Section 5: Existing Environment in the Planning Area

E. Air Pollution

Air quality issues associated with the preferred project location were reviewed, and it is not anticipated that construction of the WWTP and collection system will cause a negative impact on air quality in this region of Jackson County. According to the EPA AirData website (http://www.epa.gov/air/data/index.html), the proposed project site is not located within a nonattainment area. The closest non-attainment areas to the proposed project site are Lawrence County, Kentucky, and Campbell County, Kentucky. Lawrence County is located approximately 70 miles northeast of Jackson County and is in nonattainment for particulate less than 2.5 micrometers in size. Campbell County is located approximately 95 miles northwest of Jackson County and is in nonattainment for 8-hour ozone. Due to the significant distance of these nonattainment areas from the proposed project location, the construction of the proposed project would not affect air emissions in those areas.

It is anticipated that there will be little if any emissions to air during the construction and operation of the proposed wastewater system and that topographical or meteorological conditions will not hinder the dispersal of the emissions. During construction, a temporary increase in emissions will occur due to construction equipment; however, this level will decrease after the termination of the project. To control the amount of air emissions, it is expected that the contractors for the project will operate construction equipment in accordance with state and federal regulations.

F. Floodplains

The proposed project property is covered within the Floodplain Insurance Rate Map (FIRM) Map Number 21109C0117C dated August 3, 2009, for Jackson County, Kentucky. Review of this map indicated that portions of the project area are located in a Special Flood Hazard area subject to inundation by the 1% annual chance flood. Permits have been obtained by the KDOW and USACE to allow for construction in the floodplain at this site.

G. Soils

The Natural Resources Conservation Service (NRCS) maintains a Web Soil Survey online (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) and the website was accessed for this report to obtain information regarding the soils present at the project site. The following soil series make up the majority of the soils located within the project area:

- Grigsby fine sandy loam, 0 to 3 percent slopes, frequently flooded
- Rigley-Rock outcrop association, steep
- Shelocta-Gilpin channery silt loams, steep

Section 5: Existing Environment in the Planning Area

The Grigsby fine sandy loam and Rigley-Rock outcrop association of soils are well drained soils that are made up of coarse-loamy alluvium and colluvium derived from sedimentary rock. The Shelocta-Gilpin channery silt loams are well drained and are made up of fine-loamy residuum weathered from sandstone and siltstone.

H. Geology

According to the USGS Sandgap, Kentucky, Geologic Quadrangle map (1973) for the proposed project area, the lower and middle Pennsylvanian Breathitt Formation is the rock unit that is most prevalent in the region. This formation consists of sandstones, siltstones, shale, and coal. The sandstones are very fine to fine grained, light to medium gray in color, and are micaceous. The siltstones and shales range in color from medium dark to dark gray.

I. Topography

The subject property is located within the coal field area of southeastern Kentucky. The topography in this region of Kentucky is largely made up of forested hills dissected by V-shaped valleys eroded through thick, flat-lying sequences of Mississippian and Pennsylvanian aged coal-bearing rocks. The mountain ridges are generally as narrow and sinuous as the valley bottoms, and the terrain consists of steep slopes. Cliffs of resistant sandstone cap many ridges.

The project site is located on the United States Geological Survey's (USGS) Sandgap, Kentucky, topographic quadrangle map (1976) at an elevation of approximately 1,000 to 1,020 feet above Mean Sea Level. The site topography varies as shown in Figure 1. The new WWTP will be located at an elevation of approximately 1,010 feet. Birch Lick Creek runs along the east side of the project area.

2. Biological Features

The sewer system to the new WWTP will be constructed within previously disturbed road right-of-ways or on previously disturbed private property immediately adjacent to a road right-of-way. Therefore impacts to existing plant and animal communities will not be a factor as these areas have already been disturbed. The proposed new WWTP site appears to have undisturbed land; therefore, the United State Fish and Wildlife Service (USFWS) and the Kentucky Department of Fish and Wildlife Resources (KDFWR) were contacted to determine if there were any federally or state listed threatened or endangered species in the vicinity of the project site. Reponses were received from Mr. Daniel Stoelb of the KDFWR and Mr. Virgil Lee Andrews, Jr. of the USFWS. Copies of the correspondence from these agencies are included in Section 9 of this report.

Mr. Stoelb (KDFWR) indicated that the federally-endangered Indiana bat is known to occur within close proximity to the project site. He recommended that any trees that require harvesting be cut from November 15th through March 31st. He recommended that to

minimize indirect impacts to aquatic resources, strict erosion control measures such as silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches should be developed and implemented prior to construction. In addition, the KDFWR response recommended that directional borings be conducted at stream crossings to reduce impacts to aquatic resources.

Mr. Andrews (USFWS) indicated that several federally listed species have the potential to occur within the project vicinity, which are the Indiana bat, the Virginia big-eared bat, and four types of mussel species (Cumberland bean, Cumberland elktoe, little-wing pearly mussel, fluted kidneyshell). Mr. Andrews stated that since trees are not proposed to be removed from the site, the Indiana bat and Virginia big-eared bat would not likely be impacted. Mr. Andrews recommended that Best Management Practices be used to reduce sedimentation and run-off into stream channels to avoid impacts to the mussel species.

3. Cultural Features

The Kentucky Heritage Council was contacted regarding the possibility of historic and archaeological resources on or adjacent to the preferred project site. A response was received from Ms. Donna M. Neary, Director of the Kentucky Heritage Council and SHPO at the time that the letter was issued. Ms. Neary indicated that the proposed project has the potential to impact archaeological sites eligible for listing in the National Register of Historic Places. Therefore, Ms. Neary recommended that an archaeological survey be conducted on the property prior to construction on the site. This survey was completed at the site by Cultural Resource Analysts, Inc. (CRAI) in March 2009, and the study found two multicomponent archaeological sites, two isolated finds, and one historic standing structure. One of the multicomponent sites was found to have integrity and may produce significant data about the prehistory of the Eastern Kentucky Coalfield physiographic region. CRAI recommended that if the site cannot be avoided during construction, that additional work will be necessary to assess the site for inclusion in the National Register of Historic Places. No further work was recommended on the remaining sites. The findings of this study were submitted to the SHPO for review. In a letter dated July 15, 2009, Mr. Mark Dennen (the Kentucky SHPO in 2009) indicated that he concurred with the findings of the CRAI study.

As a result of the initial archaeological study completed at the site, a Phase II study was conducted at the site by CRAI in August 2010 to further evaluate the multicomponent site located along Indian Creek. This report recommended that the site be considered eligible for the National Register of Historic Places. The findings of this study were submitted to the SHPO for review. In a letter dated June 23, 2011, Mr. Dennen indicated that he concurred with the findings of the CRAI study. It has been determined that this site will be avoided during construction of the new WWTP. Copies of the correspondence from the SHPO are included in Section 9 of this report.

Section 5: Existing Environment in the Planning Area

4. Other Resource Features

No streams or water bodies in the service area are classified as Outstanding Resource or other Special Waters. There are no national or state parks in the vicinity of the site, or other applicable environmentally sensitive areas. The NRCS was contacted to obtain information regarding USDA Designated Important Farmland on or adjacent to the project property. A response was received from Mr. Steve Jacobs, Resource Soil Scientist with the NRCS. Mr. Jacobs indicated that portions of the project site are considered prime farmland. A copy of the correspondence from this agency is included in Section 9 of this report.

Section 6: Existing Wastewater System

1. On-Site Disposal

   The Cumberland Valley District Health Department (CVDHD), which oversees Jackson County does not maintain a list of failing septic systems. However, periodically they receive complaints of failing systems and odors. In such instances, the property owner is required to fix it. Many of the septic systems are so old that there is no record of when they were constructed or where they are located. Based on CVDHD personnel, there are numerous areas of poor soil conditions and/or seasonal high groundwater and a substantial incidence of failing or marginally operating septic systems is suspected.

   Based on field and map counts, 649 homes and 54 small commercial establishments are served by on-lot septic systems. There are no reported straight pipes. If one were discovered, the CVDHD would require the property owner to install a septic system.

2. Wastewater Treatment Plants

   There is one sewage treatment plant in the existing Planning Area: the McKee WWTP.

   A. McKee WWTP

KPDES Permit No.	KY0034444
Type	Activated Sludge
Age	Variable, Original Structures are 30+ years old
Design Capacity	0.17 mgd
Process Units	(1) Flow Equalization Tank
	(2) Extended Aeration Tanks
(2) Secondary Clarifiers	
(1) Nitrification Basin	
(1) Tertiary Clarifier	
(1) Chlorination/Dechlorination Tanks	
(2) Aerobic Digesters	
Drying beds	
Reliability Category	Unspecified in KPDES Permit – Assumed Grade C
Average Daily Flow (ADF)	99,000 gpd
Peak Daily Flow	409,000 gpd
Maximum Month ADF	180,000 gpd
Effluent Limits:	
$CBOD_5$	10 / 15 mg/l (30-day avg / max weekly avg)
TSS	30 / 45 mg/l (30-day avg / max weekly avg)
NH_3-N	10 / 15 mg/l (30-day avg / max weekly avg)

Section 6: Existing Wastewater System

The McKee wastewater treatment plant (WWTP) began as a small concrete plant originally constructed in the mid 1970's. Expansions since then have consisted of two steel package plants of, one of which experienced a near structural collapse prior to the addition of stiffeners. With the addition of the package plants, the original aeration basin was converted to a nitrification/polishing basin, and the original clarifier to a tertiary clarifier. Because of the age of the system, repairs are performed as needed, but no major overhauls have been performed recently or are planned.

The entire WWTP is nearing the end of its useful life, and due to the piecemeal manner in which it has been constructed, it can be difficult to operate. This difficulty is exacerbated by periodic high flows from excessive infiltration and inflow (I/I), which has resulted in KPDES permit violations at the WWTP during and following significant rain events. Because of space limitations and the configuration of the existing WWTP, expansion or major renovation involving replacement of existing tanks would at best be difficult.

A simplified process flow diagram of the treatment plant is shown in Figure 6-1.

The WWTP has had a history of multiple violations. Many of the violations are related to excessive I/I that historically plagued the city. In 2011 with the exception of two months in which the TSS limit was exceeded and one month in which the $CBOD_5$ limit was exceeded, the only other parameter of concern was E. coli, which exceeded permit limits in seven months for a total of 18 violations. Furthermore, according to the US EPA Enforcement and Compliance History Online (ECHO) database, in the past five years, the McKee WWTP has had multiple violations of $CBOD_5$, TSS, ammonia, and E. coli limits.

In March, 2007, the City of McKee entered into an Agreed Order with the Environmental and Public Protection Cabinet. The Agreed Order recognized that the WWTP is hydraulically overloaded and placed the City of McKee on the Sewer Sanction List as one of its conditions. A subsequent Corrective Action Plan (CAP) addressed the excessive flows, which is discussed further in Part 3 of this Section.

Tables 6-1 and 6-2, provide flow and analytical DMR data respectively.

Table 6-1
McKee WWTP – Flow January 2010 thru December 2011

Month	Average Monthly Flow (gpd)	
	2010	2011
Jan 2010	119,746	128,388
Feb	152,255	157,321
Mar	110,530	165,214
Apr	79,240	178,439
May	98,782	114,483
Jun	49,459	77,759
Jul	62,895	54,576
Aug	70,023	42,450
Sep	26,250	59,405
Oct	21,285	65,804
Nov	62,335	161,405
Dec	134,670	179,696
Average		98,850
Maximum		179,696

Table 6-2, McKee WWTP – WWTP Performance Data, 2011

	TSS								
	mo avg			max wk avg		mo avg		max wk avg	
	inf	eff	% rem	inf	eff	inf	eff	inf	eff
2011	(mg/l)	(mg/l)		(mg/l)	(mg/l)	(ppd)	(ppd)	(ppd)	(ppd)
Jan	1,763	2	100	2,900	4	626	1.73	1,852	6.07
Feb	1,986	5	100	4,720	12	2,181	5.38	4,629	9.91
Mar	138	12	91	376	41	165	18.08	517	56.42
Apr	279	7	98	1,000	10	280	8.76	967	18.68
May	388	4	99	960	8	629	5.47	2,330	16.99
Jun	110	5	95	140	12	90	2.89	181	4.53
Jul	108	6	95	168	9	50	3.10	64	7.21
Aug	72	5	93	144	11	24	1.64	39	2.98
Sep	357	17	95	664	44	294	19.89	686	68.62
Oct	239	6	98	772	9	123	2.45	281	3.28
Nov	128	16	88	180	53	140	24.43	235	74.30
Dec	117	11	91	208	23	230	23.33	545	48.15
Avg	474	8	95	1,019	20	403	9.76	1,027	26.43
Max	1,986	17	100	4,720	53	2,181	24.43	4,629	74.30
Limit	report	30	85	report	45	report	42.50	report	63.80
Violations	---	0	0	---	1	0	0	0	2

Section 6: Existing Wastewater System

	CBOD5								
	mo avg			max wk avg		mo avg		max wk avg	
	inf	eff	% rem	inf	eff	inf	eff	inf	eff
2011	(mg/l)	(mg/l)		(mg/l)	(mg/l)	(ppd)	(ppd)	(ppd)	(ppd)
Jan	766	7	99	1,142	12	423	2.24	1,457	5.90
Feb	963	4	100	1,125	6	1,015	3.70	1,174	5.54
Mar	87	8	91	184	14	103	9.99	253	19.27
Apr	161	11	93	486	26	173	16.48	469	48.57
May	213	4	98	365	9	294	6.06	886	16.99
Jun	110	4	96	129	7	90	3.17	164	6.46
Jul	87	3	97	105	4	43	1.25	54	1.80
Aug	71	4	94	114	8	23	1.43	32	2.78
Sep	286	6	98	810	11	352	5.40	1,263	17.16
Oct	238	3	99	404	4	90	1.09	147	1.46
Nov	77	4	95	105	7	107	5.91	174	14.51
Dec	87	5	95	122	7	133	8.32	189	14.65
Avg	262	5	96	424	10	237	5.42	522	12.92
Max	963	11	100	1,142	26	1,015	16.48	1,457	48.57
Limit	report	10	85	report	15	report	14.20	report	21.30
Violations	---	1	0	---	1	0	1	0	1

	NH3-N				Total N-N		Total P-P	
	mo avg	max wk av	mo avg	max wk av	mo avg	max wk av	mo avg	max wk av
	eff	eff	eff	eff	eff	eff	eff	eff
2011	(mg/l)	(mg/l)	(ppd)	(ppd)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
Jan	<0.25	<0.25	<0.15	<0.38	8.0	9.0	0.345	1.050
Feb	0.4	0.7	0.42	0.96	13.0	20.0	1.073	1.350
Mar	<0.25	<0.25	<0.34	<0.71	32.0	47.0	0.946	1.240
Apr	1.56	5.34	0.90	2.86	16.8	27.0	1.613	2.930
May	<0.25	<0.25	<0.29	<0.61	16.6	22.0	1.578	1.890
Jun	0.70	1.88	0.42	0.93	9.3	11.0	2.060	3.040
Jul	1.29	4.41	0.96	3.53	14.5	20.0	2.008	2.870
Aug	<0.25	<0.25	<0.09	<0.21	10.4	18.0	2.172	3.230
Sep	<0.25	<0.25	<0.17	<0.39	18.0	29.0	2.135	2.520
Oct	0.30	0.44	0.13	0.22	8.8	14.0	1.895	2.300
Nov	<0.25	<0.25	<0.35	<0.73	12.0	30.0	1.362	2.000
Dec	0.69	1.79	1.28	3.75	7.8	10.0	0.935	1.380
Avg	0.8	2.4	0.69	2.04	14	21	1.510	2.150
Max	1.6	5.3	1.28	3.75	32	47	2.172	3.230
Limit	10	15	14.2	21.3	report	report	report	report
Violations	0	0	0	0	---	---	---	---

2011	pH - min mo eff (S.U.)	pH - max mo eff (S.U.)	D.O. mo min eff (mg/l)	Total Res. Chlorine mo avg eff (mg/l)	Total Res. Chlorine day max eff (mg/l)	E.Coli 30-d G.M eff (#/100 ml)	E.Coli 7-d G.M eff (#/100 ml)	E.Coli violations
Jan	6.1	6.6	7.1	0.000	0.000	1	1	
Feb	6.4	6.5	7.8	0.000	0.000	312	2420	3
Mar	6.2	6.9	7.5	0.000	0.000	81	2420	3
Apr	6.3	6.8	7.8	0.000	0.000	2,161	2420	4
May	6.1	6.9	7.6	0.000	0.000	64	1733	3
Jun	6.3	7.6	7.7	0.000	0.000	5	11	
Jul	6.4	7.1	7.6	0.000	0.000	11	299	1
Aug	6.5	7.6	7.8	0.000	0.000	9	38	
Sep	6.3	7.3	7.8	0.000	0.000	18	1120	
Oct	6.4	8.6	8.4	0.000	0.000	13	68	
Nov	6.9	7.4	7.9	0.000	0.000	178	2420	2
Dec	7.1	7.4	7.0	0.000	0.000	28	2420	2
Avg	---	---	7.7	0.000	0.000	---	---	
Min	6.1	---	7.0	---	---	---	---	
Max	---	8.6	8.4	0.000	0.000	2,161	2420	
Limit	6.0	9.0	7	0.011	0.019	130	240	
Violations	0	0	0	0	0	→	→	18

B. Other WWTP's

There are several other package wastewater treatment plants within the Planning Area. None of these WWTP's are in the first phase of the Planning Area.

1. Sandgap Elementary School WWTP

KPDES Permit Number	KY 0087009
US Hwy 421	
Sand Gap, KY 40481	
Type	Activated Sludge
Age	Unknown
Design Capacity	0.0075 mgd
Process Units	Grinding, Screening Extended Aeration Clarification Chlorination/Dechlorination
Reliability Category	Unspecified in KPDES Permit – Assumed Grade C
Average Daily Flow	0.0010 mgd
Peak Daily Flow	0.0010 mgd

Effluent Limits:

$CBOD_5$	30 / 45 mg/l (mo. avg / daily max)
TSS	30 / 45 mg/l (mo. avg / daily max)
NH_3-N	4.0 / 6.0 mg/l (mo. avg / daily max) 5/1 - 10/31
	10 / 15 mg/l (mo. avg / daily max) 11/1 - 4/30

In general, the WWTP meets permit requirements and operates well-under its design capacity. According to the US EPA Enforcement and Compliance History Online (ECHO) database, in the past three years, the Sandgap Elementary WWTP has had a few violations of ammonia, chlorine residual and E. coli limits, but nonetheless does not appear to have a chronic history of violations.

2. Annville Institute WWTP

KPDES Permit Number	KY 0082937
4500 Highway 30W	
Annville. KY 40402	
Type	Activated Sludge
Age	Unknown
Design Capacity	0.020 mgd
Process Units	Extended Aeration
	Clarification
	Chlorination
Reliability Category	Unspecified in KPDES Permit – Assumed Grade C
Average Daily Flow	0.0046 mgd
Peak Daily Flow	0.0779 mgd
Effluent Limits:	
$CBOD_5$	20 / 30 mg/l (mo. avg / daily max)
TSS	30 / 45 mg/l (mo. avg / daily max)
NH_3-N	4.0 / 6.0 mg/l (mo. avg / daily max) 5/1 - 10/31
	10 / 15 mg/l (mo. avg / daily max) 11/1 - 4/30

The WWTP normally operates well-under its design capacity. However, the historical peak daily flow is almost four times the design flow. According to the US EPA Enforcement and Compliance History Online (ECHO) database, in the past three years, the Annville Institute WWTP has had a occasional violations of BOD_5, chlorine residual and E. coli limits, and frequent violations of ammonia limits.

3. Jackson County Regional Industrial Park WWTP

KPDES Permit Number	KY 0088251
Highway 30	
McKee, Kentucky 40447	
Type	Activated Sludge

Age	Unknown
Design Capacity	0.0075 mgd
Process Units	Extended Aeration Clarification Chlorination
Reliability Category	Unspecified in KPDES Permit – Assumed Grade C
Average Daily Flow	0.01 mgd
Peak Daily Flow	0.026 mgd
Effluent Limits:	
$CBOD_5$	25 / 37.5 mg/l (mo. avg / max week avg)
TSS	30 / 45 mg/l (mo. avg / daily max)
NH_3-N	4.0 / 6.0 mg/l (mo. avg / daily max) 5/1 - 10/31 10 / 15 mg/l (mo. avg / daily max) 11/1 - 4/30

The WWTP consistently operates above its design capacity. According to the US EPA Enforcement and Compliance History Online (ECHO) database, in the past three years, the Jackson County Regional Industrial Park WWTP has had a occasional violations of ammonia and E. coli limits, and chronic violations chlorine residual limits.

4. Jackson Manor WWTP

KPDES Permit Number	KY 0091596
96 Highway 3444 Annville, KY	
Type	Activated Sludge
Age	Unknown
Design Capacity	0.015 mgd
Process Units	Extended Aeration Clarification Chlorination
Reliability Category	Unspecified in KPDES Permit – Assumed Grade C
Effluent Limits:	
$CBOD_5$	20 / 30 mg/l (mo. avg / daily max)
TSS	30 / 45 mg/l (mo. avg / daily max)
NH_3-N	4 / 6 mg/l (mo. avg / daily max) 5/1 - 10/31 10 / 15 mg/l (mo. avg / daily max) 11/1 -4/30

The WWTP generally meets permit requirements. According to the US EPA Enforcement and Compliance History Online (ECHO) database, in the past three years, the Jackson Manor WWTP has had occasional violations of chlorine residual limits.

5. Tyner Elementary School WWTP

KPDES Permit Number	KY 0074128
Hwy 30 West Tyner, KY 40447	
Type	Activated Sludge
Age	Unknown
Design Capacity	0.01 mgd
Process Units	Screening Extended Aeration Clarification Chlorination
Reliability Category	Unspecified in KPDES Permit – Assumed Grade C
Average Daily Flow	0.0024 mgd
Peak Daily Flow	0.0024 mgd
Effluent Limits:	
$CBOD_5$	30 / 45 mg/l (mo. avg / daily max)
TSS	30 / 45 mg/l (mo. avg / daily max)
NH_3-N	4 / 6 mg/l (mo. avg / daily max) 5/1 - 10/31 10 / 15 mg/l (mo. avg / daily max) 11/1 -4/30

The WWTP normally operates well-under its design capacity. According to the US EPA Enforcement and Compliance History Online (ECHO) database, in the past three years, the Tyner Elementary School WWTP has had occasional violations of fecal coliform and chlorine residual limits and frequent violations of ammonia and total suspended solids limits.

3. Collection and Conveyance System

A. McKee

Many of the sewers were constructed in the mid 1970's, consisting of about eight miles of gravity sewer and one duplex pump station. The gravity sewers contain about 150 manholes and consist mostly of 8" PVC pipe with some 8" vitrified clay pipe. To address excessive infiltration and inflow (I/I), the sewers in downtown McKee were replaced in the early 2000's. The pump station was completely refurbished in 1997. In 2008, a sewer investigation and repair project was completed that involved closed circuit televising, replacement of failed sections of sewer and repair of leaking manholes. One particular section of sewer that was replaced was a section of broken main adjacent to the Pigeon Roost Creek that allowed significant inflow whenever the creek rose a couple of feet during a significant storm event.

An Infiltration/Inflow (I/I) analysis was performed to numerically assess the flow patterns in the sewer system since the completion of the 2008 repairs. Daily recorded flows and precipitation data (from the University of Kentucky Agricultural Weather website for the Berea weather station), were analyzed to calculate

infiltration and inflow values. A detailed analysis is provided in Exhibit 6-1 at the end of this Section. Flows are rounded to the nearest 1,000 gpd.
The I/I analysis of flow data from January 1, 2010 through December 31, 2011 involved the following analyses.

- Average Daily Flow
  The average daily flow is 99,000 gpd.

- Non-Rainfall Day

  A non-rainfall day is defined as a day in which the precipitation is less than or equal to 0.1 inches. **The average non-rainfall flow is 90,000 gpd.**

- Base (Dry Weather) Flow Day

  The base flow is the amount of wastewater excluding the contribution of any infiltration/inflow (I/I). Base flow days were identified as those in which the effects of I/I were considered negligible, i.e, there was no rainfall (less than or equal to 0.10 inch), and there did not appear to be any significant infiltration due to antecedent moisture conditions. **Based on the selected days, the average base flow is 50,000 gpd.**

- Peak Infiltration Day

  Peak infiltration occurs during non-rainfall periods when the soils are saturated. These days typically occur during the late fall and early spring. **Based on the selected days, the average peak infiltration flow is 235,000 gpd.**

- Peak Infiltration and Inflow Day

  Peak infiltration and Inflow occurs on rainy days when the soils are saturated. These days also typically occur during the late fall and early spring. **Based on the selected days, the average peak infiltration and inflow flow is 278,000 gpd.**

  Using the values determined above, the following was calculated.

- **Average infiltration =** average non-rainfall day – average base flow day = **40,000 gpd**

- **Average inflow =** average daily flow – average non-rainfall day = **9,000 gpd**

- **Peak infiltration =** average peak infiltration day – average base flow day = **185,000 gpd**

- **Peak rain induced inflow =** average peak I/I day – peak infiltration day = **93,000 gpd**

Based on a total equivalent population of 1,039 customers (See Table 7-1) :

- **Average daily flow per capita = 95 gpcd**
- **Peak I/I day per capita = 268 gpcd.**

The U.S. EPA guidelines (Sewer System Infrastructure Analysis and Rehabilitation, EPA/625/6-91/030) for determining excessive I/I are defined as follows:

- Infiltration – If the average daily flow to the WWTP is 120 gallons per capita per day (gpcd) or less, infiltration is considered non-excessive. If the average daily flow is greater than 120 gpcd, further investigation of flows is required. The average daily flow per capital is 95 gpcd, and therefore the McKee collection system is not considered subject to excessive infiltration.

- Inflow – If the rainfall induced peak hydraulic flow rate at the WWTP exceeds 275 gpcd, the city shall perform a study of the sewer system to determine the quantity of excessive inflow and propose a rehabilitation program to eliminate excessive inflow. The peak inflow per household is 268 gpcd, and is therefore, not considered to be subject to excessive inflow.

That being said, the City of McKee continues to monitor the flow to the WWTP, identify sources of I/I and to correct problems as they are discovered.

Pump Station Condition and Capacity

The collection system has one pump station located near the intersection of Hwy 421 and SR 89 on the west side of McKee. This pump station which is a submersible duplex station, was refurbished in 1997 and is rated for 500 gpm @ 30 ft TDH. Despite high flows during rain events, the pump station is sufficiently large enough to handle the peak flows.

B. Other WWTP's

The other WWTP's have direct lateral connections to their respective wastewater treatment plants located on the same site. Average and peak flows for these WWTP's are provided in Part 2(B) of this chapter.

4. Biosolids Disposal

   A. McKee

      Dewatered solids are currently land applied (as a Class B biosolid) or transferred to a permitted landfill for disposal.

   B. Other WWTP's

      Specific information on biolsolids disposal for these WWTP's was not obtained. Typically, small package WWTP's will remove liquid solids as needed from a sludge holding tank or from an aeration tank, via a licensed hauler. The solids are then transferred to a municipal WWTP for further treatment and ultimate disposal.

5. Operation, Maintenance and Compliance

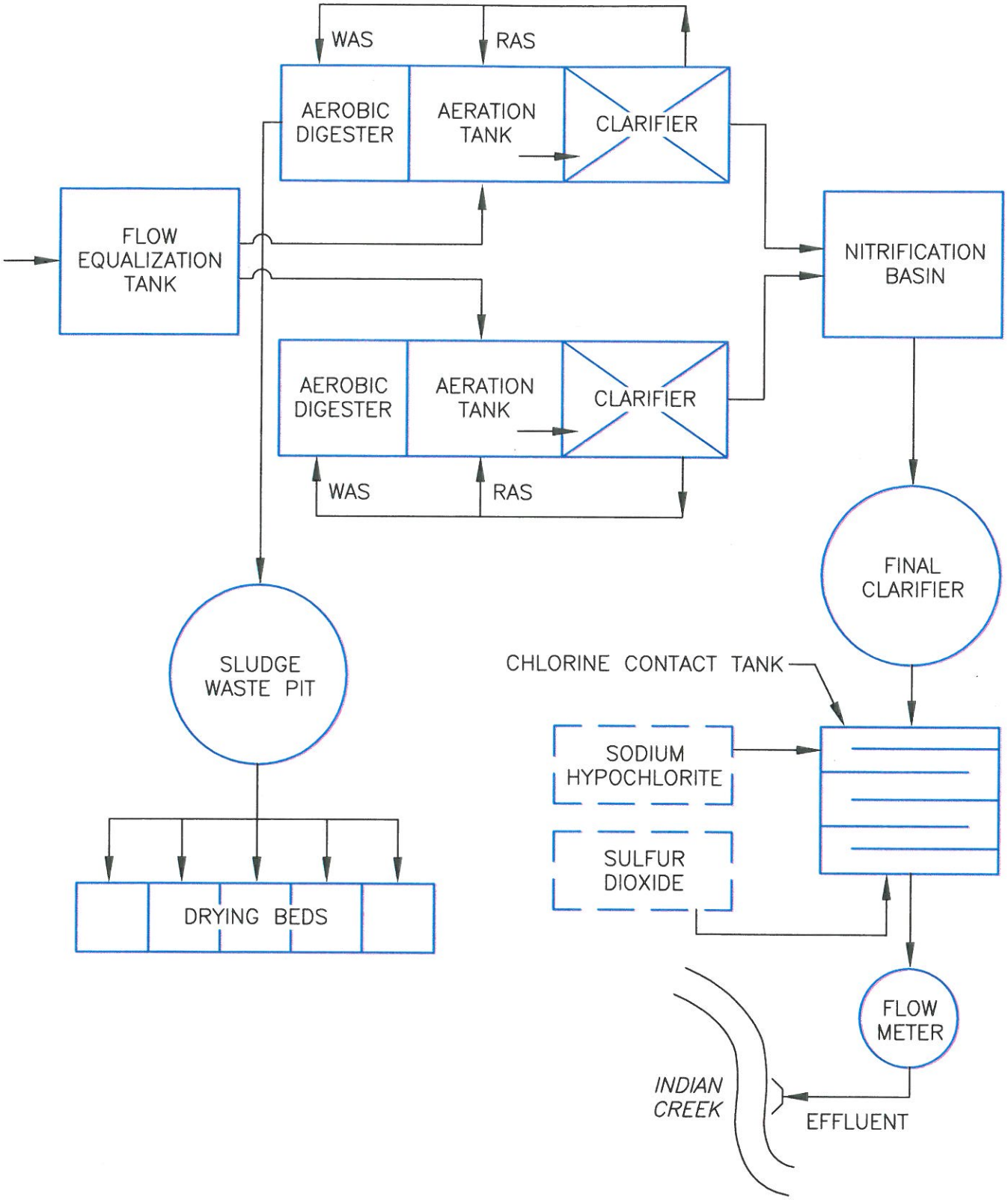
   A. McKee

      Given the condition of the existing WWTP, and the intent to construct a new WWTP in the near future, equipment repairs are made as needed to keep the process functioning, and routine preventative maintenance is performed.

      As noted previously, the City of McKee entered into an Agreed Order with the Division of Water in 2006. The Order largely stemmed from violations caused by excessive flow during rain events leading to discharge permit violations. As noted above, subsequent sewer repairs were performed to comply with the Order and related Corrective Action Plan.

   B. Other WWTP's

      See Part 2(B) of this chapter.



nesbitt engineering, inc. *providing proven solutions since 1976*	PROCESS FLOW DIAGRAM EXISTING WASTEWATER TREATMENT PLANT CITY OF McKEE			
drawing revisions: Figure 6–1	drawn by: JCW	disk/file name: \PROCESS FLOW DIAGRAM.DWG	job no.: 1098.10	
	date: 7–05–12	last plot date:	scale: NOT TO SCALE	

EXHIBIT 6-1
City of McKee, Kentucky
Infiltration and Inflow Evaluation
January 2010 - December 2011

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
01/01/10	15,680	15,680		15,680			0.00
01/02/10	14,370	14,370		14,370			0.00
01/03/10	14,680	14,680		14,680			0.00
01/04/10	16,530	16,530		16,530			0.00
01/05/10	5,650	5,650		5,650			T
01/06/10	60,050	60,050		60,050			0.00
01/07/10	173,190	173,190			173,190		T
01/08/10	248,450	248,450			248,450		0.00
01/09/10	362,180	362,180			362,180		T
01/10/10	409,130	409,130			409,130		T
01/11/10	41,020	41,020		41,020			T
01/12/10	45,190	45,190		45,190			T
01/13/10	8,240	8,240		8,240			0.00
01/14/10	16,940	16,940		16,940			0.00
01/15/10	23,740	23,740		23,740			0.00
01/16/10	25,880	25,880		25,880			0.00
01/17/10	48,870		48,870				0.58
01/18/10	106,220	106,220					0.00
01/19/10	96,410	96,410					0.00
01/20/10	106,880		106,880				0.52
01/21/10	115,310		115,310				0.21
01/22/10	115,840		115,840				0.14
01/23/10	116,050	116,050					0.00
01/24/10	243,670		243,670			243,670	1.49
01/25/10	284,130	284,130			284,130		T
01/26/10	257,880	257,880			257,880		T
01/27/10	233,960	233,960			233,960		0.00
01/28/10	211,230	211,230			211,230		0.00
01/29/10	16,950	16,950					0.00
01/30/10	147,320		147,320				0.28
01/31/10	130,490	130,490					0.00
02/01/10	146,130	146,130					0.00
02/02/10	138,250	138,250					T
02/03/10	121,680	121,680					T
02/04/10	110,570	110,570					0.00
02/05/10	99,540		99,540				1.09
02/06/10	95,830		95,830				0.21
02/07/10	196,450	196,450					0.00
02/08/10	146,820	146,820					0.00
02/09/10	141,460		141,460				0.38
02/10/10	118,640	118,640					T
02/11/10	98,750	98,750					0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
02/12/10	87,560	87,560					0.00
02/13/10	78,930	78,930					0.00
02/14/10	209,050	209,050					0.00
02/15/10	198,430		198,430			198,430	0.11
02/16/10	165,470	165,470					T
02/17/10	158,090	158,090					T
02/18/10	125,840	125,840					0.00
02/19/10	86,430	86,430					0.00
02/20/10	201,650	201,650			201,650		0.00
02/21/10	203,840	203,840			203,840		0.00
02/22/10	198,340	198,340			198,340		T
02/23/10	195,700	195,700			195,700		0.00
02/24/10	187,640	187,640			187,640		T
02/25/10	186,400	186,400			186,400		T
02/26/10	185,420	185,420			185,420		0.00
02/27/10	190,580	190,580			190,580		T
02/28/10	189,640	189,640			189,640		0.00
03/01/10	113,020	113,020					0.00
03/02/10	111,530	111,530					0.00
03/03/10	109,600	109,600					0.00
03/04/10	104,110	104,110					0.00
03/05/10	97,320	97,320					0.00
03/06/10	88,360	88,360					0.00
03/07/10	84,790	84,790					0.00
03/08/10	90,480	90,480					T
03/09/10	86,740	86,740					0.00
03/10/10	91,710	91,710					T
03/11/10	94,880	94,880					T
03/12/10	118,850		118,850				0.62
03/13/10	149,310	149,310					T
03/14/10	136,430	136,430					T
03/15/10	142,130	142,130					T
03/16/10	136,120	136,120					0.00
03/17/10	127,400	127,400					0.00
03/18/10	105,820	105,820					0.00
03/19/10	89,620	89,620					0.00
03/20/10	92,450	92,450					0.00
03/21/10	91,770	91,770					0.00
03/22/10	130,910		130,910				0.30
03/23/10	111,290	111,290					T
03/24/10	98,630	98,630					0.00
03/25/10	105,880	105,880					T
03/26/10	121,020		121,020				0.32
03/27/10	88,710	88,710					0.00
03/28/10	116,760		116,760				0.28
03/29/10	146,470	146,470					T
03/30/10	126,910	126,910					0.00
03/31/10	117,410	117,410					0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
04/01/10	105,470	105,470					0.00
04/02/10	97,150	97,150		97,150			0.00
04/03/10	92,890	92,890		92,890			0.00
04/04/10	83,550	83,550		83,550			0.00
04/05/10	88,310	88,310		88,310			0.00
04/06/10	91,340	91,340		91,340			0.00
04/07/10	66,950	66,950		66,950			0.00
04/08/10	73,420		73,420				0.17
04/09/10	85,050	85,050		85,050			0.00
04/10/10	72,700	72,700		72,700			0.00
04/11/10	68,830	68,830		68,830			0.00
04/12/10	75,880	75,880		75,880			0.00
04/13/10	71,420	71,420		71,420			0.00
04/14/10	65,370	65,370		65,370			0.00
04/15/10	71,760	71,760		71,760			0.00
04/16/10	59,820	59,820		59,820			0.00
04/17/10	65,530		65,530				0.12
04/18/10	65,320	65,320		65,320			0.00
04/19/10	72,470	72,470		72,470			0.00
04/20/10	78,080	78,080		78,080			T
04/21/10	71,450	71,450		71,450			T
04/22/10	67,180	67,180		67,180			0.00
04/23/10	63,480		63,480				0.15
04/24/10	63,510		63,510				0.60
04/25/10	78,140		78,140				0.61
04/26/10	101,170	101,170					T
04/27/10	110,750		110,750				0.80
04/28/10	104,210	104,210					0.00
04/29/10	89,900	89,900					0.00
04/30/10	76,110	76,110					0.00
05/01/10	87,600		87,600				0.88
05/02/10	79,580		79,580				6.35
05/03/10	77,650		77,650				0.96
05/04/10	90,150	90,150		90,150			0.00
05/05/10	98,210	98,210		98,210			0.00
05/06/10	96,870	96,870		96,870			0.00
05/07/10	99,650	99,650		99,650			0.00
05/08/10	97,650	97,650		97,650			T
05/09/10	89,650	89,650		89,650			0.00
05/10/10	95,600	95,600		95,600			0.00
05/11/10	121,640	121,640					T
05/12/10	117,850	117,850					0.00
05/13/10	115,600	115,600					0.00
05/14/10	111,250	111,250					0.00
05/15/10	98,650		98,650				0.25
05/16/10	87,650		87,650				0.78
05/17/10	85,960		85,960				0.59
05/18/10	101,560		101,560				0.15

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
05/19/10	93,120	93,120					0.00
05/20/10	85,620	85,620					0.00
05/21/10	98,760		98,760				0.14
05/22/10	99,540		99,540				0.17
05/23/10	111,920	111,920					0.00
05/24/10	110,580	110,580					0.00
05/25/10	98,630	98,630					0.00
05/26/10	100,580	100,580					0.00
05/27/10	105,600	105,600					0.00
05/28/10	103,890	103,890					0.00
05/29/10	106,830	106,830					0.00
05/30/10	104,760	104,760					0.00
05/31/10	89,650	89,650		89,650			0.00
06/01/10	72,300		72,300				0.23
06/02/10	58,600	58,600		58,600			0.00
06/03/10	35,420	35,420		35,420			T
06/04/10	29,500		29,500				0.52
06/05/10	12,790	12,790		12,790			0.00
06/06/10	15,820		15,820				0.17
06/07/10	14,390	14,390		14,390			0.00
06/08/10	20,720	20,720		20,720			0.00
06/09/10	20,020		20,020				0.50
06/10/10	60,110	60,110		60,110			0.00
06/11/10	57,780		57,780				0.21
06/12/10	53,120		53,120				0.33
06/13/10	73,230	73,230		73,230			0.00
06/14/10	103,670		103,670				0.79
06/15/10	49,390	49,390		49,390			T
06/16/10	49,380	49,380		49,380			T
06/17/10	73,230	73,230		73,230			0.00
06/18/10	47,409	47,409		47,409			0.00
06/19/10	41,160	41,160		41,160			T
06/20/10	39,340	39,340		39,340			0.00
06/21/10	67,600		67,600				0.41
06/22/10	90,460	90,460		90,460			0.00
06/23/10	68,280	68,280		68,280			0.00
06/24/10	49,540		49,540				0.39
06/25/10	49,370	49,370		49,370			0.00
06/26/10	71,760	71,760		71,760			0.00
06/27/10	42,280	42,280		42,280			0.00
06/28/10	46,510	46,510		46,510			T
06/29/10	39,110	39,110		39,110			0.00
06/30/10	31,480	31,480		31,480			0.00
07/01/10	37,560	37,560		37,560			0.00
07/02/10	40,120	40,120		40,120			0.00
07/03/10	56,200	56,200		56,200			0.00
07/04/10	63,870	63,870		63,870			0.00
07/05/10	65,480	65,480		65,480			0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
07/06/10	61,230	61,230		61,230			0.00
07/07/10	60,580	60,580		60,580			0.00
07/08/10	78,300	78,300		78,300			0.00
07/09/10	89,620		89,620				1.00
07/10/10	95,470	95,470		95,470			T
07/11/10	116,500	116,500		116,500			0.00
07/12/10	168,950		168,950				0.18
07/13/10	132,580		132,580				2.23
07/14/10	85,600	85,600		85,600			0.00
07/15/10	63,210	63,210		63,210			0.00
07/16/10	54,080	54,080		54,080			0.00
07/17/10	48,630		48,630				0.22
07/18/10	45,280	45,280		45,280			T
07/19/10	50,290		50,290				0.31
07/20/10	45,630	45,630		45,630			T
07/21/10	44,560		44,560				1.02
07/22/10	44,000	44,000		44,000			0.00
07/23/10	48,620	48,620		48,620			0.00
07/24/10	44,630	44,630		44,630			0.00
07/25/10	42,580		42,580				0.44
07/26/10	39,580	39,580		39,580			0.00
07/27/10	46,320		46,320				0.17
07/28/10	56,020	56,020		56,020			0.00
07/29/10	40,150	40,150		40,150			0.00
07/30/10	39,560	39,560		39,560			0.00
07/31/10	44,560		44,560				0.34
08/01/10	48,620	48,620		48,620			0.00
08/02/10	50,590	50,590		50,590			0.00
08/03/10	55,600	55,600		55,600			0.00
08/04/10	60,790	60,790		60,790			0.00
08/05/10	61,250	61,250		61,250			0.00
08/06/10	70,580	70,580		70,580			0.00
08/07/10	76,250	76,250		76,250			0.00
08/08/10	75,760	75,760		75,760			0.00
08/09/10	70,580	70,580		70,580			0.00
08/10/10	69,140	69,140		69,140			0.00
08/11/10	68,450	68,450		68,450			0.00
08/12/10	71,350	71,350		71,350			0.00
08/13/10	77,630	77,630		77,630			0.00
08/14/10	80,910	80,910		80,910			0.00
08/15/10	71,960	71,960		71,960			0.00
08/16/10	67,020	67,020		67,020			0.00
08/17/10	70,540	70,540		70,540			0.00
08/18/10	75,890		75,890				0.99
08/19/10	78,930	78,930		78,930			0.00
08/20/10	69,810	69,810		69,810			0.00
08/21/10	77,000	77,000		77,000			0.00
08/22/10	71,460	71,460		71,460			0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
08/23/10	79,350	79,350		79,350			0.00
08/24/10	77,090	77,090		77,090			0.00
08/25/10	76,590	76,590		76,590			0.00
08/26/10	77,250	77,250		77,250			0.00
08/27/10	70,560	70,560		70,560			0.00
08/28/10	68,030	68,030		68,030			0.00
08/29/10	67,380	67,380		67,380			0.00
08/30/10	65,930	65,930		65,930			0.00
08/31/10	68,410	68,410		68,410			0.00
09/01/10	70,710	70,710		70,710			0.00
09/02/10	25,210	25,210		25,210			0.00
09/03/10	37,290	37,290		37,290			0.00
09/04/10	35,070	35,070		35,070			0.00
09/05/10	26,290	26,290		26,290			0.00
09/06/10	22,300	22,300		22,300			0.00
09/07/10	22,520	22,520		22,520			0.00
09/08/10	Flow Data Suspect						0.00
09/09/10							0.00
09/10/10							0.00
09/11/10			0				0.23
09/12/10							0.00
09/13/10							0.00
09/14/10	23,160	23,160		23,160			0.00
09/15/10	24,030	24,030		24,030			0.00
09/16/10	38,480		38,480				0.75
09/17/10	31,900	31,900		31,900			0.00
09/18/10	18,000	18,000		18,000			0.00
09/19/10	16,670	16,670		16,670			0.00
09/20/10	17,590	17,590		17,590			0.00
09/21/10	15,230	15,230		15,230			0.00
09/22/10	23,930	23,930		23,930			0.00
09/23/10	22,250	22,250		22,250			0.00
09/24/10	18,690	18,690		18,690			0.00
09/25/10	35,860	35,860		35,860			0.00
09/26/10	19,890	19,890		19,890			0.00
09/27/10	28,420		28,420				0.25
09/28/10	25,170	25,170		25,170			0.00
09/29/10	19,090	19,090		19,090			0.00
09/30/10	12,240	12,240		12,240			0.00
10/01/10	14,420	14,420		14,420			0.00
10/02/10	21,660	21,660		21,660			0.00
10/03/10	16,240	16,240		16,240			0.00
10/04/10	14,510	14,510		14,510			0.00
10/05/10	16,850	16,850		16,850			0.00
10/06/10	15,390	15,390		15,390			0.00
10/07/10	5,480	5,480		5,480			0.00
10/08/10	4,130	4,130		4,130			0.00
10/09/10	14,200	14,200		14,200			0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
10/10/10	2,060	2,060		2,060			0.00
10/11/10	12,460	12,460		12,460			0.00
10/12/10	18,360	18,360		18,360			0.00
10/13/10	40,220	40,220		40,220			T
10/14/10	25,150	25,150		25,150			0.00
10/15/10	26,630	26,630		26,630			0.00
10/16/10	18,650	18,650		18,650			0.00
10/17/10	16,930	16,930		16,930			0.00
10/18/10	22,060	22,060		22,060			0.00
10/19/10	20,610	20,610		20,610			0.00
10/20/10	29,940	29,940		29,940			0.00
10/21/10	29,980	29,980		29,980			0.00
10/22/10	17,710	17,710		17,710			0.00
10/23/10	11,910	11,910		11,910			0.00
10/24/10	13,830	13,830		13,830			0.00
10/25/10	34,600		34,600				0.55
10/26/10	44,890		44,890				1.11
10/27/10	38,010	38,010		38,010			0.00
10/28/10	35,870	35,870		35,870			0.00
10/29/10	29,340	29,340		29,340			0.00
10/30/10	22,250	22,250		22,250			0.00
10/31/10	25,490	25,490		25,490			0.00
11/01/10	29,240	29,240		29,240			0.00
11/02/10	26,140	26,140		26,140			0.00
11/03/10	34,970		34,970				0.22
11/04/10	49,320	49,320		49,320			T
11/05/10	48,840	48,840		48,840			0.00
11/06/10	38,060	38,060		38,060			0.00
11/07/10	36,840	36,840		36,840			0.00
11/08/10	44,350	44,350		44,350			0.00
11/09/10	39,590	39,590		39,590			0.00
11/10/10	36,860	36,860		36,860			0.00
11/11/10	44,090	44,090		44,090			0.00
11/12/10	33,050	33,050		33,050			0.00
11/13/10	26,050	26,050		26,050			0.00
11/14/10	21,160	21,160		21,160			T
11/15/10	32,220	32,220		32,220			0.00
11/16/10	107,590		107,590				0.72
11/17/10	73,900	73,900		73,900			0.00
11/18/10	64,810	64,810		64,810			0.00
11/19/10	56,770	56,770		56,770			0.00
11/20/10	46,210	46,210		46,210			0.00
11/21/10	39,360	39,360		39,360			0.00
11/22/10	45,900	45,900		45,900			0.00
11/23/10	86,390		86,390				0.13
11/24/10	86,720		86,720				0.15
11/25/10	72,270	72,270		72,270			0.00
11/26/10	129,770		129,770				0.58

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
11/27/10	94,260	94,260		94,260			0.00
11/28/10	68,280	68,280		68,280			0.00
11/29/10	82,230	82,230		82,230			0.00
11/30/10	274,820		274,820			274,820	0.96
12/01/10	386,620	386,620			386,620		0.00
12/02/10	200,420	200,420			200,420		T
12/03/10	151,560	151,560					0.00
12/04/10	124,420		124,420				0.36
12/05/10	113,050	113,050					T
12/06/10	106,340	106,340					0.00
12/07/10	100,200	100,200					0.00
12/08/10	69,770	69,770					0.00
12/09/10	78,070	78,070					0.00
12/10/10	76,210	76,210					0.00
12/11/10	70,450	70,450					T
12/12/10	182,240		182,240				0.43
12/13/10	145,090		145,090				0.12
12/14/10	116,840	116,840					0.00
12/15/10	108,070	108,070					0.00
12/16/10	265,020		265,020			265,020	0.92
12/17/10	250,900	250,900			250,900		0.00
12/18/10	169,450	169,450			169,450		0.00
12/19/10	148,280	148,280					0.00
12/20/10	129,670	129,670					0.00
12/21/10	120,960	120,960					T
12/22/10	128,840	128,840					0.00
12/23/10	118,250	118,250					0.00
12/24/10	106,420	106,420					0.00
12/25/10	98,630	98,630					T
12/26/10	93,580	93,580					T
12/27/10	94,050	94,050					0.00
12/28/10	92,760	92,760					0.00
12/29/10	90,300	90,300					0.00
12/30/10	120,150		120,150				0.25
12/31/10	118,160	118,160					0.00
01/01/11	180,230		180,230				0.41
01/02/11	64,680	64,680					0.00
01/03/11	142,270	142,270					0.00
01/04/11	Flow Data Suspect						0.00
01/05/11							0.00
01/06/11							0.00
01/07/11							T
01/08/11							T
01/09/11							0.00
01/10/11							0.00
01/11/11							T
01/12/11							T
01/13/11							0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
01/14/11							0.00
01/15/11							0.00
01/16/11							0.00
01/17/11							T
01/18/11	77,710		77,710				0.29
01/19/11	123,610		123,610				0.12
01/20/11	111,980	111,980					T
01/21/11	101,290	101,290					T
01/22/11	98,230	98,230					0.00
01/23/11	94,630	94,630					0.00
01/24/11	100,250	100,250					T
01/25/11	104,540	104,540					0.00
01/26/11	185,410		185,410				0.50
01/27/11	179,270	179,270					0.00
01/28/11	181,840	181,840					T
01/29/11	156,740	156,740					0.00
01/30/11	139,490	139,490					0.00
01/31/11	140,430	140,430					T
02/01/11	151,750		151,750				0.34
02/02/11	214,830		214,830			214,830	0.47
02/03/11	182,140	182,140					0.00
02/04/11	169,740	169,740					0.00
02/05/11	173,170		173,170				0.19
02/06/11	162,280	162,280					0.00
02/07/11	166,080	166,080					T
02/08/11	150,700		150,700				0.17
02/09/11	135,840		135,840				0.40
02/10/11	116,910	116,910					T
02/11/11	119,830	119,830					0.00
02/12/11	115,920	115,920					0.00
02/13/11	112,700	112,700					0.00
02/14/11	117,550	117,550					0.00
02/15/11	114,680	114,680					0.00
02/16/11	107,720	107,720					0.00
02/17/11	100,580	100,580					0.00
02/18/11	95,670	95,670					T
02/19/11	95,370	95,370					0.00
02/20/11	87,960	87,960					T
02/21/11	99,410	99,410					0.00
02/22/11	120,360		120,360				0.29
02/23/11	115,480	115,480					0.00
02/24/11	209,070		209,070			209,070	1.17
02/25/11	360,090		360,090			360,090	1.40
02/26/11	313,960	313,960			313,960		0.00
02/27/11	219,660	219,660			219,660		T
02/28/11	275,550		275,550			275,550	1.80
03/01/11	345,050	345,050			345,050		0.00
03/02/11	296,070	296,070			296,070		0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
03/03/11	217,930	217,930			217,930		0.00
03/04/11	166,340	166,340			166,340		0.00
03/05/11	213,280		213,280			213,280	0.68
03/06/11	379,920		379,920			379,920	0.45
03/07/11	340,890	340,890			340,890		0.00
03/08/11	246,310	246,310			246,310		0.00
03/09/11	300,470		300,470			300,470	0.78
03/10/11	282,190		282,190			282,190	0.88
03/11/11	217,800		217,800			217,800	0.11
03/12/11	206,300	206,300			206,300		0.00
03/13/11	171,210	171,210			171,210		0.00
03/14/11	155,880		155,880				0.31
03/15/11	153,870		153,870				0.21
03/16/11	128,710	128,710					0.00
03/17/11	97,970	97,970					0.00
03/18/11	63,120		63,120				0.17
03/19/11	45,100	45,100					T
03/20/11	54,750	54,750					0.00
03/21/11	69,970	69,970					0.00
03/22/11	93,720	93,720					0.00
03/23/11	97,970		97,970				0.16
03/24/11	121,140	121,140					T
03/25/11	108,840	108,840					0.00
03/26/11	90,500	90,500					T
03/27/11	93,510	93,510					T
03/28/11	91,390	91,390					0.00
03/29/11	88,920	88,920					0.00
03/30/11	94,690		94,690				0.11
03/31/11	87,820	87,820					0.00
04/01/11	83,180	83,180					0.00
04/02/11	74,740	74,740					T
04/03/11	63,090	63,090					0.00
04/04/11	108,130		108,130				1.34
04/05/11	327,050		327,050			327,050	0.49
04/06/11	213,650	213,650			213,650		0.00
04/07/11	152,020	152,020			152,020		0.00
04/08/11	131,210	131,210					0.00
04/09/11	152,740		152,740				0.35
04/10/11	147,940	147,940					0.00
04/11/11	161,840		161,840				0.24
04/12/11	346,130		346,130			346,130	1.57
04/13/11	289,960	289,960			289,960		0.00
04/14/11	201,700	201,700			201,700		0.00
04/15/11	180,060		180,060			180,060	0.54
04/16/11	203,060		203,060			203,060	0.84
04/17/11	253,150	253,150			253,150		T
04/18/11	224,800	224,800			224,800		0.00
04/19/11	164,970	164,970			164,970		0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
04/20/11	171,640		171,640				0.73
04/21/11	155,580	155,580					0.00
04/22/11	165,040		165,040				0.33
04/23/11	107,190		107,190				0.57
04/24/11	113,700		113,700				0.53
04/25/11	116,120	116,120					0.00
04/26/11	123,210		123,210				0.49
04/27/11	185,050		185,050			185,050	1.01
04/28/11	350,270		350,270			350,270	0.84
04/29/11	227,560	227,560			227,560		T
04/30/11	158,390	158,390					0.00
05/01/11	157,220		157,220				0.50
05/02/11	144,910	144,910					T
05/03/11	291,290		291,290			291,290	1.24
05/04/11	359,840	359,840			359,840		0.00
05/05/11	219,050	219,050			219,050		0.00
05/06/11	169,070	169,070					0.00
05/07/11	148,490	148,490					T
05/08/11	109,310	109,310					T
05/09/11	104,360	104,360					0.00
05/10/11	93,190	93,190					0.00
05/11/11	81,730	81,730					0.00
05/12/11	76,220	76,220					0.00
05/13/11	74,660	74,660					T
05/14/11	85,860		85,860				0.52
05/15/11	78,990		78,990				0.34
05/16/11	95,410	95,410					T
05/17/11	95,140	95,140					T
05/18/11	103,160		103,160				0.15
05/19/11	92,260	92,260					0.00
05/20/11	70,000	70,000					0.00
05/21/11	55,400	55,400					0.00
05/22/11	62,850		62,850				0.43
05/23/11	109,190		109,190				0.87
05/24/11	114,520	114,520					T
05/25/11	82,270	82,270					0.00
05/26/11	99,360		99,360				0.45
05/27/11	83,610		83,610				0.19
05/28/11	71,060	71,060		71,060			0.00
05/29/11	63,590	63,590		63,590			0.00
05/30/11	63,310	63,310		63,310			0.00
05/31/11	93,650	93,650		93,650			0.00
06/01/11	66,470	66,470		66,470			0.00
06/02/11	62,070	62,070		62,070			0.00
06/03/11	54,390	54,390		54,390			0.00
06/04/11	47,580	47,580		47,580			0.00
06/05/11	32,180	32,180		32,180			T
06/06/11	69,670	69,670		69,670			0.00

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
06/07/11	45,290	45,290		45,290			0.00
06/08/11	51,510	51,510		51,510			0.00
06/09/11	64,350	64,350		64,350			0.00
06/10/11	55,670	55,670		55,670			T
06/11/11	79,910	79,910		79,910			0.00
06/12/11	75,410	75,410		75,410			0.00
06/13/11	58,730	58,730		58,730			0.00
06/14/11	58,630	58,630		58,630			0.00
06/15/11	60,700		60,700				0.37
06/16/11	51,160	51,160		51,160			0.00
06/17/11	50,450		50,450				0.17
06/18/11	43,050		43,050				0.57
06/19/11	124,730		124,730				0.62
06/20/11	184,700		184,700				2.01
06/21/11	155,030	155,030			155,030		0.00
06/22/11	187,380	187,380			187,380		T
06/23/11	117,550		117,550				0.13
06/24/11	43,720	43,720		43,720			0.00
06/25/11	73,500	73,500		73,500			0.00
06/26/11	73,860		73,860				0.21
06/27/11	98,140	98,140		98,140			T
06/28/11	103,910	103,910		103,910			0.00
06/29/11	76,150	76,150		76,150			0.00
06/30/11	66,890	66,890		66,890			0.00
07/01/11	61,590	61,590		61,590			0.00
07/02/11	42,730	42,730		42,730			0.00
07/03/11	60,790	60,790		60,790			0.00
07/04/11	105,800	105,800					T
07/05/11	96,440		96,440				1.51
07/06/11	69,920	69,920		69,920			T
07/07/11	70,540	70,540		70,540			0.00
07/08/11	65,470		65,470				0.42
07/09/11	51,810	51,810		51,810			0.00
07/10/11	63,310	63,310		63,310			0.00
07/11/11	57,170	57,170		57,170			0.00
07/12/11	57,320	57,320		57,320			0.00
07/13/11	47,380	47,380		47,380			T
07/14/11	37,260	37,260		37,260			0.00
07/15/11	56,830		56,830				0.76
07/16/11	57,500	57,500		57,500			0.00
07/17/11	53,970		53,970				0.28
07/18/11	49,850	49,850		49,850			0.00
07/19/11	54,110	54,110		54,110			0.00
07/20/11	74,230	74,230		74,230			0.00
07/21/11	54,060	54,060		54,060			0.00
07/22/11	39,790	39,790		39,790			0.00
07/23/11	39,850	39,850		39,850			0.00
07/24/11	35,590		35,590				0.41

Date	Flow (gpd)						Rainfall (inches)
	Flow	Non-Rainfall Day	Rainfall Day	Base Flow Day	Peak Infiltration Day	Peak I/I Day	
07/25/11	46,960	46,960		46,960			T
07/26/11	37,860	37,860		37,860			0.00
07/27/11	29,460	29,460		29,460			0.00
07/28/11	41,770	41,770		41,770			0.00
07/29/11	36,280	36,280		36,280			T
07/30/11	54,290	54,290		54,290			T
07/31/11	41,920	41,920		41,920			0.00
08/01/11	35,750	35,750		35,750			0.00
08/02/11	37,620	37,620		37,620			0.00
08/03/11	44,640		44,640				0.48
08/04/11	40,160	40,160		40,160			0.00
08/05/11	43,370	43,370		43,370			0.00
08/06/11	36,510		36,510				0.13
08/07/11	35,650		35,650				0.40
08/08/11	49,170		49,170				0.16
08/09/11	31,440	31,440		31,440			T
08/10/11	52,610	52,610		52,610			0.00
08/11/11	33,090	33,090		33,090			0.00
08/12/11	31,550	31,550		31,550			0.00
08/13/11	54,460	54,460		54,460			0.00
08/14/11	72,220		72,220				0.27
08/15/11	60,330	60,330		60,330			0.00
08/16/11	47,770	47,770		47,770			0.00
08/17/11	43,530	43,530		43,530			0.00
08/18/11	42,050	42,050		42,050			T
08/19/11	58,390	58,390		58,390			0.00
08/20/11	73,340	73,340		73,340			0.00
08/21/11	53,020	53,020		53,020			T
08/22/11	43,200		43,200				0.19
08/23/11	30,140	30,140		30,140			0.00
08/24/11	44,740	44,740		44,740			0.00
08/25/11	35,580	35,580		35,580			0.00
08/26/11	40,040	40,040		40,040			0.00
08/27/11	26,210	26,210		26,210			0.00
08/28/11	25,050	25,050		25,050			0.00
08/29/11	31,260	31,260		31,260			0.00
08/30/11	34,670	34,670		34,670			0.00
08/31/11	28,390	28,390		28,390			0.00
09/01/11	36,340	36,340		36,340			0.00
09/02/11	28,570	28,570		28,570			T
09/03/11	34,050	34,050		34,050			0.00
09/04/11	25,450		25,450				0.37
09/05/11	74,120		74,120				1.52
09/06/11	187,470		187,470				0.71
09/07/11	113,470		113,470				0.36
09/08/11	108,800	108,800					T
09/09/11	66,540	66,540		66,540			0.00
09/10/11	47,110	47,110		47,110			0.00