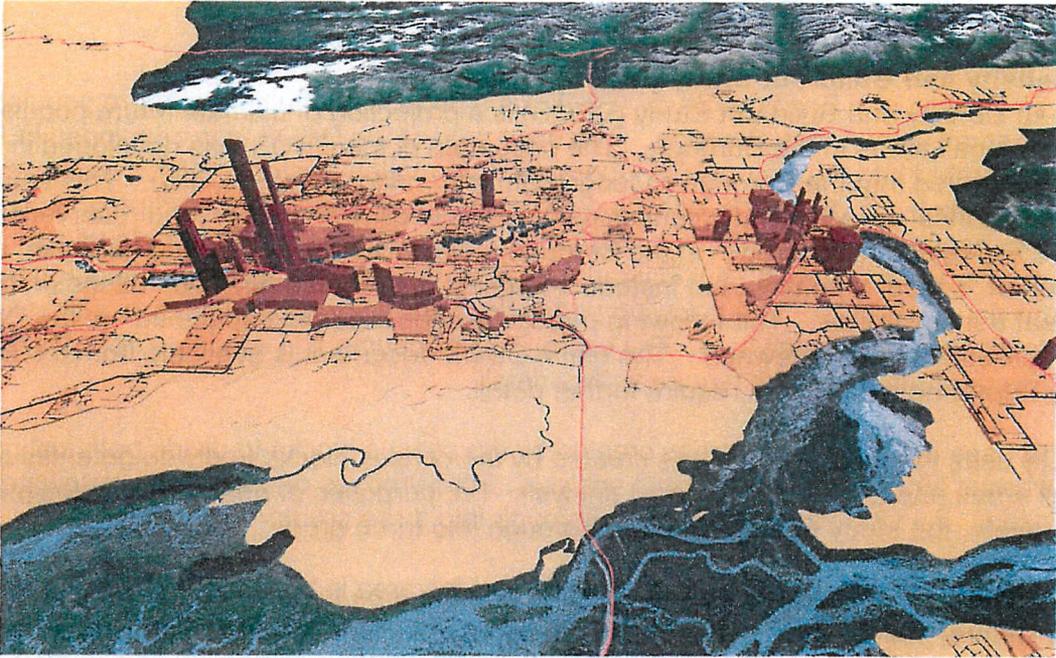


MSB Density and Build-out Analysis - Wastewater Report



May 27, 2013

MSB Density and Build-out Analysis - Wastewater Report

Introduction - The MSB Density and Build-out Analysis (DBOS) - Wastewater Report was commissioned in the Fall of 2012 in order to integrate wastewater and septage issues into the recent MSB Density and Build-out Study (DBOS). This effort was further intended as a supplement to the 2010 Regional Wastewater and Septage Treatment Study (RWWSTS). The DBOS Wastewater examination illustrates WWTP needs throughout the Borough, reinforces the need for expanded wastewater and septage facilities and illustrates additional population that could result should WWTP facilities be provided.

MSB - Density and Build-out Study (DBOS) - Overview

The Mat-su Density and Build-out Study (DBOS) is a projection of ultimate future population and housing for small areas in the Borough. The base data of the DBOS was developed in 2012 and was integrated into the Borough's Geographic Information System (GIS). This analysis combines historical growth trends, census data, soil suitability and other land reservation factors and future expectations for growth in the Borough. The DBOS is not a future land use plan or suggestion of "zoned" land use, but instead a forecast of probable densities based on historical and current density trends. The following pages describe a partial explanation of the DBOS and its implications for Wastewater. The entire DBOS document is available from the Borough Planning Department if readers require further detail.

The DBOS uses the 2462 study areas created by the census blocks to divide potential growth into small areas and allows sub-regional analysis. For purposes of analyzing wastewater and septage needs, the study areas divide the Borough into three areas:

- The Central Core including Palmer, Wasilla and the area in between the two communities
- The Central Valley which expands the core area to include Meadow Lakes, Big Lake, Houston, the KGB Corridor and Pt. MacKenzie (This area achieves its maximum growth in approximately 60 years)
- The North Susitna Valley including the corridor from Willow to Talkeetna and Trapper Creek (This area achieves its maximum growth in approximately 100 years)

The DBOS proposes a future land use and density pattern for the Borough, which preserves the current atmosphere while consuming remaining vacant land. A central high-rise urban core similar to Anchorage would not be part of this future but a solidification of the current mid-rise scheme found in Palmer and Wasilla. Other higher density development clusters would develop around a set of 23 major intersections throughout the Borough.

DBOS Goals

- Use a Realistic, Understandable Basis
 - Basis = Actual Alaskan Land Use Practice Based on Development Patterns and Pace During the Past 30 Years
- Use Consistent Study Areas and an Overall Growth Framework Shared by Other Agencies
 - Census Blocks / 2010 Transportation Area Zones / Community Council Study Areas
 - Share Base Case Growth Forecast with University of Alaska at Anchorage ISER
3.09% Annual
 - Share a Common Data Framework with Department of Transportation and Public Facilities, MSB School District and Other State of Alaska Agencies

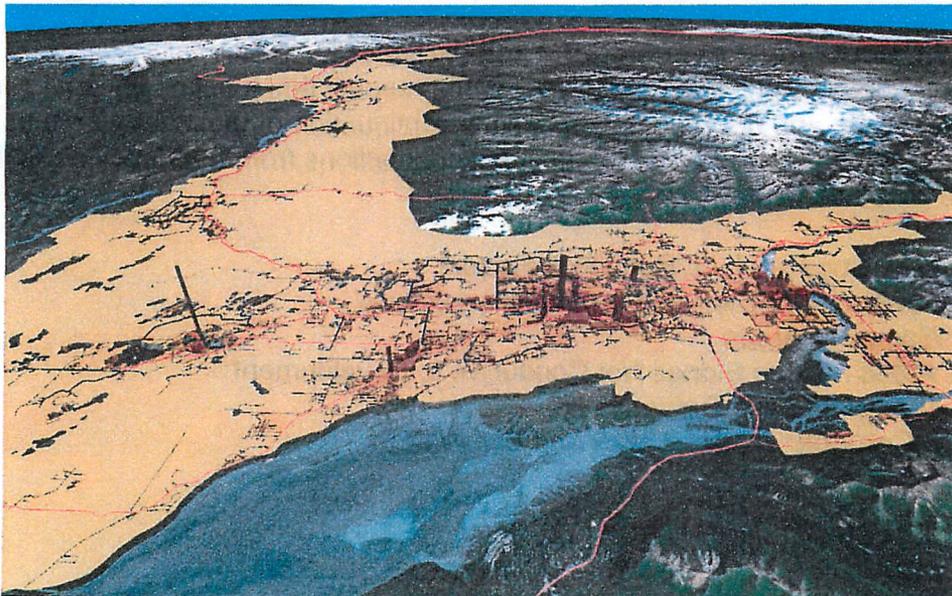
DBOS Outcomes

- Allow Population Projections for Small Areas
- Develop Conceptual Site Locations for Community Facilities
 - Schools
 - Public Safety Stations
 - Libraries
 - Parks / Open Space Acreage Districts
 - Transportation Corridors
 - Wastewater and Septic Treatment Facilities
 - Other Facilities
- Identify Sites that Might be Located on Borough Land
- Economic Development Analysis
- Facilitate Land Use Analysis and Strategy

MSB Density Study – Borough-Wide

Figure 1 displays a conceptual view of how the Borough might develop. The tall brown columns represent town centers corresponding to Palmer, Wasilla, Big Lake and portions of the KGB corridor. The darkest areas represent the highest density and the lighter tan areas represent lower densities. Only the valley floor would be developed and densities would decline gradually as one moves from town centers to the foot of the mountains. Densities proceeding up the Susitna and Matanuska Valleys would remain low and little or no density would exist west of the Susitna. The Central Area including Palmer, Wasilla, Big Lake, Houston, Sutton, the KGB Corridor and Pt. MacKenzie would contain the majority of development and would build-out (consume all vacant land with a given density) by 2060. The North Susitna Corridor including Willow, Cantwell, the "Y", Talkeetna and Trapper Creek would build-out in approximately 100 years.

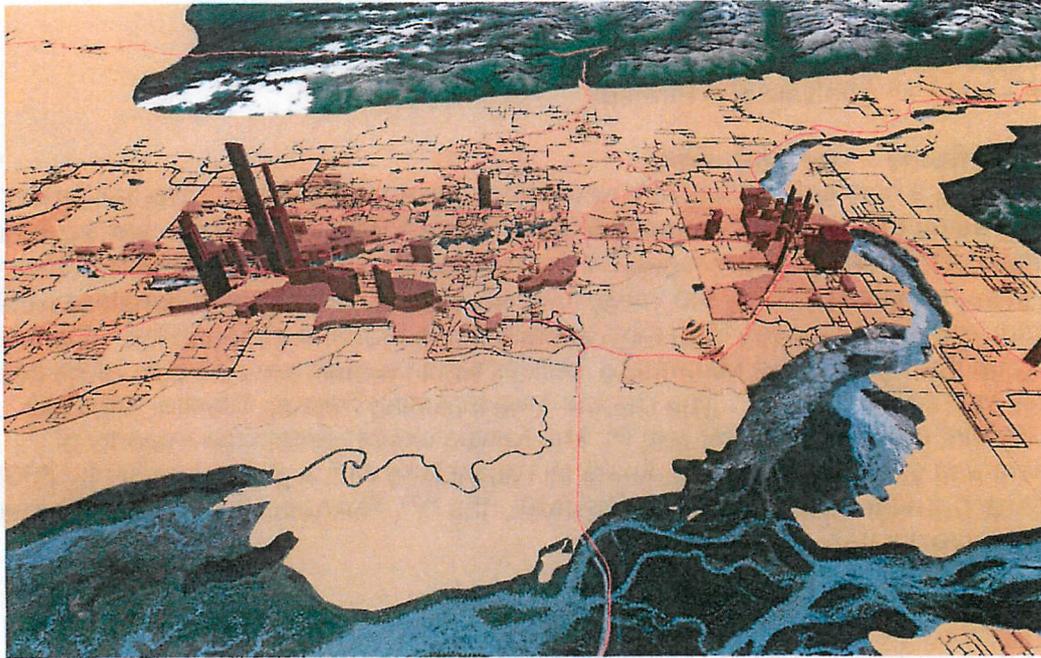
Figure 1



MSB Density Study – Core Area

Figure 2 is a close-up view of the “Core Area” currently served by a partial public sewer /water system. This area includes Palmer, Wasilla and the areas between those two communities. The town centers in these areas would feature “mid-rise” development. The typical building envelopes in these areas would be similar to the four-story to six-story buildings already evident in the central business districts of Palmer and Wasilla. No high-rise buildings similar to those in Anchorage are suggested.

Figure 2



Density Study Calculations, Assumptions and Variables

The DBOS is unique among planning analyses in the respect that it acknowledges current land use behavior practices and polices and forecasts a continuation of these into the future based on actual Alaskan land use practices. Reasonable deductions from the developable land inventory were made as follows:

- Soil Suitability – Using PARTIAL Reduction Factors
- Commercial Development Centered Around Intersections
- Permanent Wilderness Areas
- Mountainous Areas / Steep Slopes Not Conducive to Development
- State and Federal Parks and Refuges
- Transportation Corridors, Rivers, Lakes and Salt Water

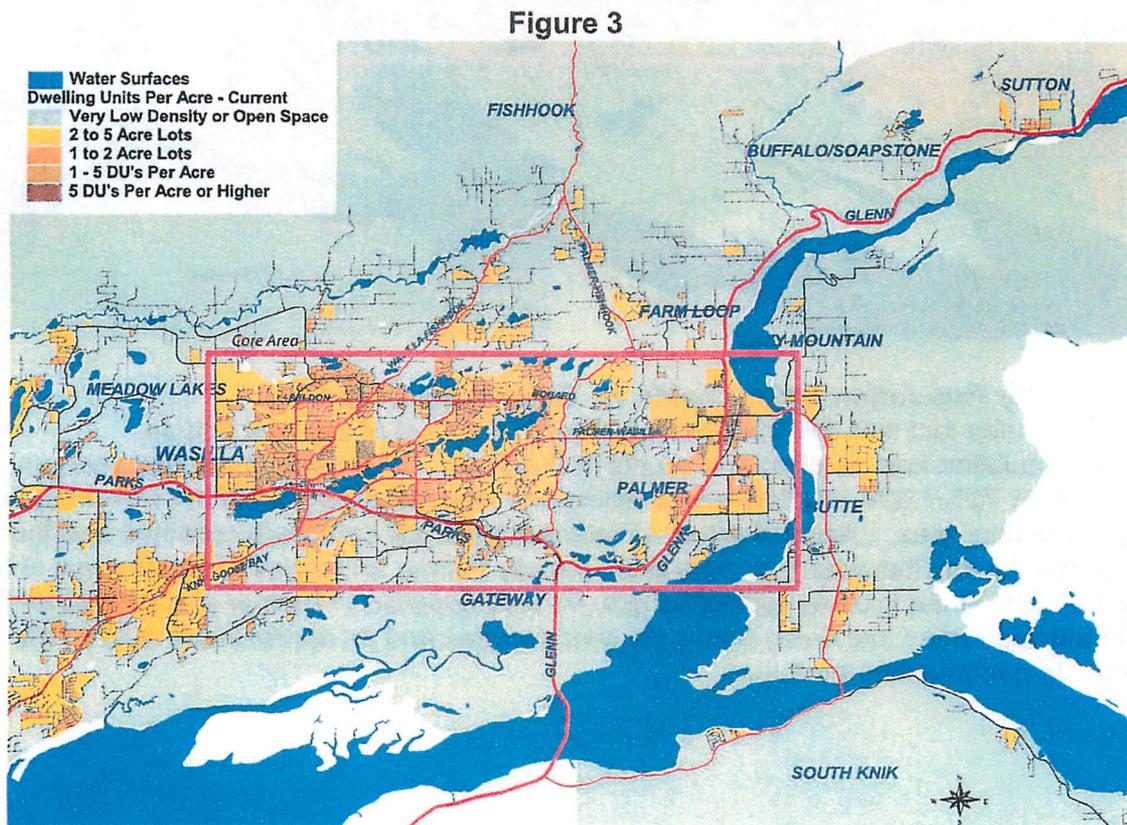
Borough-Wide Quantities from the Study

The following population and dwelling unit quantities were derived from the DBOS. A population of approximately 400,000 would be reached at "build-out". "Build-out" is defined as the time at which all land parcels have been consumed and housing or other uses have been constructed on them.

- Total Existing Persons – 88,754 (2010)
- Total Build Out Persons – 398,322
- Total Potential Additional Persons – 309,651
- Existing Dwelling Units – 41,066
- Total Build Out Dwelling Units – 186,540
- Potential New Dwelling Units – 145,651
- University of Alaska at Anchorage Institute for Social and Economic Research (ISER) Annual 3.09% Base Rate Suggests Build-out in 2060
- Actual Build-out is Probable in a 50 – 100-year Timeframe with the central area achieving "build-out" by 2060 and the North Susitna corridor achieving this in a 100-year timeframe.

Current Dwellings Per Acre – Core Area

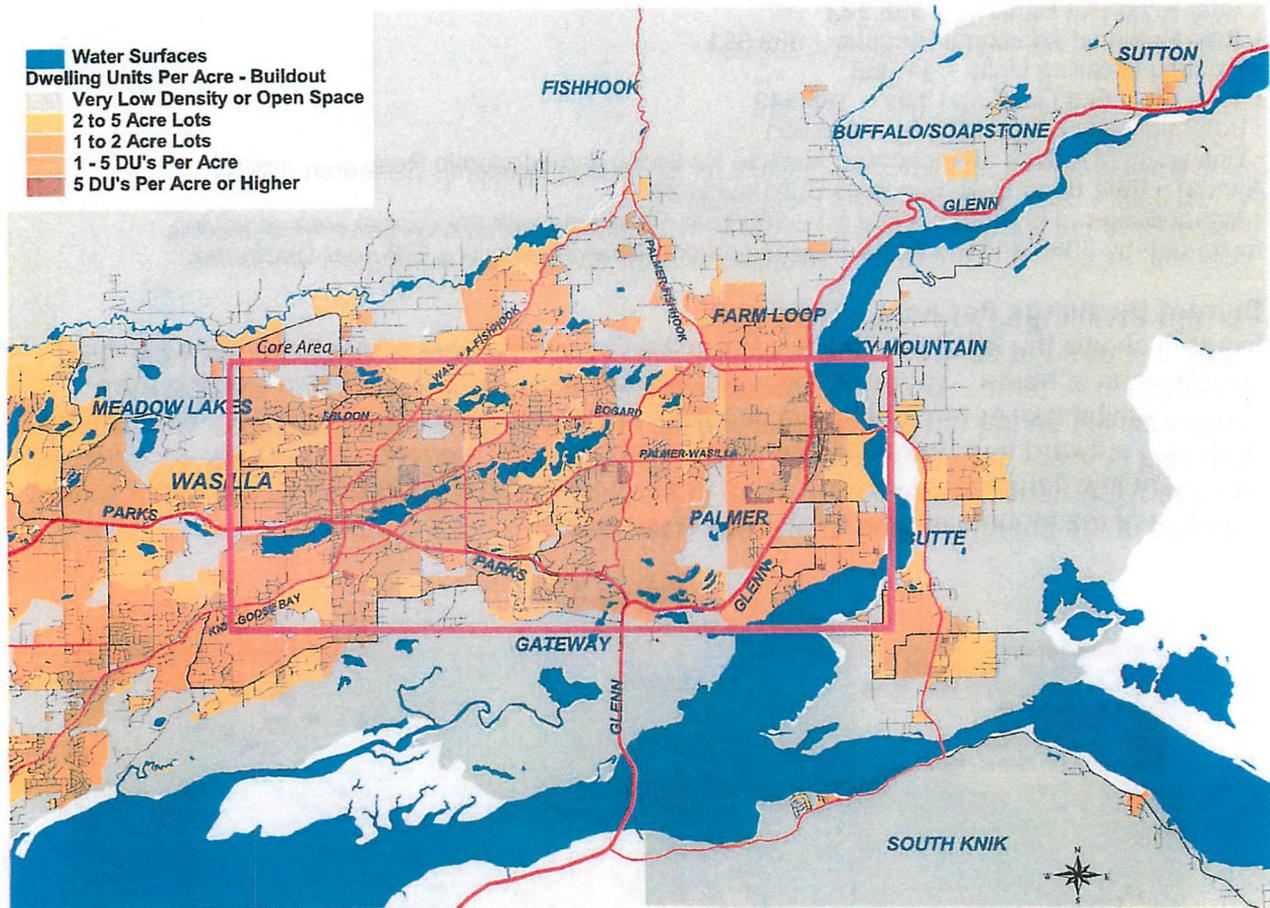
Figure 3 shows the 2010 housing density in the Core Area using a "dwellings per acre" land classification scheme. Currently, densities are low and only a few areas in existing town centers exhibit darker tan and brown densities approaching the highest category of 5 du/acre. Radiating outward from these denser areas, lower density categories are quickly encountered as current low densities trend even lower in the progression moving from town centers toward the edge of the mountains and rural areas in general.



Dwellings Per Acre at Build-out – Core Area

Figure 4 illustrates probable land categories at build-out when the majority of vacant land is consumed. The area between palmer and Wasilla would include more suburban densities and include some sub-one acre lots, but mostly include the categories of 1 to 2 and 2 to 5 acre lots.

Figure 4



Density Study Population Data - Inside vs. Outside the Core Area

Table 1 illustrates fact that the core area represents a subset of the total Mat-su Borough population and dwelling unit counts at build-out. In general, there has been an approximately 70% / 30% mix between dwelling unit absorption outside of the core area vs. inside of the core area. Approximately 42 years of historical data were collected and the data reconfirmed this mix between the “core area” (Mostly Palmer and Wasilla) and the rest of the Borough. 35% of the historic residential growth has happened in Palmer and Wasilla and the area in between (the Core Area) during the past decades and an approximate 30% / 70% mix is expected to continue into the future.

Table 1
Mix of Dwelling Units and Population Between the Core Area and Non-Core Area

Geographic Area	2010 Dwelling Units	Percentage	Build-out Dwelling Units	Percentage	2010 Population	Percentage	Build-out Population	Percentage	Dwelling Unit Absorption According to Borough Records - 1970 - 2011	Percentage
Outside of the Core Area	26,686	65%	140,291	75%	52,337	59%	285,281	72%	24,659	65%
Inside of the Core Area	14,380	35%	46,249	25%	36,417	41%	113,041	28%	13,470	35%
Total All Areas	41,066		186,540		88,754		398,322		38,129	
Detail by WWS Zones	2010 DU		BO DU		2010 Pop		BO Pop		Absorbed 1970 - 2011	
Palmer City Core	2,269		5,741		5,942		14,750		1,871	
Wasilla City Core	3,209		9,528		7,041		22,362		3,055	
Zone P1	1,061		3,625		2,594		9,168		1,006	
Zone P2A	603		1,736		1,737		4,450		590	
Zone P2B	445		1,707		1,211		4,339		414	
Zone P3	655		7,224		1,772		15,695		627	
Zone P4	303		789		849		2,031		286	
Zone W1	585		3,738		1,595		9,248		562	
Zone W2	1,916		6,586		4,858		16,393		1,805	
Zone W3	1,708		2,809		4,356		7,209		1,640	
Zone W4	1,626		2,765		4,462		7,397		1,614	

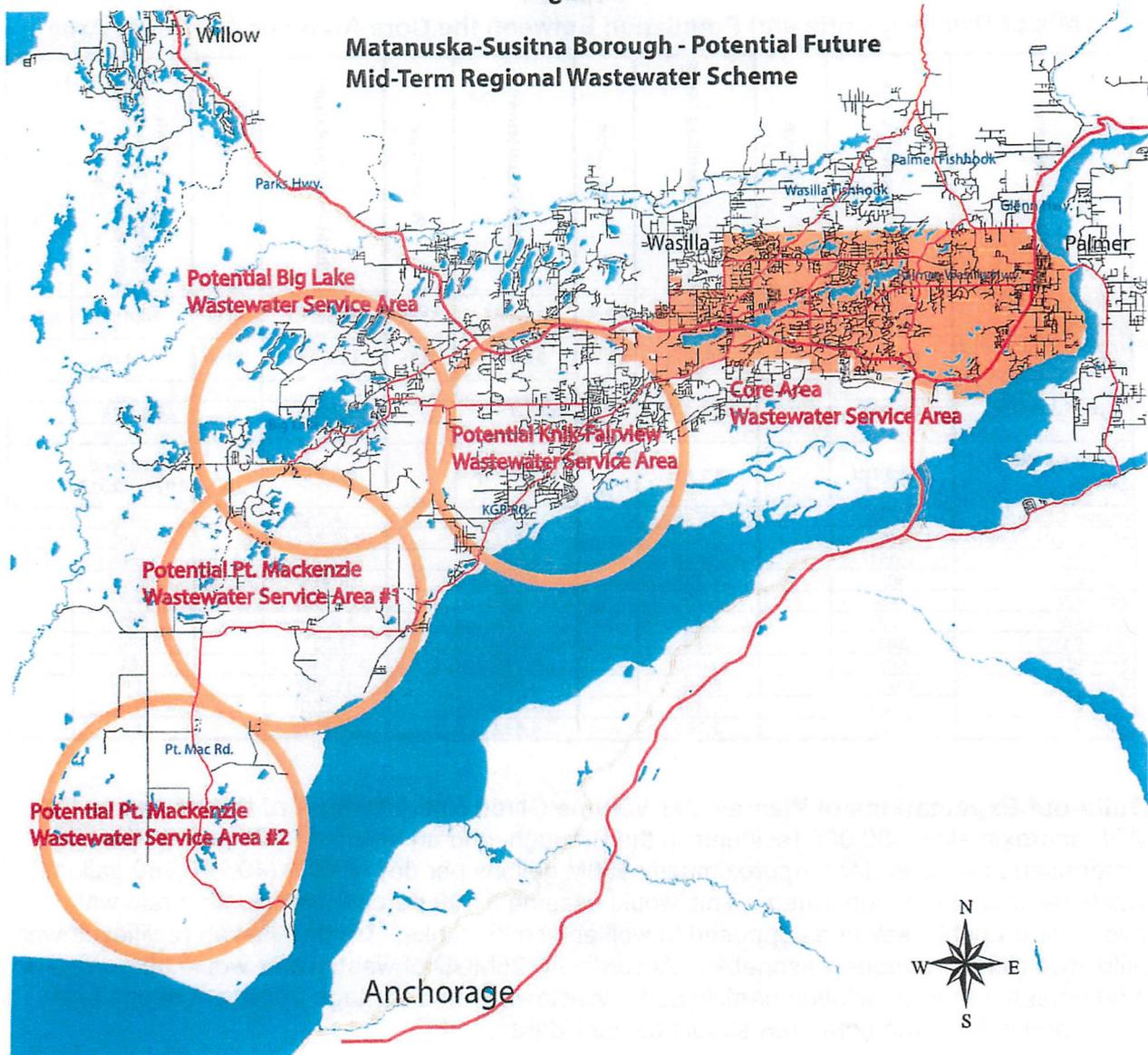
Build-out Expectations of Wastewater Volume Given Assumptions of Public Sewer Use

With approximately 400,000 residents in the Borough, and an assumed 125 gallons per day water usage as a standard, Approximately 50M gallons per day (MGD) (49,790,250 gallons) of wastewater could be generated. This would assume a 100 percent participation rate with everyone on public sewer as opposed to well and septic tanks. Given Alaskan realities, lower utilization rates are more reasonable. Accordingly, 25MGD of wastewater would be generated if 50 percent of the population participated. Wastewater and septage treatment needs both inside and outside the core area should be considered.

Potential Wastewater Service Areas

Figure 5 illustrates a potential set of 5 additional wastewater treatment service areas that could serve rapidly-growing portions of the Borough during the next 25 years. This is only a hypothetical display of data, assuming the need to serve the both the core area and the most rapidly-growing areas based on a reasonable estimate of 50 percent utilization of public sewer at build-out. Other models are possible given changes in the variables of utilization and plant size. The rapidly-growing Knik-Fairview, Big Lake and Pt. MacKenzie areas currently have no proposals for public sewer analysis and are developing as predominantly large lot areas given the lack of public infrastructure facilitating higher densities.

Figure 5



Wastewater Volume at Build-out by Community Council

The wastewater volumes for community councils may be calculated using the population figures available in the DBOS. Only a portion of the Borough is covered by community councils and a fractional wastewater flow results when these portions are netted out. Table 2 illustrates the distribution of the 36.0MGD flow contained in community councils as a subset of the total 50MGD of build-out flow that would result from 100 percent utilization of public sewer. The table also illustrates fractional flows for lower utilization rates trending downward to 50 percent.

Table 2

DRAFT - Wastewater Volume by Community Council at Build-out

Community Council Name	Population at Build-out	100% Wastewater Volume With 100% of Population on Public Sewer Calculated at 125 GPD Per Capita	90% Wastewater Volume With 90% of Population on Public Sewer Calculated at 125 GPD Per Capita	80% Wastewater Volume With 80% of Population on Public Sewer Calculated at 125 GPD Per Capita	70% Wastewater Volume With 70% of Population on Public Sewer Calculated at 125 GPD Per Capita	60% Wastewater Volume With 60% of Population on Public Sewer Calculated at 125 GPD Per Capita	50% Wastewater Volume With 50% of Population on Public Sewer Calculated at 125 GPD Per Capita
BIG LAKE	15,114	1,889,250	1,700,325	1,511,400	1,322,475	1,133,550	944,625
BUFFALO/SOAPS TONE	1,698	212,250	191,025	169,800	148,575	127,350	106,125
BUTTE	9,655	1,206,875	1,086,188	965,500	844,813	724,125	603,438
CHASE	10,033	1,254,125	1,128,713	1,003,300	877,888	752,475	627,063
CHICKALOON	4,907	613,375	552,038	490,700	429,363	368,025	306,688
FARM LOOP	4,297	537,125	483,413	429,700	375,988	322,275	268,563
FISHHOOK	7,756	969,500	872,550	775,600	678,650	581,700	484,750
GATEWAY	26,234	3,279,250	2,951,325	2,623,400	2,295,475	1,967,550	1,639,625
GLACIER VIEW	8,767	1,095,875	986,288	876,700	767,113	657,525	547,938
KNIK-FAIRVIEW	44,800	5,600,000	5,040,000	4,480,000	3,920,000	3,360,000	2,800,000
LAZY MOUNTAIN	3,369	421,125	379,013	336,900	294,788	252,675	210,563
MEADOW LAKES	34,147	4,268,375	3,841,538	3,414,700	2,987,863	2,561,025	2,134,188
NORTH LAKES	8,012	1,001,500	901,350	801,200	701,050	600,900	500,750
POINT MACKENZIE	17,699	2,212,375	1,991,138	1,769,900	1,548,663	1,327,425	1,106,188
SOUTH KNIK	2,180	272,500	245,250	218,000	190,750	163,500	136,250
SOUTH LAKES	10,953	1,369,125	1,232,213	1,095,300	958,388	821,475	684,563
SUSITNA	27,846	3,480,750	3,132,675	2,784,600	2,436,525	2,088,450	1,740,375
SUTTON	3,373	421,625	379,463	337,300	295,138	252,975	210,813
TALKEETNA	7,136	892,000	802,800	713,600	624,400	535,200	446,000
TANAINA	16,185	2,023,125	1,820,813	1,618,500	1,416,188	1,213,875	1,011,563
TRAPPER CREEK	3,648	456,000	410,400	364,800	319,200	273,600	228,000
WILLOW	20,532	2,566,500	2,309,850	2,053,200	1,796,550	1,539,900	1,283,250
TOTAL	288,341	36,042,625	32,438,363	28,834,100	25,229,838	21,625,575	18,021,313

Blue Indicates Community Councils Inside the Core Area

MSB Regional Wastewater and Septage Treatment Study (RWWSTS) - Overview

In 2009, the Matanuska Borough (in cooperation with the Cities of Palmer and Wasilla) commissioned the Regional Wastewater and Septage Treatment Study. This study concentrated on the Core Area of the Borough which includes the communities of Palmer, Wasilla and the area in between.

Regional Wastewater and Septage Treatment Study
 Matanuska-Susitna Borough
 In cooperation with:
 City of Palmer
 City of Wasilla

Prepared by:
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 Project Contact: Greg Jones, P.E.
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2010 Regional Wastewater and Septage Treatment Study (RWWSTS)

The RWWSTS developed 11 study areas to facilitate the calculation of population and household growth and differing and transitional adoption of public sewer utilization by residents in areas with extensive mixtures of public sewer / well and septic tank utilization.

Palmer was split into six areas with the "Palmer" zone comprising the majority of the municipal limits. Areas P1, P2A, P2B, P3 and P4 included progressively more rural areas with lower utilization and less access to public sewer

Wasilla was split into five zones with the "Wasilla " zone including the municipal limits. Areas W1, W2, W3 and W4 include progressively more rural areas with lower utilization and access to public sewer. Population, household and public sewer utilization forecasts were calculated in the RWWSTS for the eleven sub zones.

Summary of Key Quantities in the RWWSTS

- Core Area Zone Population to Reach 120,000 by 2059
- Population Estimates Were Based on ISER "KABATA Medium, No Bridge" Quantities

The recommendations of the RWWSTS were as follows:

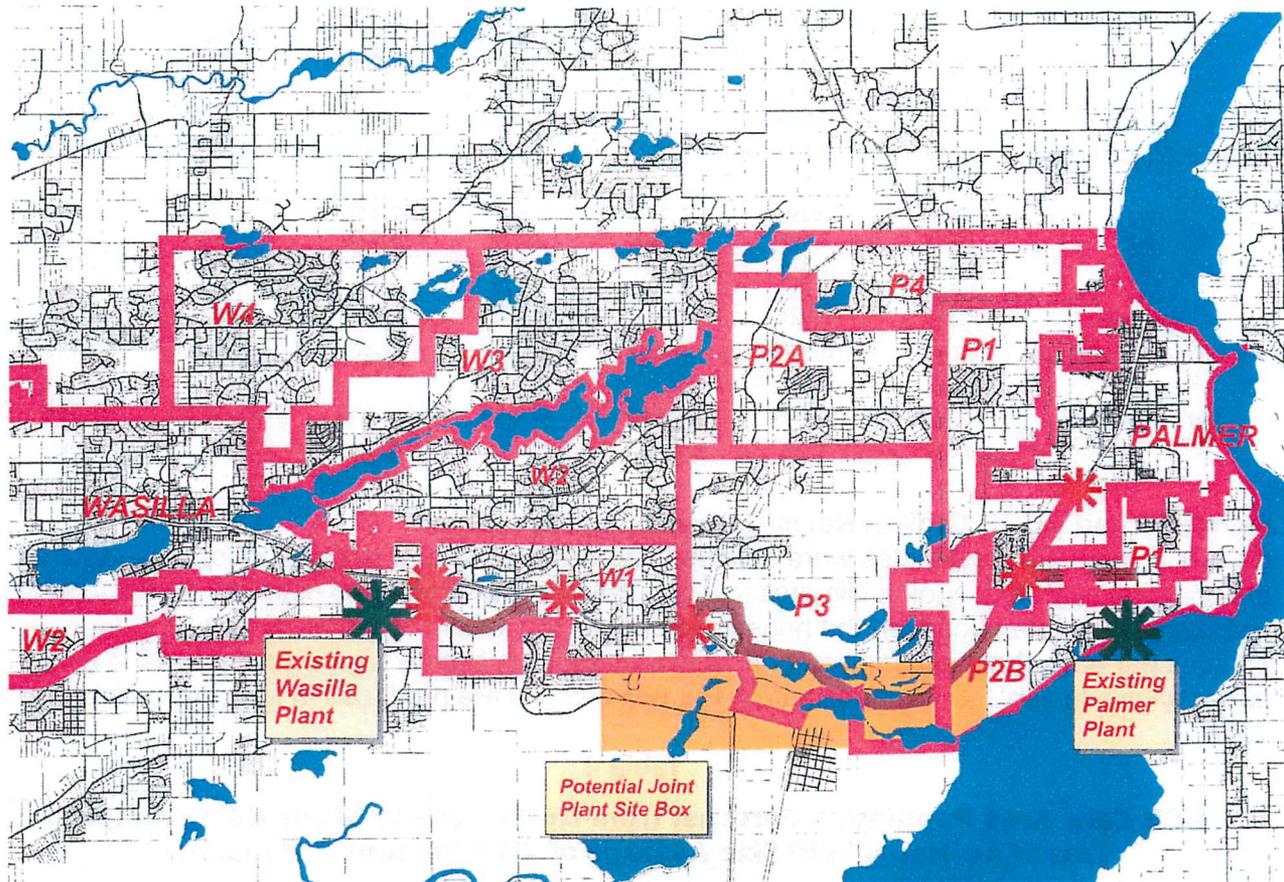
1. Construct a regional Wastewater Treatment Plant (WWTP) using one of 2 technologies:
 - a. MBR – Membrane Bio Reactor
 - b. CAS – Conventional Activated Sludge
2. Select a site, obtain a NPDES permit, consider land cost
3. Initiate environmental processes upon selection of a site
4. Secure grant funding for the WWTP, conveyance piping & new septage receiving station
5. Begin the process to develop a regional wastewater authority

Service Zones with Plants & Site Boxes

Figure 6 illustrates the existing treatment plants and the potential site box for a potential new regional WWTP. **The orange site box is well-positioned to either become the home to a new regional WWTP or to serve as a location for an initial septage-only facility.** The red asterisks indicate major intersections along the major service lines. The dark red line linking the intersections passing along the northern edge of the orange site box represents the major trunk lines for sewer and water. These lines provide enhanced access to water and sewer to five of six intersections in this area that would be prime sites for higher density housing. Land centered around these intersections may benefit from low-cost access to public water and sewer infrastructure and therefore develop at increased density.

Figure 6

MSB Regional Wastewater / Septage Treatment Plant Site Box and Service Lines



Source: Regional Wastewater and Septage Treatment Study

Dwelling Units / Households Forecast (2010 RWWSTS vs. DBOS)

The RWWSTS forecasts growth in the years between 2010 and 2015 at rates between 5 and 7 percent. The DBOS forecasts annual growth rates of approximately 3.5% in 2013 declining to 1.6% in 2060. The DBOS rates are lower than those found in the RWWSTS. The build-out effects of the difference in growth rates is nominal. Table 3 illustrates the household forecast for the core area during the next 50 years and breaks the population into decades and the individual study areas used in the RWWSTS. By 2020, the year in which a RWWTP might be operational, the core area will be approximately 43 percent built-out according to these calculations. This milestone illustrates the need to have adequate wastewater and septic infrastructure on-line before the community is half built-out so that new homes may take advantage of public sewer.

Table 3

MSB Core Area Household (Dwelling Unit) Forecast from Density Study

WWS_Zone	2010	2013	2020	2030	2040	2050	2060
P1	1,080	1,250	1,645	2,210	2,723	3,184	3,645
P2A	712	777	927	1,142	1,487	1,960	2,433
P2B	425	468	570	715	967	1,328	1,688
P3	363	446	641	919	1,960	3,763	5,566
P4	300	311	336	372	459	597	735
PALMER	2,187	2,516	3,282	4,377	5,088	5,413	5,738
Palmer Zones Subtotal	5,067	5,767	7,401	9,736	12,683	16,244	19,805
W1	666	819	1,174	1,683	2,338	3,139	3,941
W2	2,275	2,495	3,007	3,739	4,927	6,570	8,214
W3	2,240	2,372	2,681	3,122	3,481	3,759	4,037
W4	1,644	1,716	1,883	2,122	2,345	2,554	2,763
WASILLA	2,716	3,078	3,922	5,129	6,210	7,167	8,124
Wasilla Zones Subtotal	9,541	10,479	12,667	15,794	19,301	23,190	27,079
Core Area Total	14,608	16,246	20,069	25,530	31,985	39,434	46,884
Annual Percentage Change	0.0%	3.5%	2.8%	2.2%	2.4%	1.9%	1.6%

RWWSTS and DBOS Growth Rates Converted to Population

Once the Household estimates were obtained, the wastewater flow estimation formula requires the conversion of household estimates into population. The RWWSTS used a 2.32 persons per household estimate to convert the household data to population. The DBOS used a higher persons per household assumption of 2.75 which results in slightly higher populations at build-out as shown in Table 4. Approximately 128,933 persons are produced in the core area by 2060.

Table 4

MSB Core Area Population Forecast from DBOS Density Study Using Adapted TransCAD Household Size Average of 2.75 Persons / Household

WWS_Zone	2010	2013	2020	2030	2040	2050	2060
P1	2,970	3,436	4,524	6,078	7,489	8,757	10,025
P2A	1,957	2,135	2,550	3,142	4,089	5,390	6,691
P2B	1,169	1,288	1,567	1,965	2,660	3,651	4,643
P3	998	1,227	1,763	2,527	5,389	10,349	15,308
P4	825	855	924	1,023	1,262	1,641	2,021
PALMER	6,014	6,918	9,026	12,038	13,991	14,886	15,780
Palmer Zones Subtotal	13,933	15,859	20,353	26,773	34,880	44,674	54,467
Annual Percentage Change	0.0%	4.2%	3.3%	2.5%	2.9%	2.2%	1.8%
W1	1,831	2,250	3,229	4,627	6,428	8,633	10,837
W2	6,257	6,861	8,269	10,282	13,548	18,068	22,588
W3	6,160	6,524	7,372	8,584	9,573	10,337	11,101
W4	4,521	4,718	5,177	5,833	6,449	7,023	7,598
WASILLA	7,469	8,465	10,786	14,104	17,078	19,710	22,341
Wasilla Zones Subtotal	26,238	28,817	34,835	43,431	53,076	63,771	74,466
Annual Percentage Change	0.0%	3.1%	2.5%	2.0%	2.1%	1.7%	1.5%
Core Area Total	40,171	44,676	55,188	70,204	87,957	108,445	128,933
Annual Percentage Change	0.0%	3.5%	2.8%	2.2%	2.4%	1.9%	1.6%

Utilization Rates from the 2010 RWWSTS

Table 5 illustrates assumed rates of growth in use of public sewer by Core Area residents. These rates were used in the RWWSTS. In 2020, the potential year in which a RWWSTP would come on-line, utilization rates in the municipal limits of Palmer and Wasilla are forecast to be high, while utilization rates in other study areas on the fringe of these communities would continue to increase.

Table 5
MSB Projected Public Sewer Utilization Rates - 2010 WWS Plan

Year	2010	2013	2020	2030	2040	2050	2060
P1	0.0%	0.0%	38.0%	68.0%	92.0%	100.0%	100.0%
P2A	0.0%	0.0%	25.0%	49.0%	88.0%	100.0%	100.0%
P2B	5.0%	5.0%	18.0%	23.0%	33.0%	48.0%	63.0%
P3	2.0%	2.0%	40.0%	50.0%	60.0%	70.0%	80.0%
P4	0.0%	0.0%	0.0%	2.0%	10.0%	10.0%	10.0%
Palmer	93.0%	96.0%	100.0%	100.0%	100.0%	100.0%	100.0%
W1	25.0%	50.0%	85.0%	95.0%	100.0%	100.0%	100.0%
W2	0.0%	0.0%	40.0%	73.0%	84.0%	90.0%	90.0%
W3	0.0%	0.0%	5.0%	30.0%	40.0%	45.0%	50.0%
W4	0.0%	0.0%	0.0%	2.0%	20.5%	25.0%	25.0%
Wasilla	38.0%	47.0%	80.0%	96.0%	100.0%	100.0%	100.0%

Conversion of Population Data to Influent Volume - Table 6 calculates the core area daily influent estimate of 13.6MGD using the 125 GPD per capita standard. In 2020, when a RWWSTP would come on-line, influent volume would be at approximately 3.4M.

Table 6
MSB Core Area Daily Influent Forecast Based on 125 Gallons Per Day Per Capita Benchmark, 2.75 PPH & 2009 WWS Plan Public Sewer Utilization Rates

WWS_Zone	2010	2013	2020	2030	2040	2050	2060
P1	0	0	214,885	516,644	861,255	1,094,615	1,253,083
P2A	0	0	79,678	192,445	449,756	673,740	836,393
P2B	7,303	8,050	35,250	56,488	109,711	219,074	365,621
P3	2,495	3,068	88,132	157,966	404,206	905,497	1,530,765
P4	0	0	0	2,558	15,778	20,518	25,258
PALMER	699,178	830,155	1,128,273	1,504,742	1,748,887	1,860,709	1,972,531
Palmer Zones Subtotal	708,975	841,273	1,546,218	2,430,842	3,589,593	4,774,152	5,983,651
W1	57,217	140,649	343,088	549,478	803,555	1,079,105	1,354,655
W2	0	0	413,471	938,241	1,422,584	2,032,693	2,541,188
W3	0	0	46,077	321,919	478,637	581,457	693,829
W4	0	0	0	14,584	165,248	219,476	237,430
WASILLA	354,797	497,291	1,078,648	1,692,428	2,134,741	2,463,695	2,792,649
Wasilla Zones Subtotal	412,014	637,940	1,881,284	3,516,649	5,004,765	6,376,425	7,619,751
Core Area Total	1,120,989	1,479,212	3,427,502	5,947,491	8,594,358	11,150,577	13,603,402

Actual Municipal Wastewater Historical Data and Flow Projections

Data collected from the Palmer Public Works Department displays an annual growth rate in influent of approximately 1.5%. Data collected from the Wasilla Public Works Department displays an annual growth rate in influent of approximately 3.4%. These growth rates are illustrated in Tables 7 and 8 and will continue to contribute to the demand for additional public infrastructure needs in the Borough.

Table 7

Palmer Public Works Department - City of Palmer Historic Wastewater Values and Projections

Historic Data	Number of Residential Users	Number of Commercial Users	Total Users	Residential % Increase Year to Year	Commercial Increase Year to Year	Res & Comm % Increase Year to Year	Annual Influent in Gallons	% of 1 mgd * Capacity	% Increase Year to Year	Average Influent MGD
2001	541	133	674				170,857,219	46.81%		0.47
2002	603	159	762	11.5%	19.5%	13.1%	178,037,505	48.78%	4.20%	0.49
2003	681	180	861	12.9%	13.2%	13.0%	158,354,507	43.38%	-11.06%	0.43
2004	774	196	970	13.7%	8.9%	12.7%	160,852,301	44.07%	1.58%	0.44
2005	853	212	1,065	10.2%	8.2%	9.8%	170,016,134	46.58%	5.70%	0.47
2006	941	231	1,172	10.3%	9.0%	10.0%	162,006,303	44.39%	-4.71%	0.44
2007	1,054	255	1,309	12.0%	10.4%	11.7%	188,474,031	51.64%	16.34%	0.52
2008	1,138	278	1,416	8.0%	9.0%	8.2%	181,713,982	49.78%	-3.59%	0.50
2009	1,219	296	1,515	7.1%	6.5%	7.0%	187,461,318	51.36%	3.16%	0.51
2010	1,326	302	1,628	8.8%	2.0%	7.5%	193,547,001	53.03%	3.25%	0.53
2011	1,475	318	1,793	11.2%	5.3%	10.1%	193,586,992	53.04%	0.02%	0.53
		Averages		10.6%	9.2%	10.3%			1.5%	

Table 8

Wasilla Public Works Department - City of Wasilla Historic

Year	Annual Flow in Gallons	Average Influent MGD	Comments	Annual Increments		Continuous Growth Model - 2004 - 2012	
				Annual Flow Growth	Annual Flow Growth Percentage	Annual Flow Growth	Annual Flow Growth Percentage
2003	84,850,005		No data for first three months				
2004	100,436,700	0.28					
2005	101,926,500	0.28		1,489,800	1.48%		
2006			No Data				
2007	116,485,200	0.32					
2008	127,777,600	0.35		11,292,400	9.69%		
2009	131,131,300	0.36		3,353,700	2.62%		
2010	135,231,600	0.37		4,100,300	3.13%		
2011	139,974,600	0.38		4,743,000	3.51%		
2012	127,790,986	0.35		-12,183,614	-8.70%	27,354,286	
Average Annual Flow Growth Based on Annual Increments				2,132,598	1.96%		
Continuous Growth Model Flow						27.24%	3.40%

Current Public Sewer Utilization Rates

Figure 7 illustrates the core area public sewer utilization rates of 18 percent based on the 2,593 households currently using public sewer. Borough-wide, seven percent of residents use public sewer as illustrated in Figure 8.

Figure 7

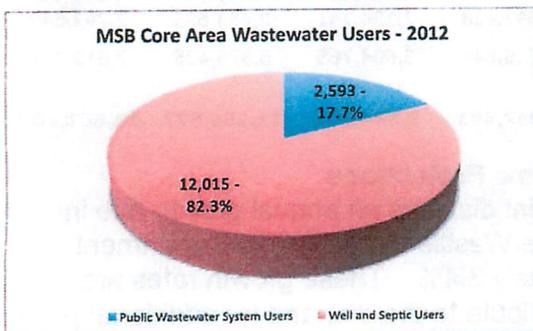
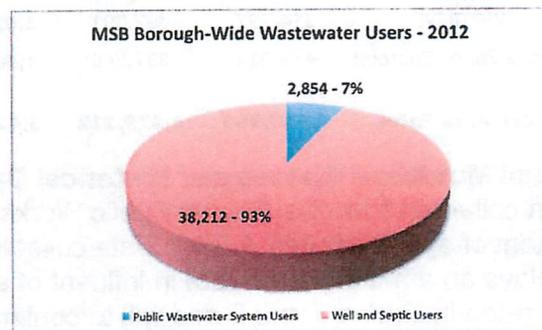


Figure 8



The Need for Septage Disposal Alternatives

12,015 households or 82 percent of residents in the core area are using wells and septic tanks and predominantly having their septage hauled. Well and septic systems, are also the predominant domestic source borough-wide. Seven percent of residents used public sewer while the balance (93%) were using septic tanks and using the services of septage disposal firms as illustrated in Figures 9 and 10. By 2020, approximately 27M gallons of septage from throughout the Borough will be hauled to Anchorage annually as a result of existing population and growth. (Wasilla has a STEP system which continues to generate septage at individual residences which also must be pumped and hauled).

Figure 9

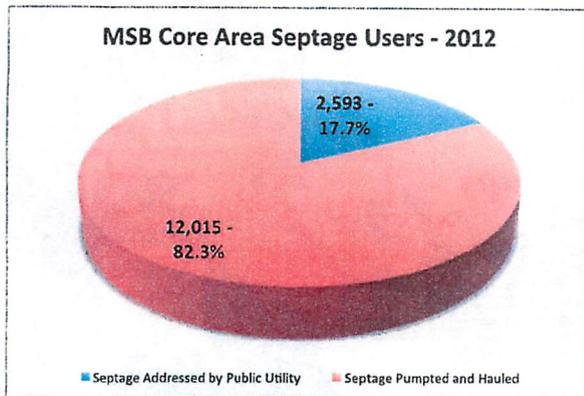
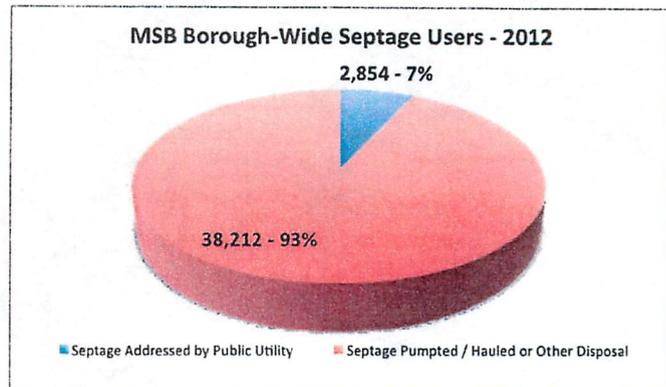


Figure 10



Increased Density Attributable to New Regional Wastewater & Septage Treatment Plant

Figure 11 illustrates the intersections that could potentially sustain higher densities given access to public water and sewer lines and other factors encouraging denser, multi-family property development. The yellow-shaded land areas immediately around the red asterisks would benefit from the increased densities afforded by municipal infrastructure.

Table 9 illustrates potential additional density that could result from the availability of public sewer capacity in neighborhoods centered around six key intersections. **Approximately 6,669 additional residents could result if lower cost public sewer were provided at these six intersections.** This constitutes a five percent increase in core area population and a 1.7 percent increase in overall Borough population.

Figure 11

Major Intersections Affected by WWS Infrastructure Resources

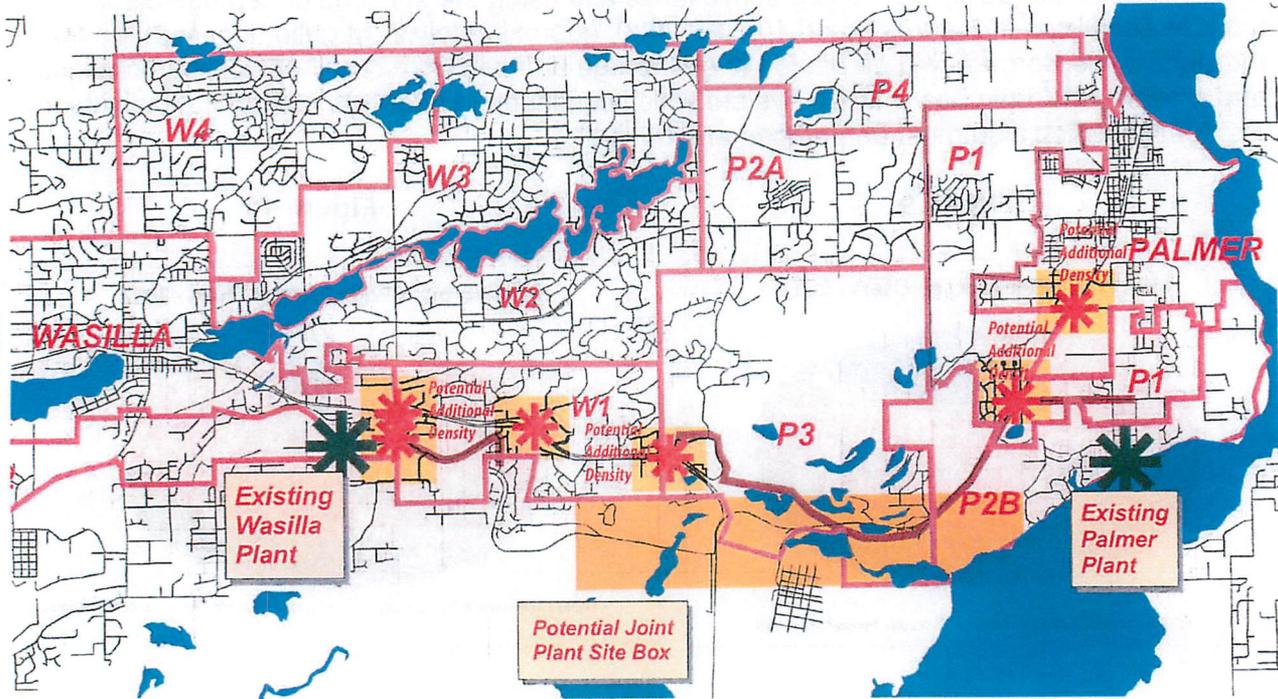


Table 9

Potential Density Increases Adjacent to WWS Infrastructure Path

Population Values	Dwelling Units at Build-out	Population at Build-out
Buildout Values at Neighborhoods Centered Around 6 Key Intersections Along Main Sewer Lines	7,522	17,750
Build-out Values Possible Given Improved Public Sewer Access	10,391	24,419
Increased Density	2,869	6,669
Percentage Increase in Subarea Intersections	38%	38%

Education Flows - Current and future education flows could add as much as 1.0MGD to influent if these facilities became users of public sewer systems as shown in Table 10.

Table 10

Potential Education Wastewater Flows From Existing and Proposed Schools

Wasilla Study Areas

Year	Elementary Schools	Number of Students	Flow Per Student	ES Flow	Middle Schools	Number of Students	Flow Per Student	MS Flow	High Schools	Number of Students	Flow Per Student	HS Flow	Combined Flow
2010	11	450	20	99,000	2	900	25	45,000	3	1,000	30	90,000	234,000
2035	13	450	20	117,000	3	900	25	67,500	4	1,000	30	120,000	304,500
2060	14	450	20	126,000	3	900	25	67,500	4	1,000	30	120,000	313,500

Palmer Study Areas

Year	Elementary Schools	Number of Students	Flow Per Student	ES Flow	Middle Schools	Number of Students	Flow Per Student	MS Flow	High Schools	Number of Students	Flow Per Student	HS Flow	Matara College	Number of Students	Flow Per Student	Matara College Flow	Combined Flow
2010	4	450	20	36,000	2	900	25	45,000	2	1,000	30	60,000	1	2,000	15	30,000	171,000
2035	6	450	20	54,000	2	900	25	45,000	2	1,000	30	60,000	1	2,500	15	37,500	196,500
2060	7	450	20	63,000	2	900	25	45,000	2	1,000	30	60,000	1	3,000	15	45,000	213,000

Core Area Totals

Year	Elementary Schools	Number of Students	Flow Per Student	ES Flow	Middle Schools	Number of Students	Flow Per Student	MS Flow	High Schools	Number of Students	Flow Per Student	HS Flow	Matara College	Number of Students	Flow Per Student	Matara College Flow	Combined Flow
2010	15	900	40	135,000	4	1,800	50	90,000	5	2,000	60	150,000	1	2,000	15	30,000	405,000
2035	19	900	40	171,000	5	1,800	50	112,500	6	2,000	60	180,000	1	2,500	15	37,500	501,000
2060	21	900	40	189,000	5	1,800	50	112,500	6	2,000	60	180,000	1	3,000	15	45,000	526,500

Findings

- The Core Area build-out population estimates in the 2010 RWWSTS and the DBOS approximately coincide.
- The DBOS confirms that additional WWTP's are needed, both inside and outside of the core area, as the community continues to grow.
- 82 percent of core area residents and 93 percent of Borough residents are using septic systems and the majority require septage hauling services.
- Higher density housing opportunities could be developed in neighborhoods located around six key intersections if adequate public sewer capacity and connection opportunities were available. This could add 6,669 people to build-out population.
- The two existing municipal plants are growing and potential school flows are significant.
- 50-year WWTP Core Area needs as presented in the RWWSTS are valid. These flows could reach 3.4MGD by 2020 and 13.6MGD at build-out.
- The current site box for the RWWTP is well-located and makes sense for both initial septage disposal and long-term regional WWTP use. Additional sites should be considered elsewhere in the Borough as growth in areas outside of the core continues.
- Action to secure a regional WWTP / Septage Disposal site in the site vicinity box shown in this report should commence soon.