Johnson Creek Sediment Sampling Work Plan
PCC Structurals, Inc.
Large Parts Campus
Portland, Oregon

September 20, 2017

Prepared for

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Portland, Oregon

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LIST OF ABBREVIATIONS AND ACRONYMS

CSM	conceptual site model
DUs	decision units
EPA	US Environmental Protection Agency
ft	feet or foot
HVOCs	halogenated volatile organic compounds
ISM	incremental sampling methodology
ITRC	Interstate Technology and Regulatory Council
LAI	Landau Associates, Inc.
LPC	Large Parts Campus
ODEQ	Oregon Department of Environmental Quality
oz	ounces
PCB	polychlorinated biphenyl
PCC	PCC Structurals, Inc.
ppm	parts per million
RI	Remedial Investigation
SAP	sampling and analysis plan
Work Plan	Johnson Creek Sediment Sampling Work Plan

1.0 INTRODUCTION

This Phase II Remedial Investigation (RI) Johnson Creek Sediment Sampling Work Plan (Work Plan) has been prepared on behalf of PCC Structurals, Inc. (PCC) to describe planned sampling activities in Johnson Creek, in the vicinity of PCC's Large Parts Campus (LPC), located at 4600 SE Harney Drive in Portland, Oregon (Site; Figure 1). The sediment sampling is proposed to confirm the current creek conditions as required by the Oregon Department of Environmental Quality (ODEQ).

The activities outlined in this Work Plan constitute additional scope under the ongoing RI and will be conducted in accordance with applicable sampling methods and quality assurance/quality control procedures outlined in the ODEQ-approved Phase I RI Work Plan (Landau Associates, Inc. [LAI] 2009), Phase II RI Work Plan (LAI 2010), and the associated sampling and analysis plans included as appendices in the Phase I and Phase II RI Work Plans. Methods and procedures specific to this Work Plan are summarized in the subsequent sections.

2.0 BACKGROUND

Site background information, including details regarding the Site's location, ownership history, and the conceptual site model (CSM), was presented in the Agency Review Draft RI Report (LAI 2013). The CSM will be revised, as appropriate, based on the results of the investigation outlined in this Work Plan and other ongoing RI activities. The following section briefly summarizes information relevant to the planned Johnson Creek sediment sampling.

2.1 Sediment Investigations

Sediment investigation activities have consisted of collecting sediment samples from Johnson Creek in the vicinity of the storm drain pipe outfall. Initial sediment samples were collected on August 27, 2010; 3 samples were collected at locations 30 feet (ft) upstream, 30 ft downstream, and at the storm drain outfall, respectively. The initial samples were analyzed for priority pollutant metals and halogenated volatile organic carbons (HVOCs).

As part of an onsite storm drain replacement project between 2011 and 2013, PCC sampled soil that would be excavated in accordance with its standard practice and to meet disposal facility requirements. The results of initial soil sampling indicated concentrations of polychlorinated biphenyl (PCB) Aroclor 1254 greater than 14 parts per million (ppm).

Following the detections of the PCBs in soil in the vicinity of the storm drain, ODEQ requested additional sediment sampling of Johnson Creek to include analysis for priority pollutant metals and PCBs. On January 5, 2012, sediment samples were collected along five transects located downstream of the outfall in groups of three samples per transect. Ten sediment samples were collected at distances between 50 and 100 ft upstream of the outfall to establish background concentrations of constituents in sediment. Sediment sampling was conducted in general accordance with the sampling and analysis plan (SAP) addendum included as part of the Phase II RI Work Plan (LAI 2010) and as described in the Supplemental Sediment Sampling Work Plan (LAI 2011).

In October 2014, additional sediment samples were collected from two transects located upstream of the Johnson Creek outfall and seven transects located downstream of the outfall. Transects were located 100 and 50 feet upstream, and 30, 60, 100, 150 and 300 feet downstream. Three to five samples were collected from each transect. Following review of the results, ODEQ requested two additional downstream transects located 200 and 250 feet from the outfall. Four samples were collected from each of these two additional transects in June 2015.

Sampling under this Work Plan is being performed to assess sediment quality prior to planned improvement activities in the Johnson Creek Oxbow to be completed by the City of Portland (anticipated in summer 2018). At the direction of ODEQ, PCC evaluated the feasibility of performing an incremental sampling methodology (ISM) approach in Johnson Creek in place of sampling along the transects from previous events. As part of the feasibility planning for the ISM approach, ODEQ, PCC,

and LAI performed a site reconnaissance in the Johnson Creek Oxbow on July 18, 2017 to document creek conditions, which included a visual survey of the creek bed materials. The results of this survey, and photographs of representative creek bed materials are provided on Figure 2 and in Appendix A, respectively. A summary of the findings of the creek reconnaissance and draft proposed sampling methodology were provided to ODEQ in an email dated August 2, 2017 (Gaona 2017).

3.0 PROPOSED SCOPE OF WORK

Based on the previous work completed in Johnson Creek, and the reconnaissance summarized above, three decision units (DUs) will be sampled at the proposed locations shown on Figure 2, as discussed below.

3.1 Decision Unit and Sample Location Selection

Three DUs will be sampled as part of this approach. DUs will be defined by areas of sampleable material (i.e., fines, gravel with fines, and cobbles with fines). Areas excluded from the DUs are deposits of cobbles and boulders that are not sampleable. The general areas where these DUs will be located are shown on Figure 2: DU1 is located upstream of the outfall, and DU2 and DU3 are located downstream of the outfall. If additional areas of sampleable material are identified during field activities that were not previously mapped, these areas may be adjusted, or additional DUs may be added in the field. Additionally, field staff will visually assess creek conditions downstream of DU3 to determine if there is another DU with sampleable material within a reasonable distance of DU3 (i.e., within 200 feet). At the direction of ODEQ, samples will only be collected from areas identified as fines, gravel with fines, and cobbles with fines. LAI will remain in regular contact with ODEQ during the sampling event to provide updates on conditions encountered in the field and any deviations from the planned DUs.

Within each sample area (DU), LAI field staff will stake a point that will be the randomly selected originating point. Attempts will be made to locate this point using a hand-held GPS unit while in the field (overhead riparian flora may impede GPS use). LAI field staff will then measure a specific distance from the stake and collect a sample. The distance will vary in each DU based on the overall area of the DU with sampleable material. LAI field staff will then move laterally and collect a second sample. This approach will continue throughout the sample area until 30 incremental samples have been collected in each DU. Incremental samples will be spaced as evenly as possible within each DU. The location of each of the incremental samples will be roughly marked on figures in the field.

3.2 Sediment Sampling Procedures

General sampling and analysis procedures will be consistent with those in the ODEQ-approved Sampling and Analysis Plan (LAI 2009) and Sampling and Analysis Plan Addendum (LAI 2010). ISM sediment sampling will be performed in general accordance with the established guidelines in the Interstate Technology and Regulatory Council (ITRC) guidance document (ITRC 2012). Certain procedures may be adapted to allow for the unique environment of sampling in the creek bed with limited sampleable material available.

As described above, 30 incremental samples will be collected per DU. In order to obtain the amount of material necessary for ISM laboratory analysis, each incremental sample will require approximately 4 ounces (oz) of sediment from each sampling location within each DU. Incremental sediment samples will be collected into a 4-oz glass jar before being composited into the ISM sample for each DU.

Samples will be stored on ice and transported under documented chain of custody to the analytical laboratory.

In areas with "fines" and "gravel with fines", a stainless steel cylinder (12 to 18 inches in diameter) will be placed into the stream bed to isolate the sample location. Water may be removed from the cylinder via a bilge pump. Samples will be collected from the upper 6 inches of sediment. Approximately 4 oz of sediment will be removed from the isolated area with a stainless steel spoon or scoop, and placed into the ISM sample containers provided by the analytical laboratory.

In areas with "cobbles with fines", where a stainless steel cylinder cannot be placed into the streambed due to the cobbles, sediment will be removed from around the cobbles with a stainless steel spoon, peristaltic pump, or portable vacuum pump. Field staff will attempt to collect approximately 4 oz of sediment from each incremental sample area. If a pump is used, sample tubing will be placed around the cobbles in the streambed with the intent of sampling sediment. The sample will be allowed to settle, and water will be decanted until approximately 4 oz of sediment have been collected. Platinum-cured silicone tubing will be used for the pumps to prevent cross-contamination of PCBs from sample tubing to the sediment sample, in the event low-level PCB congener analysis is required by ODEQ.

Sampling equipment used will be decontaminated following sample collection in each DU (but not between each incremental sample). Decontamination will include removing large particulate matter with a brush or paper towel, and rinsing with Alconox® and distilled water.

A triplicate sample is planned for DU1 and DU3. The collection of triplicate samples allows for the calculation of a relative standard deviation for comparison of sample results from the DU upstream of the outfall (DU1) to the sample results from the DUs downstream of the outfall. Triplicate samples will be collected as independent random samples in DU1 and DU3, using the same procedures discussed in Section 3.1. Three independent ISM samples will be collected from DU1 and DU3, with 30 incremental samples per DU (a total of 90 incremental samples for each DU with a triplicate sample).

In addition to the incremental samples in each DU, three discrete subsurface samples will be collected to assess sediment beneath the armoring layer (approximately 12 inches depth), per ODEQ's request. Collection will be performed with the recognition that the discrete samples may not be representative of sediment quality at that depth in the DU. The discrete samples will be collected in each DU from an area with "fines" or "gravel with fines". A stainless steel cylinder (12 to 18 inches in diameter) will be placed into the streambed to isolate the sample location. Water may be removed from the cylinder via a bilge pump, and sediment will be removed from the cylinder via a stainless steel spoon or scoop to reach the desired sample depth. Approximately 4 oz of sediment will be removed from the isolated area with a stainless steel spoon or scoop and placed into laboratory-supplied containers.

3.3 ISM Processing and Sample Analysis

PCC's contracted analytical laboratory, APEX Laboratories of Tigard, Oregon, will process the ISM samples and perform the sample analyses. Upon receipt of the ISM samples, APEX will dry, sieve, grind, and process the ISM samples in accordance with the ITRC sample preparation protocol (ITRC 2012) and its standard operating procedure for processing ISM samples. APEX will provide PCC with a copy of its ISM standard operating procedures, which will be provided to ODEQ for reference prior to the sampling event.

Following ISM processing, all sediment samples will be analyzed for PCB Aroclors by US Environmental Protection Agency (EPA) Method 8082 and Priority Pollutant Metals (suite of 13 metals) plus cobalt by EPA Methods 6010B and 7471A. Unused sample material will be archived for future analyses, including potential analysis of PCB congeners by EPA Method 1668C. Additional analysis will be determined by PCC and ODEQ in consultation.

3.4 Discrete Sample Analysis

Discrete sediment samples will be analyzed for PCB Aroclors by EPA Method 8082 and Priority Pollutant Metals plus cobalt by EPA Methods 6010B and 7471A. Unused sample material will be archived for future analyses, including potential analysis of PCB congeners by EPA Method 1668C. Additional analysis will be determined by PCC and ODEQ in consultation.

4.0 DATA EVALUATION AND REPORTING

Analytical data will be tabulated and validated in accordance with the ODEQ-approved Sampling and Analysis Plan (LAI 2009) and Sampling and Analysis Plan Addendum (LAI 2010). Formal presentation of the work completed under this Work Plan will be provided to ODEQ in a formal data report. The following information will be included:

- Updated figures with current creek conditions (i.e., sediment size distribution) and final DUs.
- A description of sample activities and any deviations from the methods and procedures presented in this Work Plan.
- Photos of sampling activities, DUs, and incremental and discrete sample material.
- Tables summarizing analytical results for ISM and discrete samples.
- Statistical calculations of the relative standard deviation in the DUs, where ISM triplicate samples are collected, and a comparison of results from the DU upstream of the outfall to the DUs downstream of the outfall.

5.0 PROJECT SCHEDULE

LAI is planning to conduct the sample activities described in this Work Plan the week of October 2, 2017, pending ODEQ approval of this Work Plan.

6.0 USE OF THIS REPORT

This Johnson Creek Sediment Sampling Work Plan has been prepared for the exclusive use of PCC Structurals, Inc. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

7.0 REFERENCES

Gaona, C. 2017. "Re: PCC LPC Johnson Creek ISM Approach for DEQ Concurrence." Colette Gaona, Landau Associates, Inc. August 2.

ITRC. 2012. "Incremental Sampling Methodology: Executive Summary." http://www.itrcweb.org/ism-1/executive_summary.html. Interstate Technology and Regulatory Council.

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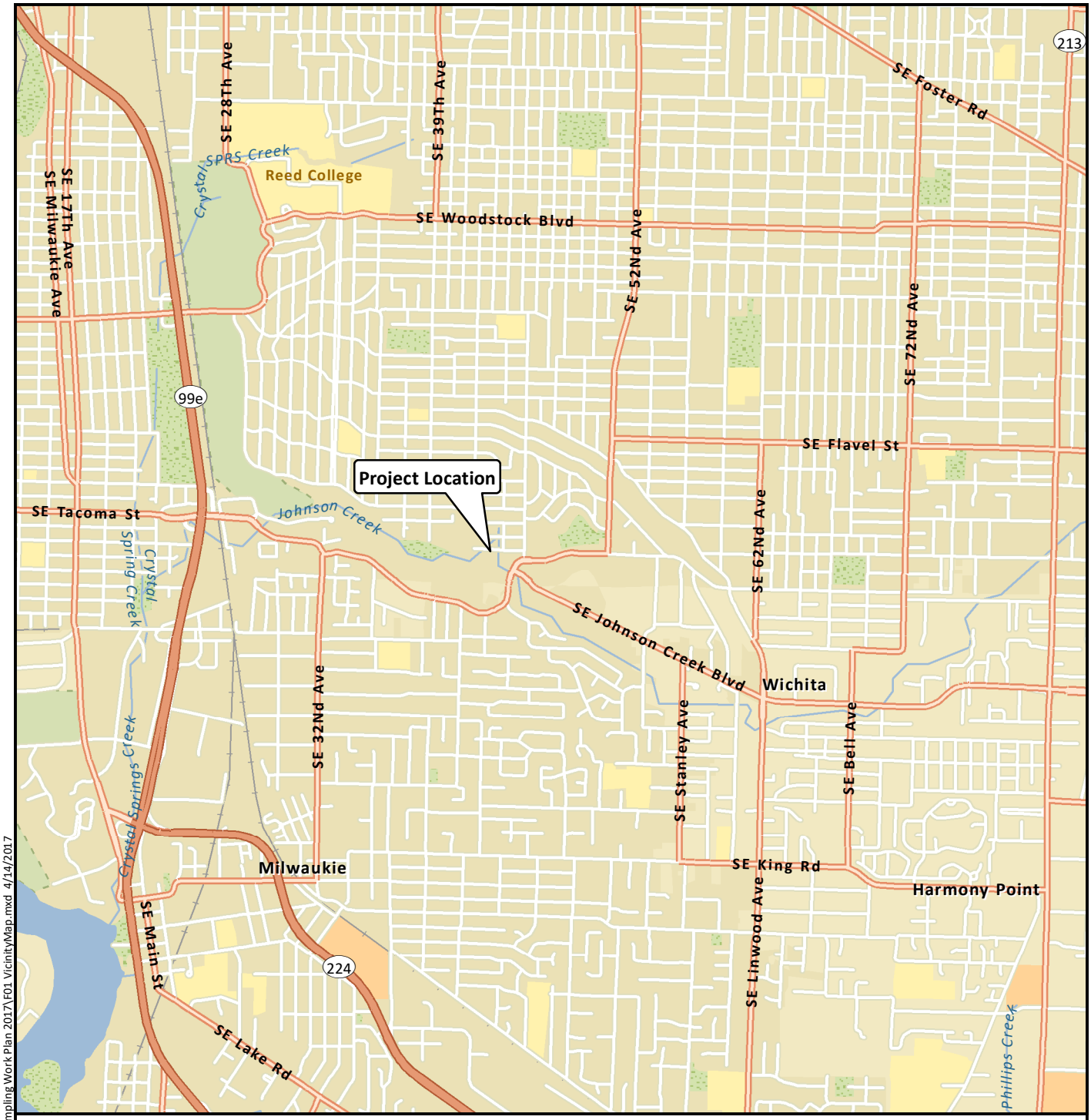

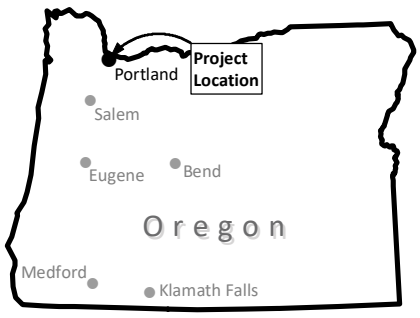

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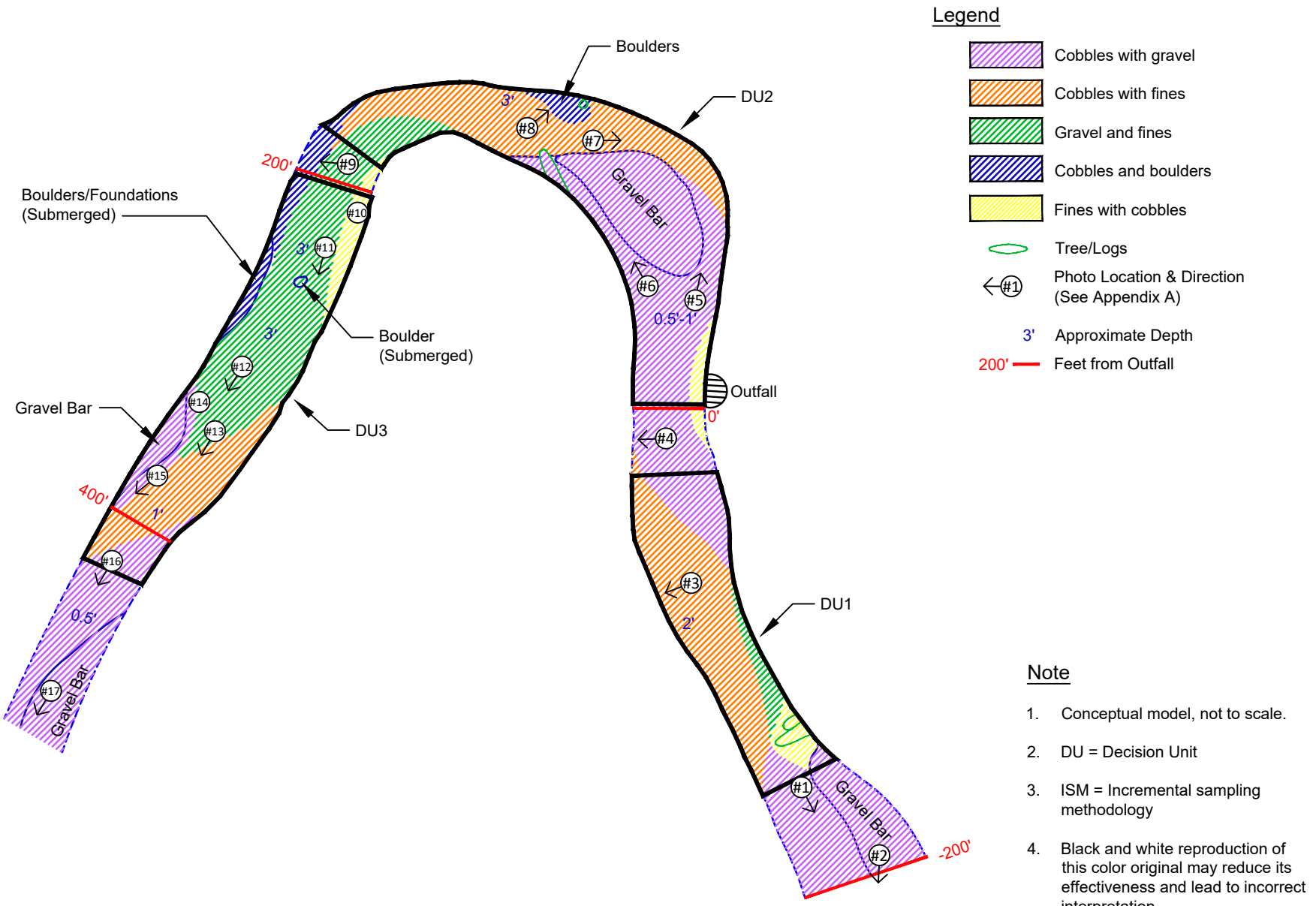
PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Vicinity Map**	Figure 1



Note

1. Conceptual model, not to scale.
2. DU = Decision Unit
3. ISM = Incremental sampling methodology
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Johnson Creek Streambed Map and Proposed Decision Units for ISM Approach**	Figure 2

APPENDIX A

Selected Site Photographs

Photograph #1

Photograph #2

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Photograph #3

Photograph #4

PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Selected Site Photographs**	Figure A-2

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Photograph #5

Photograph #6

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PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Selected Site Photographs**	Figure A-3

Photograph #7

Photograph #8

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PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Selected Site Photographs**	Figure A-4

Photograph #9

Photograph #10

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LANDAU ASSOCIATES	PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Selected Site Photographs**	Figure A-5

Photograph #11

Photograph #12

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Selected Site Photographs

Figure
A-6

Photograph #13

Photograph #14

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Selected Site Photographs

Figure
A-7

Photograph #15

Photograph #16

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Selected Site Photographs

Figure
A-8

Photograph #17

Cobbles and Boulders

PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Selected Site Photographs**	Figure A-9

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Cobbles with Fines

Cobbles with Gravel

Fines

Gravel and Fines

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PCC Structurals, Inc. Large Parts Campus Portland, Oregon	**Selected Site Photographs**	Figure A-11