Platte River Regional Wastewater System Refinement Technical Memorandum

To:	Sarpy County
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Project:	Southern Sarpy County Wastewater Study – Phase IB
Subject:	Platte River Regional Wastewater System Refinement
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This Technical Memorandum refines the previously developed concept for a regional wastewater system in southern Sarpy County discharging treated wastewater to the Platte River. It is organized as follows:

- Objective
- Summary
- Background
- Stakeholder Input
- Growth and Flow Forecasts
- Wastewater Treatment
- Wastewater Conveyance
- Implementation

The following attachments provide supporting information:

- Attachment A – Basin Workshop Meeting Minutes
- Attachment B – Force Main Routing
- Attachment C –Cost Estimate Breakdown

Objective

The Southern Sarpy County Master Plan Phases I and II completed in 2006 and 2007 provided preliminary planning for wastewater service in southern Sarpy County. This Technical Memorandum

refines the concept, associated phasing, and cash flow requirements for a regional wastewater system in southern Sarpy County discharging treated wastewater to the Platte River. It incorporates current stakeholder expectations with respect to growth, and updated treatment and conveyance costs. The intent is to provide a baseline for comparison to other regional wastewater treatment alternatives to be developed and evaluated in the subsequent Regional Wastewater Treatment Alternatives Technical Memorandum.

Summary

As Sarpy County continues to grow and developable area north of the hydrologic ridgeline is consumed, growth pressures will be redirected to southern Sarpy County. In order to support the impending growth, wastewater service south of the ridgeline is essential. A regional wastewater concept was developed in 2006 and 2007 as a part of the Southern Sarpy County Master Plan Phase I and II. The recommended concept included a regional wastewater treatment facility (WWTF) discharging treated effluent from the Buffalo Creek, Springfield Creek, and Zweibel Creek drainage basins in southern Sarpy County to the Platte River, as well as a system of interceptor sewers, pump stations, and interim satellite treatment facilities. Phase 1A of the current Southern Sarpy County Wastewater Treatment Study (Regional Study) validated the feasibility of the previously developed regional wastewater concept given regulatory, environmental, and governance considerations. As a part of the current phase of the Regional Study, Phase 1B, the regional wastewater concept was refined, future growth and flows in southern Sarpy County were forecasted with input from various stakeholders, likely treatment processes were explored, a phasing strategy was developed, and cash flow requirements were identified.

The growth forecasting process involved several stakeholder meetings and close coordination with other planning efforts. Through this process, it was projected that the population of southern Sarpy County would experience an increase of over 85,000 residents, nearly four times the current population, over the 40 year study period (2015-2055). Likewise, the number of employees of major commercial and large industrial was estimated to nearly double (approximately 18,600 new employees). The projected flow associated with the aforementioned growth is 9.9 million gallons per day.

The regional wastewater concept is expected to be implemented in three phases according to the projected growth and flow demands. In the first phase, subdivided into Phase 1A and Phase 1B, immediate and short term growth areas as identified by stakeholder input would be supported. It is assumed that implementation of Phase 1A facilities would be completed under separate Interlocal Agreements between affected stakeholders in each basin. Phase 1 includes an expansion of the existing Springfield Plant and several small interim satellite treatment facilities in the drainage basins. It is anticipated that the regional entity established through the Joint Powers Act Agreement will operate Phase 1A facilities and proceed with planning and construction of all subsequent phases.

In the second phase, longer tem growth would be accommodated by the construction of several miles of interceptor sewer, a regional pump station and force main in the Zweibel Creek Basin, and a regional

WWTF with biological nutrient removal and ultraviolet disinfection in the southern end of the Springfield Creek Basin. In the final phase, the previously constructed regional WWTF and regional pump station would be expanded, and interceptor sewers would be extended. At the conclusion of the third phase, the necessary wastewater infrastructure to accommodate new growth south of the ridgeline through the end of the study period (2055) would be in place, according to the growth projections completed as a part of the Regional Study.

Preliminary capital and O&M cost estimates for each phase of the regional wastewater concept were developed using an assortment of available data. Preliminary capital cost estimates for Phase 1A and Phase 1B are about $ 22.6 and $ 28.5 million, respectively, with estimated annual O&M costs of about $ 1.8 and $ 3.8 million. Phase 2 and Phase 3 preliminary cost estimates are about $ 115.1 and $ 54.5 million, respectively, with estimated annual O&M costs of about $ 4.5 and $ 6.3 million. All costs are presented in 2015 dollars. It should be noted that a financial analysis will be completed as a part of this study. The results of the analysis will be summarized in the Regional Wastewater System Financial Assessment Technical Memorandum.

Background

The communities of Sarpy County, Nebraska have experienced significant growth in recent years. In general, this growth has occurred in areas where public water supplies and municipal sewerage systems were available; predominately north of the hydrologic ridgeline (northern Sarpy County). The hydrologic ridgeline separates Sarpy County into a northern portion that drains to Papillion Creek, and a southern portion that drains to the Platte River. As the availability of land north of the ridgeline diminishes, growth pressures move to the southern portion of Sarpy County (southern Sarpy County). To support this future economic development and growth, water and wastewater utilities are essential.

The Southern Sarpy County Master Plan Phases I and II completed in 2006 and 2007 provided preliminary planning for wastewater service in southern Sarpy County. At that time, it was determined that wastewater infrastructure constructed on a regional basis provided the greatest efficiency, economic advantage, and environmental protection. The regional wastewater concept developed during this effort included a regional wastewater treatment facility (WWTF) discharging to the Platte River in southern Sarpy County, as well as a system of interceptor sewers, pump stations, and interim satellite treatment facilities (collectively, “Regional System”). The Regional System would convey and treat wastewater generated south of the ridgeline in the Buffalo Creek, Springfield Creek, and Zweibel Creek basins. It was anticipated that this regional concept would be implemented in multiple phases.

The first phase included interceptor sewers in each of the three basins (Buffalo Creek, Springfield Creek, and Zweibel Creek), interim satellite treatment facilities in the Buffalo Creek and Zweibel Creek Basins, as well as the expansion of the existing wastewater treatment facility in the Springfield Creek Basin (Springfield Plant). The interim satellite treatment facilities and expanded Springfield Plant were conceptualized as “interim solutions,” and necessary to accommodate near-term growth demands.

The second phase included extension of the interceptor sewers in the Buffalo Creek and Springfield Creek Basins to a new regional WWTF site, and the extension of the interceptor sewer in the Zweibel Creek Basin to a new regional Pump Station (PS) site. Additionally, during the second phase, the new Regional PS in Zweibel Creek Basin and associated force main, and first phase of the new Regional WWTF in Springfield Creek Basin would be constructed. During this phase, the interim treatment facilities and expanded Springfield plant would be decommissioned.

The final phase included additional interceptor extensions in the Buffalo Creek and Springfield Creek Basins, and an expansion of the Regional WWTF. The entire Regional System is depicted in Figure 1 below.

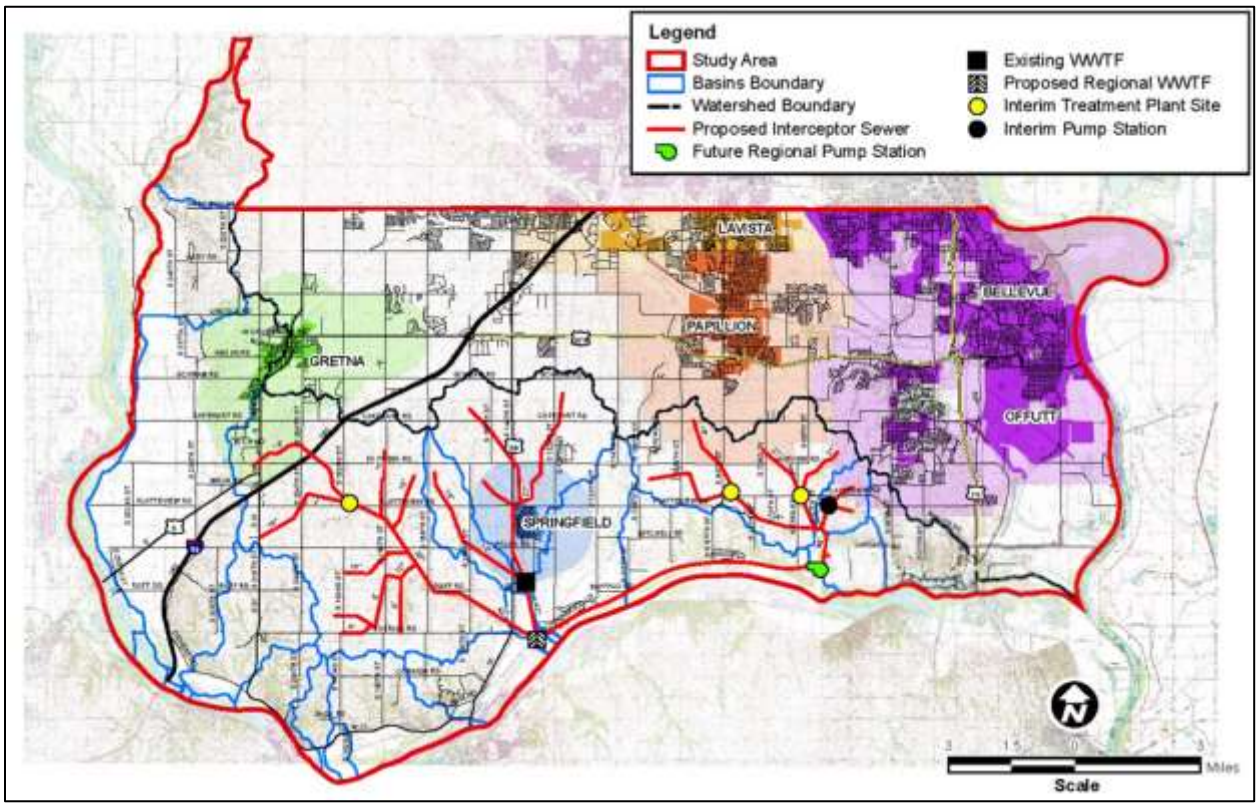


Figure 1. Southern Sarpy County Master Plan Regional Concept – 2006 / 2007 Studies

The preliminary cost estimate for the Regional System as defined above is displayed in the following table.

Table 1 – Cost Estimate – 2006 / 2007 Studies

Phase	Cost (2006 Dollars)	Cost (2015 Dollars)
First Phase	$ 35,350,507	$ 45,904,391
Second Phase	$ 98,386,904	$ 127,760,285
Third Phase	$ 47,014,648	$ 61,050,857
Total Project	**$ 180,752,059**	**$ 234,777,787**

In early 2015, HDR completed the first phase of the current Southern Sarpy County Wastewater Treatment Study (referred to as the "Regional Study"). The goal of this initial phase, known as Phase 1A, was to both confirm, and build upon, the regional concept from the previous studies completed in 2006 and 2007. Phase 1A validated the feasibility of this concept given regulatory, environmental, and governance considerations.

The environmental review in Phase 1A included the consultation of numerous desktop resources and meetings with the U.S. Fish and Wildlife Service (USFWS) and Nebraska Game and Parks Commission (NGPC). Based on the desktop resources review and preliminary agency input, it was determined that one to three years would be necessary to accommodate the multiple permits/approvals that would be required from varying parties/resource agencies for the construction of the Regional WWTF and accompanying treated effluent discharge to the Platte River. National Pollution Discharge Elimination System (NPDES), Endangered Species Act (ESA), and Section 404 of the Clean Water Act were identified as presenting the greatest challenges, and it was noted that National Environmental Policy Act (NEPA) compliance would also be needed if federal funding were pursued (including the Clean Water State Revolving Fund). Early coordination with the USFWS and NGPC was noted as being essential. Although there were several environmental components and considerations identified as necessitating careful attention during project planning, none of the expected approvals, permits, or other potential constraints was deemed insurmountable.

During the regulatory review process, regulatory requirements and the associated implications of obtaining a NPDES permit for a regional WWTF discharge in southern Sarpy County were examined based on two potential discharge locations – Springfield Creek and the Platte River. The regulatory review also included discussions with representatives from the Nebraska Department of Environmental Quality (NDEQ). Based on the meetings and review, it was determined that the permitting process could require one to three years to complete. The estimated permitting time is a result of the heightened scrutiny anticipated from resource agencies due to the presence of threatened and endangered species, as well as stakeholder interest in protecting the Platter River. Outfall location, antidegradation requirements, mixing allowance, and nutrient removal limitations were recognized as needing to be

determined early in the project, as they ultimately dictate permitting conditions. Early consultation with NDEQ and the U.S. Environmental Protection Agency (EPA) Region 7 was noted as being critical. Additionally, should federal funding be pursued, NEPA compliance would be necessary, which would potentially extend the permitting process. It should be noted that throughout the review process, no issues were identified that are expected to preclude regulatory approval of a regional WWTF NPDES permit.

The regional governance review completed in Phase 1A yielded two existing statutory schemes Sarpy County, municipalities, and other public agencies could use to form a governing body for wastewater treatment throughout the County. These opportunities exist under current Nebraska legislation, and include the Joint Public Agency Act, and the Interlocal Cooperation Act. The two acts provide authority for public agencies to enter into an agreement to coordinate efforts to serve the needs and development of the Region.

HDR was recently retained by Sarpy County to complete the second phase of the Regional Study. The second phase, known as Phase 1B, includes refinement of the Regional System concept introduced in earlier studies and validated during the first phase of the current Regional Study.

Stakeholder Input

Stakeholder input is an indispensable component of any planning effort. For the Regional Study, stakeholder involvement began early in the process and continued throughout the study. On October 1, 2015 a Basin Workshop was held. Meeting Minutes from the Basin Workshop are included as Attachment A, located at the conclusion of this document. Attendees included representatives from Sarpy County, each of the stakeholder communities, and various other entities. During the Workshop, attendees were divided into three groups, one for each drainage basin in the study area; Buffalo Creek, Springfield Creek, and Zweibel Creek. The goal of the workshop was to gain stakeholder input with respect to growth forecasting efforts and project phasing. Table 2 identifies the primary workshop discussion topics, and provides a brief summary of the stakeholder input received.

Table 2 – Basin Workshop Input

Discussion Topic	Stakeholder Input Received
Phasing Plans From 2006 / 2007 Studies	• Growth priorities have changed over time requiring revisions to the phasing plans generated in the previously completed studies.
Growth Forecast Assumptions	• In general, growth assumptions to be used in the forecasting efforts were deemed reasonable. • It was suggested that the Regional Study be closely coordinated with other planning efforts, such as the growth model developed for the Metropolitan Area Planning Agency (MAPA) Heartland 2050 Project. • The incremental growth allocation for the Buffalo Creek Basin was noted as being a little low. • The incremental growth allocation for the Zweibel Creek Basin was noted as being a little high. • The rate at which the remaining developable area in Omaha is consumed, the availability of sewer service, and the school district boundaries were identified as having significant influence on growth in southern Sarpy County.
Growth / Development Areas	• Buffalo Creek: predominately residential growth northwest of Interstate 80 and along Highway 31 South is anticipated, with some industrial and commercial growth occurring along highway and interstate corridors. • Springfield Creek: residential growth east of Springfield and commercial and industrial growth along Highway 50 north of Capehart Road is anticipated. • Zweibel Creek: predominately residential growth is expected.
Key Development Areas / Current Interim Plans	• Buffalo Creek: the City of Gretna is in the preliminary design phase of bringing sewer service to accommodate immediate growth pressure east of the Highway 31 South and Interstate 80 junction, extending East/West along Interstate 80 and North/South along Highway 31 South. The City has recent approval from the City of Omaha to serve this area by over the ridge pumping to the Papillion Creek Basin. The area north of Interstate 80 was identified as the highest priority. The area south of Interstate 80 was identified as the next priority. • Springfield Creek: the City of Springfield has a development plan in-hand that includes 250 total units (includes single family, multifamily, and mixed use) to be constructed on the north side of the City, east of existing development. This are was identified as a priority, and the associated growth is expected to consume the current remaining treatment capacity at the existing Springfield Plant. The area north of Springfield on either side of Highway 50 was identified as another priority and the County has recent approval from Omaha to serve this area by over the ridge pumping to the Papillion Creek Basin. Growth in this area is anticipated to be predominately industrial. • Zweibel Creek: Over the ridge negotiations with Omaha are sufficient for the limited development in the immediate future for both the City of Bellevue and Papillion. The first priorities were identified as the areas on the east side of the drainage basin along Platteview Road as well as the northwest potion of the drainage basin.
Potential Implementation Schedule	• Establishing separate Interlocal agreements to proceed with construction to accommodate initial needs was perceived as a critical success factor. • Additionally, defining logistics of a JPA agreement for long term regional operation as soon as practicable was noted as important.
Potential Capital Outlay	• There was a desire expressed to have cost statistics presented on a cost per acre basis.

Growth and Flow Forecasts

This section identifies likely growth areas in southern Sarpy County based on stakeholder input, and the associated population and flow forecasts.

Growth

The growth forecasting completed by the Regional Study Team (Team) included projections for future population and employment growth in southern Sarpy County. The growth forecasting process involved several meetings with various stakeholders, and close coordination with other planning efforts, such as MAPA Heartland 2050 (MAPA 2050). With stakeholder input, the Team identified where and when growth was likely to occur, and how much and how quickly growth was expected. The Team also analyzed how closely projections aligned with MAPA 2050. The assumptions utilized in the growth forecast projections are summarized in Table 3, Growth Forecast Assumptions.

Table 3 – Growth Forecast Assumptions

No.	Variable	Unit	Value
1	Overall Sarpy County Residential Population Growth • 2015-2045 • 2046-2055	People/year	• 3,624.5 • 2,844.5
2	Incremental Growth South of Ridge Line: • 2020 • 2025 • 2035 • 2050	Percent	• 10% • 35% • 75% • 90%
3	Portion of Growth in Buffalo Creek Basin South of Ridge: • 2015-2025 • 2026-2035 • 2036-2055	Percent	• 45% • 35% • 25%
4	Portion of Growth in Springfield Creek Basin South of Ridge: • 2015-2025 • 2026-2035 • 2036-2055	Percent	• 45% • 40% • 35%
5	Portion of Growth in Zweibel Creek Basin South of Ridge: • 2015-2025 • 2026-2035 • 2036-2055	Percent	• 10% • 25% • 40%
6	Single Family Residential	People/DU	2.7
7	Dwelling Units (DU) per Developable Acre	DU/acre	5
8	People per Developable Acre	People/acre	13.5
9	Developable Acre to Total Acre Ratio (Residential)	Percent	60%
10	Commercial Growth	SF/10 years	500,000
11	Commercial Building Area per Developable Acre	SF/acre	13,700
12	Area per Commercial Employee	SF/employee	196
13	Commercial Employees per Developable Acre	Employees/acre	70
14	Industrial Growth	SF/10 years	3,000,000
15	Industrial Building Area per Developable Acre	SF/acre	12,000
16	Area per Industrial Employee	SF/employee	600
17	Industrial Employees per Developable Acre	Employees/acre	20
18	Developable Acre to Total Acre Ratio (Commercial/Industrial)	Percent	65%

Population and Employment Growth

Population growth in Sarpy County was projected over the 40 year study period (2015-2055) assuming continuation of the linear growth trends observed in Sarpy County from 2000 to 2010, which equated to an average of 3,524.5 people per year. It should be noted that in an effort to better align with the overall population projection of MAPA 2050, the linear growth rate observed from 2000 to 2010 was

reduced over the last ten years of the study period (2046 to 2055) to 2,844.5 people per year. As such, the population of Sarpy County is projected to increase by approximately 140,805 residents by year 2055. The Regional Study was completed on the premise that, with the availability of sewer service in southern Sarpy County, growth in the County will occur both north and south of the ridge line. Additionally, developable area in the Papillion Creek Drainage Basin north of the ridge line is limited, and as the developable area fills up, growth pressure in southern Sarpy County will increase. With that said, of the 140,805 new residents projected, it is estimated that approximately 60% of the growth, or 86,674 people, will occur in southern Sarpy County.

As a part of the Regional Study, major commercial and large industrial employment growth through 2055 was also projected. Over a ten year period through 2025, approximately 500,000 and 3,000,000 square feet of new major commercial and industrial growth, respectively, is estimated in Sarpy County according to ongoing work by SB Friedman as part of the Sarpy County Comprehensive Plan. Using these estimated growth rates, and the assumptions identified in Table 3 above, it is projected that the number of major commercial and large industrial employees in Sarpy County will increase by approximately 30,219. Again, approximately 60% of that growth is anticipated in southern Sarpy County, or 18,602 employees of major commercial and large industrial.

Population and employment forecasts by basin for southern Sarpy County were completed and are displayed in Tables 4 entitled, Southern Sarpy County Population and Employment Forecasts by Basin.

Table 4 – Southern Sarpy County Population and Employment Forecasts by Basin

Year	Buffalo Creek		Springfield Creek		Zweibel Creek		Southern Sarpy County	
	Population	Employment	Population	Employment	Population	Employment	Population	Employment
2020	571	99	571	99	127	22	1,269	220
2025	2,773	525	2,773	525	616	117	6,162	1,168
2030	6,578	1,282	7,122	1,390	3,335	657	17,035	3,329
2035	10,574	2,094	11,689	2,318	6,189	1,237	28,452	5,648
2040	14,652	2,924	17,398	3,481	12,713	2,566	44,763	8,971
2045	18,730	3,761	23,106	4,652	19,237	3,905	61,073	12,319
2050	21,930	4,539	27,586	5,742	24,357	5,150	73,873	15,431
2055	25,130	5,332	32,067	6,851	29,477	6,418	86,674	18,602

As noted previously, growth forecasting efforts were coordinated closely with the MAPA 2050 Model. Figures 2-5 compare the Regional Study growth forecasting (population and employment), summarized in Table 4, to the MAPA 2050 projections for the County as a whole and for southern Sarpy County.

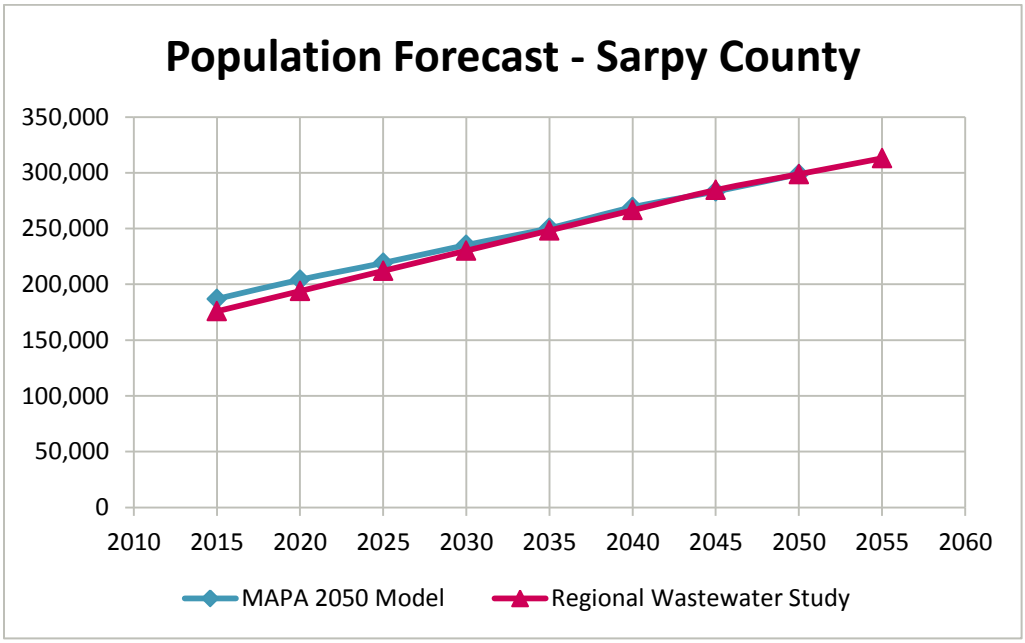


Figure 2. Total Population Comparison

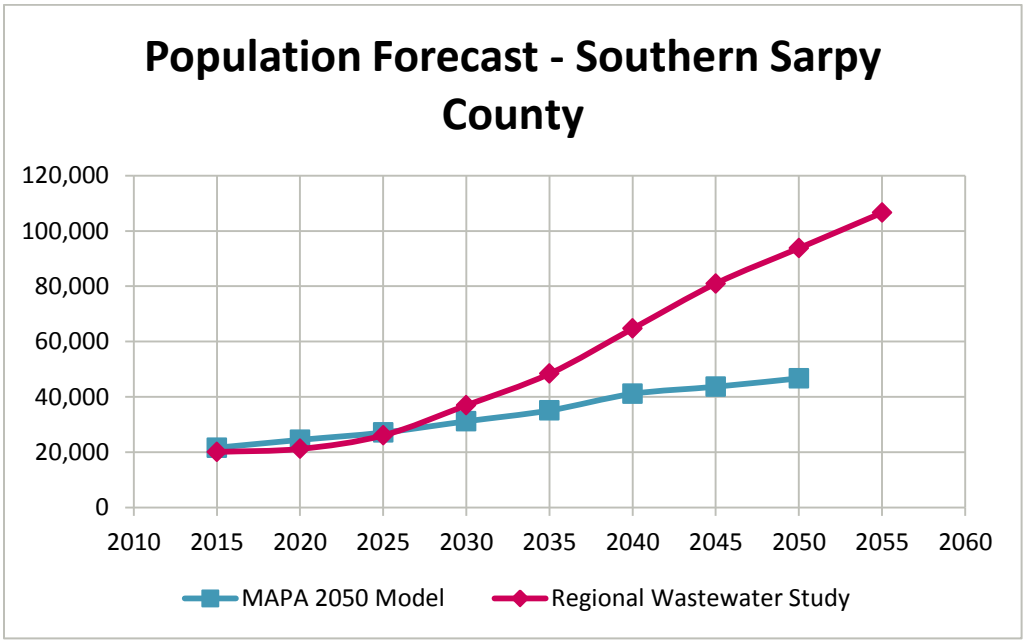


Figure 3. Southern Sarpy County Population Comparison

As displayed in Figure 2 above, the two overall Sarpy County population projections are nearly identical. However, in Figure 3, it can be seen that the MAPA 2050 model is projecting significantly less growth in southern Sarpy County than the Regional Study. This is attributed to the premise of the MAPA 2050

Model which assumes that wastewater service during the projection period is not available south of the ridge line.

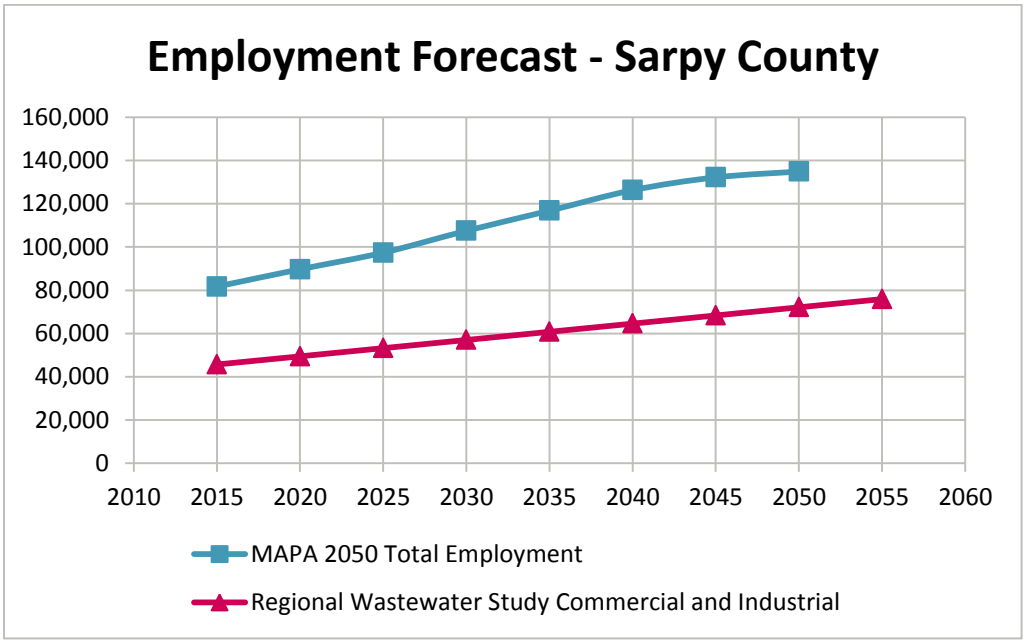


Figure 4. Total Employment Comparison

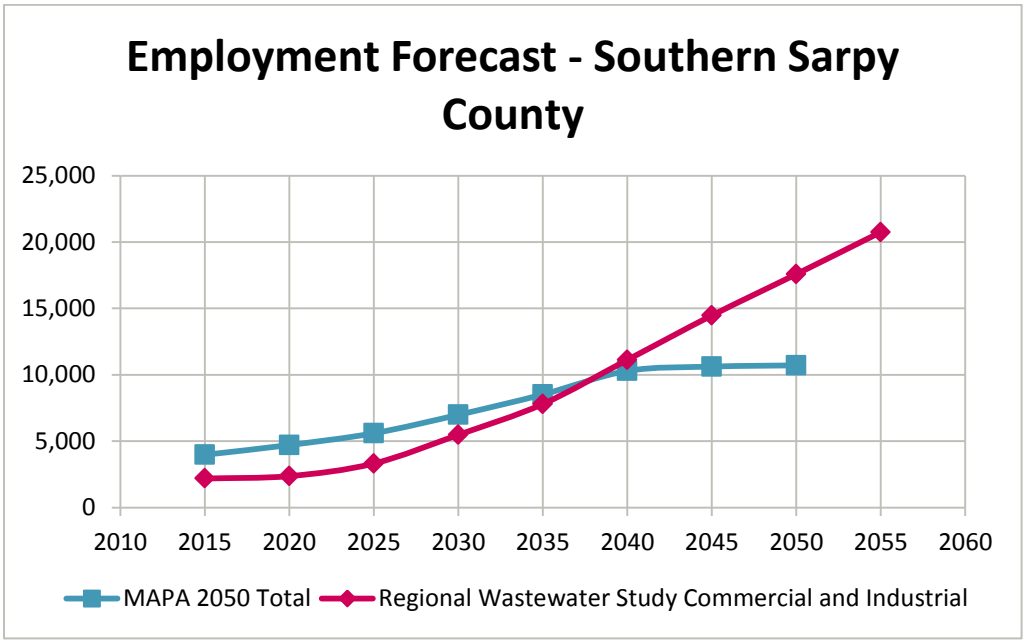


Figure 5. Southern Sarpy County Employment Comparison

At first glance, the two employment projections displayed in Figure 4 do not correlate well. However, it is important to understand that the MAPA 2050 projections includes all non-farm employment, and the

projection for the Regional Study estimates major commercial and large industrial employment only (i.e. smaller industrial and typical residential commercial is not included in the Regional Study projections). Southern Sarpy County employment projections are compared in Figure 5, again all non-farm employment is included in the MAPA projections and major commercial and industrial make up the Regional Study projections. As previously noted with the population projections, the Regional Study projects more growth in southern Sarpy County than the MAPA 2050 Model.

Total Acres and Developable Acres

Table 5 displays the corresponding acres, developable and total, necessary to support the projected population and employment growth summarized in Table 4 above. A conversion factor of 60 percent was used to convert total acres to developable acres for residential growth. Similarly a conversion factor of about 65 percent was used to convert total commercial and industrial acres to developable acres.

Table 5 – Southern Sarpy County Projected Acres by Basin

Year	Buffalo Creek		Springfield Creek		Zweibel Creek		Southern Sarpy County	
	Developable	Total	Developable	Total	Developable	Total	Developable	Total
2020	46	76	46	76	10	17	102	169
2025	225	371	225	371	50	83	501	825
2030	536	883	580	956	272	448	1,388	2,287
2035	863	1,421	954	1,571	505	833	2,322	3,825
2040	1,196	1,971	1,421	2,341	1,039	1,712	3,656	6,023
2045	1,530	2,521	1,888	3,110	1,573	2,591	4,991	8,222
2050	1,797	2,959	2,261	3,724	2,000	3,292	6,057	9,974
2055	2,064	3,398	2,635	4,338	2,427	3,995	7,126	11,730

Flow

Following the population and employment forecasting, flow projections were completed by the Team. Future residential, commercial, and industrial flows associated with projected growth in southern Sarpy County were estimated. Assumptions used in flow projections are included in the following Table.

Table 6 – Flow Forecast Assumptions (Max Month)			
No.	**Variable**	**Unit**	**Value**
1	Residential Flow	gpcd	100
2	Commercial Flow	gpad	1,500
3	Commercial Flow	gpcd	21.4
4	Industrial Flow	gpad	1,500
5	Industrial Flow	gpcd	75.0

All gallons per capita per day (gpcd) and gallons per acre per day (gpad) numbers are intended to be representative of maximum month flows which generally are about 20 percent higher than average flows. The 100 gpcd for residential flow is intended to include neighborhood commercial flows. The gpad and gpcd numbers for major commercial and industrial flows are believed representative of primarily domestic wastewater contributions from the type of major commercial and industrial development anticipated in Sarpy County.

Future flow accompanying the projected growth in southern Sarpy County was calculated using the assumptions presented in Table 6. A summary of flow projections by basin for southern Sarpy County is presented below in Table 7.

Table 7 – Southern Sarpy County Forecasted Flows per Basin [gpd]				
Year	**Buffalo Creek**	**Springfield Creek**	**Zweibel Creek**	**Southern Sarpy County**
2020	62,726	62,726	13,939	139,392
2025	307,161	307,161	68,258	682,580
2030	730,763	791,277	370,831	1,892,871
2035	1,176,539	1,300,736	689,242	3,166,518
2040	1,631,555	2,087,758	1,417,267	5,136,579
2045	2,086,921	2,725,270	2,145,853	6,958,043
2050	2,451,192	3,235,251	2,728,688	8,415,130
2055	2,816,290	3,746,387	3,312,844	9,875,521

Wastewater Treatment

This section presents the likely treatment process to meet anticipated water quality requirements and mitigate anticipated environmental implications identified in Phase 1A, and updates wastewater treatment costs for both smaller interim satellite treatment facilities and the ultimate larger regional treatment facility. It begins with a discussion of Platte River flows.

Platte River Flows

Historic Platte River flow data from USGS gage station 6805500 near Louisville was acquired and reviewed. A 30 year period of record (1984-2014) was analyzed. 2015 was disregarded as a result of incomplete data. Low flows used in defining critical water quality criteria were determined for the interested period of record. Flow statistics based on data from the Louisville gage are included Table 8, Flow Statistics - Louisville Gage from 1984-2014.

Table 8 – Flow Statistics - Louisville Gage from 1984-2014 [CFS]

Minimum Flow (2006)	Maximum Flow (1993)	Median Flow	Mean Flow	1Q10	7Q10	Regional WWTF Max Month Flow
322	130,800	6,670	4,028	849	1,056	15.3

As indicated in Table 8, Platte River flows have ranged from 322 to 130,800 CFS over the 30 year period with median and mean flows of 6,670 and 4,028 CFS, respectively. The 1-day 10-year (1Q10) and 7-day 10-year (7Q10) flows typically used for analyzing and permitting treated wastewater discharge permits are 849 and 1,056 CFS, respectively over the 30 year period.

As a basis of comparison, the current Louisville Wastewater Treatment Plant NPDES permit was initially issued in 2010 and extended beyond the expiration date of September 30, 2015 by letter dated October 1, 2015. It includes 1Q10 and 7Q10 flows for the summer season (the most stringent case) of 844 CFS and 1,049 CFS, consistent with the 30 year flow statistics noted above.

As shown in Table 8, the expected maximum month discharge to the Platte River from the Sarpy County Regional WWTF in year 2055 is 9,875,521 gallons per day (gpd) which equates to 15.3 CFS. As such, the expected max month discharge of treated wastewater is less than 2 percent of even the 1Q10 Platte River flow. Furthermore, the peak discharge from the future Regional WWTF in 2055, assuming a peaking factor of 2.5, is still less than 10 percent of the recorded minimum river discharge. The discharge from the Regional WWTF, even under low Platte River flow conditions, would account for only a fraction of the flow in the river.

Average daily stream flow for the 30 year period is displayed in Figure 6, Platte River at Louisville – Average Daily Flow. The red dotted line indicates the average flow (4,028 CFS) and the green dashed line represents the average Regional WWTF flow (12.2 CFS).

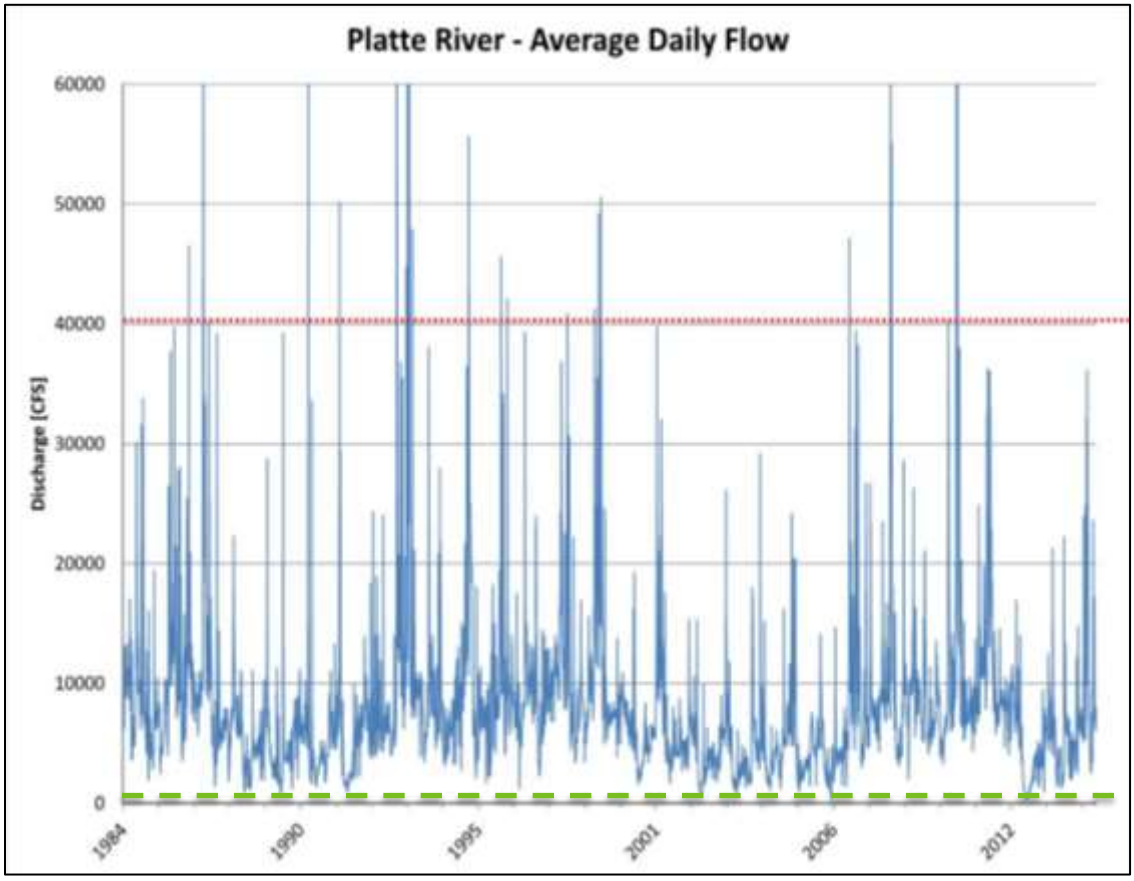


Figure 6. Platte River at Louisville – Average Daily Flows

Treatment Process

Regional Wastewater Treatment Facility

It is anticipated that the Regional WWTF would consist of a headworks facility for preliminary treatment, a secondary, biological treatment process capable of providing nutrient removal, a disinfection process (other than chlorination) to polish the liquid stream, and solids processing for the resulting biosolids. For solids processing, thickening, digestion and dewatering provide Class B biosolids that can be land applied, landfilled, or processed further offsite (as needed). Figure 7 at the conclusion of this section illustrates the treatment process described herein.

Headworks

The headworks provides preliminary processing to remove screenings and grit that can interfere with pumping and equipment. Screenings and grit can also fill tanks resulting in less active volume. An effective headworks is used to protect downstream operations and reduce overall maintenance work.

- Screening

The first treatment step is screening. Several screen configurations and options - including climber, multi-rake, perforated plate, drum-type, and step-type screens, etc. - are available to remove inert debris from the wastewater. The most common screen size is 6 mm (1/4 inch), but larger (coarse) and smaller (fine) screen sizes are available. Screenings washer and compactors are often employed with screens to clean organic matter (returned to waste stream) from the screenings, and to compact screenings for disposal.

- Grit Removal

Grit removal is incorporated into the process as the next step to protect equipment and tanks. Aerated grit tanks, forced vortex grit removal, and gravity vortex processes are all options for grit removal. Grit pumps, classifiers, clarifier, and conveyors process the grit prior to disposal.

Biological Nutrient Removal

A biological nutrient removal (BNR) process is used to concurrently treat the wastewater for organics (BOD_5), suspended solids (TSS), ammonia, total nitrogen (TN), and total phosphorus (TP).

- Anaerobic Zone

The anaerobic (ANR) zone works as the selector zone for phosphorus accumulating organisms (PAOs). By selecting for PAOs, enhanced levels of TP removal are achieved. This supports effluent phosphorus levels to 1 mg-P/L for a typical wastewater. A low nitrate recycle stream is required, which is provided by recycling from the end of the anoxic zone. This recycle stream, or the anaerobic mixed liquor return (ANR MLR) is usually 100 to 200 percent of the influent flow. The typical hydraulic retention time (HRT) for this zone is in the range of two to four hours.

- Anoxic Zone

The anoxic (ANX) zone supports TN removal by converting residual nitrates to dissolved nitrogen, which gases off in the aerobic zone. A recycle stream from the aerobic zone (ANX MLR) is required to transport nitrates to the anoxic zone. A recycle flow of 100 to 400 percent of the influent flow may be used depending on the influent TKN and the treatment goals. The typical HRT from this zone is between four and eight hours.

- Aerobic Zone

The aerobic (AER) tank provides the zone needed for ammonia conversion to nitrate; to meet low effluent ammonia concentration discharge requirements. A minimum dissolved oxygen level of 2 mg/L is applied in this zone for a conventional system. The HRT for this zone is often 8 to 12 hours for conventional activated sludge processes, but can be as long as 24 to 48 hours for extended air activated sludge systems.

- Clarification

Clarification or sedimentation is provided at the secondary clarifiers (SCL). During secondary clarification, the microorganisms, or biological floc, utilized during the BNR process settles to the bottom of the SCL. A portion of the settled microorganisms, or activated sludge, is returned ahead of the anoxic basin in order to maintain the population required to reduce wastewater pollutants. The recycled portion, known as return activated sludge (RAS), is necessary to re-seed wastewater entering the BNR process. Excess solids are wasted and routed for solids processing.

Disinfection

For clear effluent with low TSS, ultraviolet (UV) disinfection is often utilized as an alternative to chlorine disinfection and dechlorination due to reasonable capital costs, compact footprint, ease of operation, and from both onsite safety and downstream water quality perspectives. Dosages for UV systems are site specific, but can range from less than 10 to over 30 mJ/cm^2. Collimated beam testing is often used to support sizing and is typically provided by UV equipment manufacturers.

Solids Processing

Waste activated sludge (WAS) from the biological treatment system undergoes further processing prior to end use. In order to be land applied as class B biosolids, pathogen reduction and vector attraction reduction requirements must be met according to federal regulations.

- Thickening

Thickening is used to increase the solids concentration prior to digestion to better utilize the digestion process. Equipment options include gravity belt thickeners (GBT), centrifuges, and rotary drum thickeners, among others. Chemical polymer addition is often used to support thickening.

- Aerobic Digestion

Aerobic digestion reduces the biosolids produced by biodegrading solids. The aerobic digester requires a 40 day HRT at 20^{o}C and a 60 day HRT at 15 ^{o}C. Alternatively, samples may be taken and tested to demonstrate biosolids meet federal requirements. As an alternative to aerobic digestion, anaerobic digestion with primary clarification could be utilized in the treatment process. This option should be further evaluated in later phases of the project. To be conservative, treatment cost variables reported in the following section assume anaerobic digestion and primary clarification is employed.

- Dewatering

Dewatering is used to further concentrate solids and reduce the required hauling volume. Equipment options include belt filter presses, centrifuges, screw presses, fan presses, and others. Chemical polymer addition is used to support dewatering.

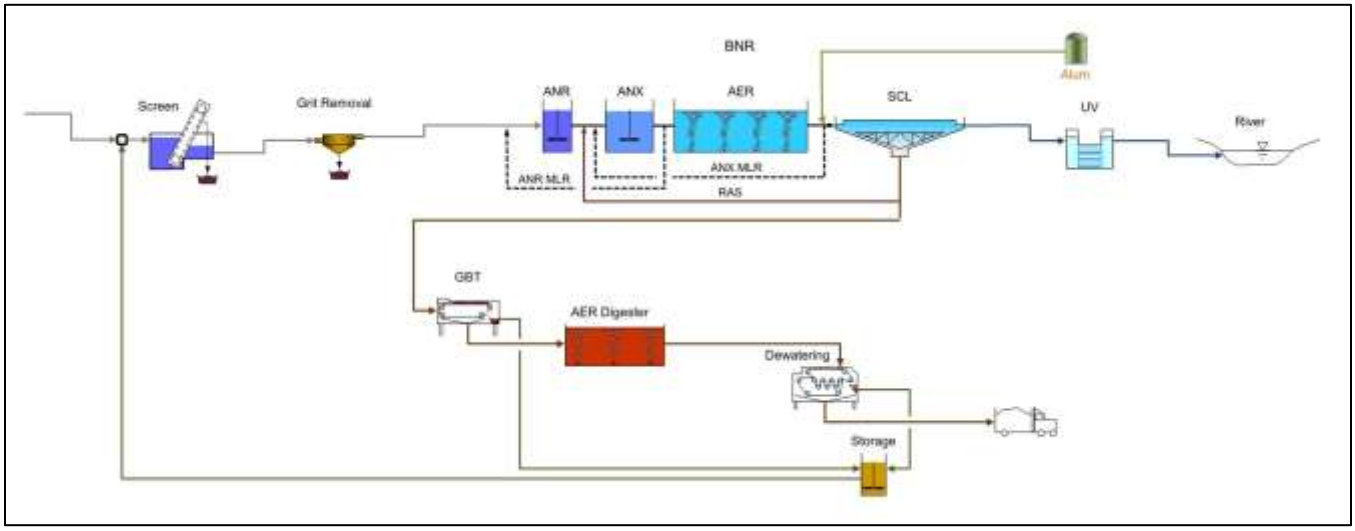


Figure 7. Regional WWTF Treatment Process

Satellite Treatment Facilities

Smaller satellite treatment facilities function to treat the wastewater streams to accommodate immediate and short term growth prior to construction of the Regional WWTF. Once the Regional WWTF is operational, the smaller satellite facilities would be decommissioned. Options would be explored to convert the decommissioned facilities to flow equalization / storage facilities. Opportunities would also be reviewed during regional plant design to repurpose equipment from the satellite facilities for use at the Regional WWTF. Figure 8 below depicts the likely treatment process described in this section.

Preliminary screening, batch biological treatment, and in-pipe UV disinfection provide an overall straightforward, but effective means for liquid processing. Solids stabilization and storage in a combined tank followed by thickening and/or dewatering gives a simple approach to processing solids. The biosolids generated may be landfilled or trucked to another facility for further processing.

Screening

Screening is recommended for the satellite treatment plants to perform the same functions as described for the Regional WWTF. The screen would be much smaller due to the smaller flow volume passing through the screen. A larger opening size may be appropriate, because the satellite facilities have less equipment to protect and have a shorter design life. Screening capabilities can potentially be maintained after construction of the Regional WWTF to protect conveyance facilities and equipment.

Sequencing Batch Reactor

A sequencing batch reactor (SBR) offers a practical option for biological treatment at satellite treatment facilities. Common tankage is used for reaction, aeration, and settling. Two parallel tanks would likely be

needed to provide for continuous treatment and reliability. An anoxic phase is easily incorporated into the operational cycle to provide for TN treatment. After construction of the Regional WWTF, the SBR tanks could be converted to provide flow equalization / storage.

- Blowers

Blowers provide the dissolved oxygen needed for biological treatment, and in particular, nitrification. Due to the variable liquid levels in tanks, positive displacement blowers are frequently used for SBR installations. With the construction of the Regional WWTF, a blower may be maintained at the satellite facility for mixing of the equalization tanks. Additional blowers could potentially be relocated for reuse at the Regional WWTF.

Disinfection

Disinfection at the satellite treatment facility may be provided by inline or in-pipe UV disinfection equipment, which provides effective and compact treatment for smaller flows without constructing separate tankage. This provides the benefit of simple operation and control with an economical installation. With the construction of the Regional WWTF, the satellite UV disinfection equipment could potentially be reused to treat in-plant reuse water at the regional facility.

Solids Processing

- Stabilization and Storage

Additional tankage would be provided at the satellite facilities to provide waste solids storage and stabilization. Depending on the end use of the solids, the compact solids handling tanks may be provided for storage prior to disposal of the solids.

- Thickening

Satellite treatment facilities may be amendable to solids thickening with specialized thickening equipment (similar to the regional facility description), or by providing decant capability to the solids stabilization and storage tank.

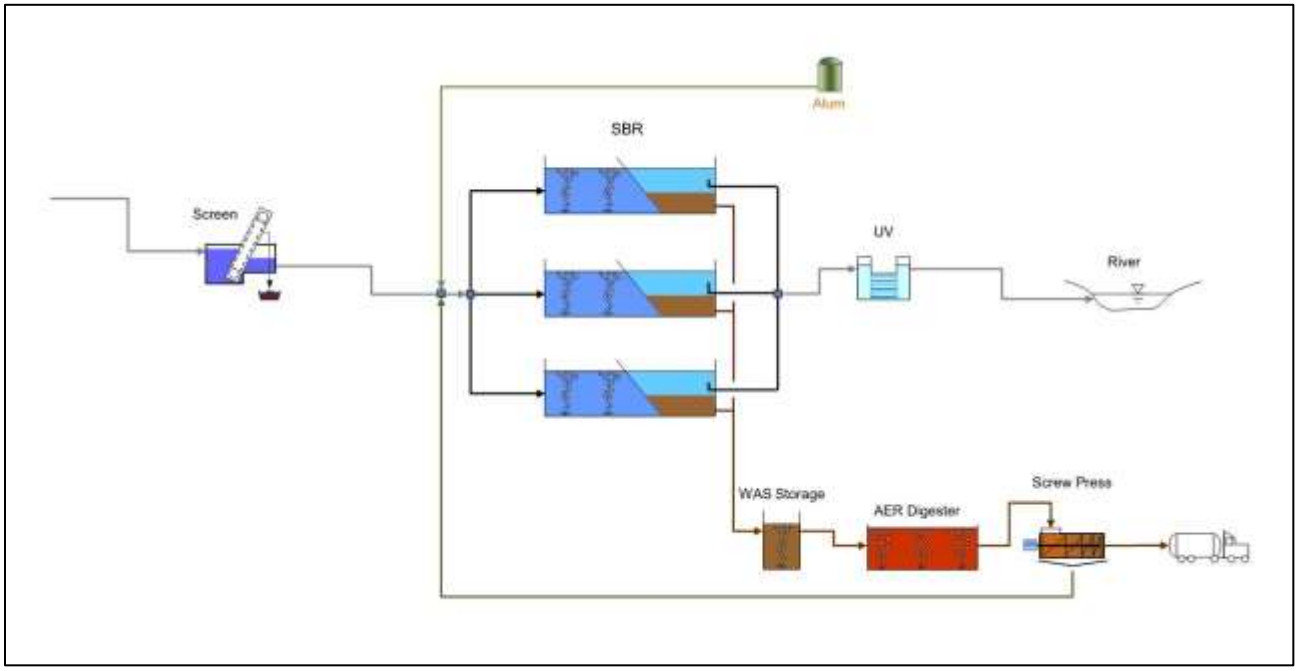


Figure 8. Satellite Treatment Facility Treatment Process

Cost Variables

Treatment costs for a new regional WWTF with nutrient removal and UV disinfection, as well as for satellite treatment facilities, both capital and O&M, were estimated using available unit process cost curves, HDRs planning level cost tool (WaterCost 1.2), cost information from recently constructed or designed WWTF's, and input from various manufacturers. The available data indicated a capital cost of $ 11.80/GPD treated (max month) was used for cost estimating purposes for both the regional treatment facility and the interim satellite treatment facility concepts, the result of both economies of scale for the larger, more complex regional WWTF and the smaller, simpler satellite WWTF's. A cost of $ 0.20/GPD treated (max month) was used for O&M estimating purposes for the regional treatment facility, and a cost of $ 0.40/GPD treated (max month) was used for O&M estimating purposes for the satellite treatment facilities, the result of economies of scale for a single, larger regional WWTF as opposed to multiple, smaller satellite WWTF's.

Wastewater Conveyance

This section presents a likely wastewater conveyance configuration and updates wastewater conveyance costs to deliver wastewater flows from anticipated growth areas to regional treatment facilities.

Configuration

The collection system configuration was identified based on topographic mapping, and remains nearly identical to the preliminary routing proposed during the 2006 and 2007 studies. In general, the Platte

River Watershed in southern Sarpy County drains from north to south. Thus, it was anticipated that a series of interceptor sewers would be constructed in each of the three major drainage basins utilizing gravity to direct wastewater flows toward the Platte River, along the southern end of the Watershed.

Interceptor sewers planned in the Buffalo Creek Basin generally convey wastewater flow from the north end of the drainage basin, beginning in the vicinity of Capehart Road and Highway 31 South, southeast across the basin. The interceptor would terminate at the Regional WWTF on the southern end of the Springfield Creek Basin. An interim satellite WWTF is planned to support near term growth and is preliminarily assumed to be in the proximity of Platteview Road and South 192nd Street.

In the Springfield Creek Basin, the interceptor plan is to convey flow from north to south across the basin, terminating at the new Regional WWTF. The proposed regional facility was preliminarily assumed to be south of Springfield within a mile of the Platte River in the vicinity of South 132nd Street and Buffalo Road. Interim pump stations are planned on the north end of the basin around Highway 50 and Fairview Road, and east of the City of Springfield adjacent Pflug Road. Additionally, a regional PS is planned directly east of the existing Springfield Plant. This facility would pump wastewater flow collected just outside of the eastern edge of the Springfield Creek Basin into the new collection system.

The interceptor sewers planned in the Zweibel Creek Basin generally convey wastewater flow from northwest to southeast across the basin. Two interim satellite WWTFs are planned to accommodate near term growth and are assumed to be located along Platteview Road on either side of the drainage basin. A Regional PS preliminarily assumed to be in the vicinity of Laplatte Road and east of South 56th Street would be constructed to discharge flows to the Regional WWTF through force main. Four alternate alignments (A – D) were evaluated for the associated force main routing from the proposed Regional WWTF to the proposed Regional PS.

The recommended alternative is Alignment A with Alignment B as an alternate. The advantage of Alignment A is that the alignment is located entirely within road right-of-way. As such, no easements will be required for the alignment, and maintenance of the line is considered easier since the entire alignment is along roads. The disadvantage of Alignment A is that it is the longest Alignment, which equates to higher capital construction costs than the other alignments. The advantage of Alignment B is that the length of the alignment is less than Alignment A which equates to a lower construction cost. The disadvantage of Alignment B is that approximately 49 percent of the alignment is located on private property, so easements will be required to construct and maintain the force main. Both alignments maintain ample distance from nearby lakes which eliminate concerns with water contamination from potential force main failures.

In the alignment descriptions below, it is assumed that the Regional WWTF site is located in the vicinity of South 132nd Street and Buffalo Road, and the Regional PS site is located in the vicinity of South 56th Street and Laplatte Road. These locations would be further evaluated during later phases of the project.

- Alignment Alternative A – Starting from the Regional WWTF site, South 132nd Street and Buffalo Road, this alignment assumes the force main will then run east on Buffalo Road to South 120th Street, north on South 120th Street to Mitchell Road, east on Mitchell Road to South 96th Street, north on South 96th Street to Platteview Road, east on Platteview Road to South 57th Street, and south on 57th Street to the proposed regional pump station located near the intersection of South 56th Street and Laplatte Road. As previously noted the entire proposed force main alignment is located within road right-of-way in Alignment Alternative A. See Figures B1-B8 of Attachment B.
- Alignment Alternative B – Starting from the Regional WWTF site, South 132nd Street and Buffalo Road, this alignment assumes the force main will be routed east on Buffalo Road to South 120th Street, north on South 120th Street to Mitchell Road, east on Mitchell Road to South 96th Street. From the intersection of Mitchell Road and South 96th Street the force main will be routed east across private property to the proposed regional pump station located near the intersection of South 56th Street and Laplatte Road. Approximately 51 percent of the proposed force main alignment is located within road right-of-way and 49 percent of the force main alignment is located within easements on private property in Alignment Alternative B. See Figures B9-B18 of Attachment B.

Cost Variables

Wastewater conveyance costs for gravity interceptors, force mains, and pump stations, both capital and O&M, were estimated using available cost curves, existing reports and studies, and cost information from recent construction projects in the region. The available data indicated a capital cost of approximately $ 7.70/inch diameter/linear foot of sewer and $ 5.90/inch diameter/linear foot of force main were used for cost estimating purposes for gravity interceptors and force mains, respectively. A cost of $ 0.30/liner foot of interceptor and $ 0.10/linear foot of force main were used for projecting annual O&M costs. Pump station costs were estimated for two categories based on size of the facility. Estimated costs for pump stations with capacity less than one MGD were projected using a capital cost of approximately $2.10/GPD pumped and an annual O&M cost of $0.10/GPD pumped. A capital cost of approximately $1.20/GPD pumped and an annual O&M cost of $0.05/GPD pumped was used for facilities with pumping capacity greater than one MGD.

Implementation

This section identifies potential phasing, costs, and cash flow requirements for implementation of the regional wastewater treatment facilities and conveyance identified above. It reflects the stakeholder input, and growth and flow forecasts previously presented.

Phasing

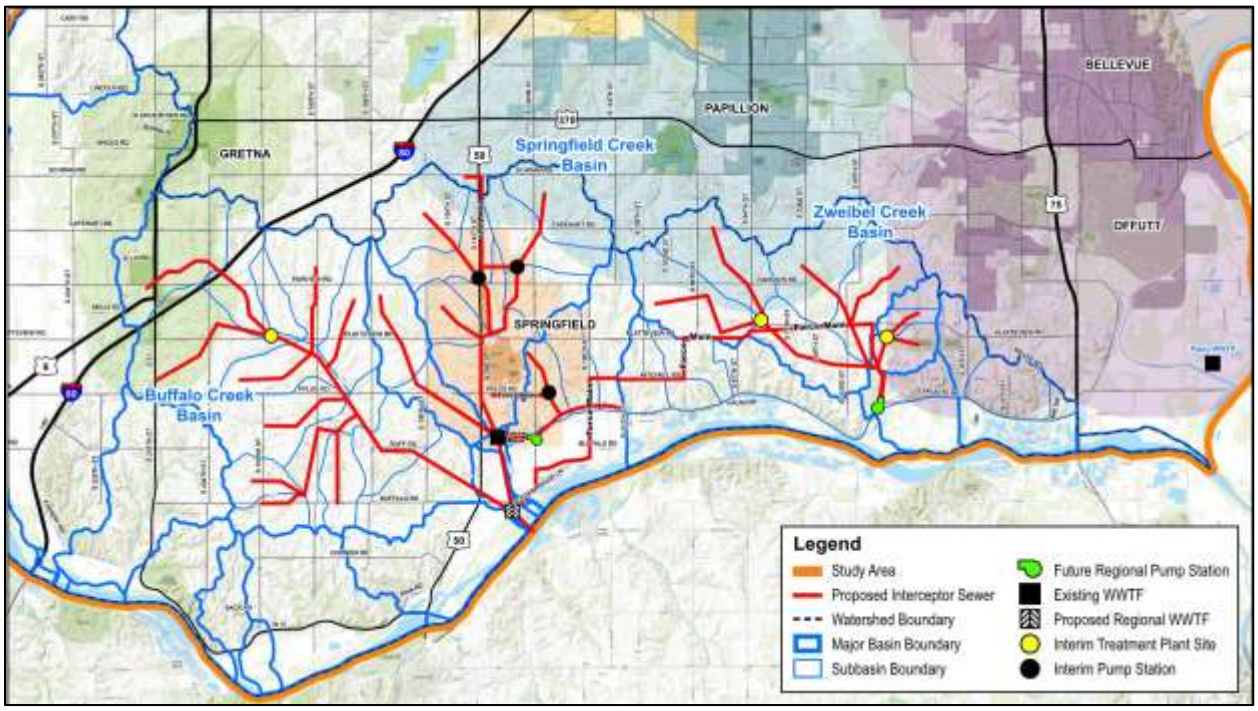


Figure 9. Refined Regional Concept

Ensuring that growth occurs in a semi-orderly fashion is a critical component of limiting unnecessary project costs, thereby keeping regional wastewater service costs as low as possible. The regional concept as developed in the 2006 and 2007 studies and refined herein, is summarized in Figure 9 above, and includes a system of interceptor sewers, pump stations, and treatment facilities in southern Sarpy County.

It is anticipated that the implementation of this concept would consist of three phases, Phases 1-3. Consistent with anticipated growth areas and needs, and as a means of controlling initial project cost, it is recommended that implementation of Phase 1, be further divided into two sub-phases, Phase 1A and Phase 1B. Collectively, infrastructure constructed in Phase 1 accommodates anticipated immediate and short term growth demands in each of the three basins through 2035.

Based on stakeholder input received during the Basin Workshop, immediate and short term growth areas were identified for each basin. These key growth areas include:

- Buffalo Creek Basin – Area in the vicinity of Interstate 80 and Highway 31 South, south of Gretna
- Springfield Creek Basin – Area north of Springfield on either side of Highway 50 and immediately east of the City of Springfield.
- Zweibel Creek Basin – Area east of South 60th Street along Platteview Road, and south of Papillion between South 84th Street and South 108th Street.

Proposed Phase 2 infrastructure assumes that development will expand out around the key growth areas supported in Phase 1. In the third and final phase, the sewer service is brought to the remainder of each of the three basins. Phase 2 and 3 are projected to serve long term growth demands in each of the three basins through 2044 and 2055, respectively.

Figure 10, Southern Sarpy County Phasing Plan - Wastewater Treatment, shows the general timing and capacity provided for each of the phases relative to growth and associated flow projections.

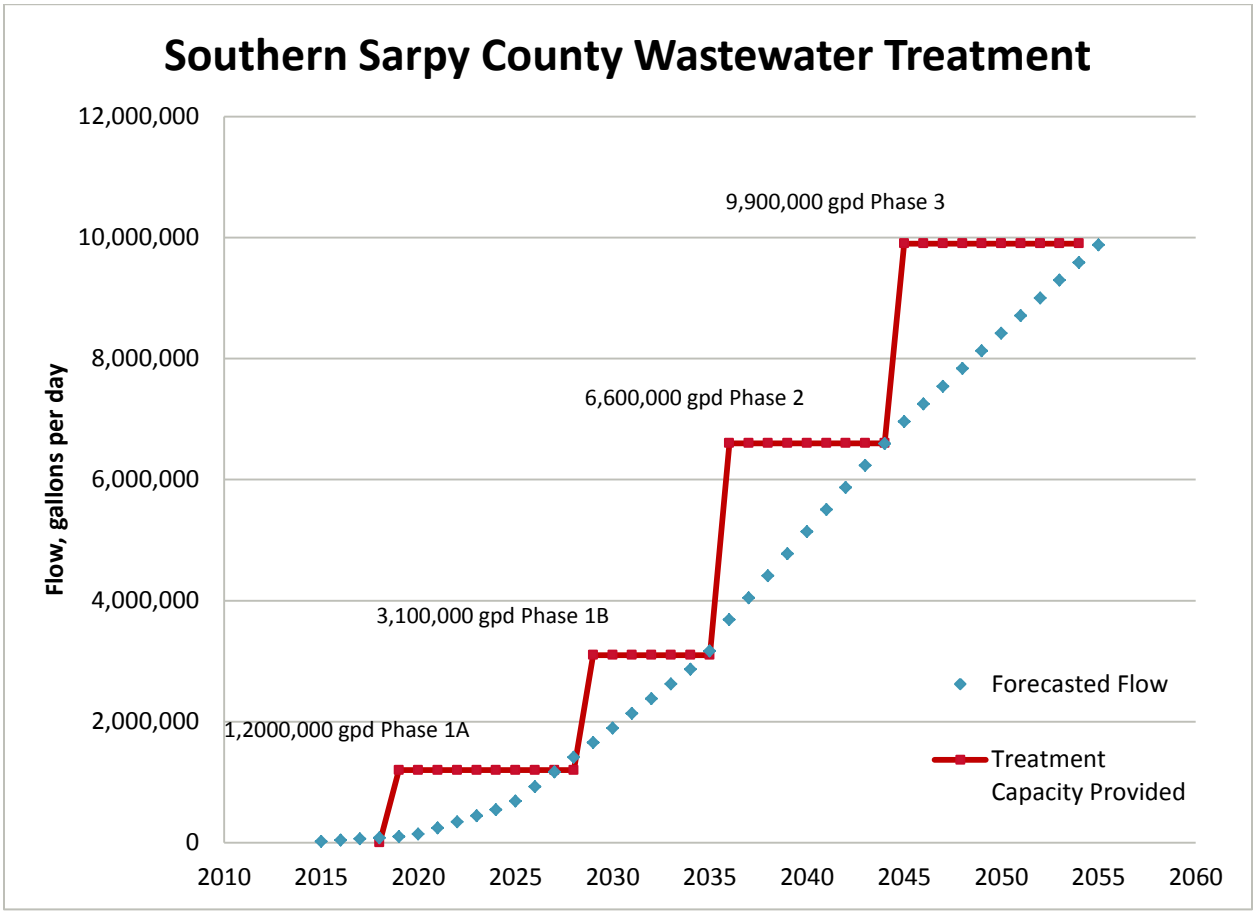


Figure 10. Southern Sarpy County Phasing Plan – Wastewater Treatment

The phasing plan described above, and in greater detail below, is based on the current growth projection introduced earlier in this document. This strategy is entirely dependent on actual growth, and as a result, actual phasing and implementation strategies will vary. For example, the timeline could change and/or the number of project phases could fluctuate as a result of faster or slower than expected growth. Additionally, growth pressures could be redirected, resulting in modifications to where identified infrastructure is constructed.

Regardless, the recommended Regional Study implementation strategy is defined below in Table 9. A detailed summary of the proposed phasing in each of the three basins concludes this section. As indicated in Table 9 the implementation strategy anticipates the following parallel efforts:

- Implementation of Phase 1A facilities under separate Interlocal Agreements between the affected stakeholders in each basin, allowing the affected stakeholders to proceed as quickly or as deliberately as desired.
- Development of a regional entity, including all stakeholders under the Joint Powers Act Agreement, that will be in place to operate Phase 1A facilities as they are put into service, and then to subsequently plan and implement Phase 1B and future phases.

Table 9 – Regional Wastewater Study Implementation Strategy

Year	Associated Action
2016	Fashion Interlocal Agreements to proceed with initial conveyance and treatment. • Sarpy County and the city of Gretna in the Buffalo Creek Basin • Sarpy County and the cities of Springfield and Papillion in the Springfield Creek Basin • Sarpy County and the cities of Papillion and Bellevue in the Zweibel Creek Basin
2016	Begin Phase 1A design followed by construction.
2019	Phase 1A infrastructure is operational.
2020	Fashion JPA agreement for regional operation, and subsequent conveyance and treatment. Regional authority is established (note, stakeholder input suggests basic details of the aforementioned agreement should be discussed as soon as practicable).
2025	Regional authority proceeds with Phase 1B design followed by construction.
2028	Phase 1B infrastructure is operational.
2031	Regional authority proceeds with Phase 2 design followed by construction.
2035	Phase 2 infrastructure is operational.
2041	Regional authority proceeds with Phase 3 design followed by construction.
2044	Phase 3 infrastructure is operational.

Buffalo Creek Basin

Phasing of the Regional System in Buffalo Creek Basin is shown in Figures 11-14.

Phase 1

Phase 1A in the Buffalo Creek Basin includes an interceptor sewer and interim satellite treatment facility with a capacity of about 600,000 GPD. This infrastructure would support the immediate development plans north of Interstate 80 in the locality of Highway 31 South. The interim facility was preliminarily assumed to be in the vicinity of Platteview Road and South 192nd Street. During Phase 1B, a second interceptor would be constructed south of the initial interceptor, opening up the area south of Interstate 80 along Highway 31 South.

Phase 2

During the second phase, an interceptor sewer would be constructed beginning at the interim treatment facility location, and extending southeast across the basin to the Regional WWTF site. Additionally, the interim satellite facility would be decommissioned.

Phase 3

During the third and final phase, several interceptor branches would be constructed, opening up sewer service to the remainder of the drainage basin.

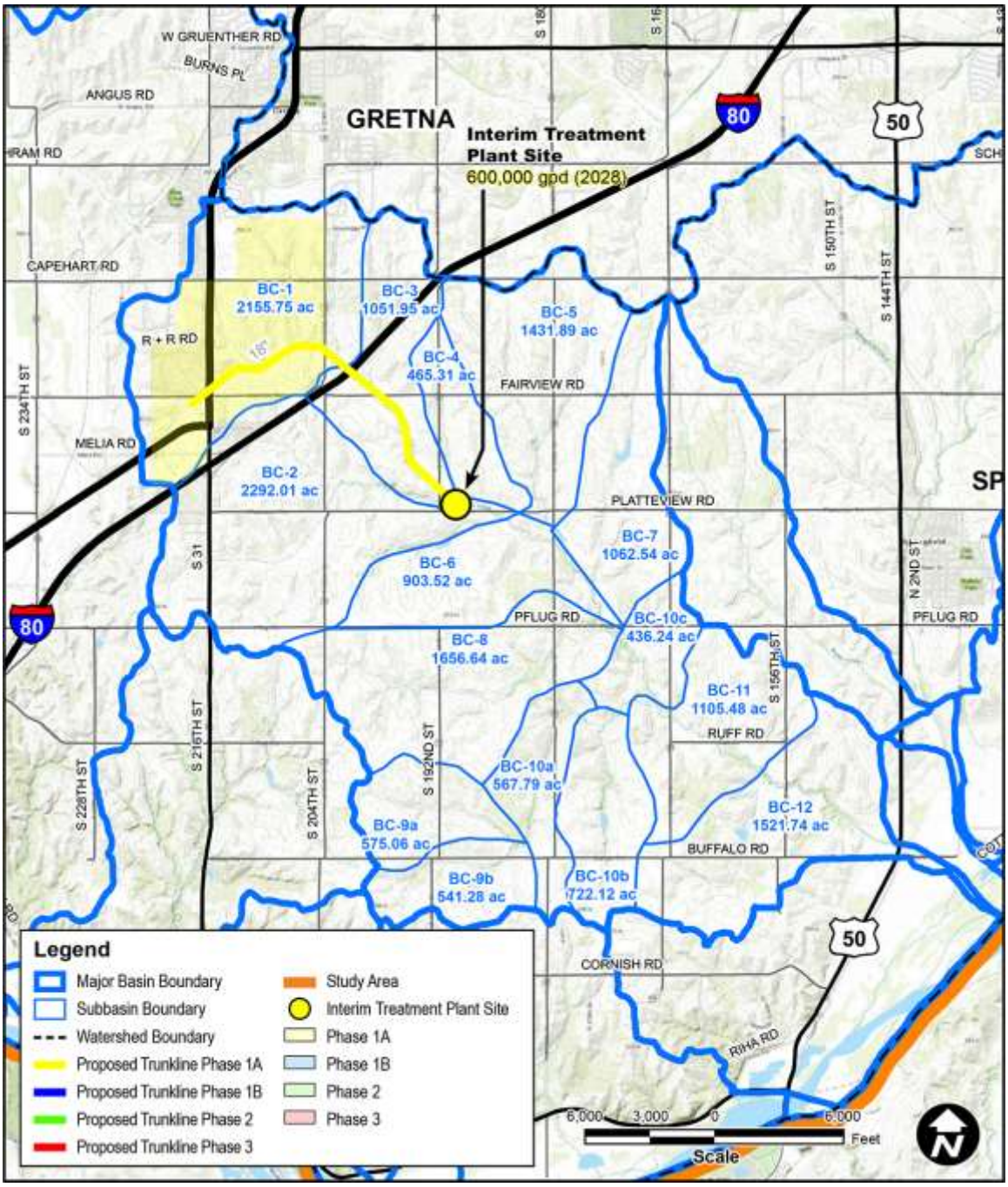


Figure 11. Phase 1A – Buffalo Creek Basin

Figure 12. Phase 1B – Buffalo Creek Basin

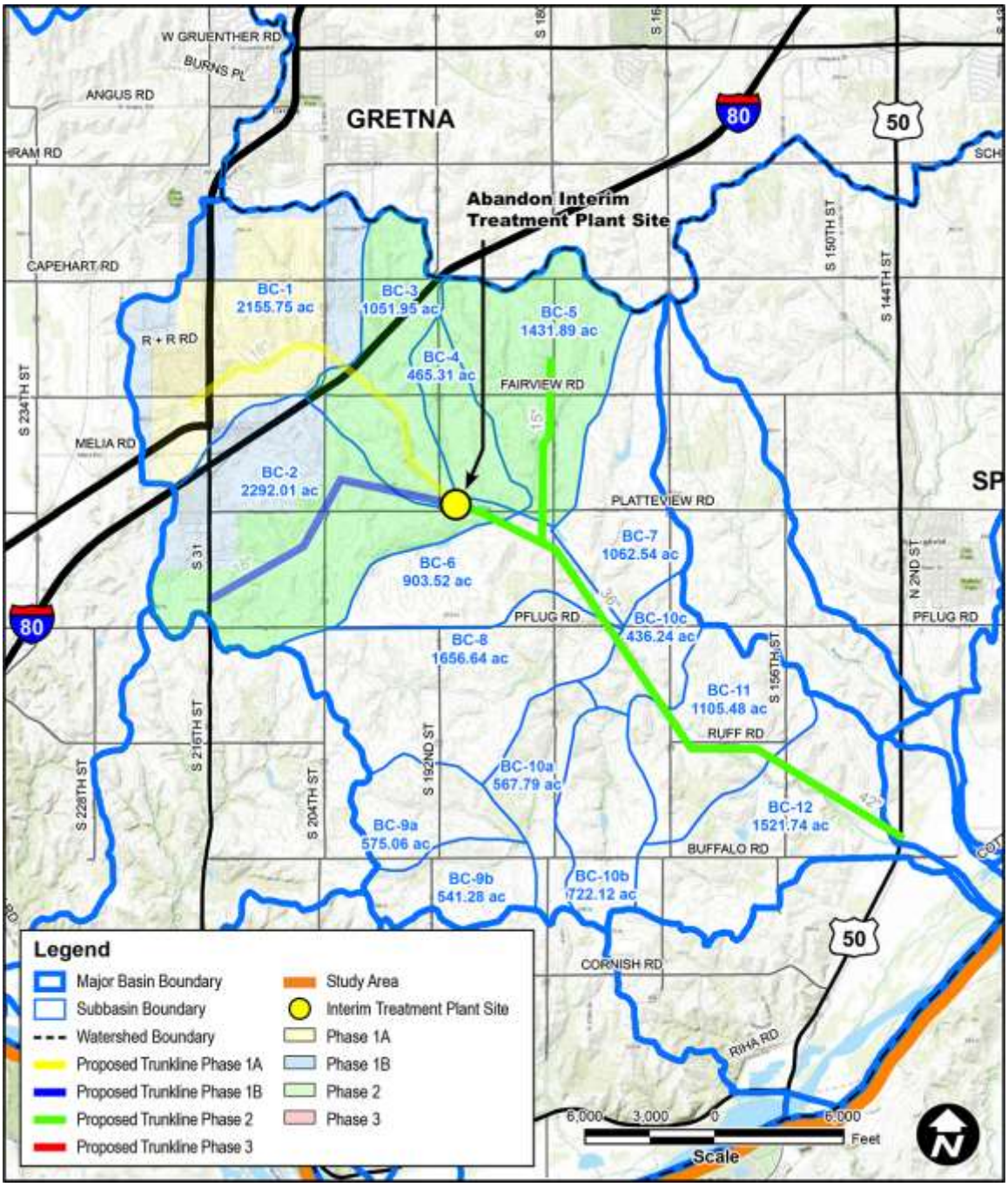


Figure 13. Phase 2 – Buffalo Creek Basin

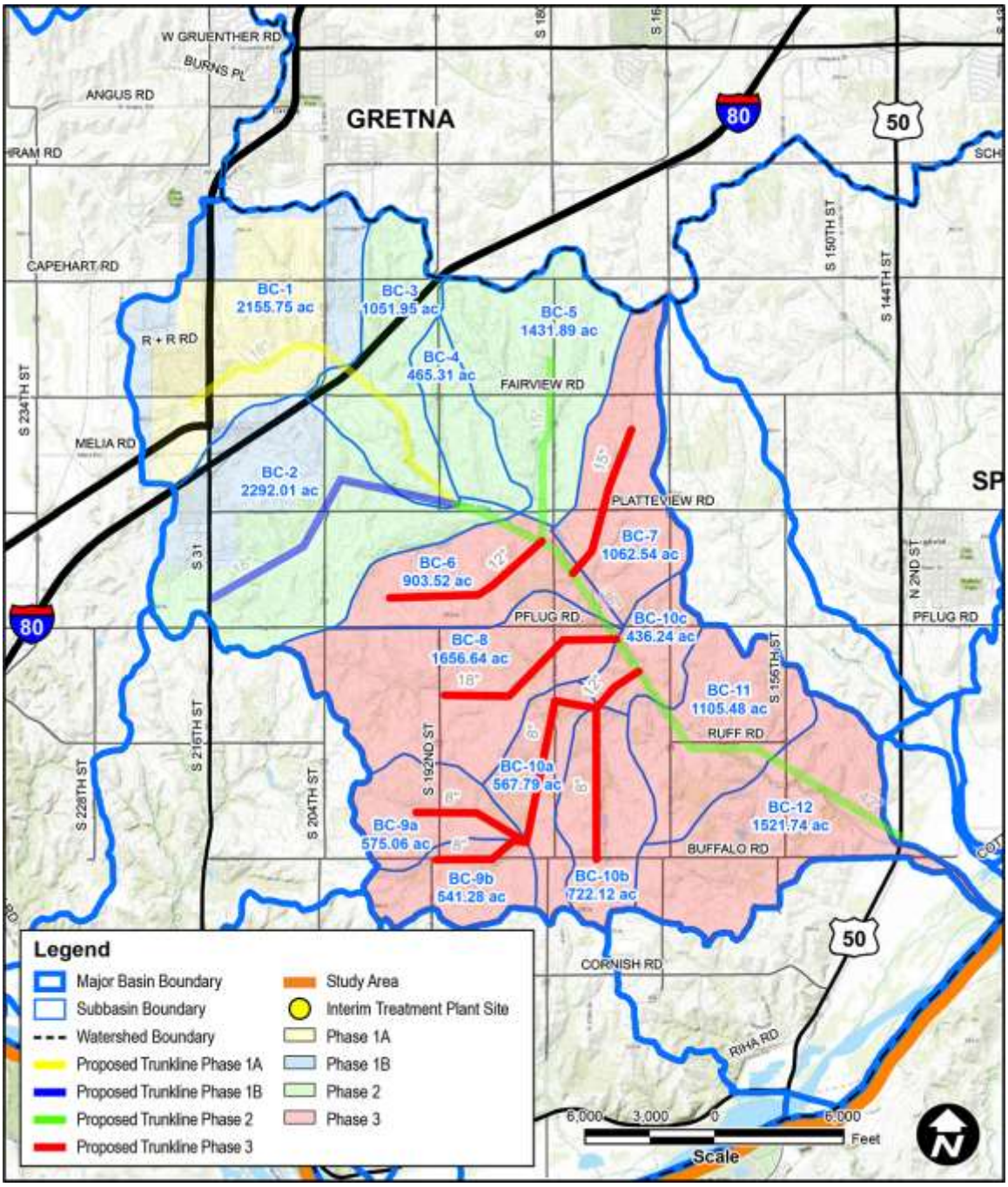


Figure 14. Phase 3 – Buffalo Creek Basin

Springfield Creek Basin

Phasing of the Regional System in the Springfield Creek Basin is depicted in Figures 15-18.

Phase 1

Phase 1A in the Springfield Creek Basin includes an interceptor sewer and a 600,000 GPD expansion of the existing Springfield Plant. Additionally, three interim PS's and associated force main would be constructed in Springfield Creek Basin. Two interim PS's on the north end of the basin would pump collected wastewater north over the ridge for treatment at the Papillion Creek Wastewater Treatment Plant. These interim facilities were preliminarily located in the vicinity of Fairview Road and Highway 50, and the second, north of Fairview Road and west of South 132nd Street. The third interim PS, east of Springfield, would accommodate immediate residential development east of the City, and pump collected wastewater into the existing collection system for treatment at the expanded Springfield Plant. This interim facility was preliminarily located adjacent the intersection of Pflug Road and South 132nd Street. The Phase 1A infrastructure would support the immediate development plans in the Springfield Creek Basin. During Phase 1B, the existing interceptor would be extended and a new interceptor would be constructed. Phase 1B would accommodate future growth in the northeast portion of the drainage basin and provide the necessary infrastructure to support the remainder of the northwest portion of the basin. An additional expansion of the existing Springfield Plant would also be completed during Phase 1B, supporting residential development east of the City of Springfield.

Phase 2

During Phase 2, the first phase of the Regional WWTF would be constructed, which would include two 3.3 MGD treatment trains, providing a treatment capacity of approximately 6.6 MGD. An interceptor sewer would be constructed beginning at each of the north interim PS locations, extending south across the basin to the Regional WWTF site. Finally, the existing Springfield Plant and two north interim PS's and associated force main would be decommissioned.

Phase 3

During the third and final phase, a third treatment train would be constructed, providing a total treatment capacity at the Regional WWTF of 9.9 MGD. Also, interceptor branches would be constructed; opening up sewer service to the southeast and southwest portions of the basin, and the interim PS and associated force main east of Springfield would be decommissioned. Finally, a regional pump station would be constructed directly east of the decommissioned Springfield Plant. This facility would pump wastewater flow collected immediately outside of the eastern edge of the Springfield Creek Basin into the new collection system.

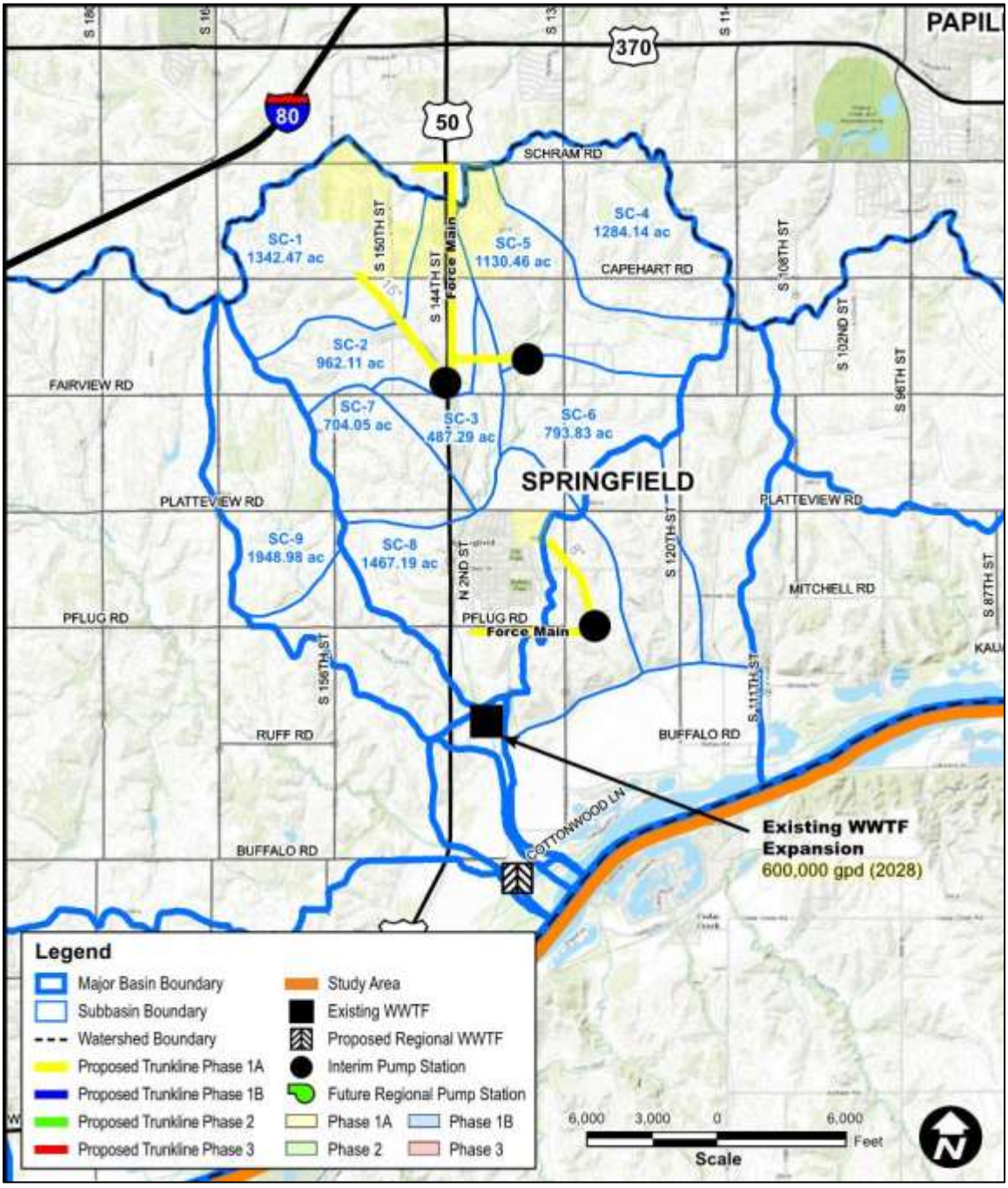


Figure 15. Phase 1A – Springfield Creek Basin

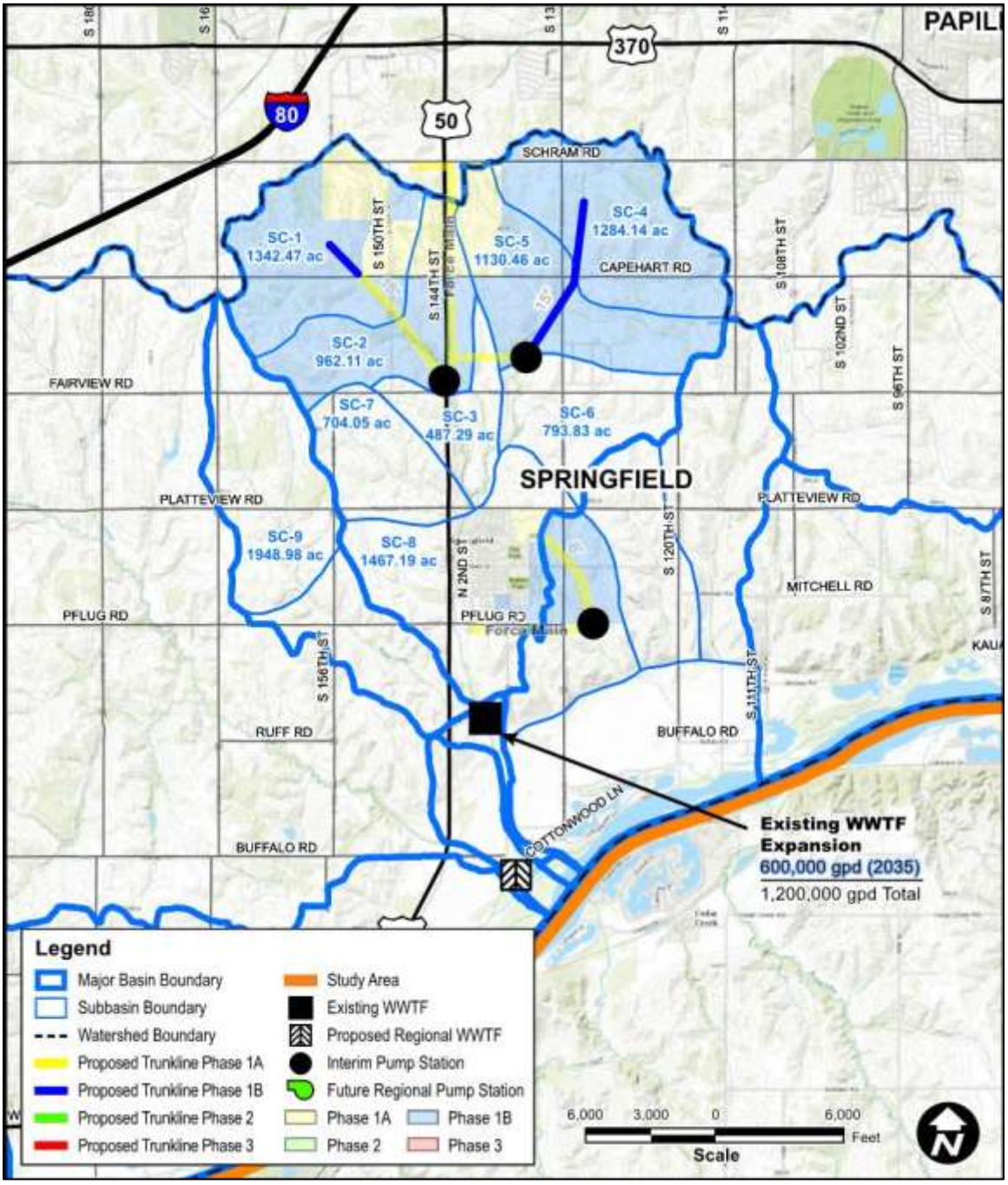


Figure 16. Phase 1B – Springfield Creek Basin

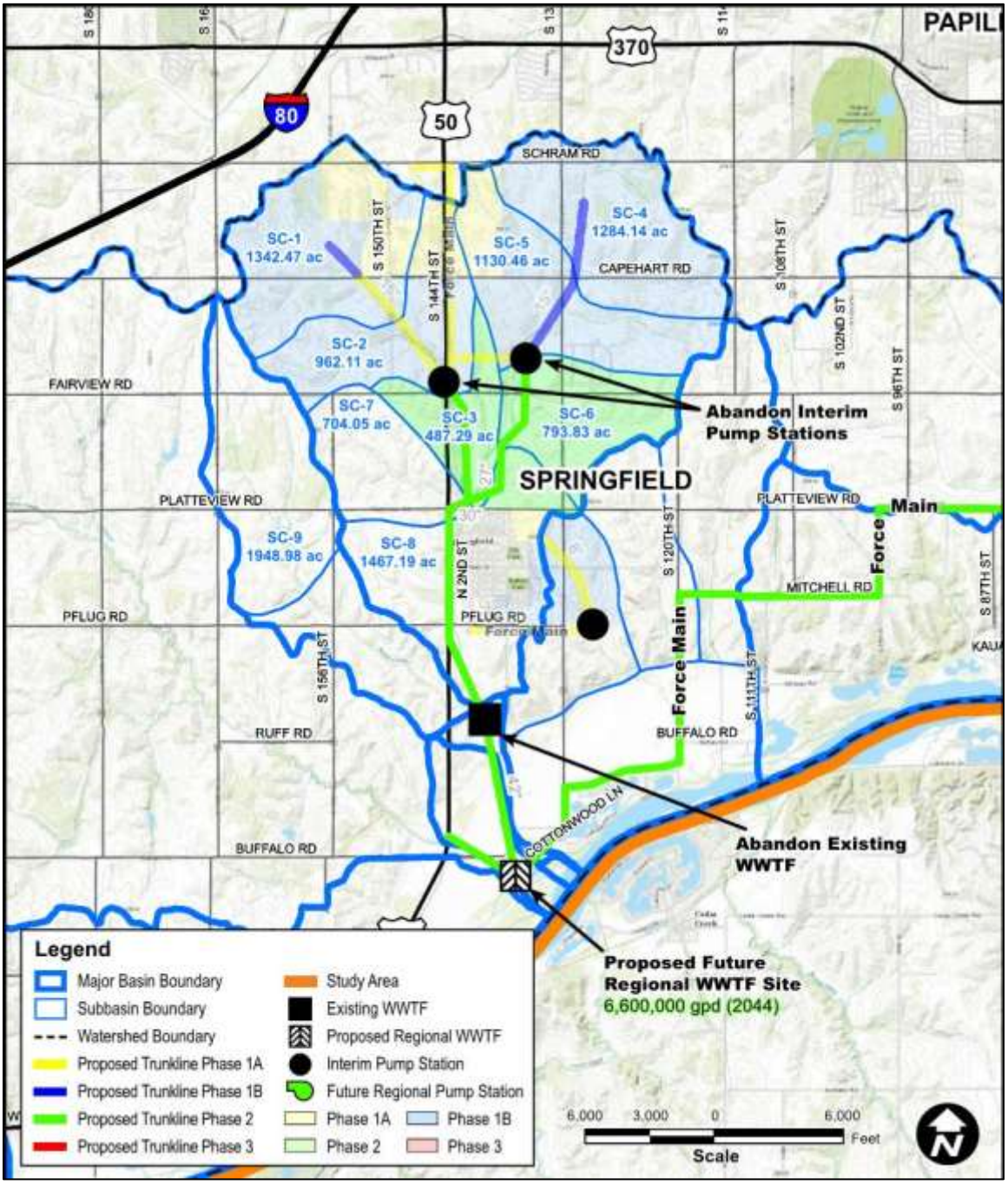


Figure 17. Phase 2 – Springfield Creek Basin

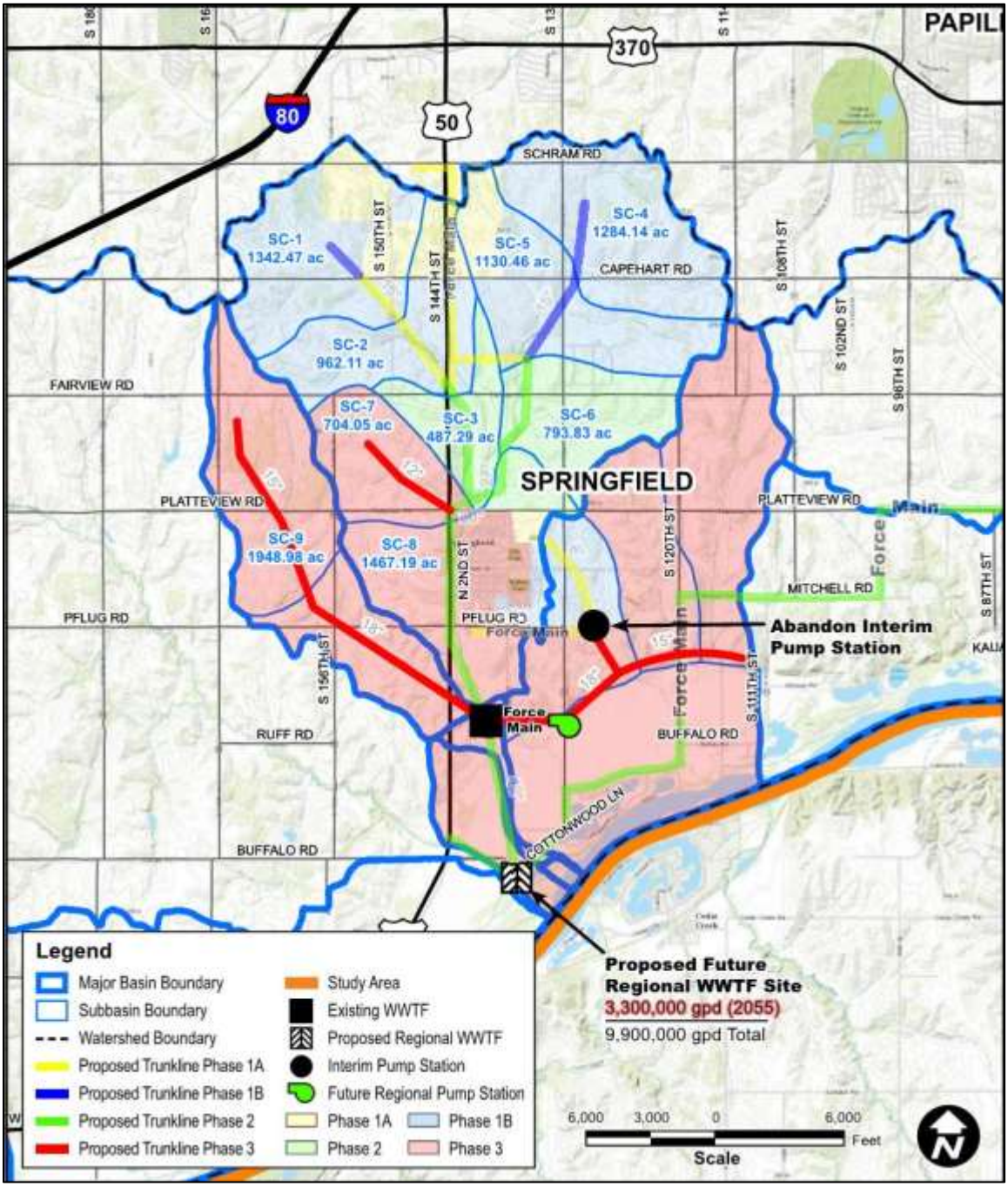


Figure 18. Phase 3 – Springfield Creek Basin

Zweibel Creek Basin

Phasing of the Regional System in Zweibel Creek Basin is presented in Figures 19-21.

Phase 1

Phase 1 in the Zweibel Creek Basin begins with Phase 1B, as an immediate need was not perceived in Zweibel Creek according to the associated stakeholders. Any growth during the interim between Phase 1A and Phase 1B would be supported by a continuation of the existing over the ridge pumping to Omaha. In Phase 1B, a series of interceptors, and two interim satellite treatment facilities with a capacity of 350,000 GPD each would be constructed in the Zweibel Creek Basin. The west interim treatment facility was assumed to be in the locality of Platteview Road and South 84th Street. The east facility is assumed to be south of Platteview road and east of South 50th Street. The infrastructure would serve growth south of Papillion in the northeast portion of the drainage basin, and the area on the east side of the drainage basin north and south of Platteview Road.

Phase 2

During the second phase, an interceptor would be constructed south of the previously constructed west interceptor, opening up the remainder of the west portion of Zweibel Creek Basin. A regional pump station preliminarily assumed to be south of Laplatte Road and east of South 60th Street would be constructed, along with a force main to convey flow from the Regional PS site to the Regional WWTF in the Springfield Creek Basin. Finally, the interim treatment facilities would be decommissioned during Phase 2, and interceptors would be constructed to convey flow from the existing satellite treatment facility sites to the new Regional PS.

Phase 3

In Phase 3, the previously constructed Regional PS would be expanded and interceptors constructed to open up the remainder of the Zweibel Creek Basin.

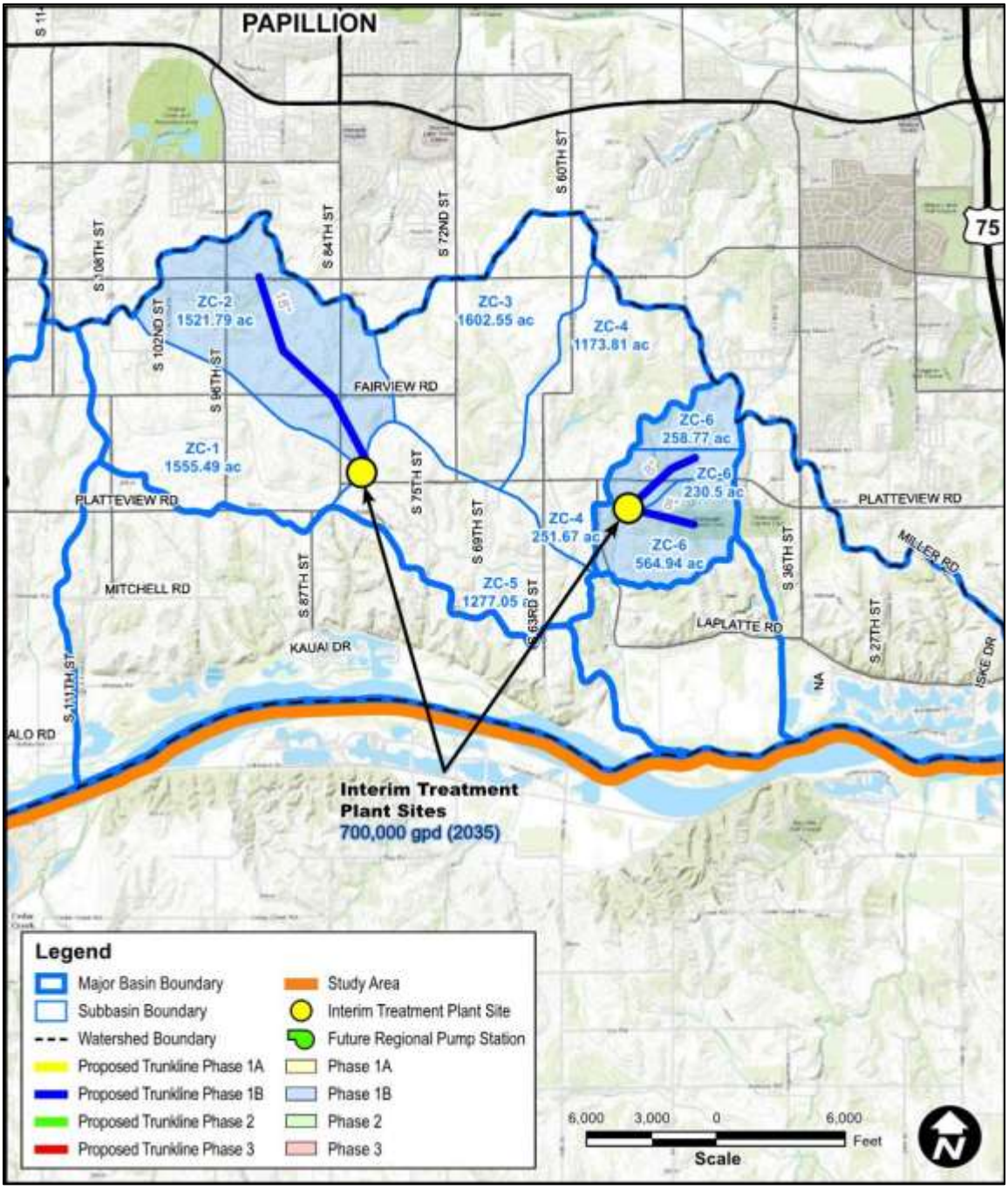


Figure 19. Phase 1B – Zweibel Creek Basin

Figure 20. Phase 2 – Zweibel Creek Basin

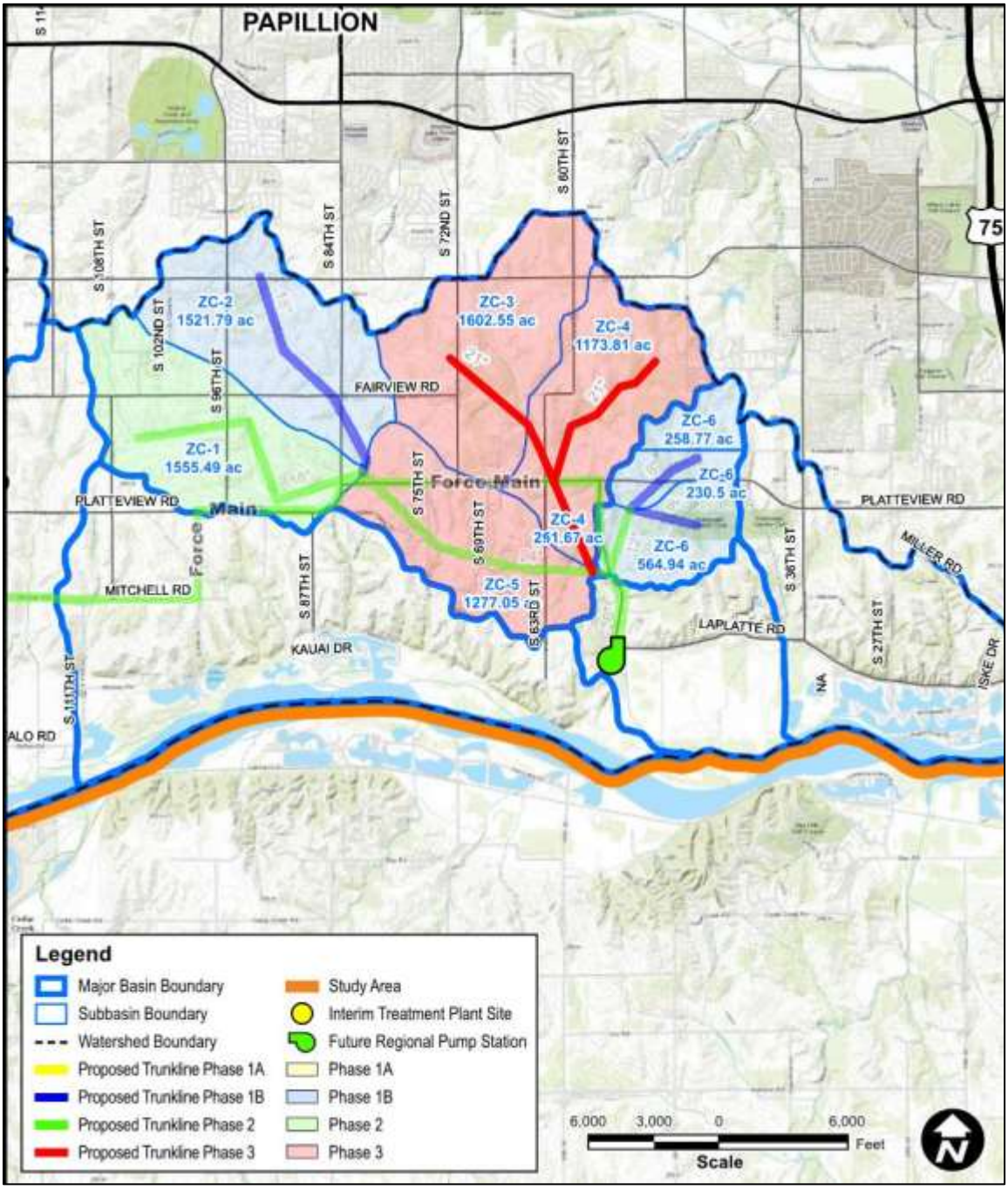


Figure 21. Phase 3 – Zweibel Creek Basin

Costs

Capital Costs

The preliminary capital cost estimate associated with the Regional Wastewater Concept refined in the Southern Sarpy County Wastewater Treatment Study has been organized according to phase and by

basin, and is summarized in Tables 10 and 11. Capital costs include estimated construction costs, a contingency, and an allowance for engineering, legal, and administrative costs. Additionally, a breakdown of the cost estimate for each basin is included in Attachment C following this document. All costs are order of magnitude, planning level costs, and are presented in 2015 dollars (20 Cities ENR 9992).

Table 10 – Preliminary Regional Capital Cost Estimate By Phase

Phase	Cost (2015 Dollars)
Phase 1A	$ 22,600,000
Phase 1B	$ 28,500,000
Phase 2	$ 115,100,000
Phase 3	$ 54,600,000
Total Project	**$ 220,800,000**

Table 11 – Preliminary Regional Capital Cost Estimate By Basin

Buffalo Creek	Cost (2015 Dollars)
Phase 1A	$ 10,000,000
Phase 1B	$ 9,000,000
Phase 2	$ 32,800,000
Phase 3	$ 15,800,000
Total	**$ 67,600,000**
Springfield Creek	**Cost (2015 Dollars)**
Phase 1A	$ 12,600,000
Phase 1B	$ 8,400,000
Phase 2	$ 38,000,000
Phase 3	$ 22,300,000
Total	**$ 81,300,000**
Zweibel Creek	**Cost (2015 Dollars)**
Phase 1A	N/A
Phase 1B	$ 11,100,000
Phase 2	$ 44,300,000
Phase 3	$ 16,500,000
Total	**$ 71,900,000**

O&M Costs

Preliminary annual operation and maintenance (O&M) requirements for each drainage basin, according to phasing, were also estimated for the major system components (pump station, collection system, etc.). These estimated costs are shown in Table 12 and include general labor, chemical, electrical, and preventative maintenance on equipment/infrastructure as well as a multiplier (2.6) to account for administrative/overhead costs, major infrastructure/equipment repair, and other miscellaneous operating expenses. The multiplier is based on AWWA benchmarking data (2013) and annual operating budgets from existing systems of similar complexity functioning in the region. All costs are order of magnitude, planning level costs, and are presented in 2015 dollars (20 Cities ENR 9992).

Table 12 – Preliminary Regional O&M Cost Estimate By Phase and Component (2015 Dollars)

Drainage Basin	Component	Phase 1A Annual Cost	Phase 1B Annual Cost	Phase 2 Annual Cost	Phase 3 Annual Cost
Buffalo Creek	Collection System	$13,270	$24,110	$55,710	$96,980
	Force Main	N/A	N/A	N/A	N/A
	Pump Station	N/A	N/A	N/A	N/A
	Treatment	$624,150	$1,248,290	$978,960	$1,468,440
	Portion of Regional System	**$637,410**	**$1,272,400**	**$1,034,670**	**$1,565,420**
Springfield Creek	Collection System	$8,510	$16,150	$42,370	$70,380
	Force Main	$5,490	$5,490	$1,440	$940
	Pump Station	$507,120	$507,120	$240,560	$292,570
	Treatment	$624,150	$1,248,290	$1,302,270	$1,953,410
	Portion of Regional System	**$1,145,260**	**$1,777,050**	**$1,586,620**	**$2,317,280**
Zweibel Creek	Collection System	N/A	$13,890	$40,340	$56,020
	Force Main	N/A	N/A	$15,610	$15,610
	Pump Station	N/A	N/A	$647,760	$647,760
	Treatment	N/A	$728,170	$1,151,570	$1,727,350
	Portion of Regional System	**N/A**	**$742,060**	**$1,855,270**	**$2,446,730**

Cash Flow

Table 13 identifies the timing of the capital and annual O&M costs for the refined regional concept and phasing plan presented herein. As indicated, all cost information is presented in 2015 dollars. It should be noted that a financial analysis will be completed as a part of this study. The results of this analysis will be summarized in the Regional Wastewater System Financial Assessment Technical Memorandum.

Table 13 – Preliminary Regional Concept Capital and O&M Cost Summary (2015 Dollars)						
Year	Capital Outlay			O&M Cost		
	Buffalo	Springfield	Zweibel	Buffalo	Springfield	Zweibel
2016	$ 845,700	$ 1,069,860	$ 0	$ 0	$ 0	$ 0
2017	$ 3,382,800	$ 4,279,440	$ 0	$ 0	$ 0	$ 0
2018	$ 3,382,800	$ 4,279,440	$ 0	$ 0	$ 0	$ 0
2019	$ 845,700	$ 1,069,860	$ 0	$ 0	$ 0	$ 0
2020	$ 0	$ 0	$ 0	$ 637,410	$ 1,145,260	$ 0
2021	$ 0	$ 0	$ 0	$ 637,410	$ 1,145,260	$ 0
2022	$ 0	$ 0	$ 0	$ 637,410	$ 1,145,260	$ 0
2023	$ 0	$ 0	$ 0	$ 637,410	$ 1,145,260	$ 0
2024	$ 0	$ 0	$ 0	$ 637,410	$ 1,145,260	$ 0
2025	$ 762,630	$ 714,660	$ 936,536	$ 637,410	$ 1,145,260	$ 0
2026	$ 3,050,520	$ 2,858,640	$ 3,746,146	$ 637,410	$ 1,145,260	$ 0
2027	$ 3,050,520	$ 2,858,640	$ 3,746,146	$ 637,410	$ 1,145,260	$ 0
2028	$ 762,630	$ 714,660	$ 936,536	$ 637,410	$ 1,145,260	$ 0
2029	$ 0	$ 0	$ 0	$ 1,272,400	$ 1,777,050	$ 742,060
2030	$ 0	$ 0	$ 0	$ 1,272,400	$ 1,777,050	$ 742,060
2031	$ 2,197,136.49	$ 2,551,521.93	$2,981,148.23	$ 1,272,400	$ 1,777,050	$ 742,060
2032	$ 7,689,977.73	$ 8,930,326.76	$10,434,018.80	$ 1,272,400	$ 1,777,050	$ 742,060
2033	$ 7,964,619.79	$ 9,249,267.00	$10,806,662.33	$ 1,272,400	$ 1,777,050	$ 742,060
2034	$ 7,964,619.79	$ 9,249,267.00	$10,806,662.33	$ 1,272,400	$ 1,777,050	$ 742,060
2035	$ 1,647,852.37	$ 1,913,641.45	$2,235,861.17	$ 1,272,400	$ 1,777,050	$ 742,060
2036	$ 0	$ 0	$ 0	$ 1,034,670	$ 1,586,620	$ 1,855,270
2037	$ 0	$ 0	$ 0	$ 1,034,670	$ 1,586,620	$ 1,855,270
2038	$ 0	$ 0	$ 0	$ 1,034,670	$ 1,586,620	$ 1,855,270
2039	$ 0	$ 0	$ 0	$ 1,034,670	$ 1,586,620	$ 1,855,270
2040	$ 0	$ 0	$ 0	$ 1,034,670	$ 1,586,620	$ 1,855,270
2041	$ 1,336,355.31	$ 1,887,021.21	$ 1,399,323.48	$ 1,034,670	$ 1,586,620	$ 1,855,270
2042	$ 5,345,421.24	$ 7,548,084.83	$ 5,597,293.93	$ 1,034,670	$ 1,586,620	$ 1,855,270
2043	$ 5,345,421.24	$ 7,548,084.83	$ 5,597,293.93	$ 1,034,670	$ 1,586,620	$ 1,855,270
2044	$ 1,336,355.31	$ 1,887,021.21	$ 1,399,323.48	$ 1,034,670	$ 1,586,620	$ 1,855,270
2045	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2046	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2047	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2048	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2049	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2050	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2051	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2052	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2053	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2054	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730
2055	$ 0	$ 0	$ 0	$ 1,565,420	$ 2,317,290	$ 2,446,730

Attachment A – Basin Workshop Meeting Minutes

Meeting Minutes

Project:	Southern Ridge Wastewater Treatment Study – Phase 1b
Subject:	Kick-off Stakeholder Meeting
Date:	Thursday, October 01, 2015
Location:	Sarpy County Board Room
Attendees:	See sign-in sheet attached

Agenda

- Phase 1A results refresher
- Phase 1B
    - Objectives
    - Potential growth forecasts
    - Potential growth/development areas
    - 2007 Plan Phases 1, 2, and 3
    - Current Interim Plans
- Basin Breakout sessions
    - Growth Forecasts (20 minutes)
    - Growth/Development Areas (15 minutes)
    - Immediate Plans (15 minutes)
    - Refined Phasing Plan (20 minutes)
    - Potential Implementation Schedule (10 minutes)
    - Potential Capital Outlay (10 minutes)
    - Potential Funding Mechanisms (time permitting)
- Basin Breakout Feedback
- Next steps and path forward

Meeting Discussion

- Reviewed the project presentation, covering:
    - Phase 1A results refresher
    - Phase 1B
        - Objectives
        - Potential growth forecasts
        - Potential growth/development areas
        - 2007 Plan Phases 1, 2, and 3
        - Current Interim Plans
- Conducted three individual working sessions for Buffalo Creek, Springfield Creek and Zweibel Creek (see attachments for breakout session notes) covering:
        - Growth Forecasts (20 minutes)
        - Growth/Development Areas (15 minutes)
        - Immediate Plans (15 minutes)

  - Refined Phasing Plan (20 minutes)
  - Potential Implementation Schedule (10 minutes)
  - Potential Capital Outlay (10 minutes)
  - Potential Funding Mechanisms (time permitting)
- Basin facilitator provided summary Basin Breakout Feedback
- Discussed Next steps and path forward
    - Data request from each community on sewer information

Attachments: Sign-In sheet
Meeting Agenda and Data Request
Breakout Question List
Buffalo Creek Breakout meeting notes
Springfield Creek Breakout meeting notes
Zweibel Creek Breakout meeting notes

Southern Sarpy County Wastewater Study - Phase 1B

Kickoff Stakeholder Meeting

10.01.2015

Name		Company	Attendance			
James	Bartels	MUD	☒	Present	☐	Not Present
Art	Beccard	TD2	☒	Present	☐	Not Present
Dan	Berlowitz	Bellevue	☐	Present	☒	Not Present
Scott	Bovick	Sarpy Co.	☐	Present	☒	Not Present
Dave	Dechant	HDR	☒	Present	☐	Not Present
Mayor	Dill	Springfield	☐	Present	☒	Not Present
Pat	Dowse	Sarpy Co.	☒	Present	☐	Not Present
Bruce	Fountain	Sarpy Co.	☒	Present	☐	Not Present
Mike	Gilligan	JEO	☐	Present	☒	Not Present
Kathleen	Gottsch	Springfield	☒	Present	☐	Not Present
Bill	Herr	Sarpy Co.	☒	Present	☐	Not Present
Dan	Hoins	Papillion	☒	Present	☐	Not Present
Erin	Hunt	HDR	☐	Present	☒	Not Present
Kevin	Jarosz	Black Hills Energy	☐	Present	☒	Not Present
Steve	Jensen	Sarpy Co.	☒	Present	☐	Not Present
Don	Kelly	Sarpy County Board	☒	Present	☐	Not Present
Owen	Killham	Olsson	☐	Present	☒	Not Present
Jeff	Kooistra	Gretna	☒	Present	☐	Not Present
John	Kottmann	LaVista City	☒	Present	☐	Not Present
Marty	Leming	Papillion	☒	Present	☐	Not Present
Donna	Lyman	Sarpy Co.	☒	Present	☐	Not Present
Tim	Obrian	OPPD	☐	Present	☒	Not Present
Nichole	O'Keefe	Sarpy Co.	☐	Present	☒	Not Present
James	Olmsted	O&P	☒	Present	☐	Not Present
Steve	Oltmans	Olsson	☒	Present	☐	Not Present
Steve	Perry	O&P	☐	Present	☒	Not Present
Marlin	Petermann	PMRNRD	☒	Present	☐	Not Present
Mike	Piernicky	Olsson	☐	Present	☒	Not Present
Dave	Potter	JEO	☒	Present	☐	Not Present
Andrew	Rainboldt	Sarpy Econ Dev	☒	Present	☐	Not Present
Jeff	Ray	JEO	☒	Present	☐	Not Present
Jeff	Roberts	Bellevue	☐	Present	☒	Not Present
Joe	Roberts	HDR	☒	Present	☐	Not Present
Kent	Roberts	Black Hills Energy	☒	Present	☐	Not Present
Chris	Shewchuk	Bellevue	☒	Present	☐	Not Present
Mike	Smith	Sarpy Co.	☒	Present	☐	Not Present
Joe	Soucie	LaVista	☐	Present	☒	Not Present
Jeff	Thompson	Papillion	☒	Present	☐	Not Present
Jeremy	Walker	Olsson	☒	Present	☐	Not Present
Jim	Warren	Sarpy County Board	☒	Present	☐	Not Present
Mark	Wayne	Sarpy Co.	☒	Present	☐	Not Present
Ann	Williams	HDR	☒	Present	☐	Not Present
Denny	Wilson	Sarpy Co.	☒	Present	☐	Not Present
John	Winkler	PMRNRD	☐	Present	☒	Not Present
Greg	Youell	MAPA	☐	Present	☒	Not Present
Leanne	Ziettlow	HDR	☒	Present	☐	Not Present

Mike Felschow MAPA ✓
Darren Carlson Springfield ✓
Bob Roseland Spr. City Council ✓

Dean Dunn, Bellevue ✓
Eric Williams - Papio ✓

Agenda

Project:	Southern Ridge Wastewater Treatment Study – Phase 1B
Subject:	Basin Workshop
Date:	Thursday, October 01, 2015
Location:	Sarpy County Administration Building, Board Room

- Introductions
- Phase 1A results refresher
- Phase 1B
  - Objectives
  - Potential growth forecasts
  - Potential growth/development areas
  - 2007 Plan Phases 1, 2, and 3
  - Current Interim Plans
- Basin Breakout sessions
  - Growth Forecasts (20 minutes)
  - Growth/Development Areas (15 minutes)
  - Immediate Plans (15 minutes)
  - Refined Phasing Plan (20 minutes)
  - Potential Implementation Schedule (10 minutes)
  - Potential Capital Outlay (10 minutes)
  - Potential Funding Mechanisms (time permitting)
- Basin Breakout Feedback
- Next steps and path forward

Info Request

- Detailed budget report (labor, materials, supplies) for sanitary sewer system (collection, pumping, conveyance, and treatment)
- Current rate structure and other fees
- Sanitary sewer system asset inventory (collection, pumping, conveyance, and treatment)

Southern Ridge Wastewater Treatment Study
Basins Workshop 10/01/2015
Breakout Questions

Growth Forecasts (20 min)

1. Does 2000 through 2010 growth provide a good basis for forecasting current and future growth for this study, or should we forecast more or less, and why?
2. Does the identified 5% (2020), 25% (2025), 60% (2035), 90% (2055) progression for growth south of the ridgeline a good basis for forecasting sewer needs south of the ridgeline, or should we forecast more or less growth south of the ridgeline, and why?
3. Does the identified 25% Buffalo Creek, 40% Springfield Creek, and 35% Zweibel Creek growth distribution provide a good basis for forecasting sewer needs south of the ridgeline, or should we forecast a different split, where, and why?

Growth/Development Areas (15 min)

1. What are the current and shorter term growth pressures south of the ridgeline – residential, commercial, and industrial?
2. Where are the current and shorter term growth pressures south of the ridgeline?

Immediate Plans (15 min)

1. What is being planned in the way of sewer service to accommodate growth south of the ridgeline in the next 6 months to 3 years?
2. Where and what type of growth will be accommodated?

Refined Phasing Plan (20 min)

1. Which subbasins south of the ridgeline should be provided with sewer service initially to accommodate commercial / industrial growth over the next 3 to 10 years?
2. Which subbasins south of the ridgeline should be provided with sewer service initially to accommodate residential growth over the next 3 to 10 years?
3. Are the Cities and County willing and able to focus growth into target areas to manage infrastructure costs?

Potential Implementation Schedule (10 min)

1. Is the proposed phasing to implement Phase 1A in the 2016-2020 timeframe to serve forecast growth through 2028-2030 and to implement Phase 1B in the 2025 to 2028 timeframe to serve forecast growth through 2035 a good basis for this study, or should it be more or less aggressive?
2. Is the approach to implement Phase 1A through separate ICA agreements for each basin in parallel with development of a county wide JPA agreement for subsequent operation and implementation a good approach, or are there better ideas?

Potential Capital Outlay (10 min)

1. Are the initially estimated Phase 1A expenditures of $8.7m for Buffalo Creek, $14.7m for Springfield Creek, $12.2m for Zweibel Creek, and $35.6m overall manageable or too much? Could more be accommodated?
2. Are the initially estimated Phase 1A expenditures of $4.9m for Buffalo Creek, $12.4m for Springfield Creek, $11.0m for Zweibel Creek, and $28.3m overall manageable or too much? Could more be accommodated?

Potential Funding Mechanisms (time per.)

1. What sewer development fees are currently being charged?
2. What range of sewer development fees could be charged?
3. What sewer rates are currently being charged?
4. What range of sewer rates could be charged?
5. What other funding sources should be considered?

Breakout Sessions

03

Growth Forecasts (20 min)

Growth/Development Areas (15 min)

Immediate Plans (15 min)

Refined Phasing Plan (20 min)

Potential Implementation Schedule (10 min)

Potential Capital Outlay (10 min)

Potential Funding Mechanisms (time per.)

Potential Growth Forecasts (to be refined)

Sarpy County Population

- 2000 Population = 122,595
- 2010 Population = 158,840
- Growth = 36,245 over 10 years
- Growth = 3,624.5 per year

Sarpy County Flows

- Flows = 130 gpcd *(from prior master plan)*
- Flows = 98 gpcd Max Month *(from Table II-4 in Springfield Wastewater Treatment and Collection System Study)*

Assumptions

- 3624.5 per year
- % South of Ridge Line
  - 5% - 2020
  - 25% - 2025
  - 60% - 2035
  - 90% - 2055
- 25% Buffalo Creek
- 40% Springfield Creek
- 35% Zweibel Creek
- 100 gpcd Max Month

Potential Sarpy County Growth Forecasts (to be refined)

Year		Cumulative Total South	Cumulative Buffalo Creek	Cumulative Springfield Creek	Cumulative Zweibel Creek
2025	Population	6,160	1,540	2,470	2,160
2025	Flow	600,000	150,000	250,000	200,000
2030	Population	17,040	4,260	6,810	5,960
2030	Flow	1,700,000	400,000	700,000	600,000
2035	Population	28,450	7,110	11,380	9,960
2035	Flow	2,800,000	700,000	1,100,000	1,000,000
2045	Population	61,070	15,270	24,430	21,380
2045	Flow	6,100,000	1,500,000	2,400,000	2,000,000
2055	Population	93,690	23,420	37,480	32,790
2055	Flow	9,400,000	2,300,000	3,700,000	3,300,000

Potential Sarpy County Growth Forecasts (to be refined)

Year		Cumulative Total South	Cumulative Buffalo Creek	Cumulative Springfield Creek	Cumulative Zweibel Creek
2025	Households	2,300	600	900	800
2025	Flow	600,000	150,000	250,000	200,000
2030	Households	6,300	1,600	2,500	2,200
2030	Flow	1,700,000	400,000	700,000	600,000
2035	Households	10,500	2,600	4,200	3,700
2035	Flow	2,800,000	700,000	1,100,000	1,000,000
2045	Households	22,500	5,600	9,000	7,900
2045	Flow	6,100,000	1,500,000	2,400,000	2,000,000
2055	Households	34,700	8,700	13,900	12,100
2055	Flow	9,400,000	2,300,000	3,700,000	3,300,000

Potential Implementation (to be refined)

2015

Interlocal agreements to proceed with initial conveyance and treatment

- Sarpy County/Gretna (Buffalo Creek)
- Sarpy County/ Springfield (Springfield Creek)
- Sarpy County/Papillion/ Bellevue (Zweibel Creek)

Operational facilities in 3-5 years

2020

JPA Agreement for regional operation (and subsequent conveyance and treatment)

- Sarpy County
- Gretna
- Springfield
- Papillion
- Bellevue
- La Vista

2025

- Sarpy County/Gretna expand Buffalo Creek
- Sarpy County/ Springfield expand Springfield Creek
- Sarpy County/Papillion/ Bellevue expand Zweibel Creek

-or-

Regional authority expands Buffalo Creek, Springfield Creek and Zweibel Creek

2030

Regional authority proceed with regional conveyance and treatment

Potential Capital Outlay (to be refined)

Buffalo Creek $8.7m
Springfield Creek $14.7m
Zweibel Creek $12.2m
Total $35.6m
(2015 $)
Serves Population To ± 2028
~$2600 per capita

Buffalo Creek $4.9m
Springfield Creek $12.4m
Zweibel Creek $11.0m
Total $28.3m
(2015 $)
Serves Population to ±2035
~$2100 per capita

Buffalo Creek Breakout Questions Discussion Summary

Attendees in breakout group:

John Kottman, La Vista	Joe Roberts, HDR
James Olmsted, O&P	Jim Warren, Sarpy Co. Board
Marlin Petermann, P-MRNRD	Ann Williams, HDR
Jeff Ray, JEO	Denny Wilson, Sarpy Co.

Growth Forecasts

- Group commented that the linear population growth observed in 2000 through 2010 (3,264 people/year) was a good basis for the study. Additionally, the same linear growth appears to have been realized over the last five years.
- Group members noted that 2.7 people per household appeared low. Three (3) per household was proposed instead.
- 100 gpcd was identified as a reasonable projection for water usage.
- The group believes slow growth south of the ridgeline is likely, and thought the identified progression seemed reasonable.
- Omaha's new growth projection was referenced at this time, which projects only 20 years of developable area available in Omaha.
- It was noted that if sewer service was provided, or the remaining developable area in Omaha is consumed sooner than anticipated, growth may occur at a faster rate than displayed.
- The group thought 25% split for Buffalo Creek seemed a little low.
- Group members noted that school district boundaries could have a significant affect on where growth occurs.

Growth/Development Areas

- Group anticipates growth would predominately be residential with a few areas identified as high density residential or multifamily. It is projected that commercial will also occur primarily along highway and interstate corridors. A small section of industrial growth north of the Capehart Rd, south of I-80 starting along Highway 50, and moving west is projected. Additionally, pockets of industrial growth along the interstate corridor are also possible.
- Where are the current and shorter term growth pressures south of the ridgeline?
  - See the marked-up Buffalo Creek Basin Maps (red=commercial, purple=industrial, yellow=residential, non shaded portion of basin map also assumed to be residential).
  - Immediate growth pressure was identified adjacent the S 31 and I-80 junction (NE and SE), extending e/w along I-80 and n/s along S 31 (BC 1 & BC 2). Area north of the interstate is the highest priority (BC 1).
    - Approximately 2100 acres

- Growth in the remainder of the basin is highly dependent on where access from I-80 is located.
    - An I-80 interchange at 192nd street was discussed as a likely scenario. However, others indicated that NDOR is leaning away from an interchange in this location, as there are two existing interchanges nearby. If an interchange is constructed in this location, growth is anticipated around the interchange and along the 192nd Street and Platteview RD corridors.
    - A push for an interchange at Pflug RD was also identified as a possibility. If this is realized, area south of interstate (BC 2) becomes another priority.

Immediate Plans

- What is being planned in the way of sewer service to accommodate growth south of the ridgeline in the next 6 months to 3 years?
    - The City of Gretna has entered into an agreement with the City of Omaha and Sarpy County to pump sanitary flow from the area to be developed, over the ridge to Omaha for treatment. Per this agreement, Gretna has agreed not to develop approximately 2100 acres of land north of the ridgeline.
    - With water infrastructure (16" water main) and transportation infrastructure already in place, the City of Gretna is in the planning phase of bringing sewer service to this area, and is currently actively engaged in preliminary design.
    - The initial design concept is to convey sanitary flow via gravity from this area to the SE (roughly aligns with proposed 18" interceptor). A new pump station and force main would be constructed, pumping flow over the ridgeline to Omaha. Some of the infrastructure supports the regional plan, but the remainder does not (i.e. the pump station and force main would eventually be abandoned).
    - It is anticipated that construction would begin within 2 years.
    - It was noted, that the City of Gretna has deferred approximately 2,100 acres north of the ridgeline in order to pump the same from south of the ridgeline. Depending on the direction of development, there may be a more immediate need to open up that deferred acreage for development.
    - The question was asked whether the packaged plant concept has been reviewed/considered by the City of Gretna. To date, it has not.

- Where and what type of growth will be accommodated?
    - Predominately residential with some high density/multifamily. Some commercial is also anticipated. Growth initially to the NE and SE of the I-80 and S 31 junction and along highway and interstate corridors (portions of BC 1&2). Some industrial is possible along interstate corridor as well.

Refined Phasing Plan

- Which subbasins south of the ridgeline should be provided with sewer service initially to accommodate commercial / industrial growth over the next 3 to 10 years?
  - Portions of BC 1 and 2 along interstate and highway corridor – Commercial/potential industrial along interstate corridor (2 years)
  - Small portion of BC No. 4 on north end – Industrial
- Which subbasins south of the ridgeline should be provided with sewer service initially to accommodate residential growth over the next 3 to 10 years?
  - Portions of BC 1 and 2 – (2 years)
- Are the Cities and County willing and able to focus growth into target areas to manage infrastructure costs?
  - Gretna is already focusing growth in target areas that have water mains and transportation infrastructure in place. Cities prefer growth within the cities and their ETJs.

Potential Implementation Schedule

- Is the proposed phasing to implement Phase 1A in the 2016-2020 timeframe to serve forecast growth through 2028-2030 and to implement Phase 1B in the 2025 to 2028 timeframe to serve forecast growth through 2035 a good basis for this study, or should it be more or less aggressive?
  - Everything is fluid, but the phasing identified appears reasonable currently. Also, proposed phasing to implement 1A timeframe would/could change Gretna's current plans (pump station and force main within 2 years).

- Is the approach to implement Phase 1A through separate ICA agreements for each basin in parallel with development of a county wide JPA agreement for subsequent operation and implementation a good approach, or are there better ideas?
  - Separate ICA agreements in the short term is the best approach that is available at the present time. Defining JPA logistics as soon as possible is ideal.
  - Determining how to manage/what to do with revenue generated by new sewer service is critical.

Potential Capital Outlay

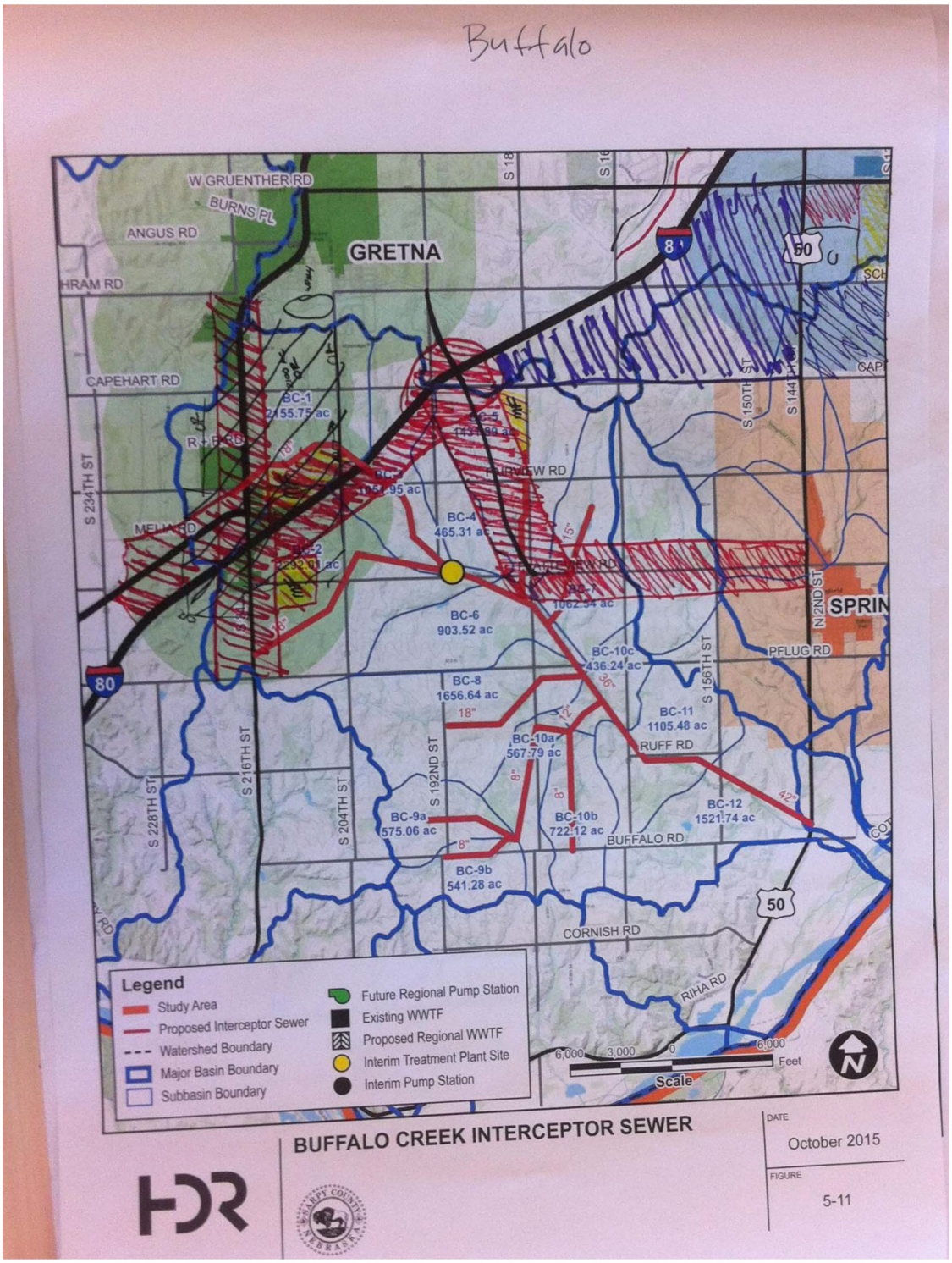
- It was discussed that treatment and construction costs will not decrease.
- Gretna currently has agreement to pump over the ridge for approximately 2,100 acres. The design and construction of infrastructure to do that (force main and pump station) is estimated to cost approx. $6M.

Potential Funding Mechanisms

- What sewer development fees are currently being charged?
  - $11,000/acre commercial and industrial
- What range of sewer development fees could be charged?
- What sewer rates are currently being charged?
- What range of sewer rates could be charged?
- What other funding sources should be considered?
  - SRF Funding
  - Water Sustainability Fund
  - National grants that promote regional treatment and environmental benefits should be explored.

Attachments

- Markups of subbasin maps (3)


Buffalo
GRETNA
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BURNS PL
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HRAM RD
CAPEHART RD
MELIA RD
FAIRVIEW RD
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RUFF RD
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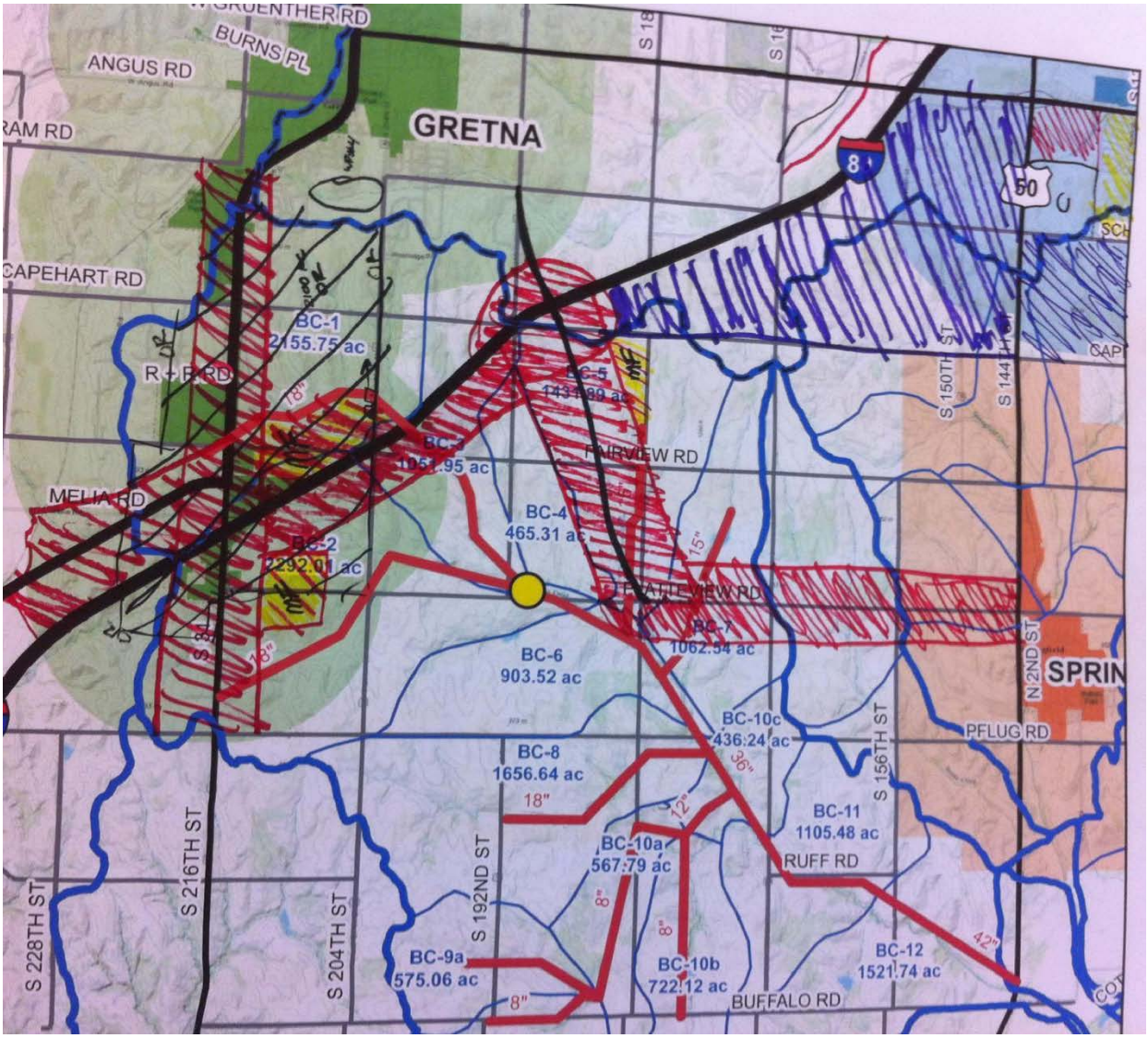
BC-12 1521.74 ac
BC-9a 575.06 ac
BC-9b 541.28 ac
Legend
Study Area
Proposed Interceptor Sewer
Watershed Boundary
Major Basin Boundary
Subbasin Boundary
Future Regional Pump Station
Existing WWTF
Proposed Regional WWTF
Interim Treatment Plant Site
Interim Pump Station
6,000 3,000 0 6,000
Feet
Scale
BUFFALO CREEK INTERCEPTOR SEWER
DATE
October 2015
FIGURE
5-11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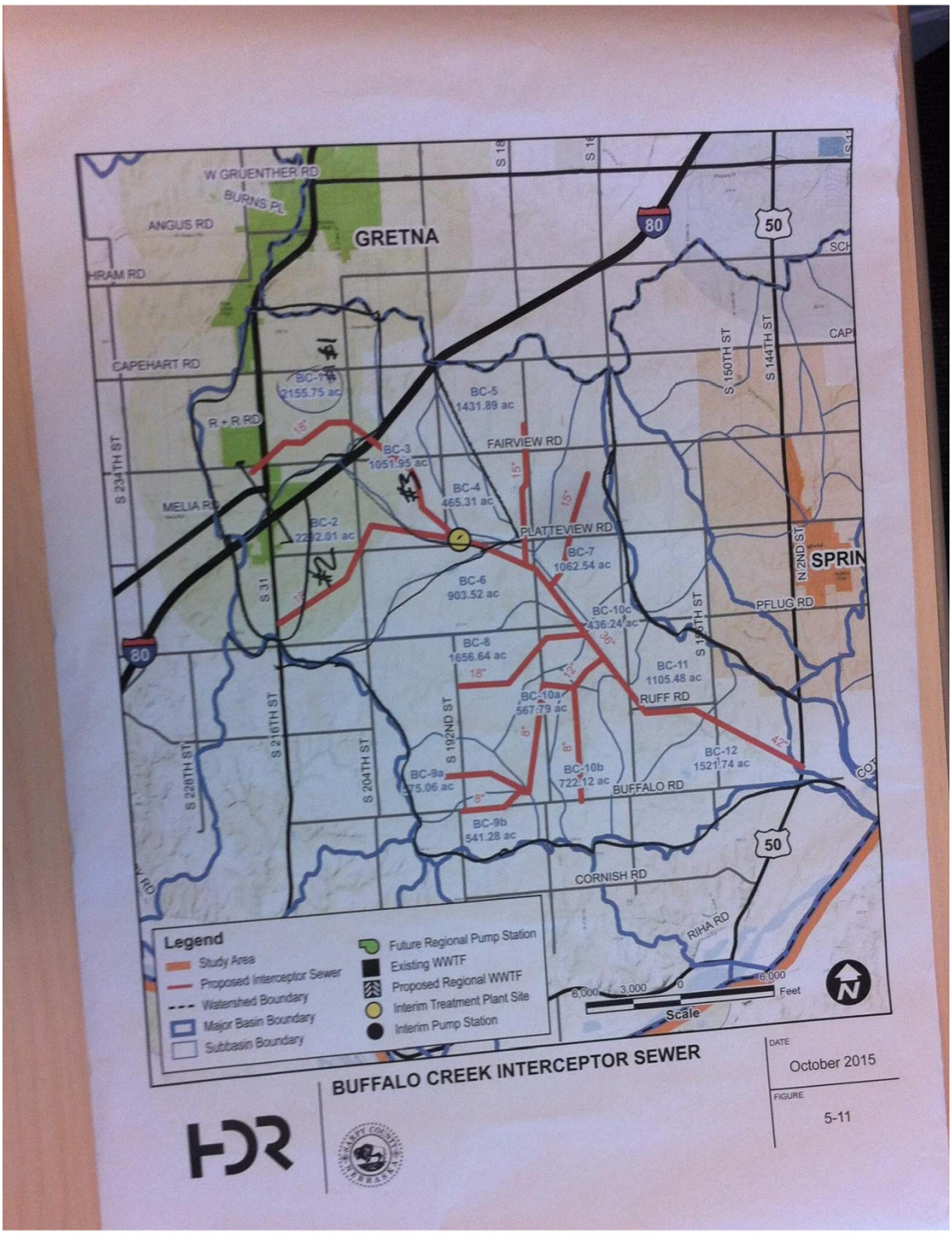
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BC-9a
175.06 ac
BC-9b
541.28 ac
BC-10a
567.79 ac
BC-10b
722.12 ac
BC-10c
436.24 ac
BC-11
1105.48 ac
BC-12
1521.74 ac
Legend
Study Area
Proposed Interceptor Sewer
Watershed Boundary
Major Basin Boundary
Subbasin Boundary
Future Regional Pump Station
Existing WWTF
Proposed Regional WWTF
Interim Treatment Plant Site
Interim Pump Station
6,000 3,000 0 6,000 Feet
Scale
BUFFALO CREEK INTERCEPTOR SEWER
DATE
October 2015
FIGURE
5-11

Springfield Creek Breakout Questions Discussion Summary

Attendees in breakout group:

Art Beccard, TD2	James Bartels, MUD
Darren Carlson, Springfield	Keri Kasun, MUD
Bill Herr, Sarpy	Kathleen Gottsch, Springfield
Dan Hoins, Papillion	Dave Potter, JEO
Bob Roseland, Springfield	Andrew Rainboldt, Sarpy
Mike Smith, Sarpy	Leanne Ziettlow, HDR
Jeremy Walker, Olsson	

Growth Forecasts

- Group commented that the 3624 growth per year was too low. Suggested 4000 or even 5000 is more representative.
- Group also asked about what residential/commercial/industrial split this represented. Project Team needs to make sure the split takes into account the best estimate of residential/commercial/industrial split going forward.
- Springfield noted that 80 gmcd was used as the max month on the recent report.
- Group thought the percentage split-out was reasonable for both the progression of growth and the split between the three basins was reasonable.

Growth/Development Areas

- Group noted that they are seeing residential north and east of Hwy 50, commercial and industrial west of Hwy 50 for current and shorter term growth pressures.
- Group noted that school district boundaries will affect short-term growth areas.
- Group marked-up one Springfield Creek subbasin plot with knowledge of current development.

Immediate Plans

- What is being planned in the way of sewer service to accommodate growth south of the ridgeline in the next 6 months to 3 years?
  - Springfield has a development in-had that includes 1500 houses and expects Phase 1 at a 5 year build out, Phase 2, 3-4 years and could be started prior to Phase 1 being completed. This will consume the current WWTP remaining capacity. Estimate for expanding this WWTP is 3 - 5 years, so a decision is imminent on a path forward for WWTP improvements.
  - Other developments discussed:
    - 132 & Pflug – multifamily

  - Hwy 50 & Platteview (SW) – light industrial
  - Hwy 50 & Capehart – light industrial
  - Pflug & Platteview - industrial
- Where and what type of growth will be accommodated?
  - Group suggest #1 priority residential east of current Springfield, #2 priority – commercial and industrial north of Springfield. Would need to coordinate these areas with the current Comprehensive Plan document.

Refined Phasing Plan

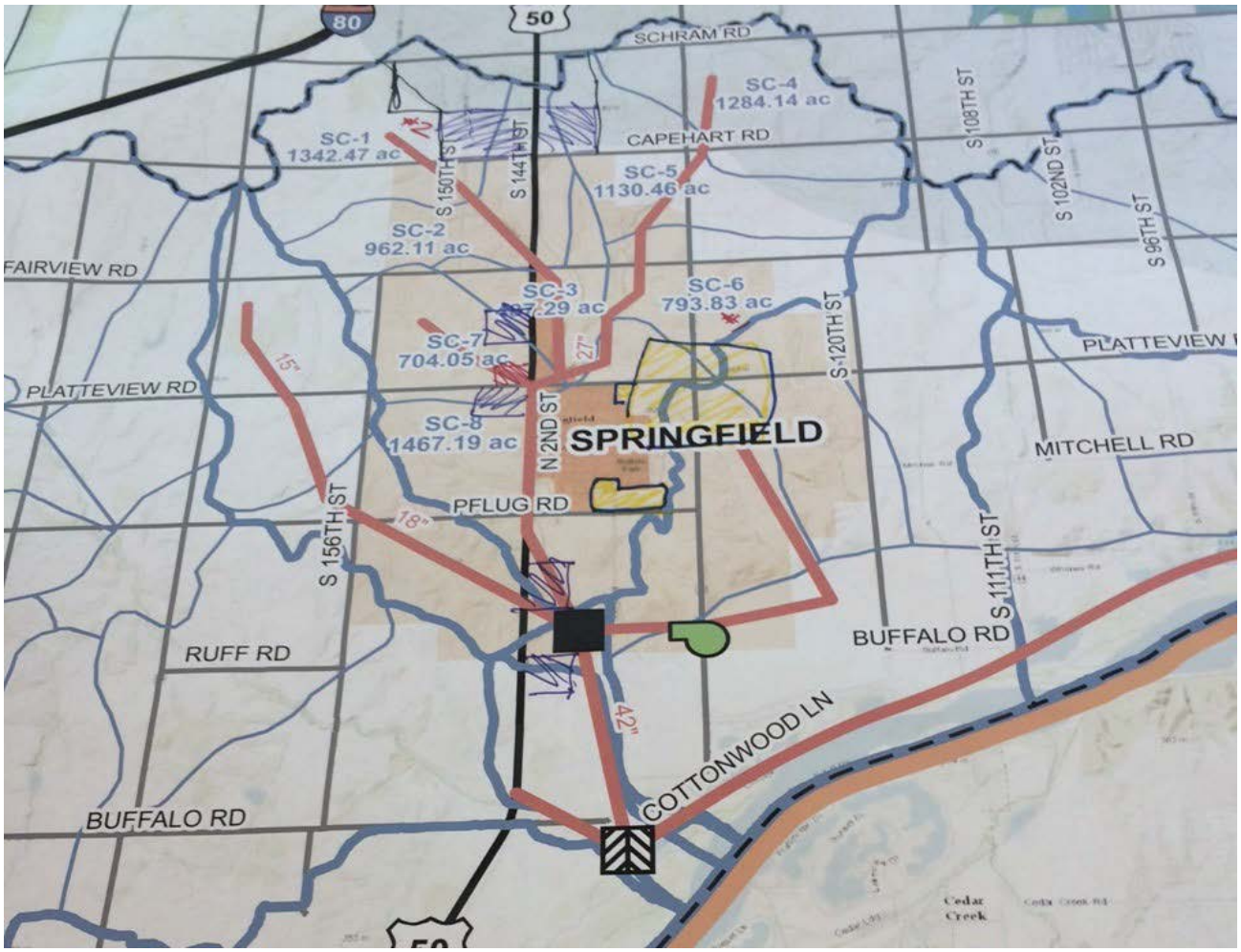
- Which subbasins south of the ridgeline should be provided with sewer service initially to accommodate commercial / industrial growth over the next 3 to 10 years?
  - As noted above.
  - Dependent on what developers approach the Cities and what they want to do. That development then generates revenues and fees.
  - As development comes in, certain decisions would be made but need to support the infrastructure development.
- Which subbasins south of the ridgeline should be provided with sewer service initially to accommodate residential growth over the next 3 to 10 years? Group suggests this is similar to areas identified above.
- Are the Cities and County willing and able to focus growth into target areas to manage infrastructure costs?
  - Papillion noted that they have open ground north of the ridgeline; if developers want area south of the ridgeline, then Papillion asks the City of Omaha to pump over the ridge. They understand that this is counter-productive and want to establish a JPA with the six entities.

Potential Implementation Schedule

- Is the proposed phasing to implement Phase 1A in the 2016-2020 timeframe to serve forecast growth through 2028-2030 and to implement Phase 1B in the 2025 to 2028 timeframe to serve forecast growth through 2035 a good basis for this study, or should it be more or less aggressive?
  - Group supported the implementation of a JPA sooner rather than later. M. Smith (Sarpy Co) stated that, if the details are worked out, a JPA could be completed in 60 days. Would need each jurisdiction to have their governing body approve, too.
    - Suggested using “911 Agreement” as a model.
  - Governing body of the JPA would make decisions on growth priorities and set rates.
  - Group had questions about the timing of the new regional facility and the current Springfield facility, and how that would be phased in.

  - How would this be phased in, and how would the current Springfield facility be phased out (and revenue be reduced to the plant).
- Is the approach to implement Phase 1A through separate ICA agreements for each basin in parallel with development of a county wide JPA agreement for subsequent operation and implementation a good approach, or are there better ideas?
  - Group wanted to go to a JPA ASAP.

Markup of subbasin map:



Zweibel Creek Breakout Questions Discussion Summary

Attendees in group:	Steve Oltmans, Project Team	Donna Lynam, Sarpy
	Pat Dowse, Sarpy	Mark Wayne, Sarpy
	Chris Shewchuk, Bellevue	Jeff Thompson, Papillion
	Marty Leming, Papillion	Eric Williams, P-MR NRD
	Mike Felshow, MAPA	Dave Dechant, Project Team

Growth Forecasts

- Belief is that growth will occur out from existing developed area.
- Concern that growth forecast for wastewater study needs to be coordinated with other planning efforts, ie water, transportation, etc.
- Papillion and MUD are working on a boundary agreement for water service. The half section line along 54th Street extended is the dividing line between the Cities of Papillion and Bellevue.
- MAPA doesn't forecast much growth south of the ridgeline because of a lack of sewer service. Need to coordinate MAPA and sewer study forecasts. MAPA growth model was used to look at growth with and without sewer service south of ridgeline; that information should be available.
- Concern was expressed by MAPA that growth has not occurred and will not occur post 2008 crash the way it did prior to 2008. Also, that the millennial population will change the way growth occurs, ie more densely. It was suggested that we be a bit more conservative than Heartland 2050.
- Others believe that growth will occur with sewer service; perhaps not quite as aggressively as shown in the current forecasts for south of the ridgeline. This will be particularly true as developable acreage is consumed in Omaha (~2040?). It was suggested that the sewer study use the growth model developed for Heartland 2050 and results simulated for southern Sarpy County if sewer service was in place.
- It was agreed that the forecast split for the three basins seemed reasonable. (However, Buffalo may be higher and Zweibel lower)
- School district boundaries are a major influence on growth; however the group expressed confidence that this issue would be addressed by the legislature in the next few years.

Growth/Development Areas

- The growth in Zweibel Creek basin is and will be residential growth with some smaller neighborhood associated commercial growth. No industrial growth is anticipated.

- Within a few years Bellevue will be built out in the Papio Basin. The upper portion of Zweibel Creek basin ZC-4 is already pumped over the ridge. As growth continues outward, Bellevue anticipates permission to pump additional growth over the ridge to Omaha as well. Study needs to account for current Bellevue agreements. The $9M interim price tag does not appear to be reflective to Bellevue's needs.
- Papillion has nothing in their 5 year CIP related to sewer service for growth south of the ridgeline.
- It was discussed, without consensus, that Capehart Road could become the next Schramm Road in 5 years spurring development along that corridor.
- If/when the school district boundary issue is resolved there could be a flurry of development either side of Schramm Road and south of Shadow Lake with the latter occurring more quickly (see yellow highlighted area on basin map). It is likely that the school district impact won't be felt for five years, two to three years to get changed through legislature and two to three years for development to follow.

Immediate Plans

- It was felt that over the ridge negotiations with Omaha are sufficient for limited development in the immediate future for both Bellevue and Papillion in the Zweibel Creek basin.
- Bellevue not anticipating growth to Zweibel in the next 5 years that wouldn't be covered by existing agreements.
- No immediate plans by either Papillion or Bellevue to expand into basins. Papillion could see the need if the school boundary changes. 72nd street corridor may become high demand. Papillion feels growth given current trends will be west to interstate.

Refined Phasing Plan

- Growth is anticipated to be residential and neighborhood commercial.
- Bellevue would prioritize basin ZC-6 for development in Zweibel Creek.
- Papillion would prioritize basin ZC-2 and the west part of ZC-3 for development in Zweibel Creek.
- Several expressed skepticism regarding the ability to manage and focus growth areas in southern Sarpy County believing there are too many competing Cities and the County to do so. It works for Omaha since they are the only entity involved and affected.
- It was suggested that the Papio Creek Watershed Partnership might be a good example of a mechanism to work together to manage and focus growth. That group with multiple stakeholders pretty effectively identifies and prioritizes water quality related projects across the Papio Watershed.
- It was suggested that an inter-cooperative agreement to establish a unified connection fee and collect money for sewer service would be a good start.

Potential Implementation Schedule

- It was agreed that the phasing plan should allow everyone to have a piece of the growth.
- There doesn't seem to be a strong driver for implementation in the Zweibel Creek basin.
- Historically, 3 homes per acre / 8 people per acre has been a good rule of thumb for future growth. However, this may not be appropriate for southern Sarpy County.
- Near term implementation may be too aggressive given presumed demand. School district and other barriers to entry would need to be overcome before serious efforts would take place.

Potential Capital Outlay

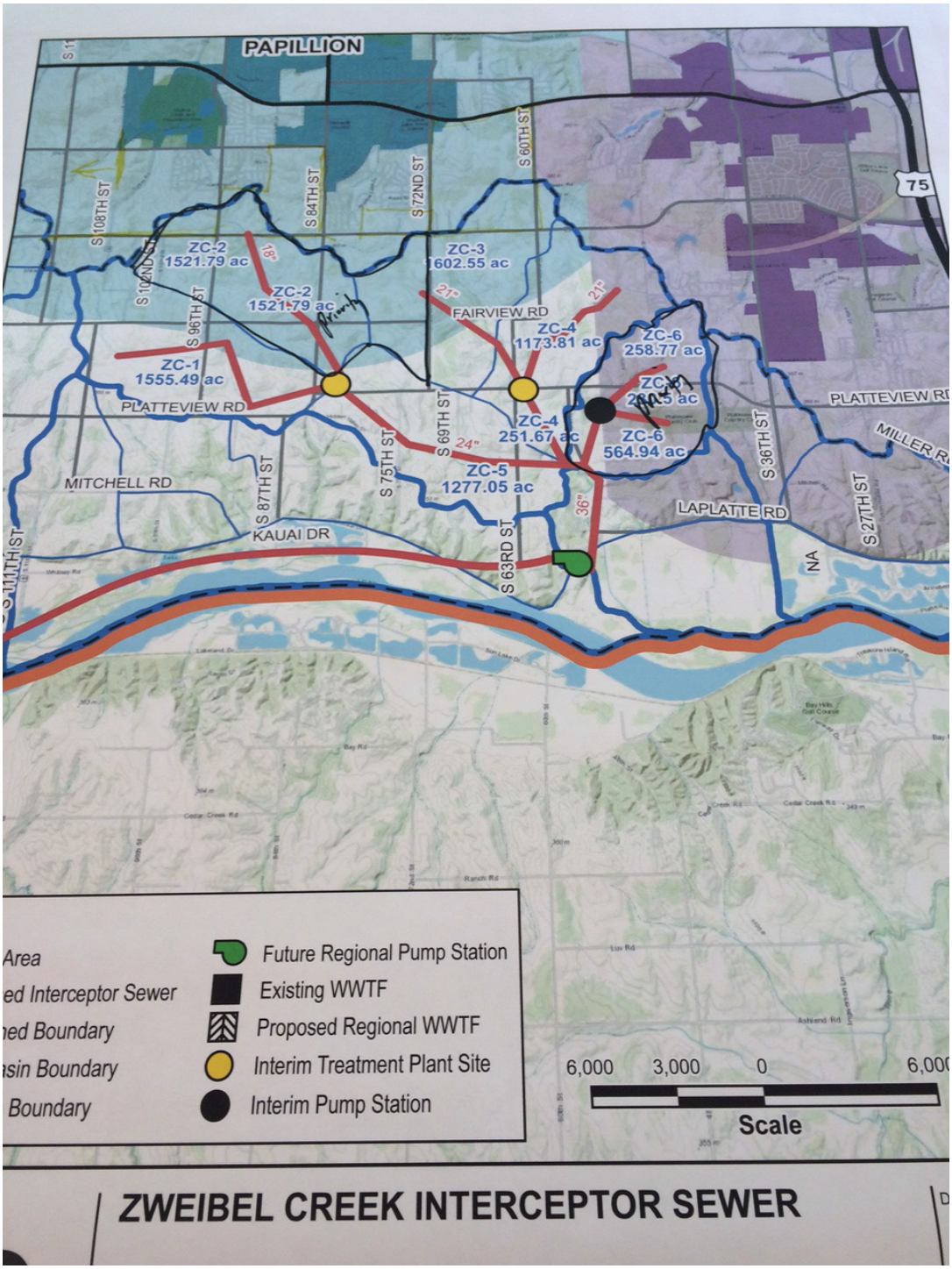
- It was suggested that costs should be developed on a cost per acre basis as more meaningful for consideration and to integrate commercial and industrial growth as well.
- There is a "watershed fee" for development in the Papio basin, but currently there is no similar fee for development in the Platte River basin.
- Nether Papillion or Bellevue have currently set aside any monies for over the ridge infrastructure. Both rely heavily of SID development to generate baseline infrastructure, then annex in as debt ratios become tolerable.
- Omaha does not charge a connection fee for development in southern Sarpy County. The only charge is through sewer rates.
- The County has compiled connection fees and sewer rates for the multiple entities in Sarpy County and will share. It may not reflect Papillion's current rates which just went up. Both Papillion and Bellevue master fee schedules can be found on the respective City's website. Bellevue's is on the City Clerk site.

Potential Funding Mechanisms

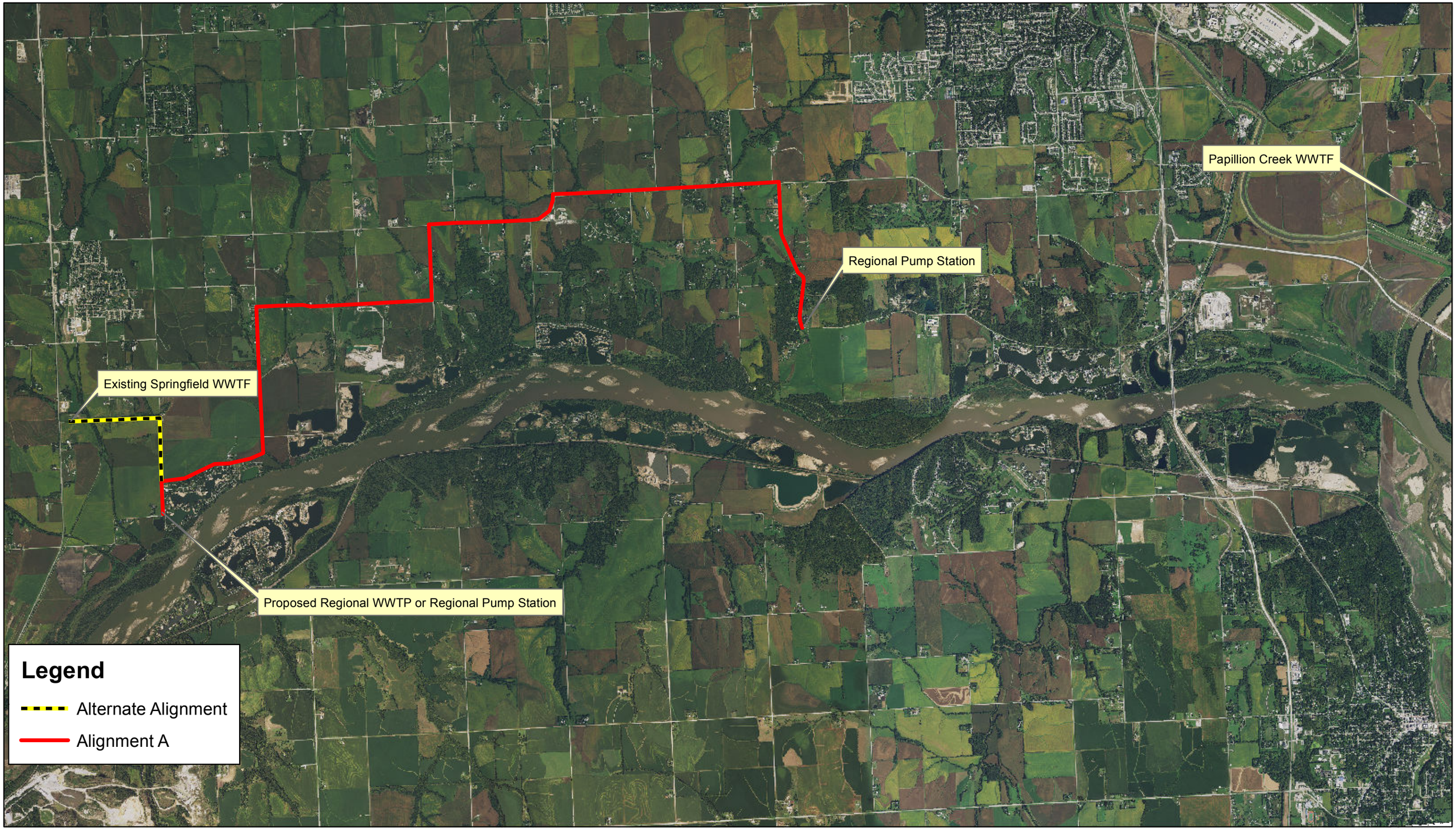
- Omaha does not charge a connection fee for development in southern Sarpy County. The only charge is through sewer rates.
- The County has compiled connection fees and sewer rates for the multiple entities in Sarpy County and will share. It may not reflect Papillion's current rates which just went up. Both Papillion and Bellevue master fee schedules can be found on the respective City's website. Bellevue's is on the City Clerk site.

Attachment

- Markups of subbasin map


PAPILLION
S 108TH ST
S 102ND ST
S 96TH ST
S 84TH ST
S 72ND ST
S 60TH ST
75
ZC-2
1521.79 ac
ZC-2
1521.79 ac
ZC-3
1602.55 ac
FAIRVIEW RD
ZC-4
1173.81 ac
ZC-6
258.77 ac
ZC-1
1555.49 ac
PLATTEVIEW RD
ZC-4
251.67 ac
ZC-6
564.94 ac
S 69TH ST
S 75TH ST
S 36TH ST
MILLER RD
ZC-5
1277.05 ac
MITCHELL RD
S 87TH ST
KAUAI DR
LAPLATTE RD
S 27TH ST
S 111TH ST
S 63RD ST
24"
36"
Future Regional Pump Station
Existing WWTF
Proposed Regional WWTF
Interim Treatment Plant Site
Interim Pump Station
6,000
3,000
0
Scale
ZWEIBEL CREEK INTERCEPTOR SEWER

Attachment B – Force Main Routing



OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-1

Proposed Regional WWTP or Regional Pump Station

Co Rd 52

S 132nd St

S 138th St

S 120th St

S 113th St

Buffalo Rd

N Shore Dr

Sandy Pt

Lakeview Dr

Cottonwood Ln

Yost Park Rd

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment A
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 1 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-2

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment A
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 2 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-3

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment A
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 3 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-4

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment A
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

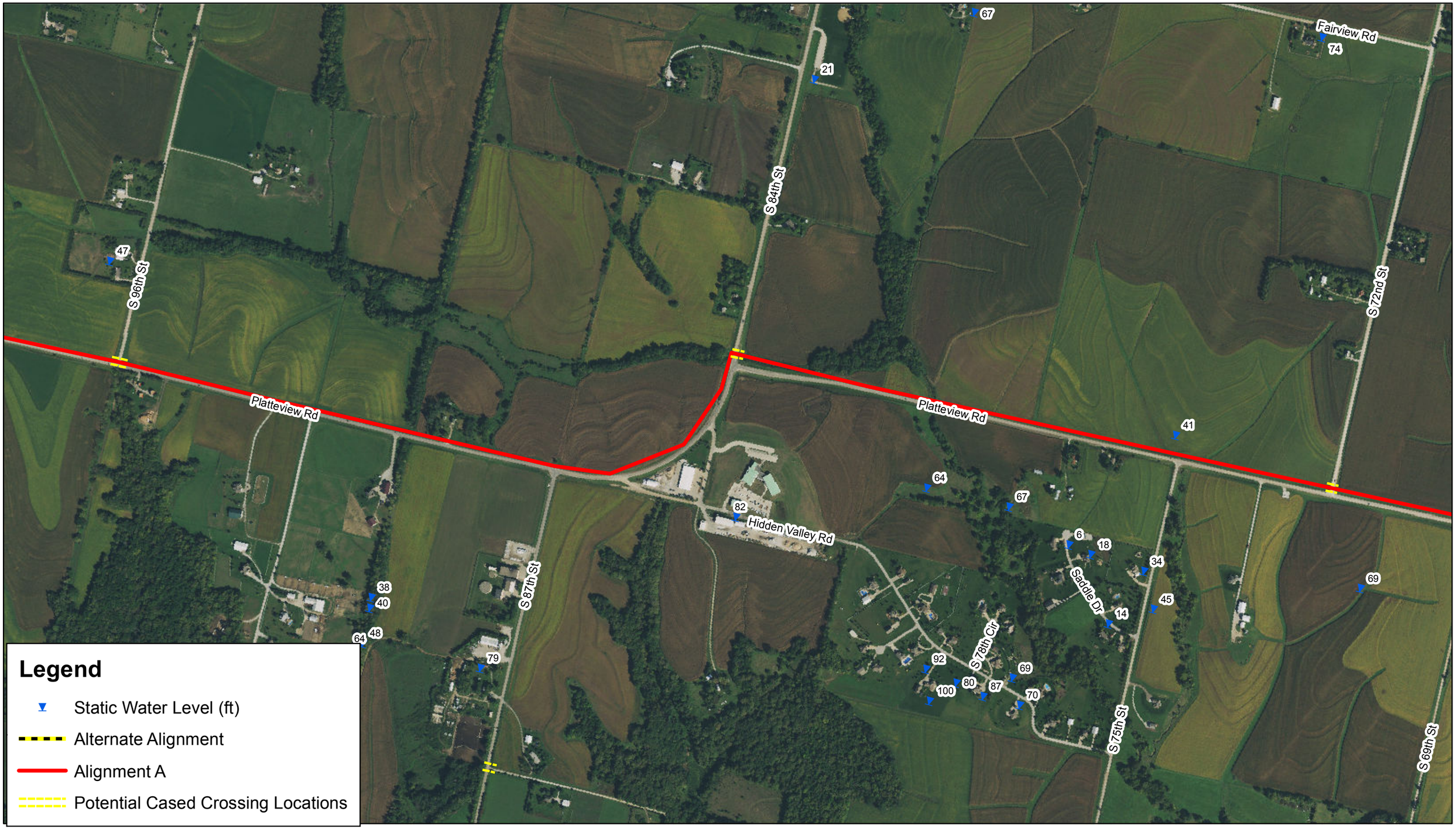
OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 4 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-5



OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 5 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-6

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment A
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 6 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-7

Platteview Rd
Laplatte Rd
Country View Ln
S 57th St
S 56th St
Riverview Forest Rd
Merrill Mission Rd
S 57th Ave
S 63rd St
Mud Rd
Regional Pump Station
31
10
9
11
10
17
20
25
26
30
24
15
10
58
25
14
55
64.5
15
18
100
72
29
29
33

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment A
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

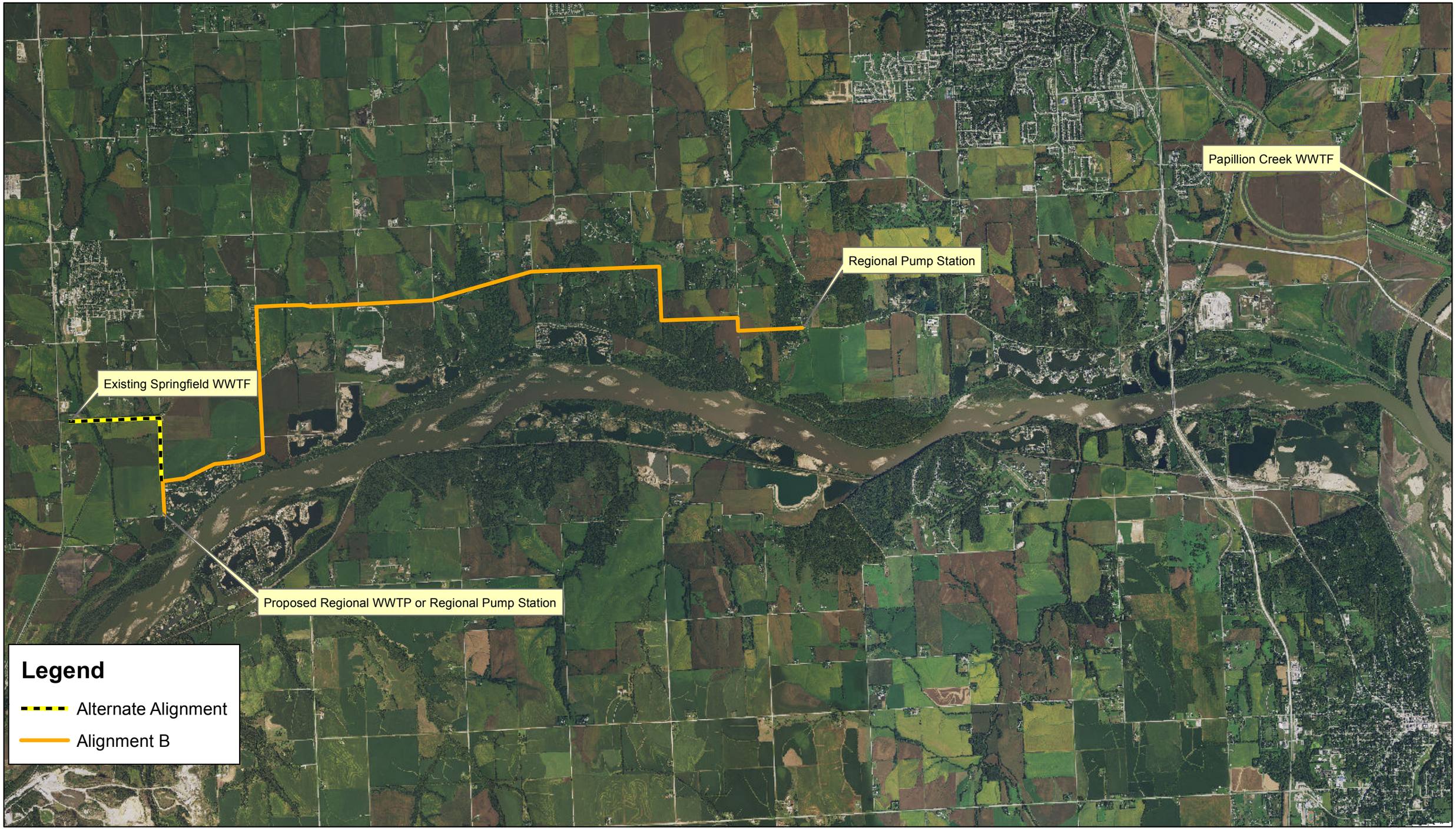
OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT A-Page 7 of 7

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-8



OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-9

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 1 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-10

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 2 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-11

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 3 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-12

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

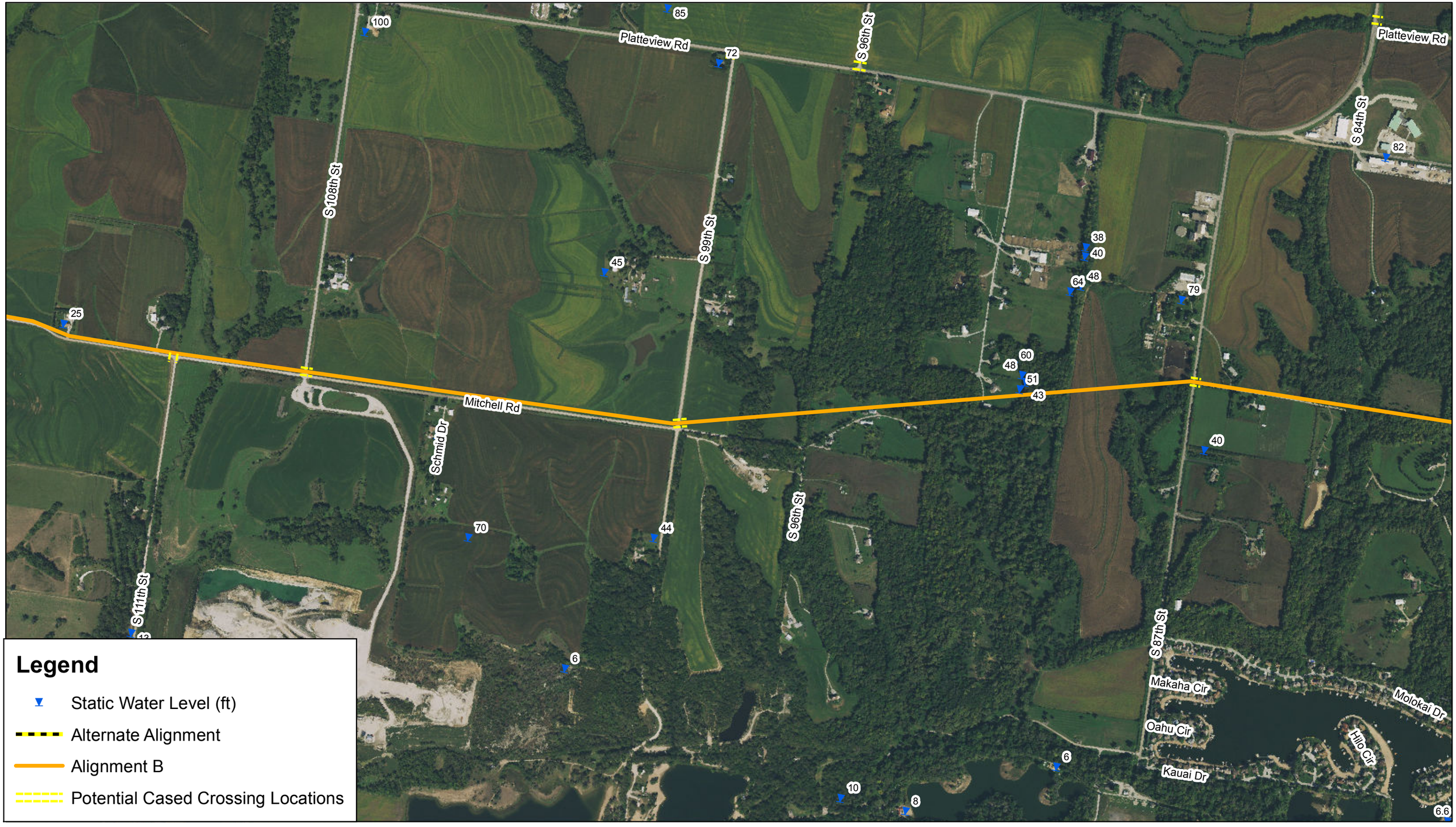
OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 4 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-13



Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 5 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-14

Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

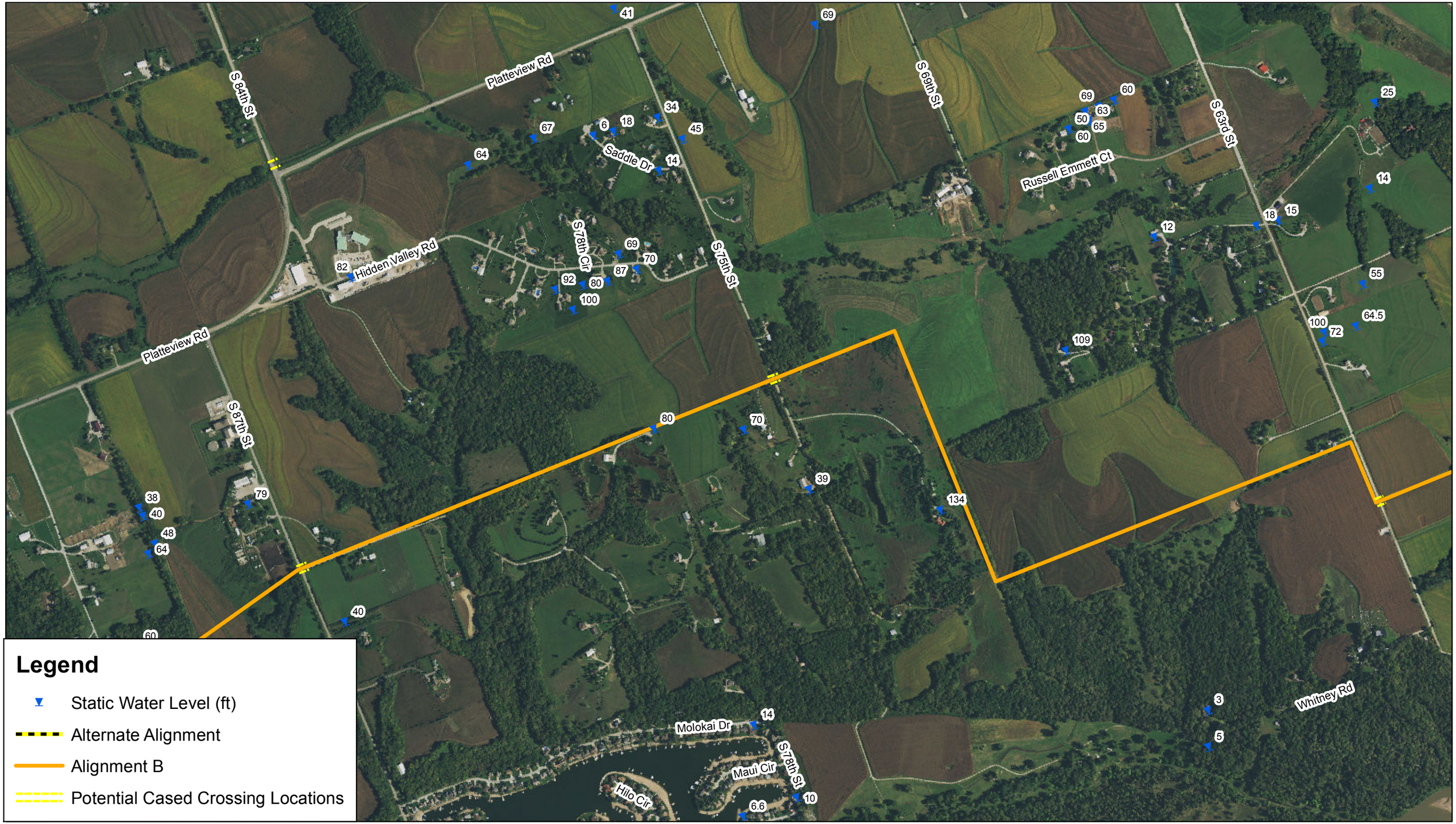
OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 6 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-15



Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

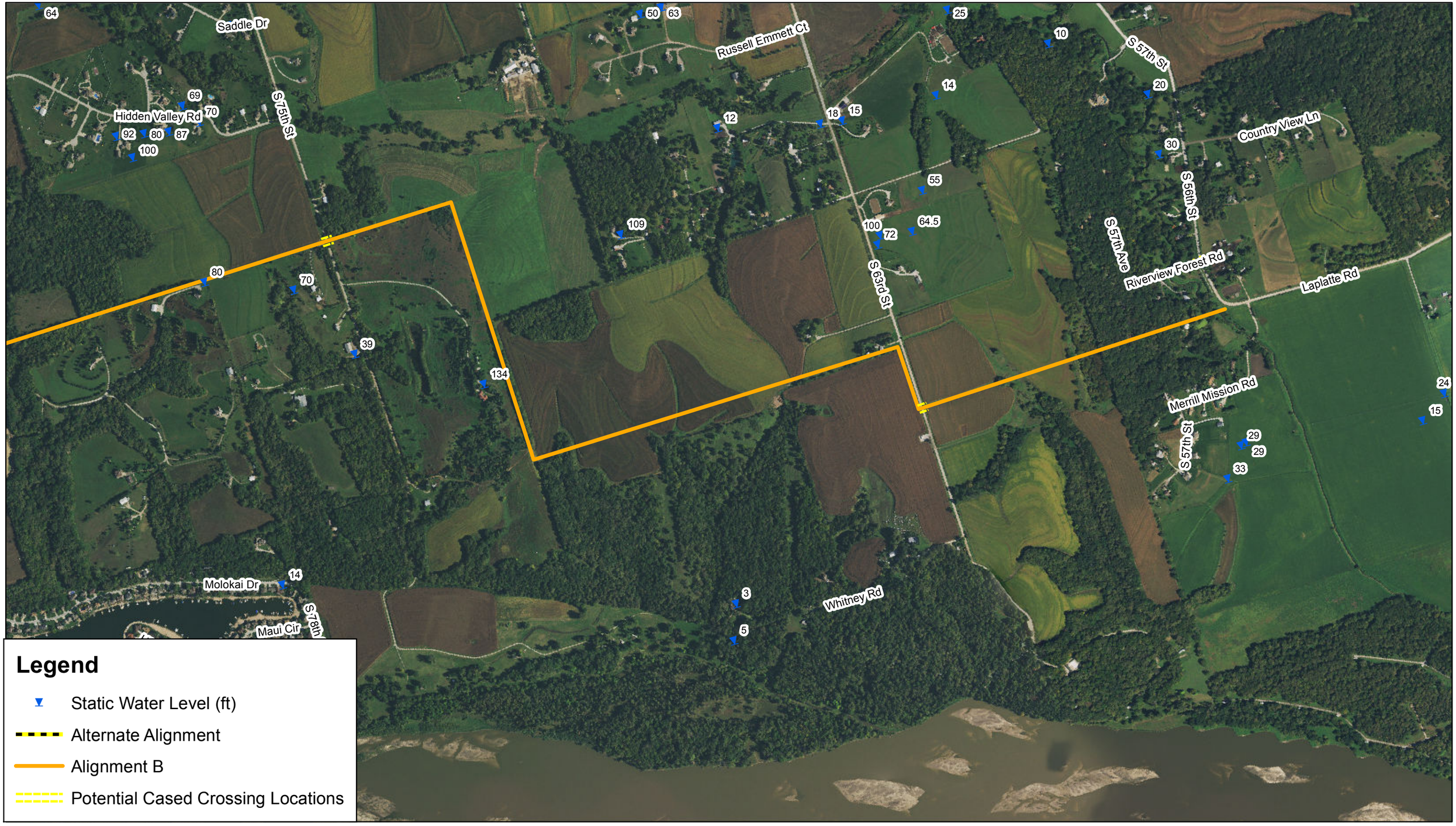
OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 7 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-16



Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

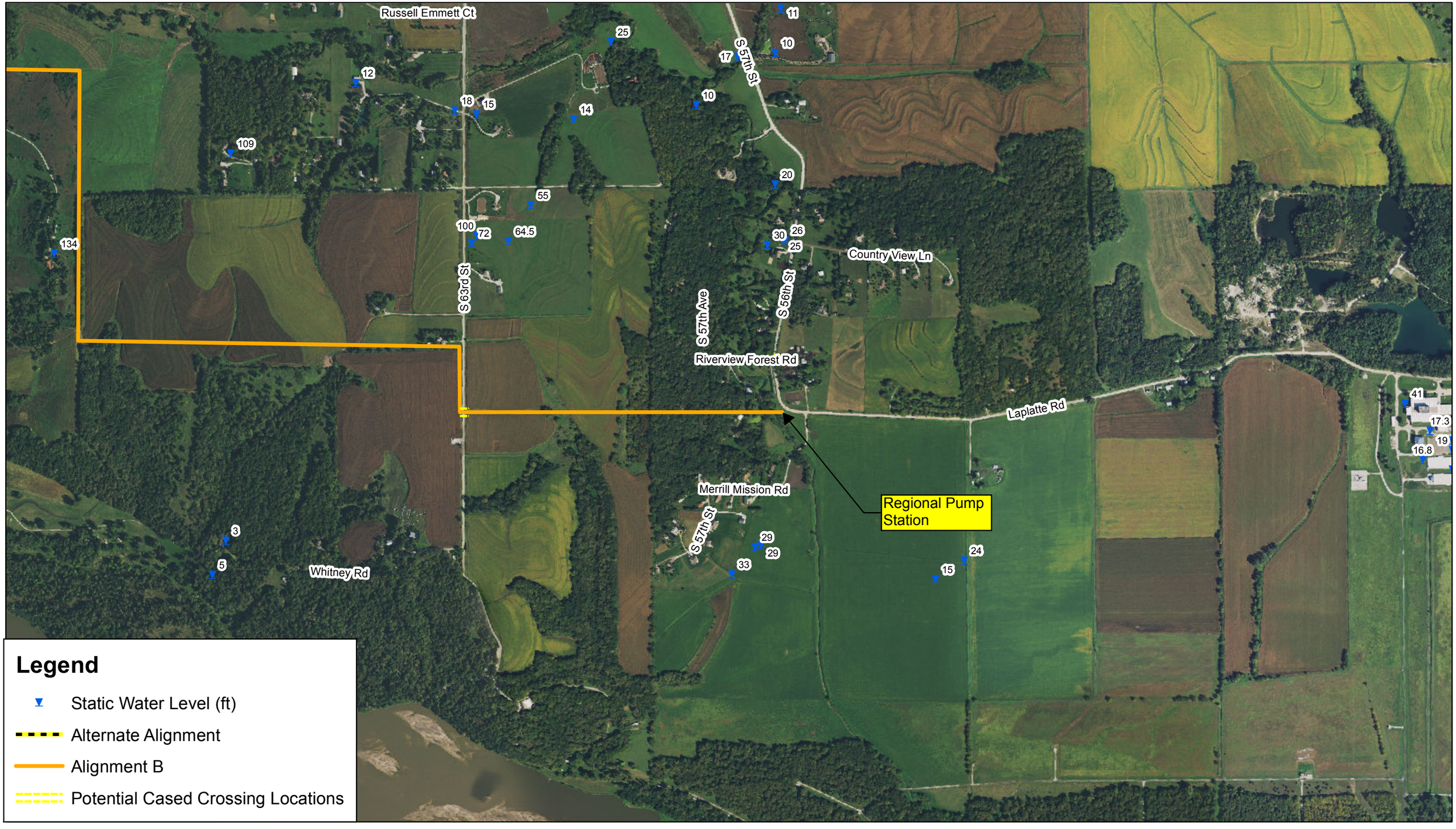
OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 8 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-17



Legend

- Static Water Level (ft)
- Alternate Alignment
- Alignment B
- Potential Cased Crossing Locations

0 0.125 0.25 Miles

OLSSON ASSOCIATES

FORCE MAIN ALIGNMENT B-Page 9 of 9

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE B-18

Attachment C – Breakdown of Preliminary Cost Estimate

TOTAL PROJECT COST (BY BASIN)

BASIN	COST
Buffalo Creek	$67,527,812
Springfield Creek	$81,331,897
Zweibel Creek	$71,907,845
TOTAL PROJECT COST =	**$220,767,554**

TOTAL PROJECT COST (BY PHASE)

PHASE	COST
Phase 1A	$22,603,608
Phase 1B	$28,483,151
Phase 1 Subtotal	$51,086,759
Phase II	$115,132,934
Phase III	$54,547,860
TOTAL PROJECT COST =	**$220,767,553**

SUMMARY BREAKDOWN OF COSTS BY BASIN AND PHASE

Buffalo Creek	Cost
Phase I	$18,978,294
Phase II	$32,780,525
Phase III	$15,768,993
Total Buffalo Creek Cost =	$67,527,812

Springfield Creek	Cost
Phase I	$21,057,336
Phase II	$38,007,710
Phase III	$22,266,850
Total Springfield Creek Cost =	$81,331,897

Zweibel Creek	Cost
Phase I	$11,051,129
Phase II	$44,344,698

Phase III	**$16,512,017**
Total Zweibel Creek Cost =	**$71,907,845**

Total Length of Interceptor Sewer Pipe (LF)	**286,300**
Total Length of Interceptor Sewer Pipe (Miles)	**54.22**

Total Cost of Sewer Interceptor and Manholes =	**$47,049,314**
Estimated Percentage of Sewer Cost to Total Project =	21.31%
Total Cost of Sewage Treatment [1] =	**$173,718,239**
Estimated Percentage of Treatment Cost to Total Project =	78.69%

1 - Includes cost of Rechannizing Zweibel Creek, Interim Pump Station, Interim Force Main, Future Pump Station and Future Force Main

TOTAL INTERCEPTOR SYSTEM AND TREATMENT =	**$220,767,553**

BUFFALO CREEK

Ultimate Population Projected = **25,130** persons

Total Basin Cost (Interim + Final Treatment Options Included)

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	25,800	LF	$52	$1,341,600
2	12 IN Sewer	10,700	LF	$78	$834,600
3	15 IN Sewer	15,900	LF	$98	$1,550,250
4	18 IN Sewer	32,000	LF	$117	$3,744,000
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	8,000	LF	$176	$1,404,000
8	30 IN Sewer	6,500	LF	$195	$1,267,500
9	36 IN Sewer	3,900	LF	$234	$912,600
10	42 IN Sewer	20,600	LF	$273	$5,623,800
11	54 IN Sewer	900	LF	$351	$315,900
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	1,200,000	GPD	$10	$12,000,000
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	2,823,271	GPD	$10	$28,232,709
Construction Subtotal					**$57,226,959**
Engineering, Legal and Administrative	18%				$10,300,853
Capital Subtotal					**$67,527,812**

Easements
Permitting
Land Acquisition

BUFFALO CREEK - PHASE IA

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	9,000	LF	$117	$1,053,000
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	8,000	LF	$176	$1,404,000
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	600,000	GPD	$10	$6,000,000
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	0	GPD	$10	$0
Construction Subtotal					$8,457,000
Engineering, Legal and Administrative	18%				$1,522,260
Capital Subtotal					$9,979,260

BUFFALO CREEK - PHASE IB

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	13,900	LF	$117	$1,626,300
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	600,000	GPD	$10	$6,000,000
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	0	GPD	$10	$0
Construction Subtotal					$7,626,300
Engineering, Legal and Administrative	18%				$1,372,734
Capital Subtotal					$8,999,034

BUFFALO CREEK - PHASE II

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	8,600	LF	$98	$838,500
4	18 IN Sewer	0	LF	$117	$0
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	6,500	LF	$195	$1,267,500
9	36 IN Sewer	3,900	LF	$234	$912,600
10	42 IN Sewer	20,600	LF	$273	$5,623,800
11	54 IN Sewer	900	LF	$351	$315,900
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	1,882,181	GPD	$10	$18,821,806
Construction Subtotal					$27,780,106
Engineering, Legal and Administrative	18%				$5,000,419
Capital Subtotal					$32,780,525

BUFFALO CREEK - PHASE III

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	25,800	LF	$52	$1,341,600
2	12 IN Sewer	10,700	LF	$78	$834,600
3	15 IN Sewer	7,300	LF	$98	$711,750
4	18 IN Sewer	9,100	LF	$117	$1,064,700
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	941,090	GPD	$10	$9,410,903
Construction Subtotal					$13,363,553

Engineering, Legal and Administrative	18%	$2,405,440
Capital Subtotal		$15,768,993

TOTAL BUFFALO CREEK - ALL PHASES = **$67,527,812**

2,823,271

SPRINGFIELD CREEK (including Turtle Creek)

Ultimate Population Projected = **32,067** persons

Total Basin Cost (Interim + Final Treatment Options Included)

Item No.	Description		Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer		4,500	LF	$52	$234,000
2	12 IN Sewer		7,500	LF	$78	$585,000
3	15 IN Sewer		9,600	LF	$98	$936,000
4	18 IN Sewer		25,300	LF	$117	$2,960,100
5	21 IN Sewer		12,300	LF	$137	$1,678,950
6	24 IN Sewer		3,300	LF	$156	$514,800
7	27 IN Sewer		8,100	LF	$176	$1,421,550
8	30 IN Sewer		1,000	LF	$195	$195,000
9	36 IN Sewer		10,200	LF	$234	$2,386,800
10	42 IN Sewer		7,500	LF	$273	$2,047,500
11	54 IN Sewer		900	LF	$351	$315,900
12	Creek Rechannelization		0	LF	$195	$0
13	Wastewater Pump Stations	**	1,950,000	GPD	*$1.75*	$2,325,000
14	Interim Force Main	(assume 12 IN FM)	21,100	LF	$60	$1,266,000
15	Force Main	(assume 14 IN FM)	3,600	LF	$70	$252,000
16	Future Regional Pump Station		2,250,000	GPD	$1	$2,250,000
17	18 IN Future Forcemain to the Regional WWTF		0	LF	$90	$0
18	Satelite Treatment Facility		0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion		1,200,000	GPD	$10	$12,000,000
20	Participation in Future Regional Plant		3,755,674	GPD	$10	$37,556,736
Construction Subtotal						**$68,925,336**
Engineering, Legal and Administrative		18%				$12,406,561
Capital Subtotal						**$81,331,897**

Easements
Permitting
Land Acquisition

SPRINGFIELD CREEK - PHASE IA

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	4,500	LF	$52	$234,000
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	0	LF	$117	$0
5	21 IN Sewer	6,400	LF	$137	$873,600
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations **	1,950,000	GPD	*$1.75*	$2,325,000
14	Interim Force Main (assume 12 IN FM)	21,100	LF	$60	$1,266,000
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	600,000	GPD	$10	$6,000,000
20	Participation in Future Regional Plant	0	GPD	$10	$0
Construction Subtotal					$10,698,600
Engineering, Legal and Administrative	18%				$1,925,748
Capital Subtotal					$12,624,348

SPRINGFIELD CREEK - PHASE IB

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	9,800	LF	$117	$1,146,600
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main (assume 12 IN FM)	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	600,000	GPD	$10	$6,000,000
20	Participation in Future Regional Plant	0	GPD	$10	$0
Construction Subtotal					$7,146,600
Engineering, Legal and Administrative	18%				$1,286,388
Capital Subtotal					$8,432,988

SPRINGFIELD CREEK - PHASE II

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	0	LF	$117	$0
5	21 IN Sewer	5,900	LF	$137	$805,350
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	8,100	LF	$176	$1,421,550
8	30 IN Sewer	1,000	LF	$195	$195,000
9	36 IN Sewer	10,200	LF	$234	$2,386,800
10	42 IN Sewer	7,500	LF	$273	$2,047,500
11	54 IN Sewer	900	LF	$351	$315,900
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main (assume 12 IN FM)	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	2,503,782	GPD	$10	$25,037,824
Construction Subtotal					$32,209,924
Engineering, Legal and Administrative	18%				$5,797,786
Capital Subtotal					$38,007,710

SPRINGFIELD CREEK - PHASE III

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	7,500	LF	$78	$585,000
3	15 IN Sewer	9,600	LF	$98	$936,000
4	18 IN Sewer	15,500	LF	$117	$1,813,500
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	3,300	LF	$156	$514,800
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main (assume 12 IN FM)	0	LF	$60	$0
15	Force Main (assume 14 IN FM)	3,600	LF	$70	$252,000
16	Future Regional Pump Station	2,250,000	GPD	$1	$2,250,000
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	1,251,891	GPD	$10	$12,518,912
Construction Subtotal					$18,870,212

Engineering, Legal and Administrative	18%	$3,396,638
Capital Subtotal		$22,266,850

TOTAL SPRINGFIELD CREEK - ALL PHASES = **$81,331,897**

3,755,674

ZWEIBEL CREEK

Ultimate Population Projected = **29,477** persons

Total Basin Cost (Interim + Final Treatment Options Included)

Item No.		Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8	IN Sewer	7,100	LF	$52	$369,200
2	12	IN Sewer	3,100	LF	$78	$241,800
3	15	IN Sewer	0	LF	$98	
4	18	IN Sewer	23,900	LF	$117	$2,796,300
5	21	IN Sewer	15,500	LF	$137	$2,115,750
6	24	IN Sewer	12,200	LF	$156	$1,903,200
7	27	IN Sewer	4,600	LF	$176	$807,300
8	30	IN Sewer	0	LF	$195	
9	36	IN Sewer	4,500	LF	$234	$1,053,000
10	42	IN Sewer	0	LF	$273	
11	54	IN Sewer	900	LF	$351	$315,900
12		Creek Rechannelization	3,821	LF	$195	$744,264
13		Wastewater Pump Stations	0	GPD	$1.75	$0
14		Interim Force Main	0	LF	$60	$0
15		Force Main	0	LF	$70	
16		Future Regional Pump Station	4,981,583	GPD	$1	$4,981,583
17		18 IN Future Forcemain to the Regional WWTF	60,000	LF	$90	$5,400,000
18		Satelite Treatment Facility	700,000	GPD	$10	$7,000,000
19		Wastewater Treatment Plant Expansion	0	GPD	$10	
20		Participation in Future Regional Plant	3,321,055	GPD	$10	$33,210,555
Construction Subtotal						**$60,938,851**
Engineering, Legal and Administrative		18%				$10,968,993
Capital Subtotal						**$71,907,845**
Easements			70,900			
Permitting						
Land Acquisition						

ZWEIBEL CREEK - PHASE IA

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	0	LF	$117	$0
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	0	GPD	$10	$0
Construction Subtotal					$0
Engineering, Legal and Administrative	18%				$0
Capital Subtotal					$0

ZWEIBEL CREEK - PHASE IB

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	7,100	LF	$52	$369,200
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	10,700	LF	$117	$1,251,900
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	3,821	LF	$195	$744,264
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	700,000	GPD	$10	$7,000,000
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	0	GPD	$10	$0

Construction Subtotal		$9,365,364
Engineering, Legal and Administrative	18%	$1,685,765
Capital Subtotal		$11,051,129

ZWEIBEL CREEK - PHASE II

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	3,100	LF	$78	$241,800
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	13,200	LF	$117	$1,544,400
5	21 IN Sewer	0	LF	$137	$0
6	24 IN Sewer	12,200	LF	$156	$1,903,200
7	27 IN Sewer	0	LF	$176	$0
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	4,500	LF	$234	$1,053,000
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	900	LF	$351	$315,900
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0
16	Future Regional Pump Station	4,981,583	GPD	$1	$4,981,583
17	18 IN Future Forcemain to the Regional WWTF	60,000	LF	$90	$5,400,000
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	2,214,037	GPD	$10	$22,140,370
Construction Subtotal					$37,580,253
Engineering, Legal and Administrative	18%				$6,764,446
Capital Subtotal					$44,344,698

ZWEIBEL CREEK - PHASE III

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Total Cost
1	8 IN Sewer	0	LF	$52	$0
2	12 IN Sewer	0	LF	$78	$0
3	15 IN Sewer	0	LF	$98	$0
4	18 IN Sewer	0	LF	$117	$0
5	21 IN Sewer	15,500	LF	$137	$2,115,750
6	24 IN Sewer	0	LF	$156	$0
7	27 IN Sewer	4,600	LF	$176	$807,300
8	30 IN Sewer	0	LF	$195	$0
9	36 IN Sewer	0	LF	$234	$0
10	42 IN Sewer	0	LF	$273	$0
11	54 IN Sewer	0	LF	$351	$0
12	Creek Rechannelization	0	LF	$195	$0
13	Wastewater Pump Stations	0	GPD	$1.75	$0
14	Interim Force Main	0	LF	$60	$0
15	Force Main	0	LF	$70	$0

16	Future Regional Pump Station	0	GPD	$1	$0
17	18 IN Future Forcemain to the Regional WWTF	0	LF	$90	$0
18	Satelite Treatment Facility	0	GPD	$10	$0
19	Wastewater Treatment Plant Expansion	0	GPD	$10	$0
20	Participation in Future Regional Plant	1,107,018	GPD	$10	$11,070,185
Construction Subtotal					$13,993,235
Engineering, Legal and Administrative	18%				$2,518,782
Capital Subtotal					$16,512,017

TOTAL ZWEIBEL CREEK - ALL PHASES = $71,907,845

3,321,055