Nashville capacity 600,000 gpd

BEAN BLOSSOM RSD

BROWN COUNTY, INDIANA

PRELIMINARY ENGINEERING REPORT

FOR:

WASTEWATER FACILITIES

DRAFT

SEPTEMBER 2014

PREPARED FOR:

BEAN BLOSSOM RSD BOARD MEMBERS

STEVE STALEY	PRESIDENT
DEBBIE LARSH	MEMBER
MIKE LEGGINS	MEMBER
JOHN KENNARD	MEMBER
TERESA OSTERLK	"

1 Owner Plant
2 Nashville
3 Hemsburg
Based on Cost

PREPARED BY:

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BEAN BLOSSOM RSD
WASTEWATER PROJECT
PROJECT FINANCING OPTIONS
8/22/14

WWTP AT BEAN BLOSSOM

Scenario	Amount of Loan	crf	Annual Debt Service	Annual Reserve	O,M&R	Total Annual Requirement	Total Est. EDU's	Estimated Monthly Rate/EDU
RD Loan - 3.25% - 40 years	$4,460,000	0.0451	$201,146	$20,115	$150,000	$371,261	210	$147.33
RD Loan - 2.375% - 40 years	$4,460,000	0.0391	$174,386	$17,439	$150,000	$341,825	210	$135.64
45% RD Grant + RD Loan @ 3.25%	$2,453,000	0.0451	$110,630	$11,063	$150,000	$271,693	210	$107.81
75% RD Grant + RD Loan @ 2.375%	$1,115,000	0.0391	$43,597	$4,360	$150,000	$197,956	210	$78.55
75% RD Grant + $500,000 CFF Grant + RD Loan @ 2.375%	$615,000	0.0391	$24,047	$2,405	$150,000	$176,451	210	$70.02
SRF Loan - 2.0% - 20 years	$4,460,000	0.0612	$272,952	$68,238	$150,000	$491,190	210	$194.92

Total Project Cost = $4,460,000

WWTP AT HELMSBURG

Scenario	Amount of Loan	crf	Annual Debt Service	Annual Reserve	O,M&R	Total Annual Requirement	Total Est. EDU's	Estimated Monthly Rate/EDU
RD Loan - 3.25% - 40 years (BBRSD Customers)	$4,673,450	0.0451	$210,773	$21,077	$133,900	$365,750	210	$145.14
RD Loan - 3.25% - 40 years (HRSD Customers)	$226,550	0.0451	$10,217	$1,022	$16,100	$27,339	63	$36.16
RD Loan - 2.375% - 40 years (BBRSD Customers)	$4,673,450	0.0391	$182,732	$18,273	$133,900	$334,905	210	$132.90
RD Loan - 2.375% - 40 years (HRSD Customers)	$226,550	0.0391	$8,858	$886	$16,100	$25,844	63	$34.19
45% RD Grant + RD Loan @ 3.25% (BBRSD Customers)	$2,570,398	0.0451	$115,925	$11,592	$133,900	$261,417	210	$103.74

45% RD Grant + RD Loan @ 3.25% (HRSD Customers)	$124,603	0.0451	$5,620	$562	$16,100	$22,282	63	$29.47
75% RD Grant + RD Loan @ 2.375% (BBRSD Customers)	$1,168,363	0.0391	$45,683	$4,568	$133,900	$184,151	210	$73.08
75% RD Grant + RD Loan @ 2.375% (BBRSD Customers)	$56,638	0.0391	$2,215	$221	$16,100	$18,536	63	$24.52
75% RD Grant + $500,000 CFF Grant + RD Loan @ 2.375% (BBRSD Customers)	$707,463	0.0391	$27,662	$2,766	$133,900	$164,328	210	$65.21
75% RD Grant + $500,000 CFF Grant + RD Loan @ 2.375% (HRSD Customers)	$17,538	0.0391	$686	$69	$16,100	$16,854	63	$22.29
SRF Loan - 2.0% - 20 years (BBRSD Customers)	$4,673,450	0.0612	$286,015	$71,504	$133,900	$491,419	210	$195.01
SRF Loan - 2.0% - 20 years (HRSD Customers)	$226,550	0.0612	$13,865	$3,466	$16,100	$33,431	63	$44.22

Total Project Cost = +/-$4,900,000

Cost Allocated to Helmsburg Customers = $985,000 x 23%; O&M to Helmsburg = +/- $70,000/year x 23%

SECTION 1

GENERAL INFORMATION AND PROJECT PLANNING AREA

1.1 Location

The Bean Blossom Regional Sewer District is located in Brown County, Indiana. The District was originally formed in 2006 then was expanded in April 2013. The new boundary includes all unincorporated areas of Brown County, and excludes the existing Helmsburg Regional Sewer District, Gnaw Bone Regional Sewer District, Cordry Sweetwater Conservancy District, and Town of Nashville. This study focuses on the unincorporated Bean Blossom and Woodland Lake areas, as there is a history of septic system problems and these areas have concentrated homes and/or businesses. The service area includes portions of Sections 25 and 36, Township 10 North, Range 2 East, of Jackson Township, and portions of Sections 30 and 31, Township 10 North, Range 3 East, of Hamblen Township, of the Second Principal Meridian, as shown on the Bean Blossom and Morgantown Quadrangles, State of Indiana, United States Geological Survey map. Refer to Appendix A for the 2006 IDEM Notice of Decision and correspondence related to the expansion of the Regional Sewer District in 2013, and Exhibit 1.1 for a topographical map of the proposed service areas.

1.2 Environmental Resources Present

An environmental review was undertaken in 2009 for a project to install a wastewater collection system in Bean Blossom and conveying the wastewater to the Helmsburg WWTP. A copy of the correspondence received from the review agencies is included in Appendix B.

1.2.1 Land Use/Farmland/Previously Classified Lands

The land use within the service area primarily consists of low and medium density residential areas. There are a few small businesses that are spread throughout Bean Blossom. A 27-lot mobile home park and the Bill Monroe Music Festival properties are located in Bean Blossom. Woodland Lake is surrounded by residential homes, some occupied seasonally and some year-round. The proposed sewers will be installed within existing roadway right-of-way, or within easements in residential areas. No impact to prime farmland will occur as a result of this project. The construction and operation of the proposed project will not impact any known monuments, National Natural Landmarks, wild and scenic rivers, wilderness areas, State or National Parks, reservations or recreational areas. As such, there are no environmental consequences and no need for mitigation efforts related to these concerns.

1.2.2 Flood Plains

A construction in a Floodway Permit from the Indiana Department of Natural Resources, Division of Water will be required where structures are constructed within the Beanblossom Creek or Hoppers Branch flood plain. This permit will require that the top of all proposed structures be designed at a minimum of two feet above the 100-year flood elevation. A utility crossing a creek is exempt from a permit as long as the crossing meets the IDNR requirements. A copy of the Flood Insurance Rate Map (FIRM) is presented on Exhibit 1.2.

1.2.3 Wetlands

According to the National Wetlands Inventory Map, the wetlands within the study area impacted by this project are primarily the streams. Crossing of these streams will be accomplished via directional boring, which will not disturb any designated Wetlands. Refer to Exhibit 1.3 for a wetlands map.

1.2.4 Historic Sites and Structures

There are several historic sites and structures located within the study area. Maps and descriptions for identified historic sites and structures are taken from the Brown County Interim Report and provided in Appendix C. Refer to Exhibit's 1.4 (A & B) for a map showing historic sites and structures in the planning area. The SHPO letter dated October 26, 2009, located in Appendix B, indicated that no historic buildings, structures, districts, or objects listed in or eligible for inclusion in the National Register of Historic Places with the probable area of potential effects.

1.2.5 Biological Resources

Plant life in the project planning area consists of residential landscaping and open fields. Typical wildlife such as rabbit, squirrel, raccoon, opossum, chipmunk and various birds comprise the animal community. A portion of the proposed project is within the range of the federally endangered Indiana bat. Refer to the October 7, 2009 letter from the United States Department of Interior Fish and Wildlife Service in Appendix B. The construction and operation of the project is not anticipated to negatively impact any known habitats, as construction will be undertaken considering the requirements outlined in the 10/7/09 Fish and Wildlife letter.

The project will be implemented to minimize any impact to endangered and non-endangered species and their habitat. Where applicable, bare and disturbed areas will be re-vegetated with a mixture of grasses (excluding

all verities of fescue), legumes, native shrubs and hardwood tree species, upon completion. Some tree clearing is anticipated for this project.

1.2.6 Water Quality Issues

Water quality will not be negatively impacted as a result of the construction and operation of the proposed project. The pipes crossing the larger streams will be installed via directional drilling to avoid negative water quality impacts. Water quality in the Bean Blossom area will be improved with the installation of the proposed wastewater system, as current failing on-site septic systems that degrade the water quality will be eliminated. During construction the contractor will be required to comply with a Stormwater Pollution Prevention Plan that addresses sedimentation, petroleum products, hazardous materials, etc. to reduce the risks of water pollution, which will be reviewed and approved by the Brown County Soil Water Conservation Service and IDEM.

1.2.7 Coastal Resources

The project will have no effect on the Lake Michigan Coastal Zone.

1.2.8 Socio-Economic Issues

There will be no negative effect on the economics or location of minority and/or low-income populations.

1.2.9 Miscellaneous Issues

1.2.9.1 Air Quality

Construction activities should not impact ozone, airborne pollutants or other current or future air quality concerns other than minor fumes and dust typically generated during such activity. The adverse impacts caused by dust may be alleviated by periodically wetting the exposed soil and unpaved roadways to reduce suspension of particles, constructing wind barriers, or treating the area with chemical stabilizers, if applicable. The dust and fumes are short term impact, lasting only during the construction phase.

1.2.9.2 Noise

Construction activities may generate noise which typically results from such activities. To reduce noise impacts, work activities can be limited to normal daytime hours. The noise is a short term impact, lasting only during the construction phase.

1.2.9.3 Open Space and Recreational Opportunities

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

1.2.9.4 Transportation

The proposed pipe installation for this project will be parallel to or cross several county roads, State Road 135 and State Road 45. It is anticipated that the pipes will be directional drilled across the roads, thereby minimizing the impacts to them. Traffic control measures will be required in the plans if it becomes necessary to temporarily close a lane off, etc. A permit will be required from the Indiana Department of Transportation and most likely the Brown County Highway Department for work done adjacent to these roads.

1.3 Population Trends

An income survey conducted by Ball State University in 1998, demonstrated that the population of the Bean Blossom and Woodland Lake planning areas was 471 persons. An income survey conducted by Ball State University in 2002 for the Bean Blossom Area indicated a population of approximately 160 persons. There has not been any significant changes since these surveys were conducted. Approximately 90% of the Bean Blossom Area land area has been developed into an estimated 71 residential, single-family homes and 14 business/commercial/institutional establishments listed as follows:

- Staley's 27-Lot Mobile Home Park
- Bill Monroe Music Park and Campground
- Bean Blossom Inn
- St. David's Episcopal Church
- Mother's Cupboard
- Bean Blossom Mennonite Church
- Fire Department
- Shopworth Grocery
- Veterinary Clinic
- Dog Grooming Business
- Beauty Salon
- Brown County Water
- Antique Store

- Sprint Logistics and Midwest Ammonia Training Center

Also included in the Bean Blossom planning area is the Old Settler's Road Area, which is located west of St. Rd. 135 and North of Hoppers Branch and includes 16 residential homes and the Bean Blossom Inn Restaurant. Also located in the Old Settler's Road Area is a Lutheran Church, which has a recently constructed on-site mound septic system and therefore will not be served at this time, but remains a future possibility. The Woodland Lake portion of the planning area is strictly a residential lake community containing approximately 67 existing residential homes.

The estimated future customers for the service area based on undeveloped land are shown in Table 1.1.

Table 1.1
Estimated Future Development In Planning Area

Study Area	Residential	Business/Commercial
Bean Blossom	5	5
Old Settler's Road	4	1
Woodland Lake (*)	25	0
Total	31	6

Notes for Table 1.1:
* - Includes 7 undeveloped lots at Woodland Lake and 18 potential customers at Fox Lake, which have not expressed an interest in being served by wastewater facilities but are anticipated to be interested when facilities are made available at Woodland Lake.

1.4 Community Engagement

Previous studies have been prepared, one by R.W. Armstrong & Associates in January 2001, one by Ladd Engineering, Inc. in September 2003 and another by Ladd Engineering, Inc. in September 2009. Each of these studies included a public hearing, which drew in residents of the proposed service area. In addition, several letters of support for a project were received in 1998 from local residents and businesses, and are provided in Appendix D. Continued efforts will be offered by the Bean Blossom RSD to keep the local citizens informed. The BBRSD meets monthly and these meetings are open to the public.

SECTION 2

EXISTING FACILITIES

2.1 General

This section of the report presents conditions of the existing wastewater facilities within the Bean Blossom and Woodland Lake areas. In addition, this section of the report will describe the existing facilities located with the Helmsburg Regional Sewer District (HRSD), as combining the HRSD and BBRSD into one, or conveyance of wastewater from both districts to a centrally located treatment plant, or the Town of Nashville may be prudent.

2.2 Bean Blossom and Woodland Lake Facilities

The Bean Blossom and Woodland Lake residents and businesses currently have individual onsite wastewater treatment and disposal systems located on individual properties, generally consisting of a septic tank and soil absorption disposal system. Several of these on-site systems are in, or near failure.

The Bill Monroe Music Park and Campground hosts numerous music festivals, including a large bluegrass festival, during which the population can temporarily increase to nearly 20,000 people. These festivals are usually weekend-long events and occur throughout the festival season from early April to late October. They utilize an 850-gpd septic tank and on-site mound system for wastewater disposal from the office/museum. Besides the on-site system for the office/museum the park has three (3) holding tanks having a combined capacity of 7,500 gallons, which receive wastewater from semi-trailer type restroom facilities and three cabins. In addition there are several port-o-lets scattered throughout the park. Currently there are no sewer hook-ups for individual campground lots.

Staley's Mobile Home Park's system consists of 7 septic tank and 2 on-site absorption disposal field for treatment and disposal. There have been several concerns and issues over the past several years by Health Department officials with this system. The system has been repaired and "band-aided" over the years to keep it functioning.

Helmsburg, an unincorporated area, which is located about 2.5 miles west of Bean Blossom, is the closest community to the planning area that has an existing sanitary sewer system and treatment facility. The Helmsburg collection system was designed to handle those existing and future residents within the planning area boundaries of the Helmsburg Regional Sewer District. Any additional flows from outside the existing service area would have to be connected directly to the existing treatment facility. Based on information obtained, the Helmsburg WWTP was sized to include the unincorporated areas of Trevlec, located

approximately 2 miles west and Bean Blossom. However, Trevlec nor Bean Blossom ever connected to the Helmsburg WWTP.

2.3 History and Condition of Helmsburg Wastewater Facilities

The existing sanitary sewer system and treatment facilities in the community of Helmsburg consists of a low-pressure/grinder pumping system, which conveys flows to a 25,000 gpd extended aeration packaged-type treatment system. The collection system and treatment facilities were constructed in 1995, and were funded, in part, by a Community Focus Fund Grant from the Indiana Department of Commerce, and local Brown County EDIT Funds.

The existing Helmsburg Wastewater Treatment Plant is a conventional extended aeration package plant consisting of a flow equalization tank, aeration tank with a diffused aeration system, clarification facilities, chlorination/dechlorination facilities, surge control facilities and a tertiary filter to provide nitrification and a good quality effluent.

The disinfection facilities consist of chlorination and dechlorination tablet-type feeders, which feeds calcium hypochlorite and sodium sulfite tablets. The sodium sulfite is fed into the treatment stream at the effluent end of the chlorine contact tank.

Post aeration is provided in a 120-gallon chamber using air from the filter air scour blower. Post aeration occurs after the dechlorination process.

A 2,500 gallon aerated sludge holding tank is also provided as part of the package plant. Sludge is stored in this tank and then hauled for treatment at other wastewater treatment facilities. This design summary for the existing Helmsburg wastewater collection system and treatment plant, taken from the R.W. Armstrong Preliminary Engineering Report dated January 2001, is located in Appendix E.

Based on information obtained from a Helmsburg Regional Sewer District representative in 2009, the average daily flow received by the Helmsburg wastewater treatment plant is approximately 6,000 to 8,000 gpd, but has been as high as 18,000 gpd during a wet weather event.

The Helmsburg Elementary School is connected to the Helmsburg system, which provides approximately 1,000 gpd of flow to the treatment plant.

The condition of the existing steel plant tankage, grating, etc are badly corroded and in need of rehabilitation or replacement. Photographs of the existing HRSD treatment plant and IDEM inspection reports are provided in Appendix F.

2.4 Financial Status

The BBRSD has no income or debt at the current time. The District has a banking account balance of approximately $3,255, which came from previous local grants, etc.

SECTION 3

NEED FOR PROJECT

3.1 Wastewater Facilities Needs

The Brown County Health Department has reported numerous problems with the existing on-site septic systems within the planning area over the last 20 years. The soils within the study area are not conducive to the proper operation of on-site soil absorption septic systems. Problems range from too small of lot size to soil impermeability or permeability and hilly terrain, which limit the space available for an on-site septic system. Pollution of surface water and ground water resources has been a major health issue and concern throughout the study area. Nearly all of the septic systems in the study area have experienced some problems, many have experienced complete failure. In the past there has been some modifications and repairs made in the Woodland Lake area due to inoperable on-site septic systems. Soil absorption fields are clogged, causing holding tanks to fill to their capacity, overflows, and the discharge of untreated wastewater directly onto the ground.

The Bean Blossom business area has been in a state of decline since most all of the businesses do not have the necessary land available to either upgrade or even repair their septic systems. The Woodland Lake Area has many homes with grossly undersized septic systems on lots with no more space available for needed absorption field expansion, replacement, or repairs.

The Brown County Health Department has cited several homeowners within the planning area for septic tank and absorption field system failures. That office has denied issuing septic permits to several potential businesses and residences because of inadequate space, poor soil structure or seasonal high ground water tables that cannot be successfully lowered for a septic system. In some cases, expensive mound systems have been the only type of on-site disposal system that could be approved. Because many septic tank and absorption field systems are more than 50 years old, future additional failures are anticipated.

The Brown County Health Department has also conducted stream analysis testing at several locations throughout the Bean Blossom area. These tests revealed E coli counts of 2,400 parts per million at a location downstream of the 27-lot mobile home park, and 690 parts per million at a roadside ditch located on the north side of Covered Bridge Road.

The Bill Monroe Music Park and Campground is referred to as the "Mecca of Bluegrass Music" and is host several major Bluegrass Music events during the summer. The music park and campground owner expends considerable amounts of money for holding tank pump-out and disposal of their wastewater, and for port-a-let rental. The music park and campground owner and maintenance

personnel have expressed a need for a permanent solution to their wastewater management dilemma. A representative from the music park and campground have expressed a desire to provide sewer hook ups to approximately 35 campsites located at the front of the facilities should a permanent wastewater system be available. Refer to Appendix G for information to further document the project need.

3.2 Helmsburg WWTP Needs

Ladd Engineering, Inc. completed an evaluation of the Helmsburg WWTP in 2009. This evaluation was for considering the needs associated with connection of the Bean Blossom area. A copy of this evaluation summary, which documents the needs, is provided in Appendix H.

3.3 Wastewater Flows and Loadings

The wastewater flows and waste loads must be estimated for sizing the wastewater system components. For the purpose of project phasing effects on the costs for a wastewater system, the flows and waste loads for the Bean Blossom and Woodland Lake Areas have been analyzed and estimated separately. Previous studies completed estimated sewage flows and waste loads by utilizing the existing Brown County Water Company and Town of Nashville Water Utility water usage records and then adding a 20% increase assuming that the water usage will increase when adequate wastewater facilities are provided. In addition, an allowable infiltration rate is commonly added for gravity sewer piping and is based on the length and diameter of the gravity sewer collection piping system. The water usage records for the period June 2012 through May 2014 were obtained from the Brown County Water Company and Town of Nashville. In reviewing the water usage records for residential users (equivalent dwelling unit – EDU), the average usage was approximately 125 gpd for Bean Blossom customers and 57 gpd for Woodland Lake customers. Considering that water usage varies considerably for the EDU's being served, people move in and out of homes periodically who may have different water usage habits, water usage will probably increase when wastewater facilities are provided by an unknown percentage, and some EDU's have private wells, the wastewater flows for each area for sizing wastewater system components will be determined by comparing the flows utilizing Table 11-1 in 327 IAC 3-6-11 (utilized by the IDEM) and the water usage, including allowable infiltration. The actual water usage obtained in 2003 will be utilized to determine the number of EDU's for business customers in Bean Blossom, as Brown County Water did not provide a breakdown by customer for their Bean Blossom customers. Water usage information within the September 28, 2009 Preliminary Financial Rate Study by Patrick Callahan, CPA will be utilized for Staley's MHP and Bill Monroe Music Park. The following influent wastewater concentrations, which are approximately the same as received at the Helmsburg WWTP, except for phosphorus that is not monitored, will be utilized in determining the estimated waste loads:

BOD5 – 370 mg/l

TSS – 250 mg/l

NH3 – 60 mg/l

P-10 mg/L

3.3.1 Bean Blossom Area

There are currently approximately 71 residential and 14 commercial/business users located within the Bean Blossom Area. The estimated water usage and wastewater flows for the Bean Blossom Area are shown in Table 3.1.

Table 3.1

Estimated Wastewater Flows – Bean Blossom Area

Service Connection Description	Flow Calc. Factor per Table 11-1 (gpd)	Total Est. Flow from Table 11-1 (gpd)	Equiv. No. of EDU's (Total WW Flow/310 gpd)	Avg. Water Usage (gpd)	Average Water Usage Increased By 20% (gpd)	Equivalent No. of EDU's (Avg. Water Use/125 gpd
71 Residential	310	22,010	71	8,875 (*1)	10,650	71
Staley's Mobile Home Park 27 MH's 1 Residential	200/MH 310/EDU	5,710	22	3,570	4,284	34
Bill Monroe Facility 35 c'ground sites w/sewer, 315w/o sewer, museum/office 4 employees & 3 cabins	100/site 50/site 20/empl. 100/cabin	19,630	63	2,048	2,458	20
Mother's Cupboard 50 meals	35	1,750	6	67	80	1
Beauty Salon Est. 10 customers	10	100	1	38	46	1
Dog Grooming 1 emp. 10 animals	20 10	120	1	125 (*2)	150	1
Vet Clinic 1 Vet. 1 Asst. 2 Support 30 cages 1 Surgery Rm.	75 75 20 5 50	225	1	125 (*2)	150	1
Fire Dept. Est. 10 Firemen	35	350	1	48	58	1
Brown County Water Co. Est. 3 emp.	20	60	1	125 (*2)	150	1

Table 4.1 Continued

Estimated Wastewater Flows – Bean Blossom Area

Service Connection Description	Flow Calc. Factor per Table 11-1 (gpd)	Total Est. Flow from Table 11-1 (gpd)	Equiv. No. of EDU's (Total WW Flow/310 gpd)	Avg. Water Usage (gpd)	Average Water Usage Increased By 20% (gpd)	Equivalent No. of EDU's (Avg. Water Use/125 gpd
Bean Blossom Inn Rest. 50 seats	35	1,750	6	39	47	2
B'Blossom Mennonite Church - 90 seats	4	360	1	80	96	1
Shopworth Grocery Est 5 emp. + 1,200 sq. ft.	20 0.1/ sq. ft.	1,300	4	576	691	6
St. David's Episcopal Church - 60 seats	5	300	1	33	40	1
Antique Store Est. 2 employees	20	40	1	125 (*2)	150	1
Sprint Logistics and Midwest Ammonia Training Center 13 emp's + 2 part time	20 10	280	1	125 (*2)	150	1
Total Current		53,985	181	15,999	19,200	143
9 Residential	310	2,790	9	1,125	1,350	9
6 Com/Bus. Est. 2 emp.	20	240	6	750 (*2)	900	6
Lutheran Church – 80 seats	4	320	1	60	72	1
Farnbaugh Property 120 c'ground sites w/o sewer + office w/ 8 emp's	50/site 20/empl.	6,160	20	2,500 (*2)	3,000	20
Total Current + Future		**63,495**	**217**	**20,434**	**24,522**	**179**

Notes for Table 4.1:

*1 – 125 gpd/EDU

*2 – 125 gpd/small business used if the actual water usage unknown

The total future estimated water usage, including a 20% increase, is 24,522 gpd. An allowable infiltration volume estimated for a gravity sewer collection system is 5,000 gpd, which results in a total future flow of 29,522 (24,522 + 5,000) gpd. The allowable infiltration volume estimated for a pressure or vacuum sewer collection system is 1,100 gpd, which results in a total future flow of 25,622 (24,522 + 1,100) gpd. Considering that the average water usage is very low when compared to the flow calculation factors per Table 11-1 from 327 IAC 3-6-11, an average flow of 150 gpd/EDU and 180 EDU's will be utilized to determine the

total flow for sizing system components in the Bean Blossom area. This equates to a total average daily flow of 26,850 (150 gpd/EDU x 179 EDU's) gpd. Rounding up to a flow of 30,000 gpd is recommended.

The projected waste loads are calculated as follows:

BOD5 – 0.030 mgd x 370 mg/l x 8.34 lbs/gal. =92.6 lbs/day

TSS – 0.030 mgd x 250 mg/l x 8.34 lbs/gal. = 62.6 lbs/day

NH3 - 0.030 mgd x 60 mg/l x 8.34 lbs/gal. = 15.0 lbs/day

P – 0.030 mgd x 10 mg/L x 8.34 lbs/gal = 2.5 lbs/day

3.3.2 Woodland Lake Area

There are currently approximately 67 residential users located within the Woodland Lake Area. There is another lake located just west of Woodland Lake by the name of Fox Lake, which has approximately 15 residential homes that will be considered in the future estimated wastewater flows. The estimated water usage and wastewater flows for the Woodland Lake are shown in Table 3.2.

Table 3.2

Estimated Wastewater Flows – Woodland Lake Area

Service Connection Description	Flow Calc. Factor per Table 11-1 (gpd)	Total Est. Flow from Table 11-1 (gpd)	Equiv. No. of EDU's (Total WW Flow/310 gpd)	Avg. Water Usage (gpd)	Average Water Usage Increased By 20% (gpd)	Equivalent No. of EDU's (Avg. Water Use/57 gpd
67 Residential	310	20,770	67	3,819 (*1)	4,583	67
Total Current		20,770	67	3,819	4,583	67
28 Residential	310	8,680	28	1,596	1,915	28
Total Current + Future		**29,450**	**95**	**5,415**	**6,498**	**95**

Notes for Table 4.3:

*1 – 57 gpd/EDU

The total future estimated water usage, including a 20% increase, is 6,498 gpd. The allowable infiltration volume estimated for a pressure sewer collection system is 1,500 gpd, which results in a total future flow of 7,998 (6,498 + 1,500) gpd. For the same reasons previously stated, in section 3.3.1, it is recommended that a wastewater flow of 14,250 (150 gpd/EDU x 95 EDU's) gpd rounded up to

15,000 gpd be utilized for sizing system components in the Woodland Lake Area.

The projected waste loads are calculated as follows:

BOD5 – 0.015 mgd x 370 mg/l x 8.34 lbs/gal. = 46.3 lbs/day

TSS – 0.015 mgd x 250 mg/l x 8.34 lbs/gal. = 31.3 lbs/day

NH3 - 0.015 mgd x 60 mg/l x 8.34 lbs/gal. = 7.5 lbs/day

P - 0.015 mgd x 10 mg/l x 8.34 lbs/gal. = 1.3 lbs/day

3.3.3 Flow Summary

A summary of future estimated wastewater flows and waste loads for each study area are shown in Table 3.3.

Table 3.3

Summary of Future Flows and Waste Loads By Service Area

Area	Bean Blossom	Woodland Lake	Totals
Flows (mgd)	0.030	0.015	0.045
BOD (lbs/day)	92.6	46.3	138.9
TSS (lbs/day)	62.6	31.3	93.9
NH3 (lbs/day)	15.0	7.5	22.5
P (lbs/day)	2.5	1.3	3.8

SECTION 4

ALTERNATIVES CONSIDERED

4.1 Collection System Alternatives

The following alternatives were considered for wastewater collection in the Bean Blossom and Woodland Lake Areas:

- No Action
- Conventional Gravity Sewer System
- Low Pressure Sewer System with Grinder Pump Stations
- Vacuum Sewer System
- Septic Tank Effluent Pressure Sewer System

Alternative No. 1 - No Action:

Description:

The current wastewater system for the study area consists of septic tanks for treatment and on-site soil absorption for disposal. There are port-o-lets located on some of the properties within the study area. Many of the existing on-site septic systems are more than 50 years old and are experiencing frequent failures. Adequate repairs to these existing systems to comply with County and State (410 IAC 6-8.2) requirements cannot be made due to small lot sizes and poor soil conditions. The no action alternative would continue to create adverse environmental impacts to the watershed and to Beanblossom Creek, which is a tributary to Lake Lemon located approximately 6 miles downstream from Bean Blossom. Inadequate wastewater collection and disposal facilities presently limit economic growth of the study area. Copies of letters from local residents and businesses, taken from the R.W. Armstrong Preliminary Engineering Report dated January 2001, provided in Appendix D, describe some of the present septic treatment/disposal problems. The No Action Alternative would provide the study areas with neither short nor long term benefits.

Design Criteria:

Not applicable.

Map:

Not applicable for this alternative.

Environmental Impacts:

The no action alternative would continue to pollute nearby waterways, potentially pollute the groundwater and therefore have a negative impact on the environment.

Land Requirements:

Not applicable.

Potential Construction Problems:

Not applicable.

Sustainability Considerations:

Not applicable.

Cost Estimates:

Not applicable.

Alternative No. 2 - Conventional Gravity Sewer System:

Description:

Conventional gravity sewer systems have been in use for years as the usual method of conveying sanitary sewage. The operation and maintenance costs are low but the construction costs can be high. With a conventional gravity system, sewers are laid to a slope to maintain scouring velocity in the pipe. Too low of a velocity will result in sedimentation in the pipe with subsequent degradation in sewer performance. The major disadvantage of a conventional gravity sewer is the need, at times, for excessively deep trenches to maintain slope on a sewer or to avoid a natural barrier such as a creek or hill, at which time a lift station may become necessary. Lift stations are used to pump the flow up to a higher level, either to a treatment plant or to another portion of the collection system, through a conveyance line (force main) for further processing. A conventional gravity sewer system was not considered practical for the Woodland Lake Area due to its rolling topography, which would require several lift stations and multiple pumping of the wastewater. There are a few existing buildings that either sit below the street level, or that have significant topography changes between the building and proposed sewer main that will most likely require grinder pump stations, which have been considered in the conventional gravity sewer system alternative cost tables for Bean Blossom. Adjustments to the final collection system layouts will be required during the design phase when more accurate survey information is obtained. For purposes of this study there have been a few grinder pump stations proposed for a few buildings to eliminate the need for deep gravity sewers and additional lift stations in the conventional gravity sewer system alternatives.

Design Criteria:

The design criteria for this alternative comply with 10-States Standards, 327 IAC 3 and RUS design policies (7 CFR 1780.57).

Map:

Refer to Exhibit 4.1 for a layout map of the gravity sewer system alternative for Bean Blossom.

Environmental Impacts:

This alternative would involve the installation of sewers, some within road or alley right-of-ways and some within private easements. The removal of a few trees where sewers are proposed within private easements will most likely be required. Hoppers Branch will be crossed, and other smaller ditches will be crossed or the sewer will parallel it. Directional drilling of the pipe across Hoppers Branch and other precautions along or across small ditches will be taken to minimize erosion and environmental impacts. The proposed lift stations are anticipated to be installed outside of existing public right-of-ways, which may require archaeological and other environmental reviews. Gravity sewer depths will be greater than the other collection system alternatives meaning wider trenches and larger areas of disturbances, which may result in increased environmental impacts. Wider trenches will result in more excess dirt that will need to be hauled off and disposed of.

Land Requirements:

Permanent and temporary construction easements will be needed for some of the proposed sewers. Land acquisition will be required for the proposed lift stations.

Potential Construction Problems:

According to the Brown County Soils Report, most all soils within the service areas are very limited in respect to shallow excavations. The rating on the soil properties that influence the ease of digging, depth to bedrock or a cemented pan, hardness of bedrock, depth to the seasonal high water table, flooding, the amount of large stones, etc. Therefore, the construction of a conventional gravity sewer system may be difficult.

Sustainability Considerations:

A conventional gravity sewer system will be easier to operate and maintain when comparing it to the other alternatives evaluated. This alternative would use less energy than the other alternatives evaluated, as there is less pumping of the

wastewater. However, the larger pipes associated with this alternative use more materials and most likely more energy in the manufacturing process.

Cost Estimates:

The estimated construction and non-construction costs for a conventional gravity sewer system in Bean Blossom are provided in Table 4.1, the estimated replacement costs (short-term assets) in Table 4.2, and the total estimated operation, maintenance and replacement (short-lived asset) costs in Table 4.3.

Table 4.1
Estimated Construction and Non-Construction Cost for Conventional Gravity

Construction					
Item	Description	Quantity	Unit	Unit Cost	Amount
1	8" Gravity Sewer	13,710	LF	$32	$438,720
2	3" Force Main	950	LF	$13	$12,350
3	2-1/2" Force Main	900	LF	$12	$10,800
4	2" Force Main	3,600	LF	$10	$36,000
5	1-1/2" Pressure Sewer	2,050	LF	$10	$20,500
6	6" Laterals (*1)	13,000	LF	$25	$325,000
7	8" x 6" Wyes	74	EA	$90	$6,660
8	Simplex Grinder Pump Stations	9	EA	$6,000	$54,000
9	Pressure Sewer Valve Assemblies	9	EA	$500	$4,500
10	4' Diameter Manholes	47	EA	$2,400	$112,800
11	Force Main Air Release Valves	9	EA	$2,500	$22,500
12	Compacted Granular Backfill	2,500	LF	$25	$62,500
13	Pavement Replacement	1,900	LF	$50	$95,000
14	Main Lift Station	1	LS	$100,000	$100,000
15	Bill Monroe C'Ground/Festival Park Grinder Pump Lift Station	1	LS	$60,000	$60,000
16	Staley's Mobile Home Park Grinder Pump Lift Station	1	LS	$60,000	$60,000
17	SR 45 W. Grinder Pump Lift Station	1	LS	$50,000	$50,000
18	Covered Bridge Road Grinder Pump Lift Station	1	LS	$50,000	$50,000
19	Old Settler's Road Grinder Pump Lift Station	1	LS	$50,000	$50,000
20	3" Force Main, Augured Bores	50	LF	$45	$2,250
21	2-1/2" Force Main, Augured Bores	100	LF	$35	$3,500
22	2" Force Main, Directional Bores	300	LF	$30	$9,000
23	2" Force Main, Augured Bores	300	LF	$20	$6,000
24	8" Gravity Sewer Stream Crossing	100	LF	$80	$8,000
25	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$160,000	$160,000
26	Mobilization, Bond & Insurance	1	LS	$86,920	$86,920
Subtotal Construction					$1,847,000

Non-Construction	
Item	Amount
Engineering Design and Construction	$157,200
Additional Engineering	$15,100
Construction Inspection	$73,900
Legal	$12,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$15,000
Soils Evaluation	$5,000
Administrative	$2,100
Construction Contingency	$184,700
Subtotal Non-Construction	$518,000
Total Cost	$2,365,000

Note for Table 4.1: *1 – 6" lateral quantity includes extending pipe to near the building to be served for purposes of comparing to the low-pressure sewer alternatives, which includes extending the lateral to near the building where it is assumed that the existing septic tank is located. If it is determined that gravity is the selected alternative in this chapter then the lateral quantity will be reduced in the project cost estimate, provided later in this report, to extend only from the mainline sewer to the right-of-way, or edge of easement line. The building owner would be responsible for extending the lateral from the right-of-way line to the building.

Table 4.2
Estimated Fixed Assets Costs for Conventional Gravity

Item	Estimated Annual Cost
Lift Station Pumps	$3,100
Lift Station Pump Controls	$400
Lift Station Pump Motors	$500
Grinder Pumps & Controls	$1,500
Air Release Valve Replacement	$900
Total	**$6,400**

Table 4.3
Estimated O, M & R Costs for Conventional Gravity

Item	Estimated Annual Cost
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$28,800
Energy (Power Costs) – Lift Stations (*1)	$2,600
Materials & Supplies	$550
Repairs	$550
Fixed Assets Costs (From Table 4.2)	$6,400
Outside Services (Tank Cleaning, Billing, etc.)	$5,250
Insurance	$1,100
Conferences, Training, etc.	$350
Professional Services (Attorney, Engineer, Financial, etc.)	$1,000
Total	**$46,600**

Note for Table 4.3: *1 – For purposes of comparing alternatives, includes estimated power cost for simplex grinder pumps, which would be paid by the customer

Alternative No. 3 – Low Pressure Sewer System with Grinder Pump Stations:

Description:

Low-pressure sewer systems consist of low-pressure pipes that generally are buried below the frost line following the land contours and grinder pump stations. The grinder pump station consists of a wet well (usually 2-feet diameter and 6-

feet deep) which includes the pump and level controls. Each grinder pump station has its own control panel, which is either mounted, at the pump unit or on the building owners' structure. There are some major disadvantages with the pressure systems including higher maintenance cost with each building owner having a grinder pump station and the possibility of grease build-up and pump clogging. The major advantage of the pressure system is that the pipes are buried shallower and are smaller sized than conventional gravity sewers and therefore can sometimes result in a lower construction cost.

Design Criteria:

The design criteria for this alternative comply with 10-States Standards, 327 IAC 3 and RUS design policies (7 CFR 1780.57).

Map:

Refer to Exhibit's 4.2 and 4.3 for a layout map of the low-pressure sewer system for Bean Blossom and Woodland Lake, respectively.

Environmental Impacts:

This alternative would involve the installation of sewers, some within road or alley right-of-ways and some within private easements. The removal of a few trees where sewers are proposed within private easements will most likely be required. Hoppers Branch will be crossed, and other smaller ditches will be crossed or the sewer will parallel it. Unlike conventional gravity sewers that need to be laid on line and grade, the pressure sewers can be directional bored, or auger bored in many instances, and the pipes can be installed following the contour of the ground or zigzagged around obstacles, which minimizes surface disruptions and reduces the environmental impacts. Directional drilling of the pipe across Hoppers Branch and other precautions along or across small ditches will be taken to minimize erosion and environmental impacts. The proposed grinder pump stations and some of the pipes are anticipated to be installed outside of existing public right-of-ways, which may require archaeological and other environmental reviews. However, much of the land where the system will be installed has been previously disturbed.

Land Requirements:

Permanent and temporary construction easements will be needed for some of the proposed sewers.

Potential Construction Problems:

As referenced under the conventional gravity sewer alternative, according to the Brown County Soils Report, most all soils within the service areas are very

limited in respect to shallow excavations. The rating on the soil properties that influence the ease of digging, depth to bedrock or a cemented pan, hardness of bedrock, depth to the seasonal high water table, flooding, the amount of large stones, etc. Therefore, the construction of a low pressure system may encounter some challenges, but not as many as with a deeper installed conventional gravity sewer system.

Sustainability Considerations:

A low pressure sewer system will require more to operate and maintain when comparing it to the conventional gravity sewer alternative evaluated. This alternative would use more energy than the other alternatives evaluated, as there is more pumping of the wastewater. However, the pipes are smaller than the other alternatives meaning less material used, which equates to less energy usage in the manufacture of the pipe.

Cost Estimates:

The estimated construction and non-construction costs for a low pressure sewer system with grinder pump stations in Bean Blossom and Woodland Lake are provided in Table's 4.4 and 4.5, respectively. The estimated replacement costs (short-term assets) for the Bean Blossom and Woodland Lake areas are provided in in Table's 4.6 and 4.7, respectively. The total estimated operation, maintenance and replacement (short-lived asset) for the Bean Blossom and Woodland Lake areas are provided in in Table's 4.8 and 4.9, respectively.

Table 4.4
Estimated Construction Cost for Low Pressure Grinder Pump Sewers – Bean Blossom

Item	Description	Quantity	Unit	Unit Cost	Amount
1	4" Pressure Sewer	3,000	LF	$15	$45,000
2	3" Pressure Sewer	5,500	LF	$13	$71,500
3	2" Pressure Sewer	7,200	LF	$11	$79,200
4	1-1/2" Pressure Sewer	12,000	LF	$10	$120,000
5	Simplex Grinder Pump Stations (*1)	83	EA	$5,500	$456,500
6	Pressure Sewer Valve Assemblies	83	EA	$500	$41,500
7	Pressure Sewer/Force Main Air Release Valves	11	EA	$2,500	$27,500
8	Line Flushing Valve Pits	27	EA	$2,000	$54,000
9	Compacted Granular Backfill	525	LF	$18	$9,450
10	Pavement Replacement	455	LF	$50	$22,750
11	Bill Monroe C'Ground/Festival Park Grinder Pump Lift Station	1	LS	$30,000	$30,000
12	Staley's Mobile Home Park Grinder Pump Lift Station	1	LS	$30,000	$30,000
13	4" Pressure Sewer, Augured Bores	100	LF	$50	$5,000
14	3" Pressure Sewer, Augured/Directional Bores	500	LF	$45	$22,500
15	2" Pressure Sewer, Augured Bores	600	LF	$30	$18,000
16	1-1/2" Pressure Sewer, Augured Bores	1,000	LF	$20	$20,000
17	Spare Parts	1	LS	$5,000	$5,000
18	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$105,700	$105,700
19	Mobilization, Bond & Insurance	1	LS	$58,100	$58,100
Subtotal Construction					**$1,221,700**

Non-Construction

Item	Amount
Engineering Design and Construction	$107,600
Additional Engineering	$30,100
Construction Inspection	$73,900
Legal	$12,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$8,600
Soils Evaluation	$5,000
Administrative	$1,430
Construction Contingency	$122,170
Subtotal Non-Construction	**$408,800**
Total Cost	**$1,630,500**

Table 4.5
Estimated Construction Cost for Pressure Grinder Pump Sewers – Woodland Lake

Item	Description	Quantity	Unit	Unit Cost	Amount
1	4" Force Main	11,100	LF	$15	$166,500
2	4" Pressure Sewer	700	LF	$15	$10,500
3	3" Pressure Sewer	5,000	LF	$13	$65,000
4	2" Pressure Sewer	1,800	LF	$11	$19,800
5	1-1/2" Pressure Sewer	11,300	LF	$10	$113,000
6	Simplex Grinder Pump Stations (*1)	67	EA	$5,500	$368,500
7	Pressure Sewer Valve Assemblies	67	EA	$500	$33,500
8	Pressure Sewer/Force Main Air Release Valves	17	EA	$2,500	$42,500
9	Line Flushing Valve Pits	11	EA	$2,000	$22,000
10	Compacted Granular Backfill	425	LF	$18	$7,650
11	Pavement Replacement	375	LF	$50	$18,750
12	Woodland Lake Lift Station	1	LS	$85,000	$85,000
13	4" Force Main, Augured Bores	500	LF	$50	$25,000
14	3" Pressure Sewer, Augured Bores	500	LF	$45	$22,500
15	2" Pressure Sewer, Augured Bores	150	LF	$30	$4,500
16	1-1/2" Pressure Sewer, Augured Bores	200	LF	$20	$4,000
17	Spare Parts	1	LS	$5,000	$5,000
18	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$101,300	$101,300
19	Mobilization, Bond & Insurance	1	LS	$55,000	$55,000
Subtotal Construction					**$1,170,000**

Non-Construction Item	Amount
Engineering Design and Construction	$103,400
Additional Engineering	$29,100
Construction Inspection	$37,000
Legal	$12,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$1,000
Soils Evaluation	$2,500
Administrative	$1,000
Construction Contingency	$117,000
Subtotal Non-Construction	**$356,000**
Total Cost	**$1,526,000**

Notes for Table's 4.4 and 4.5: *1 – The potential for clustering buildings into one simplex grinder pump station may be possible but cannot be determined until a detailed topographical survey is obtained during the engineering design phase of the project. For conservative purposes this study assumes one simplex grinder pump station per building being served.

The Woodland Lake cost estimate (Table 4.5) includes the conveyance system from Woodland Lake to Bean Blossom.

Table 4.6 Estimated Fixed Assets Costs for Pressure Sewers with Grinder Pumps – Bean Blossom	
Item	**Estimated Annual Cost**
Grinder Pumps and Controls	$16,600
Air Release Valve Replacement	$1,100
Total	**$14,700**

Table 4.7 Estimated Fixed Assets Costs for Pressure Sewers with Grinder Pumps – Woodland Lake	
Item	**Estimated Annual Cost**
Grinder Pumps and Controls	$11,200
Lift Station Pumps and Controls	$700
Air Release Valve Replacement	$1,700
Total	**$13,600**

Table 4.8 Estimated O, M & R Costs for Pressure Sewers with Grinder Pumps – Bean Blossom	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$28,800
Energy (Power Costs) – Grinder Pump Stations (*1)	$1,800
Materials & Supplies	$550
Repairs	$550
Fixed Assets Costs (From Table 4.6)	$14,700
Outside Services (Tank Cleaning, Billing, etc.)	$5,000
Insurance	$2,500
Conferences, Training, etc.	$350
Professional Services (Attorney, Engineer, Financial, etc.)	$1,000
Total	**$55,250**

Table 4.9 Estimated O, M & R Costs for Pressure Sewers with Grinder Pumps – Woodland Lake	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$14,400
Energy (Power Costs) -- Grinder Pump Stations (*1)	$1,300
Materials & Supplies	$300
Repairs	$300
Fixed Assets Costs (From Table 4.7)	$11,600
Outside Services (Tank Cleaning, Billing, etc.)	$4,200
Insurance	$1,800
Conferences, Training, etc.	$200
Professional Services (Attorney, Engineer, Financial, etc.)	$600
Total	**$34,700**

Note for Table's 4.8 and 4.9: *1 – For purposes of comparing alternatives, includes estimated power cost for simplex grinder pumps, which would be paid by the customer

Alternative No. 4 – Vacuum Sewer System:

Description:

Vacuum sewer systems consist of low-pressure pipes that generally are buried beneath the frost line at a slope with periodic step-ups to avoid deep installation. The wastewater flows from the building by gravity to a vacuum pit. A vacuum pit can serve each building or a few buildings located close together can be clustered to one vacuum pit. The vacuum pit has an interface valve that automatically opens when a certain volume of sewage is collected in the vacuum pit. A central collection system station generates vacuum, which sucks the sewage from the vacuum pit when the interface valve opens. The advantage of a vacuum system is that pipe sizes are kept to a minimum; usually 4 to 8-inch and major spills of sewage are impossible. The disadvantage of the vacuum system is that the collector station is very expensive unless the cost can be shared amongst several users.

Based on input received from a representative of AIRVAC, a vacuum sewer system company, a vacuum system was determined to be feasible for the Bean Blossom Area but was not for the Old Settler's Road Area and Woodland Lake Area. In addition, a representative of AIRVAC has indicated that when there are less than 90 customers; this alternative not practical due to the high cost of the vacuum station. Considering the separation of the Woodland Lake area from the Bean Blossom area, the low number of customers in each area and the AIRVAC correspondence, this alternative has been deemed unfeasible and will not be considered further.

Alternative No. 5 – Septic Tank Effluent Pressure (STEP) System:

Description:

The STEP sewer system is very similar to the low pressure grinder pump sewer system except for the following:

- Septic tanks (watertight) are used in lieu of grinder pump stations
- Effluent pumps are used following the septic tank in lieu of grinder pumps, as the larger solids in the wastewater settle out in the septic tank prior to reaching the pump
- Preliminary treatment is being achieved in the septic tank, which requires periodic (estimated every 3 to 5 years) solids removal and disposal, whereas the grinder pump stations convey all of the wastewater, including ground up solids to the treatment plant site

As with the low pressure grinder pump sewer system, the STEP sewer system requires similar installation complexity, and electrical service provided for the pump controls.

Design Criteria:

The design criteria for this alternative comply with 10-States Standards, 327 IAC 3, and RUS design policies (7 CFR 1780.57).

Map:

Refer to Exhibit's 4.2 and 4.3 for a layout map of the STEP system for Bean Blossom and Woodland Lake, respectively. These exhibits are the same as those for Alternative No. 3 except in lieu of grinder pumps there would be 1,500 gallon septic tanks with effluent pumps.

Environmental Impacts:

This alternative would involve the installation of sewers, some within road or alley right-of-ways and some within private easements. The removal of a few trees where sewers are proposed within private easements will most likely be required. Hoppers Branch will be crossed, and other smaller ditches will be crossed or the sewer will parallel it. Unlike conventional gravity sewers that need to be laid on line and grade, the pressure sewers can be directional bored, or auger bored in many instances, and the pipes can be installed following the contour of the ground or zigzagged around obstacles, which minimizes surface disruptions and reduces the environmental impacts. Directional drilling of the pipe across Hoppers Branch and other precautions along or across small ditches will be taken to minimize erosion and environmental impacts. The proposed septic tanks and some of the pipes are anticipated to be installed outside of existing public right-

of-ways, which may require archaeological and other environmental reviews. However, much of the land where the system will be installed has been previously disturbed.

Land Requirements:

Permanent and temporary construction easements will be needed for some of the proposed sewers.

Potential Construction Problems:

As referenced under the conventional gravity and low pressure with grinder pump stations sewer alternatives, according to the Brown County Soils Report, most all soils within the service areas are very limited in respect to shallow excavations. The rating on the soil properties that influence the ease of digging, depth to bedrock or a cemented pan, hardness of bedrock, depth to the seasonal high water table, flooding, the amount of large stones, etc. Therefore, the construction of a low pressure system will most likely encounter some challenges, but not as many as with a deeper installed conventional gravity sewer system..

Sustainability Considerations:

A low pressure sewer system, with grinder pumps, or septic tanks and effluent pumps will require more to operate and maintain when comparing it to the conventional gravity sewer alternative evaluated. This alternative would use more energy than the conventional gravity sewer alternative but less than the low pressure sewer with grinder pump stations alternative, as there is pumping of the wastewater, but it is partially treated septic tank effluent. The pipes are similar in size to the low pressure with grinder stations and smaller than the conventional gravity sewer pipes meaning less material used, which equates to less energy usage in the manufacture of the pipe.

The estimated construction and non-construction costs for a STEP system in Bean Blossom and Woodland Lake are provided in Table's 4.10 and 4.11, respectively. The estimated replacement costs (short-term assets) for the Bean Blossom and Woodland Lake areas are provided in in Table's 4.12 and 4.13, respectively. The total estimated operation, maintenance and replacement (short-lived asset) for the Bean Blossom and Woodland Lake areas are provided in in Table's 4.14 and 4.15, respectively.

Table 4.10
Estimated Construction Cost for Septic Tank Effluent Pressure Sewers – Bean Blossom

Item	Description	Quantity	Unit	Unit Cost	Amount
1	4" Pressure Sewer	3,000	LF	$15	$45,000
2	3" Pressure Sewer	5,500	LF	$13	$71,500
3	2" Pressure Sewer	7,200	LF	$11	$79,200
4	1-1/2" Pressure Sewer	12,000	LF	$10	$120,000
5	Septic Tanks w/Effluent Pump (*1)	83	EA	$5,000	$415,000
6	Pressure Sewer Valve Assemblies	83	EA	$500	$41,500
7	Pressure Sewer/Force Main Air Release Valves	11	EA	$2,500	$27,500
8	Line Flushing Valve Pits	27	EA	$2,000	$54,000
9	Compacted Granular Backfill	525	LF	$18	$9,450
10	Pavement Replacement	455	LF	$50	$22,750
11	Bill Monroe C'Ground/Festival Park Septic Tanks with Pumps	1	LS	$20,000	$20,000
12	Staley's Mobile Home Septic Tanks with Pumps	1	LS	$20,000	$20,000
13	4" Pressure Sewer, Augured Bores	100	LF	$50	$5,000
14	3" Pressure Sewer, Augured/Directional Bores	500	LF	$45	$22,500
15	2" Pressure Sewer, Augured Bores	600	LF	$30	$18,000
16	1-1/2" Pressure Sewer, Augured Bores	1,000	LF	$20	$20,000
17	Spare Parts	1	LS	$5,000	$5,000
18	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$99,600	$99,600
19	Mobilization, Bond & Insurance	1	LS	$55,000	$55,000
Subtotal Construction					**$1,151,000**

Non-Construction	
Item	**Amount**
Engineering Design and Construction	$101,900
Additional Engineering	$30,100
Construction Inspection	$73,900
Legal	$12,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$8,600
Soils Evaluation	$5,000
Administrative	$1,400
Construction Contingency	$115,100
Subtotal Non-Construction	**$401,000**
Total Cost	**$1,552,000**

Table 4.11
Estimated Construction Cost for Septic Tank Effluent Pressure Sewers – Woodland Lake

Item	Description	Quantity	Unit	Unit Cost	Amount
1	4" Force Main	11,100	LF	$15	$166,500
2	4" Pressure Sewer	700	LF	$15	$10,500
3	3" Pressure Sewer	5,000	LF	$13	$65,000
4	2" Pressure Sewer	1,800	LF	$11	$19,800
5	1-1/2" Pressure Sewer	11,300	LF	$10	$113,000
6	Septic Tanks w/Effluent Pump (*1)	67	EA	$5,000	$335,000
7	Pressure Sewer Valve Assemblies	67	EA	$500	$33,500
8	Pressure Sewer/Force Main Air Release Valves	17	EA	$2,500	$42,500
9	Line Flushing Valve Pits	11	EA	$2,000	$22,000
10	Compacted Granular Backfill	425	LF	$18	$7,650
11	Pavement Replacement	375	LF	$50	$18,750
12	Woodland Lake Lift Station w/Odor Control	1	LS	$110,000	$110,000
13	4" Force Main, Augured Bores	500	LF	$50	$25,000
14	3" Pressure Sewer, Augured Bores	500	LF	$45	$22,500
15	2" Pressure Sewer, Augured Bores	150	LF	$30	$4,500
16	1-1/2" Pressure Sewer, Augured Bores	200	LF	$20	$4,000
17	Spare Parts	1	LS	$5,000	$5,000
18	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$100,000	$100,000
19	Mobilization, Bond & Insurance	1	LS	$54,800	$54,800
Subtotal Construction					**$1,160,000**

Non-Construction	
Item	**Amount**
Engineering Design and Construction	$102,500
Additional Engineering	$29,100
Construction Inspection	$37,000
Legal	$12,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$1,000
Soils Evaluation	$2,500
Administrative	$1,900
Construction Contingency	$116,000
Subtotal Non-Construction	**$355,000**
Total Cost	**$1,515,000**

Note for Table's 4.10 and 4.11: *1 – The potential for clustering buildings into one septic tank may be possible but cannot be determined until a detailed topographical surveying is obtained during the engineering design phase of the project. For conservative purposes this study assumes one septic tank per building being served.

The Woodland Lake cost estimate (Table 4.11) includes the conveyance system from Woodland Lake to Bean Blossom.

Table 4.12 Estimated Fixed Assets Costs for Septic Tank Effluent Pressure Sewers – Bean Blossom	
Item	**Estimated Annual Cost**
STEP Pumps and Controls	$9,800
Air Release Valve Replacement	$1,100
Total	**$10,900**

Table 4.13 Estimated Fixed Assets Costs for Septic Tank Effluent Pressure Sewers – Woodland Lake	
Item	**Estimated Annual Cost**
STEP Pumps and Controls	$11,200
Lift Station Pumps and Controls	$700
Odor Control Chemical Feed Pumps	$100
Air Release Valve Replacement	$1,700
Total	**$13,700**

Table 4.14 Estimated O, M & R Costs for Septic Tank Effluent Pressure Sewers – Bean Blossom	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$28,800
Energy (Power Costs) – STEP Pumps	$900
Materials & Supplies	$550
Repairs	$550
Fixed Assets Costs (From Table 4.12)	$10,900
Outside Services (Tank Cleaning, Billing, etc.)	$7,800
Insurance	$2,500
Conferences, Training, etc.	$350
Professional Services (Attorney, Engineer, Financial, etc.)	$1,000
Total	**$53,350**

Table 4.15 Estimated O, M & R Costs for Septic Tank Effluent Pressure Sewers – Woodland Lake	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$14,400
Energy (Power Costs) – STEP Pumps and Lift Station	$1,000
Materials & Supplies (incl. Odor Control Chemical)	$1,100
Repairs	$300
Fixed Assets Costs (From Table 4.13)	$13,700
Outside Services (Tank Cleaning, Billing, etc.)	$6,400
Insurance	$1,800
Conferences, Training, etc.	$200
Professional Services (Attorney, Engineer, Financial, etc.)	$600
Total	**$39,500**

4.2 Treatment and Disposal System Alternatives

The following alternatives were considered for wastewater treatment for the Bean Blossom and Woodland Lake Areas:

- No Action
- Conveyance to Helmsburg WWTP
- Conveyance to Town of Nashville WWTP
- Extended Aeration Activated Sludge WWTP
- Constructed Wetlands
- Facultative Lagoons with Land Application of Effluent
- Re-circulating Filter Media

Alternative No. 1 - No Action:

Description:

For the same reasons indicated in the Collection System Alternatives section, the no action alternative would continue to create adverse environmental impacts to the watershed and to Beanblossom Creek, which is a tributary to Lake Lemon located approximately 6 miles downstream from Bean Blossom. Inadequate wastewater collection and disposal facilities presently limit economic growth of the study area. The No Action Alternative would provide the study areas with neither short nor long term benefits.

Design Criteria:

Not applicable.

Map:

Not applicable for this alternative.

Environmental Impacts:

The no action alternative would continue to pollute nearby waterways, potentially pollute the groundwater and therefore be a negative impact to the environment.

Land Requirements:

Not applicable.

Potential Construction Problems:

Not applicable.

Sustainability Considerations:

Not applicable.

Cost Estimates:

Not applicable.

Alternative No. 2 – Conveyance to Helmsburg RSD:

Description:

Conveyance of wastewater from the Bean Blossom planning area to the existing treatment plant at Helmsburg is a considered alternative. The Helmsburg Regional Sewer District (RSD) operates a 25,000-gpd extended aeration steel packaged-type treatment plant that was constructed in 1995. The treated flow is discharged into Beanblossom Creek. The condition of the existing plant appears fair but in need of maintenance, as the steel components above the water level are showing significant corrosion deterioration caused by the release of hydrogen sulfide gas. The average daily and maximum daily flow to the plant for the period of March 2008 through May 2009 was 5,000 and 11,000 gpd, respectively. The influent BOD concentration during that same period averaged 368 mg/L, which is considerably higher than the 210 mg/L the plant was designed for. The higher BOD concentration is most likely due to long detention times within the collection system and low levels of inflow or infiltration into the collection

system. Considering the volume available in the existing aeration chamber and the maximum BOD organic rate allowed by IDEM of 15 lbs BOD/1,000 cft, the actual average plant capacity is approximately 20,500 gpd. Considering that the community has remained status quo, this daily flow and BOD loading is assumed to be the same today. It is suspected that the significant corrosion of the plant components is caused by anaerobic wastewater, possibly from low flows within Helmsburg's low-pressure/grinder pump collection system.

The estimated future flow from the Bean Blossom and Woodland Lake Areas is 0.045 mgd. In order for the existing Helmsburg plant to receive this additional flow it would need to be expanded. Besides, based on the condition of the existing steel plant components, a new plant would need to be constructed so that its projected useful life would exceed the duration of any loan period, assuming that a loan would be needed for the project financing. The reuse of the existing steel plant structure could be considered for sludge digestion, sludge storage or flow equalization if a new plant were constructed. Based on information obtained in 2009, the Helmsburg system currently has approximately 63 customers. The estimated number of current users from the Bean Blossom and Woodland Lake Areas are 85 and 67 respectively.

A new plant is suggested at Helmsburg due to the existing plants lack of capacity and condition. One option would be for Helmsburg to construct a new plant with other improvements to existing facilities and the BBRSD would then pay an upfront connection charge to help offset a significant portion of the costs. A second option would be for the Helmsburg RSD to merge with the BBRSD and then the BBRSD would take over the Helmsburg treatment property and other facilities then finance the treatment plant improvements. Under the first option, the Helmsburg RSD would need to incur some debt to finance a portion of the proposed WWTP.

The general improvements associated with this alternative include the following:

- Lift Station at Bean Blossom with Odor Control
- Conveyance force main from Lift Station to Helmsburg WWTP
- Influent flow splitter box
- Construct 60,000 gpd AeroMod plant
- Standby Generator
- Piping and Valves
- Existing plant upgrades and painting
- Ultraviolet (UV) disinfection system and post aeration
- Geotextile bag system for sludge drying
- Control/Storage Building (30' x 40')
- Electrical
- Site Work and restoration of disturbed areas

Design Criteria:

The design criteria for this alternative comply with 10-States Standards, 327 IAC 3 and RUS design policies (7 CFR 1780.57).

Map:

Refer to Exhibit 4.1 for a map showing conveyance to Helmsburg and Exhibit 4.5 for a flow schematic of the treatment plant.

Environmental Impacts:

It is anticipated that the new WWTP would be constructed on the existing Helmsburg WWTP property, which has been previously disturbed. No negative environmental impacts are anticipated. The IDEM NPDES permit effluent limits are anticipated to be more stringent than the existing limits, due to their anti-degradation rules. This would benefit the environment.

Land Requirements:

An additional 1 acre of land (minimum) would be required for this alternative.

Potential Construction Problems:

Considering that most of the new WWTP would be elevated to be above the 100-year flood elevation, no construction problems related to excavation are anticipated. There will most likely be minor construction problems associated with switchover from the existing plant to a new plant.

Sustainability Considerations:

Considering that the proposed WWTP will be an extended aeration type plant, additional energy use will be required. In addition, the lift station at Bean Blossom conveying the flow to Helmsburg will require more energy when compared to having a treatment near Bean Blossom. This alternative would improve the existing WWTP condition and thus make the system more reliable and sustainable.

Cost Estimates:

The estimated construction and non-construction costs for the conveyance and treatment facilities to Helmsburg is provided in Table 4.16 The estimated replacement costs (short-term assets) for this alternative are provided in in Table 4.17. The total estimated operation, maintenance and replacement (short-lived asset) for this alternative are provided in in Table 4.18.

Table 4.16 Estimated Construction Cost – Conveyance to Helmsburg RSD for Treatment	
Item	**Amount**
Bean Blossom Lift Station, including Odor Control	$110,000
6" Force Main – Open Cut (11,200 LF)	$224,000
Road/Driveway Crossings – Open Cut (400 LF)	$26,000
Highway/Railroad Crossings – Jack & Bore (200 LF)	$55,000
6" Force Main – Directional Bore (2,500LF)	$125,000
Force Main Air Release Valves (15 EA)	$38,000
Force Main Connection at Helmsburg RSD WWTP	$3,000
Influent Flow Splitter Box	$30,000
.06 MGD AeroMod Plant	$420,000
Existing Plant Upgrades/Conversions	$20,000
UV Disinfection System & Post Aeration	$45,000
Plant Drain Lift Station	$30,000
Standby Generator	$35,000
Piping & Valves	$25,000
Control/Storage Building	$70,000
Electrical	$75,000
Geotextile Bag System for Sludge Drying	$25,000
Miscellaneous (Site Restoration, Painting, Fence, Flow Meter, etc.)	$128,300
Bond, Mobilization & Insurance	$70,700
Subtotal Construction	**$1,485,000**
Non-Construction	
Item	**Amount**
Engineering Design and Construction	$129,000
Additional Engineering	$10,000
Construction Inspection	$50,400
Legal	$5,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$12,500
Soils Evaluation	$2,500
Administrative	$1,100
Construction Contingency	$148,500
Subtotal Non-Construction	**$412,000**
Total Cost	**$1,897,000**

Table 4.17 Estimated Fixed Assets Costs for Conveyance & Treatment at Helmsburg	
Item	**Estimated Annual Cost**
Lift Station Pumps	$1,000
Lift Station Pump Controls	$100
Chemical Feed Polymer Pumps	$200
Blowers	$3,000
UV Bulbs	$200
Total	**$4,500**

Table 4.18 Estimated O, M & R Costs for Conveyance & Treatment at Helmsburg	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$28,800
Energy (Power Costs)	$16,700
Materials & Supplies (incl. Chemicals)	$3,000
Repairs	$1,000
Fixed Assets Costs (From Table 4.17)	$4,500
Outside Services (Certified Operator)	$12,000
Biosolids Handling & Disposal	$5,000
Insurance	$4,500
Conferences, Training, etc.	$700
Professional Services (Attorney, Engineer, Financial, etc.)	$1,000
Total	**$77,200**

Does not include treatment costs

Alternative No. 3 – Conveyance to Town of Nashville:

Description:

Conveyance of wastewater from the Bean Blossom planning area to the existing treatment plant at Nashville is a considered alternative. The Town of Nashville operates a extended aeration treatment plant that was upgraded and expanded recently. The Town has indicated that they have 100,000 gpd of excess capacity available. Therefore, there would be no WWTP improvements needed to accept flows from the Bean Blossom and Woodland Lake areas. The Town has indicated that the conveyance line from Bean Blossom would connect to their existing collection system, located approximately ½ block south of Main Street behind the Fire Station. The Town would not charge an upfront connection charge as long as the BBRSD paid the user rate required by the Town of Nashville's Sewer Rate Ordinance. A copy of the Town's sewer rates and charges ordinance in included in Appendix K.

Design Criteria:

The design criteria for this alternative comply with 10-States Standards, 327 IAC 3 and RUS design policies (7 CFR 1780.57).

Map:

Refer to Exhibit 4.4 for a map showing conveyance options to Nashville. A second conveyance option is shown if HRSD and Bean Blossom/Woodland Lake both conveyed their wastewater to Nashville. The second option would connect directly into the Nashville WWTP.

Environmental Impacts:

The conveyance line route would be south of Bean Blossom along SR 135 to Greasy Creek Road then south along Greasy Creek Road to Nashville. The areas along the way, just south of Bean Blossom are steep and wooded, requiring the construction of pipe through hills and ravines. Therefore, it is anticipated that some tree clearing will be needed and some potentially archeological reconnaissance along the proposed conveyance line route. Some of the conveyance line will be directional drilled in an attempt to minimize environmental impacts.

Land Requirements:

Permanent and temporary construction easements will be required for this alternative.

Potential Construction Problems:

A considerable amount of the proposed conveyance line will be installed through hilly wooded topography. Some of the proposed conveyance line will be directional drilled in an effort to minimize disturbances and to reduce potential negative environmental impacts.

Sustainability Considerations:

Considering that the Nashville WWTP is existing, the energy used to operate the plant would most likely not increase as a result of adding the BBRSD as a customer. The lift station at Bean Blossom conveying the flow to Nashville will require more energy when compared to having a treatment near Bean Blossom, or conveyance to Helmsburg, as it would be larger in size. Due to the length of conveyance line and the elevation differences between Bean Blossom and Nashville, the conveyance line will be larger, which will allow for future connections, avoiding future sewer extensions, which makes for a sustainable future situation.

Cost Estimates:

The estimated construction and non-construction costs for the conveyance to Nashville are provided in Table 4.19. The estimated replacement costs (short-term assets) for this alternative are provided in in Table 4.20. The total estimated operation, maintenance and replacement (short-lived asset) for this alternative are provided in in Table 4.21.

Table 4.19 Estimated Construction and Non-Construction Cost – Conveyance to Nashville	
Item	**Amount**
Bean Blossom Lift Station, including Odor Control & Flow Meter	$115,000
Intermediate Lift Station, including Standby Generator	$140,000
8" Force Main – Open Cut (22,000 LF)	$550,000
8" Force Main – Directional Bore (3,000 LF)	$180,000
Force Main Air Release Valves (18 EA)	$45,000
Force Main Connection at Nashville	$3,000
Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	$103,000
Bond, Mobilization & Insurance	$57,000
Subtotal Construction	**$1,193,000**
Non-Construction	
Item	**Amount**
Engineering Study, Design and Construction	$105,200
Additional Engineering	$6,500
Construction Inspection	$37,000
Legal	$5,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$6,000
Soils Evaluation	$3,500
Administrative	$1,500
Construction Contingency	$119,300
Subtotal Non-Construction	**$337,000**
Total Cost	**$1,530,000**

Table 4.20 Estimated Fixed Assets Costs for Conveyance to Nashville	
Item	**Estimated Annual Cost**
Lift Station Pumps	$3,400
Lift Station Pump Controls	$200
Air Release Valve Replacement	$1,800
Total	**$5,400**

Table 4.21 Estimated O, M & R Costs for Conveyance to Nashville	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$14,400
Energy (Power Costs) – Lift Stations	$3,350
Materials & Supplies (incl. Odor Control Chemical)	$1,200
Repairs	$1,500
Fixed Assets Costs (From Table 4.20)	$5,400
Outside Services (Tank Cleaning, etc.)	$1,000
Treatment Cost	$122,000
Insurance	$1,200
Conferences, Training, etc.	$100
Professional Services (Attorney, Engineer, Financial, etc.)	$500
Total	**$150,650**

Alternative No. 4 – Extended Aeration Activated Sludge WWTP

Description:

The extended aeration activated sludge process uses microorganisms to feed on organic contaminants in wastewater, producing a high quality effluent for discharge to a nearby receiving stream, or into a subsurface elevated mound, drip irrigation system, or other land application technique. The activated sludge plant is probably the most popular biological treatment process. It is used for both large and small installations. These plants are capable of producing a high quality effluent for the price. Activated sludge package plants are used by isolated facilities such as hospitals or hotels, cluster situations, subdivisions and small communities. The basic activated sludge process consists of several interrelated components including; an aeration tank where the biological reaction takes place; an aeration source that provides oxygen and mixing; a clarifier tank where the solids settle and are separated from wastewater treatment and; a means of collecting the solids either to return them to the aeration tank, or to remove them from the process. The removed solids are then further processed and disposed of. There are several types of extended aeration activated sludge processes including oxidation ditches, sequential batch reactors, vertical loop reactors, etc. The extended activated sludge process is a viable alternative for the planning area and a packaged type AeroMod plant will be further evaluated.

Based on preliminary conservations with a property owner, the WWTP location is shown on Exhibit 4.4. The plant effluent will be discharged to an unnamed tributary that flow to Beanblossom Creek.

Design Criteria:

The design criteria for this alternative comply with 10-States Standards and RUS design policies (7 CFR 1780.57).

Map:

Refer to Exhibit 4.4 for a map showing the WWTP location and Exhibit 4.6 for a flow schematic of the WWTP.

Environmental Impacts:

An archeological reconnaissance at the proposed treatment plant site may be required. The site is in an open area, so no trees will need to be removed for the proposed treatment plant. A few trees may need to be removed for the installation of the plant effluent pipe.

Land Requirements:

The purchase of land will be required for the WWTP. Approximately 2 acres of property is anticipated.

Potential Construction Problems:

No construction problems are anticipated with this alternative, as the plant will be elevated above grade minimizing excavation required.

Sustainability Considerations:

This alternative will use energy, comparable to the Helmsburg treatment alternative and more than the conveyance to Nashville alternative.

Cost Estimates:

The estimated construction and non-construction costs for the extended aeration treatment plant are provided in Table 4.22. The estimated replacement costs (short-term assets) for this alternative are provided in in Table 4.23. The total estimated operation, maintenance and replacement (short-lived asset) for this alternative are provided in in Table 4.24.

Table 4.22 Estimated Construction Cost – Extended Aeration Treatment	
Item	**Amount**
6" Force Main – Open Cut (5,800 LF)	$116,000
Road/Driveway Crossings – Open Cut (150 LF)	$9,750
6" Force Main – Directional Bored (300 LF)	$15,000
Force Main Air Release Valves (5 EA)	$12,500
Force Main Connection at WWTP	$1,800
0.045 mgd AeroMod Plant	$457,900
UV Disinfection & Post Aeration	$40,000
Standby Generator	$35,000
Piping, Valves	$25,000
Control Storage Building	$70,000
Geotextile Bag System for Sludge Drying	$25,000
Plant Drain Lift Station	$30,000
Electrical	$70,000
Miscellaneous (Site Restoration, Painting, Fence, Flow Meter, etc.)	$90,800
Bond, Mobilization & Insurance	$50,250
Subtotal Construction	**$1,049,000**
Non-Construction	
Item	**Amount**
Engineering Design and Construction	$92,800
Additional Engineering	$3,000
Construction Inspection	$37,000
Legal	$5,000
Bond Council	$15,000
Financial Advisor	$10,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$28,000
Land/Easement Acquisition	$20,000
Soils Evaluation	$2,500
Administrative	$1,800
Construction Contingency	$149,900
Subtotal Non-Construction	**$320,000**
Total Cost	**$1,369,000**

Table 4.23 Estimated Fixed Assets Costs for Extended Aeration WWTP	
Item	**Estimated Annual Cost**
Chemical & Polymer Feed Pumps	$200
Blowers	$2,700
UV Bulbs	$200
Sludge Pump	$200
Total	**$3,300**

Table 4.24 Estimated O, M & R Costs for Extended Aeration WWTP	
Item	**Estimated Annual Cost**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$28,800
Energy (Power Costs)	$15,700
Materials & Supplies (incl. Chemicals)	$3,000
Repairs	$1,000
Fixed Assets Costs (From Table 4.23)	$3,300
Outside Services (Certified Operator)	$12,000
Biosolids Handling & Disposal	$4,000
Insurance	$4,500
Conferences, Training, etc.	$700
Professional Services (Attorney, Engineer, Financial, etc.)	$1,000
Total	**$74,000**

Alternative No. 5 – Constructed Wetlands

Description:

The Constructed Wetlands utilizes a combination of chemical and biological processes to remove nutrients from wastewater. The wetlands system is preceded with preliminary treatment consisting of individual septic tanks at each property, or large septic tank treatment at the centralized plant location. After preliminary treatment is achieved the wastewater flows into a wetland cell or cells. A system of plants planted in a sand/gravel medium provides a natural treatment within the cell(s) by up taking the nutrients. Constructed wetland effluent would either be disinfected and discharged into a surface water-receiving stream or disposed of by drip irrigation or into an elevated mound. The constructed wetland cannot meet the NPDES permit limits for discharge into a surface water-receiving stream. While discharging constructed wetland effluent into a subsurface source can be viable, it is not considered to be for the Bean Blossom area due to the soils limitations for septic system discharge and shallow excavations. Therefore, the constructed wetland alternative will not be considered further.

Alternative No. 6 – Facultative Lagoons with Land Application of Effluent

Description:

A facultative lagoon system consists of a series of ponds, which hold the wastewater until a sufficient level of treatment is achieved, and the effluent can be safely discharged to a surface water-receiving stream. Facultative lagoons can be either aerated or non-aerated (stabilization lagoons). Stabilization lagoons

systems are usually 5 to 6 feet deep where aerated lagoons may be 10 to 20 foot deep. Advantages of lagoon systems include their relatively low maintenance requirements and relatively small quantities of sludge production. Disadvantages of a lagoon system are that the lagoon cannot be located within ¼-mile to the nearest residence, they experience reduced biological activity and treatment efficiency during cold weather, ice formation can hamper the operation and in overloading situations, or spring and fall periods when turnover occurs, odors can be produced and lagoons require more property area. The facultative lagoon system cannot consistently meet NPDES permit limits associated with a surface water discharge, however an option is to land apply lagoon effluent. This alternative has been deemed unfavorable due to the site location requirements and unavailability of known land for land application. Therefore, the facultative lagoon system alternative will not be considered further.

Land application is permitted through IDEM under 327 IAC 6.1-7 as forms of land application of pollutant-bearing water. Sizing for the reuse field is based on the hydraulic capacity of the soil and the nitrogen uptake of the crop in the field. The proposed crop is usually a alfalfa and/or hardwood tree to maximize nitrogen uptake of the system. Spray irrigation discharges using mechanical irrigation equipment to apply treated wastewater over a wide area that can be used for agricultural purposes. Spray irrigation is limited to slopes less than 6% to prevent runoff of the applied wastewater, requires a 90-day minimum storage for periods when it cannot be applied during wet conditions or on frozen ground, and requires either significant setbacks or effluent disinfection with a high degree of treatment. Because of these limitations, spray irrigation was not considered further for disposal.

Alternative No. 7 – Re-circulating Filter Media

Description:

A re-circulating filter media (RMF) system consists of a tank, or earth-lined vessel filled with a bed of graded media (sand, gravel, textiles, etc.) and pump(s). Septic tank effluent enters the filter media tank and pumped onto the media bed where it flows through the media bed. As the partially treated wastewater passes through the media, a combination of physical, chemical, and biological processes consistently treat the wastewater. A portion of the flow that passes through the media is re-circulated over the media and a portion is discharged into either a collection system or for further treatment processing prior to its discharge to a surface water-receiving stream or disposed of by drip irrigation, spray irrigation, or into an elevated mound. Re-circulating filter media systems are fairly simple to operate and include only a few mechanical components (i.e. pumps and controls). Either individual treatment RMF's serving one or two buildings, or a centralized RMF could be considered but both would require preliminary septic tank treatment ahead of the units. The RMF cannot meet the NPDES permit limits for discharge into a surface water-receiving stream. While discharging

RMF effluent into a subsurface source or via spray irrigation may be viable, for the same reasons listed for Alternative No. 6 this alternative is deemed to be unfeasible. Therefore, the RMF alternative will not be considered further.

SECTION 5

SELECTION OF AN ALTERNATIVE

5.1 General Information

5.1.1 Introduction

A cost-effective-analysis was prepared for each of the feasible alternatives listed in Section 4. The cost-effective-analysis takes into consideration the initial capital (project) costs; annual operation, maintenance and replacement cost, and salvage values. All of the estimated costs were brought back into today's costs for comparison purposes. A current Federal discount interest rate of 1.6% was utilized for the cost-effective-analysis. A 20-year planning period is used for the cost-effective-analysis.

The estimated construction costs are based on manufacturer's quotations, estimating manuals, recent bid construction prices and estimating experience and have been slightly inflated, as the construction bids would most likely not be received until sometime next year.

The estimated salvage values are arrived at based on their future worth at the end of the 20-year planning period.

Besides the estimated construction costs there are other costs associated with undertaking a project. These other costs are identified as non-construction costs, which are explained in the following paragraphs of this section.

5.1.2 Non-Construction Costs

1. General

Non-construction costs are those costs that are associated with preparing a project for construction, monitoring the project during construction, and follow-up after construction is completed. Non-construction costs generally include engineering, legal and administrative, land acquisition and easements, grant administration, sometimes direct equipment purchases, accounting services, start-up costs and contingencies. As a whole, non-construction costs can range between 20% and 40% of the total project cost depending on the method utilized to finance the project and size of the project.

2. Engineering

Engineering generally includes the associated costs for preparing detailed studies, design plans and specifications, assisting with project financing, field exploration surveys, preparing permit applications, easement preparation, and construction shop drawing review, construction observation and post construction follow-up activities.

3. Legal and Administrative

Legal services are often required to assist with the preparation of bond and/or rate ordinances that may be required. Some of the funding agencies for projects of this type require additional legal documents. Administrative costs include such things as permit fees, bid advertising fees, newspaper legal advertising, etc. A bond council may need to be retained depending on the method utilized to fund the project.

4. Grant Administration

A certified Grant Administrator is required for projects that are partially funded by the Indiana Office of Community and Rural Affairs Community Focus Fund. The Grant Administrator is generally responsible for handling the forms and paperwork associated with this funding program, reviewing payrolls during construction, drawing-down funds and performs several other miscellaneous duties.

5. Land Acquisition

Land acquisition is commonly referred to as the process of obtaining needed site property and easements for pipelines, lift stations and wastewater treatment plant.

6. Contingencies

Budgeted contingency money is used to pay for unexpected, unforeseen, or unanticipated costs associated with the project. Contingency money may be needed for construction or non-construction items. Contingencies are typically based on a percentage of the project cost and that percentage is determined by the project complexity. During the study and design phases of a project contingency is usually estimated at 10% of the construction costs and after construction bids are received and the costs are better known, then the contingency amount is reduced to 3% to 5%.

5.2 Life-Cycle Cost Analysis - Collection System Alternatives

Based on the information provided in Section 4, the following collection system alternatives have been deemed feasible:

- Conventional gravity for Bean Blossom and low pressure with grinder pumps for Woodland Lake areas
- Low pressure with grinder pumps for Bean Blossom and Woodland Lake areas
- Low pressure with septic tanks (STEP) for Bean Blossom and Woodland Lake areas

The opinion of probable project costs associated with the listed collection system alternatives is provided in Table 5.1.

Table 5.1
Collection System Alternatives - Opinion of Probable Project Costs

Alternative	Project Cost
Conventional gravity for Bean Blossom and low pressure with grinder pumps for Woodland Lake areas	$3,891,000
Low pressure with grinder pumps for Bean Blossom and Woodland Lake areas	$3,156,500
Low pressure with septic tanks (STEP) for Bean Blossom and Woodland Lake areas	$3,067,000

The following salvage values for the listed alternatives is provided in Table's 5.2, 5.3, 5.4 and 5.5

Table 5.2
Estimated Salvage Value – Conventional Gravity Bean Blossom

Item	Estimated Current Value	Estimated Life (years)	Estimated Value at Year 20
Lift Station Pumps	$54,000	15	$40,500
Grinder Pumps	$18,000	12	$10,800
Air Release Valves	$13,500	15	$10,125
Gravity Sewer	$140,000	50	$84,000
Force Main/Pressure Sewer	$8,000	50	$4,800
Manholes, Wet Wells & Valve Vaults	$62,300	50	$37,400
Simplex Grinder Pump Tanks	$16,200	50	$9,700
Total			**$197,325**

Table 5.3 Estimated Salvage Value – Pressure Sewers with Grinder Pump Stations Bean Blossom			
Item	**Estimated Current Value**	**Estimated Life (years)**	**Estimated Value at Year 20**
Grinder Pumps	$174,000	12	$104,400
Air Release Valves	$16,500	15	$12,375
Pressure Sewers	$32,700	50	$19,620
Valve Vaults	$8,800	50	$5,280
Simplex Grinder Pump Tanks	$149,400	50	$89,640
Duplex Grinder Pump Tanks	$5,000	50	$3,000
Total			**$234,315**

Table 5.4 Estimated Salvage Value – Pressure Sewers with Grinder Pump Stations Woodland Lake			
Item	**Estimated Current Value**	**Estimated Life (years)**	**Estimated Value at Year 20**
Grinder Pumps	$134,000	12	$80,400
Air Release Valves	$12,000	15	$9,000
Lift Station Pumps	$10,000	15	$7,500
Pressure Sewers	$20,000	50	$12,000
Valve Vaults	$6,400	50	$3,840
Simplex Grinder Pump Tanks	$120,600	50	$72,360
Total			**$185,100**

Table 5.5 Estimated Salvage Value – Pressure Sewers with Septic Tanks Bean Blossom			
Item	**Estimated Current Value**	**Estimated Life (years)**	**Estimated Value at Year 20**
Effluent Pumps	$104,400	10	$0
Air Release Valves	$16,500	15	$12,375
Pressure Sewers	$32,700	50	$19,620
Valve Vaults	$8,800	50	$5,280
Septic Tanks	$205,050	50	$123,030
Total			**$160,305**

Table 5.6 Estimated Salvage Value – Pressure Sewers with Septic Tanks Woodland Lake			
Item	**Estimated Current Value**	**Estimated Life (years)**	**Estimated Value at Year 20**
Effluent Pumps	$80,400	10	$0
Air Release Valves	$12,000	15	$9,000
Lift Station Pumps	$10,000	15	$7,500
Pressure Sewers	$20,000	50	$12,000
Valve Vaults	$6,400	50	$3,840
Septic Tanks	$157,450	50	$94,470
Total			**$126,810**

A life-cycle-cost summary of the collection system alternatives for Bean Blossom and Woodland Lake are provided in Table's 5.7 and 5.8, respectively.

Table 5.7 Present Worth Cost Comparison of Collection Alternatives – Bean Blossom			
Item	**Alternative**		
	Gravity	**Pressure w/ Grinder Pumps**	**Pressure w/Effluent Pumps**
Project Cost	$2,365,000	$1,630,500	$1,552,000
Annual O, M & R Cost	$46,600	$55,250	$53,350
Salvage Value at year 20	$197,325	$234,315	$160,305
Present Worth Summary (20 years @ 1.6% interest)			
a) Total Project Cost	$2,365,000	$1,630,500	$1,552,000
b) PW of Annual O, M & R (PW factor 17.005)	$792,433	$939,526	$907,217
c) PW of Salvage Value (PW factor 0.7286)	$143,771	$170,722	$116,798
Total (a+b-c)	**$3,013,662**	**$2,399,304**	**$2,342,419**

Table 5.8 Present Worth Cost Comparison of Collection Alternatives – Woodland Lake		
Item	**Alternative**	
	Pressure w/ Grinder Pumps	**Pressure w/Effluent Pumps**
Project Cost	$1,526,000	$1,515,000
Annual O, M & R Cost	$34,700	$39,500
Salvage Value at year 20	$185,100	$126,810
Present Worth Summary (20 years @ 1.6% interest)		
b) Total Project Cost	$1,526,000	$1,515,000
b) PW of Annual O, M & R (PW factor 17.005)	$590,100	$671,700
c) PW of Salvage Value (PW factor 0.7286)	$134,900	$92,400
Total (a+b-c)	**$1,981,200**	**$2,094,300**

5.2 Non-Monetary Factors - Collection System Alternatives

A listing of the advantages and disadvantages of each collection system considered are listed in Table 5.9.

Table 5.9

Collection System Types – Advantages/Disadvantages

Collection System	Advantages	Disadvantages
Gravity	• Widely used • Simple • Reliable	• Terrain dependant • Large excavations • More construction related environmental impacts • More prone to I/I
Low Pressure w/Grinder Pump Sta's	• Not terrain dependent • Solids ground up • Less excavation and environmental impacts than gravity	• Some policing of what is conveyed to the pumping structure • Higher maintenance
Low Pressure w/Septic Tanks	• Not terrain dependent • Less excavation and environmental impacts than gravity	• Some policing of what is conveyed to the pumping structure (cleaning outlet filters) • Periodic solids removal from septic tanks • More prone to I/I than low pressure w/grinder pumps • Potential for odor complaints from septic wastewater in coll. System & at WWTP

The small diameter pressure sewer collection systems are the least cost based on the life-cycle-cost summary and offer the greatest flexibility because they can overcome hilly terrain, such as that found in most of the study areas. In addition, a smaller quantity of excavation is required for these types of systems lessening negative environmental impacts. With the recent advancement and increased popularity of the directional drilling (boring) method of utility pipeline installation, pressure sewers could be installed in the study area with minimized disturbance to the public. Considering that the present worth value of the grinder pump stations and septic tank effluent systems are nearly equal, and that estimates were used in the analysis, both alternatives are considered equal on a cost basis. The gravity sewer alternative is approximately 25-30% higher than the low pressure with grinder pumps, or with septic tanks alternatives for Bean Blossom. Taking into consideration the advantages and disadvantages of the alternatives, and the near equal O, M & R costs, it is recommended that the low pressure system with grinder pumps be selected for both Bean Blossom and Woodland Lake.

5.4 Life-Cycle Cost Analysis - Treatment Plant

Based on the information provided in Section 4, the following conveyance and treatment system alternatives have been deemed feasible:

- Conveyance and treatment at Helmsburg
- Conveyance to Nashville for treatment
- Extended Aeration Activated Sludge WWTP at Bean Blossom

The opinion of probable project costs associated with the listed conveyance and treatment system alternatives is provided in Table 5.10.

Table 5.10
Conveyance & Treatment System Alternatives - Opinion of Probable Project Costs

Alternative	Project Cost
Conveyance and treatment at Helmsburg	$1,897,000
Conveyance to Nashville for treatment	$1,530,000
Extended aeration WWTP at Bean Blossom	$1,418,000

The following salvage values for the listed alternatives are provided in Table's 5.11, 5.12, and 5.13.

Table 5.11
Estimated Salvage Value – Conveyance & Treatment at Helmsburg

Item	Estimated Current Value	Estimated Life (years)	Estimated Value at Year 20
Lift Station Pumps & Controls	$12,000	15	$9,000
Blowers	$50,000	15	$37,500
Chemical Feed Pumps	$3,200	15	$2,400
Air Release Valves	$22,500	15	$16,875
Plant Piping & Valves	$12,000	50	$7,200
Force Main	$67,000	50	$40,000
Concrete Structures	$25,000	50	$15,000
Wet Well & Valve Vault	$17,000	50	$10,200
Control/Storage Building	$35,000	50	$21,000
Total			**$159,175**

Table 5.12 Estimated Salvage Value – Conveyance to Nashville			
Item	**Estimated Current Value**	**Estimated Life (years)**	**Estimated Value at Year 20**
Lift Station Pumps & controls	$54,000	15	$40,500
Air Release Valves	$27,000	15	$20,250
Force Main	$208,750	50	$125,250
Wet Wells & Valve Vaults	$24,400	50	$14,650
Total			**$200,650**

Table 5.13 Estimated Salvage Value – Extended Aeration WWTP			
Item	**Estimated Current Value**	**Estimated Life (years)**	**Estimated Value at Year 20**
Blowers	$40,000	15	$30,000
Chemical Feed Pumps	$3,200	15	$2,400
Air Release Valves	$7,500	15	$4,500
Force Main	$29,400	50	$17,640
Plant Piping & Valves	$12,000	50	$7,200
Concrete Structures	$22,500	50	$13,500
Valve Vaults	$4,000	50	$2,400
Control/Storage Building	$35,000	50	$21,000
Total			**$98,640**

A life-cycle-cost summary of the conveyance and treatment system alternatives for Bean Blossom and Woodland Lake are provided in Table 5.14.

Table 5.14 Present Worth Cost Comparison of Conveyance & Treatment Alternatives			
Item	**Alternative**		
	Conveyance to Helmsburg	**Conveyance to Nashville**	**Extended Aeration WWTP**
Project Cost	$1,897,000	$1,530,000	$1,369,000
Annual O, M & R Cost	$77,200	$150,650	$74,000
Salvage Value at year 20	$159,175	$200,650	$98,640
Present Worth Summary (20 years @ 1.6% interest)			
c) Total Project Cost	$1,897,000	$1,530,000	$1,369,000
b) PW of Annual O, M & R (PW factor 17.005)	$1,312,790	$2,561,800	$1,258,370
c) PW of Salvage Value (PW factor 0.7286)	$115,980	$146,190	$71,870
Total (a+b-c)	**$3,093,810**	**$3,945,610**	**$2,555,500**

A listing of the advantages and disadvantages of each conveyance and treatment system considered are listed in Table 5.15.

Table 5.15
Treatment System Types – Advantages/Disadvantages

Treatment System	Advantages	Disadvantages
Conveyance and Treatment at Helmsburg RSD	• No operation and maintenance associated with treatment and disposal if under the control of the Helmsburg RSD Potentially lowest user rate with added Helmsburg customers if HRRSD & BBRSD combine	• Treatment costs would be under the control of an outside entity unless regionalization occurred with local representation • Requires a conveyance line and lift station with odor control • Requires significant plant upgrade • Highest project cost • NPDES permit required if under the control of BBRSD, otherwise would be required of HRSD
Conveyance to Nashville	• No maintenance associated with treatment and disposal • No NPDES permit required	• Treatment costs would be under the control of an outside entity • Requires a long conveyance line and 2 lift stations with odor control • Highest O, M & R cost
Extended Aeration Activated Sludge	• Capable of producing high quality effluent • Minimal land use • Most popular • Lowest cost on a PW basis • Lowest O, M & R cost	• Certified operator attention required • Routine sludge removal and disposal • NPDES permit required

As can be seen from Table 5.15, the extended aeration treatment plant at Bean Blossom is the most cost-effective alternative on a present worth basis. Depending on the amount of grant money available for the project, the conveyance to Helmsburg alternative may offer a lower user rate for Bean Blossom and Woodland Lake customers due to the inclusion of the HRSD customers. However, there other factors besides monetary such as reliability, expandability and implementability that should be considered in selecting the best alternative. The conveyance to Helmsburg and the extended aeration plant at Bean Blossom alternatives are considered equal when it comes to reliability. All three alternatives are considered equal in regards to implementability and expandability. The 8-inch conveyance force main to Nashville has excess capacity available. The extended aeration plant at Bean Blossom is recommended unless a deal can be worked out with the HRSD to combine into one regional sewer district and the Helmsburg customers pay their fair share of the treatment plant costs.

SECTION 6

PROPOSED PROJECT

6.1 Wastewater Improvements

The wastewater improvements consist of the construction of low pressure sewers with grinder pump stations at Bean Blossom and Woodland Lake, and a 0.045 mgd extended aeration treatment plant at Bean Blossom.

Refer to Exhibit's 4.2, 4.3, 4.5 and 4.6 for maps and a schematic showing the proposed wastewater improvements.

6.2 Project Cost Estimate

An opinion of probable project costs for the recommended improvements described in Section 5 is provided in Table 6.1. The non-construction costs in Table 5.1 should be considered as preliminary until the various professionals are contracted for services and the funding sources determined.

Table 6.1
Proposed Wastewater Project
Opinion of Probable Project Costs

Construction – Bean Blossom Collection System

Item No.	Description	Quantity	Unit	Unit Cost	Total
1	4" Pressure Sewer	3,000	LF	$15	$45,000
2	3" Pressure Sewer	5,500	LF	$13	$71,500
3	2" Pressure Sewer	7,200	LF	$11	$79,200
4	1-1/2" Pressure Sewer	12,000	LF	$10	$120,000
6	Simplex Grinder Pump Stations (*1)	83	EA	$5,500	$456,500
7	Pressure Sewer Valve Assemblies	83	EA	$500	$41,500
8	Pressure Sewer/Force Main Air Release Valves	11	EA	$2,500	$27,500
9	Line Flushing Valve Pits	27	EA	$2,000	$54,000
10	Compacted Granular Backfill	525	LF	$18	$9,450
11	Pavement Replacement	455	LF	$50	$22,750
12	Bill Monroe C'Ground/Festival Park Grinder Pump Lift Station	1	LS	$30,000	$30,000
13	Staley's Mobile Home Park Grinder Pump Lift Station	1	LS	$30,000	$30,000
14	4" Pressure Sewer, Augured Bores	100	LF	$50	$5,000
15	3" Pressure Sewer, Augured/Directional Bores	500	LF	$45	$22,500
16	2" Pressure Sewer, Augured Bores	600	LF	$30	$18,000

Table 6.1 Continued					
Item No.	**Description**	**Quantity**	**Unit**	**Unit Cost**	**Total**
17	1-1/2" Pressure Sewer, Augured Bores	1,000	LF	$20	$20,000
18	Spare Parts	1	LS	$5,000	$5,000
19	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$105,700	$105,700
20	Mobilization, Bond & Insurance	1	LS	$58,100	$58,100
Subtotal Construction – Bean Blossom Collection System					**$1,221,700**
Construction – Woodland Lake Collection System					
1	4" Force Main	11,100	LF	$15	$166,500
2	4" Pressure Sewer	700	LF	$15	$10,500
3	3" Pressure Sewer	5,000	LF	$13	$65,000
4	2" Pressure Sewer	1,800	LF	$11	$19,800
5	1-1/2" Pressure Sewer	11,300	LF	$10	$113,000
6	Simplex Grinder Pump Stations (*1)	67	EA	$5,500	$368,500
7	Pressure Sewer Valve Assemblies	67	EA	$500	$33,500
8	Pressure Sewer/Force Main Air Release Valves	17	EA	$2,500	$42,500
9	Line Flushing Valve Pits	11	EA	$2,000	$22,000
10	Compacted Granular Backfill	425	LF	$18	$7,650
11	Pavement Replacement	375	LF	$50	$18,750
12	Woodland Lake Lift Station	1	LS	$85,000	$85,000
13	4" Force Main, Augured Bores	500	LF	$50	$25,000
14	3" Pressure Sewer, Augured Bores	500	LF	$45	$22,500
15	2" Pressure Sewer, Augured Bores	150	LF	$30	$4,500
16	1-1/2" Pressure Sewer, Augured Bores	200	LF	$20	$4,000
17	Spare Parts	1	LS	$5,000	$5,000
18	Miscellaneous (Site Restoration, Traffic Control, Rule 5 Permit, etc.)	1	LS	$101,300	$101,300
19	Mobilization, Bond & Insurance	1	LS	$55,000	$55,000
Subtotal Construction – Woodland Lake Collection System					**$1,160,000**
Construction - Extended Aeration WWTP					
Item					**Amount**
6" Force Main – Open Cut (5,800 LF)					$116,000
Road/Driveway Crossings – Open Cut (150 LF)					$9,750
6" Force Main – Directional Bored (300 LF)					$15,000
Force Main Air Release Valves (5 EA)					$12,500
Force Main Connection at WWTP					$1,800
0.045 mgd AeroMod Plant					$457,900
UV Disinfection & Post Aeration					$40,000
Standby Generator					$35,000
Piping, Valves					$25,000
Control Storage Building					$70,000
Geotextile Bag System for Sludge Drying					$25,000
Plant Drain Lift Station					$30,000

Table 6.1 Continued	
Item	**Amount**
Miscellaneous (Site Restoration, Painting, Fence, Flow Meter, etc.)	$90,800
Bond, Mobilization & Insurance	$50,250
Subtotal Construction Extended Aeration WWTP	**$1,049,000**
Non-Construction	
Engineering Design and Construction	$276,900
Additional Engineering	$66,200
Construction Inspection	$148,000
Legal	$15,000
Bond Council	$35,000
Financial Advisor	$20,000
CFF Grant Administration (includes Environmental Review & Labor Standards)	$56,000
Soils Evaluation	$8,000
Administrative	$1,830
Maintenance Equipment (Truck & Portable Generator)	$59,300
Construction Contingency	$343,070
Subtotal Non-Construction	**$1,029,300**
Total Project	**$4,460,000**

6.3 Annual Operating Budget

In addition to covering operation and maintenance expenses there is a need for funding reserve amounts to fund short-lived assets (i.e. equipment, etc. that has less than a 20-year life). These amounts may also be referred to as replacement costs. Refer to Table's 4.6, 4.7 and 4.23 for a breakdown of the short-lived assets for the recommended collection and treatment systems. In addition to these assets, a maintenance truck will be included having a value of $28,000 and an estimated 10-year life, which equates to an annual amount needed of $2,800.

A summary of the estimated operation and maintenance expenses, including the short-lived assets in provided in Table 6.2.

Table 6.2 Estimated Annual O, M & R Costs for Proposed Project	
Item	**Estimated Annual Amount**
Labor (Salary, Benefits, Payroll Tax, Insurance, etc.)	$57,600
Energy (Power Costs)	$16,300
Materials and Supplies (including chemicals)	$3,850
Repairs	$1,800
Short-Lived Assets (Replacement)	$32,400
Outside Services (Tank Cleaning, Billing, Certified Operator, etc.)	$21,200
Biosolids Handling & Disposal	$4,000
Insurance	$9,000
Conferences, Training, etc.	$1,250
Professional Services (Attorney, Engineer, Financial Advisor, etc.)	$2,600
Total	**$150,000**

The potential sources for funding the proposed project are a CFF grant an RD grant and RD loan, or SRF loan. The RD issues direct loans for wastewater projects of this type and are available to rural areas and to cities and towns with a population of 10,000 or less. Funds are available to public entities, such as municipalities, counties, special-purpose districts and Indiana tribes. In addition, funds may be made available to corporations operated on a not-for-profit basis. Priority will be given to public entities, in areas with less than 5,500 people, to construct, extend or improve wastewater facilities. The maximum term for loans is 40 years. The interest rate is based on the MHI. Based on the 2010 census tract map, both the Bean Blossom and Woodland Lake areas could qualify for the RD poverty rate if adequate documentation was provided that there exists a health and safety issue. An RD grant up to 45% of the eligible project costs could be available if in the intermediate MHI range and up to 75% if in the poverty range. RD grant amounts are also based on the reasonable level of user rates determined by the RD and project need. The CFF is a grant program administered by the IDOC and funded with federal Community Development Block Grant (CBDG) dollars. These grants support a variety of construction projects that either benefit low to moderate-income persons or eliminate blight in communities. At least 51% of the population must be at the low to moderate-income level. The CFF program is generally only available to cities, incorporated towns and counties. The CFF program is very competitive and requires a minimum 10% match with the maximum grant amount being $600,000. Therefore, the County would need to apply for the grant on behalf of the sewer district. The SRF is a federal loan program available to cities, towns, counties, regional sewer districts, conservancy districts and Water Authorities and is administered by the IDEM. The loan money is provided for treatment plant improvements, sewer line extensions, upgrades, combined sewer overflow corrections and infiltration/inflow projects.

Table 6.3 provides various funding amounts and estimated user rates based on 210 EDU's. A RD loan for a 40-year financing period at an interest rate of 3.25% and 2.375% was used for an intermediate and poverty rate, respectively to estimate a user rate. An interest rate of 2.00% and 20 year financing period was utilized for a SRF loan. This interest rate is subject to change on a quarterly basis.

Table 6.3 Estimated User Rates – Funding Scenarios						
Funding Scenario	**Loan Amount**	**Annual Debt Service Amount**	**Annual Reserve Amount**	**O, M & R**	**Total Annual Requirement**	**Est. Monthly Rate/EDU**
RD Loan – 3.25%	$4,460,000	$210,773	$21,077	$150,000	$371,261	$147.33
RD Loan – 2.375%	$4,460,000	$174,386	$17,439	$150,000	$341,825	$135.64
45% RD Grant & RD Loan @ 3.25%	$2,453,000	$110,630	$11,063	$150,000	$271,693	$107.81
75% RD Grant & RD Loan @ 2.375 %	$1,115,000	$43,597	$4,360	$150,000	$197,956	$78.55
75% RD Grant + $500k CFF Grant & RD Loan @ 2.375 %	$615,000	$24,047	$2,405	$150,000	$176,451	$70.02
SRF Loan @ 2% - 20 years	$4,460,000	$272,952	$68,238	$150,000	$491,190	$194.92

SECTION 7

CONCLUSIONS AND RECOMMENDATIONS FOR IMPLEMENTATION

7.1 Proposed Project Implementation

Considering the project recommendations discussed in previous sections of this report, Table 7.1 provides a listing of recommended implementation steps along with an anticipated schedule for completion of the project.

Table 7.1
Project Implementation Steps and Schedule

Activity	Anticipated Completion Date
Meet with USDA RD to discuss project	September 2014
Review and approve Report by BBRSD	November 2014
Public Meeting on Report	November 2014
Preliminary engineering report submittal to USDA RD	November 2014
Secure Rate Consultant & Attorney	November 2014
Make Application to USDA RD	November 2014
Begin Design	November 2014
Complete Environmental Review	February 2015
Submit Proposal to OCRA for CFF Grant	March 2015
RD Letter of Conditions (Loan/Grant Approval)	April 2015
Easement Acquisition	April 2015
Submit Application to OCRA for CFF Grant	May 2015
Receive OCRA CFF Grant	August 2015
Design Plans, Project Manual & Permit Applications	September 2015
Secure Construction Permits	November 2015
Receive Construction Bids	January 2016
Construction Completion	January 2017
Project Close-out	February 2017

It is recommended that the Bill Monroe and Farabaugh facilities be required to install temporary storage tanks to equalize flows to the WWTP during their weekend events so the WWTP is not overloaded.