MENDOCINO RAILWAY

Foot of Laurel Street
Fort Bragg, California 95437

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6 September 2023

Morgan Bigelow
Department of Toxic Substances Control
700 Heinz Avenue, Suite 100
Berkeley, California 94710

Subject: Request to Add Respondent to Order
Former Georgia-Pacific Wood Products Facility (Site Code: 202276)
KJ 1965021*21

Dear Ms. Bigelow:

This letter[1] is prepared to request consideration of an additional Respondent to the Site Investigation and Remediation Order (Order; Docket No. HSA-RAO 06-07-150) issued by the Department of Toxic Substances Control (DTSC) for the former Georgia-Pacific Wood Products Facility (Site) located at 90 West Redwood Avenue, Fort Bragg, Mendocino County, California. The Order became effective on 21 February 2007. DTSC issued the First Amendment to the Site Investigation and Remediation Order (Order First Amendment) on 9 June 2022.

Through the process of the site investigation, completed under the Order and oversight by DTSC, Pond 8 sediments have been investigated and found to contain pollutants (Arcadis 2013, Kennedy Jenks 2019, 2020). Pond 8 is located in Operable Unit E (OU-E) and provides treatment for stormwater that enters the pond via sheet flow and via the Maple and Alder Creek outfalls, located in the eastern section of the pond; pollutants are generally removed by settling as water moves from the east end of the pond to the spillway at the west end of the pond. As part of the investigation, stormwater evaluations have been completed to assess pollutant sources and removal efficiency for Pond 8 sediments. A remedial action has been proposed for Pond 8 sediments in the Final OU-E Feasibility Study (Kennedy Jenks 2019), approved by DTSC (DTSC 2019), and in the Draft OU-E Remedial Action Plan (RAP; Kennedy Jenks 2020). DTSC has initiated internal review of the Draft OU-E RAP, but additional review is pending completion of the draft Environmental Impact Report (EIR) by the City (DTSC 2020).

Stormwater evaluations found that a significant majority of the pollutants (80 to 95 percent) entering Pond 8 via stormwater were contributed by drainage areas outside the Site. Approximately 54.5 percent of the Pond 8 drainage basin is in two urban watershed catchments located within the City of Fort Bragg (City) that drain to Pond 8 (also known as the Mill Pond) through the culverted Maple and Alder Creeks. Stormwater runoff from these offsite, City catchments was analyzed for dioxins and furans, a key community concern, which were found at concentrations that exceeded the Water Quality Objective (WQO) by one to two orders of magnitude. Further, dioxin and furan concentrations in offsite stormwater entering Pond 8 from City catchments were higher than the maximum concentrations of

[1] This letter was previously submitted to DTSC on 17 August 2023. It is being resubmitted with a revised Attachment A in response to DTSC's email on 28 August 2023.

dioxins and furans in Pond 8 sediment, located near the stormwater outfalls in the eastern section of Pond 8. Additional information about the completed stormwater evaluations, including sampling results and hydrology maps, is provided in Attachment A.

At this time, the City has not been listed as a Respondent to the Order. However, as demonstrated through the completed stormwater evaluations (Attachment A), City stormwater is an established, ongoing source of dioxins and furans to sediment in Pond 8, and therefore under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) has joint and several liability for site investigation and remediation activities within Pond 8. Accordingly, Mendocino Railway respectfully requests that DTSC add the City as a Respondent to the Order.

Very truly yours,

Mendocino Railway

Mike Buck
Project Manager

Enclosure

Attachment A: Stormwater Memo

References

Arcadis. 2013. Final Remedial Investigation Report Operable Unit E (RI Report), Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. Prepared for Georgia-Pacific LLC. January.

DTSC. 2019. Letter from Ms. Juliet Pettijohn, to Mr. David G. Massengill, Senior Director, Georgia-Pacific LLC, re: Georgia-Pacific, Operable Unit E Feasibility Study, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. 24 October.

DTSC. 2020. Letter from Ms. Juliet Pettijohn, to Mr. David G. Massengill, Senior Director, Georgia-Pacific LLC, re: Operable Unit E Draft Remedial Action Plan and Confirmation of No Further Action for Operable Unit E Soil and Ponds 5 and 9, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. 8 December.

Kennedy Jenks. 2019. Final Feasibility Study, Operable Unit E, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. 12 September.

Kennedy Jenks. 2020. Draft Remedial Action Plan, Operable Unit E, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. 14 October.

cc: Robert Pinoli, Mendocino Railway
Jeremie Maehr, Kennedy Jenks
Rachel Morgan, Kennedy Jenks

Attachment A

Stormwater Memo

Kennedy Jenks

6 September 2023

Memorandum

To: Mike Buck, Mendocino Railway

From: Jeremie Maehr and Rachel Morgan, Kennedy Jenks

Subject: Former Georgia-Pacific Wood Products Facility
Fort Bragg, CA
Mill Pond Storm Water Summary
KJ 1965021*21

This memorandum describes storm water quality and its effect on sediment within Pond 8 at the former Georgia-Pacific Wood Products Facility (Mill Site) in Fort Bragg, California. The analysis results in the following key findings:

- Storm water entering Pond 8 contains dioxins and furans at concentrations above the California Water Quality Objectives along with other pollutants such as metals and organics.
- A significant majority of the pollutants (80 to 95%) entering Pond 8 via storm water are from drainage areas outside the Mill Site.
- Pond 8 provides extremely effective storm water treatment for these compounds removing approximately 20 to 97% of pollutants. Most of the removed compounds are recalcitrant and are removed by settling rather than by destruction or transformation and are retained in Pond 8 sediments.
- The concentrations of dioxins and furans, a key community concern, observed in Pond 8 sediment are lower than concentrations in suspended solids in storm water, neither of which pose an unacceptable risk to human health or ecological receptors.

Evaluation Summary

A summary of storm water evaluations completed for the Mill Pond (also called Pond 8) at the Mill Site is presented herein, with a focus on dioxins and furans. The Mill Pond drainage basin is approximately 417 acres. Approximately 54.5 percent of the drainage basin is in two urban watershed catchments located within the City of Fort Bragg that drain to Mill Pond through the culverted Maple and Alder Creeks (offsite). The remainder of the drainage basin (approximately 45.5 percent) is located at the Mill Site and either drains to the pond through sheet flow or in concentrated flows through established storm water management features (onsite), including former wastewater treatment Ponds 1 through 4 (South Ponds). The individual drainage basins

are described in detail in the Mill Pond Storm Water Sampling Report and are presented in Figure 1-2 of that report (Arcadis 2012).

Storm water quality within the Mill Pond drainage basin has been evaluated over two sampling efforts. The first sampling effort was conducted in 2011 to support the design of an alternate surface water conveyance feature for the Mill Pond. The results of this evaluation were summarized in the Mill Pond Storm Water Sampling Report (Arcadis 2012). Water quality, storm flow, and rainfall data were collected immediately before and during two storm events in February and March 2011. Six sampling stations were established (Figure 1-2), with Station CE primarily representing offsite flows from Maple Creek and Station D representing offsite flows from Alder Creek. The remaining four sampling stations represented onsite flows. Grab samples were collected prior to the storm event to characterize water quality before substantial runoff generation. Composite samples[1] were collected incrementally throughout the storm using automated samplers and combined to provide an integrated estimate of the constituent concentrations throughout the storm event. Discrete samples were also collected, but were not analyzed for dioxins/furans. One pre-event grab sample and one composite sample was collected from each of the six sampling stations and analyzed for dioxins/furans for each of the two storms, for a total of 12 pre-event grab samples and 12 composite samples.

Dioxin and furan congeners were converted to 2,3,7,8-TCDD TEQ using toxicity equivalency factors (TEFs) adopted by the California Environmental Protection Agency Office of Environmental Health Hazard Assessment (OEHHA; OEHHA 2011) for comparison purposes; TEQ values are presented in Table 1. The 2,3,7,8-TCDD TEQ exceeded the Water Quality Objective[2] (WQO) in two of four pre-event grab samples and four of four composite samples from Stations D and CE (offsite), and two of four pre-event grab samples and two of four composite samples from Stations E and S (onsite). For both storm events, the 2,3,7,8-TCDD TEQ did not exceed the WQO in the pre-event grab samples from the Mill Pond or the Mill Pond Dam Spillway but did exceed the WQO in the composite samples collected during the storm event at these two locations.

The 2012 storm water sample data was used to calculate the net change (increase or decrease) between inflow and outflow constituent mass (Arcadis 2012). An overall reduction in mass at the Mill Pond outfall relative to the input mass was considered a net water quality benefit. Improvements in water quality are most likely attributed to constituent mass settling out along

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[1] Because composite samples collect an equal volume of media at each sample interval, composite sample results may be biased over the long term and skewed toward samples collected after the first flush of storm water.

[2] The Water Quality Objective (WQO) for 2,3,7,8-TCDD TEQ is the Public Health Goal (PHG) of 0.05 pg/L.

with suspended solids in the Mill Pond and accumulating in Mill Pond sediment. The distribution of 2,3,7,8-TCDD TEQ in Mill Pond sediment is presented in Figure 4-24a of the Operable Unit E Remedial Investigation Report. Results of the loading calculations for the constituents monitored indicated the majority (94 percent) of 2,3,7,8-TCDD TEQ mass influx to the Mill Pond was from Alder and Maple Creeks. This is supported by the composite sample results; as presented in Table 1, the 2,3,7,8-TCDD TEQ was highest at Stations D and CE during the storm events, and were often one to two orders of magnitude greater than the 2,3,7,8-TCDD TEQ calculated for onsite runoff. The results also indicated constituent loads at the Mill Pond outfall were generally lower than the inflow loading. The calculated removal efficiency of the Mill Pond ranged from 88 percent to 97 percent. These reductions suggest the Mill Pond provides a net water quality improvement of storm water inflows. These improvements are most significant for storm water entering the Mill Pond from offsite.

Samples were also analyzed for Total Suspended Solids (TSS). Due to the relatively low solubility of Dioxins and Furans, these compounds are typically found associated with particulate and organic matter in environmental media such as soil and sediment, including suspended solids in stormwater runoff. Dioxin concentrations in incoming solids were estimated by dividing the 2,3,7,8-TCDD TEQ by the TSS concentration in the associated drainage basin. A summary of the mass balance calculations and estimated dioxin concentrations in incoming sediment is presented in Table 2. Additional calculations supporting Table 2 are provided in Attachment A.

The second sampling effort was completed in 2013 to further characterize the quality of storm water runoff entering the Mill Pond from the Maple and Alder Creeks at peak discharge (i.e., offsite sources); samples representative of onsite runoff were not collected. The Alder sampling location was Station D from the 2011 sampling events, and the Maple sampling location was near the location of Station CE from the 2011 sampling events (Figure 2 of the 2013 report). The results of this evaluation were summarized in the Wood Products Facility Storm Water Sampling Report (Arcadis 2013). Water quality and storm flow data were collected during one storm event in November 2013. A total of 8 grab samples were collected from 23:00 on November 18 to 05:15 on November 19, 2013 at approximately 45-minute intervals at each sampling location. Samples were selected for analysis at both locations based on the hydrograph generated at Alder Creek. A total of 4 grab samples from the Alder station and 3 grab samples from the Maple station were chosen for dioxin/furan analysis. All storm water runoff from offsite drainage basins (i.e., catchments located in the City of Fort Bragg) contained 2,3,7,8-TCDD TEQ that exceeded the WQO by one to two orders of magnitude. Results are presented in Table 1.

Figure 4 shows a comparison of data from Pond 8 sediments with the estimated concentration of 2,3,7,8-TCDD TEQ in suspended solids collected during the storm water sampling.

Concentrations in incoming storm water from Maple and Alder Creeks are higher than maximum concentrations in Pond 8 sediment, located near the storm water outfalls in the eastern section of Pond 8, and are on average eight-times higher than concentrations found near the treated industrial waste water discharge location on the west end of Pond 8.

Enclosures:

Table 1	Summary of Grab and Composite Sample Dioxin/Furan Results
Table 2	Summary of Estimated Influent and Effluent Dioxin/Furan Loads and Dioxin/Furan Concentration in Suspended Sediment
Figure 1-2	Site Hydrology and Subcatchments (Excerpt from Mill Pond Storm Water Sampling Report [Arcadis 2012])
Figure 2	Stormwater Sample Locations and Subcatchments (Excerpt from Storm Water Sampling Report [Arcadis 2013a])
Figure 4-24a	2,3,7,8-TCDD TEQ (Human/Mammal) Concentrations in Sediment Compared with Human Health PSL (Excerpt from Final Remedial Investigation Report Operable Unit E [Arcadis 2013b])
Figure 4	2,3,7,8-TCDD TEQ Concentrations in Suspended Solids and Sediment
Attachment A	Table 2 Calculations

References:

Arcadis. 2012. Mill Pond Storm Water Sampling Report, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. April.

Arcadis. 2013a. Wood Products Facility Storm Water Sampling Report, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. December.

Arcadis. 2013b. Final Remedial Investigation Report Operable Unit E, Former Georgia-Pacific Wood Products Facility, Fort Bragg, California. January.

Office of Environmental Health Hazard Assessment. 2011. Use of the Toxicity Equivalency Factor (TEF_{WHO-05}) Scheme for Estimated Toxicity of Mixtures of Dioxin-Like Chemicals. January.

cc: Robert Pinoli, Mendocino Railway

Tables

Table 1: Summary of Grab and Composite Sample Dioxin/Furan Results

Sample Location:	Sample Name:	Representative of Onsite or Offsite Runoff?	2,3,7,8-TCDD TEQ (Human/Mammal) (pg/L) (a)	Exceed WQO? (b)
February 2011 (Storm 1)				
2012 - Pre-Event Grab Samples	Station D	Offsite Only (Alder Creek)	0.04	N
	Station CE	Onsite and Offsite (Maple Creek)	**0.17**	Y
	Station E	Onsite, Subbasin of Station CE	**0.06**	Y
	Station S	Onsite	0.03	N
	Pond 8	-	0.04	N
	Spillway	-	0.003	N
2012 - Composite Samples	Station D	Offsite Only (Alder Creek)	**11.09**	Y
	Station CE	Onsite and Offsite (Maple Creek)	**7.11**	Y
	Station E	Onsite, Subbasin of Station CE	**0.14**	Y
	Station S	Onsite	**0.12**	Y
	Pond 8	-	**1.67**	Y
	Spillway	-	**0.68**	Y
March 2011 (Storm 2)				
2012 - Pre-Event Grab Samples	Station D	Offsite Only (Alder Creek)	**8.12**	Y
	Station CE	Onsite and Offsite (Maple Creek)	**0.06**	Y
	Station E	Onsite, Subbasin of Station CE	**0.06**	Y
	Station S	Onsite	0.002	N
	Pond 8	-	0.00	N
	Spillway	-	0.005	N
2012 - Composite Samples	Station D	Offsite Only (Alder Creek)	**2.94**	Y
	Station CE	Onsite and Offsite (Maple Creek)	**3.40**	Y
	Station E	Onsite, Subbasin of Station CE	0.01	N
	Station S	Onsite	0.01	N
	Pond 8	-	**0.43**	Y
	Spillway	-	**0.07**	Y
November 2013				
Alder Creek Storm Drain	Alder-R1	Offsite Only (Alder Creek)	**5.93**	Y
	Alder-P1	Offsite Only (Alder Creek)	**14.28**	Y
	Alder-P3a	Offsite Only (Alder Creek)	**28.84**	Y
	Alder-F1	Offsite Only (Alder Creek)	**3.67**	Y
Maple Creek Storm Drain	Maple-R1	Offsite Only (Maple Creek)	**4.82**	Y
	Maple-R3	Offsite Only (Maple Creek)	**20.02**	Y
	Maple-P3	Offsite Only (Maple Creek)	**1.84**	Y

Notes:
(a) The 2,3,7,8-TCDD TEQ was calculated using toxic equivalency factors adopted by the California Environmental Protection Agency Office of Environmental Health Hazard Assessment (OEHHA; OEHHA 2011)
(b) The Water Quality Objective (WQO) for 2,3,7,8-TCDD TEQ is the Public Health Goal (PHG) of 0.05 pg/L.

Table 2: Summary of Estimated Influent and Effluent Dioxin/Furan Loads and Dioxin/Furan Concentration in Suspended Sediment

Sample Name:	Representative of Onsite or Offsite Runoff?	Total Volume (Liters x 10^6)	2,3,7,8-TCDD TEQ (Human/Mammal) (µg)	2,3,7,8-TCDD TEQ/TSS (pg/g)
February 2011 (Storm 1)				
Station D	Offsite Only (Alder Creek)	13.2	130	345
Station CE	Onsite and Offsite (Maple Creek)	11.8	93.9	254
Station E (a)	Onsite, Subbasin of Station CE	4.5	0.085	7.9
Station S	Onsite	9.9	0.518	9.6
O-1 & O-2	Onsite	0.6	1.14	-
Inflow	-	39.3	237	-
Outflow	-	40.2	27.2	-
Removal Efficiency of Pond		-	88%	-
Proportion of Influent from Offsite Drainage Basin (Stations D and CE)		-	94%	-
Proportion of Influent from Onsite Drainage Basins		-	6%	-
March 2011 (Storm 2)				
Station D	Offsite Only (Alder Creek)	4.9	14.6	594
Station CE	Onsite and Offsite (Maple Creek)	4	13.6	426
Station E (a)	Onsite, Subbasin of Station CE	0.2	0.001	0.5
Station S	Onsite	1.3	0.011	1.7
O-1 & O-2	Onsite	1.4	0.012	-
Inflow	-	11.6	30.1	-
Outflow	-	12	0.792	-
Removal Efficiency of Pond		-	97%	-
Proportion of Influent from Offsite Drainage Basin (Stations D and CE)		-	94%	-
Proportion of Influent from Onsite Drainage Basins		-	6%	-

TSS = Total Suspended Solids

Notes:
(a) Station E is a subbasin of Station CE, and therefore was not included in the loading calculations.
(b) Calculations based on composite samples.

Figures

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B0066138.0006.00003
I:\FortBragg\MXD\Stormwater\Feb2011_April2011\Fig 2-2 Subcatchments.mxd - 8/1/2011 @ 3:17:38 PM

LEGEND

- ISCO SAMPLER
- FLOW DIRECTION
- PIPE LOCATION (APPROX.)
- CONTOURS
- SUBCATCHMENT BOUNDARY
- PONDS

NOTE: PIPE LOCATIONS ARE APPROXIMATE
AND NOT ALL SURFACE WATER FLOW PATHS ARE SHOWN

0 400 800 Feet
GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
Mill Pond Storm Water Sampling Report

SITE HYDROLOGY AND SUBCATCHMENTS

ARCADIS | FIGURE 1-2

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B0066138.0006.00003

LEGEND

- STORM WATER SAMPLE LOCATION
- PIPE LOCATION (APPROX.)
- SUBCATCHMENT BOUNDARY
- PONDS

NOTE: PIPE LOCATIONS ARE APPROXIMATE

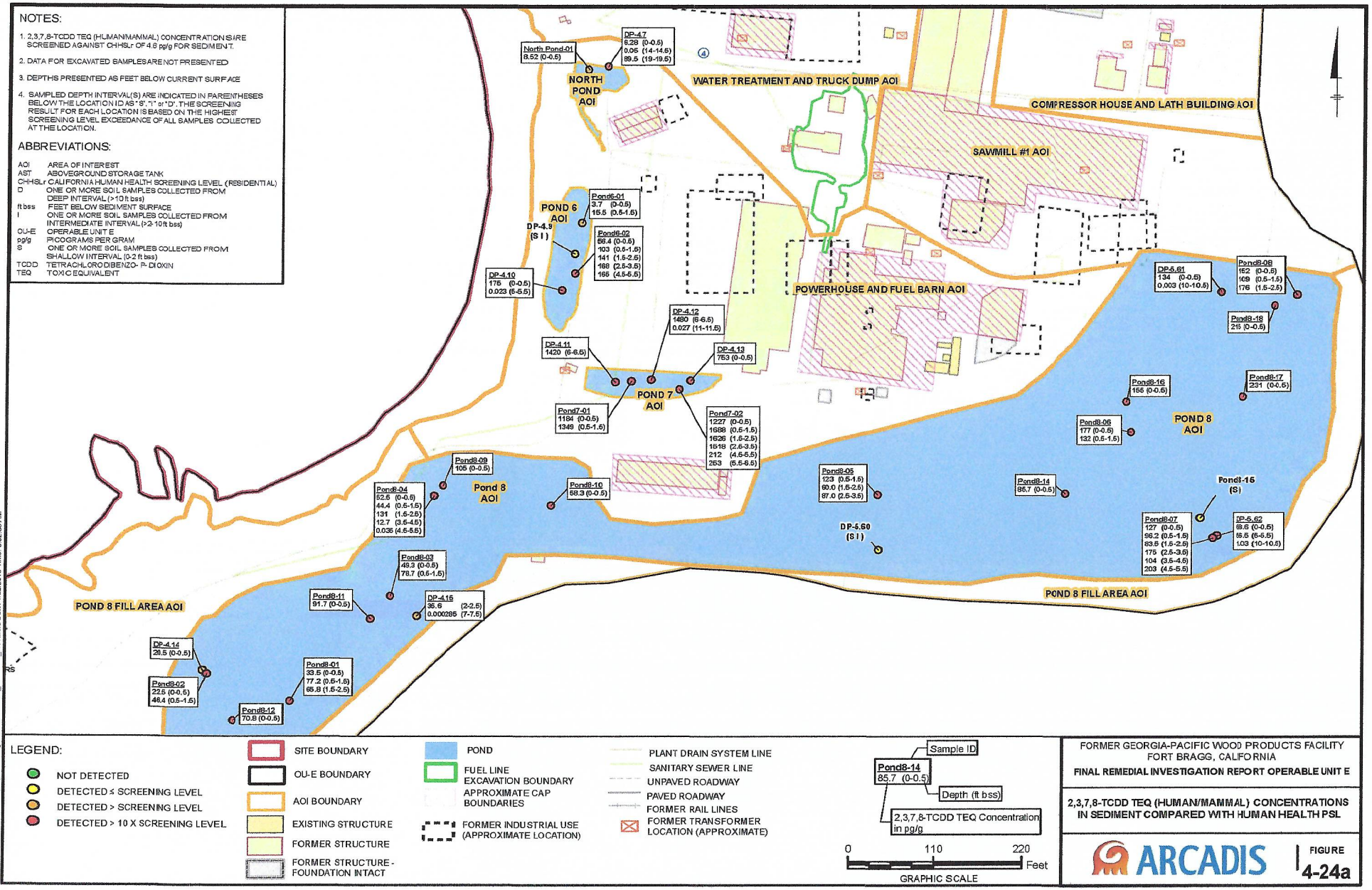
0 400 800 Feet
GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

STORM WATER SAMPLING REPORT

STORMWATER SAMPLE LOCATIONS AND SUBCATCHMENTS

ARCADIS | FIGURE 2



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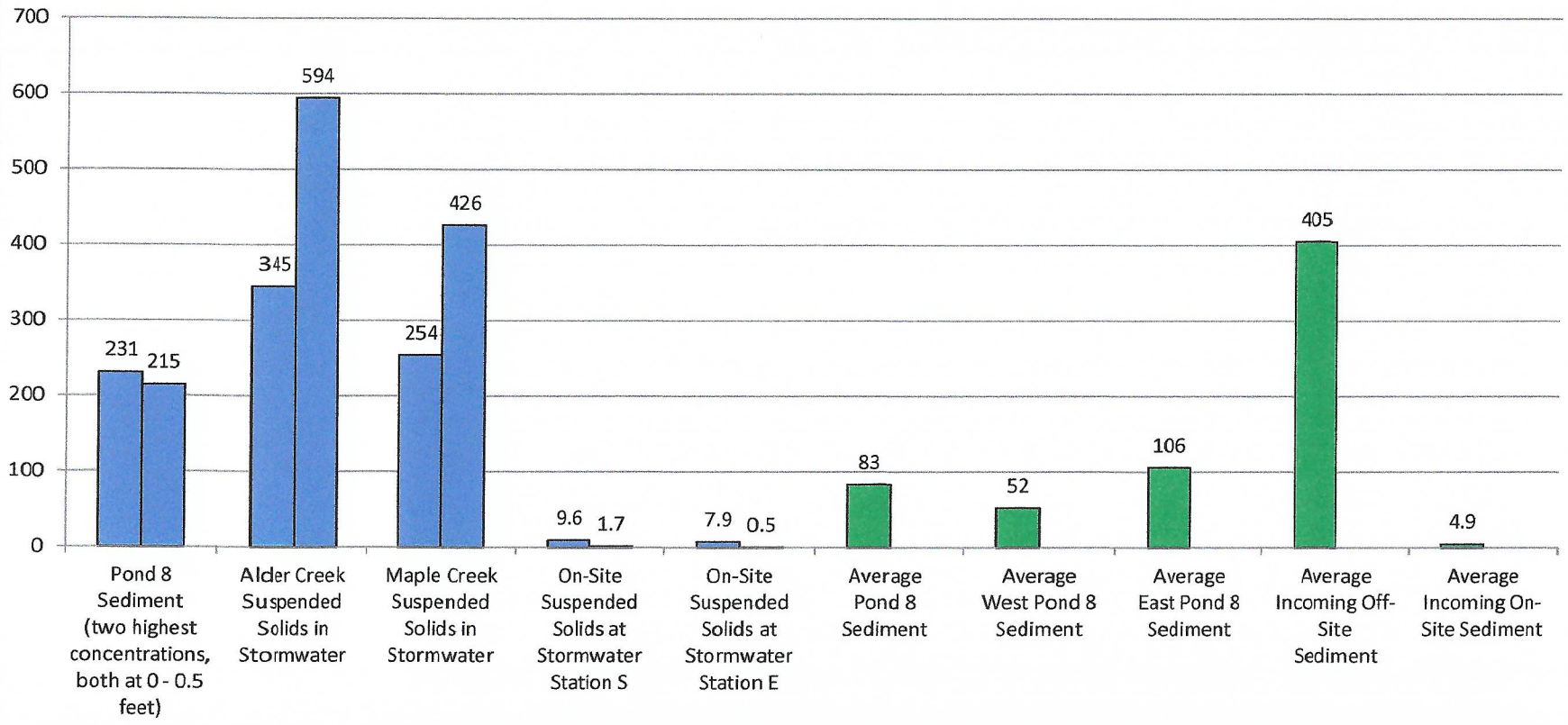

Notes:

1. Off-site and on-site storm water 2,3,7,8-TCDD TEQ concentrations in solids presented here are estimated based on data collected in February and March 2011. The Pond 8 sediment 2,3,7,8-TCDD TEQ concentrations are from the two highest concentration samples located near the off-site storm water outfalls at Pond 8 (see Figure 4-24a presented in the OU-E RI).
2. On a mass basis, off-site storm water contributed more than 90% of the 2,3,7,8-TCDD TEQ load entering Pond 8 during the February and March 2011 storm events.
3. The average concentration of 2,3,7,8-TCDD TEQ in solids in off-site stom water entering Pond 8 is approximately 5 times greater than the average concentration and twice the maximum concentration observed in Pond 8 sediment.
4. 2,3,7,8,-TCDD TEQ concentrations in off-site storm water exceeded the WQO in all samples collected during storm events.
5. Concentrations in pg/g.

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

2,3,7,8-TCDD TEQ Concentrations in Suspended Solids and Sediment

Kennedy/Jenks Consultants
Engineers & Scientists

FIGURE
4

Attachment A

Table 2 Calculations

Table A.1: Table 2 Calculations - 2,3,7,8-TCDD TEQ Mass in Event 1

			Total Mass (1)																			
		Basin	CE			D			S			O-1 & O-2 (4)			E			Inflow (3)			Outflow		
	WHO TEFs 2005	Total Volume	13.2		TCDD/TCDF	11.8		TCDD/TCDF	4.5		TCDD/TCDF	9.9		TCDD/TCDF	0.6		TCDD/TCDF	39.3	TCDD/TCDF	40.2		TCDD/TCDF
	(Human/ Mammal)	(Liters x 10^6)			Equivalency			Equivalency			Equivalency			Equivalency			Equivalency		Equivalency			Equivalency
1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	0.01	µg	1,883		18.83	2,952		29.52	33	J	0.33	73	J	0.73	5.6	J	0.056	4,941	49.41	1,620		16.2
1,2,3,4,6,7,8-HpCDF	0.01	µg	800		8	1,113		11.13	9.4	J	0.094	21	J	0.21	1.6	J	0.016	1,943	19.43	539	J	5.39
1,2,3,4,7,8,9-HpCDF	0.01	µg	75	J	0.75	120	J	1.2	2.2	U	0	4.8	U	0	0.3	U	0	202	2.02	37	U	0
1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	40	J	4	59	J	5.9	2.9	U	0	6.3	U	0	0.3	U	0	108	10.8	31	U	0
1,2,3,4,7,8-HxCDF	0.1	µg	34	J	3.4	39	J	3.9	1.9	U	0	4.2	U	0	0.2	U	0	79.9	7.99	20	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	109	J	10.9	143	J	14.3	3.8	U	0	8.2	U	0	0.4	U	0	265	26.5	40	U	0
1,2,3,6,7,8-HxCDF	0.1	µg	47	J	4.7	58	J	5.8	1.9	U	0	4.1	U	0	0.2	U	0	111	11.1	19	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	0.1	µg	63	J	6.3	104	J	10.4	3.2	U	0	7.1	U	0	0.4	U	0	177	17.7	35	U	0
1,2,3,7,8,9-HxCDF	0.1	µg	ND		0	ND		0	ND		0	ND		0	ND		0	ND	0	ND		0
1,2,3,7,8-Pentachlorodibenzofuran	0.03	µg	ND		0	ND		0	ND		0	ND		0	ND		0	ND	0	ND		0
1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	1	µg	28	J	28	36	J	36	2.1	U	0	4.5	U	0	0.3	U	0	70.4	70.4	31	U	0
2,3,4,6,7,8-HxCDF	0.1	µg	38	J	3.8	50	J	5	2.1	U	0	4.6	U	0	0.2	U	0	94.5	9.45	21	U	0
2,3,4,7,8-PeCDF	0.3	µg	ND		0	ND		0	ND		0	ND		0	ND		0	ND	0	ND		0
2,3,7,8-Tetrachlorodibenzofuran	0.1	µg	ND		0	ND		0	ND		0	ND		0	ND		0	ND	0	ND		0
OCDD	0.0003	µg	14,746		4.4238	19,172		5.7516	290		0.087	631		0.1893	41.4		0.01242	34,839	10.4517	16,922		5.0766
OCDF	0.0003	µg	2,699		0.8097	4,505		1.3515	24	J	0.0072	52	J	0.0156	3.3	J	0.00099	7,280	2.184	1,744	J	0.5232
2,3,7,8-TCDD TEQ (Human/Mammal)		**µg**			**93.9**			**130**			**0.518**			**1.14**			**0.085**		**237**			**27.2**

Notes:

(1) Storm event #1 flow volume based on 24 hour flows from 2/15/11 6:00 AM to 2/16/11 6:00 AM.
(2) This table is based on Table 3-4, Estimated Influent and Effluent Loads and Net Change - Event 1 (Composite Samples) from the Mill Pond Storm Water Sampling Report (Arcadis 2012).
(3) Basin E loads are accounted for in Basin CE and were not included again in the total influent loading.
(4) O-1 and O-2 mass estimates are based on the Basin S sample data normalized for the differences in watershed area.

	Offsite (CE + D)	Onsite
Percent Influent Flow Volume:	64	36
Percent Influent Dioxins/Furans as 2,3,7,8-TCDD TEQ	94	6

Pond 8 Removal Efficiency (%)	88

Table A.2: Table 2 Calculations - 2,3,7,8-TCDD TEQ Mass in Event 2

	WHO TEFs 2005 (Human/ Mammal)	Basin Total Volume (Liters x 10^6)	Total Mass (1) CE 4		TCDD/TCDF Equivalency	D 4.9		TCDD/TCDF Equivalency	S 1.3			TCDD/TCDF Equivalency	O-1 & O-2 (4) 1.4			TCDD/TCDF Equivalency	E 0.2			TCDD/TCDF Equivalency	Inflow (3) 11.6	TCDD/TCDF Equivalency	Outflow 12			TCDD/TCDF Equivalency
1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	0.01	µg	410		4.1	456		4.56	3.3	U	0		3.4	U	0		0.2	U	0		872	8.72	72	J	0.72	
1,2,3,4,6,7,8-HpCDF	0.01	µg	153		1.53	169		1.69	1.9	U	0		2	U	0		0.2	U	0		327	3.27	15	U	0	
1,2,3,4,7,8,9-HpCDF	0.01	µg	17.1	J	0.171	11	U	0	2.9	U	0		3	U	0		0.2	U	0		33.9	0.339	23	U	0	
1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	11.2	J	1.12	12	J	1.2	2	U	0		2.1	U	0		0.1	U	0		26.9	2.69	14	U	0	
1,2,3,4,7,8-HxCDF	0.1	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	18.4	J	1.84	22	J	2.2	2.5	U	0		2.6	U	0		0.2	U	0		45.3	4.53	18	U	0	
1,2,3,6,7,8-HxCDF	0.1	µg	20.8	J	2.08	19	J	1.9	1.6	U	0		1.7	U	0		0.1	U	0		43	4.3	10	U	0	
1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	0.1	µg	16.1	J	1.61	17	J	1.7	2.2	U	0		2.3	U	0		0.1	U	0		37.1	3.71	16	U	0	
1,2,3,7,8,9-HxCDF	0.1	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
1,2,3,7,8-Pentachlorodibenzofuran	0.03	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	1	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
2,3,4,6,7,8-HxCDF	0.1	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
2,3,4,7,8-PeCDF	0.3	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
2,3,7,8-TCDD	1	--	--			ND		0	ND		0		ND		0		ND		0		ND	0	ND	ND	0	
2,3,7,8-Tetrachlorodibenzofuran	0.1	--	ND		0	ND		0	ND		0		ND		0		ND		0		ND	0	ND	-	0	
OCDD	0.0003	µg	3,471		1.0413	3,814		1.1442	37	J	0.0111		39	J	0.0117		3.4	J	0.00102		7,361	2.2083	239	J	0.0717	
OCDF	0.0003	µg	482		0.1446	565		0.1695	3.8	U	0		4	U	0		0.3	U	0		1,055	0.3165	37	U	0	
2,3,7,8-TCDD TEQ (Human/Mammal)		**µg**			**13.6**			**14.6**			**0.011**				**0.012**				**0.001**			**30.1**			**0.792**	

Notes:
(1) Storm event #2 flow volume based on 24 hour flows from 3/2/11 6:00 PM to 3/3/11 6:00 PM.
(2) This table is based on Table 3-5, Estimated Influent and Effluent Loads and Net Change - Event 2 (Composite Samples) from the Mill Pond Storm Water Sampling Report (Arcadis 2012).
(3) Basin E loads are accounted for in Basin CE and were not included again in the total influent loading.
(4) O-1 and O-2 mass estimates are based on the Basin S sample data normalized for the differences in watershed area.

	Offsite (CE + D)	Onsite
Percent Influent Flow Volume:	77	23
Percent Influent Dioxins/Furans as 2,3,7,8-TCDD TEQ	94	6

Pond 8 Removal Efficiency (%)	97

Table A.3: Table 2 Calculations - 2,3,7,8-TCDD TEQ/TSS in Event 1

		Basin	Total Mass (1)																											
			CE					D					S					O-1 & O-2 (4)		E					Inflow (5)		Outflow			
	WHO TEFs 2005 (Human/ Mammal)	Total Volume (Liters x 10^6)	13.2		µg/L	cong µg/ TSS g (see note 3)	TCDD/TCDF Equivalency	11.8		µg/L	cong µg/ TSS g	TCDD/TC DF Equivalency	4.5		µg/L	cong µg/ TSS g	TCDD/TC DF Equivalency	9.9	TCDD/TC DF Equivalency	0.6		µg/L	cong µg/ TSS g	TCDD/TC DF Equivalency	39.3	TCDD/TC DF Equivalency	40.2		TCDD/TC DF Equivalency
1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	0.01	µg	1,883		1.43E-04	5.09E-03	5.09E-05	2,952		2.50E-04	7.82E-03	7.82E-05	33	J	7.33E-06	6.11E-04	6.11E-06	73	J 0.73	5.6	J	9.33E-06	5.19E-04	5.19E-06	4,941	49.41	1,520		16.2
1,2,3,4,6,7,8-HpCDF	0.01	µg	800		6.06E-05	2.16E-03	2.16E-05	1,113		9.43E-05	2.95E-03	2.95E-05	9.4	J	2.09E-06	1.74E-04	1.74E-06	21	J 0.21	1.6	J	2.67E-06	1.48E-04	1.48E-06	1,943	19.43	539	J	5.39
1,2,3,4,7,8,9-HpCDF	0.01	µg	75	J	5.68E-06	2.03E-04	2.03E-06	120	J	1.02E-05	3.18E-04	3.18E-06	2.2	U	0	0	0	4.8	U 0	0.3	U	0	0	0	202	2.02	37	U	0
1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	40	J	3.03E-06	1.08E-04	1.08E-05	59	J	5.00E-06	1.56E-04	1.56E-05	2.9	U	0	0	0	6.3	U 0	0.3	U	0	0	0	108	10.8	31	U	0
1,2,3,4,7,8-HxCDF	0.1	µg	34	J	2.58E-06	9.20E-05	9.20E-06	39	J	3.31E-06	1.03E-04	1.03E-05	1.9	U	0	0	0	4.2	U 0	0.2	U	0	0	0	79.9	7.99	20	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	109	J	8.26E-06	2.95E-04	2.95E-05	143	J	1.21E-05	3.79E-04	3.79E-05	3.8	U	0	0	0	8.2	U 0	0.4	U	0	0	0	265	26.5	40	U	0
1,2,3,6,7,8-HxCDF	0.1	µg	47	J	3.56E-06	1.27E-04	1.27E-05	58	J	4.92E-06	1.54E-04	1.54E-05	1.9	U	0	0	0	4.1	U 0	0.2	U	0	0	0	111	11.1	19	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	0.1	µg	63	J	4.77E-06	1.70E-04	1.70E-05	104	J	8.81E-06	2.75E-04	2.75E-05	3.2	U	0	0	0	7.1	U 0	0.4	U	0	0	0	177	17.7	35	U	0
1,2,3,7,8,9-HxCDF	0.1	µg	ND		ND	0	0	ND		ND	0	0	ND		ND	0	0	ND	0	ND		ND	0	0	ND	0	ND		0
1,2,3,7,8-Pentachlorodibenzofuran	0.03	µg	ND		ND	0	0	ND		ND	0	0	ND		ND	0	0	ND	0	ND		ND	0	0	ND	0	ND		0
1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	1	µg	28	J	2.12E-06	7.58E-05	7.58E-05	36	J	3.05E-06	9.53E-05	9.53E-05	2.1	U	0	0	0	4.5	U 0	0.3	U	0	0	0	70.4	70.4	31	U	0
2,3,4,6,7,8-HxCDF	0.1	µg	38	J	2.88E-06	1.03E-04	1.03E-05	50	J	4.24E-06	1.32E-04	1.32E-05	2.1	U	0	0	0	4.6	U 0	0.2	U	0	0	0	94.5	9.45	21	U	0
2,3,4,7,8-PeCDF	0.3	µg	ND		ND	0	0	ND		ND	0	0	ND		ND	0	0	ND	0	ND		ND	0	0	ND	0	ND		0
2,3,7,8-Tetrachlorodibenzofuran	0.1	µg	ND		ND	0	0	ND		ND	0	0	ND		ND	0	0	ND	0	ND		ND	0	0	ND	0	ND		0
OCDD	0.0003	µg	14,746		1.12E-03	3.99E-02	1.20E-05	19,172		1.62E-03	5.08E-02	1.52E-05	290		6.44E-05	5.37E-03	1.61E-06	631	0.1893	41.4		6.90E-05	3.83E-03	1.15E-06	34,839	10.4517	16,922		5.0766
OCDF	0.0003	µg	2,699		2.04E-04	7.30E-03	2.19E-06	4,505		3.62E-04	1.19E-02	3.58E-06	24	J	5.33E-06	4.44E-04	1.33E-07	52	J 0.0156	3.3	J	5.50E-06	3.06E-04	9.17E-08	7,260	2.184	1,744	J	0.5232
2,3,7,8-TCDD TEQ (Human/Mammal)		**µg/g**					**0.000**					**0.000**					**0.000**		**1.146**					**0.000**		**237.436**			**27.190**
		pg/g					**264**					**345**					**9.6**							**7.8**					
Total Suspended Solids (TSS) (composite) (see note 3)		g	389600					377600					54000					--		10800					--		--		

Notes:

(1) Storm event #2 flow volume based on 24 hour flows from 3/2/11 6:00 PM to 3/3/11 6:00 PM.

(2) This table is based on Table 3-5, Estimated Influent and Effluent Loads and Net Change - Event 2 (Composite Samples) from the Mill Pond Storm Water Sampling Report (Arcadis 2012).

(3) Total Suspended Solids (TSS) sample result converted to g/L and multiplied by total basin volume to calculate ug/TSS g for each congener.

(4) O-1 and O-2 mass estimates are based on the Basin S sample data normalized for the differences in watershed area.

(5) Basin E loads are accounted for in Basin CE and were not included again in the total influent loading.

Table A.4: Table 2 Calculations - 2,3,7,8-TCDD TEQ/TSS in Event 2

			Total Mass (1)																															
	WHO TEFs 2005 (Human/ Mammal)	Basin Total Volume (Liters x 10^6)	CE 4		µg/L		conc µg/ TSS g (see note 3)		TCDD/TCDF Equivalency		D 4.9		µg/L		conc µg/ TSS g		TCDD/TCDF Equivalency		S 1.3		µg/L		conc µg/ TSS g		TCDD/TCDF Equivalency		O-1 & O-2 (4) 1.4		E 0.2		µg/L		conc µg/ TSS g		TCDD/TCDF Equivalency		Inflow (5) 11.6	TCDD/TCDF Equivalency		Outflow 12	TCDD/TCDF Equivalency	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	0.01	µg	410		1.03E-04		1.28E-02		1.28E-04		456		9.31E-05		1.86E-02		1.86E-04		3.3	U	0		0		0		3.4	U	0.2	U	0		0		0		872	8.72		72	J	0.72
1,2,3,4,6,7,8-HpCDF	0.01	µg	153		3.83E-05		4.78E-03		4.78E-05		169		3.45E-05		6.90E-03		6.90E-05		1.9	U	0		0		0		2	U	0.2	U	0		0		0		327	3.27		15	U	0
1,2,3,4,7,8,9-HpCDF	0.01	µg	17.1	J	4.28E-06		5.34E-04		5.34E-06		11	U	0		0		0		2.9	U	0		0		0		3	U	0.2	U	0		0		0		33.9	0.339		23	U	0
1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	11.2	J	2.80E-06		3.50E-04		3.50E-05		12	J	2.45E-06		4.90E-04		4.90E-05		2	U	0		0		0		2.1	U	0.1	U	0		0		0		26.9	2.69		14	U	0
1,2,3,4,7,8-HxCDF	0.1	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	0.1	µg	18.4	J	4.60E-06		5.75E-04		5.75E-05		22	J	4.49E-06		8.98E-04		8.98E-05		2.5	U	0		0		0		2.6	U	0.2	U	0		0		0		45.3	4.53		18	U	0
1,2,3,6,7,8-HxCDF	0.1	µg	20.8	J	5.20E-06		6.50E-04		6.50E-05		19	J	3.88E-06		7.76E-04		7.76E-05		1.6	U	0		0		0		1.7	U	0.1	U	0		0		0		43	4.3		10	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	0.1	µg	16.1	J	4.03E-06		5.03E-04		5.03E-05		17	J	3.47E-06		6.94E-04		6.94E-05		2.2	U	0		0		0		2.3	U	0.1	U	0		0		0		37.1	3.71		16	U	0
1,2,3,7,8,9-HxCDF	0.1	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
1,2,3,7,8-Pentachlorodibenzofuran	0.03	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	1	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
2,3,4,6,7,8-HxCDF	0.1	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
2,3,4,7,8-PeCDF	0.3	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
2,3,7,8-TCDD	1	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	–	0
2,3,7,8-Tetrachlorodibenzofuran	0.1	–	ND		ND		0		0		ND		ND		0		0		ND		ND		0		0		ND		ND		ND		0		0		ND	ND	0
OCDD	0.0003	µg	3,471		8.68E-04		1.08E-01		3.25E-05		3,814		7.78E-04		1.56E-01		4.67E-05		37	J	2.84E-05		0.005692		1.70E-06		39	J	3.4	J	0.000017		0.0017		5.1E-07		7,361	2.2083		239	J	0.0717
OCDF	0.0003	µg	482		1.21E-04		1.51E-02		4.52E-06		565		1.15E-04		2.31E-02		6.92E-06		3.8	U	0		0		0		4	U	0.3	U	0		0		0		1,055	0.3165		37	U	0
2,3,7,8-TCDD TEQ (Human/Mammal)		µg/g							0.000426								0.000694								0.0000017								0.0000005			30.0838				0.7917
		pg/g							426								694								1.7								0.5							
Total Suspended Solids (TSS) (composite) (see note 3)		g	32000								24500								6500								–		2000								–			–		

Notes:
(1) Storm event #2 flow volume based on 24 hour flows from 3/2/11 6:00 PM to 3/3/11 6:00 PM.
(2) This table is based on Table 3-5, Estimated Influent and Effluent Loads and Net Change - Event 2 (Composite Samples) from the Mill Pond Storm Water Sampling Report (Arcadis 2012).
(3) Total Suspended Solids (TSS) sample result converted to g/L and multiplied by total basin volume to calculate ug/TSS g for each congener.
(4) O-1 and O-2 mass estimates are based on the Basin S sample data normalized for the differences in watershed area.
(5) Basin E loads are accounted for in Basin CE and were not included again in the total influent loading.