# Regional Wastewater Treatment Alternatives Technical Memorandum

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| To: | Sarpy County |
| From: | Joe Roberts – HDR<br>David Dechant - HDR<br>Joe Baxter – Olsson Associates<br>Owen Killham – Olsson Associates |
| CC: | File |
| Project: | Southern Sarpy County Wastewater Study – Phase IB |
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This Technical Memorandum defines and evaluates multiple regional wastewater treatment alternatives for southern Sarpy County, and culminates in the recommendation of a regional wastewater concept based on an evaluation of the relative cost effectiveness, nonmonetary considerations, and stakeholder input. It also provides a phased implementation plan and associated cash flow requirements for the recommended alternative. It is organized as follows:

- Objective
- Summary
- Background
- Treatment Alternatives
- Comparative Costs
- Nonmonetary Considerations
- Stakeholder Input
- Recommendations

The following Attachments provide supporting information:

- Attachment A – Force Main Routing
- Attachment B – Preliminary Cost Estimate Breakdowns
- Attachment C – Alternatives Workshop Meeting Summary

## Objective

This Technical Memorandum evaluates the relative cost effectiveness and nonmonetary considerations of the following regional wastewater treatment concepts for wastewater from southern Sarpy County.

- Construction of a new regional wastewater treatment facility in southern Sarpy County
- Expansion of the existing Springfield Wastewater Treatment Facility
- Expansion of the City of Omaha's Papillion Creek Wastewater Treatment Plant
- Various combinations of the above

The intent is to consider alternatives to the previously proposed new regional wastewater treatment facility in southern Sarpy County south of Springfield to enable stakeholders to select the most cost effective concept for treatment of wastewater from southern Sarpy County.

## Summary

Lack of sanitary sewer service continues to be an impediment to growth and development in southern Sarpy County. A regional wastewater concept was developed as a part of the Southern Sarpy County Master Plan completed in 2006 to address this immediate need and facilitate future economic development. The concept recommended at that time included a regional wastewater treatment facility (WWTF) south of Springfield discharging treated effluent from southern Sarpy County to the Platte River. This concept is referred to as the "Baseline Concept." Phase 1A of the current Southern Sarpy County Wastewater Treatment Study (Regional Study) validated the feasibility of the Baseline Concept given regulatory, environmental, and governance considerations. As a part of the current phase of the Regional Study, Phase 1B, four additional alternatives were analyzed to ensure the most cost effective concept for treatment of wastewater from southern Sarpy County is selected.

The evaluation considered monetary and nonmonetary considerations, as well as input from stakeholders. It should be understood that the majority of the regional wastewater conveyance system is common to each of the regional treatment alternatives, and differentiations are the result of varying locations of regional treatment. The five evaluated concepts include the following:

- Baseline Concept - New regional WWTF South of Springfield
- Alternative 1 - Expanded Springfield WWTF
- Alternative 2 - Expanded Omaha Papillion Creek Wastewater Treatment Plant (PCWWTP)
- Alternative 3 - Expanded Springfield WWTF / Expanded Omaha PCWWTP
- Alternative 4 - New Regional WWTF South of Springfield / Expanded PCWWTP

The monetary portion of the evaluation included the generation of preliminary capital, operation and maintenance (O&M), and present worth cost estimates. The three concepts involving an expansion of the Omaha PCWWTP (Alternatives 2, 3, 4) had the lowest estimated capital costs, reflective of some economy of scale. The Baseline Concept and Alternative 1 had the lowest estimated O&M cost. Estimates for Alternatives 2, 3, and 4 were significantly higher due to the assumption that O&M costs for

the PCWWTP treatment component will escalate at a rate greater than inflation consistent with current City of Omaha rate forecasts. Alternative 1 (expanded Springfield) had the lowest present worth cost, and appears to be the most economically favorable regional wastewater concept for long-term development in southern Sarpy County. However, the present worth costs for four of the five regional wastewater concepts are within 10 percent.

Although economic considerations will certainly be a significant driver in any decision regarding regional wastewater treatment in southern Sarpy County, the closeness of the cost estimates and current accuracy emphasizes the importance of considering nonmonetary criteria. Six nonmonetary evaluation criteria were utilized during the analysis, and each evaluation criteria consisted of multiple sub-criterion. The nonmonetary evaluation criteria included: Environmental impacts, water quality impacts, ease of permitting, implementability, stakeholder and public acceptance, and sustainability. Each regional wastewater concept was scored on a scale from one to three with three being the most favorable. The two regional wastewater treatment concepts that received the highest total score are Alternative 1 (expanded Springfield) and Alternative 2 (expanded PCWWTP).

Based on the monetary and nonmonetary evaluation summarized above as well as input from stakeholders, Alternative 1 is the recommended alternative for treatment of wastewater generated in southern Sarpy County. However, it should be understood that Phase 1 is identical for each of the regional wastewater concepts, and that a conclusive determination regarding the ultimate location of regional wastewater treatment (i.e. PCWWTP, Springfield WWTP site, new site south of Springfield) can be made following the start of Phase 1.

## Background

The Southern Sarpy County Master Plan Phases I and II completed in 2006 and 2007 recommended construction of 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”). In this concept, the Regional System would convey and treat wastewater generated south of the hydrologic ridgeline in the Buffalo Creek, Springfield Creek, and Zweibel Creek basins. Phase 1A of the current Southern Sarpy County Wastewater Treatment Study (referred to as the “Regional Study”) validated the feasibility of this concept given regulatory, environmental, and governance considerations. The Platte River Regional Wastewater System Refinement Technical Memorandum refined the concept and identified the associated phasing and cash flow requirements.

To ensure the most cost effective concept for treatment of wastewater from southern Sarpy County is selected, other alternatives are worthy of consideration; most notably expansion of the existing Springfield or Omaha Papillion Creek wastewater treatment plants in lieu of, or in combination with, construction of a new regional wastewater treatment facility in southern Sarpy County. However, it should be emphasized that most of the regional wastewater conveyance system is common to each of the regional treatment alternatives.

## Treatment Alternatives

This section presents the following alternatives, summarized in Table 1, for treatment of wastewater generated in southern Sarpy County.

**Table 1 – Regional Wastewater Treatment Concepts**

| Designation | Summarized Description |
|---|---|
| Baseline Concept | Construction of a new regional WWTF in southern Sarpy County for treatment of wastewater from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins |
| Alternative 1 | Expansion of the existing Springfield WWTF for treatment of wastewater from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins |
| Alternative 2 | Expansion of the City of Omaha's Papillion Creek Wastewater Treatment Plant (PCWWTP) for treatment of wastewater from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins |
| Alternative 3 | Expansion of the existing Springfield WWTF for treatment of wastewater from the Buffalo Creek and Springfield Creek basins, and expansion of the City of Omaha's PCWWTP for treatment of wastewater from the Zweibel Creek basin. |
| Alternative 4 | Construction of a new regional WWTF in southern Sarpy County for treatment of wastewater from the Buffalo Creek and Springfield Creek basins, and expansion of the City of Omaha's PCWWTP for treatment of wastewater from the Zweibel Creek basin. |

### New Regional Treatment Facility in Southern Sarpy County (Baseline Concept)

In this concept, referred to as the "Baseline Concept," a new regional WWTF would be constructed in southern Sarpy County to treat wastewater generated south of the ridgeline from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins. Treated wastewater would be discharged to the Platte River. The concept was originally proposed in the 2006 and 2007 Southern Sarpy County Master Plan Phases I and II and validated in Phase 1A of the current Regional Study. The baseline concept is described in more detail in the Platte River Regional Wastewater System Refinement Technical Memorandum.

In general, the Platte River Watershed in southern Sarpy County drains from north to south. Thus, the collection system in the Baseline Concept 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. The Regional WWTF was preliminarily assumed to be south of Springfield within a mile of the Platte River, south of Buffalo Road. Flow from the Buffalo Creek and Springfield Creek basins would gravity flow through their respective interceptor networks to the Regional WWTF. Wastewater from the

Zweibel Creek basin would be pumped from the southern end of the Zweibel Creek Basin west to the Regional WWTF. A short outfall sewer would be constructed to convey treated wastewater effluent from the Regional WWTF to the Platte River. Figure 1 below graphically depicts the Baseline Concept.

The Baseline Concept is expected to be implemented in three primary phases according to projected growth and flow demands. In the initial phase, interim satellite WWTFs would be constructed and the existing Springfield WWTF would be expanded to support immediate and short-term development in the region. According to current growth forecasts, infrastructure constructed in Phase 1 would accommodate growth demands in each of the three basins through 2035. In the second and third phases, a regional WWTF would be constructed, and later expanded, to support long-term growth.

For comparison to subsequent alternative concepts introduced, Table 2 summarizes key aspects of the Baseline Concept.

**Table 2 – Baseline Concept Summarized Statistics**

| Parameter | Value |
|---|---|
| Location of Regional Wastewater Treatment | New Regional WWTF South of Springfield |
| Capacity of Regional WWTF / Expanded WWTF | 9.9 MGD |
| Anticipated No. of Phases for Implementation | 4 (Phases 1A, 1B, 2, 3) |
| No. of Interim Satellite WWTF / Existing Facility Expansions | 4 |
| No. of Pump Stations | 5 |
| Approximate Linear Footage of Force Main | 85,000 |
| Approximate Linear Footage of Interceptor Sewer | 285,000 |
| Approximate Linear Footage of Outfall Sewer | 3,000 |

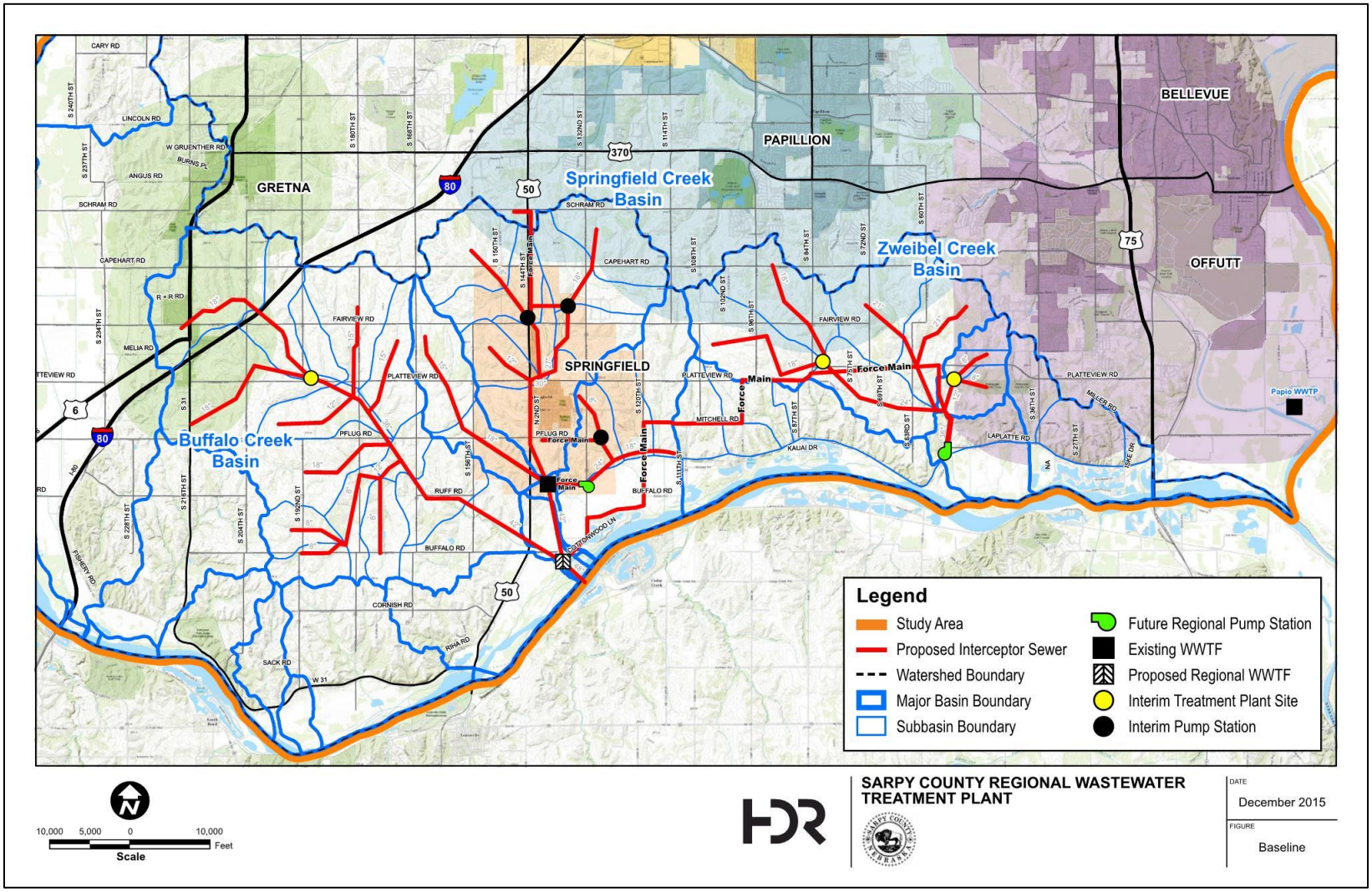



**Figure 1. New Regional Treatment Facility in Southern Sarpy County**

## Expanded Springfield Wastewater Treatment Facility (Alternative 1)

This concept, referred to herein as "Alternative 1," would expand the existing Springfield WWTF to treat wastewater generated south of the ridgeline in Sarpy County from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins. Treated effluent would be conveyed and discharged to the Platte River rather than discharged to Springfield Creek due to anticipated hydraulic limitations in Springfield Creek.

The existing City of Springfield WWTF has a capacity of 0.22 MGD with minimal capacity for growth. The City of Springfield completed the Wastewater Treatment & Collection System Evaluation (referred to as "Springfield Study") in February 2015 to evaluate their existing system and identify options for an expansion of the existing wastewater treatment facility to enable growth. The recommendation from this evaluation was to construct a new sequencing batch reactor (SBR) wastewater treatment system at the existing WWTF site with a treatment capacity of 1 MGD. For this expansion, the existing wastewater infrastructure would be reused or repurposed. This Alternative (as well as each of the regional wastewater treatment concepts) in the Regional Study requires an initial expansion to support immediate and short-term development in the Springfield Creek Basin of similar magnitude (approximately 1.2 MGD) to the expansion recommended in the Springfield Study.

Based on the current growth projection, a treatment capacity of approximately 9.9 MGD would be required to satisfy long-term regional needs through the study period (2055). To accommodate an expansion of this magnitude, a new WWTF would be required. Options would be explored during design of the Springfield WWTF expansion to repurpose existing equipment and infrastructure for use at the expanded WWTF. This correlates well with the findings from the Springfield Study, which considered an expansion scenario associated with the ultimate build-out treatment capacity for the Springfield Creek Basin (identified as 7.92 MGD). In this scenario, it was determined that much of the existing wastewater infrastructure was insufficient for the projected future wastewater demand. As such, new infrastructure would be necessary. The required footprint needed to construct the expanded Springfield WWTF would likely be greater than the existing property owned by the City of Springfield. As a result, additional property south of the existing Springfield WWTF would likely be required.

As displayed in Figure 2 below, much of the collection system necessary for Alternative 1 is identical to the Baseline Concept collection system summarized above. The observed variations result from the location of regional wastewater treatment, which in Alternative 1 is the expanded Springfield WWTF. This is a characteristic that will be observed in each of the alternative wastewater concepts evaluated. In Alternative 1, flow from the Buffalo Creek and Springfield Creek basins would gravity flow through their respective interceptor networks to the expanded Springfield WWTF. Wastewater from the Zweibel Creek basin would be pumped from the southern end of the Zweibel Creek Basin, west to the expanded Springfield WWTF. An outfall sewer approximately two miles in length would be constructed to convey treated wastewater effluent from the Springfield WWTF to the Platte River.

Alternative 1, much like the Baseline Concept and each of the subsequent alternatives defined below, is expected to be implemented in three primary phases according to projected growth and flow demands. In the initial phase, interim satellite WWTFs would be constructed and the existing Springfield WWTF would be expanded to support immediate and short-term development in the region. According to current growth forecasts, infrastructure constructed in Phase 1 would accommodate growth demands in each of the three basins through 2035. In the second and third phases, a regional WWTF (expanded Springfield WWTF) would be constructed, and later expanded, to support long tem growth.

For comparison to the Baseline and the other alternative regional wastewater concepts, Table 3 summarizes key aspects of Alternative 1.

**Table 3 – Alternative 1 Summarized Statistics**

| Parameter | Value |
|---|---|
| Location of Regional Wastewater Treatment | Expanded Springfield WWTF |
| Capacity of Regional WWTF / Expanded WWTF | 9.9 MGD |
| Anticipated No. of Phases for Implementation | 4 (Phases 1A, 1B, 2, 3) |
| No. of Interim Satellite WWTF / Existing Facility Expansions | 4 |
| No. of Pump Stations | 5 |
| Approximate Linear Footage of Force Main | 80,000 |
| Approximate Linear Footage of Interceptor Sewer | 275,000 |
| Approximate Linear Footage of Outfall Sewer | 11,000 |

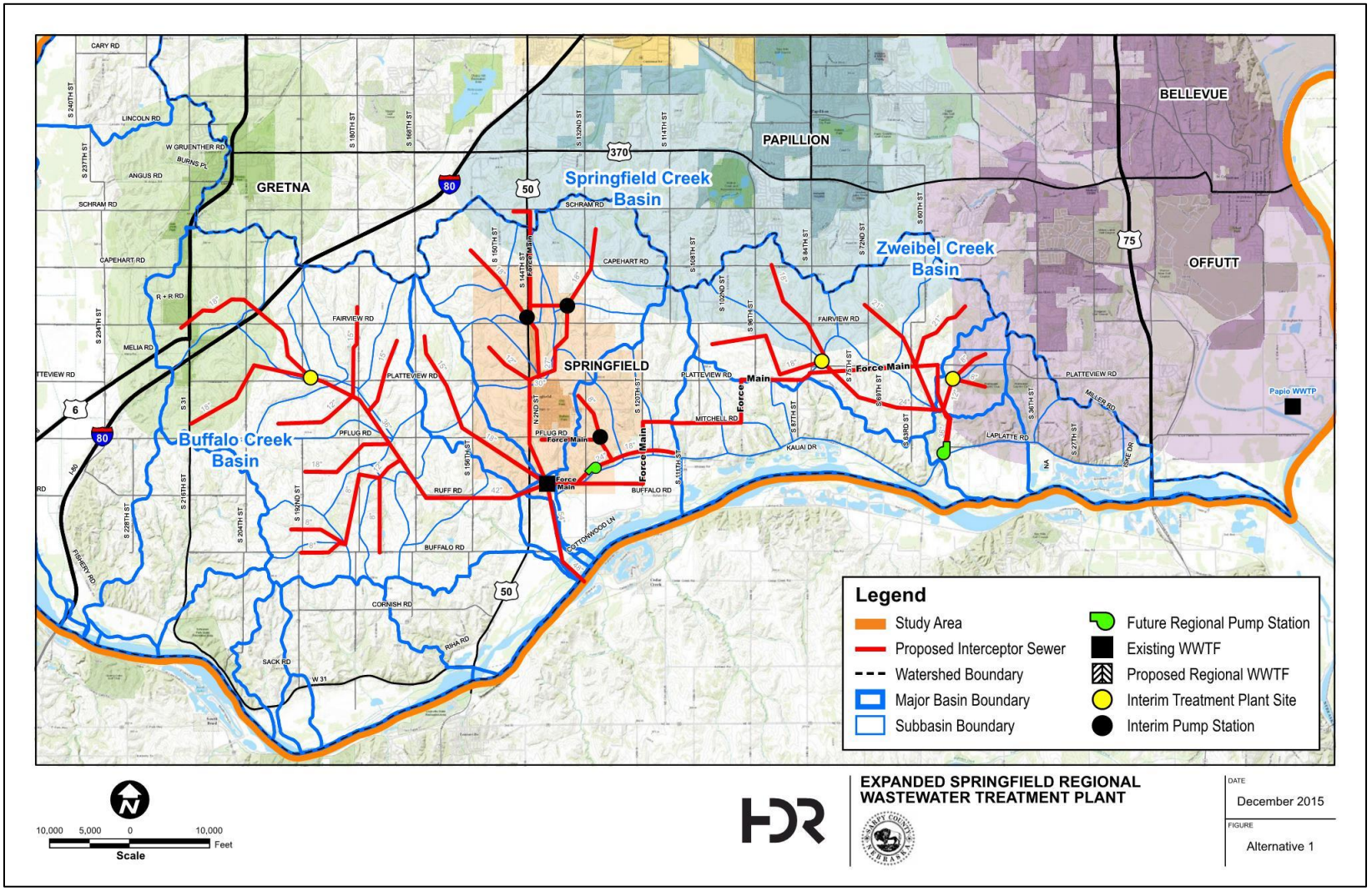



**Figure 2. Expanded Springfield Wastewater Treatment Facility**

## Expanded Omaha Papillion Creek Wastewater Treatment Plant (Alternative 2)

This concept, designated as "Alternative 2,"would expand the existing Omaha Papillion Creek Wastewater Treatment Plant (PCWWTP) to treat wastewater generated south of the ridgeline in Sarpy County from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins. Treated effluent from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins in southern Sarpy County would be discharged from the expanded Omaha PCWWTP to Papillion Creek in Douglas County along with treated effluent from the Papillion Creek basin.

The Omaha PCWWTP is located south of Omaha near the City of Bellevue and was designed to accommodate wastewater flows from the Papillion Creek basin which includes northern, but not southern Sarpy County. The key treatment components consist of primary clarification, trickling filters / solids contact, and secondary clarification. According to the Papillion Creek WWTP Study completed in 2014 ("Papio WWTP Study"), current (2015) average daily and maximum month flows at the PCWWTP were estimated to be approximately 65 and 80 MGD, respectively. At this current demand, the facility is consistently in compliance with exiting NPDES permit requirements. Although the facilities theoretical hydraulic capacity of 150 MGD seemingly indicates sufficient capacity for wastewater flows from southern Sarpy County, modeling conducted as a part of the Papio WWTP Study revealed that at current maximum month flow conditions, the PCWWTP could experience difficulty complying with existing regulatory conditions without improvements to the existing facility. Further, modelling results revealed that this difficulty was intensified in simulations with one of the two trickling filters out of service and as future flow demands increased. It is also worth noting that a portion of the collection system serving the PCWWTP is a combined sewer system, increasing operational complexity. Thus, it is likely that plant improvements would be necessary to accommodate wastewater flow from southern Sarpy County to maintain regulatory compliance and improve plant operations.

Several capital improvements were identified and evaluated in the Papio WWTP Study. As a part of the study, a comprehensive plan which included three phases of WWTP improvements was generated. Improvements provided near-, mid-, and long-term solutions in accordance with regulatory assumptions and wastewater flow projections. The first phase would be implemented to address aging infrastructure, existing system optimization, as well as to provide needed redundancy for the trickling filters. The total capital cost for completion of the first phase was estimated at $26,548,000. The Second and third phase of improvements were proposed to address assumed lower ammonia limits and future limits on nutrients (phosphorus and total nitrogen), respectively. The latter two phases of the comprehensive plan were estimated at a capital cost of $204,107,000. All costs were presented in 2013 dollars. Although portions of the first phase of wastewater improvements are currently underway, the implementation schedule for the latter two phases of the comprehensive plan is much less certain.

Figure 3 below depicts Alternative 2. The majority of the collection system is identical to the Baseline and Alternative 1 concepts, as shown in the figure. The observed variations result from the location of

regional wastewater treatment, which in Alternative 2 is the expanded PCWWTP. In Alternative 2, 100 percent of the flow from southern Sarpy County is pumped. Flow from the Buffalo Creek and Springfield Creek basins would gravity flow through their respective interceptor networks to a regional pump station, and would be pumped east to the PCWWTP. Wastewater from the Zweibel Creek basin would be pumped from the southern end of the Zweibel Creek Basin, east to the PCWWTP. The alignment for the associated force mains carrying flow from the pump stations to the PCWWTP is further discussed in Attachment A.

Alternative 2 is expected to be implemented in three primary phases according to projected growth and flow demands. In the initial phase, interim satellite WWTFs would be constructed and the existing Springfield WWTF would be expanded to support immediate and short-term development in the region. According to current growth forecasts, infrastructure constructed in Phase 1 would accommodate growth demands in each of the three basins through 2035. In the second and third phases, the PCWWTP would be expanded to support long-term growth in Southern Sarpy County.

For comparison to the Baseline and the other alternative regional wastewater concepts, Table 4 summarizes key aspects of Alternative 2.

**Table 4 – Alternative 2 Summarized Statistics**

| Parameter | Value |
|---|---|
| Location of Regional Wastewater Treatment | Expanded PCWWTP |
| Capacity of Regional WWTF / Expanded WWTF | 9.9 MGD |
| Anticipated No. of Phases for Implementation | 4 (Phases 1A, 1B, 2, 3) |
| No. of Interim Satellite WWTF / Existing Facility Expansions | 4 |
| No. of Pump Stations | 6 |
| Approximate Linear Footage of Force Main | 165,000 |
| Approximate Linear Footage of Interceptor Sewer | 285,000 |
| Approximate Linear Footage of Outfall Sewer | N/A |

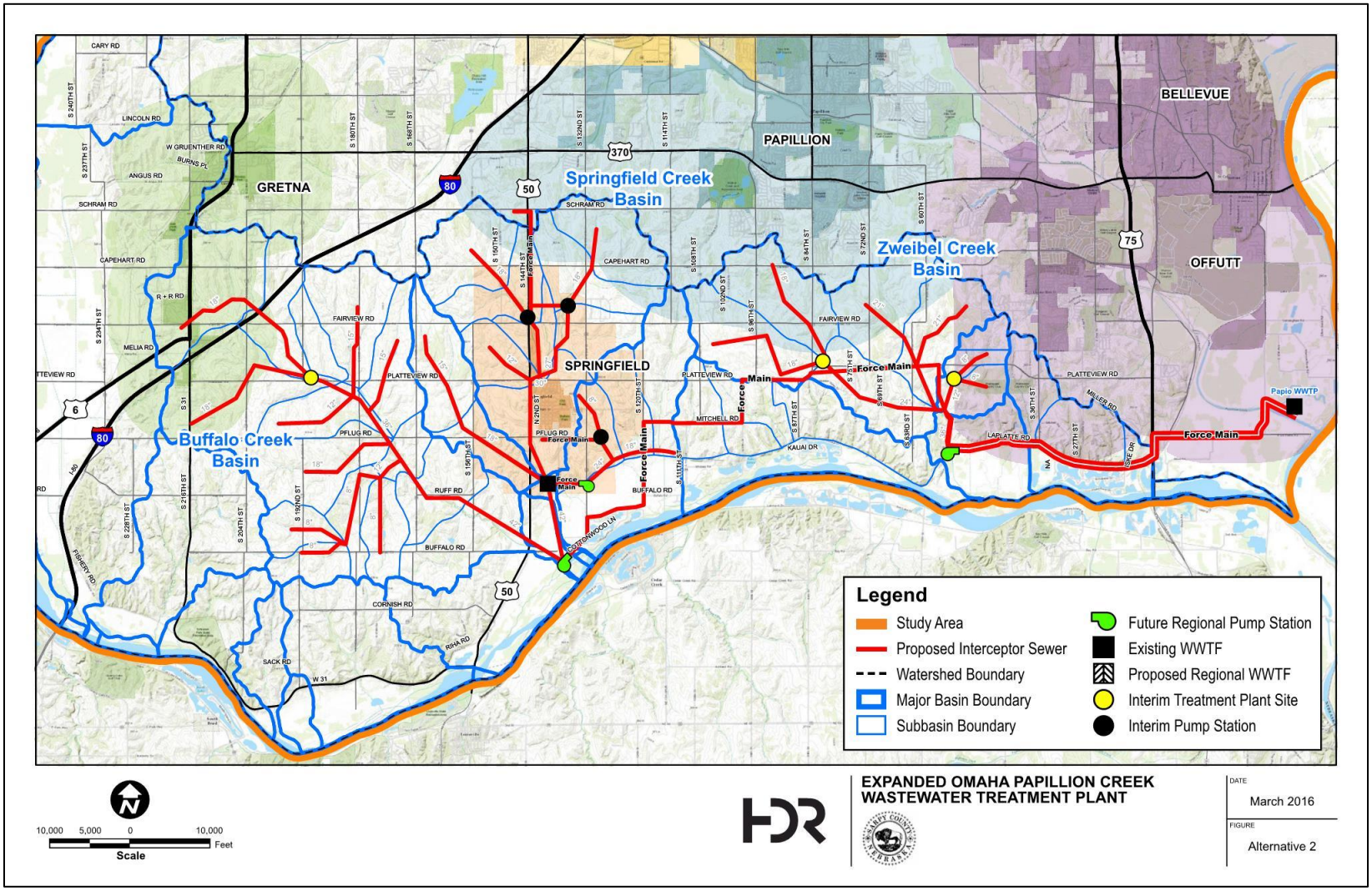



**Figure 3. Expanded Papillion Creek Wastewater Treatment Plant**

## Expanded Springfield and Papillion Creek Wastewater Treatment Plants (Alternative 3)

This concept, referred to as Alternative 3, is a combination of Alternative 1 (expanded Springfield WWTF) and Alternative 2 (expanded PCWWTP) described above. In Alternative 3, the existing Springfield WWTF would be expanded to treat wastewater generated south of the ridgeline in Sarpy County from the Buffalo Creek and Springfield Creek basins, and the existing Omaha PCWWTP would be expanded to treat wastewater generated south of the ridgeline in Sarpy County from the Zweibel Creek basin. Treated effluent from the expanded Springfield WWTF would be conveyed and discharged to the Platte River rather than discharged to Springfield Creek due to anticipated hydraulic limitations in Springfield Creek, and treated effluent from the Omaha PCWWTP would be discharged to Papillion Creek in Douglas County along with treated effluent from the Papillion Creek basin.

Figure 4 below shows Alternative 3. The majority of the collection system is identical to previous concepts, as shown in the figure. The observed variations result from the location of regional wastewater treatment, which in Alternative 3 is a combination of the expanded Springfield WWTF and PCWWTP. In Alternative 3, flow from the Buffalo Creek and Springfield Creek basins would gravity flow through their respective interceptor networks to the expanded Springfield WWTF. Wastewater from the Zweibel Creek basin would be pumped from the southern end of the Zweibel Creek Basin, east to the PCWWTP.

Alternative 3 is expected to be implemented in three primary phases according to projected growth and flow demands. In the initial phase, interim satellite WWTFs would be constructed and the existing Springfield WWTF would be expanded to support immediate and short-term development in the region. According to current growth forecasts, infrastructure constructed in Phase 1 would accommodate growth demands in each of the three basins through 2035. In the second and third phases, regional wastewater treatment (expanded Springfield WWTF and PCWWTP) would be constructed, and later expanded, to support long tem growth.

For comparison to the Baseline and the other alternative regional wastewater concepts, Table 5 summarizes key components of Alternative 3.

**Table 5 – Alternative 3 Summarized Statistics**

| Parameter | Value |
|---|---|
| Location of Regional Wastewater Treatment | Expanded Springfield WWTF / Expanded Omaha PCWWTP |
| Capacity of Regional WWTF / Expanded WWTF | 6.6 MGD / 3.3 MGD |
| Anticipated No. of Phases for Implementation | 4 (Phases 1A, 1B, 2, 3) |
| No. of Interim Satellite WWTF / Existing Facility Expansions | 4 |
| No. of Pump Stations | 5 |
| Approximate Linear Footage of Force Main | 65,000 |
| Approximate Linear Footage of Interceptor Sewer | 275,000 |
| Approximate Linear Footage of Outfall Sewer | 11,000 |

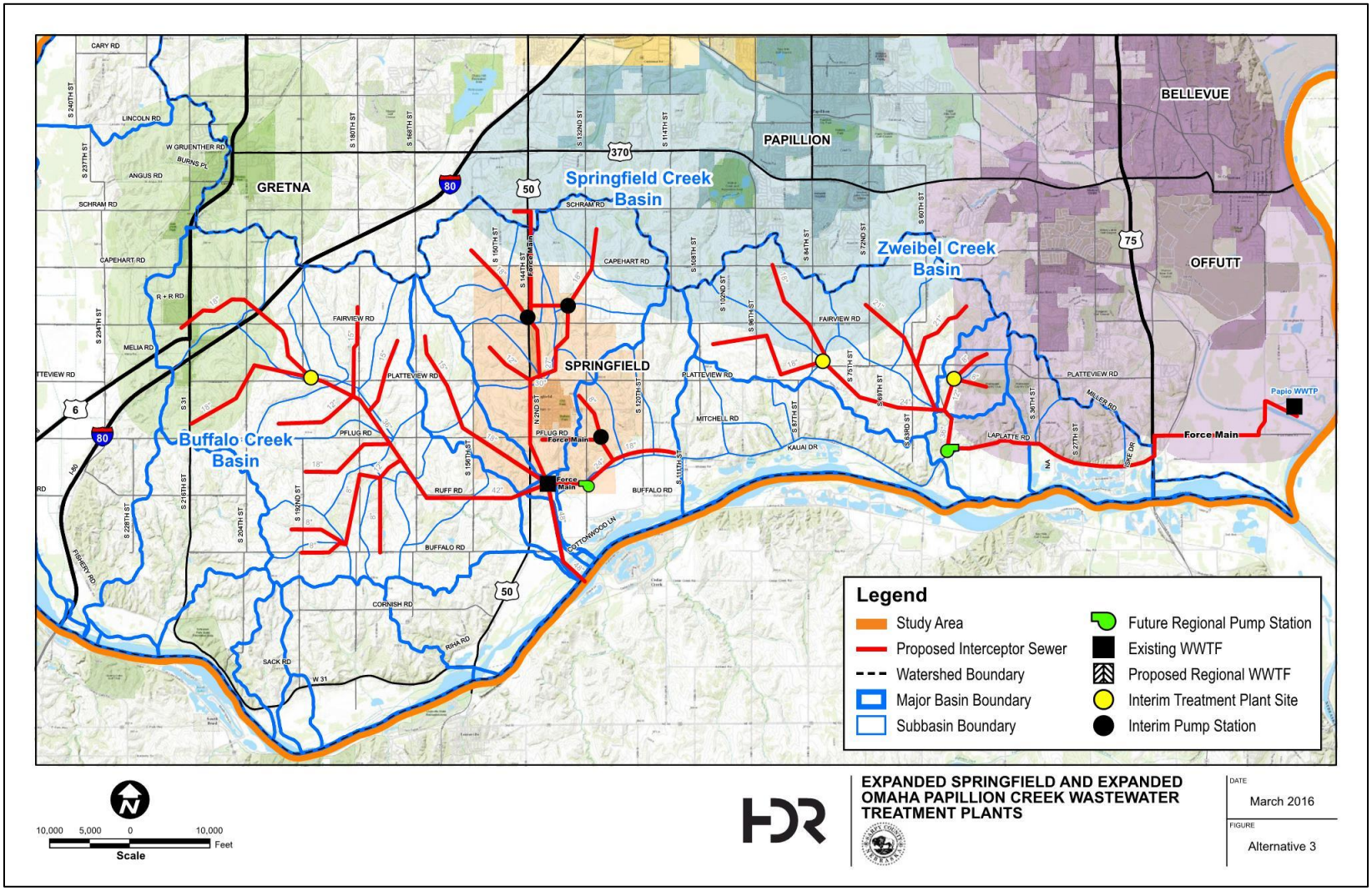



**Figure 4. Expanded Springfield and Papillion Creek Wastewater Treatment Plants**

## New Regional Treatment Facility and Expanded Papillion Creek WWTP (Alternative 4)

This concept, referred to as Alternative 4, is a combination of the Baseline Concept and Alternative 2 (expanded PCWWTP) described above. In Alternative 4, a new regional WWTF would be constructed in southern Sarpy County to treat wastewater generated south of the ridgeline in Sarpy County from the Buffalo Creek and Springfield Creek basins, and the existing Omaha PCWWTP would be expanded to treat wastewater generated south of the ridgeline in Sarpy County from the Zweibel Creek basin. Treated effluent from the new regional treatment facility would be discharged to the Platte River in southern Sarpy County, and treated effluent from the Omaha PCWWTP would be discharged to Papillion Creek in Douglas County along with treated effluent from the Papillion Creek basin.

Figure 5 below shows Alternative 4. The majority of the collection system is identical to the other concepts, as shown in the figure. The observed variations result from the location of regional wastewater treatment, which in Alternative 4 is a combination of the new Regional WWTF and expanded PCWWTP. In Alternative 4, flow from the Buffalo Creek and Springfield Creek basins would gravity flow through their respective interceptor networks to the new Regional WWTF located south of Springfield. Wastewater from the Zweibel Creek basin would be pumped from the southern end of the Zweibel Creek Basin, east to the PCWWTP.

Alternative 4 is expected to be implemented in three primary phases according to projected growth and flow demands. In the initial phase, interim satellite WWTFs would be constructed and the existing Springfield WWTF would be expanded to support immediate and short-term development in the region. According to current growth forecasts, infrastructure constructed in Phase 1 would accommodate growth demands in each of the three basins through 2035. In the second and third phases, regional wastewater treatment (new regional WWTF and expanded PCWWTP) would be constructed, and later expanded, to support long tem growth.

For comparison to the Baseline and the other alternative regional wastewater concepts, Table 6 summarizes key components of Alternative 4.

**Table 6 – Alternative 4 Summarized Statistics**

| Parameter | Value |
|---|---|
| Location of Regional Wastewater Treatment | New Regional WWTF South of Springfield / Expanded PCWWTP |
| Capacity of Regional WWTF / Expanded WWTF | 6.6 MGD / 3.3 MGD |
| Anticipated No. of Phases for Implementation | 4 (Phases 1A, 1B, 2, 3) |
| No. of Interim Satellite WWTF / Existing Facility Expansions | 4 |
| No. of Pump Stations | 5 |
| Approximate Linear Footage of Force Main | 65,000 |
| Approximate Linear Footage of Interceptor Sewer | 285,000 |
| Approximate Linear Footage of Outfall Sewer | 3,000 |

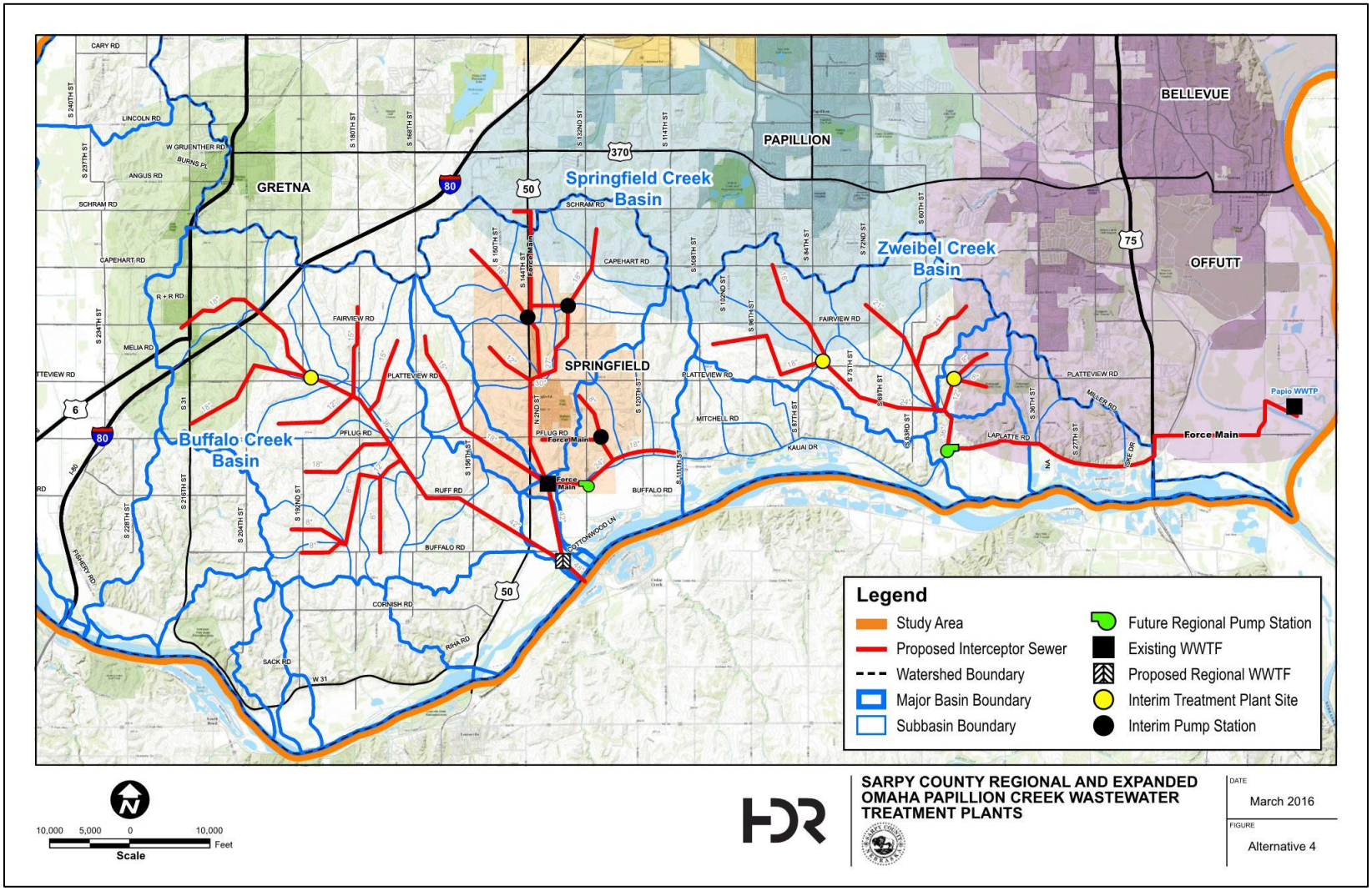



**Figure 5. New Regional Treatment Facility and Expanded Omaha Papillion Creek Wastewater Treatment Plant**

To enable a quantitative comparison of each of the evaluated regional wastewater treatment concepts, the following table, entitled Regional Wastewater Concepts Summary Statistics, displays the summary characteristics for the Baseline Concept and each Alternative.

**Table 7 – Regional Wastewater Concepts Summary Statistics**

| Parameter | Baseline Concept | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| Location of Regional Wastewater Treatment | New WWTF South of Springfield | Expanded Springfield WWTF | Expanded Omaha PCWWTP | Expanded Springfield WWTF / PCWWTP | New WWTF South of Springfield / Expanded PCWWTP |
| Capacity of New Regional / Expanded WWTF | 9.9 MGD | 9.9 MGD | 9.9 MGD | 6.6 MGD / 3.3 MGD | 6.6 MGD / 3.3 MGD |
| Anticipated No. of Phases | 4 (Phases 1A, 1B, 2, 3) | 4 (Phases 1A, 1B, 2, 3) | 4 (Phases 1A, 1B, 2, 3) | 4 (Phases 1A, 1B, 2, 3) | 4 (Phases 1A, 1B, 2, 3) |
| No. of Interim WWTF | 4 | 4 | 4 | 4 | 4 |
| No. of Pump Stations | 5 | 5 | 6 | 5 | 5 |
| Approximate LF of Force Main | 85,000 | 80,000 | 165,000 | 65,000 | 65,000 |
| Approximate LF of Interceptor Sewer | 285,000 | 275,000 | 285,000 | 275,000 | 285,000 |
| Approx. LF of Outfall Sewer | 3,000 | 11,000 | N/A | 11,000 | 3,000 |

## Comparative Costs

This section presents the estimated capital, operations and maintenance (O&M), and present worth costs for each of the evaluated alternatives. The estimated costs are order of magnitude, planning level costs, suitable for comparative purposes. Costs are presented in 2015 dollars (20 Cities ENR 9992). Capital costs include estimated construction costs, a contingency, and an allowance for engineering, legal, and administrative costs. Capital and O&M costs reflect the estimated unit cost information presented in the Platte River Regional Wastewater System Refinement Technical Memorandum with the exception of treatment costs associated with the expansion of the existing PCWWTP. Based on the Papio WWTP Study as well as a prior report completed in 2003, a unit price of $ 4.25/GPD treated (max month) in lieu of the $ 11.80/GPD previously presented was used for the expansion of the PCWWTP. O&M costs were estimated according to existing City of Omaha sewer rates.

### Capital

The preliminary capital cost estimates associated with each of the evaluated regional wastewater concepts are included in Table 8. It should be noted that, accuracy of planning level cost estimates typically range from about 20 percent on the low side to approximately 30 percent on the high side,

according to the American Association of Cost Estimators. A breakdown of the cost estimate for each concept is included in Attachment B located at the conclusion of the document. As shown in the table, the three concepts involving an expansion of the Omaha PCWWTP are the most favorable with the lowest estimated capital costs. This reflects some economy of scale for a relatively small incremental expansion of an existing treatment facility as opposed to construction of an entirely new facility at a new location.

**Table 8 – Preliminary Capital Cost Estimates (2015 Dollars)**

| Regional Wastewater Concept | Description | Cost |
|---|---|---|
| Baseline | New Regional Facility | $ 220,800,000 |
| Alternative 1 | Expanded Springfield Facility | $ 219,400,000 |
| Alternative 2 | Expanded Omaha PCWWTP | $ 171,600,000 |
| Alternative 3 | Expanded Springfield & PCWWTP | $ 192,900,000 |
| Alternative 4 | New Regional & PCWWTP | $ 193,500,000 |

It should be noted that an estimated $95,000,000 of the total capital cost for each concept is for the infrastructure common to all alternatives.

## Operations and Maintenance

Preliminary Operations and Maintenance (O&M) costs for each of the evaluated regional wastewater concepts were also estimated throughout the 40 year study period (2015-2055) and account for the following:

- General labor
- Chemicals
- Electrical
- Infrastructure / Equipment preventative maintenance and replacement
- Administrative / Overhead costs, major system repair, lab operation, and other miscellaneous operating expenses (multiplier of 2.6 – according to AWWA benchmarking data (2013) and annual operating budgets from existing systems of similar complexity functioning in the region)

Estimated O&M costs are presented by phase in Table 9 and represent equipment and infrastructure in place during each phase. Table 9 highlights that O&M costs for Phase 1A and Phase 1B are identical for each of the regional wastewater concepts, given that the infrastructure necessary for projected immediate and short-term development is identical for each concept. Additionally, as seen in the table, estimated O&M costs for the three concepts involving wastewater treatment at the Omaha PCWWTP

are significantly higher in Phases 2 and 3 than the other two alternatives. This will be discussed in additional detail in the next section.

**Table 9 – Preliminary Operation and Maintenance Cost Estimates By Phase (2015 Dollars)**

| Phase | Baseline Concept | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| Phase 1A Annual Cost | $ 1,782,700 | $ 1,782,700 | $ 1,782,700 | $ 1,782,700 | $ 1,782,700 |
| Phase 1B Annual Cost | $ 3,791,500 | $ 3,791,500 | $ 3,791,500 | $ 3,791,500 | $ 3,791,500 |
| Phase 2 Annual Cost | $ 4,476,500 | $ 4,472,400 | $ 7,617,500 | $ 5,086,500 | $ 5,088,700 |
| Phase 3 Annual Cost | $ 6,329,400 | $ 6,323,600 | $ 10,390,500 | $ 7,248,000 | $ 7,250,200 |

## Present Worth

Present worth is a calculated value that provides a means to directly compare the total costs of alternatives with different capital and O&M requirements. The present worth values of the Baseline Concept and each of the evaluated Alternatives are presented in Table 10. The following assumptions were utilized in preparation of the estimates presented.

- Evaluated over the full 40 year study period (2015-2055)
- Costs are presented in 2015 dollars
- Implementation of each concept will be in phases as indicated above and defined in the Platte River Regional Wastewater System Refinement Technical Memorandum
- O&M costs are associated with the facilities in place during each phase
- O&M costs will escalate at a rate equal to inflation with the exception of the PCWWTP component of Alternatives 2, 3, and 4
- O&M costs for the PCWWTP treatment component of Alternatives 2, 3, and 4 will escalate at a rate greater than inflation consistent with rate forecasts by the City of Omaha
- The forecasted escalation for the PCWWTP related component of the O&M costs for Alternatives 2, 3, and 4 will be the rates stipulated by current Omaha Ordinance dated June 24, 2014 for Bulk 1 Customers (minus inflation) through 2018, and thereafter at 9 percent (minus inflation) through 2029 (see discussion below)
- Inflation is forecasted at a long-term average rate of 3.1 percent

As displayed in Table 10, the present worth costs for four of the five regional wastewater concepts are within 10 percent of each other. At this preliminary stage of the project, these costs could be considered essentially equal due to the previously discussed variability in cost estimating. Nevertheless, Alternative 1 (expanded Springfield Facility) appears to be the most economically favorable regional wastewater concept for long-term development in southern Sarpy County.

Although capital costs for Alternatives 2, 3, and 4 were more favorable as compared to the other alternatives, total O&M costs over the 40 year study period were estimated to be over 40 percent more costly. This was as a result of the assumption that O&M costs for wastewater treatment at the new regional WWTF, expanded Springfield WWTF, or interim satellite WWTF would increase each year proportional to long-term inflation. However, O&M costs for the component involving wastewater treatment at the PCWWTP for Alternatives 2, 3, and 4 would increase at a rate greater than the projected long-term inflation rate.

The assumption of escalated O&M costs for Omaha PCWWTP alternatives is based on the June 2014 City of Omaha Ordinance, which set forth a schedule of charges through year 2018. In accordance with the aforementioned ordinance, sewer rate fees in Omaha for Bulk 1 Customers are set to increase by approximately 10 percent annually (about 7 percent above anticipated inflation) from year 2016 to 2018. Following 2018, it is assumed that sewer rates will increase by approximately 9 percent annually (about 6 percent above inflation) from 2019 through 2029, at which time the CSO program is anticipated to be completed, and sewer rates should be at a level necessary to sustain the associated debt service.

It should be noted that these assumptions, while believed to be reasonable, are nothing more than assumptions. The City of Omaha has not contemplated expansion of the Omaha PCWWTP to serve southern Sarpy County and the implications of doing so are not reflected in the 2014 Ordinance, nor in the longer term rate increase assumption.

It should also be understood that the City of Omaha will be updating wastewater program costs and completing a community affordability study in the next few years. The results of the study could have a significant impact on the assumptions detailed above, resulting in necessary adjustments to the 2015 present worth costs presented in Table 10.

**Table 10 – Preliminary Present Worth Estimations (2015 Dollars)**

| Regional Wastewater Concept | Capital Cost | O&M Cost | Total Present Worth Cost |
|---|---|---|---|
| Baseline | $ 220,800,000 | $ 152,500,000 | $ 373,300,000 |
| Alternative 1 | $ 219,400,000 | $ 152,400,000 | $ 371,800,000 |
| Alternative 2 | $ 171,600,000 | $ 362,900,000 | $ 534,500,000 |
| Alternative 3 | $ 192,900,000 | $ 214,300,000 | $ 407,200,000 |
| Alternative 4 | $ 193,500,000 | $ 214,400,000 | $ 407,900,000 |

Figures 6-10 on the pages that follow graphically depict annual capital and O&M outlays for each of the regional wastewater treatment concepts assuming the previously discussed phasing strategy. As depicted, the capital outlays for each of the regional wastewater treatment concept are relatively consistent for each phase. The most significant variance is associated with the construction of the

selected regional wastewater treatment in Phase 2. It can also be seen that capital and O&M outlays in Phases 1A and 1B are identical. Annual O&M outlays vary in Phases 2 and 3, as a result of escalated O&M costs through 2029 for Alternatives involving treatment at the PCWWTP.

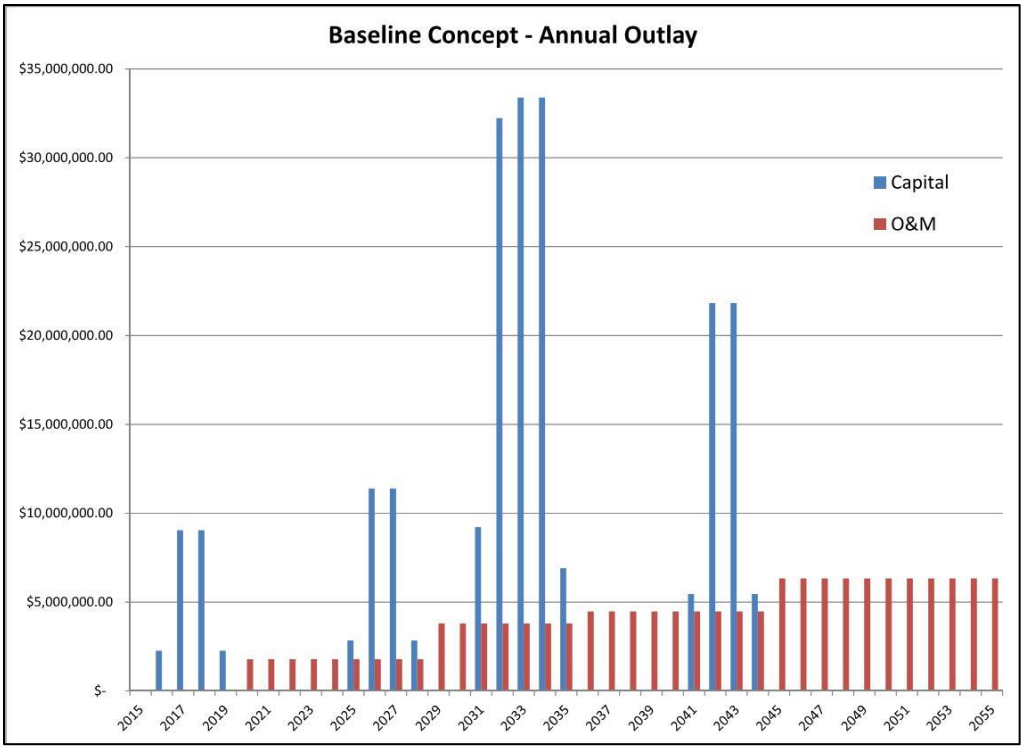



**Figure 6. Annual Outlay – New Regional Treatment Facility in Southern Sarpy County**

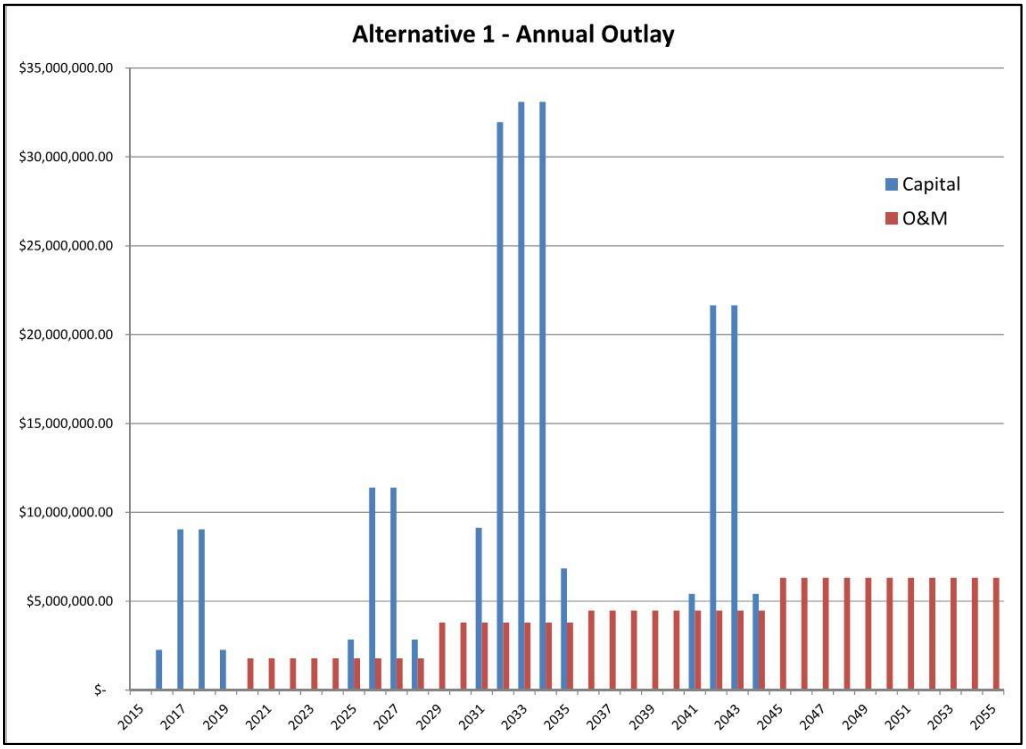



**Figure 7. Annual Outlay – Expanded Springfield Wastewater Treatment Facility**

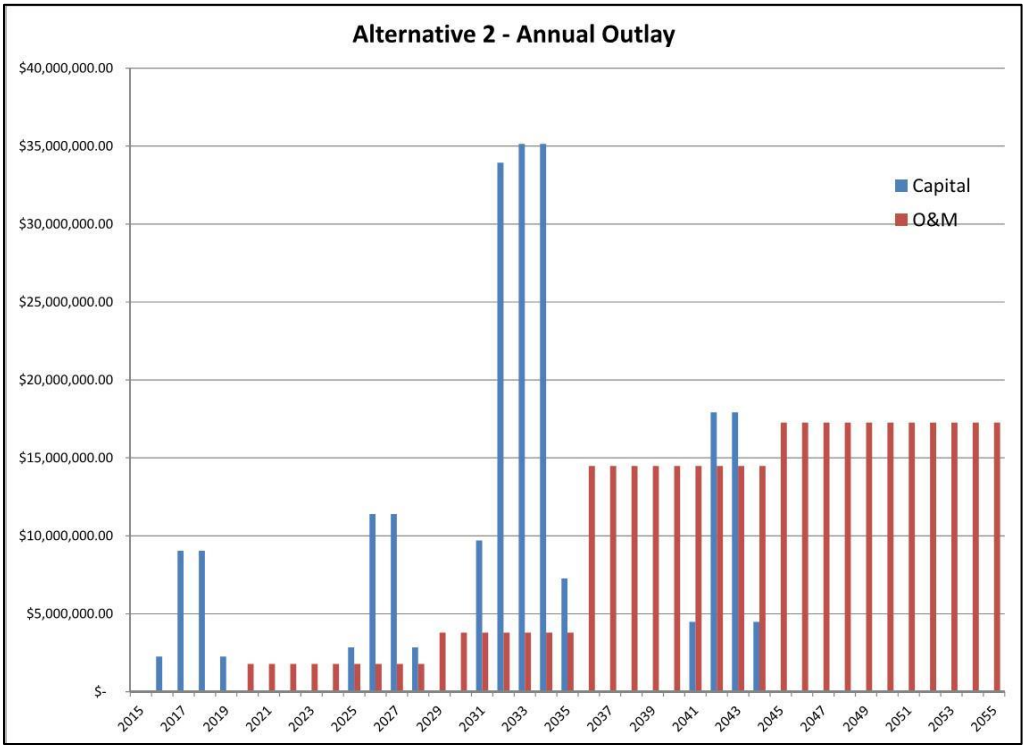



**Figure 8. Annual Outlay – Expanded Papillion Creek Wastewater Treatment Plant**

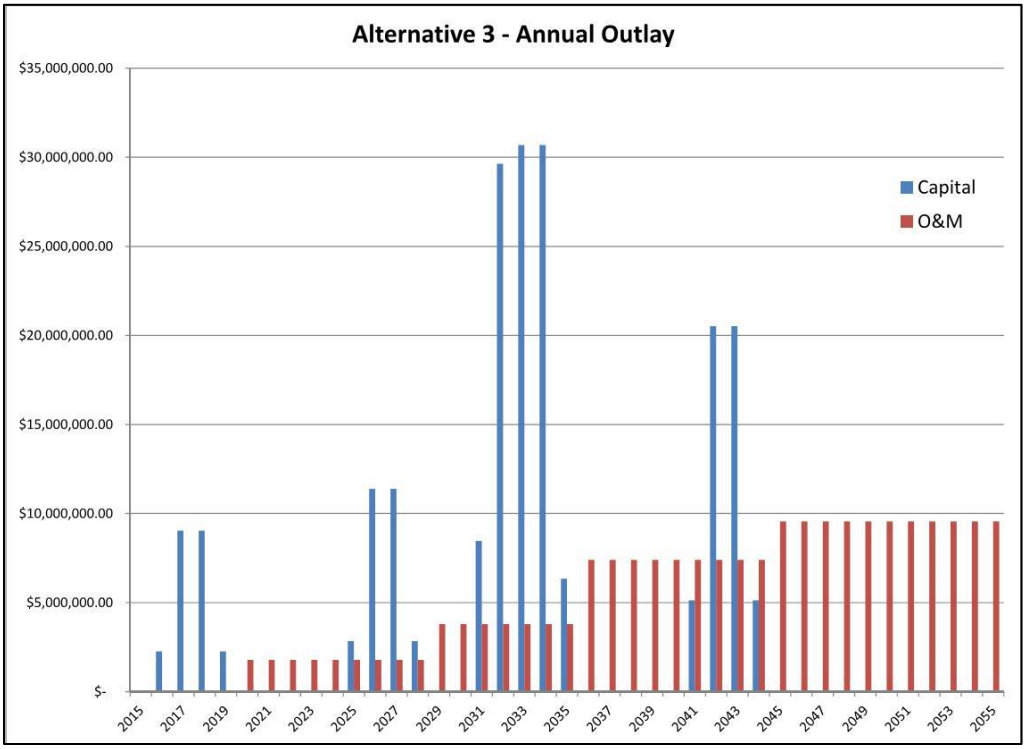



**Figure 9. Annual Outlay – Expanded Springfield and Papillion Creek Wastewater Treatment Plants**

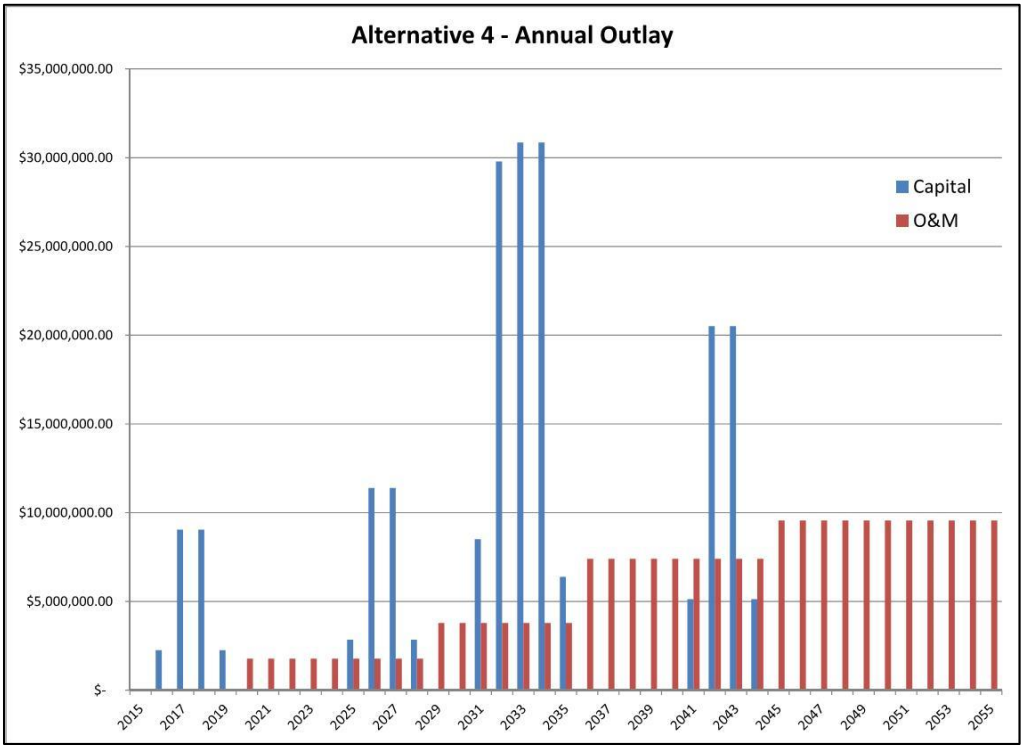



**Figure 10. Annual Outlay – New Regional Treatment Facility and Expanded Papillion Creek Wastewater Treatment Plant**

## Nonmonetary Considerations

This section identifies nonmonetary criteria considered for regional wastewater concepts in southern Sarpy County and evaluates each alternative relative to those considerations.

### Criteria

Although economic considerations will certainly be a significant driver in any decision regarding regional wastewater treatment in southern Sarpy County, the closeness of the estimates and current accuracy emphasizes the importance of considering nonmonetary criteria. Six nonmonetary evaluation criteria were utilized during the analysis, and each evaluation criteria consists of multiple sub-criterion. The following table summarizes the evaluation criteria.

**Table 11 – Nonmonetary Evaluation Criteria**

| Evaluation Criteria | Sub-Criteria | Description |
|---|---|---|
| Environmental Impacts | Threatened and Endangered Species | Impact to threatened and endangered species (e.g. American ginseng, pallid sturgeon, northern long-eared bat, etc.) |
| | Conservation Lands | Impacts to conservation land (e.g. state parks and recreation area, etc.) |
| | Wetlands or Waters of the U.S. | Impacts to designated wetlands or Waters of the U.S |
| | Wellhead Protection | Impact to public water supply wells |
| | Hydrologic Impacts | Effect on the hydrologic cycle from discharging water out of basin (e.g. declining river flow) |
| Water Quality Impacts | Assimilative Capacity of Receiving Body | Ability of the receiving body of water to receive impurities without adverse impact |
| | Nutrients | Impact caused by wastewater effluent nutrient levels of (i.e. nitrogen and phosphorus) |
| | Effluent Characteristics | Impacts of typical wastewater constituents on water quality (e.g. BOD, TSS, Ammonia, etc.) |
| | Disinfection | Probable disinfection requirements and sensitivity |
| Ease of Permitting | NPDES | Complexity of obtaining National Pollution Discharge Elimination System Permit for wastewater discharge |
| | Flood Plain Development | Requirements associated with flood plain development (e.g. wastewater treatment facility, outfall sewer, etc.) |
| | Misc. Permits | Complexity of obtaining Air Quality Construction Permit, miscellaneous local permits |
| | CSO Implications | Increased complexity resulting from the existence of an existing combined sewer system within the collection system |
| Implementability | Ability to Phase Improvements | Ability to phase wastewater infrastructure and equipment construction |
| | Flexibility to Changes in Growth Forecasts | Ability to adjust implementation of wastewater concept to accommodate variations in population forecasting |
| | Expandable for Future Demands | Ability to expand regional WWTF to match future demands |
| | Implementation Risk and Timeframe | Risk of regional wastewater concept implementation and timeframe sensitivity |

| | | |
|---|---|---|
| | Land Acquisition | Ability to acquire land necessary for regional wastewater concept |
| | Constructability | Complexity associated with construction (e.g. retrofitting existing infrastructure vs. greenfield construction) |
| Stakeholder and Public Acceptance | Stakeholder Autonomy | Ability of stakeholders to set rates and utilize revenue |
| | Stakeholder Control | Stakeholder has say in determining what is constructed and associated timeframe |
| | Public Acceptance | Expected public opposition to conveyance and treatment facilities |
| Sustainability | Energy | Energy demand of facilities and equipment |
| | Materials | Building materials required for construction |
| | Reuse of Existing Facilities | The ability to utilize existing infrastructure in the implementation of the regional wastewater concept |

## Results

The regional wastewater treatment concepts were scored on a scale from one to three for each evaluation sub-criterion presented in Table 11, with three being the most favorable. An average score was then determined for each evaluation criterion based on the summation of the associated sub-criteria. The ranking score for each regional wastewater concept is displayed in the following table. It should be understood that the ranking of alternatives presented in the Table 11 assumes equal weight of nonmonetary criteria. Relative importance of each criterion will be measured with input from stakeholders.

The two regional wastewater treatment concepts that received the highest scores are Alternative 1 (expanded Springfield) and Alternative 2 (expanded PCWWTP).

**Table 12 – Nonmonetary Evaluation Matrix**

| Evaluation Criteria / Sub-Criteria | Baseline Concept | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| | New Regional | Springfield | PCWWTP | SF & PCWWTP | New Regional & PCWWTP |
| **Environmental Impacts** | **2.4** | **2.8** | **2.4** | **2.4** | **2.2** |
| *Threatened and Endangered Species* | 2 | 2 | 3 | 2 | 2 |
| *Conservation Lands* | 3 | 3 | 3 | 3 | 3 |
| *Wetlands or Waters of the U.S.* | 2 | 3 | 2 | 2 | 2 |
| *Wellhead Protection* | 2 | 3 | 3 | 3 | 2 |
| *Hydrologic Impacts* | 3 | 3 | 1 | 2 | 2 |
| **Water Quality Impacts** | **2.0** | **2.0** | **2.5** | **2.3** | **2.3** |
| *Assimilative Capacity of Receiving Body* | 2 | 2 | 3 | 3 | 3 |
| *Nutrients* | 2 | 2 | 2 | 2 | 2 |
| *Effluent Characteristics* | 2 | 2 | 2 | 2 | 2 |
| *Disinfection* | 2 | 2 | 3 | 2 | 2 |
| **Ease of Permitting** | **1.8** | **2.3** | **2.5** | **2.3** | **1.8** |
| *NPDES* | 1 | 1 | 3 | 2 | 2 |
| *Flood Plain Development* | 1 | 3 | 3 | 3 | 1 |
| *Misc. Permits* | 2 | 2 | 3 | 2 | 2 |
| *CSO Implications* | 3 | 3 | 1 | 2 | 2 |
| **Implementability** | **2.5** | **2.7** | **2.3** | **2.0** | **1.8** |
| *Ability to Phase Improvements* | 3 | 3 | 2 | 2 | 2 |
| *Flexibility to Changes in Growth Forecasts* | 3 | 3 | 2 | 2 | 2 |
| *Expandable for Future Demands* | 3 | 3 | 2 | 2 | 2 |
| *Implementation Risk and Timeframe* | 2 | 2 | 3 | 2 | 2 |
| *Land Acquisition* | 1 | 2 | 3 | 2 | 1 |
| *Constructability* | 3 | 3 | 2 | 2 | 2 |
| **Stakeholder and Public Acceptance** | **2.3** | **2.7** | **2.0** | **2.3** | **2.3** |
| *Stakeholder Autonomy* | 3 | 3 | 3 | 3 | 3 |
| *Stakeholder Control* | 3 | 3 | 1 | 2 | 2 |
| *Public Acceptance* | 1 | 2 | 2 | 2 | 2 |
| **Sustainability** | **1.7** | **1.7** | **2.3** | **2.0** | **2.0** |
| *Energy* | 2 | 2 | 1 | 2 | 2 |
| *Materials* | 1 | 1 | 3 | 2 | 2 |
| *Reuse of Existing Facilities* | 2 | 2 | 3 | 2 | 2 |
| **Total Points (out of 18)** | **12.7** | **14.1** | **14.1** | **13.2** | **12.4** |

### *Environmental Impacts*

As a result of the type of construction, location of construction, and force main orientation associated with each of the regional wastewater treatment concepts varies (South of Springfield along the Platte River, existing Springfield WWTF site, and existing PCWWTP site), the potential impacts on environmental aspects will also vary. These environmental aspects include threatened and endangered species, proximity to sensitive geographic features such as conservation land, wetlands, and waters of the U.S., as well as potential impacts to the hydrologic cycle. Out of basin effluent discharges, the necessary crossing of Papillion Creek, and the general closeness of the associated force main to national wetlands lead to decreased favorability for regional wastewater treatment concepts involving an effluent discharge to Papillion Creek.

### *Water Quality Impacts*

As stated earlier, the hydraulic capacity of Springfield Creek is limited, diminishing the possibility that a regional discharge will be permitted at Springfield Creek. For that reason, water quality impact considerations were limited to regional wastewater discharges to the Papillion Creek/Missouri River and the Platte River. These bodies of water have different characteristics, and regulatory expectations will vary. For example, it is anticipated that a new Platte River effluent discharge will be more closely scrutinized than increasing the effluent discharge volume to Papillion Creek, adding favorability to Alternative 2. The impact of projected future nutrient removal requirements is expected to have an impact on both receiving bodies.

### *Ease of Permitting*

Permitting for the construction of a new WWTF is expected to be more complex than permitting a WWTF expansion. Additionally, the process undertaken to obtain an entirely new NPDES permit on the Platte River will likely be more complex than the process to amend the current PCWWTP NPDES permit. However, additional flow from southern Sarpy County to the existing PCWWTP could complicate the facility's ability to accommodate upstream combined sewer flows. Finally, development in the floodplain further reduces ease of permitting scores for the Baseline Concept and Alternative 4.

### *Implementability*

The ability to phase improvements, adjust the implementation strategy as fluctuations from growth forecasting are observed, as well as expand to meet future demands will vary depending on the details of the location of regional wastewater treatment. It is expected that the regional wastewater treatment concepts involving the design and construction of a new facility will have an increased level of flexibility. However, land acquisition requirements for a new regional WWTF south of Springfield leads to less favorable implementability scores for the Baseline Concept and Alternative 4.

### *Stakeholder and Public Acceptance*

With the implementation of any of the regional wastewater treatment concepts, Sarpy County, Gretna, Springfield, Bellevue, and Papillion will retain their autonomy with respect to their individual wastewater collection systems and interactions with their customers. For example, regardless of the

regional wastewater treatment concept implemented, each of those stakeholders will be billed at a bulk rate by the regional system, but will continue to have the ability to set their own rates and utilize the associated sewer revenue as desired. For each of the regional concepts, exclusive of the Omaha PCWWTP, each stakeholder will also have a larger say in what gets constructed and when it is implemented, resulting in higher stakeholder control scores for the Baseline Concept and Alternative 1.

#### *Sustainability*

Energy saving equipment and technology, and other green aspects could be implemented in the design and construction of a new WWTF. Additionally, variable pumping requirements for each of the regional wastewater concepts provides another opportunity for energy conservation. For example, the necessity in Alternative 2 to pump 100 percent of the wastewater flow leads to a less favorable energy score. However, entirely new construction would require greater material utilization than the expansion of an existing facility, leading to higher sustainability scores for Alternatives 2 and 3. In all of the regional wastewater concepts, the ability to reuse equipment or facilities will be explored.

## Stakeholder Input

This section summarizes the input received from stakeholders regarding each of the alternatives introduced above as well as the relative importance of the evaluation criteria, which includes the monetary and nonmonetary considerations presented in the preceding sections.

### Alternatives Workshop

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 January 21, 2016 an Alternatives Workshop was held. A meeting summary from the Alternatives Workshop can be found in Attachment C, located at the conclusion of this document. Attendees included representatives from Sarpy County, each of the stakeholder communities, and various other entities. During the Alternatives Workshop, stakeholder input was obtained regarding each of the five regional wastewater concepts evaluated, as well as the relative importance of each of the evaluation criterion used in the analysis of the alternatives. Relative importance was assessed using a paired comparison approach. Each attendee completed a paired comparison table. In this type of analysis, each criterion is individually compared against the remaining criteria to determine the relative importance of each criterion. The results from this exercise are reflected in the weighting factors displayed in Table 13.

**Table 13 – Evaluation Criteria Weighting Factors**

| Evaluation Criteria | Weighting Factor (%) |
|---|---|
| Cost Effectiveness | 19 % |
| Environmental Impacts | 16 % |
| Water Quality Impacts | 19 % |
| Ease of Permitting | 6 % |
| Implementability | 14 % |
| Stakeholder and Public Acceptance | 12 % |
| Sustainability | 14 % |

The weighting factors developed from the paired comparison process were used to generate scores for each regional wastewater treatment concept reflective of stakeholder input. Total scores were determined by multiplying the weighting factors by each criterion's ranking score. Monetary ranking was assigned based on the present worth estimations located in Table 10. The nonmonetary ranking scores were based on rankings of nonmonetary considerations summarized in Table 12. The results are displayed in the following table. As displayed in the table, the alternative that received the highest score was Alternative 1 (expanded Springfield).

**Table 15 – Alternatives Analysis With Stakeholder Input**

| Regional Wastewater Concept | Evaluation Criteria | | | | | | | Total Points |
|---|---|---|---|---|---|---|---|---|
| | Cost Effectiveness | Environmental Impacts | Water Quality Impacts | Ease of Permitting | Implementability | Stakeholder and Public Acceptance | Sustainability | |
| Baseline Concept | 44.3 | 38.4 | 38.0 | 10.5 | 35.0 | 28.0 | 23.3 | 217.6 |
| Alternative 1 | 44.3 | 44.8 | 38.0 | 13.5 | 37.3 | 32.0 | 23.3 | 233.3 |
| Alternative 2 | 31.7 | 38.4 | 47.5 | 15.0 | 32.7 | 24.0 | 32.7 | 221.9 |
| Alternative 3 | 38.0 | 38.4 | 42.8 | 13.5 | 28.0 | 28.0 | 28.0 | 216.7 |
| Alternative 4 | 38.0 | 35.2 | 42.8 | 10.5 | 25.7 | 28.0 | 28.0 | 208.1 |

## Recommendations

This section recommends Alternative 1 (expanded Springfield) as the most cost effective alternative for treatment of wastewater generated in southern Sarpy County based on the monetary and nonmonetary evaluations, and stakeholder input summarized above. It also presents a timeline for phased implementation and the associated phasing and cash flow requirements for implementation of the regional wastewater conveyance and treatment facilities identified above.

## Alternative

The alternatives analysis summarized above indicated Alternative 1 as the preferred regional wastewater concept to treat wastewater generated in southern Sarpy County. Alternative 1 is referred to as an expansion of the existing Springfield WWTF and includes the construction of a system of interceptor sewers, pump stations, interim treatment facilities, and a new regional WWTF at the existing Springfield WWTF site. The regional facility would treat wastewater from the Buffalo Creek, Springfield Creek, and Zweibel Creek basins and discharge treated effluent to the Platte River.

## Implementation

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. It should be understood that the phasing detailed below and illustrated in Figure 11 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.

It is anticipated that the implementation of Alternative 1 would consist of three phases, Phases 1-3, according to the growth projections presented in the Platter River Regional Wastewater System Refinement Technical Memorandum. 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. As previously indicated, Phase 1 is identical for each of the regional wastewater concepts. As such, it should be emphasized that a conclusive determination regarding the long term location of regional wastewater treatment (i.e. PCWWTP, Springfield WWTP site, new site south of Springfield) can be made after Phase 1 has begun. Phase 2 and 3 are projected to serve long term growth demands in each of the three basins through 2044 and 2055, respectively.

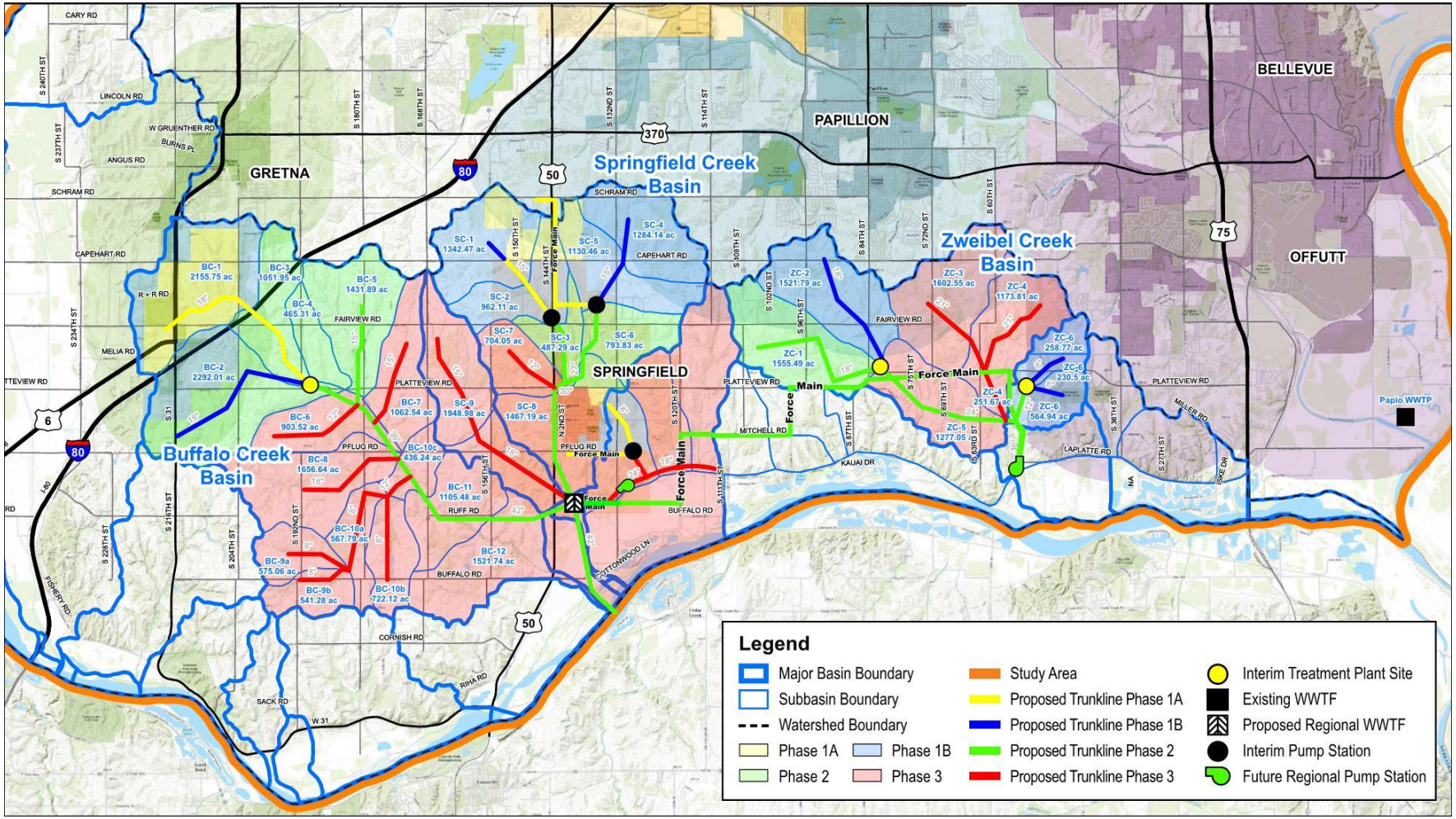



**Figure 11. Alternative 1 – Phased Implementation**

### 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, the satellite treatment facility would be expanded to a total capacity of 1,200,000 GPD and a second interceptor would be constructed south of the initial interceptor, opening up the area south of Interstate 80 along Highway 31 South.

Phase 1A in the Springfield Creek Basin includes an interceptor sewer and a 600,000 GPD expansion of the existing Springfield WWTF. Additionally, three interim pump stations (PS) 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 PCWWTP. The first interim facility was preliminarily located in the vicinity of Fairview Road and Highway 50, and the second, north of Fairview Road and west of South 132nd Street. A 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 WWTF. 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 and remainder of the northwest portion of the basin. An additional expansion of the existing Springfield WWTF would also be completed during Phase 1B, supporting residential development east of the City of Springfield.

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 Phase 2 in Buffalo Creek Basin, an interceptor sewer would be constructed beginning at the interim treatment facility location, and extending southeast across the basin to the Regional WWTF located at the existing Springfield WWTF site. Additionally, the interim satellite facility would be decommissioned.

In Springfield Creek Basin, 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 new Regional WWTF. Finally, the existing Springfield WWTF and two north interim PS's and associated force main would be decommissioned.

In the Zweibel Creek Basin, 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 60$^{th}$ 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. The force main alignment is discussed in greater detail in Attachment A. 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

The third and final phase in Buffalo Creek Basin includes the construction of several interceptor branches, providing the availability of sewer service to the remainder of the drainage basin.

In the Springfield Creek Basin, 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 Regional WWTF, pumping wastewater flow collected immediately outside of the eastern edge of the Springfield Creek Basin to the Regional WWTF.

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

## Cash Flow

Table 16 identifies the timing of the capital and annual O&M costs for the Alternative 1 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 16 – Preliminary Capital and O&M Cost Summary (2015 Dollars)**

| Year | Capital Outlay | | | O&M Cost | | |
|---|---|---|---|---|---|---|
| | Buffalo | Springfield | Zweibel | Buffalo | Springfield | Zweibel |
| 2016 | $ 997,926 | $ 1,262,435 | $ 0 | $ 0 | $ 0 | $ 0 |
| 2017 | $ 3,991,704 | $ 5,049,739 | $ 0 | $ 0 | $ 0 | $ 0 |
| 2018 | $ 3,991,704 | $ 5,049,739 | $ 0 | $ 0 | $ 0 | $ 0 |
| 2019 | $ 997,926 | $ 1,262,435 | $ 0 | $ 0 | $ 0 | $ 0 |
| 2020 | $ 0 | $ 0 | $ 0 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2021 | $ 0 | $ 0 | $ 0 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2022 | $ 0 | $ 0 | $ 0 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2023 | $ 0 | $ 0 | $ 0 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2024 | $ 0 | $ 0 | $ 0 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2025 | $ 899,903 | $ 843,299 | $ 1,105,113 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2026 | $ 3,599,614 | $ 3 ,373,195 | $ 4,420,452 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2027 | $ 3,599,614 | $ 3,373,195 | $ 4,420,452 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2028 | $ 899,903 | $ 843,299 | $ 1,105,113 | $ 637,408 | $ 1,145,254 | $ 0 |
| 2029 | $ 0 | $ 0 | $ 0 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2030 | $ 0 | $ 0 | $ 0 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2031 | $ 2,627,964 | $ 2,930,169 | $ 3,570,940 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2032 | $ 9,197,875 | $ 10,255,591 | $ 12,498,290 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2033 | $ 9,526,371 | $ 10,621,862 | $ 12,944,657 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2034 | $ 9,526,371 | $ 10,621,862 | $ 12,944,657 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2035 | $ 1,970,973 | $ 2,197,627 | $ 2,678,205 | $ 1,272,397 | $ 1,777,044 | $ 742,056 |
| 2036 | $ 0 | $ 0 | $ 0 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2037 | $ 0 | $ 0 | $ 0 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2038 | $ 0 | $ 0 | $ 0 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2039 | $ 0 | $ 0 | $ 0 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2040 | $ 0 | $ 0 | $ 0 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2041 | $ 1,576,899 | $ 2,185,479 | $ 1,651,202 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2042 | $ 6,307,597 | $ 8,741,918 | $ 6,604,807 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2043 | $ 6,307,597 | $ 8,741,918 | $ 6,604,807 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2044 | $ 1,576,899 | $ 2,185,479 | $ 1,651,202 | $ 1,034,276 | $ 1,582,718 | $ 1,855,392 |
| 2045 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2046 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2047 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2048 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2049 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2050 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2051 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2052 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2053 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2054 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |
| 2055 | $ 0 | $ 0 | $ 0 | $ 1,565,028 | $ 2,311,741 | $ 2,446,857 |

# Attachment A – Force Main Routing

# Preliminary Force Main Routing

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.

## Configuration – Regional WWTF to Regional Pump Station

There were four (4) alternate alignments (A – D) that were evaluated for the force main routing from the proposed Regional WWTF, which is assumed to be near the intersection of Buffalo Road and S. 132nd Street or at the existing Springfield WWTF location, to the proposed Regional Pump Station, which us assumed to be near the intersection of S. 56th Street and Laplatte Road.

Alignment Alternative A is the force main alignment that will run from either of the Proposed Regional WWTF locations to the proposed Regional Pump Station. With either regional WWTF location, the force main will be routed to the intersection of S. 132nd Street and Buffalo Road. The force main will then run east on Buffalo Road to S. 120th Street, north on S. 120th Street to Mitchell Road, east on Mitchell Road to S. 96th Street, north on S. 96th Street to Platteview Road, east on Platteview Road to S. 57th Street, and south on 57th Street to the proposed regional pump station located near the intersection of S. 56th Street and Laplatte Road. With this alternative alignment the entire force main alignment is proposed to be located within road right-of-way.

Alignment Alternative B is the force main alignment that will run from either of the Proposed Regional WWTF locations to the proposed Regional Pump Station. With either regional WWTF location, the force main will be routed to the intersection of S. 132nd Street and Buffalo Road. The force main will then run east on Buffalo Road to S. 120th Street, north on S. 120th Street to Mitchell Road, east on Mitchell Road to S. 96th Street. From the intersection of Mitchell Road and S. 96th Street the force main will be routed east across private property to the proposed regional pump station located near the intersection of S. 56th Street and Laplatte Road. With this alternative alignment approximately 51% of the force main alignment is proposed to be located within road right-of-way and 49% of the force main alignment is proposed to be located within easements on private property.

Alignment Alternative C is the force main alignment that will run from either of the Proposed Regional WWTF locations to the proposed Regional Pump Station. With either regional WWTF location, the force main will be routed to the intersection of S. 132nd Street and Buffalo Road. The force main will then run east on Buffalo Road to S. 120th Street, north on S. 120th Street to Buffalo Road, east on Buffalo Road to S. 111th Street, north on S. 111th Street to Mitchell Road, east on Mitchell Road to S 96th Street, north on S 96th Street to Platteview Road, east on Platteview Road to S. 57th Street, and south on 57th Street to the regional pump station located near the intersection of S. 56th Street and Laplatte Road. With this alternative alignment the entire force main alignment is proposed to be located within road right-of-way. The alignment does run close to three (3) lakes located near the intersection of Buffalo Road and S. 111th Street which may cause concerns of water contamination if there was a force main break near this area.

Alignment Alternative D is the force main alignment that will run from either of the Proposed Regional WWTF locations to the proposed Regional Pump Station. With either regional WWTF location, the force main will be routed to the intersection of S. 132nd Street and Buffalo Road. The force main will then run east on Buffalo Road to S. 120th Street, north on S. 120th Street to Buffalo Road, east on Buffalo Road to S. 111th Street, north on S. 111th Street to Mitchell Road, east on Mitchell Road to S 96th Street. From the intersection of Mitchell Road and S. 96th Street the force main will be routed east across private property to the proposed regional pump station located near the intersection of S. 56th Street and Laplatte Road. With this alternative alignment approximately 49% of the force main alignment is proposed to be located within road right-of-way and 51% of the force main alignment is proposed to be located within easements on private property. The alignment does run close to three (3) lakes located near the intersection of Buffalo Road and S. 111th Street which may cause concerns of water contamination if there was a force main break near this area.

The recommended alignment alternative would be Alignment A with Alignment B as an alternate. The advantages of Alignment A is this alignment is located entirely within road right-of-way so no easements will be required for the alignment and maintenance of the line is easier since the entire alignment is near 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 B which equates to a lower construction cost. The disadvantage for Alignment B is that the approximately 49% of the alignment is located on private property so easements will be required to construct and maintain the line. Maintenance of the portions of the force main located on private property will not be as convenient as Alignment A due to those portions of the alignment not being near roads. Both alignments also maintain a respective distance from lakes which eliminates concerns with water contamination from potential force main breaks.

## Configuration – Regional Pump Station to Papillion Creek WWTP

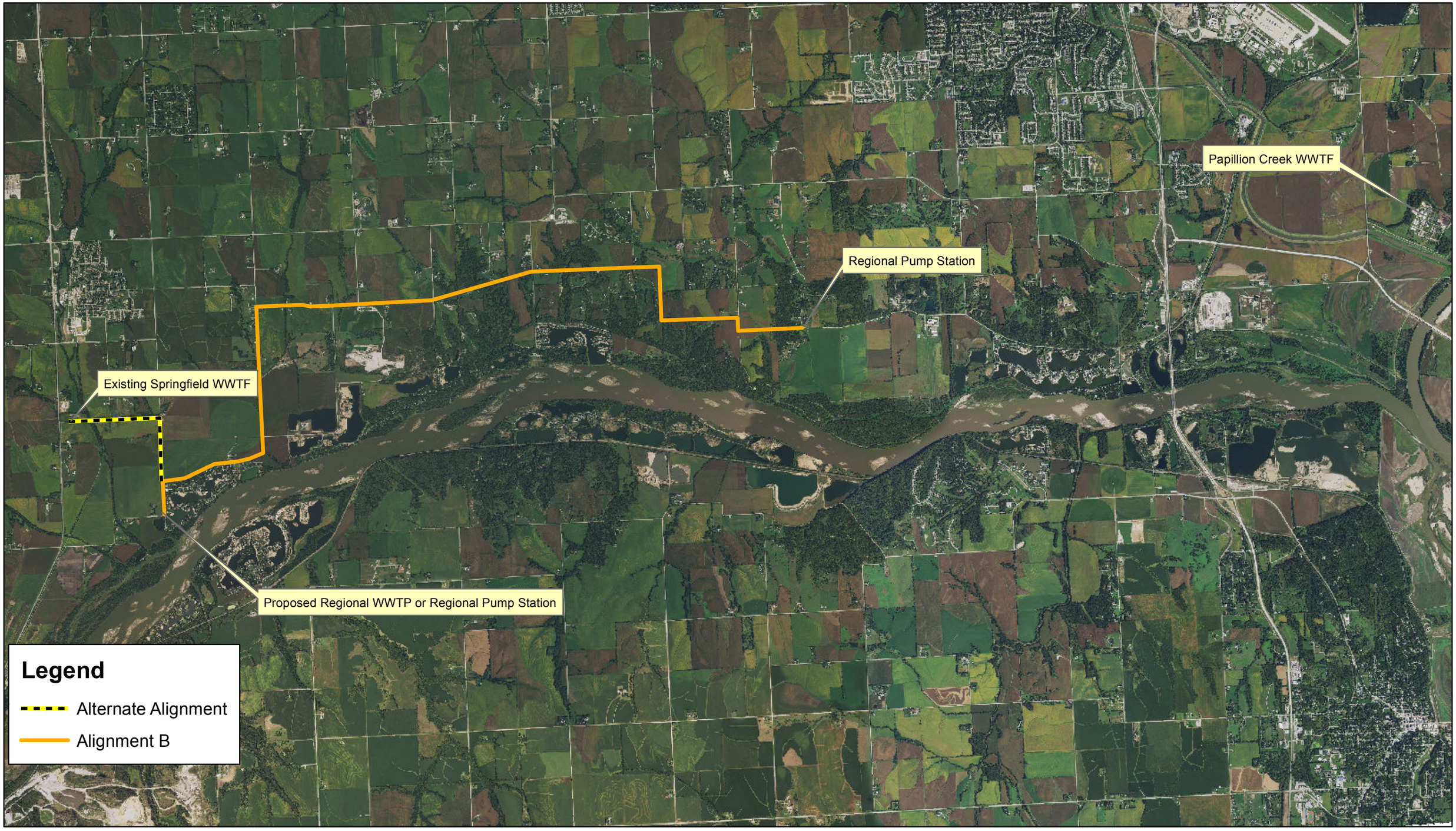
There were two (2) alternate alignments (E & F) that were evaluated for the force main routing from the proposed Regional Pump Station, assumed to be near the intersection of S. 56th Street and Laplatte Road, and to the City of Omaha Papillion Creek Wastewater Treatment Plant (PCWWTP). Depending on the selected regional wastewater treatment alternative, this section of force main could be either a single force main or a dual force main.

Alignment Alternative E is the force main alignment that will run from the proposed Regional Pump Station located near the intersection of S. 56th Street and Laplatte Road to the PCWWTP. The force main will start at the pump station and run east on Laplatte Road to Clay Street, north on Clay Street to Laplatte Road, east on Laplatte Road to an area just south of the PCWWTP. The force main will be routed north across private property to Papillion Creek. The force main may also need to be located on private property just north of Laplatte Road from the rail line east due to existing utilities in the road right-of-way. The force main will need to be bored under Papillion Creek, Keystone Trail, and the access road to the PCWWTP and will terminate at the connection point at the treatment facility. All the utilities that run to the treatment facility are on the south side of the entrance road so the bored crossing will need to be deep enough to avoid the utilities. With this alternative alignment approximately 93% of the force main alignment is proposed to be located within road right-of-way and 7% of the force main

alignment is proposed to be located within easements on private property. Depending on the location of the existing utilities along Laplatte Road the portion of alignment within road right-of-way may fall to 63% and the portion of the force main to be located on private property within easements may climb to 37%.

Alignment Alternative F is the force main alignment that will run from the proposed Regional Pump Station located near the intersection of S. 56th Street and Laplatte Road to the PCWWTP. The force main will start at the pump station and run east on Laplatte Road to Clay Street, north on Clay Street to Laplatte Road, east on Laplatte Road to Harlan Lewis Road, north on Harlan Lewis Road to the plant entrance road, east on the north side of the plant entrance road and will terminate at the connection point at the treatment facility. The force main may need to be located on private property just north of Laplatte Road from the rail line east due to existing utilities in the road right-of-way. With this alternative alignment the entire force main alignment is proposed to be located within road right-of-way if the section of alignment on Laplatte Road is able to be located within the road right-of-way. If that portion of alignment needs to be located within easements on private property approximately 61% of the force main alignment is proposed to be located within road right-of-way and 29% of the force main alignment is proposed to be located within easements on private property

The recommended alignment alternative would be Alignment F. The main advantage of Alignment F is that the crossing of U.S. Highway 34 with Alignment F will be simpler as far as construction and permitting than Alignment E. The other advantage is the entire alignment would be either within road right-of-way or adjacent to road right-of-way which will make future maintenance of the force main more convenient than Alignment E. There are not anticipated to be any issues with regulatory agencies regarding the location of the proposed boring of Papillion Creek with either Alignment E or Alignment F.




OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT B**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-4

Proposed Regional WWTP or Regional Pump Station

S 144th St
State Hwy 50
S 132nd St
Co Rd 52
S 120th St
Buffalo Rd
S 138th St
N Shore Dr
Lakeview Dr
Cottonwood Ln
Yost Park Rd

## 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 A-5

0 0.125 0.25 Miles

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**FORCE MAIN ALIGNMENT B-Page 2 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-6

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT B-Page 3 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-7

0 0.125 0.25 Miles

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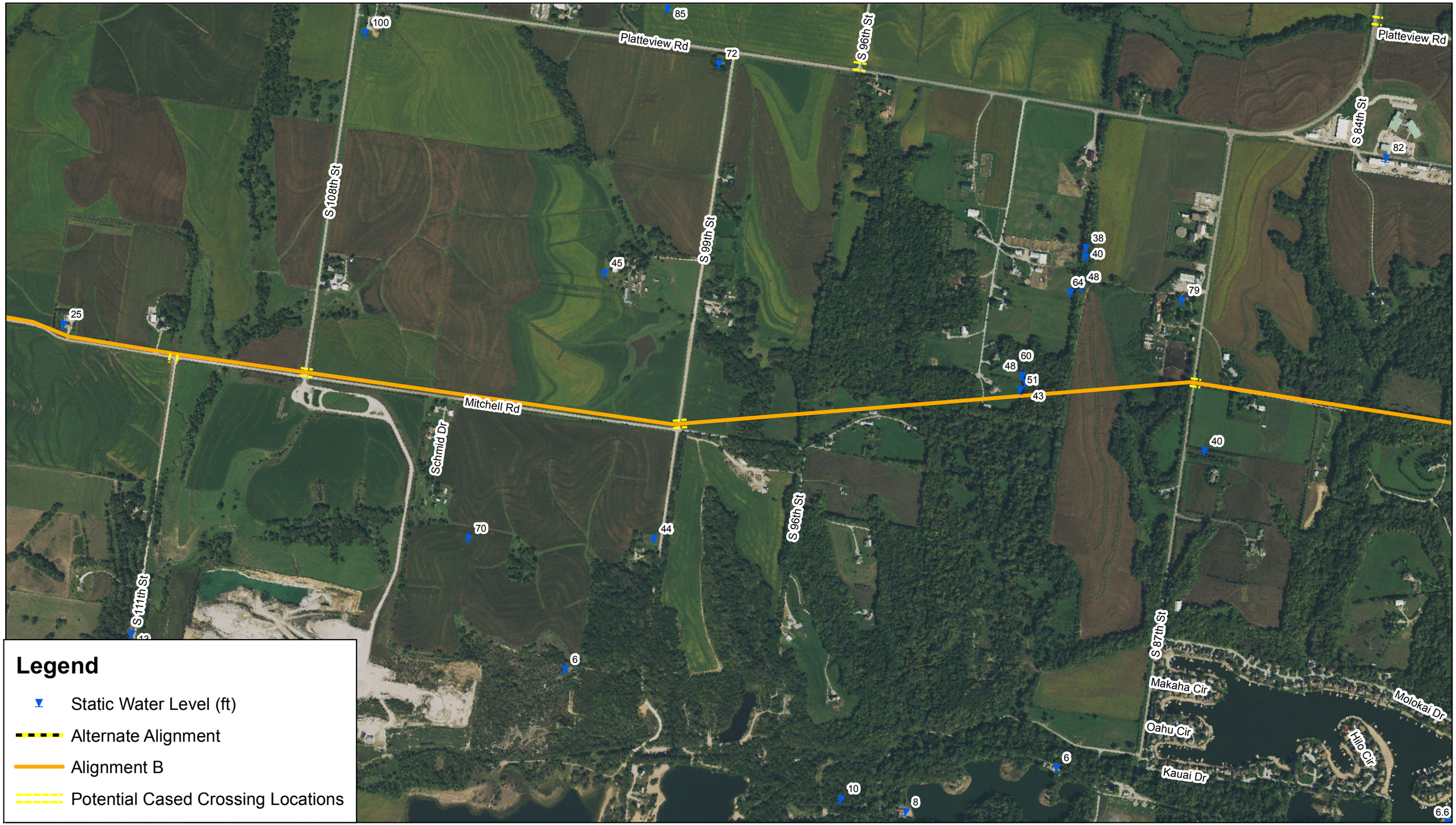
**FORCE MAIN ALIGNMENT B-Page 4 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-8




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 A-9

0 0.125 0.25 Miles

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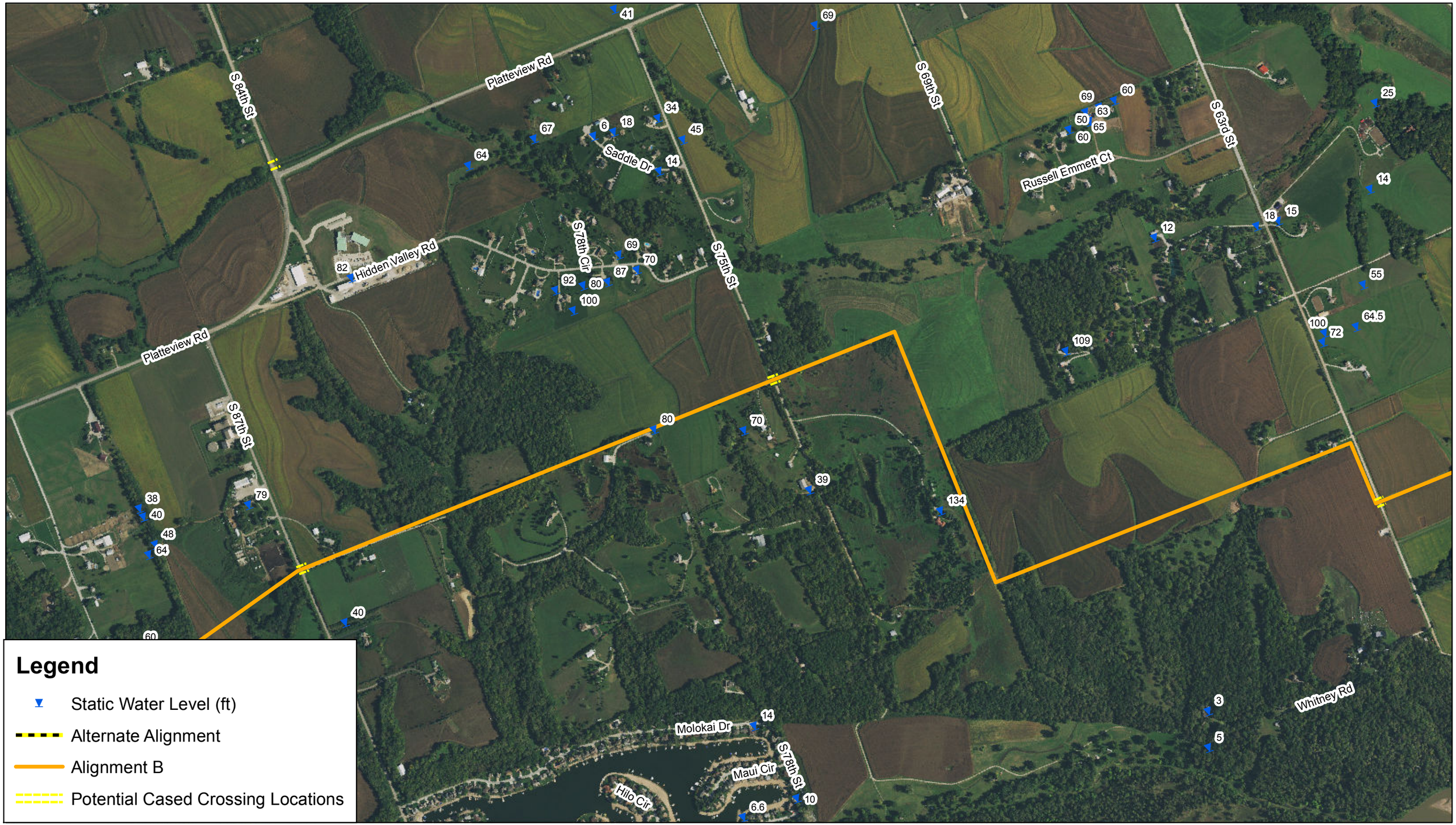
**FORCE MAIN ALIGNMENT B-Page 6 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-10

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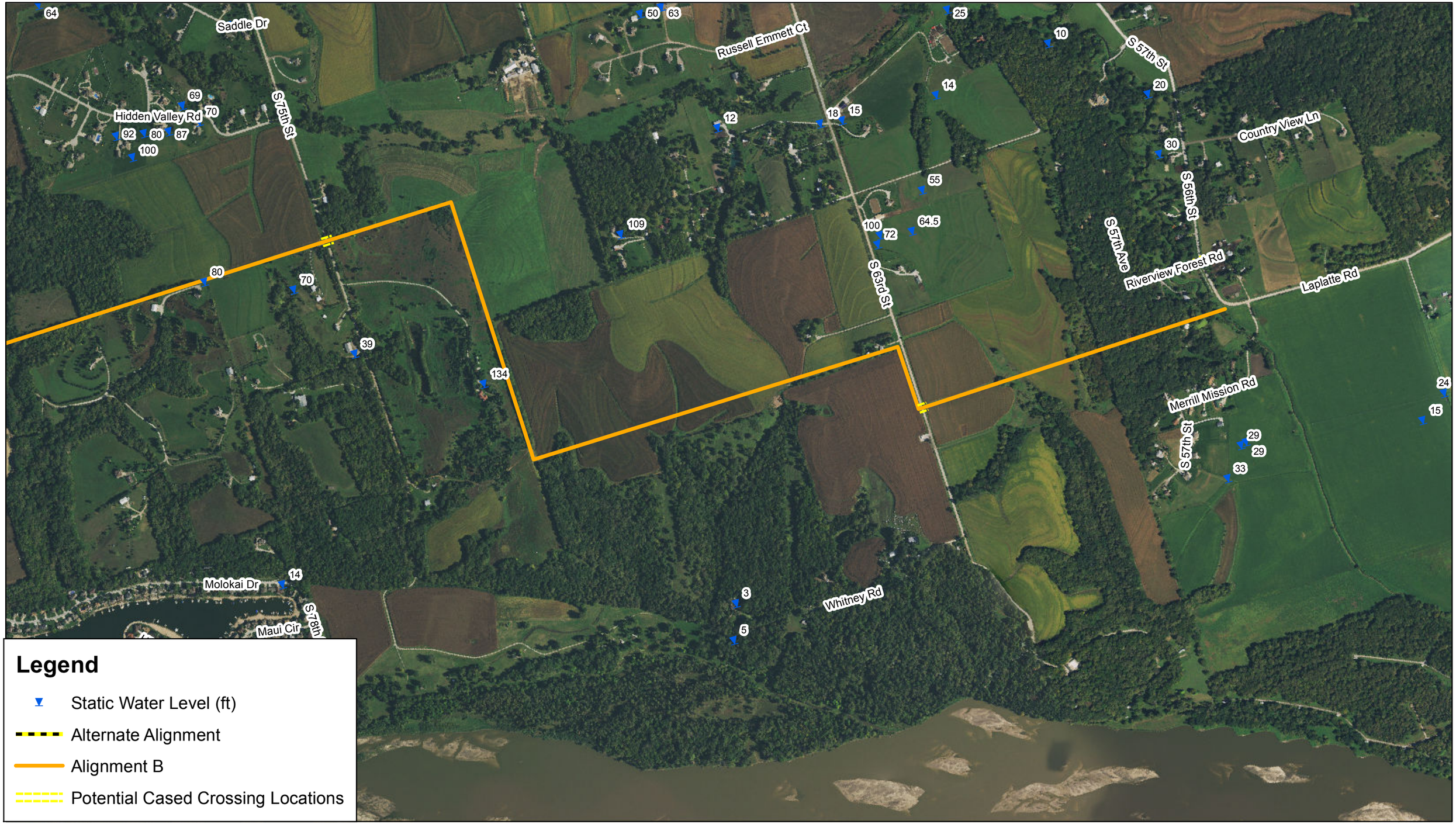
**FORCE MAIN ALIGNMENT B-Page 7 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-11

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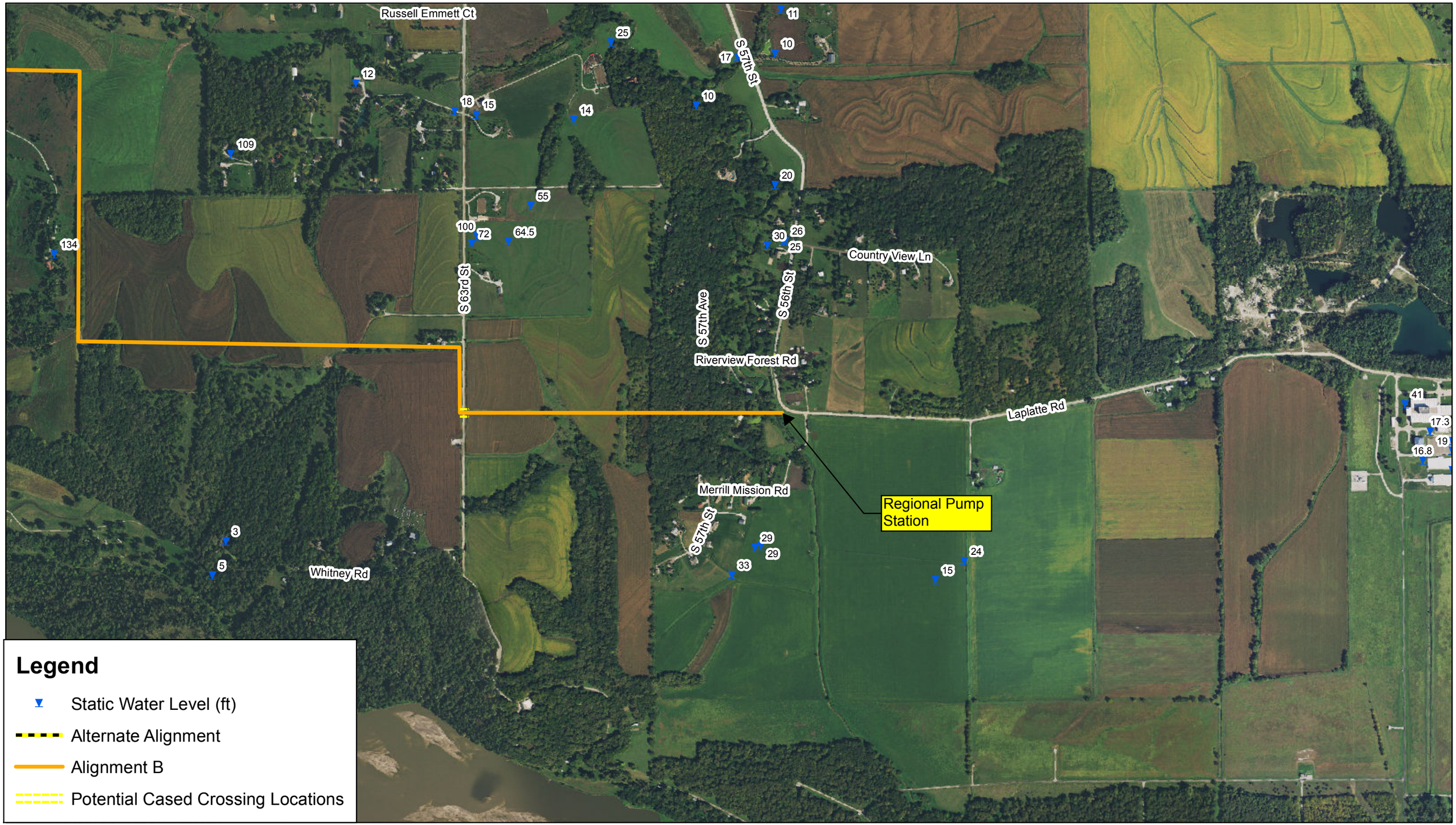
**FORCE MAIN ALIGNMENT B-Page 8 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-12




0 0.125 0.25 Miles

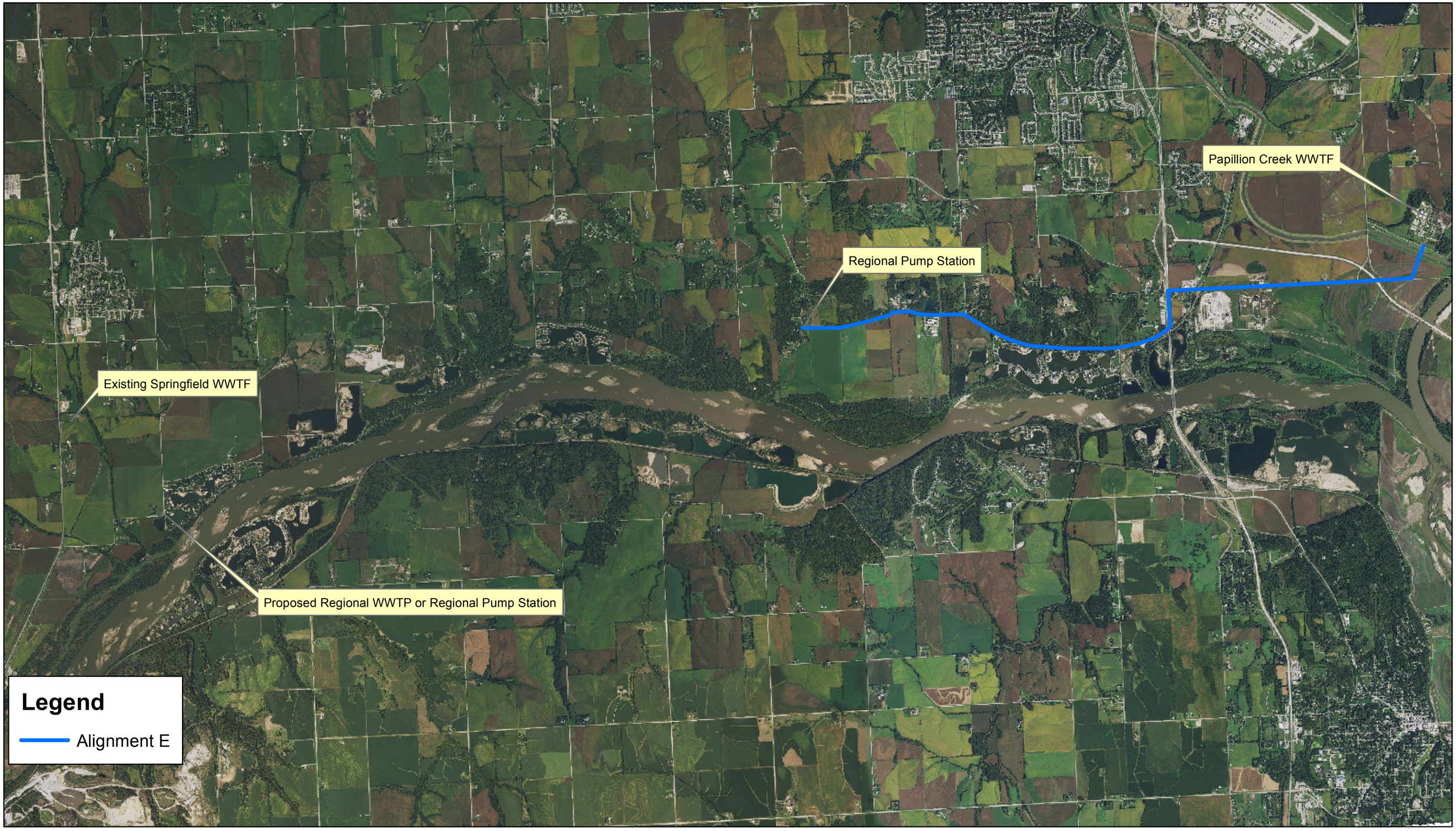
OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT B-Page 9 of 9**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-13

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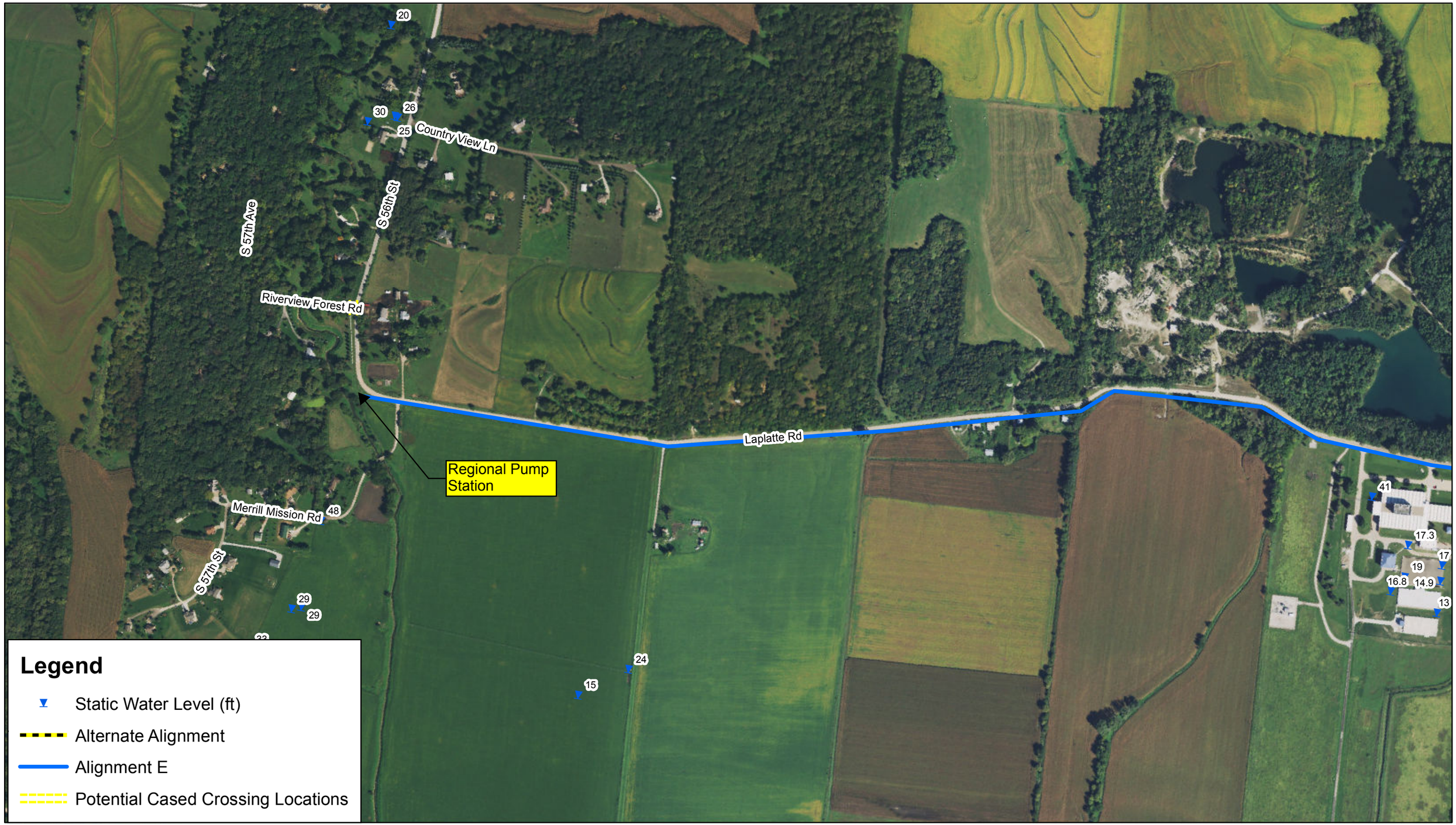
**FORCE MAIN ALIGNMENT E**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-14




0 0.125 0.25 Miles

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**FORCE MAIN ALIGNMENT E-Page 1 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-15

0 0.125 0.25 Miles

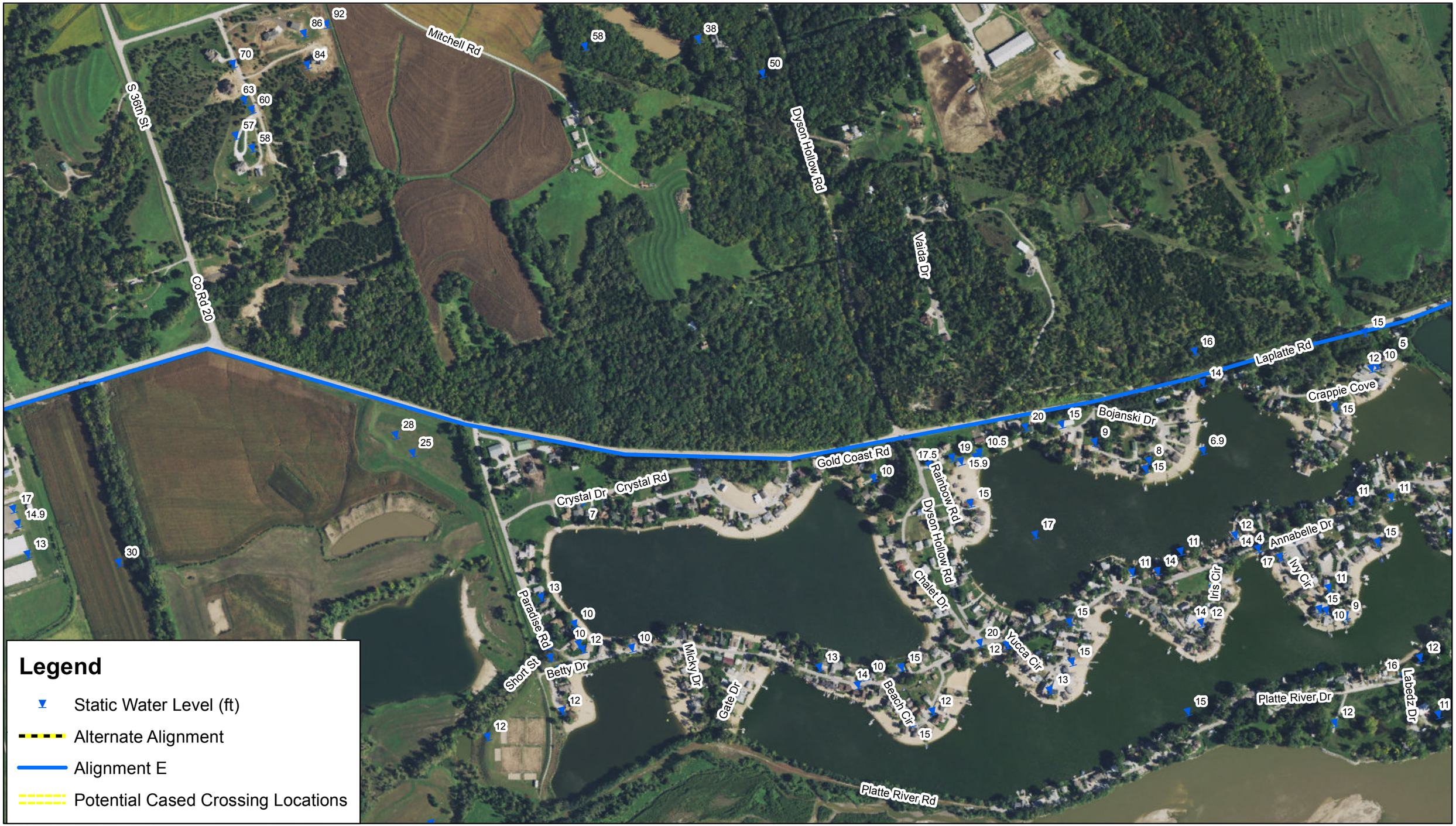
OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 2 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-16




0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 3 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-17

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 4 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-18

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 5 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-19

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 6 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-20

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 7 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-21

US Hwy 34

Harlan Lewis Rd

PAPILLION CREEK

la Platte Rd

Missouri River Rd

Papillion Creek WWTF

5

7

15

18

20

10

12

20

14

14

14

## Legend

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

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT E-Page 8 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-22

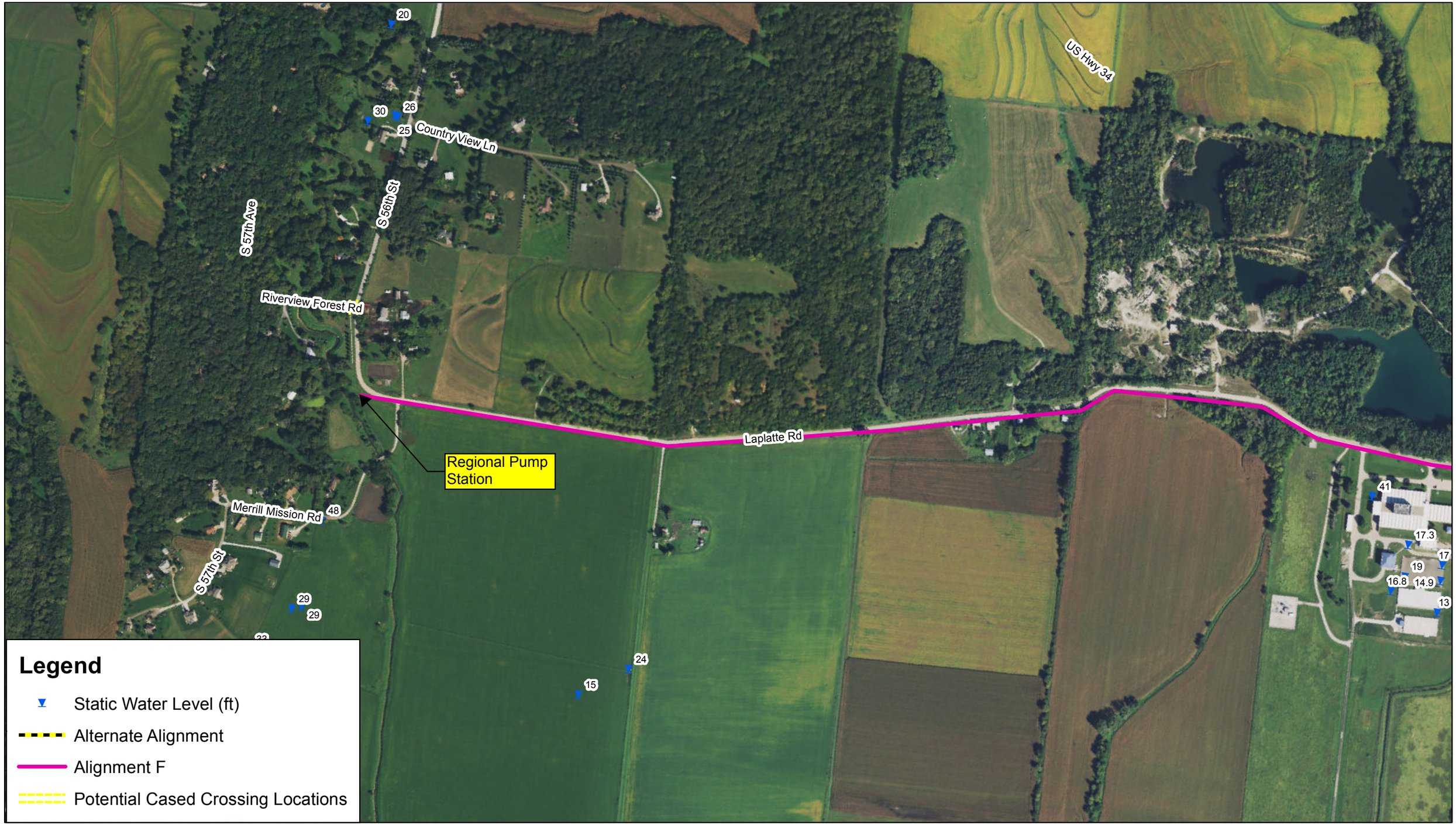
OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-23




0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 1 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-24

Mitchell Rd
US Hwy 34
S 36th St
Co Rd 20
Laplatte Rd
Crystal Dr
Crystal Rd
Paradise Rd
Short St
Betty Dr
Annabelle Dr

92
66
70
84
49
58
63
60
57
58
41
17.3
17
14.9
19
16.8
13
30
28
25
7
13
6
10
10
12
10
12
12

## Legend

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

0 0.125 0.25 Miles

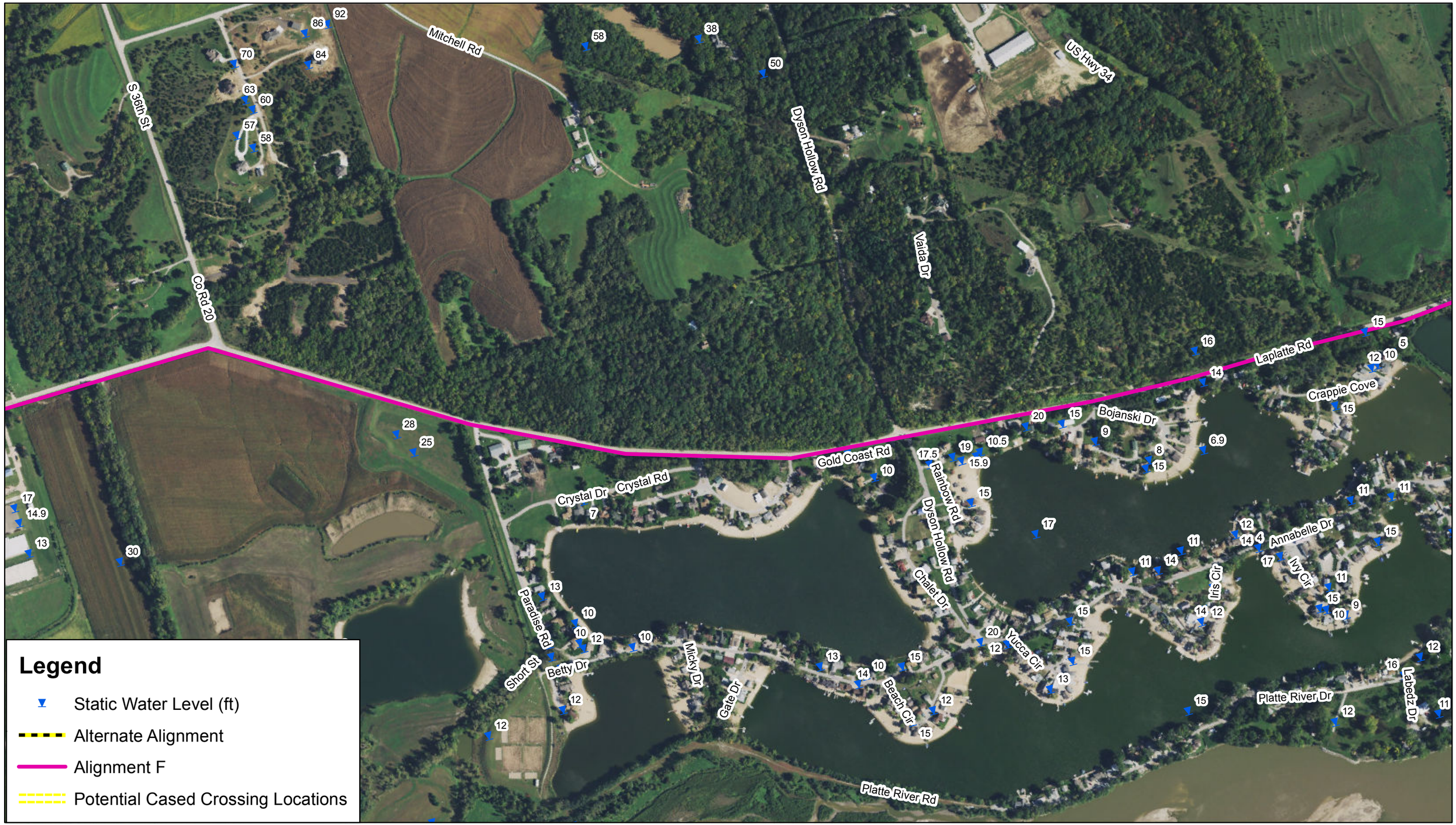
OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 2 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-25




0 0.125 0.25 Miles

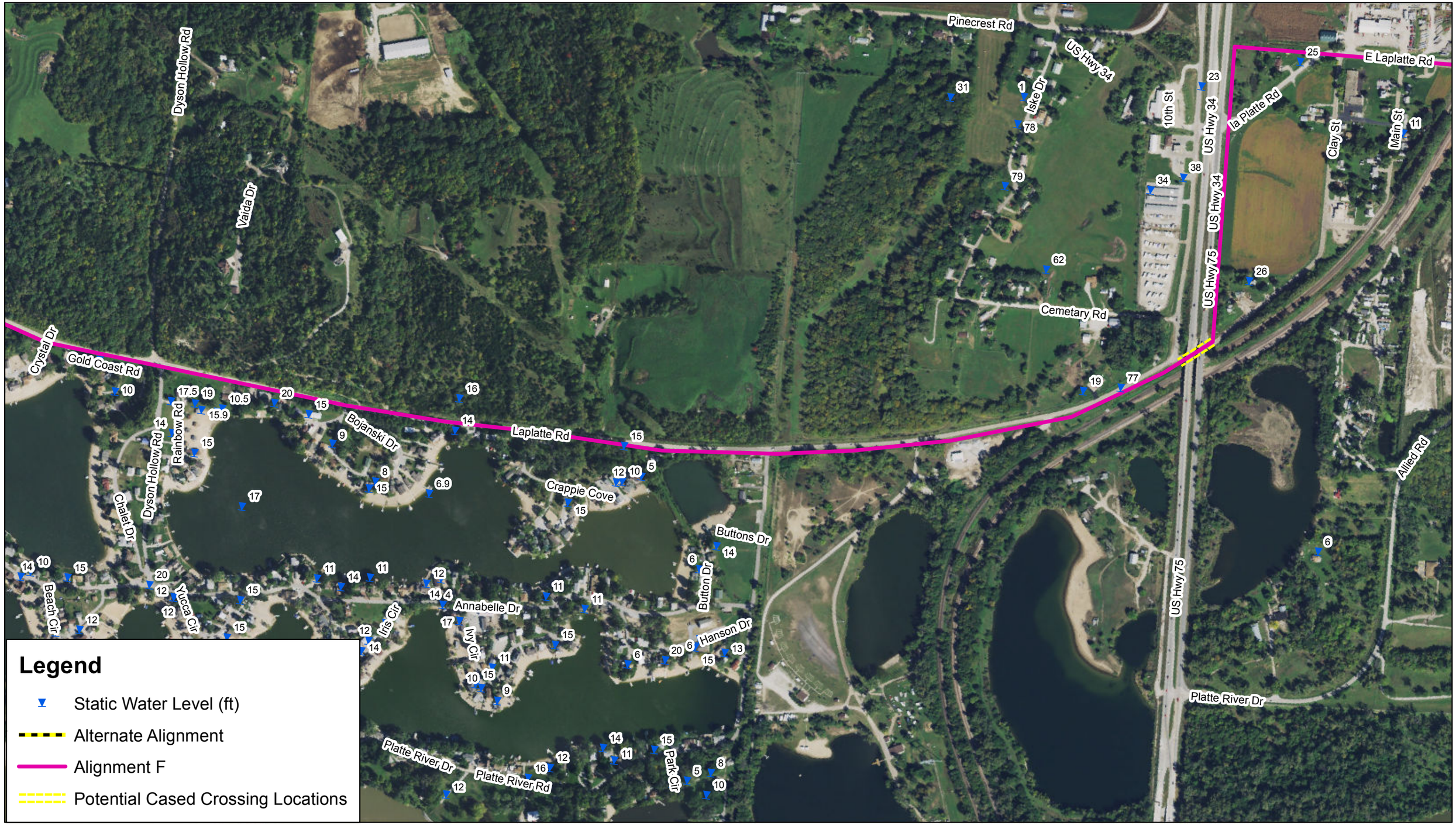
OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 3 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-26



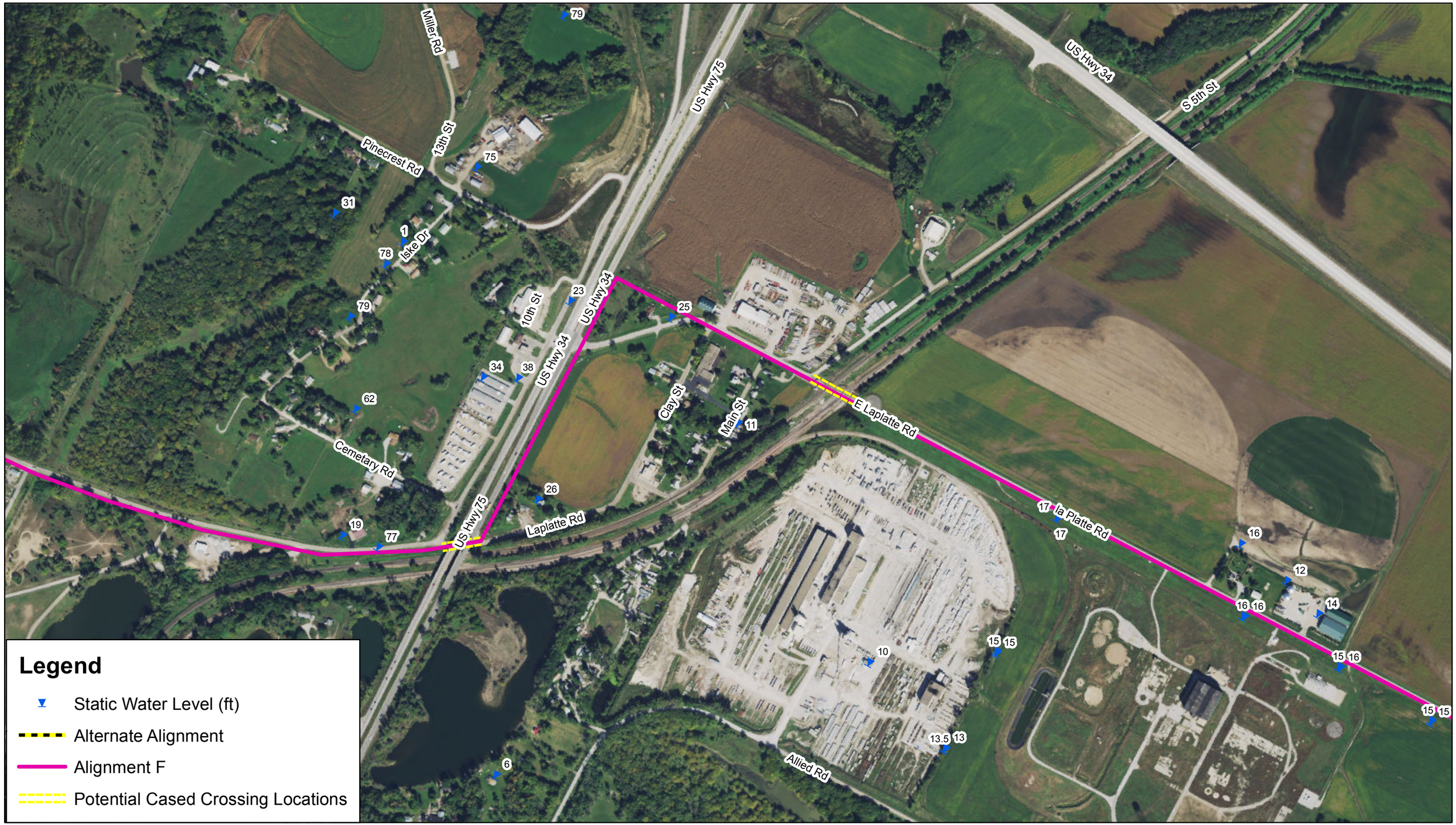

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 4 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-27




0 0.125 0.25 Miles

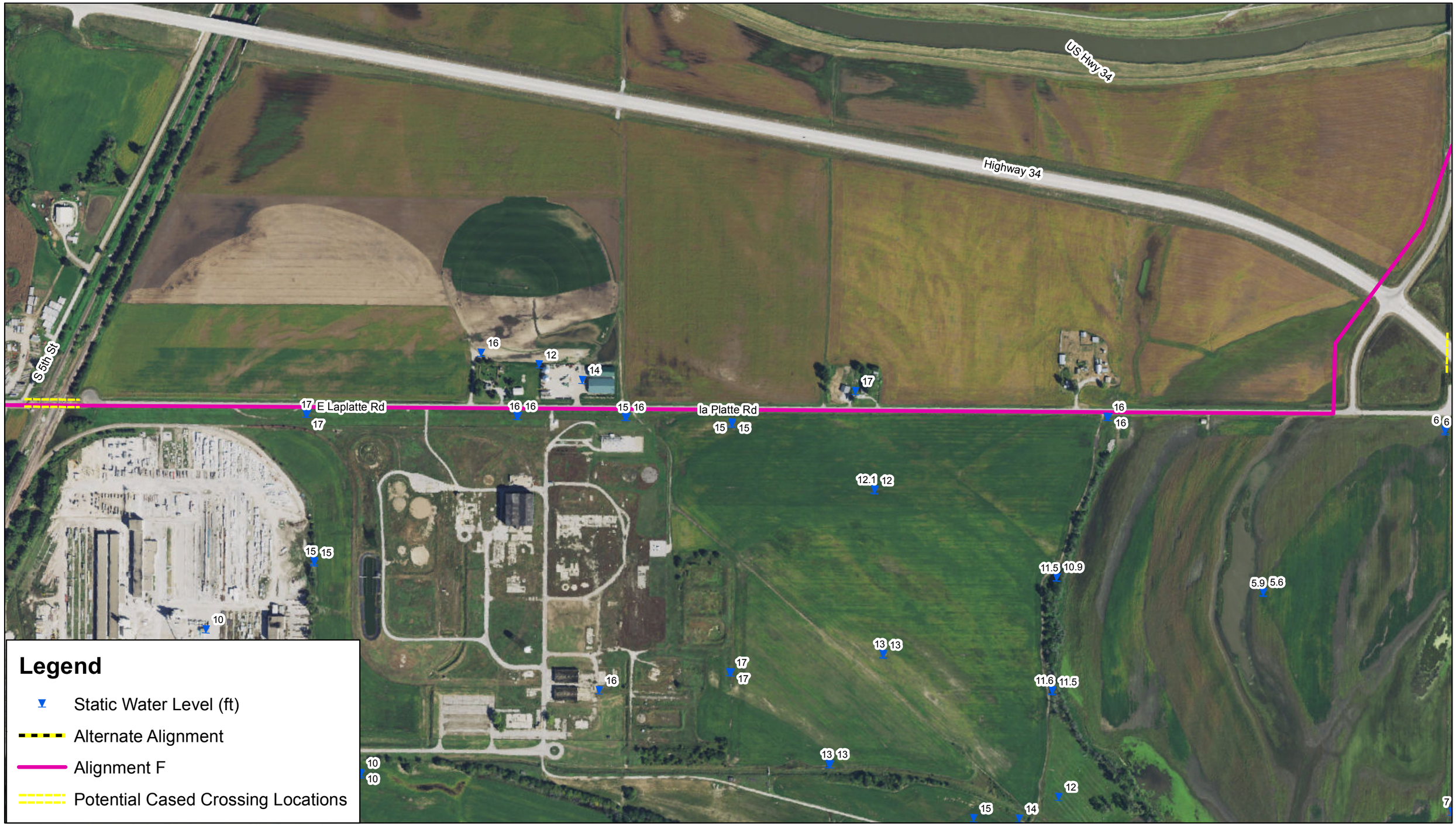
OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 5 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-28




0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 6 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-29

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 7 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-30

Missouri River Rd

US Hwy 34

Harlan Lewis Rd

PAPILLION CREEK

Papillion Creek
WWTF

18

20

12

10

16

14

9

14

14

14

**Legend**

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

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**FORCE MAIN ALIGNMENT F-Page 8 of 8**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-31

Existing
Springfield WWTF

S 144th St

State Hwy 50

S 138th St

US Hwy 34

S 132nd St

Co Rd 52

31
15
27
17
47
98
112
106
84
80
11
12
12
81

**Legend**

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

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**ALTERNATE FORCE MAIN-Page 1 of 2**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-32

S 138th St

US Hwy 34

S 132nd St

Co Rd 52

Proposed Regional WWTP or Regional Pump Station

N Shore Dr

Buffalo Rd

Sandy Pt

Lakeview Dr

Lake View Dr

Cottonwood Ln

Buffalo Rd

**Legend**

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

0 0.125 0.25 Miles

OLSSON ASSOCIATES

**ALTERNATE FORCE MAIN-Page 2 of 2**

SOUTHERN SARPY COUNTY WASTEWATER STUDY - PHASE 1B

DATE 12/1/2015

FIGURE A-33

# Attachment B – Preliminary Cost Estimate Breakdowns

# 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

## 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 Administrativ | | 18% | | | | $12,406,561 |
| **Capital Subtotal** | | | | | | **$81,331,897** |

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## 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 | $0 |
| 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 | $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 | 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 | 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 | $0 |
| 20 | Participation in Future Regional Plant | 3,321,055 | GPD | $10 | $33,210,555 |
| **Construction Subtotal** | | | | | **$60,938,851** |
| Engineering, Legal and Administrativ | 18% | | | | $10,968,993 |
| **Capital Subtotal** | | | | | **$71,907,845** |

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# TOTAL PROJECT COST (BY BASIN)

| BASIN | COST |
|---|---|
| Buffalo Creek | $67,596,842 |
| Springfield Creek | $79,539,241 |
| Zweibel Creek | $72,199,895 |
| TOTAL PROJECT COST = | $219,335,978 |

# 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 | $114,113,414 |
| Phase III | $54,135,804 |
| TOTAL PROJECT COST = | $219,335,977 |

## SUMMARY BREAKDOWN OF COSTS BY BASIN AND PHASE

| Buffalo Creek | Cost |
|---|---|
| Phase I | $18,978,294 |
| Phase II | $32,849,555 |
| Phase III | $15,768,993 |
| Total Buffalo Creek Cost = | $67,596,842 |

| Springfield Creek | Cost |
|---|---|
| Phase I | $21,057,336 |
| Phase II | $36,627,110 |
| Phase III | $21,854,794 |
| Total Springfield Creek Cost = | $79,539,241 |

| Zweibel Creek | Cost |
|---|---|
| Phase I | $11,051,129 |
| Phase II | $44,636,748 |
| Phase III | $16,512,017 |
| Total Zweibel Creek Cost = | $72,199,895 |

| | |
|---|---|
| **Total Length of Interceptor Sewer Pipe (LF)** | **281,600** |
| **Total Length of Interceptor Sewer Pipe (Miles)** | **53.33** |
| **Total Cost of Sewer Interceptor and Manholes =** | **$46,460,258** |
| Estimated Percentage of Sewer Cost to Total Project = | 21.18% |
| **Total Cost of Sewage Treatment [1] =** | **$172,875,719** |
| Estimated Percentage of Treatment Cost to Total Project = | 78.82% |

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 =** | **$219,335,977** |

## 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 | 17,600 | LF | $273 | $4,804,800 |
| 11 | 54 IN Sewer | 3,400 | LF | $351 | $1,193,400 |
| 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** | | | | | **$57,285,459** |
| Engineering, Legal and Administrative | 18% | | | | $10,311,383 |
| **Capital Subtotal** | | | | | **$67,596,842** |

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## 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 | | 1,600 | LF | $156 | $249,600 |
| 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 | | 0 | LF | $273 | $0 |
| 11 | 54 IN Sewer | | 3,400 | LF | $351 | $1,193,400 |
| 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) | 2,400 | LF | $70 | $168,000 |
| 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** | | | | | | **$67,406,136** |
| Engineering, Legal and Administrativ | | 18% | | | | $12,133,105 |
| **Capital Subtotal** | | | | | | **$79,539,241** |

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## 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 | $0 |
| 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 | $0 |
| 9 | 36 IN Sewer | 4,500 | LF | $234 | $1,053,000 |
| 10 | 42 IN Sewer | 0 | LF | $273 | $0 |
| 11 | 54 IN Sewer | 3,400 | LF | $351 | $1,193,400 |
| 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 | 4,981,583 | GPD | $1 | $4,981,583 |
| 17 | 18 IN Future Forcemain to the Regional WWTF | 53,000 | LF | $90 | $4,770,000 |
| 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 | 3,321,055 | GPD | $10 | $33,210,555 |
| **Construction Subtotal** | | | | | **$61,186,351** |
| Engineering, Legal and Administrativ | 18% | | | | $11,013,543 |
| **Capital Subtotal** | | | | | **$72,199,895** |

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# TOTAL PROJECT COST (BY BASIN)

| BASIN | COST |
|---|---|
| Buffalo Creek | $60,329,074 |
| Springfield Creek | $67,091,653 |
| Zweibel Creek | $44,118,072 |
| TOTAL PROJECT COST = | $171,538,799 |

# 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 | $90,825,780 |
| Phase III | $29,626,260 |
| TOTAL PROJECT COST = | $171,538,799 |

## SUMMARY BREAKDOWN OF COSTS BY BASIN AND PHASE

| Buffalo Creek | Cost |
|---|---|
| Phase I | $18,978,294 |
| Phase II | $32,688,901 |
| Phase III | $8,661,879 |
| Total Buffalo Creek Cost = | $60,329,074 |

| Springfield Creek | Cost |
|---|---|
| Phase I | $21,057,336 |
| Phase II | $33,221,750 |
| Phase III | $12,812,568 |
| Total Springfield Creek Cost = | $67,091,653 |

| Zweibel Creek | Cost |
|---|---|
| Phase I | $11,051,129 |
| Phase II | $24,915,129 |
| Phase III | $8,151,814 |
| Total Zweibel Creek Cost = | $44,118,072 |

| | |
|---|---|
| **Total Length of Interceptor Sewer Pipe (LF)** | **283,600** |
| **Total Length of Interceptor Sewer Pipe (Miles)** | **53.71** |
| **Total Cost of Sewer Interceptor and Manholes =** | **$45,931,028** |
| Estimated Percentage of Sewer Cost to Total Project = | 26.78% |
| **Total Cost of Sewage Treatment [1] =** | **$125,607,771** |
| Estimated Percentage of Treatment Cost to Total Project = | 73.22% |

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 =** | **$171,538,799** |

## 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 | Creek Rechannelization | 0 | LF | $195 | $0 |
| 12 | Wastewater Pump Stations | 0 | GPD | $1.75 | $0 |
| 13 | Interim Force Main | 0 | LF | $60 | $0 |
| 14 | Force Main | 0 | LF | $70 | $0 |
| 15 | Future Regional Pump Station | 4,934,208 | GPD | $1 | $4,934,208 |
| 16 | 18 or 30 IN Future Forcemain to the Papio Plant | 49,000 | LF | $150 | $7,350,000 |
| 17 | Satelite Treatment Facility | 1,200,000 | GPD | $10 | $12,000,000 |
| 18 | Wastewater Treatment Plant Expansion | 0 | GPD | $10 | $0 |
| 19 | Participation in Future Regional Plant | 2,823,271 | GPD | $3.60 | $10,163,775 |
| **Construction Subtotal** | | | | | **$51,126,334** |
| Engineering, Legal and Administrative | 18% | | | | $9,202,740 |
| **Capital Subtotal** | | | | | **$60,329,074** |

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## 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 | Creek Rechannelization | | 0 | LF | $195 | $0 |
| 12 | Wastewater Pump Stations | ** | 1,950,000 | GPD | *$1.75* | $2,325,000 |
| 13 | Interim Force Main | | 21,100 | LF | $60 | $1,266,000 |
| 14 | Force Main | | 3,600 | LF | $70 | $252,000 |
| 15 | Future Regional Pump Station | | 7,184,208 | GPD | $1 | $7,184,208 |
| 16 | 18 or 30 IN Future Forcemain to the Papio Plant | | 49,000 | LF | $150 | $7,350,000 |
| 17 | Satelite Treatment Facility | | 0 | GPD | $10 | $0 |
| 18 | Wastewater Treatment Plant Expansion | | 1,200,000 | GPD | $10 | $12,000,000 |
| 19 | Participation in Future Regional Plant | | 3,755,674 | GPD | $3.60 | $13,520,425 |
| **Construction Subtotal** | | | | | | **$56,857,333** |
| Engineering, Legal and Administrativ | | 18% | | | | $10,234,320 |
| **Capital Subtotal** | | | | | | **$67,091,653** |

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## 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 | $0 |
| 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 | $0 |
| 9 | 36 IN Sewer | 4,500 | LF | $234 | $1,053,000 |
| 10 | 42 IN Sewer | 0 | LF | $273 | $0 |
| 11 | Creek Rechannelization | 3,821 | LF | $195 | $744,264 |
| 12 | Wastewater Pump Stations | 0 | GPD | $1.75 | $0 |
| 13 | Interim Force Main | 0 | LF | $60 | $0 |
| 14 | Force Main | 0 | LF | $70 | $0 |
| 15 | Future Regional Pump Station | 4,981,583 | GPD | $1 | $4,981,583 |
| 16 | 18 or 30 IN Future Forcemain to the Papio Plant | 38,000 | LF | $90 | $3,420,000 |
| 17 | Satelite Treatment Facility | 700,000 | GPD | $10 | $7,000,000 |
| 18 | Wastewater Treatment Plant Expansion | 0 | GPD | $10 | $0 |
| 19 | Participation in Future Regional Plant | 3,321,055 | GPD | $3.60 | $11,955,800 |
| **Construction Subtotal** | | | | | **$37,388,197** |
| Engineering, Legal and Administrativ | 18% | | | | $6,729,875 |
| **Capital Subtotal** | | | | | **$44,118,072** |

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# TOTAL PROJECT COST (BY BASIN)

| BASIN | COST |
|---|---|
| Buffalo Creek | $68,103,062 |
| Springfield Creek | $80,457,517 |
| Zweibel Creek | $44,330,472 |
| TOTAL PROJECT COST = | $192,891,051 |

# 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 | $95,616,635 |
| Phase III | $46,187,656 |
| TOTAL PROJECT COST = | $192,891,051 |

## SUMMARY BREAKDOWN OF COSTS BY BASIN AND PHASE

| Buffalo Creek | Cost |
|---|---|
| Phase I | $18,978,294 |
| Phase II | $33,355,775 |
| Phase III | $15,768,993 |
| Total Buffalo Creek Cost = | $68,103,062 |

| Springfield Creek | Cost |
|---|---|
| Phase I | $21,057,336 |
| Phase II | $37,133,330 |
| Phase III | $22,266,850 |
| Total Springfield Creek Cost = | $80,457,517 |

| Zweibel Creek | Cost |
|---|---|
| Phase I | $11,051,129 |
| Phase II | $25,127,529 |
| Phase III | $8,151,814 |
| Total Zweibel Creek Cost = | $44,330,472 |

| | |
|---|---|
| **Total Length of Interceptor Sewer Pipe (LF)** | **283,500** |
| **Total Length of Interceptor Sewer Pipe (Miles)** | **53.69** |
| **Total Cost of Sewer Interceptor and Manholes =** | **$46,377,422** |
| Estimated Percentage of Sewer Cost to Total Project = | 24.04% |
| **Total Cost of Sewage Treatment [1] =** | **$146,513,629** |
| Estimated Percentage of Treatment Cost to Total Project = | 75.96% |

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 =** | **$192,891,051** |

## 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 | 17,600 | LF | $273 | $4,804,800 |
| 11 | 48 IN Sewer | 5,200 | LF | $312 | $1,622,400 |
| 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** | | | | | **$57,714,459** |
| Engineering, Legal and Administrative | 18% | | | | $10,388,603 |
| **Capital Subtotal** | | | | | **$68,103,062** |

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## 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 | | 0 | LF | $273 | $0 |
| 11 | 48 IN Sewer | | 5,200 | LF | $312 | $1,622,400 |
| 12 | Creek Rechannelization | | 0 | LF | $195 | $0 |
| 13 | Wastewater Pump Stations | ** | 1,950,000 | GPD | *$1.75* | $2,325,000 |
| 14 | Interim Force Main | | 21,100 | LF | $60 | $1,266,000 |
| 15 | Force Main | | 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** | | | | | | **$68,184,336** |
| Engineering, Legal and Administrativ | | 18% | | | | $12,273,181 |
| **Capital Subtotal** | | | | | | **$80,457,517** |

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## 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 | $0 |
| 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 | $0 |
| 9 | 36 IN Sewer | 4,500 | LF | $234 | $1,053,000 |
| 10 | 42 IN Sewer | 0 | LF | $273 | $0 |
| 11 | 48 IN Sewer | 0 | LF | $312 | $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 | 4,981,583 | GPD | $1 | $4,981,583 |
| 17 | 18 IN Future Forcemain to the Regional WWTF | 40,000 | LF | $90 | $3,600,000 |
| 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 | 3,321,055 | GPD | $3.60 | $11,955,800 |
| **Construction Subtotal** | | | | | **$37,568,197** |
| Engineering, Legal and Administrativ | 18% | | | | $6,762,275 |
| **Capital Subtotal** | | | | | **$44,330,472** |

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# TOTAL PROJECT COST (BY BASIN)

| BASIN | COST |
|---|---|
| Buffalo Creek | $67,670,474 |
| Springfield Creek | $81,474,559 |
| Zweibel Creek | $44,330,472 |
| TOTAL PROJECT COST = | $193,475,505 |

# 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 | $96,201,089 |
| Phase III | $46,187,656 |
| TOTAL PROJECT COST = | $193,475,505 |

## SUMMARY BREAKDOWN OF COSTS BY BASIN AND PHASE

| Buffalo Creek | Cost |
|---|---|
| Phase I | $18,978,294 |
| Phase II | $32,923,187 |
| Phase III | $15,768,993 |
| Total Buffalo Creek Cost = | $67,670,474 |

| Springfield Creek | Cost |
|---|---|
| Phase I | $21,057,336 |
| Phase II | $38,150,372 |
| Phase III | $22,266,850 |
| Total Springfield Creek Cost = | $81,474,559 |

| Zweibel Creek | Cost |
|---|---|
| Phase I | $11,051,129 |
| Phase II | $25,127,529 |
| Phase III | $8,151,814 |
| Total Zweibel Creek Cost = | $44,330,472 |

| | |
|---|---|
| **Total Length of Interceptor Sewer Pipe (LF)** | **286,400** |
| **Total Length of Interceptor Sewer Pipe (Miles)** | **54.24** |
| **Total Cost of Sewer Interceptor and Manholes =** | **$46,961,876** |
| Estimated Percentage of Sewer Cost to Total Project = | 24.27% |
| **Total Cost of Sewage Treatment [1] =** | **$146,513,629** |
| Estimated Percentage of Treatment Cost to Total Project = | 75.73% |

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 =** | **$193,475,505** |

## 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 | 48 IN Sewer | 1,400 | LF | $312 | $436,800 |
| 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** | | | | | **$57,347,859** |
| Engineering, Legal and Administrative | 18% | | | | $10,322,615 |
| **Capital Subtotal** | | | | | **$67,670,474** |

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## 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 | 48 IN Sewer | 1,400 | LF | $312 | $436,800 |
| 12 | Creek Rechannelization | 0 | LF | $195 | $0 |
| 13 | Wastewater Pump Stations ** | 1,950,000 | GPD | *$1.75* | $2,325,000 |
| 14 | Interim Force Main | 21,100 | LF | $60 | $1,266,000 |
| 15 | Force Main | 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** | | | | | **$69,046,236** |
| Engineering, Legal and Administrativ | 18% | | | | $12,428,323 |
| **Capital Subtotal** | | | | | **$81,474,559** |

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## 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 | $0 |
| 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 | $0 |
| 9 | 36 IN Sewer | 4,500 | LF | $234 | $1,053,000 |
| 10 | 42 IN Sewer | 0 | LF | $273 | $0 |
| 11 | 48 IN Sewer | 0 | LF | $312 | $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 | 4,981,583 | GPD | $1 | $4,981,583 |
| 17 | 18 IN Future Forcemain to the Regional WWTF | 40,000 | LF | $90 | $3,600,000 |
| 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 | 3,321,055 | GPD | $3.60 | $11,955,800 |
| **Construction Subtotal** | | | | | **$37,568,197** |
| Engineering, Legal and Administrativ | 18% | | | | $6,762,275 |
| **Capital Subtotal** | | | | | **$44,330,472** |

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# Attachment C – Alternatives Workshop Meeting Summary

# Agenda

| | |
|---|---|
| Project: | Southern Ridge Wastewater Treatment Study – Phase 1B |
| Subject: | Project Review |
| Date: | Thursday, January 21, 2016 |
| Location: | Sarpy County Administration Building, Board Room |

- Introductions
- Phase 1A Results Refresher
- Phase 1B Overview
- Technical Memorandum (TM) review and discussion
    - Regional Wastewater System Refinement TM
    - Regional Wastewater Treatment Alternatives TM
- Breakout Group
    - Evaluation criteria weighting
    - Preferred Alternate selection
    - Breakout summary discussion
- Status of Governance agreement
- Request from PMR NRD to discuss a potential stormwater partnership
- Path Forward
    - Financial Meeting - mid February
    - Project Wrap-up
- Other Items
- Action Items

**Southern Ridge Wastewater Study - Phase IB**

**1/21/2016** **Stakeholder Meeting**

| Name | | Company | Attendance | |
|---|---|---|---|---|
| James | Bartels | MUD | ☒ Present | ☐ Not Present |
| Scott | Bovick | Sarpy County | ☐ Present | ☐ Not Present |
| Dave | DeBoer | MUD | ☒ Present | ☐ Not Present |
| Dave | Dechant | Consultant Team | ☒ Present | ☐ Not Present |
| Dean | Dunn | City of Bellevue | ☒ Present | ☐ Not Present |
| Michael | Felschow | MAPA | ☒ Present | ☐ Not Present |
| Bruce | Fountain | Sarpy County | ☒ Present | ☐ Not Present |
| Kathleen | Gottsch | City of Springfield | ☒ Present | ☐ Not Present |
| Tom | Gould | Consultant Team | ☐ Present | ☐ Not Present |
| Marty | Grate | City of Omaha | ☒ Present | ☐ Not Present |
| Bill | Herr | Sarpy County | ☒ Present | ☐ Not Present |
| Steve | Jensen | Sarpy County | ☒ Present | ☐ Not Present |
| John | Kottman | City of La Vista | ☐ Present | ☐ Not Present |
| Marty | Leming | City of Papillion | ☒ Present | ☐ Not Present |
| Donna | Lyman | Sarpy County | ☐ Present | ☐ Not Present |
| Tim | O'Brien | OPPD | ☒ Present | ☐ Not Present |
| Steve | Oltmans | Consultant Team | ☒ Present | ☐ Not Present |
| Jennifer | Morales | City of Omaha | ☐ Present | ☐ Not Present |
| Steve | Perry | Olmstead & Perry (Representing Gretna) | ☒ Present | ☐ Not Present |
| Marlin | Petermann | Papio-Missouri River NRD | ☒ Present | ☐ Not Present |
| Mike | Piernicky | Consultant Team | ☐ Present | ☐ Not Present |
| Jeff | Ray | Consultant Team | ☐ Present | ☐ Not Present |
| Joe | Roberts | Consultant Team | ☒ Present | ☐ Not Present |
| Kent | Roberts | Black Hills Energy | ☐ Present | ☐ Not Present |
| Chris | Shewchuk | City of Bellevue | ☒ Present | ☐ Not Present |
| Mike | Smith | Sarpy County | ☒ Present | ☐ Not Present |
| Joe | Soucie | City of La Vista | ☒ Present | ☐ Not Present |
| Jeff | Thompson | City of Papillion | ☒ Present | ☐ Not Present |
| Jeremy | Walker | Olsson (Representing Springfield) | ☒ Present | ☐ Not Present |
| Mark | Wayne | Sarpy County | ☒ Present | ☐ Not Present |
| Eric | Williams | Papio-Missouri River NRD | ☒ Present | ☐ Not Present |
| Dennis | Wilson | Sarpy County | ☒ Present | ☐ Not Present |
| Leanne | Ziettlow | Consultant Team | ☒ Present | ☐ Not Present |
| Dan | Harris | | ☒ Present | ☐ Not Present |
| Jeff | Kroonstra | Gretna | ☒ Present | ☐ Not Present |
| Epiphany | Ramos | Bellevue | ☒ Present | ☐ Not Present |
| James | Caraway | Chamber | ☒ Present | ☐ Not Present |
| Rob | Roseland | | ☒ Present | ☐ Not Present |
| | | | ☐ Present | ☐ Not Present |
| | | | ☐ Present | ☐ Not Present |
| | | | ☐ Present | ☐ Not Present |
| | | | ☐ Present | ☐ Not Present |
| | | | ☐ Present | ☐ Not Present |

| NON-MONETARY EVALUATION CRITERIA | | |
|---|---|---|
| **Evaluation Criteria** | **Sub-Criteria** | **Description** |
| *Environmental Impacts* | Threatened and Endangered Species | Impact to threatened and endangered species (e.g. American ginseng, pallid sturgeon, northern long-eared bat, etc.) |
| | Conservation Lands | Impacts to conservation land (e.g. state parks and recreation area, etc.) |
| | Wetlands or Waters of the U.S. | Impacts to designated wetlands or Waters of the U.S |
| | Wellhead Protection | Impact to public water supply wells |
| | Hydrologic Impacts | Effect on the hydrologic cycle of discharging water out of basin (e.g.. declining river flow) |
| *Water Quality Impacts* | Assimilative Capacity of Receiving Body | Ability of the receiving body of water to receive impurities without adverse impact |
| | Nutrients | Impact caused by wastewater effluent nutrient levels of (i.e. nitrogen and phosphorus) |
| | Effluent Characteristics | Impacts of typical wastewater constituents on water quality (e.g. BOD, TSS, Ammonia, etc.) |
| | Disinfection | Probable disinfection requirements and sensitivity |
| *Ease of Permitting* | NPDES | Complexity of obtaining National Pollution Discharge Elimination System Permit for wastewater discharge |
| | Flood Plain Development | Requirements associated with flood plain development (e.g. wastewater treatment facility, outfall sewer, etc.) |
| | Misc. Permits | Complexity of obtaining Air Quality Construction Permit, miscellaneous local permits |
| | CSO Implications | Increased complexity resulting from the existence of an existing combined sewer system within the collection system |
| *Implementability* | Ability to Phase Improvements | Ability to phase wastewater infrastructure and equipment construction |
| | Flexibility to Changes in Growth Forecasts | Ability to adjust implementation of wastewater concept to accommodate variations in population forecasting |
| | Expandable for Future Demands | Ability to expand regional WWTF to match future demands |
| | Implementation Risk and Timeframe | Risk of regional wastewater concept implementation and timeframe sensitivity |
| | Land Acquisition | Ability to acquire land necessary for regional wastewater concept |
| | Constructability | Complexity associated with construction (e.g. retrofitting existing infrastructure or existing vs. greenfield construction) |
| *Stakeholder and Public Acceptance* | Stakeholder Autonomy | Ability of stakeholders to set rates and utilize revenue |
| | Stakeholder Control | Stakeholder has say in determining what is constructed and associated timeframe |
| | Public Acceptance | Expected public opposition to conveyance and treatment facilities |
| *Sustainability* | Energy | Energy demand of facilities and equipment |
| | Materials | Building materials required for construction |
| | Reuse of Existing Facilities | The ability to utilize existing infrastructure in the implementation of the regional wastewater concept |

| NON-MONETARY EVALUATION | | | | | |
|---|---|---|---|---|---|
| | Scale: 1 Least to 3 Most Favorable | | | | |
| Evaluation Criteria/Sub-Criteria | Baseline Concept | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
| **Environmental Impacts** | **2.4** | **2.8** | **2.4** | **2.4** | **2.2** |
| *Threatened and Endangered Species* | 2 | 2 | 3 | 2 | 2 |
| *Conservation Lands* | 3 | 3 | 3 | 3 | 3 |
| *Wetlands or Waters of the U.S.* | 2 | 3 | 2 | 2 | 2 |
| *Wellhead Protection* | 2 | 3 | 3 | 3 | 2 |
| *Hydrologic Impacts* | 3 | 3 | 1 | 2 | 2 |
| **Water Quality Impacts** | **2.0** | **2.0** | **2.5** | **2.3** | **2.3** |
| *Assimilative Capacity of Receiving Body* | 2 | 2 | 3 | 3 | 3 |
| *Nutrients* | 2 | 2 | 2 | 2 | 2 |
| *Effluent Characteristics* | 2 | 2 | 2 | 2 | 2 |
| *Disinfection* | 2 | 2 | 3 | 2 | 2 |
| **Ease of Permitting** | **1.8** | **2.3** | **2.5** | **2.3** | **1.8** |
| *NPDES* | 1 | 1 | 3 | 2 | 2 |
| *Flood Plain Development* | 1 | 3 | 3 | 3 | 1 |
| *Misc. Permits* | 2 | 2 | 3 | 2 | 2 |
| *CSO Implications* | 3 | 3 | 1 | 2 | 2 |
| **Implementability** | **2.5** | **2.7** | **2.3** | **2.0** | **1.8** |
| *Ability to Phase Improvements* | 3 | 3 | 2 | 2 | 2 |
| *Flexibility to Changes in Growth Forecasts* | 3 | 3 | 2 | 2 | 2 |
| *Expandable for Future Demands* | 3 | 3 | 2 | 2 | 2 |
| *Implementation Risk and Timeframe* | 2 | 2 | 3 | 2 | 2 |
| *Land Acquisition* | 1 | 2 | 3 | 2 | 1 |
| *Constructability* | 3 | 3 | 2 | 2 | 2 |
| **Stakeholder and Public Acceptance** | **2.3** | **2.7** | **2.0** | **2.3** | **2.3** |
| *Stakeholder Autonomy* | 3 | 3 | 3 | 3 | 3 |
| *Stakeholder Control* | 3 | 3 | 1 | 2 | 2 |
| *Public Acceptance* | 1 | 2 | 2 | 2 | 2 |
| **Sustainability** | **1.7** | **1.7** | **2.3** | **2.0** | **2.0** |
| *Energy* | 2 | 2 | 1 | 2 | 2 |
| *Materials* | 1 | 1 | 3 | 2 | 2 |
| *Reuse of Existing Facilities* | 2 | 2 | 3 | 2 | 2 |
| **Total Points** | **12.7** | **14.1** | **14.1** | **13.2** | **12.4** |

Southern Sarpy County Wastewater Treatment Study

Paired Comparison Matrix for Alternatives Evaluation Criteria

Directions:

This matrix facilitates the comparison of the 7 evaluation criteria. In each box of the matrix, circle the number of the criterion that you think is the more important of the two. If you consider two criteria being compared to be essentially equal, circle both. Once you have completed all the comparisons, count the number of times you circled each number. Write the score in the blanks on the right side of the matrix.

| Evaluation Criteria | 1 - Cost Effectiveness | 2 - Environmental Impacts | 3 - Water Quality Impacts | 4 - Ease of Permitting | 5 - Implementability | 6 - Stakeholder and Public Acceptance | 7 - Sustainability |
|---|---|---|---|---|---|---|---|
| 1 Cost Effectiveness | | 1 vs 2 | 1 vs 3 | 1 vs 4 | 1 vs 5 | 1 vs 6 | 1 vs 7 |
| 2 Environmental Impacts | | | 2 vs 3 | 2 vs 4 | 2 vs 5 | 2 vs 6 | 2 vs 7 |
| 3 Water Quality Impacts | | | | 3 vs 4 | 3 vs 5 | 3 vs 6 | 3 vs 7 |
| 4 Ease of Permitting | | | | | 4 vs 5 | 4 vs 6 | 4 vs 7 |
| 5 Implementability | | | | | | 5 vs 6 | 5 vs 7 |
| 6 Stakeholder and Public Acceptance | | | | | | | 6 vs 7 |
| 7 Sustainability | | | | | | | |

How many times did you select:

1? ____

2? ____

3? ____

4? ____

5? ____

6? ____

7? ____

Total

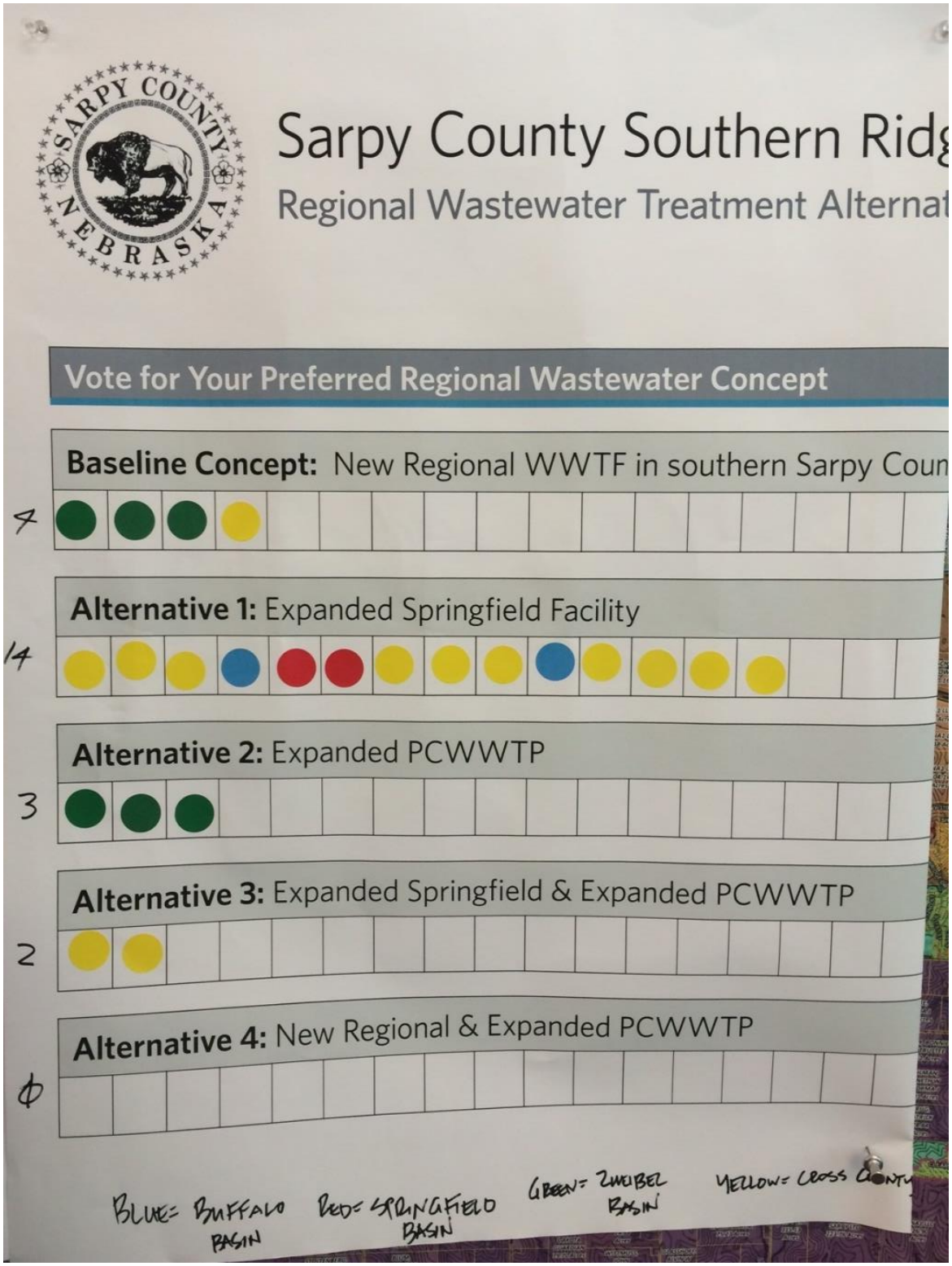
| | Group 1 | Number | Weighting Factor |
|---|---|---|---|
| 1 | Cost Effectiveness | 32 | 20.4% |
| | Environmental Impacts | 18 | 11.5% |
| 3 | Water Quality Impacts | 28 | 17.8% |
| | Ease of Permitting | 11 | 7.0% |
| | Implementability | 22 | 14.0% |
| | Stakeholder and Public Acceptance | 17 | 10.8% |
| 2 | Sustainability | 29 | 18.5% |
| | Total | 157 | 100.0% |

| | Group 2 | Number | Weighting Factor |
|---|---|---|---|
| 1 | Cost Effectiveness | 28 | 19.7% |
| 3 | Environmental Impacts | 25 | 17.6% |
| 2 | Water Quality Impacts | 27 | 19.0% |
| | Ease of Permitting | 5 | 3.5% |
| | Implementability | 16 | 11.3% |
| | Stakeholder and Public Acceptance | 20 | 14.1% |
| | Sustainability | 21 | 14.8% |
| | Total | 142 | 100.0% |

| | Group 3 | Number | Weighting Factor |
|---|---|---|---|
| 1 (tie) | Cost Effectiveness | 28 | 19.4% |
| 3 | Environmental Impacts | 21 | 14.6% |
| 1 (tie) | Water Quality Impacts | 28 | 19.4% |
| | Ease of Permitting | 13 | 9.0% |
| | Implementability | 22 | 15.3% |
| | Stakeholder and Public Acceptance | 16 | 11.1% |
| | Sustainability | 16 | 11.1% |
| | Total | 144 | 100.0% |

| | Group 4 | Number | Weighting Factor |
|---|---|---|---|
| 3 | Cost Effectiveness | 17 | 15.6% |
| 1 | Environmental Impacts | 22 | 20.2% |
| 2 | Water Quality Impacts | 20 | 18.3% |
| | Ease of Permitting | 6 | 5.5% |
| 3 | Implementability | 17 | 15.6% |
| | Stakeholder and Public Acceptance | 14 | 12.8% |
| | Sustainability | 13 | 11.9% |
| | Total | 109 | 100.0% |

| | All Groups | Number | Weighting Factor |
|---|---|---|---|
| 1 | Cost Effectiveness | 105 | 19.0% |
| 3 | Environmental Impacts | 86 | 15.6% |
| 2 | Water Quality Impacts | 103 | 18.7% |
| | Ease of Permitting | 35 | 6.3% |
| | Implementability | 77 | 13.9% |
| | Stakeholder and Public Acceptance | 67 | 12.1% |
| | Sustainability | 79 | 14.3% |
| | Total | 552 | 100.0% |


Sarpy County Southern Ridg
Regional Wastewater Treatment Alternat
Vote for Your Preferred Regional Wastewater Concept
Baseline Concept: New Regional WWTF in southern Sarpy Coun
4
Alternative 1: Expanded Springfield Facility
14
Alternative 2: Expanded PCWWTP
3
Alternative 3: Expanded Springfield & Expanded PCWWTP
2
Alternative 4: New Regional & Expanded PCWWTP
0
BLUE= BUFFALO BASIN
RED= SPRINGFIELD BASIN
GREEN= ZIMMER BASIN
YELLOW= CROSS COUNTY