Town of Fortville
Executive Summary
Waterworks Master Plan 2017

I. PROJECT SUMMARY

A. General

This Waterworks Master Plan has been prepared for the Town of Fortville. It's purpose is to provide the Town Council and citizens in the community's planning area with a plan for the orderly expansion of the waterworks system over the next 20 years.

B. Purpose and Scope of Master Plan

Currently there are approximately 36 linear miles of water lines that serve the populated areas of Town. The water treatment plant is a water filtration facility with softening that was expanded in 1998 to a design rating of 1.44 MGD. However, it's been several years since the plant was upgraded. In addition, the service area has recently experienced a substantial increase in residential development. This caused the Town to re-evaluate the entire waterworks system in order to accommodate the current and future needs of the community.

Improvements presented in this report are planned to benefit the future 20 year growth of the Town and surrounding service area whose population is expected to increase. Recommendations for system expansion were targeted to provide centralized treatment capabilities to accommodate the high population growth presently being experienced in the area.

C. Financial Analysis

Financing the recommended improvements and extension of the system could be cost prohibitive without planned funding avenues. The cost for improvements can be divided into projects which can be implemented to coincide with development. Potential funding avenues are presented in Section IX.

II. EXISTING SERVICE AREA

A. Corporate Limits

The Town of Fortville is located approximately 12 miles northeast of Indianapolis in the northwest corner of Hancock County. The community was incorporated as the Town of Fortville in 1865 and sits between the Towns of Ingalls, Fishers, and McCordsville. After several annexations, the Town presently contains approximately 3 square miles.

B. Extended Service Area

The Town encompasses parts of Vernon Township in the northwest part of Hancock County, Indiana. The adjacent Towns are McCordsville to the west and Ingalls to the east along SR 67. The service area extends into Hamilton County on the north and at the present time is bounded by N 400 W on the west side, approximately W 650 N on the south side, and N 50 E on the east.

C. Population

1. Existing Population

The population based on the 2010 Census data is 3,929 which is an increase of 14% from the previous decade. According to the Census records there are 2.53 persons per household (pph) based on the population and an estimated 1,553 households. The current 2016 population is estimated at 3,998 persons.

2. Historical Population

A review of past, current and future population trends is necessary in order to determine and appropriately plan for future expansion of the system. **Table 1** provides a listing of past trends.

Vernon Township has a current population of 11,005 and contains 4,322 housing units. The 2010 census notes that the township has a total area of 31.33 square miles of which 31.26 square miles (99.78%) is land and 0.07 square miles (0.22%) is water. The two largest Towns in the Township are McCordsville and Fortville. Together they make up 80% of the population.

TABLE 1
HISTORICAL POPULATION

	Fortville		Hancock County	
Census	Pop.	%±		
1870	387		15,123	18.1%
1880	634	63.8%	17,123	13.2%
1890	685	8.0%	17,829	4.1%
1900	1,006	46.9%	19,189	7.6%
1910	1,174	16.7%	19,030	-0.8%
1920	1,213	3.3%	17,210	-9.6%
1930	1,289	6.3%	16,605	-3.5%
1940	1,463	13.5%	17,302	4.2%
1950	1,786	22.1%	20,332	17.5%
1960	2,209	23.7%	26,665	31.1%
1970	2,460	11.4%	35,096	31.6%
1980	2,787	13.3%	43,939	25.2%
1990	2,690	-3.5%	45,527	3.6%
2000	3,444	28.0%	55,391	21.7%
2010	3,929	14.1%	70,002	26.4%
Est. 2016	3,998	1.8%	73,717	5.3%

3. Future Population

It should be noted that, in the past 14 decades the Town only experienced a decline between 1980 and 1990. Based on this historical trend it is expected that the Town will experience continued increases in population over the planning period. Population projections are difficult to determine in some areas because the Town's service area limits do not coincide with a Township boundary. In order to derive the most likely projections the future population will be based on a combination of sources, factors and assumptions. *The Comprehensive Plan for the Town predicts that the population within the Town limits will be 4,720 by 2025 and 5,334 by 2035.*

Population projections in undeveloped areas were based on acreage and a conservative building density of 2.5 single family residences (sfr) per acre. (The allowable building density from the Town's Construction Standards is 2.8 households per acre.) Future growth predictions can be attributed to both the economic expansion of the Indianapolis metropolitan area as well as the expansion of the nearby Cities of Fishers and Noblesville over the recent past. Using the present growth pattern, it is estimated that 8,000 people could reside in the service area by the year 2030 and this could rise to over 13,000 by the year 2040.

TABLE 2
FUTURE POPULATION PROJECTIONS

Area	Acreage	Homes [1]	Population [2]
Northwest	635	1,330	3,340
Northeast	146	364	910
Southwest	759	1,898	4,745
Southeast	410	943	2,351
TOTAL	*1,950*	*4,535*	*11,346*

[1] Unplatted ground derived using 2.5 sfr per acre
[2] Derived from Census data indicating 2.5 person per household in area

D. Economic Projections

Economic growth is expected to parallel the population growth which will be centered around the areas currently served and the major roadway corridors. Commercial and industrial users in the planning area account for a moderately healthy 15% of the existing customer accounts. These are mostly located in the business park, downtown corridor, and adjacent to SR 67. Based on this background it is expected that unless a major industry or business is solicited commercial growth tendencies will continue to remain similar to the present.

Economic growth will occur by additional tax base resulting from increased development within the planning area. Based on the Comprehensive Plan and the proposed concepts for the TIF Districts, growth will be a mix of residential and commercial uses with a planned and measured ratio that includes green space and walking trails. It is the desire of the Town to limit commercial and industrial users to specific uses and targeted locations within the service area.

E. Customer Base

Most areas in Town are served by the waterworks system. Only a handful of properties are not served but these are primarily on large lots with wells and are not near an available water line. Water service has been extended beyond the Town limits in some areas. The present user base includes 1,838 residential, 269 commercial and multi-family, 12 industrial, and 30 government and institutional for a total of 2,149 customers. There are 1,957 customers within Town and 192 outside of Town. In 2017, the Town accepted 146 new users which is an increase of 7%.

F. Topography

The terrain within the service area is flat to gently rolling. Most areas in Town generally falls from southeast to northwest. Contour elevations range from a high of 880 feet above mean sea level (msl) in the south to a low of 840 feet in the north.

G. Land Use

Land use in the service area is predominantly agricultural outside of the Town limits, although this is quickly changing. Residential land use is more concentrated within and west of the Town due to growth in the Fishers area. The County's long range planning efforts incorporates the land use plan developed by the Town.

H. Transportation

A high quality transportation system is essential for future development. The Town is located between the Towns of McCordsville and Ingalls on a smaller scale and between the Cities of Indianapolis and Pendleton on a larger scale. SR 67 passes through the Town east to west and Southeastern Parkway/Merrill Street north to south. These two major transportation networks allows excellent access through Town and provides a cross-connection to several larger nearby municipalities. Interstates 69 and 70 are nearby which will also impact development patterns.

III. EXISTING WATERWORKS SYSTEM

The Fortville Municipal Water Utility was established in 1913. The overall system contains a treatment plant, three (3) sand and gravel groundwater wells, a distribution network with an estimated 36 miles of water mains, and 2 elevated water storage tanks. System components are listed on **Table 3**.

A. Waterworks Plant

The iron removal and softening plant was originally constructed in 1955 adjacent to the park at the confluence of Jackson Ditch and Stottlemeyer Ditch. Presently, treatment consists of iron and manganese removal, fluoridation, chlorination and softening. The average daily use is 0.377 MGD. In 1998, improvements were made to replace outdated equipment and increase plant

capacity from 500 to 1,000 gpm (1.4 MGD). Existing treatment components include four (4) iron removal filters (3 vertical and 1 three-cell horizontal), one (1) induced draft aerator, two (2) reaction basins, four (4) 500 gpm high service pumps and four (4) softeners. New electrical controls were installed in 1998.

Initially, water from the wells is pumped to the top of the aeration tower. The water then gravity flows to the reaction basins, after which the high service pumps transport it through the iron filters and zeolite softeners. Prior to distribution, the water receives chlorination and fluoridation. Due to plant limitations only one well is operated at a time.

B. Water Supply

Water is supplied by three sand and gravel groundwater wells ranging in depths from 72 to 104 feet. The largest well has a rated capacity of 1,000 gpm. The two remaining wells are rated at 950 gpm each for a total combined pumping capability of 2,900 gpm. Because the Town is located above a natural aquifer, it is less subject to potential shortages caused by droughts.

C. Distribution System

The distribution system extends beyond the corporate boundaries of the town. The system contains almost 37 miles of water lines, ranging in size from less than 2 inches to 12 inches in diameter. About 4 miles of the system contains lines that are 2" or less. Most of the older lines are cast iron. Fire protection is provided via 352 hydrants located throughout the system, 69 of which are outside of the Town limits. In 2017 the distribution system expanded by over 3 miles, mostly out of the County. This was a 9% increase in one year.

D. Storage

Water storage consists of two (2) elevated storage tanks. The older unit is 300,000 gallons and was constructed in 1965. In 2009, the tank was rehabbed which included painting the interior and exterior, sealing the seams, foundation repair, relocating the power lines, correcting the overflow pipe, making repairs and modifications to improve safety related concerns, and eliminate operational and OSHA deficiencies. It is located in the center of Town between the Conrail Railroad tracks at Mill Street and the intersection of Noel and Walnut Streets.

The second tank was constructed in 2009 and has a 500,000 gallon capacity. It is located in the southernmost part of their current service area on the grounds of the Vernon Township School. The school is situated at the intersection of State Road 234 and County Road 200 West.

TABLE 3
EXISTING SYSTEM COMPONENTS

Component	
Design Average Flow of WTP	1.440 MGD
Groundwater Wells	1 @ 1,000 gpm (12" dia.)
	2 @ 950 gpm (10" dia.)
Elevated Storage Tanks	1 @ 300,000 gals; 1 @ 500,000 gals
High Water Elevation	130 feet to overflow; 986' Elevation
Available Pressure	56 psi
Iron Removal Filters	3 Vertical, 1 three cell horizontal
Disinfection	Chlorine gas
Softening	Zeolite; Ion Exchange
Other Treatment (Taste, Odor)	Flouridation; Cascade Aeration
High Service Pumps	4 @ 500 gpm

IV. EXISTING AND FUTURE WATER DEMAND

A. Existing Demand

Existing demand averages 0.377 MGD which is 26% of the plant design capacity of 1.4 MGD. This equates to approximately 66 gpd per capita after deducting 20% for non-residential usage. Monthly average demand and high daily demand for the past year are tabulated on **Table 4**. As shown, the difference between the average demand and maximum daily demand is 0.128 MGD. In the past year the highest flow recorded was 0.655 MGD which occurred in September 2017. The lowest flow was 0.306 MGD which occurred in both March and November of 2017.

Based on the existing plant capacity and the recorded average usage approximately 1.063 MGD is available for future developements under the current conditions. *This would allow for an additional 3,270 single family residents (sfr) to be accommodated until an increase would be required.* (1,063,000 gpd / 325 gpd per household = 3,270 sfr)

B. Water Loss

Water loss is the difference between the water treated at the plant and the water billed or consumed by users. At the present time, the loss is approximately 20%. Water loss is commonly attributed to water main leaks, breaks, maintenance, aged meters, fire fighting and other similar type activities. Ideally, losses should not exceed 15% of the total water withdrawn. Water consumption as a comparison of water treated is shown on **Table 4.**

TABLE 4
HISTORICAL TREATMENT PLANT VOLUME

Year 2016	**Avg Daily Treated Vol (MGD)**	**Max Daily Treated Vol (MGD)**	**Avg Consumed (Sold) (MGD)**
January 2017	0.326	0.422	0.271
February 2017	0.317	0.409	0.276
March 2017	0.306	0.421	0.220
April 2017	0.348	0.435	0.214
May 2017	0.363	0.459	0.255
June 2017	0.460	0.658	0.233
July 2017	0. 410	0.613	0.367
August 2017	0.506	0.640	0.361
September 2017	0.485	0.655	0.368
October 2017	0.361	0.585	0.416
November 2017	0.306	0.417	0.361
December 2017	0.334	0.532	0.257
Average	***0.377***	***0.505***	0.300

C. Future Demand

In accordance with Ten State Standards, peak hourly flows are calculated to be 2.5 times the average, or approximately 655 gpm. The maximum capacity of the treatment plant is 1.44 MGD which is satisfactory for the present demand and a substantial amount of growth.

There are several land parcels that are likely to be developed within the planning period. Many of these are on the market for sale while others have preliminary plans for development. Initial calculations for developing these parcels were based on an assumed density using a rate of 2.5 single family residences (sfr) per acre, 2.5 persons per household (pph) rate (from census records), and an industry standard of 325 gpd per sfr (10 State Standards).

As estimated the population in the service area could increase by over 7,000 in the next 20 to 40 years. Of course this would depend on the economic and political climate which could impact conditions with little or no warning. Regardless, having a plan in place is a good first step to being able to react quickly and provide services when needed. *Approximately 1,300 acres could be developed without any expansion of the treatment plant. However, the plant is aged and many components may need to be replaced or updated. In addition, in order to provide adequate pressure and fire flows, changes may be needed in the distribution system in order to provide looping and eliminate dead ends.*

D. Existing Water Characteristics

Raw water characteristics are as shown on Table 5 below:

TABLE 5
RAW WATER CHARACTERISTICS

PH		7.6
Hardness	CaCO3	314 mg/l
Calcium	Ca	80 mg/l
Magnesium	Mg	26 mg/l
Sodium	Na	8.5 mg/l
Potassium	K	1.2 mg/l
Iron	Fe	2.4 mg/l
Manganese	Mn	0.02 mg/l
Alkalinity	CaCo3	326 mg/l
Chlorides	Cl	5 mg/l
Sulfates	SO4	9 mg/l
Phosphates	PO4	0.12 mg/l
Nitrates	N	0.1 mg/l
Fluorides	F	0.4 mg/l

V. WATERWORKS SYSTEM CONDITION, PROBLEMS, NEEDS

A. Water Treatment Issues

- While the plant has adequate available volume for growth, the facility is aged and many of the components are deteriorated. The last update was nearly 20 years ago. Most of the components need to be replaced and/or upgraded. A new plant may be less costly than replacing the aged and deteriorated components. The new facility should use a treatment process that would reduce or eliminate chlorides in the system.
- Due to limitations of the high service pumps only one well is operated at a time. The plant capacity is presently capped at 1,000 gpm.
- The aerator does not operate at optimal efficiency which affects the volume of water that can be effectively treated. The aerator needs to be replaced in the near future, especially if a new plant is not constructed.
- The wastewater treatment plant has difficulty meeting its NPDES permit limits for chlorides. This is partly due to the softening that is conducted at the plant. In addition, it is likely that many residences have water softening devices installed in their homes which increases the amount of chlorides being discharged to the wastewater system.
- The plant is located in the northwest part of the service area. The north tower is located in the north central part of Town and the south tower is located in the southern part of the service area at approximately 850N and W 200 N. This results in transporting water a couple of miles from the plant in order to serve the southern most part of the current service area. Installing another regional plant to provide treatment service to developments in the southern half of the territory may be practical at some point in the future.

B. Water Storage Issues

- Generally, water storage facilities are considered adequate if there is capacity to satisfy one days average demand. The average daily water consumption is around 377,000 gallons. Future water demands will depend upon the rate of development. The storage tanks have a

combined capacity of 800,000 gallons. Deducting the existing average consumption leaves 423,000 gallons of storage that is available for future development. This is adequate for an additional 4,230 persons or 1,692 households based on 100 gallons per day per capita and 2.5 persons per household.

- One of the storage tanks is located near the center of Town. The other one is located in the far southern part of Town. As areas develop in between it may be beneficial to construct another water tower that is more centrally located to serve the newly developed areas.

C. Water Supply Issues

- The Town's wells all access the same aquifer. This could be an issue if the aquifer becomes contaminated in the future. Preliminary investigation of an additional wellfield should begin.

D. Distribution System Issues

- Hydrant flow tests are conducted annually. In the outlying areas there are several dead-ends which may affect system pressures and volume. This could be an issue as areas are developed and the system is extended. Larger lines and looping would improve this situation. Additional testing may be needed.

- Water loss is the difference between the water treated at the plant and the water billed. At the present time, the loss is approximately 20%. This is a decrease from 36% which was the loss before many of the meters were replaced. Ideal water loss is 15%. The meter replacement program needs to continue for the remaining meters in order to further reduce the water loss. The system should also be evaluated to identify other areas that could be contributing to unnecessary water waste.

E. General Issues

- Water for a small number of residences and businesses are sourced from private on-site wells. Most of these are in outlying areas that cannot be easily and cost effectively served by the present system. Increased development in the service area will provide the opportunity to better serve these properties.

- Water service extends beyond the Town and County limits. Future plans should consider areas that could potentially be served to assure adequate resources can be put in place when needed.

- TIF Districts have been established in 3 parts of Town. The three TIFs are the Broadway Avenue, South Madison, and the Industrial Business Park TIFs. These areas should be evaluated to assure that service could be extended where needed as development occurs while preventing a loss of pressure and flows in other areas of Town.

- The plant, storage tower, and wells have adequate capacity for significant growth in the service area. **Table 6** shows the available capacity of each based on existing demand.

TABLE 6
AVAILABLE CAPACITY

Component	Capacity	Current Usage	Available Capacity	Equivalent Growth [1]
Treatment Plant	1.440 MGD	*0.377 avg.*	*1.063 MGD*	*3,270 res*
		0.521 max.		
Groundwater Wells	2.736 MGD[2]	*0.377 avg.*	*2.359 MGD*	*7,258 res*
		0.521 max.		
Storage Tanks	800,000 gals	*377,000 avg.*	*423,000 gals*	*1,302 res*
		0.521 max.		

[1] Derived from the available capacity divided by 325 gpd per residence

[2] Derived from 2 wells running with largest out of service (2 @ 950 gpm = 1900 gpm; 1900 gal/min x 24 hours/day x 60 min/hr = 2,736,000 million gallons)

VI. PROPOSED WATERWORKS SYSTEM IMPROVEMENTS

A. Treatment Plant Improvements

1. Existing Plant

The present treatment process consists of iron and manganese removal, fluoridation, chlorination and softening. In 1998, improvements were made to replace outdated equipment and electrical controls. The plant capacity was also increased to 1,000 gpm (1.4 MGD). Existing components include four (4) iron removal filters, one (1) induced draft aerator, two (2) reaction basins, four (4) 500 gpm high service pumps and four (4) softeners.

The plant is well operated and well maintained. However the major components are nearing 20 years old and are showing their age. Based on the existing plant capacity and the recorded average flows approximately 1.063 MGD is available for future developements under the current conditions. *This would allow an additional 3,270 single family residents to be accommodated until an increase in plant capacity would be required. (1,063,000 gpd/325 gpd per household = 3,270 sfr)*

Due to the age of the components, it is recommended that the plant be replaced. Installing a new plant may be less costly than replacing the aged and deteriorated components. In addition a new facility would provide the opportunity to change the treatment process to a type that would reduce or eliminate chlorides in the system. The wastewater treatment plant has difficulty meeting its permit limits for chlorides, and it is likely that it is partly due to the softening that is conducted at the water plant.

2. Proposed Plant Replacement

The plant is currently housed in a building on park grounds. The building is old and in need of repairs and updates. A change in treatment process would require the removal of all existing components and re-working the layout to accommodate the replacement units. The plant would need to remain on-line during construction which could prove difficult if not impossible. A better option may be to relocate the facility to allow the new components to be installed without disrupting service. After construction is complete, a transfer could be made to the new plant.

In order to eliminate chlorides as an issue, it is recommended that the plant process include zeolite softening with a spiralater. **Table 7** lists the proposed unit operations.

TABLE 7
PROPOSED WATER TREATMENT PLANT COMPONENTS

Design Average Flow	1,800 gpm; 2.592 MGD
Type of System	Spiralater (Reactor)
Number of Units (Reactor)	3 each @ 9' dia. x 23' tall
Filters with Air Wash	2 @ 2 cell (4 total); 10' dia x 40' long
Type of Catalyst	White silica sand
Footprint per Unit	81 sq. ft. each
Disinfection	Chlorine (Sodium Hypochlorite)
High Service Pumps	Vertical Turbine; 3 @ 600 gpm each
Chemical Feed	Sodium Hydroxide @ Reactor
	Sulfuric Acid prior to Filters
Backwash Holding Tank	200,000 gals (37.5' x 75' x 10' deep)
Backwash Pumps	2 @ 200 gpm
Clearwell	200,000 gals (37.5' x 75' x 10' deep)

The Spiralater system is referred to as a solids contact reactor for the precipitation of calcium in the form of calcium carbonate. Raw water enters the bottom of the reactor and is thrust upward through a bed of fine sand which serves as the catalyst. Sodium hydroxide is added at the lower level near the entryway for the raw water. The raw water hardness causes a chemical reaction for precipitate to deposit and grow on the catalyst particles. Treated water then flows from the top of the reactor to the filters so any floc carryover can be removed.

The benefits include a high loading rate which allows for a smaller footprint. In addition the process produces a solid pellet as a byproduct, which has the potential for beneficial use as fertilizer.

B. Distribution System Future Improvements and Expansion Areas

Recommended distribution system improvements to provide service to likely development areas and TIF Districts have been proposed as a means to loop and extend lines where they are most practical. The following narrative generally describes the proposed plan to provide service.

- **Northwest corner of Town**

  There is an existing 12" water line along Southeastern Parkway/Merrill Street. Ohio Street (101st Street) contains an 8" line. Plans are underway to extend this line with a 12" to the west which will close this loop.

- **Southwest of Town**

  There are 12" lines along N 200 W and Broadway. Extending a main transmission line along W 900 N and N 300 W would extend service to this area.

- **East of Town**

  There is a 12" main in W1050 N which could be extended. In order to assure adequate pressure and flows, the system should be looped by installing a main north along N 50 W and over to Broadway. This would also provide a main to connect other areas in the east that could be served in the future. A minimum sized line of 12 inches is recommended.

- **South of Town**

  There is a 12" water line in N 200 W which was installed to serve the Mt. Vernon School. Water service could be extended west along W 900 N from N 200 W or south along Fortville Pike from the point where it intersects with N 200 W. In order to assure adequate pressure and flows, the system should be looped by extending a line along Fortville Pike and then west along SR 234 to the existing line in N 200 W. This would also provide a future main to connect presently unserved areas along the route. At the present time, Fortville has not extended water service beyond the southern boundary of the Town. A water main would need to be extended south from the existing line that serves the school. A 12 inch line is recommended for the main transmission lines. The Town's second water tower is also installed at the school.

Due to the distance and terrain, it may be more practical to construct a second plant to serve the area in the southern part of the service area. This would depend upon the timing and level of development in the vicinity.

- **Northwest service area - Hamilton County**

  This area contains a platted development called Vermillion. The development is partially built out and water service has been extended where needed. The existing 12" water line along Southeastern Avenue provides service to this area. Ohio Street (101st Street) contains an 8" line which will be extended west with a 12" line which will improve looping. Easements may be necessary. Extension of the 12" line in Connecticut Avenue would close this loop.

- **West service area - Hamilton County**

  This area consists of approximately 120 acres of platted development west of Fortville. The development is located along 96th Street in Fishers and is partially built out. Water service has been extended where needed to accommodate the build-out as it occurs. An existing 12" water line in 96th Street provides service to this area. The proposed plan to extend a 12" line west along Ohio Street will provide looping on the north.

C. TIF District Development

One of the goals identified in the Town's Comprehensive Plan is to establish additional TIF or Economic Improvement (EIDs) Districts in selected areas of Town. Each District has a potential plan for development. Growth or change in land use in these areas may require improvements and changes in the distribution system in order to increase, loop, or extend lines where they are most practical. The following describes the areas and proposed plans to optimize service.

1. South Madison TIF District

This area consists of 186 acres of land that extends southeast to SR 234 from the southern borders of the Business District and the Broadway Consolidated TIFs. At the present time the area is primarily agricultural with a few rural homes. The TIF District is "envisioned to accommodate the industrial and commercial growth to the south and will form a new door to

the community". A Master Plan has been developed for the area which includes extending Madison Avenue to Fortville Pike. The density for residential users will range from 2 to 10 units per acre. The Master Plan included the following land uses and areas:

Residential	41.4 acres
Mixed Use	35.9 acres
Commercial/Retail	12.5 acres
Flex Office/Warehouse	20.4 acres
Manufacturing/Light Industrial	53.0 acres
Parks/Open Space	12.9 acres

According to the South Madison Study, the Town's Utility Department "has reported that there are no areas with water pressure concerns. In addition the existing 12-inch water main running along North Fortville Pike will have ample capacity to serve the South Madison study area." The projected water demand for the study area is 251,000 gpd.

In order to provide service to this area the water main will need to be extended. At the present time there are no water mains within the area other than the 8" water line which will be extended with 12" line in N 1000 W (north boundary) and a 12" line along Fortville Pike (western boundary). The preliminary Master Plan for the TIF area proposed extending the existing line east along W1000 N and then south along the proposed South Madison Boulevard. This will be a new roadway that will join Broadway to Fortville Pike. The water line must be sized to fully satisfy the water demand from the South Madison TIF study area. A 12-inch was recommended to match the existing main in Fortville Pike.

2. Fortville Business District TIF

This district was established in 2003 and is the oldest of the TIF Districts. The area consists of 45 acres located at the east end of the Town south of SR 67. The tenants in the business park are primarily light industrial. Water lines have been extended along the main streets and occupied lots in the district. *At this time, no improvements are recommended for this area.* While the area is not fully built out, looping will be needed when the ground to the east develops.

3. Broadway Consolidated District

This district was established in 2016 and was formed to encourage reinvestment and development within the older parts of Town. The area contains approximately 250 acres which encompass historic Main Street and the area adjacent to SR 67 from the east to the west outskirts of the corporate limits. Design standards have been established for new non-residential and multi-family proposals in this area. The Town Council and Fortville Plan Commission are in the process of adopting zoning ordinances and standards to guide the future growth and development for the Broadway corridor. Included will be an evaluation of the current water system and other infrastructure to ensure they are adequate for the projected growth. At this time, all developed areas have water service.

D. Proposed Satellite Treatment Plant (WTP No. 2)

If development warrants in the future, the Town may want to evaluate the benefit of installing another plant and a new wellfield to serve the southern part of the service area. Ideally the plant would be centrally located to allow easy access from developments. Installing a new treatment plant requires evaluation of potential sites for the facility. Approximately 2 acres would be needed. Site evaluation is typically based on the following criteria:

- Proximity to the existing service area, populated areas and future developments
- Availability of land sized for the proposed plant and future expansion
- Proximity to the wastewater system
- Willingness of owner to sell or lease the property
- Location of a reliable aquifer

Initially, the plant should be designed to accommodate the flows from a new development with the ability to expand on-site. The project can be funded by pre-paid capacity fees that are charged to the developer. A potential site for a satellite plant should be located in the southeast part of the service area which could allow residents to abandon their on-site wells and be served by a municipal system. Additional evaluation would be needed to fully determine a site's suitability.

VIII. PHASED IMPROVEMENTS PLAN

Implementing an overall waterworks system throughout the service area would require a significant capital outlay. Extension of main transmission lines that are appropriately sized for the area would be cost prohibitive if all work were to be done at one time. A more feasible approach is to establish preliminary phases for extensions that would reflect planned or likely development. Phased improvements can ease funding issues while providing for the orderly expansion of service over time as the need arises.

The typical time horizon for a preliminary plan is twenty years with reviews and updates made every two (2) years at a minimum. Potential funding mechanisms to support desired improvements are generally discussed in Section IX. A more detailed study is needed in order to identify and evaluate the full range of available funding avenues once a project is planned and the scope has been narrowed.

A. Existing Budget

The Town has an annual budget of approximately $8.2 million dollars. The annual operating expense for the Waterworks Department is $1.4 million dollars. A capital improvements fund has been established using capacity fees which could be used to finance large scale projects. At this time there is one outstanding loan that is funded through revenue receipts from raised user rates. It is scheduled to be paid off in 2030. The waterworks budget requirements area as follows:

Operations and Maintenance	$1,204,000	86%
Debt Service	$ 158,000	11.5%
Capacity Reserve	$ 35,000	2.5%

B. Existing Rate Structure

The same rate is applied for water usage within and outside of Town. However, a hydrant charge is added to users located outside of the Town limits. The structure includes a base rate plus a volume charge per thousand gallons. New customers are assessed a System Development Charge that is based on an Equivalent Dwelling Unit (EDU). The Rates and Charges Ordinance for the Waterworks is provided in **Appendix B**.

C. Project Priorities

For planning purposes, capital improvements can be separated into those that are needed immediately, those that are needed within 1 to 5 years, 5-10 years, 10-15 years and 15 to 20 years. Immediate and short term needs are usually apparent, while needs over 5 years are more dynamic and unpredictable. Priorities are typically established based on need, existing problems, current and planned developments, population, and overall impact and benefit of the improvements. Areas with historical problems, high development potential and those that would derive the greatest benefit should be classified as higher priorities.

D. Personnel

As the service area expands and the system is extended personnel will need to be added. It is recommended that another operator be added when the need arises to expand the plant. A laborer will be needed within completion of the next few developments. Budget planning should include provisions for additional staff.

E. Potential Future Needs

1. Establish Phased Expansion and Looping of Major Transmission Lines

There are several large parcels that are currently being developed or are ripe for development. Many of these are in outlying areas that cannot be easily and cost effectively served by the present system. In order to provide adequate volume to newly developed and outlying areas, transmission lines need to be extended and looped. Extension of main lines that are appropriately sized for the area could be cost prohibitive if all work were to be done at one time. A more feasible approach is to establish preliminary phases for extensions that would reflect planned or likely development. Phased improvements can ease funding concerns while providing for the orderly expansion of service as needed.

Phase I Extend, loop, and replace mains in select areas of Town to better serve currently proposed development. Specific areas include Ohio Street, Connecticut Avenue, and Broadway Street. **Phase IA** would extend a 12" line along the west end of Ohio to serve development that is presently underway northwest of the Town. **Phase 1B** would replace undersized lines and loop and reroute lines along the Broadway Street corridor.

Phase 1C would complete the loop along Connecticut Avenue on the northwest and along the east end of Ohio. These projects should be done within the next 1 to 5 years.

Phase II Extend and loop a main transmission line along the proposed Madison Avenue corridor and Fortville Pike. The new line would extend to SR 234 (CR 800 N) and then west to CR 200 W where it can connect to the 12 inch line that serves the Mt. Vernon Schools. This would improve flows and provide a major incentive to encourage development in the south. This should be planned for implementation within the next 5 to 10 years but the schedule will be driven by development.

Phase III Extend and loop a main transmission line along SR 234 and CR 300 W to the existing 12 inch main in Broadway. There are several large parcels that have the potential to be developed in the west. Extending a main along this route would be a major incentive to encourage development. It is projected that this will not be needed for another 10 to 15 years as this area has been slower to develop.

2. Replace the Existing Water Treatment Plant

While the plant is well maintained and has adequate volume for growth, the facility is aged and many of the components are deteriorated. *The current facility has exceeded the typical 20 year life expectancy of a plant.* In addition, the aerator needs to be replaced and, due to plant capacity limitations, only one well is operated at a time. As such, it is recommended that a new plant be constructed which may be less costly than replacing the aged components. A new plant would also provide the opportunity to change the treatment process to a type that would reduce or eliminate chlorides in the wastewater system.

Planning for a new plant should begin soon. Typical time frames for project planning, determining and fulfilling financing requirements, and designing and bidding the work range from 1 to 3 years. Since the plant has already exceeded its useful life, it is critical that steps be taken soon to replace or upgrade the facility since this is a priority.

The plant is currently housed in a building on park grounds. Changing the treatment process within the existing building would require removing all of the components and re-working the layout. This is not possible since the plant would need to remain on-line. The facility would therefore need to be relocated to property currently owned by the Town or ground that is purchased by the Town. This would allow the new plant to be constructed with minimal disruption to the existing process. It is recommended that the plant process include zeolite softening with a spiralater. **Table 7** lists the proposed unit operations.

3. Install a Fixed Based Meter Reading System

Automatic meter reading allows consumption, diagnostic, and data to be easily collected and transferred to a central database for billing and analysis. The system would be an add-on to the existing meters, most of which have been replaced, to enable real time data from individual customer meters to be transmitted to a central hub. This should be installed within the next 5 years. The benefits include the following:

a. Lower costs by eliminating expensive and labor intensive manual meter reading.
b. Improve employee safety. Meters can be centrally read and service can be connected or disconnected by office staff.
c. Reduce billing errors through use of reliable and dedicated long range radio network.
d. Conserve energy, reduce water loss, and improve operational efficiencies by quickly identifying leaks, tampering, outages, or other abnormalities.
e. Increase accuracy; Primary use radio spectrum is protected by law from interference.
f. Information is transmitted electronically which increases the amount of data that can be collected and stored.
g. Timely identification of system problems such as main leaks or breaks.
h. Improve customer relations due to timely identification of problems caused by leaks and breaks in customer lines. Individual usage trends can be reported.
i. System can be integrated with other operations in order to create a multi-use system.

4. Install Another Tower

One of the storage tanks is located in the center of Town. The other tank is located in the far southern part of the Town limits. As areas develop in between the two, it may be beneficial to construct another water tower that is more centrally located to serve the newly developed areas and areas that have the potential for development. The tower should be constructed at a height that would keep the pressure zones the same as the existing.

5. Install A Satellite Treatment Plant

The existing plant is located in the northwest part of the service area which results in transporting water many miles from the plant in order to serve the southern most part of the service area. As development warrants in the future, installing another regional plant in the south may be practical at some point. Initially the plant should be designed to accommodate the flows from a new development with the ability to expand on-site. The project can be funded by pre-paid capacity fees that are charged to the developer. Evaluation of a new plant should begin when the current facility is close to reaching capacity.

6. Evaluate Another Wellfield

The existing wells all access the same aquifer which could be an issue if the aquifer becomes contaminated in the future. Preliminary investigation of an additional wellfield should begin. This is especially important is a regional plant is constructed in the south to avoid the need to install lengthy raw water lines. It is suggested that areas to the east near Sugar Creek be investigated as a future water source. Records of existing wells indicate positive and high volume yields.

7. Provide Developer Assistance to Expand the System

The Town could negotiate with developers to install oversized water mains. This would assure that future systems are installed at capacities appropriate for the area that could be served. For example, the Town could waive/credit fees or provide financial assistance to fund the initial cost and then be reimbursed through future capacity and connection fees.

8. Increase the Development Charges

The System Development Charge in the current rate structure is $1,200 per EDU. This charge does not distinguish between connections made within the Town limits and those located outside of the corporate limits. Since this rate has been in effect since 2011, the Town may want to evaluate the need for an increase. This would require a modification of the existing ordinance, a study to justify the increase, and approval by the IURC.

9. IURC

The Town is currently in the Indiana Utility Regulatory Commission (IURC). As such any proposed rate increases are subject to their approval. Municipal water utilities may withdraw from the IURC. In that case, rate regulation would occur at the local level which is the Town Council. Specific guidelines as contained in the Indiana Code must be followed and these vary by type of utility. Disadvantages include loss of experience and oversight benefits provided by IURC membership. Advantages include the ability to quickly change rates, issue debt, and begin construction and capital improvements projects because they are approved at the local level.

F. Cost Estimates

Future improvements include extending the Town's waterworks system and expanding the treatment capabilities. Estimates were prepared for each project and are itemized on **Table 9.** Priority projects and phasing are listed on **Table 10.**

TABLE 9
Cost Estimate for Future Waterworks Improvements

	Exhibit	Quantity	Unit	Unit Cost		Ext. Cost
Relocate and Install New Plant (1.2 MGD)						
New RO Water Treatment Plant	7	1	ea	$3,000,000		$3,000,000
Land (3 acres)		3	acres	$10,000		$30,000
					Subtotal	$3,030,000
Northwest Loop along Ohio St & Connecticut (PHASE I)						
12" Water Line Along Ohio	8, 8A	4775	lf	$85		$405,875
Valves		4	ea	$4,000		$16,000
Bore across Creek		1	ls	$225,000		$225,000
12" Water Line along Connecticut		2000	lf	$85		$170,000
Valves		2	ea	$4,000		$8,000
Connect to Existing		4	ea	$2,000		$6,000
					Subtotal	$832,875
South Madison Extension (PHASE II)	8, 8C					
12" Water Line along Proposed Madison Ext		4000	lf	$85		$340,000
Valves		4	ea	$4,000		$16,000
Connect to Existing		2	ea	$2,000		$4,000
					Subtotal	$360,000
Loop along Fortville Pike & SR 234 (PHASE II)	8, 8D, 10					
12" Water Line along Fortville Pike		8700	lf	$85		$739,500
12" Water Line along SR 234		4000	lf	$85		$340,000
Valves		12	ea	$4,000		$48,000
Connect to Existing		2	ea	$2,000		$4,000
					Subtotal	$1,131,500
Loop along SR 234 & CR 300 W (PHASE III)	8, 8B, 10					
12" Water Line along SR 234		5280	lf	$85		$448,800
12" Water Line along CR 300 W		9400	lf	$85		$799,000
Valves		14	ea	$4,000		$56,000
Connect to Existing		2	ea	$2,000		$4,000
					Subtotal	$1,307,800
Northeast Loop along CR 1100 N & N 50 W	8, 8C					
12" Water Line along SR 67 & County Line N		4700	lf	$85		$399,500
12" Water Line along N 50 W and CR 1050 N		6500	lf	$85		$552,500
Valves		10	ea	$4,000		$40,000
Connect to Existing		2	ea	$2,000		$4,000
					Subtotal	$996,000
Southeast Loop; N 50 W, CR 900 N, & CR 800 N	8, 8D					
12" Water Line along CR 900 N to Fortville Pike		7800	lf	$85		$663,000
12" Water Line along N 50 W & SR 234 to FP		8980	lf	$85		$763,300
Valves		15	ea	$4,000		$60,000
Connect to Existing		2	ea	$2,000		$4,000
Highway Bore		100	lf	$250		$25,000
					Subtotal	$1,515,300
East Loop along N 50 W & CR 1000 N	8, 8C					
12" Water Line; N50W betwn CR 1000N &900N		7780	lf	$85		$661,300
12" Water Line; CR 1000 N to New Madison St		4000	lf	$85		$340,000
Valves		11	ea	$4,000		$44,000
Connect to Existing		3	ea	$2,000		$6,000
					Subtotal	$1,051,300
Establish New Wellfield Near Sugar Creek(East						
Research & Develop		1	ls	$30,000		$30,000
Test Wells		3	ea	$10,000		$30,000
					Subtotal	$60,000
Elevated Storage Tower (400,000 gal; East)						
Storage Tank (400,000 gal)		1	ea	$650,000		$650,000
Land		1	ac	$10,000		$10,000
					Subtotal	$660,000
Regional WTP South						
WTP (0.500 MGD)		1	ea	$2,000,000		$2,000,000
Land		3	ac	$10,000		$30,000
Wells		2	ea	$85,000		$170,000
Raw Water Line		1111	lf	$85		$94,435
					Subtotal	$2,294,435

Note: Hydrants, Easements, and Soft Costs are not included in above cost estimates.

TABLE 10
COST ESTIMATES FOR PHASED IMPROVEMENTS
Town of Fortville, Indiana

Item	Unit	Quantity	Unit Cost	Extended
PHASE I - 1 to 5 Years				
1A - Extension Along West Ohio Street				
12" Water Line	lf	1,475	$65	$95,875
12" Valves	ea	2	$4,000	$8,000
Connect to Existing	ea	1	$1,500	$1,500
Creek Bore (475')	ls	1	$225,000	$225,000
		Total Phase I		**$330,375**
1B - Reinforce & Loop Broadway Corridor				
12" Water Line	lf	4,300	$65	$279,500
Valves	ea	10	$4,000	$40,000
Connect to Existing	ea	22	$1,500	$33,000
Highway Bore (2)	lf	200	$250	$50,000
				$402,500
1C - Connecticut Loop; Extension Along East Ohio St				
12" Water Line Ohio St	lf	3,300	$65	$214,500
12" Water Line Connecticut	lf	2,000	$65	$130,000
Valves	ea	5	$4,000	$20,000
Connect to Existing	ea	4	$1,500	$6,000
				$370,500
1D - Fixed Base Meter System				
Add Additional Meter Systems	ea	1,000	$288	$288,000
Base Station & Antenna	ea	2	$30,000	$60,000
Interface, Training, Software	ea	1	$43,600	$43,600
Installation	ls	2	$20,000	$40,000
				$431,600
1E - Replace Aerator (IF PLANT IS NOT REPLACED)				
Draft Aerator (2100 gpm)	ea	1	$65,000	$65,000
Misc Accessories	ls	1	$15,000	$15,000
Installation & Piping Modifications	ls	1	$60,000	$60,000
				$140,000
1F - Relocate and Replace Water Treatment Plant				
New R/O Water Treat Plant	ls	1	$3,000,000	$3,000,000
Land (3 Acres)	ea	3	$10,000	$30,000
				$3,030,000
PHASE II - SOUTH MADISON EXTENSION - 5 to 10 Years				
12" Water Line Prop Madison Ext	lf	4,000	$65	$260,000
12" Line Fortville Pike & SR234	lf	12,700	$65	$825,500
Valves	ea	16	$4,000	$64,000
Connect to Existing	ea	4	$1,500	$6,000
Creek/Highway Bore	lf	200	$250	$50,000
				$1,205,500
PHASE III - Looping @ CR 300 W & SR234 - 10 to 15 years				
12" Water Line	lf	14,680	$65	$954,200
Valves	ea	14	$4,000	$56,000
Connect to Existing	ea	2	$1,500	$3,000
Creek/Highway Bore	lf	200	$250	$50,000
		Total Phase II		**$1,063,200**

VIII. FUNDING OPTIONS

One of the primary obstacles to an effective utility management plan is instability of funding. A properly organized capital financing program provides for an orderly and long term implementation of proposed projects. Financing must consider both the capital improvements and annual operating costs to maintain the system in order to assure that it continually functions as intended. Ideally, funding sources should be consistent, stable and publicly acceptable. This allows long range activities and projects to be properly planned and assures that installed systems are continually maintained. Funding for the Town's waterworks activities are currently built into the existing rates and budgets. There is no funding mechanism in place that is directly dedicated to system expansion and improvement.

There are a number of funding avenues available to finance desired projects. Primary funding sources typically take the form of a user fee or assessment against those that directly benefit from the service. Other sources include developer funding with possible contribution from the Town. Potential funding sources include the State Revolving Fund (SRF) loan program, the Rural Development (RD) grant/loan program, Developer Assistance, or the Indiana Bond Bank. The debt service is then repaid from service fees from the users who benefit from the improvements.

A. State Revolving Fund

The State Revolving Fund (SRF) is a below market rate loan program administered by the Indiana Department of Environmental Management (IDEM) to fund public wastewater and waterworks projects. A combination of State and Federal funds (20/80) leverages the issuance of bonds by the State which in turn are loaned to eligible communities with terms extending up to 20 years. Interest rates are tiered with rates ranging from 2.0% to 3.1% depending on the median household income and existing utility rates. Requirements include an approved loan application, Preliminary Engineering Report, construction plans and specifications, an Environmental Assessment, and Finding of No Significant Impact. SRF funds can be used as a supplement or to finance the entire project.

B. Rural Development Loan/Grant Program

Rural Development administers a water, waste disposal, and community facility grant/loan program to construct, enlarge, extend or otherwise improve community facilities providing essential services to financially needy rural areas and towns with a population of 10,000 or less. The funds are available to public entities, such as municipalities, counties, special-purpose districts, Indiana tribes, and certain locally affiliated not for profit corporations.

Grants are also available to reduce water and waste disposal costs to a reasonable level for rural users. Applicants must be unable to finance the proposed project from their own resources or through commercial credit at reasonable rates and terms. Grants are used to reduce water and waste disposal costs to a reasonable level and may not exceed 75% of eligible project costs. Grants are usually made in conjunction with a loan. Interest rates for loans are based on the mean household income and range from 3.15% to 5.5%. Partnering of other loan and grant programs is encouraged. Projects must be designed to assure adequate capacity to serve the present population to the extent feasible and reasonable foreseeable growth needs of the area. All facilities financed must be for public use and must be modest in size, design, and cost. Loan repayment can be up 40 years but not beyond the useful life of a facility. Due to limited funds and a more stringent application process, approval under this program is typically lengthy and can take years.

C. Indiana Bond Bank

The Indiana Bond Bank is an alternative funding source for infrastructure development. Their major function is to issue tax-exempt revenue bonds in its own name and use the proceeds from the bond sales to purchase pools of local government bond issues. This gives local governments an opportunity to realize substantial savings on fees associated with bond issues, such as marketing, insurance, and interest costs. Requirements for participation include a detailed application to the review board, which includes a completed rate study with rates sufficient to satisfy all associated costs. Bonds are sold at a rate slightly higher than face value. The Bond Bank requires assurance that adequate coverage is in place to meet annual debt service (approximately 125% of the annual payment). Typical terms are less than 20 years and the loan amount is capped at $2 million dollars. The current interest rate estimated at 3.0%.

D. Developer Assistance

Developers usually pay for internal water systems and main extensions to proposed developments. Developers could also be required to fund or share in the cost to avoid or correct adverse impacts caused by the new development. This could include increasing line sizes to accommodate future development or eliminating downstream impacts. The Town could also contribute to developer costs to install oversized systems built in anticipation of future growth. While this does not reflect a direct funding source for the Town, it does provide a means to install water main extensions that are sized appropriately for the area.

E. TIF

Tax increment financing (TIF) is a public financing method that is used to subsidize redevelopment, infrastructure, and other community-improvements projects. Establishing TIF Districts provides an avenue where municipalities can divert future property tax revenue increases from a defined area or district toward an economic development project or public improvement project in the community. While subsidies to TIF districts are not directly appropriated from a municipality's budget, a loss is incurred through lost tax revenue.

As noted previously, there are three TIF Districts within the Town's service area. In accordance with the associated TIF ordinances, revenues from any development goes to the Town. Revenues can only be used to retire bonds from improvements that would directly benefit the TIF District which can assist with the extension of infrastructure to and within these areas.

IX. STANDARDS, POLICIES, AND REGULATORY PRACTICES

It is essential that the impact of private development on the Town's facilities be monitored and controlled through policies, codes and regulatory practices. This is accomplished through on-site inspections, plan review, and construction and development standards.

A. Construction and Design Standards

System problems could occur if there are inadequate controls related to new development. Installing water systems for individual subdivisions and private developments are typically the responsibility of the developer. Construction standards are currently in place to address issues

such as materials, installation, testing and workmanship. The standards should be provided to private developers and engineering firms when new developments are proposed. The Standards need to be periodically reviewed and revised to assure that the documents are kept up to date with current industry practices. The last update was in 2016.

B. Plan Review and Construction Inspection

Reviewing plans and inspecting the work during construction will assure that designs are consistent and projects are completed in accordance with the Town's standards and specifications for materials, sizing, installation and workmanship. Plans for new developments should also be reviewed for surrounding and downstream impacts. This will assure that installed systems have adequate capacity for future developments. Correction of adverse impacts caused by new developments should be required prior to approval of any project. Work could be completed by the developer, or a joint endeavor could be undertaken with the Town sharing in the cost to increase lines or eliminate problems in affected areas.

C. Facilities Management System

The water system has been digitized and incorporated into the Town's GIS mapping system. This provided an interface to property names and addresses which will ease the implementation of a GIS based facilities management (FM) program if one is pursued in the future. A computerized FM program will assist with filing, recording, and tracking new construction, maintenance, work orders, and customer complaints. This will allow problem areas to be easily identified so long term projects could be planned and prioritized. The cost for an integrated FM system will depend on the extent and capabilities of the program.

Record drawings for new water line installation should be input on the map as soon as possible after acceptance in order to maintain an accurate and up to date inventory of the system. Ideally, the record drawings should be provided in a computerized format according to the Town's standards. This will assure consistency of drawings and facilitate updating the basemap.

X. GENERAL CONCLUSIONS AND RECOMMENDATIONS

Improvements presented in this report are planned to benefit the future 20 year population growth of the Town and surrounding service area whose population is expected to increase. Extensions of the water system by the Town has made service accessible to a number of neighborhoods and homes that were previously on private wells. The water treatment plant and extended mains have adequate capacity to serve the existing population and many of the areas that are likely to be developed.

This Master Plan was prepared as a planning tool to guide future design efforts. It is not intended to, nor will it result in, complete expansion of the system. Installation of new water lines were proposed where necessary to serve existing developed areas or areas likely to be developed in the near future. Preliminary design of the system expansion was based on the best available information, as obtained from existing maps, aerial photography, and field work.

The basic purpose of a Master Plan is to develop a blueprint that will reasonably correct and eliminate existing problems, as well as plan for future development and expansion of the system. Uncontrolled development has an adverse effect on the citizens, property, neighborhoods, and utility operations. Installation of a waterworks system to serve the entire service area represents a significant capital investment. Completion of a Master Plan represents a critical step to guide a future improvements. The next course of action, after approving the Master Plan, is to agree on an overall program and financing strategy, and implement any additional funding mechanisms.

Expansion of the water system to unserved areas and future 20 year projected growth in the Town will consist of installing a network of main transmission lines. In addition, several recommendations are proposed to extend and loop lines to improve system conditions. Other recommendations to assure an effective management program are as follows:

1. Review the design and development standards, specifications, and plan review procedures to confirm that controls are in place to assure that new developments have adequate capacity and will not adversely affect the existing system. This document should be reviewed at least every three (3) years.

2. Develop specific work plans, management objectives, annual goals and associated budgets for completing projects. Compile a list of existing problem areas to assist in setting priorities, and prepare schedules for projects within the funding limits set by the Council.

3. Develop a public education program to inform customers about conservation of water in order to reduce costs and preserve valuable resources.

4. Evaluate available facilities management software that can be interfaced to the Town's digital map. The program should include complaint tracking, work order scheduling, maintenance, and system inventory.

5. Periodically review the Master Plan to determine if revisions to the plan or priorities are needed due to changing conditions. This should be done every 5 years at a minimum.

6. Locations of recorded easements where water lines have been installed outside of the rights of way should also be input on the map. Establishing digital standards for submittal of plans will allow files to be directly entered into the GIS database.