

7.0 Additional Study of Sewer Alternative along W. Mathis St.

The preliminary design report presented a recommendation for construction of sewer segments Red-1 and Red-2 along the east and north side of Oak Creek from Manhole AA7-21 (NW 41st Street and West Mathis Street) to Manhole AA6-68 (located just west of the main Lincoln Airport runway). Based on the costs presented for Red-1 and Red-2, Lincoln Wastewater requested further analysis for rehabilitation of the existing 27 inch trunk sewer along West Mathis Street with a revised design flow condition of Tier I versus the previously identified Tier I plus 1,500 future acres condition.

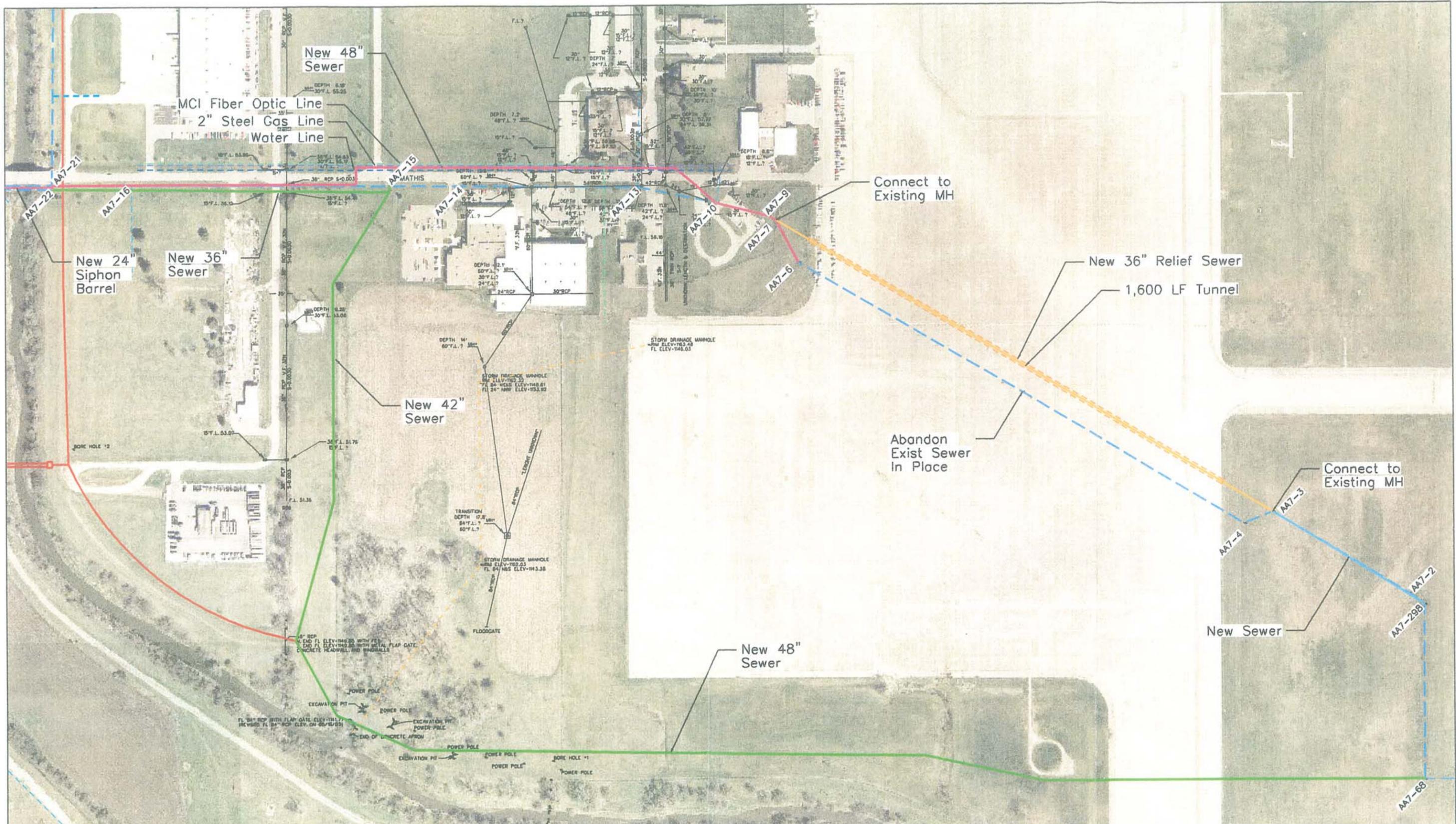
The additional analysis included field reconnaissance along West Mathis Street from NW 36th Street to NW 41st Street to identify potential utility conflicts associated with relaying, paralleling, or replacing the existing sewer. Modeling of the existing sewer was then conducted to identify phased improvements to convey flows to try and achieve a Tier I flow condition.

7.1. Utility Conflicts

West Mathis Street from NW 36th Street to NW 41st Street was investigated to identify potential utility conflicts that would impede improvements to the existing 27 inch sanitary sewer. City of Lincoln GIS/CAD information was used to identify existing storm sewers along the route. A field reconnaissance of the alignment conducted by HDR personnel identified existing utilities in the project area. A recent One-Call locate had marked the storm water, sanitary sewer, Time Warner Cable, and Alltel Communication lines along the south side of West Mathis Street from NW 36th Street to NW 38th Street.

From the located utilities, it was determined that the existing 48/54 inch storm sewer was installed 6 feet south (centerline to centerline) of the existing sanitary sewer. The storm sewer invert is approximately 1-2 feet above the top of the sanitary sewer. Therefore, any modifications to the existing sanitary sewer between Manhole AA7-10 and Manhole AA7-14 would require removal and replacement of 520 feet of large diameter storm sewers as indicated on Figure 7-1. In addition to the existing storm sewer, LES has an overhead power distribution line along the south side of West Mathis Street from Manhole AA7-10 to Manhole AA7-21 (NW 36th Street to NW 41st Street) as indicated in Figure 7-2. Modifications to the existing sewer would require relocation of these power poles at a cost of approximately \$3,000 to \$4,000 per pole.

The north side of West Mathis Street from NW 36th Street to NW 41st Street has an 8 inch water distribution line located approximately 9 feet north of the back of curb (BOC). A 2



Phase 1 - MH AA7-6 to MH AA7-21
 48"-2,580 LF
 24"-180 LF Siphon

Phase 2 - MH AA7-3 to MH AA7-298
 36"-1,900 LF

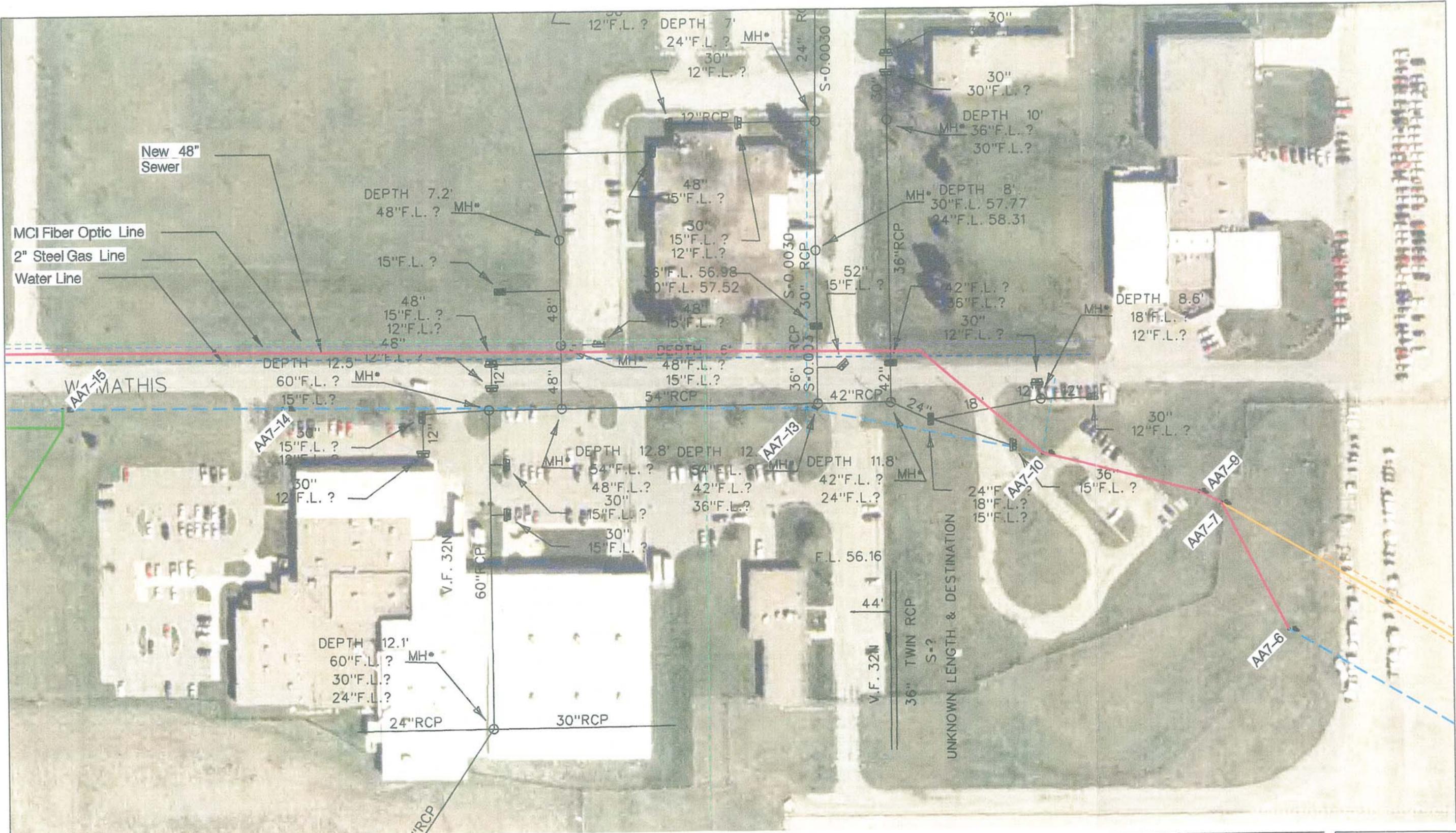
Phase 3 - MH AA7-7 to MH AA7-3
 36"-585 LF

Alternative B - MH AA7-68 to MH AA7-22
 48"-3,902 LF
 42"-1,548 LF
 30"-1,130 LF



**Oak Creek Trunk Sewer
 Additional Study Alternatives A & B**

DATE	1/10/06
FIGURE	7-1



inch steel gas lines is located approximately 19 feet north of the BOC, and an MCI fiber optic cable is located approximately 29 feet north of the BOC.

Additional utility conflicts could result from crossing storm sewers along West Mathis Street. The storm sewer invert elevations and precise locations are not included in the City of Lincoln GIS/CAD information and were not available in the Lincoln Airport Authority record drawings. Therefore, further investigations would be required to determine the exact location and elevations of the sewers as follows:

- Storm sewers east of Manhole AA7-6 and beneath the tarmac of unknown size and elevation.
- Storm sewer between Manhole AA7-6 and AA7-7 of unknown size and elevation.
- 48 inch RCP storm sewer parallel to the sanitary sewer between Manhole AA7-10 and Manhole AA7-13 of unknown elevation as previously identified.
- 54 inch RCP storm sewer parallel to the sanitary sewer between Manhole AA7-13 and Manhole AA7-14 of unknown elevation as previously identified.
- Twin 36 inch RCP storm sewers parallel to NW 36th Street of unknown elevation between Manhole AA7-10 and Manhole AA7-13.
- 48 inch RCP storm sewer between Manhole AA7-13 and Manhole AA7-14 of unknown elevation.
- 60 inch RCP storm sewer between Manhole AA7-14 and Manhole AA7-15 of unknown elevation.
- 36 inch RCP storm sewer between Manhole AA7-15 and AA7-16 of unknown elevation.

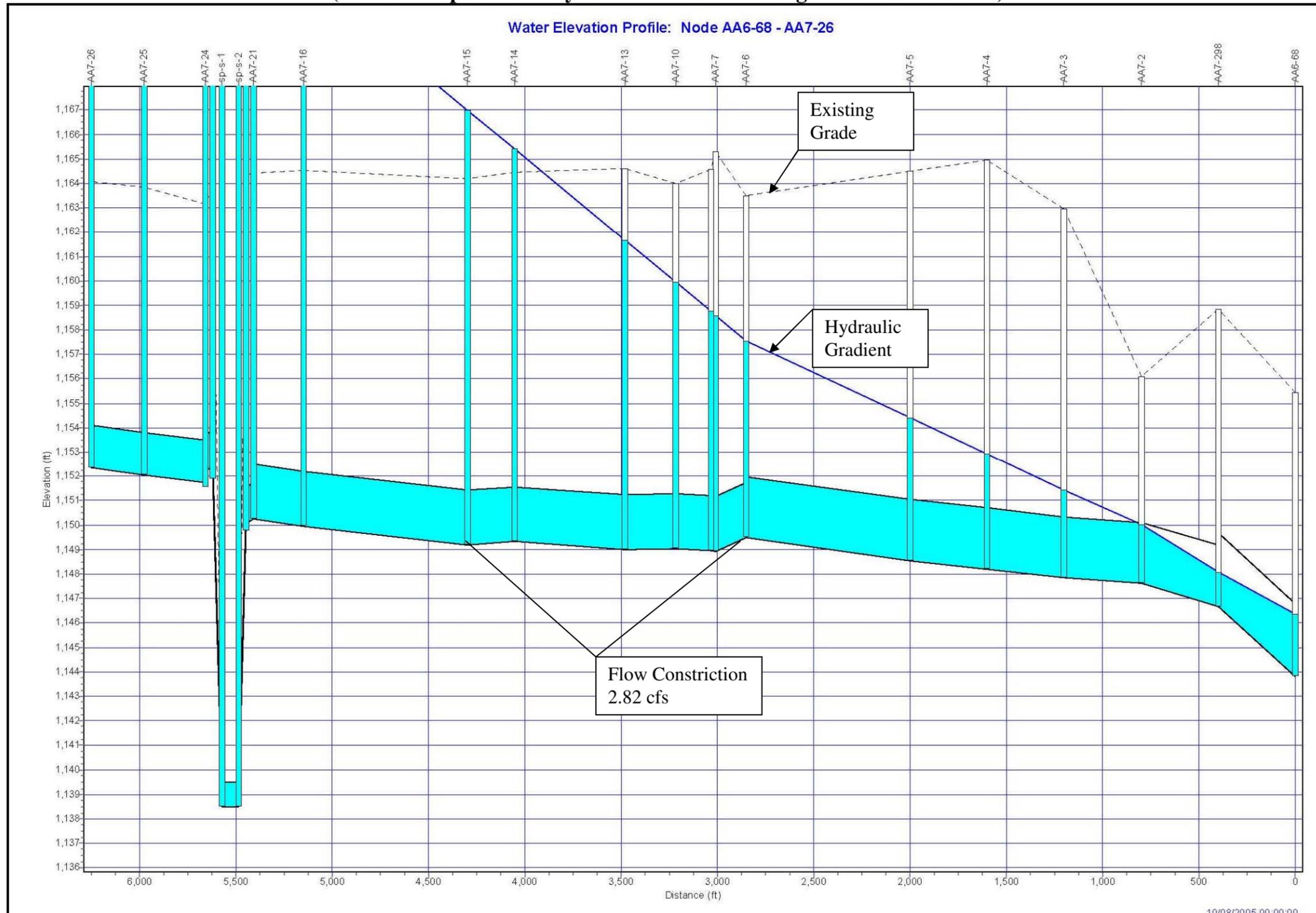
7.2. Modeling of Existing Trunk Sewer from Manhole 68 to the Oak Creek Siphon

The existing Oak Creek Basin Sewer was modeled using SWMM Version 5.0 to determine points of flow constrictions which limit the available conveyance capacity. Figure 7-3 illustrates the hydraulic profile from Manhole AA7-26 (NW 44th Street and West Mathis Street) east to Manhole AA6-68 (west of the Airport Runway). From Manhole AA7-6 to Manhole AA7-15 (NW 35th Street west to NW 38th Street), the sewer is limited in capacity to only 2.82 cfs as indicated in the attached Table 7-1. Based on minimum slope and velocity requirements, the existing 27 inch sewer was replaced by a 48 inch sewer as indicated in Figure 7-4 from Manhole AA7-6 to Manhole AA7-21. In addition, a new 24 inch siphon barrel was added to the existing Oak Creek Siphon. This increased the available capacity of the siphon from approximately 2 cfs to 14 cfs.

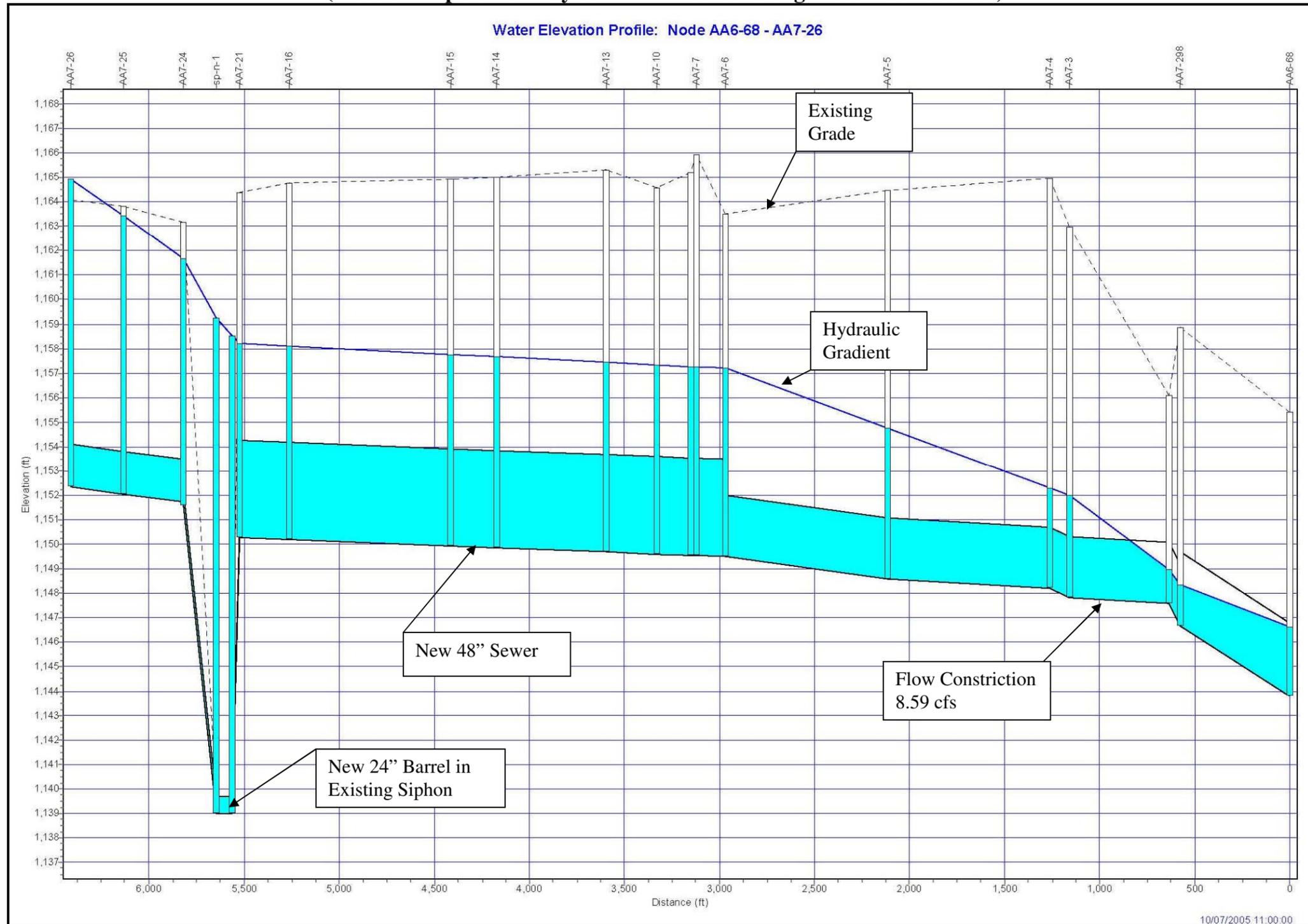
Table 7-1 Hydraulic Conveyance Limitations in the Existing Segment E-2

Model Conduit	Downstream Manhole	Upstream Manhole	Existing Condition			Phase 1			Phase 2			Phase 3		
			Maximum Flow (cfs)	Design Flow (cfs)	Maximum Velocity (ft/s)									
			TRK-51	AA6-68	AA7-298	28.62	46.92	5.09	28.62	46.92	5.34	28.62	46.92	5.73
TRK-52	AA7-298	AA7-2	28.62	50.21	9.09	28.62	50.21	9.07	28.62	23.65	6.68	28.62	50.21	9.07
TRK-53	AA7-2	AA7-3	28.62	8.59	7	28.62	8.59	7	28.62	32.16	6.03	28.62	31.11	7
TRK-54	AA7-3	AA7-4	28.62	24.67	5.83	28.62	32.16	6.03	28.62	11.27	5.95			
TRK-55	AA7-4	AA7-5	28.62	8.67	5.83	28.62	11.27	5.95	28.62	17.45	5.83			
TRK-56	AA7-5	AA7-6	28.62	13.44	5.83	28.62	17.45	5.83	28.62	33.28	3.62			
TRK-57	AA7-6	AA7-7	28.62	18.83	7.2	28.62	33.28	3.62						
TRK-58	AA7-7	AA7-9	28.62	10.29	7.2	28.62	27.52	3.13	28.62	27.52	3.13	28.63	27.53	6.22
TRK-59	AA7-9	A7-10	28.62	6.53	7.2	28.62	23.85	2.69	28.62	23.85	2.69	28.62	23.85	3.67
TRK-60	A7-10	AA7-13	28.62	3.30	7.2	28.62	25.11	2.58	28.62	25.11	2.61	28.62	25.11	3.35
TRK-61	AA7-13	AA7-14	28.62	6.05	7.2	28.62	24.67	2.58	28.62	24.67	2.61	28.62	24.67	3.08
TRK-62	AA7-14	AA7-15	28.62	2.82	7.2	28.62	24.46	2.59	28.62	24.46	2.61	28.62	24.46	2.92
TRK-63	AA7-15	AA7-16	28.62	9.20	7.2	28.62	25.11	2.61	28.62	25.11	2.62	28.62	25.11	2.82
TRK-64	AA7-16	AA7-21	28.62	10.88	7.2	28.62	25.11	2.62	28.62	25.11	2.62	28.62	25.11	2.74

**Figure 7-3: Oak Creek Trunk Sewer – Existing Sewer from Manhole AA6-68 to Manhole AA7-26
(West of Airport Runway to NW 44th Street along West Mathis Street)**



**Figure 7-4: Oak Creek Trunk Sewer – Phase 1 Improvements from Manhole AA6-68 to Manhole AA7-26
(West of Airport Runway to NW 44th Street along West Mathis Street)**



With the improvements, the new capacity of the sewer was increased to 8.59 cfs as indicated in Table 7-1. The flow constriction is a result of the sewer installed with negligible slope between Manhole AA7-3 and Manhole AA7-298 just west of the Airport Runway. The existing 30 inch sewer would be replaced with a new 36 inch sewer constructed to maximize the slope between the identified manholes as indicated in Figure 7-5.

With the improvements, the new capacity of the sewer was increased to 11.27 cfs. This flow constriction is a result of the undersized 30 inch sewer beneath the airport tarmac between Manhole AA7-7 to AA7-3. Replacement of the existing 30 inch sewer with a new 36 inch sewer constructed with the maximum available slope would increase the capacity of the sewer to 23.85 cfs, which is 4.77 cfs less than the required Tier I design flow condition as indicated in Figure 7-6.

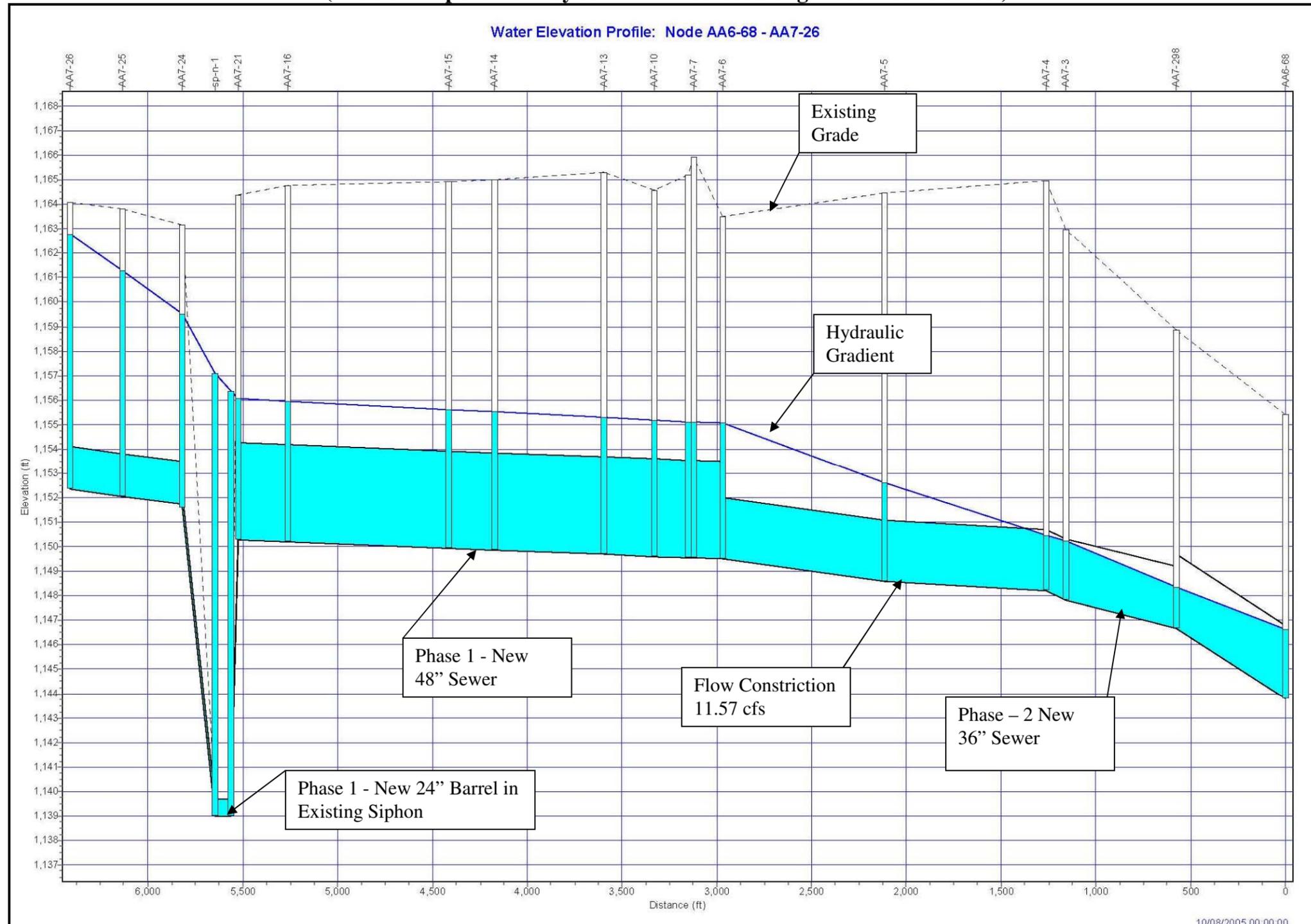
Note that in Figures 7-3 through 7-6, the existing siphon is unable to convey all of the Tier I flows and over three feet of headloss is present in each condition.

7.3. Proposed Improvements of the Existing Trunk Sewer

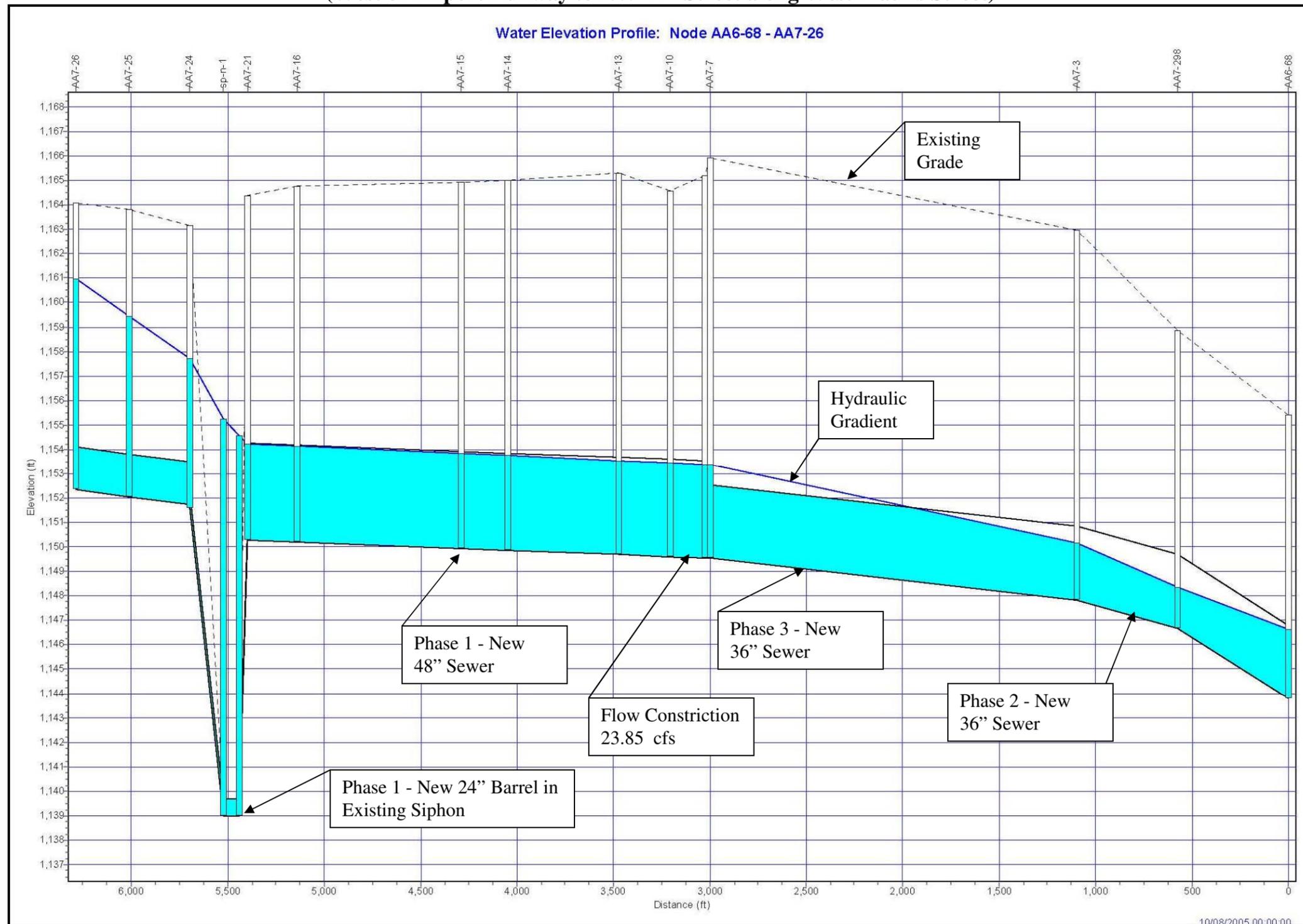
The improvements identified below provide a phased development plan for conveyance of flows in an attempt to serve a Tier I design flow. As previously identified, the existing 27 inch sewer from Manhole AA7-21 to Manhole AA6-68 (West Mathis Street from NW 41st Street to the west side of the main airport runway) has an existing capacity of 2.8 cfs which is a result of the negative grade between Manhole AA7-7 and Manhole AA7-6 as indicated on Figure 7-3 Oak Creek Trunk Sewer Existing. The existing metering data provided by Lincoln Wastewater System indicates that flows in July 2005 peaked at 2.68 cfs. The low flow contribution per acre could be attributed to the commercial and industrial developments in the basin with very low rate for wastewater generation.

Phase 1 improvements would include replacement of the existing trunk sewer from Manhole AA7-6 to Manhole AA7-21 with 2,580 linear feet of 48 inch trunk sewer. The 48 inch trunk sewer size was selected to meet minimum slope and velocity requirements and conveyance of Tier I flows. The 48 inch sewer would be located on the north side of West Mathis Street and would require the relocation of the existing 2 inch gas main. In addition to the 48 inch trunk sewer, an additional 24 inch barrel would be added to the existing 8 and 12 inch diameter siphon barrels to convey Tier I flows. With the Phase I improvements, the new capacity of the Trunk Sewer is 8.59 cfs which would convey flows until 2006 based on the City's design flow equation for the developed areas.

**Figure 7-5: Oak Creek Trunk Sewer – Phase 2 Improvements from Manhole AA6-68 to Manhole AA7-26
(West of Airport Runway to NW 44th Street along West Mathis Street)**



**Figure 7-6: Oak Creek Trunk Sewer – Phase 3 Improvements from Manhole AA6-68 to Manhole AA7-26
(West of Airport Runway to NW 44th Street along West Mathis Street)**



Phase 2 improvements would include constructing a new 36 inch sewer from Manhole AA7-3 to Manhole AA7-298 (west of the main airport runway). With the Phase II improvements, the new capacity of the Trunk Sewer is 11.27 cfs which would convey flows until 2010 based on the City’s design flow equation for the developed areas.

Phase 3 improvements would include constructing a new 36 inch sewer from Manhole AA7-7 to AA7-3 (beneath the existing airport tarmac) to parallel the existing 30 inch trunk sewer. The increased slope and capacity of the sewer will improve the capacity to 23.85 cfs. This would allow capacity for conveyance of flows until 2022 based on the City’s design flow equation for the developed areas.

These improvements provide a maximum capacity of the sewer at 23.85 cfs, which is 4.77 cfs less than a Tier I flow condition. This deficiency in flow is related to the maximum capacity of the 48 inch trunk sewer when constructed at a minimum slope in an attempt to maintain minimum flow velocities. At a flow of 23.85 cfs, surcharging will occur on the west side of the siphon to approximately 3 feet below existing grade at Manhole AA7-26 (NW 44th Street and West Mathis Street).

7.4. Project Costs

The project costs for the phased development plan have been previously presented in Tables 6-1 and 6-2: Opinion of Probable Project Costs. These costs were determined using the average bid results for the West ‘O’ Street Trunk Sewer Extension Project – Phases 1 and 2 and the Upper Southeast Salt Creek Subbasin Sewer –Segment 1. These costs include 20% contingencies in the Construction Cost.

Table 7-2: Opinion of Probable Project Costs				
Segment	Construction Cost	Easement Costs	Eng, Legal, Admin. Costs	Total Project Cost
Phase 1	\$1,298,000	-	\$260,000	\$1,558,000
Phase 2	\$168,000	-	\$34,000	\$202,000
Phase 3	\$1,912,000	-	\$382,000	\$2,294,000
Total Cost	\$3,378,000	-	\$676,000	\$4,054,000

The costs for the phased plan only reflects removal and replacement of the 2 inch gas main. No costs for relocation of any storm sewers have been included. Considerable conflicts and potential costs exist with the existing storm sewers in the project area. Field locates and probes in the area will be required to ascertain the actual modifications for the storm sewers and the associated costs.

7.5. Phased Development Plan Summary

The phased development plan summary is presented in Table 7-3. The “Existing Areas” represents the design flow condition for areas identified as existing in the Comprehensive Plan. The actual areas where development has occurred to-date is reflected in the “Developed Areas”. This development is significantly less than identified, thus the replacement date for portions of the collection system can be delayed. LWWS will need to monitor the development in the Oak Creek Basin to maximize their investment in the existing collection system.

Table 7-3: Phased Construction of the Alternate Development Plan for Segment E-2

Phase	Proposed Improvement MH to MH	Location	Capacity (cfs)	“Existing Areas” Replacement Date	“Developed Areas” Replacement Date
Existing			2.8	2005	2005
1	AA7-6 to AA7-21	W. Mathis from NW 36 th to NW 41 st	8.59	2005	2006
2	AA7-3 to AA7-298	West of Airport Runway	11.27	2005	2009
3	AA7-3 to AA-7	Tarmac West of Runway	23.85	2016	2022
4	Unknown		28.62 (Tier I Flow)	2016	2022

7.6. Present Value Cost

The present value cost for the phased development plan is indicated in Table 7-4. This illustrates that the present value cost with a 4% discount rate provides a total present value cost for the phased development plan for Segment E-2 of \$3,713,000.

Table 7-4: Present Value Costs

Segment	Total Project Cost	Year Constructed*	Present Value Cost
Phase 1	\$1,558,000	2005	\$1,558,000
Phase 2	\$202,000	2006	\$197,000
Phase 3	\$2,294,000	2009	\$1,961,000
Total Cost	\$4,054,000		\$3,713,000

*All year constructed dates are based on the current development in the basin.

7.7. Comparison to Recommended Development Plan in Study

The Oak Creek Basin Preliminary Design Study indicated a total project cost of \$4,314,000 for design and construction of segments Red-1, Red-2, Pink-1, and a new Siphon structure. This design cost was based on serving Tier I design flows, plus an additional 1,500 acres of future areas. The phased development plan for Segment E-2 presented in this section indicates a present value total project cost of \$3,713,000, but is unable to meet a Tier I flow condition. This alternative development plan will only convey 23.85 cfs, therefore, is 4.77 cfs short of the Tier I design flow condition. In addition, the existing siphon and sewer west of the siphon will continue to operate in a submerged condition.

The Oak Creek Basin Preliminary Design Study total project cost could be reduced if a Tier I design condition is established for the project. This reduces the pipe sizes in Red-1, Red-2, Pink-1, and the Siphon. Given the costs presented above, the Preliminary Design Cost project cost is \$150,700/cfs and the alternative development plan for Segment E-2 is \$155,700/cfs. Therefore, on this comparison the Preliminary Design Study plan is the most feasible project based on a dollar/cfs basis.

7.8. Phased Development of the Preliminary Design Study

A phased development plan for the proposed Preliminary Design Study could delay costs for constructing the new siphon and Segment P-1 until a time when development occurs on the west side of Oak Creek. This phased development plan would include constructing the proposed 48 inch Red-1 and Red-2 from Manhole 68 to Manhole AA7-21 (from the Airport Runway to NW 41st Street and West Mathis Street). The connection of Red-2 to the existing E-3 and siphon would provide better hydraulic conditions at the existing siphon by lowering the hydraulic grade line compared to the improvement plan identified in paragraph 7.3 above. The opinion of probable project cost for this phased development plan is indicated in Table 7-5 with a detailed breakdown attached.

Table 7-5: Phased Development of the Preliminary Design Study	
Construction Cost (w/20% Cont.)	\$2,966,000
Easement Costs	-
EL&A Costs	\$593,000
Total Project Cost	\$3,559,000

This phased development plan will allow for Tier I development on the east side of Oak Creek and be able to provide conveyance for 14 cfs of the identified 18 cfs of Tier I flows from the west side of Oak Creek through the existing siphon with a 24 inch siphon barrel addition. The existing siphon will continue to have operational and maintenance issues which could cause surcharging on the west side of Oak Creek. This alternative allows for future construction of a new siphon south of the existing siphon in the future.

Oak Creek Trunk Sewer (Segment E-2 Phased Development Plan)

SUMMARY OF PROJECT COSTS

Phase 1		
Construction Cost Total		\$1,298,000
Right-of-Way Costs		\$0
Phase 1		
Construction Cost Total		\$168,000
Right-of-Way Costs		\$0
Phase 1		
Construction Cost Total		\$1,912,000
Right-of-Way Costs		\$0
Total Construction Cost		\$3,378,000
Engineering, Legal, and Administrative Costs	20%	\$676,000
TOTAL PROJECT COST		\$4,054,000

*OPPC is based on preliminary design drawings using West 'O' Street Trunk Sewer Extension - Phases 1 and 2 and Upper Southeast Salt Creek Subbasin Sewer - Segment 1 Bid Tab average line item costs.

Oak Creek Trunk Sewer (Phase 1)

<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u> \$	<u>Total Cost</u> \$
GENERAL REQUIREMENTS				
Mobilization	1	LS	\$17,000	\$17,000
Supervision	1	LS	\$34,000	\$34,000
Equipment Rental & Misc.	1	LS	\$4,000	\$4,000
Total - General Requirements				\$55,000

<u>DESCRIPTION</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Sewer Pipe in Place Excluding Manholes				
48" Sewer Pipe	2,580	LF	\$240	\$619,000
Subtotal				\$619,000
Siphon				
Structures	1	LS	\$30,000	\$30,000
Piping	1	LS	\$200,000	\$200,000
Subtotal				\$230,000
Manholes				
Tee-Based Manhole	105	VF	\$750	\$79,000
Subtotal				\$79,000
Connections to Existing Facilities				
Connection at BOL	1	LS	\$10,000	\$10,000
Connection at EOL	1	LS	\$10,000	\$10,000
Subtotal				\$20,000
Miscellaneous				
Abandon Existing Sewer In-Place	2,580	LF	\$8	\$21,000
Seeding	14,333	SY	\$0.60	\$9,000
Remove and Replace 2 Inch Gas Main	2,580	LF	\$15	\$39,000
Over Excavation and Trench Stabilization/Foundation Material	0	Tons	\$30	\$0
Electric or Telephone Utilities Not Shown	200	LF	\$20	\$4,000
Water Utilities Less Than or Equal to 4" Dia. Not Shown	100	LF	\$25	\$3,000
Storm or Sanitary Sewer Utilities Less Than 8" Dia. Not Shown	100	LF	\$25	\$3,000
Subtotal				\$79,000
Construction Cost Subtotal				\$1,082,000
Contingencies			20%	\$216,000
TOTAL CONSTRUCTION COST				\$1,298,000

ADDITIONAL PROJECT COSTS

Right-of-Way Costs				
Permanent Easement	57,000	SF	\$0.00	\$0
Temporary Construction Easement	133,000	SF	\$0.00	\$0
Subtotal				\$0
Engineering, Legal, and Administrative Costs			20%	\$260,000
TOTAL PROJECT COST				\$1,558,000

Oak Creek Trunk Sewer (Phase 2)

<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u> \$	<u>Total Cost</u> \$
GENERAL REQUIREMENTS				
Mobilization	1	LS	\$2,000	\$2,000
Supervision	1	LS	\$4,000	\$4,000
Equipment Rental & Misc.	1	LS	\$1,000	\$1,000
Total - General Requirements				\$7,000

<u>DESCRIPTION</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Sewer Pipe in Place Excluding Manholes				
36" Sewer Pipe	575	LF	\$180	\$104,000
Subtotal				\$104,000
Connections to Existing Facilities				
Connection at BOL	1	LS	\$10,000	\$10,000
Subtotal				\$10,000
Manholes				
Standard Manhole, Type "G"	20	VF	\$840	\$17,000
Subtotal				\$17,000
Miscellaneous				
Seeding	3,194	SY	\$0.60	\$2,000
Over Excavation and Trench Stabilization/Foundation Material	0	Tons	\$30	\$0
Subtotal				\$2,000
Construction Cost Subtotal				\$140,000
Contingencies			20%	\$28,000
TOTAL CONSTRUCTION COST				\$168,000

ADDITIONAL PROJECT COSTS

Right-of-Way Costs				
Permanent Easement	57,000	SF	\$0.00	\$0
Temporary Construction Easement	133,000	SF	\$0.00	\$0
Subtotal				\$0
Engineering, Legal, and Administrative Costs			20%	\$34,000
TOTAL PROJECT COST				\$202,000

Oak Creek Trunk Sewer (Phase 3)

<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u> \$	<u>Total Cost</u> \$
GENERAL REQUIREMENTS				
Mobilization	1	LS	\$26,000	\$26,000
Supervision	1	LS	\$50,000	\$50,000
Equipment Rental & Misc.	1	LS	\$6,000	\$6,000
Total - General Requirements				\$82,000

<u>DESCRIPTION</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Sewer Pipe in Place Excluding Manholes				
36" Sewer Pipe	1,875	LF	\$180	\$338,000
Subtotal				\$338,000
Tunnel				
Taxiway/Tarmac	1,600	LF	\$720	\$1,152,000
Subtotal				\$1,152,000
Connections to Existing Facilities				
Connection at BOL	1	LS	\$10,000	\$10,000
Connection at EOL	1	LS	\$10,000	\$10,000
Subtotal				\$20,000
Miscellaneous				
Seeding	1,528	SY	\$0.60	\$1,000
Over Excavation and Trench Stabilization/Foundation Material	0	Tons	\$30	\$0
Subtotal				\$1,000
Construction Cost Subtotal				\$1,593,000
Contingencies			20%	\$319,000
TOTAL CONSTRUCTION COST				\$1,912,000

ADDITIONAL PROJECT COSTS

Right-of-Way Costs				
Permanent Easement	57,000	SF	\$0.00	\$0
Temporary Construction Easement	133,000	SF	\$0.00	\$0
Subtotal				\$0
Engineering, Legal, and Administrative Costs			20%	\$382,000
TOTAL PROJECT COST				\$2,294,000

Oak Creek Trunk Sewer (Red-1, Red-2, Rehab Exist Siphon)

<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
			\$	\$
GENERAL REQUIREMENTS				
Mobilization	1	LS	\$40,000	\$40,000
Supervision	1	LS	\$77,000	\$77,000
Equipment Rental & Misc.	1	LS	\$9,000	\$9,000
Total - General Requirements				\$126,000
DESCRIPTION				
Sewer Pipe in Place Excluding Manholes				
48" Sewer Pipe	6,260	LF	\$240	\$1,502,000
Subtotal				\$1,502,000
Tunnel				
Taxiway	400	LF	\$1,080	\$432,000
Subtotal				\$432,000
Connections to Existing Facilities				
Connection at BOL	1	LS	\$10,000	\$10,000
Connection at EOL	1	LS	\$10,000	\$10,000
Subtotal				\$20,000
Siphon				
Structures	1	LS	\$30,000	\$30,000
Piping	1	LS	\$200,000	\$200,000
Subtotal				\$230,000
Manholes				
Tee-Based Manhole	43	VF	\$750	\$32,000
Subtotal				\$32,000
Miscellaneous				
84" Storm Sewer Modifications	1	LS	\$75,000	\$75,000
36" Storm Sewer Modifications	1	LS	\$10,000	\$10,000
Gravel Surfacing (In-Place)	25	Tons	\$30	\$1,000
Seeding	32,000	SY	\$0.60	\$19,000
Misc. Tree Removal & Replacement	1	LS	\$15,000	\$15,000
Over Excavation and Trench Stabilization/Foundation Material	0	Tons	\$30	\$0
Electric or Telephone Utilities Not Shown	200	LF	\$20	\$4,000
Water Utilities Less Than or Equal to 4" Dia. Not Shown	100	LF	\$25	\$3,000
Storm or Sanitary Sewer Utilities Less Than 8" Dia. Not Shown	100	LF	\$25	\$3,000
Subtotal				\$130,000
Construction Cost Subtotal				\$2,472,000
Contingencies			20%	\$494,000
TOTAL CONSTRUCTION COST				\$2,966,000
ADDITIONAL PROJECT COSTS				
Right-of-Way Costs				
Permanent Easement	57,000	SF	\$0.00	\$0
Temporary Construction Easement	133,000	SF	\$0.00	\$0
Subtotal				\$0
Engineering, Legal, and Administrative Costs			20%	\$593,000
TOTAL PROJECT COST				\$3,559,000