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APONOWICH, DRISCOLL & ASSOCIATES, INC.

NW Natural

Former Koppers Basin Stormwater Pumping System

Installation Report

August 16, 2023

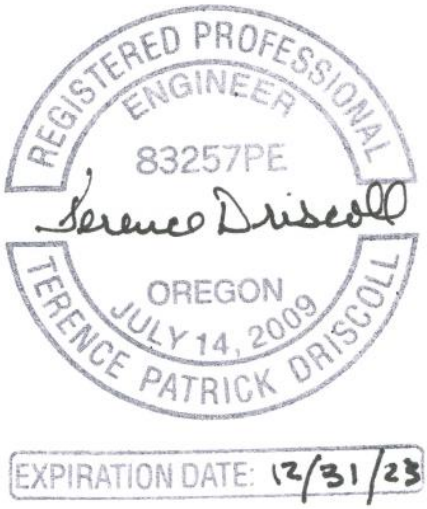

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Table of Contents

List of Tables

List of Figures

Background

On December 2, 2021, the Oregon Department of Environmental Quality (DEQ) provided verbal support and concurrence for the removal of a persistent standing water condition in the former Koppers tank farm basin at the Gasco site.

As described by DEQ, the standing water removal will temporarily address applicable ecological exposure pathways for surface water within the basin (i.e., incidental ingestion of water by wildlife, aquatic life) until a permanent remedial action is selected in the Gasco OU Feasibility Study (DEQ 2021)[1]. Figure 1 documents the former Koppers Basin condition on January 21, 2021, showing high water levels and abundant vegetation.

Figure 1: Former Koppers Basin Condition-January 21, 2021 Looking North

[1] 2 December 2021 e-mail from Wes Thomas-ODEQ to Rob Ede—Hahn and Associates, Subject: RE: Koppers Tank Basin Pumping/Water Removal

It is estimated that 75% of the basin floor is unlined, with the northern end of the basin being partially lined with concrete. Observations suggest that rainwater is the primary source of inflow to the basin, rather than groundwater. As a result, rainfall data from the area was used as the primary design parameter of the pumping system, with an allowance for minor groundwater intrusion.

This Installation Report describes the details of the installation and operation of the former Koppers Basin dewatering pump system to the NW Natural Pretreatment plant. The NW Pretreatment Plant treats these waters as well as groundwater from the HC&C System and ultimately discharges to the main Groundwater Treatment System for full treatment and permitted discharge via National Pollution Discharge Elimination System Permit 103061, which is pending renewal with DEQ.

Predicted Flows

Because the source of water in the former Koppers basin is thought to be largely precipitation, the statistical rainfall data for Portland was used for sizing the system. The former Koppers basin was calculated to be approximately 50,000 square feet in area. Because minimal precipitation runoff into the basin has been observed, only that rainfall falling directly into the basin was included in the calculation.

Projected Flows from the Former Koppers Basin

To evaluate the pumping system's ability to quickly empty the basin, the 10-year-1 hour storm was selected for design purposes. This storm is a statistical calculation of a storm with a 10-year return frequency for a 1-hour duration in Portland.

The National Weather Service's Technical Paper No. 40: Rainfall Frequency Atlas of The United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years lists the rainfall intensity for this storm as 0.60 inches/hour.

A submersible pump sized for 180 gpm was selected and installed, along with an electrical panel and control instrumentation. This pump has sufficient capacity to empty the basin in approximately 1 hour during the rainiest months (November and December).

Pumping System Installation

Appendix A contains two schematics of the installed former Koppers basin pumping system: a process flow diagram and the system as shown on the GTS SCADA system. In addition, an aerial view of the former Koppers Basin Dewatering system showing the various components is included.

As noted on the photograph, the aerial photo showing the location of former Koppers Basin pumps, piping and valves was taken before the basin was emptied and the vegetation removed. Appendix B shows the condition of the basin in March 2023, which has remained dry through the date of this report.

The wet well submersible pumping system is equipped as follows:

- A 180-gpm submersible pump rated at 38 feet of dynamic head,
- A 4-inch check valve to prevent backflow to the basin when the pump is not operating,
- A 4-inch isolation valve to permit the pump to be removed from the basin for maintenance when required.

The former Koppers Basin Dewatering Pump is located in the sump of the former oil-water separator as shown in the basin aerial view in Appendix B. Because the basin does not readily drain to one area, an additional submersible sump pump (40-50 gpm) has been placed midway in the basin which pumps directly to the former oil-water separator where it is pumped with the remainder of the basin flow by the main pump.

The main dewatering pump discharges through a 4-inch HDPE force main approximately 750 feet across the NW Natural site to the existing three-20,000-gallon Equalization Tanks. These tanks will reduce the peak flows from the former Koppers basin when pumped on to the existing NW Natural Pretreatment Plant.

The Equalization Tanks are already piped to a 75-gpm pump with a flow meter, which discharges directly to the NW Natural Pretreatment Plant. Figure 2 shows the Koppers Basin on March 29, 2023 after a recent rain which is in marked contrast to the same view approximately two years earlier in Figure 1. Water is still draining to the sump but the basin is largely dry.

Figure 2: Former Koppers Basin--March 29, 2023, After Recent Rain Looking North

Pumping Operation Control and Setpoints

The Main Dewatering Pump output is manually controlled. The pump is operated and controlled off level setpoints in the former oil-water separator wet well. All elevations are relative to the bottom of the wet well and are as shown in Table 1.

Table 1: Main Dewatering Pump Level Setpoints

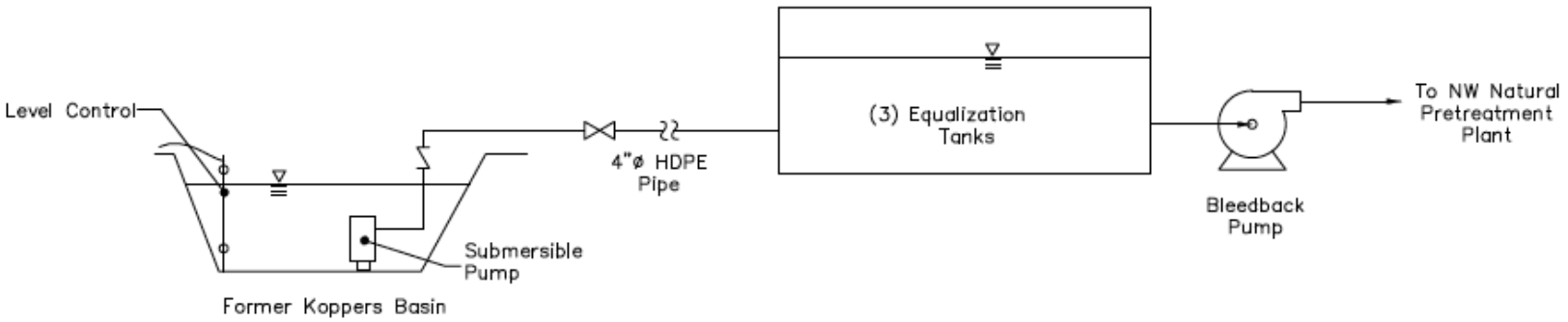
Operating Condition	Level[2]
LOW LEVEL Alarm	1.0
Pump OFF	1.5
Pump ON	3.3
HIGH LEVEL Alarm	3.5
HIGH-HIGH LEVEL Alarm	4.0

Note that the HIGH-HIGH LEVEL is below the top of the former oil-water separator basin so that both HIGH LEVEL alarms will sound before flow begins to back up into the former Koppers Basin.

Terence P. Driscoll, P.E., BCEE

[2] Levels shown are relative to the bottom of the oil-water separator wet well.

Appendix A—Former Koppers Basin Pumping Schematics and Site Plan



Dewatering System
Process Flow Diagram

Former Koppers Basin

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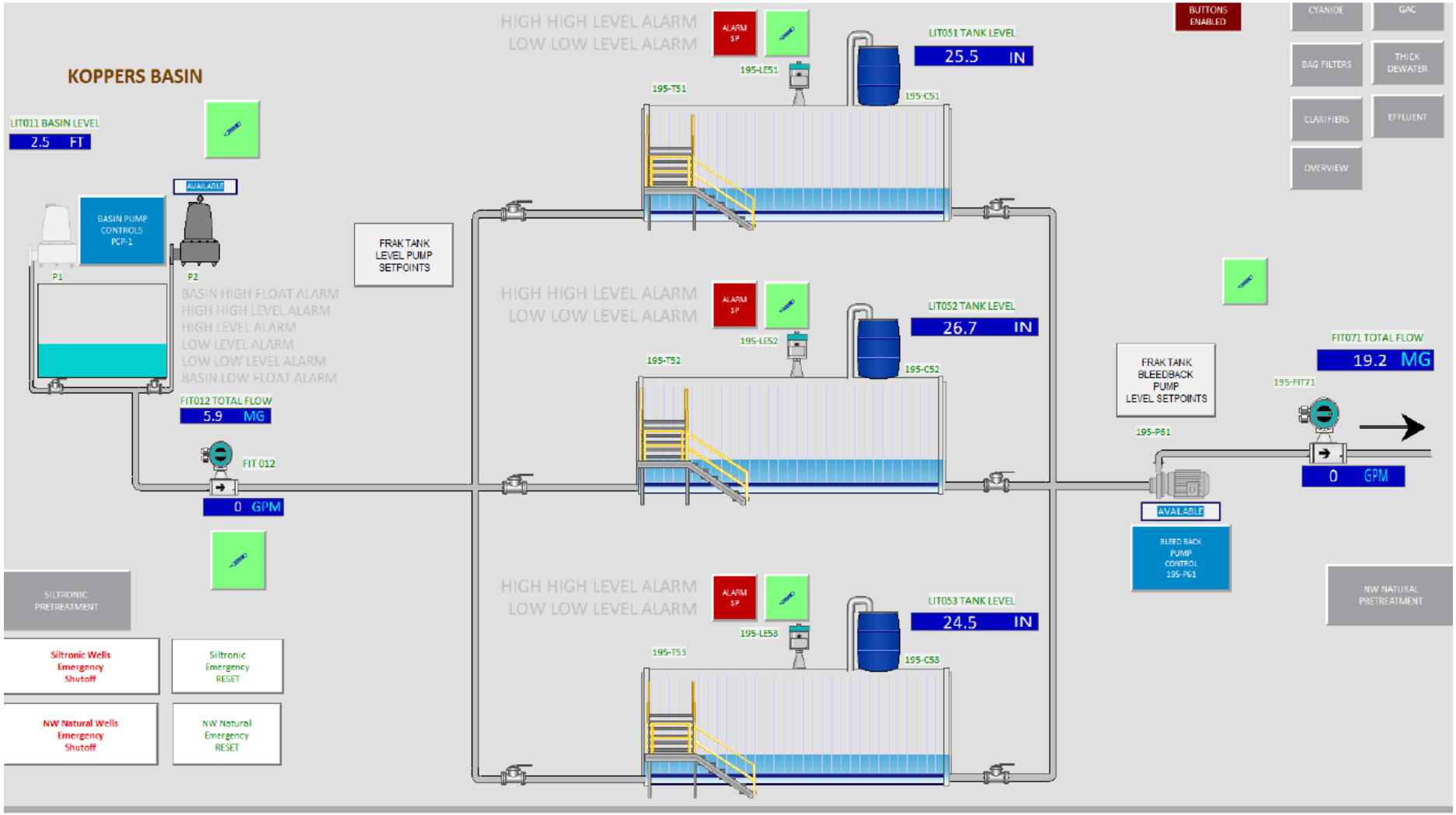
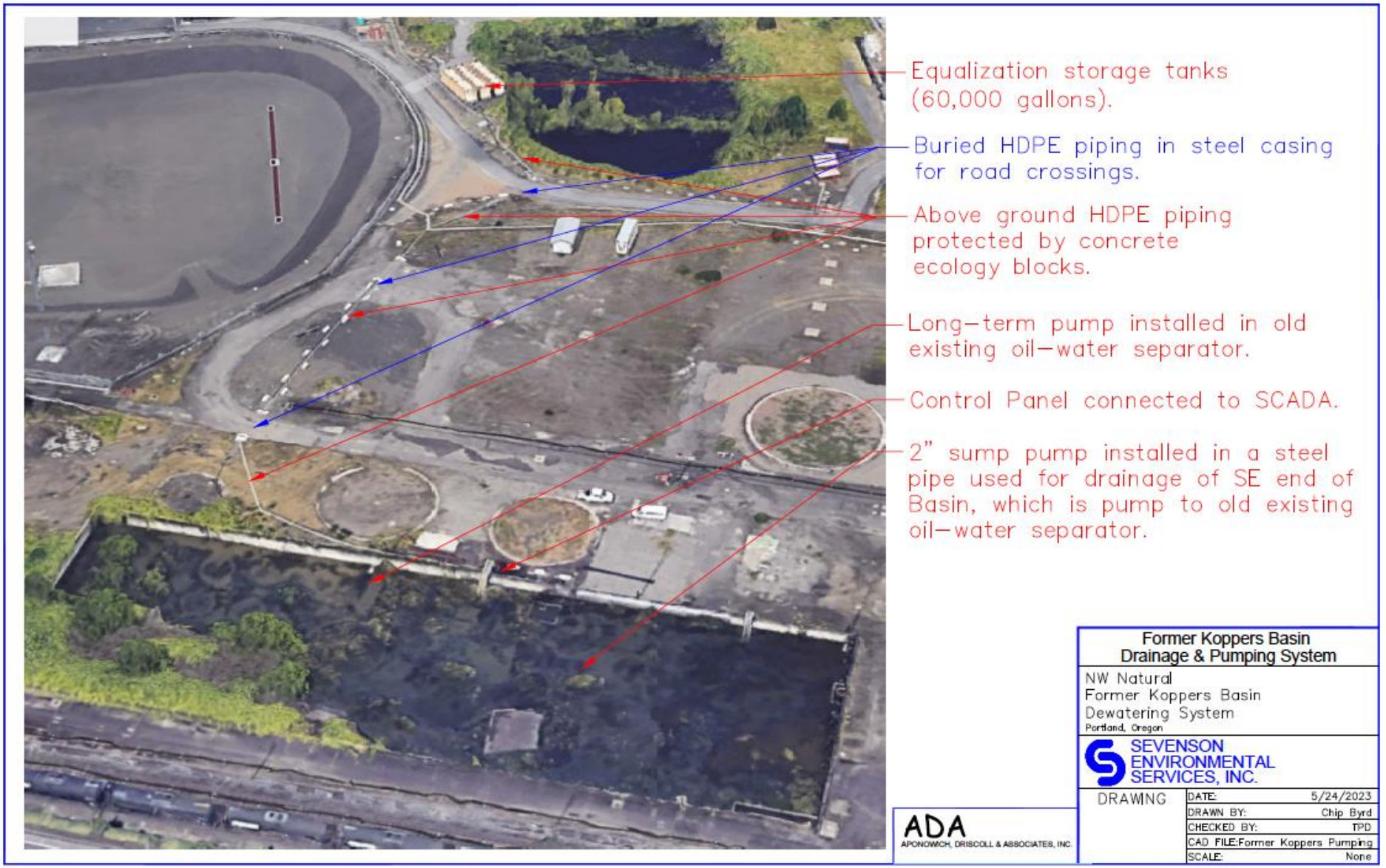
SERVICES, INC.

DRAWING
KP

DATE:	1/21/22
DRAWN BY:	C. Bigelow
CHECKED BY:	T. Driscoll
CAD FILE:	Dewatring PFD
SCALE:	None


KOPPERS BASIN
LIT011 BASIN LEVEL
2.5 FT
BASIN PUMP CONTROLS PCP-1
AVAILABLE
P1
P2
BASIN HIGH FLOAT ALARM
HIGH HIGH LEVEL ALARM
HIGH LEVEL ALARM
LOW LEVEL ALARM
LOW LOW LEVEL ALARM
BASIN LOW FLOAT ALARM
FIT012 TOTAL FLOW
5.9 MG
FIT 012
0 GPM
FRAK TANK LEVEL PUMP SETPOINTS
HIGH HIGH LEVEL ALARM
LOW LOW LEVEL ALARM
ALARM SP
195-LE51
195-T51
195-C51
LIT051 TANK LEVEL
25.5 IN
195-LE52
195-T52
195-C52
LIT052 TANK LEVEL
26.7 IN
195-LE53
195-T53
195-C53
LIT053 TANK LEVEL
24.5 IN
BUTTONS ENABLED
CYANIDE
GAC
BAG FILTERS
THICK DEWATER
CLARIFIERS
EFFLUENT
OVERVIEW
FRAK TANK BLEEDBACK PUMP LEVEL SETPOINTS
195-P61
AVAILABLE
BLEED BACK PUMP CONTROL 195-P61
FIT071 TOTAL FLOW
19.2 MG
195-FIT71
0 GPM
SILTRONIC PRETREATMENT
Siltronic Wells Emergency Shutoff
Siltronic Emergency RESET
NW Natural Wells Emergency Shutoff
NW Natural Emergency RESET
NW NATURAL PRETREATMENT

NOTE: Photo below shows piping installed prior to removal of water and vegetation from the Former Koppers Basin



Appendix B—Site Installation Photographs

Former Koppers Wet Well Dewatering Pump Installation (Basin Drained) Looking South

View of Pump in Wet Well (Green HIGH HIGH-LEVEL float shown)

Basin Sump Pump Installation (Pumping to Main Dewatering Pump; Discharge Shown)

Flow Meter and Pipeline from Basin to Equalization Tanks