CITY OF ORLAND

WATER SYSTEM CAPACITY STUDY

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Date: July 1, 2014

Section 1
Introduction

GENERAL

1.0 Purpose

The Water System Capacity Study (Study) is intended to provide the City of Orland a comprehensive document regarding the water system, including supply, storage, distribution and demands. This document delineates water system demands at the current city population and for the projected future growth of the city. The Study shall supersede the prior Water System Master Plan prepared in 2004.

1.1 Study Funding

The Study is funded by a 2012 Housing and Community Development/ Community Development Block Grant (HCD/CDBG) program grant (12-CDBG-8404) obtained by the city.

1.2 Scope

The scope of work involved in the Study consists of the following:

- A description of the existing water system.
- Evaluation of the existing water use characteristics.
- Evaluation of the adequacy of existing pumping, storage and distribution system facilities to meet present water requirements.
- Projections of future population and water requirements.
- Evaluation of the requirements for pumping, storage and distribution system facilities to meet future projected water requirements.
- Development of a water system computer model and conduct hydraulic analyses to determine the required improvements to Orland's water system to satisfy present and future water requirements.
- Preparation of a Capital Improvement Program that identifies a prioritized schedule of recommended improvements and replacement of facilities.
- Development of cost estimates to complete the recommended Capital Improvement Program and identify the impact on operating and connection fee revenues.
- Development of a list of available funding sources.

1.3 Description Of Project Area

The City of Orland was incorporated in 1909 and is located in a portion of Sections 15, 16, 21, 22, 23, 26, 27 and 28, Township 22 North, Range 3 West, Mount Diablo Meridian, Glenn County, California. It is within the Sacramento Valley along Interstate 5 and approximately 31 miles south of Red Bluff, 17 miles north of Willows, and 20 miles west of Chico. See Figure 1 for a location map depicting the City of Orland.

According to 2010 US Census Bureau data, Orland contains approximately 1,900 acres within the city limits with a total population of 7,291.

1.4 Sources Of Data

Much of the data, including record drawings, city mapping, historic water supply and demands, operational issues and system testing information, utilized for the Study was obtained from City of Orland staff and the office of the City Engineer. Pumping capacities of existing city wells was taken from the 2013 annual report of the public water system prepared by the California Department of Public Health.

Information regarding future population growth within the city was from the City of Orland 2010 General Plan prepared by PMC.

1.5 Computer Modeling Software

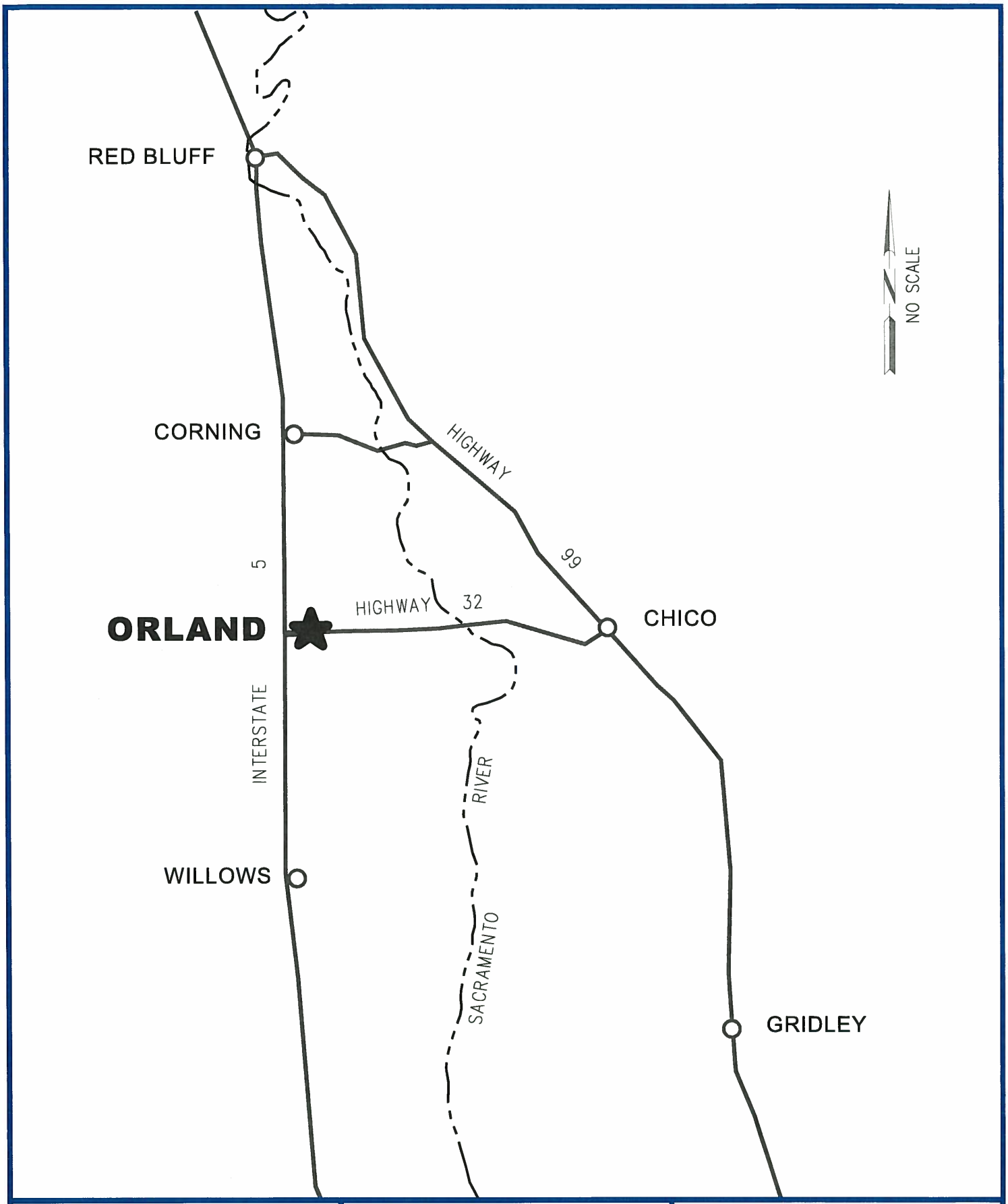
The hydraulic analysis of the water system was performed utilizing H_2ONET version 9.0 software developed by Innovyze. H_2ONET operates within AutoCAD software allowing the existing city water infrastructure mapping to be utilized to build water model elements including pipes, junctions or nodes where pipes connect, the water storage tank, and wells. Information from the city mapping and archived records was used to determine pipe diameters and roughness factors that were input to the model.

Table 1.1 provides a detailed breakdown of the elements contained with the water model for the city's existing infrastructure.

Table 1-1 - Water Model Elements

Model Element	Number in Model
Junction	508
Pipe	638
Tank	1
Well	6

The model allows varying water demands to be assigned to junctions throughout the city that represent different scenarios such as the maximum day, peak hour and fire flow demands. The software analysis provides results including the pressure, flow rate and flow velocity in the system based on the input demand information.



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CITY OF ORLAND

LOCATION MAP

FIGURE 1

Section 2
Existing Water System

2.0 Introduction

The City of Orland owns and operates two separate public water systems. The primary water system, Public Water System No. 1110001, serves customers principally within the limits of the city. An auxiliary water system, Public Water System No. 1105003, serves an industrial park at the Haigh Field Airport located approximately 1.2 miles southeast of the city. The auxiliary water system is not connected to the city's primary water system.

Due to the high cost for construction of a lengthy water main to interconnect the two water systems, it is unlikely that the primary and auxiliary water systems will be connected within the planning period of this Water System Capacity Study. Therefore, this report addresses only the primary water system which serves the City of Orland.

This section provides a description of the existing water system facilities serving the City of Orland. The existing water system consists of water supply wells, an elevated water storage tank, a distribution piping network, and appurtenant valves, water services and fire hydrants. The information provided is based upon city maps, construction plans, operational record data and field inspections.

2.1 Water Supply

Public Water System Number 1110001 serves the City of Orland and consists of six wells. The wells are identified as Central Street Well, Lely Park Well, Woodward Avenue Well, Corporation Yard Well, Suisun Street Well and Roosevelt Avenue Well. The wells are distributed throughout the city and range in depth from 150 feet to 400 feet. The wells produce between 350 and 1,090 gallons per minute each, and are automatically regulated by the water level in the elevated water storage tank. Auxiliary standby power is provided at Woodward Avenue Well and Suisun Street Well.

A description of each of the wells owned and operated by the city is contained in Table 2-1 at the end of this Section. Information shown in Table 2-1 is based upon historical records such as well logs, record plans and specifications, site inspections and interviews with Department of Public Works staff.

The water system is operated at 50 to 65 pounds per square inch (psi) pressure under normal demand. The six wells are capable of producing 5,130 gallons per minute (gpm) at 55 psi system pressure. Under maximum demand conditions, the wells will produce approximately 6,510 gpm at 25 psi system pressure.

Since the 2004 Water System Master Plan, the Eighth Street Well went offline in 2005 and the Railroad Avenue Well went offline in 2012. To partially compensate for the loss of water from these wells, the Lely Park Well was upgraded to produce 800 gpm from 500 gpm and brought into the City's system during that time period.

2.2 Water Storage

The city has one elevated water storage tank with a capacity of 80,000 gallons. The steel storage tank is located adjacent to an alley west of Fifth Street between Walker Street and Swift Street. The storage tank was constructed by Des Moines Bridge and Iron Company in 1912. The elevation of the tank maintains the water system pressure between 43 psi and 54 psi under gravity conditions.

Each city well is connected to an individual level control switch located in the elevated water storage tank. The level control switches are positioned such that, as the water level in the storage tank lowers, one level switch closes, sending a signal to start one pump. If the pumping rate does not exceed the water demand, the water level in the storage tank continues to drop until a second level control switch closes, starting another pump. When the pumping rate exceeds the water demand, the water level in the storage tank rises until the level control switch opens and the pump connected to that level control switch stops.

City staff alternates the starting order of the pumps on a weekly basis to equalize the amount of time that each pump is operated.

2.3 Water Distribution

The city's water distribution system consists of approximately 34 miles of pipeline ranging in size from 4-inch diameter to 10-inch diameter. A network of 14-inch diameter water mains is planned to connect all of the wells, with 10-inch, 8-inch and 6-inch diameter distribution piping throughout the city.

There are 402 public fire hydrants distributed throughout the city and a total of 14 private fire hydrants located at the fairgrounds, high school and Glenn County Public Works corporation yard.

2.4 Water Services

The 2013 Annual Inspection Report prepared by the State of California Department of Public Health indicates that the City has 2,817 active water services as of 2011, providing water to a City population of 7,501 persons at that time. All water services within the City are metered services.

2.5 Water Quality

Water quality is a term used to describe the physical, chemical and biological characteristics of water with respect to its suitability for a particular use. National Primary Drinking Water Regulations, or primary standards, are standards that apply to public water systems and protect drinking water quality by limiting the levels of specific contaminates that can adversely affect public health. All primary standards are based upon health effects to the water customers.

Secondary drinking water regulations are standards that apply to contaminates such as taste, odor, color and constituents which may affect the aesthetic quality of drinking water.

The City of Orland is responsible for providing water that meets all primary and secondary drinking water standards that are promulgated by the United States Environmental Protection Agency and adopted by the State of California Department of Health Services.

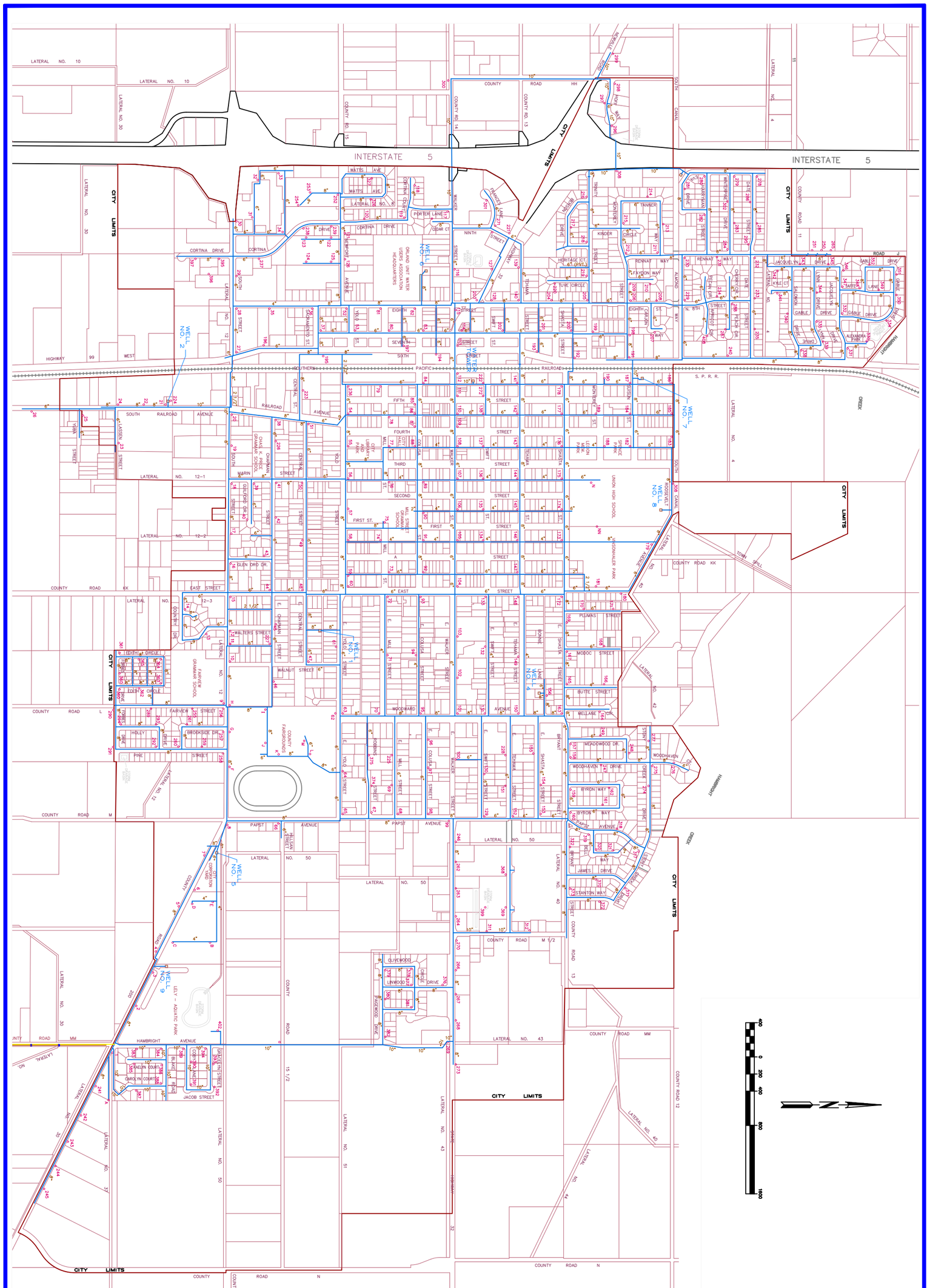
The water supplied from Orland wells is of excellent quality. The water is classified as hard. The source water is nonaggressive to pipes and deposits minimal scale in pipes and fixtures.

Chlorine is added to the water from Woodward Avenue Well, Corporation Yard Well and Suisun Street Well as a preventive measure due to intermittent positive bacteriological tests of the wells. Water from the Central Street Well, Eighth Street Well and Roosevelt Avenue Well are not treated.

State regulations [Title 22, Chapter 15, Article 20], California Health and Safety Code [Section 116470], require the city to distribute to each water customer an annual report on the quality of the water served and have the most recent water quality information on each water source available for review. A "Consumer Confidence Report" is prepared each year and is based on calendar-year data. Consumer Confidence Reports must be delivered to consumers by July 1 of each year. The 2013 Consumer Confidence Report for Public Water System Number 1110001 is included as Appendix A of this report.

Table 2-1
Existing Water Sources

Water Source	State Well Number	State Source Number	Year Drilled	Capacity (gpm)	Casing Depth (feet)	Sanitary Seal Depth (feet)	Gravel Pack	Power Source	Standby Power
Lely Aquatic Park	None	001	1978	800	150	90	Yes	100 hp	No
Central Street	01	002	1954	860	176	None	No	60 hp	No
Woodward Avenue	04	005	1964	1,000	160	60	No	60 hp	Yes
Corporation Yard	05	006	1964	1,030	160	60	No	100 hp	No
Suisun Street	07	008	1983	1,090	360	80	Yes	100 hp	Yes
Roosevelt Avenue	08	009	1992	350	410	94	Yes	50 hp	No
Total				5,130					



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EXISTING WATER SYSTEM

PUBLIC WATER SYSTEM NUMBER 1110007

FIGURE 2

Section 3
Existing Water Use

3.0 Introduction

This section presents information on the water production of city wells and an evaluation of the adequacy of the existing water system source capacity and storage volume to meet current needs.

3.1 Water Production

Each well within the city's water system has a flow meter which indicates the rate of flow in gallons per minute (gpm) and records the total flow volume in gallons. The city maintains monthly water production data for each of the wells within the system. Table 3-1 (on page 3-2) shows the monthly and annual production data for all city wells for calendar years 1986 through 2013. The data shown in Table 3-1 represents total water produced by all city wells, for all customer classes including single-family residential, multi-family residential, commercial/institutional, industrial and landscape irrigation.

In 2011, the annual average daily water production was 250 gallons per capita per day, but production varied between 103 gallons per capita per day in January and 447 gallons per capita per day in July.

3.2 Adequacy of Existing Source Capacity

At the end of each calendar year city staff submits an Annual Report to the State of California Department of Public Health (DPH) to report monthly water production, bi-monthly metered water deliveries and the number of active water service connections. The DPH prepares an Annual Inspection Report that includes the water production and water delivery data provided by the city and an evaluation of the adequacy of the existing water source capacity and storage volume. A copy of the Annual Inspection Report for 2013 is included as Appendix B of this report.

The DPH uses the provisions of Chapter 16, California Water Works Standards, Section 64564 of Title 22 of the California statutes to determine needed source capacity and needed storage volume for the water system.

Based upon the 2013 calendar year data, the DPH determined that the Orland water system is in compliance with the Water Works Standards for source capacity since the needed source capacity is 4,772 gallons per minute (gpm) and the current total source capacity is 5,130 gpm. The DPH evaluation of the needed source capacity is based upon the peak hour demand, but does not include provisions for fire flows.

City staff reports that all existing wells within the water system run simultaneously at times during the summer to meet water demands. Our calculations indicate that the current maximum daily demand is approximately 5,400 gpm and the combined maximum day demand plus fire flow demand is approximately 7,900 gpm. Given the small amount of existing storage volume, the City should consider increasing the source capacity a minimum of 2,770 gpm from 5,130 gpm to 7,900 gpm to meet the current combined maximum daily demand plus fire flow demand.

Table 3-1
Water Production
(in millions of gallons)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1986	22	29	21	29	35	76	78	86	104	50	32	22	584
1987	N	O	T		A	V	A	I	L	A	B	L	E
1988	23	29	54	44	50	70	90	80	94	36	27	29	626
1989	28	32	24	32	44	92	93	82	52	38	27	36	580
1990	34	32	44	56	69	69	108	98	63	63	42	43	721
1991	43	93	25	41	58	78	101	81	74	54	37	25	710
1992	33	27	36	53	56	52	74	104	129	62	42	32	700
1993	23	30	36	45	79	79	118	82	87	54	45	35	714
1994	40	32	47	66	59	93	101	103	74	52	41	40	748
1995	38	38	33	35	79	75	65	115	98	55	56	30	717
1996	35	34	38	49	62	77	116	118	63	68	44	31	735
1997	41	34	45	63	96	94	116	92	66	44	49	35	775
1998	36	31	38	22	37	71	91	182	89	61	35	36	729
1999	38	34	39	55	73	96	108	87	84	67	45	43	769
2000	40	36	46	65	78	103	112	112	98	63	47	35	835
2001	37	37	45	62	119	97	124	126	117	73	54	30	921
2002	38	41	54	69	83	102	108	110	78	58	44	33	816
2003	30	28	27	35	55	100	113	112	80	61	36	29	706
2004	31	27	40	57	81	92	101	101	82	54	29	32	727
2005	27	25	28	34	53	80	112	99	82	63	35	32	669
2006	28	31	32	38	78	98	116	95	80	56	28	26	706
2007	31	28	50	51	95	91	113	96	76	53	41	33	758
2008	27	25	39	60	85	99	107	96	91	100	93	37	860
2009	22	23	35	64	85	82	114	108	87	46	38	26	730
2010	26	22	31	35	62	89	114	92	77	55	18	23	644
2011	24	43	29	43	61	80	104	101	87	50	31	33	685
2012	33	21	37	39	89	97	117	84	110	59	39	26	750
2013	26	28	48	61	91	96	126	96	85	63	47	47	816

3.3 Adequacy of Existing Storage Volume

The purpose of storage volume is to provide water for demands on the water system in excess of the combined pumping rate of the system wells. Demands on the water system include the maximum daily water demand, water for fire-fighting purposes and emergency storage to sustain the city's needs during periods of power outages or failure of pumping equipment.

In our evaluation, we have not assumed to provide 100% of emergency storage since auxiliary standby power is provided at the Woodward Avenue Well and Suisun Street Well. For computer modeling purposes, we have also assumed fire flow requirements to be 2,500 gpm for a duration of four (4) hours city wide, noting that there are a number of commercial areas identified by the Fire Chief and Building Official as needing 3,500 or 4,500 gpm (see Section 5.7 for additional information).

These areas will require larger distribution mains (12-inch minimum, 14-inch preferred) and sufficient storage to fight fire for four hours.

The DPH annual inspection (Appendix B) identified the city's storage deficiency as being 406,720 gallons while allowing for the existing 80,000 gallons in the elevated storage tank. Since this tank is now more than 100 years old and substantially smaller than what is required, its capacity should not be included in future storage tank capacity calculations. It should also be noted that the DPH's assessment of Orland's storage deficiency did not include storage for fire demand.

Under all computer modeling scenarios, the required storage volume exceeds the 80,000 gallon capacity of the existing elevated storage tank.

Section 4
Future Water Use

4.0 Introduction

This section presents population estimates for the city of Orland through the year 2028 and an estimate of the required source capacity and storage volume to meet the projected population in the year 2028.

4.1 Population Estimates

The recent Amendment to the City of Orland General Plan established three growth rate scenarios to develop population estimates for the city through the year 2028. The three growth rates consist of (1) a "High" growth rate of 2.6 percent average annual growth rate, (2) a "Medium" growth rate of 2.2 percent average annual growth rate and (3) a "Low" growth rate of 1.8 percent average annual growth rate.

For the three growth rate scenarios, the resulting 2028 population projections for Orland would be 12,286 persons if the "High" growth rate occurs, 11,363 persons if the "Medium" growth rate occurs, and 10,506 persons if the "Low" growth rate occurs.

4.2 Required Source Capacity

Based upon 2011 data, a total of 2,817 active water service connections provides water to a city population of 7,501 persons. This data indicates an occupancy factor of 2.66 persons per water service connection. Assuming an occupancy factor of 2.66 persons per water service connection, and depending upon the actual growth rate, Orland will have between 3,950 and 4,615 active water service connections by the year 2028.

If the "High" growth rate is assumed, the total number of active water service connections in the year 2028 will be approximately 4,615. Based upon our calculations, the maximum daily demand in the year 2028 will be approximately 7,110 gallons per minute (gpm). The existing source capacity of approximately 5,130 gpm will have to be increased by 1,980 gpm to meet Orland's maximum daily demand under the "High" growth rate scenario, and an additional 1,500 gpm should be planned in the capacity upgrades to address coincident fire flow demand. As new development occurs during the planning period, new wells will be a requirement and should be the responsibility of the proposed development.

Orland staff have recently completed design and made application for the proposed Eva Drive Well with the State's Revolving Fund (SRF). At this time, the proposed Eva Drive Well is expected to produce between 1,000 gpm and 1,250 gpm and will cost an estimated $1.16 million. Accounting for the Eva Drive well, we anticipate the need for two additional wells to be implemented by the year 2028.

4.3 Required Storage Volume

Based upon 2,817 metered service connections, the California Water Works Standards require approximately 2.0 million gallons of storage. The existing elevated water storage tank provides 80,000 gallons, or 0.08 million gallons, of storage volume. The DPH has determined that even though the water system does not meet the California Water Works Standards for storage volume, the city may utilize source capacity to offset the needed storage volume.

The cost to construct a new municipal well is far less than the cost to provide additional storage volume. Since the DPH allows the use of source capacity to offset needed storage volume, we have determined the quantity of required storage volume in the year 2028 based upon the required source capacity in the year 2028.

To compute the required storage volume for the year 2028, we have calculated the hourly demand data for the maximum day. The computation for the required storage volume assumes a maximum day demand of 7,110 gallons per minute (gpm) and an increase in the existing source capacity of approximately 3,480 gpm. The required storage volume was computed for the following system conditions:

- Pumping rate with Suisun Street Well out of service and 2,500 gpm fire flow
- Pumping rate with all pumps in service and 2,500 gpm fire flow
- Pumping rate with Suisun Street Well out of service and no fire flow
- Pumping rate with all pumps in service and no fire flow

The required storage volume for the year 2028 is computed to be approximately 620,000 gallons if all system pumps are in service and 1,475,000 gallons if the highest capacity well is out of service.

Section 5
Recommended Water System Improvements

5.0 Introduction

This section provides a prioritized schedule of recommended capital improvements to the water system to meet current and future needs of the city of Orland. The locations of the recommended improvements (where known) are shown on Figure 3, and itemized cost estimates for the improvements are included in Section 6.

Improvements which are recommended as part of a 15-year Capital Improvement Program include:

- Construction of Eva Drive Well
- Construction of a new potable water storage tank with a booster pump at the Suisun Street Well site
- Removal of the existing elevated water storage tank
- Improvements to the Central Street Well
- Water Main replacements in two constricted locations to eliminate small diameter water mains
- Construction of an additional well at a site to be determined
- Construction of a new potable water storage tank with a booster pump at the Corporation Yard Well site.
- Water Main replacements between Suisun storage tank and the Corporation Yard storage tank
- Construction of an additional well at a site to be determined

Following are project descriptions for the recommended improvements.

5.1 Eva Drive Well Improvements

City staff have been actively identifying potential well sites since 2005, when the Eighth Street Well went offline. When the Railroad Avenue Well also went offline in 2012, the existing well at Lely Aquatic Park was improved to provide up to 800 gallons per minute (gpm) from its previous flow rate of 500 gpm, as originally designed to irrigate the associated park. Knowing that Lely Well would only provide a portion of the capacity lost to the offline wells, Public Works Commissioner Denton suggested the Eva Drive location as a potential site.

City staff researched the site and determined that the City owned the property following the chain of title through Caltrans right-of-way acquisition during construction of Interstate 5, the relinquishment to Glenn County from Caltrans as “excess right-of-way” upon I-5 completion and the subsequent annexation of the area and its associated rights-of-way by the City of Orland. Public Works then directed the office of the City Engineer to design the improvements at this site.

The design was recently completed, approved by the California Department of Public Health and is currently awaiting approval from the State Revolving Fund (SRF). This well will be drilled approximately 400 feet deep and is anticipated to produce between 1,000 and 1,250 gpm. The well will also have a back-up generator and will tie into the conveniently located 10-inch water main traversing the site.

The Eva Drive Well improvements are estimated to cost $1,160,400.00.

5.2 Suisun Well Site Water Storage Tank & Booster Pump Improvements

The existing 80,000 gallon elevated water storage tank was constructed in 1912. The storage tank (1) does not meet the requirements of the California Water Works Standards for needed storage volume for a public water system with the number of water service connections that currently exist, (2) will have been in service for more than 100 years midway through the planning period and (3) does not meet current California Building Code structural design standards to resist the effects of an earthquake.

The two alternatives available to the city to meet existing and future storage volume requirements for the water system are to (1) continue to construct additional wells to provide excess source capacity to offset the lack of adequate storage volume or (2) construct a water storage tank(s) with adequate storage volume.

With the first alternative, when the existing elevated water storage tank reaches its useful life and must be taken out of service, each well within the water system will have to be equipped with a variable frequency drive motor or pump control valve to operate the pump predicated upon pressure in the distribution system. All system wells will also have to be equipped with a generator to provide power for temporary operation during power outages since no emergency storage volume would exist. The advantage of constructing additional wells is that the initial cost is less than constructing a new elevated water storage tank.

With the second alternative, new water storage tank(s) would provide the best fire protection dependability, lower electrical costs as the storage tank could meet most daily demands and system pumps would be utilized in off-peak hours, provide uniform distribution pressure, and provide effective control of the system pumps. The primary disadvantage with constructing new water storage tank(s) is initial cost.

In the 2004 Water System Master Plan, the Suisun Street Well site was identified as a viable location for an elevated storage tank to replace the existing elevated storage tank and to provide substantially more storage capacity. Following recent discussions with tank suppliers and related contractors, the office of the City Engineer determined that the City of Orland would be better served by two tanks at two sites, and that ground level tanks with booster pumps and back-up generators would allow more consistent maintenance from elevated tank alternatives. An additional benefit of two tanks in two locations is the ability to meet most fire demands without overloading the distribution system across the entire city.

Based upon estimated water system demands in the year 2028, and assuming an increase in source capacity of 3,480 gpm by the year 2028, the computer analysis indicates that the required water storage volume for Orland's water system will be approximately 620,000 gallons if all system pumps are in service and 1,475,000 gallons if the highest capacity well is out of service.

It is recommended that a new water storage tank be constructed with a storage volume of 750,000 gallons. The cost to construct a new water storage tank, install a booster pump and remove the existing elevated storage tank is estimated to be $1,437,500.00.

5.3 Central Street Well Improvements

This improvement was cited in the 2004 Water System Master Plan and is being modified to update estimated costs.

With the exception of Central Street Well, all well sites within the city water system have a masonry building to house the pump motor, electrical equipment, flow meter, valves and discharge piping. The well building provides the well equipment protection from the weather and security from vandalism.

The well building at the Central Street Well consists of a wood-frame building with wire mesh over the building window openings. The exterior of the building is stucco and the interior of the building is wood. The well site has a chain link perimeter fence for security of the well building and the appurtenant hydropneumatic tank.

Because of its poor condition, it is recommended that the existing wood and stucco building be removed and a new masonry building be constructed in its place. The new masonry building would be more secure than the existing building because it would not have any window openings. The new well building would have large louvered wall openings and a rotary roof vent to provide ventilation of the building.

The cost to remove the existing building and construct a new masonry building is estimated to be $52,500.00.

5.4 Water Main Replacements in Two Constricted Locations

This improvement was cited in the 2004 Water System Master Plan and is being modified to update estimated costs.

In the past, whenever funding was available, city staff has been diligent in their efforts to install water mains to eliminate dead end water pipes and reinforce the distribution system. Two existing water mains within the distribution system are recommended for replacement with larger pipes to increase water flow and improve fire flows from existing fire hydrants served by the mains.

It is recommended that the existing water mains be replaced at the following locations:

- **East Street-Walters Street Alley:** The existing 2½-inch diameter water main located in the alley between East Street and Walters Street, running north and south between East Chapman and South Street, is recommended to be replaced with an 8-inch diameter water main. The cost to install the new water main, services and appurtenant valves is estimated to be $70,050.00.

- **Yolo Street to Sixth Street:** The existing 2½-inch diameter water main located on the westerly extension of Yolo Street between the alley east of the Union Pacific Railroad tracks and Sixth Street is recommended to be replaced with an 8-inch diameter water main. The cost to install a new water main is estimated to be $69,750.00.

Additionally, we recommend that all existing 4-inch and 6-inch diameter water mains be upgraded to 8-inches minimum as funding becomes available.

5.5 Second New Well Site Improvements

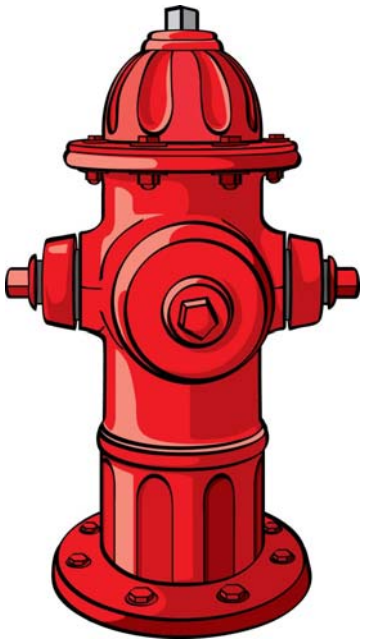
Since a site has not been identified for the two additional wells, we would recommend that the recent estimate prepared for the Eva Drive Well design and funding application be utilized for budgetary purposes. This "to be identified" well should be expected to cost approximately $1,160,400.00.

5.6 Corporation Yard Well Site Water Storage Tank & Booster Pump

This will be the second of two storage tank improvements (see discussion for 5.2 above). Splitting the required storage volume allows phasing and expansion as population increases. Additionally, a second tank allows either tank to receive maintenance and/or repairs in the future while still providing a level of fire protection redundancy not available when dependent on one tank.

The estimated cost to construct this item is $1,371,375.00.

5.7 Water Main Replacement between the Proposed Suisun Storage Tank and the Proposed Corporation Yard Storage Tank



The City of Orland Fire Chief and Building Official recommended that the downtown area and a number of commercial areas be upgraded to provide 4,500 gpm and 3,500 gpm, respectively (both for a duration of 4 hours). Their recommendations were based on the types of building construction and uses within these areas while applying the latest applicable fire codes (see Figure 4).

Since the city's water system was originally designed based on meeting 2,500 gpm city wide, the existing main sizes within those recommended areas are undersized to accommodate the higher flow rates, velocities and friction losses. While our proposed upgrade to 14-inch diameter water main between the two storage tanks may not route a larger main to every identified property needing higher flow rates, the majority of the sites are served and the city's entire system will be substantially improved.

The cost to install the 14-inch diameter C905 PVC water main along this proposed route is estimated to be $1,488,180.00.

5.8 Third New Well Site Improvements

If the Eva Drive Well and the second new well provide enough source capacity, or the population does not increase as rapidly as projected, this well may not be required within the study period. We have included it as a possibility for planning purposes and will monitor source production and population annually to determine when and if this well might be needed. Since a site has not been identified for this well, we would recommend that the recent estimate prepared for the Eva Drive Well design and funding application be utilized for budgetary purposes.

This “to be identified” well should be expected to cost approximately $1,160,400.00.

1. EVA DRIVE WELL IMPROVEMENTS
2. NEW WATER STORAGE TANK AND BOOSTER PUMP IMPROVEMENTS
3. CENTRAL STREET WELL IMPROVEMENTS
4. WATER MAIN REPLACEMENT (EAST - WALTERS ALLEY)
5. WATER MAIN REPLACEMENT (YOLO ST. TO SOUTH ST.)
6. WELL IMPROVEMENTS (LOCATION TBD)
7. NEW WATER STORAGE TANK AND BOOSTER PUMP IMPROVEMENTS
8. WATER MAIN REPLACEMENT (SUISUN WELL TO CORPORATE YARD WELL)
9. WELL IMPROVEMENTS (LOCATION TBD)

N

400 0 200 400 800 1600

FIGURE 3

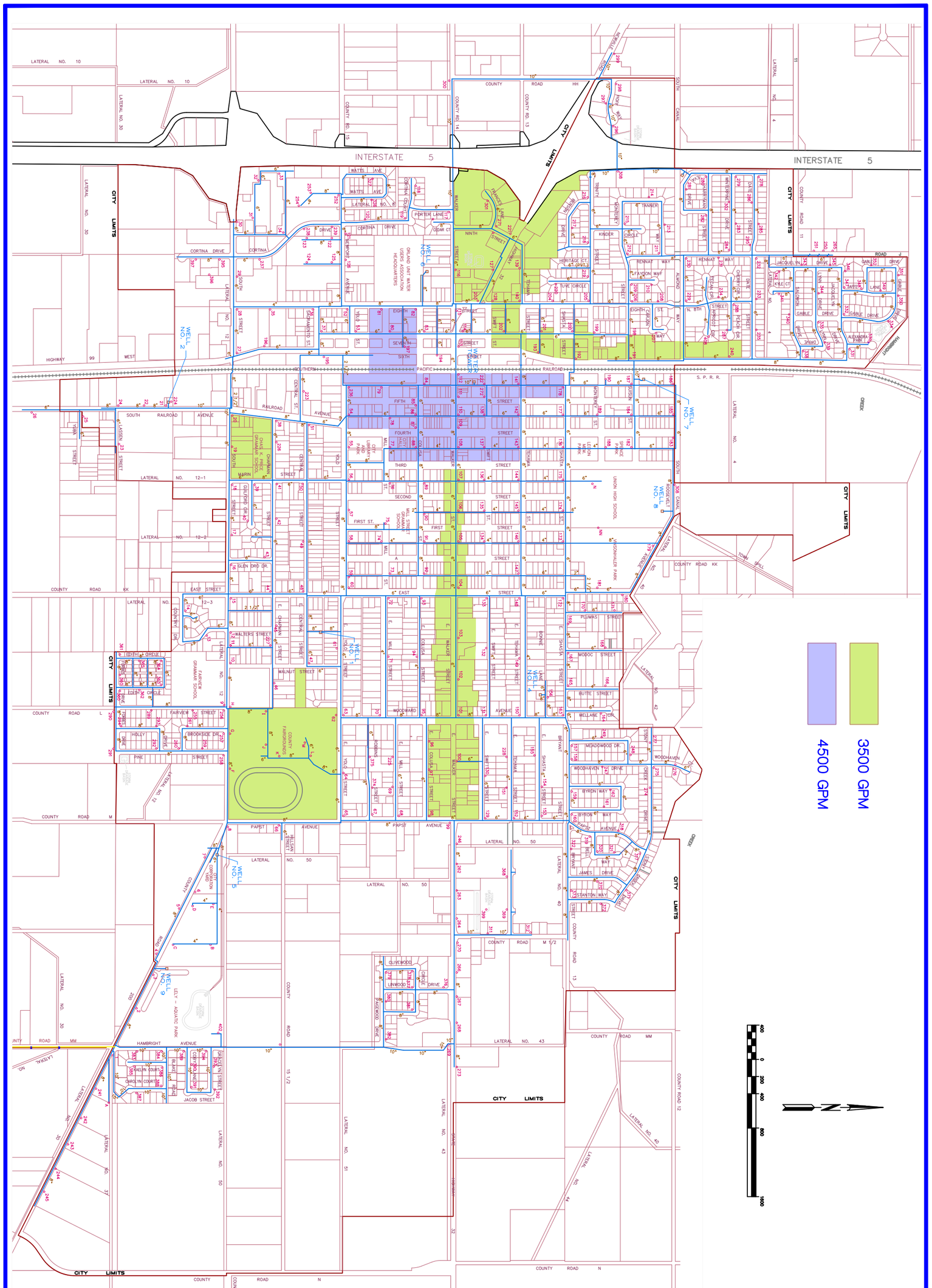
PAGE 5-6

CITY OF ORLAND

RECOMMENDED WATER SYSTEM IMPROVEMENTS

PUBLIC WATER SYSTEM NUMBER 1110007

RAR
ROLLS ANDERSON & ROLLS
CIVIL ENGINEERS
115 YELLOWSTONE DRIVE • CHICO, CALIFORNIA 95973-6811



ROLLS ANDERSON & ROLLS
CIVIL ENGINEERS
115 YELLOWSTONE DRIVE • CHICO, CALIFORNIA 95973-5811

CITY OF ORLAND

APICAL FIRE FLOW DEMAND AREAS

PUBLIC WATER SYSTEM NUMBER 1110007

FIGURE 4

Section 6
Cost Estimates

6.0 Basis for Cost Estimates

The cost estimates below are based upon the recommended improvements described in Section 5 and shown on Figure 3. The unit prices are based upon recent experience with similar improvements in northern California. Estimated costs should be adjusted annually to reflect the changes in construction costs, based upon the Engineering News Record Construction Cost Index (ENRCCI) or the Consumer Price Index.

6.1 Eva Drive Well Improvements:

Item	Description	Quantity	Unit Cost	Amount
1	Well drilling, pump testing, casing & seal	Lump Sum	$450,000.00	$450,000.00
2	Turbine pump motor and electric controls and building	Lump Sum	$467,000.00	$467,000.00
3	Standby generator	1 Ea.	$50,000.00	$50,000.00
			Subtotal	$967,000.00
	Contingency, Engieering and Administration			$193,400.00
				$1,160,400.00

6.2 Suisun Well Site Water Storage Tank & Booster Pump Improvements:

Item	Description	Quantity	Unit Cost	Amount
1	Site work	Lump Sum	$30,000.00	$30,000.00
2	Furnish and install 750,000 gallon water storage tank	Lump Sum	$1,012,500.00	$1,012,500.00
3	Furnish and install booster pump	Lump Sum	$130,000.00	$130,000.00
4	Wireless pump control system	Lump Sum	$20,000.00	$20,000.00
5	Remove existing elevated tank	Lump Sum	$57,500.00	$57,500.00
			Subtotal	$1,250,000.00
	Contingency, Engieering and Administration			$187,500.00
				$1,437,500.00

6.3 Central Street Well Improvements:

Item	Description	Quantity	Unit Cost	Amount
1	Remove existing building	Lump Sum	$6,250.00	$6,250.00
2	Masonry building	Lump Sum	$37,500.00	$37,500.00
			Subtotal	$43,750.00
	Contingency, Engieering and Administration			$8,750.00
				$52,500.00

6.4A Water Main Replacement (East-Walters Alley):

Item	Description	Quantity	Unit Cost	Amount
1	Connect to existing water main	2 Ea.	$3,125.00	$6,250.00
2	8" PVC water main	520 LF	$62.50	$32,500.00
3	8" gate valve	2 Ea.	$1,250.00	$2,500.00
4	Water service	14 Ea.	$1,000.00	$14,000.00
5	Abandon existing water main	Lump Sum	$3,125.00	$3,125.00
			Subtotal	$58,375.00
	Contingency, Engieering and Administration			$11,675.00
				$70,050.00

6.4B Water Main Replacement (Yolo Street to Sixth Street):

Item	Description	Quantity	Unit Cost	Amount
1	Connect to existing water main	2 Ea.	$3,125.00	$6,250.00
2	8" diameter PVC water main	390 LF	$62.50	$24,375.00
3	8" gate valve	2 Ea.	$1,250.00	$2,500.00
4	Direction bore railroad crossing	Lump Sum	$25,000.00	$25,000.00
			Subtotal	$58,125.00
	Contingency, Engieering and Administration			$11,625.00
				$69,750.00

6.5 Second Well Improvements (Site TBD):

See 6.1 above for breakdown.

Total: $1,160,400.00

6.6 Corporation Yard Well Site Water Storage Tank & Booster Pump Improvements:

Item	Description	Quantity	Unit Cost	Amount
1	Site work	Lump Sum	$30,000.00	$30,000.00
2	Furnish and install 750,000 gallon water storage tank	Lump Sum	$1,012,500.00	$1,012,500.00
3	Furnish and install booster pump	Lump Sum	$130,000.00	$130,000.00
5	Wireless pump control system	Lump Sum	$20,000.00	$20,000.00
			Subtotal	$1,192,500.00
	Contingency, Engieering and Administration			$178,875.00
				$1,371,375.00

6.7 Water Main Replacement (Suisun Tank to Corporation Yard Tank):

Item	Description	Quantity	Unit Cost	Amount
1	Connect to existing water main or fire hydrant	46 Ea.	$5,000.00	$230,000.00
2	14" diameter PVC water main	10,370 LF	$95.00	$985,150.00
3	Abandon existing main	Lump Sum	$25,000.00	$25,000.00
			Subtotal	$1,240,150.00
	Contingency, Engieering and Administration			$248,030.00
				$1,488,180.00

6.8 Third New Well Improvements:

See 6.1 above for breakdown.

Total: $1,160,400.00

Section 7
Funding Sources

7.0 Introduction

This section shall discuss the potential impacts that implementation of the proposed Water System Capital Improvement Program (WSCIP) would have on current operating and connection fee revenues, as well as investigate the various and currently available state & federal funding sources.

7.1 Existing Budgetary Restraints

Discussions with the Finance Director determined that the Water Enterprise Fund operates at a light surplus each year. A review of the estimated "Five Year Budget Projection" as recently submitted to the State Revolving Fund as part of the City's application for the Eva Drive Well (see Table 7-1 below) reveals that the annual surplus is projected to be between $27,000.00 and $46,000.00. The Finance Director further explained that the fund is also receiving a loan repayment in the form of a lease for 824 Fourth Street. Annual repayment amounts total slightly less than $10,000.00.

Table 7-1

FIVE YEAR BUDGET PROJECTION (Small Community Water System)

INSTRUCTIONS: Yellow-shaded cells are for data entry; all other cells are locked except line item descriptions which can be changed if needed. Years 2 through 5 will be compounded automatically by the inflation factor in Cell G6.

System Name: City of Orland | Inflation Factor (%): 5.2 | System ID Number: 1110001

LINE		EXPENSES AND SOURCE OF FUNDS	2014	2015	2016	2017	2018
1		OPERATIONS AND MAINTENANCE (O&M) EXPENSES					
2		Salaries and Benefits including Uniform Allowance	399,395.00	420,163.54	442,012.04	464,996.67	489,176.50
3		Advertising, Travel and Training	700.00	736.40	774.69	814.98	857.36
4		Power and Other Utilities	145,000.00	152,540.00	160,472.08	168,816.63	177,595.09
5		Fees Regulatory	10,000.00	10,520.00	11,067.04	11,642.53	12,247.94
6		Treatment Chemicals	0.00	0.00	0.00	0.00	0.00
7		Telephone and Communications	14,000.00	14,728.00	15,493.86	16,299.54	17,147.11
8		Chemical Monitoring	0.00	0.00	0.00	0.00	0.00
9		Equipment Maintenance and Gasoline	41,000.00	43,132.00	45,374.86	47,734.36	50,216.54
10		Materials, Supplies, and Parts	30,000.00	31,560.00	33,201.12	34,927.58	36,743.81
11		Office Supplies and Expenses	8,000.00	8,416.00	8,853.63	9,314.02	9,798.35
12		Administrative Overhead Allocation	133,797.00	140,754.44	148,073.68	155,773.51	163,873.73
13		Additional O&M for New Project	0.00	0.00	0.00	2,000.00	2,104.00
14		**Total O&M Expenses:**	781,892.00	822,550.38	865,323.00	912,319.80	959,760.43
16		GENERAL AND ADMINISTRATIVE EXPENSES					
17		Engineering and Professional Services	37,000.00	38,924.00	40,948.05	43,077.35	45,317.37
18		Depreciation and Amortization	47,500.00	49,970.00	52,568.44	55,302.00	58,177.70
19		Insurance	10,464.00	11,008.13	11,580.55	12,182.74	12,816.24
20		Existing Contribution to CIP (From CIP J48)	34,000.00	34,000.00	34,000.00	34,000.00	34,000.00
21		O&M Reserve	0.00	0.00	0.00	0.00	0.00
22		Other Reserves	0.00	0.00	0.00	0.00	0.00
23		Miscellaneous	0.00	0.00	0.00	0.00	0.00
24	**	New Funding Project Costs	0.00	0.00	0.00	0.00	0.00
25		Additional New Project Contribution to CIP (From CIP J59)	0.00	0.00	0.00	20,460.00	20,460.00
26	**	Debt Service	12,170.00	0.00	0.00	0.00	0.00
27		**Total General and Administrative Expenses:**	141,134.00	133,902.13	139,097.04	165,022.08	170,771.31
28		**TOTAL EXPENSES (Line 14+ Line 27):**	923,026.00	956,452.51	1,004,420.04	1,077,341.88	1,130,531.74
30		REVENUES RECEIVED					
31		Cash Revenues (Water Rates)	836,340.00	879,830.00	925,581.00	973,711.00	1,024,343.00
32	**	Depreciation Reserves	47,500.00	49,970.00	52,568.00	55,302.00	58,178.00
33	**	Fees and Services	0.00	0.00	0.00	0.00	0.00
34	**	Hookup Charges	65,000.00	68,380.00	71,936.00	75,676.00	79,612.00
35	**	Withdrawal from CIP or Other Reserves	0.00	0.00	0.00	0.00	0.00
36	**	Other Fund Sources: Interest, Etc.	7,000.00	200.00	200.00	200.00	200.00
37	**	Grants	0.00	0.00	0.00	0.00	0.00
38	**	SRF Loan	0.00	0.00	0.00	0.00	0.00
39	**	Business Loans	0.00	0.00	0.00	0.00	0.00
40		**TOTAL REVENUE (Lines 31 through 39):**	955,840.00	998,380.00	1,050,285.00	1,104,889.00	1,162,333.00
41		**NET LOSS OR GAIN:**	32,814.00	41,927.49	45,864.96	27,547.12	31,801.26

Report Prepared by (Name and Title): _____ Date: _____

(** Inflation factor not applied to future year projections)

	2014	2015	2016	2017	2018
Number of Customers:	2817	2817	2817	2817	2817
Average Monthly Revenue Needed Per Customer: (total expenses ÷ # of customers ÷ 12)	27.31	28.29	29.71	31.87	33.44

Considering the nearly $8 million dollars needed to implement the proposed WSCIP which equates to approximately $1,100.00 per capita, it is a simple determination that these improvements could not be funded internally and shall require some combination of state and federal grants and loans as well as private developer installations (where a nexus can be derived).

When queried, the Finance Director also stipulated that the city's bonding capacity may be limited, due to recent indebtedness incurred to address PERS shortfalls; however, he stated that some financing for infrastructure improvements may be possible since an asset is created.

A discussion of various state and federal funding sources follows.

7.2 California Department of Public Health (CDPH) Safe Drinking Water State Revolving Fund (SDWSRF)

City of Orland staff recently submitted the Eva Drive Well improvement plans and application to this funding source. The SDWRSF was established to provide funds to correct municipal water system deficiencies. This agency's funding criteria is based upon a prioritized list that addresses water system problems that pose public health risks, water systems with needs for funding to comply with requirements of the Safe Drinking Water Act, and water systems most in need on a per household affordability basis.

http://www.cdph.ca.gov/services/funding/Pages/SRF.aspx

7.3 California Department of Public Health (CDPH) Proposition 84 Funding for Public Water Systems

This program provides funding for emergency clean water grants (Section 75021), small community infrastructure improvements for chemical or nitrate contaminants (Section 75022), or grants to prevent or reduce contamination of groundwater that serves as a source of drinking water (Section 75025). While the City of Orland's system may not meet the criteria of this program at this time, it would be prudent to track this program for future funding opportunities.

http://www.cdph.ca.gov/services/funding/Pages/Prop84.aspx

7.4 California Department of Public Health (CDPH) American Recovery and Reinvestment Act of 2009 (ARRA)

This program supplements the previously cited SDWSRF above and provides $160 million dollars of funding for infrastructure development for California's drinking water systems.

No additional application appears to be required as the SDWRSF is administering this funding. Most of the funding has already been committed to pending and current construction, although a portion has been set aside for small system technical assistance.
http://www.cdph.ca.gov/services/funding/Pages/ARRA.aspx

7.5 USDA Rural Development Water System Direct Loans and Grants

This program was established to develop water systems in rural areas and towns with a population not in excess of 10,000. Applicants must be unable to obtain the financing from other sources at rates and terms they can afford and/or from their own sources.

Since the city should exceed the 10,000 population threshold for this program during the study period, we would suggest that this funding source be fully investigated and utilized early on in the implementation of the WSCIP.

USDA Direct Loan rates are typically a bit lower than financing elsewhere and are amortized over a period of up to 40 years.

http://www.rurdev.usda.gov/UWP-dispdirectloansgrants.htm

7.6 USDA Rural Development Water System Guaranteed Loans

Again, this program is offered to communities with a threshold population of 10,000. Water system Guaranteed Loans provide a loan guarantee for the construction of water projects serving financially needy communities in rural areas. Guaranteed loans are made and serviced by conventional lenders such as banks, savings and loan associations, mortgage companies and other eligible lenders. To qualify, applicants must be unable to obtain the required credit without the loan guarantee from private, commercial or cooperative sources at reasonable rates and terms. Guaranteed loans may be made in combination with direct loans. Guarantees do not exceed eighty percent of the amount financed and are limited to a 40 year term. Interest rates are fixed or variable and are determined by the lender and borrower subject to USDA Rural Development review and approval.

http://www.rurdev.usda.gov/UWP-dispguaranteedloan.htm

Please note that these funding sources will require the City of Orland's water rates to rise proportionately to pay back each loan within its specified term.

Appendices

Water System Name: City of Orland Report Date: April 3, 2014

******* Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.*******

Last year, as in years past, your tap water met all EPA and State of California (State) drinking water health standards. The City of Orland (City) vigilantly safeguards its water supplies and once again, we are proud to report that our system has not violated a maximum contaminant level or any other water quality standard. Included are details about where your water comes from, what it contains, and how it compares to State standards. We are committed to providing you with information, because informed customers are our best allies.

We test the drinking water quality for many constituents as required by state and federal regulations. This report shows the results of our monitoring for the period of January 1 through December 31, 2013 and may include earlier monitoring data. For additional water quality data, contact Forrest Marston of the City Public Works Department at (530) 865-1610.

The Orland City Council meets on the first and third Monday of each month at 7:30 p.m. at the Carnegie Center. Please feel free to participate in these meetings.

GENERAL INFORMATION ON DRINKING WATER:

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

TERMS USED IN THIS REPORT

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency (USEPA).

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

ND: not detectable at testing limit

ppm: parts per million or milligrams per liter (mg/L)

ppb: parts per billion or micrograms per liter (ug/L)

WATER SUPPLY SOURCES

The City has seven wells which supply water to the system. The wells are distributed throughout the City and range in depth from 150 feet to 400 feet. The wells produce between 350 and 1,090 gallons per minute each, and are automatically regulated by the water level in the elevated storage tank.

CITY WATER SOURCES		
WELL NUMBER	**WELL NAME**	**WATER SOURCE**
09	Lely Aquatic Park	Groundwater
01	Central Street	Groundwater
04	Woodward Avenue	Groundwater
05	Corporation Yard	Groundwater
07	Suisun Street	Groundwater
08	Roosevelt Avenue	Groundwater

A Drinking Water Source Assessment was performed, for all the wells shown above, in May of 2003 by the California Department of Public Health, Valley District. The sources are considered most vulnerable to the following activities not associated with any detected contaminants: sewer collection systems, above ground storage tanks, motor pools, parks, utility stations/maintenance areas, contractor/government agency equipment storage yards, high density housing (>1 house/0.5 acres), road/street/railroad transportation corridors, schools, rv parks and railroad yards/maintenance/fueling areas. At the time the assessment was performed, there were no contaminants detected in the water supply, however the wells are still considered vulnerable to activities located near the drinking water sources.

A copy of the complete assessment may be viewed at:

Redding Field Operations Office
415 Knollcrest Drive, Suite 110
Redding, CA 96002
Attention: Gunther L Sturm, (530) 224-4866

or at

City of Orland
815 Fourth Street
Orland, CA 95963
Attention: Forrest Marston, (530) 865-1610

The City adds chlorine to the groundwater from the Woodward Avenue, Corporation Yard, Central Street, and Suisun Street wells as a preventative measure due to intermittent positive bacteriological tests of the wells. Water from the Roosevelt Avenue well is not treated.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water before we treat it include:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application and septic systems.

Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, USEPA and the California Department of Public Health (Department) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

MICROBIOLOGICAL WATER QUALITY

Testing for bacteriological contaminants in the water distribution system is required by state regulations. This testing is done regularly to verify that the water system is free of coliform bacteria. Multiple samples are taken weekly at dedicated locations in the distribution system for bacteriological testing. Two or more positive results in any month constitute a failure of the standard.

TABLE 1 – DETECTION OF MICROBIOLOGICAL CONTAMINANTS

MICROBIOLOGICAL CONTAMINANTS	HIGHEST NO. OF DETECTIONS	NO. OF MONTHS IN VIOLATION	MCL	MCLG	TYPICAL SOURCE
Total Coliform Bacteria	0	0	More than 1 sample in a month with a detection	0	Naturally present in the environment
Fecal Coliform or *E. coli*	0	0	A routine sample and a repeat sample detect total coliform and either sample also detects fecal coliform or *E. coli*	0	Human and animal fecal waste

LEAD AND COPPER TESTING

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Orland is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Lead and copper testing of water from individual customer taps throughout the distribution system is required by State regulations. The City of Orland is responsible for collecting water samples every three years, to be tested for lead and copper contamination. The table below summarizes the most recent monitoring for these constituents in parts per billion (ppb) or parts per million (ppm).

TABLE 2 – DETECTION OF LEAD AND COPPER

SUBSTANCE (unit of measure)	YEAR SAMPLED	NO. OF SAMPLES	90th PERCENTILE LEVEL DETECTED	NO. OF SAMPLES ABOVE AL	AL	PHG	TYPICAL SOURCE
Lead (ppb)	2011	20	ND	0	15	0.2	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Copper (ppm)	2011	20	0.31	0	1.3	0.3	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives

SAMPLING RESULTS

The City of Orland takes hundreds of water samples each year in order to determine the presence of any radioactive, biological, inorganic, volatile organic or synthetic organic contaminants. The following tables show only those contaminants that were detected. Although all of the substances listed here are under the Maximum Contaminant Level (MCL), we feel it is important that you know exactly what was detected and how much of the substance was present in the water. The State allows us to monitor for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data is included, along with the year in which the sample was taken.

TABLE 3 – DETECTION OF SODIUM AND HARDNESS

SUBSTANCE (unit of measure)	YEAR SAMPLED	LEVEL DETECTED	RANGE OF DETECTIONS	MCL	PHG	TYPICAL SOURCE
Sodium (ppm)	2005	20	18 – 27	None	None	Salt present in the water and is generally naturally occurring
Hardness (ppm)	2005	203	153 – 227	None	None	Sum of polyvalent cations present in the water, generally magnesium and calcium, and are usually naturally occurring

TABLE 4 – DETECTION OF CONTAMINANTS WITH A PRIMARY DRINKING WATER STANDARD

CHEMICAL OR CONSTITUENT (unit of measure)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	MCL	PHG	TYPICAL SOURCE
Aluminum (ppm)	2007-2012	0.01	ND-0.06	1	0.6	Erosion of natural deposits
Barium (ppm)	2006-2012	0.08	ND-0.11	1	2	Discharge of oil drilling wastes and from metal refineries; erosion of natural deposits
Chromium (ppb)	2006-2012	4.5	ND-11.6	50	100	Erosion of natural deposits; discharge from steel and pulp mills and chrome plating
Fluoride (ppm)	2006-2012	0.05	ND-0.1	2	1	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate (NO_3)[1] (ppm)	2013	9.9	2.6-18.9	45	45	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits

TABLE 5 – DETECTION OF CONTAMINANTS WITH A SECONDARY DRINKING WATER STANDARD

CHEMICAL OR CONSTITUENT (unit of measure)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	MCL	PHG	TYPICAL SOURCE
Chloride (ppm)	2006-2012	21.3	14.6-32	500	N/A	Runoff/leaching from natural deposits; seawater influence
PH, Laboratory (Standard Units)	2005-2007	7.5	7.4-7.7	N/A	N/A	
Specific Conductance (µS/cm)	2006-2012	481	332-576	1600	N/A	
Sulfate (ppm)	2006-2012	21.4	11.1-25	500	N/A	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (TDS) (ppm)	2006	330	N/A	1000	N/A	Runoff/leaching from natural deposits
Total Filterable Residue (ppm)	2007	313	280-360	1000	N/A	
Turbidity[2] (NTU)	2005-2011	0.63	ND-2.47	5	N/A	Soil runoff

[1] Nitrate in drinking water at levels above 45 mg/L is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 45 mg/L may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with specific enzyme deficiencies. If you are caring for an infant, or you are pregnant, you should ask advice from your health care provider.

[2] Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of water quality. High turbidity can hinder the effectiveness of disinfectants.

State of California—Health and Human Services Agency
California Department of Public Health

RON CHAPMAN, MD, MPH
Director & State Health Officer

EDMUND G. BROWN, JR
Governor

March 20, 2013

City of Orland
815 Fourth Street
Orland, CA 95963

Attention: Jere Schmitke, Director of Public Works

SUBJECT: CITY OF ORLAND PUBLIC WATER SYSTEM, SYSTEM NO. 1110001 — ANNUAL INSPECTION

On March 6, 2013, James Reade of my staff met with Mike Schroer to conduct an annual inspection of the City's public water system. The inspection report and accompanying deficiency record are enclosed for your review.

If you or your staff have any questions about the inspection, please call James Reade at (530) 224-2485. Dan Cikuth is your principal contact with this office and can be reached at (530) 224-3271. You may also contact me at (530) 224-4861.

R. Crenshaw

Reese B. Crenshaw, P.E.
Valley District Engineer
DRINKING WATER FIELD
OPERATIONS BRANCH

Enclosure

California Department of Public Health
Drinking Water Field Operations Branch
Annual Inspection Report

Purveyor: City of Orland (City) System No: 1110001
Person(s) Contacted/Position: Mike Schroer, Operator
Date of inspection: March 6, 2013 Reviewing Engineer: James Reade, P.E.
Last A.I. Date: April 24, 2012 by Dan Cikuth, P.E. District Engineer: Reese Crenshaw, P.E.

A. INTRODUCTION

1. Permit Status

Full: The original permit was issued in 1959 and reissued on June 4, 1971 for the following:
East & Colusa Street Well (Well-03, source 004) – now inactive
Railroad Avenue Well (Well-02, source 003) - now to be destroyed
Corp Yard Well (Well-05, source 006)
Central Street Well (Well-01, source 002)
Woodward Street Well (Well-04, source 005)
Elevated Tank
There have been two amendments issued as follows:
March 29, 1985 for Suisun Well (Well-07, source 008).
April 29, 1996 for Roosevelt Well (Well-08, source 009)
October 24, 2012 for continuous chlorination

The Lely Aquatic Park Well has been operating for decades without a permit. The Lely Well's service area is the Lely Aquatic Park, consisting of three ball diamonds and a small pond. The Aquatic Park water system is connected to the City's distribution system through an open gate valve. Usage is such that the park would likely qualify as a public water system (transient, non community). A temporary permit for operation of the Lely Aquatic Park Well and its water system was issued recently. Now that the Lely Park well is operating as part of the City's system the temporary permit is essentially invalid.

2. Changes in System

Since last annual inspection: No Changes.
Planned future changes: The following are planned to be completed as funds become available: (1) Upgrade Lely Well by installing distribution piping from Lely to nearby (new) subdivisions, looping the line back to the main distribution system – dependent on a new subdivision going in.; (2) Drill a replacement well for recently abandoned Well 06 (8th St. Well); (3) Install SCADA system; and (4) Convert certain wells to VFD and abandon/stop using elevated tank. The Railroad Avenue well is scheduled for replacement through the State Revolving Fund (SRF) process. The pump and motor have been removed from the Railroad Avenue well but it has not yet been destroyed.

3. Consumer & Production Data (From the 2011 Annual Report to the Department)

No. of service connections: 2,817 No. with meters: All, except 11 AG connections
Approx. population served: 7,501
Water produced during the 12 month period: (Jan. 2011 to Dec. 2011): 653 MG
Maximum month: 142 MG (July 2011) Maximum day: Daily records are not kept, wells are visited three times per week.

4. Past Data

Table 1 – Water Use Data

Year	Max. Month MG	Max. Day 1.5 gpm	GPM PDPC	Total Conn.	Meter Conn.	Flat Conn.	Source Capacity	Max. Pop.
2002	109.7	3,686	1.44	2,563	2,563	0	6,430	6,337
2003	112.9	3,793	1.47	2,585	2,585	0	6,430	6,337
2004	No Data			2,615	2,615	0	6,310	6,525
2005	111.9	3,760	1.43	2,622	2,622	0	5,570	6,675
2006	115.6	3,884	1.41	2,746	2,746	0	5,570	7,189
2007	95	3,192	1.15	2,772	2,772	0	5,570	7,772
2008	127	4,267	1.52	2,800	2,800	0	5,570	7,420
2009	113.8	3,824	1.37	2,800	2,800	0	5,570	7,420
2010	114	3,831	1.37	2,803	2,803	0	5,570	7,420
2011	142	4,772	1.69	2,817	2,817	0	5,130	7,501
	5 yr	**avg =**	**1.42**					

Footnote: Max day was formerly calculated based on a 1.3x factor. The revised California Waterworks Standards require a 1.5x factor. The 1.5x factor has been applied to the above table, including historical data.

Discussion & Appraisal: Except for facilities owned by the city and the eleven agricultural connections, all service connections are metered. Because wells are only visited three times per week, and because there is no SCADA historizing, maximum day demand must be estimated from the maximum month demand.

Peak hourly demand is estimated as 1.5 x 4,772 = 7,158 gpm, therefore, there is a deficit of 7,158 – 5,130 = 2,028 gpm during peak demand times. The waterworks standards require systems to meet 4 hours of peak demand, so 2,028 x 60 x 4 = 486,720 gallons deficit. The elevated tank only has 80,000 gallons of storage capacity, so the City cannot meet 4 hours of peak demand. **The actual deficit is 406,720 gallons.** The City has applied for SRF funds to replace the Railroad well and is in the process of finding a replacement location for the abandoned Well 06.

Maximum Day Demand (MDD) appears to be covered by the existing well sources. MDD in 2011 was calculated at 4,772 gpm. This is still fairly close to the maximum source capacity (5,130 gpm). **The City should be prepared impose water conservation policies should any key well go down in the summer months until new wells can be constructed.**

B. Sources

Table 2 – Source Data

Wells	Status	Capacity (gpm)	Comments
Well 01 Central Street	Active	860	Pressure tank: 5,200 gallons Pump motor: 60 HP Chlorination: yes Backup power: no Oil Lubrication Snifter valve for hydro tank air No sanitary seal, drilled in 1954
Well 02 Railroad Avenue	**(Abandoned)** pump and motor removed but well not properly destroyed	**0**	Pressure tank: 5,200 gallons Pump motor: Chlorination: Backup power: natural gas generator No sanitary seal, drilled in 1958

Wells	Status	Capacity (gpm)	Comments
Well 04 Woodward Avenue (Bonney Lane)	Active	1,000	Pressure tank: 5,200 gallons Pump motor: 100 HP Chlorination: yes Backup power: direct drive auto start from 305 cu inch Chevy natural gas V8 engine*. New style water lubricated bearings – only water from well pump provides lube water Compressor for hydro tank air Drilled in 1964, conductor casing not pulled when sanitary seal poured. *engine idles until called to pump from tank level control system
Well 05 Corporation Yard	Active	1,030	Pressure tank: 3,350 gallons Pump motor: 100 HP Chlorination: yes Backup power: no Oil lubrication Compressor for hydro tank air Drilled in 1964, conductor casing not pulled when sanitary seal poured.
Well 07 Suisun Street	Active	1,090	Pressure tank: 5,200 gallons Pump motor: 100 HP Chlorination: yes Backup power: direct drive Oil lubrication Compressor for hydro tank air Drilled in 1983, sanitary seal to 80 feet
Well 08 Roosevelt Avenue	Active	350	Pressure tank: 1,050 gallons Pump motor: 50 HP Chlorination: yes Backup power: no Water Lubrication all the time - even when well is off Compressor for hydro tank air Drilled in 1992, sanitary seal to 94 feet
Lely Aquatic Park Well	Active	800	Pressure tank: 5,200 gallons Pump motor: 100 HP Chlorination: yes Backup power: no Water lubrication without water feed line (high water table) Well operates on a pressure switch, telemetry for operating on tank level is not in place. Drilled in 1978, sanitary seal to 90 feet
	Total	**5,130**	

Discussion & appraisal (including compliance with source capacity requirements):

The wells operate in a lead-lag sequence based on the level of water in the elevated tank. On average, the lead-lag sequence is rotated every other week. Sequencing is controlled via a panel at the elevated tank and recorded in a spiral-bound notebook. When a well is in operation, a light indicator is ON for that well on the control panel.

Well water levels are measured and recorded every three months. Wells are visited by the operator three times per week.

It was reported that the new style water lubrication at Well 04 dramatically reduces water leakage around the packing.

All wells are equipped with good raw water sample taps, and the chlorination injection sites are far enough away that raw water samples can be collected when the well is operating with the chlorinator. For the water lubricated Roosevelt Ave. well, chlorinated water is routed into the well when the well is OFF constantly. A solenoid valve needs to be used to prevent constantly entering the well.

It is recommended that the City discontinue the practice of plumbing the air vacuum release valve discharge back into the well casing. When the discharge spurts water it will keep the upper parts of the casing damp which could lead to premature corrosion of the casing as well as provide moist areas where bacteria colonies can grow.

C. TREATMENT

1. Surface Water Sources

There are no surface water sources.

2. Groundwater Sources

The City chlorinates it wells with a full strength (12.5%) sodium hypochlorite solution to minimize the potential for total coliform detections in the distribution system. CT is not provided and is not required. LMI Model 171 solution are utilized. The City targets a chlorine residual of greater than 0.3 mg/L leaving the well site. Distribution chlorine residuals are measured and recorded concurrently with the collection of bacteriological samples.

3. Other Treatment or Blending facilities

No other treatment is provided.

4. Describe Records Maintained of Treatment:

A "Monthly Chlorination Log" is maintained in each well house. On it are recorded water meter reading (gal), chlorine tank level (gal), total chlorine used since previous visit (gal), and measured chlorine residual (mg/L). These records are maintained for Department review.

D. STORAGE FACILITIES

Table 3 – Storage Data

Storage	Type	Capacity	Zone	Comments
Elevated tank	Steel	80,000 gal.	One	For pressure regulation

Does storage capacity comply with Waterworks Standards? No, there is not enough storage capacity to meet peak hour demand.

Discussion & appraisal: The tank was last drained, inspected and cleaned on February 16, 2010. The Department's checklist for inspection is utilized, and this checklist was reviewed during the inspection. The City utilizes an electrical contractor (Steve Halsey Electric) for the inspections. Reportedly the internal tank inspection is performed by opening the hatch on top of the tank and looking inside.

If the inspector must step into the tank for any repairs or further inspections, the tank must be disinfected per AWWA Standard C-652.

There is a constant power supply (UPS battery back-up system that keeps the level probe system functioning in case there is a power loss at the tank site.

E. TRANSMISSION FACILITIES

There are no transmission lines.

F. DISTRIBUTION SYSTEM

1. Pressure Zones

Table 4 – Pressure Zone Data

Pressure Zone Name	Pressure Range (psi)	Source Production (wells, pressure. sta. etc.)	Storage Capacity	No. of Connections
One zone*	Approx. 50-55 psi	All wells	80,000 gal	All

2. **Mains**

Table 5 – Distribution System Materials

Material	Amount @ %	Size *	Condition
Cast Iron 50% Ductile Iron 50%	~ 40 %, oldest part of city ~ 80 years old	Varies	Old pipe – good, but 2.5-inch size has been problem
Asbestos Cement	~ 10 %	6 inch	Good
PVC	~ 50 %	Varies	Good

* Pipe sizes range from 4"-10", with a few short sections of 2 to 2-1/2" pipe and one 12" pipe to and from the elevated tank.

3. **Discuss leak history during past 12 months:** According to the 2011 Annual Report to the Department there were zero meter leaks and zero main leaks. This is less than most years and most water systems.

4. **Are distribution facilities constructed in accordance with Waterworks Standards?**
The distribution system is reported to be constructed in accordance with the Waterworks Standards, though some of the lines are reportedly buried just below grade.

There is no main line replacement program in place. Instead, there are projects to loop lines and run parallel lines in older portions of the system to help improve pressure and redundancy. Main line leaks are rare, so a main replacement program isn't a priority.

Approximately 90% of the service lines are copper with the remainder polyethylene.

5. **Describe water & sewer main separation practices:** Fiscal year 09-10 CDPH inspector contacted the city Engineer (Ken Skillman with Rolls, Anderson and Rolls) and forwarded him a link to the revised California Waterworks Standards, including water main separation practices. The city has been following the 2003 water main separation exception guidelines, which are used for exceptions to the standards; and are posted on the Department's website.

Reportedly, many established areas of town have water and sewer mains running down alleyways in close proximity to each other. Before commencing a project to replace water or sewer mains in these areas, the city should consult with CDPH to ensure compliance with water main separation criteria, or if that is not feasible, an approved alternative.

6. **Does the system have low head lines and what is their program to eliminate them?**
There are no low head lines in the system. The topography is flat with one pressure zone, and the water head provided by the elevated tank ensures positive pressure on the water system side of well head check valves.

7. **Any lead pipes, joints, &/or lead solder in distribution system?** According to the City, there is very little, if any, lead in the distribution system. Results of lead and copper monitoring (see Section G.7, below) suggest that lead is not a problem with this water system.

8. **Alarms**
There are no alarms. The City is hoping to install SCADA and alarms as funds allow. A pressure gage should be installed at the fire station.

G. WATER QUALITY AND MONITORING

1. **Distribution Bacteriological Monitoring**
Description of program: The most current bacteriological sample siting plan is from June 2009 and has three samples being collected each week (Mondays) from 12 dedicated sampling stations. Samples are collected by City staff.
Sampling plan: Received 6/17/09.
Controlling factor: The number of service connections (2,817) is the controlling factor.
Number of required samples: Three per week.

MCL violations in past year? No.

Discussion & appraisal: A routine sample in May 2009 at the Corp Yard sample site was positive for fecal and total coliform. Repeat results were negative. Staff investigated the situation and recommended the city cut back oleander bushes from around the sample station. However, in June 2009, two of three raw water samples collected at the Railroad Avenue Well were total and fecal coliform positive. Subsequent quarterly testing of the Railroad Ave well was negative until April 2010, when the Railroad Avenue well produced a total coliform positive, fecal negative, result. The Railroad Ave. well was constructed in 1958 and does not have sanitary seal. The Railroad Avenue Well was abandoned in 2012.

There was one routine total coliform sample collected in February 2012. That sample was negative for fecal coliform. All four of the follow up samples were negative for total and fecal coliform.

The city reports coliform results from the airport water system (i.e., Haigh Field - #1105003) on the monitoring form for the city's water system. **These are two separate systems and reporting must also be separated.**

2. **Raw Bacteriological Monitoring**

Description of program: Wells are typically sampled on a quarterly basis. Water quality is generally good, except for the Railroad Avenue Well which has had sporadic positive results for total and fecal coliform. The Railroad Avenue Well was abandoned in 2012 but still needs to be properly destroyed.

All raw water sampling taps consist of copper tubing and a small valve. Reportedly all sample taps are now located upstream of the check valve. The operator said the well pump is always running when raw samples are collected and that chlorine is measured to ensure that no free residual is present.

3. **Groundwater Rule Monitoring Description of program:** The City submitted the Groundwater Rule Monitoring Form on April 7, 2010. The City states their plan is to sample all wells that could have contributed water to the system at the time the total coliform routine sample is collected. A routine total coliform positive sample was collected from the "Road M1/2 and Tehama" sampling location in February 2012. All three repeat samples from the distribution system were negative for total and fecal coliform. The Shop (Corp Yard) well was the only source supplying the affected area at the time. The repeat sample collected at the Shop well source was negative for both total and fecal coliform organisms.

4. **Source Water Chemical Monitoring**

Description of program: The City relies on the monitoring schedules provided by the Department.

Sample collection: Samples are collected by city water system staff.

Discussion & appraisal: It appears that a perchlorate sample is due for the Lely Park Well. A Delinquent Monitoring Schedule Report was given to Mike during the inspection. The well was in the process of being reconstructed when the sample was due. The City utilizes Basic Laboratory for the chemical analyses. Prior to December 2009, the City utilized FGL.

5. **Disinfection Byproducts Monitoring**

Description of program: The Disinfection Byproducts Monitoring Plan was received on August 16, 2004. The plan indicates that samples will be collected in August at six fire hydrants which are evenly spread around the perimeter of the distribution system. The average of the six results is utilized.

The most recent round of DBPR sampling occurred in June 2011. The TTHM results averaged to 0.2 ug/l, and the HAA5 results averaged to below the limit of detection.

In order to avoid the Stage 2 Initial Distribution System Evaluation (IDSE), the Department send the City a letter on September 17, 2008, which provided the City a "provisional 40/30" waiver from the IDSE. The requirement for the waiver was that DBP samples were to be collected by "no later than September 30, 2008". This is because "40/30 waivers" cannot be issued if there's been a monitoring violation, two sample rounds were necessary by 2008.

On September 18, 2008, the six fire hydrants were sampled for the DBPs. The results averaged 4.7 ppb TTHM, and ND for HAA5.

On August 18, 2009, six fire hydrants were sampled for TTHM but not HAA5. The average TTHM result was 2.6 ppb.

The City needs to submit the stage 2 monitoring plan (2 sites sampled once per year) by October 1, 2013. The average results of the 6 fire hydrants will not be allowed for Stage 2 monitoring. The City will have to select the two sites with the highest results and use these sites for compliance with the locational running annual average for TTHM and HAA5.

Sample collection: Performed by City personnel.
Discussion & appraisal: DBP results are low, testing is up-to-date.

6. **Disinfectant Residual Monitoring**
Description of program: Distribution free chlorine residuals are measured three times each week when routine bacteriological samples are collected. The City just started reporting the free chlorine residuals on the Department's standard form. The average for the submitted data in 2011 was 0.26 mg/L free chlorine.
Sample collection: Concurrent with TCR sampling.
Discussion & appraisal: The City keeps the chlorine residuals relatively low.

7. **Lead & Copper Monitoring**
Description of program: The city is on triennial monitoring for lead and copper.
Discussion & appraisal: Lead and copper in the distribution system was last tested in June 2011. The 90th percentile value for lead was below the limit of detection (<0.005 mg/l). The 90th percentile value for copper was 0.310 mg/l. These values are well below action levels. The next round of lead and copper sampling will be due during the summer months of 2014.

8. **Other Monitoring**
Description of program: There is no other monitoring.

H. OPERATION AND MAINTENANCE

1. **Planning & Personnel**
Are system improvements made in accordance with the Waterworks Standards? Reportedly, yes, but in older parts of Orland sewer and water mains commonly run down the same alleyways (see discussion under Section F.5., above).
Does the utility have up-to-date distribution system maps? Yes.
Is up-to-date copy of system schematic on file? Yes, included with bacteriological sample siting plan provided in June 2009 and the DBP monitoring plan from 2004.
What is the minimum grade requirement? Since there is no treatment other than disinfection, a treatment operator is not needed. The required distribution grade is D2 (confirmed on 3/23/10).

Table 6 – Personnel

Name	Title	Grade
Jere R. Schmitke	Public Works Director	T1/D2
Michael R. Schroer	Public Works Mechanic	T1/D2
Anthony A. Rodriguez	Operator	D2

2. **Cross-Connection Control Program**
Name of cross-connection control inspector(s): Jonathan Ikerd (Jon's Backflow – certified tester #09612) is contracted by the city to test and repair or replace backflow devices and assemblies.
Is there a copy of the cross-connection control ordinance on file? Yes, in the bacteriological sample plan folder.
Discussion & appraisal: Jonathan Ikerd performs annual testing of backflow devices and bills the customer. According to the 2011 annual report to the Department, there are 79 backflow devices in the City of Orland distribution system. Twenty two devices were installed in 2011. All 79 devices were tested in 2011. Seven devices failed, and all were either repaired or replaced.

Jere Schmitke determines whether a backflow device is required and what type. Under the city's cross-connection control program, he has the authority to inspect any customer's premises.

The City's wastewater plant is not connected to the City's domestic water system.

3. Complaint Program

Table 8 – Complaints Summary (2011)

Type	Number	Comments
Taste and odor	1	Repaired Water Leak
Color		
Turbidity		
Air		
Pressure	5	Customer Filters Plugged
Illness		
Other	17	Leaking water meters
Total	23	

Discussion & appraisal: Complaints are forwarded to the front desk and then passed on to Jere Schmitke, or one of his subordinates. Complaints are addressed the same day. The City efficiently tracks complaints and can provide a printed summary upon request.

4. Emergency Response

Is an up-to-date emergency notification plan (ENP) on file? Yes, dated May 16, 2011.
Emergency Response Plan: Yes. Latest version is from 2007.
Notification of ODW of significant system problems: The City notifies CDPH promptly when there are significant problems.
Discussion & appraisal: The water system is relatively problem free. The City is able to handle most situations in-house but appears to contact CDPH if and when necessary.

The Emergency Response Plan, which is required to be updated by the findings of the Vulnerability Assessment, was submitted to this office shortly after the January 2007 inspection.

5. Main Disinfection Program

Describe main disinfection program (i.e., method, contact time, chlorine residual, bacteriological tests, records) for new & repaired mains: The HTH tablet disinfection method is utilized after maintenance and for new construction. The city does not have a copy of the AWWA disinfection standards. On 3/24/10, the inspector emailed the city a link to the AWWA website, where the standards can be purchased.
Does the main disinfection program comply with AWWA specifications? Reportedly it does, though the city does not have a copy of said specifications (i.e., AWWA C-651).
Discussion & appraisal: The city should always have copies of AWWA's disinfection standards on hand and follow them.

6. Valve Maintenance Program

Describe program: The City exercises valves annually. Recently, the City purchased a valve exercising machine which has enabled the City to more easily work the valves.
Are number & location of valves satisfactory? (i.e., mainline, ARVR, blowoff valves, etc.): For the most part, though some areas of town (e.g., Railroad Avenue) could use additional valves.
Discussion & appraisal (i.e., are valves recorded on maps available to field crews? Are all valves located with valve covers raised to grade?): Valve covers are at grade and are painted for easy identification. However, a valve occasionally goes missing (e.g., inadvertently covered by asphalt). For this reason, the city would like to have the valves located by precision GPS and placed on a drawing of the distribution system. There are 52 valves in the distribution system ranging in size from 4-12 inches. All valves were exercised in 2011.

7. Flushing

Describe program: Deadends are flushed once per year or more frequently, if needed.

Approximate number of dead ends : 45 Percent with flushing valves: 100%
Discussion & appraisal: Pressure tanks at the wells are flushed two times per year. All of the dead ends were flushed in 2011.

8. **Emergency Backup Power**
Discussion & appraisal: Two wells have emergency power. Their combined capacity is 2,060 gpm, so an area-wide electrical outage (serious outages almost always occur during the wet season when the demand for water is low) could present difficulties for the water system. If a new well is added to the system, it is recommended that it have a backup source of power.

The wells with generators have auto-start upon loss of power. However, the auto-start switch is not tested. It is recommended that the auto-start switch be tested at least per the manufacturer's recommended frequency.

9. **Supervisory Control & Data Acquisition System (SCADA)**
Discussion & appraisal: There is no SCADA.

10. **Consumer Confidence Report (CCR)**
Discussion & appraisal: The City utilizes their consulting firm Rolls, Anderson and Rolls to prepare the CCR. A review of the 2011 CCR was performed after this inspection.

I. OVERALL SYSTEM APPRAISAL

The water system appears to be well operated and maintained. Water quality is good. It appears that a perchlorate sample is due for the Lely Park Well. The City seems to be doing a good job of operating the water system. The deficit in peak hour demand should be covered by the SRF project to replace the Railroad Avenue well. One deficiency was noted, please see the system deficiency record.

J. APPENDIX

System Deficiency Record

Report Updated by: James Reade, P.E.

3-20-13
Signature Date

SYSTEM DEFICIENCY RECORD

Name of System City of Orland System Number 1110001

Date Noted	Description of Defect or Hazard	Priority No.	Reported Corrected	Confirmed Corrected
9/18/08	The check valve at the Lely Aquatic Park well appeared to be leaking badly at the time of inspection. It needs to be repaired or replaced.	3		3/17/10
9/18/08	At the Lely well there is an open hole in the check valve on the vacuum release line. This hole needs to be plugged.	2		5/12/11
9/18/08	The air release on the Roosevelt hydropneumatic tank needs to be plumbed downward and screened.	3		3/17/10
9/18/08	Quarterly nitrate sampling needs to be conducted at the Railroad Ave well for a minimum four quarters. This deficiency was not addressed from the last inspection.	3		5/12/11
9/18/08	Since the system has exceeded 2,700 service connections three bacteriological samples must be collected each week.	3		3/17/10
9/18/08	Various chemical monitoring is listed as "Due Now" in the CDPH data base. A copy of the monitoring schedule is included with this report.	3		3/17/10
3/17/10	AWWA disinfection standards (C-652) are not being followed during annual reservoir inspections (T22 §64582).	2		5/12/11 – City agreed to do this when human contact is made inside the tank
3/17/10	Quarterly nitrate samples not collected per T22 §64432.1(a)(2).	2		5/12/11
5/12/11	Submit monthly treatment records, and calculate a monthly chlorine dosage at each well.	2		4/24/12
5/12/11	The Haigh Field Industrial Park bacteriological samples must be separated, and counted separately, from the City of Orland's results.	2		4/24/12
5/12/11	Cease routing chlorinated bearing lube water into the Railroad Avenue Well when the well is OFF.	1		4/24/12
4/24/12	Reinstall a raw water sampling tap before the check valve at the Suisun Well, the Corp Yard Well, and the Roosevelt Well.	3		3/19/13
3/6/13	Roosevelt Well: A solenoid valve needs to be used on the water lubrication system to prevent chlorinated system water from constantly entering the well when it is off.	3		

Priority Number:
1) Critical – complete immediately
2) High – complete within one week
3) Moderate – complete within one month
4) Lower – complete within six months
5) Long Term – contact this office to discuss time frame

If any deficiency can not be corrected within the time frame of the Priority Number this office must be contacted to request an alternate time for correction.