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ENVIRONMENTAL ENGINEERING & TECHNOLOGY, INC.

August 21, 2012

Metropolitan Utilities District of Omaha
Engineering Memorandum No. 3
NPDES Studies
EE&T Project No. 12501

Subject: Review of the Existing Conditions in the Missouri River

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INTRODUCTION

The Metropolitan Utilities District of Omaha (M.U.D.) operates two split-treatment softening facilities, the Platte South Potable Water Treatment Plant (PWTP) and the Florence PWTP, that currently discharge residuals that are generated during treatment to the Missouri River. These discharges are permitted under NPDES Permit No. NE0000906 and NPDES Permit No. NE0000914, respectively. Both of these permits went into effect on October 1, 2009.

As part of these NPDES permits, the Nebraska Department of Environmental Quality (NDEQ) directed M.U.D. to develop study plans for an evaluation of selected technologies and associated costs for solids reduction and evaluation of current water quality impacts from the discharge of solids to the Missouri River through Outfall 002 at Platte South PWTP and through the outfalls at the Florence PWTP. Three objectives were given for these studies, one of which was to provide a Review of the Existing conditions in the Missouri River. This Review is to include:

- River flow and sediment load in the Missouri River
- Existing water quality in the Missouri River
- Biological communities in the Missouri River

The proposed study plans that described, in part, the approach the research team proposed to use for the Review of the Existing Conditions in the Missouri River were submitted in September 2010. NDEQ indicated approval of the proposed approach for the Review during a November 10, 2010 project meeting.

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The approach to this Review is to focus on the section of the Missouri River located within the watershed designated as Hydrologic Unit Code (HUC) 10230006, in which the outfalls from both the Platte South PWTP and Florence PWTP are located. The boundaries of HUC 10230006 are shown in Figure 1. The primary monitoring station in this HUC is USGS 6610000, although data from other sources were reviewed and reported, as appropriate.

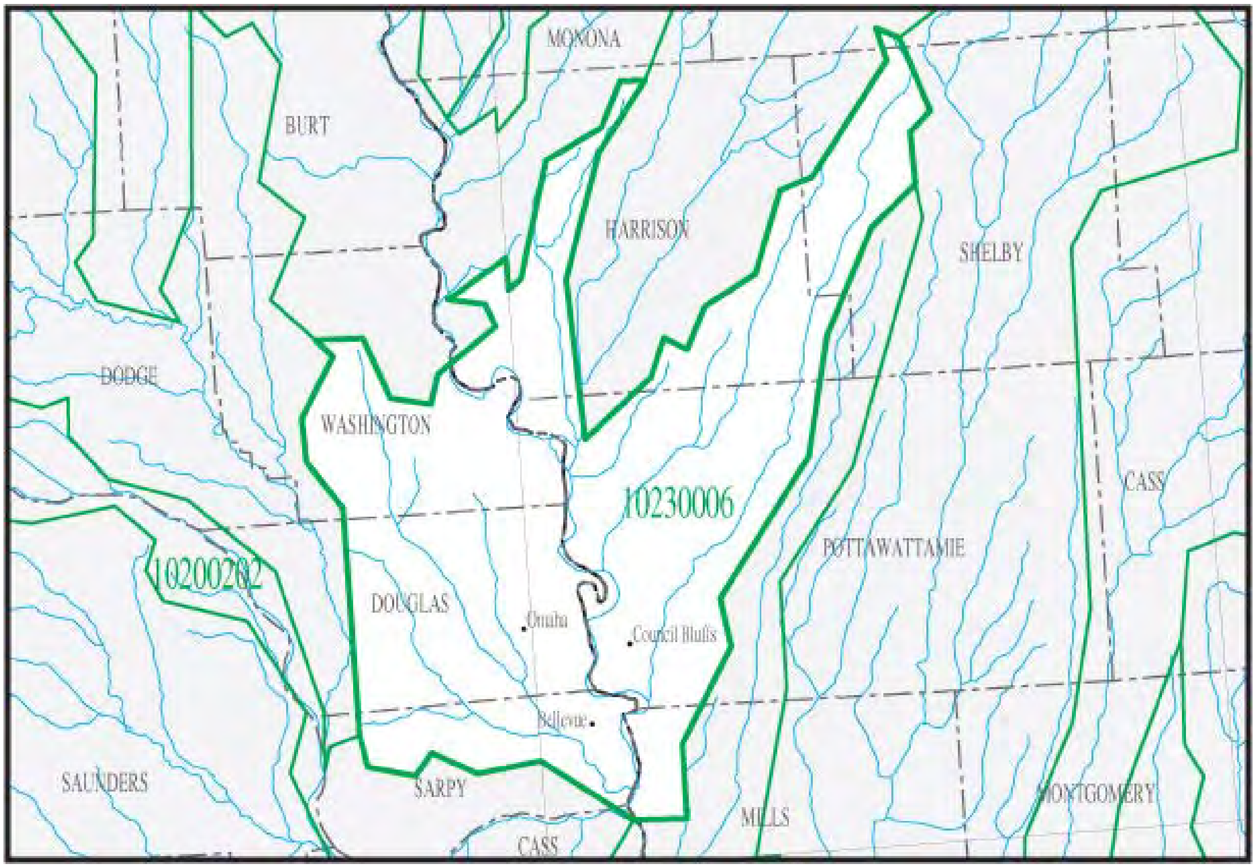

Figure 1. Boundary of HUC 10230006 (from http://water.usgs.gov/wsc/cat/10230006.html)

The data that are available for this section of the Missouri River have been complied into an interactive, CD-ROM based tool. This tool is divided into three sections: 1) Hydrology & Watershed Modeling, 2) Water Quality, and 3) Biological Assessment. Each section of the tool contains a bibliography containing references to literature and papers concerning the section of the Missouri River near Omaha, including links to view the abstracts of those works. Pertinent data are also linked to references; for example, the Water Quality section features links to water quality data provided by USGS and a link to water quality data from EPA STORET.

The purpose of this memo is to briefly summarize some of the major characteristics of the Missouri River within HUC 10230006, as detailed by the data in the CD-ROM tool.

River Flow and Sediment Load

River flow and sediment loading in the Missouri River changed greatly during the 20th Century due to the construction of a series of dams along the Upper Missouri River. These dams, which were constructed between 1940 and 1964, are used for hydroelectricity generation, to control flooding, and to maintain sufficient flows for barge navigation. In general, the construction of the dams has significantly reduced the variance between daily mean flows in the river and, on average, has increased the mean flow near Omaha by approximately one-third above the pre-dam period (Pegg *et al.*, 2003). This can be observed in Figure 2; while the periodic spikes associated with storm events greatly subsided post 1948 when the dams began to be placed in service, the mean discharge rate has increased during this period.

The annual flow cycle for this part of the Missouri River is characterized by lower winter flows. Over the entire historical record for USGS 6610000 there is noticeable peak in flow rates during the late spring months (April through June) when the river receives snowmelt. However, as can be seen in Figure 3, since the construction of the dams the drop off in river flows typically observed during the late-summer/early-fall is no longer regularly observed, as the dams are operated to extend the navigation season on the river. Winter river flows have also increased significantly post-dam construction, as water stored for hydroelectric and flow control purposes is released through the winter to provide reservoir capacity to accommodate spring runoff.

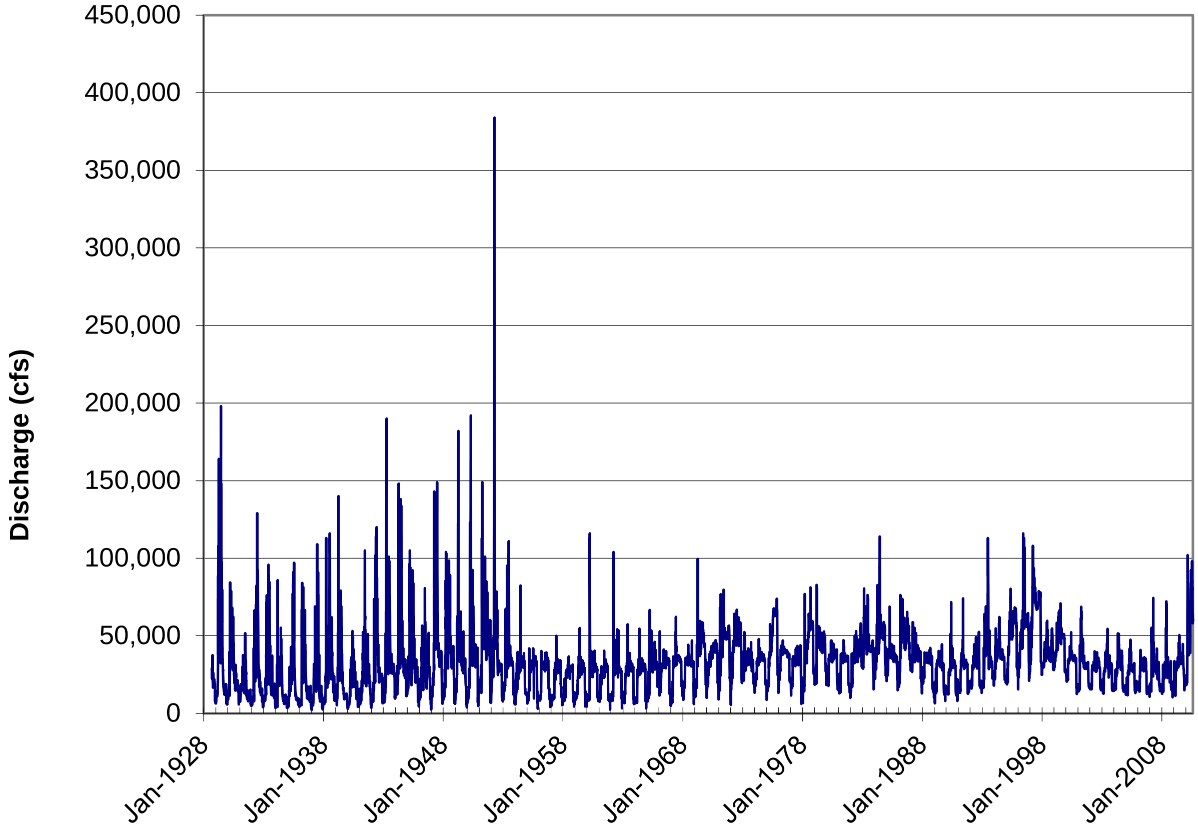

Figure 2. Daily discharge through USGS 6610000 (Omaha, NE) from September 1, 1928 through August 31, 2010

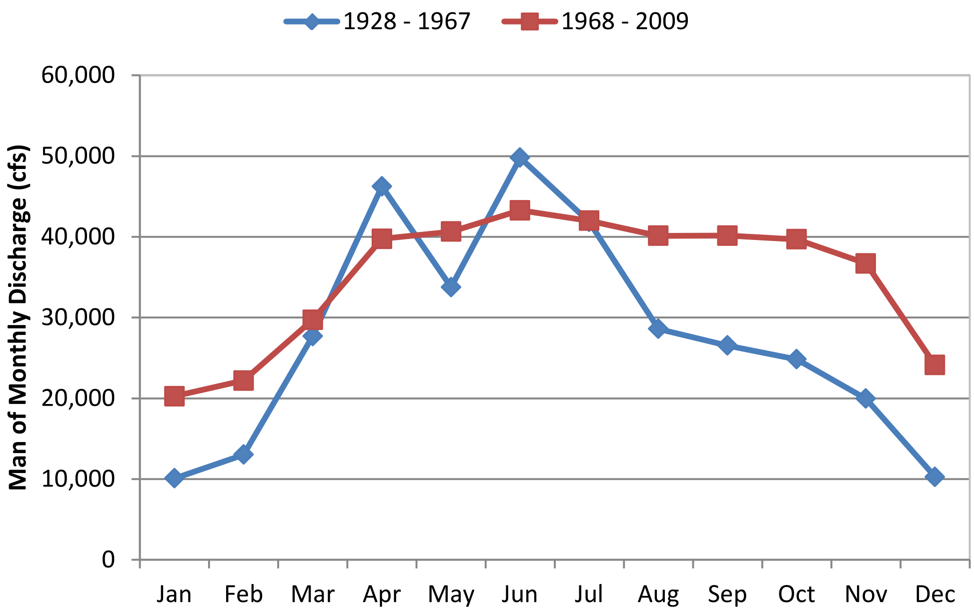

Figure 3. Historic mean monthly discharge through USGS 6610000 (Omaha, NE)

Sediment loading data for the Missouri River at USGS 6610000 are much sparser than river flow data. Daily average suspended sediment concentrations for the river are available only for the following periods: 10/1/1971 through 9/30/1976; 10/1/1991 through 9/30/2003; and 10/1/2008 through 9/30/2009. Figure 4 shows the annual cycle for suspended sediment concentration, which, as expected, closely mirrors the river discharges as shown in Figure 3.

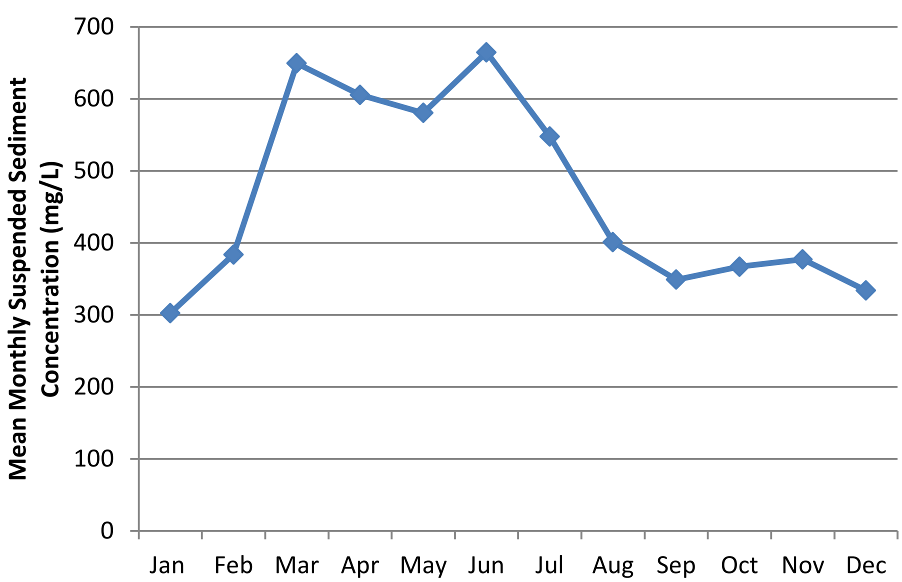

Figure 4. Historic mean monthly suspended sediment concentration at USGS 6610000 (Omaha, NE)

Interestingly, even though all data shown in Figure 4 were recorded after October 1971, sediment loads appear to drop off by the end of the summer even though river flows now remain high through this period. Presumably, during this period a higher percentage of the total river flow is comprised of water released from upstream dams, which has a lower suspended solids concentration than tributary flows.

Together, the data shown in Figures 3 and 4 can be used to determine the mean suspended sediment discharge in tons/day, which represents the mass-flow rate at which sediment is moving down the river. As would be expected, the annual trend of this mass-flow rate follows that of Figures 3 and 4. Figure 5 shows a percentile plot of the monthly mean suspended sediment discharge through USGS 661000.

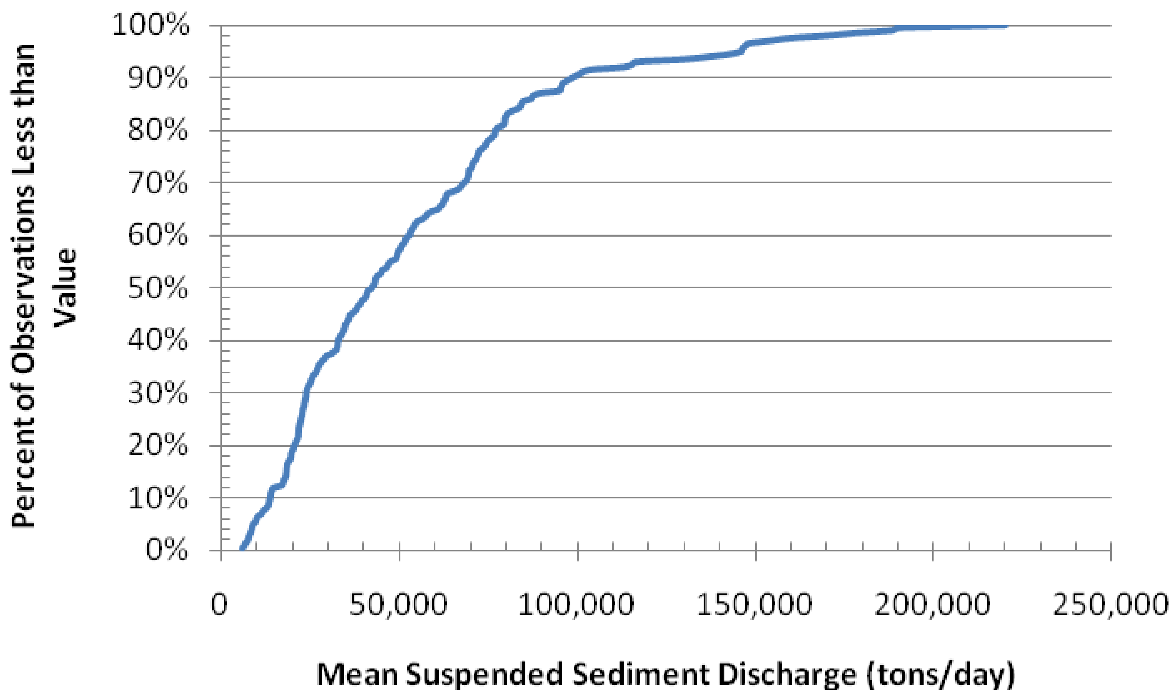

Figure 5. Percentile plot of monthly mean suspended sediment discharge through USGS 6610000 (Omaha, NE)

As Figure 5 shows, there is a relatively high variance in the mean suspended sediment discharge through USGS 6610000. The 10th percentile suspended sediment discharge calculated was 13,535 tons/day, which is approximately three times less than the median value of 41,950 tons/day. The maximum discharge calculated for this station was 220,000 tons/day, which is more than a factor of 5 greater than the median mass-flow rate.

The sediment discharge in this section of the Missouri River also experiences large, occasional peaking as seen between the difference in the 90th percentile of 98,365 tons/day and the maximum. The high values are generally associated with storm events, and generally occur between March and August.

25th Percentile Flow

The NPDES permits for both the Platte South PWTP and the Florence PWTP require that pH Mixing Zone studies be conducted when the Missouri River flow rate is less than or equal to the annual 25th percentile flow; thus, establishing the annual 25th percentile flow is an important part of meeting the NPDES permit requirements. The time frame used to establish the 25th percentile flow is an important factor in determining that flow threshold. To illustrate this point, percentile plots for a variety of time periods are shown in Figure 6. The 25th percentile flow for each period is listed in Table 1.

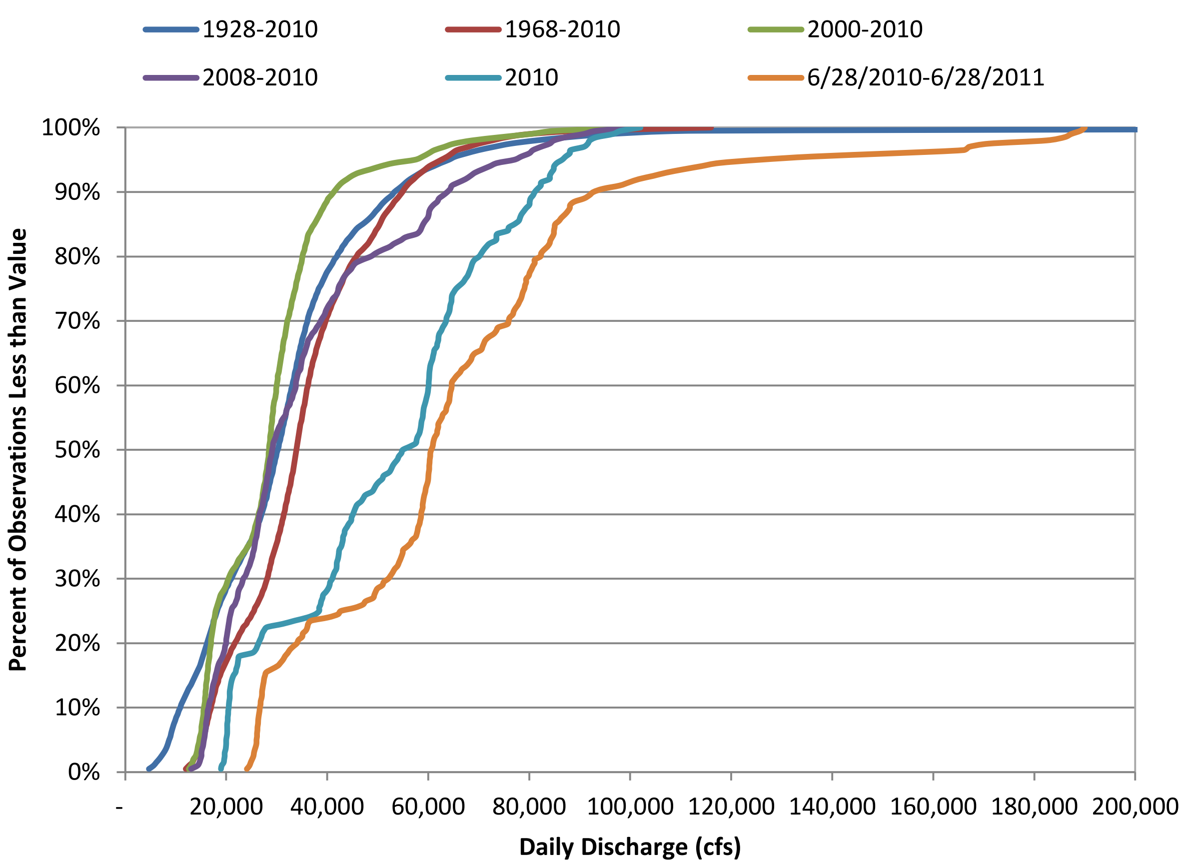

Figure 6. Percentile plot of the daily discharge through USGS 6610000 (Omaha, NE) for different time periods

Table 1. 25th percentile flow rates through USGS 6610000 (Omaha, NE) for different time periods

Time Period	25th Percentile Flow (cfs)
1928 - 2010	18,200
1968 - 2010	25,500
2000 - 2010	17,900
2008 - 2010	21,000
2010	38,400
6/28/2010 - 6/28/2011	42,700

Both Figure 6 and Table 1 show that the 25th percentile flow can vary significantly depending on the reference period. For example, while the 25th percentile flow rate the entire historic data set is 18,200 cfs, during the entire calendar year of 2010 the minimum average daily flow rate observed at USGS 661000 was 18,300 cfs. Instead, the 25th percentile observed during calendar year 2010 is more than double the 25th percentile of the entire historical data set, and is 1.8 times larger than the 25th percentile flow during the previous three year period (2008 – 2010).

All indications are that this trend will continue for the near future. At present, the Missouri River is experiencing a historic flooding event, with sustained releases from the Upper Missouri River dams that are more than double the previous historical peak releases. The 25th percentile of the average daily discharges from the previous 365 days of data (June 28, 2010 – June 28, 2011) is higher than the 80th percentile of the historical data set.

Existing Water Quality

Water quality data for the Missouri River within HUC 10230006 is primarily limited to two sample sets. The first, obtained from EPA STORET Data Warehouse, was collected by NDEQ at Station ID SMT2MISSR110 (latitude 41.2763889, longitude -95.8995), which is located between the Florence PWTP and Platte South PWTP outfalls. Data collection occurred on three days between January and March 2003. During this period, the average flow rate was 16,300 cfs, at the very low end of monthly mean flows. Results from this study are presented in Table 2. Note that the average turbidity measured during this collection effort is much less than would be expected based on the average suspended sediment concentrations shown previously in Figure 4. It is not clear why there would be such a discrepancy between the data sources.

Table 2. Water quality data collected in Q1 2003

Parameter	Units	Average	Standard Deviation
Dissolved oxygen	mg/L	14.06	0.51
pH		8.56	
Specific conductance	µmho/cm	813	36
Temperature, water	°C	0.95	0.66
Turbidity	ntu	17.0	1.3

The second set of water quality data comes from work conducted by USGS between August 2006 and October 2007 at multiple stations along the Missouri River and its junction with tributaries within HUC 10230006. These stations, descending in order from the uppermost station to the furthest downstream stations, are: 412126095565201, 411636095535401, 411316095551301, 411105095532301. Data collected during this period include standard water quality parameters (temperature, DO, etc.); nutrients (Total N, P, etc.); heavy metals (As, Pb, etc.); and various endocrine disrupting compounds and wastewater surrogates (bisphenol A, caffeine, etc.) These data are provided on the CD-ROM, and can be perused in depth. While the breadth of data collected by USGS precludes a detailed summary of each individual contaminant, the following trends were noted:

- Heavy metals were present at detectable levels, but appeared to be directly correlated to suspended sediment levels in the river.
- Endocrine disputing compounds were detected in some tributaries, but levels of these compounds in the Missouri River itself were below detection limits.

Biological Communities

An extensive biography is included on the CD-ROM detailing efforts to characterize and improve biological communities within the Missouri River. The impact of the Upper Missouri River dams and increasing development has been significant; in 1993, Hesse *et al.* noted that the population density of certain chub and minnow species in the Missouri River in Nebraska has decreased by as much as 95 percent since 1971. As early as 1968, Morris *et al.* noted that channelizing the river reduced available benthic area by as much as 67 percent. There have been large-scale impacts to biological communities resulting from damming, channelization, and development within the watershed The only biological data collected within HUC 10230006 that are listed in the EPA STORET Data Warehouse are from a NDEQ study conducted on August 25, 2004 at station GRW04449-571 (latitude 41.165783, longitude -95.849148), which is located between the Florence PWTP and Platte South PWTP outfalls. The detailed data are provided on the CD-ROM tool, including the taxons of macroinvertebrates that were collected, and are summarized in Table 3.

Table 3. Biological community data collected August 25, 2004

Parameter	Value Type	Units	Average	Standard Deviation
Macroinvertebrates	Actual	count	5.08	9.59
Population diversity, fish, # of species	Actual	count	5.75	6.49
Taxonomic Richness	Calculated	count	5.09	6.79
Species Relative Density	Calculated	fraction	0.13	0.10
Biomass	Calculated	kg	16.40	23.31
Count	Calculated	count	29.36	33.76

Summary

Information concerning the existing conditions in the Missouri River is presented on the provided CD-ROM, and summarized above. These existing conditions will be used as a baseline when evaluating current water quality impacts from the PWTP outfalls when conducting the site-specific field studies that are outlined in NPDES Permit No. NE0000906 and NPDES Permit No. NE0000914.

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September 5, 2011

Metropolitan Utilities District of Omaha
Engineering Memorandum No. 4
NPDES Studies
EE&T Project No. 12501

Subject: Platte South pH Mixing Zone Study

The Platte South Potable Water Treatment Plant (PWTP), operated by the Metropolitan Utilities District of Omaha (M.U.D.), is a split-treatment softening facility that currently discharges residuals that are generated during treatment to the Missouri River. This discharge is permitted under NPDES Permit No. NE0000906, which went into effect as of October 1, 2009. As part of this NPDES permit, the Nebraska Department of Environmental Quality (NDEQ) directed M.U.D. to conduct pH Mixing Zone Study to determine if the discharge from the Platte South PWTP attains the water quality standards for pH (range 6.5 to 9.0) at the end of the acute mixing zone.

The pH Mixing Zone Study was conducted February 15 – 17, 2011, in accordance with the pH Mixing Zone Study plan submitted to NDEQ in March 2010. A report detailing the methodology used by this study, as well as the data collected during this study, has been prepared by Tennessee Technological University (Tennessee Tech) and is attached to the memorandum as Attachment A.

Background

Outfall 002 currently conveys settled solids from the six upflow clarification basins at the Platte South PWTP to the Missouri River. Solids removed from each of the clarification basins collect at the PWTP in a storage pit. When the pit is full, the residuals are pumped to the Missouri River via a 5-mile long pipeline. The pit is pumped out approximately every 15 minutes under existing conditions.

The pipeline that conveys residuals to Outfall 002 has a high point approximately mid-way along its length. Downstream of this high point, the residuals flow by gravity to the discharge. Friction losses along the portion of the pipeline under gravity-flow conditions serves

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to attenuate the flow surges caused by pumping; as a result, by the time the residuals reach Outfall 002 the flow is relatively uniform and constant. The residuals discharged through Outfall 002 are relatively concentrated, with an average total suspended solids (TSS) concentration of approximately 80,000 mg/L. The TSS concentration varies with plant operations, ranging from as low as 6,000 mg/L to as high as 180,000 mg/L. The pH of these residuals varies with the solids concentration; on a day when the solids concentration was relatively high (160,000 mg/L), the pH of the residuals was approximately 10.7.

The location of Outfall 002 is shown in Figure 1. Prior to conducting the pH Study, M.U.D. contracted with a diver to physically verify the location of the end of the pipe in the river at Outfall 002 to help direct the research team's field activities. The location of the outfall in the Nebraska State Plane Coordinate System are 476601.28 ft N, 2775327.96 ft E.

Figure 1. Location of Outfall 002 serving Platte South PWTP (scale – 1":1500')

Currently, Outfall 002 only discharges residuals that settle in the PWTPs upflow clarifiers. Spent filter backwash water generated at the PWTPs filter plant are currently discharged through Outfall 001, located at Zweibel Creek. As part of the requirements established by NPDES Permit No. NE0000906, M.U.D. is abandoning Outfall 001 and re-routing the spent filter backwash water currently handled by that outfall to Outfall 002. However, at the time the study was conducted, that work had not yet been completed. As the spent filter backwash water is considerably more dilute than the residuals currently discharged through Outfall 002, it is anticipated that adding this stream to Outfall 002 will serve to further reduce any potential pH impacts associated with this outfall.

River Conditions at Time of Study

One of the criteria established by NDEQ for the pH Mixing Zone Study is that the receiving stream flow rate: a) be less than or equal to the annual 25th percentile flow, b) is not an increasing trend, and c) is stable for a long enough period of time to reasonably allow M.U.D. to notify the research team to mobilize and conduct the study, with this period of time not to exceed 14 consecutive days. NDEQ also specified that the study should be conducted when weather conditions do not pose a hazard to the health and/or safety of workers conducting the study and that ice cover, if any, on the receiving stream should be minimal.

The original study plan proposed to use data from the previous 10 years to establish the annual 25th percentile flow, which was 17,400 cfs. At a November 10, 2010 meeting with NDEQ, discussion centered around the fact that river levels were higher than normal due to elevated releases from upstream dams, so that the flow threshold of 17,400 cfs might be unobtainable. With that in mind, the research team decided to target a river flow threshold of 23,100 cfs, which was the 25th percentile of the previous three years' worth of flow data.

As can be seen in Figure 2, the only days during the lower flow period of Winter 2010/2011 where the Missouri River flow was at or below the targeted flow threshold of 23,100 cfs were February 4 and 5. The decision was made for the research team to mobilize for the study on February 10, 2011 when the Missouri River flow was at 25,800 cfs. By the time the research team was on-site to begin the study on February 15, 2011, the flow had increased to 30,100 cfs. Unfortunately, equipment malfunction prevented completion of the pH data collection until late afternoon of February 17, at which point the Missouri River flow had increased to approximately 43,000 cfs. If only the previous 365 days of flow data were considered, this value would be approximately the annual 36th percentile flow; if the flow data set were increased to the previous three years, the flow of 43,000 cfs would be approximately equal to the annual 66th percentile flow.

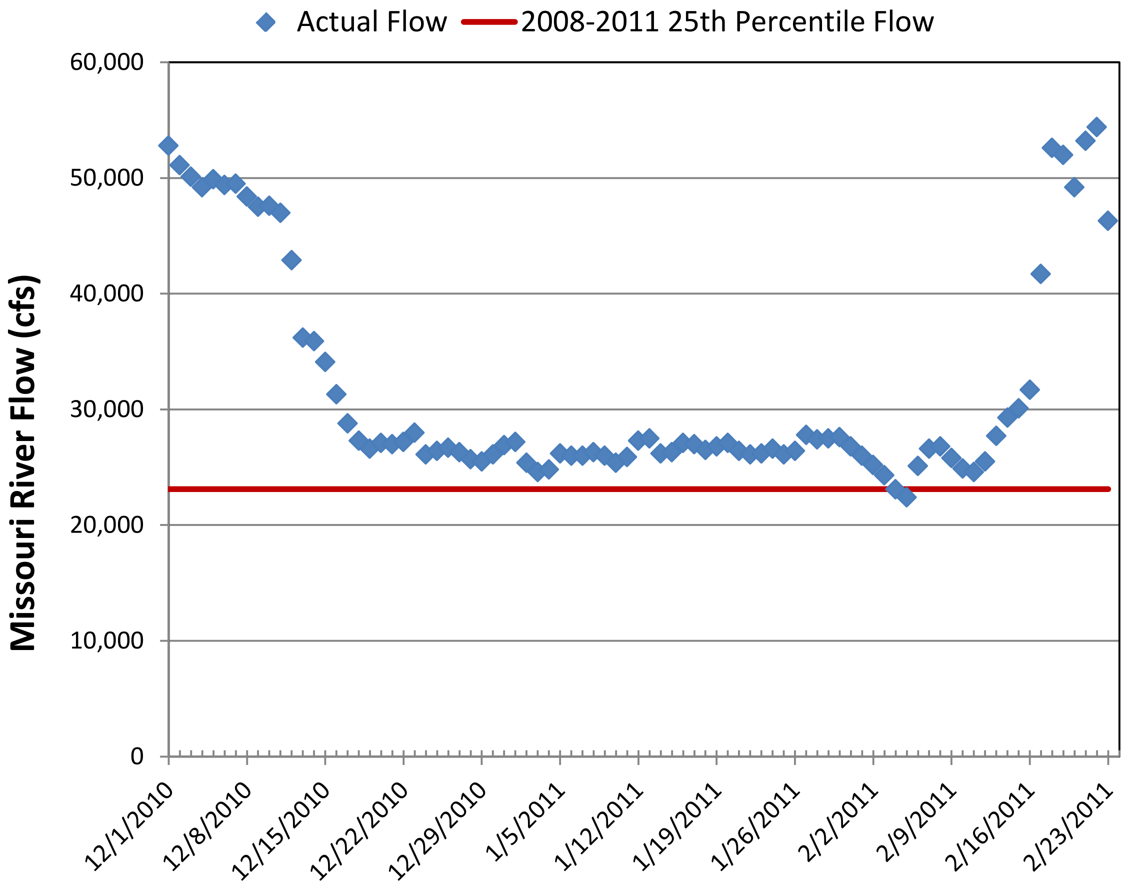


Figure 2. **Reported Missouri River flow rates during the Winter 2010/2011 low flow period**

Missouri River Velocities and Geomorphology

An acoustic Doppler profiler (SonTek/YSI RiverSurveyor®) was used to collect river velocity and geomorphology data along transects upstream of, in the vicinity of, and downstream of Outfall 002. The river channel geomorphology was relatively uniform over the area measured. Due to a bend in the river in this vicinity, the channel is deepest along the right descending bank. As Figure 3 shows, Outfall 002 extends into the river channel near the deepest part of the channel.

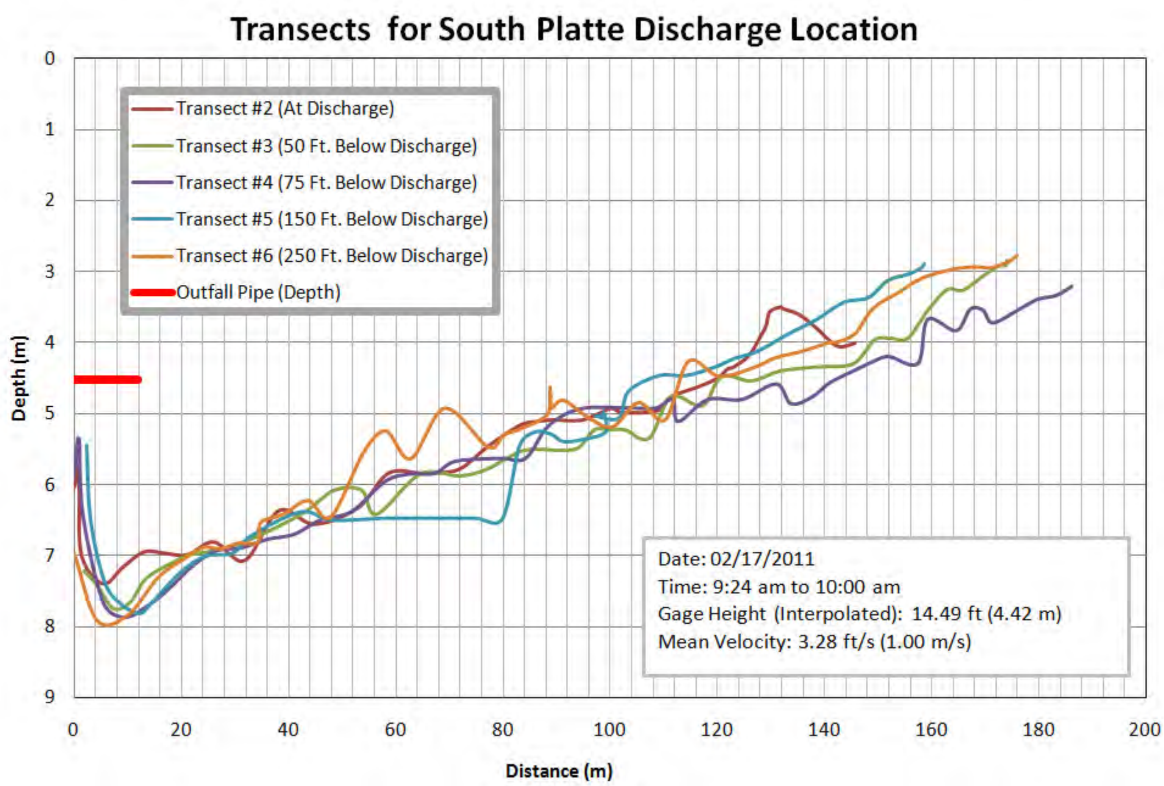


Figure 3. Missouri River channel geomorphology in the vicinity of Outfall 002

The mean flow velocity at the time of the study was 1.0 m/s. While the acoustic Doppler profiler was not sensitive enough to differentiate the flow rate of the discharge at the outfall, due to pump limitations the maximum flow at the outfall is limited to 400 gpm (0.89 cfs) and, due to attenuate in the gravity-flow portion of the pipeline, the average flow rate is typically less. Even during low-flow conditions, the dilution factor will exceed 13,000 (river) : 1 (discharge). With this high of dilution factor, the contribution of hydroxyl ions by the residuals solids is insignificant and should results in virtually no change in pH of the Missouri River.

pH Data Analysis

pH data were collected using three datasondes (two Troll® 9000's and one Hydrolab® H2O) that were mounted to the boat and deployed at depths of 0.8, 0.5, and 0.2 times the channel depth. The datasondes measured pH continuously as the boat navigated via GPS to preselected grid points, as shown in Figure 4. The grid points are spaced 25 feet apart, and the location of the outfall is roughly at grid point 6-1.

Table 1 shows the background pH levels upstream and downstream of the outfall, and at the vicinity of the outfall. More detailed pH data for each depth are presented in Tables 2 through 4, and is shown graphically in Figures 5 through 7. **All pH measurements collected during the study met the allowable water quality standards for pH (range 6.5 to 9.0)**.

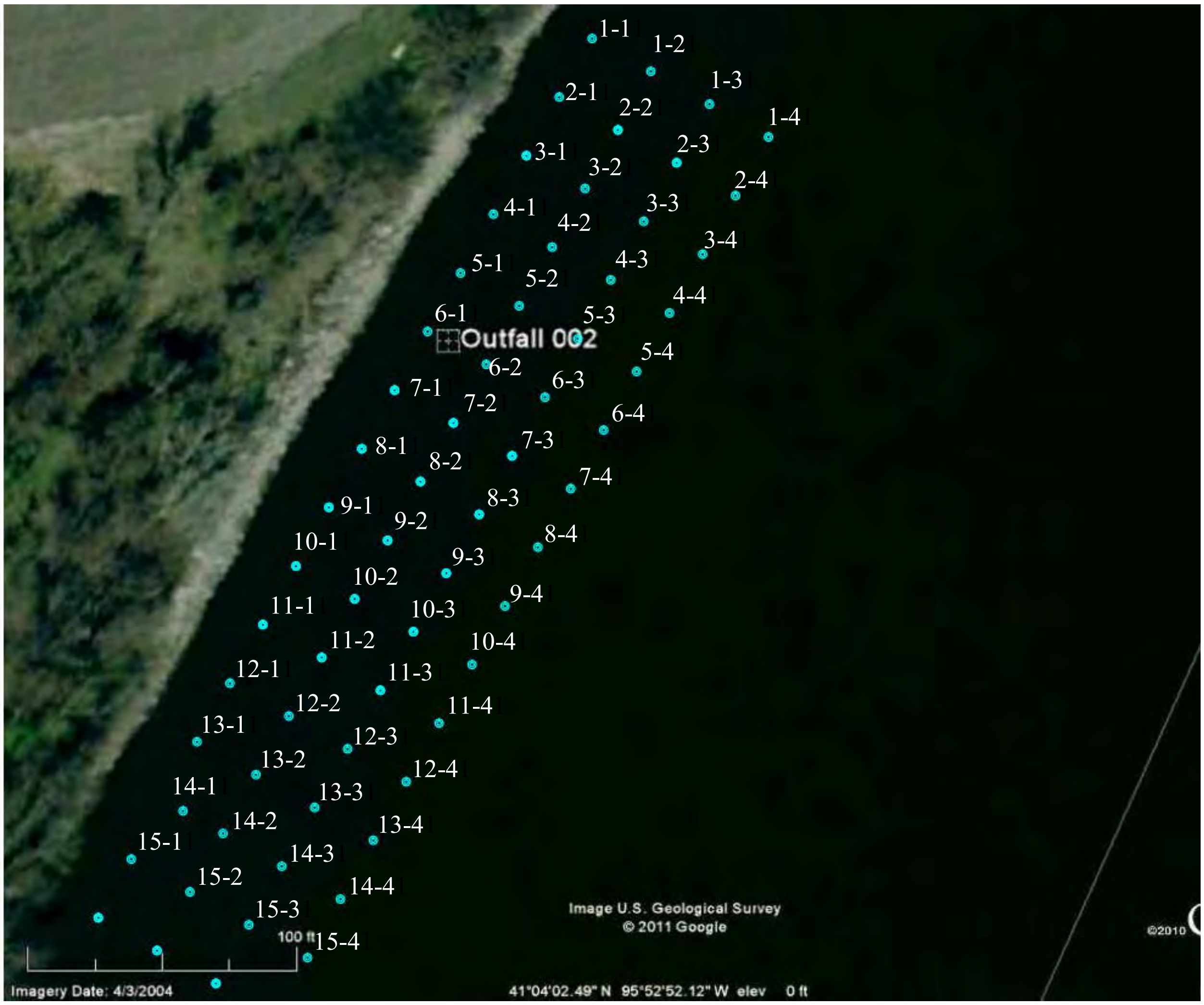


Figure 4. Grid layout used for river pH analyses

Table 1. Summary of background pH levels and pH at Outfall 002

	Sample Depth		
Sample Location	**0.2D**	**0.5D**	**0.8D**
Background - Upstream	7.67	7.71	7.63
Around Outfall 002	7.96	7.81	7.88
Background - Downstream	7.73	7.79	7.84

Table 2. pH measurement by grid location at depth of 0.2D

Row \ Column	1	2	3	4
2		8.04	8.05	8.05
6	7.77	7.6	7.82	8.06
7	7.77	7.9	7.98	8.06
8	7.74	8.04	8.03	8.06
9	7.89	8.04	8.04	8.06
10	7.76	8.04	8.03	7.82
11	7.8	8.05	8.04	8.05
12		7.98	8.02	8.03

Table 3. pH measurement by grid location at depth of 0.5D

0.5D

Row \ Column	1	2	3	4
2			7.79	7.80
6	7.79	7.69	7.73	7.79
7	7.78	7.68	7.73	7.79
8		7.68	7.73	7.79
9	7.78	7.68	7.74	7.79
10	7.79	7.68	7.74	7.79
11	7.80	7.66	7.74	7.79
12			7.79	

Table 4. pH measurement by grid location at depth of 0.8D

Row \ Column	1	2	3	4
2		8.05		8.06
6	8.02	7.95	7.64	8.06
7	8.02	7.6	7.66	8.06
8	8.02	7.6	7.67	8.05
9	8.03	7.59	7.67	8.04
10	8.03	7.57	7.67	8.03
11	8.03	7.56	7.68	8.02
12		7.76	7.65	7.67

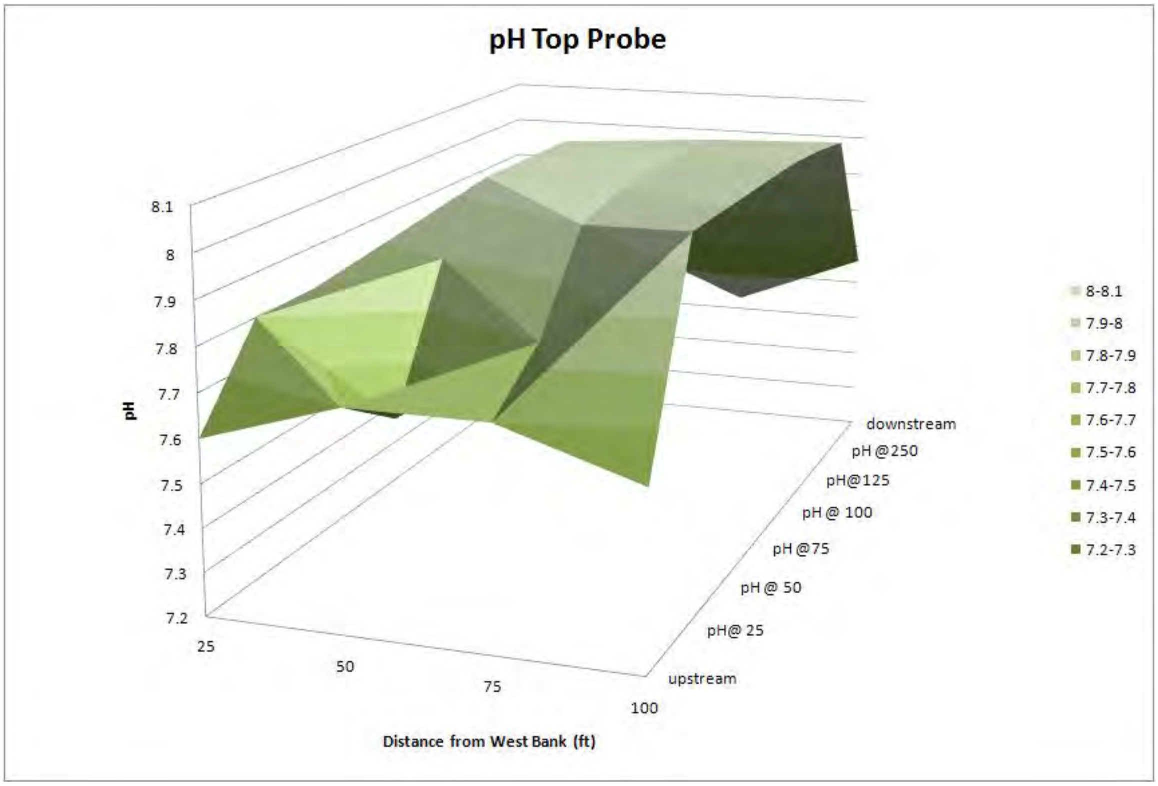


Figure 5. **pH measurement at depth of 0.2D**

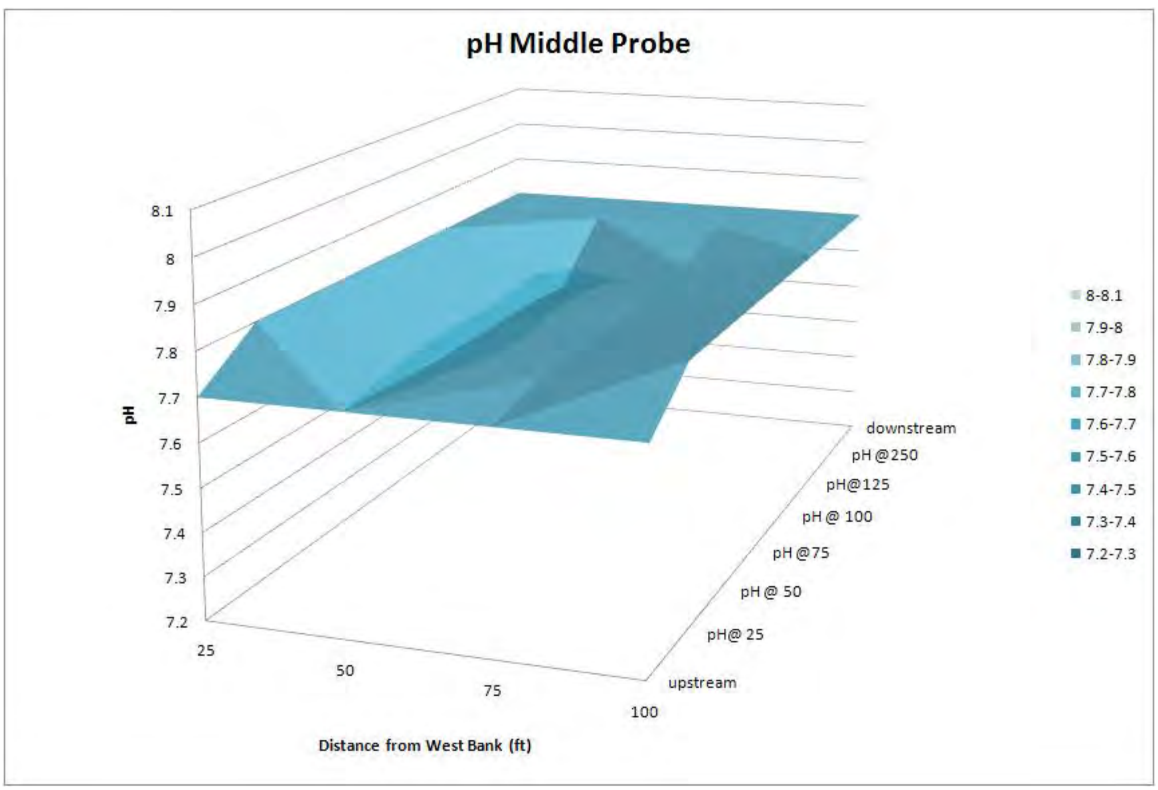


Figure 6. **pH measurement at depth of 0.5D**

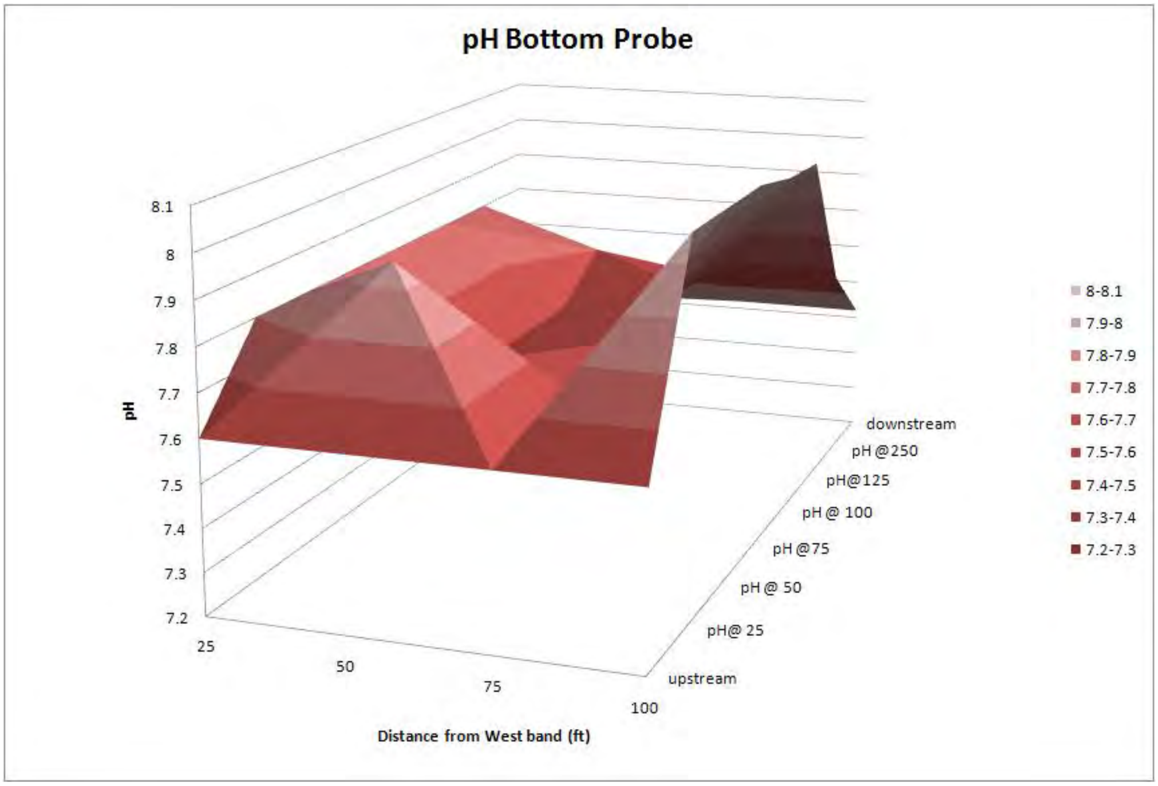


Figure 7. **pH measurement at depth of 0.8D**

TSS Data Analysis

In addition to pH measurements, water samples were collected at various locations for total suspended solids analysis. Unlike pH, total suspended solids is a conservative parameter, and provides secondary verification of the Outfall's mixing zone. The TSS data collected are shown in Table 5. Note: the data in Column 1 were collect later in the day than the data in Columns 2 and 3, which is why they are 25 to 35 percent lower than the data in Columns 2 and 3. However, the general trend holds between all three columns, and is illustrated in Figure 8.

Table 5. TSS measurement by grid location at depth of 0.8D

Row \ Column	1	2	3
2		1,210	1,090
3	845		
7	892	1,338	1,190
8	898	1,438	1,298
9	948	1,443	1,218
10	795	1,437	1,113
11	938	1,228	1,186
16	880	1,228	1,098

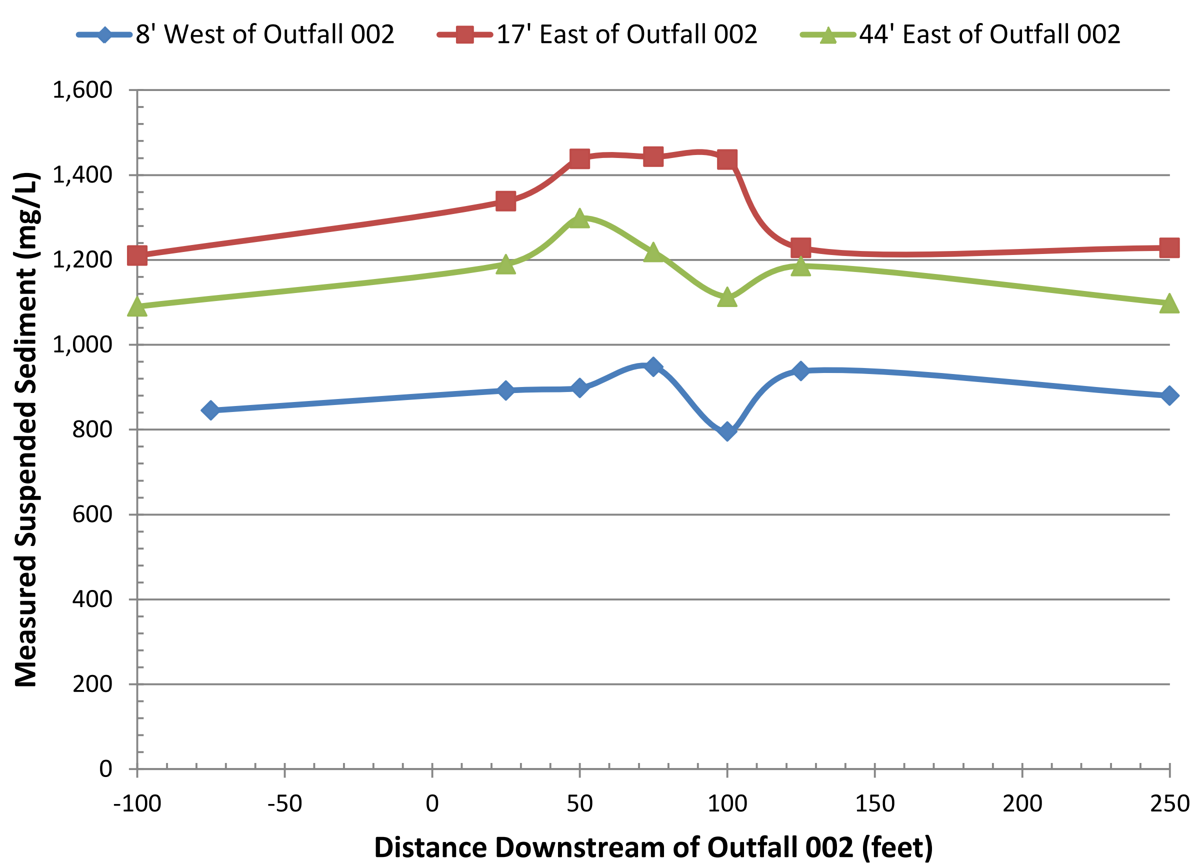


Figure 8. TSS measurements by location relative to Outfall 002

In each of the three profiles, a slight increase in TSS is observed as the profile moves longitudinally downstream of Outfall 002. Higher than background TSS levels are sustained as far as 125 feet downstream of Outfall 002, but by 250 feet downstream of Outfall 002 the TSS values return to approximately the level of the background levels observed upstream of Outfall 002.

Summary

The pH Mixing Zone Study was completed at Platte South in February 2011. By the time data collection was completed, the Missouri River flow rate had increased to approximately 43,000 cfs, which exceeded the river flow threshold targeted when the study was initiated and the research team began mobilizing to the site.

All pH measurements collected during the study met the allowable water quality standards for pH (range 6.5 to 9.0). TSS data suggests that the limits of the acute mixing zone extend more than 125 feet, but less than 250 feet, downstream of Outfall 002. However, even within the acute mixing zone, the pH is within the allowable range. Based on the data collected during this study and all other available information, it appears that the discharge form Outfall 002 does not adversely impact pH levels within the Missouri River.

Attachment A

Platte South pH Mixing Zone Preliminary Report

By

The Center for the Management, Utilization, and
Protection of Water Resources,
Tennessee Technological University

Platte South pH Mixing Zone Preliminary Report

By

The Center for the Management, Utilization, and
Protection of Water Resources,
Tennessee Technological University

Background

The Metropolitan Utilities District (M.U.D.) operates the Platte South Potable Water Treatment Plant (PWTP), which currently discharges residuals to the Missouri River. This discharge is allowed under NPDES Permit No. NE0000906, which went into effect as of October 1, 2009. A requirement set forth under the permit (Part 1, Item C) is for M.U.D. to conduct a pH instream mixing zone study in the Missouri River of wastewater discharged through Outfall 002 in the Missouri River.

> *"C. Compliance Schedule for a pH Mixing Zone Study upon issuance of this permit, the Metropolitan Utilities District (M.U.D.) shall implement the compliance schedule set forth below for conducting a pH instream mixing zone study in the Missouri River of the wastewater discharge through Outfall 002 at the Platte South PWTP. The objective of the study shall be to determine if the discharge from Outfall 002 at the Platte South PWTP attains the water quality standards for pH (range 6.5 to 9.0) at the end of the acute mixing zone."*

Outfall 002 currently conveys settled solids from the six upflow clarification basins at Platte South PWTP to the Missouri River. These solids are collected at the PWTP in a storage pit. When the pit is full, the residuals are pumped to the Missouri River via a 5-mile long pipeline.

To satisfy the requirements for the pH mixing zone study, Tennessee Technological University's Center for the Management, Utilization, and Protection of Water Resources in conjunction with EE&T, Inc. conducted a mixing zone study at Outfall 002 from February 15-17, 2011. This mixing study included river velocity profiles at five transects, and pH and total suspended analyses in the mixing zone. The results of the study are presented in this report.

Methodology and Results

Transects:

Transect velocity and geomorphology data were obtained using the SonTek/YSI RiverSurveyor® (Manufacturer) (Figure 1). This unit is a robust and accurate Acoustic Doppler Profiler flow measurement system designed to quickly measure river discharge from a moving vessel. Transects were obtained by following the grid points shown in Figure 2 using a Trimble® GeoXH GPS. The contours for each transect monitored are presented in Attachment A, Figures A.1 through A.6. The river channel geomorphology was relatively uniform over the area measured Figure 3. Average stream velocity of 1.00 m/sec was used in all calculations.

Figure 1. SonTek/YSI River Surveyor®.

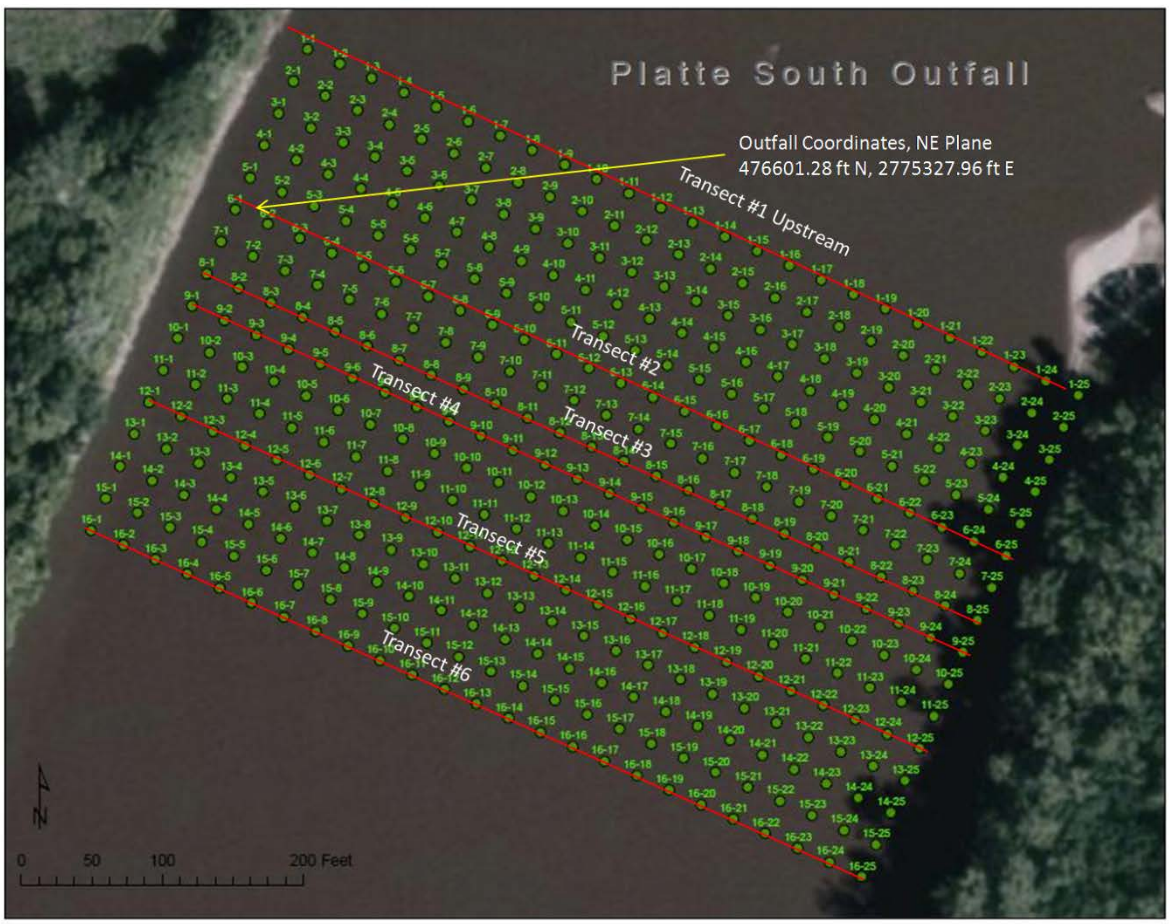


Figure 2. Grid layout of Outfall 002 in Platte pH mixing study. The numbered points are locations spaced 25 ft apart. This grid is a background file on the GPS system. Navigation for the RiverSurveyor® profiles were per the transects shown in the attachment. Note: Grid point numbers are readily visible in 200% Zoom view.

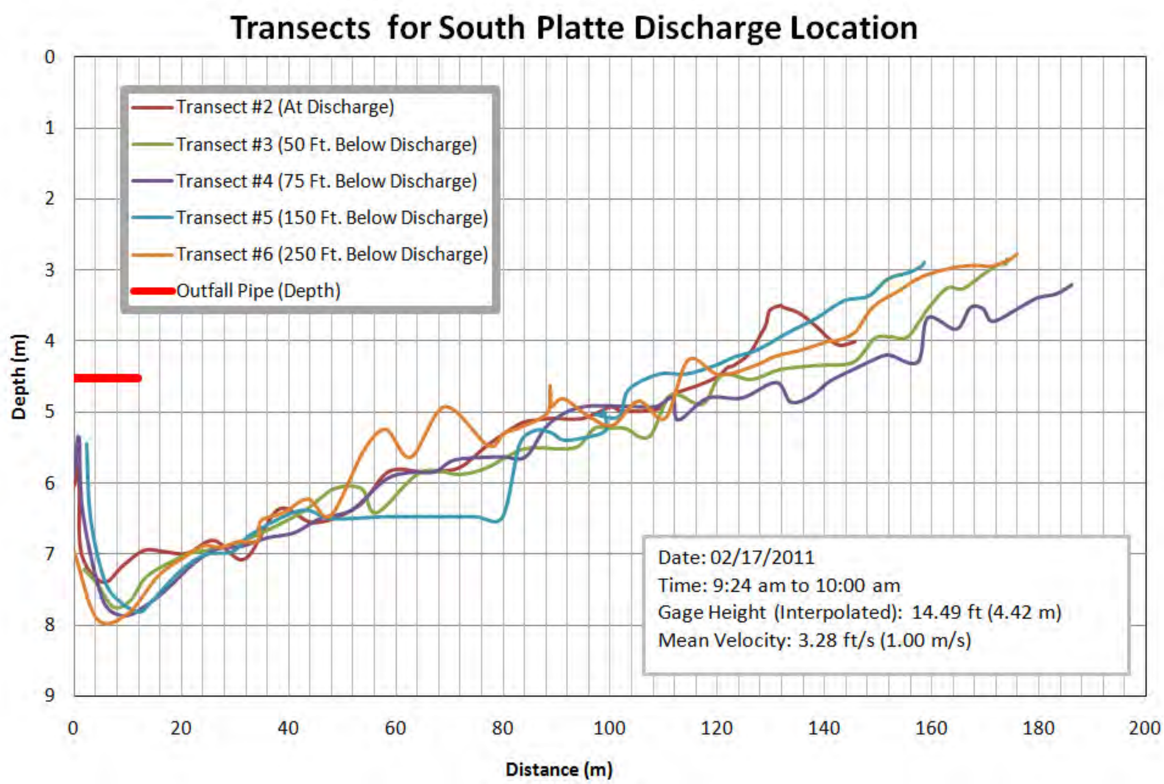


Figure 3. Missouri River transect data at South Platte discharge and downstream transects.

pH Study:

pH Study Objective: The objective of the study was to determine the pH mixing zone when high pH water is discharged through the Platte South PWTP Outfall 002.

Methods: The pH mixing study was performed utilizing datasondes that continuously record pH at specified time intervals and the Trimble® GPS navigation system. The datasondes were mounted to the boat and deployed at depths of 0.8, 0.5, and 0.2. The datasondes utilized in the analyses were 2 Troll® 9000's and one Hydrolab® H2O. These units were calibrated using 7 and 10 pH buffer solutions and were checked for drift at the completion of the study. Analyses of calibration standards before and after field deployment are presented in Table 1.

Table 1.

Calibration Drift Check for Datasondes						
		Calibration	Pre-Run		Post-Run	
			2/16/2011		2/17/2011	
Standard			7.00	10.00	7.00	10.00
Unit	SN	Date				
Troll 9000	31517	12/15/2011	7.03	10.15	7.05	10.05
Troll 9000	31504	12/15/2011	7.05	10.15	7.06	10.15
Hydrolab H2O	22107	12/15/2011	7.00	10.03	7.07	10.16

Datasonde calibration data.

River flow at the time of the pH study is presented in Figure 4. An observer was stationed at the manhole located on the river bank above Outfall 002 (location 476,631.77 ft N, 27,752.19 ft. E) to verify flow. Flow through the manhole was observed to be continuous during river pH measurements. A grab sample at the manhole had a pH of 10.7.

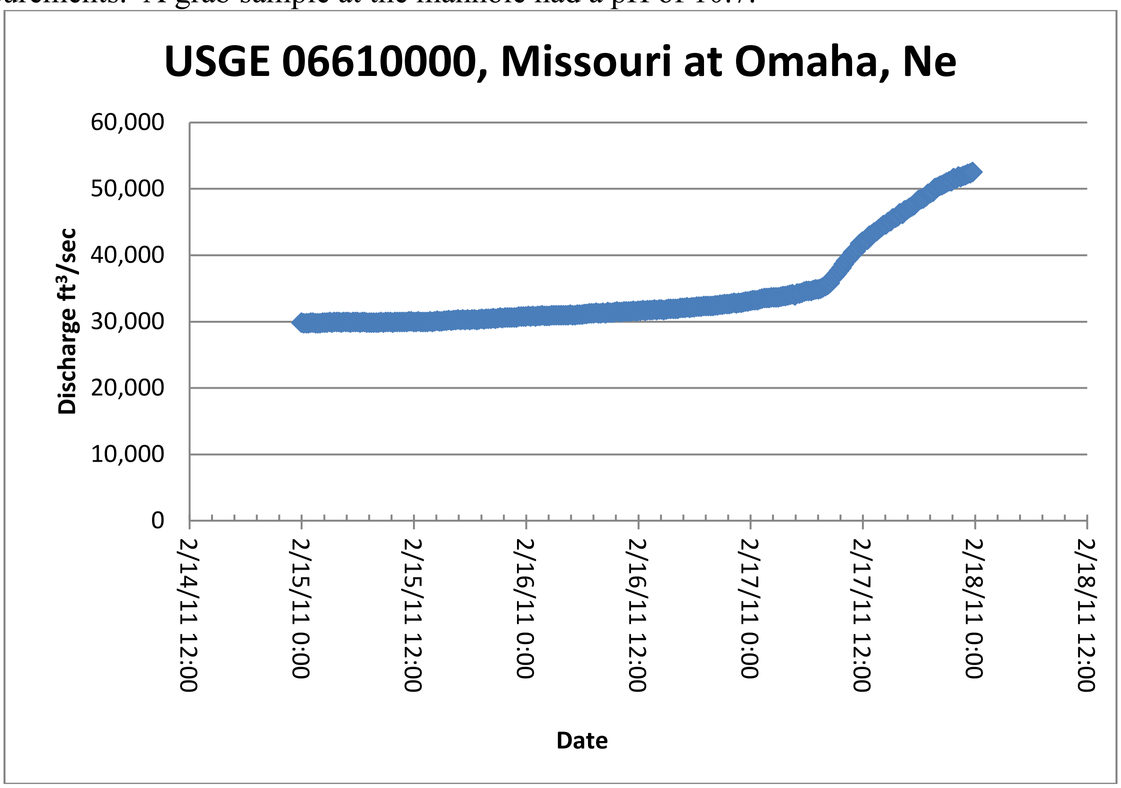


Figure 4. Missouri River Gauge at Omaha, Ne. pH study performed on February 17 from 4:00 p.m. to 5:00 p.m. Flow had increased in that time period to approximately 40,000 ft^3/sec.

To obtain pH data, the boat was navigated using the Trimble® GPS per the grid shown in Figure 5. The pH measurements were taken parallel to steam flow. There was concern that the deployed datasondes would hit the west river bottom if transects were run perpendicular to stream flow. The datasondes had to be raised on the run next to the west bank to prevent dragging datasondes on the river bottom. The pH probes were set to record data at 15-sec intervals for the two Troll® 9000s and 20-sec intervals for the Hydrolab®. The system times for the datasondes were synchronized with the computer system time, and time was recorded for when the boat navigated through specified grid points. Time was then used to extract the logged pH data from the data files and matched with grid location. This methodology allows for efficient collection of pH data in a high velocity steam. Additional pH data were collected upstream of the outfall, downstream of the mixing zone, and over the outfall.

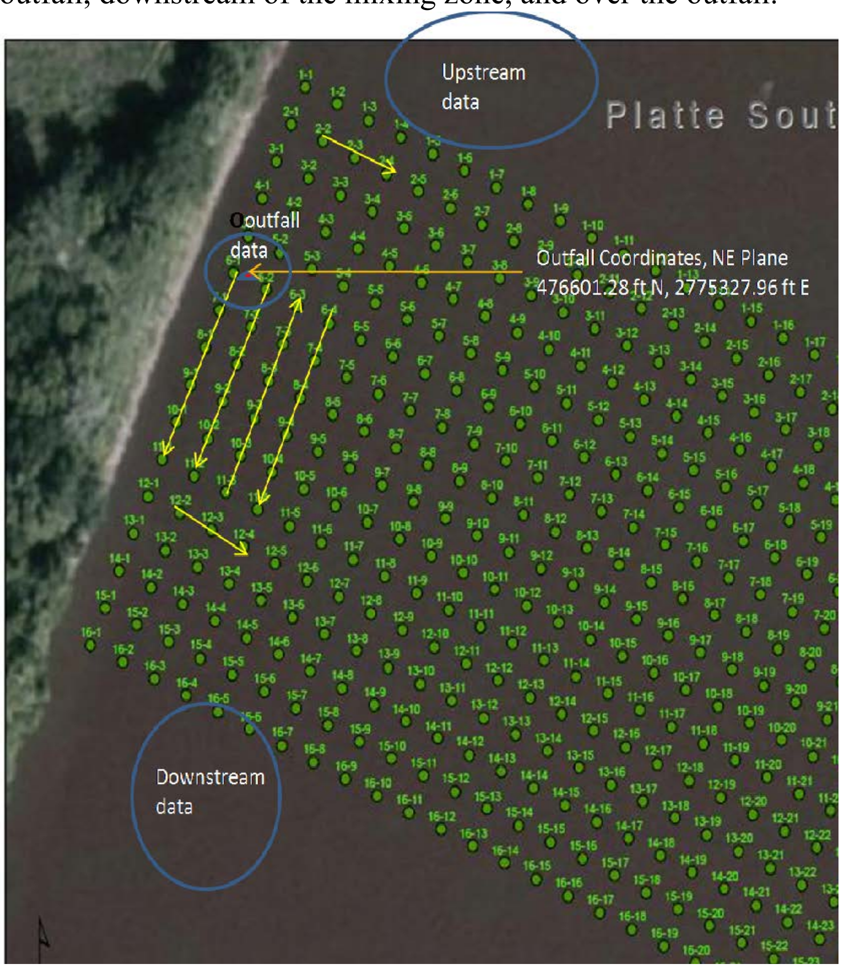


Figure 5. Grid layout for river pH analyses. The numbered points are locations spaced 25 ft apart. This grid is a background file on the GPS system. Navigation for the pH measurements were per the diagram shown in the attachment.

Geography and Soils: The Missouri River travels through bedrock formations consisting of limestone and shale deposited in shallow seas eons ago (USACE 2009). The Pierre shale formation, deposited late in the Cretaceous geologic period, underlies a large portion of the Great Plains region of the north central United States. Several major dams (Garrison, Oahe, Fort Randall) have been built along the Missouri River, which cuts through this formation. The marine environment present during the deposition of the Pierre shale contained microfossils, shells and organic matter which precipitated as carbonates (primarily calcite): 0.6 to 64% calcium carbonate (Demars and Chaney 1982).

Soils in the Missouri River valley formed in loess, glacial till, or alluvium or in a combination of these parent materials. Loess is wind-deposited silty material that originated in the Missouri River valley during the ice age. As the glaciers receded, they left behind massive, braided outwash plains covered with silty "glacial flour," which was deposited from the silt-laden glacial meltwaters. Before this young landscape could be stabilized by vegetation, the wind picked up much of the silty material and blew it across the adjacent countryside. The loess was originally calcareous. It had finely divided particles of calcium carbonate.

The thickness of a loess deposit characteristically decreases as the distance from the source of the loess increases. Particle size of the loess decreases as the distance from the source increases, because wind transports finer particles farther than coarser particles. Therefore, the content of clay in the loess deposit and the corresponding soils increases from west to east.

Results: Graphical presentations of the pH data from the study are presented in Figures 6-8. All pH data collected are shown in Appendix B. These figures include upstream and downstream data, transitional data between grid points, and pH measurements in the vicinity of the discharge point. The pH range for all measurements was from 7.41 to 8.06. All pH data were within the NPDES Permit No. NE0000906 water quality standards for pH (range 6.5 to 9.0).

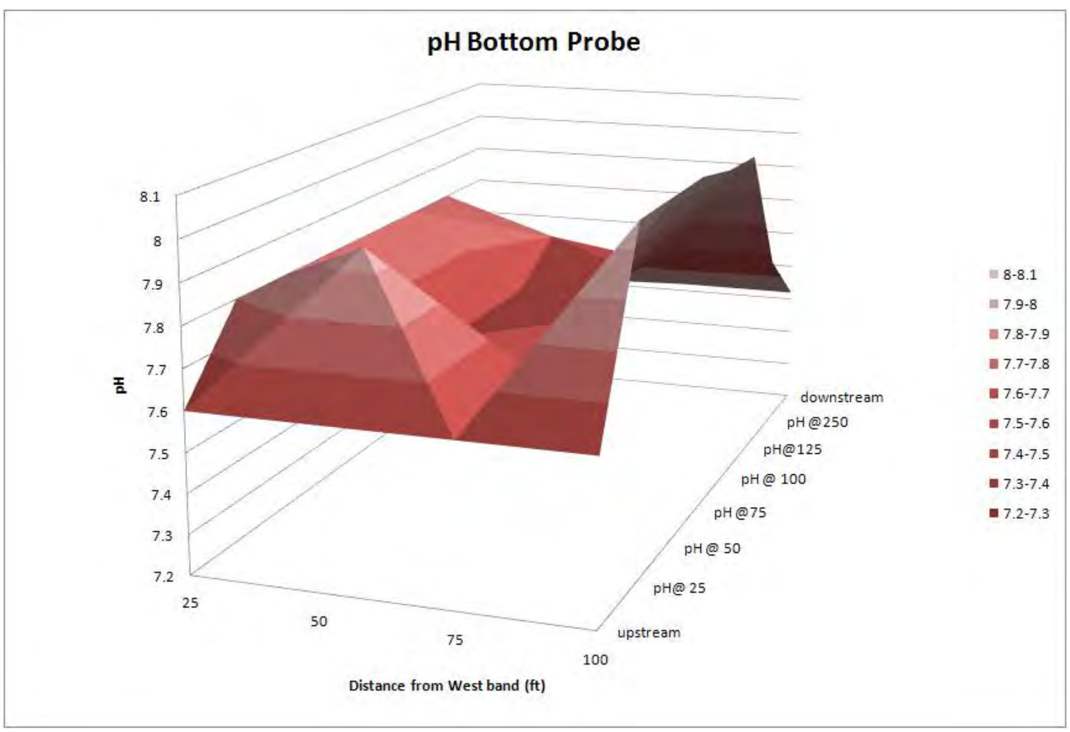


Figure 6. pH measurements at 0.8 depth.

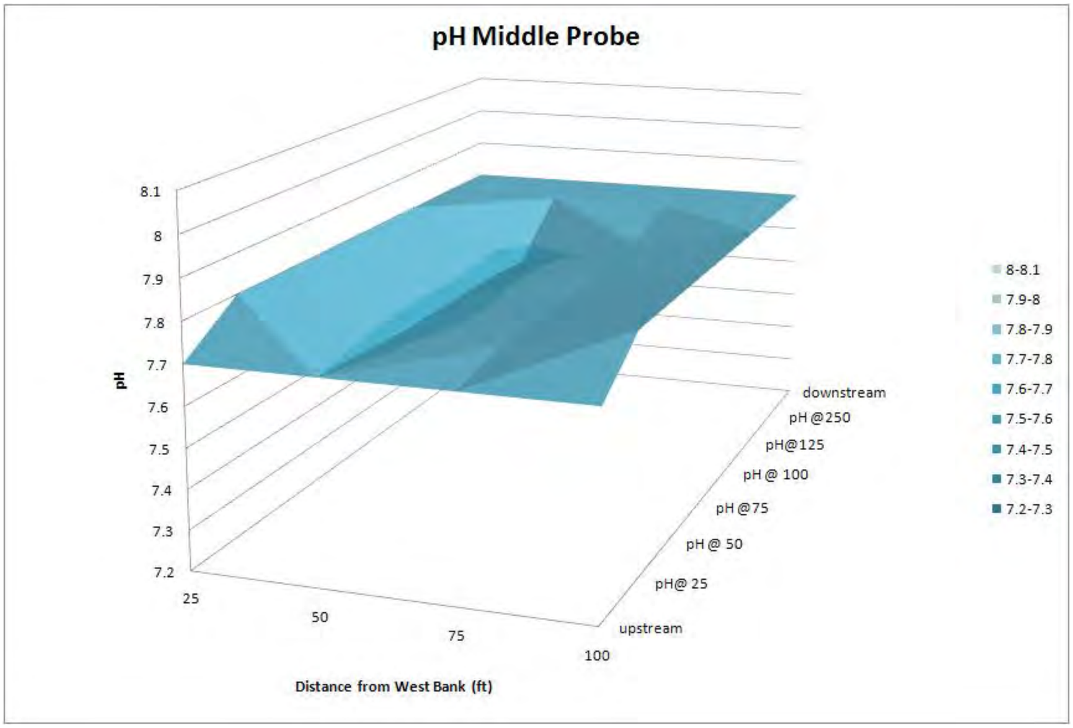


Figure 7. pH measurements at 0.5 depth.

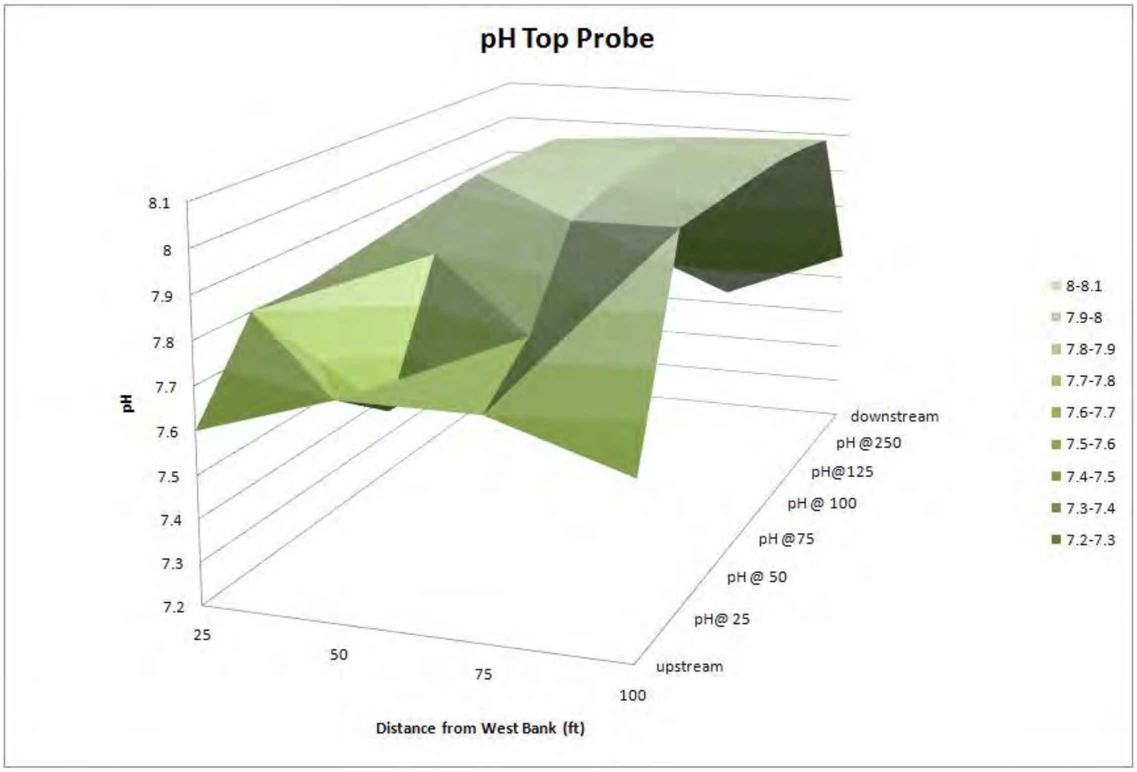


Figure 8. pH measurements at 0.2 depth.

The drier areas of the Missouri River watershed are located above Omaha, where a greater percentage of the rainfall infiltrates into the calcareous soils and geological formations, and a disproportionately lower amount of rainfall surface runoff occurs compared to runoff amounts observed in the lower portions of the watershed (USAE 2009). The Missouri River normally has an alkaline pH with values above the PWTP residual solids discharge point normally ranging from 8 to 9 (USGS 2010, EPA Storet Data). Lower pH values measured probably resulted from the abnormal increased winter runoff in 2011.

Missouri River Hydrology: The U.S. Army Corps of Engineers regulates the flows on the Missouri River for navigation, habitat, and flood control. At the 25th percentile, low flows typically occur from November through February (Table C.1). (http://nwis.waterdata.usgs.gov/ne/nwis/dvstat?search_site_no=06610000&format=sites_selection_links). An estimate of the length of the mixing zone was calculated using the following equations developed by Thomann and Mueller (1987) for side bank discharges:

$$L_M = (2.6\, V\, W^2)/\text{H} \qquad (1)$$

where

V = average stream velocity (fps),
W = Average stream width (ft), and
H = Average stream depth (ft).

This equation was developed with the following assumption:

- Water quality variables are homogeneous laterally, across the stream and vertically with depth,
- Stream flow involves only advective flow—there is no longitudinal mixing in downstream direction- True plug flow conditions.

The transect geomorphology was simplified to a right-angle triangle as shown in Appendix A, Transects for South Platte Discharge Location, and the corresponding cross-sectional areas ad average velocities were computed. Using the simplified stream geomorphology, the wetted perimeter (P) was computed for each flow rate and corresponding gauge depth for a triangular channel. For a rectangular channel

$$P = 2H + 2W \quad . \qquad (2)$$

The depth and width for a rectangular channel can be determined by solving Equation 2 and the equation for the area of a rectangle (A=HW) simultaneously. Using the computed values for the rectangular depth and width of the river with the same P and V_{ave} as computed for the 25th percentile flow rates, L_m was computed. Calculations presented in Table C.2 indicated the estimated L_m to achieve complete mixing of a constituent across the river width was much greater than the acute mixing zone specified in the MUD NPDES (125 ft). The dilution factor clearly shows that the residual discharge stream (400 gpm or 0.89 cfs) was insignificant compared to stream flow. The dilution factor is

Total stream flow rate/discharge flow rate (3) .

With dilution factors greater than 13,000 (river) : 1 (discharge) during low flow conditions, the contribution of hydroxyl ions by the residual solids is insignificant and should result in virtually no change in pH of the Missouri River. During the PWTP Mixing Study sampling period in February 2011, the Missouri River gauge height was 17.1225 ft flow rate with a flow rate exceeding 35,000 cfs. The dilution factor was greater than 39,000:1, and the pH measurements reflected ambient conditions.

Total Suspended Solids Study:
The pH measurements data were supplemented by the collection of upstream, mixing zone, and downstream water samples at 0.8 depth that were analyzed for total suspended solids (TSS). Samples were collected at the grid locations listed in Table 2. The Trimble® GPS was used to navigate to the specified grid locations shown in Attachment 10. A pull-ring grab sampler was used to collect samples at the specified depth. Samples were analyzed per Standard Methods 2540 D. The results of the analysis are shown in Table 2. Stream velocity appears to be the major determinate of TSS in the stream rather than outfall discharge. The lowest values for TSS were obtained on the series of samples closest to the west river bank where steam velocity is lowest. The integrity of the sampling technique was verified by collection and analysis of field duplicates (variance < 10 %).

Table 2. TSS Analysis at selected grid points at 0.8 depth.

Sample Number	Grid Position	Test	Result (mg/L)	Position
1011236-003	3-1	TSS	845	upstream
1011236-001	2-2	TSS	1210	upstream
1011236-002	2-3	TSS	1090	upstream
1011236-004	7-1	TSS	892	mixing zone
1011236-005	7-2	TSS	1338	mixing zone
1011236-006	7-3	TSS	1190	mixing zone
1011236-007	8-1	TSS	898	mixing zone
1011236-008	8-2	TSS	1438	mixing zone
1011236-009	8-3	TSS	1298	mixing zone
1011236-010	9-1	TSS	948	mixing zone
1011236-011	9-2	TSS	1443	mixing zone
1011236-012	9-3	TSS	1218	mixing zone
1011236-013	10-1	TSS	795	mixing zone
1011236-014	10-2	TSS	1425	mixing zone
1011236-015	10-2FD	TSS	1448	mixing zone
1011236-016	10-3	TSS	1113	mixing zone
1011236-017	11-1	TSS	938	mixing zone
1011236-018	11-2	TSS	1228	mixing zone
1011236-019	11-3	TSS	1138	mixing zone
1011236-020	11-3FD	TSS	1233	mixing zone
1011236-021	16-1	TSS	880	downstream
1011236-022	16-2	TSS	1228	downstream
1011236-023	16-3	TSS	1098	downstream

References

Geotechnical Properties, Behavior and Performance of Calcareous Soils. Edited by Demars and Chaney. American Society for Testing and Materials. 1982.

Missouri River Bed Degradation Reconnaissance Study. U.S. Army Corps of Engineers, Kansas City District. PN 124302. August 2009.

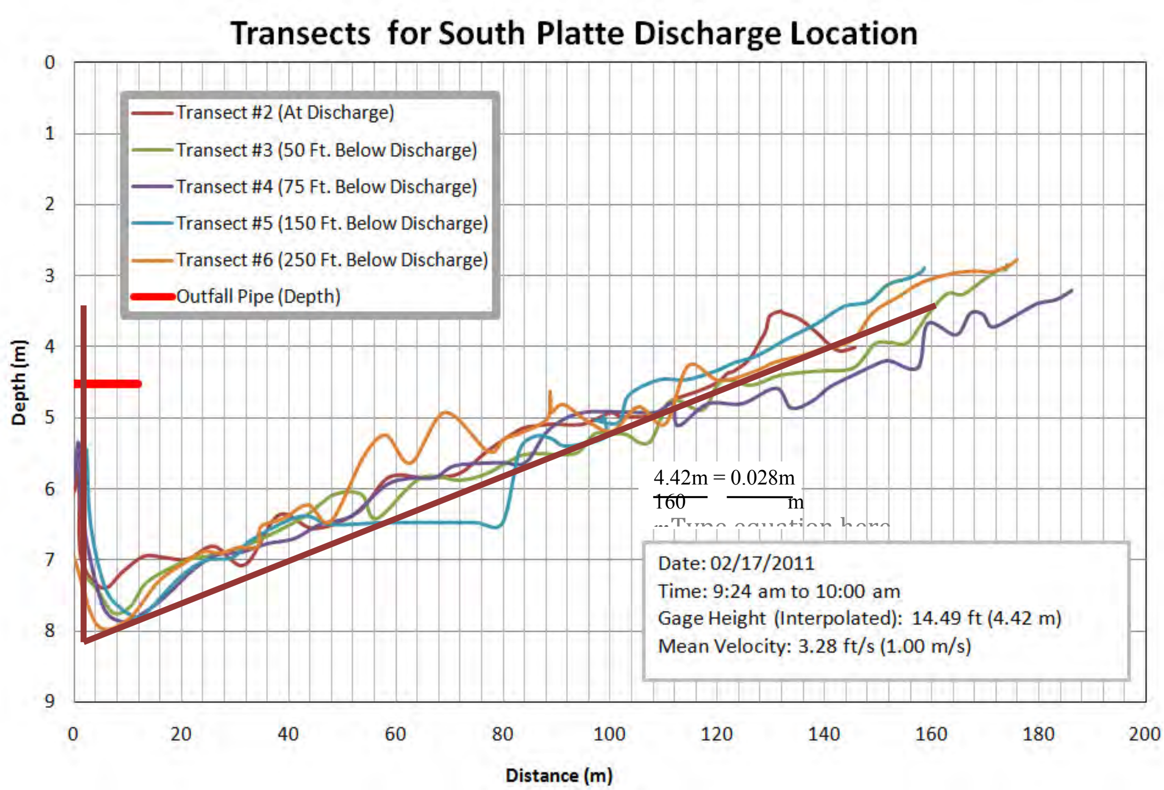
Thomann, R.V. and J.A. Mueller. Principles of Surface Water Quality Modeling and Control. New York, NY: Harper and Row Publishers. p. 644.

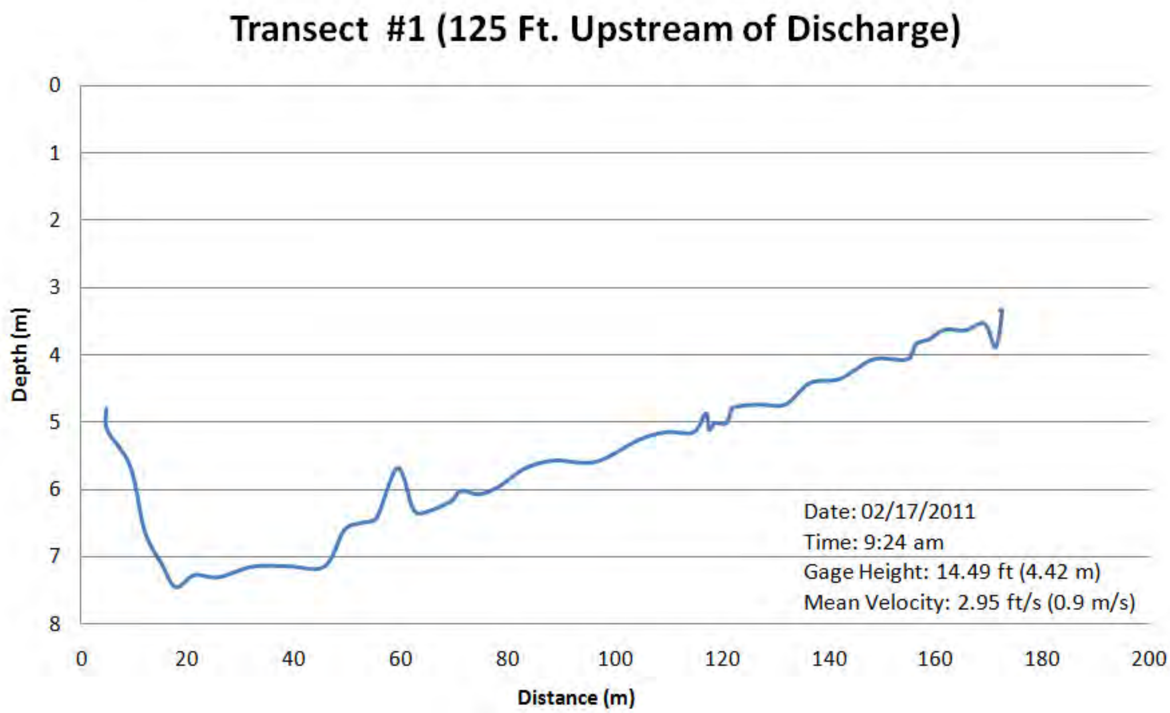
Water Quality Report 2010: 06610000 Missouri River at Omaha, NE. U.S. Department of Interior, U.S. Geological Survey.

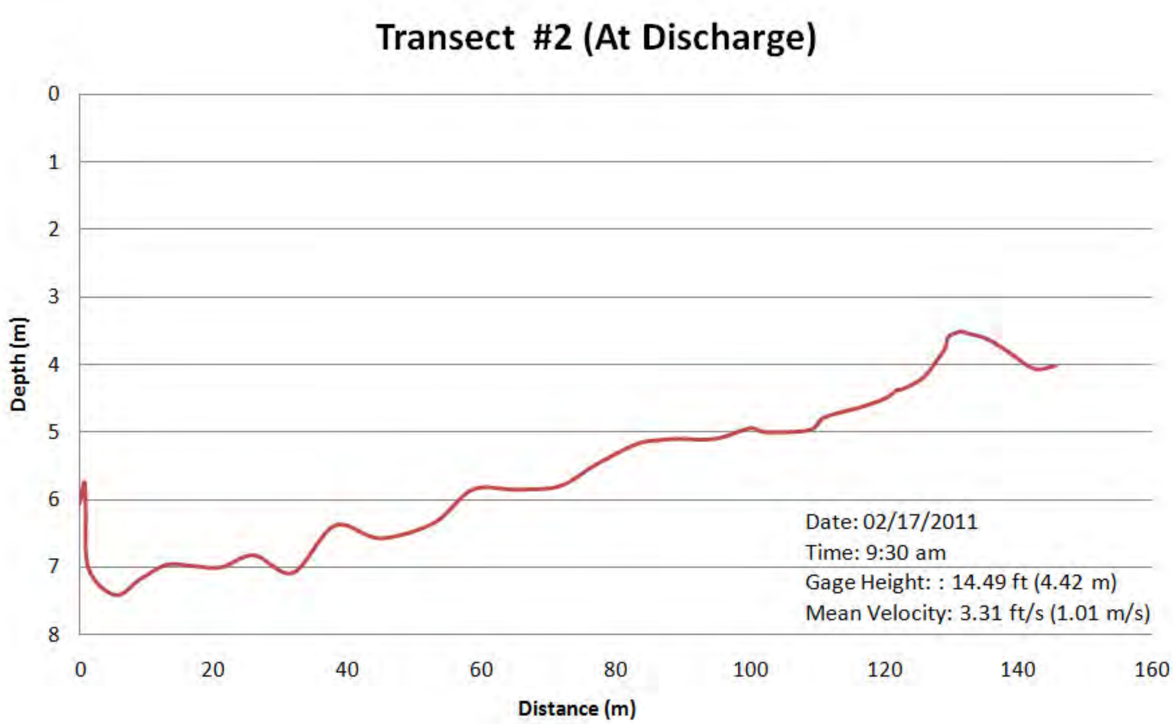
Appendix A
Transect Data

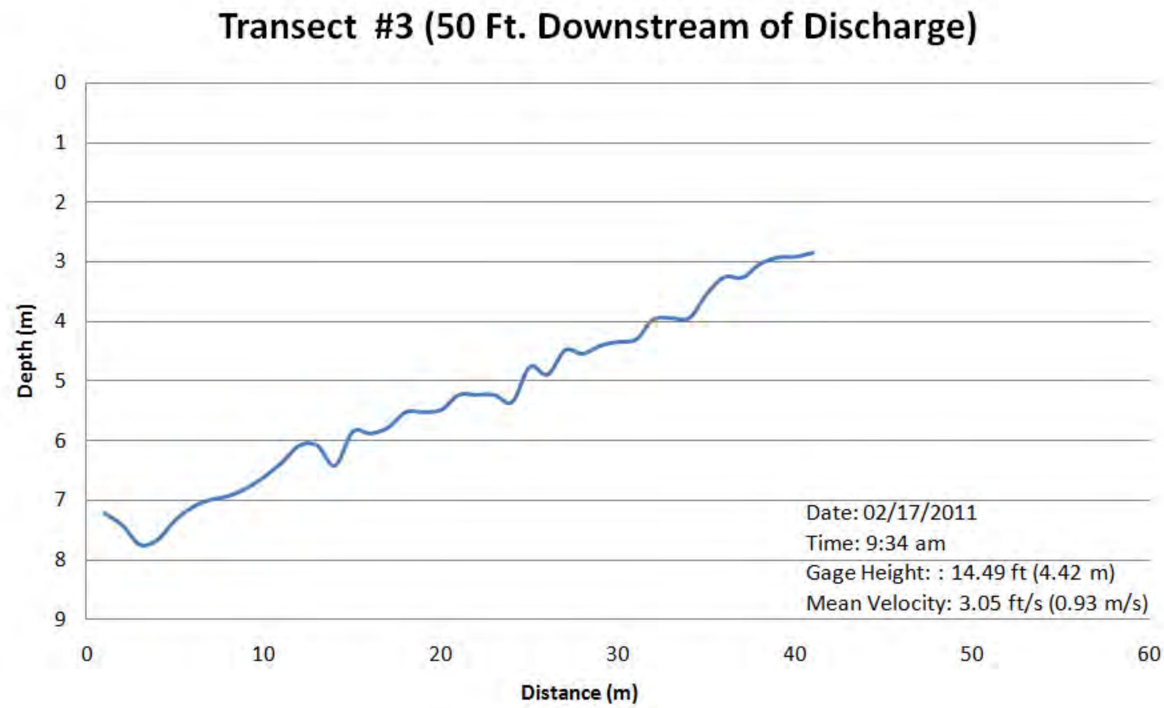
Interpolation for Water Surface and Depth to Outfall Pipe

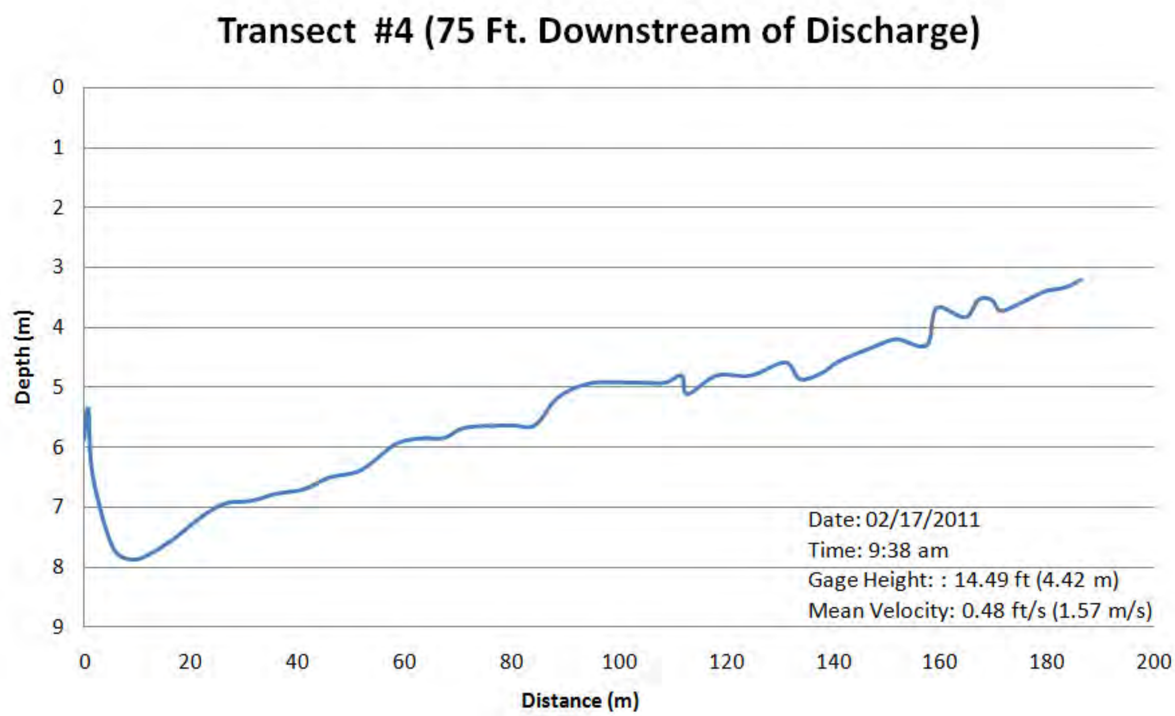
	USGS Gage	Mile	Datum	Gage Height	Water Surface		
Diver Date	6610000	615.9	948.24	13.67	961.91		
Diver Date	6807000	562.6	905.36	8.26	913.62		
	South Platte Outfall						
	Diver Date	595.9	932.149944	11.6399812	943.789925		
	Pipe Elevation:		Feet from Surface:	12	931.789925		
	USGS Gage	Mile	Datum	Gage Height	Water Surface		
17-Feb-11	6610000	615.9	948.24	17.1225	965.3625		
17-Feb-11	6807000	562.6	905.36	10.1125	915.4725		
	South Platte Outfall						
	17-Feb-11	595.9	932.149944	14.492106	946.6420497		4.417248
				Depth to Pipe Elevation from Water Surface:	14.85212477	Ft	
					4.526982677	Meters	
				Distance from Shore to outfall pipe:	42	ft	
					12.80175567	Meters	From Surface

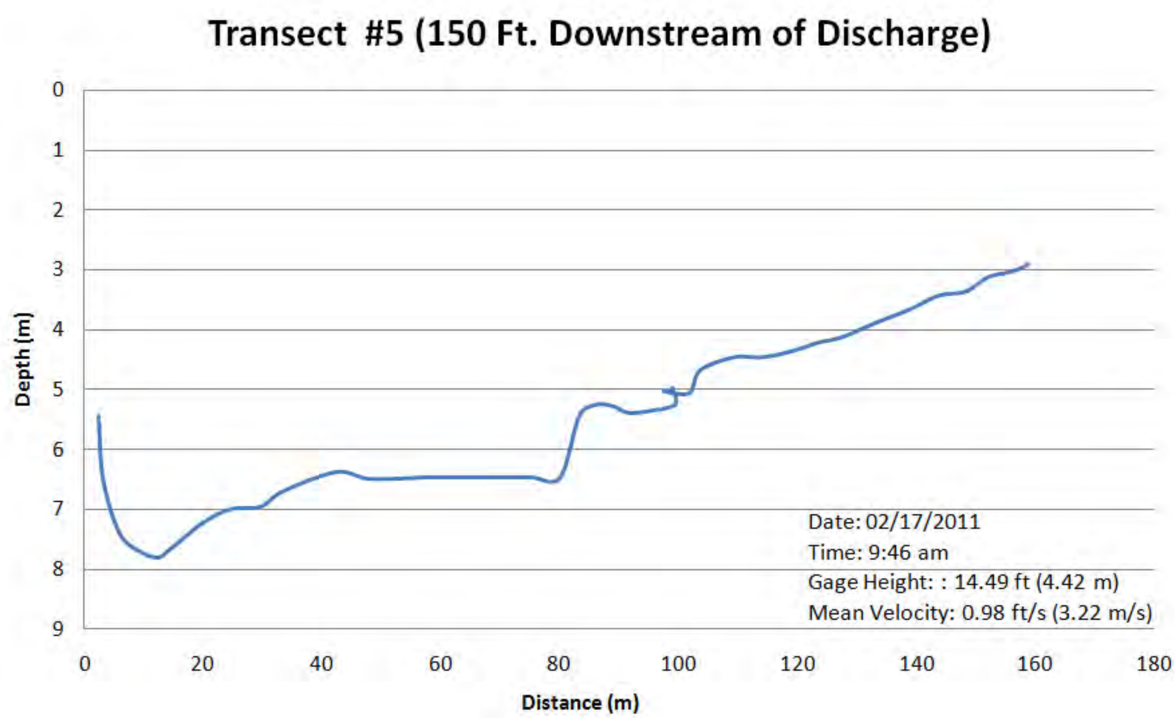


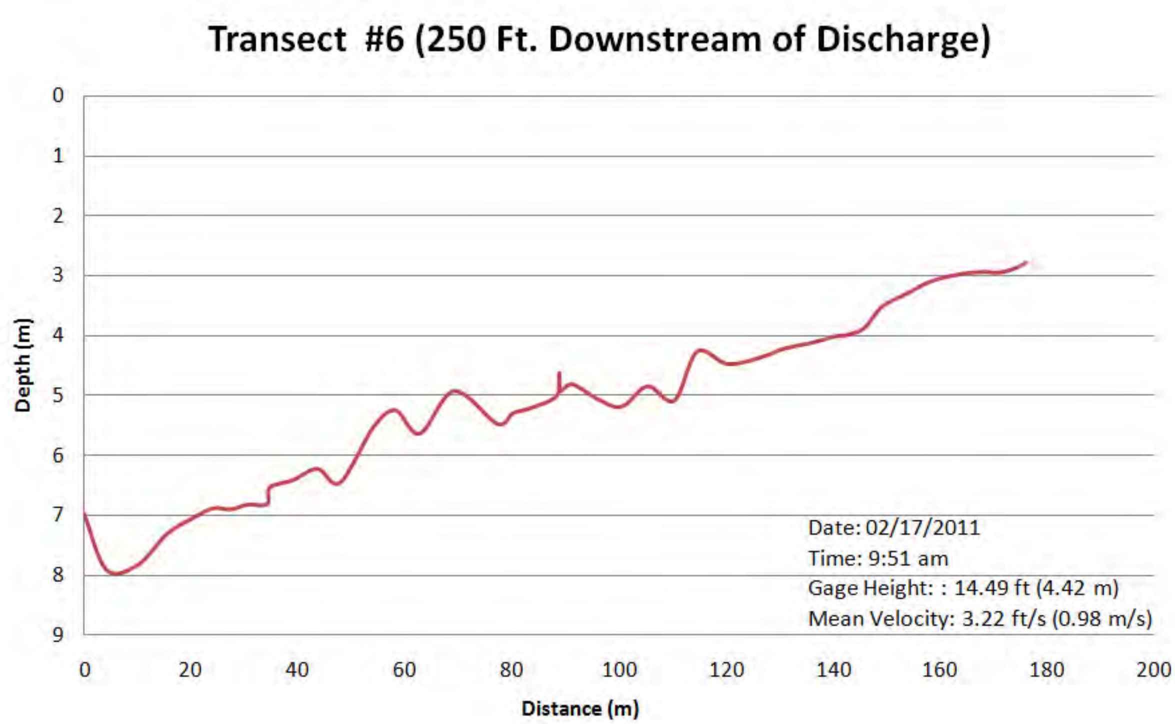

Transect #1 (125 Ft. Upstream of Discharge)
Depth (m)
Distance (m)
0
1
2
3
4
5
6
7
8
0
20
40
60
80
100
120
140
160
180
200
Date: 02/17/2011
Time: 9:24 am
Gage Height: 14.49 ft (4.42 m)
Mean Velocity: 2.95 ft/s (0.9 m/s)


Transect #2 (At Discharge)
Depth (m)
Distance (m)
0
1
2
3
4
5
6
7
8
0
20
40
60
80
100
120
140
160
Date: 02/17/2011
Time: 9:30 am
Gage Height: : 14.49 ft (4.42 m)
Mean Velocity: 3.31 ft/s (1.01 m/s)


Transect #3 (50 Ft. Downstream of Discharge)
Depth (m)
0
1
2
3
4
5
6
7
8
9
Distance (m)
0
10
20
30
40
50
60
Date: 02/17/2011
Time: 9:34 am
Gage Height: : 14.49 ft (4.42 m)
Mean Velocity: 3.05 ft/s (0.93 m/s)


Transect #4 (75 Ft. Downstream of Discharge)
Depth (m)
0
1
2
3
4
5
6
7
8
9
Distance (m)
0
20
40
60
80
100
120
140
160
180
200
Date: 02/17/2011
Time: 9:38 am
Gage Height: : 14.49 ft (4.42 m)
Mean Velocity: 0.48 ft/s (1.57 m/s)


Transect #5 (150 Ft. Downstream of Discharge)
Depth (m)
0
1
2
3
4
5
6
7
8
9
Date: 02/17/2011
Time: 9:46 am
Gage Height: : 14.49 ft (4.42 m)
Mean Velocity: 0.98 ft/s (3.22 m/s)
0
20
40
60
80
100
120
140
160
180
Distance (m)


Transect #6 (250 Ft. Downstream of Discharge)
Depth (m)
0
1
2
3
4
5
6
7
8
9
Date: 02/17/2011
Time: 9:51 am
Gage Height: : 14.49 ft (4.42 m)
Mean Velocity: 3.22 ft/s (0.98 m/s)
0
20
40
60
80
100
120
140
160
180
200
Distance (m)

Appendix B
pH data

Table B.1. pH data at 0.8 depth.

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	15:53:00		7.41	3.12
2/17/11	15:53:15		7.41	3.2
2/17/11	15:53:30		7.43	3.12
2/17/11	15:53:45		7.42	3.1
2/17/11	15:54:00		7.43	3.15
2/17/11	15:54:15		7.44	3.1
2/17/11	15:54:30		7.45	3.11
2/17/11	15:54:45		7.45	3.16
2/17/11	15:55:00		7.45	3.09
2/17/11	15:55:15		7.46	3.09
2/17/11	15:55:30		7.45	3.23
2/17/11	15:55:45		7.47	3.13
2/17/11	15:56:00		7.46	3.17
2/17/11	15:56:15		7.48	3.18
2/17/11	15:56:30		7.48	3.16
2/17/11	15:56:45		7.5	3.09
2/17/11	15:57:00		7.49	3.11
2/17/11	15:57:15		7.52	3.1
2/17/11	15:57:30		7.52	3.12
2/17/11	15:57:45		7.51	3.14
2/17/11	15:58:00		7.51	3.13
2/17/11	15:58:15		7.52	3.12
2/17/11	15:58:30		7.51	3.07
2/17/11	15:58:45	downstream	7.51	3.05
2/17/11	15:59:00	downstream	7.51	3.06
2/17/11	15:59:15	downstream	7.52	2.98
2/17/11	15:59:30	downstream	7.53	2.98
2/17/11	15:59:45	downstream	7.52	3.07
2/17/11	16:00:00	downstream	7.53	3.06
2/17/11	16:00:15	downstream	7.54	3.1
2/17/11	16:00:30	downstream	7.55	3.03
2/17/11	16:00:45	downstream	7.55	3.01
2/17/11	16:01:00	11-2	7.56	3.05
2/17/11	16:01:15		7.56	3.09
2/17/11	16:01:30		7.56	3.17
2/17/11	16:01:45	10-2	7.57	3.08
2/17/11	16:02:00		7.58	3.11
2/17/11	16:02:15	9-2	7.59	3.07

Table B.1 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	16:02:30		7.59	3.09
2/17/11	16:02:45	8-2	7.6	3.08
2/17/11	16:03:00		7.65	3.08
2/17/11	16:03:15	7-2	7.6	3.14
2/17/11	16:03:30	6-2	7.95	3.14
2/17/11	16:03:45		7.6	3.16
2/17/11	16:04:00	upsteam bkg	7.61	3.18
2/17/11	16:04:15	upsteam bkg	7.62	3.13
2/17/11	16:04:30	upsteam bkg	7.63	3.1
2/17/11	16:04:45	upsteam bkg	7.62	3.19
2/17/11	16:05:00	upsteam bkg	7.64	3.11
2/17/11	16:05:15	upsteam bkg	7.64	3.12
2/17/11	16:05:30	upsteam bkg	7.65	3.1
2/17/11	16:05:45	upsteam bkg	7.65	3.09
2/17/11	16:06:00	upsteam bkg	7.65	3.09
2/17/11	16:06:15		7.65	3.14
2/17/11	16:06:30	6-3	7.64	3.19
2/17/11	16:06:45		7.66	3.08
2/17/11	16:07:00	7-3	7.66	3.06
2/17/11	16:07:15	8-3	7.67	3.02
2/17/11	16:07:30		7.67	3.02
2/17/11	16:07:45	9-3	7.67	3.08
2/17/11	16:08:00	10-3	7.67	3.04
2/17/11	16:08:15		7.68	3.02
2/17/11	16:08:30	11-3	7.68	3.06
2/17/11	16:08:45		7.68	3.09
2/17/11	16:09:00		7.68	3.05
2/17/11	16:09:15		7.68	3.1
2/17/11	16:09:30		7.68	3.08
2/17/11	16:09:45		7.68	3.09
2/17/11	16:10:00		7.69	3.04
2/17/11	16:10:15		7.7	2.97
2/17/11	16:10:30		7.71	2.96
2/17/11	16:10:45		7.71	2.95
2/17/11	16:11:00		7.71	2.94
2/17/11	16:11:15		8.06	2.94
2/17/11	16:11:30		7.75	2.94
2/17/11	16:11:45		7.82	2.95
2/17/11	16:12:00		7.91	2.95

Table B.1 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	16:12:15		8.06	3
2/17/11	16:12:30		7.76	3.02
2/17/11	16:13:00		7.71	3.01
2/17/11	16:13:15		7.71	2.99
2/17/11	16:13:30		7.69	3.01
2/17/11	16:13:45		7.7	3.04
2/17/11	16:14:00		7.71	2.99
2/17/11	16:14:15		7.83	2.97
2/17/11	16:14:30		8.05	2.96
2/17/11	16:14:45		7.67	2.96
2/17/11	16:15:00		7.67	2.96
2/17/11	16:15:15		7.7	2.95
2/17/11	16:15:30		7.7	2.95
2/17/11	16:15:45		7.96	2.96
2/17/11	16:16:00		7.68	2.95
2/17/11	16:16:15		7.71	2.94
2/17/11	16:16:30		7.83	2.95
2/17/11	16:16:45		8.05	2.95
2/17/11	16:17:00		7.7	2.97
2/17/11	16:17:15		8.07	2.97
2/17/11	16:17:30		8.06	2.99
2/17/11	16:17:45		8.04	3.02
2/17/11	16:18:00		8.04	3.03
2/17/11	16:18:15		7.91	3
2/17/11	16:18:30		8.05	3
2/17/11	16:18:45	11-4	8.02	3
2/17/11	16:19:00		8	2.95
2/17/11	16:19:15	10-4	8.03	2.97
2/17/11	16:19:30		8.05	3
2/17/11	16:19:45	9-4	8.04	3.02
2/17/11	16:20:00		8.05	2.97
2/17/11	16:20:15		8.05	3
2/17/11	16:20:30	8-4	8.05	3.02
2/17/11	16:20:45		8.05	2.99
2/17/11	16:21:00		8.05	2.96
2/17/11	16:21:15		8.06	2.99
2/17/11	16:21:30		8.05	3.05
2/17/11	16:21:45	7-4	8.06	3.02
2/17/11	16:22:00		8.06	2.95
2/17/11	16:22:15		8.06	2.96

Table B.1 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	16:22:30	6-4	8.06	2.98
2/17/11	16:22:45		8.05	3.08
2/17/11	16:23:00		8.05	3.02
2/17/11	16:23:15		7.98	3.07
2/17/11	16:23:30		7.95	3.09
2/17/11	16:23:45		8.01	3.15
2/17/11	16:24:00		7.93	3.23
2/17/11	16:24:15		7.82	3.21
2/17/11	16:24:30		7.74	3.11
2/17/11	16:24:45		7.97	3.1
2/17/11	16:25:00		7.99	3.06
2/17/11	16:25:15		7.74	3.09
2/17/11	16:25:30		7.85	3.12
2/17/11	16:25:45		7.89	3.1
2/17/11	16:26:00		7.99	3.12
2/17/11	16:26:15		7.74	3.05
2/17/11	16:26:30		8.03	2.98
2/17/11	16:26:45		8.05	2.96
2/17/11	16:27:00	2-4	8.06	3.01
2/17/11	16:27:15		8.01	3.02
2/17/11	16:27:30		8	3.05
2/17/11	16:27:45		8.04	3.01
2/17/11	16:28:00		8.06	2.99
2/17/11	16:28:15	2-2	8.05	3.04
2/17/11	16:28:30		8.05	3.08
2/17/11	16:28:45		8.06	3.05
2/17/11	16:29:00		8.01	3.08
2/17/11	16:29:15	downstream	7.97	3.12
2/17/11	16:29:30	downstream	8.03	3.24
2/17/11	16:29:45	downstream	8.03	3.19
2/17/11	16:30:00	downstream	8.04	3.17
2/17/11	16:30:15	downstream	8.05	3.15
2/17/11	16:30:30	downstream	8.05	3.16
2/17/11	16:30:45	downstream	8	3.13
2/17/11	16:31:00	downstream	8.05	3.09
2/17/11	16:31:15	downstream	8.05	3.1
2/17/11	16:31:30	downstream	8.02	3.13
2/17/11	16:31:45	downstream	7.98	3.12
2/17/11	16:32:00		7.92	3.12
2/17/11	16:32:15	12-2	7.76	3.15

Table B.1 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	16:32:30		7.73	3.13
2/17/11	16:32:45		7.96	3.17
2/17/11	16:33:00		7.84	3.14
2/17/11	16:33:15	12-3	7.65	3.14
2/17/11			7.97	3.15
2/17/11	16:33:30		8.04	3.07
2/17/11	16:33:45		8.04	3.08
2/17/11	16:34:00		7.79	3.05
2/17/11	16:34:15	12-4	7.67	3
2/17/11	16:34:30		7.71	2.99
2/17/11	16:34:45		7.84	3
2/17/11	16:35:00		7.71	3.06
2/17/11	16:35:15		7.77	3.03
2/17/11	16:35:30		7.73	3.07
2/17/11	16:35:45	downstream	8	3.04
2/17/11	16:36:00	downstream	7.93	3.05
2/17/11	16:36:15	downstream	7.88	3.07
2/17/11	16:36:30	downstream	7.93	3.1
2/17/11	16:36:45	downstream	7.72	3.1
2/17/11	16:37:00	downstream	8.02	3.1
2/17/11	16:37:15	downstream	8.02	3.15
2/17/11	16:37:30	downstream	8.02	3.19
2/17/11	16:37:45	downstream	8.02	3.25
2/17/11	16:38:00	downstream	8.01	3.24
2/17/11	16:38:15	downstream	8.02	3.25
2/17/11	16:38:30	downstream	8.02	3.29
2/17/11	16:38:45	downstream	8.02	3.28
2/17/11	16:39:00	downstream	8.02	3.21
2/17/11	16:39:15	downstream	8.02	3.27
2/17/11	16:39:30	downstream	8.02	3.23
2/17/11	16:39:45	downstream	8.02	3.26
2/17/11	16:40:00	downstream	8.03	3.18
2/17/11	16:40:15	downstream	8.03	3.21
2/17/11	16:40:30	downstream	8.03	3.17
2/17/11	16:40:45	downstream	8.03	3.13
2/17/11	16:41:00	downstream	8.03	3.22
2/17/11	16:41:15	downstream	8.03	3.22
2/17/11	16:41:30	downstream	8.03	3.2
2/17/11	16:41:45	downstream	8.04	3.13
2/17/11	16:42:00	downstream	8.03	3.17

Table B.1 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	16:42:15		8.03	3.19
2/17/11	16:42:30	11-1	8.03	3.21
2/17/11	16:42:45		8.03	3.21
2/17/11	16:43:00	10-1	8.03	3.21
2/17/11	16:43:15		8.03	3.23
2/17/11	16:43:30	9-1	8.03	3.23
2/17/11	16:43:45		8.02	3.3
2/17/11	16:44:00		8.02	3.31
2/17/11	16:44:15		8.03	3.24
2/17/11	16:44:30	8-1	8.02	3.28
2/17/11	16:44:45		8.02	3.26
2/17/11	16:45:00		8.02	3.29
2/17/11	16:45:15	7-1	8.02	3.29
2/17/11	16:45:30		8.02	3.32
2/17/11	16:45:45	6-1	8.02	3.34
2/17/11	16:46:00		8.02	3.31
2/17/11	16:46:15		8.02	3.31
2/17/11	16:46:30		8.02	3.28
2/17/11	16:46:45		8.02	3.35
2/17/11	16:47:00		8.02	3.25
2/17/11	16:47:15		8.03	3.26
2/17/11	16:47:30		8.04	3.14
2/17/11	16:47:45		8.04	3.1
2/17/11	16:48:00		8.04	3.11
2/17/11	16:48:15	around discharge	8.04	3.14
2/17/11	16:48:30	around discharge	8.04	3.16
2/17/11	16:48:45	around discharge	8.03	3.24
2/17/11	16:49:00	around discharge	8.02	3.27
2/17/11	16:49:15	around discharge	8.02	3.31
2/17/11	16:49:30	around discharge	8	3.19
2/17/11	16:49:45	around discharge	7.97	3.16
2/17/11	16:50:00	around discharge	7.68	3.19
2/17/11	16:50:15	around discharge	7.68	3.26
2/17/11	16:50:30	around discharge	7.62	3.27
2/17/11	16:50:45	around discharge	7.65	3.2
2/17/11	16:51:00	around discharge	7.67	3.15
2/17/11	16:51:15	around discharge	7.81	3.13
2/17/11	16:51:30	around discharge	7.72	3.22
2/17/11	16:51:45	around discharge	7.71	3.24
2/17/11	16:52:00	around discharge	7.67	3.32

Table B.1 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/11	16:52:15	around discharge	7.69	3.3
2/17/11	16:52:30	around discharge	7.7	3.19
2/17/11	16:52:45	around discharge	7.71	3.21
2/17/11	16:53:00	around discharge	7.71	3.27
2/17/11	16:53:15	around discharge	7.75	3.23
2/17/11	16:53:30	around discharge	7.82	3.18
2/17/11	16:53:45	around discharge	7.73	3.2
2/17/11	16:54:00	around discharge	7.75	3.21
2/17/11	16:54:15	around discharge	7.73	3.21
2/17/11	16:54:30	around discharge	7.72	3.26
2/17/11	16:54:45		7.73	3.26
2/17/11	16:55:00		7.73	3.23
2/17/11	16:55:15		7.73	3.29
2/17/11	16:55:30		7.74	3.18
2/17/11	16:55:45		7.74	3.18
2/17/11	16:56:00		7.75	3.14
2/17/11	16:56:15		7.74	3.18
2/17/11	16:56:30		7.75	3.16
2/17/11	16:56:45		7.74	3.18
2/17/11	16:57:00		7.75	3.21
2/17/11	16:57:15		7.76	3.12
2/17/11	16:57:30		7.76	3.16

Table B.2. pH data at 0.5 depth.

Date	Time	pH		Temperature
02/17/11	15:59:16	7.64		2.77
02/17/11	15:59:36	7.66		2.74
02/17/11	15:59:56	7.66	11-2	2.73
02/17/11	16:00:16	7.67	11-2	2.77
02/17/11	16:00:36	7.67		2.88
02/17/11	16:00:56	7.67		2.82
02/17/11	16:01:16	7.67		2.79
02/17/11	16:01:36	7.68		2.81
02/17/11	16:01:56	7.68	10-2	2.79
02/17/11	16:02:16	7.68	9-2	2.82
02/17/11	16:02:36	7.68		2.82
02/17/11	16:02:56	7.68	8-2	2.9
02/17/11	16:03:16	7.68	7-2	2.84
02/17/11	16:03:36	7.69		2.82
02/17/11	16:03:56	7.69	6-2	2.86
02/17/11	16:04:16	7.7	upsteam bkg	2.83
02/17/11	16:04:36	7.7	upsteam bkg	2.82
02/17/11	16:04:56	7.7	upsteam bkg	2.8
02/17/11	16:05:16	7.71	upsteam bkg	2.87
02/17/11	16:05:36	7.71	upsteam bkg	2.94
02/17/11	16:05:56	7.72	upsteam bkg	2.76
02/17/11	16:06:16	7.73		2.77
02/17/11	16:06:36	7.73	6-3	2.76
02/17/11	16:06:56	7.73	7-3	2.77
02/17/11	16:07:16	7.73	8-3	2.76
02/17/11	16:07:36	7.74	9-3	2.77
02/17/11	16:07:56	7.74	10-3	2.77
02/17/11	16:08:16	7.74		2.78
02/17/11	16:08:36	7.74	11-3	2.79
02/17/11	16:08:56	7.75		2.74
02/17/11	16:09:16	7.75		2.68
02/17/11	16:09:36	7.76		2.65
02/17/11	16:09:56	7.76		2.65
02/17/11	16:10:16	7.76		2.65

Table B.2 (cont.)

Date	Time	pH		Temperature
02/17/11	16:10:36	7.76		2.65
02/17/11	16:10:56	7.76		2.65
02/17/11	16:11:16	7.76		2.67
02/17/11	16:11:36	7.76		2.7
02/17/11	16:11:56	7.77		2.7
02/17/11	16:12:16	7.76		2.7
02/17/11	16:12:36	7.77		2.72
02/17/11	16:12:56	7.77		2.68
02/17/11	16:13:16	7.77		2.67
02/17/11	16:13:36	7.78		2.66
02/17/11	16:13:56	7.78		2.65
02/17/11	16:14:16	7.79		2.65
02/17/11	16:14:36	7.78		2.67
02/17/11	16:14:56	7.77		2.65
02/17/11	16:15:16	7.78		2.66
02/17/11	16:15:36	7.78		2.65
02/17/11	16:15:56	7.77		2.71
02/17/11	16:16:16	7.78		2.73
02/17/11	16:16:36	7.78		2.69
02/17/11	16:16:56	7.78		2.72
02/17/11	16:17:16	7.78		2.71
02/17/11	16:17:36	7.78		2.7
02/17/11	16:17:56	7.79		2.66
02/17/11	16:18:16	7.78		2.68
02/17/11	16:18:36	7.79	11-4	2.71
02/17/11	16:18:56	7.79	10-4	2.68
02/17/11	16:19:16	7.79		2.7
02/17/11	16:19:36	7.79	9-4	2.68
02/17/11	16:19:56	7.79		2.66
02/17/11	16:20:16	7.79	8-4	2.74
02/17/11	16:20:36	7.79		2.68
02/17/11	16:20:56	7.8		2.66
02/17/11	16:21:16	7.79		2.67
02/17/11	16:21:36	7.79	7-4	2.78
02/17/11	16:21:56	7.79		2.72
02/17/11	16:22:16	7.79	6-4	2.82
02/17/11	16:22:36	7.78		2.82
02/17/11	16:22:56	7.76		2.86
02/17/11	16:23:16	7.77		2.83
02/17/11	16:23:36	7.77		2.82

Table B.2 (cont.)

Date	Time	pH		Temperature
02/17/11	16:23:56	7.79		2.77
02/17/11	16:24:16	7.79		2.78
02/17/11	16:24:36	7.79		2.8
02/17/11	16:24:56	7.78		2.8
02/17/11	16:25:16	7.8		2.69
02/17/11	16:25:36	7.8		2.66
02/17/11	16:25:56	7.8		2.72
02/17/11	16:26:16	7.79		2.75
02/17/11	16:26:36	7.8	2-4	2.72
02/17/11	16:26:56	7.8		2.69
02/17/11	16:27:16	7.79		2.79
02/17/11	16:27:36	7.8		2.75
02/17/11	16:27:56	7.79	2-3	2.79
02/17/11	16:28:16	7.79	2-4	2.87
02/17/11	16:28:36	7.78		2.92
02/17/11	16:28:56	7.79	bkg downstream	2.83
02/17/11	16:29:16	7.79	bkg downstream	2.81
02/17/11	16:29:36	7.79	bkg downstream	2.82
02/17/11	16:29:56	7.79	bkg downstream	2.83
02/17/11	16:30:16	7.79	bkg downstream	2.78
02/17/11	16:30:36	7.78	bkg downstream	2.85
02/17/11	16:30:56	7.79	bkg downstream	2.83
02/17/11	16:31:16	7.79	bkg downstream	2.9
02/17/11	16:31:36	7.79		2.88
02/17/11	16:31:56	7.8	12-2	2.79
02/17/11	16:32:16	7.79		2.86
02/17/11	16:32:36	7.8		2.78
02/17/11	16:32:56	7.8	12-3	2.75
02/17/11	16:33:16	7.81	12-4	2.7
02/17/11	16:33:36	7.82		2.68
02/17/11	16:33:56	7.81		2.72
02/17/11	16:34:16	7.8		2.72
02/17/11	16:34:36	7.8		2.78
02/17/11	16:34:56	7.8		2.76

Table B.2 (cont.)

Date	Time	pH		Temperature
02/17/11	16:35:16	7.8	bkg downstream	2.85
02/17/11	16:35:36	7.8	bkg downstream	2.8
02/17/11	16:35:56	7.8	bkg downstream	2.81
02/17/11	16:36:16	7.8	bkg downstream	2.84
02/17/11	16:36:36	7.8	bkg downstream	2.88
02/17/11	16:36:56	7.79	bkg downstream	2.93
02/17/11	16:37:16	7.78	bkg downstream	2.97
02/17/11	16:37:36	7.78	bkg downstream	2.98
02/17/11	16:37:56	7.78	bkg downstream	2.99
02/17/11	16:38:16	7.79	bkg downstream	2.93
02/17/11	16:38:36	7.79	bkg downstream	2.95
02/17/11	16:38:56	7.79	bkg downstream	2.95
02/17/11	16:39:16	7.79	bkg downstream	2.88
02/17/11	16:39:36	7.79	bkg downstream	2.87
02/17/11	16:39:56	7.8	bkg downstream	2.84
02/17/11	16:40:16	7.79	bkg downstream	2.9
02/17/11	16:40:36	7.79	bkg downstream	2.9
02/17/11	16:40:56	7.8	bkg downstream	2.87
02/17/11	16:41:16	7.79	bkg downstream	2.92
02/17/11	16:41:36	7.8	bkg downstream	2.93
02/17/11	16:41:56	7.79	bkg downstream	2.92
02/17/11	16:42:16	7.79	bkg downstream	2.93
02/17/11	16:42:36	7.8	11-1	2.96

Table B.2 (cont.)

Date	Time	pH		Temperature
02/17/11	16:42:56	7.79	10-1	2.99
02/17/11	16:43:16	7.79		2.95
02/17/11	16:43:36	7.79	9-1	2.99
02/17/11	16:43:56	7.79		2.98
02/17/11	16:44:16	7.78		2.99
02/17/11	16:44:36	7.78	8-1	3.02
02/17/11	16:44:56	7.78		3.06
02/17/11	16:45:16	7.78	7-1	2.98
02/17/11	16:45:36	7.79	6-1	2.96
02/17/11	16:45:56	7.78		3.03
02/17/11	16:46:16	7.79		2.94
02/17/11	16:46:36	7.79		2.86
02/17/11	16:46:56	7.81		2.79
02/17/11	16:47:16	7.81		2.82
02/17/11	16:47:36	7.8		2.85
02/17/11	16:47:56	7.8		2.97
02/17/11	16:48:16	7.78		2.95
02/17/11	16:48:36	7.8	around OTF	2.92
02/17/11	16:48:56	7.81	around OTF	2.87
02/17/11	16:49:16	7.81	around OTF	2.94
02/17/11	16:49:36	7.8	around OTF	2.96
02/17/11	16:49:56	7.8	around OTF	2.91
02/17/11	16:50:16	7.81	around OTF	2.82
02/17/11	16:50:36	7.81	around OTF	2.89
02/17/11	16:50:56	7.8	around OTF	2.96
02/17/11	16:51:16	7.79	around OTF	3
02/17/11	16:51:36	7.8	around OTF	2.93
02/17/11	16:51:56	7.8	around OTF	2.98
02/17/11	16:52:16	7.8	around OTF	2.95
02/17/11	16:52:36	7.8	around OTF	2.93
02/17/11	16:52:56	7.81	around OTF	2.88
02/17/11	16:53:16	7.8	around OTF	2.98
02/17/11	16:53:36	7.8	around OTF	2.96
02/17/11	16:53:56	7.8	around OTF	2.97
02/17/11	16:54:16	7.8	around OTF	2.95
02/17/11	16:54:36	7.8	around OTF	2.96
02/17/11	16:54:56	7.81	around OTF	2.84
02/17/11	16:55:16	7.81		2.92
02/17/11	16:55:36	7.81		2.86
02/17/11	16:55:56	7.81		2.89
02/17/11	16:56:16	7.8		2.92

Table B.2 (cont.)

Date	Time	pH	Temperature
02/17/11	16:56:36	7.81	2.85
02/17/11	16:56:56	7.8	2.87
02/17/11	16:57:16	7.8	2.92
02/17/11	16:57:36	7.8	2.88
02/17/11	16:57:56	7.82	2.78

Table B.3. pH data at 0.2 depth.

Date	Time	POS	Chan[12] pH	Chan[1] Temperature (°Celsius)
2/17/2011	16:00:30		8.05	3
2/17/2011	16:00:45		8.05	2.93
2/17/2011	16:01:00	11-2	8.05	2.95
2/17/2011	16:01:15		8.05	2.95
2/17/2011	16:01:30		8.04	3.04
2/17/2011	16:01:45	10-2	8.04	3.02
2/17/2011	16:02:00		8.04	3.03
2/17/2011	16:02:15	9-2	8.04	3.06
2/17/2011	16:02:30		8.04	3.02
2/17/2011	16:02:45		8.04	3.14
2/17/2011	16:03:00	8-2	8.04	3.05
2/17/2011	16:03:15	7-2	7.9	3.08
2/17/2011	16:03:30		7.57	3
2/17/2011	16:03:45	6-2	7.6	3.02
2/17/2011	16:04:00	upstream	7.62	3.17
2/17/2011	16:04:15	upstream	7.69	3.09
2/17/2011	16:04:30	upstream	7.7	3.07
2/17/2011	16:04:45	upstream	7.64	3.11
2/17/2011	16:05:00	upstream	7.79	3.11
2/17/2011	16:05:15	upstream	7.89	3.09
2/17/2011	16:05:30	upstream	7.69	3.05
2/17/2011	16:05:45	upstream	7.63	3.07
2/17/2011	16:06:00	upstream	7.72	3.1
2/17/2011	16:06:15		7.87	3.15
2/17/2011	16:06:30	6-3	7.82	3.14
2/17/2011	16:06:45	7-3	7.98	3.19
2/17/2011	16:07:00		8.03	2.96
2/17/2011	16:07:15	8-3	8.03	3.01
2/17/2011	16:07:30		8.04	2.97
2/17/2011	16:07:45	9-3	8.04	3
2/17/2011	16:08:00		8.04	3.01
2/17/2011	16:08:15	10-3	8.03	3.02
2/17/2011	16:08:30	11-3	8.04	3.01
2/17/2011	16:08:45		8.04	2.98
2/17/2011	16:09:00		8.04	2.99
2/17/2011	16:09:15		8.04	2.98
2/17/2011	16:09:30		8.04	2.99
2/17/2011	16:09:45		8.04	2.99

Table B.3 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/2011	16:10:00		8.05	2.96
2/17/2011	16:10:15		8.05	2.91
2/17/2011	16:10:30		8.05	2.9
2/17/2011	16:10:45		8.05	2.87
2/17/2011	16:11:00		8.05	2.87
2/17/2011	16:11:15		8.06	2.87
2/17/2011	16:11:30		8.06	2.88
2/17/2011	16:11:45		8.06	2.87
2/17/2011	16:12:00		8.06	2.88
2/17/2011	16:12:15		8.05	2.9
2/17/2011	16:12:30		8.06	2.94
2/17/2011	16:12:45		8.06	2.9
2/17/2011	16:13:00		8.05	2.92
2/17/2011	16:13:15		8.06	2.91
2/17/2011	16:13:30		8.05	2.98
2/17/2011	16:13:45		8.05	2.89
2/17/2011	16:14:00		8.05	2.93
2/17/2011	16:14:15		8.06	2.9
2/17/2011	16:14:30		8.06	2.88
2/17/2011	16:14:45		8.06	2.88
2/17/2011	16:15:00		8.05	2.88
2/17/2011	16:15:15		8.06	2.88
2/17/2011	16:15:30		8.06	2.89
2/17/2011	16:15:45		8.06	2.89
2/17/2011	16:16:00		8.06	2.88
2/17/2011	16:16:15		8.06	2.89
2/17/2011	16:16:30		8.06	2.88
2/17/2011	16:16:45		8.06	2.95
2/17/2011	16:17:00		7.78	2.9
2/17/2011	16:17:15		8.02	2.93
2/17/2011	16:17:30		8.05	2.9
2/17/2011	16:17:45		8.05	2.91
2/17/2011	16:18:00		8.05	2.93
2/17/2011	16:18:15		8.05	2.93
2/17/2011	16:18:30	11-4	8.05	2.94
2/17/2011	16:18:45		8.06	2.89
2/17/2011	16:19:00	10-4	7.82	2.88
2/17/2011	16:19:15		8.05	2.94
2/17/2011	16:19:30	9-4	8.06	2.91
2/17/2011	16:19:45		8.06	2.96
2/17/2011	16:20:00		8.06	2.91

Table B.3 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/2011	16:20:15	8-4	8.06	2.91
2/17/2011	16:20:30		8.06	2.91
2/17/2011	16:20:45		8.06	2.89
2/17/2011	16:21:00		8.06	2.88
2/17/2011	16:21:15		8.05	2.95
2/17/2011	16:21:30	7-4	8.06	2.93
2/17/2011	16:21:45		8.06	2.88
2/17/2011	16:22:00		8.06	2.91
2/17/2011	16:22:15	6-4	8.06	2.88
2/17/2011	16:22:30		8.06	2.94
2/17/2011	16:22:45		8.05	2.94
2/17/2011	16:23:00		8.05	2.99
2/17/2011	16:23:15		8.04	3.03
2/17/2011	16:23:30		8.04	3.04
2/17/2011	16:23:45		7.84	3.12
2/17/2011	16:24:00		7.53	3.16
2/17/2011	16:24:15		7.59	3.1
2/17/2011	16:24:30		7.62	3.06
2/17/2011	16:24:45		7.99	3.08
2/17/2011	16:25:00		8.01	3.01
2/17/2011	16:25:15		8.02	3.06
2/17/2011	16:25:30		8.03	3.05
2/17/2011	16:25:45		8.03	3.07
2/17/2011	16:26:00		8.04	2.97
2/17/2011	16:26:15		8.04	2.93
2/17/2011	16:26:30	2-4	8.05	2.89
2/17/2011	16:26:45		8.05	2.95
2/17/2011	16:27:00		8.05	2.99
2/17/2011	16:27:15		8.04	3.06
2/17/2011	16:27:30		8.05	2.94
2/17/2011	16:27:45		8.05	2.96
2/17/2011	16:28:00	2-3	8.05	2.96
2/17/2011	16:28:15	2-2	8.04	3.05
2/17/2011	16:28:30		8.05	3
2/17/2011	16:28:45		8.05	2.98
2/17/2011	16:29:00		8.04	3.08
2/17/2011	16:29:15		8.04	3.11
2/17/2011	16:29:30	downstream	7.63	3.1
2/17/2011	16:29:45	downstream	7.66	3.09
2/17/2011	16:30:00	downstream	7.53	3.07
2/17/2011	16:30:15	downstream	7.63	3.01

Table B.3 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/2011	16:30:30	downstream	7.66	3.03
2/17/2011	16:30:45	downstream	7.7	3.02
2/17/2011	16:31:00	downstream	7.69	3.1
2/17/2011	16:31:15	downstream	7.7	3.09
2/17/2011	16:31:30	downstream	7.71	3.16
2/17/2011	16:31:45		7.96	3.17
2/17/2011	16:32:00	12-2	7.98	3.12
2/17/2011	16:32:15		7.98	3.17
2/17/2011	16:32:30		8	3.13
2/17/2011	16:32:45		8.01	3.1
2/17/2011	16:33:00	12-3	8.02	3.09
2/17/2011	16:33:15		8.02	3.11
2/17/2011	16:33:30	12-4	8.03	3.02
2/17/2011	16:33:45		8.04	3
2/17/2011	16:34:00		8.03	2.95
2/17/2011	16:34:15		8.04	2.92
2/17/2011	16:34:30		8.05	2.92
2/17/2011	16:34:45		8.05	2.96
2/17/2011	16:35:00		8.04	2.93
2/17/2011	16:35:15	bkg downstream	7.64	2.93
2/17/2011	16:35:30	bkg downstream	7.67	2.95
2/17/2011	16:35:45	bkg downstream	7.69	2.96
2/17/2011	16:36:00	bkg downstream	7.69	2.97
2/17/2011	16:36:15	bkg downstream	7.69	3.1
2/17/2011	16:36:30	bkg downstream	7.69	3.12
2/17/2011	16:36:45	bkg downstream	7.71	3
2/17/2011	16:37:00	bkg downstream	7.72	3.01
2/17/2011	16:37:15	bkg downstream	7.75	3.07
2/17/2011	16:37:30	bkg downstream	7.96	3.06
2/17/2011	16:37:45	bkg downstream	7.96	3.18
2/17/2011	16:38:00	bkg downstream	7.79	3.16
2/17/2011	16:38:15	bkg downstream	7.78	3.22
2/17/2011	16:38:30	bkg downstream	7.7	3.21
2/17/2011	16:38:45	bkg downstream	7.71	3.22
2/17/2011	16:39:00	bkg downstream	7.71	3.22
2/17/2011	16:39:15	bkg downstream	7.66	3.19
2/17/2011	16:39:30	bkg downstream	7.72	3.21
2/17/2011	16:39:45	bkg downstream	7.73	3.18
2/17/2011	16:40:00	bkg downstream	7.76	3.16
2/17/2011	16:40:15	bkg downstream	7.73	3.13
2/17/2011	16:40:30	bkg downstream	7.84	3.18

Table B.3 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/2011	16:40:45	bkg downstream	7.76	3.15
2/17/2011	16:41:00	bkg downstream	7.74	3.16
2/17/2011	16:41:15	bkg downstream	7.74	3.21
2/17/2011	16:41:30	bkg downstream	7.69	3.16
2/17/2011	16:41:45	bkg downstream	7.87	3.12
2/17/2011	16:42:00	bkg downstream	7.65	3.16
2/17/2011	16:42:15	bkg downstream	7.92	3.16
2/17/2011	16:42:30	11-1	7.8	3.15
2/17/2011	16:42:45		7.7	3.13
2/17/2011	16:43:00	10-1	7.76	3.15
2/17/2011	16:43:15		7.99	3.18
2/17/2011	16:43:30	9-1	7.89	3.21
2/17/2011	16:43:45		7.74	3.2
2/17/2011	16:44:00		7.97	3.23
2/17/2011	16:44:15		7.74	3.2
2/17/2011	16:44:30	8-1	7.74	3.21
2/17/2011	16:44:45		7.68	3.17
2/17/2011	16:45:00		7.64	3.21
2/17/2011	16:45:15	7-1	7.77	3.24
2/17/2011	16:45:30		7.77	3.23
2/17/2011	16:45:45	6-1	7.77	3.26
2/17/2011	16:46:00		7.79	3.29
2/17/2011	16:46:15		7.78	3.2
2/17/2011	16:46:30	around dis	7.92	3.22
2/17/2011	16:46:45	around dis	7.75	3.26
2/17/2011	16:47:00	around dis	7.77	3.23
2/17/2011	16:47:15	around dis	7.78	3.21
2/17/2011	16:47:30	around dis	7.78	3.21
2/17/2011	16:47:45	around dis	7.99	3.12
2/17/2011	16:48:00	around dis	7.98	3.02
2/17/2011	16:48:15	around dis	7.86	3.07
2/17/2011	16:48:30	around dis	7.78	3.06
2/17/2011	16:48:45	around dis	7.99	3.1
2/17/2011	16:49:00	around dis	7.75	3.21
2/17/2011	16:49:15	around dis	7.72	3.2
2/17/2011	16:49:30	around dis	7.98	3.14
2/17/2011	16:49:45	around dis	7.97	3.18
2/17/2011	16:50:00	around dis	7.98	3.1
2/17/2011	16:50:15	around dis	7.97	3.18
2/17/2011	16:50:30	around dis	7.97	3.2
2/17/2011	16:50:45	around dis	7.97	3.21

Table B.3 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/2011	16:51:00	around dis	7.78	3.16
2/17/2011	16:51:15	around dis	7.99	3.07
2/17/2011	16:51:30	around dis	7.99	3.08
2/17/2011	16:51:45	around dis	7.98	3.17
2/17/2011	16:52:00	around dis	7.98	3.2
2/17/2011	16:52:15	around dis	7.75	3.22
2/17/2011	16:52:30	around dis	7.98	3.22
2/17/2011	16:52:45	around dis	7.98	3.2
2/17/2011	16:53:00	around dis	7.98	3.22
2/17/2011	16:53:15	around dis	7.99	3.19
2/17/2011	16:53:30	around dis	7.99	3.16
2/17/2011	16:53:45	around dis	7.99	3.19
2/17/2011	16:54:00	around dis	8	3.14
2/17/2011	16:54:15	around dis	7.99	3.21
2/17/2011	16:54:30	around dis	8	3.21
2/17/2011	16:54:45		8	3.19
2/17/2011	16:55:00		8	3.2
2/17/2011	16:55:15		7.73	3.17
2/17/2011	16:55:30		7.94	3.24
2/17/2011	16:55:45		7.98	3.15
2/17/2011	16:56:00		7.99	3.05
2/17/2011	16:56:15		7.99	3.2
2/17/2011	16:56:30		8	3.04
2/17/2011	16:56:45		8	3.12
2/17/2011	16:57:00		7.96	3.13
2/17/2011	16:57:15		7.76	3.17
2/17/2011	16:57:30		7.78	3.01
2/17/2011	16:57:45		7.78	3.11
2/17/2011	16:58:00		7.79	3.14
2/17/2011	16:58:15		7.78	3.15
2/17/2011	16:58:30		7.78	3.16
2/17/2011	16:58:45		7.81	3.02
2/17/2011	16:59:00		7.8	3.11
2/17/2011	16:59:15		7.8	3.23
2/17/2011	16:59:30		7.87	3.03
2/17/2011	16:59:45		8.02	2.92
2/17/2011	17:00:00		8	2.93
2/17/2011	17:00:15		7.83	2.91
2/17/2011	17:00:30		7.83	2.95
2/17/2011	17:00:45		7.83	2.9
2/17/2011	17:01:00		7.84	2.89

Table B.3 (cont.)

Date	Time	POS	pH	Temperature (°Celsius)
2/17/2011	17:01:15		7.84	2.91
2/17/2011	17:01:30		7.84	2.93
2/17/2011	17:01:45		7.85	2.97
2/17/2011	17:02:00		7.79	2.96
2/17/2011	17:02:15		7.93	2.98
2/17/2011	17:02:30		8.01	2.91
2/17/2011	17:02:45		7.79	2.89
2/17/2011	17:03:00		7.84	2.89
2/17/2011	17:03:15		7.85	2.88

Appendix C
Missouri River Flow Rate Data
At USGS Site 066100000

Table C.1. Missouri River 25th Percentile Daily Flow Rate at USGS Site 06610000.

#
US Geological Survey, Water Resources Data
Sites in this file include:
USGS 06610000 Missouri River at Omaha, NE
#
Data heading explanations.
begin_yr_dt ... First complete year of data of daily mean values for this day.
end_yr_dt ... Last complete year of data of daily mean values for this day.
max_va ... Maximum of daily mean values for this day.
min_va ... Minimum of daily mean values for this day.
mean_va ... Mean of daily mean values for this day.
p25_va ... 25 percentile of daily mean values for this day.
#

agency	month	day	begin_yr	end_yr	count	max_va_yr	max_va	min_va_yr	min_va	mean_va	p25_va
USGS	1	1	1953	2010	58	1987	37000	1958	6080	18500	14000
USGS	1	2	1953	2010	58	1987	37000	1958	5580	18300	13300
USGS	1	3	1953	2010	58	1987	36000	1958	5800	18100	13100
USGS	1	4	1953	2010	58	1987	36600	1960	5680	18100	14800
USGS	1	5	1953	2010	58	1987	36900	1960	4700	18200	14900
USGS	1	6	1953	2010	58	1987	37600	1960	4430	18100	14400
USGS	1	7	1953	2010	58	1987	37900	1960	4610	17900	13000
USGS	1	8	1953	2010	58	1987	37700	1960	5380	17700	12700
USGS	1	9	1953	2010	58	1987	37800	1967	5300	17300	12200
USGS	1	10	1953	2010	58	1987	37400	1967	4800	17100	11300
USGS	1	11	1953	2010	58	1987	36500	1957	4520	17300	11900
USGS	1	12	1953	2010	58	1987	36700	1957	4790	17300	12200
USGS	1	13	1953	2010	58	1987	37700	1957	4880	17300	12200
USGS	1	14	1953	2010	58	1987	35600	1957	5600	17300	12400
USGS	1	15	1953	2010	58	1987	34300	1954	6000	17200	11600
USGS	1	16	1953	2010	58	1987	33300	1954	5800	17300	12000
USGS	1	17	1953	2010	58	1987	31400	1954	5800	17300	12200
USGS	1	18	1953	2010	58	1973	39700	1972	5460	17600	11800

USGS	1	19	1953	2010	58	1973	37500	1954	7000	17900	12300
USGS	1	20	1953	2010	58	1973	33900	1967	6000	17900	13500
USGS	1	21	1953	2010	58	1983	31900	1967	6000	17600	12800
USGS	1	22	1953	2010	58	1997	32400	1967	7000	17600	12900
USGS	1	23	1953	2010	58	1997	35100	1955	7520	17800	13000
USGS	1	24	1953	2010	58	1997	33200	1955	7700	17800	13800
USGS	1	25	1953	2010	58	1997	32000	1955	7610	17800	13600
USGS	1	26	1953	2010	58	1997	31800	1955	7900	17700	13300
USGS	1	27	1953	2010	58	1997	31400	1955	8300	17500	11700
USGS	1	28	1953	2010	58	1997	31700	1978	6710	17200	10900
USGS	1	29	1953	2010	58	1983	31900	1957	7500	17300	11000
USGS	1	30	1953	2010	58	1983	34200	1961	7500	17600	11800
USGS	1	31	1953	2010	58	1983	33600	1963	8000	17800	12200
USGS	2	1	1953	2010	58	1997	33600	1963	7900	17800	12900
USGS	2	2	1953	2010	58	1997	37200	1963	7900	17700	13300
USGS	2	3	1953	2010	58	1997	38700	1965	7720	17700	13300
USGS	2	4	1953	2010	58	1997	38000	1965	8100	17500	13000
USGS	2	5	1953	2010	58	1997	35400	1989	6500	17600	13000
USGS	2	6	1953	2010	58	1997	33800	1957	7920	17800	14300
USGS	2	7	1953	2010	58	1997	34200	1957	7920	18200	15300
USGS	2	8	1953	2010	58	1966	35000	1957	7800	18400	14200
USGS	2	9	1953	2010	58	1966	50000	1957	7920	18700	13700
USGS	2	10	1953	2010	58	1966	52900	1957	7800	19100	14000
USGS	2	11	1953	2010	58	1966	45200	1963	7800	19200	13300
USGS	2	12	1953	2010	58	1966	37400	1963	7700	19000	13500
USGS	2	13	1953	2010	58	1997	34900	1963	7600	18900	13900
USGS	2	14	1953	2010	58	1997	35100	1963	7800	19100	13900
USGS	2	15	1953	2010	58	1997	35800	1963	7900	19400	14800
USGS	2	16	1953	2010	58	1984	39700	1958	8000	19400	15100
USGS	2	17	1953	2010	58	1984	42200	1958	8000	19300	15200
USGS	2	18	1953	2010	58	1984	42100	1967	7380	19500	15500
USGS	2	19	1953	2010	58	1997	58900	1967	6630	20900	15500
USGS	2	20	1953	2010	58	1971	57100	1967	7720	21400	15600
USGS	2	21	1953	2010	58	1971	68400	1964	8300	21700	15800

USGS	2	22	1953	2010	58	1971	61500	1967	7920	21400	15500
USGS	2	23	1953	2010	58	1971	52100	1967	7550	21600	15100
USGS	2	24	1953	2010	58	1983	45300	1963	7380	21200	15700
USGS	2	25	1953	2010	58	1983	45900	1963	6630	20800	15500
USGS	2	26	1953	2010	58	1983	46600	1967	7240	20600	15100
USGS	2	27	1953	2010	58	1983	48900	1967	7040	20900	15600
USGS	2	28	1953	2010	58	1983	55600	1963	7380	21200	16200
USGS	2	29	1956	2008	14	1984	33900	1964	8700	21400	14900
USGS	3	1	1953	2010	58	1983	60600	1963	6900	22100	15800
USGS	3	2	1953	2010	58	1983	61900	1963	6760	22100	16100
USGS	3	3	1953	2010	58	1983	61400	1963	7200	22200	15700
USGS	3	4	1953	2010	58	1983	62100	1963	8100	22300	15500
USGS	3	5	1953	2010	58	1983	62500	1963	7900	22200	15300
USGS	3	6	1953	2010	58	1983	66300	1963	7050	21900	14800
USGS	3	7	1953	2010	58	1983	78200	1964	7050	22100	14600
USGS	3	8	1953	2010	58	1983	80500	1964	7050	22300	14500
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USGS	3	13	1953	2010	58	1997	61500	1964	7050	25300	16100
USGS	3	14	1953	2010	58	1971	76800	1964	7380	26200	16600
USGS	3	15	1953	2010	58	2010	62200	1964	7380	25800	16900
USGS	3	16	1953	2010	58	2010	68600	1964	7200	26000	16400
USGS	3	17	1953	2010	58	2010	73700	1964	6900	26600	16800
USGS	3	18	1953	2010	58	2010	81000	1964	6760	27400	16400
USGS	3	19	1953	2010	58	2010	88500	1964	7050	29500	17000
USGS	3	20	1953	2010	58	2010	98300	1964	8950	30200	18000
USGS	3	21	1953	2010	58	2010	102000	1960	9650	30600	18300
USGS	3	22	1953	2010	58	2010	97900	1957	9520	31200	20600
USGS	3	23	1953	2010	58	2010	91800	1957	9390	32400	23200
USGS	3	24	1953	2010	58	2010	87100	1957	9520	33400	24200
USGS	3	25	1953	2010	58	2010	84000	1957	9780	33700	25100
USGS	3	26	1953	2010	58	2010	80300	1957	9520	33700	25800

USGS	3	27	1953	2010	58	2010	75800	1957	9260	33800	25400
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USGS	3	30	1953	2010	58	1962	101000	1957	11800	36600	27800
USGS	3	31	1953	2010	58	1960	96500	1957	12300	37400	27200
USGS	4	1	1953	2010	58	1960	113000	1957	12200	38000	28500
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USGS	4	3	1953	2010	58	1960	105000	1957	11400	38900	29200
USGS	4	4	1953	2010	58	1960	116000	1957	11300	38900	28600
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USGS	4	7	1953	2010	58	1960	90000	1957	11000	38300	28200
USGS	4	8	1953	2010	58	1997	92400	1957	10700	38300	28200
USGS	4	9	1953	2010	58	1997	94600	1957	10300	38400	27900
USGS	4	10	1953	2010	58	1997	97300	1957	10000	38300	27600
USGS	4	11	1953	2010	58	1997	102000	1957	9910	37900	27800
USGS	4	12	1953	2010	58	1997	105000	1957	9780	38000	28600
USGS	4	13	1953	2010	58	1997	106000	1957	9780	38300	29100
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USGS	4	15	1953	2010	58	1997	107000	1957	9650	38400	28900
USGS	4	16	1953	2010	58	1997	108000	1957	9780	38100	28800
USGS	4	17	1953	2010	58	1997	105000	1957	10700	37600	28700
USGS	4	18	1953	2010	58	1997	102000	1957	12300	37300	28900
USGS	4	19	1953	2010	58	1997	97700	1957	15200	36800	29100
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USGS	4	21	1953	2010	58	1997	96500	1957	22800	37100	29300
USGS	4	22	1953	2010	58	1997	95200	1953	26300	37000	29400
USGS	4	23	1953	2010	58	1997	94300	1953	25700	37000	28700
USGS	4	24	1953	2010	58	1997	94600	1964	25000	36800	28400
USGS	4	25	1953	2010	58	1997	93700	1953	25400	36500	28400
USGS	4	26	1953	2010	58	1997	92000	1953	25400	36700	28800
USGS	4	27	1953	2010	58	1997	91000	1958	22800	37300	29200
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USGS	4	29	1953	2010	58	1997	89300	1953	25100	37200	29300

USGS	4	30	1953	2010	58	1997	91800	1953	23300	36500	29700
USGS	5	1	1953	2010	58	1997	93000	1962	24600	36500	29400
USGS	5	2	1953	2010	58	1997	93400	1962	24600	37000	29000
USGS	5	3	1953	2010	58	1997	92600	2007	24700	37300	28900
USGS	5	4	1953	2010	58	1997	93600	2007	23800	37400	28900
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USGS	5	6	1953	2010	58	1953	95200	1958	25400	39000	29900
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USGS	5	10	1953	2010	58	1997	92400	1960	25400	37400	30800
USGS	5	11	1953	2010	58	1997	92300	1964	25000	37600	31400
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USGS	5	13	1953	2010	58	1997	92700	1990	24600	38100	31100
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USGS	5	15	1953	2010	58	1997	86600	1959	24100	37900	29900
USGS	5	16	1953	2010	58	1997	85500	1959	23000	37700	30200
USGS	5	17	1953	2010	58	1997	83200	1959	23000	37800	30700
USGS	5	18	1953	2010	58	1997	83000	1959	24800	38100	30600
USGS	5	19	1953	2010	58	1997	83000	2008	24800	38200	31100
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USGS	5	22	1953	2010	58	1997	81200	2008	24000	37800	31100
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USGS	5	24	1953	2010	58	1997	80900	1957	23600	38600	32600
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USGS	5	28	1953	2010	58	1997	86700	1961	24300	38500	32400
USGS	5	29	1953	2010	58	1997	87500	1961	25400	38800	31600
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USGS	5	31	1953	2010	58	1997	84600	1957	24300	38400	30900
USGS	6	1	1953	2010	58	1997	81100	1957	25400	38800	30800
USGS	6	2	1953	2010	58	1997	77700	1957	26100	38700	31600

USGS	6	3	1953	2010	58	1995	80300	1957	24300	38400	30700
USGS	6	4	1953	2010	58	1997	77600	1957	22800	37900	31200
USGS	6	5	1953	2010	58	1997	76200	1961	23400	38600	31900
USGS	6	6	1953	2010	58	1997	75900	1960	24600	38800	31200
USGS	6	7	1953	2010	58	1997	76000	1959	23400	38700	31300
USGS	6	8	1953	2010	58	1971	77800	1959	23400	39900	31500
USGS	6	9	1953	2010	58	1953	79400	1960	24300	41400	31500
USGS	6	10	1953	2010	58	1953	84100	1961	25000	41000	31400
USGS	6	11	1953	2010	58	1971	79700	1961	25200	40900	31700
USGS	6	12	1953	2010	58	1971	77600	1961	25900	41300	31200
USGS	6	13	1953	2010	58	1997	76700	1960	27000	41400	32400
USGS	6	14	1953	2010	58	1953	85700	1960	25200	42600	32800
USGS	6	15	1953	2010	58	1953	82600	1960	25000	43300	31700
USGS	6	16	1953	2010	58	1997	75300	1958	26400	43000	32300
USGS	6	17	1953	2010	58	1984	87400	1961	25000	42500	31600
USGS	6	18	1953	2010	58	1984	92300	1961	23000	42300	32100
USGS	6	19	1953	2010	58	1984	94200	1961	23900	42000	32900
USGS	6	20	1953	2010	58	1953	94200	1961	25000	42400	33500
USGS	6	21	1953	2010	58	1953	101000	1957	25400	43300	32400
USGS	6	22	1953	2010	58	1996	113000	1961	26800	44100	32200
USGS	6	23	1953	2010	58	1996	116000	1960	26100	43600	32100
USGS	6	24	1953	2010	58	1984	107000	1960	25200	43300	33000
USGS	6	25	1953	2010	58	1984	111000	1960	25000	43200	32100
USGS	6	26	1953	2010	58	1984	112000	1960	25700	42800	32100
USGS	6	27	1953	2010	58	1984	114000	1963	25400	43100	32300
USGS	6	28	1953	2010	58	1984	111000	1963	24200	42700	32800
USGS	6	29	1953	2010	58	1984	104000	1963	25700	42300	31900
USGS	6	30	1953	2010	58	1953	94100	1963	26400	42300	31700
USGS	7	1	1953	2010	58	2010	92400	2008	26300	41800	31700
USGS	7	2	1953	2010	58	2010	88000	2008	25200	41100	31900
USGS	7	3	1953	2010	58	2010	84000	1960	24800	40600	31200
USGS	7	4	1953	2010	58	2010	82300	1960	23900	40200	31200
USGS	7	5	1953	2010	58	2010	78800	2008	23300	39700	30900
USGS	7	6	1953	2010	58	1993	76900	1958	24600	40000	31400

USGS	7	7	1953	2010	58	1993	73500	1958	24800	40200	31700
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USGS	7	9	1953	2010	58	1993	88800	1959	26600	39800	31000
USGS	7	10	1953	2010	58	1993	113000	1959	26600	40400	30900
USGS	7	11	1953	2010	58	1993	106000	2008	25500	40800	30700
USGS	7	12	1953	2010	58	1993	94700	2008	25200	40600	31100
USGS	7	13	1953	2010	58	1993	89300	2008	24300	40000	31100
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USGS	7	16	1953	2010	58	1993	96300	2008	23500	39600	31400
USGS	7	17	1953	2010	58	1993	104000	2008	22800	40200	31400
USGS	7	18	1953	2010	58	1996	113000	2008	23400	41000	30800
USGS	7	19	1953	2010	58	1996	101000	2008	24800	40800	31100
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USGS	7	21	1953	2010	58	1993	89500	2008	26800	39800	31100
USGS	7	22	1953	2010	58	1993	84200	1958	26600	39600	30800
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USGS	7	26	1953	2010	58	2010	82400	1958	24800	39800	30700
USGS	7	27	1953	2010	58	2010	77200	1958	25200	39400	30700
USGS	7	28	1953	2010	58	2010	73500	1958	23900	39200	31700
USGS	7	29	1953	2010	58	1997	70600	1958	24100	38800	31200
USGS	7	30	1953	2010	58	1997	70000	2002	27100	38900	31700
USGS	7	31	1953	2010	58	2010	77900	1955	20600	38800	31700
USGS	8	1	1953	2010	58	2010	87300	1955	17300	38800	32000
USGS	8	2	1953	2010	58	2010	91700	1955	15300	38700	31400
USGS	8	3	1953	2010	58	2010	95900	1955	11800	38500	31100
USGS	8	4	1953	2010	58	2010	98100	1955	9900	38500	31400
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USGS	8	6	1953	2010	58	1996	107000	1955	13000	39200	31000
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USGS	8	9	1953	2010	58	2010	84900	1962	25000	39000	30300

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USGS	8	12	1953	2010	58	2010	81300	1962	23600	38400	30600
USGS	8	13	1953	2010	58	2010	79700	1962	23200	38300	30800
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USGS	8	15	1953	2010	58	2010	81500	1962	24100	38200	30800
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USGS	8	18	1953	2010	58	2010	73800	2003	24400	38400	31000
USGS	8	19	1953	2010	58	1997	70800	2007	25500	38400	30900
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USGS	8	23	1953	2010	58	1997	68300	2003	25800	38300	31200
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USGS	8	26	1953	2010	58	1997	68300	2003	25800	38000	31500
USGS	8	27	1953	2010	58	1997	69000	2003	25700	38100	31500
USGS	8	28	1953	2010	58	1997	69600	2003	25600	38100	31700
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USGS	9	16	1953	2010	58	1997	70000	2007	21900	38000	31700
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USGS	9	21	1953	2010	58	1997	69700	2008	20000	38400	30800
USGS	9	22	1953	2010	58	1997	70100	2008	20000	38400	30500
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USGS	9	25	1953	2010	58	2010	71200	2008	20100	38200	30300
USGS	9	26	1953	2010	58	2010	77000	2008	22000	38300	30000
USGS	9	27	1953	2010	58	2010	79000	2008	24700	38100	30700
USGS	9	28	1953	2010	58	2010	80100	2007	25000	38000	30800
USGS	9	29	1953	2010	58	2010	82000	2007	24800	38300	31000
USGS	9	30	1953	2010	58	2010	84600	2007	25000	38600	31100
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USGS	10	2	1953	2010	58	1998	70300	2009	25800	37600	30400
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USGS	11	5	1953	2010	58	1998	74600	1962	8760	34000	22300
USGS	11	6	1953	2010	58	1998	75100	1962	8640	33900	20000
USGS	11	7	1953	2010	58	1998	74400	1962	8280	33800	18200
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USGS	11	20	1953	2010	58	1998	74200	1960	7200	32300	16300
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USGS	11	24	1953	2010	58	1998	75400	1962	8400	31400	14600
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USGS	11	29	1953	2010	58	1998	76300	1956	2970	27500	14600
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USGS	12	1	1953	2010	58	1998	76300	1956	3420	26300	13800
USGS	12	2	1953	2010	58	1998	74800	1956	3900	26200	13800
USGS	12	3	1953	2010	58	1998	72500	1956	4860	25900	13000
USGS	12	4	1953	2010	58	1998	69800	1956	6160	25500	13200
USGS	12	5	1953	2010	58	1998	65600	1962	7920	24600	12800
USGS	12	6	1953	2010	58	1998	61700	1962	7920	23600	13100
USGS	12	7	1953	2010	58	1998	58300	1959	7000	22600	13500
USGS	12	8	1953	2010	58	1998	55200	1959	5500	21700	12900
USGS	12	9	1953	2010	58	1998	53000	1957	4160	21000	13300
USGS	12	10	1953	2010	58	1998	50400	1959	4400	20500	13600
USGS	12	11	1953	2010	58	1998	47700	1959	4400	20000	14000
USGS	12	12	1953	2010	58	1998	44500	1962	3400	19600	13400
USGS	12	13	1953	2010	58	1987	43100	1962	2600	19500	12800
USGS	12	14	1953	2010	58	1987	41500	1962	2440	19500	12500
USGS	12	15	1953	2010	58	1987	41800	1962	3160	19200	12900
USGS	12	16	1953	2010	58	1987	45900	1963	6400	19300	12500
USGS	12	17	1953	2010	58	1987	45000	1965	5000	19200	12600
USGS	12	18	1953	2010	58	1987	44400	1965	3200	19000	12300
USGS	12	19	1953	2010	58	1987	43700	1965	3500	19000	13300
USGS	12	20	1953	2010	58	1987	39700	1965	4400	19000	13500
USGS	12	21	1953	2010	58	1987	36900	1965	6000	18800	13500
USGS	12	22	1953	2010	58	1987	37500	1953	8200	18600	13500
USGS	12	23	1953	2010	58	1987	37800	1961	8000	18500	13300

USGS	12	24	1953	2010	58	1987	36900	1954	7500	18600	12600
USGS	12	25	1953	2010	58	1987	36300	1954	6000	18600	13200
USGS	12	26	1953	2010	58	1983	36700	1954	6000	18600	14300
USGS	12	27	1953	2010	58	1987	35100	1954	7000	18400	14000
USGS	12	28	1953	2010	58	1987	35100	1954	7700	18600	14000
USGS	12	29	1953	2010	58	1987	34600	1953	7700	18800	14100
USGS	12	30	1953	2010	58	1973	34800	1953	8100	18800	13500
USGS	12	31	1953	2010	58	1973	39700	1958	8520	18800	14200

Table C.2. Estimated Mixing zone length (L_M) results.

Month	Day	Flowrate (cfs)	Gauge Depth (ft)	$Area_{trian}$ (ft^2)	P_{train} (ft)	R (ft)	S (ft/ft)	V_{ave} (fps)	W_{rec} (ft)	D_{rec} (ft)	L_M (ft)	Dilution Factor
1	1	14000	10.57	1995	766	2.605512	0.000177	7.0	378	5.3	492252	15708
1	2	13300	10.59	2003	767	2.610442	0.000177	6.6	378	5.3	466756	14923
1	3	13100	10.56	1991	765	2.603047	0.000177	6.6	377	5.3	461043	14698
1	4	14800	10.61	2010	769	2.615372	0.000177	7.4	379	5.3	518419	16606
1	5	14900	10.8	2083	782	2.662207	0.000177	7.2	386	5.4	512739	16718
1	6	14400	10.7	2044	775	2.637557	0.000177	7.0	382	5.3	500165	16157
1	7	13000	10.71	2048	776	2.640022	0.000177	6.3	383	5.4	451116	14586
1	8	12700	10.82	2091	784	2.667137	0.000177	6.1	387	5.4	436225	14249
1	9	12200	10.62	2014	769	2.617837	0.000177	6.1	379	5.3	426943	13688
1	10	11300	10.61	2010	769	2.615372	0.000177	5.6	379	5.3	395820	12679
1	11	11900	10.55	1988	764	2.600582	0.000177	6.0	377	5.3	419207	13352
1	12	12200	10.64	2022	771	2.622767	0.000177	6.0	380	5.3	426140	13688
1	13	12200	10.69	2041	774	2.635092	0.000177	6.0	382	5.3	424147	13688
1	14	12400	10.55	1988	764	2.600582	0.000177	6.2	377	5.3	436821	13913
1	15	11600	10.68	2037	774	2.632627	0.000177	5.7	382	5.3	403665	13015
1	16	12000	10.55	1988	764	2.600582	0.000177	6.0	377	5.3	422730	13464
1	17	12200	10.53	1980	763	2.595652	0.000177	6.2	376	5.3	430592	13688
1	18	11800	10.57	1995	766	2.605512	0.000177	5.9	378	5.3	414898	13240
1	19	12300	10.5	1969	761	2.588257	0.000177	6.2	375	5.2	435362	13801
1	20	13500	10.6	2006	768	2.612907	0.000177	6.7	379	5.3	473328	15147
1	21	12800	10.68	2037	774	2.632627	0.000177	6.3	382	5.3	445423	14362
1	22	12900	10.75	2064	779	2.649882	0.000177	6.3	384	5.4	445980	14474
1	23	13000	10.66	2029	772	2.627697	0.000177	6.4	381	5.3	453232	14586
1	24	13800	10.59	2003	767	2.610442	0.000177	6.9	378	5.3	484303	15484
1	25	13600	10.4	1931	753	2.563607	0.000177	7.0	372	5.2	486004	15259
1	26	13300	10.45	1950	757	2.575932	0.000177	6.8	373	5.2	473009	14923
1	27	11700	10.84	2098	785	2.672067	0.000177	5.6	387	5.4	401135	13127
1	28	10900	10.73	2056	777	2.644952	0.000177	5.3	383	5.4	377538	12230
1	29	11000	10.58	1999	766	2.607977	0.000177	5.5	378	5.3	386404	12342
1	30	11800	10.45	1950	757	2.575932	0.000177	6.1	373	5.2	419662	13240

1	31	12200	10.39	1928	753	2.561142	0.000177	6.3	371	5.2	436394	13688
2	1	12900	10.4	1931	753	2.563607	0.000177	6.7	372	5.2	460989	14474
2	2	13300	10.47	1958	758	2.580862	0.000177	6.8	374	5.2	472106	14923
2	3	13300	10.43	1943	756	2.571002	0.000177	6.8	373	5.2	473916	14923
2	4	13000	10.54	1984	764	2.598117	0.000177	6.6	377	5.3	458392	14586
2	5	13000	10.46	1954	758	2.578397	0.000177	6.7	374	5.2	461898	14586
2	6	14300	10.65	2025	772	2.625232	0.000177	7.1	380	5.3	499023	16045
2	7	15300	10.66	2029	772	2.627697	0.000177	7.5	381	5.3	533419	17167
2	8	14200	10.84	2098	785	2.672067	0.000177	6.8	387	5.4	486848	15932
2	9	13700	10.59	2003	767	2.610442	0.000177	6.8	378	5.3	480794	15371
2	10	14000	10.68	2037	774	2.632627	0.000177	6.9	382	5.3	487182	15708
2	11	13300	10.62	2014	769	2.617837	0.000177	6.6	379	5.3	465437	14923
2	12	13500	10.59	2003	767	2.610442	0.000177	6.7	378	5.3	473775	15147
2	13	13900	10.59	2003	767	2.610442	0.000177	6.9	378	5.3	487813	15596
2	14	13900	10.61	2010	769	2.615372	0.000177	6.9	379	5.3	486893	15596
2	15	14800	10.54	1984	764	2.598117	0.000177	7.5	377	5.3	521862	16606
2	16	15100	10.59	2003	767	2.610442	0.000177	7.5	378	5.3	529926	16942
2	17	15200	10.56	1991	765	2.603047	0.000177	7.6	377	5.3	534951	17054
2	18	15500	10.55	1988	764	2.600582	0.000177	7.8	377	5.3	546026	17391
2	19	15500	10.64	2022	771	2.622767	0.000177	7.7	380	5.3	541408	17391
2	20	15600	10.81	2087	783	2.664672	0.000177	7.5	386	5.4	536331	17503
2	21	15800	11.05	2180	800	2.723833	0.000177	7.2	395	5.5	531409	17728
2	22	15500	10.77	2071	780	2.654812	0.000177	7.5	385	5.4	534872	17391
2	23	15100	10.69	2041	774	2.635092	0.000177	7.4	382	5.3	524969	16942
2	24	15700	10.98	2153	795	2.706578	0.000177	7.3	392	5.5	531412	17615
2	25	15500	10.89	2118	789	2.684392	0.000177	7.3	389	5.4	528979	17391
2	26	15100	10.94	2137	793	2.696718	0.000177	7.1	391	5.5	512972	16942
2	27	15600	10.86	2106	787	2.676997	0.000177	7.4	388	5.4	533862	17503
2	28	16200	10.68	2037	774	2.632627	0.000177	8.0	382	5.3	563739	18176
2	29	14900	10.96	2145	794	2.701648	0.000177	6.9	392	5.5	505254	16718
3	1	15800	10.65	2025	772	2.625232	0.000177	7.8	380	5.3	551368	17728
3	2	16100	10.93	2133	792	2.694252	0.000177	7.5	390	5.5	547444	18064
3	3	15700	10.86	2106	787	2.676997	0.000177	7.5	388	5.4	537284	17615
3	4	15500	10.68	2037	774	2.632627	0.000177	7.6	382	5.3	539380	17391

3	5	15300	10.3	1894	746	2.538957	0.000177	8.1	368	5.1	552063	17167
3	6	14800	10.07	1811	729	2.482262	0.000177	8.2	360	5.0	546219	16606
3	7	14600	10.18	1851	737	2.509377	0.000177	7.9	364	5.1	533015	16381
3	8	14500	10.27	1883	744	2.531562	0.000177	7.7	367	5.1	524725	16269
3	9	14100	10.15	1840	735	2.501982	0.000177	7.7	363	5.1	516282	15820
3	10	15000	10.27	1883	744	2.531562	0.000177	8.0	367	5.1	542819	16830
3	11	15200	10.19	1854	738	2.511842	0.000177	8.2	364	5.1	554375	17054
3	12	15300	10.18	1851	737	2.509377	0.000177	8.3	364	5.1	558570	17167
11	21	16200	10.28	1887	745	2.534027	0.000177	8.6	367	5.1	585674	18176
11	22	14900	9.99	1782	724	2.462542	0.000177	8.4	357	5.0	554313	16718
11	23	14600	9.96	1771	722	2.455147	0.000177	8.2	356	5.0	544788	16381
11	24	14600	9.93	1761	719	2.447752	0.000177	8.3	355	5.0	546434	16381
11	25	14500	10.11	1825	732	2.492122	0.000177	7.9	361	5.1	533029	16269
11	26	14500	9.98	1779	723	2.460077	0.000177	8.2	356	5.0	539973	16269
11	27	14500	10.04	1800	727	2.474867	0.000177	8.1	359	5.0	536746	16269
11	28	14400	10.04	1800	727	2.474867	0.000177	8.0	359	5.0	533044	16157
11	29	14600	10.01	1789	725	2.467472	0.000177	8.2	358	5.0	542067	16381
11	30	14100	10.15	1840	735	2.501982	0.000177	7.7	363	5.1	516282	15820
12	1	13800	10.12	1829	733	2.494587	0.000177	7.5	362	5.1	506796	15484
12	2	13800	10.13	1832	734	2.497052	0.000177	7.5	362	5.1	506295	15484
12	3	13000	10.31	1898	747	2.541422	0.000177	6.8	368	5.2	468618	14586
12	4	13200	10.36	1917	751	2.553747	0.000177	6.9	370	5.2	473531	14810
12	5	12800	10.36	1917	751	2.553747	0.000177	6.7	370	5.2	459182	14362
12	6	13100	10.25	1876	743	2.526632	0.000177	7.0	366	5.1	474987	14698
12	7	13500	10.21	1862	740	2.516772	0.000177	7.3	365	5.1	491408	15147
12	8	12900	10.28	1887	745	2.534027	0.000177	6.8	367	5.1	466370	14474
12	9	13300	10.46	1954	758	2.578397	0.000177	6.8	374	5.2	472557	14923
12	10	13600	10.49	1965	760	2.585792	0.000177	6.9	375	5.2	481834	15259
12	11	14000	10.63	2018	770	2.620302	0.000177	6.9	380	5.3	489473	15708
12	12	13400	10.43	1943	756	2.571002	0.000177	6.9	373	5.2	477479	15035
12	13	12800	10.34	1909	749	2.548817	0.000177	6.7	369	5.2	460070	14362
12	14	12500	10.39	1928	753	2.561142	0.000177	6.5	371	5.2	447125	14025
12	15	12900	10.48	1961	759	2.583327	0.000177	6.6	374	5.2	457470	14474
12	16	12500	10.5	1969	761	2.588257	0.000177	6.3	375	5.2	442441	14025

12	17	12600	10.37	1920	751	2.556212	0.000177	6.6	370	5.2	451571	14137
12	18	12300	10.3	1894	746	2.538957	0.000177	6.5	368	5.1	443815	13801
12	19	13300	10.33	1906	748	2.546352	0.000177	7.0	369	5.2	478504	14923
12	20	13500	10.46	1954	758	2.578397	0.000177	6.9	374	5.2	479663	15147
12	21	13500	10.53	1980	763	2.595652	0.000177	6.8	376	5.3	476474	15147
12	22	13500	10.44	1946	756	2.573467	0.000177	6.9	373	5.2	480582	15147
12	23	13300	10.65	2025	772	2.625232	0.000177	6.6	380	5.3	464126	14923
12	24	12600	10.49	1965	760	2.585792	0.000177	6.4	375	5.2	446405	14137
12	25	13200	10.71	2048	776	2.640022	0.000177	6.4	383	5.4	458056	14810
12	26	14300	10.69	2041	774	2.635092	0.000177	7.0	382	5.3	497156	16045
12	27	14000	10.77	2071	780	2.654812	0.000177	6.8	385	5.4	483111	15708
12	28	14000	10.75	2064	779	2.649882	0.000177	6.8	384	5.4	484009	15708
12	29	14100	10.65	2025	772	2.625232	0.000177	7.0	380	5.3	492044	15820
12	30	13500	10.7	2044	775	2.637557	0.000177	6.6	382	5.3	468904	15147
12	31	14200	10.63	2018	770	2.620302	0.000177	7.0	380	5.3	496466	15932

EE&T, Inc.

ENVIRONMENTAL ENGINEERING & TECHNOLOGY, INC.

June 27, 2012

Metropolitan Utilities District of Omaha
Engineering Memorandum No. 5
NPDES Studies
EE&T Project No. 12501

Subject: **Platte South Evaluation of Selected Technologies to Reduce Solids Discharged to the Missouri River**

Introduction

The Platte South Potable Water Treatment Plant (PWTP), operated by the Metropolitan Utilities District of Omaha (M.U.D.), is a split-treatment softening facility that currently discharges residuals that are generated during treatment to the Missouri River. This discharge is permitted under NPDES Permit No. NE0000906, which went into effect as of October 1, 2009. As part of this NPDES permit, the Nebraska Department of Environmental Quality (NDEQ) directed M.U.D. to conduct an evaluation of selected technologies to reduce solids discharged to the Missouri River. NDEQ specified that this evaluation shall include:

- Evaluation criteria
- Types of technology available to achieve solids removal
- Relationship between costs and the degree of solids removal
- The total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application
- Non-water quality environmental impacts of solids removal

Each of these objectives will be addressed in the following sections.

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Evaluation Criteria

The evaluation criteria used for this study, as outlined in the Study Plan for the Evaluation of Water Quality Impacts from the Discharge of Solids and Solids Reduction Technologies at the Platte South PWTP that was submitted to NDEQ in September 2010, are listed below.

- Capital Cost
- Operations and Maintenance Costs
- Required Process Footprints
- Operational Complexity
- Degree of Solids Removal
- Non-water Quality Environmental Impacts of Solids Removal.

Capital costs and operations and maintenance costs were developed using the Minimizing Water Treatment Residual Discharges to Surface Water Decision Support Tool published by the Water Research Foundation (Cornwell *et al.*, 2010). This tool contains a Residuals Treatment Process Sizing and Costing module, which can be used to quickly develop budget-level cost estimates for residuals treatment processes based on plant-specific information, such as solids production rate, desired dewatering schedule, etc. The accuracy of the costing model that this module is based upon was demonstrated previously by Roth *et al.* (2008).

The capital cost, operations and maintenance costs, required process footprints, and degree of solids removal criteria are discussed in the sections Relationship Between Costs and the Degree of Solids Removal and Total Cost of Application of Technology in Relation to the Effluent Reduction Benefits. The operational complexity criterion is discussed in the section Types of Technology Available to Achieve Solids Removal. Non-water quality environmental impacts of solids removal is discussed in its own section.

Types of Technology Available to Achieve Solids Removal

Before evaluating the types of technology available to achieve solids removal at Platte South PWTP, it is important to consider the types of solids that are generated at the plant. Solid residuals generated at drinking water treatment plants using a split-treatment softening process generally consist of: a) natural particles present in the raw water removed by the treatment process, b) metal salt precipitates generated by the coagulation process, and c) calcium carbonate and/or magnesium hydroxide particles generated by the lime softening process. Of these, the calcium carbonate/magnesium hydroxide particles generally comprise the largest portion of solids generated, although the final makeup of the sludge depends on site-specific characteristics.

Platte South is supplied by wells, so the raw water that the plant treats is extremely low in solids, as measured by raw water turbidity. The median turbidity of the raw water treated between January 1, 2007 and February 28, 2010 was 0.09 ntu, indicated that there are very few particles present in raw water. Likewise, because the raw water treated by the plant contains few suspended solids, very low doses of coagulant are used at the plant. During the period evaluated for this study, the median ferric chloride dose used fed at the plant was 2.5 mg/L as neat product.

Therefore, by a significant margin, the majority of solids generated by the plant are softening residuals (primarily calcium carbonate with some magnesium hydroxide). For the period studied, more than 96 percent of the daily solids production at Platte South PWTP was attributable to softening residuals, on average.

Since the solids are dominated by softening residuals, certain handling characteristics can be assumed. Because calcium carbonate particles are generally denser and more compact than other types of drinking water treatment residuals, they will thicken and dewater more readily (Cornwell and Roth, 2011).

However, there are also fewer options available to minimize the production of solids at the Platte South PWTP and thus, to minimize the discharge of solids to the Missouri River. The production of solids is inherent in the lime softening process; softening is achieved by converting dissolved solids (Ca^{2+} and Mg^{2+}) to suspended solids, which can then be removed from the treated water via settling. The only option available to minimize solids production is to reduce the amount of Ca^{2+} and Mg^{2+} that are removed, which effectively raises the finished water hardness leaving the plant. However, M.U.D. appears to have already optimized their treatment to reduce solids production at the Platte South PWTP. Most utilities generally target a finished water hardness of 75 to 150 mg/L as $CaCO_3$ with their softening processes (Randtke, 2011). During the study period, the median finished water hardness produced at Platte South was 168 mg/L as $CaCO_3$, indicating that there is little to no room available for raising the target finished water hardness to further reduce solids.

The only other option to minimize solids production at Platte South would be to change the primary treatment process to one that produces less solids, such as membrane softening. However, such an effort would require essentially re-building the Platte South PWTP, and would produce it own residuals (a high-TDS concentrate waste stream) with inherent disposal difficulties. Such an option was not considered feasible for the purposes of this study.

Since options are limited for minimizing the production of solids at Platte South, methods to remove solids from the plant's waste streams before they are discharged to the Missouri River must be considered. This involves separating and concentrating the solids from waste streams at the plant (clarifier basin blowdown and spent filter backwash water) and dewatering them sufficiently that they can be trucked off-site. Liquid waste streams would continue to be discharged to the Missouri River, although the amount of solids in those streams would be greatly reduced.

A conceptual design schematic for a drinking water treatment plant residuals treatment system is shown in Figure 1. This schematic is very similar to that used at the Platte West PWTP, which currently treats its residuals due to the lack of a suitable discharge.

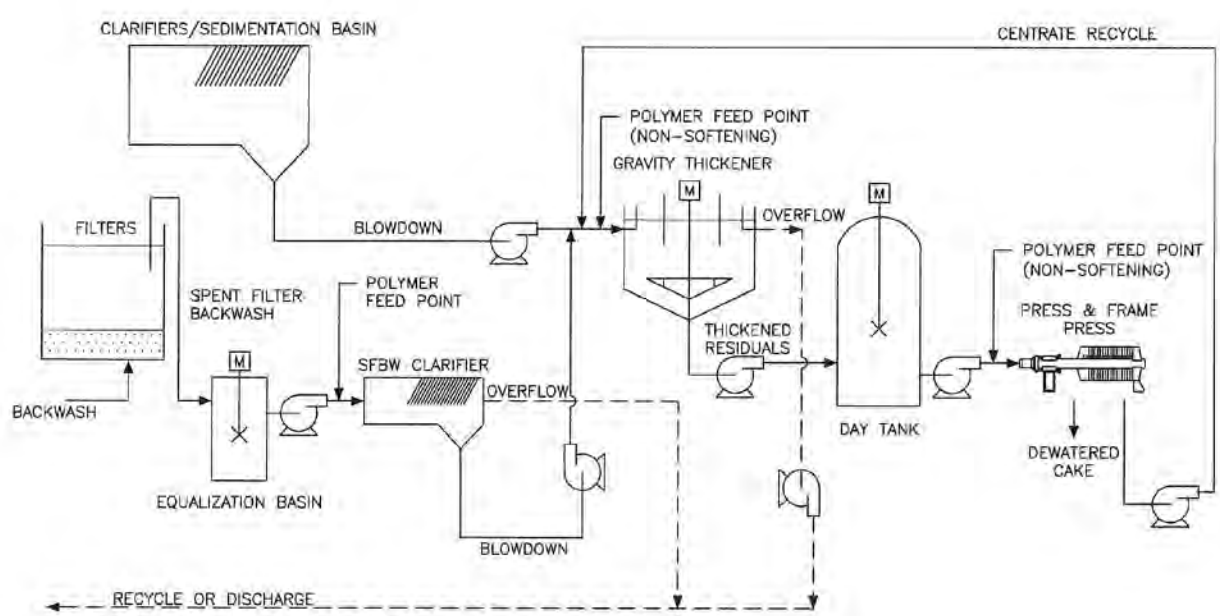

Figure 1: Conceptual design schematic for a typical residuals treatment system

There are three primary treatment steps shown in Figure 1: thickening, dewatering, and spent filter backwash water (SFBW) clarification. The first, thickening, is used to reduce the volume of solids requiring treatment, and increases the solids concentration of the sludge for the downstream dewatering process. Gravitational thickening processes are used almost exclusively in the water industry (Cornwell and Roth, 2011), so no consideration was made to alternate thickening technologies (belt-thickeners, etc.) for the purposes of this study.

Dewatering can be accomplished via mechanical or non-mechanical methods. The most commonly used mechanical dewatering technologies for softening solids are filter presses, such as plate-and-frame presses or diaphragm presses, and centrifuges. Belt filter presses are not recommended for softening sludges based on operator feedback concerning the difficulties in keeping such presses clean. Capital costs for similar-capacity filter presses and centrifuges are generally comparable. Operating costs for filter presses may be higher, as more operator attention is required to make sure that the cake separate from the filter clothes successfully while operating, but maintenance costs for centrifuges may be higher due to the relatively high level of abrasion caused by calcium carbonate particles. Mechanical dewatering processes are commonly preceded by mixed day tanks; the purpose of these tanks is to ensure that a homogeneous sludge is fed to the dewatering process.

The other type of dewatering method used for drinking water treatment plant residuals is non-mechanical dewatering. In this type of process, residuals are loaded into an open bed or lagoon and water is removed from the sludge through draining, decanting, and evaporation. Due to the quantity of sludge produced at softening plants, dewatering lagoons are the most commonly used non-mechanical dewatering process for softening residuals, because they can accommodate relatively high solids loading rates.

SFBW clarification is used to remove solids from the SFBW. Unlike clarifier blowdown, SFBW is relatively low in solids and high in volume. Several high-rate clarification processes have been tested for use in treating SFBW, but because softening residuals are relatively amenable to clarification, a simple gravity clarification process should be adequate for treating SFBW at Platte South. Because SFBW is generated at high rates over a short time frame, it is often economical to add equalization basins prior to the SFBW clarification to attenuate the

SFBW flows before reaching the clarification step. Solids collected by the SFBW clarification process are typically sent to the thickeners for further treatment.

Relationship between Costs and the Degree of Solids Removal

Degree of solids removal

As discussed above, there are not practical options to further minimize the amount of residuals produced at the Platte South PWTP; therefore, any reduction in solids discharged to the Missouri River would be associated with residuals treatment systems installed at Platte South. The cost of constructing and operating such systems will depend primarily on the system's size.

Figure 2 presents a percentile distribution of the historical daily solids production at Platte South over the period analyzed for this study (January 2007 through February 2010). During this period, the median daily solids production was 25,840 lb-dry solids/day (12.9 tons-dry solids/day) with a maximum daily solids production of 50,661 lb-dry solids/day (25.3 tons-dry/day). For comparison, daily suspended solids data for the Missouri River was obtained from USGS Station 06610000, which is the closest station to the discharge from Platte South. Data prior to October 1, 2008 was not available for this station. For the period that was available (October 2008 through February 2010), the median daily solids discharged through Station 06610000 was 34.3×10^6 lb-dry solids/day (17,150 tons-dry solids/day), with a maximum daily solids discharge of 572×10^6 lb-dry solids/day (286,000 tons-dry solids/day). The contribution that the daily solids production would make to the Missouri River solids concentration was calculated based on paired data available during the study period; a percentile plot of this data is shown in Figure 3. This figure assumes all solids generated at Platte South on a given day are discharged to the Missouri River.

As Figure 3 shows, even on the maximum day, the solids generate at Platte South comprise less than 0.7 percent of the total solids carried by the Missouri River at the location of the discharge. This value decreases significantly as the top values are excluded. A majority of the time Platte South would contribute less than 0.1 percent of the total solids in the Missouri River, with a median daily solids contribution of 0.055 percent.

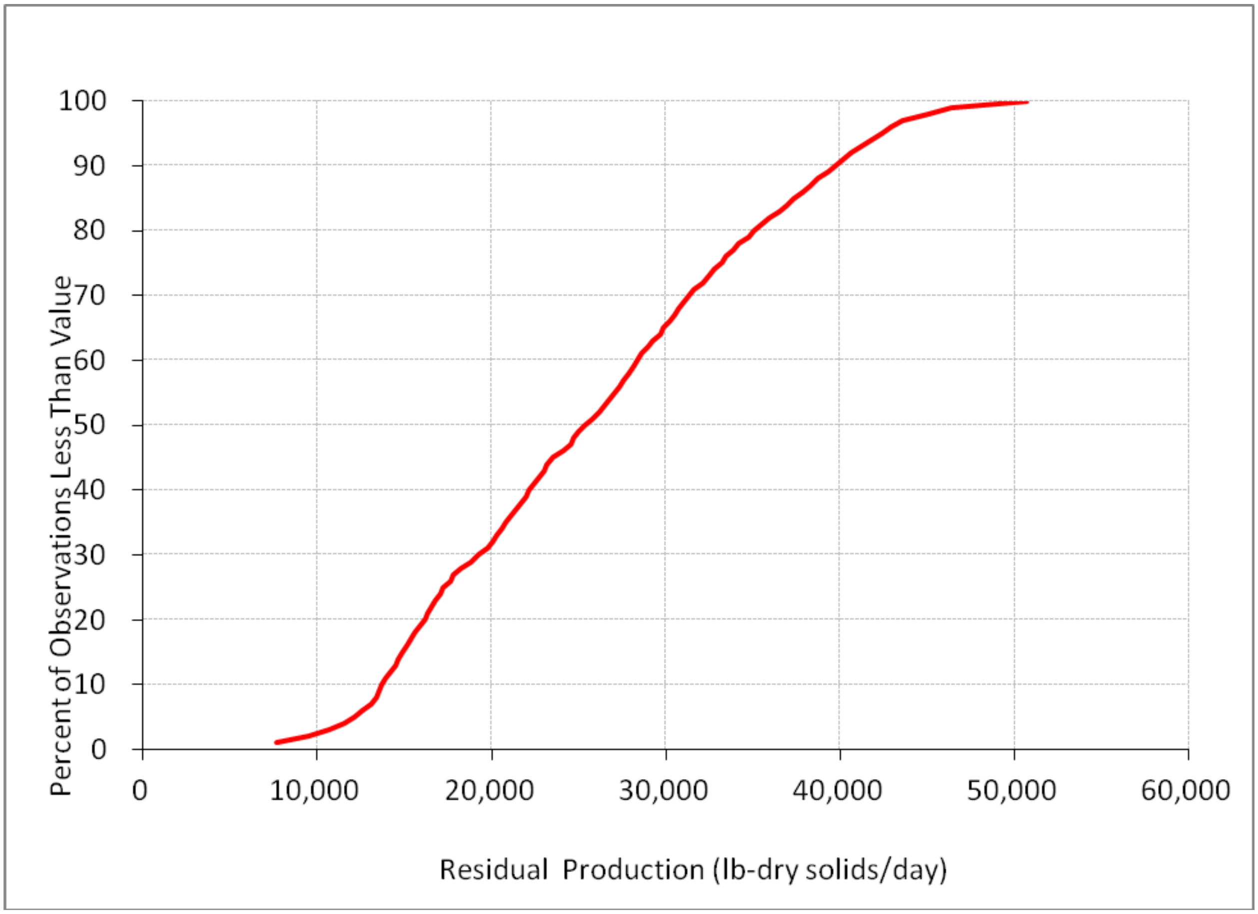

Figure 2: Percentile distribution of the daily calculated solids production at Platte South PWTP based on historical data (January 2007 – February 2010)

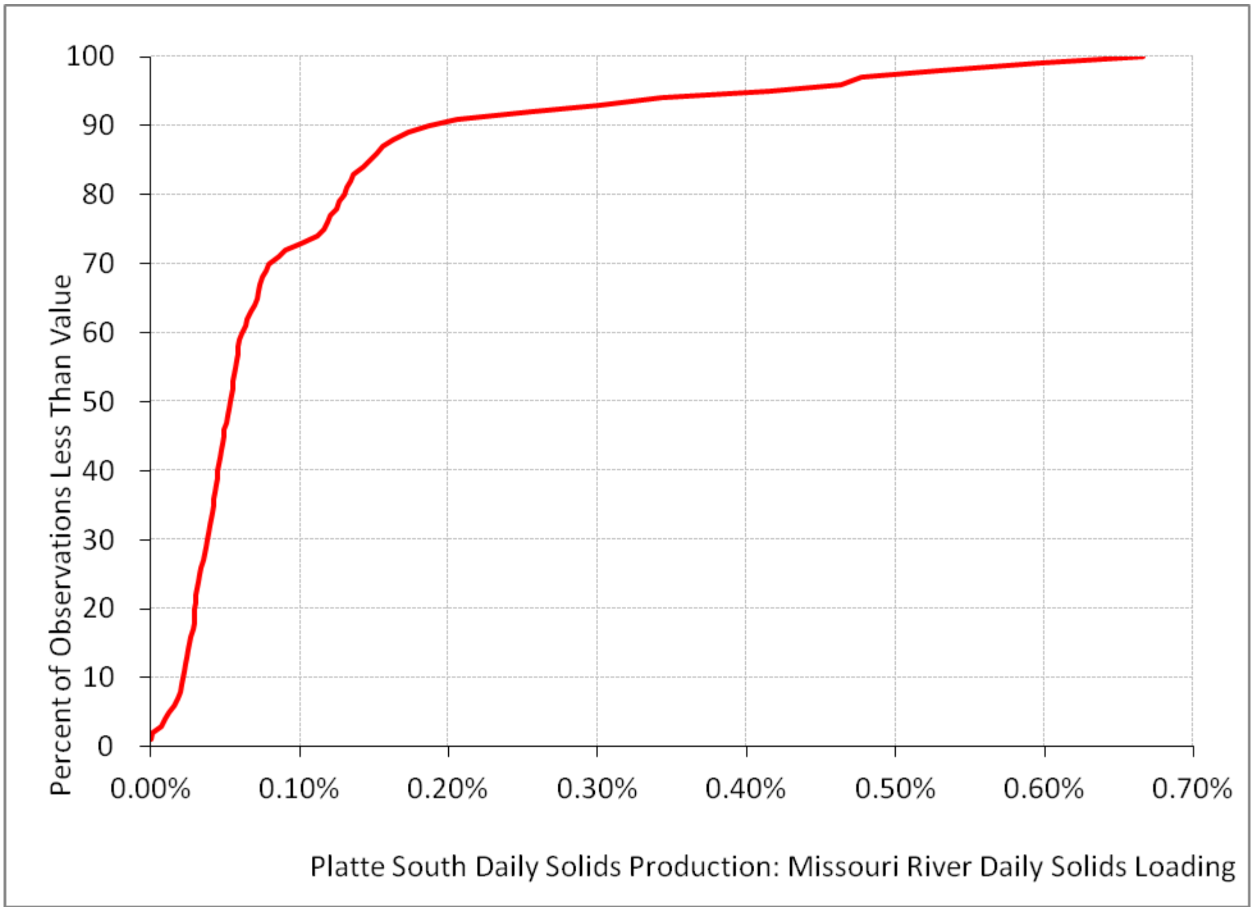

Figure 3: Percentile distribution of the daily calculated solids production at Platte South PWTP as a percentage of the total daily solids loading in the Missouri River

Although the contribution of solids from Platte South to the Missouri River is extremely small compared to the amount of solids already present in the river, residuals treatment can be implemented at Platte South to reduce the amount of residuals discharged to the river. For the purposes of this study, various levels of treatment were analyzed; cost estimates for systems designed to treat the 50th, 65th, 75th, 90th, and 100th percentile of solids production at Platte South were developed using the cost tool described previously. The solids productions corresponding to these percentiles are shown in Table 1.

Table 1: Residual Production Quantities

Percentile	50th	65th	75th	90th	100th
Residual production (lb-dry solids/day)	25,283	29,831	33,203	39,716	50,661

For the purposes of this study, it was assumed that the residuals treatment systems would have a maximum capacity corresponding to the design residuals production, and that any solids produced in excess of that design residuals production would be discharged to the river. For example, if on a given day the solids production was 30,000 lb-dry solids/day, and the system were designed for the 50th percentile, 25,283 lbs of solids would be treated and the remaining 4,717 lbs of solids would be discharged to the Missouri River. In practice the residuals treatment systems would be designed to accommodate some storage of residuals above its design capacity; for example, in the previous example the thickeners might be able to store the extra 4,717 lbs of solids until the dewatering process was able to accommodate the extra solids. However, for the purposes of this study, it is useful to assume the extra solids are discharged to the river to illustrate the relationship between costs and the degree of solids removal.

If residuals treatment systems were to be constructed to treat the daily solids productions shown in Table 1, the resulting solids discharged to the Missouri River would be as shown in Figure 4.

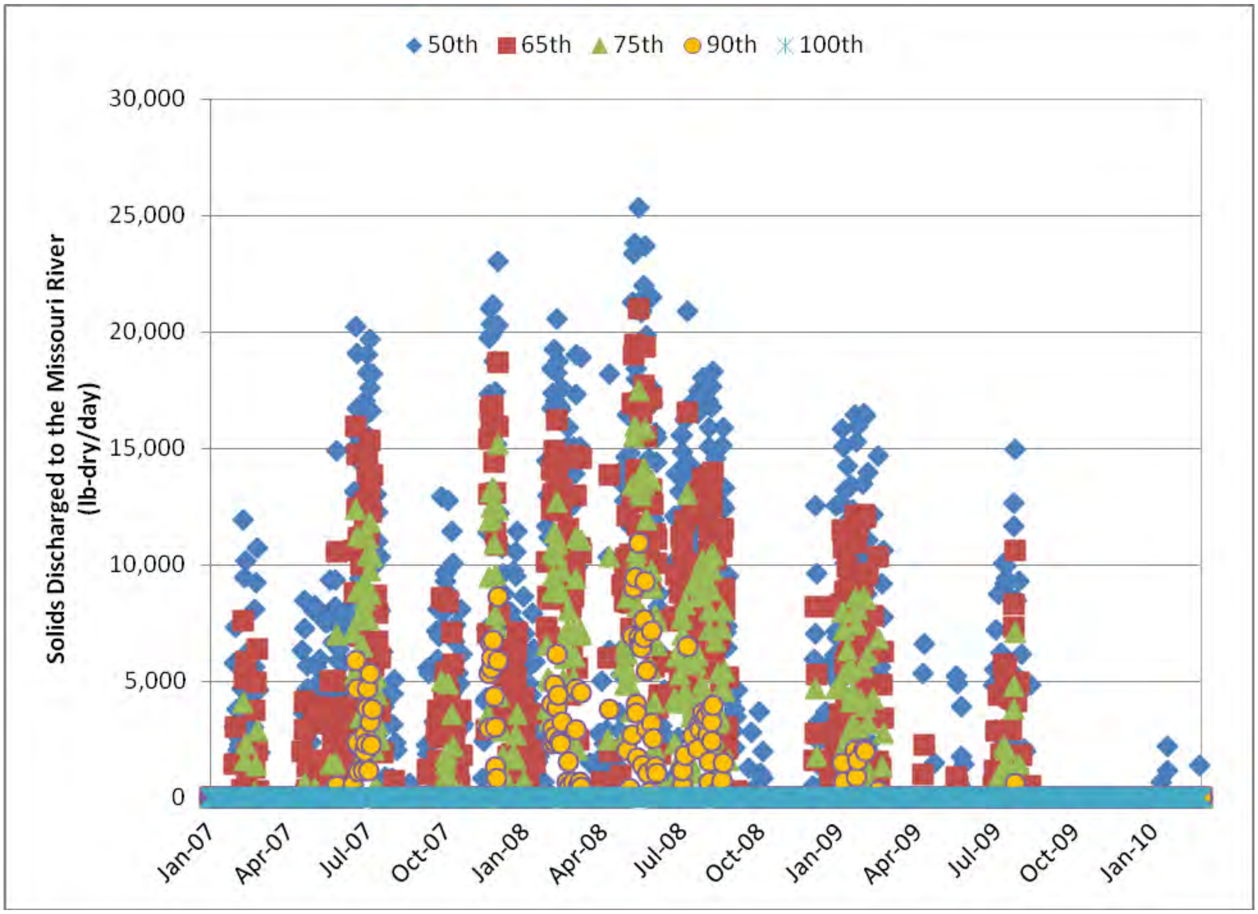

Figure 4. Daily mass of solids discharged to the Missouri River based on the percentile of daily solids production used to size residuals treatment systems

As Figure 4 shows, as the size of the residuals treatment system increases, the number of days that solids are discharged to the river and the mass of solids discharged to the river decreases. Of course, if the system is designed to accommodate the 100th percentile of residuals production, all residuals are treated and on-site and none are discharged to the river.

If this data is analyzed as a percentage of the total solid loading in the Missouri River, as was shown in Figure 3, it can be seen that even a system designed to treat the 50th percentile of daily solids production significantly reduces the amount of solids discharged to the river. This data is shown in Figure 5.

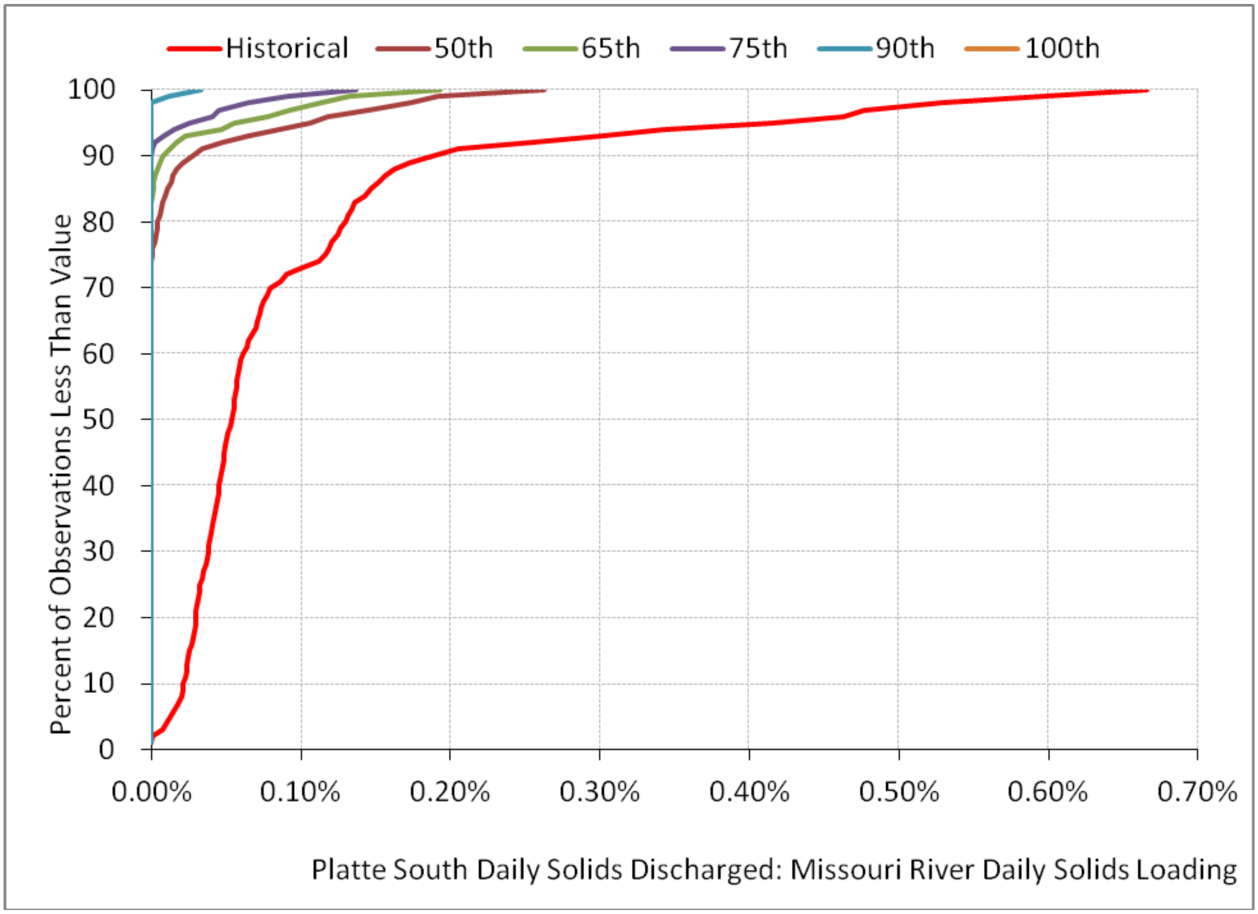

Figure 5: Percentile distribution of the daily solids discharged from Platte South PWTP as a percentage of the total daily solids loading in the Missouri River for given levels of residuals treatment

Using the calculated solids production based on the historic operating data from the period analyzed for this study, we can determine the maximum annual solids that would be discharged to the Missouri River. These data are shown in Figure 6. As Figure 6 shows, a residuals treatment system designed to treat the 50^{th} percentile of the daily residuals production at the Platte South PWTP would reduce the maximum annual solids discharge from Platte South by 75 percent. This is further reduced as the size of the residuals treatment system increases, up to a 97 percent reduction with a system designed to treat the 90^{th} percentile solids production. If the system is sized to treat the 100^{th} percentile, no solids would be discharged to the Missouri River.

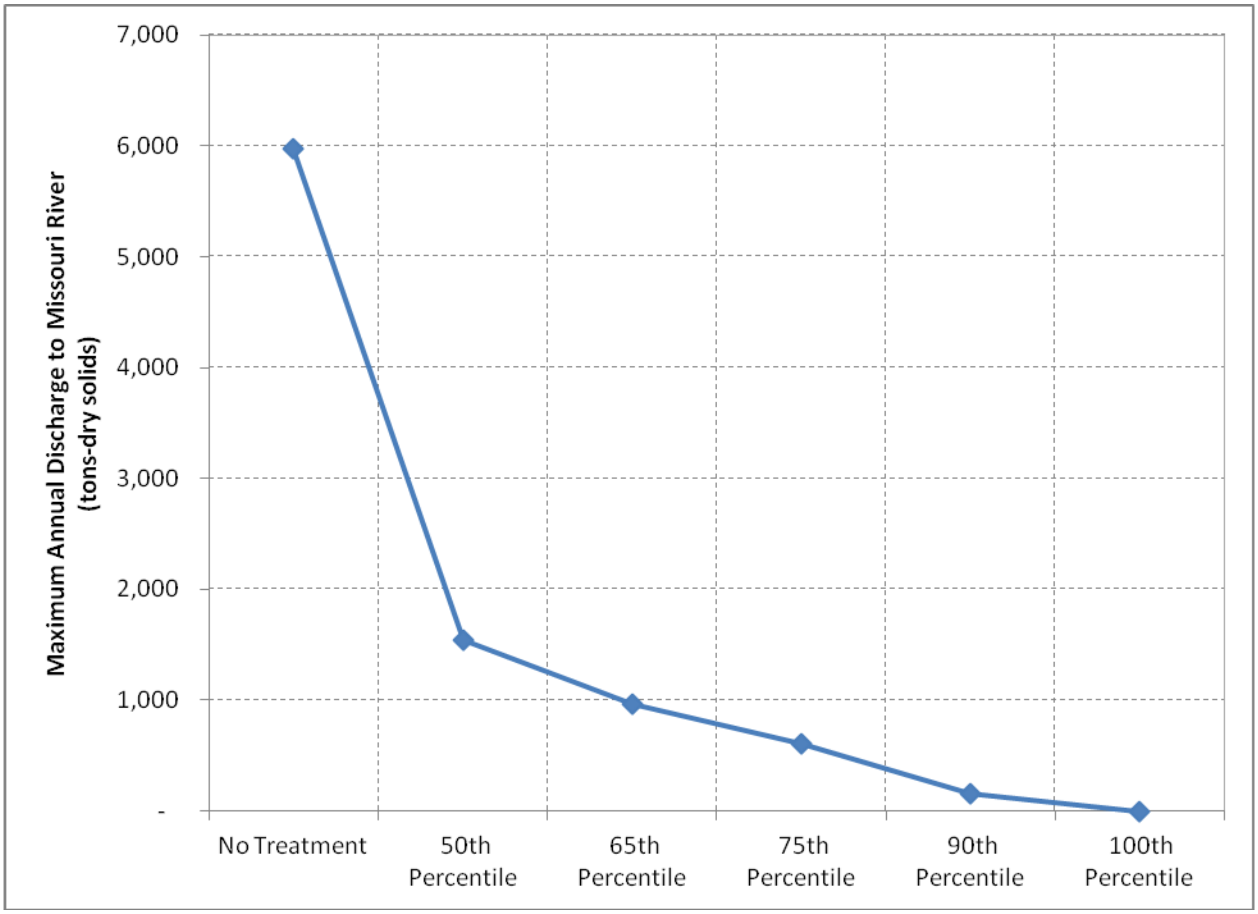

Figure 6: Comparison of maximum annual solids discharge to the Missouri River, for various levels of treatment.

As the above analysis shows, implementing residuals treatment at Platte South can significantly reduce the amount of solids discharged from the plant to the Missouri River. The next section will present the total cost of applying residual treatment technologies. While the cost of these technologies can be quantified relative to the degree of solids removal, the effluent reduction benefits to be achieved from such application are unclear, as the amount of solids already in the Missouri River at the discharge significantly outweighs the solids contributed by the plant discharge.

Cost of residuals treatment

As described previously, process sizing and cost estimates were developed using the Residuals Treatment Process Sizing and Costing module in the Minimizing Water Treatment Residual Discharges to Surface Water Decision Support Tool published by the Water Research Foundation (Cornwell *et al.*, 2010).

Sizing of the day tanks, mechanical dewatering (centrifuge or plate and frame press), and thickeners is based primarily on the design solids production rates shown in Table 1. To size the SFBW treatment processes, an operational summary provided by M.U.D. was used. This summary included average filter run times, backwash duration, and normal backwash flow rates, as shown below.

- Worst case scenario would include four filter backwashes in a single day.
- An hour between backwashes shall be used to develop a worst case backwash frequency.
- 400,000 gallons is representative of a "worst case" backwash volume.
- Using the typical 10 percent recycle rate is acceptable for SFBW treatment sizing.

These guidelines were inputted into the costing tool to assist with SFBW treatment costing with the various treatment scenarios.

The process sizes associated with each design scenario are shown in Table 2. The name, quantity, and size of each major component are outlined in the table. As Table 2 shows, except for SFBW treatment, as the residual production percentile increases the size of the process component increases. SFBW treatment remains the same in each scenario as its sizing is based off of the operational parameters shown above. SFBW equalization (EQ) storage is not included in this analysis because a current project is underway to construct two EQ tanks for use in rerouting flows from Outfall 001, which is in the process of being abandoned, to Outfall 002. It is anticipated that these tanks could be utilized for EQ of SFBW if a complete residuals treatment system were to be constructed at Platte South. Because these tanks will be existing when a residuals treatment system would be constructed, EQ tank costs have not been included in this cost analysis

Table 2: Residuals Process Components

Percentile Treated	Required Day Tank Volume (gal)	Day Tank Diameter* (ft)	Day Tanks (Quantity)	Volume Provided (gal)
50	18,655	15	2	21,258
65	21,999	16	2	24,190
75	24,482	17	2	27,309
90	29,501	18	2	30,616
100	37,393	20	2	37,796
Percentile Treated	Required Centrifuge Capacity (lb/hr)	Centrifuges (Quantity)	Centrifuge Size (lb/hr)	
50	2,214	2	2,600	
65	2,610	2	3,700	
75	2,905	2	3,700	
90	3,500	2	3,700	
100	4,436	2	6,000	
Percentile Treated	Required Plate and frame press Capacity (lb/hr)	Plate and frame press (Quantity)	Plate and frame press Size (lb/hr)	
50	2,214	2	2,250	
65	2,610	2	3,375	
75	2,905	2	3,375	
90	3,500	2	4,500	
100	4,436	2	4,500	
Percentile Treated	Thickener Basins (Quantity)	Thickener Basin Diameter (ft)		
50	2	45		
65	2	49		
75	2	52		
90	2	58		
100	2	64		
Percentile Treated	SFBW Clarifiers (Quantity)	SFBW Clarifier Diameter (ft)		
All	2	39		
Percentile Treated	Required Lagoon Volume (gal)	Provided Lagoon Length/Width** (ft)	Provided Lagoon Volume (gal)	
50	3,250,759	300	3,366,000	
65	3,475,783	310	3,594,140	
75	3,642,570	320	3,829,760	
90	3,964,810	330	4,072,860	
100	4,506,243	350	4,581,500	

*Day tank diameter is determined based on an 8-foot side wall height
**Area is based off of an assumed lagoon depth of 5 feet

As directed by M.U.D., EE& complete redundancy of equipment has not been considered when developing these cost estimates. Instead, a new lagoon is envisioned to provide backup residual storage. When system capacity is reduced because a unit is being serviced, excess residuals could be directed to the lagoon for storage until the system is back at full capacity. Because the system has two units for each process (i.e. two thickeners, two centrifuges, etc.), it was assumed that 50 percent of the residual streams could still be processed when a single unit is down. The same principle was applied to SFBW. Assuming two backwashes per day, one could be processed through the system, and one discharged to the lagoon. The clarifier blowdown and backwash volumes used for sizing the lagoon are shown in Table 3, below. The lagoon dimensions can be found in Table 2, which are based off an assumed 5 foot lagoon depth.

Table 3: Lagoon Volume Requirements

Percentile Treated	Residual Production (lb/day)	50% of Residual Production (gal/day)	Backwash Volume (gal/day)	Volume Required (gal/wk)
50	25,283	250,152	400,000	3,250,759
65	29,831	295,157	400,000	3,475,783
75	33,203	328,514	400,000	3,642,570
90	39,716	392,962	400,000	3,964,810
100	50,661	501,249	400,000	4,506,243

Along with the process sizing, a conceptual site plan for the residuals treatment infrastructure was developed. The site plan, shown in Figure 7, displays a "paper doll" layout indicating a potential alignment for the residuals treatment systems, including the lagoon. Process sizes indicated in the callouts correspond to a system designed to accommodate the 90th percentile solids production. The site plan also incorporates the SFBW EQ basins that will be existing by the time a residuals treatment system would be constructed.

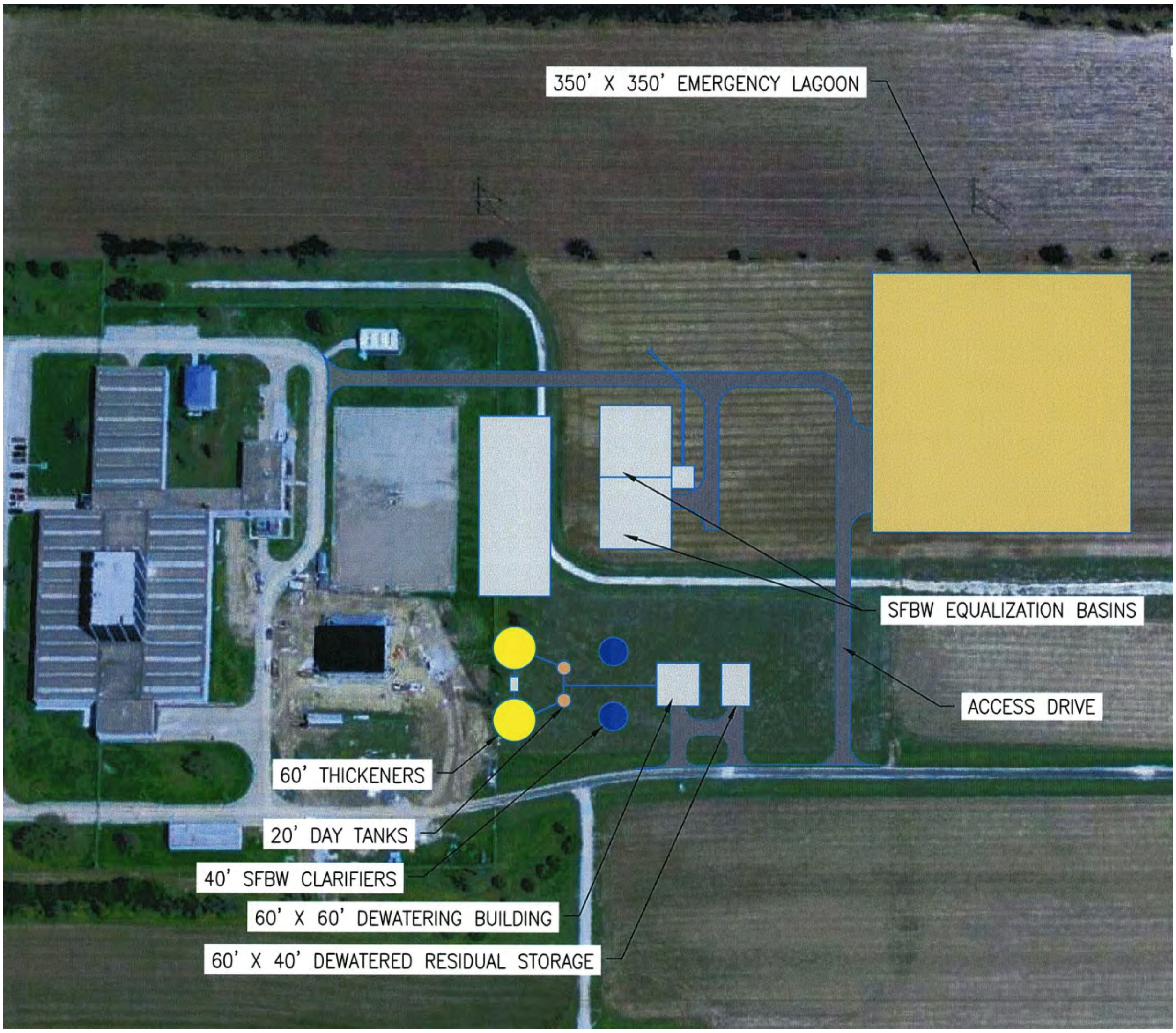

Figure 7: Conceptual site plan for residuals treatment system at Platte South

Construction of a non-mechanical dewatering system was also considered in place of the mechanical dewatering systems presented in Table 2. As discussed previously, due to the amount of solids produced at Platte South, it was assumed that dewatering lagoons would be needed instead of sand drying beds or freeze-thaw beds.

Dewatering lagoons were sized using the procedure described in an AwwaRF report by Vandermeyden and Cornwell (1998). Assuming a drained solids concentration of 20 percent and a loading depth of 6 feet, it would take approximately one year for a lagoon to dry, based on an average annual evaporation of 43.8 inches in the Omaha region (Farnsworth and Thompson, 1982). This would require a minimum of three lagoons (one being loaded, one drying, and one being cleaned) at Platte South. Each lagoon would require an area of 159,500 ft^2 (3.66 acres) using the sizing procedure outlined in the AwwaRF report. As the total required lagoon area would exceed 11 acres, not including support roads, berms, etc., it was decided that this option was less feasible than mechanical dewatering, so a cost estimate for this options was not developed.

Total capital costs for the systems indicated in Table 2, as computed by the costing tool, are shown in Table 4 for each residual production percentile analyzed. These costs are shown with individual process costs in Figures 8 and 9, corresponding to systems based on centrifuge dewatering and filter press dewatering, respectively.

Table 4: Residuals treatment costs by treatment scenario

Percentile Treated	Total Capital Costs (Centrifuge)	Total Capital Costs (Plate and frame press)
50	$ 19,940,000	$ 20,980,000
65	$ 21,900,000	$ 23,160,000
75	$ 22,270,000	$ 23,530,000
90	$ 22,820,000	$ 25,890,000
100	$ 28,650,000	$ 27,000,000

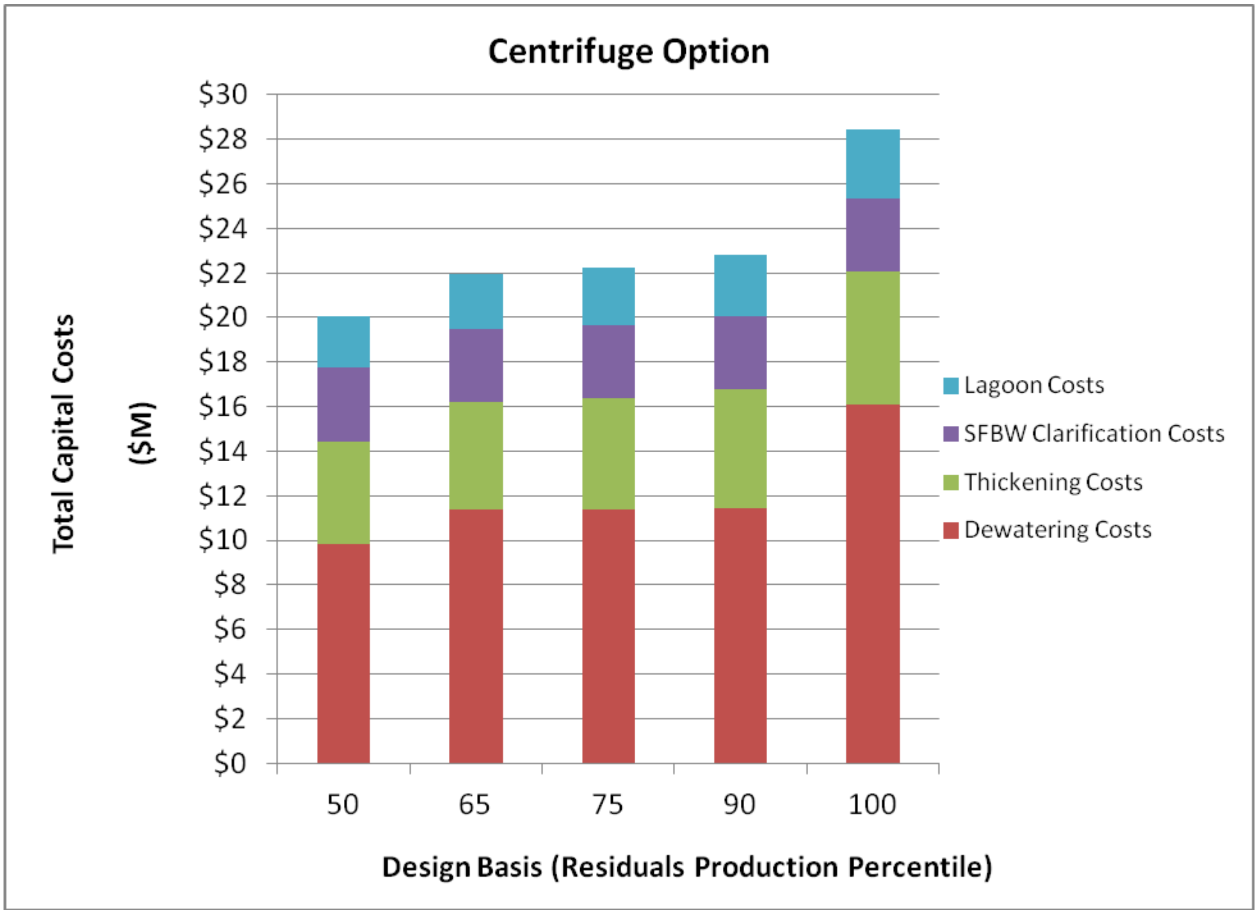

Figure 8: Treatment costs by process area (Centrifuge)

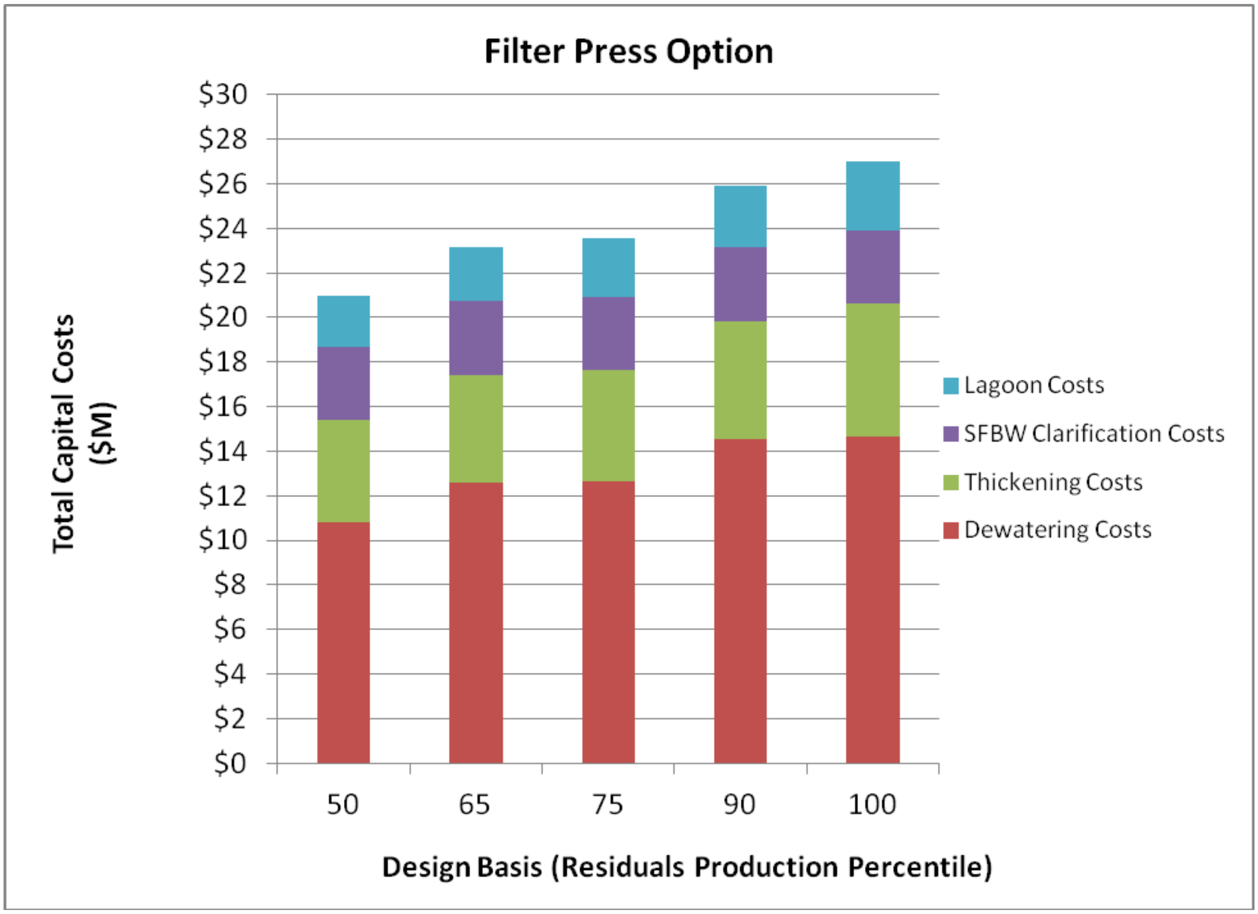

Figure 9: Treatment costs by process area (Filter press)

It is clear that the most significant driver of residuals treatment costs is the dewatering system. The costs of the centrifuge system and filter press system are roughly equivalent, although as the size of the system decreases, the centrifuges are slightly more economical.

In addition to estimating capital costs, the costing tool is configured to also estimate annual operations and maintenance costs. In order to calcualte an annual cost of residuals treatment, the capital costs were annualized based on a 20-year payback and a 5 percent interest rate. These costs are shwon in Table 5.

Table 5: Estimated annual cost of residuals treatment by treatment scenario

Centrifuge			
% Treated	Annualized Capital Costs	Annual O&M Costs	Total Annual Costs
50	$ 1,599,674	$ 986,720	$ 2,586,394
65	$ 1,757,135	$ 1,074,215	$ 2,831,350
75	$ 1,786,783	$ 1,102,104	$ 2,888,887
90	$ 1,831,083	$ 1,159,665	$ 2,990,748
100	$ 2,298,608	$ 1,400,554	$ 3,699,162
Filter Press			
% Treated	Annualized Capital Costs	Annual O&M Costs	Total Annual Costs
50	$ 1,683,182	$ 987,439	$ 2,670,620
65	$ 1,858,605	$ 1,257,308	$ 3,115,913
75	$ 1,888,253	$ 1,138,245	$ 3,026,497
90	$ 2,077,510	$ 1,396,952	$ 3,474,462
100	$ 2,166,887	$ 1,496,464	$ 3,663,351

Except for the scenario where the system is sized for the 100th percentile of the daily solids production, assuming the lagoon is for emergency discharges, there will be times when Platte South will need to discharge to the Missouri River, as shown in Figure 6. Assuming the designed system is adequate at treating only the percentile that the design intended, EE&T has estimated the quantity of residuals expected to be discharged to the Missouri River on a yearly basis. Figure 10 shows the relationship bewteen the size of the treatment system constructed and the anticipated yearly discharges to the river.

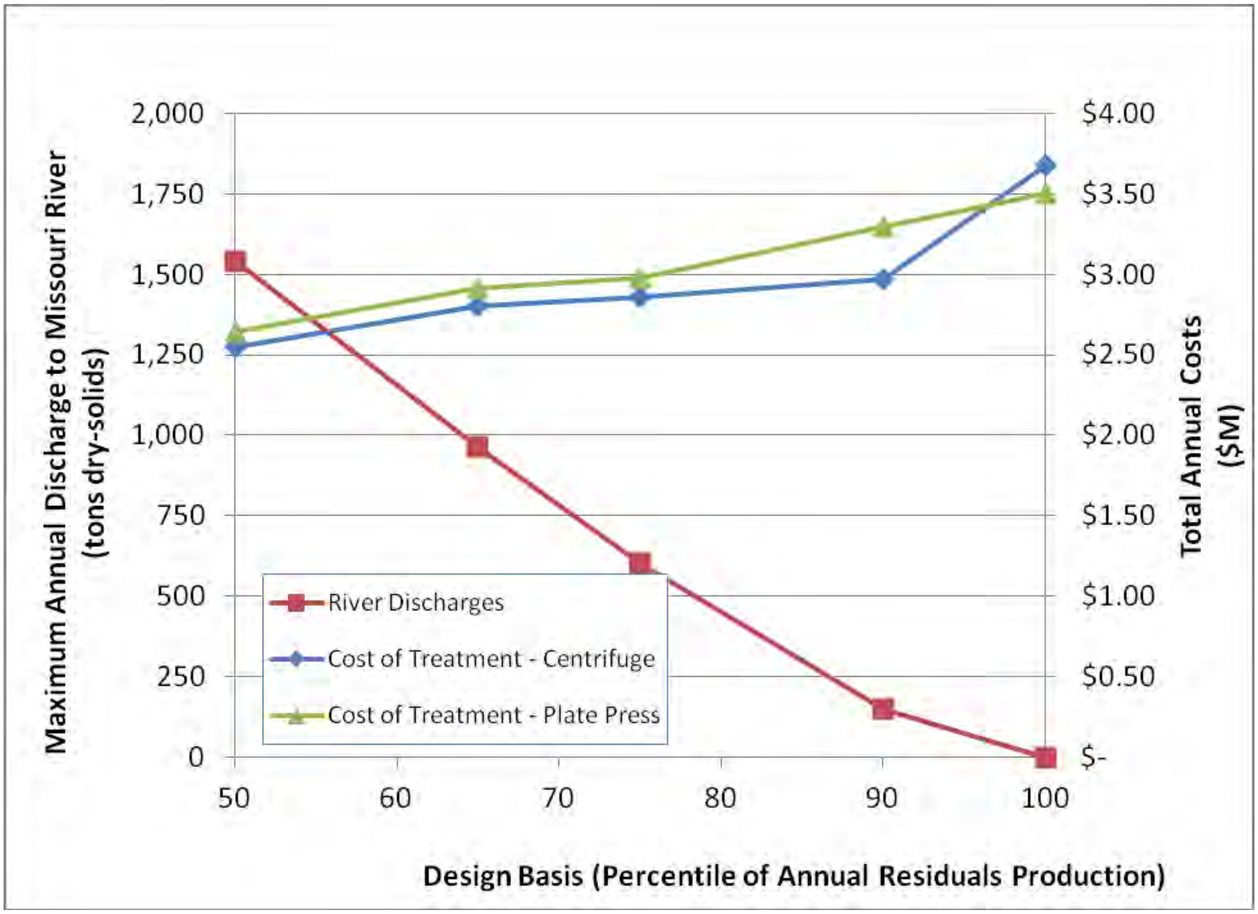

Figure 10: Annual treatment costs compared to maximum annual discharge of solids to the Missouri River

Non-Water Quality Impacts of Solids Removal

There are three primary non-water quality impacts of solids removal. First, because it is relatively energy intensive to dewater and transport drinking water treatment plant residuals, there will be carbon emissions associated with residuals treatment. Second, because the dewatered solids must be removed from the site via trucking, there will be an impact to local roadways from increased truck traffic. Finally, if the residuals were to be disposed via landfill, that would also have a non-water quality impact consumption of available landfill capacity.

Calculating carbon emissions for residuals treatment is relatively straightforward. Power use of residuals processes is based on installed horsepower and process runtime. CO_2 emissions due to power usage are estimated to be 7.18×10^{-4} metric tons of CO_2/kWh. Truck emissions are based on an assumed 50 mile trip for disposal and the amount of tonnage carried. Table 6 shows the estimated carbon emissions based on the disposal scenario.

Table 6: Estimated annual carbon emissions associated with residuals treatment at Platte South

% Treated	Power Consumption Emissions (metric tons CO_2/year)	Transportation Emissions (metric tons CO_2/year)	Total Annual Carbon Emissions (metric tons CO_2/year)
Centrifuge			
50	416	140	555
65	441	165	606
75	441	183	624
90	455	220	675
100	502	280	782
Filter Press			
% Treated	Power Consumption Emissions (metric tons CO_2/year)	Transportation Emissions (metric tons CO_2/year)	Total Annual Carbon Emissions (metric tons CO_2/year)
50	441	140	581
65	441	165	606
75	441	183	624
90	516	220	736
100	563	280	843

In addition to the emissions shown in Table 6, it should be noted that the facilities required to manage residuals will have their own carbon footprint associated with the resources and energy consumed to manufature and construct those facilities. While estimating this carbon footrpint is beyond the scope of the study, it is important to note that there are impacts beyond those assocaited solely with operation of the resiudals treatment facilities.

As with the carbon emissions, transporation impacts are also relatively straightforward to evaluate. Each treatment scenario that has been discussed is based on a maximum dewatering rate. Assuming the system is operating at that rate, we can estimate the maximum volume of dewatered cake that will need to be transporated each week. For the purposes of this anlaysis, it was assumed that the dewatered cake would have a final solids concentration of 70 percent, a unit weight of 112 lb/ft^3, and that cake transport would be accomplished using roll-of dumpsters with a capacity of 12 cubic yards (cy). With these assumptions, tranporation impacts will be as shown in Table 7.

Table 7: Estimated increase in truck traffic associated with residuals treatment at Platte South

% Treated	Residuals Production (lb/day)	Wet Cake Production (lb/week)	Wet Cake Volume (cy/week)	Trucking Days (days/week)	Number of Trucks per Week
50	25,283	252,827	84	5	7
65	29,831	298,313	99	5	9
75	33,203	332,028	110	5	10
90	39,716	397,165	131	5	11
100	50,661	506,610	168	5	14

There is also an impact associated with disposal of the dewatered residual solids. The most common beneficial reuse option for softening residuals, agricultrual land application, is not anticiapted to be economical because disposal of lime solids from the Platte West PWTP is currently filling the demand for agricultrual lime in the surrounding area. There do not appear to be any other established beneficial resuse options for the softening residuals in the Omaha region. While this does not necessarily preclude beneficial reuse of the solids, it would essentially require M.U.D. to develop a new market for lime solids, which would be a significant and time-consuming enterprise.

Because beneficial reuse does not appear to be an option, it is anticiapted that the solids will be disposed via landfill. As shown in Table 7, it is estimated that 84 to 168 cubic yards of material will need to be disposed of per week, depending on the treatment scenario. On an annual basis, this will correspond to 4,350 to 8,710 cubic yards of landfill capacity that will be consumed through the disposal of softening residuals.

Summary

As previous sections have shown, options for reducing the amount of solids discharged to the Missouri River from the Platte South PWTP are limited to residuals treatment, as M.U.D. has already optimized operations to reduce solids production. Of the residuals treatment options, non-mechanical dewatering would require over 11 acres for dewatering lagoons, so costing focused on mechanical dewatering options. Of the two mechanical dewatering options, centrifuges were less expensive for all scenarios except the 100th percentile scenario, under which all residuals would be treated on-site.

Implementing residuals treatment will reduce the mass of solids discharged to the Missouri River; however, even under current operating conditions the amount of solids contributed by the discharge from the Platte South PWTP is negligible compared to the amount of solids already present in the Missouri River. On days of peak solids production, the discharge from Platte South PWTP would comprise less than 0.7 percent of the total solids in the river. The majority of the time, less than 0.055 percent of the solids in the river would be attributable to the discharge from Platte South.

While this percentage could be driven lower through residuals treatment, it will come at a significant cost. Even the lowest treatment option considered will have an annualized cost of at least $2.5 million. Depending on the scenario selected, the cost of reducing the amount of solids discharged to the river ranges from $2.5 million to $3.7 million annually.

There are also non-water quality environmental impacts associated with solids removal. The three primary non-water quality environmental impacts are anticipated to be: increased carbon emissions, increased truck traffic to and from the water treatment plant, and use of landfill capacity. These impacts should be considered carefully when determining the feasibility of residuals management at the Platte South PWTP.

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EE&T, Inc.

ENVIRONMENTAL ENGINEERING & TECHNOLOGY, INC.

July 24, 2012

Metropolitan Utilities District of Omaha
Engineering Memorandum No. 6
NPDES Studies
EE&T Project No. 12501

Subject: Florence pH Mixing Zone Study

The Florence Potable Water Treatment Plant (PWTP), operated by the Metropolitan Utilities District of Omaha (M.U.D.), is a split-treatment softening facility that currently discharges residuals that are generated during treatment to the Missouri River. This discharge is permitted under NPDES Permit No. NE0000914, which went into effect as of October 1, 2009. As part of this NPDES permit, the Nebraska Department of Environmental Quality (NDEQ) directed M.U.D. to conduct pH Mixing Zone Study to determine if the discharge from Outfalls 001, 002, and 005 at the Florence PWTP attains the water quality standards for pH (range 6.5 to 9.0) at the end of the acute mixing zone.

The pH Mixing Zone Study was conducted October 26 – 28, 2011, in accordance with the pH Mixing Zone Study plan submitted to NDEQ in March 2010 except as noted in the following sections. A report detailing the methodology used by this study, as well as the data collected during this study, has been prepared by Tennessee Technological University (Tennessee Tech) and is attached to the memorandum as Attachment A.

Background

As specified in the NDPES permit, the pH mixing zones for Outfalls 001, 002, and 005 were evaluated. Each outfall conveys discharge with different water quality and flow characteristics. The location of each outfall is shown in Figure 1.

Figure 1. Location of Outfalls 001, 002, and 005 at the Florence PWTP (scale – 1":400')

Outfall 001 is the furthest upstream outfall, and is located approximately 170 feet south of the treatment plant's intake structure. This outfall conveys primarily backwash water, although underdrain water from the plant's 20 million gallon clearwell is also directed to this outfall. Filters are backwashed at a rate of 10 gpm/ft^2; the filters at Florence PWTP have a surface are of 1,440 ft^2, so a filter backwash discharges at approximately 14,400 gpm. On an average day, one to two filters are backwashed. A backwash event will last approximately 20 minutes, so around 290,000 gallons are discharged with each backwash. Because the backwashes happen infrequently, discharge from Outfall 001 is highly sporadic.

The discharge structure for Outfall 001 was modified in 2010 from a surface discharge to a submerged discharge. This modification was completed to reduce objectionable films, color, and turbidity attributable to the discharge, per the aesthetics mitigation requirement specified in Part I.H of NDPES Permit Number NE0000914. The manhole at Outfall 001 was not accessible during the monitoring period, which prevented collecting a discharge sample outfall 001. Samples collected from Outfall 001 prior to the modification showed a pH of 8.22 and a TSS of 1,600 mg/L for filter wash water.

Outfall 002 is approximately 720 feet downstream of Outfall 001. Outfall 002 conveys the drainage from Settling Basins #1 and #2 at Florence PWTP. These basins are generally cleaned twice per year, a process that takes one to two days. The cleaning process has two phases: first, the basin is decanted to draw off relatively clean supernatant, and then the basin is manually washed with fire hoses resulting in a highly turbid discharge. Grab samples collected from Outfall 002 during the manual washdown had a pH of 8.85 and a TSS of 4,600 mg/L. Outfall 002 is located at the riverbank, above the water surface, so the discharge from this outfall can easily be seen when the outfall is active. However, because Outfall 002 does not convey drainage other than from Settling Basins #1 and #2, this outfall is only active for a few days, twice per year.

Outfall 005 is approximately 1,100 feet downstream of Outfall 002, and is the furthest downstream outfall considered for the pH mixing zone study at Florence PWTP. This outfall receives flow from Settling Basin #3, and from the plant’s four upflow solids contact basins (clarifiers). Florence PWTP utilizes a split-softening process, so two clarifiers contain alum sludge and two clarifiers contain lime softening residuals. These four clarifiers blow down to a collection sump that then discharges to Outfall 005 by gravity (controlled by an automated valve). Prior to 2011 Florence PWTP operated this sump as a batch fill-draw process, and the sump was discharged to Outfall 005 approximately 20 minutes out of every 40 minutes. Since that time, Florence PWTP has modified sump operations to blow down to Outfall 005 on a more continual basis.

Because Outfall 005 receives flow from clarifiers containing either alum sludge or lime softening residuals, the characteristics of the discharge varies depending on which clarifier is being blown down. Like Outfall 001, Outfall 005 was modified in 2010 to submerge the discharge structure for aesthetics mitigation purposes, so it was not possible to directly sample the effluent from Outfall 005 during the pH mixing zone study. Samples from Outfall 005 collected prior to the outfall modification indicated that the pH of the effluent was 10.65, with a TSS of 6,095 mg/L.

River Conditions at Time of Study

One of the criteria established by NDEQ for the pH Mixing Zone Study is that the receiving stream flow rate: a) be less than or equal to the annual 25th percentile flow, b) is not an increasing trend, and c) is stable for a long enough period of time to reasonably allow M.U.D. to notify the research team to mobilize and conduct the study, with this period of time not to exceed 14 consecutive days. NDEQ also specified that the study should be conducted when weather conditions do not pose a hazard to the health and/or safety of workers conducting the study and that ice cover, if any, on the receiving stream should be minimal.

The original study plan proposed to use data from the previous 10 years to establish the annual 25th percentile flow, which was 17,400 cfs. Subsequently, the team was informed that NDEQ typically uses a 20-year period for determining annual flows, which give a 25th percentile flow of 24,700 cfs. However, because the US Army Corps of Engineers (USACE) operates upstream dams to maintain higher elevations in Missouri River during barge transport season, the lowest river flows occur between January and March. During that time it is not safe for workers to enter Settling Basins #1 and #2 for cleaning, due to the freezing weather. Because it was necessary to be cleaning Settling Basins #1 and #2 to have Outfall 002 active during the pH mixing zone study, it was determined that the pH mixing zone study needed to be conducted prior to freezing weather conditions.

Timing of the pH mixing zone study, relative to river flows, was complicated by the historic flooding experienced in 2011. For 110 days, between May 29, 2011 and September 16, 2011, Missouri River flows exceeded 100,000 cfs. These flows exceeded the 98th percentile of the previous 20 years' flow data. It was not clear during September 2011 when flows would drop down to more normal levels. Considering the risk of additional flooding the next spring due to saturated ground conditions, M.U.D. contacted NDEQ in September 2011 to request authorization for conducing the pH mixing zone study in October, prior to freezing weather. On September 28, 2011 NDEQ granted permission to conduct the pH mixing zone study in October, The study was subsequently conducted on October 26 through 28, during which time the average Missouri River flow was 47,000 cfs. This flow exceeds the 77^{th} percentile of the daily flow records for the 20-year period from 1992 through 2011; however, it is only at the 37^{th} percentile of the daily flows for calendar year 2011. As of April 2012, the last time the Missouri River was at or below the 20-year 25^{th} percentile flow of 24,700 cfs was February 11, 2011.

Missouri River Velocities and Geomorphology

An acoustic Doppler profiler (SonTek/YSI RiverSurveyor®) was used to collect river velocity and geomorphology data along transects upstream of, in the vicinity of, and downstream of each Outfall. The river channel geomorphology was relatively uniform across the width of the river near Outfall 001. As the river moves downstream, a bend in the river results in a deepening of the channel near the right descending bank. Figure 2 shows the location of each river transect relative to the outfalls, and Figure 3 present the river bed profile for each transect.

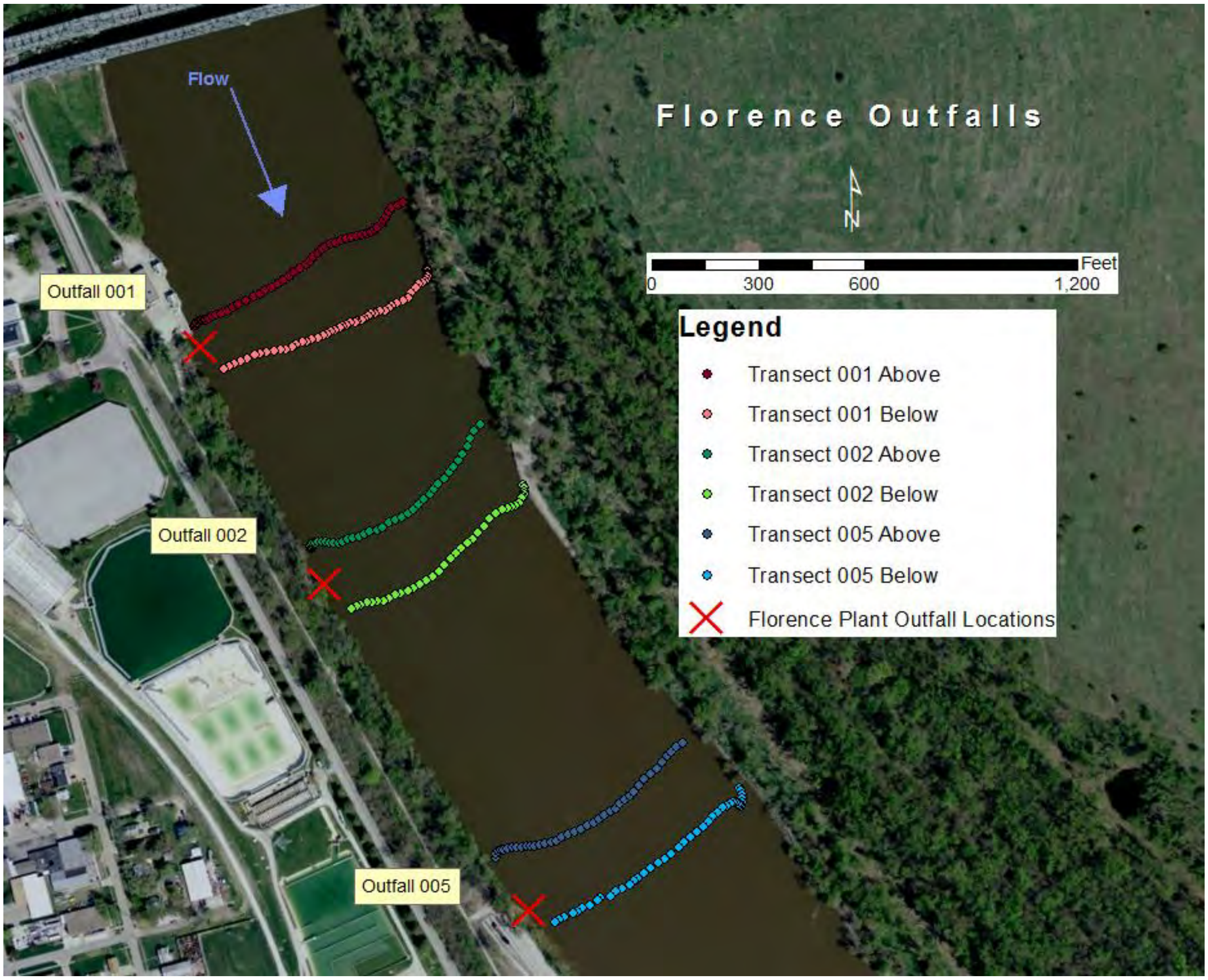


Figure 2. Transect locations for Missouri River channel profiling

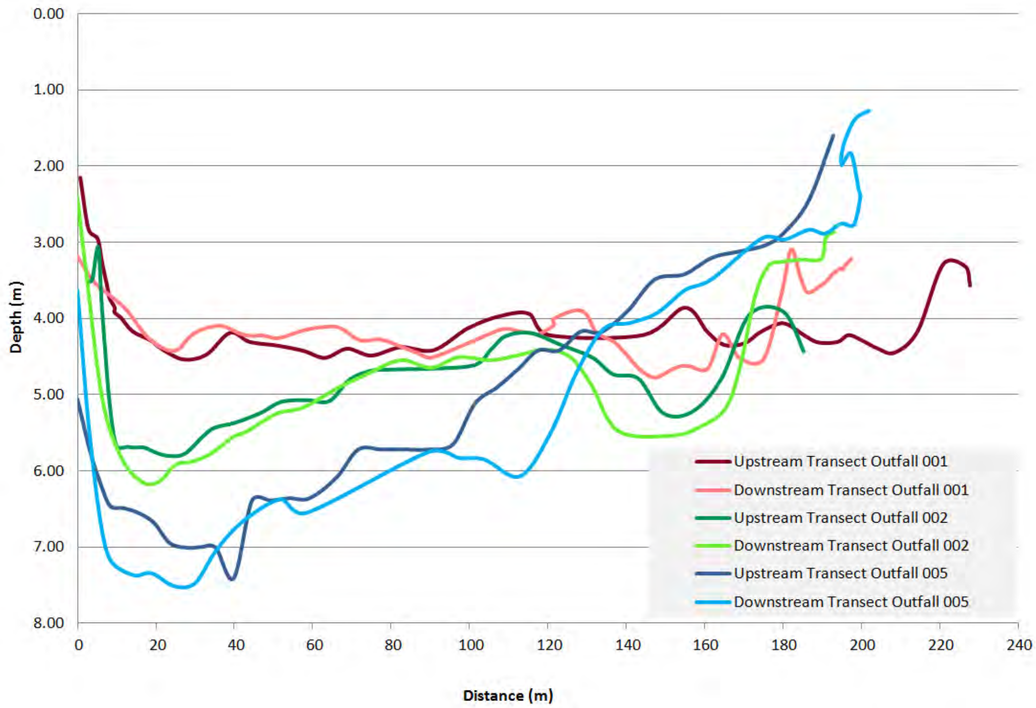


Figure 3. Missouri River channel geomorphology in the vicinity of Florence PWTP

The mean flow velocity at the time of the study was 1.22 m/s. Estimated flows for each of the outfalls are shown in Table 1.

Table 1. Discharge Characteristics for Each Outfall

	Outfall 001	Outfall 002 (decant)	Outfall 002 (cleaning)	Outfall 005
Discharge Frequency	Daily (avg. 2 events/day)	Twice per year	Twice per year	Daily
Discharge Duration (hr)	0.33 hr/event	24 hours	6 hours	Continuously
Discharge Flow (gpm)	14,400	14,000 to 15,000	1,000	140 to 330
Discharge Flow (cfs)	32.1	31.2 to 33.4	2.22	0.31 to 0.74

Establishing a river stage-flow relationship requires more data than the limited flow data that could be obtained during this study; however, the data that were obtained can be used in conjunction with the river stage-flow data from the nearby USGS Station 6610000 to estimate the relationship between river velocities observed during this study and the river velocities that would be observed during the 25th percentile flow (24,700 cfs). At 47,000 cfs during the time of the study, the river stage at USGS Station 6610000 was 18.48 feet. When the river flow decreases to 24,700 cfs, the mean river stage over the past 25 years was 13.83 feet. Assuming that the same decrease in river stage holds in the future, the projected velocity at each transect was calculated using the measured cross-sectional area and measured river width. Based on this assumption, it is estimated that in-stream flow velocities will decrease by an average of less than 13 percent from the measured values during this study, when the river flows decrease from 47,000 cfs to 24,700 cfs.

Even during low-flow conditions, the dilution factor for Outfall 001 will exceed 750 (river): 1 (discharge). For the other outfalls, the dilution factor is much greater. With this high of dilution factor, the contribution of hydroxyl ions by the residuals solids is insignificant and should result in virtually no change in pH of the Missouri River.

pH Data Analysis

pH data were collected using two datasondes (both Hydrolab® H2O) that were mounted to the boat and deployed at different depths: one instrument was deployed at a depth of 1 to 2 feet, while the other was deployed at depths between 5 to 8 feet. Initially another datasonde was present at a depth of 0.5 times the channel depth, but that instrument was lost, along with a backup instrument, when a sonde support broke as the boat was being positioned early on in the testing. The remaining two datasondes measured pH continuously and recorded pH data every 15 seconds. Buffer solutions of pH 7 and pH 10 were used to calibrate datasondes immediately prior to and after collecting field data. All calibration data were within 0.1 su of the known buffer values. As the pH data were recorded, the boat's position was monitored with a Trimble™ GeoXH GPS, which recorded position coordinates every second. The system times for the data sondes were synchronized with the GPS system time, which allowed for the pH data to be matched with the GPS position during post-processing. The locations of the pH data collected for this study are shown in Figure 4.

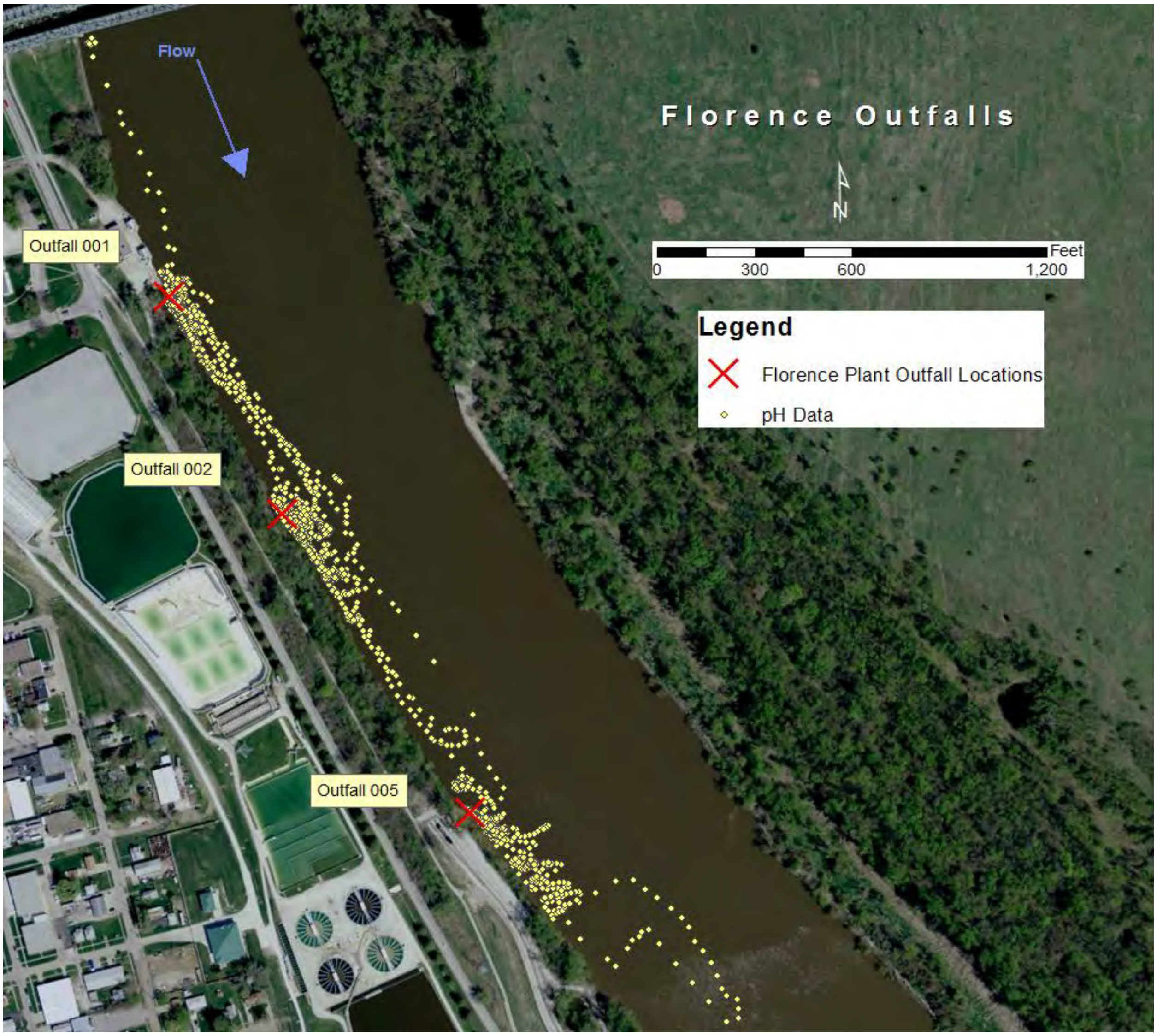


Figure 4. Location of pH data relative to plant outfalls.

All pH data collected during the study are presented in Appendix A.1. No pH monitoring data collected were significantly different from the background. The range for the pH was 8.0 to 8.56 with a mean of 8.3 (n=2,495 pH readings). The pH data were within the water quality standards for pH (range of 6.5 to 9.0) specified in NPDES Permit No. NE0000914.

Although the variation in the pH values detected was generally within the range of error of the instruments, there appear to be some trends that suggest the research team did successfully locate the plumes for each discharge. The following sections will present the pH data collected at outfall.

Outfall 001 pH Analysis

As described above, effluent samples could not be collected from Outfall 001 during the pH mixing zone study because the Outfall was submerged. Previous samples indicated that the pH of the backwash water is approximately 0.3 pH units higher than the raw water influent. pH readings were collected over several backwash cycles on different days to collect sufficient data when the outfall was and was not discharging. Figure 5 shows the pH readings collected when there was no discharge out of Outfall 001, while Figure 6 shows the pH readings collected during a discharge event when the outfall was active.

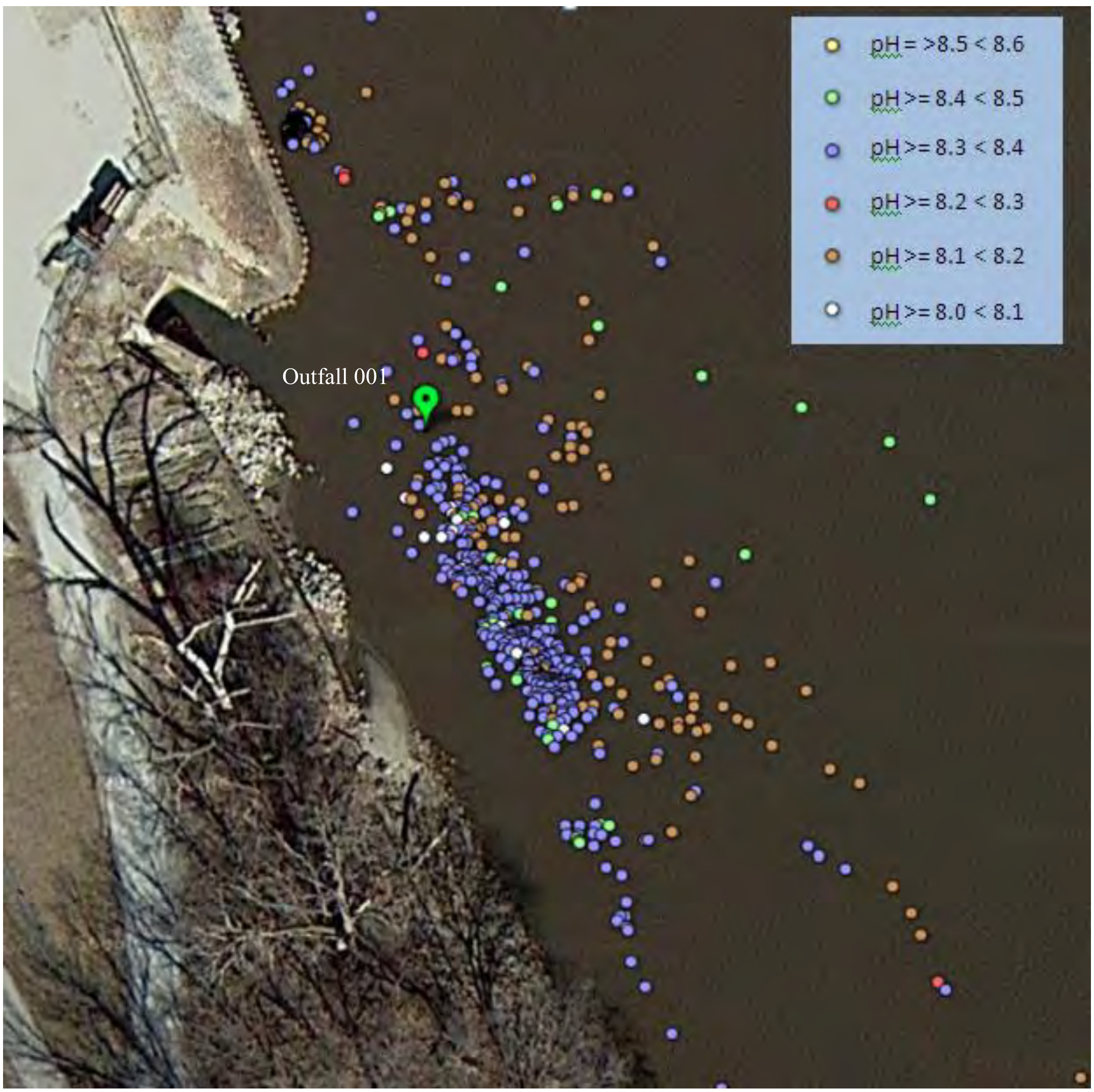


Figure 5. pH readings collected at Outfall 001 during periods of no discharge (scale – 1”:40’)

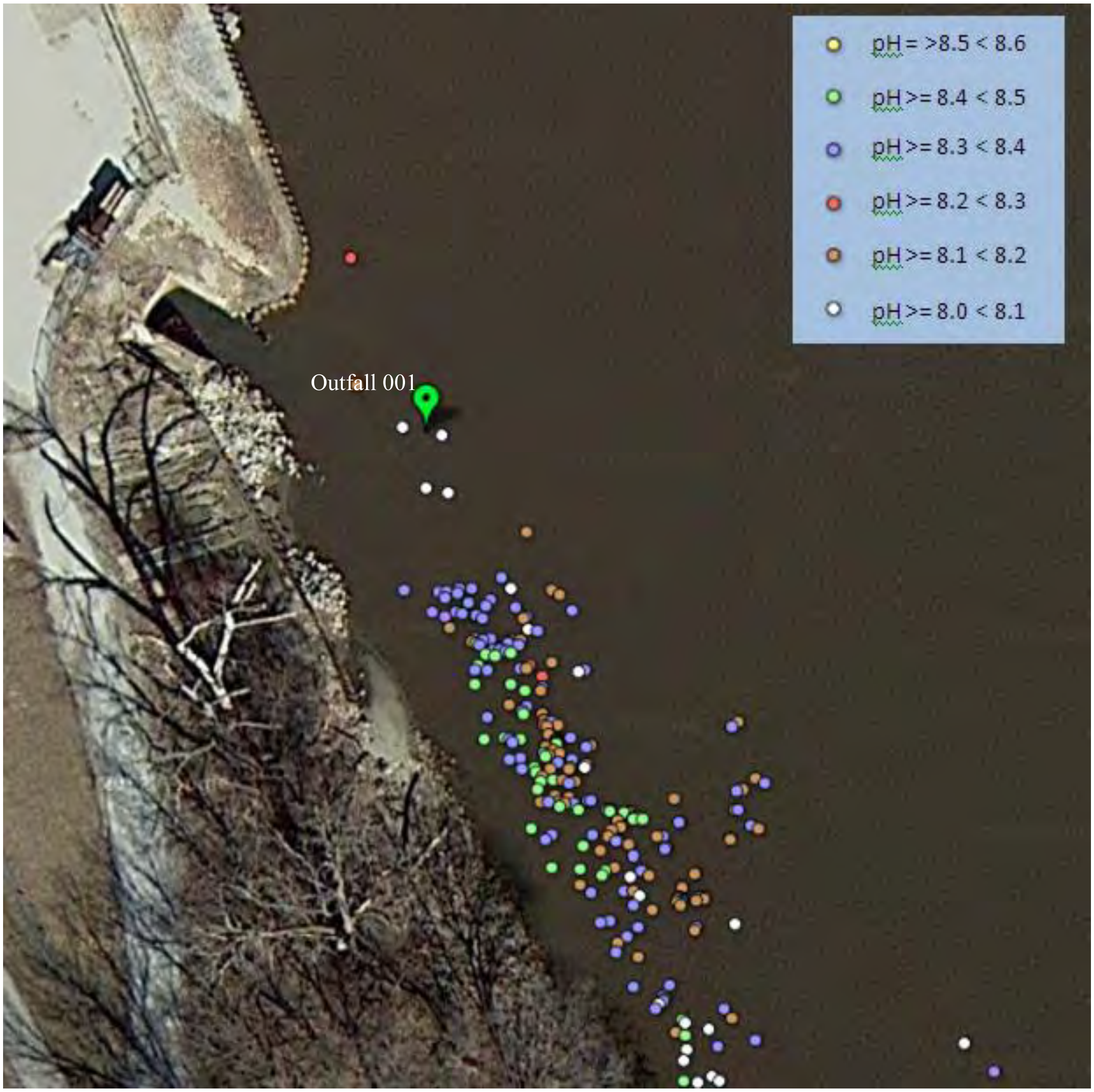


Figure 6. pH readings collected at Outfall 001 during backwash events (scale – 1”:40’)

There is a relatively wide range in background pH values during periods of no discharge, although the pH generally ranges between 8.3 and 8.4 in the area immediately downstream of the discharge. During backwash events, pH readings between 8.4 and 8.5 were more predominant, although there was still a considerable range in pH values. Given the relatively low pH of the backwash water, the results are as expected.

Outfall 002 pH Analysis

Unlike Outfall 001, there were three distinct flow regimes analyzed at Outfall 002. pH readings were collected when the settling basin was decanting, when the settling basin was being manually cleaned, and when there was no discharge from the outfall. Figures 7, 8, and 9 show these readings, respectively.

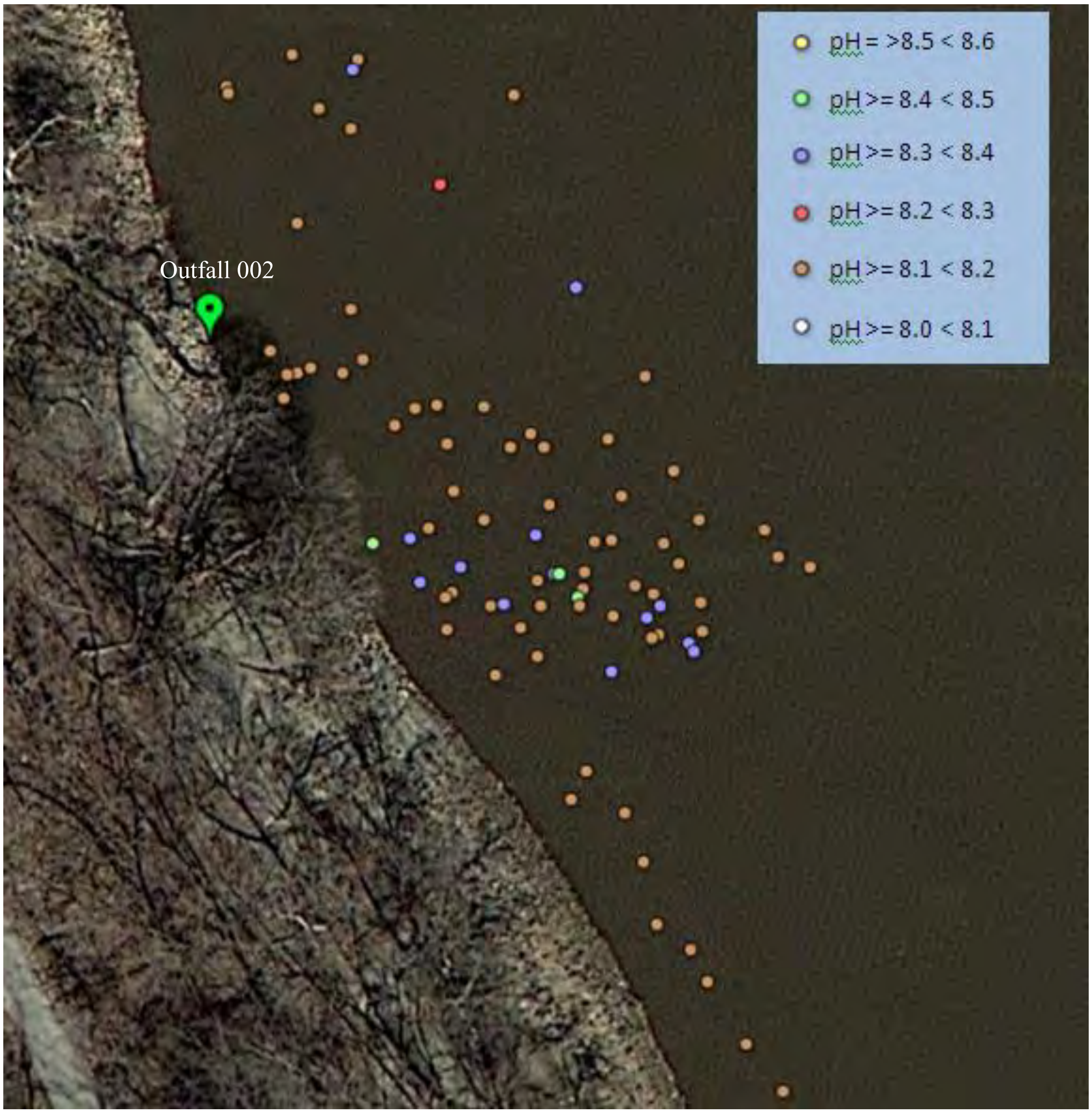


Figure 7. pH readings collected at Outfall 002 when the settling basin was being decanted (scale – 1":40')

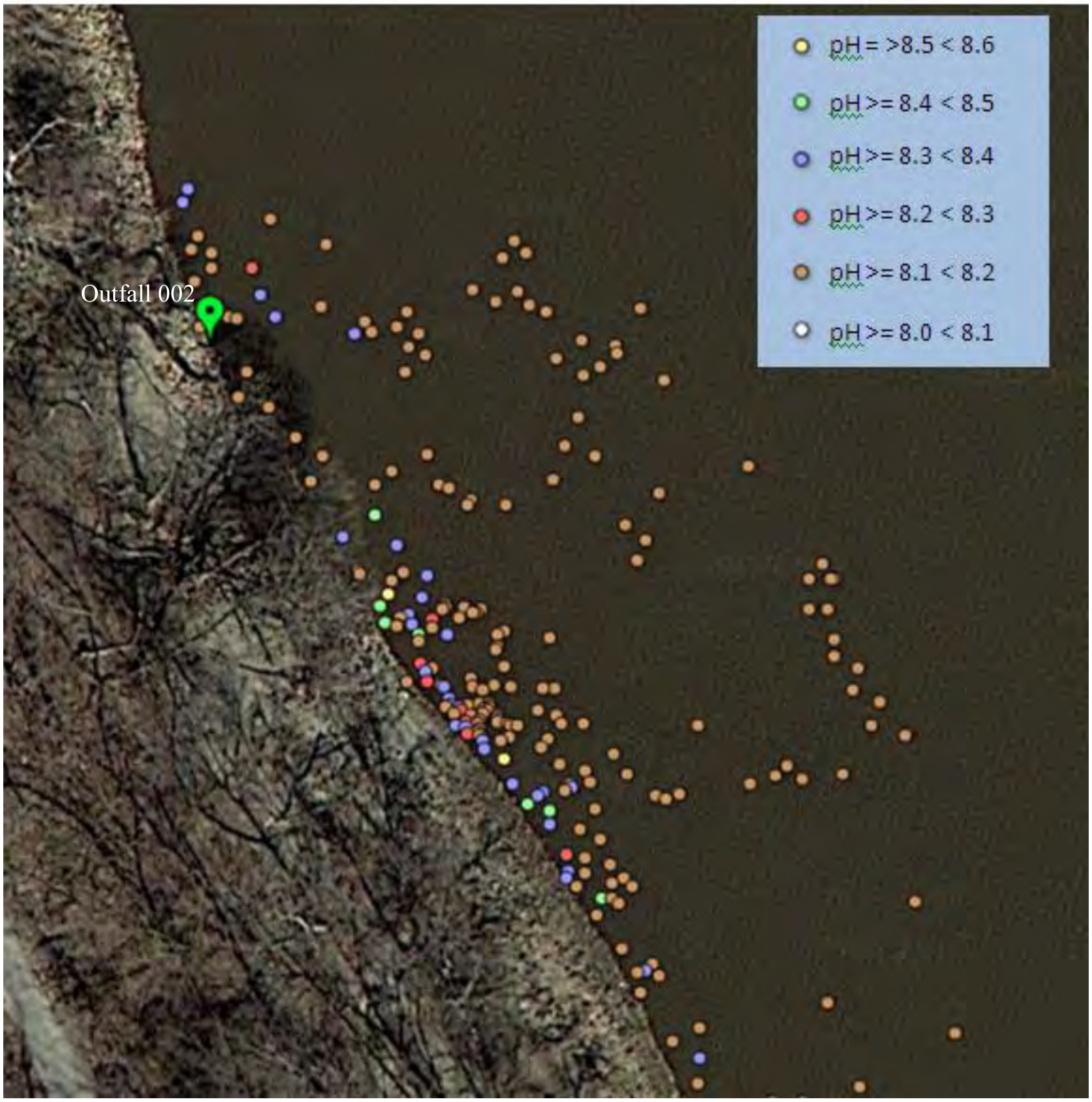


Figure 8. **pH readings collected at Outfall 002 when the settling basin was being manually cleaned (scale – 1":40')**

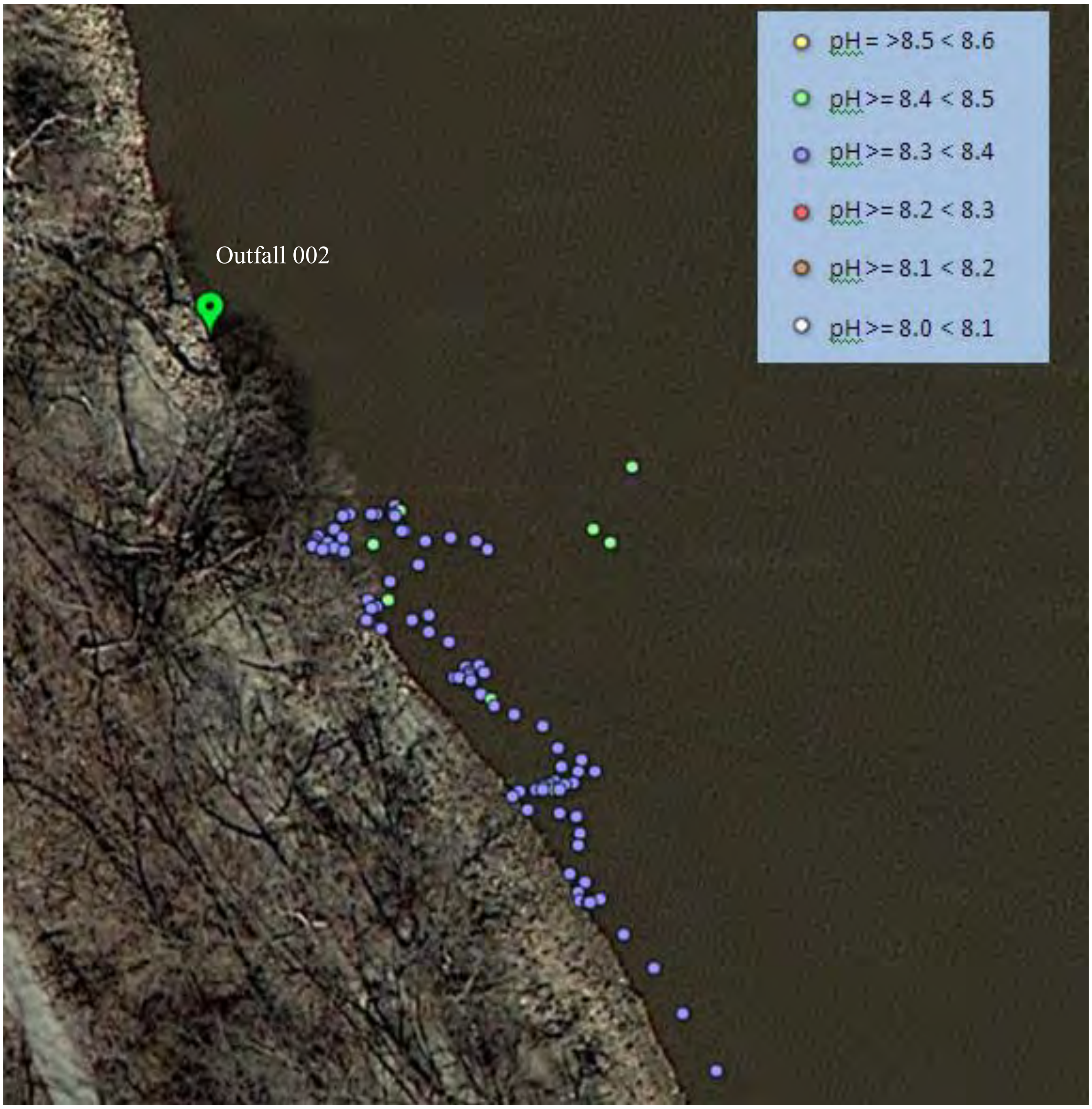


Figure 9. pH readings collected at Outfall 002 when the outfall was not active (scale – 1":40')

Interestingly, at Outfall 002 the pH readings were consistently higher when there was no discharge from the outfall, as shown in Figure 9. However, in Figure 8, it appears that the background pH level in the river was lower at the time those pH data were collected. Despite, or perhaps because, of the lower background pH, a clear pH signal can be observed downstream of Outfall 002 in Figure 8. However, these pH readings are still well below the limit of 9.0 established by the NPDES permit. Since the effluent from Outfall 002 was measured to have a pH of 8.85, it is reasonable to expect the pH in the mixing zone to be lower due to dilution.

Outfall 005 pH Analysis

Compared to Outfalls 001 and 002, Outfall 005 is where the highest likelihood of exceeding the pH limit of 9.0 would be expected. While the effluent could not be sampled directly during testing, previous samples collected from Outfall 005 indicated the pH of the effluent to be above 10.6. Thus, Outfall 005 is the only outfall to discharge residuals that themselves exceed the pH limit. Also unlike Outfalls 001 and 002, the discharge from Outfall 005 is essentially continuous. The pH readings collected near Outfall 005 are presented in Figure 10.

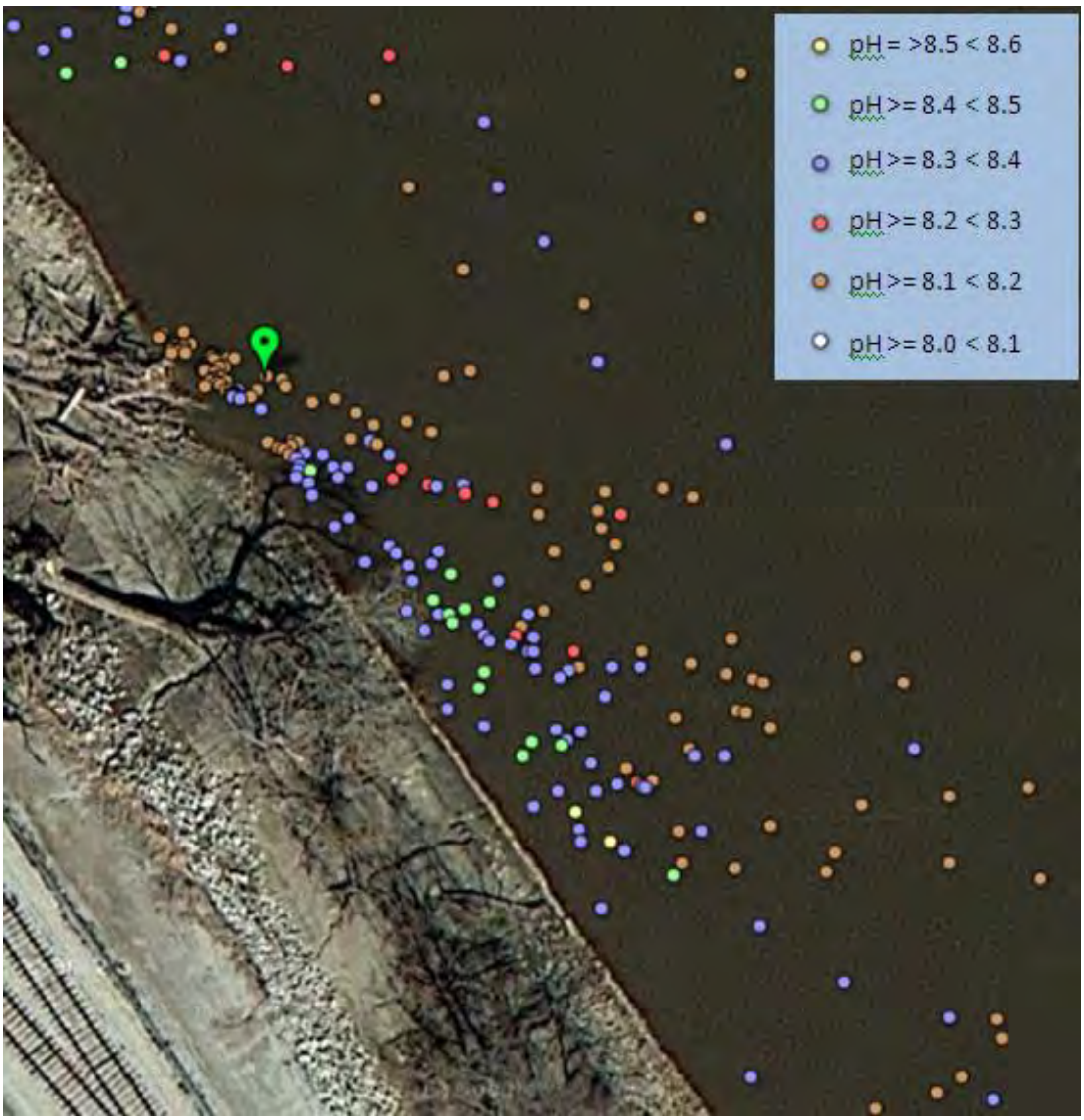


Figure 10. pH readings collected at Outfall 005 (scale – 1”:40’)

While none of the pH readings collected downstream of Outfall 005 exceeded 8.6, there is a clear signal of increased pH values downstream of the outfall, compared to the water east of the outfall. The pH data are presented more clearly in Figure 11.

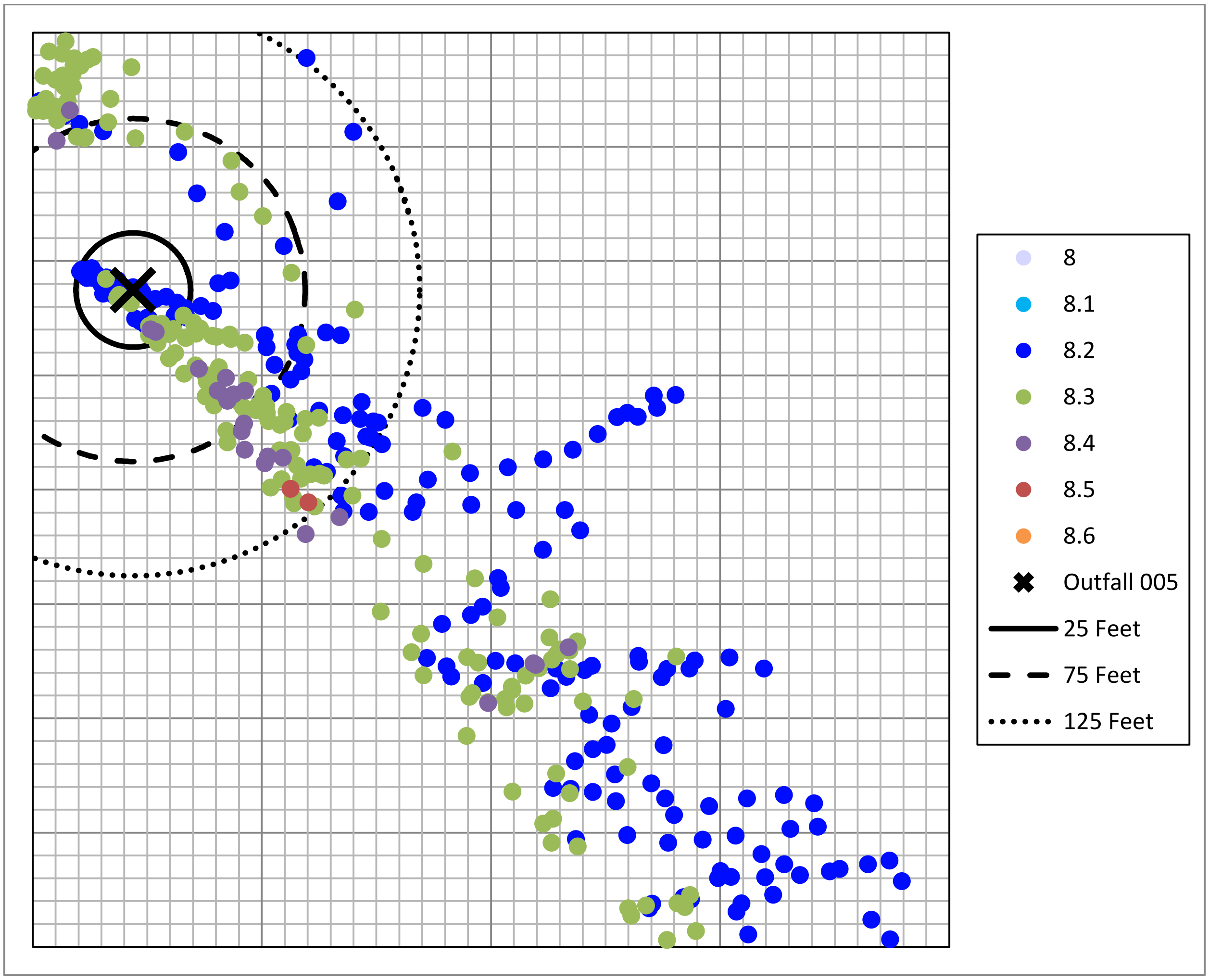


Figure 11. pH readings collected at Outfall 005 shown by distance from outfall

The highest pH values recorded downstream of Outfall 005 occur just before the 125-foot limit of the mixing zone. Beyond 125 feet pH values begin to decrease, although they are still elevated above background levels.

The Missouri River travels through bedrock formations consisting of limestone and shale deposited in shallow seas eons ago (USACE 2009). The Pierre shale formation, deposited late in the Cretaceous geologic period, underlies a large portion of the Great Plains region of the north central United States. Several major dams (Garrison, Oahe, Fort Randall) have been built along the Missouri River, which cuts through this formation. The marine environment present during the deposition of the Pierre shale contained microfossils, shells and organic matter which precipitated as carbonates (primarily calcite): 0.6 to 64% calcium carbonate (Demars and Chaney 1982).

The drier areas of the Missouri River watershed are located above Omaha, where a greater percentage of the rainfall infiltrates into the calcareous soils and geological formations, and disproportionately lower amount of rainfall surface runoff occurs compared to runoff amounts observed in the lower portions of the watershed (USAE 2009). The Missouri River normally has an alkaline pH with values above the PWTP residual solids discharge point normally ranging from 8 to 9 (USGS 2010, EPA Storet Data).

Due to the buffer capacity of the Missouri River and the small discharge flow compared to the river's volumetric flow, the pH results from Outfalls 001, 002, and 005 suggest that the impact that these discharges have on the Missouri River pH is minimal.

TSS Data Analysis

In addition to pH measurements, water samples were collected at various locations for total suspended solids (TSS) analysis. Unlike pH, TSS is a conservative parameter, and provides secondary verification of each outfall's mixing zone. All TSS data recorded are presented in Attachment A. The TSS data collected are shown in Figures 12, 13, and 14.

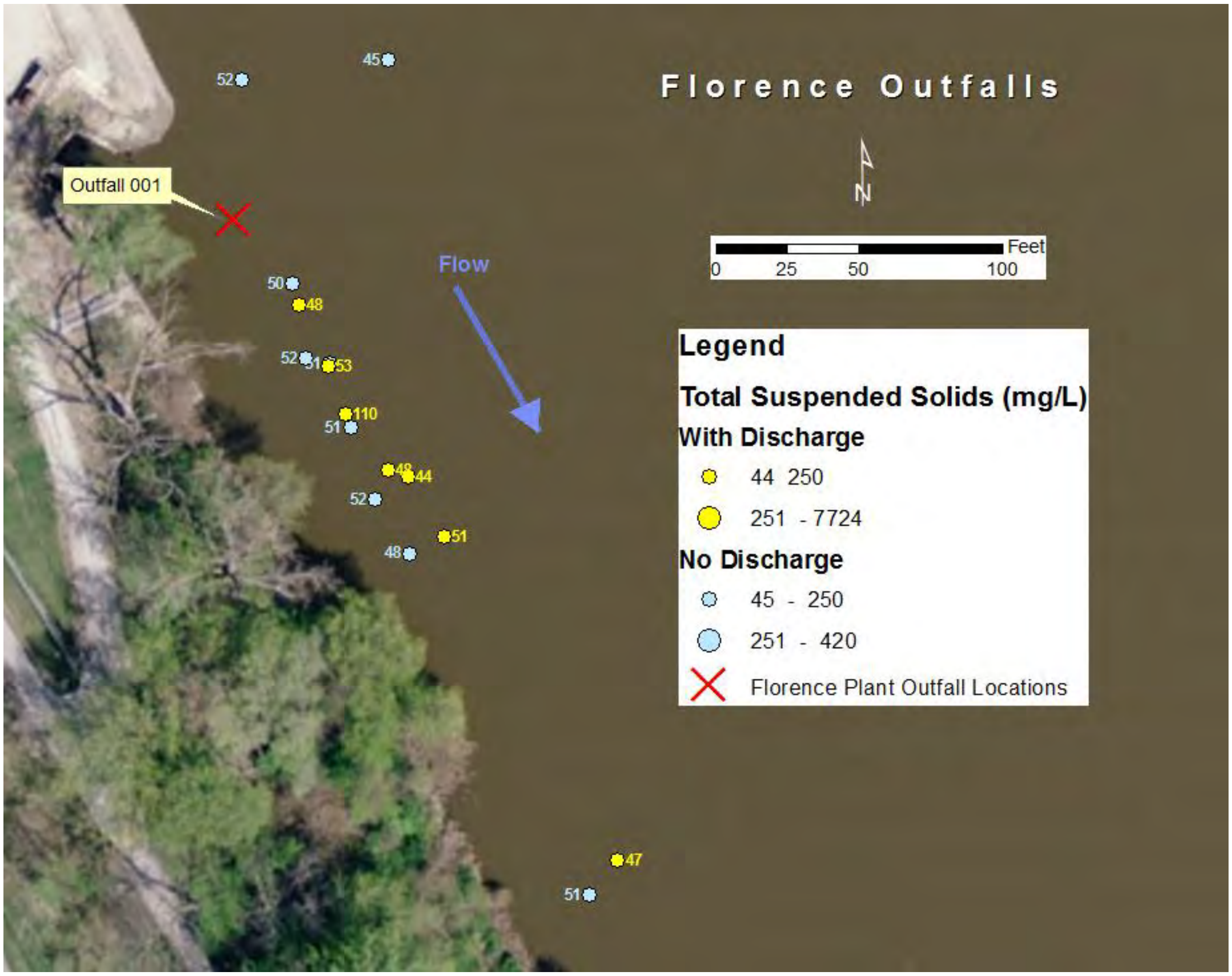


Figure 12. TSS levels measured at Outfall 001 with and without discharge

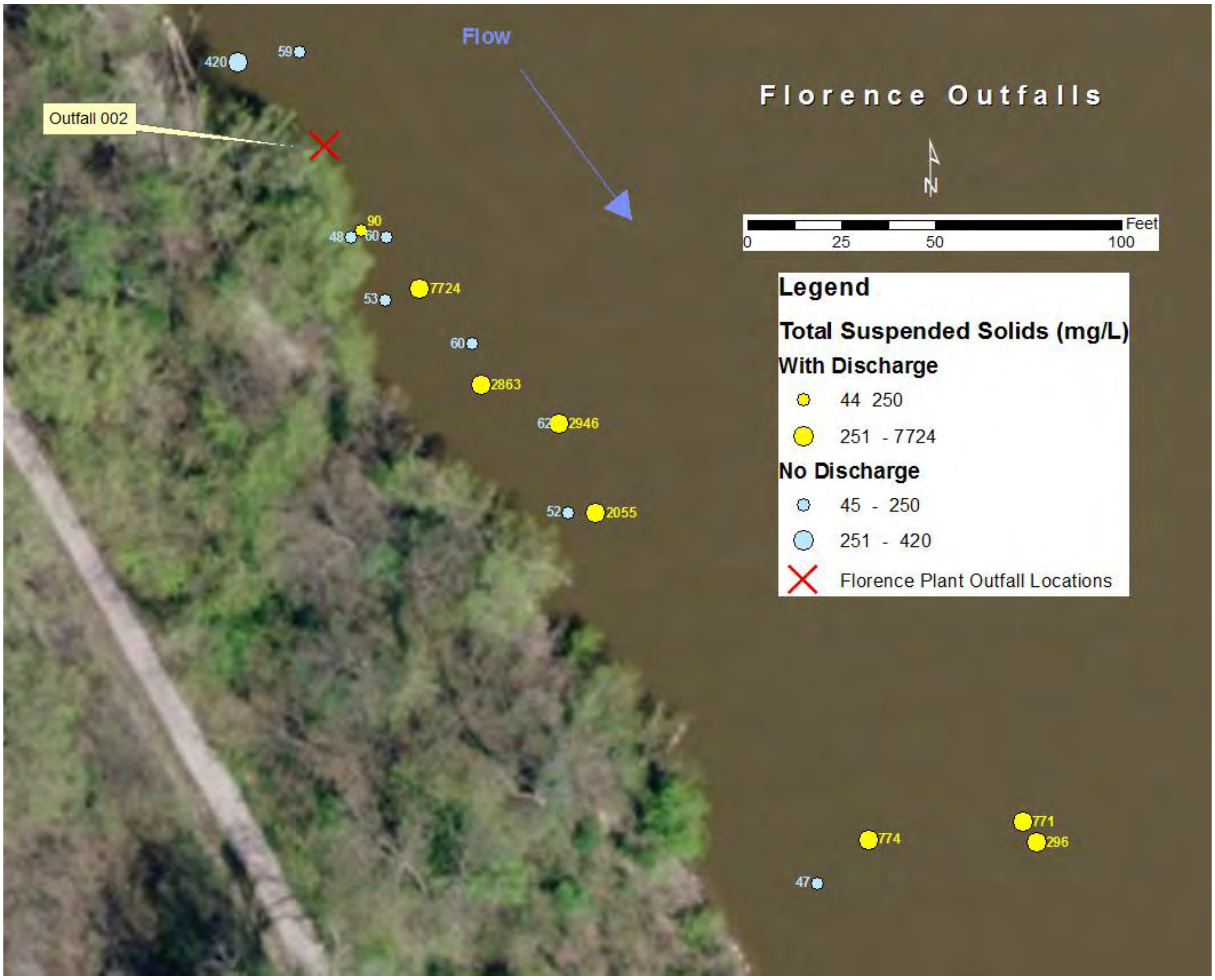


Figure 13. TSS levels measured at Outfall 002 with and without discharge

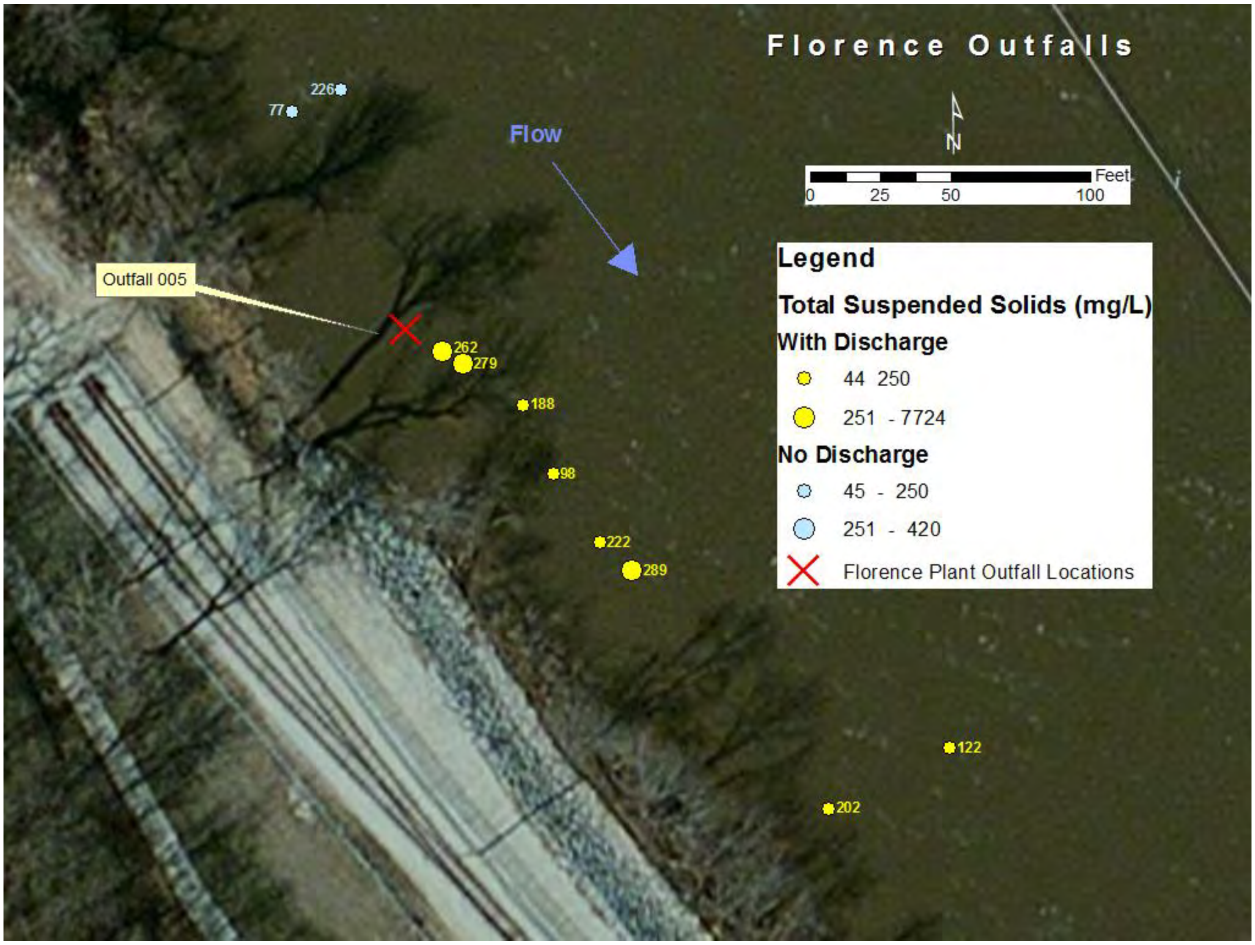


Figure 15. TSS levels measured at Outfall 005

Except for the Outfall 002 upstream outlier (420 mg/L), the average background TSS was 63 mg/L (± 40 mg/L). Outfall 001 did not appear to significantly impact the TSS level of the river. However, TSS levels downstream of Outfalls 002 and 005 were significantly higher than the background river levels. The maximum TSS recorded downstream of Outfall 002 (7,724 mg/L) is more than two orders of magnitude higher than the background river level at the time of the study 63 mg/L (± 40 mg/L). TSS levels downstream of Outfall 002 also remain elevated beyond the maximum 125-foot limit for the mixing zone. TSS levels downstream of Outfall 005 are much lower than those downstream of Outfall 002, although they are elevated above the background river levels. These elevated TSS readings also continue beyond the 125-foot mixing zone limit. However, as shown in the previous sections, although the TSS levels are elevated outside of the 125-foot mixing zone the pH levels are not.

Summary

The pH Mixing Zone Study was completed at Florence PWTP in October 2011. Due to weather considerations and the historic flooding of Summer 2011, it was decided that the study could not wait for river levels to drop to the 25th percentile of the past 20-year period (24,700 cfs). At the time the study was conducted, the Missouri River was flowing at 47,000 cfs. As of present, flows in the river have not yet dropped to, or below, 24,700 cfs.

All pH measurements collected during the study met the allowable water quality standards for pH (range 6.5 to 9.0). TSS data suggests that the limits of the acute mixing zone extend more than 125 feet, but less than 250 feet, downstream of outfall for both Outfall 002 and Outfall 005. However, even within the acute mixing zone, the pH is within the allowable range. Based on the data collected during this study and all other available information, it appears that the discharge from the Florence PWTP does not adversely impact pH levels within the Missouri River.

References

Geotechnical Properties, Behavior and Performance of calcareous soils. Edited by Demars and Chaney. American Society for Testing and Materials. 1982.

Missouri River Bed Degradation Reconnaissance Study. US. Army Corps of Engineers, Kansas City District. PN 124302. August 2009.

Water Quality Report 2010: 06610000 Missouri River at Omaha, NE. US Department of Interior, US Geological Survey.

Attachment A

Florence pH Mixing Zone Preliminary Report

By
The Center for the Management, Utilization, and
Protection of Water Resources,
Tennessee Technological University

Florence Potable Water Treatment Plant pH Mixing Zone Preliminary Report

By

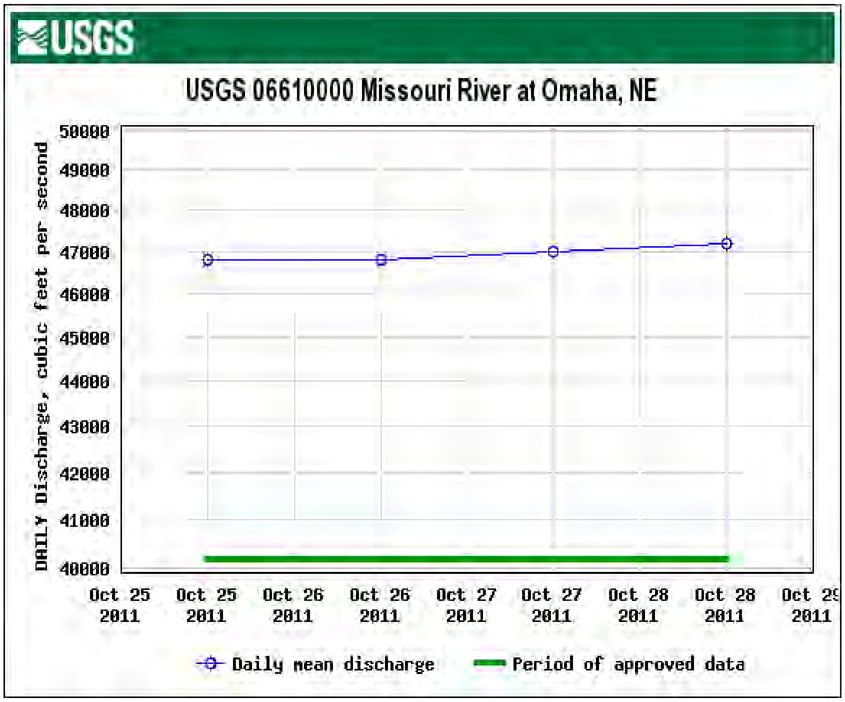
The Center for the Management, Utilization, and
Protection of Water Resources,
Tennessee Technological University

Background

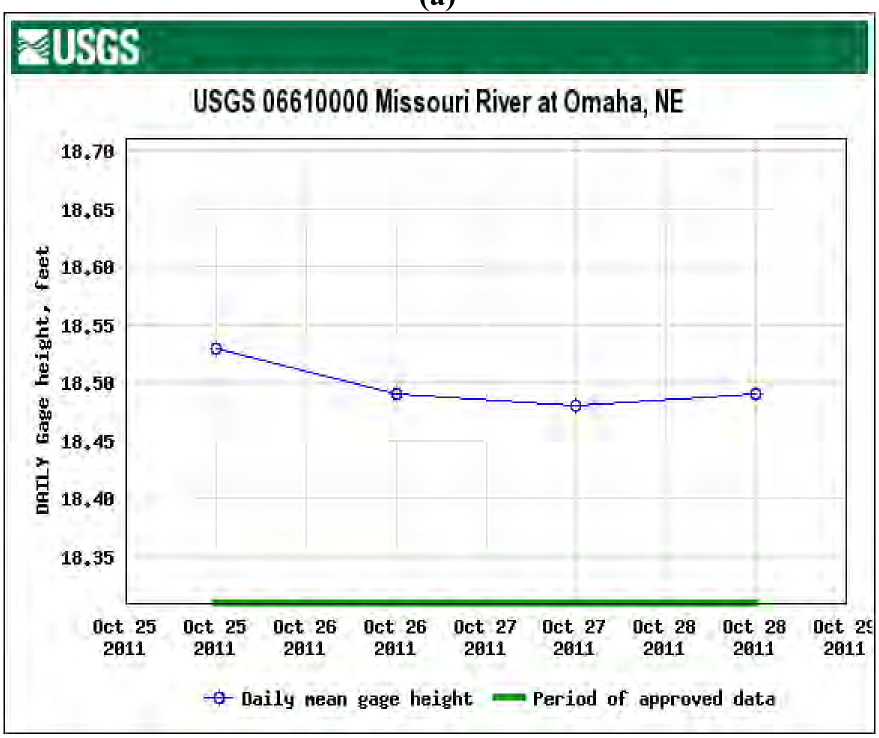
The Omaha, NE, Metropolitan Utilities District (M.U.D.) operates the Florence Potable Water Treatment Plant (PWTP), which discharges multiple wastewater streams to the Missouri River. These discharges are permitted under NPDES Permit No. NE0000914, which went into effect as of October 1, 2009. Part I, Item H, of that permit requires the M.U.D. to conduct an in-stream pH mixing zone study of waste chemical residuals discharged through Outfalls 001, 002, and 005 into the Missouri River. Outfall 001 discharges primarily filter backwash water and clearwell underdrainage water. The outfall discharge is intermittent, occurring when filters are in the backwash mode. Outfall 002 discharges chemical slurries twice a year when settling basins #1 and # 2 are cleaned. The cleaning process is generally less than 24-hr. Outfall 005 discharges blowdown from settling basin #3 and the plant's four upflow clarifiers. This is a continuous discharge, and the volume is dependent on plant operation. The objective of this study is to determine if the discharges from these outfalls attain a water pH from 6.5 to 9.0 at the end of the 125 ft acute mixing zone, and to evaluate suspended solids discharged from each of the outfalls (NPDES Permit No. NE0000914).

To satisfy the requirements for the pH field study, Tennessee Technological University's Center for the Management, Utilization, and Protection of Water Resources, in conjunction with EE&T Inc., conducted a mixing zone study at Outfalls 001, 002, and 005 from October 26-28, 2011. This mixing study included taking river velocity profiles at six transects and pH and total suspended analyses in the mixing zone. The results of the study are presented in this report. River flow (m^3/sec) and river gage height (ft) for the sampling period are shown Figure 2.

Figure 1. Florence PWTP Outfalls.



(a)



(b)

Figure 2. Missouri River flow (a) and gage height (b).

Methodology and Results

Transects:

Transect velocity and geomorphology data were obtained using the SonTek YSI RiverSurveyor® (Figure 3). This unit is a robust and accurate Acoustic Doppler Profiler flow measurement system designed to quickly measure river discharge from a moving vessel. Transect locations are shown in Figure 4. The transect data were obtained by tracking and recording GPS position using a Trimble® GeoXH GPS. The contours for each transect monitored are presented in Attachment A, Figures A1 through A14. The river channel geomorphology was relatively uniform over the area measured Figure 5. Discharge summary reports for each transect are presented with the contours. Average velocity was 1.22 m/s.

Figure 3. The SonTek YSI RiverSurveyor®.

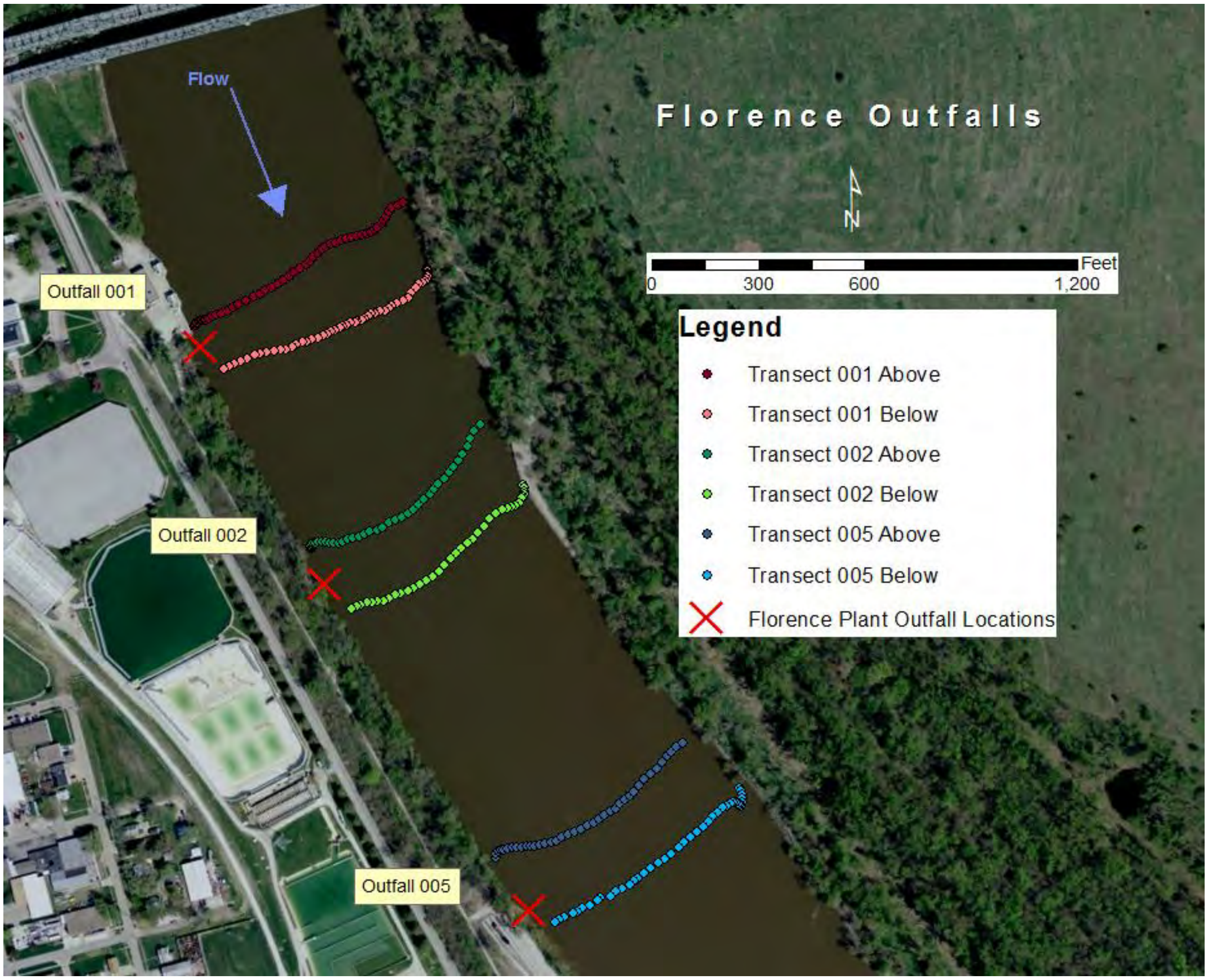


Figure 4. Florence Outfalls Transects.

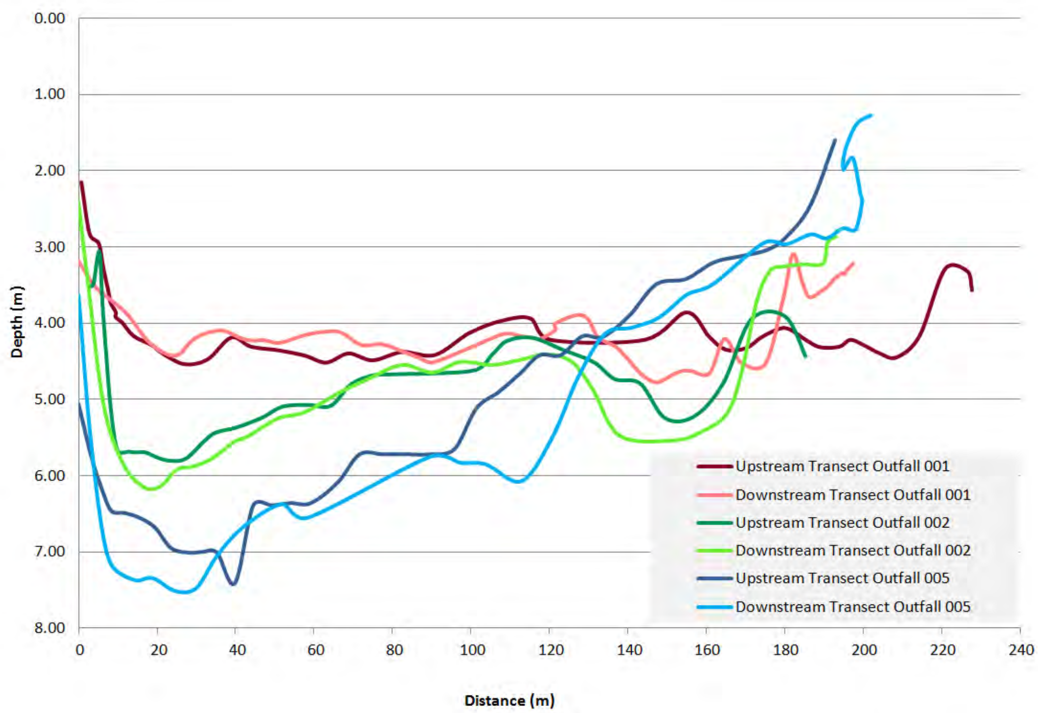


Figure 5. Graph of Florence PWTP Outfall Transects.

pH Field Study

pH Study Objective: The objective of the study was to determine the pH mixing zone when high pH chemical residual slurries are discharged through the Florence PWTP Outfalls 001, 002, and 005.

Methods: The pH mixing study was performed using the Trimble® GPS navigation system and datasondes that continuously record pH at specified time intervals. Two datasondes were mounted to the boat at a water depth of about 2 ft, and the second was deployed at varying depths of 5 to 8 ft. Both datasondes were Hydrolab® H2O. These units were calibrated using 7 and 10 pH buffer solutions and were checked for drift at the completion of the study. Analyses of calibration standards before and after field deployment are presented in Table 1.

Table 1. Calibration Drift Check for Datasondes.

		Calibration	Pre-Run		Post-Run	
			10/26/2011		10/28/2011	
Standard			7.00	10.00	7.00	10.00
Unit	SN	Date				
Hydrolab H2O	31476	10/26/2011	7.05	10.05	6.82	10.05
Hydrolab H2O	22107	10/26/2011	7.00	10.03	7.24	10.25

The pH data were collected every 15 seconds from the outfall to more than 250 ft downstream. The Trimble™ GeoXH GPS recorded position each second. A graphical overview of pH data collected is presented in Figure 6. The system times for the datasondes were synchronized with the Trimble™ GeoXH system time. Post-processing of the data allowed extraction and matching of pH data with GPS position based on time. This methodology allows for efficient collection of pH data in a high-velocity steam with intermittent outfall discharge. The sampling and collection schedule for the outfalls are shown in Table 2.

Table 2. Florence PWTP Sampling Schedule Oct. 26-28, 2011.

Outfall Sampled	Parameter	Date	Start	Complete	Discharge Status	Comments
001	pH	10/26/2011	15:14	15:40	ND	
001	pH	10/26/2011	15:41	15:55	Discharge	Intermittent discharge
001	pH	10/1/2711	14:31	15:04	ND	
001	pH	10/27/2011	15:04	15:15	Discharge	Intermittent discharge
001	pH	10/27/2011	15:15	15:49	ND	
001	pH	10/28/2011	11:35	11:43	ND	
001	pH	10/28/2011	13:45	14:03	ND	
001	pH	10/28/2011	14:03	14:15	Discharge	Intermittent discharge
001	TSS	10/27/2011	15:36	15:45	ND	
001	TSS	10/27/2011	15:36	15:45	ND	
001	TSS	10/28/2011	11:53	12:08	Discharge	Intermittent discharge
002	pH	10/26/2011	14:15	15:12	Decant water	Decant water from Basins 1& 2 discharge
002	pH	10/27/2011	9:01	10:52	Discharge	Residual solid slurry discharge from 7:30-11:30 AM
002	pH	10/27/2011	15:17	15:30	ND	Basin cleaning complete at 11:30 AM
002	TSS	10/27/2011	10:12	10:52	Discharge	Residual solid slurry discharge from 7:30-11:30
002	TSS	10/27/2011	15:36	15:45	ND	
005	pH	10/27/2011	12:19	13:23	Discharge	Continual discharge
005	TSS	10/27/2011	12:44	13:06	Discharge	Continual discharge

Results: Table 3 presents the approximate flows from each outfall from the Florence Potable Water Treatment Plant.

Table 3. Outfall Discharge information for the Florence Potable Water Treatment Plant.

	Outfall 001	Outfall 002 (draining)	Outfall 002 (washdown)	Outfall 005
Duration (hr)	0.25-0.33	4	6	continuous
Flow (gpm)	~14,400	~300-500	~100	~140-330
pH strength	Very low	Very low	low	medium

The pH data from the study are shown in Figure 6. All pH data collected are presented in Appendix B. The figures include upstream and downstream data, transitional data between grid points, and pH measurements in the vicinity of the discharge point. No pH monitoring data collected were significantly different from the background. The range for the pH was 8.0 to 8.56 with a mean of 8.3 (n=2,495 pH readings. The pH data were within the NPDES Permit No. NE0000914 water quality standards for pH (range of 6.5 to 9.0).

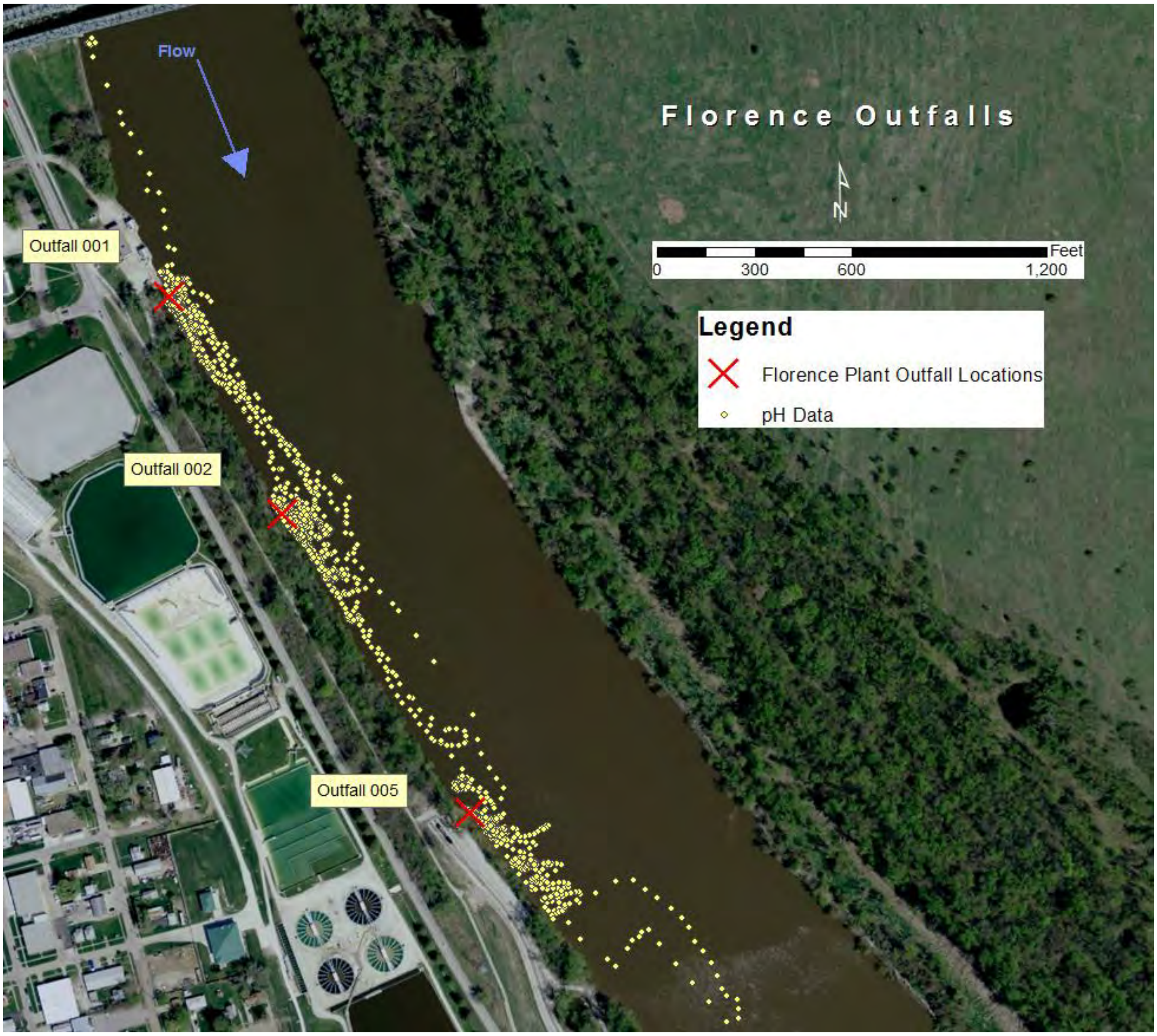


Figure 6. Florence Outfalls.

Total Suspended Solids Study

The pH measurements data were supplemented by the collection of upstream, mixing zone, and downstream water samples at a 0.8 depth that were analyzed for total suspended solids (TSS). TSS samples were collected by navigating to sampling positions using the Trimble GPS tracking system and continually tracking and recording the boat's GPS position. When the boat was positioned, the sample was collected and the time of collection recorded. Post-processing of data provided matching of GPS position with sample collection based on time of collection. A pull-ring grab sampler was used to collect samples at the specified depth. Samples were analyzed per Standard Methods 2540 D. The results of the analysis are shown in the Tables 4-6 below. The integrity of the sampling technique was verified by collection and analysis of field duplicates.

Results: TSS results are shown in Figures 7-9. Upstream data and non-discharge data were combined into a single dataset to determine background average and standard deviation. Except for the Outfall 002 upstream outlier (420), the average background TSS was 63 mg/L (± 40 mg/L). Residuals discharged from Outfall 001did not affect in-stream TSS levels that average 57 mg/L.

Chemical residuals from the basin cleaning at Outfall 002 contained high concentrations of TSS which created a plume with a maximum 7,724mg/L TSS at 50 ft downstream from the point of discharge. Two grab samples from the effluent averaged 4,635 mg/L. Discharge solids were not fully dissipated at 250 ft downstream. TSS levels in the Missouri River downstream from Outfall 005 exceeded background levels (average 208 mg/L vs. background level of 63 mg/L). This concentration was persistent at 250 ft downstream. The TSS concentrations upstream from Outfall 005 were also greater than 200 mg/L. The flow from Outfall 005 was 140 to 330 gpm (0.31 to 0.74 ft^3/s). With the flow rate in the Missouri River at approximately 47,000 ft^3/s, the discharge from Outfall 005 was negligible. It appears that the TSS upstream from Outfall 005 may have been solid residuals transport along the bottom of the river channel from Outfall 002.

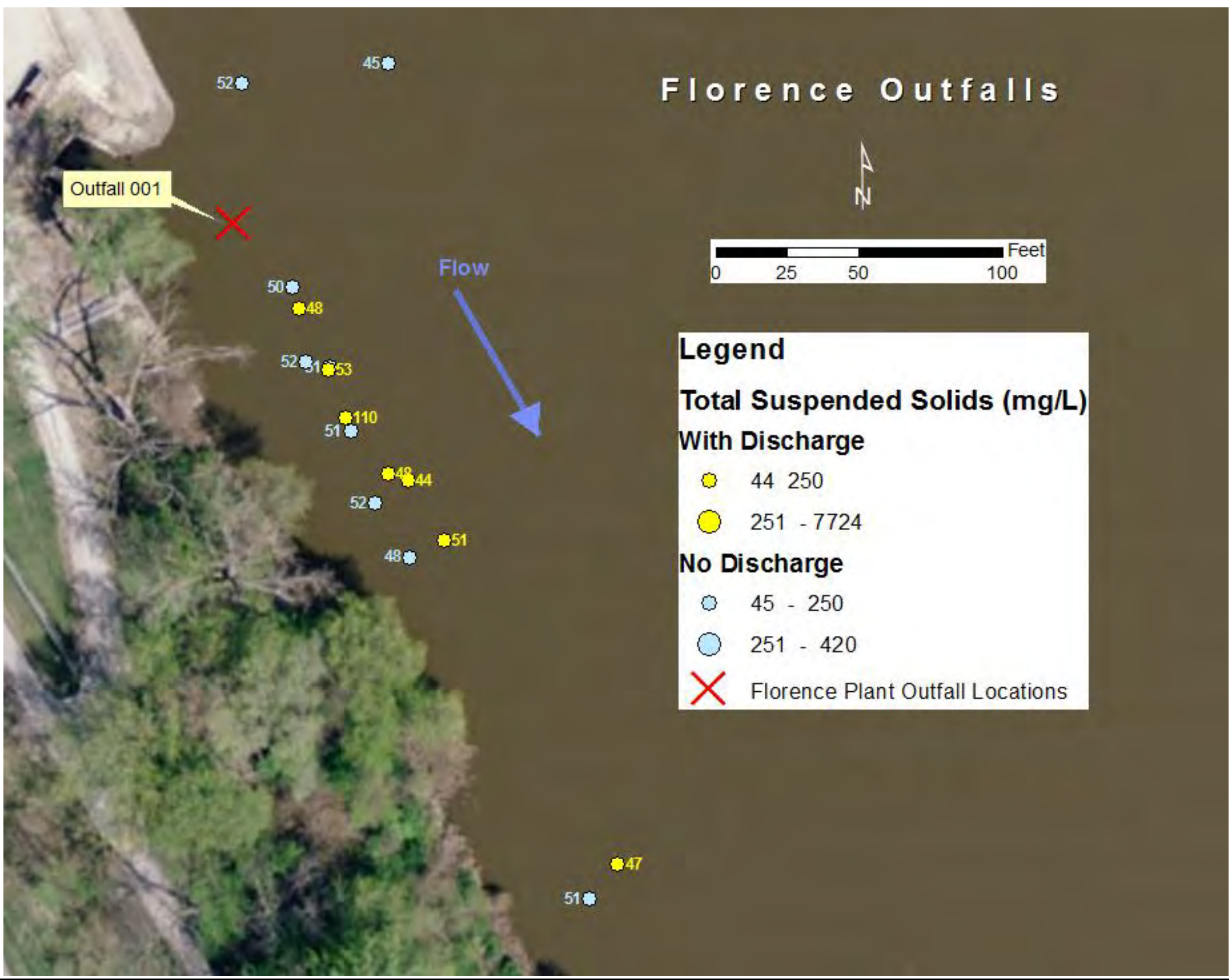


Figure 7. Florence Outfall 001 Total Suspended Solids Measurements.

Table 4. TSS Data from Outfall 001.				
OUTFALL	Location	Result (mg/L)	Flow	Time
001 Data				
001	01UPSTREAM	52	ND	12:11:58
001	01UPSTREAMEAST	45	ND	12:13:58
001	01ND25FT	50	ND	15:46:27
001	01ND50FT	51	ND	15:43:27
001	01ND50FTDUP	52	ND	15:45:12
001	01ND75FT	51	ND	15:41:42
001	01ND100FT	52	ND	15:40:12
001	01ND125FT	48	ND	15:38:12
001	01ND250FT	51	ND	15:36:12
001	01D25FT	48	D	11:58:13
001	01D50FT	53	D	11:56:43
001	01D75FT	110	D	11:54:58
001	01D100FT	48	D	12:06:02
001	01D100FTDUP	44	D	12:08:28
001	01D125FT	51	D	12:03:13
001	01D250FT	47	D	12:00:28

Key:
ND = No Discharge
D = Discharge

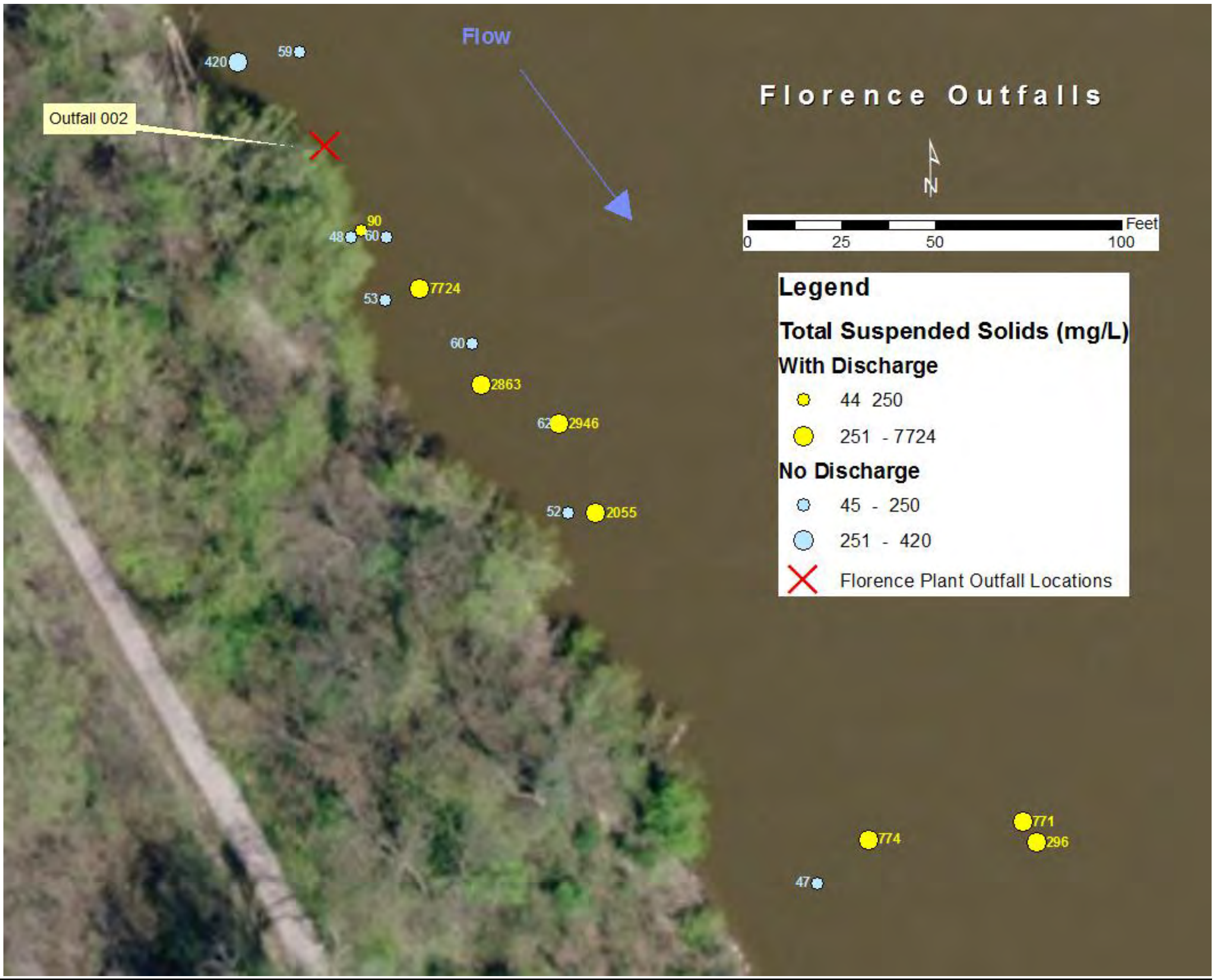


Figure 8. Florence Outfall 002 Total Suspended Solids Measurements.

Table 5. TSS Data from Outfall 002.				
002	02UPSTREAMEAST	59	ND	10:39:15
002	02UPSTREAM	420	ND	10:36:00
002	02ND25FT	60	ND	15:27:27
002	02ND25FTDUP	48	ND	15:29:12
002	02ND50FT	53	ND	15:26:12
002	02ND75FT	60	ND	15:24:12
002	02ND100FT	62	ND	15:21:57
002	02ND125FT	52	ND	15:17:42
002	02ND250FT	47	ND	15:17:42
002	02EFF	4620	D	
002	02EFFTOPWATER	4349	D	
002	02D25FT	90	D	10:31:57
002	02D50FT	7724	D	10:30:00
002	02D75FT	2863	D	10:27:45
002	02D100FT	2946	D	10:25:30
002	02D125FT	2055	D	10:17:00
002	02D250FT	774	D	10:17:00
002	02D250FTDUP	771	D	10:11:15
002	02D250FTEAST	296	D	10:12:15

Key:
ND = No Discharge
D = Discharge

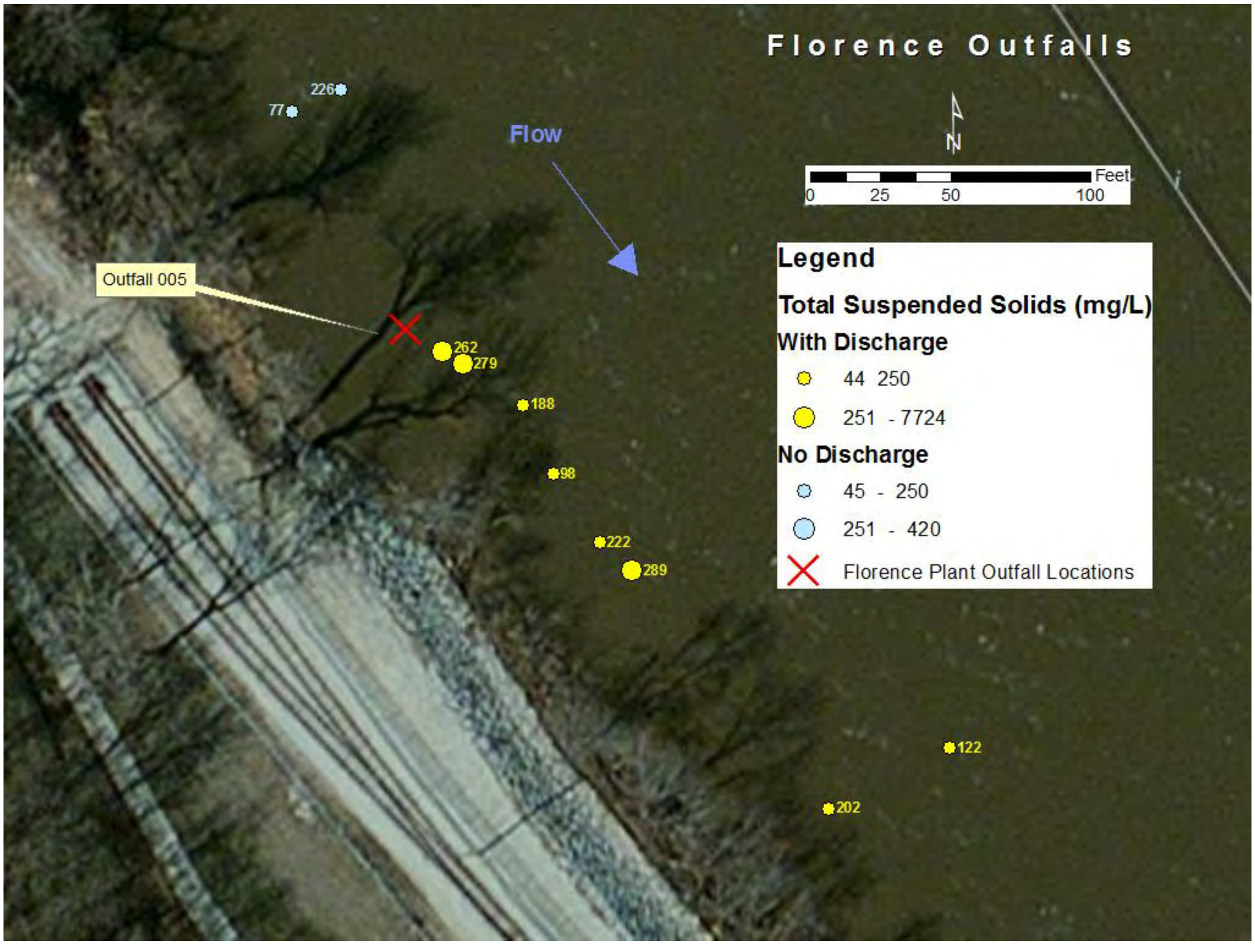


Figure 9. Florence Outfall 005 Total Suspended Solids Measurements.

Table 6. TSS Data from Outfall 005.				
005	05UPSTREAMEAST	226	ND	12:46:30
005	05UPSTREAM	77	ND	12:44:45
005	05D25FT	262	D	13:04:15
005	05D25FTDUP	279	D	13:05:30
005	05D50FT	188	D	13:02:15
005	05D75FT	98	D	13:00:15
005	05D100FT	222	D	12:57:45
005	05D125FT	289	D	12:55:45
005	05D250FT	202	D	12:50:00
005	05D250FTEAST	122	D	12:53:30

Key:
ND = No Discharge
D = Discharge

Appendix A.1: River Surveyor Data

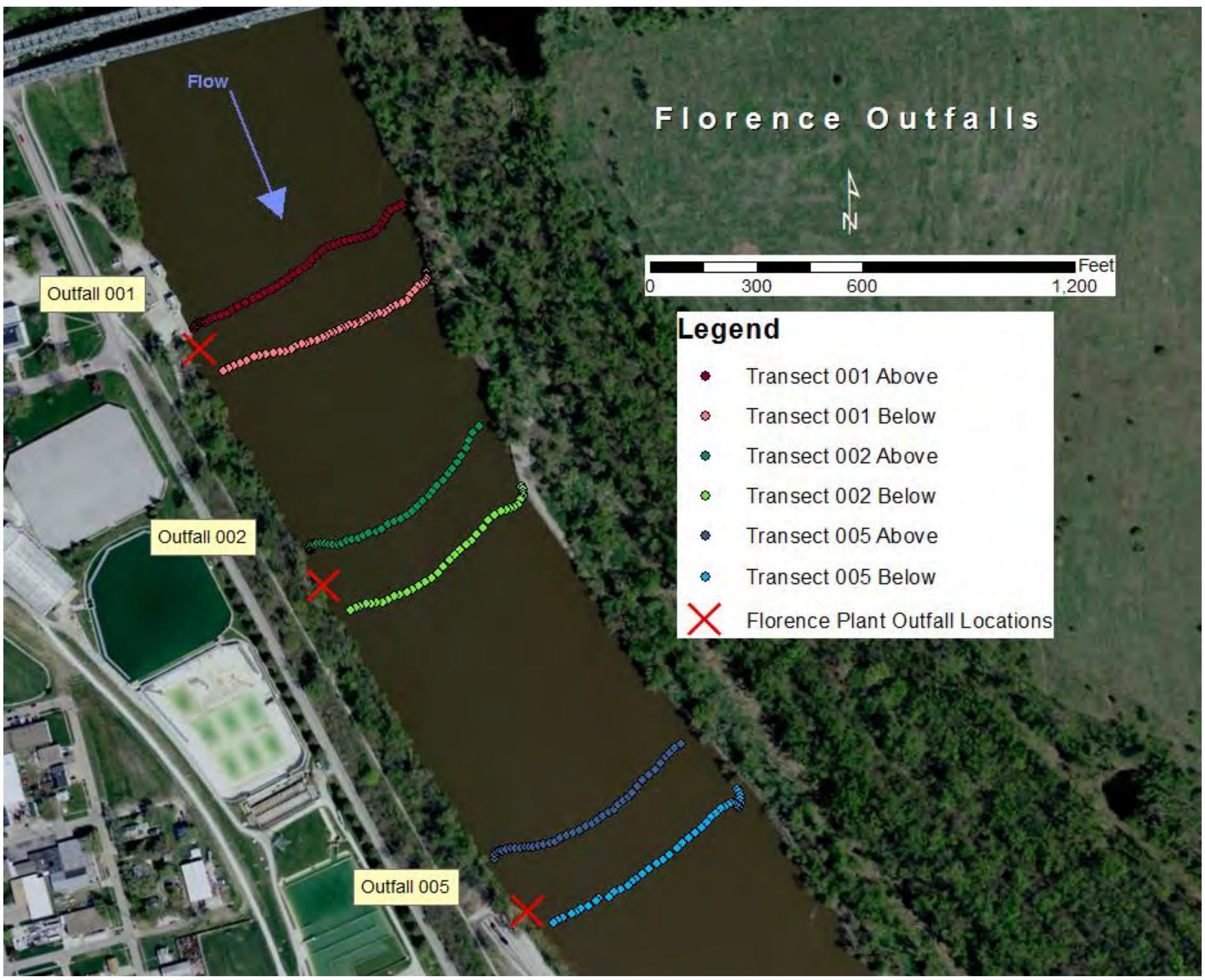


Figure A1. Florence PWTP Outfall Transects.

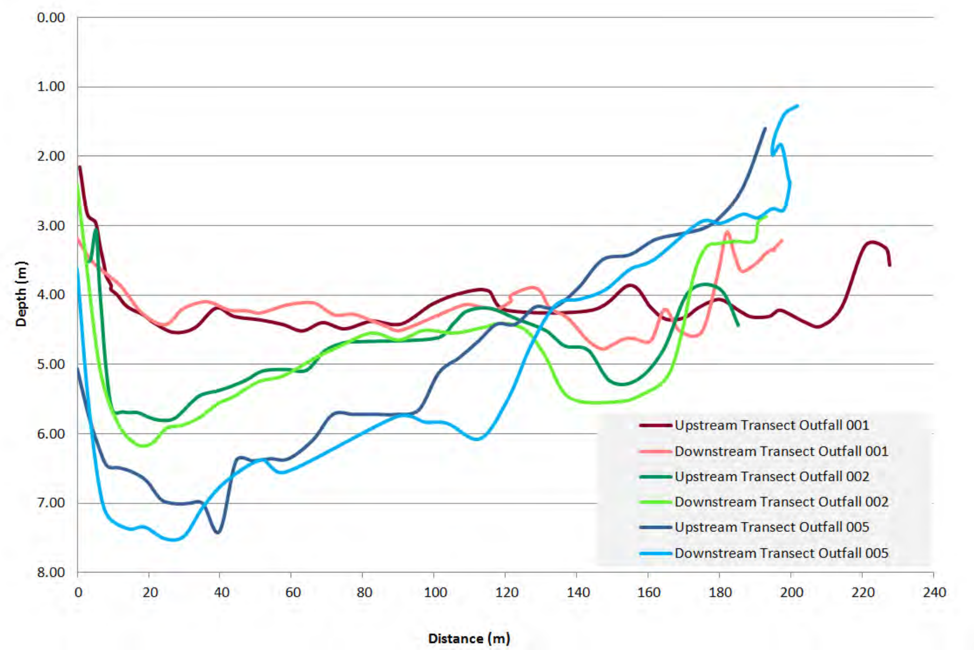


Figure A2. Graph of Florence PWTP Outfall Transects.

Discharge Measurement Summary — Date

Station Information

Station Number	
Station Name	
Location	Florence 001 upstream

Measurement Information

Measurement No.	1
Compiled By	
Checked By	

Personnel and Equipment

Party		Boat/Motor/Platform	

Rating Information

Gage Height	18.48	Rating Discharge		Rating No.	
GH Change		Index Velocity		Meas. Rating	
% Diff.	0.0%	Rated Area		Control Code	

System Information

Serial #	M862
System Frequency	1500 kHz
Firmware Version	9.6
RiverSurveyor Ver	v4.60

System Setup

# of Cells	25	Averaging Interval	5.0
Cell Size	0.40	Magnetic Decl.	3.4
Blanking Distance	0.40	Salinity	5.00
Transducer Depth	0.25	Echo Sounder	Not Pres.

Discharge Calculation Settings

Velocity Ref.	BTrack	Top Estimate	Power	Left Bank	Sloped
Track Ref.	BTrack	Bottom Est.	Power	Right Bank	Sloped
Depth Reference	ADP	Area Method	none	Orient. Profiles	all

Computed Discharge Results

Width	229.8
Area	950.3
Mean Velocity	1.46
Discharge	-1383.5
% Measured	65.4
Adj. Mean Velocity	0

Diagnostic Files

Moving Bed Test

Compass Cal

Pressure Cal

Depth Calibration

Measurement Results

		Discharge						Distance				Time		Mean Vel		#Profiles	
Tr#		Top	Middle	Bottom	Left	Right	Total	Left	Right	Total	Area	Start	End	Boat	Water	Total	Bad
1	L	-316.76	-905.17	-162.02	0	0.37024	-1383.5	1.0	1.0	229.8	950.3	14:49	14:54	0.81	1.46	56	0
Mean		-316.76	-905.17	-162.02	0	0.37024	-1383.5	1.0	1.0	229.8	950.3	Total	00:27	0.81	1.46	56	0
SDev		0	0	0	0	0	0	0.0	0.0	0.0	0.0			0.00	0.00		
COV		0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000		

Tr1=FLOR110281449.ADP;

*Gage Height units-ft. Computed Discharge Results are in metric: Width – m, Area – m^2, Mean Velocity – m/s, Discharge – m^3/s (negative sign is directional not quantitative).

Figure A3. Upstream Transect Outfall 001, October 28, 2011.

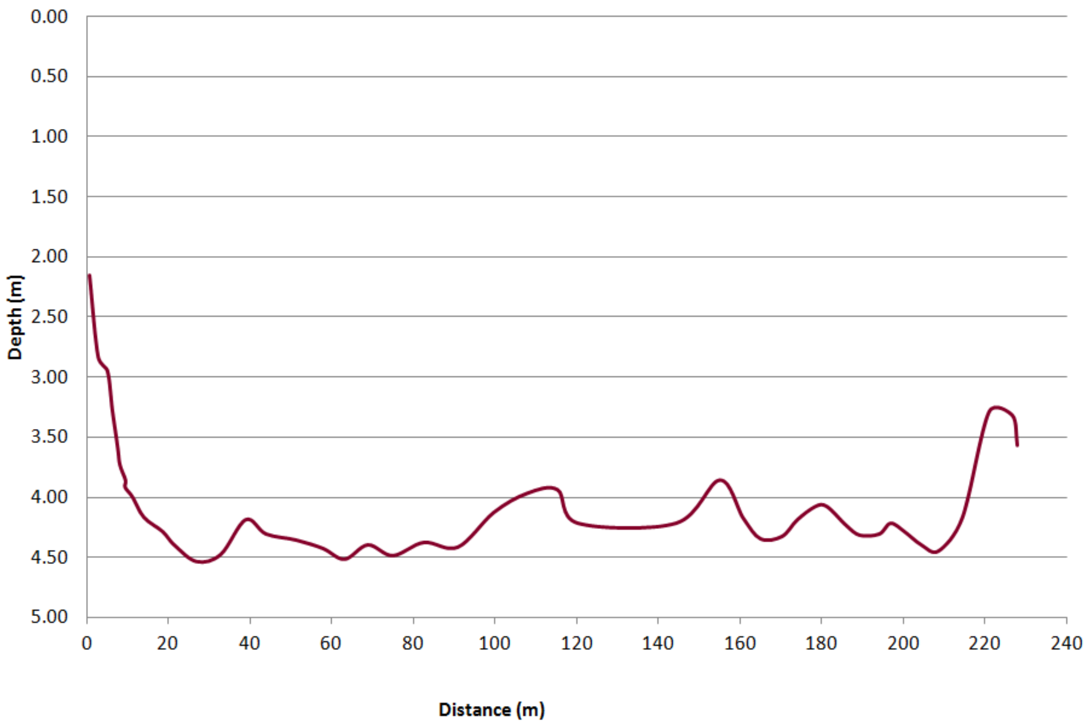


Figure A4. Graph of Upstream Transect Outfall 001.

Discharge Measurement Summary | Date

Station Information

Station Number	
Station Name	
Location	Outfall 001 downstream

Measurement Information

Measurement No.	Flor110281455
Compiled By	
Checked By	

Personnel and Equipment

Party | Boat/Motor/Platform

Rating Information

Gage Height	18.48	Rating Discharge		Rating No.	
GH Change		Index Velocity		Meas. Rating	
% Diff.	0.0%	Rated Area		Control Code	

System Information

Serial #	M862
System	1500 kHz
Frequency	
Firmware Version	9.6
RiverSurveyor Ver	v4.60

System Setup

# of Cells	25	Averaging Interval	5.0
Cell Size	0.40	Magnetic Decl.	3.4
Blanking Distance	0.40	Salinity	5.00
Transducer Depth	0.25	Echo Sounder	Not Pres.

Discharge Calculation Settings

Velocity Ref.	BTrack	Top Estimate	Power	Left Bank	Sloped
Track Ref.	BTrack	Bottom Est.	Power	Right Bank	Sloped
Depth Reference	ADP	Area Method	none	Orient. Profiles	all

Computed Discharge Results

Width	208.1
Area	845.6
Mean Velocity	1.39
Discharge	-1173.1
% Measured	64.9
Adj. Mean Velocity	0

Diagnostic Files

Moving Bed Test
Compass Cal
Pressure Cal
Depth Calibration

Measurement Results

		Discharge						Distance				Time		Mean Vel		#Profiles	
Tr#		Top	Middle	Bottom	Left	Right	Total	Left	Right	Total	Area	Start	End	Boat	Water	Total	Bad
2	R	-271.2	-761.21	-143.64	-1.53	4.4769	-1173.1	1.0	8.0	208.1	845.6	14:55	14:59	0.75	1.39	53	0
Mean		-271.2	-761.21	-143.64	-1.53	4.4769	-1173.1	1.0	8.0	208.1	845.6	Total	00:27	0.75	1.39	53	0
SDev		0	0	0	0	0	0	0.0	0.0	0.0	0.0			0.00	0.00		
COV		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000		

Tr2=FLOR110281455.ADP;

*Gage Height units-ft. Computed Discharge Results are in metric: Width – m, Area – m^2, Mean Velocity – m/s, Discharge – m^3/s (negative sign is directional not quantitative).

Figure A5. Downstream Transect Outfall 001, October 28, 2011.

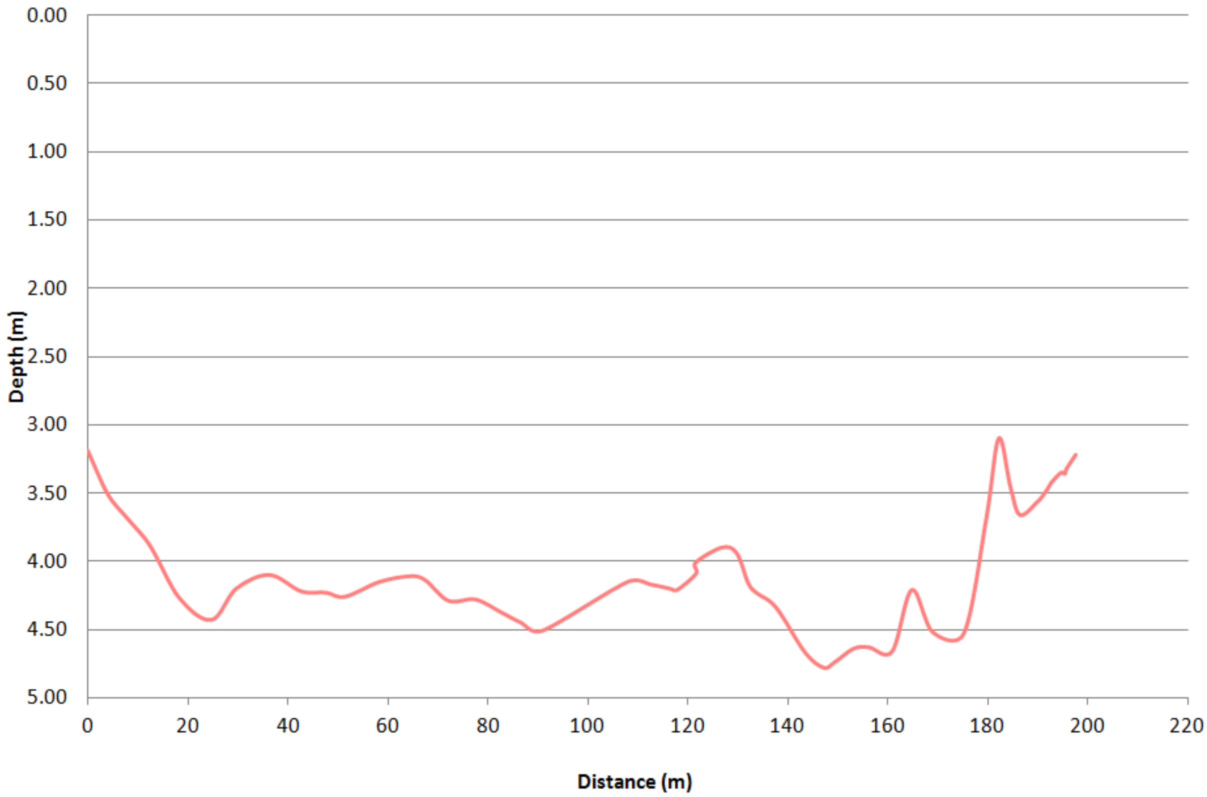


Figure A6. Graph of Downstream Transect Outfall 001.

Discharge Measurement Summary　　　　　　　　Date

Station Information	
Station Number	
Station Name	
Location	002 Upstream

Measurement Information	
Measurement No.	Flor1110281502
Compiled By	
Checked By	

Personnel and Equipment	
Party	Boat/Motor/Platform

Rating Information					
Gage Height	18.48	Rating Discharge		Rating No.	
GH Change		Index Velocity		Meas. Rating	
% Diff.	0.0%	Rated Area		Control Code	

System Information	
Serial #	M862
System	1500 kHz
Frequency	
Firmware Version	9.6
RiverSurveyor Ver	v4.60

System Setup			
# of Cells	25	Averaging Interval	5.0
Cell Size	0.40	Magnetic Decl.	3.4
Blanking Distance	0.40	Salinity	5.00
Transducer Depth	0.25	Echo Sounder	Not Pres.

Discharge Calculation Settings					
Velocity Ref.	BTrack	Top Estimate	Power	Left Bank	Sloped
Track Ref.	BTrack	Bottom Est.	Power	Right Bank	Sloped
Depth Reference	ADP	Area Method	none	Orient. Profiles	all

Computed Discharge Results	
Width	204.2
Area	923.9
Mean Velocity	1.21
Discharge	-1116.7
% Measured	67.5
Adj. Mean Velocity	0

Diagnostic Files
Moving Bed Test
Compass Cal
Pressure Cal
Depth Calibration

Measurement Results

		Discharge						Distance				Time		Mean Vel		#Profiles	
Tr#		Top	Middle	Bottom	Left	Right	Total	Left	Right	Total	Area	Start	End	Boat	Water	Total	Bad
4	L	-221.2	-753.53	-134.88	-3.3773	-3.7805	-1116.7	4.0	15.0	204.2	923.9	15:02	15:05	0.90	1.21	41	0
Mean		-221.2	-753.53	-134.88	-3.3773	-3.7805	-1116.7	4.0	15.0	204.2	923.9	Total	00:27	0.90	1.21	41	0
SDev		0	0	0	0	0	0	0.0	0.0	0.0	0.0			0.00	0.00		
COV		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000		

Tr4=FLOR1110281502.ADP;

*Gage Height units-ft. Computed Discharge Results are in metric: Width – m, Area – m^2, Mean Velocity – m/s, Discharge – m^3/s (negative sign is directional not quantitative).

Figure A7. Upstream Transect Outfall 002, October 28, 2011.

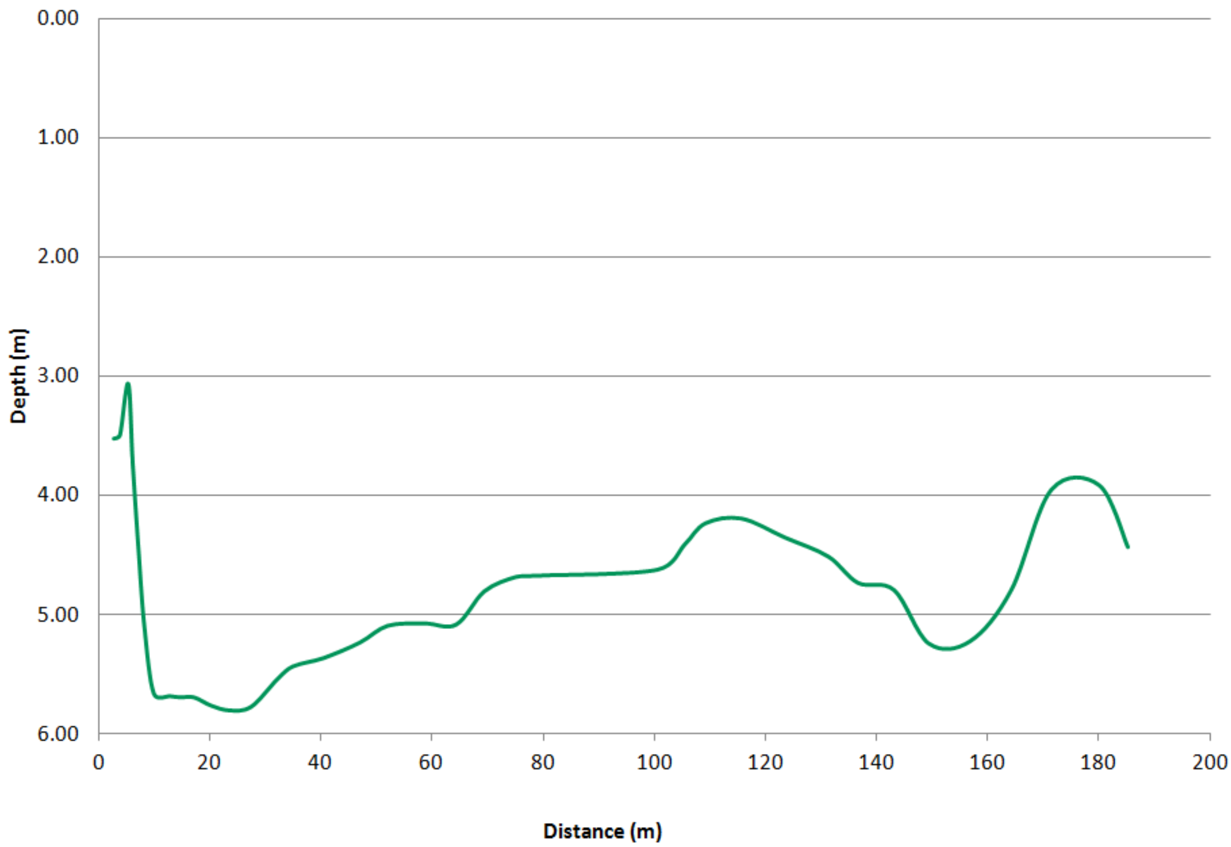


Figure A8. Upstream Transect Outfall 002.

Discharge Measurement Summary — Date

Station Information	
Station Number	
Station Name	
Location	Outfall 002 downstream

Measurement Information	
Measurement No.	Flor1110281508
Compiled By	
Checked By	

Personnel and Equipment	
Party	Boat/Motor/Platform

Rating Information					
Gage Height	18.48	Rating Discharge		Rating No.	
GH Change		Index Velocity		Meas. Rating	
% Diff.	0.0%	Rated Area		Control Code	

System Information	
Serial #	M862
System	1500 kHz
Frequency	
Firmware Version	9.6
RiverSurveyor Ver	v4.60

System Setup			
# of Cells	25	Averaging Interval	5.0
Cell Size	0.40	Magnetic Decl.	3.4
Blanking Distance	0.40	Salinity	5.00
Transducer Depth	0.25	Echo Sounder	Not Pres.

Discharge Calculation Settings					
Velocity Ref.	BTrack	Top Estimate	Power	Left Bank	Sloped
Track Ref.	BTrack	Bottom Est.	Power	Right Bank	Sloped
Depth Reference	ADP	Area Method	none	Orient. Profiles	all

Computed Discharge Results	
Width	209.5
Area	972.9
Mean Velocity	1.19
Discharge	-1160.8
% Measured	68.8
Adj. Mean Velocity	0

Diagnostic Files
Moving Bed Test
Compass Cal
Pressure Cal
Depth Calibration

Measurement Results

		Discharge						Distance				Time		Mean Vel		#Profiles	
Tr#		Top	Middle	Bottom	Left	Right	Total	Left	Right	Total	Area	Start	End	Boat	Water	Total	Bad
5	R	-222.06	-798.26	-135.8	-6.4511	1.7632	-1160.8	7.0	5.0	209.5	972.9	15:07	15:11	1.04	1.19	38	0
Mean		-222.06	-798.26	-135.8	-6.4511	1.7632	-1160.8	7.0	5.0	209.5	972.9	Total	00:27	1.04	1.19	38	0
SDev		0	0	0	0	0	0	0.0	0.0	0.0	0.0			0.00	0.00		
COV		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000		

Tr5=FLOR1110281508.ADP;

*Gage Height units-ft. Computed Discharge Results are in metric: Width – m, Area – m^2, Mean Velocity – m/s, Discharge – m^3/s (negative sign is directional not quantitative).

Figure A9. Downstream Transect Outfall 002, October 28, 2011.

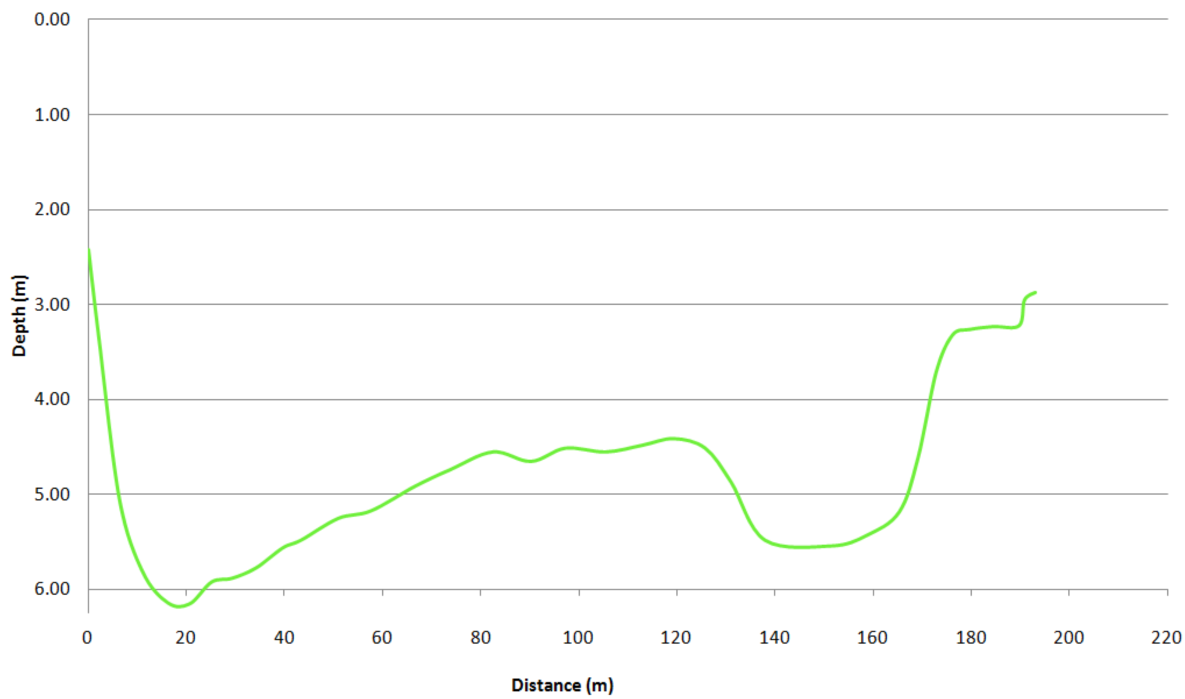


Figure A10. Downstream Transect Outfall 002.

Discharge Measurement Summary — Date

Station Information	
Station Number	
Station Name	
Location	Outfall 005 upstream

Measurement Information	
Measurement No.	Flor11101513
Compiled By	
Checked By	

Personnel and Equipment	
Party	
Boat/Motor/Platform	

Rating Information					
Gage Height	18.48	Rating Discharge		Rating No.	
GH Change		Index Velocity		Meas. Rating	
% Diff.	0.0%	Rated Area		Control Code	

System Information	
Serial #	M862
System	1500 kHz
Frequency	
Firmware Version	9.6
RiverSurveyor Ver	v4.60

System Setup			
# of Cells	25	Averaging Interval	5.0
Cell Size	0.40	Magnetic Decl.	3.4
Blanking Distance	0.40	Salinity	5.00
Transducer Depth	0.25	Echo Sounder	Not Pres.

Discharge Calculation Settings					
Velocity Ref.	BTrack	Top Estimate	Power	Left Bank	Sloped
Track Ref.	BTrack	Bottom Est.	Power	Right Bank	Sloped
Depth Reference	ADP	Area Method	none	Orient. Profiles	all

Computed Discharge Results	
Width	214.6
Area	977.5
Mean Velocity	1.11
Discharge	-1086.3
% Measured	68.3
Adj. Mean Velocity	0

Diagnostic Files
Moving Bed Test
Compass Cal
Pressure Cal
Depth Calibration

Measurement Results

		Discharge						Distance				Time		Mean Vel		#Profiles	
Tr#		Top	Middle	Bottom	Left	Right	Total	Left	Right	Total	Area	Start	End	Boat	Water	Total	Bad
7	L	-206.54	-742.12	-133.08	-2.1209	-2.4071	-1086.3	8.0	10.0	214.6	977.5	15:13	15:16	0.82	1.11	41	0
Mean		-206.54	-742.12	-133.08	-2.1209	-2.4071	-1086.3	8.0	10.0	214.6	977.5	Total	00:27	0.82	1.11	41	0
SDev		0	0	0	0	0	0	0.0	0.0	0.0	0.0			0.00	0.00		
COV		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000		

Tr7=FLOR1110281513.ADP;

*Gage Height units-ft. Computed Discharge Results are in metric: Width – m, Area – m^2, Mean Velocity – m/s, Discharge – m^3/s (negative sign is directional not quantitative).

Figure A11. Upstream Transect Outfall 005, October 28, 2011.

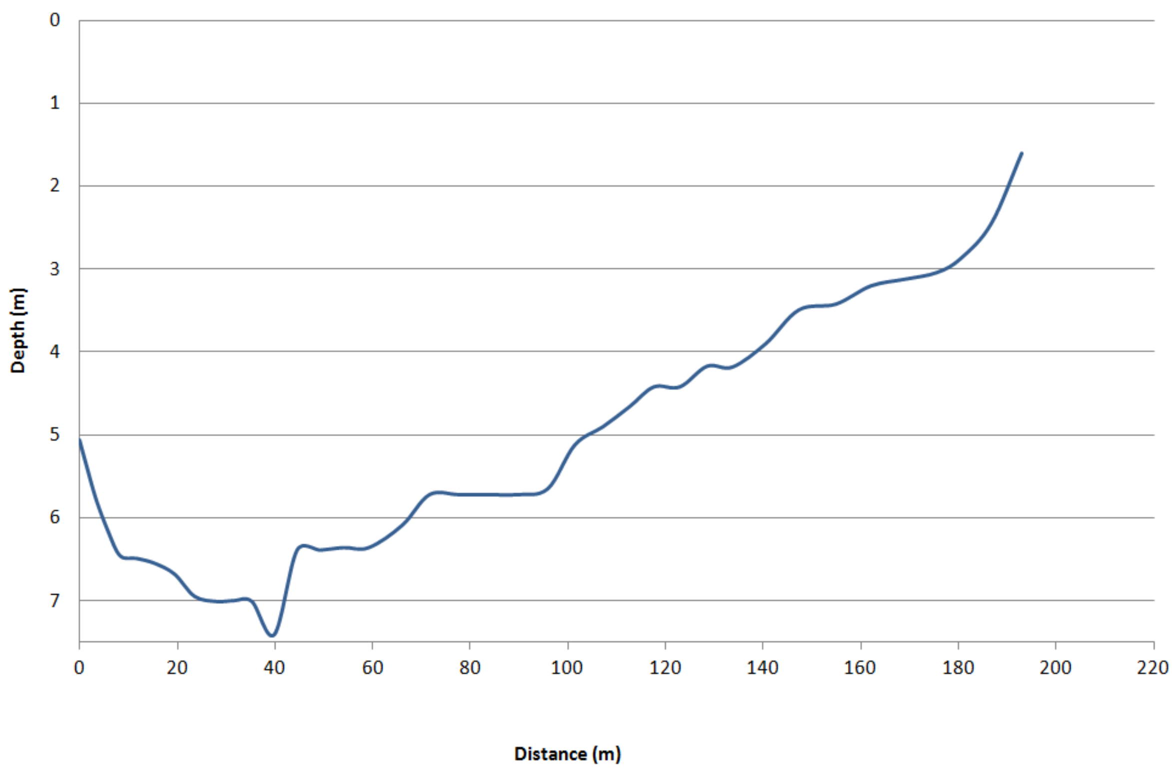


Figure A12. Upstream Transect Outfall 005.

Discharge Measurement Summary | Date

Station Information

Station Number	
Station Name	
Location	Outfall 005 downstream

Measurement Information

Measurement No.	Flor1110281518
Compiled By	
Checked By	

Personnel and Equipment

Party		Boat/Motor/Platform	

Rating Information

Gage Height		Rating Discharge		Rating No.	
GH Change		Index Velocity		Meas. Rating	
% Diff.	0.0%	Rated Area		Control Code	

System Information

Serial #	M862
System	1500 kHz
Frequency	
Firmware Version	9.6
RiverSurveyor Ver	v4.60

System Setup

# of Cells	25	Averaging Interval	5.0
Cell Size	0.40	Magnetic Decl.	3.4
Blanking Distance	0.40	Salinity	5.00
Transducer Depth	0.25	Echo Sounder	Not Pres.

Discharge Calculation Settings

Velocity Ref.	BTrack	Top Estimate	Power	Left Bank	Sloped
Track Ref.	BTrack	Bottom Est.	Power	Right Bank	Sloped
Depth Reference	ADP	Area Method	none	Orient. Profiles	all

Computed Discharge Results

Width	221.5
Area	1088.3
Mean Velocity	0.98
Discharge	-1069.7
% Measured	69.4
Adj. Mean Velocity	0

Diagnostic Files

Moving Bed Test
Compass Cal
Pressure Cal
Depth Calibration

Measurement Results

Tr#		Discharge						Distance				Time		Mean Vel		#Profiles	
		Top	Middle	Bottom	Left	Right	Total	Left	Right	Total	Area	Start	End	Boat	Water	Total	Bad
8	R	-192.38	-742.46	-134.48	-0.41235	0	-1069.7	3.0	10.0	221.5	1088.3	15:17	15:21	0.95	0.98	44	0
Mean		-192.38	-742.46	-134.48	-0.41235	0	-1069.7	3.0	10.0	221.5	1088.3	Total	00:32	0.95	0.98	44	0
SDev		0	0	0	0	0	0	0.0	0.0	0.0	0.0			0.00	0.00		
COV		0.000	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000			0.000	0.000		

Tr8=FLOR1110281518.ADP;

*Gage Height units-ft. Computed Discharge Results are in metric: Width – m, Area – m^2, Mean Velocity – m/s, Discharge – m^3/s (negative sign is directional not quantitative).

Figure A13. Downstream Transect Outfall 005, October 28, 2011.

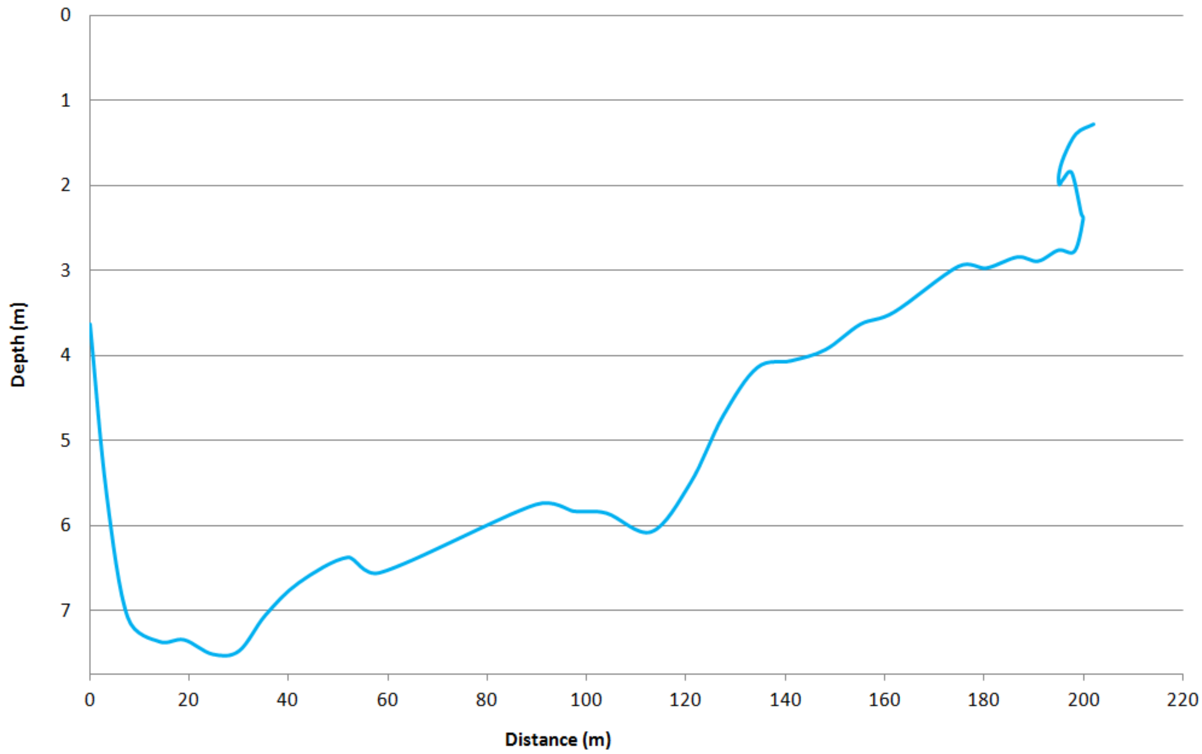


Figure A14. Downstream Transect Outfall 005.

Appendix B: pH Data

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/26/2011	18410	15:14:26	3.20	8.29	ND
001	10/26/2011	18410	15:14:41	5.30	8.38	ND
001	10/26/2011	18410	15:14:56	5.70	8.25	ND
001	10/26/2011	18410	15:15:11	4.90	8.28	ND
001	10/26/2011	18410	15:15:26	5.80	8.22	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/26/2011	18410	15:15:56	5.70	8.20	ND
001	10/26/2011	18410	15:16:11	5.70	8.21	ND
001	10/26/2011	18410	15:16:26	5.70	8.21	ND
001	10/26/2011	18410	15:16:41	5.70	8.21	ND
001	10/26/2011	18410	15:17:26	6.00	8.15	ND
001	10/26/2011	18410	15:17:41	6.10	8.12	ND
001	10/26/2011	18410	15:17:56	5.80	8.13	ND
001	10/26/2011	18410	15:18:11	5.60	8.16	ND
001	10/26/2011	18410	15:18:26	6.90	8.22	ND
001	10/26/2011	18410	15:19:26	7.00	8.31	ND
001	10/26/2011	18410	15:19:56	8.20	8.14	ND
001	10/26/2011	18410	15:20:11	7.80	8.16	ND
001	10/26/2011	18410	15:20:26	7.70	8.12	ND
001	10/26/2011	18410	15:20:41	7.80	8.16	ND
001	10/26/2011	18410	15:20:56	7.60	8.13	ND
001	10/26/2011	18410	15:21:11	7.80	8.13	ND
001	10/26/2011	18410	15:21:26	7.90	8.12	ND
001	10/26/2011	18410	15:21:41	8.00	8.14	ND
001	10/26/2011	18410	15:21:56	8.20	8.12	ND
001	10/26/2011	18410	15:22:11	8.10	8.16	ND
001	10/26/2011	18410	15:22:26	8.00	8.11	ND
001	10/26/2011	18410	15:22:41	7.90	8.11	ND
001	10/26/2011	18410	15:22:56	8.20	8.13	ND
001	10/26/2011	18410	15:23:11	7.80	8.11	ND
001	10/26/2011	18410	15:23:26	8.30	8.12	ND
001	10/26/2011	18410	15:23:41	8.20	8.14	ND
001	10/26/2011	18410	15:23:56	8.20	8.12	ND
001	10/26/2011	18410	15:24:11	8.30	8.11	ND
001	10/26/2011	18410	15:24:26	7.80	8.11	ND
001	10/26/2011	18410	15:24:41	7.90	8.12	ND
001	10/26/2011	18410	15:24:56	8.30	8.12	ND
001	10/26/2011	18410	15:25:11	8.00	8.11	ND
001	10/26/2011	18410	15:25:26	7.80	8.15	ND
001	10/26/2011	18410	15:25:41	7.50	8.20	ND
001	10/26/2011	18410	15:25:56	7.80	8.20	ND
001	10/26/2011	18410	15:26:11	7.30	8.23	ND
001	10/26/2011	18410	15:26:26	6.80	8.23	ND
001	10/26/2011	18410	15:26:41	7.80	8.22	ND
001	10/26/2011	18410	15:26:56	7.70	8.21	ND
001	10/26/2011	18410	15:27:11	7.90	8.22	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/26/2011	18410	15:27:26	7.70	8.21	ND
001	10/26/2011	18410	15:27:41	8.00	8.22	ND
001	10/26/2011	18410	15:27:56	8.00	8.21	ND
001	10/26/2011	18410	15:28:11	8.00	8.21	ND
001	10/26/2011	18410	15:28:26	7.70	8.20	ND
001	10/26/2011	18410	15:28:41	8.20	8.19	ND
001	10/26/2011	18410	15:28:56	8.10	8.15	ND
001	10/26/2011	18410	15:29:11	7.90	8.13	ND
001	10/26/2011	18410	15:29:26	7.60	8.15	ND
001	10/26/2011	18410	15:29:41	8.00	8.11	ND
001	10/26/2011	18410	15:29:56	8.10	8.13	ND
001	10/26/2011	18410	15:30:11	7.90	8.12	ND
001	10/26/2011	18410	15:30:26	8.00	8.12	ND
001	10/26/2011	18410	15:30:41	8.10	8.12	ND
001	10/26/2011	18410	15:30:56	8.00	8.10	ND
001	10/26/2011	18410	15:31:11	8.00	8.11	ND
001	10/26/2011	18410	15:31:26	8.10	8.12	ND
001	10/26/2011	18410	15:31:41	8.10	8.11	ND
001	10/26/2011	18410	15:31:56	8.10	8.20	ND
001	10/26/2011	18410	15:32:11	8.00	8.06	ND
001	10/26/2011	18410	15:32:26	8.00	8.13	ND
001	10/26/2011	18410	15:32:41	8.00	8.07	ND
001	10/26/2011	18410	15:32:56	7.70	8.07	ND
001	10/26/2011	18410	15:33:11	7.90	8.09	ND
001	10/26/2011	18410	15:33:26	8.00	8.09	ND
001	10/26/2011	18410	15:33:41	7.90	8.13	ND
001	10/26/2011	18410	15:33:56	8.10	8.00	ND
001	10/26/2011	18410	15:34:11	8.20	8.04	ND
001	10/26/2011	18410	15:34:26	8.20	8.05	ND
001	10/26/2011	18410	15:34:41	8.00	8.09	ND
001	10/26/2011	18410	15:34:56	7.90	8.06	ND
001	10/26/2011	18410	15:35:11	8.10	8.07	ND
001	10/26/2011	18410	15:35:26	8.10	8.08	ND
001	10/26/2011	18410	15:35:41	8.00	8.07	ND
001	10/26/2011	18410	15:35:56	8.00	8.12	ND
001	10/26/2011	18410	15:36:11	8.00	8.09	ND
001	10/26/2011	18410	15:36:26	8.30	8.08	ND
001	10/26/2011	18410	15:36:41	8.00	8.09	ND
001	10/26/2011	18410	15:36:56	8.00	8.08	ND
001	10/26/2011	18410	15:37:11	8.00	8.06	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/26/2011	18410	15:37:26	8.10	8.06	ND
001	10/26/2011	18410	15:37:41	8.10	8.05	ND
001	10/26/2011	18410	15:37:56	7.90	8.05	ND
001	10/26/2011	18410	15:38:11	8.20	8.10	ND
001	10/26/2011	18410	15:38:26	8.10	8.08	ND
001	10/26/2011	18410	15:38:41	7.70	8.04	Filter Backwash
001	10/26/2011	18410	15:38:56	8.10	8.04	Filter Backwash
001	10/26/2011	18410	15:39:11	8.40	8.05	Filter Backwash
001	10/26/2011	18410	15:39:26	8.20	8.07	Filter Backwash
001	10/26/2011	18410	15:39:41	8.10	8.13	Filter Backwash
001	10/26/2011	18410	15:39:56	7.80	8.05	Filter Backwash
001	10/26/2011	18410	15:40:11	8.10	8.08	Filter Backwash
001	10/26/2011	18410	15:40:26	7.80	8.10	Filter Backwash
001	10/26/2011	18410	15:40:41	8.00	8.10	Filter Backwash
001	10/26/2011	18410	15:40:56	8.20	8.09	Filter Backwash
001	10/26/2011	18410	15:41:11	8.20	8.08	Filter Backwash
001	10/26/2011	18410	15:41:26	8.10	8.12	Filter Backwash
001	10/26/2011	18410	15:41:41	8.20	8.09	Filter Backwash
001	10/26/2011	18410	15:41:56	8.20	8.07	Filter Backwash
001	10/26/2011	18410	15:42:11	8.20	8.07	Filter Backwash
001	10/26/2011	18410	15:42:26	7.90	8.09	Filter Backwash
001	10/26/2011	18410	15:42:41	8.10	8.15	Filter Backwash
001	10/26/2011	18410	15:42:56	7.70	8.10	Filter Backwash
001	10/26/2011	18410	15:43:11	7.90	8.14	Filter Backwash
001	10/26/2011	18410	15:43:26	8.00	8.09	Filter Backwash
001	10/26/2011	18410	15:43:41	7.80	8.22	Filter Backwash
001	10/26/2011	18410	15:43:56	8.10	8.27	Filter Backwash
001	10/26/2011	18410	15:44:11	7.90	8.07	Filter Backwash
001	10/26/2011	18410	15:44:26	8.00	8.18	Filter Backwash
001	10/26/2011	18410	15:44:41	7.90	8.11	Filter Backwash
001	10/26/2011	18410	15:44:56	8.20	8.12	Filter Backwash
001	10/26/2011	18410	15:45:11	8.20	8.13	Filter Backwash
001	10/26/2011	18410	15:45:26	7.70	8.44	Filter Backwash
001	10/26/2011	18410	15:45:41	8.30	8.21	Filter Backwash
001	10/26/2011	18410	15:45:56	8.30	8.13	Filter Backwash
001	10/26/2011	18410	15:46:11	6.80	8.12	Filter Backwash
001	10/26/2011	18410	15:46:26	7.20	8.12	Filter Backwash
001	10/26/2011	18410	15:46:41	7.20	8.22	Filter Backwash
001	10/26/2011	18410	15:46:56	7.20	8.12	Filter Backwash
001	10/26/2011	18410	15:47:11	7.40	8.15	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/26/2011	18410	15:47:26	7.20	8.23	Filter Backwash
001	10/26/2011	18410	15:47:41	7.10	8.33	Filter Backwash
001	10/26/2011	18410	15:47:56	7.30	8.18	Filter Backwash
001	10/26/2011	18410	15:48:11	7.50	8.28	Filter Backwash
001	10/26/2011	18410	15:49:41	1.60	8.18	Filter Backwash
001	10/26/2011	18410	15:49:56	1.80	8.23	Filter Backwash
001	10/26/2011	18410	15:50:11	1.90	8.21	Filter Backwash
001	10/26/2011	18410	15:50:26	1.80	8.20	Filter Backwash
001	10/26/2011	18410	15:50:41	3.00	8.24	Filter Backwash
001	10/26/2011	18410	15:51:11	3.80	8.34	Filter Backwash
001	10/26/2011	18410	15:51:26	4.90	8.31	Filter Backwash
001	10/26/2011	18410	15:52:11		8.23	Filter Backwash
001	10/26/2011	18410	15:52:41		8.26	Filter Backwash
001	10/26/2011	18410	15:52:56		8.13	Filter Backwash
001	10/27/2011	18410	14:31:27	1.30	8.36	ND
001	10/27/2011	18410	14:31:42	1.30	8.36	ND
001	10/27/2011	18410	14:31:57	1.60	8.36	ND
001	10/27/2011	18410	14:32:12	1.30	8.35	ND
001	10/27/2011	18410	14:32:27	1.40	8.36	ND
001	10/27/2011	18410	14:32:42	1.40	8.35	ND
001	10/27/2011	18410	14:32:57	1.30	8.36	ND
001	10/27/2011	18410	14:33:12	1.40	8.36	ND
001	10/27/2011	18410	14:33:27	1.40	8.36	ND
001	10/27/2011	18410	14:33:42	1.50	8.37	ND
001	10/27/2011	18410	14:33:57	3.00	8.37	ND
001	10/27/2011	18410	14:34:12	2.80	8.37	ND
001	10/27/2011	18410	14:34:27	3.00	8.38	ND
001	10/27/2011	18410	14:34:57	4.00	8.36	ND
001	10/27/2011	18410	14:35:12	3.90	8.35	ND
001	10/27/2011	18410	14:35:27	4.20	8.35	ND
001	10/27/2011	18410	14:35:42	4.90	8.38	ND
001	10/27/2011	18410	14:35:57	3.80	8.38	ND
001	10/27/2011	18410	14:36:12	4.00	8.36	ND
001	10/27/2011	18410	14:36:27	3.80	8.35	ND
001	10/27/2011	18410	14:36:42	4.50	8.36	ND
001	10/27/2011	18410	14:36:57	4.40	8.36	ND
001	10/27/2011	18410	14:37:12	4.50	8.37	ND
001	10/27/2011	18410	14:37:27	4.40	8.37	ND
001	10/27/2011	18410	14:37:42	4.60	8.35	ND
001	10/27/2011	18410	14:37:57	4.60	8.37	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	18410	14:38:12	4.40	8.37	ND
001	10/27/2011	18410	14:38:27	4.40	8.36	ND
001	10/27/2011	18410	14:38:42	4.30	8.37	ND
001	10/27/2011	18410	14:38:57	4.30	8.36	ND
001	10/27/2011	18410	14:39:12	4.50	8.37	ND
001	10/27/2011	18410	14:39:27	4.30	8.36	ND
001	10/27/2011	18410	14:39:42	4.40	8.36	ND
001	10/27/2011	18410	14:39:57	4.30	8.35	ND
001	10/27/2011	18410	14:40:12	4.30	8.37	ND
001	10/27/2011	18410	14:40:27	4.40	8.36	ND
001	10/27/2011	18410	14:40:42	4.60	8.36	ND
001	10/27/2011	18410	14:40:57	4.30	8.36	ND
001	10/27/2011	18410	14:41:12	4.70	8.37	ND
001	10/27/2011	18410	14:41:27	4.50	8.37	ND
001	10/27/2011	18410	14:41:42	4.60	8.36	ND
001	10/27/2011	18410	14:41:57	4.60	8.37	ND
001	10/27/2011	18410	14:42:12	4.60	8.36	ND
001	10/27/2011	18410	14:42:27	4.70	8.36	ND
001	10/27/2011	18410	14:42:42	4.50	8.36	ND
001	10/27/2011	18410	14:42:57	4.50	8.36	ND
001	10/27/2011	18410	14:43:12	4.60	8.36	ND
001	10/27/2011	18410	14:43:27	4.50	8.36	ND
001	10/27/2011	18410	14:43:42	4.50	8.36	ND
001	10/27/2011	18410	14:43:57	4.60	8.36	ND
001	10/27/2011	18410	14:44:12	4.50	8.35	ND
001	10/27/2011	18410	14:44:27	4.70	8.36	ND
001	10/27/2011	18410	14:44:42	4.60	8.35	ND
001	10/27/2011	18410	14:44:57	4.60	8.36	ND
001	10/27/2011	18410	14:45:12	4.80	8.36	ND
001	10/27/2011	18410	14:45:27	4.70	8.36	ND
001	10/27/2011	18410	14:45:42	4.50	8.36	ND
001	10/27/2011	18410	14:45:57	4.60	8.36	ND
001	10/27/2011	18410	14:46:12	4.50	8.36	ND
001	10/27/2011	18410	14:46:27	4.70	8.35	ND
001	10/27/2011	18410	14:46:42	4.80	8.35	ND
001	10/27/2011	18410	14:46:57	4.70	8.37	ND
001	10/27/2011	18410	14:47:12	4.70	8.36	ND
001	10/27/2011	18410	14:47:27	4.50	8.36	ND
001	10/27/2011	18410	14:47:42	4.60	8.36	ND
001	10/27/2011	18410	14:47:57	4.60	8.36	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	18410	14:48:12	4.60	8.36	ND
001	10/27/2011	18410	14:48:27	4.40	8.36	ND
001	10/27/2011	18410	14:48:42	4.60	8.36	ND
001	10/27/2011	18410	14:48:57	4.80	8.36	ND
001	10/27/2011	18410	14:49:12	4.50	8.36	ND
001	10/27/2011	18410	14:49:27	4.60	8.36	ND
001	10/27/2011	18410	14:49:42	4.70	8.36	ND
001	10/27/2011	18410	14:49:57	4.50	8.36	ND
001	10/27/2011	18410	14:50:12	4.50	8.36	ND
001	10/27/2011	18410	14:50:27	4.50	8.35	ND
001	10/27/2011	18410	14:50:42	4.60	8.36	ND
001	10/27/2011	18410	14:50:57	4.60	8.36	ND
001	10/27/2011	18410	14:51:12	4.60	8.36	ND
001	10/27/2011	18410	14:51:27	4.60	8.36	ND
001	10/27/2011	18410	14:51:42	4.50	8.36	ND
001	10/27/2011	18410	14:51:57	4.50	8.36	ND
001	10/27/2011	18410	14:52:12	4.50	8.36	ND
001	10/27/2011	18410	14:52:27	4.50	8.36	ND
001	10/27/2011	18410	14:52:42	4.40	8.36	ND
001	10/27/2011	18410	14:52:57	4.50	8.36	ND
001	10/27/2011	18410	14:53:12	4.60	8.36	ND
001	10/27/2011	18410	14:53:27	4.50	8.36	ND
001	10/27/2011	18410	14:53:42	4.50	8.36	ND
001	10/27/2011	18410	14:53:57	4.60	8.36	ND
001	10/27/2011	18410	14:54:12	4.50	8.36	ND
001	10/27/2011	18410	14:54:27	4.50	8.37	ND
001	10/27/2011	18410	14:54:42	4.60	8.37	ND
001	10/27/2011	18410	14:54:57	4.50	8.36	ND
001	10/27/2011	18410	14:55:12	4.50	8.37	ND
001	10/27/2011	18410	14:55:27	4.50	8.36	ND
001	10/27/2011	18410	14:55:42	4.60	8.36	ND
001	10/27/2011	18410	14:55:57	4.50	8.36	ND
001	10/27/2011	18410	14:56:12	4.50	8.36	ND
001	10/27/2011	18410	14:56:27	4.50	8.36	ND
001	10/27/2011	18410	14:56:42	4.40	8.36	ND
001	10/27/2011	18410	14:56:57	4.40	8.36	ND
001	10/27/2011	18410	14:57:12	4.40	8.36	ND
001	10/27/2011	18410	14:57:27	4.20	8.36	ND
001	10/27/2011	18410	14:57:42	4.40	8.36	ND
001	10/27/2011	31476	14:57:49	1.20	8.36	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	18410	14:57:57	4.40	8.36	ND
001	10/27/2011	31476	14:58:04	1.30	8.36	ND
001	10/27/2011	18410	14:58:12	4.50	8.36	ND
001	10/27/2011	31476	14:58:19	1.40	8.36	ND
001	10/27/2011	18410	14:58:27	4.30	8.37	ND
001	10/27/2011	31476	14:58:34	1.10	8.36	ND
001	10/27/2011	18410	14:58:42	4.30	8.36	ND
001	10/27/2011	31476	14:58:49	1.20	8.36	ND
001	10/27/2011	18410	14:58:57	4.40	8.36	ND
001	10/27/2011	31476	14:59:04	1.30	8.36	ND
001	10/27/2011	18410	14:59:12	4.50	8.36	ND
001	10/27/2011	31476	14:59:19	1.40	8.35	ND
001	10/27/2011	18410	14:59:27	4.60	8.37	ND
001	10/27/2011	31476	14:59:34	1.30	8.35	ND
001	10/27/2011	18410	14:59:42	4.50	8.36	ND
001	10/27/2011	31476	14:59:49	1.40	8.35	ND
001	10/27/2011	18410	14:59:57	4.50	8.36	ND
001	10/27/2011	31476	15:00:04	1.30	8.35	ND
001	10/27/2011	18410	15:00:12	4.60	8.36	ND
001	10/27/2011	31476	15:00:19	1.30	8.35	ND
001	10/27/2011	18410	15:00:27	4.50	8.37	ND
001	10/27/2011	31476	15:00:34	1.40	8.35	ND
001	10/27/2011	18410	15:00:42	4.60	8.36	ND
001	10/27/2011	31476	15:00:49	1.40	8.35	ND
001	10/27/2011	18410	15:00:57	4.60	8.37	ND
001	10/27/2011	31476	15:01:04	1.40	8.35	ND
001	10/27/2011	18410	15:01:12	4.60	8.38	ND
001	10/27/2011	31476	15:01:19	1.40	8.35	ND
001	10/27/2011	18410	15:01:27	4.60	8.37	ND
001	10/27/2011	31476	15:01:34	1.40	8.35	ND
001	10/27/2011	18410	15:01:42	4.70	8.37	ND
001	10/27/2011	31476	15:01:49	1.40	8.35	ND
001	10/27/2011	18410	15:01:57	4.60	8.37	ND
001	10/27/2011	31476	15:02:04	1.20	8.36	ND
001	10/27/2011	18410	15:02:12	4.60	8.37	ND
001	10/27/2011	31476	15:02:19	1.30	8.37	ND
001	10/27/2011	18410	15:02:27	4.50	8.37	ND
001	10/27/2011	31476	15:02:34	1.20	8.37	ND
001	10/27/2011	18410	15:02:42	4.50	8.37	ND
001	10/27/2011	31476	15:02:49	1.10	8.37	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	18410	15:02:57	4.50	8.37	ND
001	10/27/2011	31476	15:03:04	1.30	8.37	ND
001	10/27/2011	18410	15:03:12	4.50	8.38	ND
001	10/27/2011	31476	15:03:19	1.30	8.37	ND
001	10/27/2011	18410	15:03:27	4.50	8.37	ND
001	10/27/2011	31476	15:03:34	1.50	8.36	ND
001	10/27/2011	18410	15:03:42	3.10	8.37	ND
001	10/27/2011	31476	15:03:49	1.30	8.36	ND
001	10/27/2011	18410	15:03:57	2.20	8.41	ND
001	10/27/2011	31476	15:04:04	1.30	8.36	ND
001	10/27/2011	18410	15:04:12	2.20	8.38	ND
001	10/27/2011	31476	15:04:19	1.40	8.38	ND
001	10/27/2011	18410	15:04:27	2.60	8.38	Filter Backwash
001	10/27/2011	31476	15:04:34	1.30	8.37	Filter Backwash
001	10/27/2011	18410	15:04:42	2.40	8.41	Filter Backwash
001	10/27/2011	31476	15:04:49	1.50	8.47	Filter Backwash
001	10/27/2011	18410	15:04:57	2.30	8.40	Filter Backwash
001	10/27/2011	31476	15:05:04	1.30	8.44	Filter Backwash
001	10/27/2011	18410	15:05:12	3.00	8.41	Filter Backwash
001	10/27/2011	31476	15:05:19	1.40	8.37	Filter Backwash
001	10/27/2011	18410	15:05:27	3.00	8.45	Filter Backwash
001	10/27/2011	31476	15:05:34	1.30	8.43	Filter Backwash
001	10/27/2011	18410	15:05:42	2.30	8.43	Filter Backwash
001	10/27/2011	31476	15:05:49	1.40	8.40	Filter Backwash
001	10/27/2011	18410	15:05:57	2.90	8.41	Filter Backwash
001	10/27/2011	31476	15:06:04	1.40	8.40	Filter Backwash
001	10/27/2011	18410	15:06:12	3.70	8.42	Filter Backwash
001	10/27/2011	31476	15:06:19	1.40	8.39	Filter Backwash
001	10/27/2011	18410	15:06:27	3.60	8.40	Filter Backwash
001	10/27/2011	31476	15:06:34	1.40	8.38	Filter Backwash
001	10/27/2011	18410	15:06:42	3.60	8.39	Filter Backwash
001	10/27/2011	31476	15:06:49	1.40	8.37	Filter Backwash
001	10/27/2011	18410	15:06:57	2.60	8.41	Filter Backwash
001	10/27/2011	31476	15:07:04	1.10	8.41	Filter Backwash
001	10/27/2011	18410	15:07:12	2.50	8.40	Filter Backwash
001	10/27/2011	31476	15:07:19	1.20	8.39	Filter Backwash
001	10/27/2011	18410	15:07:27	2.70	8.45	Filter Backwash
001	10/27/2011	31476	15:07:34	1.20	8.43	Filter Backwash
001	10/27/2011	18410	15:07:42	2.90	8.42	Filter Backwash
001	10/27/2011	31476	15:07:49	1.40	8.42	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	18410	15:07:57	2.50	8.40	Filter Backwash
001	10/27/2011	31476	15:08:04	1.20	8.40	Filter Backwash
001	10/27/2011	18410	15:08:12	3.70	8.43	Filter Backwash
001	10/27/2011	31476	15:08:19	1.40	8.36	Filter Backwash
001	10/27/2011	18410	15:08:27	4.00	8.40	Filter Backwash
001	10/27/2011	31476	15:08:34	1.50	8.36	Filter Backwash
001	10/27/2011	18410	15:08:42	2.30	8.38	Filter Backwash
001	10/27/2011	31476	15:08:49	1.50	8.34	Filter Backwash
001	10/27/2011	18410	15:08:57	3.00	8.36	Filter Backwash
001	10/27/2011	31476	15:09:04	1.30	8.36	Filter Backwash
001	10/27/2011	18410	15:09:12	2.30	8.38	Filter Backwash
001	10/27/2011	31476	15:09:19	1.50	8.36	Filter Backwash
001	10/27/2011	18410	15:09:27	2.20	8.38	Filter Backwash
001	10/27/2011	31476	15:09:34	1.40	8.34	Filter Backwash
001	10/27/2011	18410	15:09:42	2.00	8.38	Filter Backwash
001	10/27/2011	31476	15:09:49	1.30	8.37	Filter Backwash
001	10/27/2011	18410	15:09:57	1.00	8.37	Filter Backwash
001	10/27/2011	31476	15:10:04	1.50	8.28	Filter Backwash
001	10/27/2011	18410	15:10:12	1.40	8.38	Filter Backwash
001	10/27/2011	31476	15:10:19	1.60	8.21	Filter Backwash
001	10/27/2011	18410	15:10:27	1.50	8.39	Filter Backwash
001	10/27/2011	31476	15:10:34	1.60	8.21	Filter Backwash
001	10/27/2011	18410	15:10:42	1.20	8.40	Filter Backwash
001	10/27/2011	31476	15:10:49	1.50	8.23	Filter Backwash
001	10/27/2011	18410	15:10:57	1.20	8.44	Filter Backwash
001	10/27/2011	31476	15:11:04	1.60	8.19	Filter Backwash
001	10/27/2011	18410	15:11:12	2.60	8.40	Filter Backwash
001	10/27/2011	31476	15:11:19	1.50	8.24	Filter Backwash
001	10/27/2011	18410	15:11:27	3.90	8.41	Filter Backwash
001	10/27/2011	31476	15:11:34	1.50	8.25	Filter Backwash
001	10/27/2011	18410	15:11:42	4.00	8.43	Filter Backwash
001	10/27/2011	31476	15:11:49	1.50	8.22	Filter Backwash
001	10/27/2011	31476	15:12:04	1.60	8.22	Filter Backwash
001	10/27/2011	31476	15:12:19	1.60	8.24	Filter Backwash
001	10/27/2011	18410	15:12:27	3.70	8.41	Filter Backwash
001	10/27/2011	31476	15:12:34	1.60	8.24	Filter Backwash
001	10/27/2011	18410	15:12:42	4.30	8.39	Filter Backwash
001	10/27/2011	31476	15:12:49	1.60	8.25	Filter Backwash
001	10/27/2011	18410	15:12:57	4.50	8.38	Filter Backwash
001	10/27/2011	31476	15:13:04	1.60	8.25	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	18410	15:13:12	4.40	8.39	Filter Backwash
001	10/27/2011	31476	15:13:19	1.50	8.36	Filter Backwash
001	10/27/2011	18410	15:13:27	4.30	8.37	Filter Backwash
001	10/27/2011	31476	15:13:34	1.40	8.40	Filter Backwash
001	10/27/2011	18410	15:13:42	4.30	8.37	Filter Backwash
001	10/27/2011	31476	15:13:49	1.30	8.39	Filter Backwash
001	10/27/2011	18410	15:13:57	4.30	8.37	Filter Backwash
001	10/27/2011	31476	15:14:04	1.50	8.40	Filter Backwash
001	10/27/2011	18410	15:14:12	4.50	8.37	Filter Backwash
001	10/27/2011	31476	15:14:19	1.70	8.38	Filter Backwash
001	10/27/2011	18410	15:14:27	3.80	8.37	Filter Backwash
001	10/27/2011	31476	15:14:34	1.60	8.37	Filter Backwash
001	10/27/2011	18410	15:14:42	1.60	8.37	Filter Backwash
001	10/27/2011	31476	15:14:49	1.70	8.37	Filter Backwash
001	10/27/2011	18410	15:14:57	1.30	8.38	Filter Backwash
001	10/27/2011	31476	15:15:04	1.70	8.37	Filter Backwash
001	10/27/2011	31476	15:15:19	1.70	8.37	Filter Backwash
001	10/27/2011	31476	15:15:34	1.70	8.37	Filter Backwash
001	10/27/2011	31476	15:15:49	1.40	8.38	ND
001	10/27/2011	31476	15:16:04	1.40	8.39	ND
001	10/27/2011	31476	15:31:04	1.20	8.41	ND
001	10/27/2011	18410	15:31:12	0.70	8.37	ND
001	10/27/2011	31476	15:31:19	1.20	8.41	ND
001	10/27/2011	18410	15:31:27	0.70	8.37	ND
001	10/27/2011	31476	15:31:34	1.20	8.41	ND
001	10/27/2011	18410	15:31:42	0.50	8.37	ND
001	10/27/2011	31476	15:31:49	0.90	8.41	ND
001	10/27/2011	18410	15:31:57	0.30	8.38	ND
001	10/27/2011	31476	15:32:04	0.80	8.42	ND
001	10/27/2011	18410	15:32:12	0.30	8.38	ND
001	10/27/2011	31476	15:32:19	0.70	8.41	ND
001	10/27/2011	18410	15:32:27	0.40	8.38	ND
001	10/27/2011	31476	15:32:34	0.60	8.41	ND
001	10/27/2011	18410	15:32:42	0.40	8.37	ND
001	10/27/2011	31476	15:32:49	0.80	8.41	ND
001	10/27/2011	18410	15:32:57	0.20	8.37	ND
001	10/27/2011	31476	15:33:04	0.70	8.41	ND
001	10/27/2011	18410	15:33:12	0.20	8.38	ND
001	10/27/2011	31476	15:33:19	0.60	8.41	ND
001	10/27/2011	18410	15:33:27	0.20	8.38	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	31476	15:33:34	0.70	8.41	ND
001	10/27/2011	18410	15:33:42	0.30	8.37	ND
001	10/27/2011	31476	15:33:49	0.90	8.41	ND
001	10/27/2011	18410	15:33:57	0.30	8.37	ND
001	10/27/2011	31476	15:34:04	0.60	8.40	ND
001	10/27/2011	18410	15:34:12	0.40	8.37	ND
001	10/27/2011	31476	15:34:19	0.50	8.41	ND
001	10/27/2011	18410	15:34:27	0.30	8.38	ND
001	10/27/2011	31476	15:34:34	0.20	8.41	ND
001	10/27/2011	18410	15:34:42	0.10	8.38	ND
001	10/27/2011	31476	15:34:49	0.30	8.41	ND
001	10/27/2011	18410	15:34:57	0.50	8.38	ND
001	10/27/2011	31476	15:35:04	0.50	8.41	ND
001	10/27/2011	18410	15:35:12	0.70	8.37	ND
001	10/27/2011	31476	15:35:19	0.80	8.39	ND
001	10/27/2011	18410	15:35:27	0.70	8.37	ND
001	10/27/2011	31476	15:35:34	1.00	8.38	ND
001	10/27/2011	18410	15:35:42	0.90	8.38	ND
001	10/27/2011	31476	15:35:49	1.10	8.38	ND
001	10/27/2011	18410	15:35:57	0.90	8.38	ND
001	10/27/2011	31476	15:36:04	1.20	8.38	ND
001	10/27/2011	18410	15:36:12	0.90	8.38	ND
001	10/27/2011	31476	15:36:19	1.10	8.38	ND
001	10/27/2011	18410	15:36:27	1.00	8.38	ND
001	10/27/2011	31476	15:36:34	1.10	8.39	ND
001	10/27/2011	18410	15:36:42	0.80	8.37	ND
001	10/27/2011	31476	15:36:49	1.10	8.39	ND
001	10/27/2011	18410	15:36:57	0.50	8.37	ND
001	10/27/2011	31476	15:37:04	1.20	8.39	ND
001	10/27/2011	18410	15:37:12	0.60	8.36	ND
001	10/27/2011	31476	15:37:19	1.10	8.39	ND
001	10/27/2011	18410	15:37:27	0.70	8.37	ND
001	10/27/2011	31476	15:37:34	1.10	8.39	ND
001	10/27/2011	18410	15:37:42	1.00	8.37	ND
001	10/27/2011	31476	15:37:49	1.20	8.39	ND
001	10/27/2011	18410	15:37:57	1.10	8.38	ND
001	10/27/2011	31476	15:38:04	1.10	8.39	ND
001	10/27/2011	18410	15:38:12	1.00	8.48	ND
001	10/27/2011	31476	15:38:19	1.00	8.39	ND
001	10/27/2011	18410	15:38:27	0.90	8.39	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	31476	15:38:34	1.20	8.39	ND
001	10/27/2011	18410	15:38:42	0.80	8.38	ND
001	10/27/2011	31476	15:38:49	1.20	8.39	ND
001	10/27/2011	18410	15:38:57	0.80	8.38	ND
001	10/27/2011	31476	15:39:04	1.30	8.38	ND
001	10/27/2011	18410	15:39:12	0.70	8.37	ND
001	10/27/2011	31476	15:39:19	1.30	8.39	ND
001	10/27/2011	18410	15:39:27	0.80	8.37	ND
001	10/27/2011	31476	15:39:34	1.20	8.39	ND
001	10/27/2011	18410	15:39:42	0.90	8.37	ND
001	10/27/2011	31476	15:39:49	1.30	8.39	ND
001	10/27/2011	18410	15:39:57	1.00	8.38	ND
001	10/27/2011	31476	15:40:04	1.20	8.41	ND
001	10/27/2011	18410	15:40:12	1.10	8.49	ND
001	10/27/2011	31476	15:40:19	1.20	8.41	ND
001	10/27/2011	18410	15:40:27	0.90	8.38	ND
001	10/27/2011	31476	15:40:34	1.10	8.41	ND
001	10/27/2011	18410	15:40:42	0.60	8.38	ND
001	10/27/2011	31476	15:40:49	1.20	8.41	ND
001	10/27/2011	18410	15:40:57	0.80	8.38	ND
001	10/27/2011	31476	15:41:04	1.30	8.40	ND
001	10/27/2011	18410	15:41:12	0.80	8.37	ND
001	10/27/2011	31476	15:41:19	1.30	8.39	ND
001	10/27/2011	18410	15:41:27	1.10	8.38	ND
001	10/27/2011	31476	15:41:34	1.20	8.39	ND
001	10/27/2011	18410	15:41:42	1.10	8.40	ND
001	10/27/2011	31476	15:41:49	1.10	8.41	ND
001	10/27/2011	18410	15:41:57	1.00	8.41	ND
001	10/27/2011	31476	15:42:04	1.20	8.41	ND
001	10/27/2011	18410	15:42:12	0.80	8.38	ND
001	10/27/2011	31476	15:42:19	1.30	8.40	ND
001	10/27/2011	18410	15:42:27	0.70	8.37	ND
001	10/27/2011	31476	15:42:34	1.30	8.40	ND
001	10/27/2011	18410	15:42:42	0.70	8.37	ND
001	10/27/2011	31476	15:42:49	1.20	8.40	ND
001	10/27/2011	18410	15:42:57	0.90	8.38	ND
001	10/27/2011	31476	15:43:04	1.40	8.39	ND
001	10/27/2011	18410	15:43:12	0.80	8.38	ND
001	10/27/2011	31476	15:43:19	1.20	8.39	ND
001	10/27/2011	18410	15:43:27	1.10	8.48	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/27/2011	31476	15:43:34	1.20	8.40	ND
001	10/27/2011	18410	15:43:42	1.20	8.49	ND
001	10/27/2011	31476	15:43:49	1.10	8.41	ND
001	10/27/2011	18410	15:43:57	1.00	8.39	ND
001	10/27/2011	31476	15:44:04	1.20	8.40	ND
001	10/27/2011	18410	15:44:12	0.70	8.40	ND
001	10/27/2011	31476	15:44:19	1.40	8.39	ND
001	10/27/2011	18410	15:44:27	0.80	8.37	ND
001	10/27/2011	31476	15:44:34	1.30	8.40	ND
001	10/27/2011	18410	15:44:42	0.70	8.37	ND
001	10/27/2011	31476	15:44:49	1.20	8.40	ND
001	10/27/2011	18410	15:44:57	1.20	8.47	ND
001	10/27/2011	31476	15:45:04	1.20	8.41	ND
001	10/27/2011	18410	15:45:12	1.20	8.49	ND
001	10/27/2011	31476	15:45:19	1.10	8.41	ND
001	10/27/2011	18410	15:45:27	1.20	8.39	ND
001	10/27/2011	31476	15:45:34	1.30	8.41	ND
001	10/27/2011	18410	15:45:42	0.90	8.39	ND
001	10/27/2011	31476	15:45:49	1.20	8.40	ND
001	10/27/2011	18410	15:45:57	0.40	8.37	ND
001	10/27/2011	31476	15:46:04	1.00	8.41	ND
001	10/27/2011	18410	15:46:12	1.10	8.44	ND
001	10/27/2011	31476	15:46:19	1.10	8.42	ND
001	10/27/2011	18410	15:46:27	1.10	8.48	ND
001	10/27/2011	31476	15:46:34	1.20	8.41	ND
001	10/27/2011	18410	15:46:42	1.10	8.38	ND
001	10/27/2011	31476	15:46:49	1.30	8.40	ND
001	10/27/2011	18410	15:46:57	0.70	8.38	ND
001	10/27/2011	31476	15:47:04	1.20	8.40	ND
001	10/27/2011	31476	15:47:19	1.10	8.42	ND
001	10/27/2011	31476	15:47:34	1.00	8.42	ND
001	10/27/2011	31476	15:47:49	1.10	8.42	ND
001	10/27/2011	31476	15:48:04	1.00	8.42	ND
001	10/27/2011	31476	15:48:19	1.10	8.42	ND
001	10/27/2011	31476	15:48:34	1.10	8.42	ND
001	10/27/2011	31476	15:48:49	1.30	8.41	ND
001	10/27/2011	31476	15:49:04	1.20	8.39	ND
001	10/27/2011	31476	15:49:19	1.50	8.39	ND
001	10/28/2011	31476	11:52:28	1.20	8.17	Filter Backwash
001	10/28/2011	31476	11:52:43	1.10	8.18	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	31476	11:52:58	1.30	8.21	Filter Backwash
001	10/28/2011	31476	11:53:13	1.30	8.21	Filter Backwash
001	10/28/2011	31476	11:53:28	1.20	8.26	Filter Backwash
001	10/28/2011	31476	11:53:43	1.40	8.24	Filter Backwash
001	10/28/2011	31476	11:53:58	1.50	8.25	Filter Backwash
001	10/28/2011	31476	11:54:13	1.40	8.19	Filter Backwash
001	10/28/2011	31476	11:54:28	1.30	8.20	Filter Backwash
001	10/28/2011	31476	11:54:43	1.50	8.27	Filter Backwash
001	10/28/2011	31476	11:54:58	1.30	8.24	Filter Backwash
001	10/28/2011	31476	11:55:13	1.40	8.24	Filter Backwash
001	10/28/2011	31476	11:55:28	1.40	8.23	Filter Backwash
001	10/28/2011	31476	11:55:43	1.50	8.27	Filter Backwash
001	10/28/2011	31476	11:56:13	1.40	8.20	Filter Backwash
001	10/28/2011	31476	11:56:28	1.50	8.17	Filter Backwash
001	10/28/2011	31476	11:56:43	1.30	8.15	Filter Backwash
001	10/28/2011	31476	11:56:58	1.40	8.04	Filter Backwash
001	10/28/2011	31476	11:57:13	1.60	8.08	Filter Backwash
001	10/28/2011	31476	11:58:13	1.20	8.23	Filter Backwash
001	10/28/2011	31476	11:58:28	1.60	8.11	Filter Backwash
001	10/28/2011	31476	11:58:43	1.60	8.08	Filter Backwash
001	10/28/2011	31476	11:58:58	1.50	8.04	Filter Backwash
001	10/28/2011	31476	11:59:13	1.30	8.21	Filter Backwash
001	10/28/2011	31476	11:59:28	1.30	8.22	Filter Backwash
001	10/28/2011	31476	11:59:43	1.20	8.23	Filter Backwash
001	10/28/2011	31476	11:59:58	1.30	8.23	Filter Backwash
001	10/28/2011	31476	12:00:13	1.30	8.23	Filter Backwash
001	10/28/2011	31476	12:00:28	1.20	8.23	Filter Backwash
001	10/28/2011	31476	12:01:28	1.30	8.22	Filter Backwash
001	10/28/2011	31476	12:01:43	0.70	8.28	Filter Backwash
001	10/28/2011	31476	12:01:58	1.00	8.23	Filter Backwash
001	10/28/2011	31476	12:02:13	1.40	8.23	Filter Backwash
001	10/28/2011	31476	12:02:28	1.30	8.23	Filter Backwash
001	10/28/2011	31476	12:02:43	1.30	8.23	Filter Backwash
001	10/28/2011	31476	12:02:58	1.30	8.25	Filter Backwash
001	10/28/2011	31476	12:03:13	1.20	8.23	Filter Backwash
001	10/28/2011	31476	12:03:28	1.10	8.24	Filter Backwash
001	10/28/2011	31476	12:03:43	1.20	8.24	Filter Backwash
001	10/28/2011	31476	12:03:58	1.10	8.24	Filter Backwash
001	10/28/2011	31476	12:04:13	1.30	8.23	Filter Backwash
001	10/28/2011	31476	12:04:28	1.10	8.24	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	31476	12:04:43	1.40	8.23	Filter Backwash
001	10/28/2011	31476	12:04:58	1.40	8.24	Filter Backwash
001	10/28/2011	31476	12:05:13	1.40	8.25	Filter Backwash
001	10/28/2011	31476	12:05:28	1.20	8.31	Filter Backwash
001	10/28/2011	31476	12:06:13	1.20	8.30	Filter Backwash
001	10/28/2011	31476	12:06:28	1.30	8.25	Filter Backwash
001	10/28/2011	31476	12:06:43	1.30	8.25	Filter Backwash
001	10/28/2011	31476	12:06:58	1.20	8.25	Filter Backwash
001	10/28/2011	31476	12:07:13	1.10	8.25	Filter Backwash
001	10/28/2011	31476	12:07:28	1.00	8.26	Filter Backwash
001	10/28/2011	31476	12:07:43	1.20	8.25	Filter Backwash
001	10/28/2011	31476	12:07:58	1.20	8.25	Filter Backwash
001	10/28/2011	31476	12:08:13	1.10	8.25	Filter Backwash
001	10/28/2011	31476	12:08:28	0.80	8.26	Filter Backwash
001	10/28/2011	31476	12:08:43	1.20	8.26	Filter Backwash
001	10/28/2011	31476	12:08:58	1.30	8.25	ND
001	10/28/2011	31476	12:09:13	1.30	8.25	ND
001	10/28/2011	31476	12:09:28	1.30	8.25	ND
001	10/28/2011	31476	12:09:43	1.10	8.25	ND
001	10/28/2011	31476	12:09:58	1.10	8.25	ND
001	10/28/2011	31476	12:10:13	1.10	8.25	ND
001	10/28/2011	31476	12:10:28	1.20	8.26	ND
001	10/28/2011	31476	12:10:43	1.00	8.26	ND
001	10/28/2011	31476	12:10:58	1.10	8.26	ND
001	10/28/2011	31476	12:11:13	1.20	8.26	ND
001	10/28/2011	31476	12:11:28	1.40	8.25	ND
001	10/28/2011	31476	12:11:43	1.10	8.25	ND
001	10/28/2011	31476	12:11:58	1.10	8.26	ND
001	10/28/2011	31476	12:12:13	1.20	8.26	ND
001	10/28/2011	31476	12:12:28	1.20	8.26	ND
001	10/28/2011	31476	12:12:43	1.30	8.26	ND
001	10/28/2011	31476	12:12:58	1.20	8.26	ND
001	10/28/2011	31476	12:13:13	1.20	8.26	ND
001	10/28/2011	31476	12:13:28	1.00	8.27	ND
001	10/28/2011	31476	12:13:43	1.10	8.28	ND
001	10/28/2011	31476	12:13:58	1.00	8.27	ND
001	10/28/2011	31476	12:14:13	1.10	8.27	ND
001	10/28/2011	31476	12:14:28	1.60	8.27	ND
001	10/28/2011	31476	12:14:43	1.20	8.26	ND
001	10/28/2011	31476	12:14:58	1.10	8.26	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	31476	12:15:13	1.20	8.26	ND
001	10/28/2011	31476	12:15:28	1.30	8.26	ND
001	10/28/2011	31476	12:15:43	1.30	8.26	ND
001	10/28/2011	31476	12:15:58	1.40	8.26	ND
001	10/28/2011	31476	12:16:13	1.30	8.26	ND
001	10/28/2011	31476	12:16:28	1.30	8.26	ND
001	10/28/2011	31476	12:16:43	1.40	8.26	ND
001	10/28/2011	31476	12:16:58	1.30	8.26	ND
001	10/28/2011	31476	12:17:13	1.40	8.26	ND
001	10/28/2011	31476	12:17:28	1.30	8.27	ND
001	10/28/2011	31476	12:17:43	1.40	8.27	ND
001	10/28/2011	31476	12:17:58	1.40	8.27	ND
001	10/28/2011	31476	12:18:13	1.30	8.27	ND
001	10/28/2011	31476	12:18:28	1.10	8.27	ND
001	10/28/2011	31476	12:18:43	1.20	8.28	ND
001	10/28/2011	31476	12:18:58	1.20	8.29	ND
001	10/28/2011	31476	12:19:13	1.20	8.28	ND
001	10/28/2011	31476	12:19:28	1.40	8.28	ND
001	10/28/2011	31476	12:19:43	1.40	8.27	ND
001	10/28/2011	31476	12:19:58	1.40	8.27	ND
001	10/28/2011	31476	12:20:13	1.40	8.27	ND
001	10/28/2011	31476	12:20:28	1.20	8.27	ND
001	10/28/2011	31476	12:20:43	1.50	8.28	ND
001	10/28/2011	31476	12:20:58	1.50	8.27	ND
001	10/28/2011	31476	12:21:13	1.50	8.27	ND
001	10/28/2011	31476	12:21:28	1.40	8.27	ND
001	10/28/2011	31476	12:21:43	1.40	8.28	ND
001	10/28/2011	31476	12:21:58	1.30	8.28	ND
001	10/28/2011	31476	12:22:13	1.20	8.29	ND
001	10/28/2011	31476	12:22:28	1.20	8.29	ND
001	10/28/2011	31476	12:22:43	1.30	8.29	ND
001	10/28/2011	31476	12:22:58	1.30	8.29	ND
001	10/28/2011	31476	12:23:13	1.30	8.29	ND
001	10/28/2011	31476	12:23:28	1.20	8.27	ND
001	10/28/2011	31476	12:23:43	1.10	8.29	ND
001	10/28/2011	31476	12:23:58	1.10	8.30	ND
001	10/28/2011	31476	12:24:13	1.00	8.30	ND
001	10/28/2011	31476	12:24:28	1.00	8.30	ND
001	10/28/2011	31476	12:24:43	1.00	8.28	ND
001	10/28/2011	31476	12:24:58	1.20	8.30	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	31476	12:25:13	1.00	8.30	ND
001	10/28/2011	31476	12:25:28	1.00	8.30	ND
001	10/28/2011	31476	12:25:43	1.10	8.29	ND
001	10/28/2011	31476	12:25:58	0.90	8.30	ND
001	10/28/2011	31476	12:26:13	1.10	8.29	ND
001	10/28/2011	31476	12:26:28	1.10	8.29	ND
001	10/28/2011	31476	12:26:43	1.20	8.29	ND
001	10/28/2011	31476	12:26:58	1.10	8.30	ND
001	10/28/2011	31476	12:27:13	0.90	8.30	ND
001	10/28/2011	31476	12:27:28	0.90	8.30	ND
001	10/28/2011	31476	12:27:43	1.00	8.30	ND
001	10/28/2011	31476	12:27:58	0.80	8.30	ND
001	10/28/2011	31476	12:28:13	0.70	8.31	ND
001	10/28/2011	31476	12:28:28	0.30	8.31	ND
001	10/28/2011	31476	12:28:43	0.20	8.31	ND
001	10/28/2011	31476	12:28:58	0.50	8.32	ND
001	10/28/2011	31476	12:29:13	0.50	8.31	ND
001	10/28/2011	31476	12:29:28	0.10	8.31	ND
001	10/28/2011	31476	12:29:43	0.00	8.31	ND
001	10/28/2011	31476	12:29:58	0.70	8.31	ND
001	10/28/2011	31476	12:30:13	0.20	8.31	ND
001	10/28/2011	31476	12:30:28	0.20	8.31	ND
001	10/28/2011	31476	12:30:43	1.10	8.30	ND
001	10/28/2011	31476	12:30:58	0.90	8.30	ND
001	10/28/2011	31476	12:31:13	1.10	8.30	ND
001	10/28/2011	31476	12:31:28	1.30	8.29	ND
001	10/28/2011	31476	12:31:43	1.20	8.30	ND
001	10/28/2011	18410	11:35:44	1.50	8.24	ND
001	10/28/2011	18410	11:35:59	1.60	8.23	ND
001	10/28/2011	18410	11:36:14	1.60	8.25	ND
001	10/28/2011	18410	11:36:29	1.30	8.25	ND
001	10/28/2011	18410	11:36:44	1.40	8.24	ND
001	10/28/2011	18410	11:36:59	1.50	8.25	ND
001	10/28/2011	18410	11:37:14	1.30	8.25	ND
001	10/28/2011	18410	11:37:29	1.30	8.25	ND
001	10/28/2011	18410	11:37:44	1.50	8.25	ND
001	10/28/2011	18410	11:37:59	1.30	8.26	ND
001	10/28/2011	18410	11:38:14	1.30	8.24	ND
001	10/28/2011	18410	11:38:29	1.10	8.26	ND
001	10/28/2011	18410	11:38:44	1.20	8.26	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	11:38:59	1.20	8.25	ND
001	10/28/2011	18410	11:39:14	1.30	8.27	ND
001	10/28/2011	18410	11:39:29	1.20	8.26	ND
001	10/28/2011	18410	11:39:44	1.20	8.26	ND
001	10/28/2011	18410	11:39:59	1.50	8.27	ND
001	10/28/2011	18410	11:40:14	1.30	8.27	ND
001	10/28/2011	18410	11:40:29	1.30	8.27	ND
001	10/28/2011	18410	11:40:44	1.10	8.27	ND
001	10/28/2011	18410	11:40:59	1.10	8.27	ND
001	10/28/2011	18410	11:41:14	1.10	8.27	ND
001	10/28/2011	18410	11:41:29	1.30	8.27	ND
001	10/28/2011	18410	11:41:44	1.20	8.27	ND
001	10/28/2011	18410	11:41:59	1.20	8.27	ND
001	10/28/2011	18410	11:42:14	1.40	8.27	ND
001	10/28/2011	18410	11:42:29	1.20	8.27	ND
001	10/28/2011	18410	11:42:44	1.00	8.27	ND
001	10/28/2011	18410	11:42:59	1.20	8.27	ND
001	10/28/2011	18410	11:43:14	1.20	8.28	ND
001	10/28/2011	18410	11:43:29	1.40	8.27	ND
001	10/28/2011	18410	11:43:44	1.40	8.27	ND
001	10/28/2011	18410	11:43:59	1.30	8.28	ND
001	10/28/2011	18410	11:44:14	1.20	8.28	ND
001	10/28/2011	18410	11:44:44	1.40	8.29	ND
001	10/28/2011	18410	11:44:59	1.40	8.28	ND
001	10/28/2011	18410	11:45:14	1.30	8.28	ND
001	10/28/2011	18410	11:45:29	1.10	8.28	ND
001	10/28/2011	18410	11:45:44	1.10	8.28	ND
001	10/28/2011	18410	11:45:59	1.00	8.28	ND
001	10/28/2011	18410	11:46:14	1.20	8.28	ND
001	10/28/2011	18410	11:46:29	1.00	8.28	ND
001	10/28/2011	18410	11:46:44	0.90	8.29	ND
001	10/28/2011	18410	11:46:59	1.00	8.28	ND
001	10/28/2011	18410	11:47:59	1.00	8.28	ND
001	10/28/2011	18410	11:48:14	1.10	8.28	ND
001	10/28/2011	18410	11:48:29	0.60	8.29	ND
001	10/28/2011	18410	11:48:44	0.60	8.31	ND
001	10/28/2011	18410	11:48:59	0.40	8.28	ND
001	10/28/2011	18410	11:49:14	0.90	8.29	ND
001	10/28/2011	18410	11:49:29	1.10	8.29	ND
001	10/28/2011	18410	11:49:44	0.80	8.30	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	11:49:59	1.00	8.29	ND
001	10/28/2011	18410	11:50:14	0.90	8.29	ND
001	10/28/2011	18410	11:50:29	0.90	8.29	ND
001	10/28/2011	18410	11:50:44	0.80	8.29	ND
001	10/28/2011	18410	11:50:59	0.90	8.30	Filter Backwash
001	10/28/2011	18410	11:51:14	1.00	8.30	Filter Backwash
001	10/28/2011	18410	11:51:59	1.30	8.30	Filter Backwash
001	10/28/2011	18410	11:52:14	0.90	8.29	Filter Backwash
001	10/28/2011	18410	11:52:29	1.20	8.31	Filter Backwash
001	10/28/2011	18410	11:52:44	1.20	8.40	Filter Backwash
001	10/28/2011	18410	11:52:59	1.30	8.37	Filter Backwash
001	10/28/2011	18410	11:53:14	0.90	8.32	Filter Backwash
001	10/28/2011	18410	11:53:29	1.10	8.43	Filter Backwash
001	10/28/2011	18410	11:53:44	1.10	8.30	Filter Backwash
001	10/28/2011	18410	11:53:59	1.30	8.31	Filter Backwash
001	10/28/2011	18410	11:54:14	1.20	8.31	Filter Backwash
001	10/28/2011	18410	11:54:29	1.40	8.30	Filter Backwash
001	10/28/2011	18410	11:54:44	1.30	8.34	Filter Backwash
001	10/28/2011	18410	11:54:59	1.20	8.34	Filter Backwash
001	10/28/2011	18410	11:55:14	1.40	8.36	Filter Backwash
001	10/28/2011	18410	11:55:29	1.20	8.30	Filter Backwash
001	10/28/2011	18410	11:55:44	1.30	8.30	Filter Backwash
001	10/28/2011	18410	11:56:14	1.30	8.33	Filter Backwash
001	10/28/2011	18410	11:56:29	1.40	8.32	Filter Backwash
001	10/28/2011	18410	11:56:44	1.10	8.34	Filter Backwash
001	10/28/2011	18410	11:56:59	1.30	8.31	Filter Backwash
001	10/28/2011	18410	11:57:14	1.10	8.31	Filter Backwash
001	10/28/2011	18410	11:58:14	1.10	8.31	Filter Backwash
001	10/28/2011	18410	11:58:29	1.00	8.32	Filter Backwash
001	10/28/2011	18410	11:58:44	0.70	8.31	Filter Backwash
001	10/28/2011	18410	11:58:59	0.70	8.30	Filter Backwash
001	10/28/2011	18410	11:59:14	0.90	8.31	Filter Backwash
001	10/28/2011	18410	11:59:29	1.00	8.33	Filter Backwash
001	10/28/2011	18410	11:59:44	1.30	8.32	Filter Backwash
001	10/28/2011	18410	11:59:59	1.10	8.33	Filter Backwash
001	10/28/2011	18410	12:00:14	1.30	8.44	Filter Backwash
001	10/28/2011	18410	12:01:29	0.70	8.33	Filter Backwash
001	10/28/2011	18410	12:01:44	1.00	8.35	Filter Backwash
001	10/28/2011	18410	12:01:59	1.00	8.31	Filter Backwash
001	10/28/2011	18410	12:02:14	1.00	8.35	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	12:02:29	1.00	8.34	Filter Backwash
001	10/28/2011	18410	12:02:44	1.00	8.39	Filter Backwash
001	10/28/2011	18410	12:02:59	1.10	8.42	Filter Backwash
001	10/28/2011	18410	12:03:14	1.00	8.31	Filter Backwash
001	10/28/2011	18410	12:03:29	0.80	8.31	Filter Backwash
001	10/28/2011	18410	12:03:44	1.00	8.31	Filter Backwash
001	10/28/2011	18410	12:03:59	0.90	8.31	Filter Backwash
001	10/28/2011	18410	12:04:14	0.90	8.31	Filter Backwash
001	10/28/2011	18410	12:04:29	0.80	8.31	Filter Backwash
001	10/28/2011	18410	12:04:44	0.90	8.37	Filter Backwash
001	10/28/2011	18410	12:04:59	1.00	8.42	Filter Backwash
001	10/28/2011	18410	12:05:14	1.40	8.34	Filter Backwash
001	10/28/2011	18410	12:05:29	1.10	8.39	Filter Backwash
001	10/28/2011	18410	12:06:29	0.90	8.31	Filter Backwash
001	10/28/2011	18410	12:06:44	1.00	8.31	Filter Backwash
001	10/28/2011	18410	12:06:59	1.20	8.42	Filter Backwash
001	10/28/2011	18410	12:07:14	1.20	8.44	Filter Backwash
001	10/28/2011	18410	12:07:29	1.10	8.32	Filter Backwash
001	10/28/2011	18410	12:07:44	1.20	8.31	Filter Backwash
001	10/28/2011	18410	12:07:59	1.10	8.31	Filter Backwash
001	10/28/2011	18410	12:08:14	1.30	8.40	Filter Backwash
001	10/28/2011	18410	12:08:29	1.30	8.42	Filter Backwash
001	10/28/2011	18410	12:08:44	1.40	8.34	Filter Backwash
001	10/28/2011	18410	12:08:59	1.00	8.31	ND
001	10/28/2011	18410	12:09:14	0.90	8.31	ND
001	10/28/2011	18410	12:09:29	0.80	8.31	ND
001	10/28/2011	18410	12:09:44	1.00	8.31	ND
001	10/28/2011	18410	12:09:59	0.60	8.31	ND
001	10/28/2011	18410	12:10:14	0.80	8.31	ND
001	10/28/2011	18410	12:10:29	0.70	8.32	ND
001	10/28/2011	18410	12:10:44	1.00	8.31	ND
001	10/28/2011	18410	12:10:59	1.10	8.31	ND
001	10/28/2011	18410	12:11:14	1.30	8.36	ND
001	10/28/2011	18410	12:11:29	1.40	8.42	ND
001	10/28/2011	18410	12:11:44	1.30	8.42	ND
001	10/28/2011	18410	12:11:59	1.30	8.32	ND
001	10/28/2011	18410	12:12:14	1.10	8.32	ND
001	10/28/2011	18410	12:12:29	1.00	8.32	ND
001	10/28/2011	18410	12:12:44	0.90	8.32	ND
001	10/28/2011	18410	12:12:59	1.10	8.31	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	12:13:14	0.90	8.41	ND
001	10/28/2011	18410	12:13:29	1.00	8.32	ND
001	10/28/2011	18410	12:13:44	1.00	8.44	ND
001	10/28/2011	18410	12:13:59	1.40	8.32	ND
001	10/28/2011	18410	12:14:14	0.60	8.31	ND
001	10/28/2011	18410	12:14:29	0.90	8.31	ND
001	10/28/2011	18410	12:14:44	1.10	8.32	ND
001	10/28/2011	18410	12:14:59	1.00	8.32	ND
001	10/28/2011	18410	12:15:14	1.10	8.32	ND
001	10/28/2011	18410	12:15:29	1.00	8.31	ND
001	10/28/2011	18410	12:15:44	1.00	8.31	ND
001	10/28/2011	18410	12:15:59	0.90	8.32	ND
001	10/28/2011	18410	12:16:14	0.90	8.32	ND
001	10/28/2011	18410	12:16:29	1.00	8.32	ND
001	10/28/2011	18410	12:16:44	0.90	8.33	ND
001	10/28/2011	18410	12:16:59	0.90	8.31	ND
001	10/28/2011	18410	12:17:14	0.90	8.31	ND
001	10/28/2011	18410	12:17:29	1.00	8.32	ND
001	10/28/2011	18410	12:17:44	1.00	8.33	ND
001	10/28/2011	18410	12:17:59	0.70	8.32	ND
001	10/28/2011	18410	12:18:14	0.90	8.32	ND
001	10/28/2011	18410	12:18:29	0.80	8.32	ND
001	10/28/2011	18410	12:18:44	0.80	8.32	ND
001	10/28/2011	18410	12:18:59	0.90	8.32	ND
001	10/28/2011	18410	12:19:14	1.10	8.32	ND
001	10/28/2011	18410	12:19:29	1.10	8.32	ND
001	10/28/2011	18410	12:19:44	1.30	8.32	ND
001	10/28/2011	18410	12:19:59	1.30	8.39	ND
001	10/28/2011	18410	12:20:14	1.20	8.33	ND
001	10/28/2011	18410	12:20:29	1.20	8.32	ND
001	10/28/2011	18410	12:20:44	1.10	8.32	ND
001	10/28/2011	18410	12:20:59	1.10	8.32	ND
001	10/28/2011	18410	12:21:14	1.00	8.32	ND
001	10/28/2011	18410	12:21:29	1.40	8.32	ND
001	10/28/2011	18410	12:21:44	1.40	8.39	ND
001	10/28/2011	18410	12:21:59	1.30	8.40	ND
001	10/28/2011	18410	12:22:14	1.30	8.33	ND
001	10/28/2011	18410	12:22:29	1.10	8.32	ND
001	10/28/2011	18410	12:22:44	1.10	8.32	ND
001	10/28/2011	18410	12:22:59	0.70	8.32	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	12:23:14	0.60	8.32	ND
001	10/28/2011	18410	12:23:29	0.80	8.32	ND
001	10/28/2011	18410	12:23:44	0.70	8.32	ND
001	10/28/2011	18410	12:23:59	0.70	8.32	ND
001	10/28/2011	18410	12:24:14	0.60	8.32	ND
001	10/28/2011	18410	12:24:29	0.40	8.32	ND
001	10/28/2011	18410	12:24:44	0.40	8.32	ND
001	10/28/2011	18410	12:24:59	0.30	8.32	ND
001	10/28/2011	18410	12:25:14	0.80	8.32	ND
001	10/28/2011	18410	12:25:29	0.20	8.32	ND
001	10/28/2011	18410	12:25:44	0.60	8.32	ND
001	10/28/2011	18410	12:25:59	0.70	8.32	ND
001	10/28/2011	18410	12:26:14	0.40	8.33	ND
001	10/28/2011	18410	12:26:29	0.50	8.33	ND
001	10/28/2011	18410	12:26:44	0.30	8.32	ND
001	10/28/2011	18410	12:26:59	0.20	8.32	ND
001	10/28/2011	18410	12:27:14	0.40	8.32	ND
001	10/28/2011	18410	12:27:29	0.50	8.32	ND
001	10/28/2011	18410	12:27:44	0.50	8.32	ND
001	10/28/2011	18410	12:27:59	0.30	8.33	ND
001	10/28/2011	18410	12:28:14	0.40	8.32	ND
001	10/28/2011	18410	12:28:29	0.20	8.33	ND
001	10/28/2011	18410	12:28:44	0.60	8.35	ND
001	10/28/2011	18410	12:28:59	0.50	8.33	ND
001	10/28/2011	18410	12:29:14	0.50	8.32	ND
001	10/28/2011	18410	12:29:29	0.50	8.32	ND
001	10/28/2011	18410	12:29:44	0.50	8.30	ND
001	10/28/2011	18410	12:29:59	0.30	8.32	ND
001	10/28/2011	18410	12:30:14	0.90	8.32	ND
001	10/28/2011	18410	12:30:29	1.10	8.32	ND
001	10/28/2011	18410	12:30:44	1.10	8.33	ND
001	10/28/2011	18410	12:30:59	1.40	8.32	ND
001	10/28/2011	18410	12:31:14	1.30	8.33	ND
001	10/28/2011	18410	12:31:29	1.50	8.34	ND
001	10/28/2011	18410	12:31:44	1.50	8.33	ND
001	10/28/2011	18410	12:31:59	1.50	8.32	ND
001	10/28/2011	18410	12:32:14	1.50	8.32	ND
001	10/28/2011	18410	12:32:29	1.60	8.32	ND
001	10/28/2011	18410	12:32:44	1.50	8.31	ND
001	10/28/2011	18410	12:32:59	1.60	8.32	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	12:33:14	1.30	8.31	ND
001	10/28/2011	18410	12:33:29	1.50	8.32	ND
001	10/28/2011	18410	12:33:44	1.40	8.31	ND
001	10/28/2011	18410	12:33:59	1.50	8.32	ND
001	10/28/2011	18410	12:34:14	1.50	8.32	ND
001	10/28/2011	18410	12:34:29	1.50	8.32	ND
001	10/28/2011	18410	12:34:44	1.50	8.32	ND
001	10/28/2011	18410	12:34:59	1.40	8.31	ND
001	10/28/2011	18410	12:35:14	1.50	8.32	ND
001	10/28/2011	18410	12:35:29	1.40	8.31	ND
001	10/28/2011	18410	12:35:44	1.40	8.31	ND
001	10/28/2011	18410	12:35:59	1.30	8.31	ND
001	10/28/2011	18410	12:36:14	1.40	8.31	ND
001	10/28/2011	18410	12:36:29	1.30	8.31	ND
001	10/28/2011	18410	12:36:44	1.40	8.31	ND
001	10/28/2011	18410	12:36:59	1.20	8.31	ND
001	10/28/2011	18410	12:37:14	1.20	8.31	ND
001	10/28/2011	18410	12:37:29	1.40	8.32	ND
001	10/28/2011	18410	12:37:44	1.50	8.31	ND
001	10/28/2011	18410	12:37:59	1.50	8.32	ND
001	10/28/2011	18410	12:38:14	1.50	8.32	ND
001	10/28/2011	18410	12:38:29	1.40	8.31	ND
001	10/28/2011	18410	12:38:44	1.30	8.31	ND
001	10/28/2011	18410	12:38:59	1.40	8.32	ND
001	10/28/2011	18410	12:39:14	1.00	8.34	ND
001	10/28/2011	18410	12:39:29	0.50	8.34	ND
001	10/28/2011	18410	12:39:44	0.30	8.33	ND
001	10/28/2011	18410	12:39:59	0.50	8.38	ND
001	10/28/2011	18410	12:40:14	0.40	8.40	ND
001	10/28/2011	18410	12:40:29	0.50	8.38	ND
001	10/28/2011	18410	12:40:44	0.60	8.38	ND
001	10/28/2011	18410	12:40:59	0.60	8.41	ND
001	10/28/2011	18410	12:41:14	0.50	8.42	ND
001	10/28/2011	18410	12:41:29	0.60	8.41	ND
001	10/28/2011	18410	12:41:44	0.60	8.41	ND
001	10/28/2011	18410	12:41:59	0.50	8.40	ND
001	10/28/2011	18410	12:42:14	0.80	8.35	ND
001	10/28/2011	18410	12:42:29	1.10	8.34	ND
001	10/28/2011	18410	12:42:44	1.20	8.36	ND
001	10/28/2011	18410	12:43:14	1.20	8.35	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	12:43:29	1.10	8.34	ND
001	10/28/2011	18410	12:43:44	1.30	8.35	ND
001	10/28/2011	18410	12:44:29	0.80	8.33	ND
001	10/28/2011	18410	12:44:44	0.90	8.33	ND
001	10/28/2011	18410	12:45:59	0.70	8.34	ND
001	10/28/2011	18410	12:46:14	0.40	8.34	ND
001	10/28/2011	18410	12:46:29	1.20	8.35	ND
001	10/28/2011	18410	12:46:44	1.20	8.34	ND
001	10/28/2011	18410	12:46:59	1.20	8.34	ND
001	10/28/2011	18410	12:47:14	1.00	8.34	ND
001	10/28/2011	18410	12:47:29	1.10	8.33	ND
001	10/28/2011	18410	12:47:44	1.30	8.34	ND
001	10/28/2011	18410	12:47:59	1.30	8.33	ND
001	10/28/2011	18410	12:48:14	1.30	8.34	ND
001	10/28/2011	18410	12:48:29	1.30	8.32	ND
001	10/28/2011	18410	12:48:44	1.30	8.32	ND
001	10/28/2011	18410	12:48:59	1.20	8.32	ND
001	10/28/2011	18410	12:49:14	1.20	8.31	ND
001	10/28/2011	18410	12:49:29	1.30	8.32	ND
001	10/28/2011	18410	12:49:44	1.30	8.31	ND
001	10/28/2011	18410	12:49:59	1.30	8.32	ND
001	10/28/2011	18410	12:50:14	1.30	8.32	ND
001	10/28/2011	18410	12:50:29	1.20	8.32	ND
001	10/28/2011	18410	12:50:44	1.20	8.31	ND
001	10/28/2011	18410	12:50:59	1.20	8.31	ND
001	10/28/2011	18410	12:51:14	1.30	8.31	ND
001	10/28/2011	18410	12:51:29	1.30	8.32	ND
001	10/28/2011	18410	12:51:44	1.20	8.32	ND
001	10/28/2011	18410	12:51:59	1.30	8.32	ND
001	10/28/2011	18410	12:52:14	1.20	8.32	ND
001	10/28/2011	18410	12:52:29	1.20	8.32	ND
001	10/28/2011	18410	12:52:44	1.30	8.30	ND
001	10/28/2011	18410	12:52:59	1.20	8.31	ND
001	10/28/2011	18410	12:53:14	1.20	8.31	ND
001	10/28/2011	18410	12:53:29	1.20	8.29	ND
001	10/28/2011	18410	12:53:44	1.20	8.31	ND
001	10/28/2011	18410	12:53:59	1.30	8.29	ND
001	10/28/2011	18410	12:54:14	1.30	8.30	ND
001	10/28/2011	18410	12:54:29	1.20	8.30	ND
001	10/28/2011	18410	12:54:44	1.20	8.30	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	12:54:59	1.20	8.29	ND
001	10/28/2011	18410	12:55:14	1.20	8.32	ND
001	10/28/2011	18410	12:55:29	1.20	8.31	ND
001	10/28/2011	18410	12:55:44	1.30	8.32	ND
001	10/28/2011	18410	12:55:59	1.20	8.32	ND
001	10/28/2011	18410	12:56:14	1.20	8.32	ND
001	10/28/2011	18410	12:56:29	1.30	8.29	ND
001	10/28/2011	18410	12:56:44	1.30	8.32	ND
001	10/28/2011	18410	12:56:59	1.30	8.31	ND
001	10/28/2011	18410	12:57:14	1.20	8.31	ND
001	10/28/2011	18410	12:57:29	1.30	8.32	ND
001	10/28/2011	18410	12:57:44	1.30	8.31	ND
001	10/28/2011	18410	12:57:59	1.20	8.31	ND
001	10/28/2011	18410	12:58:14	1.30	8.32	ND
001	10/28/2011	18410	12:58:29	1.30	8.30	ND
001	10/28/2011	18410	12:58:44	1.20	8.31	ND
001	10/28/2011	18410	12:58:59	1.20	8.32	ND
001	10/28/2011	18410	12:59:14	1.30	8.32	ND
001	10/28/2011	18410	12:59:29	1.30	8.31	ND
001	10/28/2011	18410	12:59:44	1.20	8.29	ND
001	10/28/2011	18410	12:59:59	1.20	8.30	ND
001	10/28/2011	18410	13:00:14	1.20	8.31	ND
001	10/28/2011	18410	13:00:29	1.30	8.30	ND
001	10/28/2011	18410	13:00:44	1.30	8.30	ND
001	10/28/2011	18410	13:00:59	1.30	8.30	ND
001	10/28/2011	18410	13:01:14	1.30	8.29	ND
001	10/28/2011	18410	13:01:29	1.20	8.30	ND
001	10/28/2011	18410	13:01:44	1.30	8.29	ND
001	10/28/2011	18410	13:01:59	1.30	8.30	ND
001	10/28/2011	18410	13:02:14	1.30	8.32	ND
001	10/28/2011	18410	13:02:29	1.30	8.31	ND
001	10/28/2011	18410	13:02:44	1.30	8.31	ND
001	10/28/2011	18410	13:02:59	1.10	8.30	ND
001	10/28/2011	18410	13:03:14	1.30	8.31	ND
001	10/28/2011	18410	13:03:29	1.20	8.33	ND
001	10/28/2011	18410	13:03:44	1.30	8.32	ND
001	10/28/2011	18410	13:03:59	1.30	8.30	ND
001	10/28/2011	18410	13:04:14	1.20	8.31	ND
001	10/28/2011	18410	13:04:29	1.20	8.30	ND
001	10/28/2011	18410	13:04:44	1.30	8.32	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	13:04:59	1.30	8.33	ND
001	10/28/2011	18410	13:05:14	1.30	8.31	ND
001	10/28/2011	18410	13:05:29	1.20	8.31	ND
001	10/28/2011	18410	13:05:44	1.20	8.33	ND
001	10/28/2011	18410	13:05:59	1.20	8.30	ND
001	10/28/2011	18410	13:06:14	1.20	8.32	ND
001	10/28/2011	18410	13:06:29	1.30	8.31	ND
001	10/28/2011	18410	13:06:44	1.20	8.31	ND
001	10/28/2011	18410	13:06:59	1.20	8.29	ND
001	10/28/2011	18410	13:07:14	1.20	8.29	ND
001	10/28/2011	18410	13:07:29	1.20	8.32	ND
001	10/28/2011	18410	13:07:44	1.20	8.31	ND
001	10/28/2011	18410	13:07:59	1.20	8.30	ND
001	10/28/2011	18410	13:08:14	1.30	8.31	ND
001	10/28/2011	18410	13:08:29	1.20	8.30	ND
001	10/28/2011	18410	13:08:44	1.20	8.29	ND
001	10/28/2011	18410	13:08:59	1.20	8.31	ND
001	10/28/2011	18410	13:09:14	1.20	8.30	ND
001	10/28/2011	18410	13:09:29	1.20	8.30	ND
001	10/28/2011	18410	13:09:44	1.10	8.30	ND
001	10/28/2011	18410	13:09:59	1.20	8.32	ND
001	10/28/2011	18410	13:10:14	1.20	8.30	ND
001	10/28/2011	18410	13:10:29	1.20	8.32	ND
001	10/28/2011	18410	13:10:44	1.20	8.30	ND
001	10/28/2011	18410	13:10:59	1.20	8.32	ND
001	10/28/2011	18410	13:11:14	1.20	8.31	ND
001	10/28/2011	18410	13:11:29	1.20	8.31	ND
001	10/28/2011	18410	13:11:44	1.30	8.29	ND
001	10/28/2011	18410	13:11:59	1.20	8.30	ND
001	10/28/2011	18410	13:12:14	1.20	8.30	ND
001	10/28/2011	18410	13:12:29	1.30	8.30	ND
001	10/28/2011	18410	13:12:44	1.20	8.32	ND
001	10/28/2011	18410	13:12:59	1.20	8.31	ND
001	10/28/2011	18410	13:13:14	1.20	8.30	ND
001	10/28/2011	18410	13:13:29	1.20	8.31	ND
001	10/28/2011	18410	13:13:44	1.20	8.30	ND
001	10/28/2011	18410	13:13:59	1.30	8.30	ND
001	10/28/2011	18410	13:14:14	1.20	8.30	ND
001	10/28/2011	18410	13:14:29	1.30	8.30	ND
001	10/28/2011	18410	13:14:44	1.20	8.29	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	13:14:59	1.30	8.32	ND
001	10/28/2011	18410	13:15:14	1.30	8.31	ND
001	10/28/2011	18410	13:15:29	1.20	8.31	ND
001	10/28/2011	18410	13:15:44	1.30	8.32	ND
001	10/28/2011	18410	13:15:59	1.30	8.32	ND
001	10/28/2011	18410	13:16:14	1.20	8.32	ND
001	10/28/2011	18410	13:16:29	1.20	8.30	ND
001	10/28/2011	18410	13:16:44	1.20	8.31	ND
001	10/28/2011	18410	13:16:59	1.20	8.30	ND
001	10/28/2011	18410	13:17:14	1.30	8.33	ND
001	10/28/2011	18410	13:17:29	1.20	8.32	ND
001	10/28/2011	18410	13:17:44	1.20	8.31	ND
001	10/28/2011	18410	13:17:59	1.20	8.32	ND
001	10/28/2011	18410	13:18:14	1.30	8.32	ND
001	10/28/2011	18410	13:18:29	1.30	8.31	ND
001	10/28/2011	18410	13:18:44	1.30	8.31	ND
001	10/28/2011	18410	13:18:59	1.20	8.31	ND
001	10/28/2011	18410	13:19:14	1.20	8.32	ND
001	10/28/2011	18410	13:19:29	1.30	8.31	ND
001	10/28/2011	18410	13:19:44	1.20	8.32	ND
001	10/28/2011	18410	13:19:59	1.20	8.31	ND
001	10/28/2011	18410	13:20:14	1.30	8.30	ND
001	10/28/2011	18410	13:20:29	1.20	8.30	ND
001	10/28/2011	18410	13:20:44	1.30	8.31	ND
001	10/28/2011	18410	13:20:59	1.20	8.31	ND
001	10/28/2011	18410	13:21:14	1.30	8.33	ND
001	10/28/2011	18410	13:21:29	1.20	8.32	ND
001	10/28/2011	18410	13:21:44	1.20	8.30	ND
001	10/28/2011	18410	13:21:59	1.30	8.31	ND
001	10/28/2011	18410	13:22:14	1.20	8.30	ND
001	10/28/2011	18410	13:22:29	1.30	8.29	ND
001	10/28/2011	18410	13:22:44	1.20	8.30	ND
001	10/28/2011	18410	13:22:59	1.30	8.33	ND
001	10/28/2011	18410	13:23:14	1.30	8.31	ND
001	10/28/2011	18410	13:23:29	1.30	8.31	ND
001	10/28/2011	18410	13:23:44	1.20	8.30	ND
001	10/28/2011	18410	13:23:59	1.30	8.32	ND
001	10/28/2011	18410	13:24:14	1.20	8.31	ND
001	10/28/2011	18410	13:24:29	1.30	8.33	ND
001	10/28/2011	18410	13:24:44	1.20	8.31	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	13:24:59	1.30	8.31	ND
001	10/28/2011	18410	13:25:14	1.30	8.32	ND
001	10/28/2011	18410	13:25:29	1.20	8.32	ND
001	10/28/2011	18410	13:25:44	1.30	8.30	ND
001	10/28/2011	18410	13:25:59	1.30	8.31	ND
001	10/28/2011	18410	13:26:14	1.30	8.31	ND
001	10/28/2011	18410	13:26:29	1.20	8.32	ND
001	10/28/2011	18410	13:26:44	1.20	8.32	ND
001	10/28/2011	18410	13:26:59	1.30	8.31	ND
001	10/28/2011	18410	13:27:14	1.20	8.32	ND
001	10/28/2011	18410	13:27:29	1.30	8.31	ND
001	10/28/2011	18410	13:27:44	1.20	8.32	ND
001	10/28/2011	18410	13:27:59	1.30	8.30	ND
001	10/28/2011	18410	13:28:14	1.30	8.30	ND
001	10/28/2011	18410	13:28:29	1.30	8.30	ND
001	10/28/2011	18410	13:28:44	1.20	8.31	ND
001	10/28/2011	18410	13:28:59	1.20	8.30	ND
001	10/28/2011	18410	13:29:14	1.20	8.32	ND
001	10/28/2011	18410	13:29:29	1.20	8.31	ND
001	10/28/2011	18410	13:29:44	1.20	8.33	ND
001	10/28/2011	18410	13:29:59	1.30	8.31	ND
001	10/28/2011	18410	13:30:14	1.30	8.31	ND
001	10/28/2011	18410	13:30:29	1.30	8.32	ND
001	10/28/2011	18410	13:30:44	1.20	8.33	ND
001	10/28/2011	18410	13:30:59	1.30	8.31	ND
001	10/28/2011	18410	13:31:14	1.30	8.30	ND
001	10/28/2011	18410	13:31:29	1.30	8.32	ND
001	10/28/2011	18410	13:31:44	1.30	8.30	ND
001	10/28/2011	18410	13:31:59	1.30	8.31	ND
001	10/28/2011	18410	13:32:14	1.30	8.30	ND
001	10/28/2011	18410	13:32:29	1.30	8.31	ND
001	10/28/2011	18410	13:32:44	1.30	8.30	ND
001	10/28/2011	18410	13:32:59	1.30	8.33	ND
001	10/28/2011	18410	13:33:14	1.20	8.33	ND
001	10/28/2011	18410	13:33:29	1.20	8.33	ND
001	10/28/2011	18410	13:33:44	1.30	8.31	ND
001	10/28/2011	18410	13:33:59	1.30	8.30	ND
001	10/28/2011	18410	13:34:14	1.20	8.31	ND
001	10/28/2011	18410	13:34:29	1.20	8.32	ND
001	10/28/2011	18410	13:34:44	1.20	8.32	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	13:34:59	1.30	8.31	ND
001	10/28/2011	18410	13:35:14	1.20	8.30	ND
001	10/28/2011	18410	13:35:29	1.20	8.30	ND
001	10/28/2011	18410	13:35:44	1.30	8.31	ND
001	10/28/2011	18410	13:35:59	1.20	8.32	ND
001	10/28/2011	18410	13:36:14	1.20	8.31	ND
001	10/28/2011	18410	13:36:29	1.30	8.32	ND
001	10/28/2011	18410	13:36:44	1.20	8.31	ND
001	10/28/2011	18410	13:36:59	1.20	8.34	ND
001	10/28/2011	18410	13:37:14	1.20	8.31	ND
001	10/28/2011	18410	13:37:29	1.30	8.31	ND
001	10/28/2011	18410	13:37:44	1.30	8.30	ND
001	10/28/2011	18410	13:37:59	1.30	8.32	ND
001	10/28/2011	18410	13:38:14	1.20	8.32	ND
001	10/28/2011	18410	13:38:29	1.20	8.31	ND
001	10/28/2011	18410	13:38:44	1.30	8.32	ND
001	10/28/2011	18410	13:38:59	1.20	8.32	ND
001	10/28/2011	18410	13:39:14	1.20	8.33	ND
001	10/28/2011	18410	13:39:29	1.30	8.31	ND
001	10/28/2011	18410	13:39:44	1.20	8.30	ND
001	10/28/2011	18410	13:39:59	1.20	8.32	ND
001	10/28/2011	18410	13:40:14	1.30	8.33	ND
001	10/28/2011	18410	13:40:29	1.20	8.33	ND
001	10/28/2011	18410	13:40:44	1.20	8.34	ND
001	10/28/2011	18410	13:40:59	1.30	8.36	ND
001	10/28/2011	18410	13:41:14	1.30	8.37	ND
001	10/28/2011	18410	13:41:29	1.20	8.35	ND
001	10/28/2011	18410	13:41:44	0.90	8.35	ND
001	10/28/2011	18410	13:41:59	1.20	8.36	ND
001	10/28/2011	18410	13:42:14	1.30	8.36	ND
001	10/28/2011	18410	13:42:29	1.30	8.35	ND
001	10/28/2011	18410	13:42:44	1.50	8.36	ND
001	10/28/2011	18410	13:42:59	1.40	8.36	ND
001	10/28/2011	18410	13:43:14	1.30	8.37	ND
001	10/28/2011	18410	13:43:29	1.30	8.36	ND
001	10/28/2011	18410	13:43:44	1.40	8.36	ND
001	10/28/2011	18410	13:43:59	1.70	8.36	ND
001	10/28/2011	18410	13:44:14	1.70	8.36	ND
001	10/28/2011	18410	13:44:29	1.80	8.36	ND
001	10/28/2011	18410	13:44:44	1.80	8.36	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	13:44:59	1.90	8.36	ND
001	10/28/2011	18410	13:45:14	2.60	8.37	ND
001	10/28/2011	18410	13:45:29	3.10	8.37	ND
001	10/28/2011	18410	13:45:44	3.10	8.37	ND
001	10/28/2011	18410	13:45:59	3.60	8.37	ND
001	10/28/2011	18410	13:46:14	3.70	8.36	ND
001	10/28/2011	18410	13:46:29	3.80	8.37	ND
001	10/28/2011	18410	13:46:44	3.80	8.37	ND
001	10/28/2011	18410	13:46:59	4.00	8.37	ND
001	10/28/2011	18410	13:47:14	4.10	8.38	ND
001	10/28/2011	18410	13:47:29	4.50	8.37	ND
001	10/28/2011	18410	13:47:44	4.40	8.37	ND
001	10/28/2011	18410	13:47:59	5.20	8.37	ND
001	10/28/2011	18410	13:48:14	5.10	8.37	ND
001	10/28/2011	18410	13:48:29	5.30	8.39	ND
001	10/28/2011	18410	13:48:44	5.20	8.36	ND
001	10/28/2011	18410	13:48:59	5.40	8.37	ND
001	10/28/2011	18410	13:49:14	5.20	8.38	ND
001	10/28/2011	18410	13:49:29	5.20	8.36	ND
001	10/28/2011	18410	13:49:44	5.20	8.37	ND
001	10/28/2011	18410	13:49:59	5.20	8.36	ND
001	10/28/2011	18410	13:50:14	5.30	8.36	ND
001	10/28/2011	18410	13:50:29	5.20	8.37	ND
001	10/28/2011	18410	13:50:44	5.30	8.36	ND
001	10/28/2011	18410	13:50:59	5.10	8.36	ND
001	10/28/2011	18410	13:51:14	5.30	8.36	ND
001	10/28/2011	18410	13:51:29	5.40	8.37	ND
001	10/28/2011	18410	13:51:44	5.30	8.36	ND
001	10/28/2011	18410	13:51:59	5.10	8.36	ND
001	10/28/2011	18410	13:52:14	5.20	8.36	ND
001	10/28/2011	18410	13:52:29	5.20	8.36	ND
001	10/28/2011	18410	13:52:44	5.40	8.36	ND
001	10/28/2011	18410	13:52:59	5.20	8.36	ND
001	10/28/2011	18410	13:53:14	5.30	8.36	ND
001	10/28/2011	18410	13:53:29	5.20	8.36	ND
001	10/28/2011	18410	13:53:44	5.20	8.36	ND
001	10/28/2011	18410	13:53:59	5.10	8.36	ND
001	10/28/2011	18410	13:54:14	5.20	8.37	ND
001	10/28/2011	18410	13:54:29	5.10	8.36	ND
001	10/28/2011	18410	13:54:44	5.40	8.36	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	13:54:59	5.20	8.36	ND
001	10/28/2011	18410	13:55:14	5.40	8.36	ND
001	10/28/2011	18410	13:55:29	5.30	8.36	ND
001	10/28/2011	18410	13:55:44	5.30	8.37	ND
001	10/28/2011	18410	13:55:59	5.30	8.36	ND
001	10/28/2011	18410	13:56:14	5.40	8.36	ND
001	10/28/2011	18410	13:56:29	5.30	8.37	ND
001	10/28/2011	18410	13:56:44	5.50	8.36	ND
001	10/28/2011	18410	13:56:59	5.40	8.36	ND
001	10/28/2011	18410	13:57:14	5.40	8.36	ND
001	10/28/2011	18410	13:57:29	5.40	8.36	ND
001	10/28/2011	18410	13:57:44	5.20	8.36	ND
001	10/28/2011	18410	13:57:59	5.40	8.36	ND
001	10/28/2011	18410	13:58:14	5.40	8.37	ND
001	10/28/2011	18410	13:58:29	5.40	8.36	ND
001	10/28/2011	18410	13:58:44	5.30	8.36	ND
001	10/28/2011	18410	13:58:59	5.20	8.36	ND
001	10/28/2011	18410	13:59:14	5.20	8.36	ND
001	10/28/2011	18410	13:59:29	5.30	8.37	ND
001	10/28/2011	18410	13:59:44	5.10	8.37	ND
001	10/28/2011	18410	13:59:59	5.00	8.36	ND
001	10/28/2011	18410	14:00:14	5.00	8.37	ND
001	10/28/2011	18410	14:00:29	4.90	8.36	ND
001	10/28/2011	18410	14:00:44	4.70	8.36	ND
001	10/28/2011	18410	14:00:59	5.00	8.36	ND
001	10/28/2011	18410	14:01:14	5.30	8.36	ND
001	10/28/2011	18410	14:01:29	5.10	8.36	ND
001	10/28/2011	18410	14:01:44	5.30	8.36	ND
001	10/28/2011	18410	14:01:59	5.20	8.36	ND
001	10/28/2011	18410	14:02:14	5.10	8.36	ND
001	10/28/2011	18410	14:02:29	5.30	8.36	ND
001	10/28/2011	18410	14:02:44	4.90	8.36	ND
001	10/28/2011	18410	14:02:59	5.20	8.36	ND
001	10/28/2011	18410	14:03:14	5.30	8.36	ND
001	10/28/2011	18410	14:03:29	5.20	8.36	ND
001	10/28/2011	18410	14:03:44	5.10	8.36	ND
001	10/28/2011	18410	14:03:59	5.20	8.36	ND
001	10/28/2011	18410	14:04:14	5.30	8.37	ND
001	10/28/2011	18410	14:04:29	5.30	8.41	ND
001	10/28/2011	18410	14:04:44	5.30	8.41	ND

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	14:04:59	5.20	8.42	ND
001	10/28/2011	18410	14:05:14	5.50	8.42	Filter Backwash
001	10/28/2011	18410	14:05:29	5.50	8.47	Filter Backwash
001	10/28/2011	18410	14:05:44	5.40	8.43	Filter Backwash
001	10/28/2011	18410	14:05:59	5.40	8.39	Filter Backwash
001	10/28/2011	18410	14:06:14	5.30	8.39	Filter Backwash
001	10/28/2011	18410	14:06:29	5.50	8.47	Filter Backwash
001	10/28/2011	18410	14:06:44	5.50	8.39	Filter Backwash
001	10/28/2011	18410	14:06:59	5.40	8.48	Filter Backwash
001	10/28/2011	18410	14:07:14	5.50	8.45	Filter Backwash
001	10/28/2011	18410	14:07:29	5.50	8.41	Filter Backwash
001	10/28/2011	18410	14:07:44	5.30	8.45	Filter Backwash
001	10/28/2011	18410	14:07:59	5.40	8.49	Filter Backwash
001	10/28/2011	18410	14:08:14	5.30	8.40	Filter Backwash
001	10/28/2011	18410	14:08:29	5.20	8.40	Filter Backwash
001	10/28/2011	18410	14:08:44	5.30	8.37	Filter Backwash
001	10/28/2011	18410	14:08:59	5.30	8.43	Filter Backwash
001	10/28/2011	18410	14:09:14	5.30	8.37	Filter Backwash
001	10/28/2011	18410	14:09:29	5.30	8.40	Filter Backwash
001	10/28/2011	18410	14:09:44	5.30	8.39	Filter Backwash
001	10/28/2011	18410	14:09:59	5.50	8.37	Filter Backwash
001	10/28/2011	18410	14:10:14	5.20	8.37	Filter Backwash
001	10/28/2011	18410	14:10:29	5.20	8.37	Filter Backwash
001	10/28/2011	18410	14:10:44	5.10	8.40	Filter Backwash
001	10/28/2011	18410	14:10:59	5.00	8.39	Filter Backwash
001	10/28/2011	18410	14:11:14	5.10	8.41	Filter Backwash
001	10/28/2011	18410	14:11:29	5.20	8.39	Filter Backwash
001	10/28/2011	18410	14:11:44	5.20	8.40	Filter Backwash
001	10/28/2011	18410	14:11:59	5.20	8.43	Filter Backwash
001	10/28/2011	18410	14:12:14	5.20	8.41	Filter Backwash
001	10/28/2011	18410	14:12:29	5.30	8.38	Filter Backwash
001	10/28/2011	18410	14:12:44	5.30	8.40	Filter Backwash
001	10/28/2011	18410	14:12:59	5.40	8.39	Filter Backwash
001	10/28/2011	18410	14:13:14	5.40	8.40	Filter Backwash
001	10/28/2011	18410	14:13:29	5.40	8.39	Filter Backwash
001	10/28/2011	18410	14:13:44	5.50	8.39	Filter Backwash
001	10/28/2011	18410	14:13:59	5.50	8.39	Filter Backwash
001	10/28/2011	18410	14:14:14	5.40	8.39	Filter Backwash
001	10/28/2011	18410	14:14:29	5.30	8.39	Filter Backwash
001	10/28/2011	18410	14:14:44	5.40	8.37	Filter Backwash

OUTFALL 001 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
001	10/28/2011	18410	14:14:59	5.40	8.39	Filter Backwash

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/26/2011	18410	14:14:29	5.7	8.14	Decant
002	10/26/2011	18410	14:14:44	5.8	8.15	Decant
002	10/26/2011	18410	14:14:59	5.7	8.14	Decant
002	10/26/2011	18410	14:15:14	5.7	8.15	Decant
002	10/26/2011	18410	14:15:29	5.7	8.14	Decant
002	10/26/2011	18410	14:15:44	5.8	8.14	Decant
002	10/26/2011	18410	14:15:59	5.7	8.14	Decant
002	10/26/2011	18410	14:16:14	5.8	8.15	Decant
002	10/26/2011	18410	14:16:29	5.7	8.11	Decant
002	10/26/2011	18410	14:16:44	5.8	8.11	Decant
002	10/26/2011	18410	14:16:59	5.8	8.14	Decant
002	10/26/2011	18410	14:17:14	5.5	8.15	Decant
002	10/26/2011	18410	14:17:29	5.6	8.17	Decant
002	10/26/2011	18410	14:22:43	0.9	8.20	Decant
002	10/26/2011	18410	14:22:58	0.9	8.20	Decant
002	10/26/2011	18410	14:24:46	1.1	8.21	Decant
002	10/26/2011	18410	14:25:00	5.5	8.35	Decant
002	10/26/2011	18410	14:25:15	5.5	8.34	Decant
002	10/26/2011	18410	14:25:30	6	8.12	Decant
002	10/26/2011	18410	14:25:45	5.9	8.14	Decant
002	10/26/2011	18410	14:26:00	5.6	8.15	Decant
002	10/26/2011	18410	14:26:15	5.5	8.15	Decant
002	10/26/2011	18410	14:26:30	5.9	8.16	Decant
002	10/26/2011	18410	14:26:45	6	8.14	Decant
002	10/26/2011	18410	14:27:00	6	8.16	Decant
002	10/26/2011	18410	14:27:15	5.8	8.40	Decant
002	10/26/2011	18410	14:27:30	5.5	8.38	Decant
002	10/26/2011	18410	14:27:45	5.8	8.22	Decant
002	10/26/2011	18410	14:28:00	5.8	8.19	Decant
002	10/26/2011	18410	14:28:15	5.7	8.34	Decant
002	10/26/2011	18410	14:28:30	5.6	8.32	Decant
002	10/26/2011	18410	14:28:45	5.6	8.29	Decant
002	10/26/2011	18410	14:29:00	5.7	8.33	Decant
002	10/26/2011	18410	14:29:15	5.7	8.26	Decant
002	10/26/2011	18410	14:29:30	5.9	8.26	Decant
002	10/26/2011	18410	14:29:45	5.8	8.26	Decant
002	10/26/2011	18410	14:30:00	5.6	8.23	Decant
002	10/26/2011	18410	14:30:15	5.8	8.20	Decant
002	10/26/2011	18410	14:41:42	1.1	8.28	Decant
002	10/26/2011	18410	14:41:56	2.4	8.36	Decant

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/26/2011	18410	14:42:11	4.6	8.35	Decant
002	10/26/2011	18410	14:42:26	5.1	8.33	Decant
002	10/26/2011	18410	14:42:41	5.1	8.38	Decant
002	10/26/2011	18410	14:42:56	4.6	8.34	Decant
002	10/26/2011	18410	14:43:11	5.3	8.41	Decant
002	10/26/2011	18410	14:43:26	5.2	8.43	Decant
002	10/26/2011	18410	14:43:41	5.3	8.40	Decant
002	10/26/2011	18410	14:43:56	5	8.37	Decant
002	10/26/2011	18410	14:44:11	5.7	8.39	Decant
002	10/26/2011	18410	14:44:26	5.8	8.34	Decant
002	10/26/2011	18410	14:44:41	5.7		Decant
002	10/26/2011	18410	14:44:56	5.7	8.40	Decant
002	10/26/2011	18410	14:45:11	5.8	8.26	Decant
002	10/26/2011	18410	14:45:26	5.5	8.24	Decant
002	10/26/2011	18410	14:45:41	5.6	8.22	Decant
002	10/26/2011	18410	14:45:56	5.8	8.20	Decant
002	10/26/2011	18410	14:46:11	5.5	8.21	Decant
002	10/26/2011	18410	14:46:26	5.5	8.25	Decant
002	10/26/2011	18410	14:46:41	5.5	8.23	Decant
002	10/26/2011	18410	14:46:56	5.4	8.23	Decant
002	10/26/2011	18410	14:47:11	5.7	8.29	Decant
002	10/26/2011	18410	14:47:26	5.7	8.26	Decant
002	10/26/2011	18410	14:47:41	5.9	8.28	Decant
002	10/26/2011	18410	14:47:56	5.9	8.25	Decant
002	10/26/2011	18410	14:48:11	5.7	8.24	Decant
002	10/26/2011	18410	14:48:26	6.1	8.29	Decant
002	10/26/2011	18410	14:48:41	5.8	8.23	Decant
002	10/26/2011	18410	14:48:56	6.1	8.20	Decant
002	10/26/2011	18410	14:49:11	6.2	8.18	Decant
002	10/26/2011	18410	14:49:26	5.9	8.21	Decant
002	10/26/2011	18410	14:49:41	5.8	8.17	Decant
002	10/26/2011	18410	14:49:56	5.7	8.16	Decant
002	10/26/2011	18410	14:50:11	5.8	8.18	Decant
002	10/26/2011	18410	14:50:26	6	8.20	Decant
002	10/26/2011	18410	14:50:41	5.8	8.22	Decant
002	10/26/2011	18410	14:50:56	5.5	8.22	Decant
002	10/26/2011	18410	14:51:11	5.5	8.21	Decant
002	10/26/2011	18410	14:51:26	5.6	8.23	Decant
002	10/26/2011	18410	14:51:41	5.5	8.21	Decant
002	10/26/2011	18410	14:51:56	5.4	8.23	Decant

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/26/2011	18410	14:52:11	5.4	8.22	Decant
002	10/26/2011	18410	14:52:26	5.7	8.23	Decant
002	10/26/2011	18410	14:52:41	5.8	8.24	Decant
002	10/26/2011	18410	14:52:56	5.8	8.25	Decant
002	10/26/2011	18410	14:53:11	5.3	8.24	Decant
002	10/26/2011	18410	14:53:26	5.4	8.24	Decant
002	10/26/2011	18410	14:53:41	5.5	8.24	Decant
002	10/26/2011	18410	14:54:26	5.6	8.26	Decant
002	10/26/2011	18410	14:54:41	5.9	8.25	Decant
002	10/26/2011	18410	14:54:56	5.7	8.28	Decant
002	10/26/2011	18410	14:55:26	5.7	8.26	Decant
002	10/26/2011	18410	14:55:41	5.8	8.20	Decant
002	10/26/2011	18410	14:55:56	5.5	8.20	Decant
002	10/26/2011	18410	14:56:11	5.7	8.19	Decant
002	10/26/2011	18410	14:56:26	5.7	8.19	Decant
002	10/26/2011	18410	14:56:41	5.9	8.18	Decant
002	10/26/2011	18410	14:56:56	5.6	8.19	Decant
002	10/26/2011	18410	14:57:11	5.4	8.19	Decant
002	10/26/2011	18410	14:57:26	5.5	8.19	Decant
002	10/26/2011	18410	14:57:41	5.6	8.19	Decant
002	10/26/2011	18410	14:57:56	5.7	8.17	Decant
002	10/26/2011	18410	14:58:11	5.2	8.17	Decant
002	10/26/2011	18410	14:58:26	5.2	8.15	Decant
002	10/26/2011	18410	14:58:41	5.2	8.18	Decant
002	10/26/2011	18410	14:58:56	5.6	8.24	Decant
002	10/26/2011	18410	14:59:11	5.4	8.23	Decant
002	10/26/2011	18410	14:59:26	5.5	8.23	Decant
002	10/26/2011	18410	14:59:41	5.9	8.31	Decant
002	10/26/2011	18410	14:59:56	5.7	8.50	Decant
002	10/26/2011	18410	15:00:11	5.5	8.19	Decant
002	10/26/2011	18410	15:00:26	5.4	8.16	Decant
002	10/26/2011	18410	15:00:41	5.6	8.16	Decant
002	10/26/2011	18410	15:00:56	5.3	8.18	Decant
002	10/26/2011	18410	15:01:11	5.6	8.25	Decant
002	10/26/2011	18410	15:01:26	5.6	8.17	Decant
002	10/26/2011	18410	15:01:41	5.4	8.22	Decant
002	10/26/2011	18410	15:01:56	5.2	8.16	Decant
002	10/26/2011	18410	15:02:11	4.7	8.18	Decant
002	10/26/2011	18410	15:02:26	5.3	8.16	Decant
002	10/26/2011	18410	15:02:41	5.5	8.13	Decant

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/26/2011	18410	15:02:56	5.6	8.13	Decant
002	10/26/2011	18410	15:03:11	5.7	8.15	Decant
002	10/26/2011	18410	15:03:26	5.9	8.15	Decant
002	10/26/2011	18410	15:03:41	5.9	8.13	Decant
002	10/26/2011	18410	15:03:56	5.8	8.16	Decant
002	10/26/2011	18410	15:04:11	5.8	8.17	Decant
002	10/26/2011	18410	15:04:26	5.7	8.15	Decant
002	10/26/2011	18410	15:04:41	5.4	8.15	Decant
002	10/26/2011	18410	15:04:56	5.1	8.18	Decant
002	10/26/2011	18410	15:05:11	5.3	8.18	Decant
002	10/26/2011	18410	15:05:26	4.8	8.19	Decant
002	10/26/2011	18410	15:05:41	5.5	8.19	Decant
002	10/26/2011	18410	15:05:56	5.2	8.33	Decant
002	10/26/2011	18410	15:06:11	4.4	8.30	Decant
002	10/26/2011	18410	15:06:26	4.3	8.31	Decant
002	10/26/2011	18410	15:06:41	4.8	8.30	Decant
002	10/26/2011	18410	15:06:56	4.3	8.31	Decant
002	10/26/2011	18410	15:07:11	4.4	8.33	Decant
002	10/26/2011	18410	15:07:26	4.3	8.32	Decant
002	10/26/2011	18410	15:08:26	0.5	8.24	Decant
002	10/26/2011	18410	15:08:41	0.4	8.23	Decant
002	10/26/2011	18410	15:08:56	0.2	8.23	Decant
002	10/26/2011	18410	15:09:11	0.3	8.23	Decant
002	10/26/2011	18410	15:09:26	0.4	8.23	Decant
002	10/26/2011	18410	15:09:41	0.3	8.23	Decant
002	10/26/2011	18410	15:09:56	0.2	8.23	Decant
002	10/26/2011	18410	15:10:11	0.5	8.23	Decant
002	10/26/2011	18410	15:10:26	0.3	8.23	Decant
002	10/26/2011	18410	15:10:41	0.3	8.23	Decant
002	10/26/2011	18410	15:10:56	0.4	8.24	Decant
002	10/26/2011	18410	15:11:11	0.2	8.23	Decant
002	10/26/2011	18410	15:11:26	0.4	8.23	Decant
002	10/26/2011	18410	15:11:41	0.5	8.22	Decant
002	10/26/2011	18410	15:11:56	0.9	8.22	Decant
002	10/26/2011	18410	15:12:11	0.8	8.22	Decant
002	10/26/2011	18410	15:12:26	1.1	8.23	Decant
002	10/26/2011	18410	15:12:41	1	8.21	Decant
002	10/26/2011	18410	15:12:56	0.9	8.21	Decant
002	10/26/2011	18410	15:13:11	1.3	8.34	Decant
002	10/26/2011	18410	15:13:26	1.2	8.28	Decant

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/26/2011	18410	15:13:41	0.7	8.25	Decant
002	10/26/2011	18410	15:13:56	1.2	8.21	Decant
002	10/26/2011	18410	15:14:11	1.5	8.23	Decant
002	10/26/2011	18410	15:08:26	0.5	8.24	Decant
002	10/26/2011	18410	15:08:41	0.4	8.23	Decant
002	10/26/2011	18410	15:08:56	0.2	8.23	Decant
002	10/26/2011	18410	15:09:11	0.3	8.23	Decant
002	10/26/2011	18410	15:09:26	0.4	8.23	Decant
002	10/26/2011	18410	15:09:41	0.3	8.23	Decant
002	10/26/2011	18410	15:09:56	0.2	8.23	Decant
002	10/26/2011	18410	15:10:11	0.5	8.23	Decant
002	10/26/2011	18410	15:10:26	0.3	8.23	Decant
002	10/26/2011	18410	15:10:41	0.3	8.23	Decant
002	10/26/2011	18410	15:10:56	0.4	8.24	Decant
002	10/26/2011	18410	15:11:11	0.2	8.23	Decant
002	10/26/2011	18410	15:11:26	0.4	8.23	Decant
002	10/26/2011	18410	15:11:41	0.5	8.22	Decant
002	10/26/2011	18410	15:11:56	0.9	8.22	Decant
002	10/26/2011	18410	15:12:11	0.8	8.22	Decant
002	10/26/2011	18410	15:12:26	1.1	8.23	Decant
002	10/26/2011	18410	15:12:41	1	8.21	Decant
002	10/26/2011	18410	15:12:56	0.9	8.21	Decant
002	10/26/2011	18410	15:13:11	1.3	8.34	Decant
002	10/26/2011	18410	15:13:26	1.2	8.28	Decant
002	10/26/2011	18410	15:13:41	0.7	8.25	Decant
002	10/26/2011	18410	15:13:56	1.2	8.21	Decant
002	10/26/2011	18410	15:14:11	1.5	8.23	Decant
002	10/27/2011	18410	9:01:54	1.5	8.22	Pit Cleaning
002	10/27/2011	18410	9:01:54	1.5	8.22	Pit Cleaning
002	10/27/2011	18410	9:03:39	1.6	8.23	Pit Cleaning
002	10/27/2011	18410	9:04:09	1.6	8.23	Pit Cleaning
002	10/27/2011	18410	9:04:24	1.6	8.22	Pit Cleaning
002	10/27/2011	18410	9:04:54	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:05:09	1.4	8.24	Pit Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:05:24	1.5	8.24	Pit Cleaning
002	10/27/2011	18410	9:06:24	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:06:39	1.5	8.24	Pit Cleaning
002	10/27/2011	18410	9:06:54	1.5	8.24	Pit Cleaning
002	10/27/2011	18410	9:07:09	1.4	8.25	Pit Cleaning
002	10/27/2011	18410	9:07:24	1.5	8.25	Pit Cleaning
002	10/27/2011	18410	9:07:39	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	9:07:54	1.2	8.26	Pit Cleaning
002	10/27/2011	18410	9:08:09	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	9:08:24	1.3	8.25	Pit Cleaning
002	10/27/2011	18410	9:08:39	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:08:54	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	9:09:10	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	9:09:54	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	9:10:09	1.3	8.25	Pit Cleaning
002	10/27/2011	18410	9:10:24	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:10:39	1.4	8.24	Pit Cleaning
002	10/27/2011	18410	9:10:54	1.4	8.25	Pit Cleaning
002	10/27/2011	18410	9:11:09	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	9:11:24	1.4	8.24	Pit Cleaning
002	10/27/2011	18410	9:12:09	1.3	8.22	Pit Cleaning
002	10/27/2011	18410	9:12:54	1.3	8.22	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:13:09	1.3	8.22	Cleaning Pit
002	10/27/2011	18410	9:13:24	1.3	8.23	Cleaning Pit
002	10/27/2011	18410	9:13:39	1.3	8.23	Cleaning Pit
002	10/27/2011	18410	9:13:54	1.3	8.23	Cleaning Pit
002	10/27/2011	18410	9:14:09	1.4	8.22	Cleaning Pit
002	10/27/2011	18410	9:14:24	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	9:14:39	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	9:14:54	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	9:15:09	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	9:15:24	1.3	8.22	Cleaning Pit
002	10/27/2011	18410	9:15:39	1.2	8.23	Cleaning Pit
002	10/27/2011	18410	9:15:54	1	8.23	Cleaning Pit
002	10/27/2011	18410	9:16:09	1.1	8.23	Cleaning Pit
002	10/27/2011	18410	9:16:24	1.1	8.23	Cleaning Pit
002	10/27/2011	18410	9:16:39	0.9	8.23	Cleaning Pit
002	10/27/2011	18410	9:17:09	1	8.23	Cleaning Pit
002	10/27/2011	18410	9:17:24	1.1	8.22	Cleaning Pit
002	10/27/2011	18410	9:17:39	1	8.23	Cleaning Pit
002	10/27/2011	18410	9:17:54	1.1	8.23	Cleaning Pit
002	10/27/2011	18410	9:18:09	1	8.23	Cleaning Pit
002	10/27/2011	18410	9:18:24	1	8.23	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:18:39	1	8.22	Pit Cleaning
002	10/27/2011	18410	9:18:54	1.1	8.23	Pit Cleaning
002	10/27/2011	18410	9:19:09	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	9:19:24	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:19:39	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	9:19:54	1.1	8.22	Pit Cleaning
002	10/27/2011	18410	9:20:09	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:20:24	1.4	8.23	Pit Cleaning
002	10/27/2011	18410	9:20:39	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:20:54	1.5	8.24	Pit Cleaning
002	10/27/2011	18410	9:21:09	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:21:24	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	9:21:39	1.3	8.22	Pit Cleaning
002	10/27/2011	18410	9:21:54	1.4	8.23	Pit Cleaning
002	10/27/2011	18410	9:22:09	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:22:24	1.4	8.24	Pit Cleaning
002	10/27/2011	18410	9:22:39	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:22:54	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:23:09	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:23:24	1.5	8.24	Pit Cleaning
002	10/27/2011	18410	9:23:39	1.5	8.24	Pit Cleaning
002	10/27/2011	18410	9:23:54	1.5	8.23	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Cleaning Pit
002	10/27/2011	18410	9:24:09	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:24:24	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:24:39	1.3	8.23	Cleaning Pit
002	10/27/2011	18410	9:24:54	1.2	8.22	Cleaning Pit
002	10/27/2011	18410	9:25:09	1.3	8.22	Cleaning Pit
002	10/27/2011	18410	9:25:24	1.3	8.22	Cleaning Pit
002	10/27/2011	18410	9:25:39	1.3	8.22	Cleaning Pit
002	10/27/2011	18410	9:25:54	1.1	8.22	Cleaning Pit
002	10/27/2011	18410	9:26:09	1.2	8.22	Cleaning Pit
002	10/27/2011	18410	9:26:24	1.2	8.22	Cleaning Pit
002	10/27/2011	18410	9:26:39	1.2	8.22	Cleaning Pit
002	10/27/2011	18410	9:26:54	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:27:09	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:27:24	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	9:27:39	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:27:54	1.3	8.23	Cleaning Pit
002	10/27/2011	18410	9:28:09	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:28:24	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:28:39	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	9:28:54	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	9:29:09	1.5	8.23	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:29:24	1.5	8.26	Pit Cleaning
002	10/27/2011	18410	9:29:39	1.7	8.23	Pit Cleaning
002	10/27/2011	18410	9:29:54	2.3	8.27	Pit Cleaning
002	10/27/2011	18410	9:30:09	3	8.29	Pit Cleaning
002	10/27/2011	18410	9:30:24	3	8.28	Pit Cleaning
002	10/27/2011	18410	9:30:39	1.9	8.26	Pit Cleaning
002	10/27/2011	18410	9:30:54	2.5	8.27	Pit Cleaning
002	10/27/2011	18410	9:31:09	1.8	8.25	Pit Cleaning
002	10/27/2011	18410	9:31:24	2.9	8.28	Pit Cleaning
002	10/27/2011	18410	9:31:39	2.4	8.28	Pit Cleaning
002	10/27/2011	18410	9:31:54	2.5	8.29	Pit Cleaning
002	10/27/2011	18410	9:32:09	2.5	8.25	Pit Cleaning
002	10/27/2011	18410	9:32:24	2.5	8.26	Pit Cleaning
002	10/27/2011	18410	9:32:39	1.5	8.29	Pit Cleaning
002	10/27/2011	18410	9:32:54	1.5	8.26	Pit Cleaning
002	10/27/2011	18410	9:33:09	1.5	8.27	Pit Cleaning
002	10/27/2011	18410	9:33:24	1.5	8.33	Pit Cleaning
002	10/27/2011	18410	9:33:39	1.6	8.33	Pit Cleaning
002	10/27/2011	18410	9:33:54	1.6	8.30	Pit Cleaning
002	10/27/2011	18410	9:34:09	1.5	8.38	Pit Cleaning
002	10/27/2011	18410	9:34:24	1.6	8.42	Pit Cleaning
002	10/27/2011	18410	9:34:39	1.5	8.39	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:34:54	1.5	8.39	Cleaning Pit
002	10/27/2011	18410	9:35:09	1.5	8.39	Cleaning Pit
002	10/27/2011	18410	9:35:24	1.4	8.36	Cleaning Pit
002	10/27/2011	18410	9:35:39	1.5	8.38	Cleaning Pit
002	10/27/2011	18410	9:35:54	1.4	8.49	Cleaning Pit
002	10/27/2011	18410	9:36:09	1.5	8.44	Cleaning Pit
002	10/27/2011	18410	9:36:24	1.4	8.48	Cleaning Pit
002	10/27/2011	18410	9:36:39	1.4	8.56	Cleaning Pit
002	10/27/2011	18410	9:37:09	1.6	8.24	Cleaning Pit
002	10/27/2011	18410	9:38:34	1.5	8.22	Cleaning Pit
002	10/27/2011	18410	9:39:04	1.5	8.22	Cleaning Pit
002	10/27/2011	18410	9:39:19	1.4	8.23	Cleaning Pit
002	10/27/2011	18410	9:39:34	1.5	8.23	Cleaning Pit
002	10/27/2011	18410	9:39:49	1.5	8.23	Cleaning Pit
002	10/27/2011	18410	9:40:04	1.4	8.22	Cleaning Pit
002	10/27/2011	18410	9:40:19	1.3	8.22	Cleaning Pit
002	10/27/2011	18410	9:40:34	1.1	8.22	Cleaning Pit
002	10/27/2011	18410	9:40:49	1.2	8.22	Cleaning Pit
002	10/27/2011	18410	9:41:04	1.3	8.21	Cleaning Pit
002	10/27/2011	18410	9:41:19	1.5	8.22	Cleaning Pit
002	10/27/2011	18410	9:41:34	1.4	8.22	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:41:49	1.4	8.22	Pit Cleaning
002	10/27/2011	18410	9:42:04	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	9:42:19	1.4	8.22	Pit Cleaning
002	10/27/2011	18410	9:42:34	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:42:49	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:43:04	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:43:19	1.4	8.23	Pit Cleaning
002	10/27/2011	18410	9:43:34	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:43:49	1.5	8.23	Pit Cleaning
002	10/27/2011	18410	9:44:04	1.2	8.22	Pit Cleaning
002	10/27/2011	18410	9:44:19	1.1	8.23	Pit Cleaning
002	10/27/2011	18410	9:44:34	1.2	8.22	Pit Cleaning
002	10/27/2011	18410	9:44:49	1.2	8.22	Pit Cleaning
002	10/27/2011	18410	9:45:04	1.1	8.23	Pit Cleaning
002	10/27/2011	18410	9:45:19	1.1	8.22	Pit Cleaning
002	10/27/2011	18410	9:45:34	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:45:49	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:46:04	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:46:19	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:46:34	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:46:49	1	8.24	Pit Cleaning
002	10/27/2011	18410	9:47:04	1.1	8.25	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Cleaning Pit
002	10/27/2011	18410	9:47:19	1	8.23	Cleaning Pit
002	10/27/2011	18410	9:47:34	1	8.24	Cleaning Pit
002	10/27/2011	18410	9:47:49	1.1	8.26	Cleaning Pit
002	10/27/2011	18410	9:48:04	1.2	8.26	Cleaning Pit
002	10/27/2011	18410	9:48:19	1.2	8.28	Cleaning Pit
002	10/27/2011	18410	9:48:34	1.2	8.34	Cleaning Pit
002	10/27/2011	18410	9:48:49	1.1	8.40	Cleaning Pit
002	10/27/2011	18410	9:49:04	1.1	8.41	Cleaning Pit
002	10/27/2011	18410	9:49:19	1.1	8.44	Cleaning Pit
002	10/27/2011	18410	9:49:34	1.2	8.55	Cleaning Pit
002	10/27/2011	18410	9:49:49	1.2	8.34	Cleaning Pit
002	10/27/2011	18410	9:50:19	1.2	8.23	Cleaning Pit
002	10/27/2011	18410	9:51:04	1.4	8.25	Cleaning Pit
002	10/27/2011	18410	9:51:19	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	9:51:34	1.7	8.29	Cleaning Pit
002	10/27/2011	18410	9:51:49	1.7	8.26	Cleaning Pit
002	10/27/2011	18410	9:52:04	1.7	8.25	Cleaning Pit
002	10/27/2011	18410	9:52:19	1.5	8.26	Cleaning Pit
002	10/27/2011	18410	9:52:34	1.1	8.25	Cleaning Pit
002	10/27/2011	18410	9:52:49	1.4	8.25	Cleaning Pit
002	10/27/2011	18410	9:53:04	1.3	8.24	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	9:53:19	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:53:34	1.4	8.23	Pit Cleaning
002	10/27/2011	18410	9:53:49	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	9:54:04	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:54:19	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	9:54:34	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	9:54:49	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	9:55:04	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:55:19	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:55:34	1	8.23	Pit Cleaning
002	10/27/2011	18410	9:55:49	0.9	8.23	Pit Cleaning
002	10/27/2011	18410	9:56:04	1.2	8.23	Pit Cleaning
002	10/27/2011	18410	9:56:19	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:56:34	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	9:56:49	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:57:04	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:57:19	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	9:57:34	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:57:49	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:58:04	1.1	8.24	Pit Cleaning
002	10/27/2011	18410	9:58:19	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	9:58:34	1.3	8.24	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Cleaning Pit
002	10/27/2011	18410	9:58:49	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	9:59:04	1.2	8.23	Cleaning Pit
002	10/27/2011	18410	9:59:19	1.2	8.23	Cleaning Pit
002	10/27/2011	18410	9:59:34	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:00:00	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:00:15	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:00:30	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:00:45	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:01:00	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:01:15	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:01:30	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:01:45	1.3	8.23	Cleaning Pit
002	10/27/2011	18410	10:02:00	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:02:15	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:02:30	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:02:45	1.4	8.25	Cleaning Pit
002	10/27/2011	18410	10:03:00	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:03:15	1.4	8.26	Cleaning Pit
002	10/27/2011	18410	10:03:30	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:04:30	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:04:45	1.3	8.24	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:05:00	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:05:15	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:05:30	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:05:45	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:06:00	1.3	8.23	Pit Cleaning
002	10/27/2011	18410	10:06:15	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	10:06:30	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:06:45	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:07:00	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:07:15	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:07:30	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:07:45	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:08:00	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:08:15	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:09:00	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:09:15	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:09:30	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	10:09:45	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:10:00	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	10:10:16	1.3	8.34	Pit Cleaning
002	10/27/2011	18410	10:10:30	1.2	8.26	Pit Cleaning
002	10/27/2011	18410	10:10:52	1.3	8.28	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:11:00	1.3	8.34	Cleaning Pit
002	10/27/2011	18410	10:11:15	1.2	8.26	Cleaning Pit
002	10/27/2011	18410	10:11:30	1.3	8.26	Cleaning Pit
002	10/27/2011	18410	10:11:45	1.2	8.25	Cleaning Pit
002	10/27/2011	18410	10:12:00	1.2	8.25	Cleaning Pit
002	10/27/2011	18410	10:12:15	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:14:00	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:14:15	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:14:30	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:14:45	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:15:00	1.1	8.25	Cleaning Pit
002	10/27/2011	18410	10:15:15	1.2	8.25	Cleaning Pit
002	10/27/2011	18410	10:15:30	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	10:15:45	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	10:16:00	1.2	8.25	Cleaning Pit
002	10/27/2011	18410	10:16:15	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:16:30	1.2	8.26	Cleaning Pit
002	10/27/2011	18410	10:16:45	1.2	8.25	Cleaning Pit
002	10/27/2011	18410	10:17:00	1.3	8.27	Cleaning Pit
002	10/27/2011	18410	10:17:15	1.4	8.28	Cleaning Pit
002	10/27/2011	18410	10:17:30	1.3	8.28	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:17:45	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	10:18:00	1.3	8.25	Pit Cleaning
002	10/27/2011	18410	10:18:15	1.4	8.24	Pit Cleaning
002	10/27/2011	18410	10:18:30	1.2	8.24	Pit Cleaning
002	10/27/2011	18410	10:18:45	1.3	8.25	Pit Cleaning
002	10/27/2011	18410	10:19:00	1.3	8.26	Pit Cleaning
002	10/27/2011	18410	10:19:15	1.4	8.26	Pit Cleaning
002	10/27/2011	18410	10:19:30	1.4	8.25	Pit Cleaning
002	10/27/2011	18410	10:19:45	1.4	8.26	Pit Cleaning
002	10/27/2011	18410	10:20:00	1.4	8.28	Pit Cleaning
002	10/27/2011	18410	10:20:15	1.5	8.29	Pit Cleaning
002	10/27/2011	18410	10:20:30	1.4	8.30	Pit Cleaning
002	10/27/2011	18410	10:20:45	1.5	8.30	Pit Cleaning
002	10/27/2011	18410	10:21:00	1.3	8.29	Pit Cleaning
002	10/27/2011	18410	10:21:15	1.4	8.29	Pit Cleaning
002	10/27/2011	18410	10:21:30	1.4	8.30	Pit Cleaning
002	10/27/2011	18410	10:21:45	1.4	8.32	Pit Cleaning
002	10/27/2011	18410	10:22:00	1.4	8.27	Pit Cleaning
002	10/27/2011	18410	10:22:15	1.4	8.28	Pit Cleaning
002	10/27/2011	18410	10:22:30	1.4	8.26	Pit Cleaning
002	10/27/2011	18410	10:22:45	1.4	8.29	Pit Cleaning
002	10/27/2011	18410	10:23:00	1.4	8.31	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:23:15	1.4	8.34	Cleaning Pit
002	10/27/2011	18410	10:23:30	1.4	8.26	Cleaning Pit
002	10/27/2011	18410	10:23:45	1.3	8.27	Cleaning Pit
002	10/27/2011	18410	10:24:00	1.3	8.29	Cleaning Pit
002	10/27/2011	18410	10:24:15	1.4	8.32	Cleaning Pit
002	10/27/2011	18410	10:24:30	1.4	8.27	Cleaning Pit
002	10/27/2011	18410	10:24:45	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:25:00	1.3	8.26	Cleaning Pit
002	10/27/2011	18410	10:25:15	1.4	8.32	Cleaning Pit
002	10/27/2011	18410	10:25:30	1.3	8.34	Cleaning Pit
002	10/27/2011	18410	10:25:45	1.3	8.39	Cleaning Pit
002	10/27/2011	18410	10:26:00	1.3	8.35	Cleaning Pit
002	10/27/2011	18410	10:26:15	1.4	8.27	Cleaning Pit
002	10/27/2011	18410	10:26:30	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	10:26:45	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:27:00	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	10:27:15	1.3	8.30	Cleaning Pit
002	10/27/2011	18410	10:27:30	1.4	8.30	Cleaning Pit
002	10/27/2011	18410	10:27:45	1.4	8.29	Cleaning Pit
002	10/27/2011	18410	10:28:00	1.4	8.36	Cleaning Pit
002	10/27/2011	18410	10:28:15	1.5	8.30	Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:28:30	1.4	8.28	Pit Cleaning
002	10/27/2011	18410	10:28:45	1.4	8.25	Pit Cleaning
002	10/27/2011	18410	10:29:00	1.4	8.24	Pit Cleaning
002	10/27/2011	18410	10:29:15	1.3	8.24	Pit Cleaning
002	10/27/2011	18410	10:29:30	1.3	8.26	Pit Cleaning
002	10/27/2011	18410	10:29:45	1.3	8.31	Pit Cleaning
002	10/27/2011	18410	10:30:00	1.4	8.38	Pit Cleaning
002	10/27/2011	18410	10:30:15	1.5	8.30	Pit Cleaning
002	10/27/2011	18410	10:30:30	1.4	8.31	Pit Cleaning
002	10/27/2011	18410	10:30:45	1.4	8.29	Pit Cleaning
002	10/27/2011	18410	10:31:00	1.5	8.33	Pit Cleaning
002	10/27/2011	18410	10:31:15	1.4	8.32	Pit Cleaning
002	10/27/2011	18410	10:31:30	1.4	8.31	Pit Cleaning
002	10/27/2011	18410	10:31:45	1.4	8.36	Pit Cleaning
002	10/27/2011	18410	10:32:15	1.3	8.44	Pit Cleaning
002	10/27/2011	18410	10:32:30	1.3	8.27	Pit Cleaning
002	10/27/2011	18410	10:32:45	1.3	8.25	Pit Cleaning
002	10/27/2011	18410	10:33:00	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:33:15	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	10:33:30	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:33:45	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	10:34:00	1.3	8.24	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:34:15	1.2	8.26	Cleaning Pit
002	10/27/2011	18410	10:34:45	1.4	8.26	Cleaning Pit
002	10/27/2011	18410	10:35:00	1.4	8.26	Cleaning Pit
002	10/27/2011	18410	10:35:15	1.4	8.31	Cleaning Pit
002	10/27/2011	18410	10:35:30	1.5	8.34	Cleaning Pit
002	10/27/2011	18410	10:35:45	1.3	8.26	Cleaning Pit
002	10/27/2011	18410	10:36:00	1.5	8.26	Cleaning Pit
002	10/27/2011	18410	10:36:15	1.4	8.35	Cleaning Pit
002	10/27/2011	18410	10:36:30	1.4	8.26	Cleaning Pit
002	10/27/2011	18410	10:36:45	1.3	8.26	Cleaning Pit
002	10/27/2011	18410	10:37:00	1.3	8.26	Cleaning Pit
002	10/27/2011	18410	10:37:15	1.4	8.24	Cleaning Pit
002	10/27/2011	18410	10:37:30	1.3	8.24	Cleaning Pit
002	10/27/2011	18410	10:37:45	1.2	8.24	Cleaning Pit
002	10/27/2011	18410	10:38:00	1.4	8.25	Cleaning Pit
002	10/27/2011	18410	10:38:15	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	10:38:30	1.2	8.25	Cleaning Pit
002	10/27/2011	18410	10:38:45	1.3	8.25	Cleaning Pit
002	10/27/2011	18410	10:39:00	1.4	8.31	Cleaning Pit
002	10/27/2011	18410	10:39:15	1.4	8.37	Cleaning Pit
002	10/27/2011	18410	10:39:30	1.5	8.36	Cleaning Pit

Cleaning

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:39:45	1.5	8.30	Pit Cleaning
002	10/27/2011	18410	10:40:00	1.4	8.26	Pit Cleaning
002	10/27/2011	18410	10:40:15	1.4	8.25	Pit Cleaning
002	10/27/2011	18410	10:40:30	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	10:40:45	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:41:00	1.1	8.26	Pit Cleaning
002	10/27/2011	18410	10:41:15	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:41:30	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:41:45	1.2	8.25	Pit Cleaning
002	10/27/2011	18410	10:42:00	1.3	8.25	Pit Cleaning
002	10/27/2011	18410	10:42:15	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:42:30	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:42:45	0.7	8.25	Pit Cleaning
002	10/27/2011	18410	10:43:00	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:43:15	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:43:30	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:43:45	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:44:00	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:44:15	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:44:30	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:46:00	0.8	8.25	Pit Cleaning
002	10/27/2011	18410	10:46:15	0.5	8.25	Pit

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	10:46:45	0.8	8.26	Cleaning Pit Cleaning
002	10/27/2011	18410	10:47:00	0.8	8.26	Pit Cleaning
002	10/27/2011	18410	10:47:15	0.9	8.26	Pit Cleaning
002	10/27/2011	18410	10:47:30	0.9	8.26	Pit Cleaning
002	10/27/2011	18410	10:47:45	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:48:45	0.9	8.25	Pit Cleaning
002	10/27/2011	18410	10:49:00	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:49:15	0.9	8.25	Pit Cleaning
002	10/27/2011	18410	10:49:30	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:49:45	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:50:15	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:51:00	1	8.25	Pit Cleaning
002	10/27/2011	18410	10:51:15	1.1	8.25	Pit Cleaning
002	10/27/2011	18410	10:51:30	1.1	8.25	Pit Cleaning
001	10/27/2011	18410	15:15:12	1.1	8.38	ND
001	10/27/2011	18410	15:15:27	1.1	8.38	ND
001	10/27/2011	18410	15:15:42	1.1	8.38	ND
001	10/27/2011	18410	15:15:57	1.1	8.37	ND
001	10/27/2011	18410	15:16:12	1	8.37	ND
002	10/27/2011	18410	15:16:27	1	8.38	ND
002	10/27/2011	18410	15:16:57	1.1	8.38	ND
002	10/27/2011	18410	15:17:12	1.2	8.41	ND
002	10/27/2011	18410	15:17:27	1.3	8.48	ND
002	10/27/2011	18410	15:17:42	1.2	8.48	ND
002	10/27/2011	18410	15:17:57	1.1	8.40	ND
002	10/27/2011	18410	15:18:12	1.1	8.39	ND
002	10/27/2011	18410	15:18:27	0.7	8.37	ND

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	15:18:42	0.6	8.37	ND
002	10/27/2011	18410	15:18:57	0.6	8.37	ND
002	10/27/2011	18410	15:19:12	0.8	8.37	ND
002	10/27/2011	18410	15:19:27	0.6	8.38	ND
002	10/27/2011	18410	15:19:42	0.9	8.37	ND
002	10/27/2011	18410	15:19:57	1.2	8.38	ND
002	10/27/2011	18410	15:20:12	1.2	8.39	ND
002	10/27/2011	18410	15:20:27	1.1	8.39	ND
002	10/27/2011	18410	15:20:42	0.8	8.37	ND
002	10/27/2011	18410	15:20:57	0.8	8.38	ND
002	10/27/2011	18410	15:21:12	0.8	8.38	ND
002	10/27/2011	18410	15:21:27	0.9	8.38	ND
002	10/27/2011	18410	15:21:42	0.9	8.37	ND
002	10/27/2011	18410	15:21:57	1.2	8.38	ND
002	10/27/2011	18410	15:22:12	1.2	8.48	ND
002	10/27/2011	18410	15:22:27	1	8.38	ND
002	10/27/2011	18410	15:22:42	0.8	8.36	ND
002	10/27/2011	18410	15:22:57	0.9	8.36	ND
002	10/27/2011	18410	15:23:12	0.9	8.38	ND
002	10/27/2011	18410	15:23:27	0.8	8.37	ND
002	10/27/2011	18410	15:23:42	0.8	8.38	ND
002	10/27/2011	18410	15:23:57	1.2	8.41	ND
002	10/27/2011	18410	15:24:12	1.2	8.39	ND
002	10/27/2011	18410	15:24:27	1.1	8.38	ND
002	10/27/2011	18410	15:24:42	0.9	8.37	ND
002	10/27/2011	18410	15:24:57	0.8	8.37	ND
002	10/27/2011	18410	15:25:12	0.9	8.38	ND
002	10/27/2011	18410	15:25:27	1	8.38	ND
002	10/27/2011	18410	15:25:42	1.2	8.46	ND
002	10/27/2011	18410	15:25:57	1.2	8.39	ND
002	10/27/2011	18410	15:26:12	1	8.38	ND
002	10/27/2011	18410	15:26:27	1	8.37	ND
002	10/27/2011	18410	15:26:42	0.8	8.38	ND
002	10/27/2011	18410	15:26:57	0.9	8.37	ND
002	10/27/2011	18410	15:27:12	0.9	8.38	ND
002	10/27/2011	18410	15:27:27	1.2	8.46	ND
002	10/27/2011	18410	15:27:42	1.2	8.40	ND
002	10/27/2011	18410	15:27:57	0.9	8.38	ND
002	10/27/2011	18410	15:28:12	0.8	8.37	ND
002	10/27/2011	18410	15:28:27	0.9	8.37	ND

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	18410	15:28:42	0.9	8.37	ND
002	10/27/2011	18410	15:28:57	0.9	8.37	ND
002	10/27/2011	18410	15:29:12	1.1	8.40	ND
002	10/27/2011	18410	15:29:27	0.9	8.38	ND
002	10/27/2011	18410	15:29:42	0.8	8.37	ND
002	10/27/2011	18410	15:29:57	0.8	8.37	ND
002	10/27/2011	31476	15:16:19	1.5	8.4	ND
002	10/27/2011	31476	15:16:34	1.3	8.4	ND
002	10/27/2011	31476	15:16:49	1.3	8.41	ND
002	10/27/2011	31476	15:17:04	1.2	8.41	ND
002	10/27/2011	31476	15:17:19	1.4	8.41	ND
002	10/27/2011	31476	15:17:34	1.4	8.4	ND
002	10/27/2011	31476	15:17:49	1.3	8.41	ND
002	10/27/2011	31476	15:18:04	1.4	8.4	ND
002	10/27/2011	31476	15:18:19	1.3	8.39	ND
002	10/27/2011	31476	15:18:34	1.3	8.39	ND
002	10/27/2011	31476	15:18:49	1.2	8.4	ND
002	10/27/2011	31476	15:19:04	1.3	8.4	ND
002	10/27/2011	31476	15:19:19	1.3	8.4	ND
002	10/27/2011	31476	15:19:34	1.4	8.4	ND
002	10/27/2011	31476	15:19:49	1.3	8.39	ND
002	10/27/2011	31476	15:20:04	1.3	8.38	ND
002	10/27/2011	31476	15:20:19	1.3	8.38	ND
002	10/27/2011	31476	15:20:34	1.2	8.38	ND
002	10/27/2011	31476	15:20:49	1.3	8.38	ND
002	10/27/2011	31476	15:21:04	1.5	8.38	ND
002	10/27/2011	31476	15:21:19	1.5	8.37	ND
002	10/27/2011	31476	15:21:34	1.4	8.37	ND
002	10/27/2011	31476	15:21:49	1.2	8.39	ND
002	10/27/2011	31476	15:22:04	1.4	8.39	ND
002	10/27/2011	31476	15:22:19	1.4	8.39	ND
002	10/27/2011	31476	15:22:34	1.4	8.38	ND
002	10/27/2011	31476	15:22:49	1.3	8.4	ND
002	10/27/2011	31476	15:23:04	1.3	8.4	ND
002	10/27/2011	31476	15:23:19	1.3	8.4	ND
002	10/27/2011	31476	15:23:34	1.3	8.39	ND
002	10/27/2011	31476	15:23:49	1.4	8.38	ND
002	10/27/2011	31476	15:24:04	1.3	8.38	ND
002	10/27/2011	31476	15:24:19	1.3	8.39	ND
002	10/27/2011	31476	15:24:34	1.5	8.38	ND

Outfall 002 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
002	10/27/2011	31476	15:24:49	1.5	8.38	ND
002	10/27/2011	31476	15:25:04	1.4	8.38	ND
002	10/27/2011	31476	15:25:19	1.5	8.38	ND
002	10/27/2011	31476	15:25:34	1.3	8.38	ND
002	10/27/2011	31476	15:25:49	1.4	8.4	ND
002	10/27/2011	31476	15:26:04	1.4	8.4	ND
002	10/27/2011	31476	15:26:19	1.3	8.39	ND
002	10/27/2011	31476	15:26:34	1.2	8.4	ND
002	10/27/2011	31476	15:26:49	1.3	8.4	ND
002	10/27/2011	31476	15:27:04	1.4	8.39	ND
002	10/27/2011	31476	15:27:19	1.3	8.39	ND
002	10/27/2011	31476	15:27:34	1.4	8.39	ND
002	10/27/2011	31476	15:27:49	1.4	8.4	ND
002	10/27/2011	31476	15:28:04	1.4	8.39	ND
002	10/27/2011	31476	15:28:19	1.4	8.39	ND
002	10/27/2011	31476	15:28:34	1.5	8.38	ND
002	10/27/2011	31476	15:28:49	1.4	8.39	ND
002	10/27/2011	31476	15:29:04	1.5	8.38	ND
002	10/27/2011	31476	15:29:19	1.4	8.39	ND
002	10/27/2011	31476	15:29:34	1.5	8.39	ND
002	10/27/2011	31476	15:29:49	1.2	8.4	ND
002	10/27/2011	31476	15:30:04	1.3	8.41	ND
002	10/27/2011	31476	15:30:19	1.2	8.41	ND
002	10/27/2011	31476	15:30:34	1.3	8.41	ND
002	10/27/2011	31476	15:30:49	1.2	8.41	ND

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	10:51:45	1.1	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:52:00	1.1	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:52:15	1.1	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:52:30	1.1	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:53:00	1.4	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:53:15	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	10:53:45	1.3	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:54:00	1.3	8.26	Clarifier Blowdown
005	10/27/2011	18410	10:54:15	1.3	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:54:30	1.2	8.26	Clarifier Blowdown
005	10/27/2011	18410	10:54:45	1.3	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:55:00	1.2	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:55:15	1.2	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:55:30	1	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:55:45	1.2	8.25	Clarifier Blowdown
005	10/27/2011	18410	10:56:00	1.2	8.26	Clarifier Blowdown
005	10/27/2011	18410	10:56:15	1.3	8.26	Clarifier Blowdown
005	10/27/2011	18410	10:56:45	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	10:57:00	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	10:57:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	10:57:30	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	10:57:45	1.3	8.29	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	10:58:30	1	8.29	Blowdown Clarifier Blowdown
005	10/27/2011	18410	10:58:45	1.1	8.28	Clarifier Blowdown
005	10/27/2011	18410	10:59:00	1.1	8.27	Clarifier Blowdown
005	10/27/2011	18410	10:59:15	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	10:59:30	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	10:59:45	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:01:15	1.3	8.26	Clarifier Blowdown
005	10/27/2011	18410	11:01:30	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:01:45	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:02:00	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:02:15	1.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:02:30	1.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:02:45	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:04:45	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:05:15	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:05:30	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:05:45	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:06:15	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:06:30	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:06:45	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:07:00	1.3	8.28	Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:07:15	1.5	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:07:30	1.5	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:07:45	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:08:00	1.5	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:08:15	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:08:30	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:08:45	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:09:00	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:09:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:09:30	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:09:45	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:10:00	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:10:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:10:30	1.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:10:45	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:11:00	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:11:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:11:30	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:11:45	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:12:00	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:12:15	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:12:30	1.4	8.28	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:12:45	1.4	8.34	Blowdown Clarifier Blowdown
005	10/27/2011	18410	11:13:00	1.4	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:13:15	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:13:30	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:13:45	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:14:00	1.2	8.32	Clarifier Blowdown
005	10/27/2011	18410	11:14:15	1.1	8.36	Clarifier Blowdown
005	10/27/2011	18410	11:14:30	1.1	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:14:45	1.3	8.37	Clarifier Blowdown
005	10/27/2011	18410	11:15:00	1.3	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:15:15	1.4	8.38	Clarifier Blowdown
005	10/27/2011	18410	11:15:30	1.3	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:15:45	1.3	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:16:00	1.6	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:16:15	1.5	8.40	Clarifier Blowdown
005	10/27/2011	18410	11:16:30	1.5	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:16:45	1.7	8.40	Clarifier Blowdown
005	10/27/2011	18410	11:17:15	1.6	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:17:30	1.5	8.37	Clarifier Blowdown
005	10/27/2011	18410	11:17:45	1.6	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:18:00	1.6	8.39	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:18:15	1.6	8.37	Clarifier Blowdown
005	10/27/2011	18410	11:18:45	1.7	8.37	Clarifier Blowdown
005	10/27/2011	18410	11:19:00	1.8	8.35	Clarifier Blowdown
005	10/27/2011	18410	11:19:15	1.7	8.33	Clarifier Blowdown
005	10/27/2011	18410	11:19:45	1.6	8.34	Clarifier Blowdown
005	10/27/2011	18410	11:20:00	1.7	8.35	Clarifier Blowdown
005	10/27/2011	18410	11:21:45	1.5	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:22:00	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:22:15	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:22:45	1.8	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:23:00	1.8	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:23:15	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:23:30	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:23:45	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:24:00	1.5	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:24:15	1.4	8.26	Clarifier Blowdown
005	10/27/2011	18410	11:24:30	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:24:45	1.8	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:25:00	1.8	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:25:15	1.9	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:25:30	1.8	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:25:45	1.7	8.28	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	11:26:00	1.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:26:15	1.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:26:30	1	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:26:45	1	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:27:00	0.8	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:27:15	0.9	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:27:30	0.5	8.26	Clarifier Blowdown
005	10/27/2011	18410	11:27:45	0.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:28:00	0.9	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:28:15	0.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:28:30	0.7	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:28:45	0.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:29:00	0.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:29:15	0.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:29:30	0.9	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:29:45	0.8	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:30:00	0.9	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:30:15	1.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:30:30	1.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:30:45	1.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:31:00	1.7	8.32	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:31:15	1.8	8.37	Clarifier Blowdown
005	10/27/2011	18410	11:31:30	1.8	8.36	Clarifier Blowdown
005	10/27/2011	18410	11:31:45	1.7	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:32:00	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:32:15	1.8	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:32:30	1.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:32:45	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:33:00	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:33:15	1.6	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:33:30	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:33:45	1.8	8.33	Clarifier Blowdown
005	10/27/2011	18410	11:34:00	1.8	8.38	Clarifier Blowdown
005	10/27/2011	18410	11:34:15	1.7	8.39	Clarifier Blowdown
005	10/27/2011	18410	11:34:30	1.8	8.32	Clarifier Blowdown
005	10/27/2011	18410	11:34:45	1.7	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:35:00	1.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:35:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:35:30	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:35:45	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:36:00	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:36:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:36:30	1.5	8.28	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:36:45	1.5	8.28	Blowdown Clarifier Blowdown
005	10/27/2011	18410	11:37:00	1.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:37:15	1.7	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:37:30	1.8	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:37:45	1.8	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:38:00	1.8	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:38:15	1.9	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:38:30	1.8	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:38:45	1.7	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:39:00	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:39:15	1.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:39:30	1.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:39:45	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:40:00	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:40:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:40:30	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:40:45	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:41:00	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:41:15	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:41:30	1.7	8.32	Clarifier Blowdown
005	10/27/2011	18410	11:41:45	1.7	8.34	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:42:00	1.6	8.37	Clarifier Blowdown
005	10/27/2011	18410	11:42:15	1.6	8.38	Clarifier Blowdown
005	10/27/2011	18410	11:42:30	1.6	8.33	Clarifier Blowdown
005	10/27/2011	18410	11:42:45	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:43:00	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:43:15	1.6	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:43:30	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:43:45	1.1	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:44:00	1.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:44:15	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:44:30	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:44:45	1.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:45:00	1.7	8.33	Clarifier Blowdown
005	10/27/2011	18410	11:45:15	1.7	8.42	Clarifier Blowdown
005	10/27/2011	18410	11:45:30	1.7	8.43	Clarifier Blowdown
005	10/27/2011	18410	11:45:45	1.7	8.34	Clarifier Blowdown
005	10/27/2011	18410	11:46:00	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:46:15	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:46:30	1.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:46:45	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:47:00	1.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:47:15	1.2	8.28	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	11:47:30	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:47:45	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:48:00	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:48:15	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:48:30	1.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:48:45	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:49:00	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:49:15	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:49:30	1.7	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:49:45	1.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:50:00	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:50:15	1.7	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:50:30	1.7	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:50:45	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:51:00	1.7	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:51:15	1.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:51:30	1.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:51:45	1.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:52:00	1.7	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:52:15	1.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:52:30	1.6	8.29	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	11:52:45	1.8	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:53:00	1.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:53:15	3	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:53:30	3.9	8.30	Clarifier Blowdown
005	10/27/2011	18410	11:53:45	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:54:00	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:54:15	5.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:54:30	5	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:54:45	5.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:55:00	5.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:55:15	5.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:55:30	5.1	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:55:45	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:56:00	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:56:15	5.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:56:30	5.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:56:45	5.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:57:00	5.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:57:15	5.5	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:57:30	5.3	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:57:45	5.1	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:58:00	5.2	8.28	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	11:58:15	5.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:58:30	5.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	11:58:45	5.2	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:59:00	5.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:59:15	5.4	8.27	Clarifier Blowdown
005	10/27/2011	18410	11:59:30	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	11:59:45	5.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:00:00	5.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:00:15	5.5	8.39	Clarifier Blowdown
005	10/27/2011	18410	12:00:30	5.7	8.35	Clarifier Blowdown
005	10/27/2011	18410	12:00:45	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:01:00	5.5	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:01:15	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:01:30	5.6	8.33	Clarifier Blowdown
005	10/27/2011	18410	12:01:45	5.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:02:00	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:02:15	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:02:30	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:02:45	5.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:03:00	5.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:03:15	5.4	8.28	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	12:03:30	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:03:45	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:04:00	5.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:04:15	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:04:30	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:04:45	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:05:00	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:05:15	5.7	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:05:30	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:05:45	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:06:00	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:06:15	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:06:30	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:06:45	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:07:00	5.4	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:07:15	5.5	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:07:30	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:07:45	5.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:08:00	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:08:15	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:08:30	5.2	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:08:45	5.2	8.31	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	12:19:30	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:19:45	5.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:20:00	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:20:15	5.3	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:20:30	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:20:45	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:21:00	5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:21:15	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:21:30	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:21:45	5.1	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:22:00	5.1	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:22:15	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:22:30	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:22:45	5.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:23:00	5.5	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:23:15	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:23:30	5.4	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:23:45	5.3	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:24:00	5.5	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:24:15	5.4	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:24:30	5.2	8.29	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	12:24:45	5.1	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:25:00	5.2	8.28	Clarifier Blowdown
005	10/27/2011	18410	12:25:15	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:25:30	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:25:45	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:26:00	5.3	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:26:15	5.3	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:26:30	5.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:26:45	5.4	8.33	Clarifier Blowdown
005	10/27/2011	18410	12:27:00	5.2	8.35	Clarifier Blowdown
005	10/27/2011	18410	12:27:15	5.4	8.36	Clarifier Blowdown
005	10/27/2011	18410	12:27:30	5.4	8.33	Clarifier Blowdown
005	10/27/2011	18410	12:27:45	4.9	8.35	Clarifier Blowdown
005	10/27/2011	18410	12:28:00	5.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	12:28:15	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:28:30	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:28:45	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:29:00	4.9	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:29:15	5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:29:30	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:29:45	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:30:00	5.3	8.30	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	12:30:15	5.1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:30:30	5.4	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:30:45	5.2	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:31:00	5.2	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:31:15	5.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:31:30	5.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:31:45	4.9	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:32:00	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:32:15	5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:32:30	5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:32:45	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:33:00	5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:33:15	5.2	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:33:30	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:33:45	5.1	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:34:00	5.5	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:34:15	5.1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:34:30	5.2	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:34:45	5.3	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:35:00	5.4	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:35:15	5.2	8.29	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	12:35:30	5.6	8.29	Clarifier Blowdown
005	10/27/2011	18410	12:35:45	5.7	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:36:00	5.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:36:15	5.4	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:36:30	5	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:36:45	4.7	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:37:00	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:37:15	1.3	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:37:30	1.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:37:45	1.3	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:38:00	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:38:15	1.1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:38:30	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:38:45	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:39:00	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:39:15	1.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:39:30	1.1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:39:45	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:40:00	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:40:15	1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:40:30	1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:40:45	1.1	8.31	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	12:41:00	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:41:15	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:41:30	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:41:45	1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:42:00	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:42:15	1.3	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:42:30	1.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:42:45	1.3	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:43:00	1.2	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:43:15	1.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:43:30	1.1	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:43:45	1.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:44:00	1.3	8.41	Clarifier Blowdown
005	10/27/2011	18410	12:44:15	1.4	8.41	Clarifier Blowdown
005	10/27/2011	18410	12:44:30	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:44:45	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:45:00	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:45:15	0.8	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:45:30	0.8	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:45:45	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:46:00	1.1	8.31	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	12:46:15	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:46:30	1.2	8.42	Clarifier Blowdown
005	10/27/2011	18410	12:46:45	1.1	8.34	Clarifier Blowdown
005	10/27/2011	18410	12:47:00	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:47:15	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:47:30	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:47:45	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:48:00	0.9	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:48:15	0.9	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:48:30	0.8	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:48:45	0.9	8.30	Clarifier Blowdown
005	10/27/2011	18410	12:49:00	0.9	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:49:15	1.2	8.35	Clarifier Blowdown
005	10/27/2011	18410	12:49:30	1.2	8.33	Clarifier Blowdown
005	10/27/2011	18410	12:49:45	1.2	8.41	Clarifier Blowdown
005	10/27/2011	18410	12:50:00	1.2	8.34	Clarifier Blowdown
005	10/27/2011	18410	12:50:15	1.2	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:50:30	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:50:45	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:51:00	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:51:15	0.8	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:51:30	1	8.30	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	12:51:45	1.1	8.31	Blowdown Clarifier Blowdown
005	10/27/2011	18410	12:52:00	1.1	8.42	Clarifier Blowdown
005	10/27/2011	18410	12:52:15	1.2	8.43	Clarifier Blowdown
005	10/27/2011	18410	12:52:30	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:52:45	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:53:00	1.1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:53:15	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:53:30	1	8.43	Clarifier Blowdown
005	10/27/2011	18410	12:53:45	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:54:00	0.8	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:54:15	0.8	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:54:30	0.7	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:54:45	0.7	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:55:00	1	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:55:15	1.2	8.37	Clarifier Blowdown
005	10/27/2011	18410	12:55:30	1.2	8.44	Clarifier Blowdown
005	10/27/2011	18410	12:55:45	1.3	8.53	Clarifier Blowdown
005	10/27/2011	18410	12:56:00	1.4	8.54	Clarifier Blowdown
005	10/27/2011	18410	12:56:15	1.1	8.37	Clarifier Blowdown
005	10/27/2011	18410	12:56:30	1	8.34	Clarifier Blowdown
005	10/27/2011	18410	12:56:45	1.1	8.38	Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	12:57:00	1.1	8.41	Clarifier Blowdown
005	10/27/2011	18410	12:57:15	1	8.42	Clarifier Blowdown
005	10/27/2011	18410	12:57:30	1.1	8.44	Clarifier Blowdown
005	10/27/2011	18410	12:57:45	1.3	8.48	Clarifier Blowdown
005	10/27/2011	18410	12:58:00	1.3	8.49	Clarifier Blowdown
005	10/27/2011	18410	12:58:15	1.2	8.38	Clarifier Blowdown
005	10/27/2011	18410	12:58:30	1	8.37	Clarifier Blowdown
005	10/27/2011	18410	12:58:45	0.9	8.31	Clarifier Blowdown
005	10/27/2011	18410	12:59:00	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:59:15	0.9	8.32	Clarifier Blowdown
005	10/27/2011	18410	12:59:30	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	12:59:45	1.3	8.42	Clarifier Blowdown
005	10/27/2011	18410	13:00:00	1.3	8.44	Clarifier Blowdown
005	10/27/2011	18410	13:00:15	1.3	8.44	Clarifier Blowdown
005	10/27/2011	18410	13:00:30	1.4	8.45	Clarifier Blowdown
005	10/27/2011	18410	13:00:45	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:01:00	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:01:15	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:01:30	1.2	8.34	Clarifier Blowdown
005	10/27/2011	18410	13:01:45	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:02:00	1.2	8.38	Clarifier Blowdown
005	10/27/2011	18410	13:02:15	1.3	8.39	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge Blowdown
005	10/27/2011	18410	13:02:30	1.2	8.40	Clarifier Blowdown
005	10/27/2011	18410	13:02:45	1.4	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:03:00	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:03:15	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:03:30	1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:03:45	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:04:00	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:04:15	1.3	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:04:30	1.2	8.40	Clarifier Blowdown
005	10/27/2011	18410	13:04:45	1.2	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:05:00	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:05:15	1.1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:05:30	1.2	8.34	Clarifier Blowdown
005	10/27/2011	18410	13:05:45	1.3	8.42	Clarifier Blowdown
005	10/27/2011	18410	13:06:00	1.1	8.34	Clarifier Blowdown
005	10/27/2011	18410	13:06:15	1.1	8.34	Clarifier Blowdown
005	10/27/2011	18410	13:06:30	1.2	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:06:45	1.2	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:07:00	1.3	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:07:15	1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:07:30	1.1	8.32	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	13:07:45	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:08:00	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:08:15	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:08:30	1	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:08:45	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:09:00	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:09:15	0.8	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:09:30	0.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:09:45	0.8	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:10:00	0.6	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:10:15	0.6	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:10:30	0.7	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:10:45	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:11:00	0.5	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:11:15	0.4	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:11:30	0.5	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:11:45	0.5	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:12:00	0.6	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:12:15	0.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:12:30	0.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:12:45	0.6	8.30	Clarifier Blowdown
005	10/27/2011	18410	13:13:00	0.5	8.32	Clarifier

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
						Blowdown
005	10/27/2011	18410	13:13:15	0.5	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:13:30	0.4	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:13:45	0.8	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:14:00	0.7	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:14:15	0.5	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:14:30	0.5	8.31	Clarifier Blowdown
005	10/27/2011	18410	13:14:45	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:15:00	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:15:15	0.7	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:15:30	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:15:45	0.5	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:16:00	0.5	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:16:15	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:16:30	0.8	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:16:45	0.5	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:17:00	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:17:15	0.4	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:17:30	0.5	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:17:45	0.4	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:18:00	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:18:15	0.4	8.32	Clarifier Blowdown

Outfall 005 pH Data

Outfall	Date	Sonde SN	Time:	Depth	pH	Discharge
005	10/27/2011	18410	13:18:30	0.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:18:45	0.4	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:19:00	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:19:15	0.3	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:19:30	0.4	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:19:45	0.3	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:20:00	0.4	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:20:15	0.3	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:20:30	0.2	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:20:45	0.3	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:21:00	0.4	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:21:15	0.2	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:21:30	0.2	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:21:45	0.6	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:22:00	0.9	8.33	Clarifier Blowdown
005	10/27/2011	18410	13:22:15	0.9	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:22:30	0.8	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:22:45	0.7	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:23:00	1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:23:15	1.1	8.32	Clarifier Blowdown
005	10/27/2011	18410	13:23:30	1.2	8.32	Clarifier Blowdown