TOWN OF Brownsburg

ARCADIS Design & Consultancy for natural and built assets

PRELIMINARY ENGINEERING REPORT FOR SRF FUNDING

Brownsburg Wastewater Treatment Plant Expansion and Sanitary Sewer System Improvements, Phase 1

MAY 2016

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1 PROJECT LOCATION

1.1 Service Area

The Town of Brownsburg, Indiana is located in Hendricks County, eight miles west of Indianapolis. The Brownsburg Wastewater Treatment Plant (WWTP) provides service to the Town of Brownsburg and surrounding areas, and services a population of approximately 23,000 people. Brownsburg comprises approximately 15 percent of Hendricks County by population.

The Brownsburg *existing* service area is shown in **Figure 1-1** and is bounded by:

- North: irregular line roughly by CR 700 N
- South: Donnelly Drive
- East: irregular line roughly by CR 900 E
- West: irregular line roughly by CR 500 E, CR 575 E, and CR 650 E

As part of the Town's master plan, a 20-year plan was developed that encompasses build-out of the Town's service area described above. The recommended plan entails improvements to the Town's WWTP to increase its average capacity ultimately to 7 mgd (from 3.5 mgd today) and peak capacity to 15 mgd (from 6.7 mgd today), and associated improvements to the collection system to bring these anticipated flows to the plant. The plan was broken into phases to meet the Town's needs, the first phase of which is the subject of this Preliminary Engineering Report. Further details can be found in the Town's *Wastewater Treatment Plant Expansion Master Plan* and *Sanitary Sewer Master Plan* reports updated in 2012.

The *future* (build-out) service area is also shown in **Figure 1-1** and is bounded by:

- North: Boone County line
- South: irregular line approximated by CR 300 N and CR 350 N
- East: CR 900 E
- West: CR 500 E

As part of the master plan, the Town and Hendricks County negotiated the service area boundaries and determined that it would be best for the Town to take additional service area east of the Town (within the County's service territory limits) because of the Town's close proximity of existing sewers and WWTP to these unsewered areas. The County, otherwise, would have had to build a new WWTP and extend sewers long distances. This pushed the Town's east boundary to CR 900E, which was agreed on with the County.

1.2 Project Description

This Preliminary Engineering Report includes the first phase of the Sanitary Sewer and WWTP improvements briefly described as follows. These combined improvements will

better serve the growing area within Brownsburg and increase the plant average treatment capacity to 5.25 mgd and peak capacity to 10 mgd. [Note that the Town's WWTP encompasses the West Plant (main treatment plant) and the East Plant (pretreatment and pumping facility, CSO treatment and storage).]

- Sanitary Sewer Improvements:
  - New CR 625 E interceptor
  - New US 136 lift station and force mains
- West Plant Improvements:
  - New screen building
  - New flow splitter (after screens)
  - New chemical phosphorus tanks and feed equipment
  - New mixed liquor conditioner
  - New Oxidation Ditch No. 5
  - New Secondary Clarifier No. 5 and RAS pumps
  - New tertiary filters
  - New ultraviolet disinfection (to replace chlorine system)
  - New cascade aerators
  - New outfall pipe
  - Modified non-potable water system
  - New Electrical building
  - New Annex Building
  - Associated instrumentation and electrical work
  - Associated yard piping and site work

Thus, the *project area* entails the existing West Plant, new CR 625 E interceptor (36-inch and 48-inch diameters) sewer route, new US 136 lift station, new US 136 force main (12-inch diameter) route, and new Maplehurst (redirected) force main (10-inch diameter) route as further shown on **Figure 1-2**.

1.3 Right-of-Way and Easements

The WWTP project will be constructed within the Town's property, right-of-way, and easements at the WWTP site. The new effluent pipe will be located partially on private property, but within the existing easement and in the vicinity of the existing effluent pipe. All other new treatment facilities will be constructed within Town's property.

The Collection System project entails new sewer and force main that will be constructed within the Town's right-of-way and easements. The new US 136 lift station site will be located on private property that the Town will purchase. The land needed for the lift station is not owned by the Town. The site for the lift station is a small portion of the landowner's property and is not usable for farming because it is located on the other side of the ditch from the main property making it difficult to access and bring farm equipment. The Town does not foresee any difficulty in purchasing this property.

2 CURRENT SITUATION

The following describes the current situation at the WWTPs (East Plant and West Plant) and in the collection system.

2.1 Existing Collection System Description

Brownsburg's sewer system includes combined and separate sanitary sewers. The older, central portion of Brownsburg is served by combined sewers. Two combined trunk sewers (North and South Trunk Sewers) convey wastewater and, during rains, storm water runoff to the East Plant.

The 42-inch North Trunk Sewer runs north on Green Street and receives flows from combined branch sewers and, on the north end, from separate sanitary sewers and sanitary force mains. The 48-inch South Trunk Sewer runs south on Acre Avenue, then east on Tilden Road. It conveys flows from combined branch sewers and from separate sanitary sewers and sanitary force mains.

Brownsburg's newer subdivisions are served by separate sanitary sewers which are typically tributary to sanitary lift stations (28 total not including the major lift stations already identified herein). The force mains from some of the lift stations discharge to combined sewers leading to the East Plant. Other sanitary lift stations discharge to the 18-inch Northwest Sanitary Sewer leading to the West Lift Station, which is located near the West Plant entrance.

Figure 2-1 shows the existing collection system.

2.2 Existing WWTP Description

The West Plant (main treatment plant) was placed into operation in 1987. At this time, the original treatment plant was converted into a preliminary treatment and pumping facility, called the East Plant. The East Plant discharges into the West Plant. In 2000, the West Plant was expanded to increase the Town's treatment capacity to an average capacity of 3.5 mgd and peak capacity of 6.7 mgd. In 1987, the East Plant was expanded to include CSO swirl concentrators and expanded again in 2009 to include a 1 million gallon (MG) CSO storage tank.

The East Plant entails screen and grit removal facilities. The East Plant is the major pump station that pumps flows from the Town's combined sewers. The East Plant flows are screened using an "Auger Monster" fine screen and degritted in a detritor-type grit tank. The station includes four variable speed, dry pit sewage pumps (including one standby); each pump is rated at 2.4 mgd, for an installed pumping capacity of 9.6 mgd and a firm pumping capacity of 7.2 mgd. The pumps discharge to an 18-inch diameter force main that crosses White Lick Creek and discharges to the West Plant for further treatment.

In addition, the East Plant has a combined sewer overflow structure. North and South Swirl Concentrators, located at the East Plant, provide partial treatment of overflows. During heavy rains, partially treated combined sewer overflows are discharged to White

Lick Creek. A CSO storage tank at the East Plant captures wet weather flows up to a one-year storm before an overflow will occur.

The West Plant receives flows from the East Plant and the West Lift Station. While the East Plant serves the Town's combined system, the West Lift Station serves the separate sanitary system. This station includes two 600 gpm submersible pumps, with one pump serving as a standby. The flows from this station are pumped through a manual bar screen and channel grinder at the West Plant site prior to mixing with flows discharged from East Plant.

Once the East Plant and West Lift Station flows are combined at the West Plant site, the flows are treated at the West Plant through the following treatment processes before discharge into White Lick Creek: oxidation ditches provide extended aeration for ammonia and BOD removal, secondary clarifiers, a polishing pond utilized as a disinfection tank, disinfection using chlorine gas, dechlorination using sodium bisulfite, and effluent reaeration in cascade aerators.

Specifically, the West Plant includes four oxidation ditches. Following the oxidation ditches, there are four secondary clarifiers, each 55 feet in diameter and with a side water depth of 12 feet. These clarifiers are rim feed units with scraper sludge collector mechanisms. Oxidation Ditch Nos. 3 and 4 and Secondary Clarifier Nos. 3 and 4 were added in the 2000 expansion. Secondary clarifier effluent is chlorinated and discharged to Polishing Pond No. 1 utilized as a disinfection tank. Polishing Pond No. 2 has been decommissioned. Tank effluent is then dechlorinated and discharged through a 24-inch outfall pipe into two cascade aerators.

There are five RAS pumps located in the basement of the Main Building. While these RAS pumps recycle activated sludge to the oxidation ditches, a branch pipe and control valve allow the RAS pumps to be used to pump waste activated sludge (WAS) to the aerobic digesters. WAS is stabilized by aerobic digestion. There are four sludge tanks each 70 feet in diameter and with a side water depth of 15 feet. Each sludge tank has a coarse bubble aeration system that provides air for aerobic digestion and mixing. Normally, two of the sludge tanks are used for WAS storage and thickening. The other two tanks are used for biosolids stabilization prior to dewatering. A combination gravity belt thickener/belt filter press is used for thickening the sludge prior to digestion and for dewatering the stabilized sludge. The digesters and the thickening building were constructed in the 2000 expansion.

There are a total of six drying beds, two drying beds are used for storm water debris and sanitary sewer debris. Four beds are used for drying dewatered biosolids. There is a cover storage pad for biosolids. Normally, the combination gravity belt/thickener belt filter press is used for dewatering rather than the drying beds. Dewatered biosolids are stored on the sand drying beds as Class B biosolids. Periodically a sludge application contractor hauls dewatered biosolids to farms for land application. The covered storage pad was constructed in the 2000 expansion.

Figure 2-2 and **Figure 2-3** show the East Plant and West Plant facilities.

2.3 Current Flows and Wasteload

Table 2-1 summarizes the current wastewater flows into the Town from the sewered communities (entering the West Plant). **Table 2-2** summarizes the current treatment plant operation, the plant influent and effluent concentrations and loads. The influent wastewater concentrations and loadings have been relatively stable in recent years. **Table 2-3** summarizes the plant's current NPDES permit limits.

2.4 Current Need

The Town has the following collection system and WWTP needs:

Limited Remaining WWTP Capacity. Influent flows to the West Plant have increased since the last plant expansion in 2000 and are already approaching the plant's rated capacity. The recent average daily flow is 2.9 mgd, over 80 percent of its design capacity, leaving only 0.6 mgd capacity. Hendricks County, including the area around Brownsburg, is one of the fastest growing counties in Indiana. Residential and commercial growth is expected to increase in coming years. With the high growth in the area, the limited remaining plant capacity will be utilized soon. Additional plant capacity will also provide the ability to extend sewers to septic tank areas.

Exacerbating the need for additional capacity are plans for Maplehurst Bakery, a large wastewater customer, to expand its operations, which will result in increased bakery wastewater flow. Currently, the Maplehurst Lift Station has a capacity of 800 gpm and discharges into the Northwest Interceptor, which conveys flows to the West Lift Station that only has 600 gpm capacity. The West Lift Station is currently insufficiently sized and will need a pumping capacity increase in the future if the Maplehurst Lift Station receives increased flows and continues to pump to the West Lift Station.

The East Plant has sufficient capacity for future flow conditions; a capacity increase is not proposed. It is recommended that Brownsburg continue the ongoing sewer separation projects that will reduce stormwater flow into the East Plant. If sewer separation projects do not continue but growth subject to the plant occurs, the East Plant capacity will need to be re-evaluated. There are minor operation and maintenance improvements that are needed at the East Plant; the Town will make those improvements separate from this project.

WWTP Upgrades. In addition to the anticipated increased flows and loads, the existing West Plant is in need of upgrades and improvements to maintain its current capacity and also meet its NPDES permit requirements. The last plant expansion was 15 years ago and portions of the plant need upgraded. For example, the current grinder for plant influent needs replaced and it would be most beneficial for operations and maintenance for it to be replaced with bar screens that remove the screenings from the plant flow.

Phosphorus Removal. As part of the Town's NPDES permit, phosphorus removal will be required in the next permit cycle. The West Plant currently has no means for phosphorus removal that will achieve the mandatory limits.

Polishing Pond No. 1. At the West Plant, the Town struggles with algae growth on the existing Polishing Pond No. 1 (utilized as a disinfection tank), and ultimately achieving their TSS limits.

Disinfection. At the West Plant, secondary effluent is currently disinfected using chlorine gas and dechlorinated using sodium bisulfite. There are safety concerns with chlorine gas. In addition, the gas chlorination system needs additional capacity at peak flows. The trend across the industry has been to move away from the chlorine gas. The disinfection system needs expanded and should be upgraded to a safe technology in line with the industry.

TABLE 2-1 - EXISTING WASTEWATER FLOWS (in gallons per day) OF SEWERED COMMUNITIES EXISTING TREATMENT FACILITIES DESIGN FLOWS	FLOW MGD
Average Design Flow (gpd)	3.5
Peak Design Flow (gpd)	6.7
DCI Flows*	
Domestic (D)	1.4
Commercial (C)	0.3
Industrial (I)	0.3
Total DCI	2.1
Peak Sustained Infiltration	0.6
TOTAL EXISTING FLOW	2.7
Peak DCI (Total DCI x Peaking Factor of 2.6)**	5.5
Peak Hourly Inflow & Wet Weather Infiltration Average***	1.7
Peak Hourly Flow	7.1
***Above values are derived actual water use records and from pump water volumes from June 2014 to June 2015 and assuming 30% consumption and losses**	
****Peaking factor estimated from 10-st-st**	
*****Flow meter is calibrated, flows appear accurate, and based on subtracting dry weather peak flow from influent peak flows**	

TABLE 2-2 - CURRENT TREATMENT PLANT OPERATION INFLUENT PARAMETER	CONCENTRATION mg/L	DAILY LOAD lbs
CBOD5	179	3,724
TSS	192	4,051
NH3-N	23.6	483
P	N/A*	N/A*
EFFLUENT PARAMETER		
CBOD5	3.7	137
TSS	8.4	300
NH3-N	0.1	3.7
P*	N/A	N/A
TOTAL RESIDUAL Cl	0	0
DO	9.7	N/A
pH	8.1	N/A
Above values are derived from the 24 most recent consecutive MROS Dates of MROs: June 2013 to June 2015		
***Phosphorus concentrations data not available for the full 24 most recent consecutive MROS**		

TABLE 2-3 - NPDES PERMIT EFFLUENT LIMITATIONS	LOADING		CONCENTRATION	
PARAMETER	MONTHLY AVG lbs/day	WEEKLY AVG lbs/day	MONTHLY AVG mg/L	WEEKLY AVG mg/L
$CBOD_5$ (Summer)	559.1	838.7	10.0	15.0
$CBOD_5$ (Winter)	838.7	1286.0	15.0	23.0
TSS (Summer)	670.9	1006.4	12.0	18.0
TSS (Winter)	1006.4	1509.6	18.0	27.0
Ammonia-nitrogen, NH_3-N (Summer)	83.9	123.0	1.5	2.2
Ammonia-nitrogen, NH_3-N (Winter)	123.0	184.5	2.2	3.3
	QUALITY OR CONCENTRATION			
PARAMETER	Daily Minimum	Monthly AVG	Daily Maximum	Units
Dissolved Oxygen (Summer)	7.0	-	-	mg/L
Dissolved Oxygen (Winter)	5.0	-	-	mg/L
pH	6.0	-	9.0	s.u.
Total Residual Chlorine (Final Effluent)	-	0.01	0.02	mg/L
E. coli	-	125	235	colonies/100 ml
Above values are derived from the current NPDES Permit (Expiration Date: 9/30/20)				

3 FUTURE SITUATION

The following describes the projected population and flow, projected wasteload, and the wasteload allocation provided by IDEM for the Phase 1 improvements.

3.1 Projected Population and Flow

Brownsburg currently serves an estimated 23,000 people within the existing sewered area. **Table 3-1** summarizes the historic population and flow per capita.

For the 20-year planning period (ending in Year 2036) associated with this Phase 1 project, the population receiving sewer service is projected to be 41,050 people. This is an annual average population increase of 2.3 percent. The future population increase includes areas expected to be annexed by Brownsburg and also an increase in sewer customers. Brownsburg will concentrate their efforts on providing service to areas specifically north and east of the existing Town boundaries. **Table 3-2** includes the projected population and flow per capita, assuming a linear increase. This Phase 1 project will entail a WWTP expansion to increase the average flow to 5.25 mgd accordingly. The breakdown of this flow is summarized in **Table 3-3.**

The associated daily peak flow of the Phase 1 upgrade is estimated to be 10 mgd. The daily peak flow of Phase 1 expansion was determined using the same daily peaking factor currently experienced at the plant, approximately 1.9. The hydraulic design for the Phase 1 expansion is higher than the future 2.35 hourly peaking factor.

As further described in the *Sanitary Sewer Master Plan* (2012 update), the ultimate flow required of the WWTP to serve the future (build-out) service area is 15 mgd.

3.2 Projected Wasteload

Slightly higher concentrations and loadings are projected for the design criteria to account for increased loadings from the Maplehurst Bakery expansion and ongoing I/I reductions. The design criteria shows the 90th percentile of existing influent $CBOD_5$ instead of the 50th percentile of existing influent $CBOD_5$ as previous plant upgrades have shown. The concentration increase is based on the plant seeing consistent spikes in influent loadings corresponding to industrial users' wash down cycle. **Table 3-4** summarizes the projected wasteload for Phase 1.

The wastewater strength could increase due to Brownsburg's efforts to remove infiltration and growth in the community utilizing sanitary (not combined) sewers. The strength may also be impacted by additional industrial discharges. This will be further considered for the next plant expansion that works towards the build-out condition.

3.3 Wasteload Allocation

The IDEM Municipal/NPDES Permit Section was contacted to obtain the WWTP effluent limits for the Phase 1 WWTP expansion, summarized in **Table 3-5**.

Note the concentrations remain the same as the existing NPDES permit. The loadings were increased accordingly for the increased plant flows.

TABLE 3-1 - HISTORIC POPULATION AND FLOW PER CAPTIA *YEAR*	POPULATION *NO. OF PEOPLE*	AVERAGE PLANT INFLUENT FLOW *MGD*	FLOW PER CAPTIA *GPD/PERSON*
1990	7,628	1.5	197
1995	9,960	-	-
1997	11,684	2.1	178
2000	14,520	-	-
2004	18,000	2.7	151
2007	19,468	2.6	131
2010	21,725	2.8	128
2014	23,000	2.9	126
Above information from previous PER's, Master Plans, US Census, Plant MROs			

TABLE 3-2 - PROJECTED POPULATION AND FLOW PER CAPTIA	PROJECTED POPULATION	PROJECTED AVERAGE PLANT INFLUENT FLOW	FLOW PER CAPTIA
YEAR	*NO. OF PEOPLE*	*MGD*	*GPD/PERSON*
2020	29,205	3.7	126
2025	32,906	4.1	124
2030	36,608	4.6	126
2036	41,050	5.1	124
Population increase and flow increase assume a linear trend			

TABLE 3-3 - DESIGN TREATMENT PLANT FLOWS PARAMETER	FLOW MGD
Domestic (D)	3.00
Commercial (C)	0.75
Industrial (I)	0.90
Total DCI	**4.65**
+Residual Infiltration	0.60
Average Deign Flow	**5.25**
Peak DCI (peaking factor=1.2)	5.6
Residual Infiltration	0.6
Wet Weather Infiltration	2.9
Peak Design Flow	**9.1**

TABLE 3-4 - DESIGN TREATMENT PLANT LOADINGS INFLUENT PARAMETER	CONCENTRATION mg/L	DAILY LOAD lbs
CBOD5	225	9,852
TSS	175	7,662
NH3-N	25	1,095
TKN	42	1,839
P	7	306
Average design flow = 5.25 MGD		

TABLE 3-5 - PRELIMINARY EFFLUENT LIMITATIONS PARAMETER	CONCENTRATION MONTHLY AVG mg/L	 WEEKLY AVG mg/L
$CBOD_5$ (Summer)	10.0	15.0
$CBOD_5$ (Winter)	15.0	23.0
TSS (Summer)	12.0	18.0
TSS (Winter)	18.0	27.0
Ammonia-nitrogen, NH_3-N (Summer)	1.5	2.2
Ammonia-nitrogen, NH_3-N (Winter)	2.2	3.3
Total Phosphorus	1.0	1.0

	QUALITY OR CONCENTRATION			
PARAMETER	Daily Minimum	Monthly AVG	Daily Maximum	Units
Dissolved Oxygen (Summer)	7.0			mg/L
Dissolved Oxygen (Winter)	5.0			mg/L
pH	6.0		9.0	s.u.
E. coli		125	235	colonies/100 ml
Above values are derived from the preliminary effluent limitations (9/1/15)				

4 EVALUATION OF ALTERNATIVES

Because of the needs described in Section 2, especially as it relates to the limited treatment plant capacity and its ability to reliably meet the current and upcoming NPDES permit limits, the Town must take action to increase the collection and treatment system capacities and upgrade the systems accordingly. The Town's desire is to utilize the existing infrastructure to the greatest extent to minimize cost and environmental impacts. The Town initially planned well with the location of the West Plant such that it includes sufficient space for expansion.

The following describes the specific alternatives evaluated for the collection system, and the West Plant for upgrade and expansion.

4.1 Collection System

This section provides a summary of the alternatives evaluated for the north area facilities as further described in the previous sanitary sewer master plans, portions of which are recommended for the Phase 1 improvements. The recommendation for the north area was selected first, following by appropriate phasing. Section 6 describes the recommended alternative, and the extent required for Phase 1.

4.1.1 North Area Facilities

As part of the master plans, two alternatives were evaluated associated with better serving the North region of the service area.

4.1.1.1 Option 1 – North Regional Lift Station Only

This option recommends providing a new North Regional Lift Station to serve the entire area north of I-74, sized to handle 7.6 mgd. The lift station will be located near CR 700 N and White Lick Creek. A 30-inch force main will be constructed from the North Regional Lift Station to the West Plant. The force main will parallel White Lick Creek, cross I-74 and then parallel Northfield Drive to CR 625 E. The force main will go south along CR 625 E, east along US 136, then south to the treatment plant. This entails a long force main, approximately 2.5 miles in length.

The sewers that currently flow to Maplehurst Lift Station will be redirected to the new station. This station will then eliminate the Maplehurst Lift Station and force main. This will also free capacity in the existing Northwest Sanitary Sewer to serve areas west and southwest of the Town. Two new intercepting sewers – Northeast Interceptor and Northwest Interceptor – will be constructed along CR 700 E, and each will connect to the North Regional Lift Station.

4.1.1.2 Option 2 – North Regional and US 136 Lift Stations

This option includes Option 1 described above and includes the addition of a new regional lift station – US 136 Lift Station – to minimize the long length of the North Regional Lift Station and better meet the current needs. The North Regional Lift Station construction can be provided in future phases.

In this option, the North Regional Lift Station will be located near I-74 and Maplehurst Drive, west of SR 267. When the construction of the North Regional Lift Station is complete in future phases, the Maplehurst Lift Station (Highland Springs Lift Station is tributary to Maplehurst) will be redirected to this new regional lift station. The Maplehurst Lift Station and force main will be abandoned after the North Regional Lift Station is constructed. This redirecting of Maplehurst flows will free capacity in the existing 18-inch Northwest Sanitary Sewer and West Lift Station. The Northeast Interceptor is proposed to be constructed along CR 700 N from CR 900 E to SR 267, then south and west to Maplehurst Drive, connecting to the North Regional Lift Station.

A 36-inch interceptor will be constructed parallel to Northfield Drive to Morningstar Drive. At Morningstar Drive, the interceptor diameter will increase to 48-inches. The 48-inch interceptor will continue along Northfield Drive to CR 625 E, then head south, and discharge into the US 136 Regional Lift Station on the northwest corner of CR 635 E and US 136. The US 136 Lift Station will pump into dual force mains that will parallel US 136, and then head south along Mardale Drive to the West Plant.

Once determined that Option 2 was recommended, the following alternatives were also evaluated for the route of the US 136 lift station force main.

4.1.1.3 Option 2A – US 136 Lift Station Force Main Route 1

Option 2A for the force main route followed the existing 18” sanitary sewer from the lift station site south along CR 625E then SE along US 136 to Kenwood Land where the force main would turn south down Kenwood Lane into the Bowman property. The force main would proceed south and east along the east edge of the Bowman property until it came to the northern edge of the Town of Brownsburg property. The force main will then proceed east along the northern edge of the Town of Brownsburg property, across Mardale Drive, then across the northern edge of the Brownsburg Municipal Garage property then turning south onto the WWTP property and into the proposed screen building influent channel.

4.1.1.4 Option 2B – US 136 Lift Station Force Main Route 2

Option 2B for the force main route followed the existing 18” sanitary sewer from the lift station site south along CR 625E then SE along US 136 past Mardale Drive where the 18” turns south to a point at the east edge of the property at 6825 E US HIGHWAY 136 where the force main would turn south and follow the east edge of the parcels until entering the Town of Brownsburg property at the WWTP site. The force main will then turn to the west into the proposed screen building influent channel.

4.1.1.5 Option 2C – US 136 Lift Station Force Main Route 3

Option 2C for the force main route followed the existing 18” sanitary sewer from the lift station site south along CR 625E then SE along US 136 to Mardale Drive where the force main would turn and follow the 18” sanitary sewer down Mardale Drive in the southbound travel lane until it came to the northern edge of the Brownsburg Municipal Garage property where it would turn east continuing to the east edge of the property then turning south onto the WWTP property and into the proposed screen building influent channel.

4.2 West Plant

This section provides a summary of the alternatives evaluated for each treatment process (selected for Phase 1 improvements only) to achieve the *build-out* condition at the West Plant as further described in the Town's *Wastewater Treatment Plant Expansion Master Plan* (2012). The recommendation for the build-out condition was selected first, following by appropriate phasing. Section 6 describes the recommended alternative, and the scope required for Phase 1.

A wide range of technologies exist for the expansion of the plant. The alternatives for each process presented here have been narrowed down to the two to three most suitable. Note that all costs presented in this Section are in 2016 dollars in association with the master planning efforts. Each alternative is designed to fit the existing plant schematic with minimal modifications. The Town's goal is to reuse as much of the existing infrastructure as practical and meet the long-term needs of the community and the environment.

4.2.1 Preliminary Treatment

Preliminary treatment processes are methods of removing large solids and inorganic materials from the influent prior to treatment at the plant. All recommended alternatives have screen openings of ¼" or ⅜". Solids that are captured on the screen assembly are discharged out of the unit for disposal. Removal of solids at the headworks of wastewater treatment plants is essential for the protection of downstream processes and equipment. Pump and pipe clogging can be prevented by proper screening.

Mechanically cleaned screens tend to have lower labor costs than manually cleaned screens and offer the advantages of improved flow conditions and screening capture over manually cleaned screens. However, the rake teeth on mechanically cleaned screens must be routinely inspected because of their susceptibility to breakage and bending. Drive mechanisms must also be frequently inspected to prevent fouling due to grit and rags. Grit removed from screens must be disposed of regularly. Fine screens are susceptible to grease build up, therefore flush water should be available nearby to dislodge collected grease and solids.

Fine screens are capable of removing 20 to 35 percent suspended solids and BOD_5. Fine screens may be either fixed or movable, but are permanently set in a vertical, inclined, or horizontal position and must be cleaned by rakes, teeth, or brushes. Peak head loss through fine screens ranges from 0.5 feet to 2 feet.

Cleaner more compact screenings discharge keeps odors to a minimum and lowers disposal costs, as less water and solid materials are sent to the landfill. The current trend in the industry is to install screens with smaller openings and to compact the screenings to reduce volume and odor potential to capture more solids upstream to reduce downstream operation and maintenance costs.

It is recommended that one mechanical screening units be installed and have a standby backup manual bar screen unit if the mechanical screen is down for maintenance or unscheduled down-time. There are several screening technologies available that can

provide adequate screening for the plant. All three options are priced similarly from $165,000 to $175,000 per screen. Three of the most applicable technologies were evaluated to replace the existing ineffective grinder and manual bar screen:

- Perforated Plate Screens
- Auger Monster
- Chain-Driven/Front-Cleaned Screens

4.2.1.1 Option 1 – Mechanical Perforated Plate Screen

Description

The mechanical plate screen uses stainless steel perforated plate media to automatically and efficiently remove solids from municipal waste streams. The steps form an endless moving belt that collects, conveys and discharges solids greater than ¼". The goal of fine screens is to remove the rags and debris from the system. The frequency of pump cleaning will be decreased with properly operating screens.

Performance Factors

The screening process reduces solids in the plant's biological process by removing the solids from the influent stream. The downstream treatment processes will receive reduced bacteria, floatables, suspended solids, CBOD, and nutrients. A pre-coat, or mat of organics, can build up on the screen providing enhanced treatment. All the major components are located above the deck for easy access and maintenance. Surge flows in the channel can cause waves to wash backwards through the screen knocking the screenings off and can cause a large accumulation that requires manual removal. The step screen alternative requires a building to provide housing and easier removal of the dumpster or bagger. An optional solids washer adds cost to the installation but reduces the amount of organic solids for disposal.

PERFORATED PLATE SCREENS	
ADVANTAGES	**DISADVANTAGES**
Greater capture of solids from the waste stream	Possible solids carry-over resulting from the front clean/back return design Submerged moving parts
Efficient removal of large quantities of solids	Long screens result in several heavy plates that cause more wear on the chain
Low maintenance	Plugging that could lead to screen failure
Low overhead clearance	Perforated plates not as resilient as bars and are more susceptible to damage from large objects in wastewater flow
	Maximum recommended inclination angle is 75 to 85 degrees

PERFORATED PLATE SCREENS	
ADVANTAGES	DISADVANTAGES
	Screen's binding factor is higher than the reciprocating rake and chain-driven screens

Construction Impacts

The influent channel needs to be modified to accommodate the screens and screen building. Modifications to the influent channel are also necessary for improvements to the biological processes and higher flows at the plant. The influent channel design will accommodate all scheduled processes and scheduled future expansions in order to be the most cost effective.

4.2.1.2 Option 2 – Mechanical Auger Screen

Description

Inflow enters the entrance of the channel and goes through an auger screen which shreds clumps of rags, clothing, and debris. Next solids are captured by a perforated screening trough and removed by a rotating auger. As the solids are removed, dual wash water zones clean off organic solids. The auger then conveys solids to the discharge point where an optional compactor squeezes out water before depositing the cleaned and dried material into a dumpster.

Performance Factors

An auger screen helps with solids that need to be ground up before removal. The primary advantage is that the screenings must pass through a grinder before removal. A grinder will prevent large material from damaging the fine screen components.

AUGER SYSTEM SCREEN	
ADVANTAGES	DISADVANTAGES
Solids carry-over is minimized	The single auger limits the capacity to handle extreme loads
Low maintenance due to elimination of permanently submerged moving parts	Long travel time for deep channels, which can result in heavy screen loads
Inclination angle of 35 degrees	
Easy inspection because channel does not have to be dewatered	

Construction Impacts

Construction disruption is the same as the perforated plate screen. A building to house the auger screen is necessary to aid maintenance staff access the screenings' dumpster for removal. The influent channel will be modified to accommodate the auger screen.

4.2.1.3 Option 3 – Mechanical Rake Screen

Description

The rake screen traps coarse particles in the waste water. The material is removed by the cleaning rake and discharged in the upper part of the screen, out of the water. The rake is guided by two lateral trolleys which are driven by chains.

Performance Factors

A mechanical bar screen performs the same way a manual bar screen would perform but eliminates the need for continuous maintenance from staff. The chains and moving parts are above the water level to provide maintenance access.

CHAIN-DRIVEN FRONT CLEANED SCREENS	
ADVANTAGES	**DISADVANTAGES**
Efficiently retains captured screenings by minimizing carryover	Possibility of bottom jamming by unusual deposits of trash
Low headloss across the screen	Chain-driven raking mechanism consisting of submerged sprockets or other mechanical devices is subject to fouling by grit and rags
Cleaning cycle can be automatically adjusted based on water differential in the channel	Frequent inspection and maintenance of the drive mechanisms are required
Low head room	Channel dewatering may be required for maintenance

Construction Impacts

Construction disruption will be the same for all screen alternatives. A building to house the screen will likely be necessary to aid maintenance staff access the screenings' dumpster for removal. The influent channel will be modified to accommodate the screen and screen building.

4.2.2 Biological Treatment

The biological treatment process alternatives considered for the West Plant are all modified forms of the activated sludge process. Activated sludge uses a suspended growth of organisms to removed BOD and suspended solids from the wastewater. Both biological treatment processes, oxidation ditch and extended aeration, do not require primary clarification, unlike conventional activated sludge. Both have good settling characteristics and are stable processes. The average hydraulic residence time (HRT) is around 24 hours and the average solids residence time (SRT) ranges from 12 to 24 days. Mechanical aeration equipment, either rotors or diffused air, are required to move water around the tank as well as provide aeration.

4.2.2.1 Option 1 – Conventional Activated Sludge

Description

The conventional activated sludge process requires a primary settling tank, aeration tank, and a secondary settling tank. The mixed liquor is aerated for a specified length of time. During the aeration the activated sludge organisms use the available organic matter as food producing stable solids and more organisms.

Performance Factors

Many factors affect the performance of an activated sludge treatment system. The waste rates and return rates affect the solids rates. The amount of oxygen available, aeration time and amount of organic matter affect the efficiency of the process. The temperature and pH affect the overall capacity of the microorganisms.

CONVENTIONAL ACTIVATED SLUDGE	
ADVANTAGES	**DISADVANTAGES**
Flexible operation, accommodates anoxic and aerobic processes with single biomass for biological nutrient removal	Will create two different processes at plant
Able to handle peak loads and dilute toxic substances	Associated with biomass instabilities, like sludge bulking
Reduced mixing requirement, per unit reactor volume	Requires primary settling and produces primary sludge
Smaller volume than extended aeration, easier for phased construction	Produces more WAS volume
	Higher operations cost

Construction Impacts

A primary settling tank is required for the conventional activated sludge process, and will add a significant cost and site footprint. Also, operating two different biological processes (oxidation ditch and conventional activated sludge) will place a difficulty on operators to distribute flow evenly. Aeration is provided by either mechanical surface agitators or by submerged diffusers. The size of the activated sludge tanks will be about 7,000 ft^2 assuming a 12 day Solids Retention Time (SRT) for colder temperature operation. The estimated installed cost for a conventional activated sludge system to treat an additional 3.5 MGD including the primary clarifiers is $4.6 million. The construction cost does not include approximately $3.5 million to retrofit the existing oxidation ditches and add 2 additional 70-ft primary clarifiers so the plant isn't operating two different biological treatment processes. Please note: *There will also be additional capital cost to handle the primary sludge and additional secondary sludge produced by this type process not included herein. Also the construction price does not include land purchase costs to have adequate space to install primary clarifiers.*

4.2.2.2 Option 2 – Extended Aeration

Description

In extended aeration there is an increased hydraulic retention time and an increased solids retention time compared to conventional activated sludge treatment. This causes the least quantity of sludge to be produced among the various modifications of activated sludge. Extended aeration and an oxidation ditch are very similar in biological process and only differ in a few minor areas. Extended aeration typically uses submerged aeration diffusers to aerate the flow, whereas oxidation ditches use rotating brush or disk aerators.

Performance Factors

The land area for setting up an extended aeration basin is less than an oxidation ditch. Air is supplied to the diffusers by blowers. The blowers produce more noise than an oxidation ditch's brush aerators. But if blowers are enclosed in a sound attenuating enclosure, the noise is typically not an issue. The blowers are designed to provide sufficient air to ensure that the dissolved oxygen content of the aeration chambers can always be maintained within the range of 1.0 to 2.0 mg/L.

EXTENDED AERATION	
ADVANTAGES	**DISADVANTAGES**
Stable Process	Long aeration time, larger reactor. HRT approximately 24 hours
No Primary Clarifiers	Higher aeration requirement due to long SRT
Good settling characteristics and produces less sludge than other activated sludge processes	Mechanical aeration equipment required to move water around the channel as well as aerate
Flexible operation with placement of aerators	Large site footprint required

Construction Impacts

Construction disruption will be similar to an oxidation ditch, but require slightly less land area. Six extended aeration tanks are required with each being rectangular shaped and covering approximately 5,000 ft^2. A minimum of 30,000 ft^2 is needed for the extended aeration tanks. The estimated installed cost for six extended aeration tanks is $5.1 million.

4.2.2.3 Option 3 – Oxidation Ditch

Description

An oxidation ditch is a modified form of activated sludge biological treatment process that uses long solids retention time to remove organics. Flow to the oxidation ditch is aerated and mixed with return sludge from a secondary clarifier. The tanks have a race track shape and uses surface rotor aerators to aerate and completely mix the mixed liquor.

Performance Factors

The oxidation ditch process is a fully demonstrated biological wastewater treatment technology, applicable in any situation where activated sludge treatment is appropriate. The largest obstacle to implementation is available land. This technology is very effective

in small installations, small communities, and isolated institutions, because it requires more land than conventional activated sludge treatment plants.

The long hydraulic retention time and complete mixing minimize the impact of a shock load or hydraulic surge. Oxidation ditches produce less sludge than other biological treatment processes because of the extended biological activity during the activated sludge process. A constant water level in the oxidation ditch with a continuous discharge lowers the weir overflow rate and eliminated the periodic effluent surge common to other biological processes. The effluent suspended solids concentrations are relatively higher compared to other modifications of the activated sludge process. Chemical addition is not required and operator attention is minimal.

OXIDATION DITCHES	
ADVANTAGES	**DISADVANTAGES**
Stable process and does not require chemical addition	Larger footprint than extended aeration
Good settling characteristics and produces less sludge than other activated sludge processes	Long aeration time, larger reactor. HRT approximately 24 hours
No primary clarifiers	Higher aeration requirement due to long SRT
Completely mixed	Surface aerators required to move water around the channel as well as aerate
Existing biological process and familiarity	

Construction Impacts

More land will be required for oxidation ditches than other activated sludge processes. The two oxidation ditches will require a minimum of 34,000 ft^2 site footprint to meet the Phase 1 and Phase 2 capacity increase to an average daily flow of 7.0 MGD. The estimated installed cost for two oxidation ditches is $5.1 million. For Phase 1 expansion to 5.25 MGD average daily capacity will require 17,000 ft^2 site footprint.

4.2.3 Secondary Clarifiers

The secondary clarifiers are responsible for removing microorganisms from the wastewater. Some of the microorganisms from the clarifiers are added back to the biological treatment process to start the process over again. The circular clarifier tanks settle out the activated sludge by gravity. The build-out condition (Phase 1 and Phase 2) will require two circular clarifiers, where one clarifier is installed per phase. The MLSS settles to the bottom of the clarifier, collected by a series of clarifier mechanisms and enters sludge intake ports along the bottom of the tank and the center column. The collected sludge is either wasted to the sludge holding tanks or returned back to the biological treatment tanks to maintain the biological population. The size of each of the two secondary clarifiers is 80 ft in diameter with a 15 ft side water depth.

All clarifier alternatives are either circular rim feed, rim collection or center feed, rim collection. The total estimated installed cost for two secondary clarifiers is $2.5 million. The different sludge collection equipment considered have similar costs, ranging from $210,000 to $230,000 each.

4.2.3.1 Option 1 – Rapid Sludge Pickup

General Description

In rapid sludge pickup mechanisms, a header suction tube removes the concentrated sludge along the bottom of the clarifier using gravity and a pump. The header uses suction pickup to remove the sludge from the bottom of the clarifier. The header rotates along the bottom of the clarifier similar to the spiral scraper mechanism.

Performance Factors

The suction type clarifiers will be dependent on the plant's ability to remove rags, grit and grease ahead of the secondary clarifiers. Large amounts of rags and grit can damage or clog the suction headers. The header design and gentle removal action reduces the chance for the concentrated settled sludge to resuspend into the upper liquid. There is a minimum of underwater disturbance. The header is of tapered design with the cross section decreasing from the center of the tank to the outer tip for a uniform sludge withdrawal velocity. The constant velocities prevent the possibility of sludge build up in the header or orifice clogging. The header is mounted at an angle to physically and hydraulically trap the sludge.

The tank floor is virtually flat which simplifies excavation and forming. There is no need for a separate drain line, sloping floors or special hoppers. The orifice size on the headers is based on the amount of sludge that each orifice must remove to assure the hydraulic balance required for proportional sludge withdrawal volumes over the entire tank bottom.

RAPID SLUDGE REMOVAL	
ADVANTAGES	**DISADVANTAGES**
Minimum of underwater disturbance	Potential for clogging intake orifices
Simplifies construction of tank due to flat floor	Suction headers can be damaged from rags or grit
Less valves and hoppers required	
More control to prevent sludge buildup	
Rapid removal ensures fresher sludge	

Construction Impacts

One valve controls sludge withdrawal by pumping or gravity. Single control allows the final clarifier to be more flexible in meeting changing process conditions. Plugging of orifices is a rare occurrence with adequate preliminary treatment so frequent demands for unplugging are eliminated.

4.2.3.2 Option 2 – Conventional Scrapers

General Description

A conventional scraper collection system offers sludge removal with multiple straight blades placed on an angle and a rotating sludge collection drum. The conventional scraper clarifiers offer full radius sludge removal and an energy dissipation well. The blades are constructed to an optimal angle to provide a constant sludge removal across the blades. The sludge drum removes highly concentrated sludge that is brought by the blades to the center of the tank. The hydraulic flow in the main settling area moves in the same direction as the scrapers and helps move the sludge gently toward the center of the tank. The drum does not clog and requires little maintenance. Each drive mechanism can be equipped with speed control devices.

Performance Factors

Conventional scraper clarifier mechanisms are a tested technology that is currently implemented at the plant. The conventional scrapers are less efficient than spiral scrapers because multiple passes of the scraper arms are required to remove sludge from the edge of the clarifier.

CONVENTIONAL SCRAPERS	
ADVANTAGES	**DISADVANTAGES**
Does not clog	Requires multiple passes of scraper mechanism to remove sludge from outskirts of tank
Stable process	Longer solids retention in clarifier
Fewer moving parts than rapid sludge pickup	
Cheapest Option	

Construction Impacts

The construction impacts and concerns are similar for all the clarifier alternatives. All the secondary clarifiers and oxidation ditches will be interconnected to provide backups for each other. The flow will be split evenly among clarifiers.

4.2.3.3 Option 3 – Spiral Scrapers

General Description

Spiral Scrapers offer quick sludge removal with spiral blades and a rotating sludge collection drum. The spiral scraper clarifier offer full radius skimming and an enhanced energy dissipation well. The blades are constructed to a logarithmic spiral curve with a constant 30 degree angle of attack. The sludge drum removes highly concentrated sludge that is brought by the spiral blades to the center of the tank. The drum does not clog and requires little maintenance. Each drive is typically equipped with an overload control device.

Performance Factors

Spiral scrapers are a proven technology that has been implemented at numerous plants. The spiral scraper clarifier removes sludge quickly because only one rotation of the

scrapers is required to bring the sludge from the edge of the clarifier to the center for removal.

The clarification capacity is related to the rate at which the incoming solids can be separated and conveyed to the sludge collection mechanism at the bottom of the tank. Clarifier performance is primarily impacted by the sludge settleability and MLSS concentration. Favorable hydrodynamic characteristics are also vital to clarifier performance. Even flow splitting to allow the full capacity of all clarifiers to be realized is necessary. If the flows are unevenly split, poor performance of an overloaded clarifier generally cannot be compensated by good performance of an underloaded clarifier.

SPIRAL SCRAPERS	
ADVANTAGES	**DISADVANTAGES**
Does not clog	Higher torque loading on drive mechanism
Requires one rotation to bring sludge from outskirts of tank to collection drum	More costly than conventional scrapers
Fewer moving parts than rapid sludge pickup	

Construction Impacts

The construction impacts and considerations are similar for each clarifier alternative. The flow will be split between the two proposed clarifiers while being able to backup the existing four clarifiers. The RAS pumps for the new secondary clarifiers will be located in the proposed RAS/Electrical Building. All proposed clarifier discharge weirs will match the existing weir levels so that the secondary clarifiers can backup each other and receive discharge from all oxidation ditches.

4.2.4 Tertiary Filtration

Tertiary filtration removes the suspended and colloidal solids which are carried over from previous unit processes. The effluent suspended solids from the tertiary filters are designed to be less than 5 mg/L. The tertiary filters will be located immediately upstream of disinfection. The addition of filtration upstream of disinfection in a tertiary treatment process improves water quality by removing more particles and allows the plant to meet stringent permit requirements.

The tertiary filter system will require a building to house the filters and protect them from weather damage. The filters that require a larger site footprint will require a larger building and additional costs.

4.2.4.1 Option 1 – Continuous Backwash Filter

General Description

The filtration process of a continuous backwash filter is comparable to fixed bed filters in that it removes particulate material. However, the continuous backwash filter operates under a constant backwash mode, continuously cleaning the filter bed. The continuous

wash water flow is independent of the suspended solids load and the hydraulic load on the filter.

The influent feed wastewater is introduced at the bottom of the filter and then flows upward through the sand. As the influent flows upward the sand bed is moving downwards to an airlift pipe where it is removed for cleaning. The clean filtrate water continues to move upward and exits at the top of the filter over the filtrate weir and out through the effluent pipe.

Performance Factors

Because the sand is continuously being backwashed there is no shutdown for a backwash cycle. No underdrains or media screens are required. The filter media is cleaned by an internal washing system that does not require backwash pumps or storage tanks. A volume of compressed air is required to clean the sand. The scouring by the air dislodges any solids particles attached to the sand grains.

CONTINUOUS BACKWASH FILTERS	
ADVANTAGES	**DISADVANTAGES**
No shutdown for backwash cycles	Clogging of filter media is possible
Elimination of ancillary backwash equipment and no short circuiting	Requires air supply
Minimizes operator attention and overall pressure drop	Higher capital cost
Continuously cleaned sand bed	

Construction Impacts

The continuous backwash filters footprint will be 215’ long x 22’ wide x 24’ deep. A larger construction cost is required for the continuous backwash filters because they are housed in deep concrete or metal tanks. The estimated total installed cost for the continuous backwash filters is $3.2 million, which includes the filters, the tanks, and the building to house them. The site foot print for the filter and building is approximately 4,500 ft^2.

4.2.4.2 Option 2 – Conventional Dual Media Filter

General Description

Suspended particulates are removed from water by water flowing via gravity through granular filter media at a high rate. The solids are removed within the depth of the granular material. Filtered water is removed from the filter through an underdrain system. The dual media generally consists of anthracite coal over sand. Cleaning the filter media is accomplished with an upflow water wash with full bed fluidization. Air scour is also used to ensure thorough cleaning and abrasion between grains. The solids are dislodged and flushed out of the media to be captured by the water overflowing into the waste trough. The backwash water is evacuated from the filter for recovery.

Performance Factors

The dual media filter works with gravity, eliminating the need to pump influent through the media. High filtration rates of 5 gpm/sf can be achieved. Backwash consumption can be

as low as 2% of influent flow. Four sand filters measuring 36' long x 12' wide x 12' deep are recommended for the peak flow. When one filter is in backwash mode the other three filters will be able to filter the peak flow of 15 mgd. The dual media filters have a higher headloss and larger footprint than cloth media filters.

DUAL MEDIA FILTERS	
ADVANTAGES	**DISADVANTAGES**
Air scouring cleans the media during backwash	High headloss and highest capital cost
Automatic sequencing of backwash procedure	Removed from service for backwash
Efficient solids loading	Requires water and air for backwash
	Larger footprint Required

Construction Impacts

The filter media will be housed in concrete tanks and require an approximate footprint of 3,000 ft^2. Additional backwash pumps, air scour blowers, and backwash water return pumps will be required. The estimated installed cost for four dual media filters is $5.5 million, which includes the filters, equipment, the tanks, and the building to house them.

4.2.4.3 Option 3 – Cloth Media Disc Filter

General Description

A cloth media disc filter uses woven cloth fiber in a disc to filter wastewater. The water to be treated flows by gravity into the filter segments. Solids catch on the cloth filter panels. As the solids catch on the filter media impending the flow of the water through the disc, the water level begins to rise which triggers a level sensor to start the disc to rotate and a backwash cycle begins. High pressure rinse water automatically washes the solids off the filter media.

Performance Factors

Flow through a cloth disc filter is continuous. The filter never goes off line even during a backwash cleaning cycle. The unsubmerged media is cleaned and available for immediate use, allowing the filter to handle high solids spikes while maintaining full treatment capacity. Partial submergence of the discs enables routine inspection and maintenance to be conveniently performed in a clean environment instead of requiring contact with unfiltered water. The effluent collection tank does not need to be drained in order to clean or inspect the disc filter media because the backwash cleaning system is above the submergence. Cloth filters should not be used for wastewater streams that include corrosive materials that could chemically attack the filter cloth.

CLOTH DISC FILTERS	
ADVANTAGES	**DISADVANTAGES**
Lower backwash rates	Lower resistance to chemicals and sensitive to polymer concentrations
Smaller footprint	
Continuous filtration during backwash	

Eliminates sand media and underdrains	
Can operate at partial submergence	

Construction Impacts

The cloth disc filters have a smaller footprint than the other tertiary filter alternatives. The cloth disc filters can be placed outside if water heaters are included to prevent freezing. However, for ease of maintenance and operation, the filters are recommended to be housed in a filter building. The total footprint for four cloth disc filters is 1,900 ft^2. The total estimated installed cost for the cloth disc filter option is $2.9 million.

4.2.5 Phosphorus Removal

Human waste, food residues and consumer products contribute phosphorus to domestic wastewater. The phosphorus in municipal wastewater is mostly in soluble form and approximately 20% of the total phosphorus load can be removed through clarification. The types of processes that can remove phosphorus from the wastewater are typically classified into two categories: (1) chemical-physical and (2) biological. Chemical physical processes precipitate the phosphorus and allow it to settle out as sludge. Biological processes uptake the soluble phosphorus into microorganisms that are removed as sludge.

4.2.5.1 Option 1 – Biological Phosphorus Removal

General Description

Certain bacteria in activated sludge mixed liquor suspended solids (MLSS) are classified as Polyphosphate Accumulating Organisms (PAO) and can be utilized by wastewater treatment processes to biologically remove phosphorus from wastewater to levels below 1 mg/L. Biological phosphorus removal is a two-step process. The first step must occur in an anaerobic (absence of dissolved oxygen, nitrite and nitrate) zone. In the anaerobic zone the PAOs use volatile fatty acids (either in the primary effluent or added to the system) and store them as polyhdryoxyalkanoate (PHA) while releasing stored phosphorus as orthophosphate.

The second step occurs in the aerobic zone. In the aerobic zone the stored PHA energy in the PAOs is metabolized to provide energy for the subsequent uptake of soluble orthophosphate. The PAOs take in and store phosphorus during the aerobic stage in excess of that required for growth – which is often referred to as “luxury” phosphorus uptake. The PAOs (with their excess stored phosphorus) are removed from the process with the sludge wasted from the secondary clarifiers, providing greater phosphorus removal than conventional activated sludge treatment. Phosphorus removal efficiencies have been documented in the 80 to 90 percent range with biological phosphorus removal, compared to 20 percent phosphorus removal with conventional activated sludge process.

Performance Factors

A process model was developed for the Brownsburg WWTP using the Hydromantis, Inc. GPS-X™ modeling software and served as the basis for this phosphorus removal modeling effort. The process model used updated influent characteristics as defined during the most recent 24 months MROs for model input. For this study, the model was used to evaluate varying volumes of anoxic/anaerobic zones required to assess the system potential to achieve effluent total phosphorus (TP) less than 1mg/L.

BIOLOGICAL PHOSPHORUS REMOVAL	
ADVANTAGES	**DISADVANTAGES**
Less sludge produced than chemical phosphorus removal	Large tank volume of anaerobic zones required to promote biological phosphorus removal
No chemicals required	Susceptible to biological upsets in microorganisms
	Phosphorus removal ability related to availability of sufficient carbon source
	IDEM requires chemical feed system as backup

Construction Impacts

The existing conditioners (anoxic selector) have a volume of 13,270 cubic feet. The process model indicated that to achieve biological phosphorus removal below 1 mg/L an additional 100,000 cubic feet of anaerobic volume will be needed. The new anaerobic zones need to be large enough to provide the minimum hydraulic residence time required for biological phosphorus removal.

4.2.5.2 Option 2 – Chemical Phosphorus Removal

General Description

Chemical phosphorus removal is a common method used for phosphorus removal to meet TP effluent concentrations below 1.0 mg/L. Chemical addition is often more reliable than biological phosphorus removal processes.

The required chemical dose is related to the influent liquid phosphorus concentration. Based on historical data this analysis assumed the total phosphorus concentration in the secondary clarifier influent to be 3 mg/L. In order to develop conservative alternative cost estimates this analysis assumed only one dosing point in the secondary clarifier influent would be used and the plant would need to target a limit below 1 mg/L in order to continuously meet potential water quality effluent limits. An effluent TP of 0.8 mg/L was targeted for the purposes of developing chemical dose requirements for this study.

Performance Factors

To remove 2.2 mg/L P (from 3 to 0.8 mg/L), assuming the use of alum and 5.25 mgd design daily average flow, a aluminum ion dose rate of 1.8 lb Al per lb soluble P (PO_4-P removed was assumed, for a alum dose of 33 mg/L as Alum. This includes a safety factor of approximately 2 on the theoretical stoichiometric ratio, to account for competing

reactions and other reaction inefficiencies. A dosage of 33 mg/L Alum translates to 150 gallons of 49% alum solution for 5.25 mgd. Other metal salts such as polyaluminum chloride (PACl), and ferric chloride can also be used for chemical phosphorus removal.

CHEMICAL PHOSPHORUS REMOVAL	
ADVANTAGES	**DISADVANTAGES**
Reliable phosphorus removal method and consistently achieve low TP effluent levels	Requires chemical storage tanks, new pumps, new pipes
Not dependent on influent carbon sources	Produces more sludge (~300 lbs/day) than biological phosphorus removal process
Assists in enhancing solids capture in clarifiers	Metal salts consume alkalinity
Does not lose efficiency if microbiology of secondary treatment is disrupted	If ferric chloride is used, chemical cleaning may be required on UV lamps

Construction Impacts

The chemical phosphorus removal process will require new chemical storage tanks, chemical feed pumps and feed piping.

The storage area for the bulk storage tanks will be temperature controlled, properly vented and protected from the corrosive nature of the metal salts. The liquid storage tank will include secondary containment for both full tank leak and minor leaks. Automated leak detection interlocked with alarm systems will be included in the secondary containment areas. For alum polyethylene tanks are recommended with rubber lined pumps using PVC pipe and CPVC valves. Because of the concern about chemical leaks and spills from system piping, double walled pipe with leak detection sensors should be considered during design. The piping will include valved drain locations to allow chemical to be drained from piping, valves and equipment before removal for maintenance. Two chemical metering pumps (1 duty + 1 standby) per chemical dosing point will be required.

4.2.6 Disinfection

Treating wastewater requires some type of disinfection as one of the last steps. Some of the most common disinfections are chlorine based; gaseous chlorine, liquid sodium hypochlorite, or chlorine dioxide. Ultraviolet (UV) radiation disinfection and ozone disinfection are becoming more widely used in municipal applications.

The chlorinated disinfection processes require de-chlorination to prevent the residual toxic effect of chlorine on the receiving water. More common de-chlorination technologies are the application of gaseous sulfur dioxide, or liquid sodium bisulfite. Currently liquid sodium bisulfite is used at the plant. The chlorine alternatives require an injection system and a structure to provide sufficient contact time.

4.2.6.1 Option 1 – Liquid Chlorine Disinfection

General Description

Liquid sodium hypochlorite is often used to disinfect effluent from treatment plants. The liquid form is easy to meter, and is safer for public health than gaseous forms of chlorine. A drawback to using liquid sodium hypochlorite is its relatively short shelf life (before it starts losing its disinfecting ability). Shelf life depends on initial concentration, temperature, pH, light exposure, and presence of metallic or organic impurities. Liquid sodium hypochlorite disinfection requires additional operating costs for purchasing the chemical, storing the chemical, and injecting the chemical.

Performance Factors

All forms of chlorine are highly corrosive and toxic. The storage, shipping, and handling of chlorine pose a risk. Chlorine oxidizes certain types of organic matter in wastewater, creating more hazardous compounds like trihalomethanes. Chlorine can eliminate certain noxious odors while disinfecting at the same time. The chlorine residual is easy to measure in wastewater and can be used to estimate the effectiveness of disinfection.

LIQUID CHLORINE DISINFECTION	
ADVANTAGES	**DISADVANTAGES**
Assists with ammonia removal	Ongoing cleanup and corrosion of equipment
Controls odor	Requires underground piping modifications and conversion of existing structures
Tried and Tested process	Potential chemical hazards
	Requires a minimum of 15 minutes of contact time
	Requires dechlorination

Construction Impacts

The liquid chlorine option will require a new chlorine contact tank in addition to storage tanks and chlorine injection equipment. The chlorine contact tank footprint is approximately 4000 ft^2. The estimated installed cost for implementing a liquid chlorine disinfection system is $1.5 million.

4.2.6.2 Option 2 – Gas Chlorine Disinfection

General Description

Chlorine gas is elemental chlorine and is the most used form of chlorine. It is a yellow-green gas that is stored as a liquid under pressure. It is introduced into the wastewater by gas injectors or in solution form. Chlorine gas is normally stored in steel containers. Because chlorine is hazardous, safety precautions must be exercised during all phases of shipment, storage handling and use.

Performance Factors

A routine O&M schedule should be developed to clean the meters, floats, valves, pumps, and various components every six months. Although chlorine gas is extremely dangerous chemical to handle, it is less expensive than hypochlorite compounds. The total cost of chlorination is increased by approximately 30 to 50% with the addition of dechlorination. The chlorine gas system features a storage system, evaporator, feed pump, metering system, control valve, and injection device.

CHLORINE GAS	
ADVANTAGES	**DISADVANTAGES**
Tried and Tested process	Potential air quality concerns and potential hazards
Assists with ammonia removal	Requires a minimum of 15 minutes of contact time at peak flow
Controls odor	Requires dechlorination facilities, chemical feed system, and contact tank
Existing disinfectant, so operating experience exists	Plant Expansion and increased chlorine may require augmented safety plans and procedures

Construction Impacts

The gas chlorine option will require a new chlorine contact tank, but most of the existing equipment can continue to be used. If Brownsburg decides to increase their onsite storage or chlorine gas feed rates, the existing equipment will need to be replaced because it is not sized to treat the higher future flows. The chlorine contact tank footprint is approximately 4,000 ft^2. The estimated installed cost for increasing the capacity of the existing gas chlorine disinfection system and constructing a contact tank is $1.2 million.

4.2.6.3 Option 3 – Ultraviolet Disinfection

General Description

UV disinfection uses light wavelengths between 40 and 400 nanometers (typically 254 nm) to alter pathogenic organisms and render them harmless. The principle advantage of UV disinfection is the lack of chlorine residual that must be treated. A drawback to UV disinfection is waters must pass through a solids separation process such as sedimentation, high-rate sedimentation, or filtration to reduce suspended solids to concentrations of 20 to 40 mg/l to produce clear water for UV light to penetrate and disinfect the flow. Turbidity and total suspended solids in the wastewater can render UV disinfection ineffective. When optimal water clarity cannot be reached, UV disinfection has been used to drastically reduce pathogens in the water although not to water quality standards. Ultraviolet radiation disinfection operation requires electricity to operate the UV bulbs and regular replacement of the bulbs.

Performance Factors

All surfaces between the UV radiation and the target organisms must be clean for the ballasts, lamps, and reactor to function at peak efficiency. Inadequate cleaning is one of

the most common causes of a UV system's ineffectiveness. Most UV systems are equipped with automatic lamp cleaning wipers. UV disinfection has a shorter contact time of only 20 to 30 seconds. A smaller site footprint is required because the UV system is installed in a channel. There is no residual effect that can be harmful to humans or aquatic life. UV disinfection is a physical process rather than a chemical disinfectant, so the need to handle toxic chemicals is eliminated.

UV DISINFECTION	
ADVANTAGES	**DISADVANTAGES**
Smaller footprint than chlorine	Lamps require maintenance and replacement
Easily phased and expanded	Requires tertiary treatment prior to lamps
No toxic side effects, residuals, or harmful byproducts	Efficiency of UV is affected by temperature
Safe and simple system for operators to use	Performance sensitivity to water quality
Non-corrosive	
No need for contact tanks	

Construction Impacts

The UV system will be installed in two concrete channels after the tertiary filters. One UV channel will be able to backup the other. The site footprint is approximately 300 ft^2 for a two channel UV disinfection system. Electrical equipment to support the UV disinfection system is required. The estimated installed cost for the UV system is $1.2 million.

4.2.7 Cascade Aeration and Outfall Pipe

An outfall pipe is used to carry the final treated effluent from the disinfection discharge through the cascade aerators and to White Lick Creek. The current outfall pipe is 24 inches in diameter, 1,500 feet long, and has a total drop of about 21.5 feet through the aeration cascades. During wet weather events the existing cascade aerators have had issues surcharging or creating fast moving flow. The fast moving flow could be fast enough to skip steps and not provide efficient aeration. The discharge velocity was used to determine which pipe size was most suitable. Excessive and possibly supercritical velocities can create manhole surcharging, backwater conditions or erosion of inverts. A flow velocity of 2 to 3 feet per second (fps) is standard as the desired flow velocity range for gravity sewer pipe.

A new outfall will require a discharge permit modification. At this time the permit modification to obtain a new outfall discharge designation is assumed to be a minor permit modification. Concrete pipe was chosen because it is a durable material and can withstand deterioration in multiple conditions.

4.2.7.1 Option 1 – New Cascade Aeration, NewOutfall and Abandon Existing

Performance Factors

The first alternative proposes to add new larger cascade aerators on the west side of the existing road at the south end of the WWTP adjacent to the existing cascade aerators. A new 42” pipe will carry the UV disinfection effluent to the new cascade aerators and a new 42” pipe will convey the flow to a new outfall. The new cascade aerators will be twice as wide as the existing cascade aerators to provide additional capacity. The existing cascade aerators will be abandoned.

LARGER CASCADE AERATORS AND ABANDON EXISTING	
ADVANTAGES	**DISADVANTAGES**
Can construct without long bypass pumping periods	Abandoning usable structure
Able to handle flows for both Phase 1 and Phase 2 upgrades	Not able to take new cascade aerators offline without bypass pumping
	Higher cost than Option 2

4.2.7.2 Option 2 – Reuse Existing Cascade Aerators, New Cascade Aerators, and New Outfall

Performance Factors

This option includes reusing the existing cascade aerators and installing new cascade aerators adjacent to the existing aerators. The new cascade aerators will be smaller than the new cascade aerators proposed in option one. Option 2 suggests splitting the flow at the UV disinfection effluent channel with a 36” diameter pipe from the disinfection discharge to the new cascade aerators and the existing 24” diameter pipe from the UV disinfection discharge to the existing cascade aerators. The existing cascade aerators will reuse the existing 24” pipe from the contact tank as much as possible to convey UV disinfection effluent. Both cascade aerators’ effluent will be joined at a junction box into a 42” diameter outfall pipe downstream of the cascade aerators. The existing 24” outfall pipe will be replaced with a 42” outfall pipe to provide additional capacity. A new outfall designation will be required with this alternative, but the outfall will be adjacent to the existing outfall.

24" TO CASCADE, THEN 42" TO OUTFALL	
ADVANTAGES	**DISADVANTAGES**
More flexibility because can take pair of cascade aerators offline during dry weather	Potential flow splitting issue
Lower cost than Option 1	Dissolved oxygen (DO) sampling point after both sets of cascade aerators’ effluent combined is area prone to flooding

4.2.8 Solids Handling

It was determined as part of the master plan that the existing solids handling facilities can accommodate the additional flows associated with the Phase 1 improvements. The solids handling facilities will require upgrade and expansion as part of future phases.

4.3 Project Phasing Alternatives - WWTP

Because of the needs described previously, especially as it relates to the limited treatment plant capacity and its ability to reliably meet the current and upcoming NPDES permit limits, the Town must take action to increase the treatment system capacities and upgrade the systems accordingly. The Town may consider deferring the implementation of recommended alternatives into future phases that could be more cost effective and still meet the Town's needs. Many of the recommended alternatives are needed to increase the treatment capacity of the plant and cannot be deferred without compromising the capabilities of the expanded treatment plant.

The following describes the project phasing alternatives evaluated for the West Plant upgrade and expansion. The collection system improvements cannot be broken down into smaller phases. However, the Town will evaluate when to begin the collection system improvements in relation to when the Town will begin the WWTP upgrades and choose the most practical option. To give the Town flexibility after bids are received for the collection system work, the proposed second forcemain from US 136 lift station will be listed as a bid alternate.

4.3.1 WWTP Phase 1

Phase 1 is a single construction phase alternative to expand the plant treatment capacity up to 5.25 MGD and include all the recommended alternatives in this PER.

Advantages:

Constructing all the recommended process alternatives at the same time will provide the Town with an upgraded plant with increased treatment capacity in the shortest time. With a shorter construction period, less plant shut downs and disruptions may be required which will lower the risk of plant violations during construction.

Disadvantages:

One disadvantage of this phasing alternative is it is the most expensive phasing alternative and offers the least amount of project flexibility after construction bids are received. The total estimated cost of the WWTP expansion portion of the construction project in a single phase with all recommended alternatives is $21.85 million (2016 dollars).

4.3.2 WWTP Phase 1 with Alternates

Phase 1 with alternates will bring the plant treatment capacity up to 5.25 MGD and bid all the recommendations in this PER but allow the Town to decide which unit processes to

include based on bid prices. Alternates are a means for the Owner to defer certain decisions on the scope of the Project until after pricing is obtained from prospective contractors, and to ensure the Project can be constructed with the funds available. An alternate is a defined portion of the Work that is priced separately and this provides an option for the Owner in determining the final scope of the Project. Alternates provide the Owner with a choice between different products or can define the addition or deletion of a portion of the Work.

For instance the Town can list the tertiary filters as a bid alternate and decide if there is room in the project budget to include or not include after evaluating all construction bid prices. If the Town decides the tertiary filters do not fit in the budget then they could be deferred into a future phase of plant upgrades. However, only items that are deemed by the Town to not directly increase the plant treatment capacity will be listed as alternates. The tertiary filters do not directly increase the plant treatment capacity but will increase the plant efficiency and make meeting permit limits easier. The capacity requirements for the odor control unit at the screen building are based on assumptions of odor being present after the screen is installed. The odor control unit will be listed as an alternate to determine at bid if it is needed and if it fits in the project budget. New cascade aerators and outfall piping will also be listed as bid alternates. However, in order for the peak hydraulic capacity for the 5.25 MGD expansion the new cascade aerators and outfall pipe are required. If the cascade aerator and outfall piping bid alternate is not included in the construction, the peak hydraulic capacity increase will be delayed to a future phase of construction. The main building annex will be listed as a bid alternate. The second forcemain from the US 136 lift station will be listed as a bid alternate. This PER can be amended during detailed design if the Town decides any other processes are to be listed as bid alternates in the Phase 1 upgrades.

Advantages:

Using alternates provides the Town the most flexibility in constructing the Project and the ability to control the final construction budget based on received bids. Using preliminary construction cost estimates and assuming the no alternates (cascade aerators, outfall piping, main building annex, tertiary filters and screen building odor control) are included in the final project, the WWTP expansion estimated construction cost is $15.14 million.

Disadvantages:

Bidding a construction project with numerous alternates increases the chances of a bid protest because it complicates the bidding process to objectively determine the apparent Successful Bidder. Language will be set forth in the Bid Documents to establish a fair method to determine the apparent low Bidder with inclusion or exclusion of alternates. The Project Documents will clearly identify the alternates determined by the Town that are included in the Contract after bidding.

4.3.3 Recommended Project Phasing

To provide flexibility and ensure the project bids come in within the Town's budget, packaging the WWTP improvements into Phase 1 with bid alternates is the recommended project phasing. The odor control at the screen building, tertiary filters, cascade aerators, outfall piping and headwall, main building annex and second forcemain from US 136 lift station will be listed as bid alternates. Using preliminary construction cost estimates and assuming the no alternates (cascade aerators, outfall piping, main building annex, second forcemain, tertiary filters and screen building odor control) are included in the final project, the WWTP expansion and collection system improvement estimated construction cost is $19.2 million. Depending on the project budget availability after bids are received, the Town will decide to include some or none of the alternates in the construction contract. Each alternate will be designed to be separated from the final project without affecting other portions of the project. For example, if the tertiary filters are not selected to be included in the project as an alternate, the pipe connections will be installed under Phase 1 to facilitate adding the filters in the future but not including the filters will not affect the overall yard piping layout or other treatment processes' design.

5 EVALUATION OF ENVIRONMENTAL IMPACTS

This chapter discusses the environmental impacts and mitigation measures for the wastewater treatment and collection system alternatives. Each wastewater treatment and collection system alternative involves similar construction activity on a significantly disturbed site. The only previously undisturbed site is the location of the proposed US 136 lift station; however, it is located on unusable property. As a result, environmental impacts due to the plant and collection system construction are expected to be relatively minor and similar for the various alternatives.

The selected plan will not result in any negative environmental impacts. However, the plan will result in positive long-term environmental impacts: enhanced quality of plant effluent, increased treatment capacity, elimination of chlorine gas toxic to aquatic life, additional water reuse, and reduced energy usage through VFDs.

5.1 Disturbed and Undisturbed Land

All construction for the recommended treatment facilities will occur on the existing plant site or within the easement on the private property near the existing effluent pipe that was significantly disturbed during the previous construction activities.

The new US 136 lift station will be located on undisturbed land; however, this land is unusable for farming. The soils map for the lift station area is shown in **Figure 5-1.1** and **Figure 5-1.2**. The lift station will be located to avoid the (few) existing trees on the site. Brownsburg is planning to purchase the proposed lift station site, which is approximately three quarters of an acre. An archaeological review has been performed by Accidental Discoveries, LLC and is attached to this PER report in Appendix F.

The new sewers and force mains will be located immediately next to roads in areas previously disturbed by road construction.

No borrow soil will be used for the project at any sites.

5.2 Historic and Architectural Resources

The proposed project construction is limited to the current plant site and the new US 136 lift station site. There are no known historical landmarks within these sites. The project will not impact any historical or architectural site and structure listed in the Hendricks County Interim Report and shown in **Figure 5-2.1** and **Figure 5-2.2**. The architecture No. 007 (farm), No. 008 (house), and No. 009 (cemetery) are in the vicinity of the project sites but will not be impacted by the project.

5.2 Wetlands

Figure 5-3 shows wetlands in the vicinity of the project sites, as identified on the National Wetlands Inventory. Wetlands will not be impacted by construction or operation of the project.

5.3 Surface Waters

Figure 5-4 is a map showing surface waters. The project will not adversely affect waters of high quality listed in 327 IAC 2-1-2(3), exceptional use streams listed in 327 IAC 2-1-11(b), Natural, Scenic and Recreational Rivers and Streams listed in 312 IAC 7-(2) or Salmonid Streams listed in 327 IAC 2-1.5-5(a)(3).

5.4 100-Year Floodplain

Figure 5-5.1 and **Figure 5-5.2** are maps of the floodplain near the project sites. The 100-year flood level in White Lick Creek at the plant site is Elevation 853.30, USGS datum. A portion of the proposed site of the new plant effluent pipe and outfall is within a floodway. Permits from Indiana Department of Natural Resources will be required. The Brownsburg plant staff have indicated that the treatment facility site has not experienced flooding.

5.5 Groundwater

There is no available information in the IDNR and IGS water well databases to indicate that the project's construction and operation will impact local wells in a discernible way. Groundwater dewatering will likely be required for construction of the lift station; however, the US 136 Lift Station area is served by the Town's water system and no local wells are known to exist at the site of the lift station. Within 200 feet of the proposed forcemain route along US 136 there are 7 private wells found in the IDNR water well database for homes or other private use not served by the Town's water system. Of these 7 wells, 4 are at known locations and 3 have estimated, unconfirmed locations. All but one of the seven wells are screened below 100 feet and are isolated by confining layers. The single well less than 100 feet in depth, which is not at a verified location, is screened from 47 to 50 feet. Review of the geologic log for this well indicates that there is a clay layer from the surface to 18 feet which lies over the sand aquifer being accessed by the well. Because the forcemain is anticipated to have a minimum bury depth of less than 6 feet, it is interpreted that any dewatering needed will be within perched water in the clay layer and isolated from the aquifers within which all 7 wells have been screened. The specifications will require proper handling of any dewatered flow before it is discharged.

5.6 Plants and Animals

The proposed project will be constructed on a significantly disturbed site and will not affect plants and animals. The undisturbed lift station site contains minimal trees and no known habitats. The lift station will be located to avoid the existing trees. No known endangered species are present in the project areas.

The construction and operation of the project will not negatively impact state or federal-listed endangered species or their habitat. The project will be implemented to minimize impact to non-endangered species and their habitat.

5.7 Prime Farmland and Geology

The Farmland Conversion Impact Rating form is included in **Appendix A**. The project's construction and operation will not affect prime/unique farmland.

5.8 Air Quality

The project will have short-term air quality impacts (e.g. noise, dust, odors and airborne contaminants) during construction activity that will be mitigated. As part of the project, an odor control system will be provided as an alternate at the new preliminary treatment facility to mitigate long-term odors. A diesal generator will be added to the US 136 Lift Station to provide permanent backup power. An IDEM air quality permit is not required to add a diesel generator because the anticipated pollutant emissions are during emergency power loss and do not exceed the threshold required to obtain a permit.

5.9 Open Space and Recreational Opportunities

The project's construction and operation will neither create nor destroy open space and recreational opportunities.

5.10 Lake Michigan Coastal Management Zone Impacts

The proposed project will not affect the Lake Michigan Coastal Zone.

5.11 National Natural Landmarks Impacts

The construction and operation of the proposed project will not impact National Natural Landmarks.

5.12 Secondary Impacts

The Town, through the authority of its Council and Planning Commission, will ensure that future development, as well as future collection system or treatment works projects connecting to SRF-funded facilities will be properly permitted with their regard to impacting archaeological/historical/ structural resources, wetlands, wooded areas, or other sensitive environmental resources. New development and treatment work projects will be constructed within the guidelines of the U.S. Fish and Wildlife Service, IDNR, IDEM, and other environmental review authorities.

5.13 Mitigation Measures

The alternatives considered will result in a number of short term environmental impacts. These impacts will be related primarily to project construction activities.

The construction specifications will require that proper measures be utilized to control storm water runoff and erosion from the construction site. Additionally, the specifications will require measures to reduce the creation of dust, odor, airborne contaminants, and other nuisances from construction activities. Efforts will be made to avoid construction-related impacts. Where an impact cannot be avoided appropriate mitigation measures will be utilized.

6 SELECTED PLAN

The following describes the selected plan for the collection system, East Plant, and West Plant improvements that entail this Phase 1 project.

6.1 Collection System

The Phase 1 collection system improvements entail three major recommendations. **Figure 6-1** shows the Phase 1 collection system improvements.

The North Regional Lift Station and US 136 Lift Station are recommended. Only the improvements associated with the US 136 lift station are required to meet the Town's immediate needs and are included in the Phase 1 improvements. The North Regional Lift Station will be constructed in future phases.

A new US 136 Lift Station will be constructed near the intersection of CR 625 E and US 136. The lift station will pump wastewater collected north of I-74 directly to the West Plant. A new 12-inch force main will parallel US 136 and then head south along Mardale Drive to the West Plant. The US 136 Lift Station will become the West Plant's third influent pump station (East Plant and the West Lift Station being the other two lift stations).

There are eight lift stations tributary to the West Lift Station. Flows from two outlying lift stations that are currently tributary to the West Lift Station – Highland Springs, Maplehurst – are recommended to be redirected and be tributary to the new US 136 Lift Station. This eliminates the need for a capacity increase at the West Lift Station. The existing 10-inch diameter force main from the Maplehurst Lift Station will discharge to the Northfield Drive interceptor. Redirecting the Holloway A Lift Station will also be considered in the future, to create another tributary of the new US 136 Lift Station and provide further capacity relief to the existing West Lift Station.

A new 36-inch interceptor will be constructed parallel to Northfield Drive to Morningside Drive. At Morningside Drive, the interceptor diameter will increase to 48-inches. The 48-inch interceptor will continue along Northfield Drive to CR 625 E, then head south, and discharge into the US 136 Lift Station on the northwest corner of CR 625 E and US 136. This interceptor will pick up the flows from the Maplehurst Lift Station.

6.2 West Plant

The following describes the recommended Phase 1 improvements at the West Plant to increase the plant average capacity to 5.25 mgd and peak capacity to 10 mgd. **Figure 6-2** shows the recommended flow schematic. **Figure 6-3** shows the recommended site plan for the main plant facilities, while **Figure 6-4** shows the location of the new cascade aerators and effluent pipe. **Appendix B** includes the Basis of Design Summary. The WWTP upgrades to increase treatment capacity are recommended to be bid in 1 phase with bid alternates. To make the overall project more cost effective the tertiary filters will be listed as bid alternates and allow the Town flexibility to include the filters in the Phase 1 upgrades if the project budget allows.

6.2.1 Preliminary Treatment

Flow enters the West Plant through the East Plant and also the West Lift Station. Fine screening and grit removal is provided at the East Plant prior to discharge into the West Plant. A grinder and manual bar screen is provided for the raw wastewater pumped from the West Lift Station into the West Plant.

A Screen Building with a mechanical screen is recommended to provide fine screening for flows from the West Lift Station and the new US 136 Lift Station. The Screen Building will entail one fine mechanical screen and one manual screen. The mechanical screen is recommended to be a mechanical bar screen with 1/4-inch bar spacing. The costs for the screen technologies evaluated are similar, leaving the Town's preference to be the recommended screen type. The Town has mixed experiences with the mechanical auger screen and mechanical plate screen technologies, and prefers the mechanical bar technology. Space will be reserved to connect future force mains to the screen building influent channel. An odor control unit will be designed at the screen building to control odors from the screenings and force main discharge. Odor control units will be listed as bid alternates. If an odor control system is needed it can be installed during this phase of construction or possibly delayed to a future phase of construction depending on available funding.

To be cost-effective, one mechanical screen and one manual screen will be provided, in separate channels, and will be sized to treat 8 mgd peak flow.

The East Plant and West Lift Station flows are combined and discharged into the downstream West Plant processes. A new flow splitting structure will be provided after the Screen Building to evenly split flow into the biological treatment. Sampling provisions such as a concrete pad and electrical outlet for an automatic sampler will be included with the new flow splitter.

6.2.2 Biological Treatment

The costs for the biological treatment processes evaluated are similar, when considering that the conventional activated sludge process will have additional costs associated with the increased solids handling needs. The oxidation ditch is recommended, especially since it matches the plant's existing system.

To achieve the Phase 1 projected flow and wasteload, one additional oxidation ditch is recommended. The new oxidation ditch will be similar to the existing oxidation ditch but it will be two times larger. An anoxic selector for control of filamentous organisms in the activated sludge will be constructed upstream of the oxidation ditch. Four mechanical mixers (rotors) will provide aeration and mixing. Each rotor will be fitted with a variable frequency drive and a cover for the surface aerators. Dissolved oxygen control will also be provided to pair with the VFDs for energy savings.

Process modelling and design calculations were performed to determine the size and volume of the oxidation ditch and secondary clarifier required to increase the plant's treatment capacity.

6.2.3 Secondary Clarifiers

To pair with the new oxidation ditch, a new secondary clarifier is recommended. The new clarifier will be 80 feet in diameter with a side water depth of 15 feet. The clarifier will be

rim feed (similar to the existing clarifiers) or center feed type and will include a spiral scraper type sludge removal mechanism. The costs for the sludge collection equipment evaluated are similar. The spiral scraper type mechanism is recommended because it does not clog, removes the sludge faster, and has fewer moving parts when compared to the other technologies.

The new clarifier will have the same weir elevation as the existing clarifiers so that all clarifiers can be used for backup. This will also allow the oxidation ditches to be directed to any secondary clarifier.

A new RAS pump station is recommended to house the RAS pumps. The electrical equipment for the RAS pumps, new oxidation ditch and secondary clarifier will be located in an electrical room attached to the chemical phosphorus removal building. Two wet well submersible RAS pumps are recommended for the new clarifier. The station will be located adjacent to the new clarifier that can be expanded on in the future. RAS piping and necessary control valve arrangement will be provided to direct RAS flow into the anoxic selector. A control valve arrangement similar to the current arrangement will be installed to direct WAS flow into the aerobic digesters or sludge holding tanks.

The existing scum collection in the scum manhole located in the basement of the Main Building has maintenance issues from floatables collected at the manhole. It is recommended to not add additional scum to the existing scum manhole. Scum collected from Secondary Clarifier No. 5 will flow by gravity into a scum pump station located near the new secondary clarifier. The discharge piping will include a valve to direct the scum either to the digesters, sludge holding tanks or directly to the biosolids drying beds.

6.2.3 Tertiary Filtration

Cloth media disc filters are recommended for enhanced suspended solids removal. The cost is less than the other technologies evaluated due to its smaller footprint. It also requires lower backwash rates, can be used during backwash, and eliminates sand media that washes out and requires more regular replacement.

The disc filters will be housed in a new Filter Building upstream of the disinfection channel. A disc filter system with three units (two duty, 1 standby) will be provided. The system will be designed to provide solids removal to a final effluent average concentration of ≤5 mg/L TSS. The disc filter units will be constructed of stainless steel and be placed in the Filter Building. The Filter Building will be sized to accommodate a fourth unit for the ultimate flow. The tertiary filter process is necessary to capture solids during peak flow plant upsets and seasonal process upsets. This facility is recommended to be listed as a bid alternate and can be added to the current construction project if funding is available or the construction of a tertiary filter facility can be delayed to a future phase of construction.

6.2.4 Phosphorus Removal

The chemical phosphorus removal process is recommended to meet the future total phosphorus effluent limits. Chemical phosphorus removal is a reliable process that can meet low total phosphorus limits. If the plant installed biological phosphorus removal, they will also have to install a chemical phosphorus removal system as a backup to meet the IDEM requirements

6.2.5 Disinfection

UV disinfection is recommended because it is safe, has no toxic byproducts, and it is one of the cheapest disinfection alternatives evaluated. Low pressure high output UV light disinfection is recommended. The UV system will be located in new channels. The existing chlorination-dechlorination system will be removed in its entirety and the building space will be converted to useful space for operations and maintenance.

6.2.6 Cascade Aeration and Outfall Pipe

To fully utilize the existing cascade aeration and outfall pipe and to make improvements only once to this area, the existing cascade aeration and outfall pipe will be utilized and a parallel system will be provided located next to the existing system. The new system will entail a 36-inch pipe from the disinfection channel to the new cascade system alongside the existing 24-inch pipe to the existing cascade aerators. Two new cascade aerators will be provided operating in series. A new 42-inch outfall is recommended to convey combined flows from both cascade aerators. The additional system and new pipe will provide a more suitable range of velocity, headloss and capacity than the existing units and pipe. Effluent flow will be measured using weir flow measurement at the expanded effluent control structure. The additional cascade aerators will be listed as a bid alternate. Also the outfall pipe and headwall will be listed as a bid alternate. If funding is available the cascade aeration units and outfall pipe system will be included in this construction project or if funding is not available the systems will be delayed for a future construction phase.

6.2.7 Non-Potable Water System

In addition to the treatment improvements recommended above, a new non-potable water system will be provided to eliminate the use of potable water for non-potable water purposes. This will replace the existing system located in the basement of the Main Building. The non-potable water will be drawn from the disinfection influent channel. The new system will be used for belt filter press wash water and other non-potable water uses.

The system is recommended to have an additional hydro pneumatic tank installed. The existing pumps will not be required because the new non-potable water pumps will operate on VFDs and have a higher capacity. The additional tank will provide increased reliability to the system. The effect of a water hammer will be reduced by the additional hydro pneumatic tank. The new tank will be located in the basement of the Main Building.

6.2.8 Main Building Annex

In addition to the treatment improvements recommended above, a new Main Building Annex is also recommended for additional operation and administrative space needed for the plant personnel. The existing Main Building does not have extra space for expansion. A treatment plant the size of the expanded WWTP requires dedicated offices and training room for plant staff. Administrative offices are recommended to be included in the Main Building Annex. The new Annex will include three offices, a training/meeting room, document storage room, and a break room. It will be connected to the existing Main Building through a hallway leading from the Main Building’s north entrance. The Main

building will be modified to convert an office into a new men's locker room and an existing restroom into a new women's locker room because the plant does not currently have separate locker rooms. The Main Building Annex will be listed as a bid alternate and included in the construction project if funding is available or delayed to a future phase of construction.

6.3 Green Project Reserve Sustainable Infrastructure

The following "green" improvements are recommended as part of the project:

- Dissolved oxygen control and VFDs for the rotors associated with the new oxidation ditch as described in Section 6.2.2. This will cost an additional $60,000, but will be recovered by the operational savings.
- New non-potable water system to replace the existing insufficient system as described in Section 6.2.6. This will cost $50,000.
- A LEED certified or Envision® rated building elements for the new Filter Building. This will cost an additional $50,000. There are four additional new buildings (Screen Building, one electrical building, Chemical Phosphorus Removal Building and Main Building Annex) that will be considered further for including LEED certification or Envision® Rating elements.

These improvements are identified in the Green Project Reserve Sustainability Incentive Waste Water Checklist included in **Appendix C**.

6.4 Project Cost

Table 6-1 summarizes the opinion of probable construction cost for the components of the selected Phase 1 plan. The costs are in 2016 dollars. At this preliminary level, costs are based on preliminary information and all details required for the work have not been established; therefore, the costs includes a 20 percent design contingency.

In addition to the construction costs, a total project cost has been estimated as detailed in **Table 6-2**. Preliminary engineering quotes show the estimated project costs to represent approximately 15 percent of the probable construction cost.

6.5 Project Schedule

Table 6-3 summarizes the Phase 1 project schedule.

TABLE 6-1 - ESTIMATED CONSTRUCTION COSTS OF THE SELECTED ALTERNATIVES (PHASE 1 WITH ALTERNATES) ITEM	TOTAL COST ($)
WWTP UPGRADE	
SITE WORK	$ 780,000
YARD PIPING	$ 1,760,000
SCREEN BUILDING	$ 1,280,000
FLOW SPLITTER	$ 150,000
CONDITIONER	$ 560,000
OXIDATION DITCH NO. 5	$ 2,430,000
SECONDARY CLARIFIER NO. 5	$ 1,020,000
RAS PUMP WET WELL	$ 560,000
UV ELECTRICAL BUILDING	$ 530,000
UV DISINFECTION	$ 1,200,000
CHEMICAL PHOSPHORUS REMOVAL	$ 900,000
NPW UPGRADE AND REPLACE WATER MAIN	$ 420,000
WWTP CONSTRUCTION SUBTOTAL	$ 11,590,000
MOBILIZATION/DEMOBILIZATION (4%)	$ 460,000
BONDS (2%)	$ 230,000
INSURANCE (2%)	$ 230,000
CONTRACTOR OVERHEAD+PROFIT (15%)	$ 1,740,000
ESCALATION (2.5% PER YEAR, @12 MONTHS OUT)	$ 360,000
WWTP CONSTRUCTION TOTAL (ROUNDED) without Alternates	*$ 14,610,000*
COLLECTION SYSTEM UPGRADE	
US 136 LIFT STATION	$ 1,000,000
COLLECTION SYSTEM	$ 1,990,000
COLLECTION SYSTEM CONSTRUCTION SUBTOTAL	$ 2,990,000
MOBILIZATION/DEMOBILIZATION (4%)	$ 119,600
BONDS (2%)	$ 59,800
INSURANCE (2%)	$ 59,800
CONTRACTOR OVERHEAD+PROFIT (15%)	$ 448,500
ESCALATION (2.5% PER YEAR, @12 MONTHS OUT)	$ 74,750
COLLECTION SYSTEM CONSTRUCTION TOTAL (ROUNDED)	*$ 3,750,000*
TOTAL CONSTRUCTION COST (WWTP + COLLECTION SYSTEM) without Alternates	**$ 18,360,000**
BID ALTERNATES	
ALTERNATE NO 1: SCREEN BUILDING ODOR CONTROL	$ 160,000
ALTERNATE NO 2: TERTIARY FILTER (FILTERS + BLDG)	$ 3,840,000
ALTERNATE NO 3: CASCADE AERATOR NO. 3 AND NO. 4	$ 320,000
ALTERNATE NO 4: OUTFALL PIPING + HEADWALL	$ 200,000
ALTERNATE NO 5: ANNEX BUILDING	$ 800,000
ALTERNATE NO 6: US 136 LS 2ND FORCE MAIN IN SAME TRENCH	$ 460,000
TOTAL CONSTRUCTION COST (WWTP + COLLECTION SYSTEM) with Alternates	**$ 24,140,000**

TABLE 6-2 - SELECTED PLAN COST SUMMARY ITEM	TOTAL COST ($)
NON-CONSTRUCTION COSTS	
ADMINISTRATIVE AND LEGAL	$ -
LAND & RIGHTS-OF-WAY ACQUISITION	$ -
RELOCATION	$ -
ENGINEERING FEES - DESIGN	$ 2,266,951
ADMINISTRATION AND INSPECTION FEES - CONSTRUCTION	$ 1,223,750
FEES - OTHER	$ -
PROJECT INSPECTION	$ -
COSTS RELATED TO PLANT START-UP	$ -
NON-CONSTRUCTION SUBTOTAL	$ 3,490,701
TOTAL CONSTRUCTION COST (TABLE 6-1)*	$ 18,360,000
CONTINGENCY (10%)	$ 1,836,000
CONSTRUCTION AND NON-CONSTRUCTION SUBTOTAL	$ 21,850,701
TOTAL PROJECT COST	**$ 23,690,000**

*TOTAL CONSTRUCTION COST ASSUMES ALTERNATES NOT INCLUDED

TABLE 6-3 - PHASE 1 PROJECT SCHEDULE PROJECT MILESTONE	ESTIMATED COMPLETION DATE
PRELIMINARY ENGINEERING REPORT	
· Pre-Planning Meeting	6/26/2015
· Draft PER	10/30/2015
· Public meeting	4/31/2016
· Submit PER and SRF application to IDEM	5/29/2016
· Anticipated PER Approval	7/29/2016
· Plans & Specifications Submittal	7/29/2016
· Plans & Specifications Approval	8/29/2016
· Land and Easement Acquisition Completion	8/29/2016
DESIGN - WWTP	
· Design criteria and preliminary design	9/11/2015
· 30%	12/11/2015
· 60%	4/29/2016
· 90%	7/5/2016
· 100%	8/29/2016
DESIGN - COLLECTION SYSTEM	
· Preliminary route evaluations	10/30/2015
· 30%	3/9/2016
· 60%	5/3/2016
· 90%	7/1/2016
· 100%	8/3/2016
BIDDING	
· 1st Advertise for bids	8/30/2016
· 2nd Advertise for bids	9/7/2016
· Receive bids	11/1/2016
· Close on SRF loan, award construction contracts	11/30/2016
CONSTRUCTION	
· Notice to Proceed	1/2/2016
· Substantial Completion	10/26/2018
· Final Completion/Final Construction Payment	12/21/2018

7 LEGAL, FINANCIAL & MANAGERIAL CAPABILITIES

Brownsburg intends that the Wastewater Treatment Plant Expansion and Sanitary Sewer Collection System Improvements Phase 1 project be funded principally through the State Revolving Fund (SRF). SRF financing is a federally subsidized loan program. Thus, its interest rate is below market rates.

7.1 Managerial Resolutions

Brownsburg's Town Council will adopt two resolutions, regarding the SRF financing for the Phase 1 project. The resolutions are as follows:

- Authorized Representative Resolution: Resolution authorizing the Town Manager to act on behalf of the Town in matters pertaining to a SRF loan.
- PER Acceptance Resolution: Resolution indicating that this Preliminary Engineering Report (PER) is approved and adopted by the Town Council for submission to the SRF Load Program for review and approval.

A copy of the resolutions will be inserted in **Appendix D**.

7.2 Financing Information

Brownsburg's accounting firm, H. J. Umbaugh and Associates, has prepared a financial report. The SRF Project Financing Information from the financial report is summarized in **Table 7-1**. Five sewer rate increases are recommended and are different based on if the bid alternates are implemented as part of the project. The sewage works financial analysis report is included in **Appendix D**.

For the proposed project including all bid alternate items, H. J. Umbaugh projected an average residential sewer service bill across-the-board rate increase in rates and charges of 12.5% in Phase I, 8.5% in Phase II, 8.8% in Phase III, 11.3% in Phase IV and 14.1% in Phase V.

For the project excluding all bid alternate items, H. J. Umbaugh projected an average residential sewer service bill across-the-board rate increase in rates and charges of 9.7% in Phase I, 6.8% in Phase II, 5.7% in Phase III, 12.2% in Phase IV and 14.2% in Phase V.

7.3 Letters of Intent

SRF requires letters of intent from parties affected by the project. The following are considered to be potentially affected parties:

- Significant flow/wasteload contributors
- Land/easement owners
    - Hendricks County Drainage Board
    - US 136 Lift Station site (private landowner)

7.4 Fiscal Sustainability Plan

The Town will develop a Fiscal Sustainability Plan that meets the minimum requirements listed in the Federal Water Pollution Control Act Section 603(d)(1)(E)(i) and will submit a completed FSP Certification Form prior to request for final disbursement related to the project.

TABLE 7-1 - SRF PROJECT FINANCING INFORMATION ITEM	TOTAL COST ($)
1. PROJECT COST SUMMARY	
A. COLLECTION/TRANSPORT SYSTEM COST	$ 3,670,400
B. TREATMENT SYSTEM COST	$ 16,539,600
C. NON-POINT-SOURCE (NPS) COST (SEPTIC TANK REMOVAL)	$ -
SUBTOTAL CONSTRUCTION COST	$ 20,210,000
D. CAPACITY RESERVATION FEES	$ -
E. CONTINGENCIES (INCLUDED IN PROJECT COST)	$ -
F. NON-CONSTRUCTION COST	$ 4,727,273
G. TOTAL PROJECT COST	**$ 24,940,000**
H. TOTAL INELIGIBLE SRF COSTS	$ -
I. OTHER FUNDING SOURCES	
(1) LOCAL FUNDS	$ -
(2) CASH ON HAND	$ -
(3) COMMUNITY DEVELOPMENT BLOCK GRANT - COMMUNITY FOCUS FUND	$ -
(4) US DEPT. OF AGRICULTURE RURAL DEVELOPMENT	$ -
(5) OTHER	$ -
TOTAL OTHER FUNDING SOURCES	**$ -**
2. SRF LOAN AMOUNT	**$ 24,940,000**
3. FINANCIAL ADVISOR	
A. FIRM: H.J. UMBAUGH & ASSOCIATES	
B. NAME: SCOTT MILLER	
C. PHONE NUMBER: 317-465-1500	
3. BOND COUNSEL	
A. FIRM: KROGER, GARDIS, & REGAS, LLP	
B. NAME: TRICIA LEMINGER	
C. PHONE NUMBER: 317-777-7434	
4. TOTAL COSTS NOT ELGIBLE FOR SRF REIMBURSEMENT	
A. LAND COST	$ -
B. MATERIALS & WORK DONE ON PRIVATE PROPERTY	$ -
C. GRANT APPLICATIONS & INCOME SURVEYS	$ -
D. PROJECTS TO PROMOTE ECONOMIC GROWTH	$ -
E. NPDES PERMIT APPLICATIONS AND WORK UNRELATED TO SRF PROJECT	$ -
F. CLEANING OF EXISTING EQUIPMENT	$ -
TOTAL COSTS NOT ELGIBLE FOR SRF REIMBURSEMENT	**$ 0**

8 PUBLIC PARTICIPATION

A Public Hearing will be held in June 2016 at 61 N Green St, Brownsburg, IN 46112. The following associated documents are included in **Appendix E**:

- Publisher's affidavit from Town's newspaper with the Public Hearing notice
- Contract customer and/or significant/wasteload contributors or rate payers have been notified.
- Public Hearing sign-in sheet
- Public Hearing meeting minutes
- Written comments submitted by the public during the Public Hearing and during the 5-day period following the hearing, and associated responses.
- Prepared mailing labels for interested parties, County Drainage Board, County Health Department, active regional planning commission for the planning area, local media, and customer communities.

The PER was made available for public review 10 days prior to the Public Hearing.

Arcadis U.S., Inc.
132 E. Washington Street
Suite 600
Indianapolis, Indiana 46204
Tel 317 231 6500
Fax 317 231 6514

www.arcadis.com

FIGURES

FUTURE BUILD OUT AREA

20-YEAR SERVICE AREA

EXISTING SERVICE AREA

N.

ROAD CLASSIFICATION

Expressway		Local Connector	
Secondary Hwy		Local Road	
Ramp		4WD	
Interstate Route		US Route	State Route

0 10000

FEET

CONTOUR INTERVAL: 10 FT

QUADRANGLE LOCATION

Lizton	Fayette	Zionsville
Danville	Brownsburg	Clermont
Clayton	Plainfield	Bridgeport

ADJOINING 7.5' QUADRANGLES

ARCADIS

TOWN OF
BROWNSBURG, INDIANA
PRELIMINARY ENGINEERING REPORT

EXISTING AND FUTURE SERVICE AREA
USGS MAP: BROWNSBURG QUAD

SCALE: AS SHOWN

ARCADIS US INC

MARCH 2016

FIG 1-1

MAPLEHURST LS TIE IN POINT

T16N
R1E
03

LIFT STATION AND FORCE MAIN WORK

US 136 LIFT STATION

T16N
R1E
10

WWTP UPGRADES

WEST PLANT

BROWNSBURG

Saint Malachy W Cem
White Lick Baptist Cem
Prebster Cem
Greenlawn Cem
Saint Malachy E Cem
McDaniels Cem
Lingeman Cem
Roark Stadium

W NORTHFIELD DR
E NORTHFIELD DR
E 56TH ST
E DOUGLAS DR
W TILDEN DR
E TILDEN DR
E HARRIS ST
E LOGAN ST
LINCOLN AVE
MAPLEHURST DR
MUIRFIELD DR
TIMBER LN
MIKAL LN
STONEYBROOK DR
PATRICK PL
CARNABY DR
LOWER DR
UPPER DR
LUCAS DR
RIDGELINE DR
MARDALE DR
TORREY PINE DR
WALNUT WAY
WARREN LN
HICKORY LN
HAMMONS DR
FOUNTAIN CURVE RD
DEVONSHIRE DR
MCCULLAH DR
KINGSBURY DR
ROXBURY DR
ESSEX DR
REDSUNSET DR
CO RD-600
CO RD-625
CO RD-551
CO RD-550
CO RD-500
CO RD-450
MIDNIGHT PASS
HAWK LN
HUMMINGBIRD DR
FOXFIRE LN
FALCON WAY
GREEN HILLS DR
WINGS CT
DOVER RD
KYVIK BLVD
NORTHSIDE DR
REDBUD LN
PRAIRIE DR
PICADILLY RD
SYCAMORE ST
FAIRFIELD DR
N ADAMS ST
N GRANT ST
N ODELL ST
S SCHOOL ST
JACKSON ST
S GRANT ST
S ODELL ST
BULLDOG BLVD
S STADIUM DR
MAPLE LN
THORNE DR
NELSON DR
SABLE CHASE
PENNWOOD LN
LONGVIEW BND
SOUTHPOINT CIR
MURPHY LN
ROSE LN
APPLE LN
WEIL DR
CROWN DR
RIVER RIDGE DR N
WILD RIDGE BLVD
HITTINGTON DR
AUDU

Hughes Br
W Fork White Lick Cr

1 68
FEE
4412
4411
4410
50
4409

ROAD CLASSIFICATION

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
State Route	

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

QUADRANGLE LOCATION

Lizton	Fayette	Zionsville
Danville	Brownsburg	Clermont
Clayton	Plainfield	Bridgeport

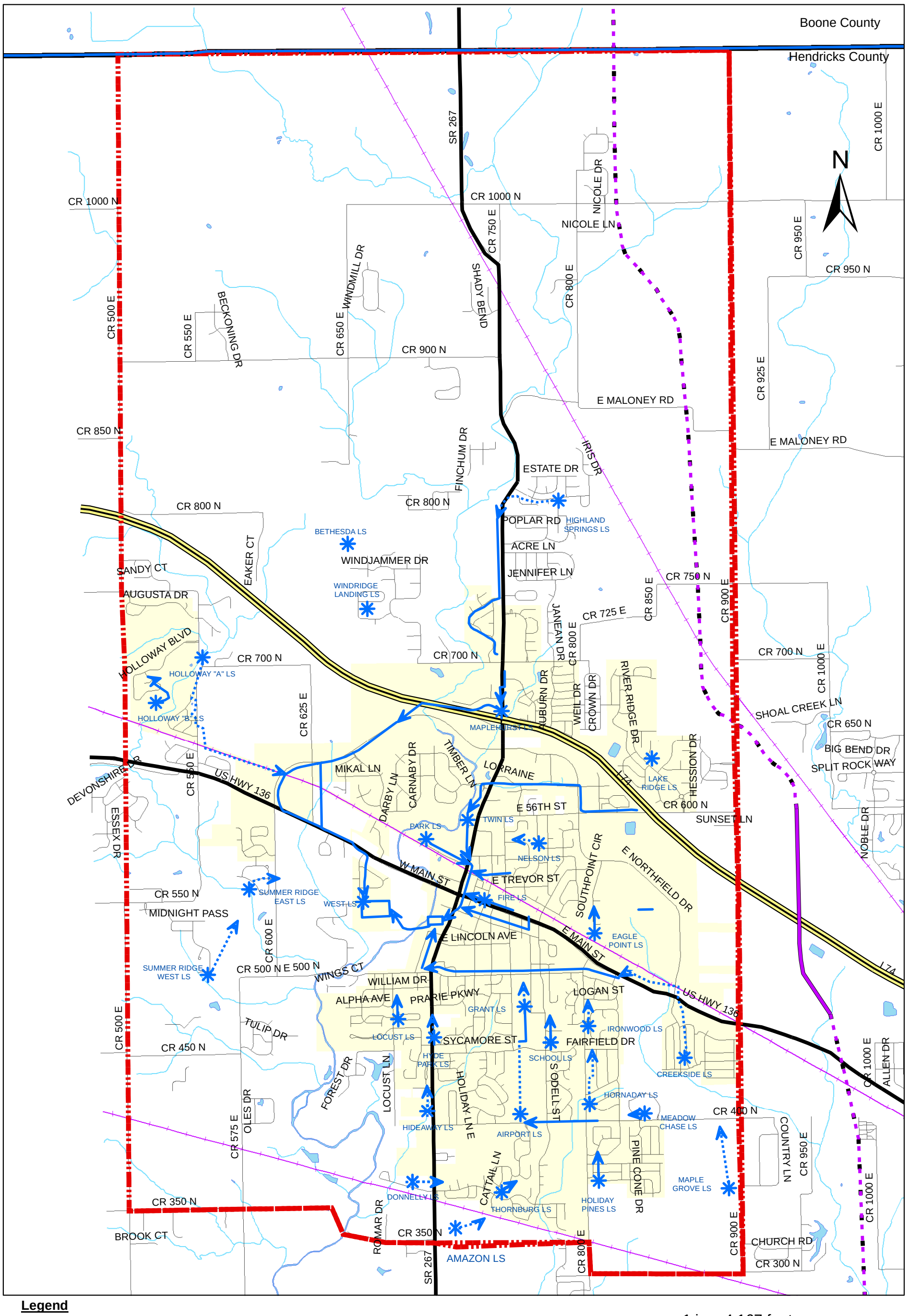
ADJOINING 7.5' QUADRANGLES

ARCADIS

TOWN OF
BROWNSBURG, INDIANA
PRELIMINARY ENGINEERING REPORT

PROPOSED WORK AREAS
USGS MAP: BROWNSBURG QUAD
SCALE: AS SHOWN

ARCADIS US INC
OCTOBER 2015
FIG 1-2



Legend

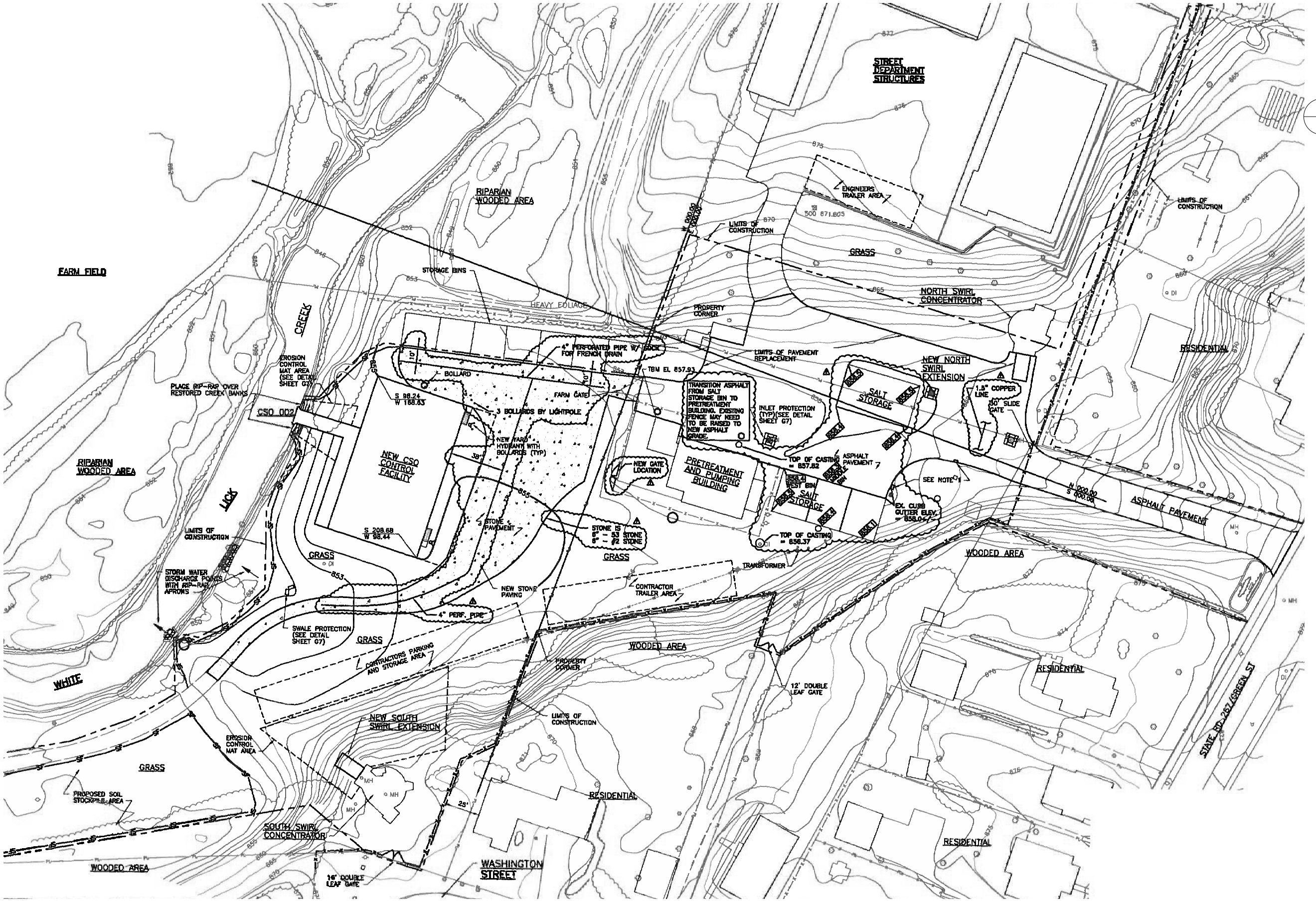
Existing Collection System

- Gravity
- Force
- Study Area Boundary
- Streams
- RailRoad
- Town Limit

1 in = 4,167 feet

0 0.375 0.75 1.5 Miles

ARCADIS	BROWNSBURG INDIANA PRELIMINARY ENGINEERING REPORT	SEWER SERVICE AREA AND PROPOSED LIFT STATIONS	MARCH 2016 **FIGURE 2-1**



EXISTING SITE PLAN

0 30' 60' 120'

DRAWING FROM 2008 AS-BUILT DRAWINGS

ARCADIS

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2015

DATE: SEPTEMBER 2015

PROJECT NO.: 04494009.0000

FILE NAME: EXISTING SITE PLAN EAST PLANT

DESIGNED BY: BPB

DRAWN BY: PVG

CHECKED BY: AES

SHEET TITLE

GENERAL

EXISTING SITE PLAN

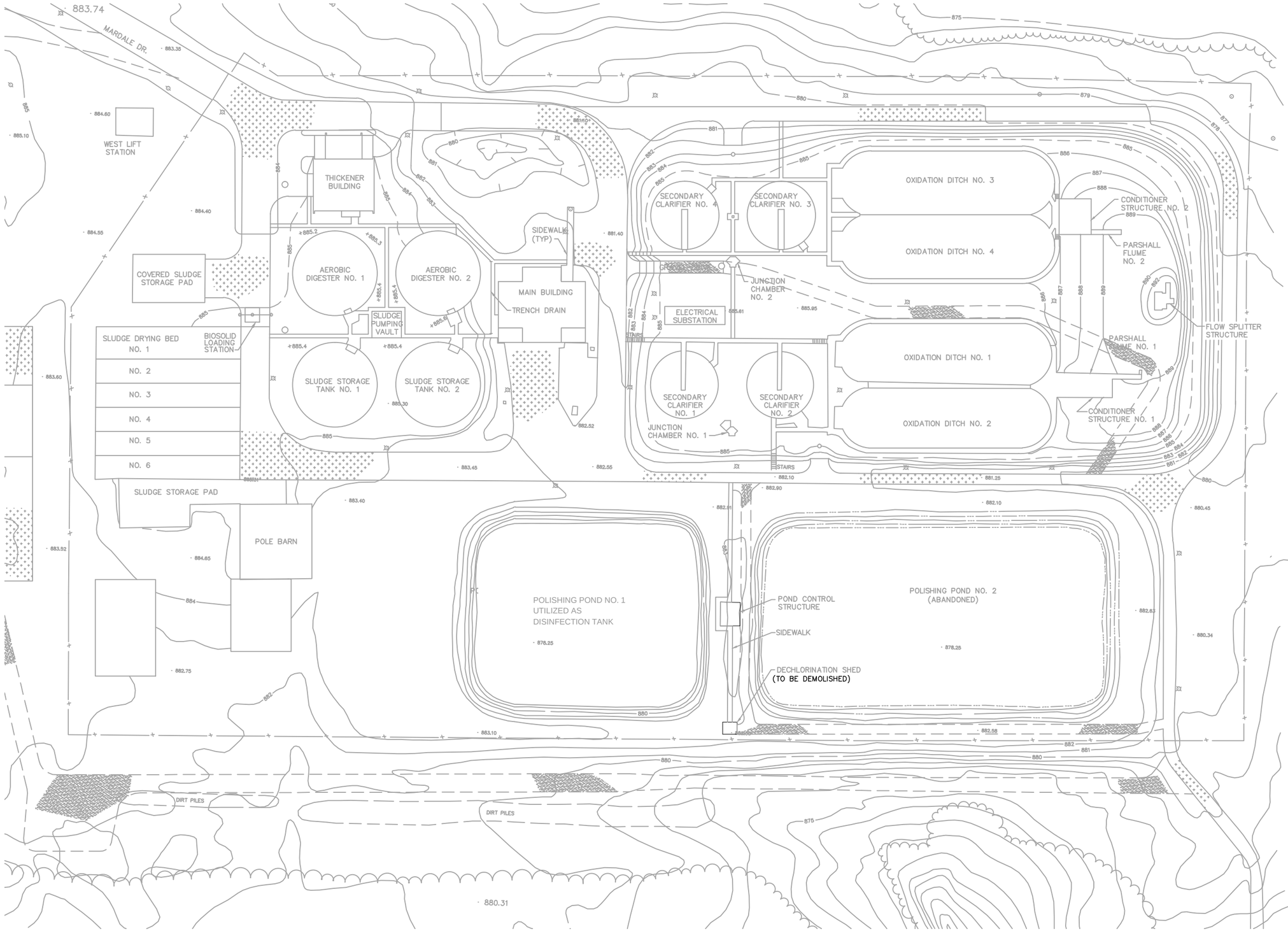
EAST PLANT

STATUS: PRELIMINARY

SCALE: AS NOTED

FIGURE 2-3

User: BBURROUGHS Spec: AUS-NCSMOD File: \\ARCADIS-US.COM\OFFICEDATA\INDIANAPOLIS-IN\PROJECTS\04494009.0000\CAD\EXISTING SITE PLAN EAST PLANT.DWG Scale:1:1 SavedDate:10/26/2015 Time:10:55 Plot Date: Burroughs, Benjamin; 10/26/2015; 11:06 - Layout:E-STIE PLAN



EXISTING SITE PLAN

0 20' 40' 80'

ARCADIS

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2015

DATE: SEPTEMBER 2015
PROJECT NO.: 04494009.0000
FILE NAME: EXISTING SITE PLAN
DESIGNED BY: BPB
DRAWN BY: PVG
CHECKED BY: AES

SHEET TITLE

GENERAL

EXISTING SITE PLAN

WEST PLANT

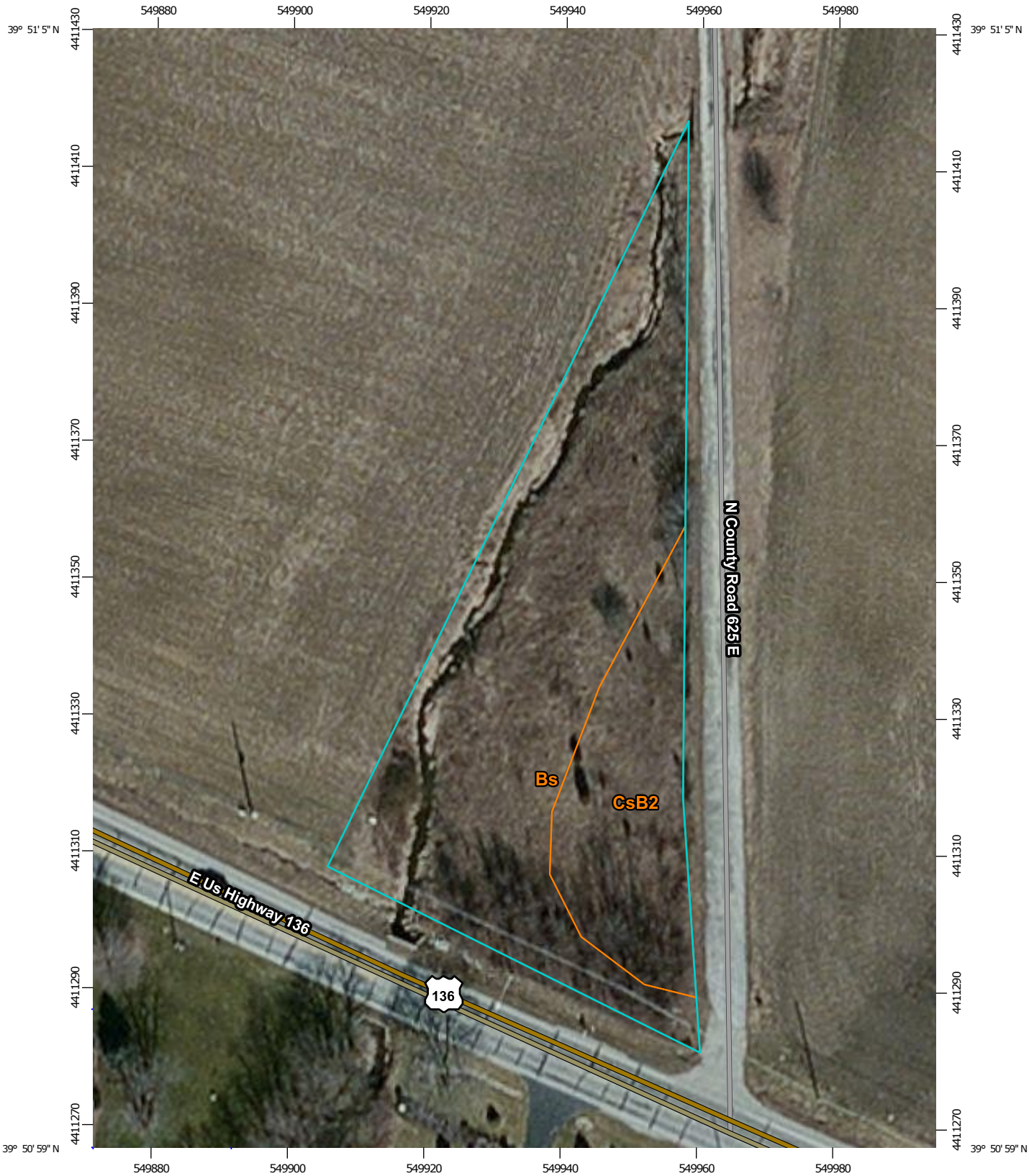
STATUS: PRELIMINARY

SCALE: AS NOTED

FIGURE 2-2

User:VANGORDEN Spec:AUS-NCSMOD File:G:\PROJECTS\04494009.0000-BROWNSBURG\CADD\PER DRAWINGS\EXISTING SITE PLAN.DWG Scale:1:1 SavedDate:9/12/2015 Time:17:19 Plot Date: Van Gorden, Philip; 9/15/2015; 09:24 ; Layout:FIGURE 1

Soil Map—Hendricks County, Indiana
(US 136 LIFT STATION SITE)



Map Scale: 1:797 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

FIGURE 5-1.1

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hendricks County, Indiana
Survey Area Data: Version 18, Sep 9, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 26, 2012—Mar 28, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

FIGURE 5-1.2

Map Unit Legend

Hendricks County, Indiana (IN063)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bs	Brookston silty clay loam, 0 to 2 percent slopes	0.7	75.5%
CsB2	Crosby-Miami silt loams, 2 to 6 percent slopes, eroded	0.2	24.5%
Totals for Area of Interest		**0.9**	**100.0%**

FIGURE 5-1.3

Lincoln Township (40001-042)

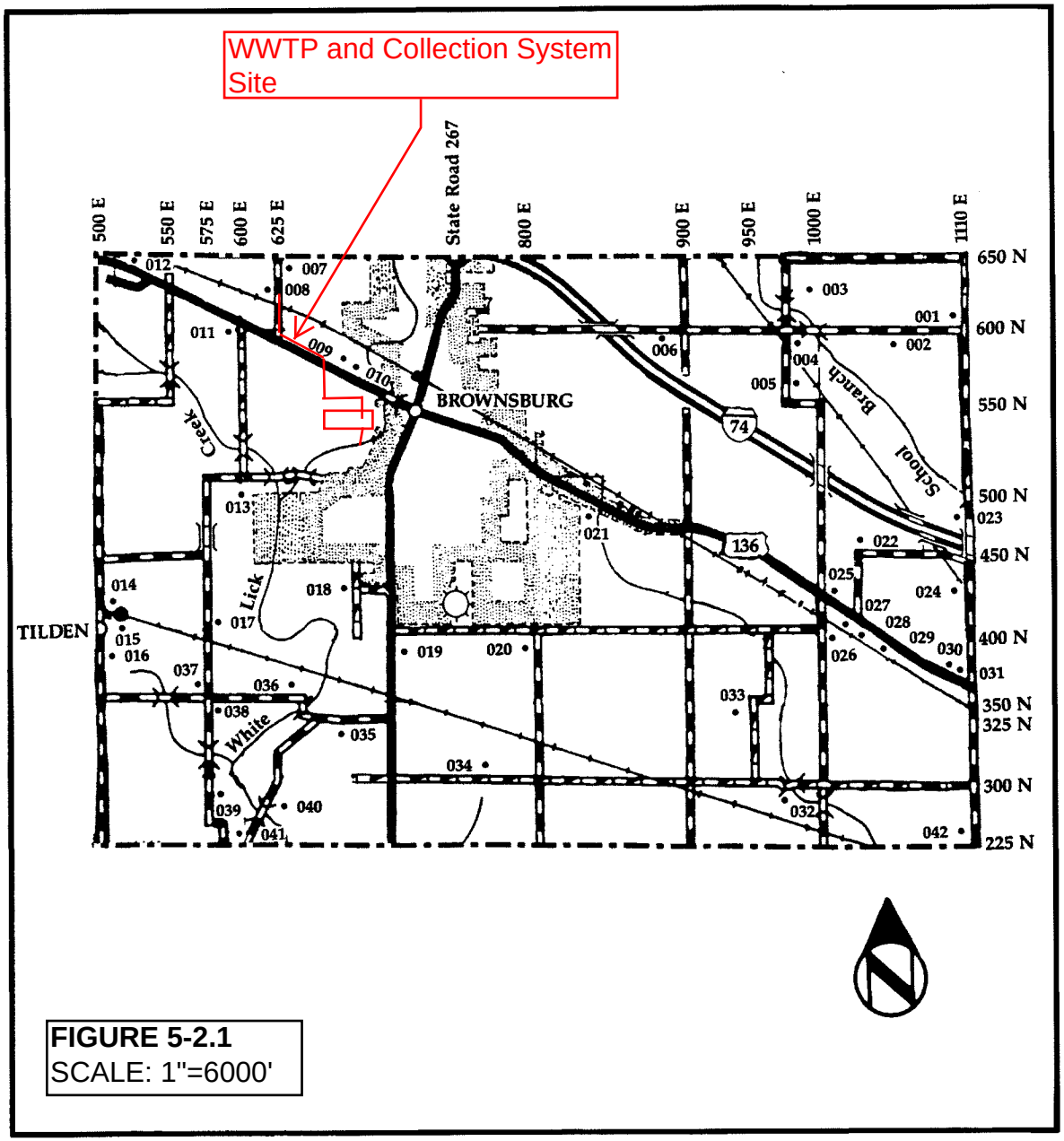


FIGURE 5-2.1
SCALE: 1"=6000'

Lincoln Township is located in the eastern portion of Hendricks County with Marion County forming its eastern border. Named in honor of President Abraham Lincoln, the township was created from neighboring Brown Township by an act of the Hendricks County Commissioners in 1863.

Lincoln Township's early settlement is closely tied with that of Brown Township. The first settler in the area was James Brown who arrived in the fall of 1824. Early settlers in the vicinity of Brownsburg were Asa McDaniel, Joel Smith, and Peter Metsker. The first school was taught by Archibald Thorne in 1828 or 1829 at the Regular Baptist Church. A second school opened in 1832 just west of Brownsburg. One of the earliest businesses of the township was Swaim's Tavern, located approximately two miles east of Brownsburg.

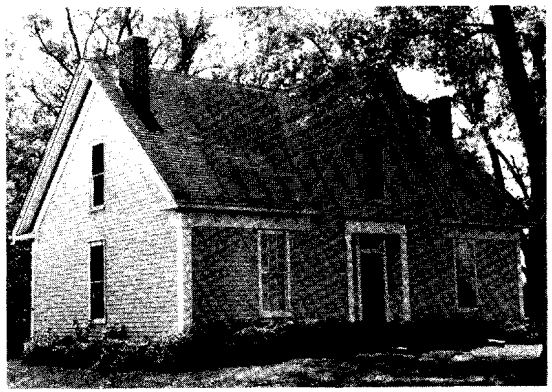
Lincoln Township had the first sizable Catholic population in Hendricks County. The St. Malachy's congregation was organized in 1867 and was the only Catholic church in Hendricks County until 1914.

Lincoln Township's major town is Brownsburg which was laid out in 1835 by William Harris and was originally known as Harrisburg. The name of the town was changed when the post office was established on March 17, 1836.

Tyrone and Tilden were two other Lincoln Township villages. Tyrone was laid out along the Cincinnati, Hamilton, and Dayton Railroad but no longer exists. Tilden, originally known as Oakley, is on the Middle-Lincoln Township line and was platted on land donated by Oakley Parker along the route of the Indianapolis, Decatur and Western Railroad. In 1895 a two-room schoolhouse (40016) was constructed at Tilden as a joint project of the two townships with Lincoln responsible for its management.

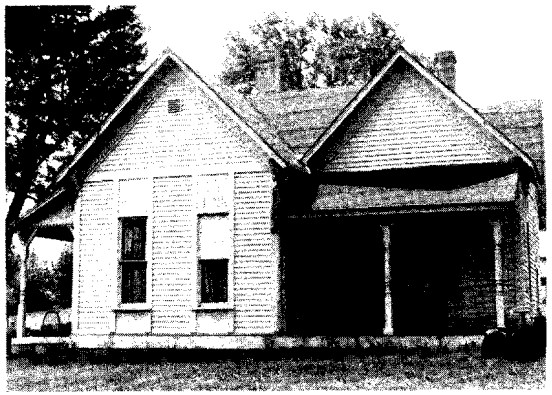
Lincoln Township's earliest structures date from the mid-nineteenth century. The Carter Dillman House (40024) and houses (40006, 40036) on 600 N and 350 N are three of the area's oldest. Most of the township's significant architecture was built during the early twentieth century. The Corrie House (40021) and the Reverend Harry A. Davis House (40028) are good examples of the American four-square and Craftsman Bungalow styles, respectively.

No.	Rtg.	Description
001	C	**House,** 600 N; Bungalow, c.1920; Architecture (117)
002	C	**Farm,** 600 N; House: Queen Anne Cottage, c.1890; Outbuildings: transverse-frame barn, chicken house, shed, corncrib, tractor sheds; Agriculture, Architecture, Vernacular/Construction (117)
003	C	**Farm,** 1000 E; House: double-pen/ Queen Anne, c.1870/c.1890; Outbuildings: English barn, corncrib, silo, chicken house; Agriculture, Architecture, Vernacular/Construction (117)
004	N	**Lincoln Township School, District No. 1,** 600 N; T-plan, 1895; Vernacular/Construction, Education (117)
005	C	**Cemetery,** 1000 E; c.1841-1900; Exploration/Settlement, Religion (117)
006	N	**House,** 600 N; Central-passage/Gothic Revival, c.1860; Architecture, Vernacular/Construction (117)
007	C	**Farm,** 625 E; House: Bungalow, c.1920; Outbuildings: livestock barn, garage, chicken houses, sheds; Agriculture, Architecture, Vernacular/Construction (074)
008	C	**House,** 625 E; House: saltbox, c.1860; Outbuildings: summer kitchen, shed; Vernacular/Construction (074)
009	C	**McDaniels Cemetery,** U.S. 136; c.1854-1930; Exploration/Settlement, Religion (074)



006

010	C	**Farm,** U.S. 136; House: Colonial Revival, c.1900; Outbuildings: English barn, tractor shed; Agriculture, Architecture, Vernacular/Construction (074)
011	C	**House,** U.S. 136; House: gable-front, c.1880/c.1915; Outbuilding: tractor shed; Vernacular/Construction (074)
012	C	**Prebster Cemetery,** U.S. 136; c.1839-1890; Exploration/Settlement, Religion (074)
013	N	**Farm,** 500 N; House: Stick Style Cottage, c.1885; Outbuilding: transverse-frame barn; Agriculture, Architecture, Vernacular/Construction (074)



013

FIGURE 5-2.2
SCALE: NTS

014	C	**Railroad Communications Building,** 500 E, Tilden; Twentieth Century Functional, c.1910; Communications, Transportation, Vernacular/ Construction (074)
015	C	**Tilden Station Supply Building,** off 500 E, Tilden; Twentieth Century Functional, c.1900; Transportation, Vernacular/Construction (074)
016	C	**Tilden School,** 500 E, Tilden; T-plan, 1895; Education, Vernacular/ Construction (074)
017	C	**House,** 575 E; Queen Anne Cottage, c.1890; Architecture (074)
018	C	**Hufford Farm,** Locust Street; House: I-house/Italianate, 1861/c.1910; Outbuilding: transverse-frame barn; Agriculture, Architecture, Vernacular/Construction (074)
019	C	**Farm,** State Road 267; House: gable-front, c.1920; Outbuilding: transverse-frame barn; Agriculture, Vernacular/ Construction (074)
020	C	**Farm,** 800 E; House: Queen Anne Cottage, c.1890; Outbuildings: English barn, chicken house; Agriculture, Architecture, Vernacular/Construction (074)
021	N	**Corrie House,** U.S. 136; House: American four-square, 1915; Outbuildings: chicken house, garage, workshop; Vernacular/Construction (117)
022	C	**Farm,** 450 N; House: I-house/Queen Anne, c.1900; Outbuildings: English barn, silo, corncrib, shed; Agriculture, Architecture, Vernacular/Construction (117)
023	C	**House,** 1100 E; Pyramidal-roof, c.1910; Vernacular/Construction (117)
024	N	**Carter Dillman House,** 1100 E; House: central-passage/Gothic Revival, c.1860/1910; Outbuildings: summer kitchen, garage; Architecture, Vernacular/Construction (117)

U.S. Fish and Wildlife Service

National Wetlands Inventory

National Wetlands Inventory

Oct 9, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Collection System Work (Green)

WWTP Work (outlined in red)

NORTH

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

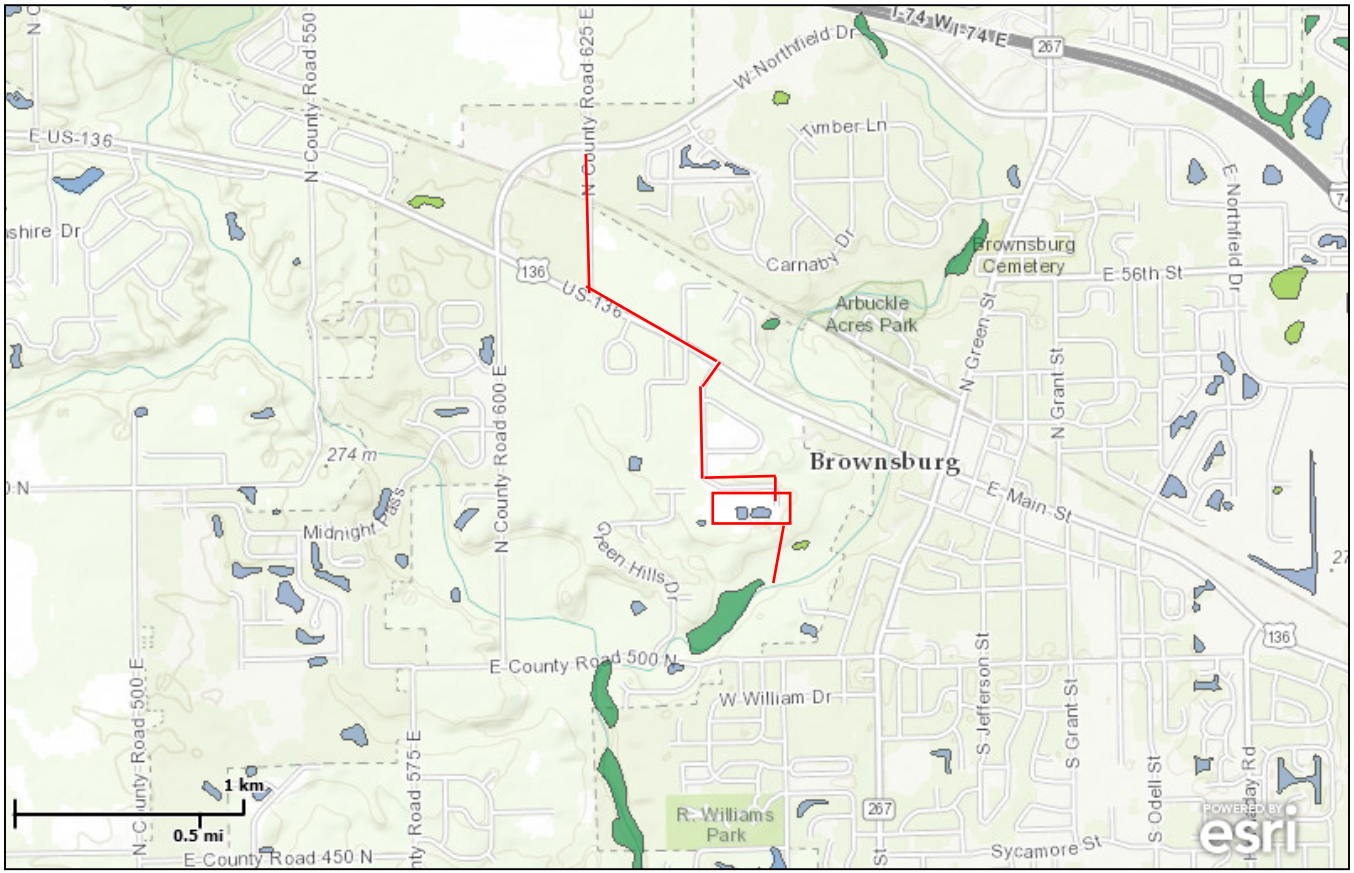
FIGURE 5-3
SCALE: 1"=5800'

U.S. Fish and Wildlife Service

National Wetlands Inventory

Surface Waters and Wetlands

Oct 9, 2015



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

NORTH

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

FIGURE 5-4
SCALE: 1"=5800'

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

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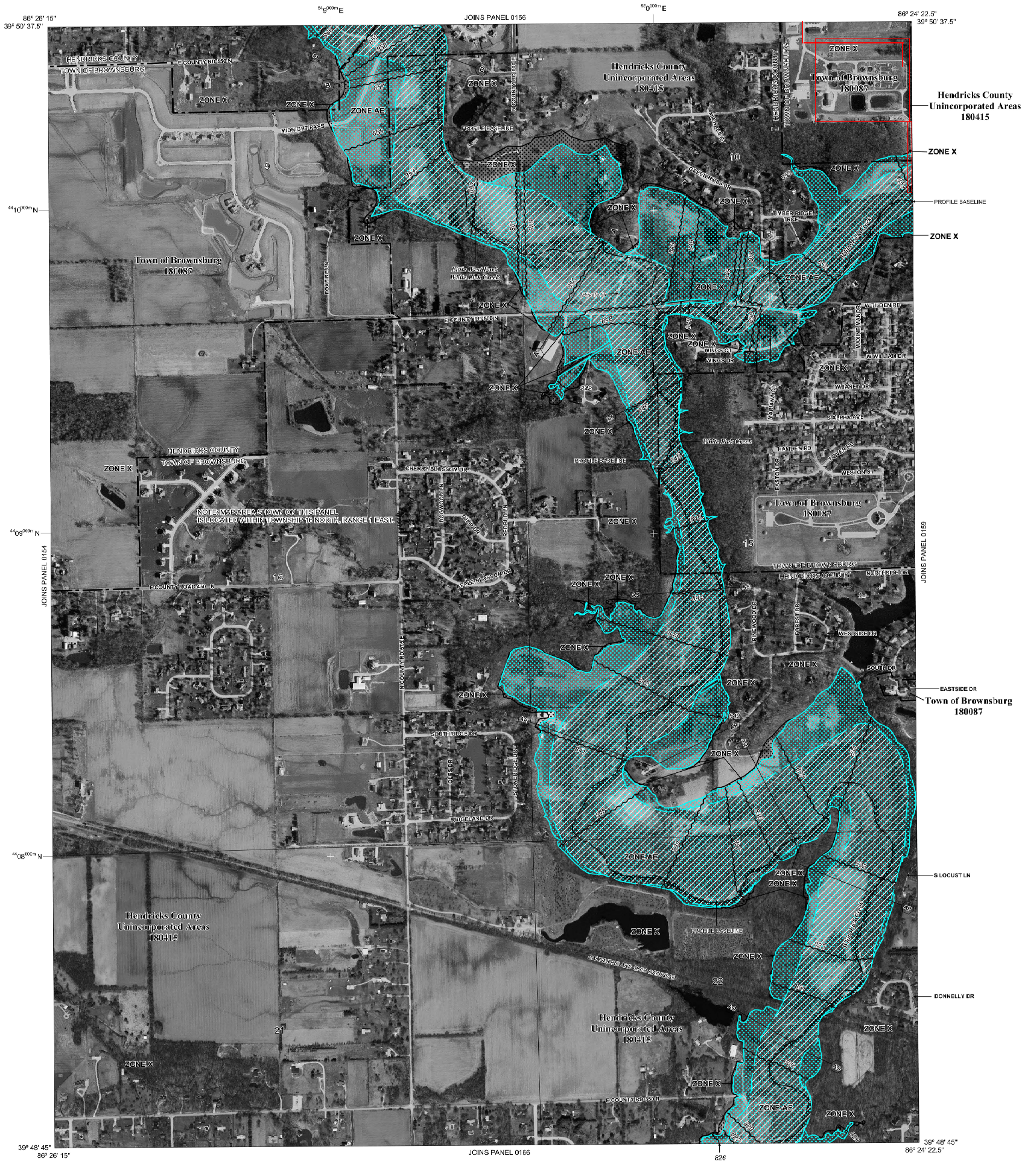
The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the Special Flood Hazard Area.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP (1-877-336-2627)** or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- (A) — (A) Cross section line
- (23) — (23) Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4°85'000"N — UTM meter Universal Transverse Mercator grid values, zone 16
- M1.5510X — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

SEPTEMBER 25, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-338-6620.

FIGURE 5-5.1

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0158D

FIRM

FLOOD INSURANCE RATE MAP

HENDRICKS COUNTY, INDIANA
AND INCORPORATED AREAS

PANEL 158 OF 375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BROWNSBURG, TOWN OF	180087	0158	D
HENDRICKS COUNTY	180415	0158	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
18063C0158D

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency

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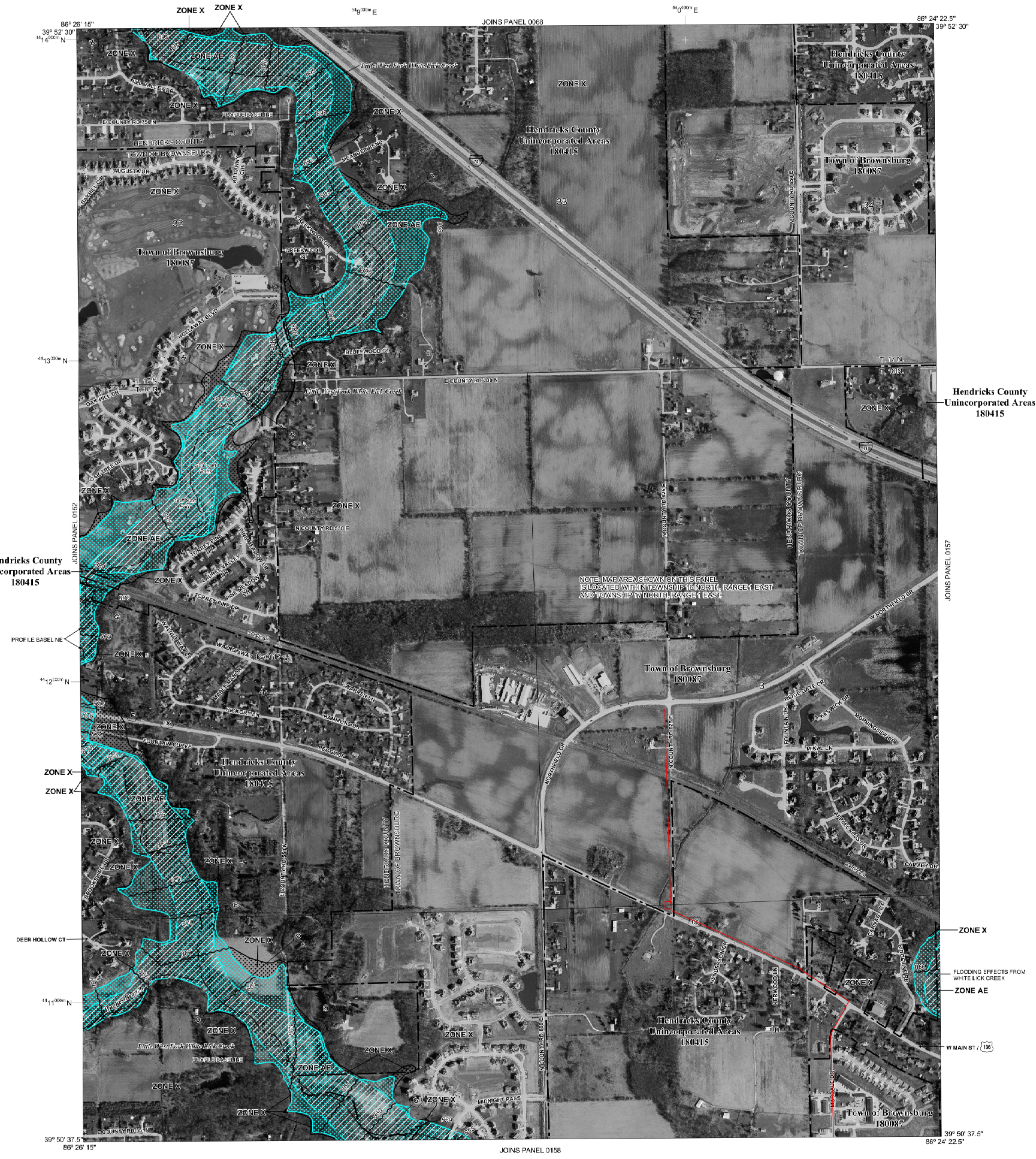

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- 513 — Base Flood Elevation line and value; elevation in feet*
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- 4512000mN — UTM meter Universal Transverse Mercator grid values, zone 16
- M1.5 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

SEPTEMBER 25, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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FIGURE 5-5.2

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0156D

FIRM

FLOOD INSURANCE RATE MAP

HENDRICKS COUNTY, INDIANA
AND INCORPORATED AREAS

PANEL 156 OF 375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
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HENDRICKS COUNTY	180415	0156	D

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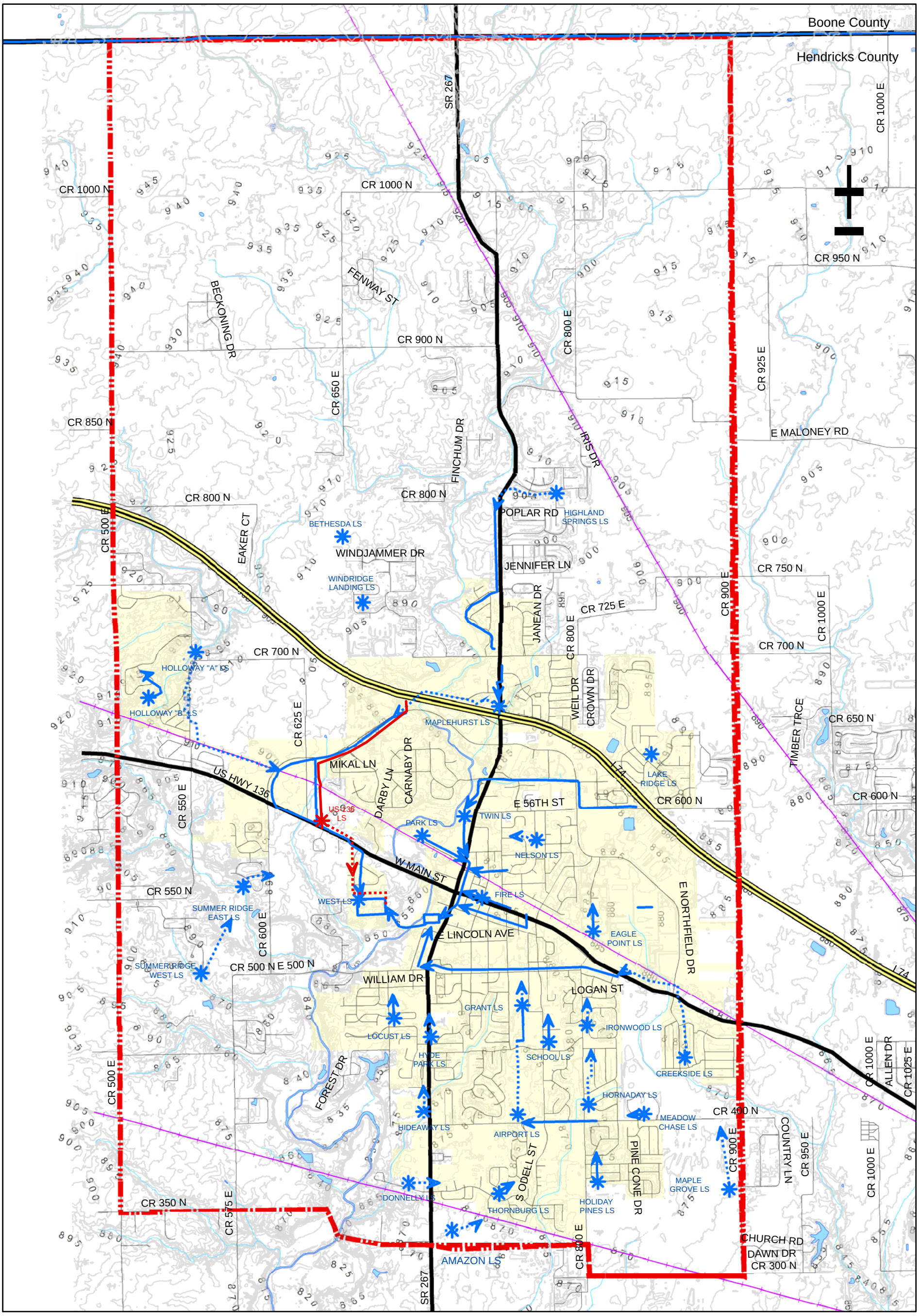
MAP NUMBER
18063C0156D

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency



Legend

Proposed Lift Stations
- Gravity
- Force

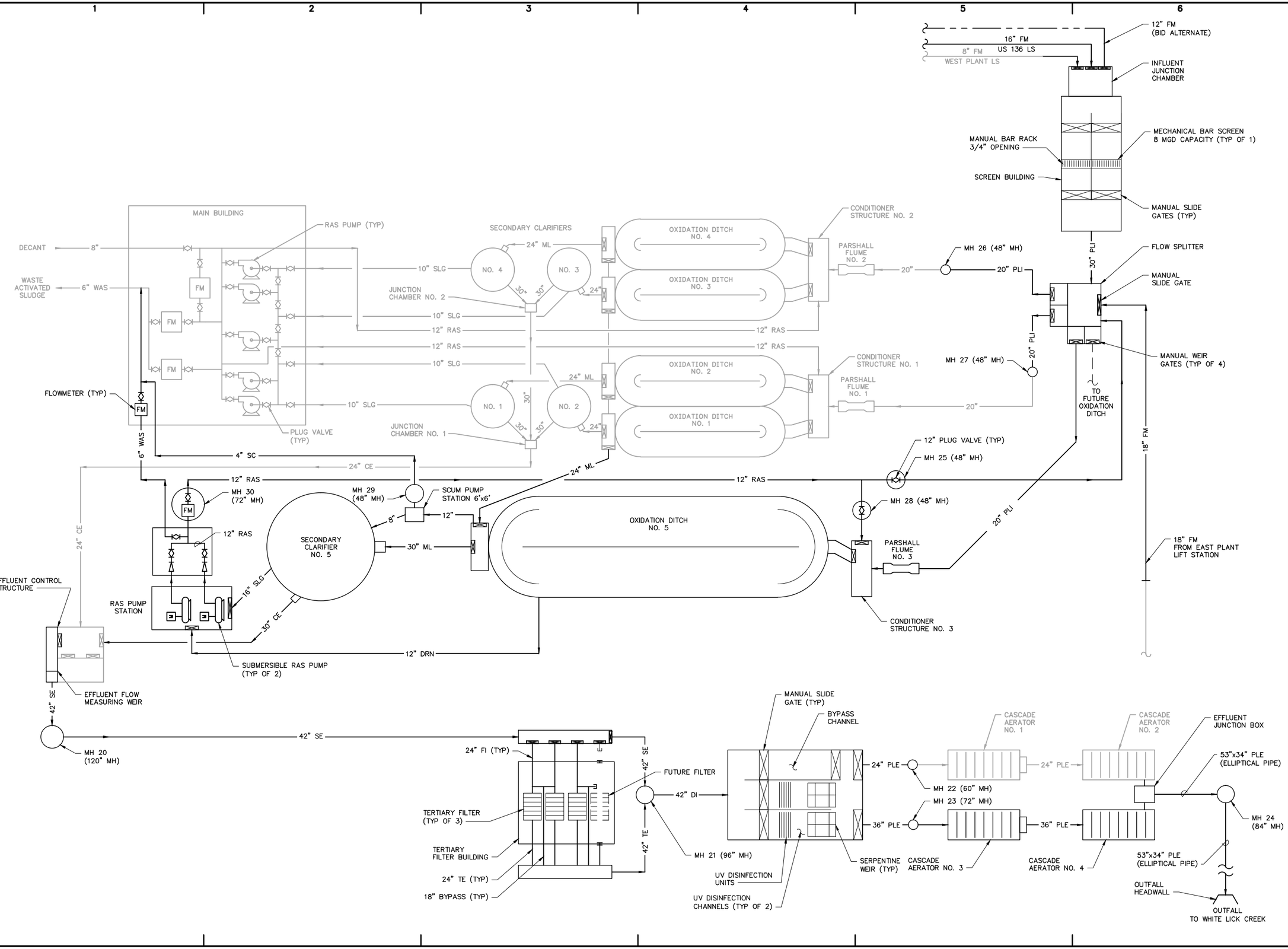
Existing Lift Stations
- Gravity
- Force

- Study Area Boundary
- Streams
- RailRoad
- Town Limit

1 in = 4,167 feet

0 0.375 0.75 1.5 Miles

ARCADIS	BROWNSBURG INDIANA PRELIMINARY ENGINEERING REPORT	PHASE 1 COLLECTION SYSTEM IMPROVEMENTS	MARCH 2016 **FIGURE 6-1**



ARCADIS

LEGAL ENTITY:
ARCADIS U.S., INC.

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2016

DATE:	MAY 2016
PROJECT NO.:	04494009.0000
FILE NAME:	G-04
DESIGNED BY:	B. BURROUGHS
DRAWN BY:	P. VANGORDEN
CHECKED BY:	J. LEE

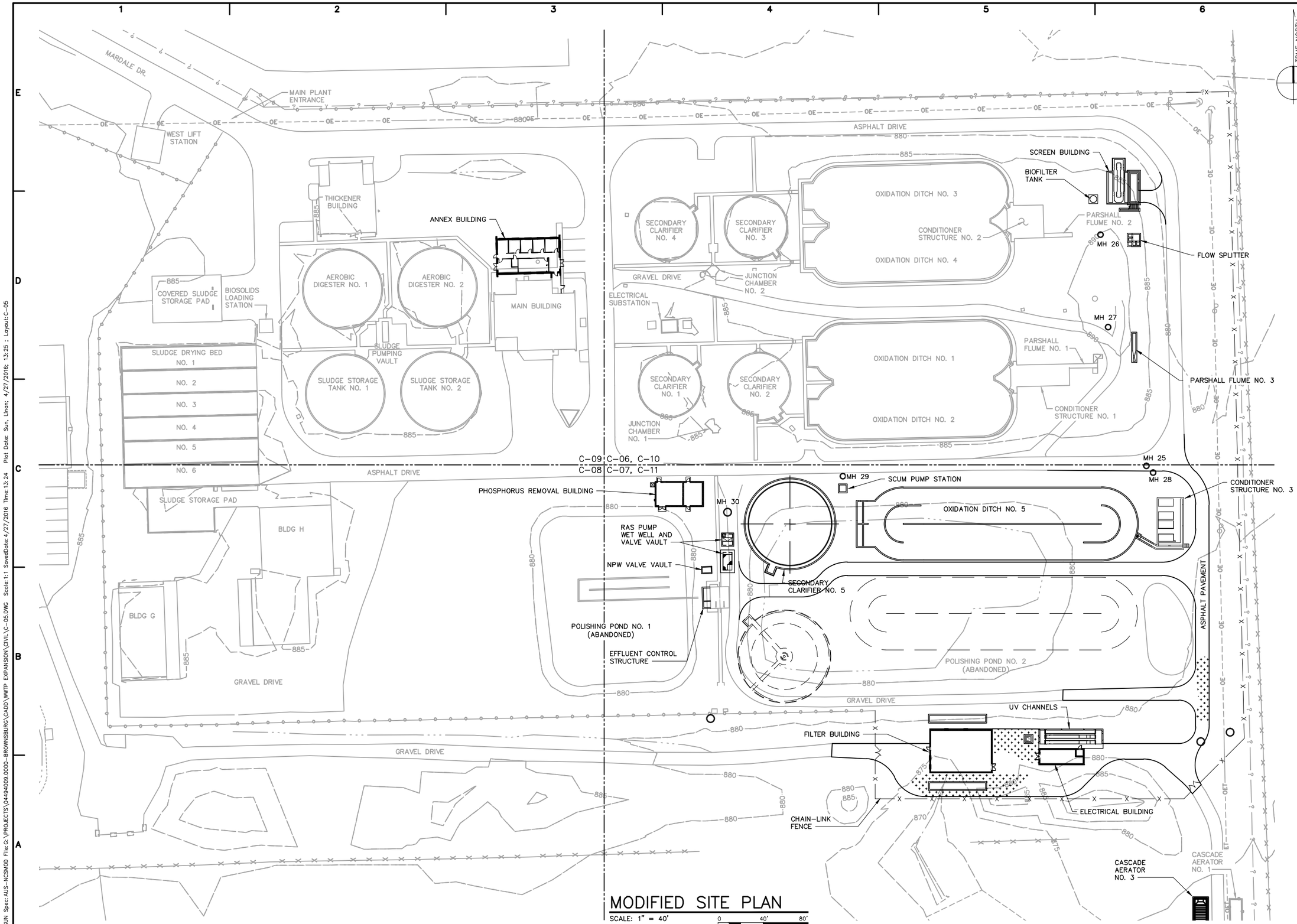
SHEET TITLE

GENERAL

PROCESS FLOW SCHEMATIC – LIQUID

STATUS:	PER
SCALE:	NOT TO SCALE
SHEET NO.:	FIGURE 6-2

User: THILLIARD Spec: AUS-ACSMOD File: G:\PROJECTS\04494009.0000-BROWNSBURG\CADD\WWTP EXPANSION\GENERAL\G-04.DWG Scale: 1:1 SavedDate: 4/26/2016 Time: 17:06 Plot Date: Hilliard, Tyler: 4/27/2016; 11:02 ; Layout: G-04



MODIFIED SITE PLAN

SCALE: 1" = 40'

0 40' 80'

ARCADIS

LEGAL ENTITY:
ARCADIS U.S., INC.

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2016

DATE:	MAY 2016
PROJECT NO.:	04494009.0000
FILE NAME:	C-05
DESIGNED BY:	BPB
DRAWN BY:	PVG
CHECKED BY:	JJL

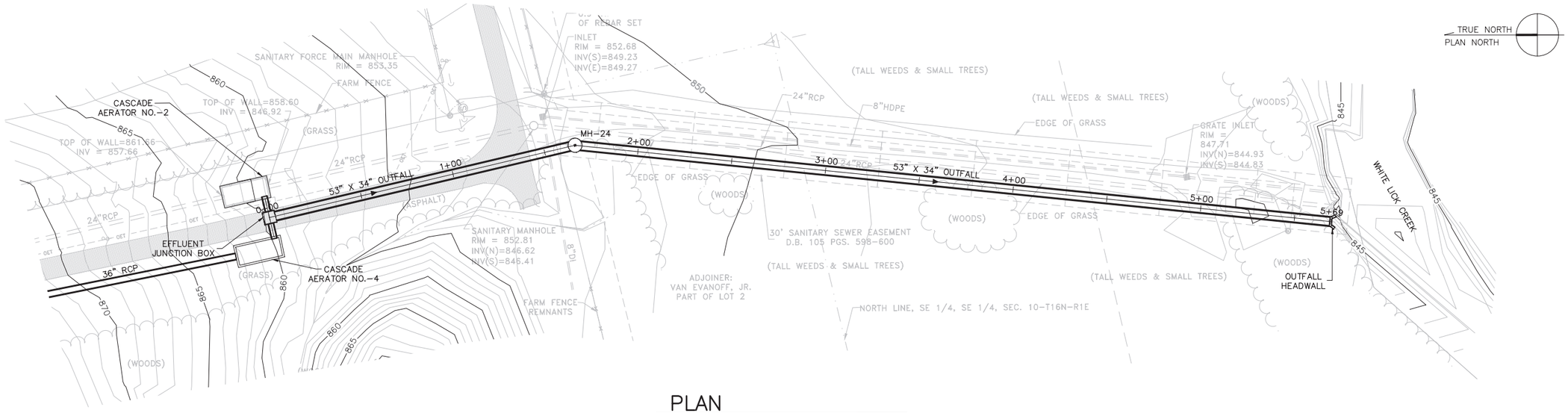
SHEET TITLE

GENERAL

MODIFIED OVERALL SITE PLAN

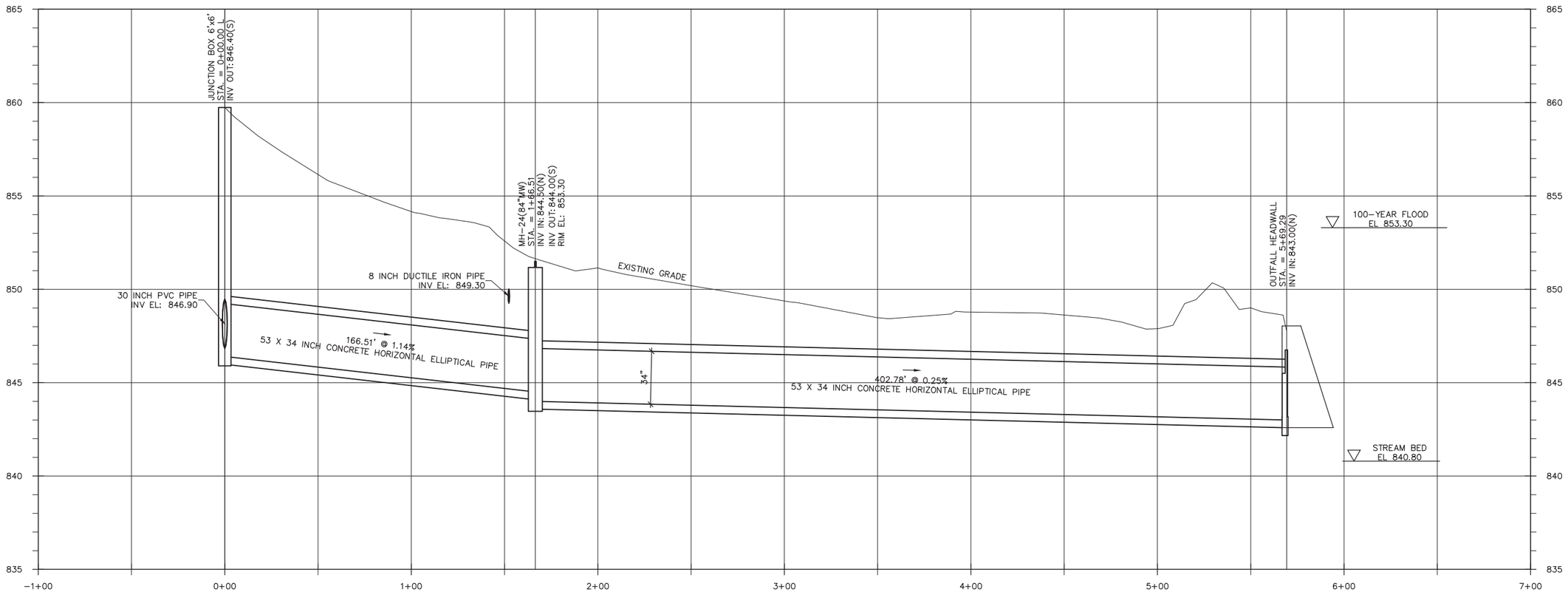
STATUS:	PER
SCALE:	AS NOTED
SHEET NO.:	FIGURE 6-3

User:LSUN Spec:AUS-NCSM00 File:G:\PROJECTS\04494009.0000-BROWNSBURG\CADD\WWTP EXPANSION\CIVIL\C-05.DWG Scale:1:1 SavedDate:4/27/2016 Time:13:24 Plot Date: Sun, Linan: 4/27/2016; 13:25 ; Layout:C-05



PLAN

0 30' 60'



PROFILE

HORIZ: 0 30' 60' VERT: 0 3' 6' 9'

ARCADIS

LEGAL ENTITY:
ARCADIS U.S., INC.

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2016

DATE: MAY 2016
PROJECT NO.: 04494009.0000
FILE NAME: C-13
DESIGNED BY: BPB
DRAWN BY: JR
CHECKED BY: JJL

SHEET TITLE

CIVIL

DETAILED SITE PLAN OUTFALL

STATUS: PER

SCALE: AS NOTED

FIGURE 6-4

APPENDIX A

FARMLAND CONVERSION IMPACT

USDA
United States Department of Agriculture

Natural Resources Conservation Service
Indiana State Office
6013 Lakeside Boulevard
Indianapolis, IN 46278
317-290-3200

March 7, 2016

Ben Burroughs PE
Water Resource Engineer
Arcadis
132 East Washington Street, Suite 600
Indianapolis, Indiana 46204

Dear Mr. Burroughs:

The proposed Sanitary Sewer Collection System Improvements project in the City of Brownsburg, Hendricks County, Indiana, as referred to in your letter received March 3, 2016, will not cause a conversion of prime farmland.

If you need additional information, please contact Rick Neilson at 317-295-5875.

Sincerely,

Jane E. Hardisty

JANE E. HARDISTY
State Conservationist

USDA is an equal opportunity provider and employer.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 1/27/16	
Name of Project Brownsburg Sewer Improvements		Federal Agency Involved Town of Brownsburg, IN	
Proposed Land Use Sanitary Sewer Lift Station		County and State Hendricks County, Indiana	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS 3/3/16	Person Completing Form: JHS
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☑	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS 3/7/16	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0.12			
B. Total Acres To Be Converted Indirectly	0.2			
C. Total Acres In Site	0.32			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form: Jay Lee | Date: 1/27/16

(See Instructions on reverse side)

Form AD-1006 (03-02)

ARCADIS Design & Consultancy for natural and built assets

Jerod Chew

District Conservationist

Danville Service Center

195 Meadow Dr

Danville, IN 46122-1413

Arcadis U.S., Inc.
132 E. Washington Street
Suite 600
Indianapolis
Indiana 46204
Tel 317 231 6500
Fax 317 231 6514
www.arcadis.com

Subject:

Farmland and Conversion Impact Rating Form:
Brownsburg Sanitary Sewer Collection System Improvements

Date:

1/27/16

Dear Jerod:

Please see the attached Farmland and Conversion Impact Rating Form for the proposed US 136 Lift Station location as part of Brownsburg Sanitary Sewer Collection System Improvements with Parts I and III filled out. Based on the aerial views, scaled maps and discussion with the landowner the proposed site is not currently being farmed. The proposed project is to add a lift station that will collect sanitary flow and pump it directly to the Brownsburg Wastewater Treatment Plant. The increase to the collection system's pumping capacity will allow the collection system to pump higher flows to the plant and possibly further decrease combined sewer overflows.

The site for the proposed lift station is in Brownsburg, IN (Hendricks County). The USGS Quadrangle Map Name, Township, Range, Section is: Brownsburg, T.16N, R.1E, 03 in Lincoln Township. The site currently doesn't have an address but is located at the northwest corner of the intersection of US 136 and CR 625 N as shown on the attached site plans.

Let me know if you have any questions.

Sincerely,

Contact:

Jay Lee

Phone:

317-236-2852

Email:

Jay.Lee@arcadis.com

Our ref:

04494009.0000

Jay Lee, PE

Project Manager

Copies:

Kathy Dillon, Town of Brownsburg

Daniel Sulkoske, Kramer Corporation

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 1/27/16	
Name of Project Brownsburg Sewer Improvements		Federal Agency Involved Town of Brownsburg, IN	
Proposed Land Use Sanitary Sewer Lift Station		County and State Hendricks County, Indiana	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS	Person Completing Form:
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0.12			
B. Total Acres To Be Converted Indirectly	0.2			
C. Total Acres In Site	0.32			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form: Jay Lee	Date: 1/27/16

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map**,** or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

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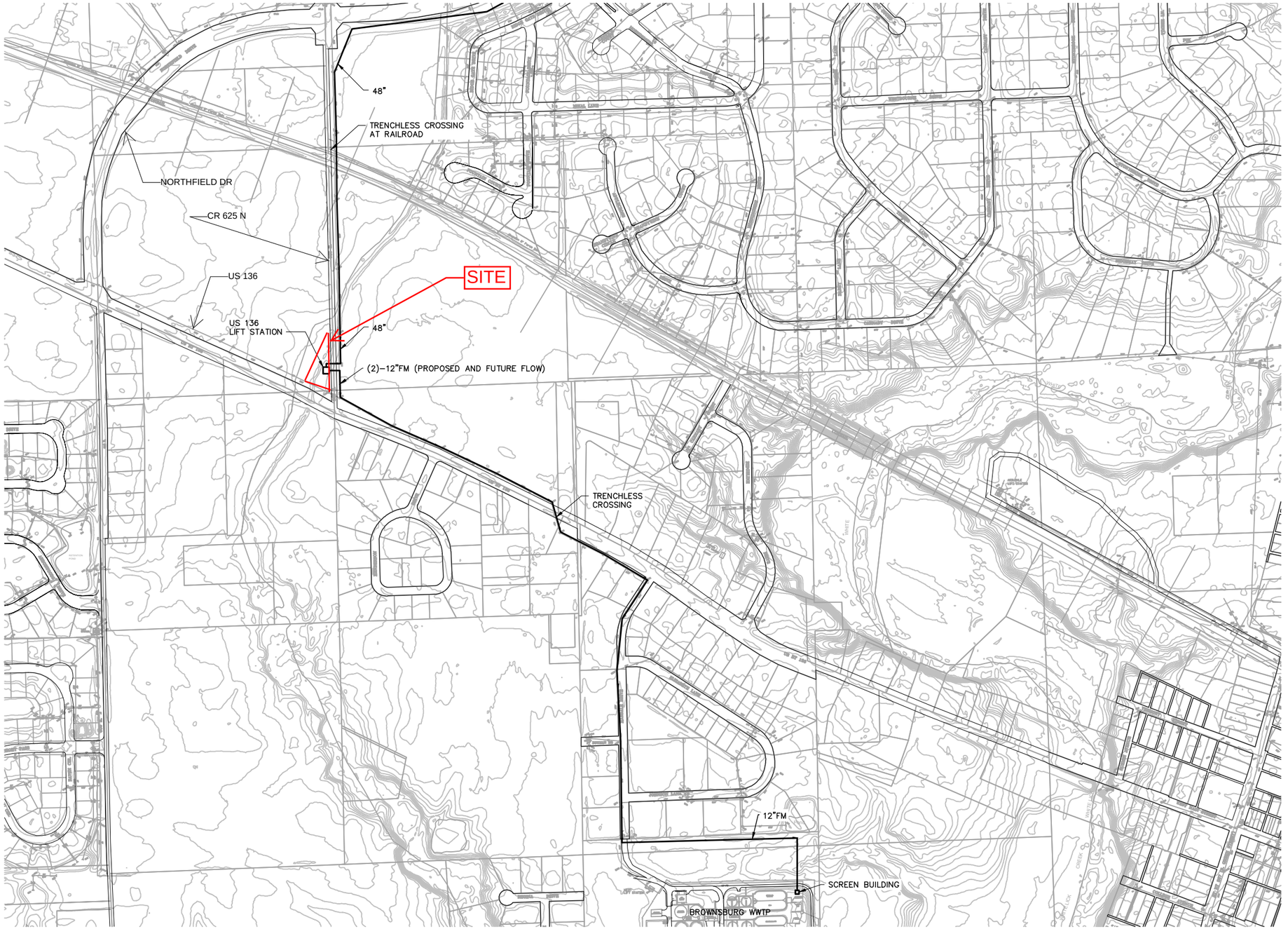


OVERALL PLAN

SCALE: 1" = 300'

0 150' 300'

ARCADIS

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2015

DATE: DECEMBER 2015

PROJECT NO.: 04494009.0000

FILE NAME: C–12

DESIGNED BY: JTN

DRAWN BY: PVG

CHECKED BY: JJL

SHEET TITLE

CIVIL

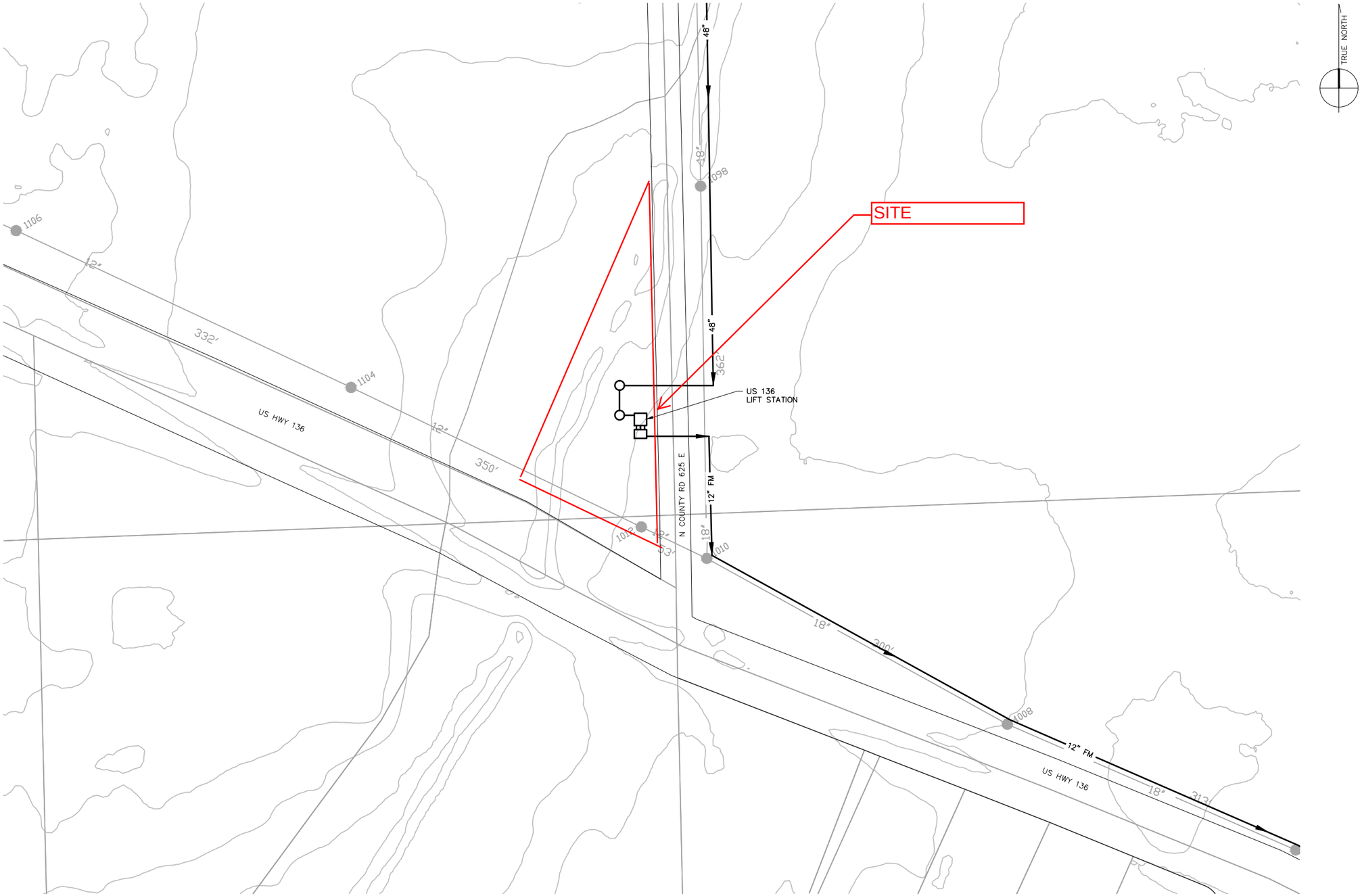
US 136 LIFT STATION FORCE MAIN OVERALL PLAN

STATUS: 30% SUBMITTAL

SCALE: AS NOTED

C–12

User:VANGORDEN Spec:AUS-NCSMOD File:G:\PROJECTS\04494009.0000-BROWNSBURG\CADD\WWTP EXPANSION\CIVIL\C-12.DWG Scale:1:1 SavedDate:12/9/2015 Time:16:32 Plot Date: Van Gorden, Philip; 12/10/2015; 11:15 ; Layout:C-12



ENLARGED SITE PLAN

SCALE: 1" = 50'

25 0 25 50

ARCADIS

CONSULTANTS

SEALS

BROWNSBURG, INDIANA

BROWNSBURG WASTEWATER TREATMENT PLANT EXPANSION

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC., 2015

DATE: DECEMBER 2015
PROJECT NO.: 04494009.0000
FILE NAME: C-13
DESIGNED BY: JTN
DRAWN BY: PVG
CHECKED BY: JJL

SHEET TITLE

CIVIL

US 136 LIFT STATION SITE PLAN

STATUS: 30% SUBMITTAL

SCALE: AS NOTED

C-13

User:VANGORDEN Spec: AUS-NCSMOD File: G:\PROJECTS\04494009.0000-BROWNSBURG\CADD\WWTP EXPANSION\CIVIL\C-13.DWG Scale:1:1 SavedDate:12/10/2015 Time:11:15 Plot Date: Plot Date: Van Gorden, Philip; 12/10/2015; 11:15 ; Layout:C-13

APPENDIX B

BASIS OF DESIGN

Preliminary Draft

PRELIMINARY ENGINEERING REPORT

2016 Brownsburg Wastewater Treatment Plant Expansion
Basis of Design Summary

I. GENERAL

1. Applicant's Name: Town of Brownsburg

2. Project Name: WWTP Expansion

3. Location: 225 S. Mardale Drive, Brownsburg, IN 46112

4. Engineer (Consultant): ARCADIS

5. NPDES Permit Number: IN0021245
   A. Date of final Permit Issuance: October 1, 2015
   B. Expiration Date: September 30, 2020

6. Remarks:
   A. Description of Present Situation: See Section 2 of the Preliminary Engineering Report for additional details

   Existing Collection System: Brownsburg's sewer system includes combined and separate sanitary sewers. The older, central portion of Brownsburg is served by combined sewers. Two combined trunk sewers (North and South Trunk Sewers) convey wastewater and, during rains, storm water runoff to the East Plant. Brownsburg's newer subdivisions are served by separate sanitary sewers which are typically tributary to sanitary lift stations (28 total not including the major lift stations already identified herein). The force mains from some of the lift stations discharge to combined sewers leading to the East Plant. Other sanitary lift stations discharge to the 18-inch Northwest Sanitary Sewer leading to the West Lift Station, which is located near the West Plant entrance.

   Existing WWTP Description: The West Plant (main treatment plant) was placed into operation in 1987. At this time, the original treatment plant was converted into a preliminary treatment and pumping facility, called the East Plant. The East Plant discharges into the West Plant. In 2000, the West Plant was expanded to increase the Town's treatment capacity to an average capacity of 3.5 mgd and peak capacity of 6.7 mgd. In 1987, the East Plant was expanded to include CSO swirl concentrators and expanded again in 2009 to include a 1 million gallon (MG) CSO storage tank.

   B. Description of Proposed Facilities:
   - Sanitary Sewer Improvements:

Preliminary Draft

  - New CR 625 E interceptor
  - New US 136 lift station and force mains
- West Plant Improvements:
  - New screen building
  - New flow splitter (after screens)
  - New chemical phosphorus tanks and feed equipment
  - New mixed liquor conditioner
  - New Oxidation Ditch No. 5
  - New Secondary Clarifier No. 5 and RAS pumps
  - New tertiary filters
  - New ultraviolet disinfection (to replace chlorine system)
  - New cascade aerators
  - New outfall pipe
  - Modified non-potable water system
  - New Electrical building
  - New Annex Building
  - Associated instrumentation and electrical work
  - Associated yard piping and site work

C. Inspection During Construction to be provided by: Town of Brownsburg's Representative

7. Estimated Project Cost: $24.63 Million

   A. Source of Funding (Revenue Bond, State Grant,SRF, Etc.): SRF

   B. Total Cost: $24.63 Million

8. Certification Seal and Signature of Engineer:

Preliminary Draft

II. DESIGN DATA – PROPOSED WWTP EXPANSION:

1. Current Population: 23,282 (Source: Estimate for 2012)

2. Design Year and Population: Design Population: 41,050 (estimated year 2036)

3. Design Population Equivalent P.E.: 50,800

4. Proposed WWTP Capacities
   A. Average Design Flow: 5.25 MGD
   B. Peak Design Flow: 10.0 MGD

5. Existing WWTP Capacities:
   A. Average Design Flow: 3.5 MGD
   B. Peak Design Flow: 6.7 MGD

6. Design Waste Strength:
   A. Average CBOD: 225 mg/l or 9,852 lbs/day
   B. Average TSS: 175 mg/l or 7,662 lbs/day
   D. NH3-N: 25 mg/l or 1,095 lbs/day
   E. TKN: 42 mg/l or 1,839 lbs/day (Assumed to be 1.67 times NH_3-N)
   F. P: 7.0 mg/l (plant influent)

7. NPDES Permit Limitation on Effluent Quality:
   A. CBOD
      a. Summer: 10 mg/l
      b. Winter: 15 mg/l
   B. TSS:
      a. Summer: 12 mg/l
      b. Winter: 18 mg/l
   C. NH_3-N:
      a. Summer: 1.5 mg/l
      b. Winter: 2.2 mg/l
   D. P: 1.0 mg/l
   E. E coli: 125 Colonies/100 ml (235 max.)
   F. Chlorine Residual: 0.01 mg/l
   G. pH: 6.0 – 9.0
   H. D.O:
      a. Summer: Daily Minimum 7.0 mg/l
      b. Winter: Daily Minimum 5.0 mg/l

8. Receiving Stream:

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A. Name: White Lick Creek
B. Tributary to: White River
C. Stream Uses: Drainage
D. 7-day, 1-in-10 year low flow: 0 cfs

III. TREATMENT UNITS

A. Influent Flow Meters
   1. Type:
      a. Existing: Parshall Flume (2 locations)
      b. New: Parshall Flume (1 location)
   2. Location:
      a. Existing: Upstream of Oxidation Ditch
      b. New: Upstream of new Oxidation Ditch
   3. Indicating, recording and totalizing: Yes

B. Grit Chamber at East Plant (no changes in this expansion)
   1. Type of grit chamber: Detritus
   2. Number of units: 1
   3. Maximum flow, MGD: 7.2
   4. Size of unit
      a. Existing, ft: 14 (L), 14 (W), 2 (SWD)
   5. Dumpster
      a. Number: 1

C. Screens at East Plant (no changes in this expansion)

   1. Type:
      a. Mechanically Cleaned Screen
      b. Auger Monster Screen
   2. Number:
      a. Mechanically Cleaned Screen: 1
      b. Auger Monster Screen: 1
   3. Capacity, MGD: 10
   4. Bar spacing:
      a. Auger Monster: 1/4 inch
      b. Mechanically Cleaned Bar Screen: 1-inch
   5. Method of cleaning:
      a. Auger Monster: Rotating helical screw
      b. Mechanically cleaned bar screen: Mechanical raking

Preliminary Draft

6. Disposal of screenings: Dumpster and then landfill

D. New Screen Building (New) for Flows from West LS and US136 LS
   1. Type: Mechanically Cleaned Screen
      a. Number: 1
      b. Bar spacing: 1/4 inch
      c. Capacity: 8 MGD each
      d. Method of cleaning: Mechanically Cleaned
      e. Disposal of screenings: Screenings press and landfill
   2. Type: Manually Cleaned Bar Screen
      a. Number: 1
      b. Bar spacing: 1 inch
      c. Capacity: 8 MGD each
      d. Method of cleaning: Manually Cleaned
      e. Disposal of screenings: landfill

E. Anoxic Selector (Existing and New)

   1. Number of units:
      a. Existing : 4
      b. New : 1
   2. Size of units:
      a. Existing, ft:
         i. 3 chambers: 14 (L) x 14 (W) x 11.4 (SWD) for Ditches #1&2
         ii. 1 unit: 24 (L) x 24 (W) x 11.4 (SWD) for Ditches #3&4
      b. New, ft:
         i. 2 chambers -16 (L) x 16 (W) x 12 (SWD)
   3. Volume, cu ft:
      a. Existing : 13,270
      b. New : 6,140
   4. Detention Time, min:
      a. Existing: 41 at 3.5 MGD
      b. New : 38 at 1.75 MGD

F. Oxidation Ditch (Existing and New)
   1. Number of units :
      a. Existing: 4
      b. New : 1
   2. Size of units, ft :
      a. Existing: 151 (L) x 51 (W) x 12 (SWD)

Preliminary Draft

   b. New: 257 (L) x 65 (W) x 14 (SWD)
3. Volume of Oxidation Ditches, cu ft :
   a. Existing: 399,020
   b. New: 218,477
4. Detention time, hrs :
   a. Existing: 20.46
   b. New: 22.40
5. Average Organic loading , (lb BOD/ day /1000 cu ft) :
   a. Existing: 13.5
   b. New: 15.0
6. Average Mixed Liquor Suspended Solids, mg/l :
   a. Existing: 2,800
   b. New: 2,800
7. Solids retention time, days :
   a. Existing: >15
   b. New: > 15
8. Type and efficiency of aeration equipment (lbO_2 /BHP-hr) :
   a. Existing: Horizontal Bladed Rotor Aerator: 3.30
   b. New: Horizontal Bladed Rotor Aerator: 3.15
9. Oxygen required, lbs/day :
   a. Existing:
      i. Carbonaceous, Total: 9, 852
      ii. Nitrogenous, Total: 2,417
      iii. Total Demand: 12, 269
   b. NEW :
      i. Carbonaceous, Total: 4,926
      ii. Nitrogenous, Total: 1,209
      iii. Total Demand : 6,135
10. Oxygen provided, lbs/day :
   a. Existing:
      i. Actual Oxygen Transfer Rate (AOTR): 9, 500
      ii. Standard Oxygen Transfer Rate (SOTR): 14,700
   b. New:
      i. Actual Oxygen Transfer Rate (AOTR): 6,269
      ii. Standard Oxygen Transfer Rate (SOTR): 9,702
11. Flow velocity in ditch, fps :
   a. Existing: 1
   b. New:1
12. Facilities to isolate units (Existing & New) : Yes
13. Facilities for flow split control (Existing & New) : Yes

Preliminary Draft

G. Secondary Clarifier (Existing and New)
   1. Type of Clarifier:
      a. Existing: Circular, Peripheral Feed, Peripheral Collection
      b. New: Spiral Scrapers sludge collection mechanisms
   2. Number of units
      a. Existing: 4
      b. New: 1
   3. Size of units, ft:
      a. Existing:
         i. Diameter : 55
         ii. Side water depth: 12
      b. New:
         i. Diameter: 80
         ii. Side water depth: 15
   4. Total surface area, sq ft:
      a. Existing: 9,503
      b. New: 5,024
   5. Surface overflow rate at the design flow-installed capacity, gpd/sq ft:
      a. Existing:
         i. Average design flow: 368 at 3.5 MGD
         ii. Design peak flow: 699
      b. New:
         i. Average design flow: 348 at 1.75 MGD
         ii. Design peak flow: 661
   6. Detention time, hrs:
      a. Existing:
         i. Average design flow: 5.84 at 3.5 MGD
         ii. Design peak flow: 3.0
      b. New:
         i. Average design flow: 7.73 at 1.75 MGD
         ii. Design peak flow: 4.0
   7. Type of sludge removal mechanism:
      a. Existing: Scraper type collector
      b. New: Spiral Scraper type collector
   8. Solids loading rate, lbs/day/sq ft:
      a. Existing: 17.2 at 100% RAS recycle
      b. New: 16.26 at 100% RAS recycle
   9. Disposal of scum (Existing & New): Scum trough to drain pipe to digester
   10. Facilities for unit isolation (Existing & New): Yes
   11. Facilities for flow split control (Existing & New): Yes
   12. Design secondary clarifier effluent quality, mg/l (Existing & New) :

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a. Average BOD: 10
b. Average TSS: 10
c. Average NH3-N, in Summer: 1.5
d. Average NH3-N, in Winter: 2.2

H. Waste Activated Sludge (WAS)
1. Minimum concentration, mg/l :
   a. Existing: 5,000
   b. New: 5,000
2. Maximum concentration, mg/l:
   a. Existing: 9,000
   b. New: 9,000
3. Number of Pumps (Existing & New) : RAS Pumps used for Pumping WAS
4. Capacity, each, gpm (Existing & New): Same as that of the RAS Pumps
5. Design WAS Flow, gpm :
   a. Existing: 70
   b. New: 35
6. Dry weight at average WAS concentration, lbs/day:
   a. Existing: 5,885
   b. New: 2,943
7. Volatile solids, % :
   a. Existing: 75
   b. New: 75
8. Volatile solids, lbs/day :
   a. Existing: 4,414
   b. New: 2,207

I. Return Activated Sludge (RAS) (Existing and New)
1. Number of Pumps (including 1 standby pump):
   a. Existing: 5
   b. New: 2
2. Capacity of one return sludge pump, MGD (Existing & New): 1.8 existing, 2.6 new
3. Method of return sludge rate control (Existing & New): Control Valve (existing), VFD (new)
4. Peak return sludge rate as % of average design flow (Existing & New): 150 %
5. Provisions for return sludge metering (Existing & New): Magnetic Flow Meters
6. Location of return sludge discharge (Existing & New): Anoxic Selector Tanks
7. Location of new RAS pumps: New RAS and Electrical Building

J. Phosphorus Removal System (New)
1. Type of Removal System: Chemical precipitation

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2. Type of Chemicals: Ferric chloride or Alum
3. Chemical Feed Points: Aeration influent and Secondary Clarifier Influent (Operator selectable)
4. Feed rate (Ferric): 30 mg/l (approx. 300 gallons per day at design flow)
5. Chemical Storage: 5,000 gallon tank
6. Chemical Feed Pumps: 2 peristaltic pumps

K. Polishing Ponds (Currently used for disinfection; To be replaced by tertiary filters/UV disinfection system)

1. Number of Ponds: 1
2. Total Volume, cu ft: 321,000
3. Total Detention Time, days (@ design average flow): 0.68
4. Design polishing pond effluent quality
   a. Average BOD, mg/l: 10.0
   b. Average TSS, mg/l: 10.0

L. Tertiary Filter: Disc Filters (New)

1. Number and size of filters: 3 units (2 duty, 1 redundant)
2. Filter Area per Unit, sq ft: 1,085
3. Filtration rate, gpm per sq ft:
   a. at peak flow rate: 3.3
   b. at average flow rate: 1.7
4. Type of filter media: Cloth (Woven polyester)
5. Pore size of filter media, µm: 10
6. Backwash rate: 119 gpm
7. Capability to chlorinate ahead of the filter: No
8. Number of Backwash Pumps:1 per Unit
9. Type of Backwash Pumps: centrifugal pump (15 HP)
10. Method of rate control: Automatic
11. Source of capacity of backwash water: Filter effluent
12. Average Effluent TSS, mg/L: < 10

M. Chlorination (To be replaced by UV System)

1. Type of disinfectant used: Chlorine Gas
2. Size of Contact Tank: There is no separate contact tank. Disinfection contact occurs at polishing pond
3. Contact time: 0.68 days at 3.5 MGD
4. Chlorine dosage, mg/l: 6.0
5. Chlorine usage, lbs/day:
   a. Average: 117

Preliminary Draft

b. Maximum: 200

N. Dechlorination: (To be replaced by UV System)
1. Chemical used: Sodium Bisulfite
2. Sodium Bisulfite dosage, mg/l: 1
3. Sodium Bisulfite usage, gal/day:
   a. Average: 27
   b. Maximum: 75

O. UV Disinfection (New)
1. Type: Low pressure high output
2. Location: Downstream of Tertiary filters
3. Size of Channel, ft: 30 (L) x 2.67 (W) x 5.17 (D)
4. UV Dosage, mJ/cm^2: 30
5. Bypass: Through bypass channel
6. Cleaning Equipment: Automatic wiping system
7. Intensity Monitoring: Yes
8. Number of UV channels: 2

P. Cascade Aerators (Existing and new)
1. Total number of cascade aerators:
   a. Existing: 2
   b. New: 2
2. Number (in series):
   a. Existing: 1
   b. New: 1
3. Influent dissolved oxygen , mg/l: 3.0
4. Effluent dissolved oxygen, mg/l: 7.0
5. Maximum temperature, ^{o} C: 25.0
6. Total height of fall, ft: 21.5
7. Average effluent dissolved oxygen, mg/l: 7.0

Q. Combination Unit- Sludge Thickening/ Sludge Dewatering (No changes in this expansion)
1. Sludge Thickening & Dewatering Units:
   a. Existing:
      i. Number and size of thickener: 1; Belt Width, m: 1.5
2. Type of Sludge Thickeners / Dewatering Unit (Existing): Belt Press
3. Thickener/Dewatering Unit Capacity, gpm:
   a. Existing: 225

Preliminary Draft

4. Hydraulic Loading – Thickening, lbs/hour:
    a. Existing: 1125
5. Hydraulic Loading – TWAS Dewatering, lbs/hour:
    a. Existing: 750
6. Provisions to Chlorinate (Existing & Proposed): None
7. Thickened Sludge Concentration:
    a. Existing: 2-4%
8. Thickened Sludge Flow, gpd:
    a. Existing: 12,960
9. Thickened Sludge Filtrate, gpd:
    a. Existing: 51,840
10. Liquid Polymer Dosage, mg/l
    a. Existing:
        i. Minimum: 1.0
        ii. Maximum: 2.0
11. Liquid Polymer Feed Rate, gph @ 8.6 lbs/.gal
    a. Existing:
        i. Average flow at minimum dosage: 0.14
        ii. Maximum flow at maximum dosage: 0.71
12. Liquid Polymer Maximum Day Usage, gpd:
    a. Existing: 17.1

R. Aerobic Digesters (No changes in this expansion)
1. Number :
    a. Existing: 2
2. Size of units, ft:
    a. Existing: 70 dia., 15 SWD
3. Volume, each, cu ft (Existing): 60,300
4. Hydraulic detention time after thickening, days: 36.54
5. Solids retention time, days:
    a. Digester Tanks at 2% Solids: 19.2
    b. Digester Tanks at 3% Solids: 28.8
6. Solids loading, lbs volatile solids/cu ft/day: 0.027
7. Percent VSS reduction, maximum,
    a. Existing:
        i. Summer: 45
        ii. Winter: 38
8. Percent solids, digested sludge: Existing: 2.9%
9. Air supply, scfm per 1000 cu ft: 40

Preliminary Draft

10. Blowers:
    a. Existing:
        i. Number (1 Standby): 3
        ii. Capacity, scfm, each: 1,800
11. Decanting method: Using telescoping valves

S. Secondary Aerobic Digesters (No changes in this expansion)
1. Number of units: 2
2. Size of units, ft: Diameter-70; Side Water Depth: 15
3. Volume, each, cu ft: 60,300
4. Sludge solids content, %: 2.9
5. Maximum detention time in secondary digesters, days:
    a. @ 2.9 percent solids: 37.3
    b. @ 4.0 percent solids: 51.1
6. Blowers:
    a. Existing:
        i. Number (1 Standby): 3
        ii. Capacity, scfm , each: 1,200
7. Sludge transfer pumps:
    a. Existing:
        i. Number: 2
        ii. Capacity, gpm, each: 400
8. Decanting method (Existing) : Using telescoping valves
9. Decant pumps:
    a. Existing:
        i. Number: 2
        ii. Capacity, gpm, each: 250

T. Sludge Storage: (No changes in this expansion)
1. Type:
    a. Existing: Sludge Drying Bed
2. Number of beds:
    a. Existing: 6
3. Size, ft:
    a. Existing Beds:
        i. Width: 20
        ii. Length: 110
4. Total surface area, sq ft:
    a. Existing: 13,200
5. Maximum sludge depth, in:

Preliminary Draft

a. Existing: 10

6. Storage available at 10 inch depth, cu ft:
   a. Existing: 11,000
7. Storage available at 10 inch depth, gallons:
   a. Existing: 82,286

U. Sludge Disposal (No changes in this expansion)

1. Ultimate disposal method of sludge: Land application by private hauler
2. Expected solids content of land-applied dewatered biosolids (principal method of disposal): 15-20%

IV. SEWER COLLECTION SYSTEM

US 136 Lift Station

1. Location: Northwest corner of US 136 and County Road 625 E
2. Type of pump: Submersible End Suction
3. Number of pumps: 3 (2 duty, 1 standby)
4. Constant or variable speed: Constant
5. Capacity of pumps: 1200 gpm, each
6. RPM and TDH: 1750 rpm and 65 TDH
7. Volume of the wet well: 1500 cu. ft. (11,300 gallons)
8. Detention time in the wet well: 15 minutes at average design flow (775 gpm)
9. A gate valve and a check valve in the discharge line: Yes
10. A gate valve on suction line: N/A
11. Ventilation: 10” Vent Pipe
12. Standby power: 150 kW Diesel Generator
13. Alarm: Yes with telemetry system
14. Breakwater tanks: No

Preliminary Draft

15. Bypass or overflow: No

16. Type of force main: High Density Polyethylene Pipe (HDPE), DR-11

17. Diameter and length of force main:
    a. 14-inch (inside diameter) at approximately 5100 feet long

Sewer

1. Type of sewer material: Reinforced Concrete Pipe (RCP)

2. Diameter and length of sewer (indicate length for each size):
    a. 48" Diameter at approximately 2000 feet long

3. Stream, highway, and railroad crossing: CSX railroad crossing with directional bore

4. Separation of combined sewer or new sewer: New Sewer

5. Number of manholes: 8 for 48" RCP

6. Water main protection: N/A

+ + End of Basis of Design Summary + +

APPENDIX C

GREEN PROJECT RESERVE

STATE REVOLVING FUND LOAN PROGRAM

GREEN PROJECT RESERVE SUSTAINABILITY INCENTIVE

CLEAN WATER CHECKLIST

SRF Loan Program Participant Information

Participant Name: Town of Brownsburg, Indiana

Project Name/Location: Wastewater Treatment Plant Expansioin / Brownsburg, Indiana

Date: July 1, 2015 Revision No. _____

Instructions

This checklist shall be completed by the SRF Loan Program participant and be updated as the project changes from concept to design through construction completion. For instance, a checklist should be submitted with:

1. The SRF Loan Program Application,
2. The Preliminary Engineering Report, along with GPR project description and cost estimates,
3. The Post-Bid Documents, including GPR construction costs, and
4. Construction completion.

Please see the *U.S. EPA Green Project Reserve Guidance* available at www.srf.in.gov for a detailed review of eligibility, definition of the GPR categories: Green Infrastructure, Water Efficiency, Energy Efficiency and Environmentally innovative; examples of ineligible projects; categorical projects and those that require business cases. **All GPR projects, components and activities must be eligible for SRF funding.**

Check all that apply to the project:

I. GREEN INFRASTRUCTURE

1. Categorical Projects
   - ☐ Implementation of green streets (combinations of green infrastructure practices in transportation rights-of-way), for either new development, redevelopment or retrofits including:
     - ☐ Permeable pavement,
     - ☐ Bioretention,
     - ☐ Trees,
     - ☐ Green roofs, and
     - ☐ Other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales, and
     - ☐ Vactor trucks and other capital equipment necessary to maintain green infrastructure projects.
   - ☐ Wet weather management systems for parking areas including:
     - ☐ Permeable pavement,
     - ☐ Bioretention,
     - ☐ Trees,
     - ☐ Green roofs, and
     - ☐ Other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales.

        - ☐ Vactor trucks and other capital equipment necessary to maintain green infrastructure projects.
    - ☐ Implementation of comprehensive street tree or urban forestry programs, including expansion of tree boxes to manage additional stormwater and enhance tree health.
    - ☐ Stormwater harvesting and reuse projects, such as cisterns and the systems that allow for utilization of harvested stormwater, including pipes to distribute stormwater for reuse.
    - ☐ Downspout disconnection to remove stormwater from
        - ☐ Sanitary,
        - ☐ Combined sewers, and
        - ☐ Separate storm sewers and manage runoff onsite.
    - ☐ Comprehensive retrofit programs designed to keep wet weather discharges out of all types of sewer systems using green infrastructure technologies and approaches such as:
        - ☐ Green roofs,
        - ☐ Green walls,
        - ☐ Trees and urban reforestation,
        - ☐ Permeable pavements
        - ☐ Bioretention cells, and
        - ☐ Turf removal and replacement with native vegetation or trees that improve permeability.
    - ☐ Establishment or restoration of:
        - ☐ Permanent riparian buffers,
        - ☐ Floodplains,
        - ☐ Wetlands (federal rules prevent the SRF Loan Programs from providing financing assistance for a wetland required as a mitigation measure)
        - ☐ Vegetated buffers or soft bioengineered stream banks
        - ☐ Stream day lighting that removes natural streams from artificial pipes and restores a natural stream morphology that is capable of accommodating a range of hydrologic conditions while also providing biological integrity.
    - ☐ Projects that involve the management of wetlands to improve water quality and/or support green infrastructure efforts (e.g., flood attenuation).
        - ☐ Includes constructed wetlands.
        - ☐ May include natural or restored wetlands if the wetland and its multiple functions are not degraded and all permit requirements are met.
    - ☐ The water quality portion of projects that employ development and redevelopment practices that preserve or restore site hydrologic processes through sustainable landscaping and site design.
    - ☐ Fee simple purchase of land or easements on land that has a direct benefit to water quality, such as riparian and wetland protection or restoration.

2. Decision Criteria for Business Cases
    - ☐ Green infrastructure projects that are designed to mimic the natural hydrologic conditions of the site or watershed.
    - ☐ Projects that capture, treat, infiltrate, or evapotranspire water on the parcels where it falls and does not result in interbasin transfers of water.
    - ☐ GPR project is in lieu of or to supplement municipal hard/gray infrastructure.
    - ☐ Other - Please provide an attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Example of Project Requiring a Business Case
    - ☐ Fencing to keep livestock out of streams and stream buffers. Fencing must allow buffer vegetation to grow undisturbed and be placed a sufficient distance from the riparian edge for the buffer to function as a filter for sediment, nutrients and other pollutants.

II. WATER EFFICIENCY

1. Categorical Projects
   - ☐ Installing or retrofitting water efficient devices, such as plumbing fixtures and appliances.
     - ☐ For example, shower heads, toilets, urinals and other plumbing devices.
     - ☐ Implementation of incentive programs to conserve water such as rebates.
     - ☐ Water sense labeled products.
   - ☐ Installing any type of water meter in previously unmetered areas, if rate structures are based on metered use
     - ☐ Can include backflow prevention devices if installed in conjunction with water meter
   - ☐ Replacing existing broken/malfunctioning water meters, or upgrading existing meters, with:
     - ☐ Automatic meter reading systems (AMR), for example:
       - ☐ Advanced metering infrastructure (AMI),
       - ☐ Smart meters,
     - ☐ Meters with built in leak detection,
     - ☐ Can include backflow prevention devices if installed in conjunction with water meter replacement.
   - ☐ Retrofitting/adding AMR capabilities or leak detection equipment to existing meters (not replacing the meter itself).
   - ☐ Water audit and water conservation plans, which are reasonably expected to result in a capital project.
   - ☒ Recycling and water reuse projects that replace potable sources with non-potable sources:
     - ☒ Gray water, condensate and wastewater effluent reuse systems (where local codes allow the practice),
     - ☒ Extra treatment costs and distribution pipes associated with water reuse.
   - ☐ Retrofit or replacement of existing landscape irrigation systems to more efficient landscape irrigation systems, including moisture and rain sensing controllers.
   - ☐ Retrofit or replacement of existing agricultural irrigation systems to more efficient agricultural irrigation systems.

2. Decision Criteria for Business Cases
   - ☐ Water efficiency can be accomplished through water saving elements or reducing water consumption. This will reduce the amount of water taken out of rivers, lakes, streams, groundwater, or from other sources.
   - ☐ Water efficiency projects should deliver equal or better services with less net water use as compared to traditional or standard technologies and practices.
   - ☐ Efficient water use often has the added benefit of reducing the amount of energy required by a POTW, since less water would need to be collected and treated; therefore, there are also energy and financial savings.
   - ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Example Projects Requiring a Business Case
   - ☐ Water meter replacement with traditional water meters.
   - ☐ Projects that result from a water audit or water conservation plan.
   - ☐ Storage tank replacement/rehabilitation to reduce loss of reclaimed water.
   - ☐ New water efficient landscape irrigation system.
   - ☐ New water efficient agricultural irrigation system.

III. ENERGY EFFICIENCY

1. Categorical Projects
   - ☐ Renewable energy projects such as wind, solar, geothermal, micro-hydroelectric, and biogas combined heat and power systems that provide power to a POTW. Micro-hydroelectric projects involve capturing the energy from pipe flow.
     - ☐ POTW owned renewable energy projects can be located onsite or offsite.
     - ☐ Include the portion of a publicly owned renewable energy project that POTW's energy needs.
     - ☐ Must feed into grid system that the utility draws from and/or there is a direction connection.
   - ☐ POTW energy management planning, including energy assessments, energy audits, optimization studies, and sub-metering of individual processes to determine high energy use areas, which are reasonably expected to result in a capital project are eligible.
   - ☒ Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR. If a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case.
   - ☐ Collection system Infiltration/Inflow detection equipment.

2. Decision Criteria for Business Cases
   - ☐ Project must be cost effective. An evaluation must identify energy savings and payback on capital and operation and maintenance costs that does not exceed the useful life of the asset.
   - ☐ The business case must describe how the project maximizes energy saving opportunities for the POTW or unit process.
   - ☐ Using existing tools such as Energy Star's Portfolio Manager (http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager) or Check Up Program for Small Systems (CUPSS) (http://www.epa/cupss) to document current energy usage and track anticipated savings.
   - ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Examples of Projects Requiring a Business Case
   - ☐ POTW projects or unit process projects that achieve less than a 20% energy efficiency improvement may be justified using a business case.
   - ☐ Projects implementing recommendations from an energy audit that are not otherwise designated as categorical.
   - ☐ Projects that cost effectively eliminate pumps or pumping stations.
   - ☐ Infiltration/Inflow (I/I) correction projects that save energy from pumping and reduced treatment costs and are cost effective.
     - ☐ Projects that count toward GPR cannot build new structural capacity. These projects may, however, recover existing capacity by reducing flow from I/I.
   - ☐ I/I correction projects where excessive groundwater infiltration is contaminating the influent requiring otherwise unnecessary treatment processes (i.e. arsenic laden groundwater) and I/I correction is cost effective.
   - ☐ Replacing pre-Energy Policy Act of 1992 motors with National Electric Manufacturers Association (NEMA) premium energy efficiency motors.
     - ☐ NEMA is a standards setting association for the electrical manufacturing industry (http://www.nema.org/gov/energy/efficiency/premium/).
   - ☐ Upgrade of POTW lighting to energy efficient sources (such as metal halide pulse start technologies, compact fluorescent, light emitting diode (LED)).
   - ☐ SCADA systems can be justified based upon substantial energy savings.
   - ☐ Variable Frequency Drive can be justified based upon substantial energy savings.

IV. ENVIRONMENTALLY INNOVATIVE

1. Categorical Projects
   - ☐ Total/integrated water resources management planning likely to result in a capital project.
   - ☐ Utility Sustainability Plan consistent with EPA's SRF sustainability policy.
   - ☐ Greenhouse gas (GHG) inventory or mitigation plan and submission of a GHG inventory to a registry (such as Climate Leaders or Climate Registry).
   - ☐ Planning activities by a POTW to prepare for adaptation to the long-term effects of climate change and/or extreme weather.
   - ☒ Construction of US Building Council LEED certified buildings or renovation of an existing building on POTW facilities.
   - ☐ Decentralized wastewater treatment solutions to existing deficient or failing onsite wastewater systems.

2. Decision Criteria for Business Cases
   - ☐ Technology or approach whose performance is expected to address water quality but the actual performance has not been demonstrated in the state;
   - ☐ Technology or approach that is not widely used in the state, but does perform as well or better than conventional technology/approaches at lower cost; or
   - ☐ Conventional technology or approaches that are used in a new application in the state.
   - ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Examples of Projects Requiring a Business Case
   - ☐ Constructed wetlands projects used for municipal wastewater treatment, polishing, and/or effluent disposal.
     - ☐ Natural wetlands.
     - ☐ Project may not further degrade.
   - ☐ Projects or components of projects that result from total/integrated water resource management planning consistent with the decision criteria for environmentally innovative projects and that are Clean Water SRF eligible.
   - ☐ Projects that facilitate adaptation of POTWs to climate change identified by a carbon footprint assessment or climate adaptation study.
   - ☐ POTW upgrades or retrofits that remove phosphorus for beneficial use, such as biofuel production with algae.
   - ☐ Application of innovative treatment technologies or systems that improve environmental conditions and are consistent with the Decision Criteria for environmentally innovative projects such as:
     - ☐ Projects that significantly reduce or eliminate the use of chemicals in wastewater treatment.
     - ☐ Treatment technologies or approaches that significantly reduce the volume of residuals, minimize the generation of residuals, or lower the amount of chemicals in the residuals.
       - ☐ Includes composting, Class A and other sustainable biosolids management approaches.
   - ☐ Educational activities and demonstration projects for water or energy efficiency.
   - ☐ Projects that achieve the goals/objectives of utility asset management plans.
   - ☐ Sub-surface land application of effluent and other means for ground water recharge, such as spray irrigation and overland flow.
     - ☐ Spray irrigation and overland flow of effluent is not eligible for GPR where there is no other cost effective alternative.

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APPENDIX D

RESOLUTIONS

A.
MODEL AUTHORIZED REPRESENTATIVE RESOLUTION

WHEREAS, the (PARTICIPANT) of Brownsburg, Indiana, herein called Town of Brownsburg, has plans for a municipal water pollution control project to meet State and Federal regulations, such as the NPDES discharge limitations, and the community intends to proceed with the construction of such works:

WHEREAS, the (PARTICIPANT) has adopted this Resolution dated _____.

NOW, THEREFORE, BE IT RESOLVED by the Council/Board, the governing body of said Town of Brownsburg, that:

1. **The Town of Brownsburg be authorized to make application for an SRF Loan and provide the State Revolving Fund Loan Program such information, otherwise act as the authorized representative of the community.**

2. **The community agrees to comply with the Indiana Finance Authority, State of Indiana and Federal requirements as they pertain to the SRF.**

3. **That two copies of the resolution be prepared and submitted as part of the community's Preliminary Engineering Report.**

ADOPTED this _____ day of _____, 2015.

THE (PARTICIPANT) OF Brownsburg, INDIANA
BY AND THROUGH ITS TOWN COUNCIL

AUTHORIZED SIGNATORY

_____ **BY: _____**

_____

_____

_____

_____

ATTEST: _____

B.
MODEL PER ACCEPTANCE RESOLUTION

WHEREAS, the Town of Brownsburg of Hendricks, County Indiana, has caused a Preliminary Engineering Report, PER, dated March 2016, to be prepared by the consulting firm of Arcadis U.S., Inc; and

WHEREAS, said PER has been presented to the public at a public hearing held _____, for their comments; and

WHEREAS, the Town of Brownsburg's Town Council finds that there was not sufficient evidence presented in objection to the recommended project in the Preliminary Engineering Report.

NOW, THEREFORE, BE IT RESOLVED THAT:

The Brownsburg Wastewater Treatment Plant Expansion and Sanitary Sewer Collection System improvements, Phase 1 Preliminary Engineering Report dated March 2016, be approved and adopted by the Town of Brownsburg's Town Council; and that said PER be submitted to the State Revolving Fund Loan Program for review and approval.

Passed and adopted by the Town of Brownsburg's Town Council this _____ day of _____, at their regularly scheduled meeting.

_____

Town Council President (Ashley Bascu) **Attest:_____**

_____

Town Council Vice President (Dennis Dawes)

_____

Member (Christopher Worley)

_____

Member (Brian Jessen)

_____

Member (Sean Benham)

UMBAUGH

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May 25, 2016

Town Council
Town of Brownsburg
61 North Green Street
Brownsburg, Indiana 46112

Re: Sewage Works Financial Analysis

Dear Members of the Council:

The attached schedules (listed below) present unaudited and limited information for the purpose of discussion and consideration in the preliminary planning stage of a possible adjustment in sewer rates and charges by the appropriate officers, officials and advisors of the Brownsburg Municipal Sewage Works. The use of these schedules should be restricted to this purpose, for internal use only, as the information is subject to future revision and further reports.

Page (s)

PRO FORMA FINANCIAL INFORMATION

3 Schedule of Estimated Project Costs and Funding
4 Schedule of Amortization of $10,000,000 Principal Amount of Proposed Sewage Works Revenue Bonds, Series 2016A – Alternative I
5 Schedule of Amortization of $10,790,000 Principal Amount of Proposed Sewage Works Revenue Bonds, Series 2016B – Alternative I
6 Schedule of Pro Forma Combined Bond Amortization – Alternative I
7 Schedule of Amortization of $10,000,000 Principal Amount of Proposed Sewage Works Revenue Bonds, Series 2016A – Alternative II
8 Schedule of Amortization of $5,490,000 Principal Amount of Proposed Sewage Works Revenue Bonds, Series 2016B – Alternative II
9 Schedule of Pro Forma Combined Bond Amortization – Alternative II
10 - 13 Pro Forma Annual Cash Operating Disbursements
14 - 15 Pro Forma Annual Revenue Requirements and Available Revenues – Alternative I
16 - 17 Pro Forma Annual Revenue Requirements and Available Revenues – Alternative II
18 - 19 Schedule of Present and Proposed Wastewater Rates and Charges – Alternative I
20 - 21 Schedule of Present and Proposed Wastewater Rates and Charges – Alternative II
22 Schedule of Present Stormwater Rates and Charges
23 Comparison of Monthly Billings for Local Indiana Communities – Alternative I
24 Comparison of Monthly Billings for Local Indiana Communities – Alternative II

SUPPLEMENTAL FINANCIAL DATA

25 Comparative Schedule of Selected Financial Information Arising From Cash Transactions - *Combined*
26 - 27 Comparative Schedule of Cash Receipts and Disbursements - *Combined*
28 Comparative Schedule of Selected Financial Information Arising From Cash Transactions - *Wastewater*

SUPPLEMENTAL FINANCIAL DATA (Cont'd)

29 - 30 Comparative Schedule of Cash Receipts and Disbursements - *Wastewater*
31 - 32 Comparative Schedule of Detailed Operating Disbursements - *Wastewater*
33 Comparative Schedule of Selected Financial Information Arising From Cash Transactions - *Stormwater*
34 Comparative Schedule of Cash Receipts and Disbursements - *Stormwater*
35 Comparison of Account Balances and Minimum Balances Required
36 Schedule of Amortization of $1,948,000 Principal Amount of Outstanding Sewage Works Revenue Bonds of 1998
37 Schedule of Amortization of $3,851,000 Principal Amount of Outstanding Sewage Works Revenue Bonds, Series 2009 A
38 Schedule of Amortization of $5,135,000 Principal Amount of Outstanding Sewage Works Revenue Bonds, Series 2011 A
39 Schedule of Combined Bond Amortization

CALCULATION OF OUTSIDE OF TOWN SURCHARGE

40 Outside of Town Surcharge by Meter Size – Alternative I
41 Outside of Town Surcharge by Meter Size – Alternative II

CALCULATION OF SEWAGE WORKS AVAILABILITY FEE

42 Calculation of Equivalent Dwelling Units
43 Calculation of Availability Fee
44 Calculation of Sewer Availability Fees for Oversize Meters
45 Comparison of System Development Charges

We would appreciate your questions or comments on this information and would provide additional information upon request.

Very truly yours,

UMBAUGH

Scott A. Miller

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

PRO FORMA FINANCIAL INFORMATION

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF ESTIMATED PROJECT COSTS AND FUNDING
(Per Consulting Engineer)

ESTIMATED PROJECT COSTS	Alternatives	
	Alternative I	Alternative II
Construction and contingencies: (1)		
Wastewater Treatment Plant	$18,296,300	$13,406,400
Sanitary Sewer expansion	3,843,700	3,433,600
Total Construction and Contingencies	22,140,000	16,840,000
Non-construction:		
Engineering fees:		
Design	2,277,273	2,277,273
Construction engineering services	1,000,000	1,000,000
Project inspection	1,250,000	1,250,000
Allowance for legal, financial advisory, bond issuance costs and rounding	200,000	200,000
Total Non-Construction	4,727,273	4,727,273
Total Estimated Project Costs	$26,867,273	$21,567,273
ESTIMATED PROJECT FUNDING		
Proposed Sewage Works Revenue Bonds, Series 2016A (2)	$10,000,000	$10,000,000
Proposed Sewage Works Revenue Bonds, Series 2016B (2)	10,790,000	5,490,000
Cash on hand (3)	2,277,273	2,277,273
Cash on hand (4)	3,800,000	3,800,000
Total Estimated Project Funding	$26,867,273	$21,567,273

(1) Updated amounts provided by the consulting engineer on February 18, 2016, assuming a 5% contingency.
(2) Assumes the bonds will be sold through the Indiana State Revolving Fund Loan Program ("SRF").
(3) Applied to the engineering design fees and paid from Funds 606 and 609. The Town will not seek reimbursement from bond proceeds.
(4) Cash on hand from Utility and other Town funds applied in addition to $2,500,000 of cash on hand used to prepay the Outstanding 1998 Bonds.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $10,000,000 PRINCIPAL AMOUNT OF
PROPOSED SEWAGE WORKS REVENUE BONDS, SERIES 2016A - ALTERNATIVE I
Principal payable annually on November 1st, beginning November 1, 2019.
Interest payable semi-annually on May 1st and November 1st, beginning May 1, 2017.
Assumed interest rate as indicated.
Assumes bonds are dated December 15, 2016.
(SRF - Traditional)

Payment Date	Principal Balance	Assumed Interest Rate	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000s)	(----------In Dollars----------)		
05/01/17	$10,000			$75,555.56 *	$75,555.56	
11/01/17	10,000			100,000.00 *	100,000.00	$175,555.56
05/01/18	10,000			100,000.00 *	100,000.00	
11/01/18	10,000			100,000.00 *	100,000.00	200,000.00
05/01/19	10,000			100,000.00 *	100,000.00	
11/01/19	10,000	2.00	$50	100,000.00	150,000.00	250,000.00
05/01/20	9,950			99,500.00	99,500.00	
11/01/20	9,950	2.00	50	99,500.00	149,500.00	249,000.00
05/01/21	9,900			99,000.00	99,000.00	
11/01/21	9,900	2.00	80	99,000.00	179,000.00	278,000.00
05/01/22	9,820			98,200.00	98,200.00	
11/01/22	9,820	2.00	80	98,200.00	178,200.00	276,400.00
05/01/23	9,740			97,400.00	97,400.00	
11/01/23	9,740	2.00	80	97,400.00	177,400.00	274,800.00
05/01/24	9,660			96,600.00	96,600.00	
11/01/24	9,660	2.00	80	96,600.00	176,600.00	273,200.00
05/01/25	9,580			95,800.00	95,800.00	
11/01/25	9,580	2.00	80	95,800.00	175,800.00	271,600.00
05/01/26	9,500			95,000.00	95,000.00	
11/01/26	9,500	2.00	80	95,000.00	175,000.00	270,000.00
05/01/27	9,420			94,200.00	94,200.00	
11/01/27	9,420	2.00	80	94,200.00	174,200.00	268,400.00
05/01/28	9,340			93,400.00	93,400.00	
11/01/28	9,340	2.00	443	93,400.00	536,400.00	629,800.00
05/01/29	8,897			88,970.00	88,970.00	
11/01/29	8,897	2.00	455	88,970.00	543,970.00	632,940.00
05/01/30	8,442			84,420.00	84,420.00	
11/01/30	8,442	2.00	469	84,420.00	553,420.00	637,840.00
05/01/31	7,973			79,730.00	79,730.00	
11/01/31	7,973	2.00	479	79,730.00	558,730.00	638,460.00
05/01/32	7,494			74,940.00	74,940.00	
11/01/32	7,494	2.00	971	74,940.00	1,045,940.00	1,120,880.00
05/01/33	6,523			65,230.00	65,230.00	
11/01/33	6,523	2.00	1,002	65,230.00	1,067,230.00	1,132,460.00
05/01/34	5,521			55,210.00	55,210.00	
11/01/34	5,521	2.00	1,035	55,210.00	1,090,210.00	1,145,420.00
05/01/35	4,486			44,860.00	44,860.00	
11/01/35	4,486	2.00	1,068	44,860.00	1,112,860.00	1,157,720.00
05/01/36	3,418			34,180.00	34,180.00	
11/01/36	3,418	2.00	1,103	34,180.00	1,137,180.00	1,171,360.00
05/01/37	2,315			23,150.00	23,150.00	
11/01/37	2,315	2.00	1,139	23,150.00	1,162,150.00	1,185,300.00
05/01/38	1,176			11,760.00	11,760.00	
11/01/38	1,176	2.00	1,176	11,760.00	1,187,760.00	1,199,520.00
Totals			$10,000	$3,438,655.56	$13,438,655.56	$13,438,655.56

Average annual principal and interest payment
for the five bond years ending November 1, 2023 $265,640.00

* Subject to change. Interest payments will be calculated based upon principal amounts drawn down.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $10,790,000 PRINCIPAL AMOUNT OF
PROPOSED SEWAGE WORKS REVENUE BONDS, SERIES 2016B - ALTERNATIVE I
Principal payable annually on November 1st, beginning November 1, 2019.
Interest payable semi-annually on May 1st and November 1st, beginning May 1, 2017.
Assumed interest rate as indicated.
Assumes bonds are dated December 15, 2016.
(SRF - Pooled)

Payment Date	Principal Balance	Assumed Interest Rate	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000s)	(----------In Dollars----------)		
05/01/17	$10,790			$101,905.56	$101,905.56	
11/01/17	10,790			134,875.00	134,875.00	$236,780.56
05/01/18	10,790			134,875.00	134,875.00	
11/01/18	10,790			134,875.00	134,875.00	269,750.00
05/01/19	10,790			134,875.00	134,875.00	
11/01/19	10,790	2.50	$200	134,875.00	334,875.00	469,750.00
05/01/20	10,590			132,375.00	132,375.00	
11/01/20	10,590	2.50	213	132,375.00	345,375.00	477,750.00
05/01/21	10,377			129,712.50	129,712.50	
11/01/21	10,377	2.50	351	129,712.50	480,712.50	610,425.00
05/01/22	10,026			125,325.00	125,325.00	
11/01/22	10,026	2.50	363	125,325.00	488,325.00	613,650.00
05/01/23	9,663			120,787.50	120,787.50	
11/01/23	9,663	2.50	370	120,787.50	490,787.50	611,575.00
05/01/24	9,293			116,162.50	116,162.50	
11/01/24	9,293	2.50	378	116,162.50	494,162.50	610,325.00
05/01/25	8,915			111,437.50	111,437.50	
11/01/25	8,915	2.50	389	111,437.50	500,437.50	611,875.00
05/01/26	8,526			106,575.00	106,575.00	
11/01/26	8,526	2.50	394	106,575.00	500,575.00	607,150.00
05/01/27	8,132			101,650.00	101,650.00	
11/01/27	8,132	2.50	400	101,650.00	501,650.00	603,300.00
05/01/28	7,732			96,650.00	96,650.00	
11/01/28	7,732	2.50	659	96,650.00	755,650.00	852,300.00
05/01/29	7,073			88,412.50	88,412.50	
11/01/29	7,073	2.50	670	88,412.50	758,412.50	846,825.00
05/01/30	6,403			80,037.50	80,037.50	
11/01/30	6,403	2.50	681	80,037.50	761,037.50	841,075.00
05/01/31	5,722			71,525.00	71,525.00	
11/01/31	5,722	2.50	692	71,525.00	763,525.00	835,050.00
05/01/32	5,030			62,875.00	62,875.00	
11/01/32	5,030	2.50	703	62,875.00	765,875.00	828,750.00
05/01/33	4,327			54,087.50	54,087.50	
11/01/33	4,327	2.50	709	54,087.50	763,087.50	817,175.00
05/01/34	3,618			45,225.00	45,225.00	
11/01/34	3,618	2.50	714	45,225.00	759,225.00	804,450.00
05/01/35	2,904			36,300.00	36,300.00	
11/01/35	2,904	2.50	720	36,300.00	756,300.00	792,600.00
05/01/36	2,184			27,300.00	27,300.00	
11/01/36	2,184	2.50	724	27,300.00	751,300.00	778,600.00
05/01/37	1,460			18,250.00	18,250.00	
11/01/37	1,460	2.50	728	18,250.00	746,250.00	764,500.00
05/01/38	732			9,150.00	9,150.00	
11/01/38	732	2.50	732	9,150.00	741,150.00	750,300.00
Totals			$10,790	$3,843,955.56	$14,633,955.56	$14,633,955.56

Average annual principal and interest payment
for the five bond years ending November 1, 2023 $556,630.00

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF PRO FORMA COMBINED BOND AMORTIZATION - ALTERNATIVE I

Payment Date	Outstanding (1) 2009A Bonds	Outstanding (1) 2011A Bonds	Proposed 2016A Bonds	Proposed 2016B Bonds	Total	Bond Year Total
05/01/16	$74,516.85	$108,825.63			$183,342.48	
11/01/16	102,516.85	338,825.63			441,342.48	$624,684.96
05/01/17	73,975.05	105,375.63	$75,555.56	$101,905.56	356,811.80	
11/01/17	102,975.05	340,375.63	100,000.00	134,875.00	678,225.68	1,035,037.48
05/01/18	73,413.90	101,850.63	100,000.00	134,875.00	410,139.53	
11/01/18	103,413.90	346,850.63	100,000.00	134,875.00	685,139.53	1,095,279.06
05/01/19	72,833.40	96,950.63	100,000.00	134,875.00	404,659.03	
11/01/19	104,833.40	346,950.63	150,000.00	334,875.00	936,659.03	1,341,318.06
05/01/20	72,214.20	91,950.63	99,500.00	132,375.00	396,039.83	
11/01/20	105,214.20	356,950.63	149,500.00	345,375.00	957,039.83	1,353,079.66
05/01/21	71,575.65	86,650.63	99,000.00	129,712.50	386,938.78	
11/01/21	541,575.65	361,650.63	179,000.00	480,712.50	1,562,938.78	1,949,877.56
05/01/22	62,481.15	81,150.63	98,200.00	125,325.00	367,156.78	
11/01/22	550,481.15	366,150.63	178,200.00	488,325.00	1,583,156.78	1,950,313.56
05/01/23	53,038.35	75,272.50	97,400.00	120,787.50	346,498.35	
11/01/23	560,038.35	375,272.50	177,400.00	490,787.50	1,603,498.35	1,949,996.70
05/01/24	43,227.90	68,897.50	96,600.00	116,162.50	324,887.90	
11/01/24	570,227.90	383,897.50	176,600.00	494,162.50	1,624,887.90	1,949,775.80
05/01/25	33,030.45	62,006.88	95,800.00	111,437.50	302,274.83	
11/01/25	580,030.45	392,006.88	175,800.00	500,437.50	1,648,274.83	1,950,549.66
05/01/26	22,446.00	54,746.88	95,000.00	106,575.00	278,767.88	
11/01/26	591,446.00	404,746.88	175,000.00	500,575.00	1,671,767.88	1,950,535.76
05/01/27	11,435.85	47,046.88	94,200.00	101,650.00	254,332.73	
11/01/27	602,435.85	417,046.88	174,200.00	501,650.00	1,695,332.73	1,949,665.46
05/01/28		38,721.88	93,400.00	96,650.00	228,771.88	
11/01/28		428,721.88	536,400.00	755,650.00	1,720,771.88	1,949,543.76
05/01/29		29,946.88	88,970.00	88,412.50	207,329.38	
11/01/29		439,946.88	543,970.00	758,412.50	1,742,329.38	1,949,658.76
05/01/30		20,465.63	84,420.00	80,037.50	184,923.13	
11/01/30		450,465.63	553,420.00	761,037.50	1,764,923.13	1,949,846.26
05/01/31		10,521.88	79,730.00	71,525.00	161,776.88	
11/01/31		465,521.88	558,730.00	763,525.00	1,787,776.88	1,949,553.76
05/01/32			74,940.00	62,875.00	137,815.00	
11/01/32			1,045,940.00	765,875.00	1,811,815.00	1,949,630.00
05/01/33			65,230.00	54,087.50	119,317.50	
11/01/33			1,067,230.00	763,087.50	1,830,317.50	1,949,635.00
05/01/34			55,210.00	45,225.00	100,435.00	
11/01/34			1,090,210.00	759,225.00	1,849,435.00	1,949,870.00
05/01/35			44,860.00	36,300.00	81,160.00	
11/01/35			1,112,860.00	756,300.00	1,869,160.00	1,950,320.00
05/01/36			34,180.00	27,300.00	61,480.00	
11/01/36			1,137,180.00	751,300.00	1,888,480.00	1,949,960.00
05/01/37			23,150.00	18,250.00	41,400.00	
11/01/37			1,162,150.00	746,250.00	1,908,400.00	1,949,800.00
05/01/38			11,760.00	9,150.00	20,910.00	
11/01/38			1,187,760.00	741,150.00	1,928,910.00	1,949,820.00
Totals	$5,179,377.50	$7,295,762.64	$13,438,655.56	$14,633,955.56	$40,547,751.26	$40,547,751.26

Average annual principal and interest payment
for the five bond years ending November 1, 2023 $1,708,917.11

(1) Assumes outstanding 1998 Bonds are retired early using $2,500,000 of cash on hand.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $10,000,000 PRINCIPAL AMOUNT OF
PROPOSED SEWAGE WORKS REVENUE BONDS, SERIES 2016A - ALTERNATIVE II
Principal payable annually on November 1st, beginning November 1, 2019.
Interest payable semi-annually on May 1st and November 1st, beginning May 1, 2017.
Assumed interest rate as indicated.
Assumes bonds are dated December 15, 2016.
(SRF - Traditional)

Payment Date	Principal Balance	Assumed Interest Rate	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000s)	(----------In Dollars----------)		
05/01/17	$10,000			$75,555.56 *	$75,555.56	
11/01/17	10,000			100,000.00 *	100,000.00	$175,555.56
05/01/18	10,000			100,000.00 *	100,000.00	
11/01/18	10,000			100,000.00 *	100,000.00	200,000.00
05/01/19	10,000			100,000.00 *	100,000.00	
11/01/19	10,000	2.00	$50	100,000.00	150,000.00	250,000.00
05/01/20	9,950			99,500.00	99,500.00	
11/01/20	9,950	2.00	50	99,500.00	149,500.00	249,000.00
05/01/21	9,900			99,000.00	99,000.00	
11/01/21	9,900	2.00	80	99,000.00	179,000.00	278,000.00
05/01/22	9,820			98,200.00	98,200.00	
11/01/22	9,820	2.00	80	98,200.00	178,200.00	276,400.00
05/01/23	9,740			97,400.00	97,400.00	
11/01/23	9,740	2.00	80	97,400.00	177,400.00	274,800.00
05/01/24	9,660			96,600.00	96,600.00	
11/01/24	9,660	2.00	80	96,600.00	176,600.00	273,200.00
05/01/25	9,580			95,800.00	95,800.00	
11/01/25	9,580	2.00	80	95,800.00	175,800.00	271,600.00
05/01/26	9,500			95,000.00	95,000.00	
11/01/26	9,500	2.00	80	95,000.00	175,000.00	270,000.00
05/01/27	9,420			94,200.00	94,200.00	
11/01/27	9,420	2.00	80	94,200.00	174,200.00	268,400.00
05/01/28	9,340			93,400.00	93,400.00	
11/01/28	9,340	2.00	443	93,400.00	536,400.00	629,800.00
05/01/29	8,897			88,970.00	88,970.00	
11/01/29	8,897	2.00	455	88,970.00	543,970.00	632,940.00
05/01/30	8,442			84,420.00	84,420.00	
11/01/30	8,442	2.00	469	84,420.00	553,420.00	637,840.00
05/01/31	7,973			79,730.00	79,730.00	
11/01/31	7,973	2.00	479	79,730.00	558,730.00	638,460.00
05/01/32	7,494			74,940.00	74,940.00	
11/01/32	7,494	2.00	971	74,940.00	1,045,940.00	1,120,880.00
05/01/33	6,523			65,230.00	65,230.00	
11/01/33	6,523	2.00	1,002	65,230.00	1,067,230.00	1,132,460.00
05/01/34	5,521			55,210.00	55,210.00	
11/01/34	5,521	2.00	1,035	55,210.00	1,090,210.00	1,145,420.00
05/01/35	4,486			44,860.00	44,860.00	
11/01/35	4,486	2.00	1,068	44,860.00	1,112,860.00	1,157,720.00
05/01/36	3,418			34,180.00	34,180.00	
11/01/36	3,418	2.00	1,103	34,180.00	1,137,180.00	1,171,360.00
05/01/37	2,315			23,150.00	23,150.00	
11/01/37	2,315	2.00	1,139	23,150.00	1,162,150.00	1,185,300.00
05/01/38	1,176			11,760.00	11,760.00	
11/01/38	1,176	2.00	1,176	11,760.00	1,187,760.00	1,199,520.00
Totals			$10,000	$3,438,655.56	$13,438,655.56	$13,438,655.56

Average annual principal and interest payment
for the five bond years ending November 1, 2023 $265,640.00

* Subject to change. Interest payments will be calculated based upon principal amounts drawn down.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $5,490,000 PRINCIPAL AMOUNT OF
PROPOSED SEWAGE WORKS REVENUE BONDS, SERIES 2016B - ALTERNATIVE II
Principal payable annually on November 1st, beginning November 1, 2019.
Interest payable semi-annually on May 1st and November 1st, beginning May 1, 2017.
Assumed interest rate as indicated.
Assumes bonds are dated December 15, 2016.
(SRF - Pooled)

Payment Date	Principal Balance	Assumed Interest Rate	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000s)	(----------In Dollars----------)		
05/01/17	$5,490			$51,850.00	$51,850.00	
11/01/17	5,490			68,625.00	68,625.00	$120,475.00
05/01/18	5,490			68,625.00	68,625.00	
11/01/18	5,490			68,625.00	68,625.00	137,250.00
05/01/19	5,490			68,625.00	68,625.00	
11/01/19	5,490	2.50	$50	68,625.00	118,625.00	187,250.00
05/01/20	5,440			68,000.00	68,000.00	
11/01/20	5,440	2.50	60	68,000.00	128,000.00	196,000.00
05/01/21	5,380			67,250.00	67,250.00	
11/01/21	5,380	2.50	128	67,250.00	195,250.00	262,500.00
05/01/22	5,252			65,650.00	65,650.00	
11/01/22	5,252	2.50	134	65,650.00	199,650.00	265,300.00
05/01/23	5,118			63,975.00	63,975.00	
11/01/23	5,118	2.50	135	63,975.00	198,975.00	262,950.00
05/01/24	4,983			62,287.50	62,287.50	
11/01/24	4,983	2.50	138	62,287.50	200,287.50	262,575.00
05/01/25	4,845			60,562.50	60,562.50	
11/01/25	4,845	2.50	142	60,562.50	202,562.50	263,125.00
05/01/26	4,703			58,787.50	58,787.50	
11/01/26	4,703	2.50	141	58,787.50	199,787.50	258,575.00
05/01/27	4,562			57,025.00	57,025.00	
11/01/27	4,562	2.50	141	57,025.00	198,025.00	255,050.00
05/01/28	4,421			55,262.50	55,262.50	
11/01/28	4,421	2.50	394	55,262.50	449,262.50	504,525.00
05/01/29	4,027			50,337.50	50,337.50	
11/01/29	4,027	2.50	398	50,337.50	448,337.50	498,675.00
05/01/30	3,629			45,362.50	45,362.50	
11/01/30	3,629	2.50	402	45,362.50	447,362.50	492,725.00
05/01/31	3,227			40,337.50	40,337.50	
11/01/31	3,227	2.50	407	40,337.50	447,337.50	487,675.00
05/01/32	2,820			35,250.00	35,250.00	
11/01/32	2,820	2.50	410	35,250.00	445,250.00	480,500.00
05/01/33	2,410			30,125.00	30,125.00	
11/01/33	2,410	2.50	409	30,125.00	439,125.00	469,250.00
05/01/34	2,001			25,012.50	25,012.50	
11/01/34	2,001	2.50	406	25,012.50	431,012.50	456,025.00
05/01/35	1,595			19,937.50	19,937.50	
11/01/35	1,595	2.50	404	19,937.50	423,937.50	443,875.00
05/01/36	1,191			14,887.50	14,887.50	
11/01/36	1,191	2.50	401	14,887.50	415,887.50	430,775.00
05/01/37	790			9,875.00	9,875.00	
11/01/37	790	2.50	397	9,875.00	406,875.00	416,750.00
05/01/38	393			4,912.50	4,912.50	
11/01/38	393	2.50	393	4,912.50	397,912.50	402,825.00
Totals			$5,490	$2,064,650.00	$7,554,650.00	$7,554,650.00

Average annual principal and interest payment
for the five bond years ending November 1, 2023 $234,800.00

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF PRO FORMA COMBINED BOND AMORTIZATION - ALTERNATIVE II

Payment Date	Outstanding (1) 2009A Bonds	Outstanding (1) 2011A Bonds	Proposed 2016A Bonds	Proposed 2016B Bonds	Total	Bond Year Total
05/01/16	$74,516.85	$108,825.63			$183,342.48	
11/01/16	102,516.85	338,825.63			441,342.48	$624,684.96
05/01/17	73,975.05	105,375.63	$75,555.56	$51,850.00	306,756.24	
11/01/17	102,975.05	340,375.63	100,000.00	68,625.00	611,975.68	918,731.92
05/01/18	73,413.90	101,850.63	100,000.00	68,625.00	343,889.53	
11/01/18	103,413.90	346,850.63	100,000.00	68,625.00	618,889.53	962,779.06
05/01/19	72,833.40	96,950.63	100,000.00	68,625.00	338,409.03	
11/01/19	104,833.40	346,950.63	150,000.00	118,625.00	720,409.03	1,058,818.06
05/01/20	72,214.20	91,950.63	99,500.00	68,000.00	331,664.83	
11/01/20	105,214.20	356,950.63	149,500.00	128,000.00	739,664.83	1,071,329.66
05/01/21	71,575.65	86,650.63	99,000.00	67,250.00	324,476.28	
11/01/21	541,575.65	361,650.63	179,000.00	195,250.00	1,277,476.28	1,601,952.56
05/01/22	62,481.15	81,150.63	98,200.00	65,650.00	307,481.78	
11/01/22	550,481.15	366,150.63	178,200.00	199,650.00	1,294,481.78	1,601,963.56
05/01/23	53,038.35	75,272.50	97,400.00	63,975.00	289,685.85	
11/01/23	560,038.35	375,272.50	177,400.00	198,975.00	1,311,685.85	1,601,371.70
05/01/24	43,227.90	68,897.50	96,600.00	62,287.50	271,012.90	
11/01/24	570,227.90	383,897.50	176,600.00	200,287.50	1,331,012.90	1,602,025.80
05/01/25	33,030.45	62,006.88	95,800.00	60,562.50	251,399.83	
11/01/25	580,030.45	392,006.88	175,800.00	202,562.50	1,350,399.83	1,601,799.66
05/01/26	22,446.00	54,746.88	95,000.00	58,787.50	230,980.38	
11/01/26	591,446.00	404,746.88	175,000.00	199,787.50	1,370,980.38	1,601,960.76
05/01/27	11,435.85	47,046.88	94,200.00	57,025.00	209,707.73	
11/01/27	602,435.85	417,046.88	174,200.00	198,025.00	1,391,707.73	1,601,415.46
05/01/28		38,721.88	93,400.00	55,262.50	187,384.38	
11/01/28		428,721.88	536,400.00	449,262.50	1,414,384.38	1,601,768.76
05/01/29		29,946.88	88,970.00	50,337.50	169,254.38	
11/01/29		439,946.88	543,970.00	448,337.50	1,432,254.38	1,601,508.76
05/01/30		20,465.63	84,420.00	45,362.50	150,248.13	
11/01/30		450,465.63	553,420.00	447,362.50	1,451,248.13	1,601,496.26
05/01/31		10,521.88	79,730.00	40,337.50	130,589.38	
11/01/31		465,521.88	558,730.00	447,337.50	1,471,589.38	1,602,178.76
05/01/32			74,940.00	35,250.00	110,190.00	
11/01/32			1,045,940.00	445,250.00	1,491,190.00	1,601,380.00
05/01/33			65,230.00	30,125.00	95,355.00	
11/01/33			1,067,230.00	439,125.00	1,506,355.00	1,601,710.00
05/01/34			55,210.00	25,012.50	80,222.50	
11/01/34			1,090,210.00	431,012.50	1,521,222.50	1,601,445.00
05/01/35			44,860.00	19,937.50	64,797.50	
11/01/35			1,112,860.00	423,937.50	1,536,797.50	1,601,595.00
05/01/36			34,180.00	14,887.50	49,067.50	
11/01/36			1,137,180.00	415,887.50	1,553,067.50	1,602,135.00
05/01/37			23,150.00	9,875.00	33,025.00	
11/01/37			1,162,150.00	406,875.00	1,569,025.00	1,602,050.00
05/01/38			11,760.00	4,912.50	16,672.50	
11/01/38			1,187,760.00	397,912.50	1,585,672.50	1,602,345.00
Totals	$5,179,377.50	$7,295,762.64	$13,438,655.56	$7,554,650.00	$33,468,445.70	$33,468,445.70

Average annual principal and interest payment
for the five bond years ending November 1, 2023 $1,387,087.11

(1) Assumes outstanding 1998 Bonds are retired early using $2,500,000 of cash on hand.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

PRO FORMA ANNUAL CASH OPERATING DISBURSEMENTS

See Explanation of Adjustments, pages 11 to 13.

Annual cash operating disbursements for the twelve months ended December 31, 2015 (unaudited)	$3,785,861
Adjustments:	
(1) Salaries and wages	44,984
(2) Employee benefits	175,429
(3) Capital or non-recurring	(162,462)
(4) Rate analysis	4,020
(5) Chemicals	2,334
(6) Biosolids management	33,875
(7) Repairs and maintenance	(6,174)
Sub-total	3,877,867
(8) Unforeseen contingencies and inflation	116,336
Pro Forma Annual Cash Operating Disbursements	$3,994,203

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

PRO FORMA ANNUAL CASH OPERATING DISBURSEMENTS
Explanation of Adjustments

Adjustment (1)

Salaries and Wages

To adjust 2015 salaries and wages disbursements based on the 2016 salary ordinance.

Pro forma wastewater salaries and wages (includes longevity pay)		$1,020,174
Pro forma stormwater salaries and wages (includes longevity pay)		396,793
Less: 2015 salaries and wages		(1,371,983)
Adjustment (1)		$44,984

Adjustment (2)

Employee Benefits

I. To adjust 2015 FICA disbursements to reflect pro forma salaries and wages.

Pro forma salaries and wages		$1,416,967	
Times FICA rate		7.65%	
Pro forma FICA			$108,398

II. To adjust 2015 PERF disbursements based on 2016 PERF rate (11.2%) and pro forma salaries and wages (excludes salaries and wages for Town Council, part-time employees and longevity pay).

Pro forma salaries and wages	$1,416,967		
Less: Pro forma salaries and wages not eligible for PERF	(75,028)		
Less: Pro forma longevity pay	(3,194)		
Sub-total		$1,338,745	
Times: 2016 PERF rate		11.20%	
Pro forma PERF			149,939

III. To adjust 2015 employee health insurance disbursements based on the current cost of health insurance, self-funded insurance and life insurance for current coverages and policies.

Pro forma monthly health insurance premium (WW & SW)	$7,046		
Pro forma monthly self insurance premium (WW & SW)	32,085		
Pro forma monthly insurance disbursements		$39,131	
Times: 12 months		12	
Pro forma health insurance			469,572
Pro forma monthly life insurance disbursements (WW & SW)		$158	
Times: 12 months		12	
Pro forma life insurance			1,896

Pro forma employee benefits	$729,805
Plus: Funding of H.S.A self funded liability (2015 Amount)	54,746
Less: 2015 disbursements	(609,122)
Adjustment (2)	$175,429

(Continued on next page)

PRO FORMA ANNUAL CASH OPERATING DISBURSEMENTS
Explanation of Adjustments

Adjustment (3)

Capital or Non-recurring Items

To adjust test year contractual services for non-recurring items.

Date	Description	Category	Amount	
Various	Annexation & public records requests	Contractual services	($82,056)	
12/18/2015	Sewage works rate analysis	Contractual services	(29,900)	
3/27/2015	Traffic impact studies	Contractual services	(18,697)	
Various	CSO plan compliance	Contractual services	(11,815)	
6/12/2015	Airport lift station design	Contractual services	(3,000)	
Various	I-74 master traffic study	Contractual services	(14,000)	
12/18/2015	Valued eng review of WWTP design	Contractual services	(2,994)	
	Adjustment (3)			($162,462)

Adjustment (4)

Rate Analysis

To provide an allowance for annual rate analysis costs.

Budgeted amount	$50,000	
Less: 2015 rate analysis disbursements	(29,900)	
	20,100	
Divided by 5 years	5	
Adjustment (4)		$4,020

Adjustment (5)

Chemicals

To adjust 2015 chemicals disbursements for 2016 budgeted prices, per Utility Superintendent.

2016 budgeted chemical disbursements	$73,000	
Less: 2015 chemical disbursements	(70,666)	
Adjustment (5)		$2,334

Adjustment (6)

Biosolids Management

To adjust 2015 sludge disposal to reflect the 2016 budget. According to the Utility Superintendent, this is due to an increase in biosolids production.

2016 budgeted biosolids management disbursements	$105,000	
Less: 2015 biosolids management disbursements	(71,125)	
Adjustment (6)		$33,875

(Continued on next page)

PRO FORMA ANNUAL CASH OPERATING DISBURSEMENTS
Explanation of Adjustments

Adjustment (7)

Repairs and Maintenance

To adjust 2015 repairs and maintenance to reflect a four-year historical average.

Sewer Department:			
2012	$71,087		
2013	176,851		
2014	101,706		
2015	124,780		
Sub-total		$474,424	
Divided by: periods covered		4	
Average annual disbursements			$118,606
Less: 2015 repairs and maintenance disbursements			(124,780)
Adjustment (7)			($6,174)

Adjustment (8)

Inflation and Contingency

To provide a 3% allowance for inflation and contingencies.

Total pro forma cash operating disbursements	$3,877,867
Times 3%	3%
Adjustment (8)	$116,336

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

PRO FORMA ANNUAL REVENUE REQUIREMENTS
AND AVAILABLE REVENUES - ALTERNATIVE I
(See explanation of references.)

Annual Revenue Requirements:	*Proposed Financing - Phase I Projects*				
	2016 (Phase I)	*2017* (Phase II)	*2018* (Phase III)	*2019* (Phase IV)	*2020* (Phase V)
Operation and maintenance disbursements (1)	$3,994,203	$4,074,087	$4,155,569	$4,280,236	$4,408,643
Additional operation and maintenance disbursements (2)	-	-	65,000	130,000	130,000
Payment in lieu of taxes (3)	264,452	264,452	264,452	264,452	264,452
Outstanding Debt Service:					
1998 Bonds (4)	-	-	-	-	-
2009A Bonds (5)	176,950	176,828	177,667	177,428	613,151
2011A Bonds (6)	445,751	448,701	443,901	448,901	448,301
Proposed Debt Service:					
2016A Bonds (7)	175,556	200,000	250,000	249,000	278,000
2016B Bonds (8)	236,781	269,750	469,750	477,750	610,425
Debt service reserve (9)	-	174,517	174,517	174,517	174,517
Allowance for capital improvements and coverage (10)	315,094	346,433	350,763	703,192	727,874
Total Revenue Requirements	5,608,787	5,954,768	6,351,619	6,905,476	7,655,363
Less interest income (11)	(12,243)	(12,243)	(12,243)	(12,243)	(12,243)
Less other receipts (11)	(9,385)	(9,385)	(9,385)	(9,385)	(9,385)
Total Net Revenue Requirements	$5,587,159	$5,933,140	$6,329,991	$6,883,848	$7,633,735
Available Revenues:					
Wastewater user fees (11)	$3,691,877	$3,691,877	$3,691,877	$3,691,877	$3,691,877
Stormwater user fees (11)	1,112,093	1,112,093	1,112,093	1,112,093	1,112,093
Availability fees (12)	320,000	329,544	329,544	329,544	329,544
Reduction in wastewater revenue from annexations (13)	(10,680)	(10,680)	(10,680)	(10,680)	(10,680)
Additional stormwater revenue from annexations (14)	12,000	12,000	12,000	12,000	12,000
Additional revenues from rate increase	-	461,869	798,306	1,195,157	1,749,014
Total Available Revenues	$5,125,290	$5,596,703	$5,933,140	$6,329,991	$6,883,848
Additional Revenues Required	$461,869	$336,436	$396,851	$553,857	$749,888
Approximate Across-The-Board Increase in Present Rates	12.5%	8.1%	8.9%	11.4%	13.8%
Resulting Approximate Average Residential Monthly Bill:					
Wastewater Presently $33.44 at 6,000 gallons - Inside Town	$37.61	$40.64	$44.24	$49.27	$56.07
Stormwater Presently $5.00 per ERU	5.00	5.00	5.00	5.00	5.00
Total Estimated Average Residential Sewage Works Bill	$42.61	$45.64	$49.24	$54.27	$61.07
Incremental Increase	$4.17	$3.03	$3.60	$5.03	$6.80
For SRF Purposes:					
Wastewater Presently $25.06 at 4,000 gallons - Inside Town	$28.19	$30.46	$33.16	$36.93	$42.03
Debt Coverage with Availability Fees:	130%	148%	139%	165%	146%
Debt Coverage without Availability Fees:	100%	117%	115%	141%	129%

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

(Cont'd)

PRO FORMA ANNUAL REVENUE REQUIREMENTS
AND AVAILABLE REVENUES - ALTERNATIVE I
Explanation of references.

(1) See "Pro Forma Annual Cash Operating Disbursements" pages 10 to 13. Pro forma 2017 and 2018 operation and maintenance disbursements have been increased for an additional 2% annual inflationary factor. A 3% inflationary factor has been applied for years 2019 and 2020.

(2) To provide an allowance for additional chemical disbursements related to phosphorus treatment beginning July 2018, per utility management.

(3) To provide an allowance for payments in lieu of property taxes. At this time payments in lieu of property taxes have not been adjusted to reflect the completion of the proposed project and the resulting additional capital assets. Calculated as follows:

	Current Operations	*WWTP Exp. Project*
Capital assets in service @ 12/31/13 (per SBOA)	$22,842,263	$22,842,263
Plus additions to utility plant (1/1/14 - 12/31/15)	1,039,297	1,039,297
2009 A Project (draw balance @ 12/31/11)	573,021	573,021
2011 A Project (cash balance @ 12/31/11)	3,141,418	3,141,418
Plus proposed WWTP & SS expansion projects *	-	26,667,273
Estimated Net Assessed Value	27,595,999	54,263,272
Times actual 2016 corporate tax rate**	0.9583	0.9583
Pro Forma Payment in Lieu of Taxes	$264,452	$520,005

* Per Utility management and the consulting engineers.
** Per Indiana Department of Local Government Finance ("DLGF") 2015 pay 2016.

(4) Assumes the 1998 Bonds will be redeemed using Sewage Works cash on hand, see page 36.

(5) To provide an allowance for debt service on the 2009A Bonds equal to the bond year total for that calendar year, see page 37.

(6) To provide an allowance for debt service on the 2011A Bonds equal to the bond year total for that calendar year, see page 38.

(7) To provide an allowance for debt service on the proposed 2016A Bonds equal to the bond year total for that calendar year, see page 4.

(8) To provide an allowance for debt service on the proposed 2016B Bonds equal to the bond year total for that calendar year, see page 5.

(9) To provide an allowance for funding of the debt service reserve on the proposed bonds over a five-year period.

(10) To provide an allowance for replacements and improvements based on depreciation expense, calculated as follows:

	2016	2017	2018	2019	2020
Capital assets in service @ 12/31/13 (per SBOA)	$22,842,263	$23,881,560	$24,196,654	$24,543,087	$24,893,850
Plus estimated prior year additions to utility plant	1,039,297	315,094	346,433	350,763	703,192
Less land @ 12/31/13 (per SBOA)	(196,503)	(196,503)	(196,503)	(196,503)	(196,503)
2009 A Project (draw balance @ 12/31/11)	573,021	573,021	573,021	573,021	573,021
2011 A Project (cash balance @ 12/31/11)	3,141,418	3,141,418	3,141,418	3,141,418	3,141,418
Estimated depreciable utility plant	27,399,496	27,714,590	28,061,023	28,411,786	29,114,977
Times composite depreciation rate	2.5%	2.5%	2.5%	2.5%	2.5%
Pro Forma Annual Depreciation Allowance	684,987	692,865	701,526	710,295	727,874
Less phase-in adjustment	(369,893)	(346,432)	(350,763)	(7,103)	0
Pro Forma Depreciation Expense	$315,094	$346,433	$350,763	$703,192	$727,874
Phase-in Percentage	54%	50%	50%	1%	0%

(11) Based on the test year ended December 31, 2015 amounts.

(12) Assumed amount for 100% debt coverage excluding availability fees in 2016. Assumed at 50% of the historic three-year average for 2017-2020.

(13) Assumes 200 customers will no longer pay the $4.45 monthly outside of town rate differential.

(14) Assumes 200 customers will now pay the $5.00 monthly stormwater fee for 1 ERU.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

PRO FORMA ANNUAL REVENUE REQUIREMENTS
AND AVAILABLE REVENUES - ALTERNATIVE II
(See explanation of references.)

Annual Revenue Requirements:	*Proposed Financing - Phase I Projects*				
	2016 (Phase I)	*2017* (Phase II)	*2018* (Phase III)	*2019* (Phase IV)	*2020* (Phase V)
Operation and maintenance disbursements (1)	$3,994,203	$4,074,087	$4,155,569	$4,280,236	$4,408,643
Additional operation and maintenance disbursements (2)	-	-	65,000	130,000	130,000
Payment in lieu of taxes (3)	264,452	264,452	264,452	264,452	264,452
Outstanding Debt Service:					
1998 Bonds (4)	-	-	-	-	-
2009A Bonds (5)	176,950	176,828	177,667	177,428	613,151
2011A Bonds (6)	445,751	448,701	443,901	448,901	448,301
Proposed Debt Service:					
2016A Bonds (7)	175,556	200,000	250,000	249,000	278,000
2016B Bonds (8)	120,475	137,250	187,250	196,000	262,500
Debt service reserve (9)	-	104,876	104,876	104,876	104,876
Allowance for capital improvements and coverage (10)	315,094	346,433	350,763	703,192	727,874
Total Revenue Requirements	5,492,481	5,752,627	5,999,478	6,554,085	7,237,797
Less interest income (11)	(12,243)	(12,243)	(12,243)	(12,243)	(12,243)
Less other receipts (11)	(9,385)	(9,385)	(9,385)	(9,385)	(9,385)
Total Net Revenue Requirements	$5,470,853	$5,730,999	$5,977,850	$6,532,457	$7,216,169
Available Revenues:					
Wastewater user fees (11)	$3,691,877	$3,691,877	$3,691,877	$3,691,877	$3,691,877
Stormwater user fees (11)	1,112,093	1,112,093	1,112,093	1,112,093	1,112,093
Availability fees (12)	319,000	329,544	329,544	329,544	329,544
Reduction in wastewater revenue from annexations (13)	(10,680)	(10,680)	(10,680)	(10,680)	(10,680)
Additional stormwater revenue from annexations (14)	12,000	12,000	12,000	12,000	12,000
Additional revenues from rate increase	-	346,563	596,165	843,016	1,397,623
Total Available Revenues	$5,124,290	$5,481,397	$5,730,999	$5,977,850	$6,532,457
Additional Revenues Required	$346,563	$249,601	$246,851	$554,607	$683,713
Approximate Across-The-Board Increase in Present Rates	9.4%	6.2%	5.8%	12.3%	13.5%
Resulting Approximate Average Residential Monthly Bill:					
Wastewater Presently $33.44 at 6,000 gallons - Inside Town	$36.58	$38.81	$41.04	$46.07	$52.30
Stormwater Presently $5.00 per ERU	5.00	5.00	5.00	5.00	5.00
Total Estimated Average Residential Sewage Works Bill	$41.58	$43.81	$46.04	$51.07	$57.30
Incremental Increase	$3.14	$2.23	$2.23	$5.03	$6.23
For SRF Purposes:					
Wastewater Presently $25.06 at 4,000 gallons - Inside Town	$27.42	$29.09	$30.76	$34.53	$39.20
Debt Coverage with Availability Fees:	134%	147%	143%	175%	152%
Debt Coverage without Availability Fees:	100%	113%	112%	145%	131%

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
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PRO FORMA ANNUAL REVENUE REQUIREMENTS
AND AVAILABLE REVENUES - ALTERNATIVE II
Explanation of references.

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(2) To provide an allowance for additional chemical disbursements related to phosphorus treatment beginning July 2018, per utility management.

(3) To provide an allowance for payments in lieu of property taxes. At this time payments in lieu of property taxes have not been adjusted to reflect the completion of the proposed project and the resulting additional capital assets. Calculated as follows:

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2011 A Project (cash balance @ 12/31/11)	3,141,418	3,141,418
Plus proposed WWTP & SS expansion projects *	-	21,367,273
Estimated Net Assessed Value	27,595,999	48,963,272
Times actual 2016 corporate tax rate**	0.9583	0.9583
Pro Forma Payment in Lieu of Taxes	$264,452	$469,215

* Per Utility management and the consulting engineers.
** Per Indiana Department of Local Government Finance ("DLGF") 2015 pay 2016.

(4) Assumes the 1998 Bonds will be redeemed using Sewage Works cash on hand, see page 36.

(5) To provide an allowance for debt service on the 2009A Bonds equal to the bond year total for that calendar year, see page 37.

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(7) To provide an allowance for debt service on the proposed 2016A Bonds equal to the bond year total for that calendar year, see page 7.

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(9) To provide an allowance for funding of the debt service reserve on the proposed bonds over a five-year period.

(10) To provide an allowance for replacements and improvements based on depreciation expense, calculated as follows:

	2016	2017	2018	2019	2020
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Plus estimated prior year additions to utility plant	1,039,297	315,094	346,433	350,763	703,192
Less land @ 12/31/13 (per SBOA)	(196,503)	(196,503)	(196,503)	(196,503)	(196,503)
2009 A Project (draw balance @ 12/31/11)	573,021	573,021	573,021	573,021	573,021
2011 A Project (cash balance @ 12/31/11)	3,141,418	3,141,418	3,141,418	3,141,418	3,141,418
Estimated depreciable utility plant	27,399,496	27,714,590	28,061,023	28,411,786	29,114,977
Times composite depreciation rate	2.5%	2.5%	2.5%	2.5%	2.5%
Pro Forma Annual Depreciation Allowance	684,987	692,865	701,526	710,295	727,874
Less phase-in adjustment	(369,893)	(346,432)	(350,763)	(7,103)	0
Pro Forma Depreciation Expense	$315,094	$346,433	$350,763	$703,192	$727,874
Phase-in Percentage	54%	50%	50%	1%	0%

(11) Based on the test year ended December 31, 2015 amounts.

(12) Assumed amount for 100% debt coverage excluding availability fees in 2016. Assumed at 50% of the historic three-year average for 2017-2020.

(13) Assumes 200 customers will no longer pay the $4.45 monthly outside of town rate differential.

(14) Assumes 200 customers will now pay the $5.00 monthly stormwater fee for 1 ERU.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF PRESENT AND PROPOSED WASTEWATER RATES AND CHARGES - ALTERNATIVE I
(INSIDE TOWN)

		Proposed				
I. All Metered Users:	Present	2016	2017	2018	2019	2020
	(1)	(2)	(3)	(4)	(5)	(6)
(1) Treatment rate per 1,000 gallons of usage per month:						
Metered Users	$4.19	$4.71	$5.09	$5.54	$6.17	$7.02
plus						
(2) Base rate - per month, as follows:						
5/8 - 3/4 inch water meter	$8.30	$9.35	$10.10	$11.00	$12.25	$13.95
1 inch water meter	19.00	21.40	23.15	25.20	28.05	31.90
1 1/4 inch water meter	29.60	33.30	36.00	39.20	43.65	49.65
1 1/2 inch water meter	42.40	47.70	51.55	56.15	62.55	71.20
2 inch water meter	72.20	81.25	87.85	95.65	106.55	121.25
3 inch water meter	164.50	185.05	200.05	217.85	242.70	276.20
4 inch water meter	285.20	320.85	346.85	377.70	420.75	478.80
6 inch water meter	647.30	728.20	787.20	857.25	955.00	1,086.80
8 inch water meter	1,151.40	1,295.35	1,400.25	1,524.85	1,698.70	1,933.10
II. All Unmetered Users:						
Residential:						
Single family residence/unit (5,370 gallons)	$30.80	$34.65	$37.45	$40.80	$45.45	$51.70

(1) Present Rates were approved by the Town Council on March 24, 2011 pursuant to Ordinance #2011-06.

(2) Phase I rates and charges represent a 12.5% across-the-board rate increase in present rates and charges.

(3) Phase II rates and charges represent a 8.1% across-the-board rate increase in Phase I rates and charges.

(4) Phase III rates and charges represent a 8.9% across-the-board rate increase in Phase II rates and charges.

(5) Phase IV rates and charges represent a 11.4% across-the-board rate increase in Phase III rates and charges.

(6) Phase V rates and charges represent a 13.8% across-the-board rate increase in Phase IV rates and charges.

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

(Cont'd)

SCHEDULE OF PRESENT AND PROPOSED WASTEWATER RATES AND CHARGES - ALTERNATIVE I
(OUTSIDE TOWN)

		Present	Proposed* 2016	2017	2018	2019	2020
I. All Metered Users:		(1)	(2)	(3)	(4)	(5)	(6)
(1) Treatment rate per 1,000 gallons of usage per month:							
Metered Users		$4.19	$4.71	$5.09	$5.54	$6.17	$7.02
plus							
(2) Base rate - per month, as follows:							
5/8 - 3/4	inch water meter	$12.75	$14.35	$15.50	$16.90	$18.80	$21.40
1	inch water meter	30.10	33.90	36.65	39.90	44.45	50.55
1 1/4	inch water meter	47.40	53.35	57.65	62.80	69.95	79.60
1 1/2	inch water meter	68.20	76.75	82.95	90.35	100.65	114.55
2	inch water meter	116.70	131.30	141.95	154.55	172.15	195.90
3	inch water meter	266.90	300.25	324.60	353.50	393.80	448.15
4	inch water meter	463.20	521.10	563.30	613.40	683.30	777.60
6	inch water meter	1,052.30	1,183.85	1,279.75	1,393.65	1,552.55	1,766.80
8	inch water meter	1,872.30	2,106.35	2,276.95	2,479.60	2,762.30	3,143.50
II. All Unmetered Users:							
Residential:							
Single family residence/unit (5,370 gallons)		$35.25	$39.65	$42.85	$46.70	$52.00	$59.15

(1) Present Rates were approved by the Town Council on March 24, 2011 pursuant to Ordinance #2011-06.

(2) Phase I rates and charges represent a 12.5% across-the-board rate increase in present rates and charges.

(3) Phase II rates and charges represent a 8.1% across-the-board rate increase in Phase I rates and charges.

(4) Phase III rates and charges represent a 8.9% across-the-board rate increase in Phase II rates and charges.

(5) Phase IV rates and charges represent a 11.4% across-the-board rate increase in Phase III rates and charges.

(6) Phase V rates and charges represent a 13.8% across-the-board rate increase in Phase IV rates and charges.

* See page 40 for Outside Surcharge calculation.

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF PRESENT AND PROPOSED WASTEWATER RATES AND CHARGES - ALTERNATIVE II
(INSIDE TOWN)

			Proposed				
I. All Metered Users:		Present	2016	2017	2018	2019	2020
		(1)	(2)	(3)	(4)	(5)	(6)
(1) Treatment rate per 1,000 gallons of usage per month:							
Metered Users		$4.19	$4.58	$4.86	$5.14	$5.77	$6.55
plus							
(2) Base rate - per month, as follows:							
5/8 - 3/4	inch water meter	$8.30	$9.10	$9.65	$10.20	$11.45	$13.00
1	inch water meter	19.00	20.80	22.10	23.40	26.30	29.85
1 1/4	inch water meter	29.60	32.40	34.40	36.40	40.85	46.35
1 1/2	inch water meter	42.40	46.40	49.30	52.15	58.60	66.50
2	inch water meter	72.20	79.00	83.90	88.75	99.70	113.15
3	inch water meter	164.50	179.95	191.10	202.20	227.05	257.70
4	inch water meter	285.20	312.00	331.35	350.55	393.65	446.80
6	inch water meter	647.30	708.15	752.05	795.65	893.50	1,014.10
8	inch water meter	1,151.40	1,259.65	1,337.75	1,415.35	1,589.45	1,804.05
II. All Unmetered Users:							
Residential:							
Single family residence/unit (5,370 gallons)		$30.80	$33.70	$35.80	$37.90	$42.55	$48.30

(1) Present Rates were approved by the Town Council on March 24, 2011 pursuant to Ordinance #2011-06.

(2) Phase I rates and charges represent a 9.4% across-the-board rate increase in present rates and charges.

(3) Phase II rates and charges represent a 6.2% across-the-board rate increase in Phase I rates and charges.

(4) Phase III rates and charges represent a 5.8% across-the-board rate increase in Phase II rates and charges.

(5) Phase IV rates and charges represent a 12.3% across-the-board rate increase in Phase III rates and charges.

(6) Phase V rates and charges represent a 13.5% across-the-board rate increase in Phase IV rates and charges.

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

(Cont'd)

SCHEDULE OF PRESENT AND PROPOSED WASTEWATER RATES AND CHARGES - ALTERNATIVE II
(OUTSIDE TOWN)

			Proposed*				
I. All Metered Users:	Present	2016	2017	2018	2019	2020
	(1)	(2)	(3)	(4)	(5)	(6)
(1) Treatment rate per 1,000 gallons of usage per month:						
Metered Users	$4.19	$4.58	$4.86	$5.14	$5.77	$6.55
plus						
(2) Base rate - per month, as follows:						
5/8 - 3/4 inch water meter	$12.75	$13.95	$14.80	$15.65	$17.55	$19.90
1 inch water meter	30.10	32.95	35.00	37.05	41.65	47.25
1 1/4 inch water meter	47.40	51.85	55.05	58.25	65.40	74.20
1 1/2 inch water meter	68.20	74.65	79.30	83.90	94.25	106.95
2 inch water meter	116.70	127.70	135.60	143.45	161.15	182.90
3 inch water meter	266.90	292.00	310.10	328.10	368.45	418.20
4 inch water meter	463.20	506.75	538.15	569.35	639.35	725.65
6 inch water meter	1,052.30	1,151.20	1,222.55	1,293.45	1,452.55	1,648.60
8 inch water meter	1,872.30	2,048.30	2,175.30	2,301.50	2,584.60	2,933.55
II. All Unmetered Users:						
Residential:						
Single family residence/unit (5,370 gallons)	$35.25	$38.55	$40.95	$43.35	$48.65	$55.20

(1) Present Rates were approved by the Town Council on March 24, 2011 pursuant to Ordinance #2011-06.

(2) Phase I rates and charges represent a 9.4% across-the-board rate increase in present rates and charges.

(3) Phase II rates and charges represent a 6.2% across-the-board rate increase in Phase I rates and charges.

(4) Phase III rates and charges represent a 5.8% across-the-board rate increase in Phase II rates and charges.

(5) Phase IV rates and charges represent a 12.3% across-the-board rate increase in Phase III rates and charges.

(6) Phase V rates and charges represent a 13.5% across-the-board rate increase in Phase IV rates and charges.

* See page 40 for Outside Surcharge calculation.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF PRESENT STORMWATER RATES AND CHARGES

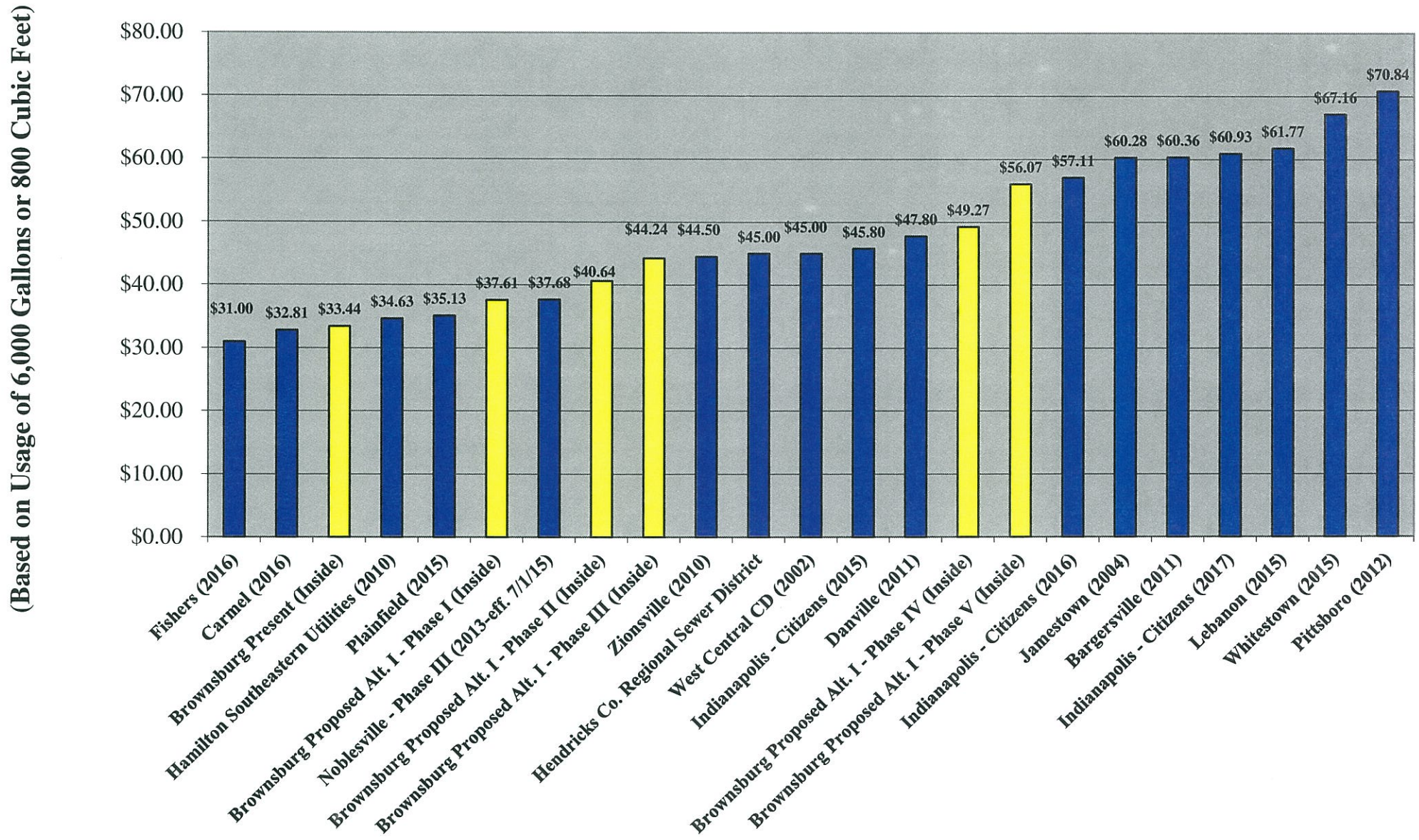
(Per Ordinance No. 2006-28, adopted November 16, 2006.)

Monthly User Fee per Equivalent Residential Unit (ERU)	$5.00

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

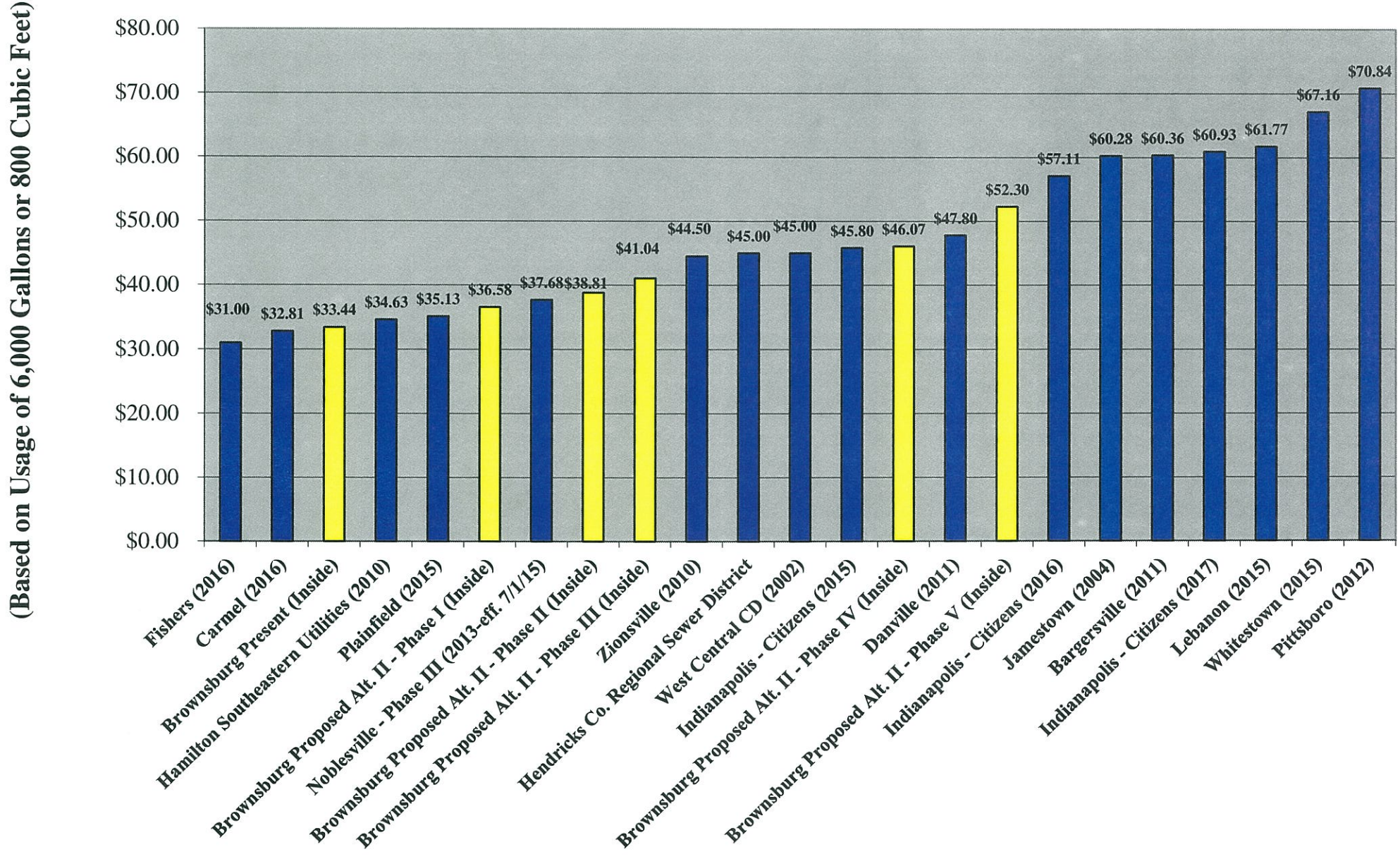
BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARISON OF MONTHLY BILLINGS FOR LOCAL INDIANA COMMUNITIES
ALTERNATIVE I



BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARISON OF MONTHLY BILLINGS FOR LOCAL INDIANA COMMUNITIES
ALTERNATIVE II



BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SUPPLEMENTAL FINANCIAL DATA

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF SELECTED FINANCIAL INFORMATION ARISING FROM CASH TRANSACTIONS

(Wastewater Utility and Stormwater Utility)
(Unaudited)

	As of		
Cash and Cash Equivalents:	12/31/2013	12/31/2014	12/31/2015
Operating cash and cash equivalents	$6,138,166	$6,462,041	$6,629,134
Sinking fund cash and cash equivalents:			
Bond and interest	270,294	270,627	272,992
Debt service reserve	1,077,965	1,077,965	1,077,965
Improvement cash and cash equivalents	961,604	1,013,035	471,719
Total Cash and Cash Equivalents	$8,448,029	$8,823,668	$8,451,810

Bonded Indebtedness:			
Sewage Works Revenue Bonds of 1998	$2,629,000	$2,295,000	$1,948,000
Sewage Works Revenue Bonds, Series 2009 A	3,904,000	3,878,000	3,851,000
Sewage Works Revenue Bonds, Series 2011 A	5,575,000	5,355,000	5,135,000
Totals	$12,108,000	$11,528,000	$10,934,000

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF CASH RECEIPTS AND DISBURSEMENTS
(Wastewater Utility and Stormwater Utility)
(Unaudited)

	Calendar Year		
	2013	2014	2015
Operating Receipts:			
Wastewater user fees	$3,635,047	$3,628,173	$3,691,877
Stormwater user fees	1,110,566	1,078,457	1,112,093
Rule 5 fees	3,750	20,570	33,689
Permits	72,766	90,867	61,100
Total Operating Receipts	4,822,129	4,818,067	4,898,759
Operating Disbursements:			
Wastewater Utility:			
Plan and building	109,650	151,975	180,648
Administrative	1,114,064	1,397,024	1,306,661
Sewer	1,154,183	1,032,676	1,146,869
Street	168,132	226,993	166,447
Maintenance	77,945	84,445	95,690
Utility	71,600	84,708	85,100
Stormwater Utility:			
Plan and building	257,951	273,595	234,922
Administrative	253,474	273,982	379,043
Street	93,016	93,846	105,645
Utility	70,412	83,834	84,836
Total Operating Disbursements	3,370,427	3,703,078	3,785,861
Net Operating Receipts	$1,451,702	$1,114,989	$1,112,898

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

(Cont'd)

COMPARATIVE SCHEDULE OF CASH RECEIPTS AND DISBURSEMENTS

(Wastewater Utility and Stormwater Utility)

(Unaudited)

	Calendar Year		
	2013	2014	2015
Non-Operating Receipts:			
Other receipts	$9,891	$54,083	$9,385
Interest	10,689	11,264	12,243
Tap fees (net)	547,456	829,640	600,170
Refunds (net)	1,777	38	2,280
Grant receipts	4,146	6,793	-
Total Non-Operating Receipts	573,959	901,818	624,078
Non-Operating Disbursements:			
Additions to utility plant	181,256	381,281	658,016
Debt Service - principal and interest	1,050,008	1,062,267	1,057,835
Payment in lieu of taxes	197,620	197,620	197,620
Project disbursements - (Funds on hand Sewer)	-	-	195,363
Project disbursements - (Funds on hand Storm)	255,141	-	-
Purchase investments	792	-	-
Stormwater credit refund	509	-	-
Total Non-Operating Disbursements	1,685,326	1,641,168	2,108,834
Increase (Decrease) in cash and cash equivalents	340,335	375,639	(371,858)
Beginning cash and cash equivalents	8,107,694	8,448,029	8,823,668
Ending Cash and Cash Equivalents	$8,448,029	$8,823,668	$8,451,810

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF SELECTED FINANCIAL INFORMATION ARISING FROM CASH TRANSACTIONS

(Wastewater Utility)

(Unaudited)

	As of		
Cash and Cash Equivalents:	12/31/2013	12/31/2014	12/31/2015
Operation and Maintenance Fund	$3,310,571	$3,671,393	$3,896,886
Sinking Fund:			
Bond and Interest Account	270,294	270,627	272,992
Debt Service Reserve Account	1,077,965	1,077,965	1,077,965
Improvement Fund	961,604	1,013,035	471,719
Total Cash and Cash Equivalents	$5,620,434	$6,033,020	$5,719,562
Bonded Indebtedness:			
Sewage Works Revenue Bonds of 1998	$2,629,000	$2,295,000	$1,948,000
Sewage Works Revenue Bonds, Series 2009 A	3,904,000	3,878,000	3,851,000
Sewage Works Revenue Bonds, Series 2011 A	5,575,000	5,355,000	5,135,000
Totals	$12,108,000	$11,528,000	$10,934,000

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF CASH RECEIPTS AND DISBURSEMENTS
(Wastewater Utility)
(Unaudited)

	Calendar Year		
	2013	2014	2015
Operating Receipts:			
Wastewater collections and penalties (net)	$3,635,047	$3,628,173	$3,691,877
Operating Disbursements:			
Plan and building	109,650	151,975	180,648
Administrative	1,114,064	1,397,024	1,306,661
Sewer	1,154,183	1,032,676	1,146,869
Street	168,132	226,993	166,447
Maintenance	77,945	84,445	95,690
Utility	71,600	84,708	85,100
Total Operating Disbursements	2,695,574	2,977,821	2,981,415
Net Operating Receipts	$939,473	$650,352	$710,462

(Continued on next page)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

(Cont'd)

COMPARATIVE SCHEDULE OF CASH RECEIPTS AND DISBURSEMENTS

(Wastewater Utility)

(Unaudited)

	Calendar Year		
	2013	2014	2015
Non-Operating Receipts:			
Other receipts	$9,891	$53,698	$9,385
Interest	5,318	5,604	6,541
Tap fees (net)	547,456	829,640	600,170
Grant receipts	176	6,793	-
Transfer from Water for B&I (BoNY)	146,500	-	-
Transfer from Stormwater for B&I (BoNY)	448,800	410,800	445,800
Total Non-Operating Receipts	1,158,141	1,306,535	1,061,896
Non-Operating Disbursements:			
Debt service - principal	561,000	580,000	594,000
Debt service - interest	489,008	482,267	463,835
Payment in lieu of taxes	197,620	197,620	197,620
Additions to utility plant	163,688	284,414	634,998
Project disbursements - (Funds on hand Sewer)	-	-	195,363
Purchase investments	792	-	-
Transfer to Bond and Interest Fund (BoNY) - Water Utility	146,500	-	-
Total Non-Operating Disbursements	1,558,608	1,544,301	2,085,816
Increase (Decrease) in cash and cash equivalents	539,006	412,586	(313,458)
Beginning cash and cash equivalents	5,081,428	5,620,434	6,033,020
Ending Cash and Cash Equivalents	$5,620,434	$6,033,020	$5,719,562

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF DETAILED OPERATING DISBURSEMENTS
(Wastewater Utility)
(Unaudited)

Operating Disbursements:	Calendar Year 2013	2014	2015
Plan and Building:			
Salaries and wages	$57,190	$75,742	$93,091
Employee benefits	34,419	45,867	39,985
Repairs and maintenance	-	-	14
Fuel	2,077	2,009	2,033
Contractual services	9,698	20,810	35,936
Office supplies	1,625	1,993	2,151
Uniforms	819	702	250
Dues and subscriptions	432	631	825
Postage	5	18	-
Telephone	1,540	1,235	1,545
Miscellaneous	1,845	2,968	4,818
Total Plan and Building	109,650	151,975	180,648
Administrative:			
Salaries and wages	177,289	210,442	239,437
Employee benefits	75,050	101,681	94,829
Purchased power	396,373	425,147	390,238
Repairs and maintenance	19,332	19,467	22,146
Fuel	809	1,392	635
Other utilities	166,519	162,926	129,603
Contractual services	155,556	135,006	248,546
Other services	2,660	10,970	6,027
Insurance	53,798	251,234	93,265
Office supplies	28,081	35,220	30,853
Uniforms	1,325	652	1,217
Dues and subscriptions	4,328	2,126	2,858
Postage	4,687	2,729	5,286
Telephone	16,169	15,878	20,913
Miscellaneous	12,088	22,154	20,808
Total Administrative	1,114,064	1,397,024	1,306,661
Sewer:			
Salaries and wages	457,537	438,776	481,781
Employee benefits	231,526	255,602	267,329
Repairs and maintenance	176,851	101,706	124,780
Materials and supplies	39,808	30,691	31,285
Biosolid management	90,284	64,369	71,125
Chemicals	70,658	59,462	70,666
Fuel	24,083	19,599	16,304
Other utilities	-	353	-
Contractual services	4,270	20,730	38,949
Other services	12,280	3,444	4,973
Lab fees	4,042	5,208	6,206
Office supplies	7,013	5,604	3,898
Uniforms	7,058	6,773	7,344
Dues and subscriptions	10,410	10,130	10,640
Postage	1,979	1,305	10
Telephone	3,353	2,702	3,095
Miscellaneous	13,031	6,222	8,484
Total Sewer	$1,154,183	$1,032,676	$1,146,869

(Continued on next page)

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF DETAILED OPERATING DISBURSEMENTS
(Wastewater Utility)
(Unaudited)

Operating Disbursements (Cont'd):	Calendar Year 2013	2014	2015
Street:			
Salaries and wages	$85,813	$114,678	$78,013
Employee benefits	33,709	65,190	46,860
Repairs and maintenance	1,814	2,000	5,940
Materials and supplies	18,739	9,684	13,729
Fuel	23,961	32,844	19,322
Uniforms	2,377	1,596	1,267
Telephone	1,366	927	1,108
Miscellaneous	353	74	208
Total Street	168,132	226,993	166,447
Maintenance:			
Salaries and wages	22,155	36,700	45,781
Employee benefits	11,702	15,677	16,926
Repairs and maintenance	1,186	3,237	2,509
Materials and supplies	39,637	22,886	22,769
Fuel	919	1,198	903
Other services	1,335	3,207	3,478
Office supplies	202	-	1,602
Uniforms	537	566	1,224
Telephone	272	463	381
Miscellaneous	-	511	117
Total Maintenance	77,945	84,445	95,690
Utility:			
Salaries and wages	38,581	45,139	48,623
Employee benefits	19,694	26,152	24,131
Repairs and maintenance	69	-	-
Office supplies	939	1,174	1,588
Dues and subscriptions	20	-	20
Postage	9,308	9,826	8,381
Telephone	206	253	337
Miscellaneous	2,783	2,164	2,020
Total Utility	71,600	84,708	85,100
Total Operating Disbursements	$2,695,574	$2,977,821	$2,981,415

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF SELECTED FINANCIAL INFORMATION ARISING FROM CASH TRANSACTIONS

(Stormwater Utility)
(Unaudited)

	As of		
Cash and Cash Equivalents:	12/31/2013	12/31/2014	12/31/2015
Operation and Maintenance Fund	$2,827,595	$2,790,648	$2,732,248
Total Cash and Cash Equivalents	$2,827,595	$2,790,648	$2,732,248

Bonded Indebtedness:

None

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARATIVE SCHEDULE OF CASH RECEIPTS AND DISBURSEMENTS
(Stormwater Utility)
(Unaudited)

	Calendar Year		
	2013	2014	2015
Operating Receipts:			
Stormwater user fees	$1,110,566	$1,078,457	$1,112,093
Rule 5 fees	3,750	20,570	33,689
Permits	72,766	90,867	61,100
Total Operating Receipts	1,187,082	1,189,894	1,206,882
Operating Disbursements:			
Plan and Building:			
Salaries and benefits	230,380	184,726	144,414
Materials and supplies	1,687	7,634	12,774
Other services	25,884	81,235	77,734
Administrative:			
Salaries and benefits	100,554	164,681	213,771
Materials and supplies	10,778	14,195	17,582
Other services	142,142	95,106	146,789
Refunds (net)	-	-	901
Street:			
Salaries and benefits	90,413	92,521	103,484
Other services	2,603	1,325	2,161
Utility:			
Salaries and benefits	57,966	71,002	72,582
Materials and supplies	10,247	11,000	10,753
Other services	2,199	1,832	1,501
Total Operating Disbursements	674,853	725,257	804,446
Net Operating Receipts	512,229	464,637	402,436
Non-Operating Receipts:			
Interest income	5,371	5,660	5,702
Other receipts	-	385	-
Grant receipts	3,970	-	-
Refunds (net)	1,269	38	2,280
Total Non-Operating Receipts	10,610	6,083	7,982
Non-Operating Disbursements:			
Additions to utility plant	17,568	96,867	23,018
Project Disbursements - (Funds on hand Storm)	255,142	-	-
Transfer to Bond and Interest Fund (BoNY)	448,800	410,800	445,800
Total Non-Operating Disbursements	721,510	507,667	468,818
Increase (Decrease) in cash and cash equivalents	(198,671)	(36,947)	(58,400)
Beginning cash and cash equivalents	3,026,266	2,827,595	2,790,648
Ending Cash and Cash Equivalents	$2,827,595	$2,790,648	$2,732,248

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARISON OF ACCOUNT BALANCES WITH MINIMUM BALANCES REQUIRED
(Wastewater Utility and Stormwater Utility)

Account:	Account Balance at 12/31/2015 (Unaudited)	Minimum Balances Required*	Ref.	Available
Operation and Maintenance Fund - WW & SW	$6,629,134	$665,834	(1)	$5,963,300
Sinking Fund:				
Bond and Interest Account	272,992	176,776	(2)	96,216
Debt Service Reserve Account	1,077,965	1,077,965	(3)	-
Improvement Fund	471,719	315,094	(4)	156,625
Sub-Totals	$8,451,810	$2,235,669		6,216,141
Less: cash on hand applied to the proposed refunding of the 1998 Bonds**				(2,500,000)
Total				$3,716,141

* Minimum balance requirements based on the outstanding bond ordinances.

** Assumes the Sewage Works will cash defease the 1998 Bonds outstanding principal plus accrued interest to the date fixed for redemption, as set by the Indiana State Revolving Fund Loan Program.

(1) The balance maintained in this fund should be sufficient to pay expenses of operation, repair and maintenance for the next succeeding two calendar months.

Pro forma operating disbursements (page 10)	$3,994,203
Times: Factor for two months (2 months/12 months)	16.67%
Minimum Balance Required	$665,834

(2) A balance should be maintained equal to the sum of the monthly transfers in the amount of one-sixth (1/6) of the next succeeding interest payment and one-twelfth (1/12) of the next succeeding principal payment.

	Payment	Factor	Required Balance
1998 Bonds:			
Interest due 5/1/16	$37,986	2/6	$12,662
Principal due 11/1/16	360,000	2/12	60,000
2009 Bonds:			
Interest due 5/1/16	74,517	2/6	24,839
Principal due 11/1/16	28,000	2/12	4,667
2011 Bonds:			
Interest due 5/1/16	108,826	2/6	36,275
Principal due 11/1/16	230,000	2/12	38,333
Minimum Balance Required			$176,776

(3) The balance of this account shall be equal to the maximum principal and interest payment of the outstanding bonds equal to $1,077,965 when fully funded.

Minimum Balance Required	$1,077,965

(4) Available for replacements and improvements. No minimum balance is required per the bond ordinance. Industry best practices, however, require one year's allowance for replacements and improvements.

Minimum Balance Suggested (Average annual additions)	$315,094

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $1,948,000 PRINCIPAL AMOUNT OF OUTSTANDING SEWAGE WORKS REVENUE BONDS OF 1998

Principal payable annually on November 1st.
Interest payable semiannually on May 1st and November 1st.
Interest rate as indicated.

Payment Date	Principal Balance	Interest Rate	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000's)	(---------- In Dollars ----------)		
05/01/16	$1,948			$37,986.00	$37,986.00	
11/01/16	1,948	3.90	$360	37,986.00	397,986.00	$435,972.00
05/01/17	1,588			30,966.00	30,966.00	
11/01/17	1,588	3.90	375	30,966.00	405,966.00	436,932.00
05/01/18	1,213			23,653.50	23,653.50	
11/01/18	1,213	3.90	389	23,653.50	412,653.50	436,307.00
05/01/19	824			16,068.00	16,068.00	
11/01/19	824	3.90	404	16,068.00	420,068.00	436,136.00
05/01/20	420			8,190.00	8,190.00	
11/01/20	420	3.90	420	8,190.00	428,190.00	436,380.00
	Totals		$1,948	$233,727.00	$2,181,727.00	$2,181,727.00

Average annual principal and interest payment
for the five bond years ending November 1, 2020 $436,345.40

Optional Redemption:

The Bonds maturing on or after November 1, 2009 are subject to redemption on November 1, 2008, or any date thereafter, on 60 days' notice, in whole or in part, in inverse order of maturity by lot within a maturity, at face value, plus accrued interest to the date fixed for redemption, without premium.

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $3,851,000 PRINCIPAL AMOUNT OF OUTSTANDING SEWAGE WORKS REVENUE BONDS, SERIES 2009 A

Principal payable annually on November 1st.
Interest payable semiannually on May 1st and November 1st.
Interest rate as indicated.

Payment Date	Principal Balance	Interest Rate	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000's)	(In Dollars)		
05/01/16	$3,851			$74,516.85	$74,516.85	
11/01/16	3,851	3.87	$28	74,516.85	102,516.85	$177,033.70
05/01/17	3,823			73,975.05	73,975.05	
11/01/17	3,823	3.87	29	73,975.05	102,975.05	176,950.10
05/01/18	3,794			73,413.90	73,413.90	
11/01/18	3,794	3.87	30	73,413.90	103,413.90	176,827.80
05/01/19	3,764			72,833.40	72,833.40	
11/01/19	3,764	3.87	32	72,833.40	104,833.40	177,666.80
05/01/20	3,732			72,214.20	72,214.20	
11/01/20	3,732	3.87	33	72,214.20	105,214.20	177,428.40
05/01/21	3,699			71,575.65	71,575.65	
11/01/21	3,699	3.87	470	71,575.65	541,575.65	613,151.30
05/01/22	3,229			62,481.15	62,481.15	
11/01/22	3,229	3.87	488	62,481.15	550,481.15	612,962.30
05/01/23	2,741			53,038.35	53,038.35	
11/01/23	2,741	3.87	507	53,038.35	560,038.35	613,076.70
05/01/24	2,234			43,227.90	43,227.90	
11/01/24	2,234	3.87	527	43,227.90	570,227.90	613,455.80
05/01/25	1,707			33,030.45	33,030.45	
11/01/25	1,707	3.87	547	33,030.45	580,030.45	613,060.90
05/01/26	1,160			22,446.00	22,446.00	
11/01/26	1,160	3.87	569	22,446.00	591,446.00	613,892.00
05/01/27	591			11,435.85	11,435.85	
11/01/27	591	3.87	591	11,435.85	602,435.85	613,871.70
Totals			$3,851	$1,328,377.50	$5,179,377.50	$5,179,377.50

Average annual principal and interest payment for the five bond years ending November 1, 2020 $177,181.36

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF AMORTIZATION OF $5,135,000 PRINCIPAL AMOUNT
OF OUTSTANDING SEWAGE WORKS REVENUE BONDS, SERIES 2011 A

Principal payable annually on November 1st.
Interest payable semiannually on May 1st and November 1st.
Interest rates as indicated.

Payment Date	Principal Balance	Interest Rates	Debt Service			Bond Year Total
			Principal	Interest	Total	
	(In $1,000's)	(%)	(In $1,000's)	(In Dollars)		
05/01/16	$5,135			$108,825.63	$108,825.63	
11/01/16	5,135	3.000	$230	108,825.63	338,825.63	$447,651.26
05/01/17	4,905			105,375.63	105,375.63	
11/01/17	4,905	3.000	235	105,375.63	340,375.63	445,751.26
05/01/18	4,670			101,850.63	101,850.63	
11/01/18	4,670	4.000	245	101,850.63	346,850.63	448,701.26
05/01/19	4,425			96,950.63	96,950.63	
11/01/19	4,425	4.000	250	96,950.63	346,950.63	443,901.26
05/01/20	4,175			91,950.63	91,950.63	
11/01/20	4,175	4.000	265	91,950.63	356,950.63	448,901.26
05/01/21	3,910			86,650.63	86,650.63	
11/01/21	3,910	4.000	275	86,650.63	361,650.63	448,301.26
05/01/22	3,635			81,150.63	81,150.63	
11/01/22	3,635	4.125	285	81,150.63	366,150.63	447,301.26
05/01/23	3,350			75,272.50	75,272.50	
11/01/23	3,350	4.250	300	75,272.50	375,272.50	450,545.00
05/01/24	3,050			68,897.50	68,897.50	
11/01/24	3,050	4.375	315	68,897.50	383,897.50	452,795.00
05/01/25	2,735			62,006.88	62,006.88	
11/01/25	2,735	4.400	330	62,006.88	392,006.88	454,013.76
05/01/26	2,405			54,746.88	54,746.88	
11/01/26	2,405	4.400	350	54,746.88	404,746.88	459,493.76
05/01/27	2,055			47,046.88	47,046.88	
11/01/27	2,055	4.500	370	47,046.88	417,046.88	464,093.76
05/01/28	1,685			38,721.88	38,721.88	
11/01/28	1,685	4.500	390	38,721.88	428,721.88	467,443.76
05/01/29	1,295			29,946.88	29,946.88	
11/01/29	1,295	4.625	410	29,946.88	439,946.88	469,893.76
05/01/30	885			20,465.63	20,465.63	
11/01/30	885	4.625	430	20,465.63	450,465.63	470,931.26
05/01/31	455			10,521.88	10,521.88	
11/01/31	455	4.625	455	10,521.88	465,521.88	476,043.76
	Totals		$5,135	$2,160,762.64	$7,295,762.64	$7,295,762.64

Average annual principal and interest payment
for the five bond years ending November 1, 2020 $446,981.26

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

SCHEDULE OF COMBINED BOND AMORTIZATION

Payment Date	Outstanding 1998 Bonds	Outstanding 2009A Bonds	Outstanding 2011A Bonds	Total	Bond Year Total
05/01/16	$37,986.00	$74,516.85	$108,825.63	$221,328.48	
11/01/16	397,986.00	102,516.85	338,825.63	839,328.48	$1,060,656.96
05/01/17	30,966.00	73,975.05	105,375.63	210,316.68	
11/01/17	405,966.00	102,975.05	340,375.63	849,316.68	1,059,633.36
05/01/18	23,653.50	73,413.90	101,850.63	198,918.03	
11/01/18	412,653.50	103,413.90	346,850.63	862,918.03	1,061,836.06
05/01/19	16,068.00	72,833.40	96,950.63	185,852.03	
11/01/19	420,068.00	104,833.40	346,950.63	871,852.03	1,057,704.06
05/01/20	8,190.00	72,214.20	91,950.63	172,354.83	
11/01/20	428,190.00	105,214.20	356,950.63	890,354.83	1,062,709.66
05/01/21		71,575.65	86,650.63	158,226.28	
11/01/21		541,575.65	361,650.63	903,226.28	1,061,452.56
05/01/22		62,481.15	81,150.63	143,631.78	
11/01/22		550,481.15	366,150.63	916,631.78	1,060,263.56
05/01/23		53,038.35	75,272.50	128,310.85	
11/01/23		560,038.35	375,272.50	935,310.85	1,063,621.70
05/01/24		43,227.90	68,897.50	112,125.40	
11/01/24		570,227.90	383,897.50	954,125.40	1,066,250.80
05/01/25		33,030.45	62,006.88	95,037.33	
11/01/25		580,030.45	392,006.88	972,037.33	1,067,074.66
05/01/26		22,446.00	54,746.88	77,192.88	
11/01/26		591,446.00	404,746.88	996,192.88	1,073,385.76
05/01/27		11,435.85	47,046.88	58,482.73	
11/01/27		602,435.85	417,046.88	1,019,482.73	1,077,965.46
05/01/28			38,721.88	38,721.88	
11/01/28			428,721.88	428,721.88	467,443.76
05/01/29			29,946.88	29,946.88	
11/01/29			439,946.88	439,946.88	469,893.76
05/01/30			20,465.63	20,465.63	
11/01/30			450,465.63	450,465.63	470,931.26
05/01/31			10,521.88	10,521.88	
11/01/31			465,521.88	465,521.88	476,043.76
Totals	$2,181,727.00	$5,179,377.50	$7,295,762.64	$14,656,867.14	$14,656,867.14

Average annual principal and interest payment
for the five bond years ending November 1, 2020 $1,060,508.02

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

CALCULATION OF OUTSIDE CUSTOMER SURCHARGE

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

OUTSIDE OF TOWN SURCHARGE BY METER SIZE - ALTERNATIVE I

Meter Size	Ratio to 5/8" Meter	Present	Proposed				
			2016	2017	2018	2019	2020
		(1)	(2)	(3)	(4)	(5)	(6)
5/8" - 3/4"	1.0	$4.45	$5.00	$5.40	$5.90	$6.55	$7.45
1"	2.5	11.10	12.50	13.50	14.70	16.40	18.65
1 1/4"	4.0	17.80	20.05	21.65	23.60	26.30	29.95
1 1/2"	5.7	25.80	29.05	31.40	34.20	38.10	43.35
2"	10.0	44.50	50.05	54.10	58.90	65.60	74.65
3"	23.0	102.40	115.20	124.55	135.65	151.10	171.95
4"	40.0	178.00	200.25	216.45	235.70	262.55	298.80
6"	91.0	405.00	455.65	492.55	536.40	597.55	680.00
8"	162.0	720.90	811.00	876.70	954.75	1,063.60	1,210.40

(1) Present Rates were approved by the Town Council on March 24, 2011 pursuant to Ordinance #2011-06.

(2) Phase I rates and charges represent a 12.5% across-the-board rate increase in present rates and charges.

(3) Phase II rates and charges represent a 8.1% across-the-board rate increase in Phase I rates and charges.

(4) Phase III rates and charges represent a 8.9% across-the-board rate increase in Phase II rates and charges.

(5) Phase IV rates and charges represent a 11.4% across-the-board rate increase in Phase III rates and charges.

(6) Phase V rates and charges represent a 13.8% across-the-board rate increase in Phase IV rates and charges.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

OUTSIDE OF TOWN SURCHARGE BY METER SIZE - ALTERNATIVE II

Meter Size	Ratio to 5/8" Meter	Present	Proposed				
			2016	2017	2018	2019	2020
		(1)	(2)	(3)	(4)	(5)	(6)
5/8" - 3/4"	1.0	$4.45	$4.85	$5.15	$5.45	$6.10	$6.90
1"	2.5	11.10	12.15	12.90	13.65	15.35	17.40
1 1/4"	4.0	17.80	19.45	20.65	21.85	24.55	27.85
1 1/2"	5.7	25.80	28.25	30.00	31.75	35.65	40.45
2"	10.0	44.50	48.70	51.70	54.70	61.45	69.75
3"	23.0	102.40	112.05	119.00	125.90	141.40	160.50
4"	40.0	178.00	194.75	206.80	218.80	245.70	278.85
6"	91.0	405.00	443.05	470.50	497.80	559.05	634.50
8"	162.0	720.90	788.65	837.55	886.15	995.15	1,129.50

(1) Present Rates were approved by the Town Council on March 24, 2011 pursuant to Ordinance #2011-06.

(2) Phase I rates and charges represent a 9.4% across-the-board rate increase in present rates and charges.

(3) Phase II rates and charges represent a 6.2% across-the-board rate increase in Phase I rates and charges.

(4) Phase III rates and charges represent a 5.8% across-the-board rate increase in Phase II rates and charges.

(5) Phase IV rates and charges represent a 12.3% across-the-board rate increase in Phase III rates and charges.

(6) Phase V rates and charges represent a 13.5% across-the-board rate increase in Phase IV rates and charges.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

CALCULATION OF SEWAGE WORKS AVAILABILITY FEE

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

CALCULATION OF EQUIVALENT DWELLING UNITS

Meter Size	Total Customers (1)	Ratio to 5/8" Meter	Total Equivalent Connections	Annual Bills	Equivalent Bills	Equivalent Dwelling Units
5/8" - 3/4"	7,825	1.0	7,825.0	93,900	93,900	7,825
1"	117	2.5	292.5	1,404	3,510	293
1 1/2"	87	5.7	495.9	1,044	5,951	496
2"	138	10.0	1,380.0	1,656	16,560	1,380
3"	6	23.0	138.0	72	1,656	138
4"	4	40.0	160.0	48	1,920	160
6"	1	91.0	91.0	12	1,092	91
8"	2	162.0	324.0	24	3,888	324
Totals	8,180		10,706.4	98,160	128,477	10,706

(1) Per Dec. 2015 Regular Bill Journal, per Utility Billing Manager.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

CALCULATION OF AVAILABILITY FEE

Existing System Equity:	Alt. I	Alt. II
Estimated net utility plant in service as of 12/31/15*	$27,595,999	$27,595,999
Less estimated government grants as of 12/31/15	(8,238,764)	(8,238,764)
Less outstanding long-term debt **	(10,934,000)	(10,934,000)
Sub-total	8,423,235	8,423,235
Divide by estimated number of Equivalent Connections (EDUs)	10,706	10,706
Proposed availability fee for existing plant	$787	$787
Proposed availability fee for existing plant-rounded	$785	$785
Plus:		
Capacity and Growth Projects:		
Cost of WWTP expansion:		
Wastewater Treatment Plant***	$22,053,937	$17,028,218
Sanitary Sewer System***	4,613,336	4,339,055
Sub-total	26,667,273	21,367,273
Divided by capacity of new treatment plant (5.25 MGD)***	5,250,000	5,250,000
Cost per gallon	5.08	4.07
Times IDEM Single Family Residential Dwelling Unit (SFRDU)	310 GPD	310 GPD
Proposed availability fee for capacity cost	$1,575	$1,262
Proposed availability fee for capacity cost (rounded)	$1,580	$1,260
Plus:		
Future Collection System Capacity Expansion:		
Wastewater Treatment Plant Phase P2a	$5,140,000	$5,140,000
Wastewater Sewer Phase S1b	8,600,000	8,600,000
Wastewater Sewer Phase S2	4,728,000	4,728,000
Sub-total	18,468,000	18,468,000
Divide by estimated number of Equivalent Connections (EDUs)	10,706	10,706
Proposed availability fee for existing plant	$1,725	$1,725
Total Availability Fee	$4,090	$3,770

* See page 15.
** See pages 36 to 38.
*** Based on the Consulting Engineer's schedule for project design and bid.

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

CALCULATION OF SEWER AVAILABILITY FEES FOR OVERSIZE METERS

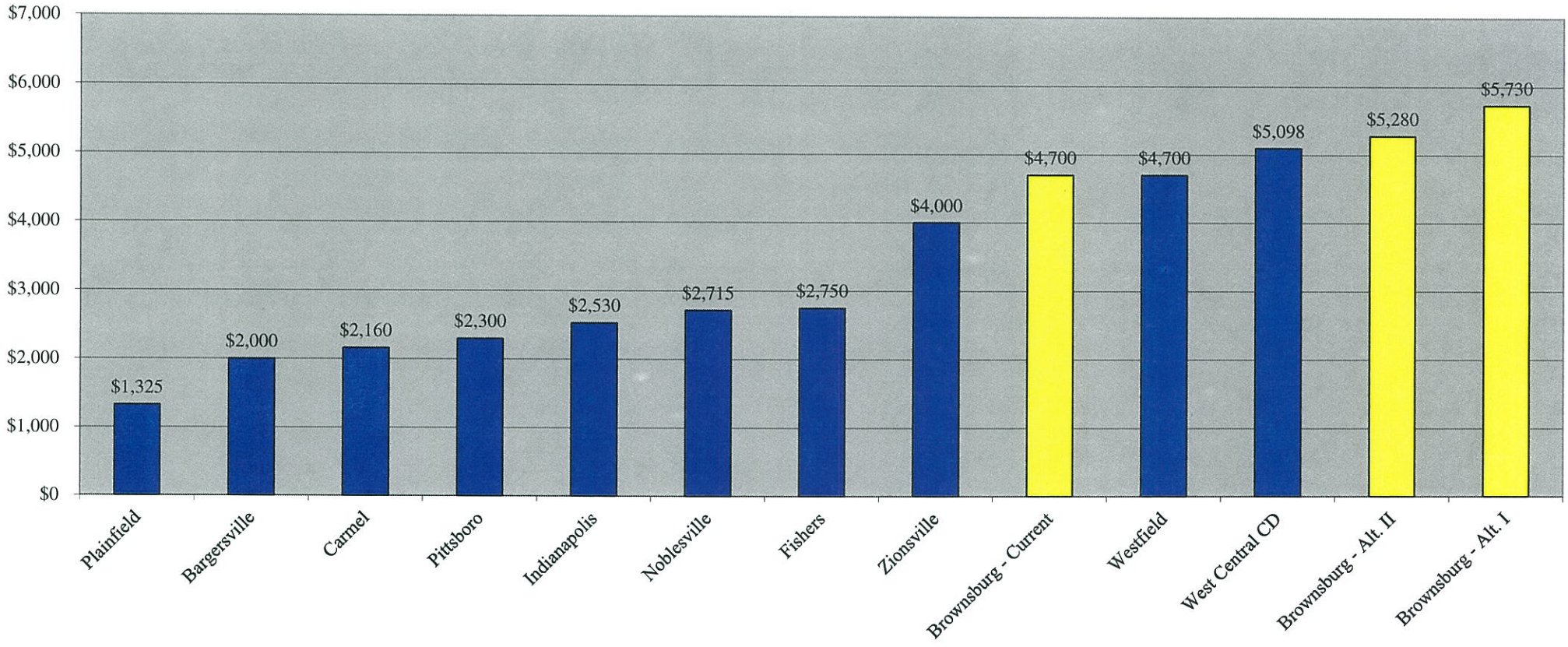
(Unaudited)

Water Meter Size		Equivalency Factor	Alt. I Fee	Alt. II Fee
5/8	inch	1.0	$4,090	$3,770
3/4	inch	1.4	5,730	5,280
1	inch	2.5	10,230	9,430
1 1/4	inch	4.0	16,360	15,080
1 1/2	inch	5.8	23,720	21,870
2	inch	10.0	40,900	37,700
3	inch	23.0	94,070	86,710
4	inch	40.0	163,600	150,800
6	inch	91.0	372,190	343,070
8	inch	162.0	662,580	610,740
10	inch	253.0	1,034,770	953,810
12	inch	365.0	1,492,850	1,376,050

(Subject to the attached letter dated May 25, 2016)
(Preliminary - Subject to Change)
(Internal Use Only)

BROWNSBURG (INDIANA) MUNICIPAL SEWAGE WORKS

COMPARISON OF SYSTEM DEVELOPMENT CHARGES



Prepared by: Umbaugh

APPENDIX E

PUBLIC PARTICIPATION

Hendricks County Clean Water
355 S Washington St #206
Danville, IN 46122

Hendricks County Health Dept
355 S Washington St, #210
Danville, IN 46122

Hendricks County Planning Dept
355 S Washington St, #212
Danville, IN 46122

Hendricks County Drainage Board
355 S Washington St #214
Danville, IN 46122

Hendricks County Engineer
355 S Washington St #209
Danville, IN 46122

Hendricks County ICON
6319 E US Hwy 36, Ste 3C,
Mailbox #16
Avon, IN 46123

Grant Kleinhenz
Town Manager
61 N Green Street
Brownsburg, IN 46112

Kathy Dillon
Wastewater Superintendent
225 S Mardale Dr
Brownsburg, IN 46112

Todd Wallace
Town Engineer
61 N Green Street
Brownsburg, IN 46112

Hendricks County Flyer
8109 Kingston St Ste 500
Avon, IN 46123

Jay Lee
ARCADIS
132 E Washington St, Suite 600
Indianapolis, IN 46204

Brownsburg Community School Corporation
310 Stadium Drive
Brownsburg, IN 46112

Maplehurst Bakeries LLC
50 Maplehurst Drive
Brownsburg, IN 46112

Wilbur & Rebecca Tague
315 W Main St
Brownsburg, IN 46112

Brownsburg Municipal Building Corporation Inc.
80 E Vermont St
Brownsburg, IN 46112

Van Evanoff
5099 Timber Ridge Trce
Brownsburg, IN 46112

Earl Schrack Revocable Trust
9025 Stonewick Cir
Zionsville, IN 46077

Gerald Schrier
5411 E County Road 550 N
Pittsboro, IN 46167

IRD LLC
125 S 1100 E
Zionsville, IN 46077

John Godfrey Rev Trust
409 Weston St
Brownsburg, IN 46112

Welbilt Properties LLC
2159 Glebe St, Suite 200
Carmel, IN 46032

Brownsburg Congregation of Jehovahs Witnesses Inc
C/O Kelly Nichols
6340 Canterbury Lane
Pittsboro, IN 46167

Mark & Tracey Scott
C/O Flagstar Bank
5151 Corporate Dr
Troy, MI 48098

Matthew & Miranda Gregory
20 E Airport Road
Suite 800
Brownsburg, IN 46112

Michael & Robin Mercer
6645 E US Highway 136
Brownsburg, IN 46112

Clifford Schrier Trust
6605 E US Highway 136
Brownsburg, IN 46112

Joseph & Kemberly Hardin
6585 E US Highway 136
Brownsburg, IN 46112

Justin & Marilyn McKee
6565 E US Highway 136
Brownsburg, IN 46112

Bradley & Tina Magee
6515 E US Highway 136
Brownsburg, IN 46112

Morriso & Marilyn Woods
6495 E US Highway 136
Brownsburg, IN 46112

Scott Helton
E US Highway 136
Brownsburg, IN 46112

Jerry Patterson Trust
22 Trotters Run
Brownsburg, IN 46112

Ashlin Haskett
6415 E US Highway 136
Brownsburg, IN 46112

Michael & Alice McKee
6405 E US Highway 136
Brownsburg, IN 46112

Terry & Gina Hudson
6385 E US Highway 136
Brownsburg, IN 46112

Mark Hayes
6355 E US Highway 136
Brownsburg, IN 46112

John & Betty Wiley
6335 E US Highway 136
Brownsburg, IN 46112

Lance Stephens & Amanda Shadday
6315 E US Highway 136
Brownsburg, IN 46112

David & Denise Barnes
6295 E US Highway 136
Brownsburg, IN 46112

David & Sharin White
6275 E US Highway 136
Brownsburg, IN 46112

Michael & Jodi Gordon
6255 E US Highway 136
Brownsburg, IN 46112

CSX Transportation Public Projects
Amanda DeCesare
500 Water Street (J-301)
Jacksonville, FL 32202

Journey Church of Brownsburg
6690 E US Highway 136
Brownsburg, IN 46112

Brownsburg Monopoly LLC
10566 N State Road 267
Brownsburg, IN 46112

Wanda Douglas
6620 E US Highway 136
Brownsburg, IN 46112

Brent & Judith Bastin
6610 E US Highway 136
Brownsburg, IN 46112

Jennifer Barnette
6516 E US Highway 136
Brownsburg, IN 46112

Ralph & Mary Marks
6510 E US Highway 136
Brownsburg, IN 46112

Betty Phillips Living Trust
6330 E US Highway 136
Brownsburg, IN 46112

Terry & Ramona Henderson
3106 Towne Dr
Carmel, IN 46032

David & Mirand Rearden
6310 N County Rd 625 E
Brownsburg, IN 46112

Ameriana Bank
1311 Broad St
New Castle, IN 47362

Zachary & Samantha Jackson
11145 Galley Way
Fortville, IN 46040

Tracey Krutz Living Trust
5393 Green Hills Dr
Brownsburg, IN 46112

Gregory & Megan Bunck
5421 Green Hills Dr
Brownsburg, IN 46112

Douglas & Anita Butz
5445 E Green Hills Dr
Brownsburg, IN 46112

Mark & Kelly Thurman
6498 Regina Dr
Brownsburg, IN 46112

Daniel & Susan Bond
5109 Timber Ridge Trce
Brownsburg, IN 46112

James & Susan Boots
5103 Timber Ridge Trce
Brownsburg, IN 46112

APPENDIX F

Archaeological Report

INDIANA ARCHAEOLOGICAL SHORT REPORT

State Form 54566 (1-11)

INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF HISTORIC PRESERVATION
AND ARCHAEOLOGY
402 West Washington Street, Room W274
Indianapolis, Indiana 46204-2739
Telephone Number: (317) 232-1646
Fax Number: (317) 232-0693
E-mail: dhpa@dnr.IN.gov

Where applicable, the use of this form is recommended but not required by the Division of Historic Preservation and Archaeology.

Author: Stacy N. Bennett

Date (*month, day, year*): March 20, 2016

Project Title: Phase Ia Archaeological Field Reconnaissance for a Proposed Lift Station in the Northwest Corner of the Intersection of CR 625 E and US 136 near Brownsburg, Hendricks County, Indiana.

PROJECT OVERVIEW

Project Description: The project calls for the construction of a lift station in the northwest corner of the intersection of CR 625 E and US 136 near Brownsburg, Hendricks County, Indiana.

INDOT Designation Number/ Contract Number:

Project Number: IN16008.01

DHPA Number:

Approved DHPA Plan Number:

Prepared For: Arcadis U. S., Inc.

Contact Person: Jeremy T. Nitka

Address: 132 E. Washington Street, Suite 600

City: Indianapolis State: IN ZIP Code: 46204

Telephone Number: (317) 236-2845 Email Address: jeremy.nitka@arcadis.com

Principal Investigator: Jeffrey A. Plunkett

Signature:

Company/Institution: Accidental Discoveries, LLC

Address: 205 Angela Court

City: Noblesville State: IN ZIP Code: 46062

Telephone Number: (317) 773-2774 Email Address: jeff@accidentaldiscoveries.net

PROJECT LOCATION

County: Hendricks

USGS 7.5' series Topographic Quadrangle: Brownsburg, Indiana

Civil Township: Lincoln

Legal Location:

SW	1/4,	SW	1/4,	SE	1/4,	SE	1/4,	Section:	3	Township: 16N	Range: 1E
	1/4,		1/4,		1/4,		1/4,	Section:		Township:	Range:
	1/4,		1/4,		1/4,		1/4,	Section:		Township:	Range:
	1/4,		1/4,		1/4,		1/4,	Section:		Township:	Range:

Topographic Map Datum: NAD 1983 Grid Alignment: South and west

Comments:

Property Owner:

PROJECT AREA DETAILS

Length meters: feet: Width meters: feet: hectares: 00.2 acres: 00.5

Natural Region: Tipton Till Plain Section

Topography: Upland flats

Soil Association: Miami-Crosby (United States Department of Agriculture, Natural Resources Conservation Service [USDA, NRCS] 2006)

Soils: Brookston silty clay loam, 0-2% slopes (Bs) - poorly drained;
Crosby-Miami silt loams, 2-4% slopes, eroded (CsB2) - somewhat poorly drained (USDA, NRCS 2016).

Drainage: Upper White

Current Land Use: The project area is currently a small field with scrub growth.

Comments:

RECORDS REVIEW: *(check all that apply)* Date of Records Check : February 27, 2016

☒ SHAARD database

☒ Site Maps on file at DHPA

Eleven previously recorded archaeological sites are located within one mile of the project area. A brief description of these sites is provided below.

12-He-15: Unidentified prehistoric lithic scatter (Guendling and Munson 1978)
12-He-119: Unidentified prehistoric isolated find (Stillwell and Cochran 1992)

Previously Reported Sites within One Mile of the Project *(include citations)*:	12-He-120: Unidentified prehistoric lithic scatter/historic isolate (Stillwell and Cochran 1992) 12-He-121: Unidentified prehistoric lithic scatter (Stillwell and Cochran 1992) 12-He-122: Unidentified prehistoric isolated find (Stillwell and Cochran 1992) 12-He-123: Late Archaic/Early Woodland lithic scatter (Stillwell and Cochran 1992) 12-He-124: Unidentified prehistoric isolated find (Stillwell and Cochran 1992) 12-He-125: Late Archaic lithic scatter (Stillwell and Cochran 1992) 12-He-126: Unidentified prehistoric isolated find (Stillwell and Cochran 1992) 12-He-128: Unidentified prehistoric lithic scatter (Stillwell and Cochran 1992) 12-He-381: Twentieth Century historic artifact scatter (Alexander and Stevens 2011)

☒ Cultural Resource Management reports, other research reports, grant reports on file at DHPA or other institutions

Previous Archaeological Studies within One Mile of the Project *(include citations)*:	Seven previous archaeological investigations have occurred within one mile of the project area (Alexander and Stevenson 2011; Gaw and Cochran 1993; Guendling and Munson 1978; Miller 2007; Grosze and Snell 2014; Stillwell 1999; Stillwell and Cochran 1992). A brief description of these investigations is provided below on Table 1.

List other institutions:	

☒ Cemetery Records

Results:	Only one historic cemetery (McDaniels Cemetery [CR-32-86], 1837-1937) was found to be located within one mile of the project. This cemetery is neither located within 100 ft. of the current project area nor will be directly impacted by any of the proposed construction activities.

☐ McGregor Industrial Site Records *(in applicable counties)*

Results:	

☒ County Interim Report

Results:	The Hendricks County Interim Report (Historic Landmarks Foundation of Indiana 1989) shows ten historic properties to be located within a mile of the project area. A brief description of these properties is provided below. Farm (063-074-00040), Greek Revival/Italianate/I-house, circa 1860 - Outstanding Farm (063-074-40007), Bungalow, circa 1920 - Contributing House (063-074-40008), Saltbox, circa 1860 - Contributing Farm (063-074-40010), Colonial Revival, circa 1900 - Contributing House (063-074-40011), Gable front c. 1880/c. 1915 - Contributing House (063-074-41015), Bungalow c. 1910 - Contributing House (063-074-41034), Greek Revival/Italianate/center-gable cottage, circa 1850/circa 1870/circa 1915 - Notable House (063-074-41035), Queen Anne, circa 1900 - Contributing House (063-074-41036), T-plan cottage, circa 1890 - Demolished Historic bridge (HB-3043), Filled-spandrel arch, circa 1927 - Contributing

☒ Historic Maps

Results:	Examination of the 1876 map of Hendricks County Indiana (Indiana Historical Society 1968) shows three residences and McDaniels Cemetery within a mile of the project area.

Known Cultural Manifestations and/or Additional Information: At the time of this investigation, at least 389 archaeological sites have been registered within Hendricks County. These sites represent the full span of prehistoric time periods as well as a number of historic sites including artifact scatters, cabins, a cistern, farmsteads, a school, a road, and a factory. Specific prehistoric cultural phases identified within the county include Albee, Allison LaMotte, Dalton, Intrusive Mound Culture, and Newtown; however, all of these cultural phases were documented on a single archaeological site within the county and were based solely on the recovery of Madison triangular point off of this site.

FIELD INVESTIGATION: *(check all that apply)* Field Investigation Dates: February 28, 2016

Field Supervisor: Stacy N. Bennett

Field Crew: Stacy N. Bennett

Surface Visibility: 0%

Factors Affecting Visibility: Visibility was affected by tall grass, weeds and scrub.

Visual Walkover ☐ Pedestrian Survey ☐ Shovel Test ☒ Screened ☒ Mesh Size 1/4 in

Interval 5 m ☐ 10 m ☐ 15 m ☒ Other *(describe below)* ☐

Number of Shovel Test Units Excavated: 7

Describe Methods: The entire project area had a ground surface visibility that was below 30% and, therefore, shovel probes were used to investigate the area. These probes were placed at 15 m (49.2 ft.) intervals, were 30 cm in diameter, and extended into undisturbed soils or to a maximum depth of 50 cm. All soil removed from the shovel probes was examined by screening it through a ¼" mesh and was then replaced.

Attach photographs documenting disturbances below

Describe Disturbances:

Comments:

RESULTS

☐ Archaeological records check has determined that the project area does not have the potential to contain archaeological resources.

☐ Archaeological records check has determined that the project area has the potential to contain archaeological resources.

☒ Phase Ia reconnaissance has located no archaeological resources in the project area.

☐ Phase Ia reconnaissance has identified landforms conducive to buried archaeological deposits.

Actual Area Surveyed hectares: 00.2 acres: 00.5

Comments:

RECOMMENDATION

☐ The archaeological records check has determined that the project area has the potential to contain archaeological resources and a Phase Ia archaeological reconnaissance is recommended.

☐ The archaeological records check has determined that the project area does not have the potential to contain archaeological resources and no further work is recommended before the project is allowed to proceed.

☒ The Phase Ia archaeological reconnaissance has located no archaeological sites within the project area and it is recommended that the project be allowed to proceed as planned.

☐ The Phase Ia archaeological reconnaissance has determined that the project area includes landforms which have the potential to contain buried archaeological deposits. It is recommended that Phase Ic archaeological subsurface reconnaissance be conducted before the project is allowed to proceed.

☐ The Phase Ia archaeological reconnaissance has determined that the project area is within 100 feet of a cemetery and a Cemetery Development Plan is required per IC-14-21-1-26.5.

Cemetery Name:

Other Recommendations/Commitments:

Pursuant to IC-14-21-1, if any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646.

ATTACHMENTS

☒ Figure showing project location within Indiana.

☒ USGS topographic map showing the project area *(1:24,000 scale)*.

☒ Aerial photograph showing the project area, land use, and survey methods.

☒ Photographs of the project area.

☐ Project plans *(if available)*

Other Attachments: Table 1: Previous Archaeological Investigations within One Mile of the Project.

Alexander, Dawn and J. Sanderson Stevens
2011 Phase Ia Archaeological Records Check and Field Reconnaissance: Northfield Drive Phase IV, Des. No. 1006651, Hendricks County, Indiana. INDOT Des No. 1006551. Weintraut & Associates, Zionsville, Indiana. Prepared for Federal Highway Administration/Indiana Department of Transportation, Indianapolis.

Gaw, Randy and Donald R. Cochran
1993 Archaeological Subsurface Reconnaissance: Brownsburg Bypass, Hendricks County, Indiana. Archaeological Resources Management Services, Ball State University, Muncie, Indiana. Prepared for American Consulting Engineers, Indianapolis.

Grozse, Noel and Samuel P. Snell
2014 Phase Ia Archaeological Survey for the Proposed North Green Street Widening, US 136 to 56th Street (Des. No. 1383683), Brownsburg, Lincoln Township, Hendricks County, Indiana. Civil and Environmental Consultants, Indianapolis, Indiana. Prepared for Indiana Department of Transportation, Indianapolis, Indiana.

Guendling, Randall L. and Cheryl A. Munson
1978 An Archaeological Reconnaissance of the Proposed Brownsburg Sewage Treatment Facility, Hendricks County, Indiana. Glenn A. Black Laboratory of Archaeology, Indiana University, Bloomington, Indiana. Prepared for R. W. Armstrong & Associates, Indianapolis.

References Cited:

Historic Landmarks Foundation of Indiana
1989 Hendricks County Interim Report. Indiana Historic Sites and Structures Inventory. Historic Landmarks Foundation of Indiana, Indianapolis.

Indiana Historical Society
1968 Illustrated Historical Atlas of the State of Indiana. Reprinted. Indiana Historical Society, Indianapolis. Originally published 1876, Baskin, Forster & Company, Chicago.

Miller, Shaun A.
2007 An Archaeological Records Check and Phase Ia Reconnaissance: Proposed SR 267 Road Rehabilitation from 1.49 Miles South of US 136 to 0.53 Miles North of US 136 through Brownsburg (INDOT Des. No. 9608920), Hendricks County, Indiana. Cultural Resource Section, Office of Environmental Services, Indiana Department of Transportation, Indianapolis, Indiana. Prepared for Indiana Department of Transportation, Crawfordsville District, Crawfordsville, Indiana.

Stillwell, Larry N.
1999 An Archaeological Field Reconnaissance of a Proposed Cellular Phone Tower (Project #069F), in Brownsburg, Hendricks County, Indiana. Cultural Resource Management Report 99FR164. Archaeological Consultants of Ossian, Muncie, Indiana. Prepared for Sagamore Environmental Services, Indianapolis.

Stillwell, Larry N. and Donald R. Cochran
1992 Archaeological Field Reconnaissance: Brownsburg Bypass, Hendricks County, Indiana. Archaeological Resource Management Services, Ball State University, Muncie, Indiana. Prepared for American Consulting Engineers, Indianapolis.

United States Department of Agriculture, Natural Resources Conservation Service
2006 Digital General Soil Map of U. S. (Spatial extent: Indiana; Spatial format: ESRI Shapefile, Coordinate System: Geographic Coordinate System [WGS84]), Fort Worth, Texas.

2016 Web Soil Survey. Electronic document, http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, accessed February 25, 2016.

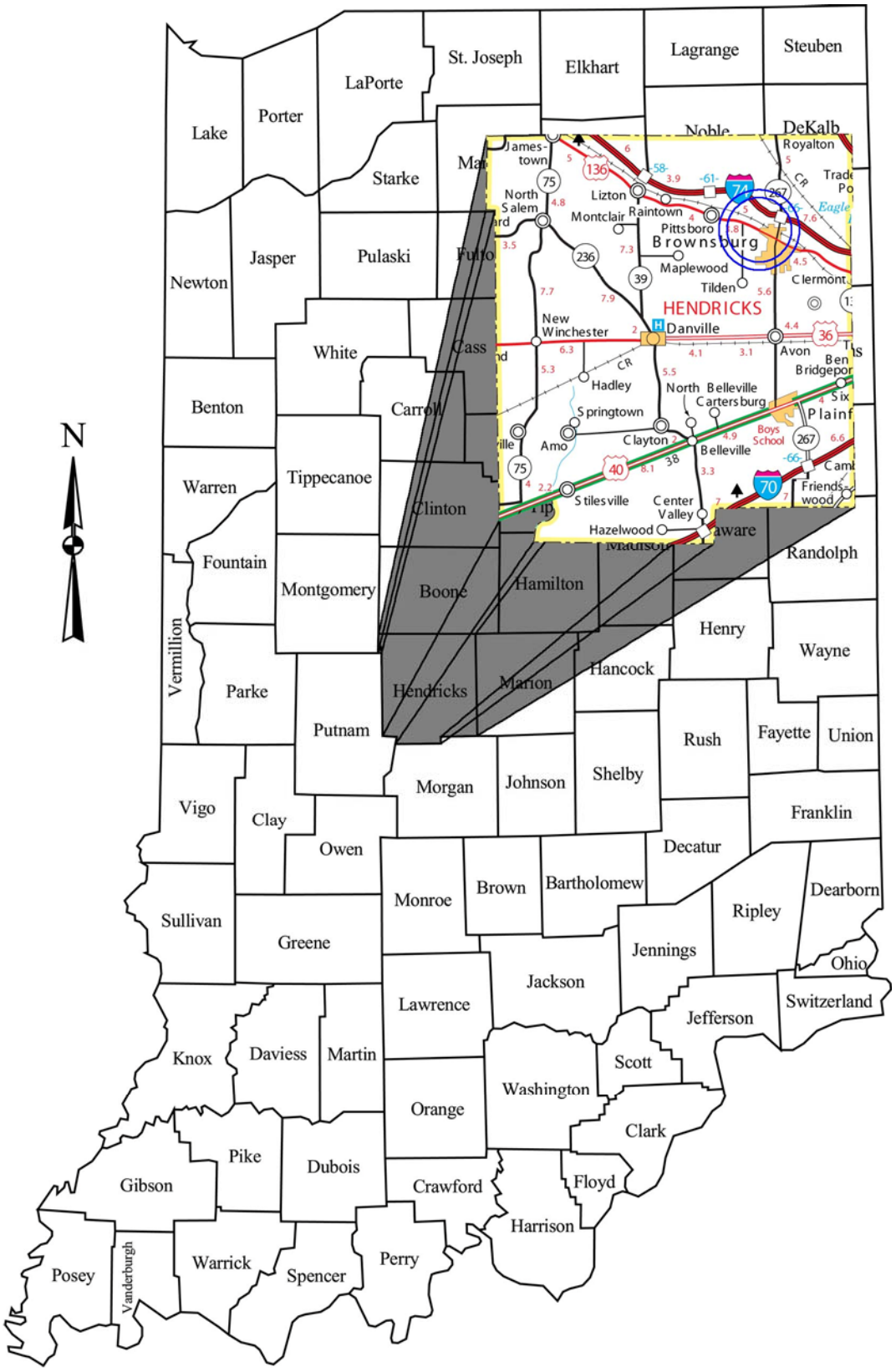
Comments:

CURATION

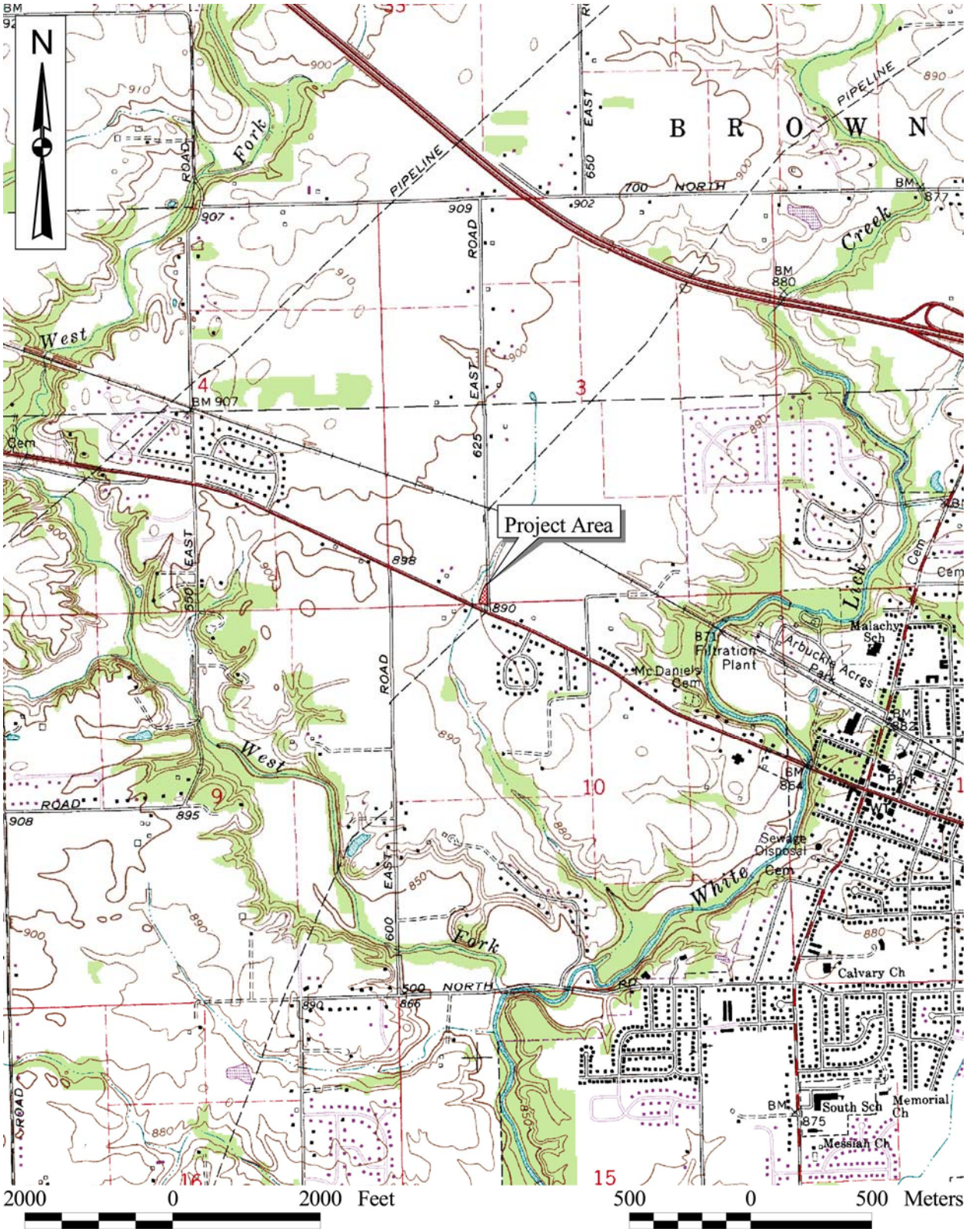
Curation Facility for Project Documentation: Accidental Discoveries, LLC

Table 1: Previous Archaeological Investigations within One Mile of the Project.

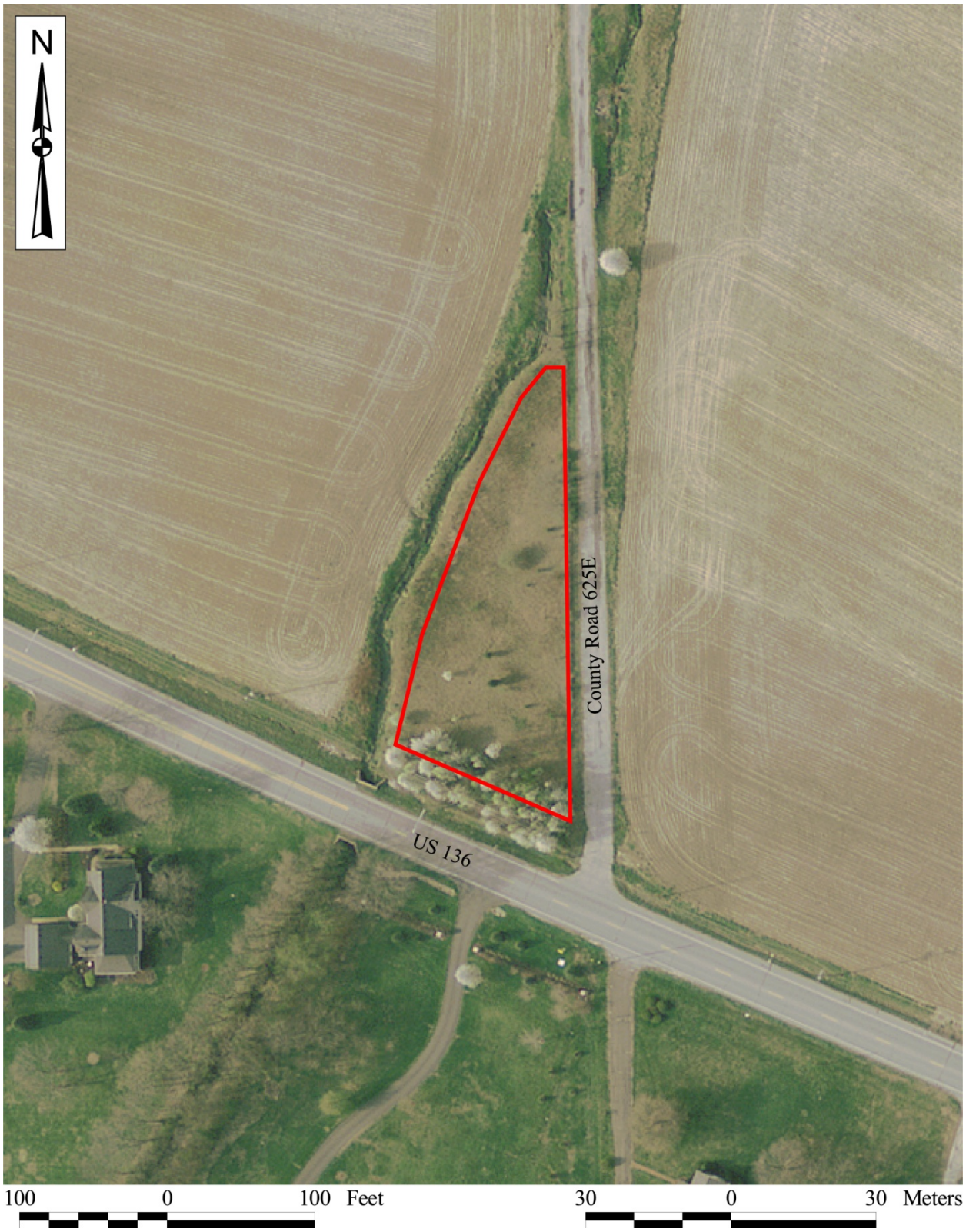
Project	Year	Area Investigated	Findings	Investigating Firm	Reference
Phase Ia Archaeological Records Check and Field Reconnaissance: Northfield Drive Phase IV, Des. No. 1006651, Hendricks County, Indiana	2011	2.18 acres	12-He-381	Weintraut & Associates	Alexander and Stevens 2011
Archaeological Subsurface Reconnaissance: Brownsburg Bypass, Hendricks County, Indiana	1993	0.9 acres	No sites found	Archaeological Resource Management Services (ARMS)	Gaw and Cochran 1993
Phase Ia Archaeological Survey for the Proposed North Green Street Widening, US 136 to 56th Street (Des. No. 1383683), Brownsburg, Lincoln Township, Hendricks County, Indiana	2014	12.7 acres	No sites found	Civil and Environmental Consultants	Grosze and Snell 2014
An Archaeological Reconnaissance of the Proposed Brownsburg Sewage Treatment Facility, Hendricks County, Indiana	1978	unknown	12-He-15	Glenn A. Black Laboratory of Archaeology	Guendling and Munson 1978
An Archaeological Records Check and Phase Ia Reconnaissance: Proposed SR 267 Road Rehabilitation from 1.49 Miles South of US 136 to 0.53 Miles North of US 136 through Brownsburg (INDOT Des. No. 9608920), Hendricks County, Indiana	2007	2.09 acres	No sites found	Cultural Resource Section, Office of Environmental Services, Indiana Department of Transportation	Miller 2007
An Archaeological Field Reconnaissance of a Proposed Cellular Phone Tower (Project #069F), in Brownsburg, Hendricks County, Indiana	1999	1.3 acres	No sites found	Archaeological Consultants of Ossian	Stillwell 1999
Archaeological Field Reconnaissance: Brownsburg Bypass, Hendricks County, Indiana	1992	~21 acres	10 sites investigated	ARMS	Stillwell and Cochran 1992



Location of the project area (blue circles) and Hendricks County in Indiana.



Location of the project area as shown on a portion of the USGS 7.5-minute series Brownsburg, Indiana topographic quadrangle.



Limits of the project area as shown on a portion of a 2011 aerial photograph.

View of the project taken from CR 625E near the center of the project area, facing south-southwest.