



City of
Aumsville

Home of the Corn Festival

Sanitary Sewer Facilities Plan 'Technical Memorandum-2016'

Aumsville, Oregon

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#108-78

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Sanitary Sewer Facilities Plan 'Technical Memorandum-2016'

Table of Contents

Chapter 1—Introduction	5
1.1 Background	5
1.2 Scope of Work	5
Chapter 2—Land Use and Population Projections	6
2.1 General	6
2.2 Land Use	6
2.3 Population Projections	6
Table 2-1 Population Growth Rates for Aumsville	
Chapter 3—Current and Projected Wastewater Flows	8
3.1 Wastewater Flows	8
Table 3-1 Actual and Projected Sewage Flows	
Chapter 4—Proposed Sanitary Sewer Improvements	9
4.1 Selected Treatment Plant Improvements	10
4.2 Discussions of Selected Treatment Plant Improvements	10
4.2.1 New Chlorination/Dechlorination Chamber	10
Table 4-1 Chlorination/Dechlorination Chamber Cost Estimate	
4.2.2 Additional Aeration Capacity	10
Table 4-2 Additional Aeration Capacity Cost Estimate	
4.2.3 Effluent Filtration	11
Table 4-3 and Table 4-4 Effluent Filtration Cost Estimate	
4.2.4 Addition to Public Works Building for More Laboratory Space	13
Table 4-5 Addition to Public Works Building for More Laboratory Space Cost Estimate	
4.3 Summary of Estimated Costs for Proposed Treatment Plant Improvements	13
Table 4-6 Summary of Estimated Costs for Proposed STP Improvements	
Chapter 5—Proposed Improvements for Future Growth	15
5.1 General	15
5.2 Service to Undeveloped Area #1	15
Table 5-1 New Sanitary Sewer-West of 11 th Street Area #1 for Future Development-Cost Estimate	

Sanitary Sewer Facilities Plan 'Technical Memorandum-2016'

Table of Contents (cont'd)

5.3	Service to Undeveloped Area #2 -----	16
	Table 5-2 New San. Sewer-East of 1 st Street Area #2 for Future Development-Cost Estimate	
5.4	Service to Undeveloped Area #3 -----	16
	Table 5-3 Sanitary Sewer Delmar Street Improvements- Phase 1 (1st St. to 4th St)-Cost Estimate	
	Table 5-4 Sanitary Sewer Delmar Street Improvements- Phase 1 (4th St. to 9th St)-Cost Estimate	
5.5	Summary of Estimated Costs for Proposed Improvements to Accommodate Future Growth-----	19
	Table 5-5 Summary of Proposed Improvements to Accommodate Future Growth-Cost Estimate	
Chapter 6—Summary and Recommendations -----		21
6.1	General-----	21
6.2	Implementation of Proposed Sanitary Sewer Improvements-----	21
6.3	Re-evaluation of Proposed Sanitary Sewer Improvements based on Current Needs-----	21
6.3.1	Upsizing Delmar Street Sanitary Sewer (1st Street to 4th Street)-----	22
6.3.2	Additional Aeration Capacity-----	22
6.3.3	Effluent Treatment/Filtration-Phase 1-----	23
6.3.4	Addition to Public Works Building for More Laboratory Space-----	23
6.3.5	New Chlorination/Dechlorination Chamber-----	23
6.3.6	Effluent Filtration -----	23
6.4	Summary of Estimated Costs for Proposed Improvements to Accommodate Future Growth-----	24
6.4.1	Service to Undeveloped Area #1 (West)-----	24
6.4.2	Service to Undeveloped Area #2 (Northeast)-----	24
6.4.3	Service to Undeveloped Area #3 (East)-----	24

Sanitary Sewer Facilities Plan 'Technical Memorandum-2016'

Table of Contents (cont'd)

6.5	Summary of Estimated Costs-----	24
	Table 6-1 Summary of Proposed STP Improvements-Cost Estimates	
	Table 6-2 Summary of Proposed Improvements for Future Growth-Cost Estimates	

Appendix A-Figure 5-1 Areas of Improvements

Chapter 1

Introduction

1.1 Background:

The City of Aumsville completed and adopted a *Wastewater Facilities Plan Update (2005 WWFP Update)*. The 2005 update examined the existing sanitary sewer system and identified the needed improvements to the sewage collection and treatment process, along with related appurtenances. It also provided cost estimates for the proposed improvements along with a proposed time schedule in which to complete the recommended work.

Since the adoption of the *2005 WWFP Update* the City has completed a number of the Phase I Improvements:

- 2007--Construction of a new master sewage lift station and screening/metering head works lagoon aeration;
- 2009--Construction of a temporary de-chlorination facility;
- 2010--Construction of the treated effluent pipeline;
- 2011--Construction of effluent irrigation system;

The above and other proposed sanitary sewer improvements projects recommended by the *2005 WWFP Update* addressed the future population growth of land area between the current city limits and urban growth boundary. This *WWFP-Technical Memorandum 2016* will discuss and outline the required system expansion in order to accommodate future growth within this area.

1.2 Scope of Work

The intent of this *WWFP-Technical Memorandum 2016* to the *2005 WWFP Update* is not to develop or set forth new sewage treatment improvements outside those recommended in the original 2005 WWFP Update, but is intended to review/update data that can change over time IE: population loss/growth, sewage influent flow rates and loading, and any other factors that may have had an influence on the original findings of the *2005 WWFP Update*. Along with this, the original cost estimates for the recommended improvements will be updated to reflect current construction costs.

This *WWFP-Technical Memorandum 2016* will review the population projections presented in the *2005 WWFP Update* and compare them to actual population changes over the past five years. Do the projections continue to closely reflect current growth trends?

The influent/effluent wastewater flows over the past several years will also be compared to those in the *2005 WWFP Update* to determine if current per capita flows have changed significantly.

Chapter 2

Land Use and Population Projections

2.1 General:

Since 2005-2015 Aumsville has not experienced significant population growth due to a downturn in the economy. During this time, no new subdivisions (5 lots or greater) were developed but new housing in-fill has been occurring on vacant properties in various areas of the City.

As of this update, it appears that there is renewed interest in new home construction and a new 80 unit subdivision is in the planning stages and is planned to start construction in 2016. The City recently completed a *Water Master Plan* in 2014. The population projections and water usage data used to develop the Water Master Plan will be referred to for this *WWFP-Technical Memorandum 2016*.

2.2 Land Use:

For this *WWFP-Technical Memorandum 2016*, only the land within the current UGB will be considered, with most of the projected population increase assumed to occur from residential (single family and multi-family) influx.

The City of Aumsville operates within established geographical boundaries that comprise of the City Limits and Urban Growth Boundary (UGB). According to the Aumsville Comprehensive Plan-1999 there are currently 192 build-able acres are zoned for Residential (single family and multi-family) and 118 acres for Commercial and Industrial.

Since the *2005 WWFP Update*, there have been no major annexations to the UGB so the data contained in the *2005 WWFP Update* will remained unchanged for this *WWFP-Technical Memorandum 2016*.

2.3 Population Projections

A comparison of the population projections contained in the *2005 WWFP Update* and the *Water Master Plan-2014* is shown in **Table 2-1**.

Table 2-1
Population Growth Rates for Aumsville

Year	Population Projection 2005 WWFP Update - 2005	Population Projection Water Master Plan- 2014
2010	3,543 (projected)	3,584 (actual)
2012	3,725 (projected)	3,700 (actual)
2014	3,916 (projected)	3,895 (actual)
2019	4,437 (projected)	4,318 (projected)

Since the population projections contained in the two plans compare very closely, the population projections and Equivalent Dwelling Units (EDU's) contained within the *2005 WWFP Update* will remain unchanged for this *WWFP-Technical Memorandum 2016*.

Chapter 3

Current and Projected Wastewater Flows

3.1 Wastewater Flows:

A review of the past five years sewer effluent records show they closely match the projected flows that were contained in the *2005 WWFP Update*. As shown in **Table 3-1**, the actual measured average effluent flows are very close to the projected average flows in the *2005 WWFP Update*.

Table 3-1
Actual and Projected Sewage Flows

Year	2010	2011	2012	2013	2014	2015
Actual Ave. Flow (MGD)	0.600	0.520	0.450	0.470	0.460	0.473
Projected Ave. Flow (MGD)	0.436	0.447	0.458	0.470	0.482	0.494

Since the projected average flows compare very closely, the projected sewage flows contained within the *2005 WWFP Update* will remain unchanged for this *WWFP-Technical Memorandum 2016*.

Chapter 4

Proposed Sanitary Sewer Improvements

4.1 Selected Treatment Plant Improvements:

The *2005 WWFP Update* provided a series of recommended improvements to the wastewater treatment plant. Based on these recommendations, the City developed a plan to implement the recommended improvements. They were listed as follows-in order of importance:

- **Phase III-Priority 1A:** Land Application of Treated Effluent (off-site property)
- **Phase III-Priority 1B:** Land Application of Treated Effluent (off-site property)
- **Phase III-Priority 2:** New Chlorination/Dechlorination Chamber
- **Phase III-Priority 3A:** Sanitary Sewer Main Line Up-sizing
- **Phase III-Priority 3B:** New Lift Station, Head Works, Mechanical Screening and Metering
- **Phase IV-Priority 1:** Additional Aeration Capacity
- **Phase V-Priority 1:** Effluent Filtration

Since the adoption of the *2005 WWFP Update*, the City has completed a number of the above Improvements:

- **Phase III-Priority 1A:** Construction of the treated effluent pipeline to off-site location
(*Completed 2010*)
- **Phase III-Priority 1B:** Construction of effluent irrigation system on off-site location
(*Completed 2011*)
- **Phase III-Priority 2:** Construction of a *temporary* Dechlorination facility (*Completed 2009*)
- **Phase III-Priority 3A:** Sanitary Sewer Main Line Up-sizing (*Completed 2007*)
- **Phase III-Priority 3B:** New Lift Station, Head Works, Mechanical Screening and Metering
(*Completed 2007*)

There still are a number of remaining improvements to be completed and are listed in order of *2005 WWFP Update* importance:

- **Phase III-Priority 2:** New Chlorination/Dechlorination Chamber
- **Phase IV-Priority 1:** Additional Aeration Capacity
- **Phase V--Priority 1:** Effluent Filtration

Cost estimates for each of these improvements have been updated to reflect current construction costs and are shown in the appropriate Table for each of the discussed improvements.

4.2 Discussion of Selected Treatment Plant Improvements

4.2.1 New Chlorination/Dechlorination Chamber-(Phase III-Priority 2)

The *2005 WWFP Update* recommended that a new chlorination/dechlorination facility be constructed to meet DEQ Standards as funds become available. A temporary de-chlorination facility was constructed in 2009 and is currently being used.

However, this temporary facility does not address the inadequate chlorination contact time of the current chlorination chamber. The new facility will upgrade the existing structure and will provide adequate disinfection contact time as well as a de-chlorination of the treated effluent before it discharges into Beaver Creek. Estimated cost for this work is shown on **Table 4-1**.

Table 4-1
Chlorination/Dechlorination Structure
Cost Estimate

Description	Total Cost
Mobilization & Bond	\$ 38,450.00
Excavation Work/Base Rock	\$ 28,500.00
Modifications to Existing Chamber Structure	\$ 250,000.00
Piping & Valving	\$ 96,500.00
Chamber Backfill Work	\$ 22,000.00
Dechlorination Equipment	\$ 46,400.00
Compliance Manhole	\$ 15,800.00
Surface Restoration Work	\$ 8,500.00
Start-Up Services	\$ 3,500.00
Sub-Total	\$ 509,650.00
Construction Contingency (15%)	\$ 76,447.00
Engineering and Inspection (15%)	\$ 76,447.00
Total Estimated Project Cost	\$ 662,544.00

4.2.2 Additional Aeration Capacity-(Phase IV-Priority 1)

The sewage treatment system currently uses seven 5-HP floating aerators: four in pond #1 and three in pond #2. The aerators are working extremely well in reducing the existing BOD

loadings. If the projected population growth trend continues however, it is estimated that four additional five horsepower aerators will be required by year 2018 to reduce the anticipated BOD loadings.

The plant operator-by monitoring the STP's effective BOD reduction records-can determine when the additional aerator capacity will be needed. Estimated cost for this work is shown on **Table 4-2**.

**Table 4-2
Additional Aeration Capacity
Cost Estimate**

Description	Total Cost
Mobilization & Bond	\$ 12,600.00
Site Work and Anchors	\$ 25,800.00
5-HP Surface Aerators (4 ea)	\$ 39,200.00
Electrical and Control Work	\$ 48,600.00
Sub-Total	\$ 126,200.00
Construction Contingency (15%)	\$ 19,455.00
Engineering-Design/Inspection/Admin. (15%)	\$ 19,455.00
Total Estimated Project Cost	\$ 165,110.00

4.2.3 Effluent Filtration-(Phase V--Priority 1)

Currently, the STP is able to meet the total suspended solids (TSS) effluent discharge limitations while discharging into Beaver Creek between November 1 to April 31. The TSS limitations-as set forth in the NPDES permit-are not to exceed an average monthly concentration of 50 mg/l.

As the future growth of Aumsville approaches 5000 persons, it is likely that the existing treatment facility will be unable to meet the TSS discharge requirements. When this occurs estimated to be year 2019-a filtration system may be required to remove excess TSS, including algae, in order to meet effluent standards in effect at that time.

In the meantime, the City should ensure that the cell transfer piping has a variable elevation draw off so that clear water can be transferred from cell to cell.

A more immediate concern however, is the STP meeting the required DEQ Total Coliform limits in the summer time effluent irrigation water. Ponds #3 and #4-in particular-develop a large bloom of blue-green algae during the summer months. This algae interferes with the disinfecting

action of chlorine. As a result, it is becoming very difficult to meet the DEQ limits without filtration before disinfection.

Therefore, it is recommended that a treatment/filtration unit be constructed-initially sized for the summer irrigation rate of 500 to 550 GPM. This filtration unit could then later be expanded to meet the winter discharge TSS limits as previously discussed. Estimated cost for Phase 1 treatment is shown on **Table 4-3**. The estimated cost for later final treatment is shown on **Table 4-4**.

**Table 4-3
Effluent Treatment (Phase 1)
Cost Estimate**

Description	Total Cost
Mobilization & Bond	\$ 18,600.00
Site Work	\$ 24,150.00
Treatment/Filtration Equipment	\$ 165,000.00
Piping and Valving	\$ 62,800.00
Electrical and Control Work	\$ 48,600.00
Sub-Total	\$ 319,150.00
Construction Contingency (15%)	\$ 47,872.50
Engineering-Design/Inspection/Admin. (15%)	\$ 47,872.50
Total Estimated Construction Cost	\$ 414,895.00

**Table 4-4
Effluent Treatment (Phase 2)
Cost Estimate**

Description	Total Cost
Mobilization & Bond	\$ 22,000.00
Site Work	\$ 74,000.00
Treatment/Filtration Equipment	\$ 365,000.00
Piping and Valving	\$ 68,000.00
Electrical and Control Work	\$ 82,800.00
Sub-Total	\$ 611,800.00
Construction Contingency (15%)	\$ 91,770.00
Engineering-Design/Inspection/Admin. (15%)	\$ 91,770.00
Total Estimated Construction Cost	\$ 795,340.00

4.2.4 Addition to the Public Works Building for More Laboratory Space

This project is being added to this *WWFP-Technical Memorandum 2016*. The current public works building was constructed in 1978. Since then-because of needed room for additional staffing and increased testing/monitoring requirements-the needed laboratory portion of the public works building has inadvertently become intermingled with needed staff space.

The STP testing and monitoring equipment is currently located on the limited available counter space, creating a crowded work area. There is no separate, roomed-off area in which to perform the required laboratory work. This crowding makes testing and recording work very difficult to accomplish.

A larger laboratory area is needed to provide the public works staff with more room to complete the required EPA/DEQ testing work along with recording the results. The additional laboratory space can be easily accomplished by extending the easterly end of the existing building outward 24'. This building extension would provide sufficient room for an adequate laboratory/testing work area.

The estimated cost for an Addition to the Public Works Building is shown on **Table 4-5**.

Table 4-5
Addition to the Public Works Building for More Laboratory Space
Cost Estimate

Description	Total Cost
Mobilization & Bond	\$ 5,600.00
Site Work	\$ 11,800.00
Concrete Work	\$ 12,350.00
Building Framing/Enclosure Work	\$ 48,600.00
Electrical and Mechanical Work	\$ 41,400.00
Sub-Total	\$ 119,750.00
Construction Contingency (15%)	\$ 17,962.50
Engineering-Design/Inspection/Admin. (15%)	\$ 17,962.50
Total Estimated Construction Cost	\$ 155,675.00

4.3 Summary of Estimated Costs for Proposed Treatment Plant Improvements:

A summary of estimated costs-for the proposed STP improvements discussed in this chapter-are shown on **Table 4-6**.

**Table 4-6
Summary of Proposed STP Improvements
Cost Estimate**

Priority	Description	Total Cost
1	Additional Aeration Capacity	\$ 165,110.00
2	Effluent Treatment/Filtration-Phase 1	\$ 414,895.00
3	Addition to Public Works Building for More Laboratory Space	\$ 155,675.00
4	Chlorination/Dechlorination Structure	\$ 662,544.00
5	Effluent Treatment/Filtration-Phase 2	\$ 795,340.00
Total Estimated Construction Cost		\$ 2,193,564.00

Chapter 5

Proposed Improvements for Future Growth

5.1 General:

The 2005 WWFP Update evaluated the existing sewage treatment plant. A strategy/plan to provide sewer service to the undeveloped portions of the City currently not served, was undertaken in the 2005 WWFP Update. Since then however, major growth-besides housing infill-has continued to progress toward the easterly and northeasterly Urban Growth Boundaries

Currently, there are three major areas of undeveloped properties within the urban growth boundary. They are shown on **Figure 5-1** in **Appendix A** and are discussed further as follows:

5.2 Service to Undeveloped Area #1:

Approximately 26 acres of medium density residential property remain undeveloped west of 11th Street between Cedar and Olney Streets. This area slopes to the west and is lower than the area currently being served by the existing sewer system. In order to develop this area, a sewage pumping station will be required. In addition, if the UGB is extended to the west, the proposed sewage pumping station would be available to serve this area also. The pump station could be designed to accommodate future growth by upsizing the pumping equipment. Estimated cost to provide service to this area is shown on **Table 5-1**.

Table 5-1
New Sanitary Sewer-West of 11th Street Area #1-Future Development
Cost Estimate

Description	Units	Total Cost
Mobilization & Bond	1s	\$ 18,500.00
6" San. Sewer Force Main	400 lf	\$ 26,000.00
Sewage Lift Station (size for adding future development to the west)	1s	\$ 458,000.00
Extend New Sanitary Sewer Line West to UGB for Future Connection	1s	\$ 24,000.00
Sub-Total		\$ 526,500.00
Construction Contingency (15%)		\$ 78,975.00
Engineering-Design/Inspection/Admin. (15%)		\$ 78,975.00
Total Estimated Project Cost		\$ 684,450.00

5.3 Service to Undeveloped Area #2

Approximately 80 acres of commercial/industrial property remain undeveloped in the northeast portion of the UGB. This area is bordered on the south by Gordon Lane, on the east by the UGB and on the north by Highway 22.

There has been several serious attempts to develop this area. However, the state of the economy and the lack of being able to obtain financing has left this area undeveloped.

This area gradually slopes from east to west and appears to be able to be served by a gravity sewer main line. This line would connect to the existing sanitary manhole on Delmar Street-just east of the railroad tracks.

However, the development of Area #2 would require a sewage pumping station to discharge into the Delmar sanitary sewer. Another option would be to lower and up size a portion of the Delmar Street sewer line to allow for gravity flow to Delmar.

Estimated cost to extend the Delmar sewer line to the westerly boundary of Area #2 is shown on **Table 5-2**.

**Table 5-2
New Sanitary Sewer- East of 1st Street Area #2-Future Development
Cost Estimate**

Description	Units	Total Cost
Mobilization & Bond	1s	\$ 22,500.00
Extend New 10" San. S Easterly to the East ROW of 1st Street	240 lf	\$ 26,400.00
Bored First Street Crossing	1s	\$ 60,000.00
Extend New 10" San. S North to New 1st Street Crossing	400 lf	\$ 38,000.00
Sanitary Sewer Manhole	2 ea	\$ 13,000.00
Connect to Existing Delmar St. Sanitary Sewer	1s	\$ 9,500.00
Surface Restoration	1s	\$ 25,800.00
Sub-Total		\$ 195,200.00
Construction Contingency (15%)		\$ 29,280.00
Engineering-Design/Inspection/Admin. (15%)		\$ 29,280.00
Total Estimated Project Cost		\$ 253,760.00

5.4 Service to Undeveloped Area #3:

Approximately 52 acres of medium density residential property remain undeveloped in the most easterly area of the UGB. This area is bordered on the south by Mill Creek Road, on the east by

the UGB and on the north by Highway 22. This area gradually slopes from east to west and appears to be able to be served by the existing gravity sewer main line installed for the Highberger Subdivision.

There is currently a 3 phase subdivision being planned for 23 acres of Area #3. This construction is anticipated to start in 2016.

However, as Area #3's continued growth progresses, sewer flows have increased to the Willamette Street main line as it is the main connecting sanitary sewer line to Delmar Street. Combine the future flows from Area #2 and the current/future flows from Area #3 it can be seen that the Delmar/Willamette Street connection (located between the railroad tracks and 1st Street) will soon be overloaded due to the limited capacity of the existing 8" sanitary sewer line on Delmar Street.

Because of the current high flows from Willamette Street, the Public Works Department has to frequently pressure wash, clean and flush the manhole located at 1st and Delmar Streets along with a downstream segment of the sewer main on Delmar to 4th Street.

To alleviate this 'bottleneck' problem-and to prevent any future manhole overflows-the Delmar Street main line should be upsized from 8" to 10" from 1st Street to 4th street. Incidentally, the *2005 WWFP Update* listed the Delmar Street Sewer Main Upsizing as a **Future Growth** project.

Because of the above future development, it is recommended the upsizing (8" to 10") of the current sanitary sewer line on Delmar Street be moved up in priority. The Delmar Street main line upsizing work would direct the additional flows from Areas #2 and #3 more directly to the STP. This would also reduce the overflow potential that could occur at the shallow connection manhole at 1st and Delmar Streets.

It is proposed that the Delmar Street sanitary sewer line be up-sized in two phases: The first phase would start at the aforementioned Delmar Street manhole, cross under the railroad tracks and connect to the deep manhole at Fourth Street.

This would alleviate the current bottleneck at the manhole at 1st and Delmar Streets. The second phase would then be constructed when the Area #2-80 acre parcel is 50% developed.

Estimated cost for Phase 1 and Phase 2 are shown on **Table 5-3** and **Table 5-4**.

Table 5-3
Sanitary Sewer Delmar Street Improvements-Phase 1 (1st St. to 4th St.)
Cost Estimate

Description	Total Cost
Mobilization & Bond	\$ 14,000.00
Temporary Traffic Control	\$ 5,500.00
Erosion & Environmental Protection	\$ 1,900.00
Saw-Cut AC	\$ 1,960.00
10" Sanitary Sewer (12'-14' deep)	\$ 51,600.00
Sanitary Sewer Manholes	\$ 13,000.00
New 4" Service Line, Tee & Connect to Exist'g Line, Tracer Wire and Box, complete	\$ 17,920.00
Bored RR Crossing	\$ 37,500.00
By-Pass Pumping Work	\$ 4,000.00
Connect to Existing Manhole on 4th	\$ 4,500.00
Remove/Repair Outside Drop	\$ 5,500.00
Remove Exist'g MH; Plug Pipe Ends; B-Fill w/CR, Grade B-Fill Match Surrounding Grade; complete	\$ 4,000.00
AC Pavement Repair	\$ 29,800.00
Line TV'ing/MH Testing/Site Cleanup	\$ 6,500.00
Site Cleanup	\$ 2,500.00
Sub-Total	\$ 200,180.00
Construction Contingency (15%)	\$ 30,027.00
Railroad Crossing Permit	\$ 4,000.00
Engineering & Administration (15%)	\$ 30,027.00
Total Estimated Project Cost	\$ 264,234.00

Table 5-4
Sanitary Sewer Delmar Street Improvements-Phase II
(4th St. to 9th St.)
Cost Estimate

Description	Total Cost
Mobilization & Bond	\$ 18,000.00
Temporary Traffic Control	\$ 11,800.00
Erosion & Environmental Protection	\$ 2,800.00
Saw-Cut AC	\$ 7,600.00
10" Sanitary Sewer (12'-14' deep)	\$ 143,000.00
Sanitary Sewer Manholes	\$ 26,000.00
New 4" Service Line, Tee & Connect to Exist'g Line, Tracer Wire and Box, complete	\$ 25,200.00
By-Pass Pumping Work	\$ 6,000.00
Connect to Existing Manhole on 4th	\$ 4,500.00
Connect to Exist'g Manholes	\$ 9,000.00
Remove/Repair Outside Drop	\$ 5,500.00
AC Pavement Repair	\$ 54,250.00
Line TV'ing/MH Testing	\$ 9,500.00
Site Cleanup	\$ 5,000.00
Sub-Total	\$ 323,650.00
Construction Contingency (15%)	\$ 48, 548.00
Engineering & Administration (15%)	\$ 48, 548.00
Total Estimated Project Cost	\$ 420,745.00

5.5 Summary of Estimated Costs for Proposed Improvements to Accommodate Future Growth:

A summary of the estimated costs for the proposed improvements-accommodating future growth as discussed in this chapter-are shown on **Table 5-5**.

Table 5-5
Summary of Proposed Improvements to Accommodate Future Growth
Cost Estimate

Description	Total Cost
Area #1-New Sanitary Sewer-West of 11th Street	\$ 684,450.00
Area #2-New Sanitary Sewer- East of 1 st Street	\$ 253,760.00
Phase I-Sanitary Sewer Delmar Street Improvements	\$ 264,234.00
Phase II-Sanitary Sewer Delmar Street Improvements	\$ 420,745.00
Total Estimated Future Growth Project Cost:	\$ 1,623,189.00

Chapter 6

Summary and Recommendations

6.1 General:

The previous chapters of this *WWFP-Technical Memorandum 2016* to the *2005 WWFP Update* have reviewed the current zoning, population trends and projected the population growth of Aumsville to year 2020, based on the same information generated by the *Aumsville Water Master Plan-April 2015*. The current and projected population were then equated to equivalent dwelling units (EDU's). EDU's may then be also used in calculating and apportioning system development charges (SDC's). The last five years of STP influent flow records were also reviewed and compared to those projected in the *2005 WWFP*.

Since the actual flows compare very closely to the projected flows contained in the *2005 WWFP Update*, the flow data contained in the *2005 WWFP Update* with remain unchanged for this *WWFP-Technical Memorandum 2016*.

6.2 Implementation of Proposed Sanitary Sewer Improvements:

Chapter 4 developed a plan to implement the recommended improvements as outlined in the *2005 WWFP Update*. Since the adoption of the *2005 WWFP Update*, the City has completed a number of the recommended Improvements:

- **Phase III-Priority 1A:** Construction of the treated effluent pipeline to off-site location
(*Completed 2010*)
- **Phase III-Priority 1B:** Construction of effluent irrigation system on off-site location
(*Completed 2011*)
- **Phase III-Priority 2:** Construction of a *temporary* Dechlorination facility (*Completed 2009*)
- **Phase III-Priority 3A:** Sanitary Sewer Main Line Up-sizing (*Completed 2007*)
- **Phase III-Priority 3B:** New Lift Station, Head Works, Mechanical Screening and Metering
(*Completed 2007*)

There are three remaining recommended improvements from the *2005 WWFP Update* to be completed.

6.3 Evaluation of Proposed Sanitary Sewer Improvements based on Current Needs:

Considering the current growth trends in the city and the resulting demands on the existing sanitary sewer system, the *WWFP-Technical Memorandum 2016* has re-evaluated the priorities of the listed *2005 WWFP Update* improvements. This re-evaluation-based on the 2016 needs-lists the following recommended improvements in order of importance:

- **Phase III-Priority 1:** Phase I: Upsizing Delmar Street Sanitary Sewer (1st St. to 4th St.)

- **Phase III-Priority 2:** Additional Aeration Capacity
- **Phase III-Priority 3:** Effluent Treatment/Filtration-Phase 1
- **Phase III-Priority 4:** Addition to Public Works Building for More Laboratory Space
- **Phase IV-Priority 5:** New Chlorination/Dechlorination Chamber
- **Phase V--Priority 6:** Effluent Filtration-Phase 2

Cost estimates for each of these improvements were updated to reflect current construction costs and are summarized on **Table 6-1**.

6.3.1 Phase III-Priority 1: Phase I-Upsizing Delmar Street Sanitary Sewer (1st St. to 4th St.):

The *2005 WWFP Update* listed the Delmar Street Sewer Main Upsizing as a *Future Growth* project. However, since then, the full development of the subdivisions east of 1st Street has occurred. Currently, the 26 acre Flowers Subdivision is beginning construction. All of these developments feed into the Highberger Street sanitary sewer line; and as such, have created a bottleneck at the Highberger Street-Delmar Street manhole connection. This connection is located between the railroad tracks and First Street.

Because of this bottleneck, the Public Works Department has to frequently pressure wash, clean and flush the Delmar Street manhole along with a downstream segment of the sewer main on Delmar Street to 4th Street. Combine the future flows from Area #2 and the current/future flows from Area #3 it can be seen that the Delmar/Willamette Street connection is becoming close to being overloaded.

It is recommended that this line be up-sized in two phases: The first phase would start at the aforementioned Delmar manhole, cross under the railroad tracks and connect to the deep manhole at Fourth Street. This would alleviate the current bottleneck at the manhole at 1st and Delmar Streets. The second phase-consisting of a new 8" line from 4th Street to 9th Street-would then be constructed when the 80 acre parcel is 50% developed.

6.3.2 Phase III-Priority 2: Additional Aeration Capacity:

The sewage system currently uses five 5-HP floating aerators. The aerators are working extremely well in reducing the existing BOD loadings. If the projected population growth trend continues, it is estimated that four additional five horsepower aerators will be required by year 2017 in order to reduce the anticipated BOD loadings.

The plant operator should work closely with the City Engineer and keep him updated when it appears BOD loadings are increasing. This will allow the City Engineer to review the past records to determine if additional aerators will be cost effective or an alternative method needs to be considered.

6.3.3 Phase III-Priority 3: Effluent Treatment/Filtration-Phase 1 (Originally Phase V-- Priority 1)

Currently, the STP is able to meet the total suspended solids (TSS) effluent discharge limitations while discharging into Beaver Creek between November 1 to April 31. The TSS limitations-as set forth in the NPDES permit-are not to exceed an average monthly concentration of 50 mg/l.

As the future growth of Aumsville approaches 5000 persons, it is likely that the existing treatment facility will be unable to meet the TSS discharge requirements. When this occurs estimated to be year 2019-a filtration system may be required to remove excess TSS, including algae, in order to meet effluent standards in effect at that time.

In the meantime, the City should ensure that the cell transfer piping has a variable elevation draw off so that clear water can be transferred from cell to cell.

A more immediate concern however, is the STP meeting the required DEQ Total Coliform limits in the summer-time effluent irrigation water. Ponds #3 and #4-in particular-develop a large bloom of blue-green algae during the summer months. This algae interferes with the disinfecting action of chlorine. As a result, it is becoming very difficult to meet the DEQ limits without filtration before disinfection.

Therefore, it is recommended that a treatment/filtration unit be constructed-initially sized for the summer irrigation rate of 500 to 550 GPM. This filtration unit could then later be expanded to meet the winter discharge TSS limits as previously discussed.

6.3.4 Phase III-Priority 4: Addition to Public Works Building for More Laboratory Space

This project is being added to the *2005 WWFP Update*. The current public works building was constructed in 1978. Since then-because of needed room for additional staffing and increased testing/monitoring requirements-the needed laboratory portion of the public works building has inadvertently become intermingled with needed staff space.

The STP testing and monitoring equipment is currently located on the limited available counter space, creating a crowded work area. There is no separate, roomed-off area in which to perform the required laboratory work. This crowding makes testing and recording work very difficult to accomplish.

A larger laboratory area is needed to provide the public works staff with more room to complete the required EPA/DEQ testing work along with recording the results. The additional laboratory space can be easily accomplished by extending the easterly end of the existing building outward 24'. This building extension would provide sufficient room for an adequate laboratory/testing work area.

6.3.5 Phase IV-Priority 5: New Chlorination/Dechlorination Chamber:

Although land application of treated effluent is shown as priority one, a new chlorination-dechlorination chamber will be a requirement of the new NPDES discharge permit. Design work for this structure should begin as soon as funds are available. This structure should be constructed during the summer months when no discharge of treated effluent to Beaver Creek is allowed.

6.3.6: Phase V--Priority 6: Effluent Treatment/Filtration-Phase 2:

Assuming that Phase 1 of the STP Effluent Treatment/Filtration has already been constructed and in operation; and the population growth continues to increase the TSS and place more demands on the STP, it is recommended that the treatment/filtration unit be further expanded to meet the winter discharge TSS limits as previously discussed in paragraph 6.3.3.

6.4 Summary of Estimated Costs for Proposed Improvements to Accommodate Future Growth:

Currently, there are three major areas of undeveloped properties within the urban growth boundary. They are shown on **Figure 5-1**. The proposed improvements would be undertaken as each of the areas develops. Cost estimates for the proposed improvements to accommodate future growth are shown on **Table 6-2**.

6.4.1 Service to Undeveloped Area #1 (west):

Approximately 26 acres of medium density residential property remain undeveloped west of 11th Street between Cedar and Olney Streets. This area slopes to the west and is lower than the area currently being served by the existing sewer system. In order to develop this area, a sewage pumping station will be required. In addition, if the UGB is extended to the west, the proposed sewage pumping station would be available to serve this area also. The pump station could be designed to accommodate future growth by upsizing the pumping equipment.

6.4.2 Service to Undeveloped Area #2 (northeast):

Approximately 80 acres of commercial/industrial property remain undeveloped in the northwest portion of the UGB. This area is bordered on the south by Gordon Lane, on the east by the UGB and on the north by Highway 22. This area gradually slopes from east to west and appears to be able to be served by a gravity sewer main line. This line would connect to the existing sanitary on Delmar Street just east of the railroad tracks.

6.4.3 Service to Undeveloped Area #3 (east): Delmar By-Pass Sewer Line (4th St. to 9th St.)-Phase II

Continuing Area #3's growth progression towards the east-northeast will generate more sewage flows to the Delmar sanitary sewer line. As the area east of First Street becomes developed, it is recommended that a by-pass sewer line be constructed on Delmar from Fourth Street and Ninth Street. This would relieve the hydraulic loading on the Olney Street sanitary sewer particularly during the winter months. The second phase would then be constructed when the Area #2-80 acre parcel is 50% developed.

6.5 Summary of Cost Estimates

The construction cost estimates are based on an average of similar local municipal projects and adjusted for June 2016 using an Engineering News Record (ENR) Construction Cost Index of 10137.05 (May 2005 was 7398). The use of the 2016 cost estimates in the future should be adjusted up or down, based on the ENR Construction Cost Index number in effect at the time of preparing such estimates.

While substantial effort has been made to prepare accurate estimates, the City is cautioned that additional factors such as specific design criteria, inflation and local work and economic conditions can have a substantial impact on actual construction costs.

**Table 6-1
Summary of Proposed STP/Sanitary Sewer Improvements--Cost Estimate**

Priority	Description	Total Cost
1	Phase I-Sanitary Sewer Delmar Street Improvement (1st St. to 4th St.)	\$ 264,234.00
2	Additional Aeration Capacity	\$ 165,110.00
3	Effluent Treatment/Filtration-Phase 1	\$ 414,895.00
4	Addition to Public Works Building	\$ 155,675.00
5	Chlorination/Dechlorination Structure	\$ 662,544.00
6	Effluent Treatment/Filtration-Phase 2	\$ 795,340.00
Total Estimated Construction Cost		\$ 2,457,798.00

**Table 6-2
Summary of Proposed Improvements to Accommodate Future Growth--Cost Estimate**

Description	Total Cost
Area #1-New Sanitary Sewer-West of 11th Street	\$ 684,450.00
Area #2-New Sanitary Sewer- East of 1 st Street	\$ 253,760.00
Phase I-Sanitary Sewer Delmar Street Improvements	\$ 264,234.00
Phase II-Sanitary Sewer Delmar Street Improvements	\$ 420,745.00
Total Estimated Future Growth Project Cost:	\$ 1,623,189.00