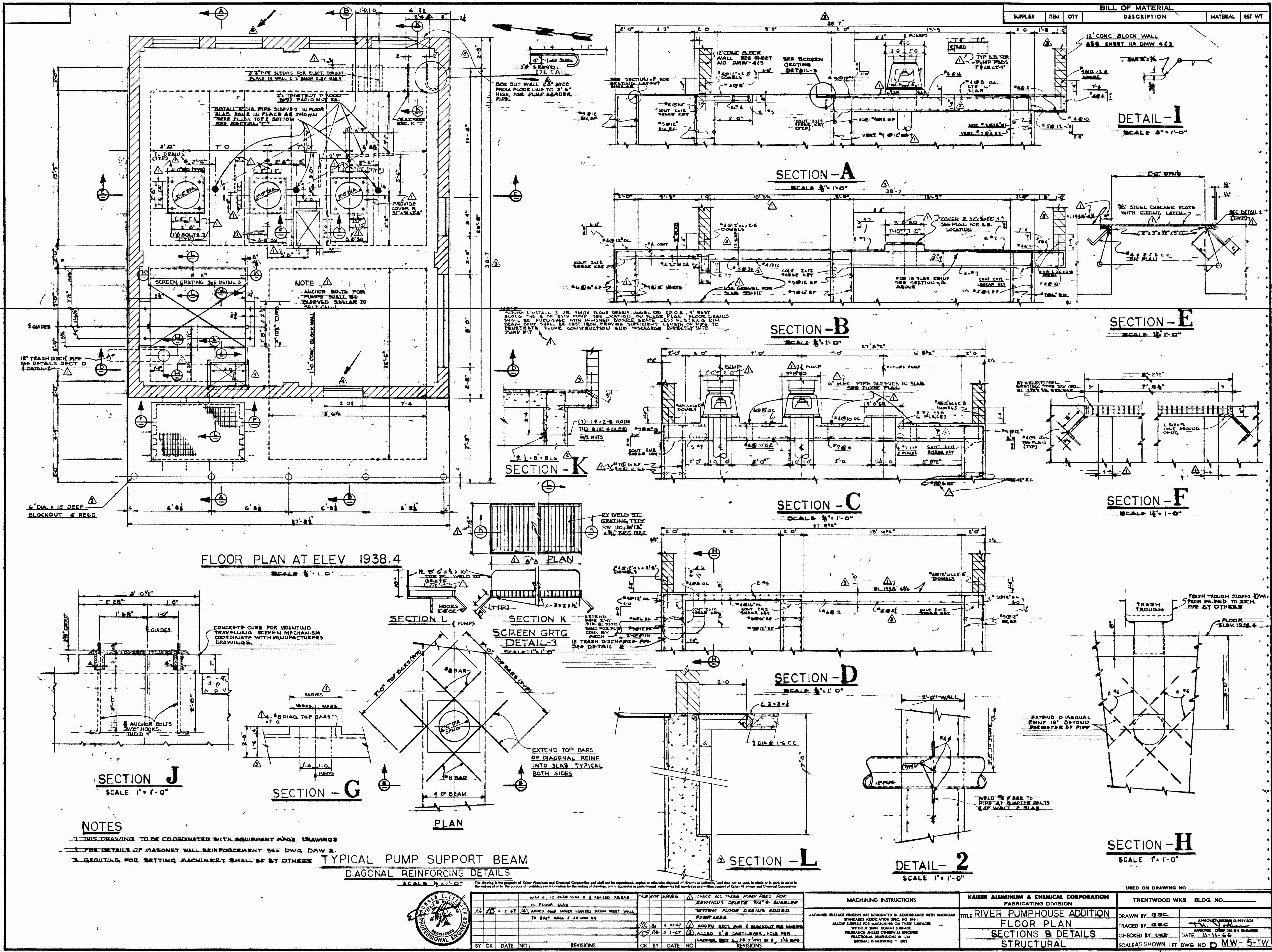
USED ON DRAWING NO _____

TRENTWOOD WKS BLDG NO _____

DRAWN BY GSC.
TRACED BY GSC
CHECKED BY DKE
SCALE AS SHOWN — 1 FT

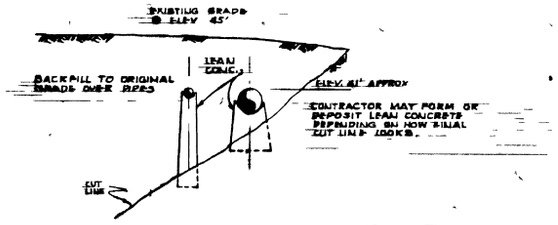
APPROVED DESIGN SUPERVISOR
APPROVED CHIEF DESIGN ENGINEER
DATE 11-11-66

DWG NO D MW 6-TW

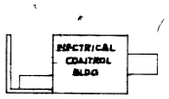


BILL OF MATERIAL
SUPPLIER | ITEM | QTY | DESCRIPTION | MATERIAL | EST WT
SECTION - A
SECTION - B
SECTION - C
SECTION - D
SECTION - E
SECTION - F
SECTION - H
SECTION - K
SECTION - L
SECTION J
SCALE 1" = 1'-0"
SECTION - G
DETAIL - 1
DETAIL - 2
SCALE 1" = 1'-0"
FLOOR PLAN AT ELEV 1938.4
SCREEN GRTG DETAIL-3
PLAN
TYPICAL PUMP SUPPORT BEAM
DIAGONAL REINFORCING DETAILS
SCALE ½ = 1'-0"
NOTES
1 THIS DRAWING TO BE COORDINATED WITH EQUIPMENT APG'S, DRAWINGS
2 FOR DETAILS OF MASONRY WALL REINFORCEMENT SEE DWG DAW 3
3 GROUTING FOR SETTING MACHINERY SHALL BE BY OTHERS
This drawing is the property of Kaiser Aluminum and Chemical Corporation and shall not be reproduced, copied or otherwise disposed of directly or indirectly and shall not be used, in whole or in part, to assist in the making of or fo the purpose of furnishing any information for the making of drawings, prints apparatus or parts thereof without the full knowledge and written consent of Kaiser Al minum and Chemical Corporation
WAS 6, 12 SLAB WAS 8 & REVISED REBAR IN FLOOR SLAB
4 5 67 4 ADDED DOOR MOVED LOUVERS FROM WEST WALL TO EAST WALL & 28 WAS 24
CHECK ALL THREE PUMP PADS FOR REVISIONS DELETE 3/4" ⌀ BUBBLER SYSTEM FLOOR DRAINS ADDED PUMP AREA
4 10-67 2 ADDED SECT. K-K & BLACKOUT FOR HANDRAIL
5 1-67 3 ADDED 2' 8 CANTILEVER, HOLE FOR LADDER, SECT L
BY CK DATE NO REVISIONS
MACHINING INSTRUCTIONS
MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN STANDARDS ASSOCIATION SPEC. NO B46-1
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES WITHOUT SIGN ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .0025
KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION
TITLE RIVER PUMPHOUSE ADDITION
FLOOR PLAN
SECTIONS & DETAILS
STRUCTURAL
TRENTWOOD WKS BLDG. NO.
USED ON DRAWING NO
DRAWN BY GSC
TRACED BY GSC
CHECKED BY DKE
SCALE AS SHOWN
APPROVED DESIGN SUPERVISOR
APPROVED CHIEF DESIGN ENGINEER
DATE 11-11-66
DWG NO D MW-5-TW
DONALD ELLERBICK
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER

BILL OF MATERIAL					
SUPPLIER	ITEM	QTY	DESCRIPTION	MATERIAL	EST WT

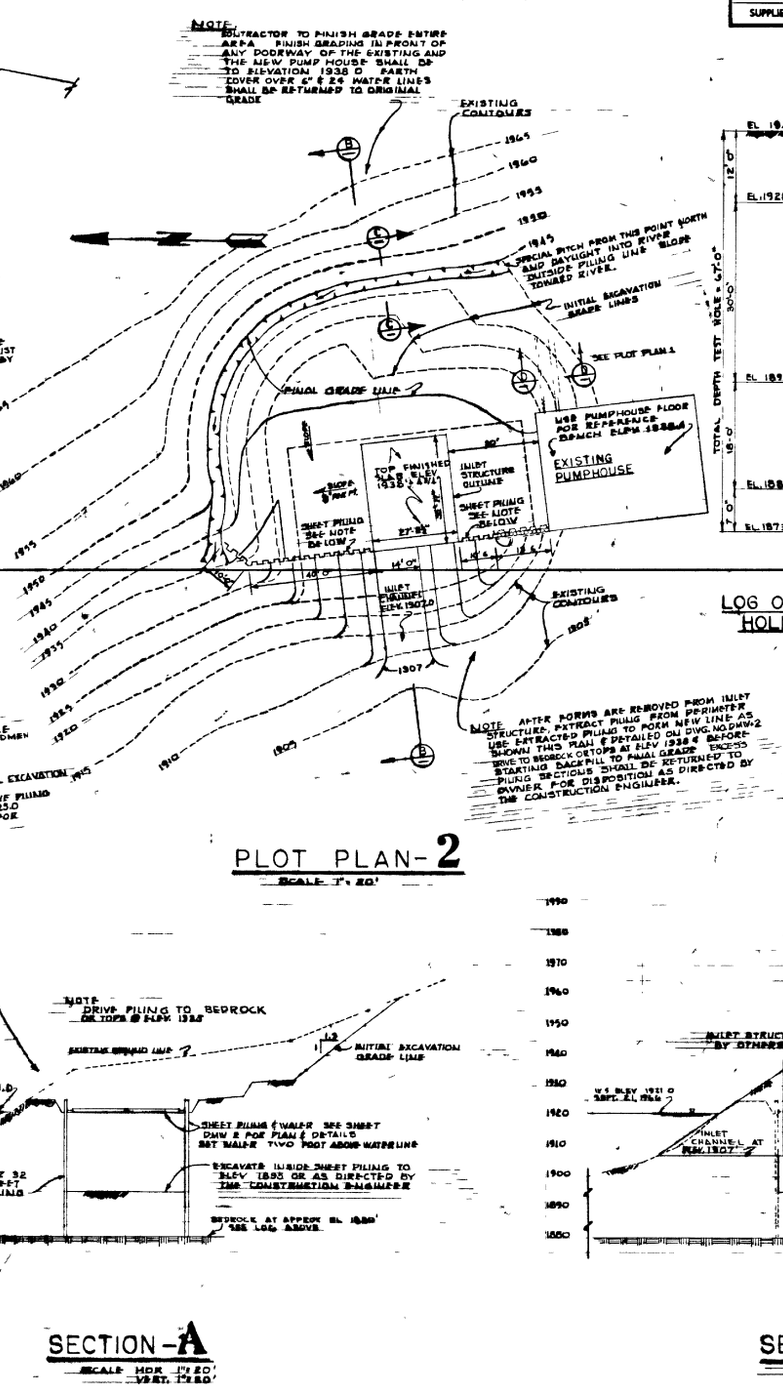


SECTION - D
NO SCALE

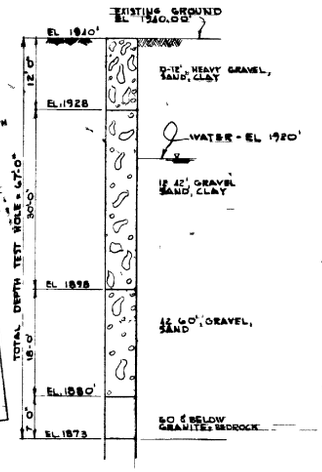


SECTION - C
DITCH DETAIL
NO SCALE

PLOT PLAN - 1
SCALE 1" = 20'

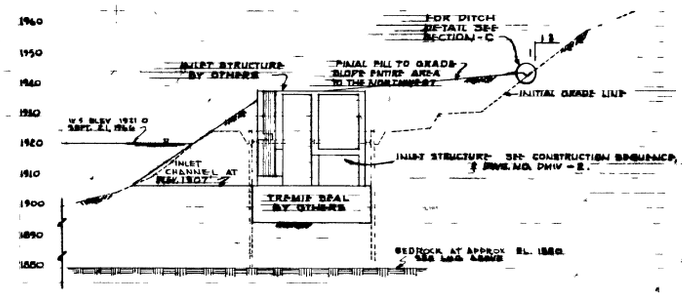


PLOT PLAN - 2
SCALE 1" = 20'



LOG OF TEST HOLE A-1

SECTION - A
SCALE HOR 1" = 20'
VERT. 1" = 20'



SECTION - B
SCALE HOR 1" = 20'
VERT. 1" = 20'

CONSTRUCTION SEQUENCE

1. INITIAL EXCAVATION AS SHOWN BY PLOT PLAN 1 AND SECTION A ON DRAWING DMW 1 IN ITS EXCAVATING AROUND EAST SIDE OF EXISTING PUMPHOUSE CARE MUST BE TAKEN TO PREVENT DISTURBING OR DAMAGING 24 INCH WATER TRANSMISSION LINE AND 6 INCH WATER LINE AT INDICATED ELEVATION 1941 PIPE MUST BE PROPERLY SUPPORTED DURING ALL PHASES OF EXCAVATION IF THE ABOVE MENTIONED WATER LINES ARE UNDERMINED, LEAN CONCRETE SHALL BE USED FOR BACKFILL TO SUPPORT SAID PIPELINES, AS SHOWN BY SECTION-D ABOVE
2. FABRICATE WALER AS PER TEMPLATE AND DETAILS ON DRAWING DMW 2 USING WALER AS GUIDE, DRIVE SHEET PILING AROUND PERIMETER OF INLET STRUCTURE AREA AS SHOWN ON DRAWING AND SPECIFICATIONS PILING SHALL BE DRIVEN TO BEDROCK OR TOPS OF PILING AT ELEVATION 1925 0
3. EXCAVATION OF INLET STRUCTURE WITHIN SHEET PILING PERIMETER TO ELEVATION 1895 FEET, OR AS DIRECTED BY CONSTRUCTION ENGINEER WALER TO REMAIN IN PLACE DURING EXCAVATION AND INITIAL POURS OF INLET STRUCTURE BASE SLAB AND WALLS BASE SLAB AND WALLS WILL BE BY OTHERS
4. DREDGING OF CHANNEL TO INLET OPENING OF STRUCTURE ACCORDING TO PLOT PLAN-2 THIS DRAWING
5. AFTER THE INLET STRUCTURE WALLS HAVE BEEN POURED ABOVE WATER LINE THE SHEET PILINGS AROUND PERIMETER OF STRUCTURE SHALL BE EXTRACTED AND DRIVEN ON NEW LINE TO THE NORTH AND SOUTH OF STRUCTURE AS SHOWN ON DRAWING DMW 1, PLOT PLAN 2, AND DETAILED ON DRAWING DMW 2 DRIVE PILINGS TO ROCK OR TOPS AT ELEVATION 1938 4 FEET BEFORE START OF BACKFILL
6. BACKFILL TO FINAL GRADE AS SHOWN ON PLOT PLAN 2 AND SECTION B, THIS SHEET MATERIAL REMOVED DURING EXCAVATION MAY BE USED FOR BACKFILL STORAGE AREA FOR BACKFILL MATERIAL SHALL BE LOCATED IN THE VICINITY OF THE ELECTRICAL CONTROL HOUSE EAST OF THE EXISTING PUMPHOUSE EXCESS MATERIAL SHALL BE WASTED APPROXIMATELY ONE HALF MILE EAST OF THE EXISTING PUMPHOUSE AT THE RACE DAMP.

DONALD ELLIS REGISTERED PROFESSIONAL ENGINEER

BY	CK	DATE	NO	REVISIONS	CK	BY	DATE	NO	REVISIONS

MACHINING INSTRUCTIONS

MACHINED SURFACE FINISHES ARE DESIGNATED IN ACCORDANCE WITH AMERICAN STANDARDS ASSOCIATION SPEC. NO 246-1
ALLOW SURPLUS FOR MACHINING ON THESE SURFACES WITHOUT SIGN: ROUGH SURFACE.
TOLERANCE UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005

USED ON DRAWING NO

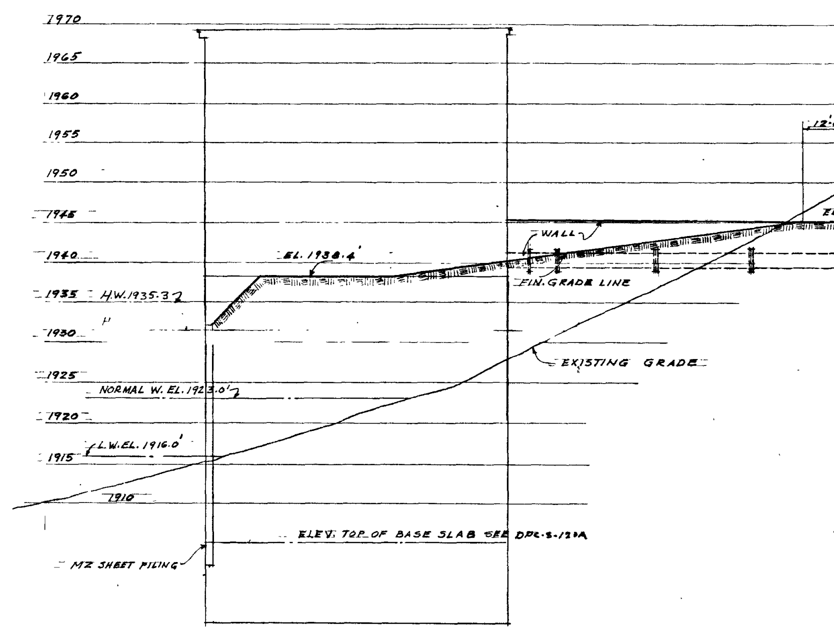
KAISER ALUMINUM & CHEMICAL CORPORATION
FABRICATING DIVISION
TRENTWOOD WKS BLDG NO

TITLE RIVER PUMPHOUSE ADDITION
PLOT PLAN SECTIONS AND CONSTRUCTION SEQUENCE
INLET STRUCTURE

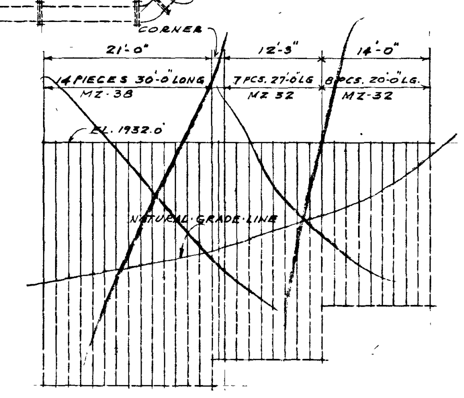
DRAWN BY DKE
TRACED BY GSC
CHECKED BY [illegible] DATE 11-11-66
SCALE AS NOTED = 1 FT
APPROVED DESIGN SUPERVISOR
APPROVED CHIEF DESIGN ENGINEER
DWG NO D MW-1 TW

TOTAL AMOUNT OF SHEET PILING REQ'D		
NO. OF PIECES	LENGTH	TYPE
14	36'-0"	MZ-38
9	32'-0"	MZ-38
14	30'-0"	MZ-38
14	27'-0"	MZ-32
6	24'-0"	MZ-32
8	20'-0"	MZ-32
7	18'-0"	MZ-32
1 CORNER	32'-0"	
1 CORNER	27'-0"	

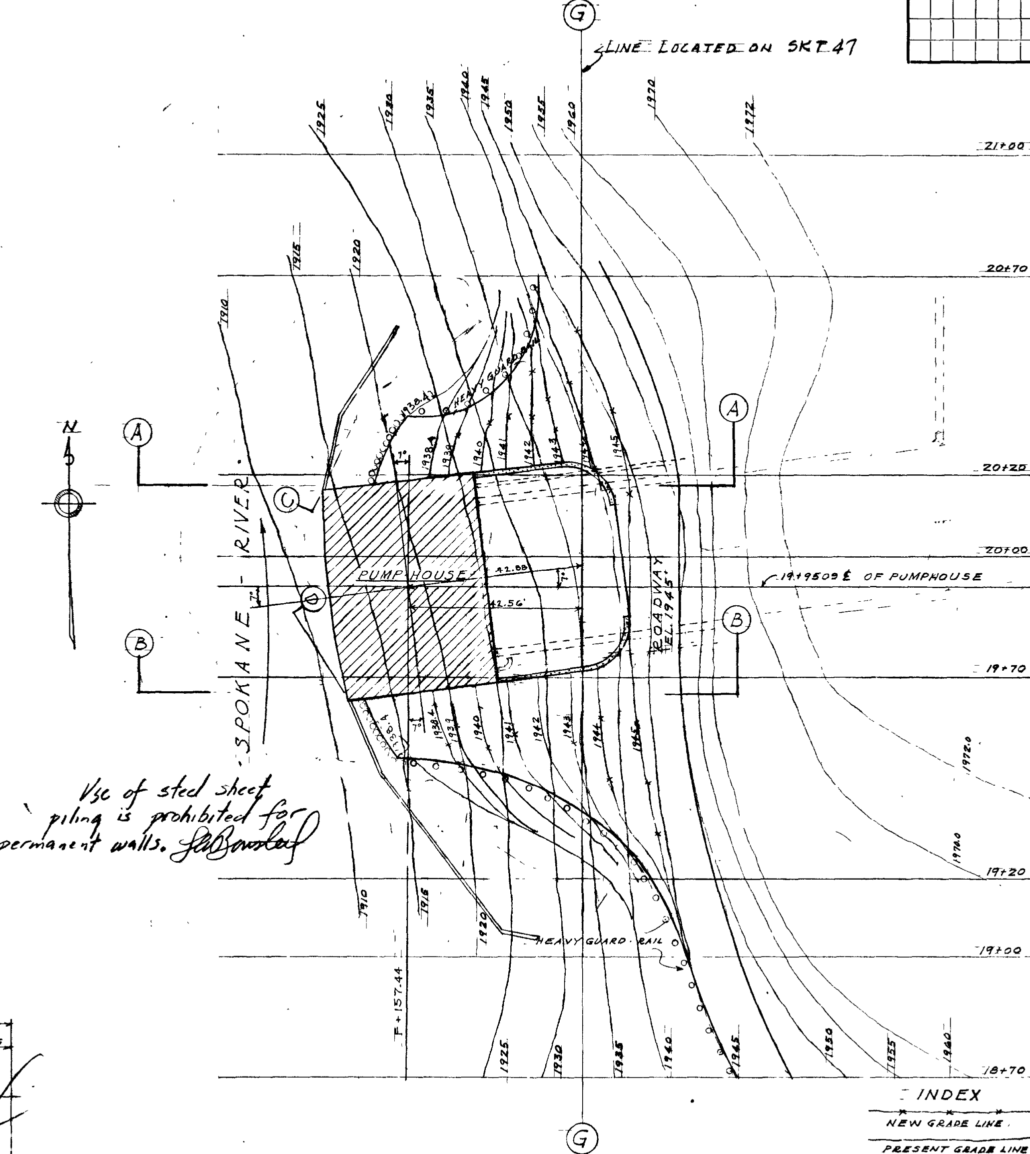
Void



PROFILE ON LINE "A-A"
SCALE 1" = 10'-0"

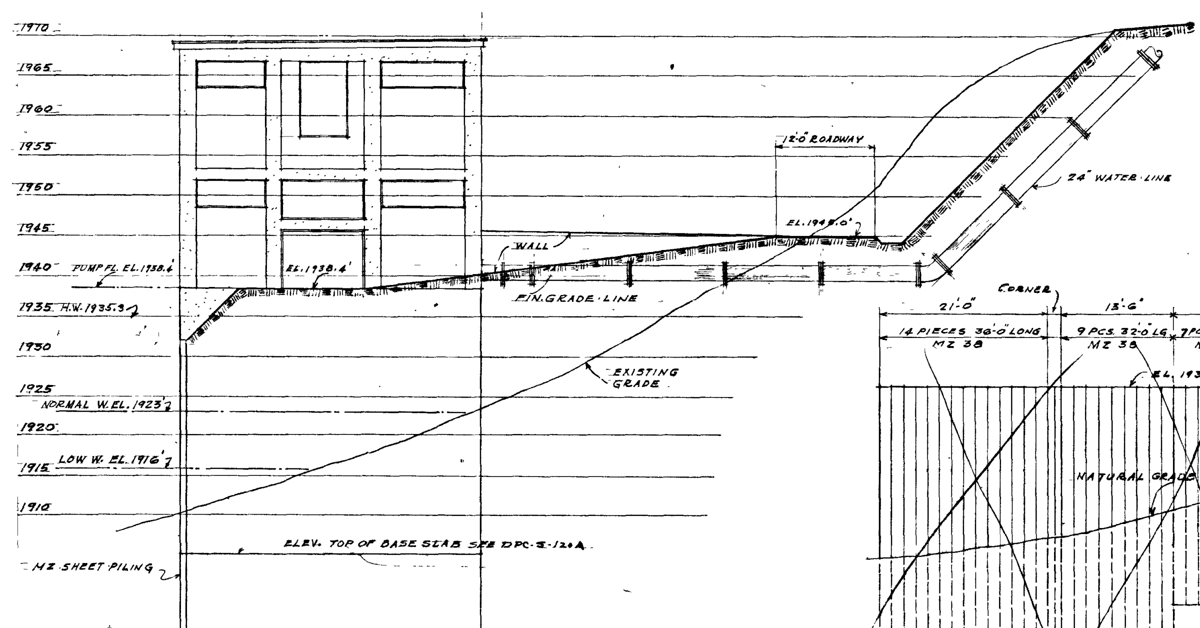


SHEET PILING ELEVATION
ON LINE "C-C"
SCALE 1" = 10'-0"

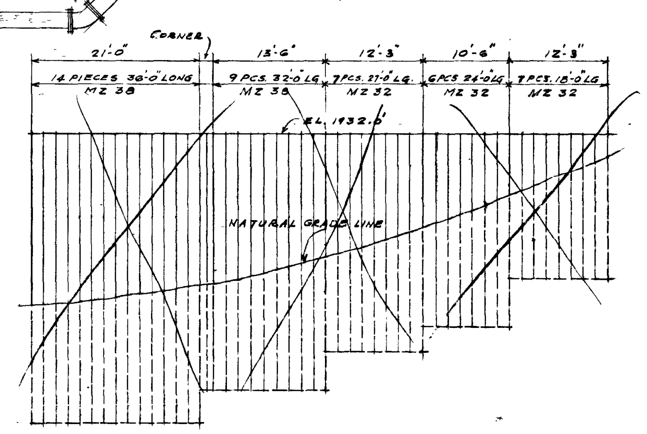


CONTOUR PLAN
SCALE 1" = 20'-0"

Use of steel sheet piling is prohibited for permanent walls.



PROFILE ON LINE "B-B"
SCALE 1" = 10'-0"



SHEET PILING ELEVATION
ON LINE "D-D"
SCALE 1" = 10'-0"

REVISIONS	
1	Relocate Pump House 10/12/42 FCH
2	AS CONST. 10-23-42 FCH
3	
4	
5	
6	
7	
8	
9	
10	

ALUMINUM MILL - TRENTWOOD PLANT
20,000,000 # CAPACITY
PUMP HOUSE - CONTOUR PLAN, SHEET PILING, NEW ROADWAY & SECTIONS

UNITED ENGINEERING AND FOUNDRY CO.
PITTSBURGH, PA.

SCALE As Noted
DATE 8-18-42
PETERS & LOFTUS
DR. BUTLER SCHRAMM
CH. M.L.
APP. R.H.K.

Approved 8/25 1942
Robert R. Horne
SUPERVISING ENGINEER
DEFENSE PLANT CORPORATION

DPC-S-117A

CHARLES BRUNING CO. MAT-SURF PENCIL CLOTH U. E. & F. CO. FORM 307-B G51741 800-6-42

SEP 30 1997

37

APPENDIX B
Water Rights Records

CERTIFICATE OF CHANGE OF PURPOSE AND PLACE OF USE OF WATER

In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and rules thereunder of the State Supervisor of Division of Water Resources.

THIS IS TO CERTIFY that the Kaiser Aluminum and Chemical Corporation of Spokane, Washington, has complied with all of the requirements of section 90.28.090 Revised Code of Washington, and is hereby granted a permit to change the place and purpose of use of a portion of the waters of the Spokane River as granted in Certificates No.1980 and 1986; that such water is being used for the purpose of industrial and manufacturing uses on the following described lands:

NW¼ sec.11,T.25N.,R.44 E.W.M., and SW¼ sec.2,T.25N.,R.44 E.W.M.,

That the use of a portion of said waters has been changed to include standby fire protection (pursuant to a license agreement) on the following described land;

> The west 665 feet of the E½NE¼ sec.11,T.25N.,R.44 E.W.M., lying north of the north line of the Spokane International Railway right-of-way.,

all in Spokane County, Washington.

WITNESS THE SEAL and SIGNATURE of the Supervisor of the Division of Water Resources of the State of Washington, affixed this 28th day of September 1956.

W. G. WALKER, Supervisor
DIVISION OF WATER RESOURCES

RECORDED:
Vol. 1, Page 480 of
Records of Change of
Purpose and Place of
Use of Water.

ENGINEERING DATA
O.K.

Washington State

DANIEL J. EVANS, GOVERNOR

H. MAURICE ANLQUIST, DIRECTOR

DEPARTMENT OF WATER RESOURCES

December 26, 1968

335 GENERAL ADMINISTRATION BUILDING
OLYMPIA, 98501

PHONE 753-6160
AREA CODE 206

Keith, Winston and Repsold
Attorneys at Law
Spokane and Eastern Building
Spokane, Washington 99201

Attention Mr. Pat Winston

Gentlemen:

Pursuant to our telephone conversation last week relative to rights to ground water held by the Kaiser Aluminum and Chemical Corporation for their Mead plant, please be advised that we are enclosing herewith, copies of certificates of ground water Nos. 1032-D, 1033-D, 1034-D, 928-A, 2321-A, and 5928-A. Included also is a plat indicating the description of the lands to which the rights are appurtenant as outlined in red, together with locations of the six wells of which we have record.

Inasmuch as all six filings have been perfected to the point of issuance of a certificate, no extension fees or annual billings are required to maintain these files in active status.

As I recall our previous discussions with respect to the well covered by certificate No. 5928-A, the permit for this particular structure authorized a withdrawal of 5000 gpm. As of that time, the pump capacity for this particular structure was 2500 gpm. We understood further that at some future date, an additional 2500 gpm would be required from this well; however, increasing the withdrawal from this particular structure would result in a discontinuance of pumping from one of the earlier wells. It was our considered opinion as of that date that the company should proceed to obtain a certificate of water right for the existing 2500 gpm withdrawal from well No. 6, and at such time as the additional withdrawal was scheduled and one of the earlier wells abandoned, that a petition for change in point of withdrawal for the old well could be made, thus transferring the withdrawal rate and the date of priority to well No. 6.

If you have further questions or desire additional clarification of the water rights for the Kaiser Corporation, please feel free to call upon us at your convenience.

Very truly yours,

Fred D. Hahn

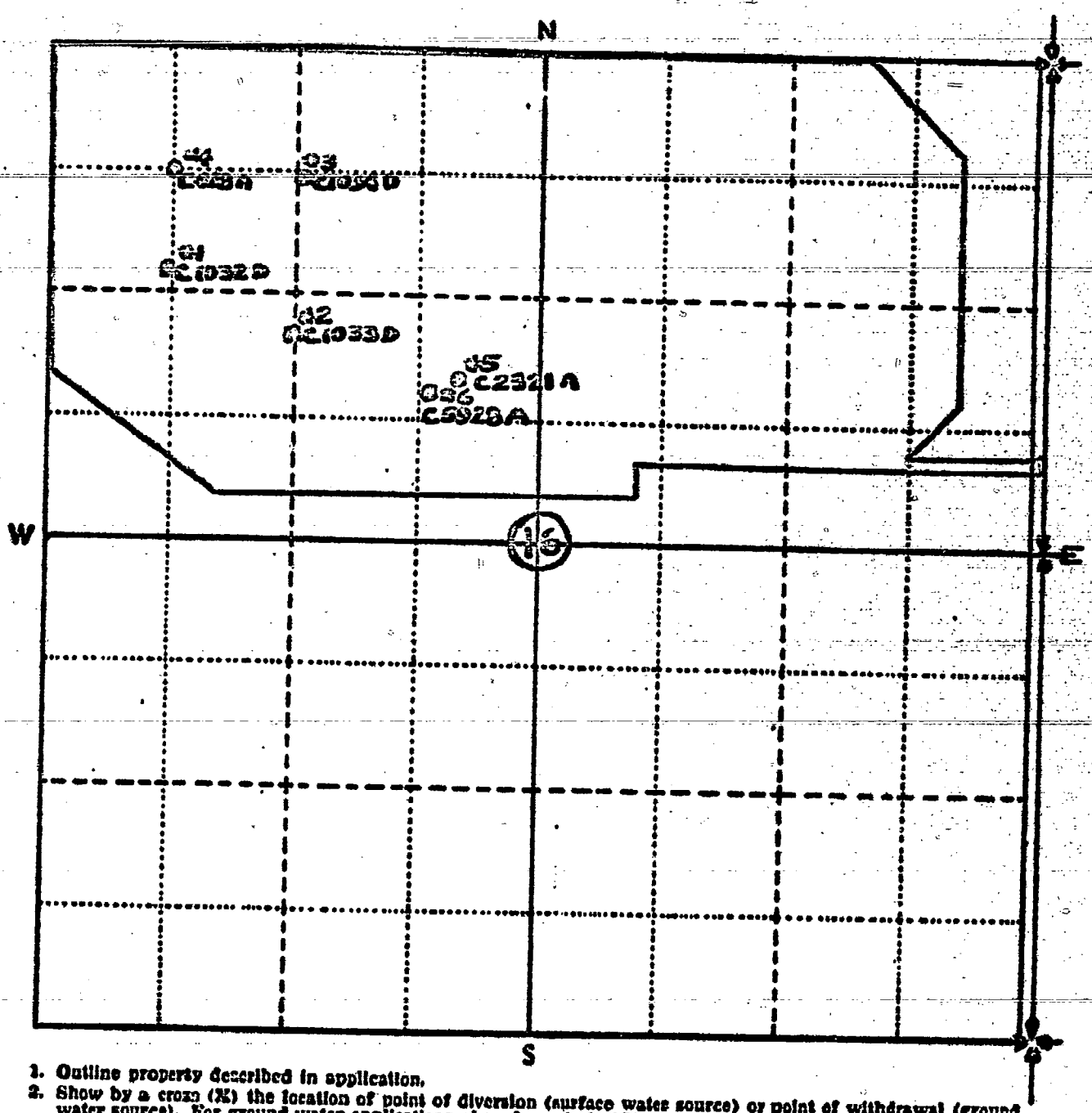
FRED D. HAHN, Deputy Director
Department of Water Resources

FDH:lf
Enclosures

S P No. 1134-A—OS

SECTION PLAT

Sec. 16 Twp. 26 N. R. 43 E W M



1. Outline property described in application.
2. Show by a cross (X) the location of point of diversion (surface water source) or point of withdrawal (ground water source). For ground water applications, show by a circle (O) the locations of other wells or works within a quarter of a mile.
3. Indicate traveling directions from nearest town.

Scale: 1 inch = 800 feet (each small square = 10 acres)

Well #	Permit	Date	Amt.	Permit	Date	Amt.
Well #1	Cert. 1032 D	June '42	1350 GPM 2020 AF/YR	Well #6 Cert. 928 A	8-16-43	2500 GPM 4000 AF/YR
" #2	Cert. 1033 D	June '42	1450 GPM 2440 AF/YR			
" #3	Cert. 1034 D	June '42	1000 GPM 1610 AF/YR			
" #4	Cert. 928 A	12-4-50	2750 GPM 4450 AF/YR			
" #5	Cert. 2321 A	2-24-55	1500 GPM 2245 AF/YR			

October 14, 1966

Kaiser Aluminum
Trentwood Works
Spokane, Washington 99215

ATTENTION: Leslie B. Stone
Project Engineer

Gentlemen:

In accordance with your letter dated October 12, 1966, you will find enclosed an application form for your possible use in filing a new application for additional pumping capacity from the Spokane River.

However, after checking our records it is found that you presently have rights for 44 cfs (19,800 gpm) under Certificates of Water Right Nos. 1930 and 1926. Therefore, it is felt that the new application should be submitted only for that quantity of water necessary to bring your total rights in line with the maximum pumping capacity of your operation. The fact that your new facility is being installed solely to provide standby equipment in case of breakdown would eliminate the necessity of filing a new application for the entire quantity of 15,600 gpm.

It is suggested you file for 2.2 cfs (1,000 gpm) such that your total rights will then equal your maximum pumping rate. If you have any questions regarding this matter, please advise. Thank you.

Very truly yours,

DEPARTMENT OF CONSERVATION

EUGENE F. WALLACE, Chief
Water Management Section
Division of Water Resources

BFW:bj
Enclosure

KAISER ALUMINUM

KAISER ALUMINUM & CHEMICAL CORPORATION

October 12, 1966

RECEIVED
DEPARTMENT OF CONSERVATION

OCT 13 1966

A.M. P.M.

Division of Water Resources
335 General Administration Building
Olympia, Washington

Attention: Mr. Gene Wallace
Geologist

Gentlemen:

We are planning the construction of a new pumping facility to be located approximately 30'-0" downstream from our existing pumping facilities on the Spokane River near Trentwood, Washington.

The new facility will include an installed additional pumping capacity of 5200 gallons per minute with provision for another possible 10,400 gallons per minute at a later date.

The water which is removed from the river will be returned to the river downstream from the pump houses. The water is routed through a closed loop and is used for cooling. The only change which occurs to the water is a temperature increase of approximately 20°F. or less. Maximum recorded intake temperature during the summer is 58°F.

The present equipment now in operation is pumping a maximum of 20,800 gpm. The proposed addition is being installed to provide standby equipment in case of breakdown, etc. and the presently anticipated maximum pumping rate from the river will continue to be 18,000-20,000 gpm.

We would appreciate receipt of the necessary permit application forms, inspection requirements, construction limitations, etc. Your expedient handling of this matter will be appreciated, since we would like to complete pumphouse construction before winter high water.

Yours very truly,

KAISER ALUMINUM & CHEMICAL CORPORATION

Leslie E. Stone

Leslie E. Stone
Project Engineer

LES:gk

TRENTWOOD WORKS
SPOKANE, WASHINGTON 99216

September 24, 1956

County Auditor
Spokane County
Spokane, Washington

Dear Sir:

Enclosed herewith Certificate No.480 for Change of Purpose and Place of Use of Water. You are also enclosed check in the amount of $1.25 to cover the cost of recording in your office.

When the certificate has been recorded, please forward to:

Keith, Winstron & Repsold
Law Offices
Spokane & Eastern Building
Spokane 4, Washington

Very truly yours,

DIVISION OF WATER RESOURCES

M. O. WALKER
Supervisor

MOW:aj
Encl. 2

September 18, 1956

Keith, Winston & Reynold
Spokane & Eastern Building
Spokane 4, Washington

Gentlemen:

Re: Change of Purpose and Place of Use of Water - Kaiser Aluminum and Chemical Corporation

Inasmuch as the above named change has been granted and all statutory requirements have been complied with, the certificate will be issued upon receipt of the following fees:

$10.00 payable to the Department of Conservation and Development
1.25 payable to the Spokane County Auditor.

Please make two separate checks or money orders and forward both to this office.

Very truly yours,
DIVISION OF WATER RESOURCES

RHR:aj

ROBERT H. RUSSELL
Assistant Supervisor

[illegible]

NOTICE OF [illegible] FOR CHANGE OF PLACE AND PURPOSE OF USE OF WATER

State of Washington, Office of the [illegible] of Division of Water Resources [illegible]

TAKE NOTICE: That Kaiser Aluminum and Chemical Corporation of Spokane, Washington, has filed a petition for a permit to change the place and purpose of use of a portion of the waters of the Spokane River as granted in Certificates No. [illegible] and [illegible]; that [illegible]

[illegible]

Any objections must be filed with the State Supervisor of the Division of Water Resources within thirty (30) days from August 17, 1956.

Witness my hand and official seal this [illegible] day of July, 1956.

M. G. Walker, Supervisor
Division of Water Resources
(Aug. 10-Aug. 17)

AFFIDAVIT OF PUBLICATION

STATE OF WASHINGTON,
COUNTY OF SPOKANE } ss.

I, G. T. Frost, being first duly sworn, on oath depose and say: That I am the Publisher, Editor and Manager of the CHENEY FREE PRESS, a weekly newspaper of general circulation, which newspaper has been established, published in the English language, and circulated continuously as a weekly newspaper in the City of Cheney, in Spokane County, State of Washington, and in said County and State for more than six months, prior to the 13th day of June, 1941, on which date the said Cheney Free Press was approved as a Legal Newspaper by Order of the Superior Court of Spokane County, Washington, and said Cheney Free Press is now so published and circulated, that the annexed is a true copy of

Notice of Petition

as it appeared in the regular issue of said paper itself and not in a supplement thereof for a period of two consecutive weeks commencing on the 10 day of August, 1956, and ending on the 17 day of August, 1956, that said newspaper was regularly distributed to its subscribers during all of said period, and that publication fee of $ 7.60 has been paid.

G. T. Frost

Subscribed and sworn to before me this 17 day of August, 1956

Violet I. Ash

Notary Public in and for the State of Washington, residing at Cheney.

STATE OF WASHINGTON
OFFICE OF THE SUPERVISOR OF DIVISION OF WATER RESOURCES
Olympia

NOTICE OF PETITION FOR CHANGE OF PLACE AND PURPOSE OF USE OF WATER

TAKE NOTICE: That Kaiser Aluminum and Chemical Corporation of Spokane, Washington, has filed a petition for a permit to change the place and purpose of use of a portion of the waters of the Spokane River as granted in Certificates No. 1980 and 1986; that such water is being used for the purpose of industrial and manufacturing uses on the following described land:

The NW¼ sec.11,T.25N.,R.44 E.W.M., and the SW¼ sec.2, T.25N.,R.44 E.W.M.,

That they wish to change the use of a portion of said waters to include standby fire protection (pursuant to a license agreement) on the following described land:

The west 665 feet of the E½NE¼ sec.11,T.25N.,R.44 E.W.M., lying north of the north line of the Spokane International Railway right-of-way.,

all in Spokane County, Washington.

Any objections must be filed with the State Supervisor of the Division of Water Resources within thirty (30) days from (last date of publication).

Witness my hand and official seal this 30th day of July,1956.

M. O. WALKER, Supervisor
DIVISION OF WATER RESOURCES

LYLE KEITH
PATRICK H. WINSTON
NELSON B. REPSOLD
E. LAWRENCE WHITE
ROBERT J. McNICHOLS

LAW OFFICES OF
KEITH, WINSTON & REPSOLD
SPOKANE & EASTERN BUILDING
SPOKANE 4, WASHINGTON
RIVERSIDE 6001

July 24, 1956

State of Washington
Department of Conservation
and Development
Division of Water Rights
Olympia, Washington

Attention: Mr. Robert H. Russell
Assistant Supervisor

Re: S.W. Certificates Nos. 1980 and 1986

Gentlemen:

Reference is made to our letter from Robert J. McNichols addressed to you under date of June 25, 1956, and your letter of reply dated June 28, 1956, concerning the procedure to be followed to permit Cominco Products, Inc. to utilize the fire protection system of Kaiser Aluminum and Chemical Corporation on a standby basis for fire protection for their plant.

Kaiser Aluminum and Chemical Corporation, in accordance with the suggestion of your letter of June 28, 1956, has executed the Petition for Change of Purpose and/or Place of Use of Water and we enclose it herewith together with three copies of the section plat covering the property involved.

We would greatly appreciate your early action on this Petition.

Very truly yours,

KEITH, WINSTON & REPSOLD

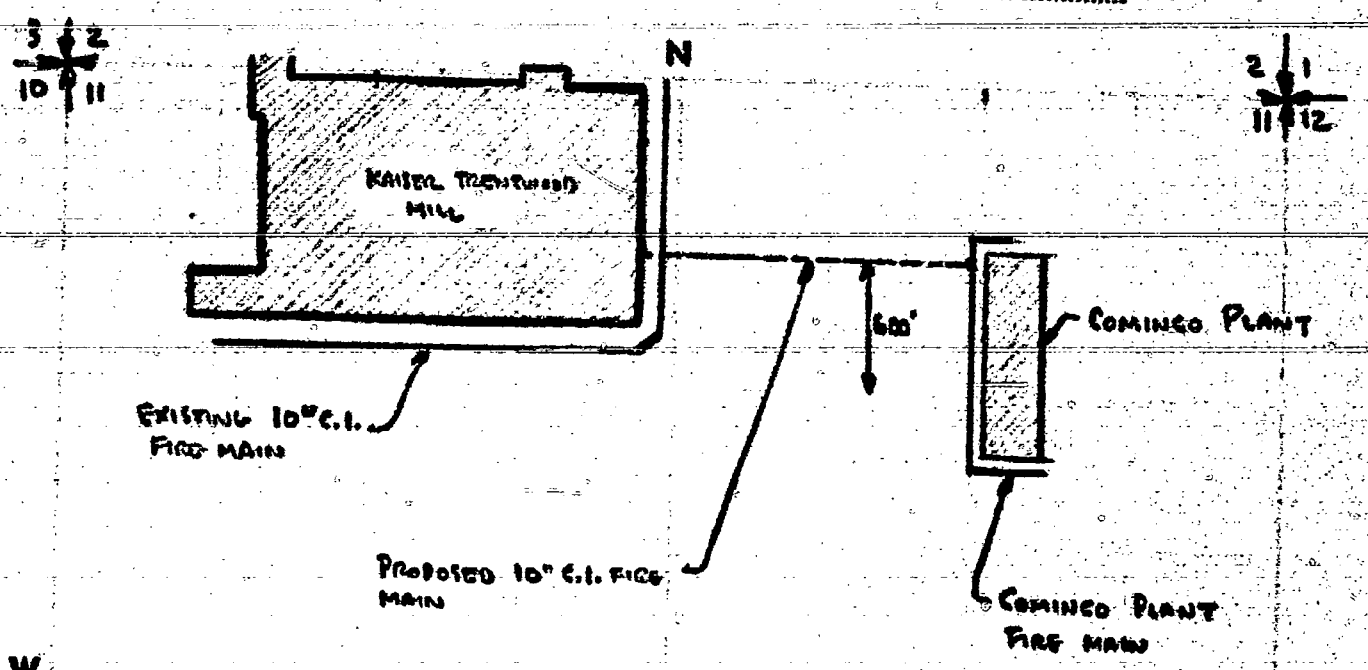
By: E. Lawrence White jk
E. Lawrence White

ELW:jk
Encl.

S. F. No. 1854-A—1-53—2018. 53466.

SECTION PLAT

Sec. 11 Twp. 25 N. R. 44 E.W.M.



Be sure to show distance and bearing of point of diversion from nearest 40-acre corner. Also traveling directions from nearest town on main highway.

Scale: 1 inch = 600 feet.

The proposed stand-by diversion is being made from the existing pipe system of Kaiser Aluminum & Chemical Corporation as indicated.

The Kaiser Works and the Cominco Plant are located approximately 6 miles East of the City of Spokane on Trent Road. Both installations are visible from the highway.

PETITION FOR CHANGE OF PURPOSE AND/OR PLACE OF USE OF WATER

TO THE STATE SUPERVISOR OF WATER RESOURCES OF WASHINGTON:

The undersigned, your petitioner, respectfully represents:

First: That he is a user of waters of The Spokane River (Stream or lake) under Permit No. 3564 3747, Certificate No. 4, p. 1980 p. 1986, decreed right _____ (Title of case) or appropriation made _____ (Give date if prior to June 15, 1917)

Second: That such right consists of a total of 44 cubic feet per second. (Cubic feet per second); that he wishes to change the place of use of water to the extent of (amount unknown - right to use water is given on stand-by basis only, (Cubic feet per second) for fire protection purposes.)

Third: That such water is being used for the purpose of Industrial and manufacturing uses at the Kaiser Trentwood Works.

on the following described land: The NW 1/4 of Section 11, Township 25 North, Range 44, EWM and the SW 1/4 of Section 2, Township 25 North, Range 44 EWM, County of Spokane, State of Washington.

Section 2 & 11, township 25 N., range 44 E, W. M.

Fourth: That he wishes to change the use of said waters to Standby fire protection only - (pursuant to a license agreement) (Purpose of use)

on the following described lands: The West 665 feet of the East 1/2 of the NE 1/4 of Section 11, Township 25 North, Range 44, EWM, lying North of the North line of the Spokane International Railway right-of-way.

Section 2 & 11, township 25 N, range 44 E, W. M., Spokane County, Washington, and that such change can be made without detriment or injury to existing rights or the State's interest in water, as provided in Sec. 39, Chap. 117, Laws of 1917.

Dated this 18th day of July, 1956

KAISER ALUMINUM & CHEMICAL CORPORATION

by Marvin L. Lee
(Petitioner)

MARVIN L. LEE
Works Manager, Trentwood Works

Kaiser Aluminum & Chemical Corporation
Trentwood Works, Spokane 69, Wash.
(Post office address)

S. F. No. 369—3-43—5C. 3445.

CERTIFICATE RECORD NO. 4, PAGE NO. 1980

STATE OF WASHINGTON, COUNTY OF Spokane

Cert. 480 Ch Purpose & Place of Use

CERTIFICATE OF WATER RIGHT

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the rules and regulations of the State Supervisor of Hydraulics thereunder.)

This is to certify, that Defense Plant Corporation *of* Washington, D. C., *State of* _____, *has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of* Spokane River, *a tributary of* Columbia River, *for the purposes of* Manufacturing *under* Appropriation *Permit No.* 3564 *issued by the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume* 4, *at Page* 1980, *on the* 1st *day of* December, *1943; that the right hereby confirmed dates from* May 20, 1942; *that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* Twenty-nine (29.0) cubic feet per second.

A description of the lands under such right to which the water hereby confirmed is appurtenant, and the place where such water is put to beneficial use, is as follows:

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER	
Section	Township	Range		H. P. Described in Permit	H. P. Actually Developed

Section	Township	Range	LEGAL SUBDIVISION	FOR OTHER USES
11	25 N.	44 E.W.M.	NW¼	Manufacturing
2	25 N.	44 E.W.M.	SW¼	

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 1st *day of* December, *19* 43

Thos. J. Bartholet

State Supervisor of Hydraulics.

Permit No. —3564—

Certificate of Water Right

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. —4— *of Water Right Certificates, on Page* —1980— *, on the* —1st— *day of* —December— *, 19*—43—

STATE OF WASHINGTON,
County of —Spokane— } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, Page* ..... *on the* ..... *day of* ..... *, 19* .....

.....

STATE PRINTING PLANT

S. F. No. 369—1938—2M. 13900.

CERTIFICATE RECORD NO. 4, PAGE NO. 1986

STATE OF WASHINGTON, COUNTY OF Spokane

Cert. Ch. Rec. & Place of use 480

CERTIFICATE OF WATER RIGHT

(For rights perfected under original, enlargement or secondary permits.)

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the regulations of the State Supervisor of Hydraulics thereunder.)

This is to certify, that Defense Plant Corporation

of Washington, D. C., ~~xxxxx~~, *has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of* Spokane River, *a tributary of* Columbia River, *for the purposes of* Manufacturing *under* Appropriation *Permit No.* 3747 *issued by the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume* 4, *at Page* 1986, *on the* 13th *day of* November, 19 43, *that the right hereby confirmed dates from* October 14, 1943; *that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* Fifteen (15.0) cubic feet per second.

A description of the lands under such right to which the water hereby confirmed is appurtenant, and the place where such water is put to beneficial use, is as follows:

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER	
Section	Township	Range		H. P. Described in Permit	H. P. Actually Developed

Section	Township	Range	LEGAL SUBDIVISION	FOR OTHER USES
11	25 N.	44 E.W.M.	NW¼	Manufacturing
2	25 N.	44 E.W.M.	SW¼	

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 13th *day of* November, 1943

Chas. X. Barthoet

State Supervisor of Hydraulics.

Permit No. 3747

Certificate of Water Right

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 4 *of Water Right Certificates, on Page* 1986, *on the* 13th *day of* December, 19 43

STATE OF WASHINGTON,
County of Spokane } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... of Book of Water Right Certificates, Page ..... on the ..... day of ....., 19.....

.....

STATE PRINTING PLANT

Form 10. S. F. No. 370—7-26-40—2M. 19677.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

RECEIVED MAY 20 1942 DIVISION OF HYDRAULICS

APPLICATION FOR A PERMIT
To Appropriate Public Waters of the State of Washington

(Read directions on last page carefully before filling out this form)

Application No. 5701

~~If~~ Defense Plant Corporation, (Name of applicant)

of 811 Vermont Avenue (Postoffice), *County of* Washington,

State of District Columbia, *do hereby make application for a permit to appropriate the following described public waters of the State of Washington subject to existing rights:*

If the applicant is a corporation, give date and place of incorporation August 22, 1940
A corporation created by Reconstruction Finance Corporation pursuant to Section 5d of Reconstruction Finance Corporation Act as amended

1. *The source of the proposed appropriation is* Spokane River (Name of stream)
tributary of ~~Lake Coeur d'Alene~~ Columbia River

2. *The amount of water which the applicant intends to apply to beneficial use is* app. 29 *cubic feet per second.*

3. *The use to which the water is to be applied is* manufacturing (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. *Time during which water will be required each year* 365 days

5. *The approximate point of diversion is located* S 42° 30' 30" E 440' from S.E. corner (Give distance and bearing to section corner)
of the Southwest quarter of Section 3 TP 25N, R 44 E

being within the NW¼ of Lot 1 Northeast quarter (Give smallest legal subdivision) *of Sec.* 10, *Tp.* 25 *N., R.* 44 E (E. or W.) *W. M.,*
in the county of Spokane

6. *The* pipe line (Main ditch, canal, or pipe line) *to be* app. 2600 *ft.* ~~55 miles~~ *in length, terminating in the* pipe line (Smallest legal subdivision) *of Sec.* 10, *Tp.* 25 *N., R.* 44 E (E. or W.) *W. M.,*
the proposed location being shown on the accompanying map.

7. *The name of the ditch, canal or other works is* Circulating Pump System for Aluminum Alloy Sheet Mill

8. *Estimated cost of development necessary to utilize fully the appropriation herein asked for* $100,000.00

9. *Does the stream from which you wish to appropriate water flow through the tract of land on which the water is to be used?* No. (Flows along south and west boundaries)

10. *Do you own the required right-of-way for the proposed works?* Perpetual rights

DESCRIPTION OF WORKS

DIVERSION WORKS—

11. *(a) Height of diversion dam* ..... *feet; length on top* ..... *feet; length at bottom* ..... *feet; material to be used and character of construction*
(Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate ..... (Timber, concrete, etc.; number and size of openings)

When storage works are contemplated a storage permit must be filed in addition to the above. These forms can be secured, together with instructions, by addressing the State Supervisor of Hydraulics, Olympia, Washington.

lab

CANAL SYSTEM—

12. *(a) Give approximate dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

(b) At ..... *miles from headgate: Width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

IRRIGATION—

13. *The land to be irrigated has a total area of* ..... *acres, described as follows:* .....
(Give legal subdivision by section, township and range)

(If more space is required, attach separate sheet)

14. *Give the legal description of land when water is to be used for purposes other than irrigation, power and municipal supply* Northeast quarter (Legal subdivisions) *Sec.* 10, *Tp.* 25 *N., Rge.* 44 E (E. or W.) *W. M.*

(a) To what stream is water returned Spokane River

(b) Locate the point of return N.E.Quarter (Smallest legal subdivision) *Sec.* 10, *Tp.* 25 *N., Rge.* 44 E (E. or W.) *W. M.*

POWER—

15. *(a) Total amount of power to be developed* None (Theoretical horsepower) *H. P.*

(b) Total fall to be utilized ..... (Head) *feet.*

(c) The nature of the works by means of which the power is to be developed .....

(d) Such works to be located in ..... (Legal subdivision) *of Sec.* ....., *Tp.* ..... *N., Rge.* ..... (E. or W.) *W. M.*

(e) To what stream is the water to be returned .....

(f) Locate point of return ..... *Sec.* ....., *Tp.* ..... *N., Rge.* ..... (E. or W.) *W. M.*

(g) The use to which power is to be applied is .....

MUNICIPAL SUPPLY—

16. *To supply the city of* ..... (Name)
..... *County, having a present population of* .....
and an estimated population of ..... *in 19*.....

(a) Estimated present requirement .....

(b) Estimated future requirement .....

17. *Construction work* ~~will begin~~ *on* ~~or before~~ began April 1, 1942

18. *Construction work will be completed on or before* January 1, 1943

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Supervisor of Hydraulics, accompany this application.

Defense Plant Corporation
(Name of applicant)
By: John W Snyder
Executive Vice President

Signed in the presence of us as witnesses:

(1) Thomas L. Kelly, 3rd (Name), 800 S. Washington St. Alexandria, Va. (Address of witness)

(2) Barbara O. Teagle (Name), 1737 Rhode Island Ave. N.W., Washington, D.C. (Address of witness)

Remarks: .....

STATE OF WASHINGTON,
COUNTY OF THURSTON. } *ss.*

This is to certify that I have examined the foregoing application together with the accompanying maps and data, and return the same for correction or completion, as follows: .....

In order to retain its priority, this application must be returned to the State Supervisor of Hydraulics, with corrections, on or before ....., *19*.....

WITNESS my hand this .....*day of* ....., *19*.....

State Supervisor of Hydraulics.

LwB

Form 10. S. F. No. 370—1-43—1M. 2886.

2nd copy of notice to Wash. Water Power Co.

RECEIVED OCT 8 1943 DIVISION OF HYDRAULICS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

APPLICATION FOR A PERMIT
To Appropriate Public Waters of the State of Washington

(Read directions on last page carefully before filling out this form)

Application No. 5915

I, Defense Plant Corporation (Name of applicant),

of Washington, D. C. (Postoffice), *County of* ....., *State of* ....., *do hereby make application for a permit to appropriate the following described public waters of the State of Washington subject to existing rights:*

If the applicant is a corporation, give date and place of incorporation Incorporated pursuant to Section 5D of the Reconstruction Finance Corp. Act office at 811 Vermont Avenue N.W. Washington, D. C.

1. *The source of the proposed appropriation is* Spokane River (Name of stream) *tributary of* Columbia River

2. *The amount of water which the applicant intends to apply to beneficial use is* 15 *cubic feet per second.*

3. *The use to which the water is to be applied is* Manufacturing (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. *Time during which water will be required each year* Entire Year

5. *The approximate point of diversion is located* 970' South & 400' West of the SE Corner Sec 3-25-44 South 42° 30'30" East 440 ft. from (Give distance and bearing to section corner) the Southeast corner of SW¼ of Sec. 3, Twp. 25 N., Rge. 44 E.W.M.

(Amended Nov. 29, 1943)

being within the ~~NW¼ of NE¼~~ Lot 1 (Give smallest legal subdivision) *of Sec.* 10, *Tp.* 25 *N., Rge* 44 *EW. M.,* (E. or W.) *in the county of* Spokane

6. *The* Pipe line (Main ditch, canal, or pipe line) *to be* .5 mi. *ft. or miles in length, terminating in the* SW¼ of Se (Smallest legal subdivision) *of Sec.* 2, *Tp.* 25N *N., R.* 44 *EW. M.,* (E. or W.) *the proposed location being shown on the accompanying map.*

7. *The name of the ditch, canal or other works is* None

8. *Estimated cost of development necessary to utilize fully the appropriation herein asked for* $ 150,000.00 plus or minus

9. *Does the stream from which you wish to appropriate water flow through the tract of land on which the water is to be used?* Adjacent to same.

10. *Do you own the required right-of-way for the proposed works?* Yes

DESCRIPTION OF WORKS

DIVERSION WORKS— Pumphouse discharging into 2-24" and 1 - 12" mains.

11. *(a) Height of diversion dam* None *feet; length on top* ..... *feet; length at bottom* ..... *feet; material to be used and character of construction*

(Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate .....
(Timber, concrete, etc.; number and size of openings)

When storage works are contemplated a storage permit must be filed in addition to the above. These forms can be secured, together with instructions, by addressing the State Supervisor of Hydraulics, Olympia, Washington.

CANAL SYSTEM—

12. *(a) Give approximate dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

(b) At ..... *miles from headgate: Width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

IRRIGATION—

13. *The land to be irrigated has a total area of* ..... *acres, described as follows:* .....
(Give legal subdivision by section, township and range)

(If more space is required, attach separate sheet)

14. *Give the legal description of land when water is to be used for purposes other than irrigation, power and municipal supply* NW¼ SW¼ Sec. 11 and Sec. 2, Tp. 25 N., Rge. 44 E. W. M.
(Legal subdivisions) (E. or W.)

(a) To what stream is water returned Spokane River

(b) Locate the point of return SE¼ NW¼ Sec 3 and Sec. 11, Tp. 25 N., Rge. 44 E. W. M.
(Smallest legal subdivision) (E. or W.)

POWER—

15. *(a) Total amount of power to be developed* ..... *H. P.*
(Theoretical horsepower)

(b) Total fall to be utilized ..... *feet.*
(Head)

(c) The nature of the works by means of which the power is to be developed .....

(d) Such works to be located in ..... *of Sec.* .....,
(Legal subdivision)
Tp. ..... *N., Rge.* ..... *W. M.*
(E. or W.)

(e) To what stream is the water to be returned .....

(f) Locate point of return ..... *Sec.* .....,
Tp. ..... *N., Rge.* ..... *W. M.*
(E. or W.)

(g) The use to which power is to be applied is .....

MUNICIPAL SUPPLY—

16. *To supply the city of* ..... (Name) .....
County, having a present population of .....
and an estimated population of ..... *in 19*.....

(a) Estimated present requirement .....

(b) Estimated future requirement .....

17. *Construction work will begin on or before* .....

18. *Construction work will be completed on or before* .....

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Supervisor of Hydraulics, accompany this application.

Defense Plant Corporation
(Name of applicant

by H. O. Skipsand
Project Engineer

Signed in the presence of us as witnesses:

(1) W. J. Overlease (Name), 704 W. 20th Spokane Wash. (Address of witness)

(2) George W. Herrington (Name), 1102 Manor, Veradale, Wash. (Address of witness)

Remarks: Water supply necessary for the operation of the Aluminum Rolling Mill at Trentwood, Washington.

STATE OF WASHINGTON,
COUNTY OF THURSTON. } *ss.*

This is to certify that I have examined the foregoing application together with the accompanying maps and data, and return the same for correction or completion, as follows: .....

In order to retain its priority, this application must be returned to the State Supervisor of Hydraulics, with corrections, on or before ....., *19*.....

WITNESS my hand this ..... *day of* ....., *19*.....

State Supervisor of Hydraulics.

Notice of Beginning of Construction

I, United Engineering & Foundry Co. Acting for and on behalf of Defense Plant Corporation, the holder of Permit No. 3564 issued by the Supervisor of Hydraulics of the State of Washington for the appropriation of 29.0 cubic feet of ~~second-feet~~ of the unappropriated waters of The Spokane River, tributary of the Columbia River, in accordance with the tenor of such permit and the limitations endorsed thereon by the Supervisor of Hydraulics, began the actual construction of the works described therein on the 27th day of July, 1942

RECEIVED AUG 10 1942 DIVISION OF HYDRAULICS

The nature and the amount of construction work already done is as follows:

PER CENT COMPLETED:

Clearing 20 %; *Material in place* None %; *Excavation* None %; *Structure* None %.

Any additional information which may tend to show good faith in the prosecution of the work:

Started clearing site July 27th preparatory to excavation, but excavation can not be started until steel piling arrives which maybe another week or ten days, at which time we expect to proceed with the excavation for the pumphouse proper, with the hope of completion of the entire pumphouse by November 1, 1942

IN WITNESS WHEREOF, I have hereunto set my hand this 3 *day of* August, 1942

United Engineering & Foundry Co.
Acting for and on behalf of
Defense Plant Corporation

(Signature of applicant)

By Project Manager

P.O. Box 2158, Spokane, Washington
Plant at Trentwood, Washington

(Post-office address)

S. F. No. 376—1-41—1M. 21070.

UNITED
ENGINEERING and FOUNDRY COMPANY
FIRST · NATIONAL · BANK · BUILDING
PITTSBURGH — PENNSYLVANIA

THIS LETTER FROM
BOX 2158
SPOKANE, WASHINGTON

CABLE ADDRESS
UNITED PITTSBURGH

SUBJECT Permit No. 3564

September 28, 1943

State of Washington
Department of Conservation and Development
Division of Water Resources
Olympia, Washington

ATTENTION: Mr. Chas. J. Bartholet
Supervisor of Hydraulics

Gentlemen:

Please refer to our permit #3564 issued to the Defense Plant Corporation, Washington D. C. to appropriate the public waters of the State of Washington.

We have already filed with you a notice of the beginning of construction, and inasmuch as the pumphouse has been completed we wish to file with you a notice of the completion of construction, notice of complete application of water to a beneficial use, and a proof of application of the water in order that we may receive a final water right certificate.

In our temporary permit No. 3564 I believe we asked for 29 cubic feet a second during the entire year for manufacturing purposes, all of which is returned to the river after being used for cooling purposes and not contaminated in any way. We believe, however, that this amount of water specified is not enough for our maximum production requirements as we are using that amount now and with additional capacity available we will probably use up to 20,000 gallons per minute which would be a little over 44 cubic feet a second.

If you would furnish us with all of the above forms and state how we should go about getting a change in the amount of water required, we will be glad to put in our application in the proper manner so that a permanent certificate of water right may be issued. Thanking you in advance for your consideration.

Yours very truly,
UNITED ENGINEERING & FOUNDRY COMPANY
ACTING FOR AND ON BEHALF OF
DEFENSE PLANT CORPORATION

H. O. Shepard

HOS:dk

H. O. Shepard
Project Engineer

S. F. No. 379—1-41—5C. 21071.

Notice of Complete Application of Water to a Beneficial Use

We X Defense Plant Corporation, holder of Permit No. 3564 issued by the State Supervisor of Hydraulics of Washington for the appropriation of 29 second-feet of the waters of Spokane River, in accordance with the tenor of such permit and the limitations endorsed thereon by the State Supervisor of Hydraulics, completely applied the waters to a beneficial use on the 5 day of August, 19 43, being within the time limitation as fixed in said permit or extended by the State Supervisor of Hydraulics for the complete application of water to a beneficial use.

(If all water granted in the permit has not been fully applied to beneficial use, give amount used in percentage to the whole, so that subsequent appropriators may have notice. If permit is for irrigation use, state per cent of lands not now watered.)

RECEIVED OCT 8 1943 DIVISION OF HYDRAULICS

IN WITNESS WHEREOF, I have hereunto set my hand this 6 day of Oct., 1943

Box 2158, Trentwood Washington
(Present address)

H. O. Shepard
(Signature of applicant)
Project Engineer

S. F. No. 380—1930. Approved as to Form [illegible] Dept. of Efficiency. 10618.

Proof of Appropriation of Water

Application No...... *Permit No.*.....

1. *Name of applicant* Defense Plant Corporation
2. *Postoffice address* Washington, D. C.
3. *Source of appropriation* Spokane River *tributary of* Columbia River
4. *For what purpose or purposes is water used?* Operation of the Trentwood Rolling Mill.
5. *Give date of beginning of construction* July 27, 1942
6. *Give date of completion of construction work* August 5, 1943
7. *When was all the water completely applied to proposed use?* August 5, 1943
8. *Fill in the following carefully, according to use. If for irrigation, fill in the number of acres described in permit and the number of acres actually irrigated (Water should be applied to the full number of acres to be irrigated before certificate can issue). If for power, give location of power plant and the theoretical horsepower described in permit. If for domestic supply, municipal, manufacturing or other uses, simply give the description of place of use.*

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION FILL IN FOLLOWING	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated
11	25 N	44E	NW¼		
2	25 N	44E	SW¼		

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER FILL IN FOLLOWING	
Section	Township	Range		H. P. Described in Permit	H. P. Actually Developed

FOR ALL OTHER USES

Section	Township	Range	LEGAL SUBDIVISION	
11	25 N	44E	NW¼	
2	25 N	44E	SW¼	

9. *During what months is water used?* Entire Year.
10. *Does map filed with your permit show correctly the location of diverting work and area of land where water is used?* Yes *If not, state wherein such map is in error*.....
11. *If the dimensions of your ditch or dam do not correspond to those described in your permit and the plans and specifications now on file in the office of the State Supervisor of Hydraulics, state what changes have been made, giving dimensions of ditch or other distributing works.*

REMARKS:

STATE OF WASHINGTON,
County of Spokane } *ss.*

I, H. O. Shepard, *being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation of water; that I know the contents thereof; and that the facts therein stated are true.*

IN WITNESS WHEREOF, I have hereunto set my hand this 6th *day of* October, 1943

H. O. Shepard.

Subscribed and sworn to before me this 6th *day of* October, 1943.

J. M. Duggan
Notary Public.
NOTARY PUBLIC in and for the State of Washington, residing at Spokane.

RECEIVED OCT 4 1943 UNITED ENGR. & FDRY. CO. PLANCOR 524

October 8, 1943.

United Engineering & Foundry Co.
Box 2158
Spokane, Washington

Attention: H. O. Shepard, Project Manager

Gentlemen:

We acknowledge receipt of your letter of October 6 with enclosures.

However, the place of use of water, as shown in the Proof of Appropriation under Permit No. 3564 and in the new application for appropriation of additional water, is within the NW¼ of Sec. 11, and the SW¼ of Sec. 2, Twp. 25 N., Rge. 44 E., while in the original Application 5701 and the permit, is given as the NE¼ of Sec. 10, Twp. 25, Rge. 44 E. We presume that you changed your plans after the first application was filed, but wish to check on the description so as to be sure that the place of use as shown on the certificate will be correct.

The fees for filing and recording the certificate were received, but the examination fee of $15.00 ($1.00 per cubic foot per second), which should accompany the application, was not received. Will you please see that it is sent as soon as is possible, as the application cannot be recorded until it is paid.

Yours very truly

CHAS. J. BARTHOLET
Supervisor of Hydraulics

By

Secretary.

G.H.

UNITED
ENGINEERING and FOUNDRY COMPANY
FIRST · NATIONAL · BANK · BUILDING
PITTSBURGH — PENNSYLVANIA

THIS LETTER FROM
BOX 2158
SPOKANE, WASHINGTON

CABLE ADDRESS
UNITED PITTSBURGH

SUBJECT PERMIT #3564

October 18, 1943

Mr. Chas. J. Bartholet, Sup'v. of Hydraulics
Department of Conservation and Development
State of Washington
Transportation Building
Olympia, Washington

Gentlemen:

We are in receipt of your favor of the 16th.

I am very glad indeed that a check has been made on the above application and that our print recently furnished you straightened out the matter correcting all errors previously made.

In accordance with your request we have issued a letter to the Spokane Daily Chronicle asking them to publish in two consecutive weekly issued a copy of the Change of Point of Diversion and upon receipt of their Affidavit of Publication will forward the same to you.

We are also pleased to enclose a signed copy of a Petition for Change of Point of Diversion of Water and Place of Use which you filled out for our signature.

We trust that this will straighten the matter entirely and upon receipt of the affidavits that you will be able to furnish us with the permanent water rights.

Yours very truly,

UNITED ENGINEERING & FOUNDRY COMPANY
Acting for and on Behalf of
DEFENSE PLANT CORPORATION

H. O. Shepard

H. O. Shepard
Project Engineer

HOS:dk

Enc.

NOTICE OF PETITION FOR CHANGE OF POINT OF DIVERSION AND PLACE OF USE OF WATER.

TO WHOM IT MAY CONCERN:

Notice is hereby given that the Defense Plant Corporation, Washington, D. C.,has filed a petition with the State Supervisor of Hydraulics at Olympia, Washington, for a permit to change the point of diversion of waters of the Spokane River to the extent of 29.0 second-feet from a point set out in Water Right Permit No. 3564 as within the NW¼ of NE¼ of Sec. 10, Twp. 25 N., Rge. 44 E.W.M., to a point within Govt. Lot 1, Sec. 10, Twp. 25 N., Rge. 44 E., and to change the place of use of such water from the NE¼ of Sec. 10, Twp. 25 N., Rge. 44 E.W.M. to use on NW¼ of Sec. 11 and SW¼ of Sec. 2, Twp. 25 N., Rge. 44 E.W.M., all in Spokane County, Washington.

Any person, firm or corporation whose right will be injuriously affected by the granting of said petition, may file with the Supervisor of Hydraulics at Olympia, Washington, such objections or representations, in writing, as he may desire to make within thirty (30) days after date of last publication, which date is _____.

Witness my hand and official seal this 16th day of October, 1943.

CHAS. J. BARTHOLET
State Supervisor of Hydraulics.

PETITION FOR CHANGE OF POINT OF DIVERSION OF WATER AND PLACE OF USE.

TO THE STATE SUPERVISOR OF HYDRAULICS OF WASHINGTON:

The undersigned, your petitioner, respectfully represents:

First: That he is a user of waters of Spokane River (Stream or Lake) under Permit No. 3564, Certificate No. ——, decreed right —— (Title of Case) or appropriation made —— (Give date, if prior to June 15th, 1917.)

Second: That such right consists of 29.00 (Cu. Ft. per Sec.).

Third: That he wishes to change the point of diversion and place of use of such water to the extent of 29.00 (Cu. Ft. per Sec.).

Fourth: That the use of such water is for the purpose of manufacturing, and that he diverts water from said stream at a point situated in the NW4 quarter of NE4 quarter of Section 10, Township 25 N., Range 44E W. M.

Fifth: That he wishes to change said point of diversion to a point situated in ~~the~~ Lot 1 ~~quarter of~~ —— of Section 10, Township 25 N., Range 44 E W. M., such point being —— (Distance above or below) the present point of diversion.

Sixth: That the water is being used for manufacturing on the following described land: NE4

——, Section 10, Township 25 N., Range 44E W.M.

Seventh: That he desires to change the place of use of said waters for manufacturing (Purpose) on the following described lands: NW4 Sec. 11 & SW4 Sec. 2.

—— Section ——, Township 25 N., Range 44E E. W. M., Spokane County, Washington, and that such changes can be made without detriment or injury to existing rights or the State's interest in water, as provided in Section ~~32~~ 6, Chapter ~~117~~ 122, Session Laws of ~~1917~~ 1929.

DATED this 18th day of Octobor, 1943.

UNITED ENGINEERING AND FOUNDRY CO. ACTING FOR AND ON BEHALF OF DEFENSE PLANT CORPORATION
Petitioner

P. O. Box 2158 Spokane, Wash
Postoffice Address

~~P. O. Spokane~~

Affidavit of Publication

STATE OF WASHINGTON }
County of Spokane. } ss.

I, J. J. Walker do solemnly swear that I am the Principal Clerk of the Spokane Daily Chronicle, a newspaper established and regularly published, once each week day (Week) (Day) in the English language, in and of general circulation in the City of Spokane, Spokane County, Washington; that said newspaper has been so established and regularly published and has had said general circulation continuously for more than six (6) months prior to the 23rd day of July, 1941; that said newspaper is printed in an office maintained at its place of publication in the City of Spokane, Washington; that said newspaper was approved and designated as a legal newspaper by order of the Superior Court of the State of Washington for Spokane County on the 23rd day of July, 1941, and that said order has not been revoked and is in full force and effect; that the notice attached hereto and which is a part of the proof of publication, was published in said newspaper two times, the publication having been made once ~~each~~ on October 20, 1943 and ~~from~~ the 27th day of October A. D. 1943, ~~to the~~ ~~day of~~ ~~A. D. 19xx~~. That said notice was published in the regular and entire issue of every number of the paper during the period of time of publication, and that the notice was published in the newspaper proper and not in a supplement.

NOTICE OF PETITION FOR CHANGE OF POINT OF DIVERSION AND PLACE OF USE OF WATER.

To whom it may concern:

Notice is hereby given that the Defense Plant corporation, Washington, D. C., has filed a petition with the State Supervisor of Hydraulics at Olympia, Washington, for a permit to change the point of diversion of waters of the Spokane River to the extent of 29.0 second-feet from a point set out in Water Right Permit No. 3564 as within the NW¼ of NE¼ of Sec. 10, Twp. 25N., Rge. 44 E. W. M., to a point within Govt. Lot 1, Sec. 10, Twp. 25 N., Rge. 44 E., and to change the place of use of such water from the NE¼ of Sec. 10, Twp. 25 N., Rge. 44 E. W. M., to use on NW¼ of Sec. 11 and SW¼ of Sec. 2, Twp. 25 N., Rge. 44 E. W. M., all in Spokane County, Washington.

Any person, firm or corporation whose right will be injuriously affected by the granting of said petition, may file with the Supervisor of Hydraulics at Olympia, Washington, such objections or representations, in writing, as he may desire to make within thirty (30) days after date of last publication, which date is October 27, 1943.

Witness my hand and official seal this 16th day of October, 1943.

CHAS. J. BARTHOLET,
State Supervisor of Hydraulics.

RECEIVED NOV 12 1943 DIVISION OF HYDRAULICS

J. J. Walker

Subscribed and sworn to before me at the City of Spokane, this 28th day of October, 1943.

Helen E. Kronberg

Notary Public in and for the State of Washington, residing at Spokane, Wash.

Form G-16

LICENSE

AGREEMENT, entered into this _____ day of _____, 1956, by and between the KAISER ALUMINUM & CHEMICAL CORPORATION, a corporation, hereinafter referred to as Kaiser, and COMINCO PRODUCTS, INC., a corporation, hereinafter referred to as Cominco,

WITNESSETH:

WHEREAS, Cominco is erecting a manufacturing installation directly to the east of the Kaiser Trentwood Works in the County of Spokane, State of Washington; and

WHEREAS, Kaiser maintains upon the property of the said Trentwood Works a fire protection system consisting of water pipes, pumps and allied facilities, hereinafter designated as the Kaiser System; and

WHEREAS, Cominco is desirous of connecting its emergency fire protection water facilities, hereinafter designated as the Cominco System, with the Kaiser System in order to properly safeguard Cominco's property; and

WHEREAS, Kaiser, in a spirit of good will and cooperation, is agreeable to allowing Cominco to connect its system with that of Kaiser subject to all of the terms and conditions hereof,

NOW, THEREFORE, Kaiser hereby authorizes Cominco to connect its emergency water system with the emergency water system of Kaiser under the following terms and conditions:

1. This authority to Cominco from Kaiser is given as a license only and no consideration therefor is passing from Cominco or any other person to Kaiser. It is specifically understood by the parties that this agreement may be terminated at will by either party.

2. Kaiser shall retain at all times a prior right to the use of its own water and water system and shall have the right at any time

it so desires to stop the flow of water from the Kaiser System to the Cominco System.

3. Kaiser assumes no liability to Cominco or to any other person for any damages or injury which may result in the event of a breakdown or a failure of Kaiser's water system, or which may result directly or indirectly from any act or omission of Kaiser which interrupts, terminates or reduces the flow of water from Kaiser to Cominco.

4. The water from the Kaiser installation shall be used by Cominco only for the purpose of extinguishing fires and for necessary testing of Cominco's fire protection system. It is specifically understood that Cominco shall not use the water from the Kaiser system for sanitary water, process water or for any purpose other than the extinguishment of fires or the testing of fire protection equipment.

5. Cominco agrees to install one or more water meters of such a type and in such a manner to be approved by Kaiser as to permit Kaiser to determine whether or not there is leakage in the Cominco water system.

6. Kaiser makes no representation to Cominco that any expenditure by Cominco pursuant to this agreement will guarantee continued or uninterrupted use of the Kaiser System.

7. Cominco agrees to submit a detailed plan indicating the location of its proposed pipes, meters and allied facilities and setting forth the details and specifications of its system. Said plan shall be presented to Kaiser for its approval and shall be attached to this agreement, marked Exhibit A, and made a part of this agreement. This agreement shall not be effective until the said plan is approved in writing by Kaiser.

8. In the event Cominco should subsequently install a water tower or other water storage or supply system for the purpose of fire protection, Cominco agrees to permit Kaiser to connect the Kaiser system

with such Cominco system for the purpose of supplementing Kaiser's fire protection system. Such authority from Cominco to Kaiser may involve the same restrictions upon Kaiser and include the same limitations as are herein placed upon Cominco.

9. Cominco agrees that at no time during the installation, testing or operation of its water system will it interfere in any way with the operations of Kaiser or with the immediate availability of adequate water for Kaiser's uses. In the event of simultaneous fire or other catastrophe, Kaiser shall have first claim on its entire water supply and system to the exclusion of Cominco.

10. A waiver by Kaiser of any of the duties or obligations hereunder shall not constitute a waiver of any provision of this agreement. The privileges herein extended from Kaiser to Cominco shall not be assignable by Cominco in any manner.

11. Nothing herein contained nor any activities carried out pursuant hereto shall give rise to any encumbrance or easement against the property of either Kaiser or Cominco.

SIGNED this _____ day of _____, 1956.

KAISER ALUMINUM & CHEMICAL CORPORATION

ATTEST:

By_____

_____

COMINCO PRODUCTS, INC.

ATTEST:

By_____

_____

LAW OFFICES OF
KEITH & WINSTON
PAULSEN BUILDING
SPOKANE 8, WASHINGTON

LYLE KEITH
PATRICK H. WINSTON
W. K. SCAMMELL, JR.
NELSON B. REPSOLD

June 4, 1947

State Supervisor of Hydraulics
State of Washington
Olympia, Washington

Dear Sir:

We represent Permanente Metals Corporation which is now operating the Trentwood Rolling Mill, at Spokane, on lease from the War Assets Administration.

We are currently preparing a description of the plant site in connection with a new lease to be entered into between Permanente Metals Corporation and the Federal Government, and have some questions in connection with the two permits to appropriate waters of the Spokane River issued to the Defense Plant Corporation.

The water rights to which we have specific reference are the following: Certificate of Water Right, Record No. 4, Page No. 1986, referring to Appropriation Permit No. 3747, and Certificate of Water Right, Record No. 4, Page No. 1980, referring to Appropriation Permit No. 3564, issued by the State Supervisor of Hydraulics.

Our purpose is to make certain that the benefit of the water rights covered by these two certificates may inure to the present operator of the Trentwood Rolling Mill, the Permanente Metals Corporation. We would appreciate your advising us whether this may be accomplished merely by a lease from the War Assets Administration covering the real property to which the above mentioned water rights are appurtenant, or whether it is necessary to have new permits issued in the name of the Permanente Metals Corporation.

We feel that the War Assets Administration would not want to relinquish these water rights; because in the event of a termination of their lease to Permanente Metals Corporation, they would undoubtedly want the water rights to run with the plant site.

If the benefit of these water rights cannot be transferred to the Permanente Metals Corporation by a lease of the plant site to the Corporation, would you advise us whether the Government could effectively make an assignment of these rights to Permanente Metals Corporation for the period of the lease.

Very truly yours,

KEITH & WINSTON

By Nelson B. Repsold

NBR:mv

June 6,1947

Keith & Winston
Paulsen Building
Spokane, Washington

Attention Mr. Repsold:

Gentlemen:

Re: Certificates No. 1986 & 1980
Defense Plant Corporation

In reply to your letter of June 4th you are advised that a lease of the property to which this right is appurtenant, automatically gives the Permanente Metals Corporation the right to make use of the water granted, as provided in the permits, without impairment of the right.

Very truly yours,

Rodney Ryker
Supervisor of Hydraulics

By
J.F.R.Appleby
Assistant Supervisor

JFRA:jr

25-44

12-3

LAW OFFICES OF
KEITH, WINSTON & REPSOLD
SPOKANE & EASTERN BUILDING
SPOKANE 4, WASHINGTON
RIVERSIDE 8001

LYLE KEITH
PATRICK H. WINSTON
NELSON B. REPSOLD
E. LAWRENCE WHITE
ROBERT J. McNICHOLS

June 25, 1956

State Supervisor of Hydraulics
Department of Conservation and Development
Olympia, Washington

Re: Certificates of Water Right

Gentlemen:

We are attorneys for the Kaiser Aluminum & Chemical Corporation and are writing to you on its behalf. Kaiser is the present owner of certain property in Spokane County which was formerly owned by Defense Plant Corporation, a former agency of the Federal Government. The particular property is the Kaiser Trentwood Works, which is located adjacent to the Spokane River. The following certificates of water right were issued to Defense Plant Corporation by the State Supervisor of Hydraulics:

1. Certificate of Water Right, Certificate Record No. 4, page 1986, dated November 13, 1943.
2. Certificate of Water Right, Certificate Record No. 4, page 1980, dated December 1, 1943.

These documents authorize the predecessor of Kaiser (and now Kaiser Aluminum & Chemical Corporation) to draw water not to exceed a total of 44 cubic feet per second.

Cominco Products, Inc., a corporation, is presently constructing a manufacturing plant to the east of and adjacent to the Kaiser Trentwood Works. The Kaiser plant has a rather extensive fire protection system consisting of pumps, pipes, hydrants, etc. The Cominco Products, Inc. has requested permission from Kaiser to attach its fire protection system to that of Kaiser for emergency purposes. The two corporations have prepared a proposed agreement which is, in essence, a license authorizing Cominco Products, Inc. to connect its system with the system of Kaiser, provided that the only use of water by Cominco shall be for the extinguishment of fire and the testing of fire protection apparatus. It specifically provides that no water shall be used for any other purpose. For your information, I enclose a photocopy of this proposed agreement.

This transaction does not involve an assignment of such rights as Kaiser may have nor does it involve any plan to divert water for any purpose other than emergency fire fighting. It is my opinion from reading the law on the subject that this matter should be submitted to your Department for approval. Such approval is hereby requested.

If you have any questions or desire any further information, please communicate with me.

Very truly yours,

KEITH, WINSTON & REPSOLD

By: Robert J. McNichols

RJM:bc
encl.

June 28, 1956

Law Offices of
Keith, Winston & Repsold
Spokane & Eastern Building
Spokane 4, Washington

Attention: Mr. Robert J. McNichols

Gentlemen:

Re: S.W. Certificates Nos.1980 & 1986

Receipt is acknowledged of your letter of June 25, 1956, requesting information as to the proper procedure to follow in order that the Cominco Products, Inc., be permitted to utilize your fire protection system "covered by subject water rights" on a standby basis for fire protection for their plant.

We feel that the best way to handle this situation is for the Kaiser Aluminum Company to petition for a change of place of use of water under subject water rights. This will authorize the Cominco Products, Inc. to use the water system for fire protection purposes.

For this use we are enclosing a petition for change of purpose of use. It should be noted that only a portion of the water right (the capacity of the pipe that will serve the Cominco Products, Inc.) should be transferred. Further it should be pointed out that the change of purpose of use is for a standby use only.

Very truly yours,

DIVISION OF WATER RESOURCES

ROBERT H. RUSSELL
Assistant Supervisor

RHR:mb
Enc.

3564

Form 10. S. F. No. 370—7-26-40—3M. 19676.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

Permit to Appropriate Public Waters of the State of Washington

Book No. 15 of Permits, on Page 3564 Under Application No. 5701

Defense Plant Corporation

of Washington, D. C.

is hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the following limitations and provisions: Permittee shall construct and maintain at his own expense a weir, or other suitable device, for measuring any water granted herein for irrigation purposes and such appropriation shall be subject to a reasonable rotation system if ordered by the State Supervisor of Hydraulics; and it is further provided that Permittee, in the use of water under this permit, shall comply with all the laws of the Departments of Fisheries and Game in accordance with Chap. 127, Laws of 1939, and all regulations and laws hereafter enacted.

Priority date of this permit is May 20, 1942

Source of the proposed appropriation is Spokane River,

tributary of Columbia River

The quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 29.0 cubic feet per second, or its equivalent in case of rotation, to be used as set out below:

The approximate point of diversion is located 970' South & 400' West of the ~~South 42 30'30" East 440 ft. from~~ SE Cor. of Sec. 3-25-44 ~~the Southeast corner of SW¼ of Sec. 3, Twp. 25 N., Rge. 44 E.W.M.~~

(Changed to Govt. Lot 1 Nov. 29, 1943),

being within ~~NW¼ of NE¼~~ Sec. 10, Twp. 25 N., Rge. 44 E. W. M.,

county of Spokane

The use, or uses, to which water is to be applied:

FOR DOMESTIC SUPPLY AND MISCELLANEOUS USES: 29.0 cubic feet per second during entire year for Manufacturing (Changed to NW1/4 of Sec. 11 + SW1/4 of ~~Sec. 2-25-44E.~~) to be used within ~~NE¼~~ Sec. 10, Twp. 25 N., Rge. 44 E. W. M.

FOR IRRIGATION: ..... cubic feet per second, from ..... to .....

each year, for irrigation of ..... acres, described as follows:

FOR POWER: .....cubic feet per second continuously each year. Total power to be developed.....theoretical horse power. Total fall to be utilized.....feet.

Nature of works by means of which power is to be developed.....

.....

Works to be located in..... Sec. ....., Twp.....N., Rge.....W. M.

Water to be returned to .....

Point of return..... Sec.....Twp.....N., Rge.....W. M.

Use to which power is to be applied.....

FOR MUNICIPAL SUPPLY: .....cubic feet per second during entire year to supply.....

.....

DESCRIPTION OF DIVERSION WORKS

Height of dam.....ft.; Length on top.....ft.; Length on bottom.....ft.

Material to be used and character of construction.....

.....

Description of headgate.....

CANAL SYSTEM

AT HEADGATE: Width on top (at water line).....ft.; Width on bottom.....ft.; Depth of water.....ft.; Grade.....ft. fall per one thousand feet.

AT.....MILES FROM HEADGATE: Width on top (at water line).....ft.; Width on bottom.....ft.; Depth of water.....ft; Grade.....feet per one thousand feet.

(Please read carefully provisions below)

Construction work shall begin on or before October 1, 1942 and shall thereafter be prosecuted with reasonable diligence and completed on or before October 1, 1943 and complete application of water to proposed uses shall be made on or before October 1, 1944

Given under my hand and the seal of this office at Olympia, Washington, this 31st day of July, 1942

Thos J Bartholet

State Supervisor of Hydraulics.

Before your certificate of water right is issued it will be necessary to file with the State Supervisor of Hydraulics each of the following reports:

1. Notice of Beginning of Construction.
2. Notice of Completion of Construction.
3. Notice of Complete Application of Water to a Beneficial Use.
4. Proof of Appropriation of Water.

Upon a satisfactory showing that the appropriation has been perfected as provided by statute the State Supervisor of Hydraulics will issue a water right certificate.

(Blanks will be furnished by the office of the Supervisor of Hydraulics)

Application No. 5701

Permit No. 3564

PERMIT

To Appropriate Public Waters of the State of Washington

County Spokane

Issued to Defense Plant Corp.

of Washington, D. C.

This instrument was first received in the office of the State Supervisor of Hydraulics, Olympia, Wash., on the 20th day of May, 1942, at 1:30 o'clock P. M.

Approved July 31, 1942

Recorded in Book No. 15 of Permits, on page 3564

CHAS. J. BARTHOLET
State Supervisor of Hydraulics.

O. H. OLSON, PUBLIC PRINTER

PROGRESS SHEET

Cert. 480 ch. Purpose & Place of use

Application No. 5701 Permit No. 3564 Certificate No. 1980
Name of Defense Plant Corporation Assigned, date:
811 Vermont Avenue To:
Washington, D.C.
Appli. received 5-20-42 Initial Exam. fee received 5-20-42
Appli. returned for completion or correction Recd 6-8-42
Statement of add. exam. fee sent 5-21-42 Amount $24.00 by registered mail
Additional examination fee received 6-8-42

Application amended Nov. 29, 1943
Application cancelled

O. K.'d for publication by Date
Notice of Water Right Application sent 5-21-42
Protests filed
Affidavit of Publication received and checked 6-8-42

Temporary Permit issued to
Proviso-Gsmns 7-20-42
Examination made by

O. K.'d for Permit July 6 4x by CJB

Statement of filing and recording fee sent 7-24-42 Amount $58.00
Filing and recording fee received 7-31-42
Permit issued 7-31-42 No. 3564

Notice of Beginning of Construction sent 7-31-42
Time for " " " extended to Fee
Notice of " " " filed 8-10-42

Notice of Prosecution of Work with Diligence sent
" " " " " " " filed

Notice of Completion sent 8-10-42
Time for " of Construction extended to
Notice of " " " filed

Notice of Complete Application of Water sent 10-1-43
Time for " " " " extended to
Notice of " " " " filed

Proof of Appropriation sent 10-1-43 ; filed

Statement of fee for final certificate sent 10-1-43 Amount $1.40
Fee received 10-8-43 in file
Final Certificate of Water Right Issued 12-1-43 No. 1980

January 29, 1942.

Mr. H. O. Shepard
Davenport Hotel
Spokane, Washington

Dear Mr. Shepard:

Referring to our telephone communication today:

We are mailing you an application form for a water right for industrial use on the Spokane River. I was not too definite in our conversation as to whether or not water would be available for appropriation because of the normal flow being appropriated by the Washington Water Power Company, and the low water flow is supplemented by water held in storage by that company in Coeur d'Alene Lake. However, as the use of water will be non-consumptive and will be returned to the river, I see no reason why the water should not be available from the river for your needs, but the appropriation must be made according to provisions of our Water Code.

If you feel so inclined, it might be advisable to discuss the matter with officials of the Washington Water Power Company and inform them that the water will be returned to the river without appreciable loss. If there is some delay in filing the application, will you please advise me by mail as to the quantity of water that will be required for this industry. You mentioned the amount in our telephone conversation but I believe I did not get the proper figures.

You may be assured of our cooperation in obtaining the required water supply.

Yours very truly

CHAS. J. BARTHOLET
Supervisor of Hydraulics.

CJB:GH

UNITED
ENGINEERING and FOUNDRY COMPANY
FIRST · NATIONAL · BANK · BUILDING
PITTSBURGH — PENNSYLVANIA

503 Metals Bldg.
Spokane, Wash.

CABLE ADDRESS
UNITED PITTSBURGH

SUBJECT Plancor - 524

February 4, 1942.

Chas. J. Bartholet, Supervisor of Hydraulics
Division of Water Resources, State of Washington
Olympia, Washington

Dear Sir:

We wish to thank you for your letter of January 29, with enclosed water permit blanks with reference to use of water of the Spokane River for industrial purposes.

As explained to you over the phone, the use of this water will be non-consumptive and will be returned to the river after we have used it for cooling purposes only. It is quite possible that the request for permit will be delayed a few days as we will file this permit through the Defense Plant Corporation, here in Spokane, and they will forward it to you in a short time.

For your information, and to confirm our conversation over the telephone, we would require about 13,000 gallons per minute, or about 19,000,000 gallons of water per 24-hour day, for the purposes considered.

We have consulted the Washington Water Power Company, also the Inland Empire Paper Company, and have received from them letters conveying their permission to use the water in the river, providing we return it after our use. I believe these two concerns are the only ones that have the use of the river and the riparian rights.

We wish to thank you for your cooperation in taking care of our request so promptly, and the application for a permit will be forwarded to you in short order.

Yours very truly,

UNITED ENGINEERING & FOUNDRY CO.
Acting for and on behalf of
DEFENSE PLANT CORPORATION

H. O. Shepard

H. O. Shepard
Project Engineer

HOS:L

Affidavit of Publication

STATE OF WASHINGTON }
County of Spokane. } ss.

I, J. J. Walker do solemnly swear that I am the Principal Clerk of the Spokane Weekly Chronicle, a newspaper of general circulation established and regularly published, once each week in the English language, in the City of Spokane, Spokane County, Washington; that said newspaper has been so established and regularly published and has had said general circulation continuously for more than six (6) months prior to the 23rd day of July, 1941; that said newspaper is printed in an office maintained at its place of publication in the City of Spokane, Washington; that said newspaper was approved and designated as a legal newspaper by order of the Superior Court of the State of Washington for Spokane County on the 23rd day of July, 1941, and that said order has not been revoked and is in full force and effect; that the notice attached hereto and which is a part of the proof of publication,

No. 5701.
NOTICE OF WATER RIGHT APPLICATION.

State of Washington, office of supervisor of hydraulics, Olympia.

To whom it may concern: Notice is hereby given that Defense Plant Corporation of Washington, state of District of Columbia, under date of May 20, 1942, filed with the state supervisor of hydraulics, Olympia, Washington, an application for a permit to divert the public waters of Spokane river tributary of Columbia river, in the amount of 29 second feet, subject to existing rights, continuously each year for the purpose of manufacturing; that the approximate point of diversion is located within NW¼ of NE¼ of section 10, township 25 N., Range 44 E. W. M., in Spokane county. A map showing the location and plan of said diversion and the place of the proposed use is on file in the office of the state supervisor of hydraulics, Olympia, Washington, together with such other information as is required by law.

Any person, firm or corporation whose right will be injuriously affected by said application may file with the state supervisor of hydraulics, at Olympia, Washington, such objections or representations, in writing, as he may desire to make, within thirty (30) days after date of last publication, which date is June 4, 1942.

Witness my hand and official seal this 21st day of May, A. D. 1942.

(Seal.) CHAS. J. BARTHOLET.
State Supervisor of Hydraulics.

RECEIVED JUN 8 1942 DIVISION OF HYDRAULICS

Form G-30

Check 6/8/42

was published in said newspaper 2 times, the publication having been made once each week from the 28 day of May A. D. 1942, to the 4 day of June A. D. 1942.

That said notice was published in the regular and entire issue of every number of the paper during the period of time of publication, and that the notice was published in the newspaper proper and not in a supplement.

J. J. Walker

Subscribed and sworn to before me at the City of Spokane, this 4 day of June, 1942.

M. J. Barrett

Notary Public in and for the State of Washington, residing at Spokane, Wash.

STATE OF WASHINGTON

THE DEPARTMENT OF GAME

515 SMITH TOWER
SEATTLE

July 20, 1942

Mr. Chas. J. Bartholet, Supervisor
Division of Hydraulics
Olympia, Washington

Dear Sir:

Re: Appl. No. 4960, 5699, 5701, 5708

In regard to the above applications, we submit the following recommendations:

Application No. 4960, King County Public Works, Parks and Playgrounds for 7.0 c.f.s. from the waters of Granite Creek, tributary of the middle fork of the Snoqualmie. We desire to protest this diversion, as the saw mill is at the present time dumping the refuse into the middle fork of the Snoqualmie. It is the desire of the Department that the Superintendent of this mill contact me at this office.

Application No. 5699, Albert E. Mc Intosh for 4.0 c.f.s. from Deep Lake. This is not a very large lake, and if possible would like to have a reduction on this size diversion, also the intake must be screened, which we will leave to the discretion of your Department.

Application No. 5701, Defense Plant Corporation for 29 c.f.s. from Spokane River, tributary of Columbia River. There are no objections to the granting of this permit, however, the intake must be screened. Contact Fred L. Roundy, Protector in Charge, residing at RFD #7, Spokane, Washington, regarding the size of screen to be used.

COPY

STATE OF WASHINGTON

THE DEPARTMENT OF GAME

515 SMITH TOWER
SEATTLE

Application No 5708, James V. Thompson for 1.0 c.f.s. from the North Fork of Dakota Creek, tributary of Dakota Creek. The applicant was interviewed by the Game Protector, and he is satisfied with a .03 c.f.s. We have been particularly cautious regarding this stream, as we have it closed as a spawning tributary. The Department would be favorable to a .03 diversion.

Yours very truly,

THE DEPARTMENT OF GAME

By C F P
Clarence F. Pautzke
Chief Biologist

CFP:ec
cc Dep't of Fisheries

COPY

Notice of Beginning of Construction

I, United Engineering & Fdry Co. Acting for and on Behalf of Defense Plant Corporation, the holder of Permit No. 3747 issued by the Supervisor of Hydraulics of the State of Washington for the appropriation of 15 second-feet of the unappropriated waters of Spokane, tributary of Columbia, in accordance with the tenor of such permit and the limitations endorsed thereon by the Supervisor of Hydraulics, began the actual construction of the works described therein on the 14 day of October, 1943

The nature and the amount of construction work already done is as follows:

PER CENT COMPLETED:

Clearing 100 %; Material in place 100 %; Excavation 100 %; Structure 100 %.

Any additional information which may tend to show good faith in the prosecution of the work:

Work Entirely Completed

RECEIVED DEC 7 1943 DIVISION OF HYDRAULICS

IN WITNESS WHEREOF, I have hereunto set my hand this 6th day of December, 1943

Harold O Stephands
(Signature of applicant)

Box 2158 Spokane, Wash.
(Present address)

Project Engr

S. F. No. 376—1-41—1M. 21070.

S. F. No. 379—1-41—5C. 21071.

Notice of Complete Application of Water to a Beneficial Use

WE ~~I~~, UNITED ENGINEERING AND FOUNDRY COMPANY Acting for and on Behalf of DEFENSE PLANT CORPORATION, holder of Permit No. 3747 issued by the State Supervisor of Hydraulics of Washington for the appropriation of 15 second-feet of the waters of Spokane River, in accordance with the tenor of such permit and the limitations endorsed thereon by the State Supervisor of Hydraulics, completely applied the waters to a beneficial use on the first day of November, 1943, being within the time limitation as fixed in said permit or extended by the State Supervisor of Hydraulics for the complete application of water to a beneficial use.

(If all water granted in the permit has not been fully applied to beneficial use, give amount used in percentage to the whole, so that subsequent appropriators may have notice. If permit is for irrigation use, state per cent of lands not now watered.)

RECEIVED
DEC 11 1943
DIVISION OF HYDRAULICS

IN WITNESS WHEREOF, I have hereunto set my hand this 9 day of Dec, 1943

PO Box 2158 Spokane Wash
(Present address)

H. O. Shepard Project Engr
(Signature of applicant)

S. F. No. 380—1930. Approved as to Form [redacted] ept. of Efficiency. 10618.

RECEIVED
DEC 11 1943
DIVISION OF
HYDRAULICS

Proof of Appropriation of Water

Application No...... *Permit No.* 3747

1. *Name of applicant* UNITED ENGINEERING & FOUNDRY COMPANY Acting for and on Behalf of DEFENSE PLANT CORPORATION
2. *Postoffice address* P. O. Box 2158 Spokane, Washington
3. *Source of appropriation* Spokane River *tributary of* Columbia River
4. *For what purpose or purposes is water used?* Manufacturing
5. *Give date of beginning of construction* August 1, 1943
6. *Give date of completion of construction work* November 1, 1943
7. *When was all the water completely applied to proposed use?* November 1, 1943
8. *Fill in the following carefully, according to use. If for irrigation, fill in the number of acres described in permit and the number of acres actually irrigated (Water should be applied to the full number of acres to be irrigated before certificate can issue). If for power, give location of power plant and the theoretical horsepower described in permit. If for domestic supply, municipal, manufacturing or other uses, simply give the description of place of use.*

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION FILL IN FOLLOWING	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER FILL IN FOLLOWING	
Section	Township	Range		H. P. Described in Permit	H. P. Actually Developed

FOR ALL OTHER USES
(Same as former permit for 29 c.f.s. already issued)

Section	Township	Range	LEGAL SUBDIVISION	

9. *During what months is water used?* All Year
10. *Does map filed with your permit show correctly the location of diverting work and area of land where water is used?* Yes *If not, state wherein such map is in error*.....
11. *If the dimensions of your ditch or dam do not correspond to those described in your permit and the plans and specifications now on file in the office of the State Supervisor of Hydraulics, state what changes have been made, giving dimensions of ditch or other distributing works.*

(Over)

REMARKS:

STATE OF WASHINGTON,
County of Spokane } *ss.*

I, H. O. Shepard, *being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation of water; that I know the contents thereof; and that the facts therein stated are true.*

IN WITNESS WHEREOF, I have hereunto set my hand this 9 *day of* December *19*43

H. O. Shepard Project Engr.

Subscribed and sworn to before me this 9th *day of* December, *19*43

M. Dickens
Notary Public.
NOTARY PUBLIC in and for the State of Washington, residing at Spokane.

Form 10. S. F. No. 370—7-26-40—3M. 19676.

3747

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

Permit to Appropriate Public Waters of the State of Washington

Book No. 15 of Permits, on Page 3747 Under Application No. 5915

Defense Plant Corporation

of Washington, D. C.

is hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the following limitations and provisions: Permittee shall construct and maintain at his own expense a weir, or other suitable device, for measuring any water granted herein for irrigation purposes and such appropriation shall be subject to a reasonable rotation system if ordered by the State Supervisor of Hydraulics; and it is further provided that Permittee, in the use of water under this permit, shall comply with all the laws of the Departments of Fisheries and Game in accordance with Chap. 127, Laws of 1939, and all regulations and laws hereafter enacted.

Priority date of this permit is October 14, 1943

Source of the proposed appropriation is Spokane River,

tributary of Columbia River

The quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 15.0 cubic feet per second, or its equivalent in case of rotation, to be used as set out below:

The approximate point of diversion is located 970 ft. South and 400 ft. West of the Southeast corner of Sec. 3, Twp. 25 N., Rge. 44 E.

being within Lot 1 Sec. 10, Twp. 25 N., Rge. 44 E. W. M.,

county of Spokane

The use, or uses, to which water is to be applied:

FOR DOMESTIC SUPPLY AND MISCELLANEOUS USES: 15.0 cubic feet per second during entire year for Manufacturing to be used within NW¼ SW¼ Sec. 11 Twp. 25 N. Rge. 44 E. Sec. 2, Twp. 25 N. N., Rge. 44 E. W. M.

FOR IRRIGATION: ..... cubic feet per second, from ..... to .....

each year, for irrigation of ..... acres, described as follows:

FOR POWER: .....cubic feet per second continuously each year. Total power to be developed.....theoretical horse power. Total fall to be utilized.....feet.

Nature of works by means of which power is to be developed.....

.....

Works to be located in..... Sec. ....., Twp.....N., Rge.....W. M.

Water to be returned to .....

Point of return..... Sec.....Twp.....N., Rge.....W. M.

Use to which power is to be applied.....

FOR MUNICIPAL SUPPLY: .....cubic feet per second during entire year to supply.....

.....

DESCRIPTION OF DIVERSION WORKS

Height of dam.....ft.; Length on top.....ft.; Length on bottom.....ft.

Material to be used and character of construction.....

.....

Description of headgate.....

CANAL SYSTEM

AT HEADGATE: Width on top (at water line).....ft.; Width on bottom.....ft.; Depth of water.....ft.; Grade.....ft. fall per one thousand feet.

AT.....MILES FROM HEADGATE: Width on top (at water line).....ft.; Width on bottom.....ft.; Depth of water.....ft; Grade.....feet per one thousand feet.

(Please read carefully provisions below)

Construction work shall begin on or before November 1, 1944 and shall thereafter be prosecuted with reasonable diligence and completed on or before November 1, 1945 and complete application of water to proposed uses shall be made on or before November 1, 1946

Given under my hand and the seal of this office at Olympia, Washington, this 3rd day of December, 1943

Thos J Barthrop

State Supervisor of Hydraulics.

Address correspondence to: United Engineering & Foundry Co.
Box 2158, Spokane, Washington

Can be approved without field exam C.F.B.

Cert. #80 ch. Purpose & Place of use

PROGRESS SHEET

Name: Defense Plant Corp; Washington, D. C.
Assigned to:
Date:

APPLI. NO. 5915 PERMIT NO. 3747 CERT. NO. 1986

Priority: 10-14-43 at 1:30 P.M.

Appli. received 10-8-43 Initial Exam. fee received 10-14-43
Appli. returned for completion or correction _____ Received _____
Statement of add. exam. fee sent _____ Amount: $10.00
Additional examination fee received 10-14-43.

Application amended 11-29-43
Application cancelled _____

O.K'd for publication by J. F. Ch. Date Oct. 15. 1943.
Notice of Water Right Application sent 10-16-43
Protests filed _____
Affidavit of Publication received and checked 11-12-43 (Nov. 27)

Temporary Permit issued _____ to _____

Examination made _____ by _____

O.K.'d for Permit Nov. 27. 1943 by J. F. Ch.

Statement of filing and recording fee sent 11-29-43 Amount $30.00
Filing and recording fee received 12-3-43
Permit issued 12-3-43 No. 3747

Notice of Beginning of Construction sent 12-4-43
Time for " " " extended to _____ Fee _____
Notice of " " " filed 12-7-43

Notice of Completion sent _____
Time for " of Construction extended to _____
Notice of " " " filed 12-7-43 (included in notice of beginning)

Notice of Complete Application of Water sent 12-7-43
Time for " " " " extended to _____
Notice of " " " " filed _____

Proof of Appropriation sent 12-7-43; filed 12-11-43

Statement of fee for final certificate sent 12-7-43 Amount $1.40
Fee received 12-11-43
Final Certificate of Water Right Issued 12-13-43 No. 1986

Affidavit of Publication

STATE OF WASHINGTON } ss.
County of Spokane. }

I, J. J. Walker do solemnly swear that I am the Principal Clerk of the Spokane Daily Chronicle, a newspaper established and regularly published, once each weekday {(Week) (Day)} in the English language, in and of general circulation in the City of Spokane, Spokane County, Washington; that said newspaper has been so established and regularly published and has had said general circulation continuously for more than six (6) months prior to the 23rd day of July, 1941; that said newspaper is printed in an office maintained at its place of publication in the City of Spokane, Washington; that said newspaper was approved and designated as a legal newspaper by order of the Superior Court of the State of Washington for Spokane County on the 23rd day of July, 1941, and that said order has not been revoked and is in full force and effect; that the notice attached hereto and which is a part of the proof of publication, was published in said newspaper two times, the publication having been made once ~~each~~ on October 20, 1943 and ~~from~~ the 27th day of October A. D. 1943, ~~to the~~ ~~day of~~ ~~A. D. 19~~.

That said notice was published in the regular and entire issue of every number of the paper during the period of time of publication, and that the notice was published in the newspaper proper and not in a supplement.

J. J. Walker

Subscribed and sworn to before me at the City of Spokane, this 28th day of October, 1943.

Helen E. Kronberg

Notary Public in and for the State of Washington, residing at Spokane, Wash.

State of Washington.
OFFICE OF SUPERVISOR OF HYDRAULICS.
OLYMPIA.
NOTICE OF WATER RIGHT APPLICATION NO. 5915.

To whom it may concern:

Notice is hereby given that the Defense Plant corporation of Washington, D. C., under date of October 8, 1943, filed with the State Supervisor of Hydraulics, Olympia, Washington, an application for a permit to divert the public waters of Spokane River tributary of Columbia River, in the amount of fifteen (15.0) second-feet subject to existing rights, continuously each year for the purpose of manufacturing; that the approximate point of diversion is located within Lot 1 of Section 10, Township 25 N., Range 44 E. W. M., in Spokane county. A map showing the location and plan of said diversion and the place of the proposed use is on file in the office of the State Supervisor of Hydraulics, Olympia, Washington, together with such other information as is required by law.

Any person, firm or corporation whose right will be injuriously affected by said application may file with the State Supervisor of Hydraulics, at Olympia, Washington, such objections or representations, in writing, as he may desire to make, within thirty (30) days after date of last publication, which date is October 27, 1943.

Witness my hand and official seal this 16th day of October, A. D. 1943.

CHAS. J. BARTHOLET,
State Supervisor of Hydraulics.

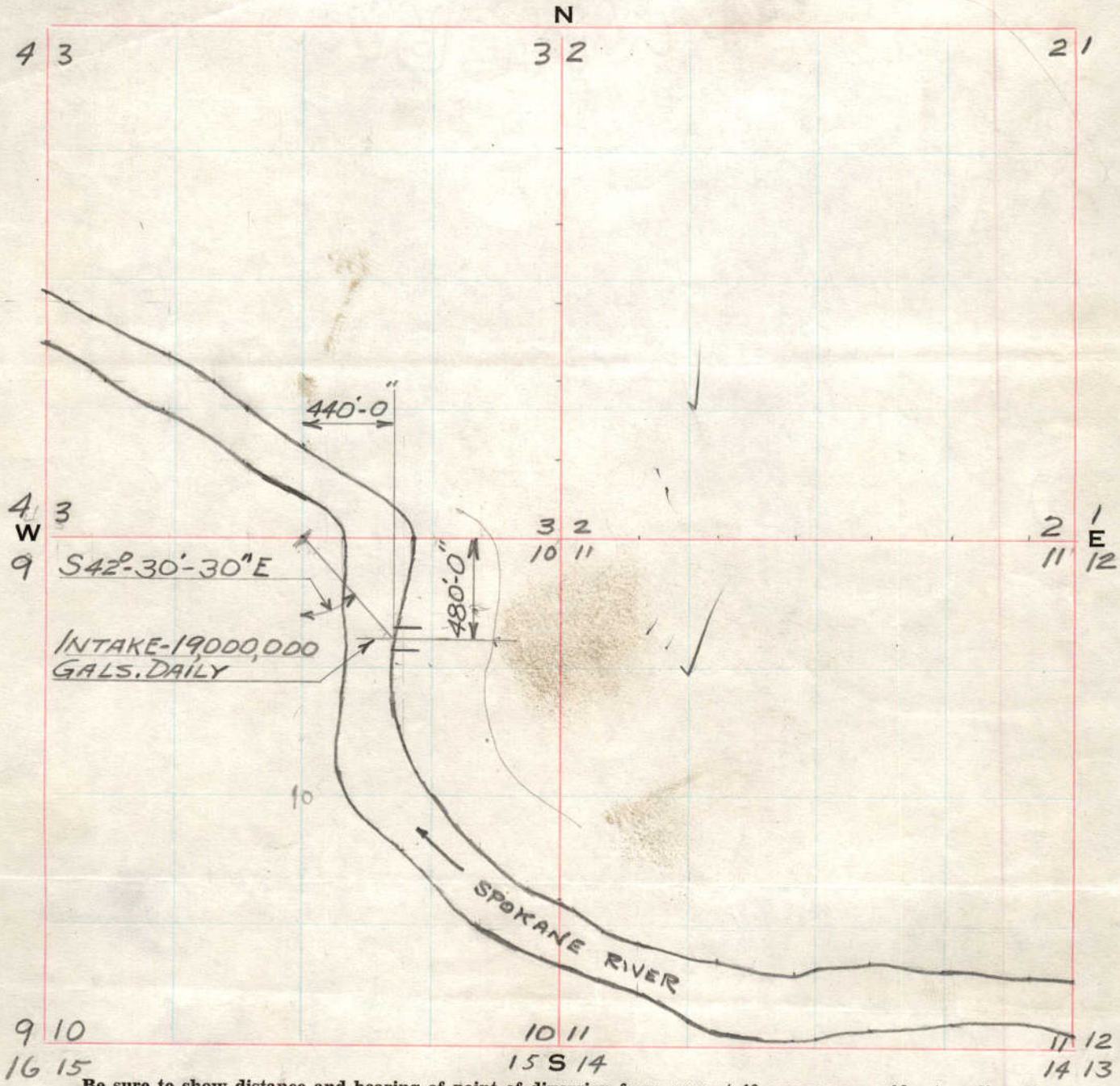
RECEIVED NOV 12 1943 DIVISION OF HYDRAULICS

Form G-16

SECTION PLAT

Sec. 3-2-10-11 Twp. 25 N. R. 44E

TRENTWOOD



Be sure to show distance and bearing of point of diversion from nearest 40-acre corner. Also traveling directions from nearest town on main highway.

Scale: 1 inch = 800 feet.

Last

APPENDIX C
Calculations

Velocity Calculations - DIF
Pump House #2

Approach Velocity $V_{approach} = Q_i/A_{screen}$
Through-Screen Velocity $V_{through\ screen} = V_{approach}$ / Screen open area

Component	Description	Value	Units	Notes
	Flow (Q_i)	44	cfs	
	Low Water Elevation	1916	feet	
Trash Rack				
	Number of Bays	1		
	Bay Width	6.875	feet	
	Invert Elevation	1910.5	feet	
	Estimated Open Erea	77	percent	
	Height	12	feet	vertical
Sluice Gates				
	Number	1		
	Width	6.875	feet	
	Height	10	feet	varries
Stationary Screen				
	Number of Screen	2		2 in-line
	Screen Bay Width	6.88	feet	
	Screen Opening Width	6.63	feet	less middle bar
	Invert Elevation	1910.5	feet	
	Estimated Open Erea	74	percent	
Travelling Screen				
	Number of Screens	1		
	Screen Width	7.50	feet	
	Invert Elevation	1907	feet	
	Estimated Open Erea	52	percent	

Calculations
Trash Rack

$V_{approaching\ trash\ rack}$	1.2	feet/second	= 44 cfs / (7.65 ft x (1,916 ft - 1,910.25 ft))
$V_{through\ screen}$	1.5	feet/second	= 1.2 ft/sec / 0.77

Sluice Gates

$V_{opening}$	0.64	feet/second	= 44 cfs / (7.5 ft x 10 ft)

Stationary Screen

$V_{approach}$	1.2	feet/second	= 44 cfs / (4 ft (1916 - 1911))
$V_{through\ screen}$	1.6	feet/second	= 1.3 ft/sec / 0.74

Travelling Screen

$V_{approach}$	0.7	feet/second	= 44 cfs / (4 ft (1916 - 1910.25))
$V_{through\ screen}$	1.3	feet/second	= 0.7 ft/sec / 0.52

Velocity Calculations - Max AIF
Pump House #2

Approach Velocity $V_{approach} = Q_i/A_{screen}$
Through-Screen Velocity $V_{through\ screen} = V_{approach}$ / Screen open area

Component	Description	Value	Units	Notes
	Flow (Q_i)	9.9	cfs	
	Low Water Elevation	1916	feet	
Trash Rack				
	Number of Bays	1		
	Bay Width	6.875	feet	
	Invert Elevation	1910.5	feet	
	Estimated Open Erea	77	percent	
	Height	12	feet	vertical
Sluice Gates				
	Number	1		
	Width	6.875	feet	
	Height	10	feet	varries
Stationary Screen				
	Number of Screen	2		2 in-line
	Screen Bay Width	6.875	feet	
	Screen Opening Width	6.625	feet	less middle bar
	Invert Elevation	1910.5	feet	
	Estimated Open Erea	73.9	percent	
Travelling Screen				
	Number of Screens	1		
	Screen Width	7.5	feet	
	Invert Elevation	1907	feet	
	Estimated Open Erea	52	percent	

Calculations
Trash Rack

$V_{approaching\ trash\ rack}$	0.26	feet/second	= 9.9 cfs / (7.65 ft x (1,916 ft - 1,910.25 ft))
$V_{through\ screen}$	0.34	feet/second	= 0.26 ft/sec / 0.77

Sluice Gates

$V_{opening}$	0.14	feet/second	= 9.9 cfs / (7.5 ft x 10 ft)

Stationary Screen

$V_{approach}$	0.27	feet/second	= 9.9 cfs / (4 ft (1916 - 1911))
$V_{through\ screen}$	0.37	feet/second	= 0.30 ft/sec / 0.74

Travelling Screen

$V_{approach}$	0.15	feet/second	= 9.9 cfs / (4 ft (1916 - 1910.25))
$V_{through\ screen}$	0.28	feet/second	= 0.15 ft/sec / 0.52

Velocity Calculations - Average AIF
Pump House #2

Approach Velocity	$V_{approach} = Q_i/A_{screen}$
Through-Screen Velocity	$V_{through\ screen} = V_{approach}$ / Screen open area

Component	Description	Value	Units	Notes
	Flow (Q_i)	2.96	cfs	
	Low Water Elevation	1916	feet	
Trash Rack				
	Number of Bays	1		
	Bay Width	6.875	feet	
	Invert Elevation	1910.5	feet	
	Estimated Open Erea	77	percent	
	Height	12	feet	vertical
Sluice Gates				
	Number	1		
	Width	6.875	feet	
	Height	10	feet	varries
Stationary Screen				
	Number of Screen	2		2 in-line
	Screen Bay Width	6.875	feet	
	Screen Opening Width	6.625	feet	less middle bar
	Invert Elevation	1910.5	feet	
	Estimated Open Erea	73.9	percent	
Travelling Screen				
	Number of Screens	1		
	Screen Width	7.5	feet	
	Invert Elevation	1907	feet	
	Estimated Open Erea	52	percent	

Calculations
Trash Rack

$V_{approaching\ trash\ rack}$	0.08	feet/second	= 9.9 cfs / (7.65 ft x (1,916 ft - 1,910.25 ft))
$V_{through\ screen}$	0.10	feet/second	= 0.26 ft/sec / 0.77

Sluice Gates

$V_{opening}$	0.04	feet/second	= 9.9 cfs / (7.5 ft x 10 ft)

Stationary Screen

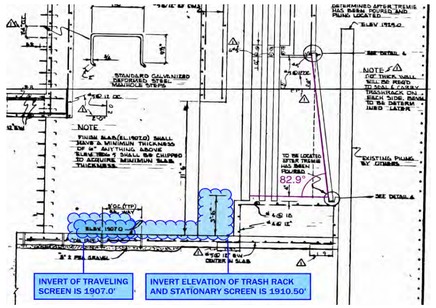
$V_{approach}$	0.08	feet/second	= 9.9 cfs / (4 ft (1916 - 1911))
$V_{through\ screen}$	0.11	feet/second	= 0.30 ft/sec / 0.74

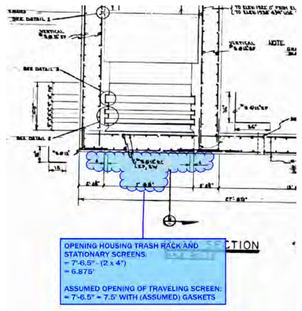
Travelling Screen

$V_{approach}$	0.04	feet/second	= 9.9 cfs / (4 ft (1916 - 1910.25))
$V_{through\ screen}$	0.08	feet/second	= 0.15 ft/sec / 0.52

Travelling Screen
Percent Open Area = ((K*L)/(K+D)(L+d))*100
POA = ((0.0603*0.0603)/(0.0603+0.023)(0.023+0.0603)*100
POA = ((0.0036)/(0.083)(0.083))*100
POA = (0.0036/0.0069)*100
POA = 0.523*100
POA = 52 percent

Trash Rack
Percent Open Area = ((K*L)/(K+D)(L+d))*100
POA = ((2*12.17)/(2+0.5)(12.17+0.5)*100
POA = ((24.34)/(2.5)(12.67))*100
POA = (24.34/31.68)*100
POA = 0.77*100
POA = 77 percent

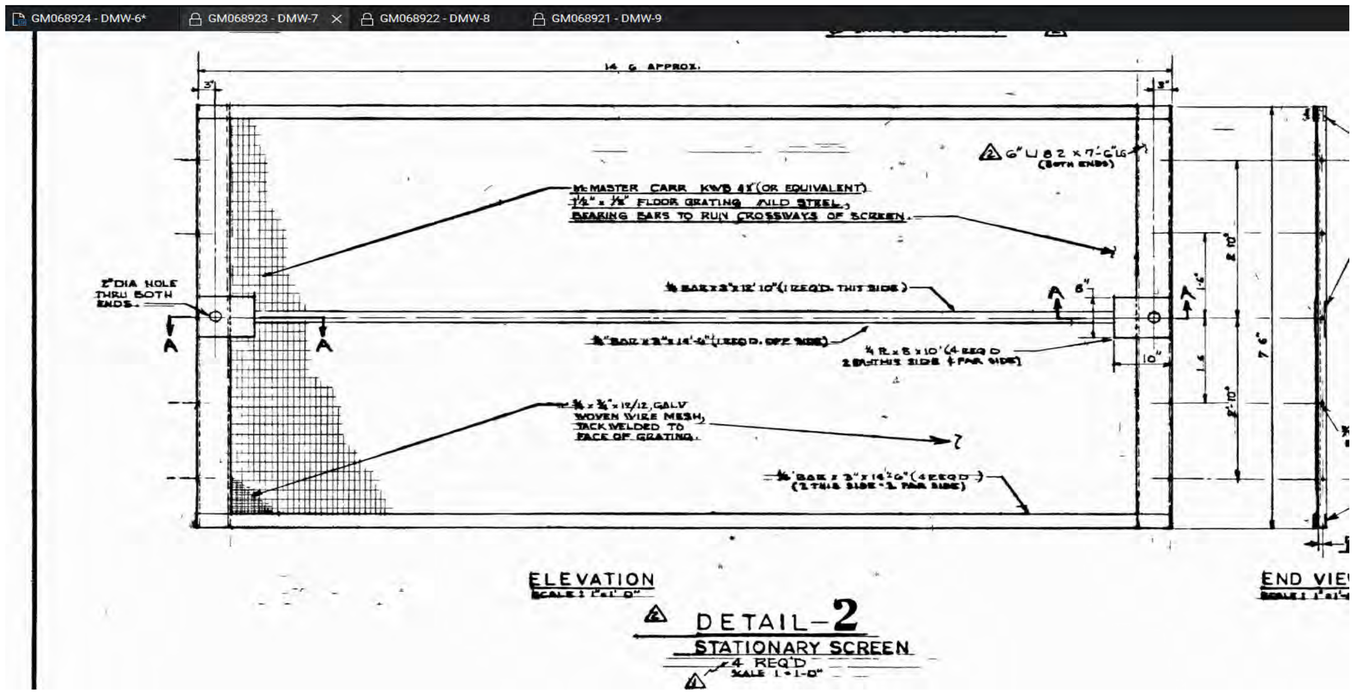




Stationary Screen:

Woven Wire Mesh Table

Mesh	Wire Diameter	Opening	Open Area %	Weight/SQ FT
1" x 1"	.063	.937	7.8	.256
1" x 1"	.080	.920	87.8	.400
1" x 1"	.092	.908	82.4	.544
1" x 1"	.105	.895	80.1	.710
1" x 1"	.120	.880	77.4	.928
1" x 1"	.135	.865	74.8	1.18
1" x 1"	.148	.852	72.6	1.42
1" x 1"	.162	.838	70.2	1.70
1" x 1"	.192	.808	65.3	2.40
1" x 1"	.250	.750	56.3	4.12
3/4" x 3/4"	.063	.687	83.9	.340
3/4" x 3/4"	.072	.678	81.7	.445
3/4" x 3/4"	.080	.670	79.8	.549
3/4" x 3/4"	.092	.658	76.9	.728
3/4" x 3/4"	.105	.645	73.9	.950



Area of Influence - DIF

$R_{AOI} = Q_i / (\pi \times d \times V)$

$R_{AOI} = 44 / (3.14 \times 5.5 \times 0.5)$

$R_{AOI} = 5.09$

Area of Influence - Mean AIF

$R_{AOI} = Q_i / (\pi \times d \times V)$

$R_{AOI} = 9.9 / (3.14 \times 5.5 \times 0.5)$

$R_{AOI} = 1.15$

Area of Influence - Mean AIF

$R_{AOI} = Q_i / (\pi \times d \times V)$

$R_{AOI} = 2.96 / (3.14 \times 5.5 \times 0.5)$

$R_{AOI} = 0.34$

APPENDIX D
Flow Data

Flow Data - Post Falls

00060, Discharge, cubic feet per second,													
Day of month	Mean of daily mean values for each day for water year of record in, ft^3/s (Calculation Period 1912-10-01 -> 2020-09-30)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	5,010	5,550	7,080	11,000	17,200	14,900	3,850	1,080	859	1,410	2,180	4,180	
2	5,020	5,650	7,060	11,300	17,100	14,500	3,570	1,060	888	1,430	2,180	4,230	
3	4,990	5,650	7,010	11,500	17,100	14,200	3,320	1,070	919	1,460	2,200	4,320	
4	4,900	5,660	6,990	11,800	17,100	13,800	3,130	1,020	917	1,540	2,240	4,550	
5	4,910	5,640	7,010	12,000	17,100	13,400	3,060	990	906	1,580	2,330	4,650	
6	4,920	5,600	7,010	12,200	17,100	13,000	2,980	966	920	1,580	2,410	4,700	
7	4,900	5,640	7,040	12,400	17,200	12,700	2,890	936	948	1,590	2,480	4,620	
8	4,900	5,730	7,060	12,600	17,200	12,300	2,710	905	1,010	1,620	2,520	4,520	
9	4,870	5,870	7,120	12,900	17,300	11,900	2,540	918	1,040	1,630	2,520	4,410	
10	4,870	6,090	7,150	13,100	17,400	11,400	2,420	903	1,050	1,620	2,510	4,390	
11	4,890	6,210	7,290	13,300	17,400	11,100	2,350	915	1,060	1,690	2,490	4,500	
12	4,920	6,280	7,490	13,600	17,400	10,700	2,240	903	1,090	1,740	2,500	4,690	
13	4,920	6,300	7,630	13,800	17,400	10,300	2,100	890	1,150	1,740	2,560	4,820	
14	4,910	6,290	7,820	14,100	17,400	9,800	2,060	868	1,170	1,760	2,680	4,840	
15	4,950	6,320	7,990	14,400	17,500	9,410	2,010	847	1,190	1,770	2,780	4,800	
16	5,080	6,360	8,210	14,800	17,500	9,190	1,960	841	1,230	1,760	2,750	4,760	
17	5,190	6,470	8,370	15,000	17,600	8,930	1,830	817	1,260	1,740	2,790	4,880	
18	5,280	6,540	8,550	15,200	17,700	8,640	1,740	824	1,260	1,750	2,840	4,950	
19	5,450	6,510	8,710	15,400	17,700	8,130	1,670	820	1,280	1,760	2,880	4,950	
20	5,530	6,660	8,880	15,700	17,600	7,770	1,610	828	1,290	1,800	2,930	4,950	
21	5,510	6,830	9,030	16,000	17,500	7,420	1,580	842	1,310	1,880	3,070	5,030	
22	5,470	6,990	9,210	16,200	17,400	7,150	1,550	822	1,330	1,920	3,210	5,080	
23	5,520	7,110	9,380	16,400	17,300	6,910	1,470	865	1,370	1,920	3,320	5,160	
24	5,580	7,130	9,540	16,700	17,100	6,470	1,400	879	1,360	1,940	3,490	5,220	
25	5,550	7,170	9,720	16,800	16,900	6,130	1,350	888	1,360	1,980	3,610	5,190	
26	5,600	7,170	9,900	16,900	16,700	5,640	1,320	918	1,380	2,000	3,760	5,160	
27	5,580	7,170	10,000	17,000	16,600	5,300	1,230	932	1,380	2,010	3,930	5,110	
28	5,590	7,090	10,200	17,100	16,300	4,960	1,200	888	1,390	2,050	3,990	5,120	
29	5,600	7,320	10,400	17,100	15,900	4,540	1,190	854	1,390	2,080	3,970	5,170	
30	5,560		10,500	17,200	15,500	4,180	1,190	847	1,430	2,190	4,020	5,190	
31	5,460		10,700		15,200		1,130	837		2,210		5,120	
Mean Monthly Discharge	**5,207**	**6,379**	**8,389**	**14,450**	**17,077**	**9,492**	**2,085**	**902**	**1,171**	**1,779**	**2,905**	**4,815**	**6,221**

Flow Data - Greenacres

00060, Discharge, cubic feet per second,													
YEAR	Monthly mean in ft^3/s (Calculation Period: 1948-03-01 -> 2011-08-31)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1948			6,471	15,580	29,510	22,900	1,999	1,391	715.7	1,497	1,499	3,052	
1949	2,728	3,148	10,690	19,440	27,710	6,873	1,071	503.6	131.7	864.7	2,805	3,453	
1950	4,569	6,437	16,490	19,520	24,030	22,650	6,216	1,001	349.4	2,195	4,435	9,128	
1951	7,735	15,440	7,296	15,160	16,550	5,648	1,324	199	329	2,788	3,600	5,185	
1952	4,241	5,176	3,988	17,820	21,870	5,814							
1999									1,185	1,628	2,616	6,738	
2000	4,100	6,068	9,558	20,030	16,150	6,646	1,632	431.9	1,158	2,159	1,994	1,591	
2001	944.6	1,118	2,075	4,593	10,830	3,124	780	150.2	493.7	1,555	2,103	4,182	
2002	5,903	5,186	7,862	19,300	20,570	19,210	3,052	519.7	1,024	1,795	1,273	1,844	
2003	3,620	10,450	9,284	12,390	7,659	4,331	605.9	96.2	807.4	1,519	1,859	3,175	
2004	1,830	4,280	7,858	12,670	10,130	6,450	1,261	645.3	1,282	2,553	3,554	8,346	
2005	6,332	6,245	3,285	9,823	7,273	3,059	834.1	143.3	802.6	1,866	2,486	2,719	
2006	11,700	6,592	6,915	15,670	15,710	7,379	1,342	157.4	725.7	1,130	5,077	5,079	
2007	5,285	5,052	14,610	14,470	9,207	2,942	618.1	40	441.9	1,361	1,945	3,028	
2008	2,395	2,178	5,358	7,653	26,160	23,500	3,332	677.5	985.8	1,556	2,019	3,060	
2009	6,236	3,534	7,590	14,260	17,900	7,623	1,270	425.9	607.6	1,112	2,055	2,476	
2010	2,522	2,583	2,856	5,589	9,291	12,170	2,236	448.9	845.1	1,411	2,690	6,041	
2011	13,030	8,430	8,348	18,090	24,540	22,900	5,918	828.8					
Mean of monthly Discharge	**5,200**	**5,740**	**7,680**	**14,200**	**17,400**	**10,800**	**2,090**	**479**	**743**	**1,690**	**2,630**	**4,320**	**6,081**

Flow Data - Trent Bridge

00060, Discharge, cubic feet per second,													
Day of													
month	Mean of daily mean values for each day for water year of record in, ft^3/s (Calculation Period 1947-10-01 -> 2015-09-30)												
	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	5,520	4,930	9,460	9,100	23,200	19,300	6,260	1,660	1,000	1,570	3,270	5,110	
2	5,460	5,480	9,310	9,370	22,900	18,800	5,720	1,640	946	1,670	2,940	5,980	
3	5,490	6,030	9,050	9,710	22,500	18,300	5,220	1,750	989	1,720	2,970	5,340	
4	5,450	6,450	8,930	10,100	22,200	18,100	5,110	1,620	961	1,710	2,750	4,970	
5	5,440	6,830	8,830	10,500	21,600	17,800	4,990	1,660	958	1,900	2,530	4,600	
6	5,130	6,880	8,910	11,100	21,200	17,500	4,980	1,500	937	1,720	2,580	4,380	
7	5,320	7,090	8,950	11,800	21,000	17,200	4,780	1,420	1,010	1,650	2,360	3,640	
8	5,160	6,970	9,040	12,500	21,100	16,700	4,380	1,280	1,100	1,620	2,840	3,640	
9	5,620	7,000	8,960	13,100	21,100	16,100	4,280	1,310	1,090	1,610	2,850	3,680	
10	5,650	7,360	8,910	13,400	21,400	15,500	4,040	1,320	1,070	1,700	2,770	3,450	
11	5,650	7,720	8,980	13,600	21,800	14,800	3,930	1,330	1,040	1,950	2,430	3,350	
12	5,920	8,350	8,860	13,700	22,100	14,200	3,690	1,300	1,050	2,030	2,460	3,480	
13	5,970	8,920	8,690	14,000	22,500	13,800	3,280	1,240	1,110	2,040	2,460	4,010	
14	5,800	9,160	8,190	14,200	23,000	13,000	3,070	1,250	1,180	1,900	2,580	3,960	
15	5,470	9,220	8,270	14,800	23,400	12,700	2,840	1,170	1,220	1,950	2,690	3,860	
16	5,160	8,920	8,130	15,300	23,800	12,500	2,770	1,150	1,220	2,000	2,570	4,070	
17	4,660	8,550	8,020	15,800	23,300	12,400	2,550	1,050	1,220	1,990	2,730	4,220	
18	4,200	8,280	8,140	16,500	23,200	12,200	2,300	1,070	1,240	1,970	2,690	4,360	
19	5,190	7,570	8,410	17,600	23,300	11,900	2,300	1,070	1,360	2,080	2,560	4,470	
20	5,580	7,370	8,580	18,600	23,300	11,700	2,460	1,050	1,280	2,130	2,440	4,660	
21	5,600	7,400	8,860	19,500	23,100	11,600	2,420	1,090	1,400	2,170	2,450	4,690	
22	5,850	7,490	9,000	20,000	22,900	11,200	2,280	935	1,390	2,570	2,510	5,100	
23	6,760	7,780	9,340	20,700	22,700	10,700	2,100	1,020	1,410	2,590	2,640	5,240	
24	6,900	8,150	9,300	21,300	22,500	10,200	1,830	1,090	1,360	2,560	3,390	5,170	
25	6,920	8,800	9,170	21,700	22,100	9,800	1,620	1,080	1,310	2,520	3,730	5,350	
26	6,870	9,120	9,240	22,000	21,800	9,320	1,640	1,020	1,400	2,090	4,000	5,380	
27	6,150	9,570	9,120	22,300	21,600	9,140	1,700	1,050	1,500	2,040	3,530	5,540	
28	6,030	9,710	9,100	22,500	21,200	8,630	1,790	1,000	1,470	2,150	3,990	5,850	
29	5,870	8,160	9,110	22,800	20,900	8,230	1,850	919	1,450	2,460	4,280	5,750	
30	5,220		9,080	23,100	20,600	7,620	1,780	972	1,500	2,960	4,400	5,690	
31	4,550		9,070		20,000		1,720	1,040		3,720		5,620	
Mean Monthly Discharge	**5,631**	**7,768**	**8,871**	**16,023**	**22,171**	**13,365**	**3,215**	**1,228**	**1,206**	**2,088**	**2,946**	**4,665**	**7,431**

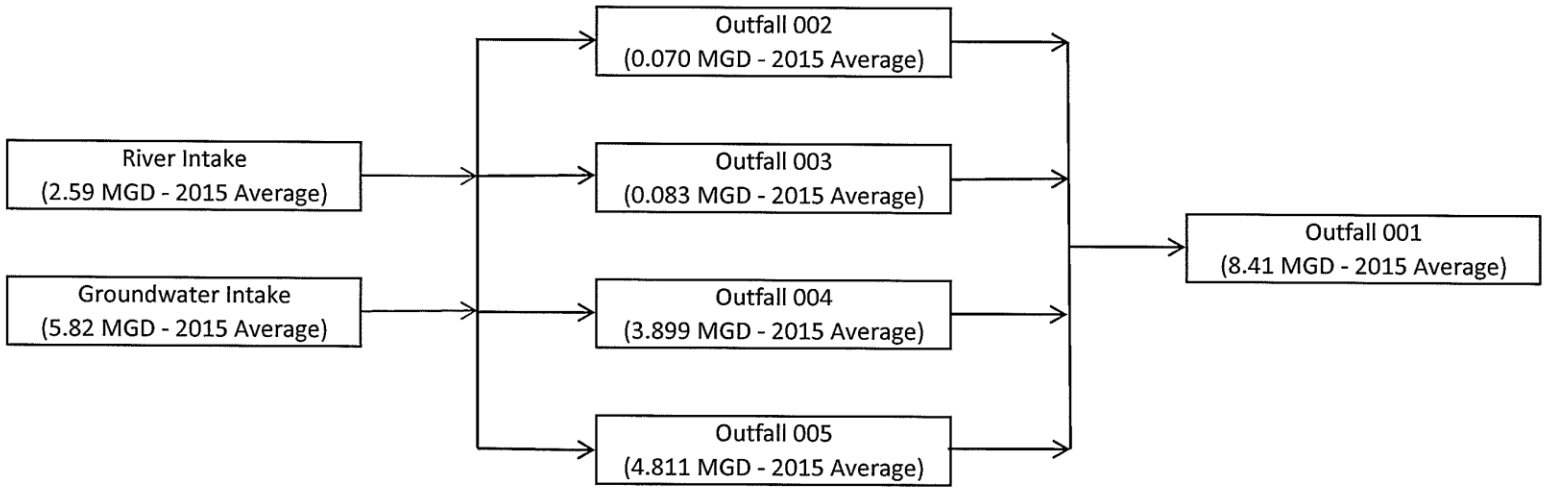
DIF	0.78%	0.57%	0.50%	0.27%	0.20%	0.33%	1.37%	3.58%	3.65%	2.11%	1.49%	0.94%	0.59%
AIF (Max)	0.18%	0.13%	0.11%	0.06%	0.04%	0.07%	0.31%	FALSE	0.82%	0.47%	0.34%	0.21%	0.13%
AIF (Mean)	0.04%	0.03%	0.02%	0.01%	0.01%	0.02%	0.06%	0.10%	0.11%	0.07%	0.05%		0.04%

River Channel	Percent	Lowest Water
DIF	2.55%	7.31%
AIF (Max)	0.55%	1.64%
AIF (Mean)	0.17%	0.49%

APPENDIX E
2015 Water Balance

EPA Form 2C
II. Flows, Sources of Pollution, and Treatment Technologioes
Section A

Overview



GeoEngineers