

CITY OF GREENFIELD

2008 Update of the Water System Capital Improvement Plan and Capacity Charge Study

July 2008

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**City of Greenfield
2008 Water System Capital Improvement Plan Update
And Capacity Charge Study**

1. Purpose of This Report

The purpose of this report is to summarize progress for the completion of work identified in the June 21, 2005 **City of Greenfield 2005-2025 Water System Capital Improvement Plan Update and Capacity Charge Study** and suggests revisions to this report based on completed projects and changes in the recently adopted City Sphere of Influence. A staged capital improvement program (CIP) was proposed in that 2005 document. The City commissioned this 2008 Water System Capital Improvement Plan Update and Capacity Charge Study as part of the 2008 Utility Rate Study being prepared by Bartle Wells Associates.

2. Summary of Previous Report

The purpose of the **2005 Water Capital Improvement Plan Update** was to identify capacity deficiencies in the water system (both existing and at build-out) and recommend improvements to correct them. A staged capital improvement program (CIP) was proposed that presented the costs of the required improvements and the approximate time frame when they will be needed.

The existing City of Greenfield water system was analyzed for its capacity to handle existing and future demands. Water demands were estimated based on land use information provided by the City of Greenfield Planning Department and by Pacific Municipal Consultants from the planning area defined in the 2005–2025 Greenfield General Plan. The water system analysis was based on design criteria established jointly between the City and Terra Engineering.

The water system analysis indicated that there were no significant deficiencies in the existing system under existing development conditions. Accordingly, the City's existing water distribution system needed to be enlarged to meet future demands and the required improvements identified in the analysis were necessary to serve future development.

The report recommended capital improvement projects indicated on **Table 1 – 2005 Recommended Water System Capital Improvement Projects** shown below.

Table 1 2005 Recommended Water System Capital Improvement Projects	
Facility	Estimated Cost
Water Supply Wells	\$ 2,400,000
Reservoirs	\$ 1,800,000
Pump Stations	\$ 1,750,000
Pipelines	\$ 6,948,000
SCADA	\$ 300,000
Total Construction Cost	\$ 13,198,000
Contract Administration, Engineering & Contingencies	\$ 3,959,400
Land Acquisition	\$100,000
Total Capital Improvement Cost	\$ 17,257,400
Administration (1.5% of total costs)	\$ 258,861
Total Water Capacity Charge Costs	\$ 17,516,261

All recommended projects were fully attributable to future development.

Implementation of the CIP was undertaken and implementation activities included:

- Incorporation of CIP recommendations into the City’s CIP program.
- Incorporation of recommendations into the City’s rate study.
- Development of a plan for environmental review of projects.
- Coordination of the water projects with other construction projects such as storm drains and sewer, gas, electric, or telephone transmission facilities, or street paving projects that may share common alignments.

Water capacity charges that were imposed on new development to finance new developments share of the costs of the recommended capital improvement projects are shown on **Table 2 – 2005 Water Capacity Charges** below.

Table 2 2005 Water Capacity Charges		
Type		Unit Cost
Typical Residence Cost	((WFU/DU) x (\$111.08))	\$3110.24
Typical Commercial Cost	(Unit Cost per water fixture unit)	\$111.08

3. Completed Water System Projects

Since the completion of the **2005 Study** the following construction items shown on **Table 3 - Completed or Under Construction Water System Capital Improvement Projects** below are under construction or have been completed:

Table 3 Completed or Under Construction Water System Capital Improvement Projects				
#	Facility	Size	Unit Cost	Estimated Cost
1	New 1,500 gpm Well at 10th Street Corp. Yard	1.4 MGD	\$800,000	\$800,000
4	10th Street Corporation Yard Reservoir	1.5 MG	\$600,000	\$600,000
7	10th Street Corporation Yard Pump Station	2,600 gpm	\$750,000	\$750,000
10	12" Apple Ave. - Calaveras Way to Third St.	1,700	\$150	\$255,000
14	12" Third Street - Pine Ave. to Apple Ave. (1/3)	1,320	\$150	\$198,000
17	12" Oak Avenue - Vineyard Estates to 2nd Street	1,320	\$150	\$198,000
22	12" 2nd Street - Elm Avenue to Pine Avenue (2/5)	2,640	\$150	\$396,000
26	SCADA System	1.s.	\$300,000	\$300,000
	Subtotal Completed or Under Construction Cost			\$3,497,000
	Administration, Engineering & Contingencies	30%		\$1,049,100
	Total Capital Improvement Cost			\$4,546,100
	Percentage of Total			26.34%

4. Growth Since 2005

Since the completion of the **2005 Study** the completed growth areas are shown on **Figure 1 - Completed Growth Projects**. **Table 4 - Completed Growth Projects** below summarizes the projects under construction or have been completed:

Designation	Zoning	Total	Ave. DU	Total DU	Unit Rate	ADF	PDF
		(ac.)			(gpd)	(gpd)	(gpd)
Residential Estate	RE	0	2	0	1,333	0	0
Low Density Residential	LDR	86.5	5	432.5	3,332	288,218	576,436
Medium Density Residential	MDR	59.4	10	594	6,664	395,842	791,683
High Density Residential	HDR	0	16	0	10,662	0	0
Neighborhood Commercial	NC	0	N/A		1,000	0	0
Downtown Commercial	DTC	4	N/A		1,000	4,000	8,000
Highway Commercial	HC	0	N/A		1,000	0	0
Light Industrial	LI	3.5	N/A		1,000	3,500	7,000
Heavy Industrial	HI	0	N/A		2,500	0	0
Professional Office	PO	0	N/A		1,000	0	0
Public Quasi Public	PQP	0	N/A		1,000	0	0
Artisan Ag. Visitor Serving	AAVS	0	N/A		1,000	0	0
Recreation Open Space	ROS	1	N/A		1,000	1,000	2,000
Total				1,027		692,560	1,385,119

5. Changes to Sphere of Influence

The City of Greenfield adopted a new Sphere of Influence on October 2007 as shown on **Figure 2 - October 2007 Sphere of Influence**. This included an additional 670 acres outside of the area included in the **2005 City of Greenfield 2005-2025 Water System Capital Improvement Plan Update and Capacity Charge Study**.

This new area will require additional average day flows and peak day flows as shown below on **Table 5 – Additional Future Water Use**.

Designation	Zoning	Total	Ave. DU	Total DU	Unit Rate	ADF	PDF
		(ac.)			(gpd)	(gpd)	(gpd)
Residential Estate	RE	65.2	2	130	1,333	86,899	173,797
Low Density Residential	LDR	58.8	5	294	3,332	195,922	391,843
Med. Density Residential (Amaral)	MDR	151	*	551	2,432	1,339,866	2,679,731
Highway Commercial	HC	61.5	N/A		1,000	61,500	123,000
Heavy Industrial	HI	66.1	N/A		2,500	165,250	330,500
Future Planning Area		261	N/A		1,000	261,000	522,000
Total		664		975		2,110,436	4,220,872
* Quantities for Amaral are based on October 2007 Amaral Annexation Water Supply Assessment							

The 2005 study identified an estimated total average day flow of 5.3 MGD, peak day flow of 10.7 MGD and a peak hour flow of 11,145 gpm. The new areas increase the flows as shown below on **Table 6 – Summary of Future Water Demand**.

Designation	ADF	PDF	Peak Hour
	(MGD)	(MGD)	(gpm)
Estimated Total from Previous Report	5.3	10.7	11,145
Revised Sphere of Influence	2.1	4.2	4,375
Revised Estimated Total	7.4	14.9	15,520

A Summary of the uses by zoning from the 2005 report, development since 2005 and the new sphere additions is shown below on **Table 7 – Future Water Use by Zones.**

Designation	Zoning	2005 Total	Built	New Sphere	New Total	Aver. DU	Total DU	Unit Rate	ADF	PDF	WFU
		(ac)	(ac)	(ac)	(ac.)			(gpd)	(gpd)	(gpd)	
Residential Estate	RE	129	0	65	194	2	388	1,333	258,563	517,126	10,864
Low Density Residential	LDR	245	86.5	59	217.5	5	1087.5	3,332	724,710	1,449,420	30,450
Medium Density Residential	MDR	194	59.4	151	285.6	10	2856	6,664	1,903,238	3,806,477	79,968
High Density Residential	HDR	0	0		0	16	0	10,662	0	0	0
Neighborhood Commercial	NC	4	0		4	N/A		1,000	4,000	8,000	168
Downtown Commercial	DTC	4	4		0	N/A		1,000	0	0	0
Highway Commercial	HC	249	0	62	311	N/A		1,000	311,000	622,000	13,067
Light Industrial	LI	141	3.5		137.5	N/A		1,000	137,500	275,000	5,777
Heavy Industrial	HI	296	0	66	362	N/A		2,500	905,000	1,810,000	38,025
Professional Office	PO	0	0		0	N/A		1,000	0	0	0
Public Quasi Public	PQP	0	0		0	N/A		1,000	0	0	0
Artisan Ag. Visitor Serving	AAVS	315	0		315	N/A		1,000	315,000	630,000	13,235
Recreation Open Space	ROS	19	1		18	N/A		1,000	18,000	36,000	756
Future Planning Area				261	261	N/A		1,000	261,000	522,000	10,966
Total			154	664	2,106		4,332		4,838,012	9,676,023	203,278
Standard Residential Dwelling = 28 water fixture units (WFU).											
Zones other than residential use based upon 0.0210084 WFU per PDF											

6. Description of Facilities to Serve New Areas

The criteria for evaluation of the existing facilities and recommendations for new facilities were included in the original report. Using these criteria, the following improvements by category are described below.

A. Water Sources

The City presently has two wells with a capacity of about 3,000 gpm (4.3 MGD) in use. A new well is presently under construction with a capacity of about 1,800 gpm (2.6 MGD). This gives a total of about 4,800 gpm (6.9 MGD).

To achieve the projected future demand, additional source capacity of about 8.0 MGD (14.9 MGD – 6.9 MGD = 8.0 MGD) would be required. This will require three additional wells of a size similar to the new corporation yard well (1,800 gpm).

B. Water Storage

Water Storage requirements are as shown on **Table 8 – Water Storage Requirements** below:

Table 8 Water Storage Requirements			
Requirement	Previous Report	Revised Sphere	Revised Total
Demand, MGD			
Average	5.3	2.1	7.4
Peak	10.7	4.2	14.9
Storage, MG			
Operational (0.3 x PDF)	3.21	1.26	4.47
Emergency	-	-	-
Fire	0.54	0.54	0.54
Total Storage Required, MG	3.75	1.80	5.01
Total Existing Storage, MG	1.0		2.5
Storage Deficit, MG	2.75		2.5

The City presently has a 1.0 MG storage tank and a 1.5 MG tank under construction (2.5 MG total). To achieve the required amount of 5.0 MG an additional 2.5 MG will be required. This amount will require two new reservoirs about 1.5 MG size each be built.

C. Pump Stations

The existing City booster pump station at 13th Street/Oak Ave (3,400 gpm) plus the new booster pump station at 10th Street Corporation Yard (3,000 gpm) will give the city the capacity of about 6,400 gpm pumping capacity to meet peak hour pumping requirements. Peak hour pumping shown on **Table 4 – Summary of Future Water Demand** is 15,520 gpm thus requiring an additional 9,120 gpm pumping capacity (15,520 gpm - 6,400 gpm = 9,120 gpm). Splitting this amount between each facility would require an upgrade of about 4,500 gpm at each pump station.

D. Pipelines

The existing grid of 12” pipelines will need to be extended as shown to serve the new areas included in the revised sphere of influence. These are shown on **Figure 3**.

7. **Recommended Additional Projects**

The water system CIP projects are shown on **Figure 3 – Capital Improvement Projects** and **Table 9 - Recommended Capital Improvement Projects** summarizes the estimated capital costs for the recommended water system improvements. The estimated capital costs are based upon experience with recent bid results for similar projects in the tri-county area. The CIP projects under the proposed land use conditions are sized to handle future demands, and thus serve to accommodate future growth. All projects in the CIP are fully attributable to future development.

Table 9				
Recommended Water System Capital Improvement Projects				
#	Facility	Size	Unit Cost	Estimated Cost
	<u>Water Supply</u>	MGD		
1	New 1,800 gpm Well Site at Cherry Avenue/10 th St.	2.6	\$1,000,000	\$1,000,000
2	New 1,800 gpm Well Site To Be Determined	2.6	\$1,000,000	\$1,000,000
3	New 1,800 gpm Well Site To Be Determined	2.6	\$1,000,000	\$1,000,000
	Subtotal			\$3,000,000
	<u>Reservoirs</u>	MG		
4	Second 1.5 MGD Reservoir at Oak/13th Site	1.5 MG	\$900,000	\$900,000
5	Second 1.5 MGD Reservoir at 10th St. Corporation Yard	1.5 MG	\$900,000	\$900,000
	Subtotal			\$1,800,000
	<u>Pump Stations</u>	gpm		
6	Additions at Oak Ave./13th Site	4,500	\$750,000	\$750,000
7	Additions at 10 TH Street Corporation Yard	4,500	\$750,000	\$750,000
	Subtotal			\$1,500,000
	<u>Pipelines</u>	feet		
8	12" Walnut Ave. - Santa Lucia SC to Third St.	2,700	\$250	\$675,000
9	12" Cherry Ave. - McDonald Way to Third St.	3,300	\$150	\$495,000
10	12" Pine Ave. - El Camino to Third Street	3,300	\$150	\$495,000
11	12" Third Street - Walnut to Cypress Ave.	4,000	\$150	\$600,000
12	12" Elm Avenue - 4th Street to 3rd Street	1,400	\$150	\$210,000
13	12" Elm Avenue - 3rd Street to 2nd Street	2,640	\$150	\$396,000
14	12" Oak Avenue – Vineyard Dr. to 2 nd St. - COMPLETED	0	\$150	\$0
15	12" Walnut Avenue – Thorpe Ave to 2nd Street	1,440	\$150	\$216,000
16	12" Cherry Avenue - 3rd Street to 2nd Street	2,640	\$150	\$396,000
17	12" Pine Avenue - 3rd Street to 2nd Street	2,640	\$150	\$396,000
18	12" 2nd Street - Oak Avenue southerly to SOI	3,500	\$150	\$525,000
19	12" 2nd Street - Walnut Avenue to Cypress Avenue	4,000	\$150	\$600,000
20	12" Cherry Avenue - Amaral Sub. to El Camino Real	5,400	\$150	\$810,000
21	12" Pine Avenue - 13th Street to El Camino Real	5,400	\$150	\$810,000
22	12" 12th Street - Walnut Avenue to Cypress Avenue	4,000	\$150	\$600,000
23	12" Cypress Ave. - 13th to El Camino Real	5,400	\$150	\$810,000
24	12" Cypress Avenue - East of Freeway to 2nd Ave.	4,600	\$150	\$690,000
25	12" 13th Street - Elm Avenue to Cypress Avenue	8,050	\$150	\$1,207,500
26	12" Elm - 13th easterly to New 12"	1,350	\$150	\$202,500
27	12" Elm Avenue southerly to SOI	4,700	\$150	\$705,000

#	Facility (continued)	Size	Unit Cost	Estimated Cost
28	12" SOI easterly to El Camino Real	5,200	\$150	\$780,000
29	12" Westerly SOI to Easterly SOI	7,600	\$150	\$1,140,000
30	12" El Camino Real - High School sotherly to SOI	3,600	\$150	\$540,000
31	12" - Pipeline 29 to Pipeline 32	2,500	\$150	\$375,000
32	12" - Pipeline 31 to 2nd Street	3,400	\$150	\$510,000
33	12" 3rd Street Extension - Elm Avenue to Pipeline 32	2,200	\$150	\$330,000
34	12" Walnut Avenue - 13th Street to 12th Street	2,700	\$150	\$405,000
35	12" Apple Avenue - 13th Street to Existing Pipeline	750	\$150	\$112,500
	Subtotal			\$15,031,500
	Total Construction Cost			\$21,331,500
	Administration, Engineering & Contingencies	30%		\$6,399,450
	Land Acquisition Costs	2 acres	\$50,000	\$100,000
	Total Capital Improvement Cost			\$27,730,950

8. New Capacity Charges

Shown below on **Table 10 - Derivation of Water Capacity Charges** are the recommended water capacity charges. The Water Capacity Charges presented in this study are based on the General Plan land use and development projections set forth above, the need for additional facilities in the City created by that development, and the best available construction cost estimates, all as described in the earlier sections of this analysis. The calculation includes a component for the City's costs of administering the program, which is set at 1.5% of the total costs. This administrative charge is intended to allow the City to recover the costs of preparing the analysis that supports the charge, to prepare the necessary documents to adopt the charge, to calculate the annual inflationary increases, and to administer and collect the fee throughout its lifespan.

Table 10		
Derivation of Water Capacity Charges		
Item	Derivation	Amount
Total Capital Improvement Cost (TCIC)	Table 9	\$27,730,950
Administration (1.5% of Total Costs)		\$415,964
Total Water Capacity Charge		\$28,146,914
Total Water Fixture Units	Table 7	203,278
Unit Cost (UC) per PDF =	TWCCC / PDF	\$138.47

Table 11 - Water Capacity Charges by Type is shown below:

Table 11					
Water Capacity Charges By Zone Type					
Zone Designation		WFU	Cost	Impact Fee	Unit
Residential Estate	Table 7	10,864	\$1,504,287	\$3,877.03	per dwelling unit
Low Density Residential	Table 7	30,450	\$4,216,268	\$3,877.03	per dwelling unit
Medium Density Residential	Table 7	79,968	\$11,072,791	\$3,877.03	per dwelling unit
High Density Residential	Table 7	0	\$0	\$3,877.03	per dwelling unit
Neighborhood Commercial	Table 7	168	\$23,271	\$138.47	per water fixture unit
Downtown Commercial	Table 7	0	\$0	\$138.47	per water fixture unit
Highway Commercial	Table 7	13,067	\$1,809,357	\$138.47	per water fixture unit
Light Industrial	Table 7	5,777	\$799,957	\$138.47	per water fixture unit
Heavy Industrial	Table 7	38,025	\$5,265,170	\$138.47	per water fixture unit
Professional Office	Table 7	0	\$0	\$138.47	per water fixture unit
Public Quasi Public	Table 7	0	\$0	\$138.47	per water fixture unit
Artisan Ag. Visitor Serving	Table 7	13,235	\$1,832,628	\$138.47	per water fixture unit
Recreation Open Space	Table 7	756	\$104,722	\$138.47	per water fixture unit
Future Planning Area	Table 7	10,966	\$1,518,463	\$138.47	per water fixture unit
Total	Table 7	203,278	\$28,146,914		

Table 8 assumes a Standard Residential Dwelling Unit = 28 water fixture units (average). Dwelling units that exceed 28 wfu shall have impact fees increased proportionately to the number of water fixture units.

Since the water capacity charges developed herein are estimates based on the best available information to date, it is recommended that adjustments to the Water Capacity Charges be made every five years to determine if development projects and cost estimates are still appropriate. In any case, it is recommended that the Water Capacity Charge be annually adjusted to account for inflation. It is recommended that the City use the Engineering News Record – Construction Cost Index (ENR - CCI) to reflect the costs of construction. In addition, the City may wish to consider adopting a policy that requires new development projects that propose changes to the City's General Plan to perform an analysis of impacts to the Water Capacity Studies and to quantify corresponding impacts to the fees.

It is also recommended that the City adopt a policy that requires development that triggers the need for certain facilities to construct those facilities or otherwise advance the necessary funding for those facilities. When a developer is required to construct facilities or advance monies for the construction of such facilities, the developer should be provided a credit against the Water Capacity Charge, which may be used to satisfy the developer's obligations and which may be transferred to other developers. The credit could also convert to a right of reimbursement after a specified period of time, provided that the City had sufficient fee revenues available.

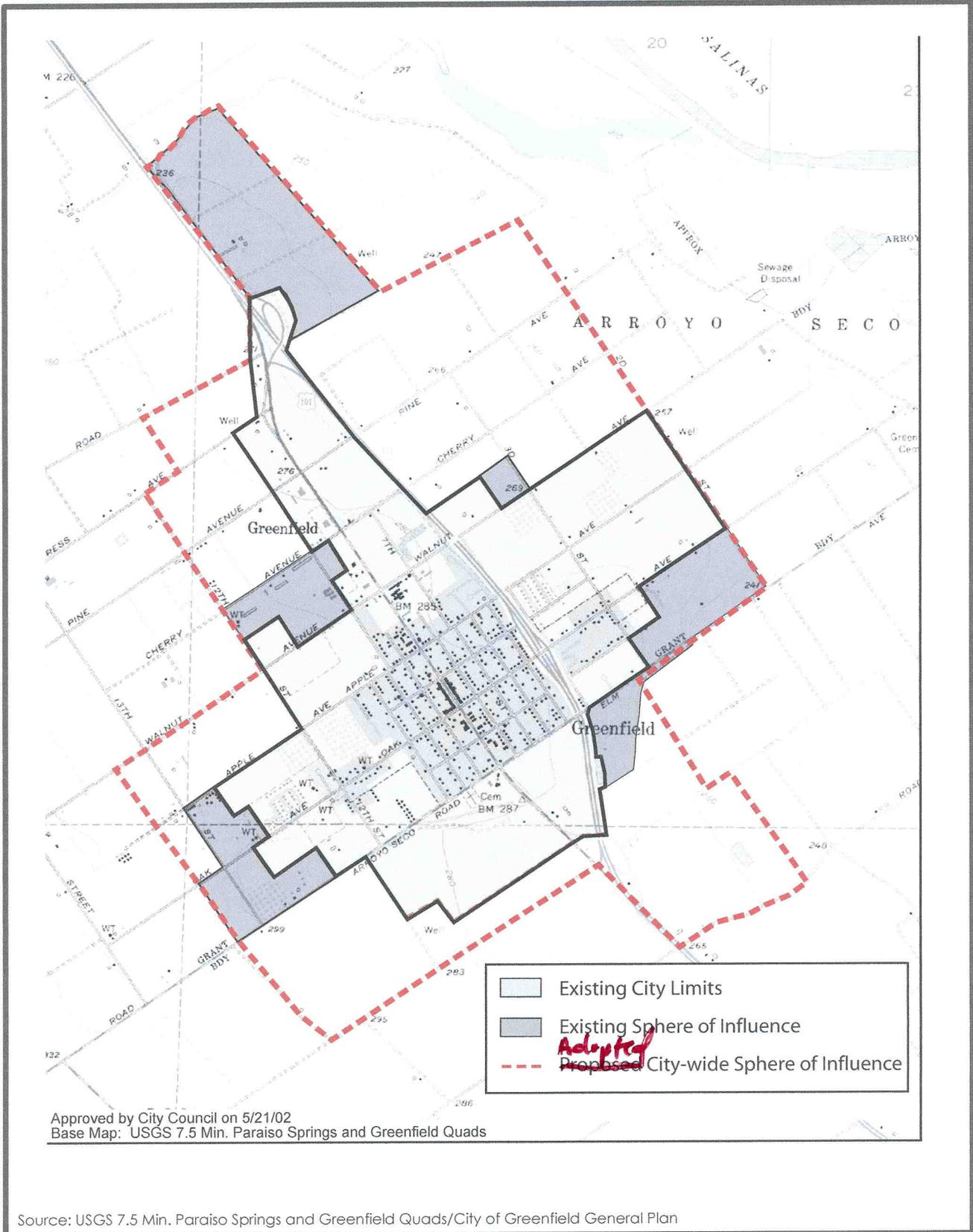
Figures

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Figure 1
 Completed Growth Projects
 City of Greenfield

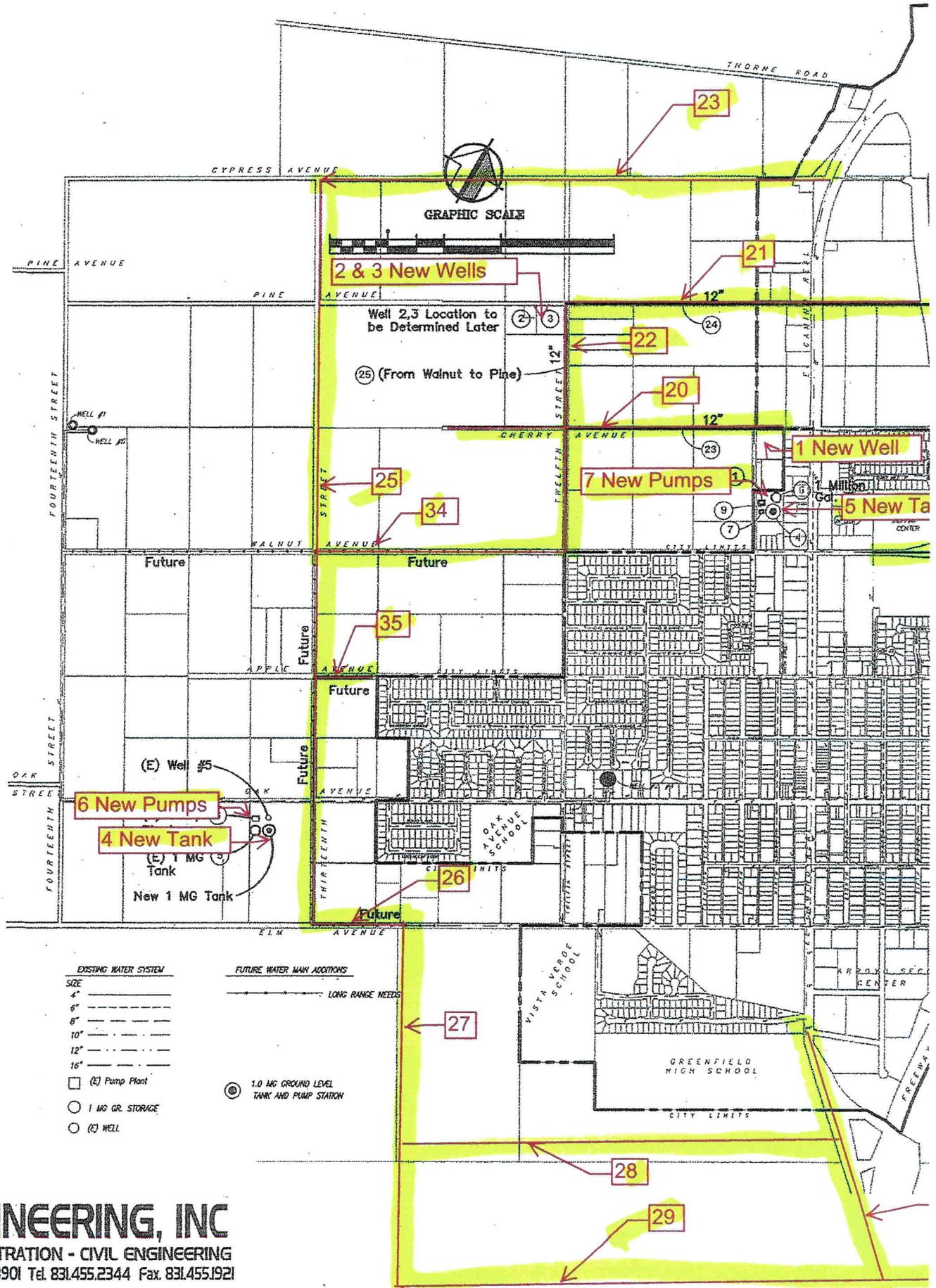


City of Greenfield Graphic Development Figures 2-6 (Rev. January 2006)

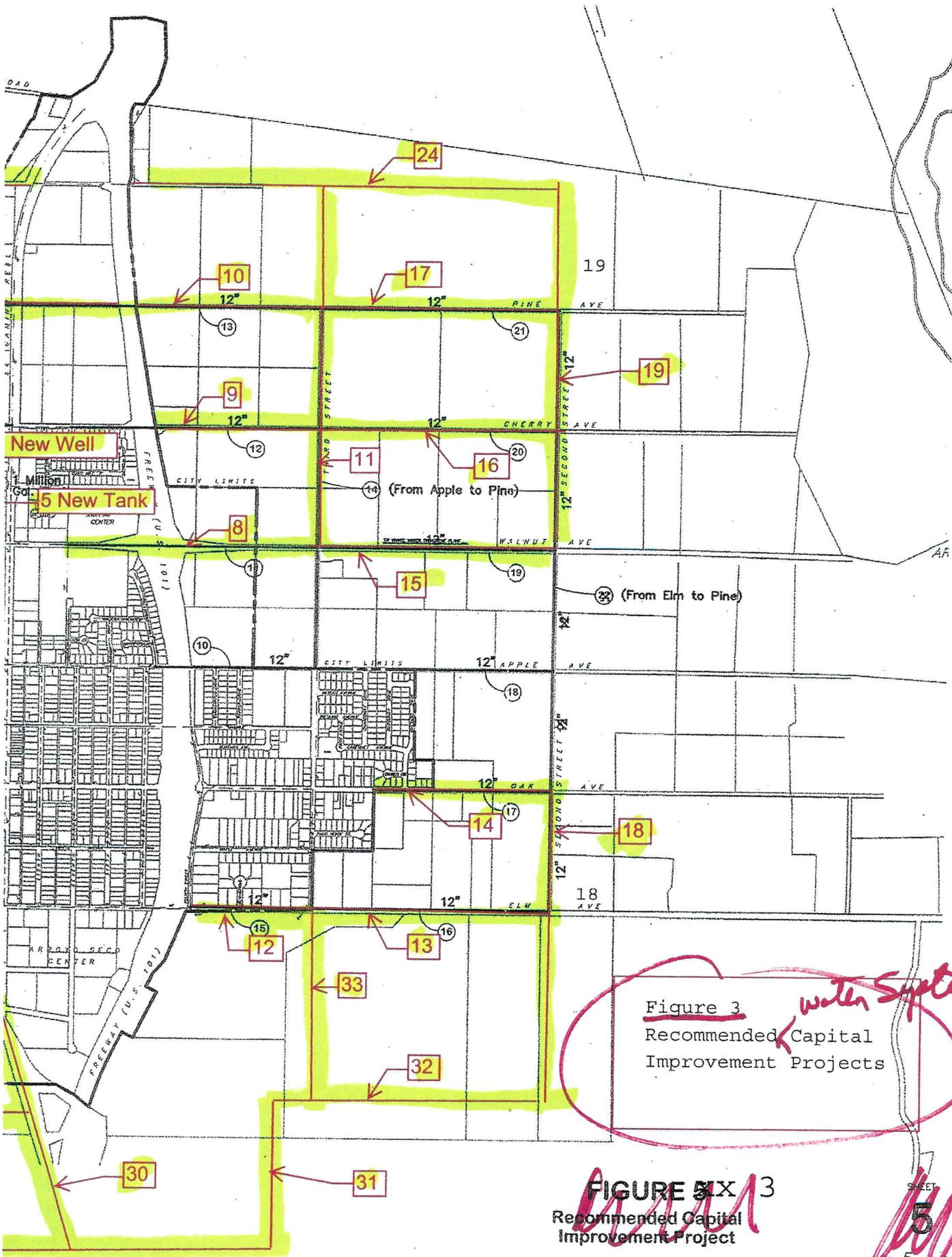
Figure 2
*Sphere of Influence
City of Greenfield*



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water system
 Figure 3
 Recommended Capital
 Improvement Projects

FIGURE 3
 Recommended Capital
 Improvement Project