Appendix H

Water Supply Assessment

VILLAGE 5/SUD-B DEVELOPMENT PROJECT

City of Lincoln

SB 610 WATER SUPPLY ASSESSMENT

Village 5/SUD-B
SB 610 Water Supply Assessment

Prepared for the
City of Lincoln

Final

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SECTION 1 – PROJECT INTRODUCTION

1.1 INTRODUCTION

As the lead agency under the California Environmental Quality Act (CEQA), the City of Lincoln (hereafter referred to as the "City") is assessing the potential environmental impacts associated with the proposed development under the Village 5/Special Use District B (Specific Plan) in the western portion of the City. To support the CEQA analysis, a Water Supply Assessment (WSA) for the Village 5/Special Use District B Specific Plan is necessary (hereafter referred to as the "Proposed Project").

Statutory Background

Enacted in 2001, Senate Bill 610 added section 21151.9 to the Public Resources Code requiring that any proposed "project" as defined in section 10912 of the Water Code comply with Water Code section 10910, et seq. Commonly referred to as a "SB 610 Water Supply Assessment," Water Code section 10910 outlines the necessary information and analysis that must be included in an environmental analysis of the project to ensure that proposed land developments have a sufficient water supply to meet existing and planned water demands over a 20-year projection.

Proposed "projects" requiring the preparation of a SB 610 water supply assessment include, among others, residential developments of more than 500 dwelling units, shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space, commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space and projects that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.[1] The Proposed Project requires a WSA because it is a residential development of more than 500 dwelling units with more than 500,000 square feet of floor space.

The WSA will be incorporated into the CEQA document — an Environmental Impact Report (EIR) — being prepared for the Proposed Project (the Project EIR).[2]

Document Preparation and Approval

The WSA law requires that the lead agency – in this case, the City of Lincoln – identify a "public water system"[3] and further requires the lead agency to request that each identified public water system prepare a WSA for the project. If the lead agency is not able to identify a public water system that may supply water for the project, the lead agency must prepare the WSA itself after

[1] Water Code § 10912, subdivision (a).
[2] Water Code § 10911(b).
[3] A "public water system" is a system that provides water for human consumption that has 3,000 service connections.

consulting with "any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site."[4]

In this case, the City of Lincoln has prepared the WSA because the City plans to serve the Proposed Project and it lies within the City's General Plan Area. This document provides the necessary information for the City to make its determinations and to comply with the assessment of water supply sufficiency as required by statute.

Document Organization

This WSA supports the Proposed Project's environmental review process and analyzes the sufficiency of water supplies to meet projected water demands of the Proposed Project through the required planning horizon. The WSA is organized according to the following sections:

Section 1: Project Introduction. This section provides an overview of WSA requirements, and a detailed description of the Proposed Project, especially the land-use elements that will require water service.

Section 2: Proposed Project Estimated Water Demands. This section describes the methodology used to estimate water demands of the Proposed Project and details the estimated water demands at build-out of the Proposed Project.

Section 3: Other Estimated Water Demands. This section details the other water demands currently served by the City, anticipated to be served based on information in the City's General Plan, as well as known and planned modifications since the City's adoption of the General Plan.

Section 4: Water Supply Characterization. This section characterizes the City's water supply portfolio that will serve the Proposed Project along with other current and future water demands. City wells, along with water service contracts and agreements are characterized for normal, single dry, and multiple dry year conditions.

Section 5: Sufficiency Analysis. This section assesses whether sufficient water will be available to meet the Proposed Project water demands, while recognizing existing and other potential planned water demands within the City of Lincoln service area. To provide the necessary conclusions required by statute, the analysis integrates the demand detailed in Section 2 and Section 3 with the characterization of the City's water supply portfolio detailed in Section 4.

[4] Water Code § 10910(b).

1.2 PROPOSED PROJECT DESCRIPTION

The Proposed Project is a new residential, mixed use development on approximately 4,785 acres located in western Placer County adjacent to existing City of Lincoln developments located to the west. The Proposed Project is bisected by the new Highway 65 bypass, and sits between the airport on the Northern Boundary and the City's Wastewater Treatment Facilities on the Southern side.

Project Background

The Project Site is currently designated as Village 5 and Special Use District B by the City of Lincoln's 2050 General Plan. These designations were intended to direct City buildout in a logical and orderly manor based upon a projects geographic location. As such, these designations provide project proponents and the City with improvements and flexibility in how the lots are organized, situated, and constructed. For example, this allows the development to allocate less area to single residences and provide larger communal areas through redistribution of densities or to increase housing density to maintain environmentally sensitive areas as open space, while conforming with the General Practice Guidance Principles.

It should be noted that this Proposed Project also includes 160 acres of Village 6 and 270 acres of Special Use District A to create a final boundary with a more logical geographic area. Specifically the 270 acres of SUD A makes Nicolaus Road the boundary of the plan area and the 160 acres of Village 6 includes a portion of developable land isolated from the remainder of Village 6 by Auburn Ravine but is contiguous with Village 5. **Figure 1-1** depicts the proposed project location and land uses.

Project Description

This WSA includes an evaluation of the Proposed Project, which consists of approximately 8,206 dwelling units and 4.58 million square-feet of commercial space on 4,786.9 acres. The breakdown of residential uses includes 320 Rural Residential, 869 Country Estates, 2,690 Low Density, 2,830 Medium Density, 1,441 High Density, and 56 Village Mixed Use dwelling units. Commercial uses consist of 7.5 acres of Village Mixed Use, 29.9 acres of Village Center, 176 acres of Village Commercial, 130 acres of Commercial/Office, and 36 acres of Business/Professional. Public uses include 36 acres for three Elementary Schools, a 20 acre Middle School, a 49 acre High School, 13 acres of Public quasi public use (public services, etc.), and nearly 1,200 acres of Parks and Open Space. The existing on-site agricultural operations on the western edge of Village 5 will remain largely unchanged and serve as a 344 acre Agricultural Preserve. Layout of the Proposed Project uses the larger lot Rural Residential homes as well as open space to buffer the residential lands from neighboring operating agricultural operations.

Table 1-1 summarizes the Proposed Project's land use acreages and dwelling unit counts.

Figure 1-1 – Proposed Project Location and Land Uses

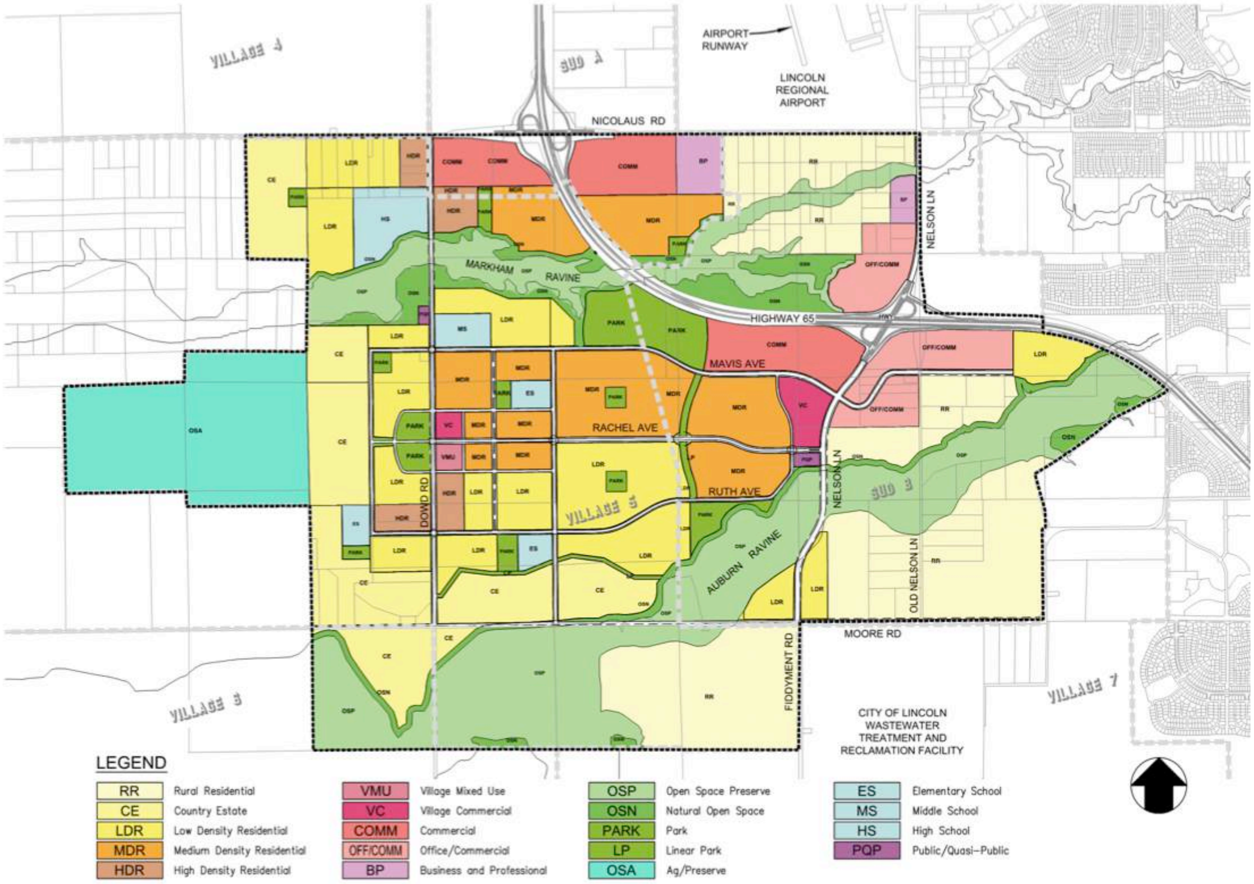

Table 1-1 – Summary of Project Land Uses and Acreages

Land Use	Gross Acreage	Net Acreage	Details
Rural Residential	759.1	652.4	320 Dwelling Units
Country Estate	453.3	435.9	869 Dwelling Units
Low Density	569.6	539.4	2,690 Dwelling Units
Medium Density	441.6	405.3	2,830 Dwelling Units
High Density	68.7	68.7	1,441 Dwelling Units
Village Mixed Use	7.5	7.5	56 Dwelling Units
Village Center	33.9	29.9	456,400 SF
Village Commercial	196.3	176.2	1,918,300 SF
Office/Commercial	159.9	129.9	1,696,800 SF
Business and Professional	42.8	36.4	395,800 SF
Elementary Schools	35.9	35.8	3 Campuses
Middle School	20.0	20.0	
High School	48.7	48.7	
Public/Quasi-Public	13.6	13.0	
Parks	149.2	126.6	
Linear Park	19.5	18.6	
Agricultural Preserve	343.5	343.5	Existing on-site agriculture is Lincoln High School Farm (Currently 280 acres)
Open Space	841.1	841.1	
Natural Open Space	218.1	202.0	
Right of Ways	225.6	225.6	
Highway 65	139.0	139.0	
Total	**4,786.9**	**4,495.5**	**8,206 Dwelling Units and 4.46 Mill SF**

Overall, the Proposed Project includes 8,206 dwelling units at average densities between 0.5 and 21 dwelling units per acre depending on unit type. The Proposed Project applies three different occupancy rates based on the type of dwelling unit for a total projected resident population of approximately 19,400.

1.3 Proposed Project Phasing

Table 1-2 describes the Proposed Project's anticipated construction phases for purposes of this WSA. Each phase represents a portion of the Proposed Project, focusing on particular land use classifications. Before constructing homes, commercial space, or other parts of the Proposed Project, the applicants will begin site grading and Project-wide infrastructure development. Some infrastructure and site grading will continue throughout all phases of the Proposed Project, as necessary. These activities include, among other things, installing facilities for potable water, recycled water (as appropriate for the Proposed Project), sewer, electric, telecommunications, gas, stormwater, and roads. During these activities, a small water demand will exist – referred to in this WSA as "construction water." This demand is included in the projected annual water demands presented in Section 2.

While the timing of the Proposed Project's ultimate build-out will be market driven, it is anticipated that all construction should be complete within about 20 years, inline with the 20-year planning horizon of this WSA.

Table 1-2 – Proposed Number of Units and Project Phasing

Project Element	Unit Count					
	Current	2020	2025	2030	2035	2040
Rural Residential	0	80	160	240	320	320
Country Estate	0	163	326	652	869	869
Low Density	0	505	1,009	2,018	2,690	2,690
Medium Density	0	531	1,062	2,123	2,830	2,830
High Density	0	353	705	1,058	1,441	1,441
Village Mixed Use	0	0	0	56	56	56

SECTION 2 – PROPOSED PROJECT ESTIMATED WATER DEMANDS

2.1 INTRODUCTION

This section describes the methodology, provides the supporting evidence, and presents the estimated annual water demands for the Proposed Project. For the purpose of estimating annual water demand, the Proposed Project is planned to develop according to the phasing in **Table 1-2**.

2.2 DETERMINING UNIT WATER DEMAND FACTORS

As detailed in Section 1, the Proposed Project has specific residential and non-residential land uses with defined residential lot-sizes, types of commercial and office uses, and other characteristics. As these attributes vary among the types of proposed land uses, so too will the water needs. To understand the water needs of the entire Proposed Project, unique demand factors that correspond with each unique land use are necessary. This subsection presents the methodology for determining the unit water use demand factors that become the basis of the Proposed Project water demand estimates. Two distinct groups of demand factors are presented: (1) residential, and (2) non-residential.

Values developed for each distinct group are based on several sources of information, details of which are provided below.

2.2.1 Current and Future Mandates

There are several factors that affect the development of unit water demand factors, ranging from state mandates to changes in the types of housing products being offered. These factors are incorporated into the determination of unit water demand factors, as discussed later in this section. Characteristics of the most important factors are described below.

2.2.1.1 Water Conservation Objectives

On November 10, 2009, Governor Arnold Schwarzenegger signed Senate Bill No. 7 (SBX7-7), which established a statewide goal of achieving a 20 percent reduction in urban per capita water use by 2020 for urban retail water suppliers.[5] Since the Proposed Project is yet to be built, this legislation has limited restrictive applicability.

The efforts undertaken by the City, and to a lesser extent Placer County and Placer County Water Agency, to comply with this statute will affect the Proposed Project's use of appliances, fixtures, landscapes and other water using features, through changes or additions to City and County

[5] California Water Code § 10608.20

ordinances and/or through an emerging "conservation ethic" seen in the region as a result of drought conditions.

2.2.1.2 Indoor Infrastructure Requirements

In January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (hereafter the "CAL Green Code") that requires the installation of water-efficient indoor infrastructure for all new projects beginning after January 1, 2011. The CAL Green Code was incorporated as Part 11 into Title 24 of the California Code of Regulations.[6] The Cal Green Code was revised in 2013 with the revisions taking effect on January 1, 2014; however these revisions do not have substantial implications to the water use already contemplated by the 2010 Cal Green Code.[7] The CAL Green Code applies to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure. All Proposed Project land uses must satisfy the indoor water use infrastructure standards necessary to meet the CAL Green Code.

The CAL Green Code requires residential and non-residential water efficiency and conservation measures for new buildings and structures that will reduce the overall potable water use inside each building and structure by 20 percent. The 20 percent water savings can be achieved in one of the following ways: (1) installation of plumbing fixtures and fittings that meet the 20 percent reduced flow rate specified in the CAL Green Code, or (2) by demonstrating a 20 percent reduction in water use from the building "water use baseline."[8] The Proposed Project will satisfy one of these two requirements through the use of appliances and fixtures such as high-efficiency toilets, faucet aerators, on-demand water heaters, or other fixtures as well as Energy Star and California Energy Commission-approved appliances.

2.2.1.3 California Model Water Efficient Landscape Ordinance and County Ordinance

The Water Conservation in Landscaping Act was enacted in 2006, requiring the Department of Water Resources ("DWR") to update the Model Water Efficient Landscape Ordinance

[6] The CAL Green Code is Part 11 in Title 24. All references in this WSA will be to the Chapter and Section numbers that appear in the adopted document which may be obtained by visiting the California Building Standards Commission web site at: http://www.documents.dgs.ca.gov/bsc/CALGreen/2010_CA_Green_Bldg.pdf

[7] "The 2010 CAL Green Code was evaluated for updates during the 2012 Triennial Code Adoption Cycle . HCD evaluated stakeholder input, changes in technology, implementation of sustainable building goals in California, and changes in statutory requirements. As such, the scope of the CAL Green Code was increased to include both low-rise and high-residential structures, additions and alterations." *Guide to the 2013 California Green Building Standards Code (Residential)*, California Department of Housing and Community Development, 2013.

[8] See CAL Green Code. For Residential construction, Section 4.303.1 provides the residential water conservation standard and Table 4.303.2 identifies the infrastructure requirements to meet this standard. Table 4.303.1 and Worksheets WS-1 and WS-2 are to be used in calculating the baseline and the reduced water use if Option 2 is selected. For non-residential construction, Section 5.303.2.3 provides the water conservation standard as well as the baseline and reduced flow rate infrastructure standards. Note that Worksheets WS-1 and WS-2 incorporate both residential and non-residential fixtures, yet the water use is still to be analyzed by "building or structure" as specified in Chapter 1, Section 101.3.

(MWELO).[9] In 2009, the Office of Administrative Law (OAL) approved the updated MWELO, which required a retail water supplier or a county to adopt the provisions of the MWELO by January 1, 2010, or enact its own provisions equal to or more restrictive than the MWELO provisions.[10] In 2015, MWELO regulations were again revised further impacting land use planning and water planning. Because the City of Lincoln is a "local agency" under the MWELO, it must require "project applicants" to prepare plans consistent with the requirements of MWELO for review and approval by the City of Lincoln. The City of Lincoln is in compliance with this state law and formally notified DWR of the City's adherence to the State's MWELO in a letter dated February 4, 2010. This WSA uses the conservative methods applicable to the MWELO in setting landscaping irrigation limits. For the purposes of this WSA, the MWELO limit is applied to all aspects of the Proposed Project.

The MWELO applies to new construction with a landscape area greater than 500 square feet.[11] The MWELO "highly recommends" use of a dedicated landscape meter on landscape areas smaller than 2,500 square feet, and requires weather-based irrigation controllers or soil-moisture based controllers or other self-adjusting irrigation controllers for irrigation scheduling in all irrigation systems.[12] The MWELO provides a methodology to calculate total water use based upon a given plant factor and irrigation efficiency.[13] Finally, the MWELO requires the landscape design plan to delineate hydrozones (based upon plant factors) and then to assign a unique valve for each hydrozone (low, medium, high water use).[14]

2.2.1.4 Metering, Volumetric Pricing, and Water Budgets

California Water Code §525 requires water purveyors to install meters on all new service connections after January 1, 1992. California Water Code §527 requires water purveyors to charge for water based upon the actual volume of water delivered if a meter has been installed. Consistent with current customer billing, the City will be billing the Village 5/SUD B water users on a volumetric basis. This will have little impact on the City in terms of implementation as the majority of the City was built in the last two decades, after the introduction of plumbing restrictions in the 1990s, and all City customers are billed volumetrically.

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[9] Gov. Code §§ 65591-65599

[10] California Code of Regulations (CCR), Tit. 23, Div. 2, Ch. 27, Sec. 492.4. The MWELO provides the local agency discretion to calculate the landscape water budget assuming a portion of landscape demand is met by precipitation, which would further reduce the outdoor water budget. For purposes of this WSA, precipitation is not assumed to satisfy a portion of the outdoor landscape requirement because the determination of an appropriate effective precipitation factor is highly uncertain given the various landscape slopes, terrain composition, concurrent watering schedules, etc.

[11] CCR Tit. 23, Div. 2, Ch. 27, Sec. 490.1.

[12] CCR Tit. 23, Div. 2, Ch. 27, Sec. 492.7(a)(1)(A)-(B).

[13] In calculating Estimated Total Water Use, the MWELO requires use of at least a 71% irrigation efficiency factor. Assuming 71% irrigation efficiency, the average plant factor must be 0.50. It would be possible to stay within the water budget if the average plant factor were higher than 0.50 by designing a system with an irrigation efficiency higher than 71%. Again the relationship between a Plant Factor (PF) and Irrigation Efficiency (IE) in the Applied Water formula is: AW=(ETo*PF)/IE.

[14] CCR Tit. 23, Div. 2, Ch. 27, Secs. 492.3(a)(2)(A) and 492.7(a)(2).

Though the water retailer for the Proposed Project will be billing customers on a volumetric basis, this action alone is not expected to substantially reduce water use. However, it is anticipated that the retail billing system will encourage and help maintain reasonable use (e.g. through the tiered rate structure and/or water budgets with penalties), so that the Proposed Project's water demands at build-out are not expected to grow as the Proposed Project progresses.

2.3 Residential Water Use Demand Factors

The Proposed Project anticipates five general lot-size designations with some residential units in the Village Mixed Use Area. The size of the lot has the greatest impact on the annual per-lot demand for water as the irrigation needs for landscaping increase with larger landscaped areas. In contrast, indoor water demands remain relatively consistent regardless of lot size, but do vary slightly based on the number of people per dwelling unit. Distinct demand factors are provided for the following residential uses:

- Indoor Residential Use – this category differentiates the slight variance anticipated to occur between the conventional housing and higher density housing to reflect the difference in people per dwelling unit.

- Outdoor Residential Use – this category addresses the landscape water demands for varying lot sizes planned within the Proposed Project.

For purposes of this WSA, residential unit water demand factors are described as "the acre-feet of water use annually per dwelling unit" – or simply put, acre-feet/dwelling unit (af/du).

2.3.1 Indoor Residential Water Use Factors

The Proposed Project's residential elements will be built in accordance with all applicable, then-current building codes including the Cal Green Code discussed previously.

Based upon the meter study conducted for the 2010 UWMP, the historic combined unit demand factor in the City's existing service area for newer houses is approximately 0.46 af/du/yr. At 2.4 persons per household, the per capita demand is about 171 gallons per person per day (gpd).[15] Because a vast majority of the existing customers are in homes built within the last decade, the current and future indoor unit demand factor is assumed to be nearly equivalent, even with the additional drivers such as the Cal Green Code.

Additionally, the size of the house has little impact on indoor water demands. While a bigger house may have more space dedicated to living areas, water use is predicated on bathroom fixtures and appliances, which are limited by the previously mentioned CAL Green Code. For

[15] See section 4.2.2 of the 2010 Lincoln UWMP

the purposes of this WSA, indoor demands are assumed to only vary slightly based on the number of people per unit. The Proposed Project's Specific Plan points to persons per household numbers that differ from previous City assumptions. This difference is due to the fact that a large number of the units in the City that are of the medium density size class are part of an age-restricted community. For the Proposed Project the projected persons per household are 2.86, 2.00, and 1.80 for the Low Density and larger, Medium Density, and High Density and smaller respectively.[16]

2.3.2 Outdoor Residential Water Use Factors

The primary factor driving outdoor water use on a per lot basis is the size of the lot and square footage of landscaping. The Proposed Project includes several residential lot types, each having a unique proposed housing layout and landscaped area. The plantings are intended to consist of low-water, drought-tolerant, and native plants. Backyards are not subject to limitations or standard developer installed landscaping; however homeowners will be strongly encouraged to follow the sustainability principles and recent drought actions may require stricter backyard landscaping plans.

To provide flexibility for the Proposed Project to landscape lots as needed and to provide a conservative assumption for this analysis, each lot is assumed to have a landscaped area equal to the lot square footage minus the house footprint and an amount of hardscaping in line with existing similar houses within the City. The remaining area of each lot is conservatively assumed to demand the maximum allowed by the MWELO. However, this provides for a conservative analysis since the landscaping goals set forth in the Specific Plan will likely result in a lower outdoor residential water demand than is estimated by this WSA because of actions taken by developers and end users to be more water efficient.

Review of historic City data indicates a wide range of planning numbers for indoor and outdoor unit demand factors. The outdoor demand factor for the various land classifications in the City was calculated from the 2010 UWMP meter study results and revised with data from a more recent meter study. This was achieved by looking at meter volumes for outdoor uses such as parks, and then dividing by the total acreage giving a range of demand factors. More details of this analysis can be found in the 2016 Lincoln Draft Comprehensive Water Master Plan.[17]

Based on the analysis preformed in the meter study, there was a range of outdoor demands. These demands changed due to the type of use and the differences in climate year to year. The resulting average outdoor demand factors for 2010, a milder year, was 3.60 AF/Ac. This is

[16] Persons per household numbers are stated in the Village 5 Specific Plan
[17] The final Comprehensive Water Master Plan is scheduled for adoption in September 2016.

consistent with previous assumptions for the area where the outdoor demand was estimated at 3.73 AF/Ac as 85% of ETo.[18]

The primary driver that could significantly change both existing residential and non-residential outdoor water demands is the MWELO, as discussed in **Section 2.2.1.3**. In following MWELO methodologies, landscaping demand can by calculated as an estimate of reference ETo as described in **Section 2.2.1.3**. Using demand values estimated for MWELO, a demand per acre or square foot is applied to the average lot size of each category to develop the outdoor demand for each residence type.

Using the outdoor unit demand factor of 3.73 af/ac/yr and associated landscape area for an average lot in the City, an estimate of current outdoor demands can be derived.[19] Using this same number and the average lot size from the Village 5/SUD B land-use plan, which is a current example of future development in the City, an estimate of future outdoor demands is created. All lot sizes are calculated to use this number. For example, the country estates are expected to share this demand per-acre value but with greater proportions of the lot dedicated to landscape versus areas covered by hardscape and the structure's footprint. The medium density lots are also assumed to have similar per-acre values, but with lesser proportions of the lot dedicated to landscaping. Thus, the country estates and medium density lots will see per dwelling unit outdoor demand factors that are greater and less than, respectively, that of a low-density dwelling unit.

The revised MWELO provides for determining the Maximum Applied Water Allowance ("MAWA"), where the maximum is determined as 55 percent of the reference evapotranspiration for the area for residential projects and 45 percent for non-residential, resulting in the following equation:

> *MAWA = (ETo) (0.62)(0.55 x LA), where ETo is the reference evapotranspiration in inches per year, LA is the landscape area, and 0.62 is a conversion factor. The resulting value is in "gallons per year"*

This number was derived for the 2010 UWMP and after conversion results in an irrigation limit of 3.73 af/ac/yr.[20] Based on a review of 2013 meter data, there was no significant change in use to justify a revision of the 3.73 af/ac/yr.

[18] ETo is the Evapotranspiration or a standard measurement used to calculate plant water demands. For more information on ETo, refer to MWELO. This value is still accurate for parks under the revised MWELO where special landscaped areas are allowed.
[19] This value is conservative for residential use under the revised MWELO but meter results for newer homes still support this value. It is anticipated that a small reduction in this value will be seen in the next meter study performed by the City.
[20] 2010 City of Lincoln UWMP. As discussed in this section, this value was found to still be appropriate for the 2015 UWMP based on meter data and has not been changed.

- **Rural Residential.** – The proposed 320 lots of this designation will include single family dwellings with accessory structures including accessory dwellings and structures such as barns. The average lot size is approximately 2 acres. These large lots will allow for development with large setbacks from roads and neighbors as well as allowing for some typically non-residential farming and animal husbandry activities consistent with rural residential properties. As such this WSA assumes an average 40% of the area to be used for landscaping resulting in an outdoor demand factor of 2.98 acre-feet.[21]

- **Country Estate.** – The proposed 869 lots of this designation will include large single family structures with extensive outdoor hardscapes. The designation for Country Estates for the Proposed Project has lots with an average size of 0.5 acres which is consistent with the City's existing Country Estate lot designation. For the purposes of this WSA, the Proposed Project will use the City's Country Estate outdoor demand factor, derived from meter data, of 0.67 acre-feet per year.

- **Low Density.** – The proposed 2,690 lots of this designation will include single family dwellings on lots with an average of 8,700 square-feet. As this lot designation is consistent with a designation analyzed as part of the UWMP meter study, the outdoor demand factor derived for the UWMP is used for the purposes of this WSA. It should be noted that while this lot type is most consistent with traditional detached single family dwellings, the developers would allow alternative lot configurations. These alternative configurations include alley, cluster, or halfplex developments. For the purposes of this WSA, the Proposed Project will use the City's Low Density outdoor demand factor, derived from meter data, of 0.27 acre-feet per year.

- **Medium Density.** – The proposed 2,830 lots of this designation will include a mix of single family dwellings as well as attached and detached housing on lots with an average of about 6,200 square-feet. Other configurations, as described in the specific plan, may include halfplex, cluster, alley, courtyard, green-court, zero-lot line, brownstones, townhomes, or condominiums. This lot designation is consistent with a designation analyzed as part of the UWMP meter study, however the lot size is larger than that of what was analyzed in the meter study. For the purposes of this WSA, the Proposed Project will use the City's Medium Density outdoor demand factor, derived from meter data, but increased proportionally in terms of an expanded landscape area. The average lot size from the Specific Plan results in an outdoor demand of 0.21 acre-feet per year.[22]

[21] This value may be high due to the revised MWELO, however the artificial 40% landscaped estimate has a significantly larger impact on this categories demand factor. The 2010 MWELO estimate is used in order to provide a conservative estimate of demand.

[22] The increase for 0.12 acre-feet per year to the .21 acre-feet per year is calculated in the same methodology used in the 2010 UWMP showing the increased demand caused by the 2015 revised .14 acre lot size vs the 2010 UWMP lot size of .08 for this demand category.

- **High Density.** – The proposed 1,441 units of this designation will include a variety of attached and multi-family dwellings on lots with an average of about 2,000 square-feet. As this lot designation is consistent with a designation analyzed as part of the UWMP meter study, the outdoor demand factor derived for the UWMP is used for the purposes of this WSA. This dwelling unit type is typically associated with community controlled outdoor spaces so the average outdoor demands were quite low in the City's meter study. For the purposes of this WSA, the Proposed Project will use the City's High Density outdoor demand factor, derived from meter data, of 0.04 acre-feet per year.

- **Mixed Use Residential.** – The proposed 56 units of this designation are a unique dwelling unit type typically existing above commercial space. Outdoor demands are minimal if present but have been found as part of the City's meter study. For the purposes of this WSA, the Proposed Project will use the City's Mixed Use outdoor demand factor, derived from meter data, of 0.03 acre-feet per year.

2.3.3 Summary of Residential Water Use Demand Factors

Table 2-1 provides a summary of the baseline demand factor for each residential land use category and the resulting unit demand factor used to estimate the Proposed Project's water use.

Table 2-1 – Summary of Residential Baseline and Proposed Project Demand Factors

Water Demand Category by Dwelling Unit (du) Type	Average Density (du/ac)	Indoor Factor	Outdoor Factor	Total Demand Factor (af/du)
Rural Residential 2 acres	0.5	0.19	2.98	3.17
Country Estate 0.5 acres	2.0	0.19	0.67	0.86
Low Density 8,700 SF	5.0	0.19	0.27	0.46
Medium Density 6,200 SF	7.0	0.18	0.21	0.39
High Density	21.0	0.17	0.04	0.21
Village Mixed Use	7.5	0.17	0.03	0.20

2.4 Non-Residential Water Use Demand Factors

The non-residential factors are developed from existing research performed for the 2015 UWMP including an extensive meter study and a separate commercial meter analysis conducted in 2014 for the ongoing City planning efforts.

For purposes of this WSA, the per-lot demand for non-residential classifications is described as either "the acre-feet of water use annually per acre of land", acre-feet/acre (af/ac), or as a single demand projection for a demand category such as an amenity center (e.g. which has a unit of "1"), acre-feet/unit (af/unit). These values reflect indoor and outdoor water needs expected for typical non-residential use for each of the following classifications:

- Village Mixed Use (first floor commercial only, the upper residential portions of this demand are addressed in **Section 2.3**)
- Village Commercial and Commercial
- Office/Commercial as well as Business and Professional
- Schools
- Public/Quasi-Public
- Parks
- Other miscellaneous uses, including open spaces, agricultural preserve, right-of-ways, and construction water

The method and basis for determining the unit water demand factor for each of these classifications is detailed in the following subsections.

Village Mixed Use

The proposed Village Mixed Use commercial facilities are anticipated to include 114,300 square feet (sf) of commercial space on approximately 7.5 acres with 56 residential units typically located above the commercial space. Water uses will primarily include retail, service, professional, and offices meant to serve the daily convenience needs of the Proposed Project's residents. It should be noted that this demand category is represented in the residential section for both indoor and outdoor demands but is still addressed for commercial demands. Based on the meter analysis preformed for the 2010 UWMP and the ongoing Water Master Planning effort, the mixed use category places housing and businesses in higher density situations than traditional commercial or residential demands. As such, both contribute to the overall demands of the mixed use category. Commercial, Office, and Professional demands are estimated at 0.99 acre-feet/acre for the purposes of this WSA.

Village Center and Village Commercial

The proposed Village Center facilities are anticipated to include 456,400 square feet (sf) of space located on approximately 29.9 acres. Water uses will primarily include retail, service, restaurants, banks, and entertainment that are meant to serve the daily convenience needs of the Proposed Project's residents.

The proposed Village Commercial facilities are anticipated to include 1,918,300 square feet (sf) of space located on approximately 176.2 acres. Water uses will include shopping centers, larger format retailers, hotels/motels, banks, and restaurants, meant to serve the whole of Lincoln.

The commercial meters analyzed as part of the Water Master Planning effort meter study produced numbers lower than the General Plan Estimate. Commercial, Office, and Professional demands are estimated at 0.99 acre-feet/acre for the purposes of this WSA.

Office/Commercial as well as Business and Professional

The proposed Office/Commercial facilities are anticipated to include 1,696,800 square feet (sf) of space located on approximately 129.9 acres. Water uses will primarily include professional offices, fitness centers, financial institutions, restaurants, other business services, and other appropriate supporting businesses meant to serve as freeway accessible moderately intensive employment.

The proposed Business and Professional facilities are anticipated to include 395,800 square feet (sf) of space located on approximately 36.4 acres. Water uses will include medical offices, clinics, law firms, accountant offices, insurance, real-estate agencies, financial institutions, government offices, social services, non-profits, and appropriate supporting commercial activities meant to serve the whole of Lincoln.

The commercial meters analyzed as part of the Water Master Planning effort meter study produced numbers lower than the General Plan Estimate. Commercial, Office, and Professional demands are estimated at 0.99 acre-feet/acre for the purposes of this WSA.

Schools

The Proposed Project includes three Elementary Schools, one Middle School, and one High School consisting of 35.5 acres, 20 acres, and 48.7 acres respectively. Each of the Elementary Schools is expected to occupy 12 acres and are located to optimally serve the residents of the Proposed Project. The Middle and High Schools are expected to serve students from outside the plan area and are located to maintain easy access. At buildout, the Specific Plan anticipates just over 4,200 students.

School demand factors in the 2010 UWMP are presented on an acre-foot per acre basis and were calculated based on information in the City's 2008 General Plan. For the purposes of this WSA, the City's existing school demand factor of 2.57 acre-feet/acre is used. This demand is consistent with the demands analyzed as part of the Water Master Planning effort.

Public/Quasi-Public

The Proposed Project includes 13 acres of Public and Quasi-Public land. This land use class is anticipated to include water uses from safety facilities such as fire stations, utilities, local government offices and facilities, school system uses, community centers, and other similar uses.

For the purposes of this WSA, the demand factor from the recent Water Master Planning effort for City Property will be used. The resulting demand factor is 2.80 acre-feet/acre.

Parks

The Proposed Project includes two distinct park types with both traditional parks and linear parks.

The Linear Parks are wide corridors that link areas with pedestrian and bikeway trails. The Specific Plan calls for 18.6 acres of these landscaped parks throughout the Proposed Project. Typically ranging from 40 feet to 100 feet in width, these parkways will use landscaping to provide both a corridor for travel and a buffer between land use types.

As described more fully in the Specific Plan, the traditional parks (totaling approximately 127 acres) consist of two large community parks and neighborhood parks spread through the residential areas. The two community parks are meant to serve the Proposed Project as well as the region with large designated turf fields, plazas, playgrounds, picnic areas, concession facilities, and a community garden. The neighborhood parks are smaller and located to allow for pedestrian access from the surrounding homes.

Park area demands were analyzed as part of the 2010 UWMP meter study and more recently verified to be correct as part of the Water Master Planning effort. For the Purposes of this WSA the City's demand factor of 3.55 acre-feet/acre is used.

Other Miscellaneous Uses

The Proposed Project has additional miscellaneous land uses including common area open space, an on-site agricultural preserve, and wildlife preserve areas. With the exception of the agricultural preserve, these uses have minimal impacts to the overall projected water use due to their limited size and water needs, or because they are temporary in nature.

Natural Open Space and Open Space Preserve

As of the preparation of this WSA, the Proposed Project includes about 841 acres of Open Space Preserve and 202 acres of Natural Open Space. While including informal trails and natural planted areas, a portion of the Natural Open Space will be planted with native landscaping to provide boarders. The remainder of the area will be undisturbed and not be irrigated.

Given the form and function of the landscaping of this Project element, a water supply will only be needed to establish plantings for the first few years. After plant establishment, these landscape features will be served by annual precipitation. Establishment of water demand factors are conservatively based on the City's landscape demand of 3.73 acre-feet/acre. For purposes of the WSA, half of this area will be established prior to 2020, with the remaining half to be established prior to 2025. Thus, the first half will no longer need to be irrigated as the remaining area is planted and established.

Agricultural Preserve

The Proposed Project includes on-site agricultural preserves totaling 343.5 acres of which 280 are existing use by the School District for student farming, to be continued as part of the Proposed Project. The proposed project expands the school farm from its existing size to provide for increased education farming opportunities.

As the existing school farming land is in operation, it already has a water supply. For the purposes of this WSA, it is anticipated that the farm will continue to use its existing water supply and will not be served as part of the Proposed Project.

Right-of-Ways

The Proposed Project includes approximately 365 acres of right-of-way. As part of the 2010 UWMP meter study, the City analyzed the meter demands for median landscaping and derived a demand factor that accounts for the majority of areas that is hardscape. For the purposes of this WSA a demand factor of 0.19 acre-feet/acre for right-of-ways is used.

Construction Water

As stated in Section 1, early phases of the Proposed Project will include site grading and infrastructure installation. These and other construction elements will require dust suppression and other incidental water uses. These are estimated to be nominal, and do not continue beyond the construction phases of the Proposed Project. For purposes of identifying incremental water demands, construction water is assumed for purposes of this WSA to be 10 acre-feet per year (this is about 3,200,000 gallons – or over 800 fill-ups of a 4,000 gallon water truck).

Summary of Non-Residential Demands

Table 2-2 provides a summary of the non-residential demand factors used to estimate the Proposed Project's future demands.

Table 2-2 – Summary of Non-Residential Demand Factors

Land Use	Demand Factor	Unit
Village Commercial	0.99	af/ac
Commercial	0.99	af/ac
Office/Commercial	0.99	af/ac
Business and Professional	1.22	af/ac
Elementary Schools	2.57	af/ac
Middle School	2.57	af/ac
High School	2.57	af/ac
Public/Quasi-Public	2.80	af/ac
Parks	3.55	af/ac
Linear Park	3.73	af/ac
Agricultural Preserve	0.0	af/ac
Open Space (establishment only)	3.73	af/ac
Natural Open Space	0.0	af/ac
Right of Ways	0.19	af/ac
Highway 65	0	af/ac
Construction Water	10.0	af/unit

2.5 PROPOSED PROJECT WATER DEMAND PROJECTION

Combining the Proposed Project's land use details and phasing as summarized in **Table 1-1** and **Table 1-2** with the demand factors presented in **Table 2-1** and **Table 2-2**, the water demands for the Proposed Project from initiation to build-out can be estimated. At completion, the Proposed Project is estimated to need approximately 5,814 acre-feet of water annually (prior to considerations of non-revenue water, described in the next subsection) and approximately 6,460 acre-feet when considering non-revenue water, as shown in **Table 2-3**. This value represents a nearly even split between indoor potable demands and outdoor non-potable demands.[23]

2.5.1 Non-Revenue Water Demands

The demand factors presented earlier in this section represent the demand for water at the residential or non-residential customer meter for each category. To fully represent the demand on water resources, non-revenue water also needs to be included. Non-revenue water represents all of the water necessary to deliver to the customer accounts and reflects distribution system leaks, water demands from potentially un-metered uses such as fire protection, hydrant flushing,

[23] As discussed previously, the estimated Proposed Project water demands do not include the existing golf course, clubhouse, or irrigated demands from existing on site agricultural uses. These existing water demands are considered under the water supply sufficiency analysis in **Section 5**.

and unauthorized connections, and inescapable inaccuracies in meter readings.[24] In most instances, the predominant source of non-revenue water is from system leaks – the loss from fittings and connections from water sources through treatment plants, tanks, pumping plants, major delivery system back-bone pipelines, and community distribution systems. Because a significant portion of the delivery system used to bring water to the Proposed Project will be new, the percentage of non-revenue water is estimated to meet the 10 percent goal set forth by the American Water Works Association. Therefore, the Proposed Project's water delivery system is expected to require an additional 645 acre-feet at build-out with 395 acre-feet of that required for outdoor demands that could be mostly met with recycled water.[25]

2.5.2 Potential Recycled Water Demand

A portion of the Proposed Project's demands will be met with recycled water (see **Section 4** for further discussion of water supply sources). Through the use of a recycled water or "purple pipe" system, a separate water line will be run to serve recycled water for non-potable use only – essentially to serve common areas and right-of-way landscaping throughout the Proposed Project.

As detailed in **Table 2-3**, park demands are only represented as outdoor demands. This means that the total recycled water demands are slightly lower than what is presented due to a small water demand meant to serve the potable requirements of the park facilities such as bathrooms and drinking fountains. It should be noted that these indoor demands are insignificant in comparison to the outdoor landscape demands. The most recent meter study puts the indoor demands at a conservative 2% of the total demands. With standard losses around 10%, the indoor park demands are considered insignificant and thus not subtracted for the purposes of this WSA.

Total demands for the Project elements to be receiving recycled water total approximately 645 acre-feet prior to the inclusion of system losses.

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[24] The American Water Works Association and the California Urban Water Conservation Council recognize the inherent non-revenue water that is either lost or not accounted for in urban treated water distribution systems and suggest purveyors strive for a value of 10% of all delivered water. Obtaining this value is dependent on numerous factors including the age and extent of distribution system infrastructure, meter rehabilitation programs, and how a purveyor accounts for actions such as fire flows and hydrant flushing.

[25] This non-revenue estimate does not include the demands assumed for the on-site agricultural preserves. These existing water demands will continue to be served by separate systems. Therefore, there are no distribution system losses that are recognized or included from these uses as part of the estimated water demands of the Proposed Project. This calculation assumes all outdoor demands are met with recycled water which is not likely possible.

Table 2-3 – Estimated Proposed Project Water Demands

	Unit Count or Acreage						Demand Factor	Demand (af/yr)					
Category	Current	2020	2025	2030	2035	2040	(af/du or af/ac)	Current	2020	2025	2030	2035	2040
Residential													
Rural Residential	0	80	160	240	320	320	0.19 (indoor)	0	15	30	46	61	61
							2.98 (outdoor)	0	238	477	715	954	954
Country Estates	0	163.0	326	652	869	869	0.19 (indoor)	0	31	62	124	165	165
							0.67 (outdoor)	0	109	218	437	582	582
Low Density	0	505.0	1,009	2,018	2,690	2,690	0.19 (indoor)	0	96	192	383	511	511
							0.27 (outdoor)	0	136	272	545	726	726
Medium Density	0	531.0	1,062	2,123	2,830	2,830	0.18 (indoor)	0	96	191	382	509	509
							0.21 (outdoor)	0	112	223	446	594	594
High Density	0	353.0	705	1,058	1,441	1,441	0.17 (indoor)	0	60	120	180	245	245
							0.04 (outdoor)	0	14	28	42	58	58
Mixed Use	0	0	0	56	56	56	0.17 (indoor)	0	0	0	10	10	10
							0.03 (outdoor)	0	0	0	2	2	2
DU Total	**0**	**1632**	**3262**	**6147**	**8206**	**8206**							
							Indoor Subtotal	0	297.7	595	1124	1501	1501
							Outdoor Subtotal	0	609.6	1219	2187	2916	2916
Commercial													
Village Mixed Use	0	4	7.5	7.5	7.5	7.5	0.99	0	4	7	7	7	7
Village Center	0	17	33.9	34	34	34	0.99	0	17	34	34	34	34
Village Commercial	0	25	49.1	98	196	196	0.99	0	25	49	97	194	194
Office/Commercial	0	20	40.0	80	160	160	0.99	0	20	40	79	158	158
Business and Professional	0	11	21.4	43	43	43	1.22	0	13	26	52	52	52
							Indoor Subtotal	0	78.5	155.3	270	446	446
Public													
Elementary School	0	0	12	24	36	36	2.57	0	0	31	62	93	93
Middle School	0	0	0	20	20	20	2.57	0	0	0	51	51	51
High School	0	0	0	49	49	49	2.57	0	0	0	125	125	125
Public/Quasi-Public	0	0	7	14	14	14	2.80	0	0	20	38	38	38
							Indoor Subtotal	0	0	50.4	276	307	307
Park	0	19	37	75	149	149	3.55	0	67	131	266	529	529
Linear Park	0	5	10	20	20	20	3.73	0	18	36	73	73	73
Ag/Preserve	0	344	344	344	344	344	0.00	0	0	0	0	0	0
Right of Way Landscaping	0	28	56	113	226	226	0.19	0	5	11	21	43	43
Open Space	0	1059	1059	1059	1059	1059	0.00	0	0	0	0	0	0
							Outdoor Subtotal	0	91.0	178.4	360	645	645
Other Miscellaneous Uses													
Construction Water	0	5	5	5	0	0	1	0	5	5	5	0	0
							Outdoor Subtotal	0	5	5	5	0	0
							Indoor Total	0	376	801	1670	2254	2254
							Outdoor Total	0	706	1402	2552	3560	3560
							Total	0	1,082	2,203	4,223	5,814	5,814
						Outdoor Non-revenue water	11%	0	78	156	283	395	395
						Indoor Non-revenue water	11%	0	42	89	185	250	250
							Total Indoor	0	418	890	1,856	2,504	2,504
							Total Outdoor	0	784	1,558	2,835	3,956	3,956
							Total Proposed Project Demand	**0**	**1,202**	**2,447**	**4,691**	**6,460**	**6,460**

SECTION 3 – OTHER ESTIMATED WATER DEMANDS

3.1 INTRODUCTION

As stated in this excerpt from Water Code Section 10910(b)(3): *"[T]he water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available…will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses…"* This section details the City's other "existing and planned future uses." For purposes of this WSA, existing and planned future uses are subdivided into the following:

- **Other Currently Proposed Projects** – in addition to the Proposed Project, the City of Lincoln (City) is the Lead Agency (pursuant to CEQA) for two additional proposed large development projects that have already completed WSAs but have yet to start construction. As Lead Agency, the City requested separate WSAs for each of these other projects though they were prepared prior to new land use information, revised demand estimates are now available. Because general plan land-use information is available for other planned developments, each of these projects have unique water demand estimates that are included in this WSA.

- **All Other Existing and Planned Future Uses –** in addition to the Proposed Project and the Other Currently Proposed Projects, existing customers and anticipated growth in the County must be quantified. The subdivisions of this category are:

  - **Current Customers and Uses** – using the 2015 UWMP as a baseline condition, this category reflects the current range of the City's potable and recycled water customers. Because these customers and uses already exist, keeping them separate from planned future uses allows an analysis to reflect anticipated reductions in use over time as Lincoln continues to implement its urban water conservation programs targeted at many of the existing customers.[26] As the majority of existing demand is from after the implementation of early water efficient plumbing codes, achievable conservation is minimal.

  - **Current Projects Underway** – within the City limits there are nearly 20 developments that are approved and ready to start or currently underway. This category includes nearly more than a dozen smaller development projects with as little as 10 units and projects underway with only half a dozen units to be

[26] New customers added to Lincoln's system will have lower demand factors, as discussed in Section 2, and will be less likely to implement additional conservation or see much reduction when changes are made. For instance, some existing customers may still have 3 gallon per flush toilets and many have 1.6 gallon per flush toilets, which when replaced, will likely only use 1.28 gallons. New houses will be constructed, per the CAL Green Code, with 1.28 gallon per flush toilets.

completed. This category also includes some parts of larger developments that are yet to be completed such as the southern portion of Twelve Bridges with more than 1,000 single family units remaining to be built.

- **Adjusted General Plan Land Use Growth** – in addition to the identified development projects currently undergoing CEQA review, the City's 2008 General Plan Update (GPU) anticipates continued urban growth throughout the City's sphere of influence. Adjustments to anticipated GPU growth to reflect the revised projections for proposed land-uses have been made. The adjustments discussed under this category include potential changes in the 2008 General Plan land use designations as identified in early project developments; specifically a revised water demand factor that accounts for the new efficient water use fixtures and building practices. [27]

- **Non-Revenue Water** – As discussed in Section 2.7.1, an additional demand is seen by the City to treat and deliver water to all customers. Referred to as non-revenue water, this water demand represents a 10 percent increase added to estimated customer demands. This value represents a long-term average experienced by the City of Lincoln.

3.2 Other Currently Proposed Projects

As mentioned in the previous section, there are a number of projects either in the early proposal stage or with completed WSA's but yet to have started construction. The estimate of water demand for each project typically follows the same methods used in Section 2 of this WSA, with specific unit demand factors applied to each unique land use element or was developed in a manor appropriate for the specific project. The other projects are:

- Village 1 – located on the western edge of the existing City and straddling highway 193, the Village 1 project has a completed WSA but has yet to start construction.
- Village 7 – located adjacent to the western edge of the Proposed Project, Village 7 has a completed WSA but has yet to begin construction.

Based on the detailed analysis completed in the recent Urban Water Management Plan effort, these "Other Currently Proposed Projects" represent approximately 3,765 acre-feet per year of new demand by 2040. **Table 3-1**, presented later in this section, summarizes the estimated water demands as determined and detailed in the other WSAs for each unique project with

[27] The City understands that projects not yet having a complete specific plan may change, however calling the demands out separately than other general plan growth will better allow the City to address water supply requirements as the relate to each project.

modifications from the UWMP effort.[28] The values shown are the estimated customer and use demands and include the additional water associated with non-revenue percentages attributable to the treatment and distribution for each project (see **Section 3.5**).

3.3 All Other Existing and Planned Future Uses

In simple terms, this category of use would typically reflect all the other water demands anticipated by the City that are in addition to the Proposed Project or other projects with a WSA including: other minor developments, developments currently underway, and future developments outside the City's current city limits without a specific plan. Because other potential changes to the 2008 GPU have been brought to the City's attention, and the City anticipates changes to current customer uses, a more detailed assessment of future demands is warranted. This subsection describes:

- Current Customers and Uses
- Current Projects Underway
- Adjusted GPU Land Use Growth

3.3.1 Current Customers and Uses

Current customers and uses in the contiguous Lincoln service area provide a baseline from which to assess additional demand from the Proposed Project and other potential planned uses. For purposes of the WSA, the deliveries to current customers in over the last few years were used to define this baseline. Based on the past few years of non-drought impacted water use, the City delivers approximately 10,000 acre-feet into its potable water system to meet current demands. This value includes the non-revenue water (see Section 2.7.1), including system losses, necessary to deliver these supplies from their respective treatment plants to the customer meter.

Given on-going conservation efforts, adoption of new rate structures, and other drivers, the City has seen an overall decrease in the annual customer use since the 2010 UWMP. Combined with this reduction in demand, the growth rate of new units coming online has left the system balanced. Therefore, the 10,174 acre-feet baseline used for the 2015 UWMP and this WSA is more representative of what would be seen from existing customers and uses if drought measures were not in effect.

An adjustment to this baseline is necessary, however, to project it into the future. A decrease is assumed that reflects on-going implementation of conservation and installation of new water-

[28] It should be noted that the 2015 UWMP effort reevaluated growth rates and presented different growth rate results than the previous water planning documents. Specifically, the City's growth rates presented in the 2015 UWMP follow a long-term average growth rate (3%) rather than the specific growth rates presented in each previous WSA. The 2015 UWMP growth adequately accounts for the proposed Village 5 growth rate as described by the project proponents but differs from previous WSAs which anticipated significant development would have proceeded before the 2015 UWMP was completed.

using fixtures by existing customers. The City's continued leadership in conservation will enable existing customers to retrofit toilets, receive appliance rebates for new household items such as dishwashers, water heaters and clothes washers, and implement irrigation efficiency improvements through various incentives. Additional reductions in existing customer demands will also occur simply as a result of the natural replacement of old fixtures and appliances with lower water-use devices. The demand reductions described in this WSA follows the trend documented in the 2015 UWMP. However, his demand reduction trend is less than the conservation the City achieved in the 2015 drought.

3.3.2 Current Projects Underway

The City of Lincoln currently has 17 projects underway within the existing City limits. This category of demand does not include planned villages that would require annexation. Six of these projects represent minor subdivisions with fewer than 30 units or developments with fewer than 30 units remaining to be built. A few of these developments are portions of much larger developments that have yet to be completed such as the remaining Twelve Bridges units which are to be built on the ungraded areas. Others include the mid-size developments generally with a few hundred units. In some instances, approved projects have been underway for more than a decade.

This class of development represents a significant challenge for the City as the number of developers involved makes tracking each development's progress and anticipated buildout difficult. Staff projections are the best available source of project timing but yearly estimates are uncertain. Given the location of these developments within the current city limits, it is anticipated that some of these developments will be completed within the 20 year time frame of this WSA and others may not be completed for a longer horizon into the future.

3.3.3 Adjusted GPU Land Use Growth

In addition to the planned developments, being the developments outside the City limits that will require annexation and have a WSA, the City has a number of other developments that are further out in the planning process. These other villages and SUDs are part of the general plan but have no specific plans as of yet. Land use projections are based off of housing density plans for vast areas and typical demand factors. These demands are expected to be re-evaluated as specific plans are developed. Since the General Plan, demand factors measured in the City have changed enough to necessitate re-evaluation of the projected demand impacts on the City. Though these projects will not likely be completed within the 20 year planning horizon of this WSA, some may start construction.

3.4 Non-Revenue Water Demands

The subtotal values in **Table 3-1** represent the demand for water at the customer's meter for each category. To fully represent the demand placed on the City's water resources, non-revenue water also needs to be included. Non-revenue water represents all of the water necessary to deliver to the meter and reflects distribution system leaks, water demands from potentially un-metered uses of fire protection, fire hydrant flushing, and unauthorized connections, and inescapable inaccuracies in meter readings. In most instances, the predominant source of non-revenue water is from system losses – the loss from fittings and connections from the City's water sources through tanks, major delivery system back-bone pipelines, smaller water mains, and single connection lines for individual customers.

Although the District has an established program for identifying and accounting for most unbilled and other system losses, there are still pipeline leaks, unmetered uses, unauthorized connections, meter inaccuracies, and other losses that are difficult to specifically quantify. Consistent with the District's methodology for calculating future water meter availability, non-revenue water is projected at a fixed rate of 10 percent.

As shown in **Table 3-1**, non-revenue demand for Existing and Planned Future Uses, not including the proposed project is estimated to be about 1,400 acre-feet per year by 2040.

3.5 Estimated Existing and Planned Future Uses

Combining the estimated water demand for Other Currently Planned Projects (see **Section 3.2** with the All Other Existing and Planned Future Uses demand (Current Customers, Projects Underway, etc.), the total estimated demand during each 5-year increment to 2040 is derived (see subtotal water demand in **Table 3-1)**.

Table 3-1 – All Other Existing and Planned Future Uses

Development	Estimated Demand (af/yr)					
	Current	2020	2025	2030	2035	2040
Other Proposed Projects	0	558	775	777	1,267	3,388
Current Demands	9,158	9,158	8,681	8,204	7,727	7,250
Projects Underway	0	265	440	509	516	648
GPU Land Use Growth	0	0	32	54	77	1,202
Total Water Demand	**9,158**	**9,981**	**9,928**	**9,544**	**9,588**	**12,489**
Loss (10%)	1016	1108	1102	1059	1064	1386
Total with Loss	**10,174**	**11,089**	**11,030**	**10,603**	**10,652**	**13,875**

3.6 Total Estimated Demand

The other existing and planned future water demands described in this section represent the total demands anticipated *in addition to* the water demands of the Proposed Project. Combining the estimated Proposed Project water demands of 6,460 acre-feet annually (see **Table 2-3**) with the estimated Existing and Planned Future water demands of approximately 14,000 acre-feet annually (see **Table 3-1**), a total estimated demand for City water supplies by 2040 is determined. Estimated existing and planned future water demands, inclusive of non-revenue water needs, for each 5-year increment to 2040 are presented in **Table 3-2**. The estimated demand for City Water supplies in 2040 is approximately 20,336 acre-feet.

Table 3-2 – Total Estimated Water Demands

Category	Estimated Demand (af/yr)					
	Current	2020	2025	2030	2035	2040
Current Customer Use	10,174	10,174	9,645	9,115	8,585	8,055
Projects Underway	0	295	489	565	573	720
Other Proposed Projects	0	620	861	863	1,408	3,765
GPU Land Use Growth	0	0	35	60	86	1,335
Proposed Project	0	1,202	2,447	4,691	6,460	6,460
Total Water Demand	**10,174**	**12,291**	**13,478**	**15,296**	**17,113**	**20,336**

Of note is that the estimated water demand for 2040 presented in **Table 3-2** is aligned with the 2015 UWMP demands. Differences are due to the delay caused by slower than expected growth` and due to efficiency increases realized or mandated since the UWMP.

SECTION 4 – WATER SUPPLY CHARACTERIZATION

4.1 INTRODUCTION

This chapter describes the City of Lincoln's existing and planned supplies for the 20 year period covered in this Water Supply Assessment (WSA). The water supplies that are used within the City and its Sphere of Influence (SOI) are derived from PCWA, NID, groundwater, and recycled water. All water supplies derived from these sources are managed in order to best meet the City's demands in different year types, reduce delivery costs, manage water quality issues, and handle drought and emergency situations. As such, water deliveries from each identified source may fluctuate in any given year because of management decisions, regulatory constraints, and hydrological conditions. Nevertheless, the City will provide retail water to meet the Proposed Project's needs.

4.2 HISTORICAL POTABLE WATER SUPPLIES

The City's water supplies have historically included water supplies that are treated and delivered through Placer County Water Agency's (PCWA) treatment and conveyance system. The water that is treated and delivered to the City consists of PCWA surface water rights and entitlements as well as Nevada Irrigation District (NID) water rights and entitlements. Under current contractual and operational conditions, PCWA's and NID's wholesale water assets are commingled in PCWA's treatment and conveyance system before they are delivered to the City. The City also uses groundwater during periods where treated surface water through PCWA's system is reduced as well as to manage summer maximum day and peak hour water demands. **Table 4-1** shows the City's annual surface water and groundwater potable water supply volumes that have been used to meet the City's treated water demands.

Table 4-1 – City of Lincoln Historic Water Supplies

	Supply (AF)		
Year	Ground Water	Surface Water	Total Supply
2006	623	8,753	9,376
2007	924	9,396	10,320
2008	1,085	9,443	10,528
2009	836	9,326	10,162
2010	962	8,253	9,215
2011	2,686	6,795	9,481
2012	2,620	7,471	10,091
2013	1,113	9,745	10,858
2014	691	8,257	8,948
2015	707	6,922	7,629

The City generally only purchases and delivers water that is necessary to meet the City's customers' demands. Historically, the City relied upon significant quantities of groundwater to meet demands but has since transitioned to acquiring surface water assets from PCWA and NID. Although the City may have the capability to access and use additional supplies from its various water sources, its operational relationships with its wholesale providers as well as its groundwater management foster a tempered approach – where the City acquires only those water assets that the City needs to meet its demands.

4.3 Existing Water Supplies and Entitlements

There are six primary water contracts and entitlements (collectively, "water supplies") that are used within the City's existing service area and SOI. All six of these water supplies are used to meet the water demands for the City's residents. And, in several areas within the City and its SOI, the water supplies can be interchanged for deliveries to certain water users. The water supplies are:

- PCWA contract entitlement
- NID contract entitlement
- Groundwater rights
- Recycled water rights
- PCWA raw water entitlements
- NID raw water entitlements

Each of these water supplies are subject to a unique set of conditions based upon their underlying water rights, the regulatory environment, the contractual limitations, and the City's ability to access and deliver the supplies to meet targeted end-user needs. Within this structural framework, the City manages its water assets to meet its customers' demands. Importantly, the structural framework morphs and changes requiring the City's water managers to adjust water asset management and system operations.[29]

4.3.1 PCWA Treated Water Supply Contract

In 2012, the City entered into an updated water supply contract with PCWA for delivery of treated surface water.[30] The PCWA Contract entitles the City to a Maximum Delivery Entitlement of 18,501,424.5 gallons (or 18.5 million gallons) of treated water supply.[31] The contract distinguishes between regulated and unregulated deliveries as follows:

[29] The City is investigating additional water assets that may be included in its water supply portfolio.
[30] The Contract is titled: "Contract between Placer County Water Agency and the City of Lincoln for a Treated Water Supply" dated November 13, 2012. (Hereafter, "PCWA Contract"). This contract is attached to this WSA as **Appendix A**.
[31] Article 5(b) PCWA Contract.

1. Maximum day Regulated Deliveries of **17,774,452** gallons per day; and
2. Maximum day Unregulated Deliveries of **726,972.5** gallons per day.

Regulated water deliveries are those deliveries where the City uses its system operations to deliver water on a demand pattern for certain uses within the City. Specifically, the City uses its facilities to regulate pressure and accommodate peak demands. Unregulated water deliveries are those water deliveries that are made to the City where PCWA uses its system operations to manage the water deliveries. PCWA's unregulated deliveries currently serve the City's "high elevation lots" generally in the Catta Verdera area.[32] The contract also contains opportunities for the City to purchase additional supplies beyond the Maximum Delivery Entitlement identified in the PCWA contract.

The City's PCWA contract provisions require PCWA to deliver water up to the maximum day delivery amount to the City for use in the City's service area. The contract contemplates delivery of water supplies derived from PCWA's water rights and entitlements as the basis for the supplies coming to the City. Water from PCWA is treated at PCWA's Foothill Water Treatment Plant and is then delivered to the City. The contract has a term of 20 years and a right of renewal for successive 20-year periods.

The maximum day water supply delivered to the City from PCWA's system is measured at the Lincoln Metering Station. In 2013, the most recent year without mandatory drought reductions, the City's maximum day (max day) regulated use under the contract was 13,944,160 gallons and the max day unregulated water use was 605,716 gallons.[33] This delivery included water derived from NID's water assets – which is described in more detail below.[34] The maximum day measurement – is just that – the single day in the calendar year when the City uses the most water as measured at the Lincoln Metering Station. As such, the max day water use can be modified depending upon which sources of water are used during specific times of the year and managing the timing of peak demand on the City's system.

In 2015, PCWA indicated that the City's remaining unused peak flow capacity under its contract was approximately 3.8 million gallons on the regulated side and 121,000 million gallons on the unregulated side.[35] PCWA estimated this amount based upon 2013 demand figures – the last normal water year where demand reductions were not mandated by the State of California. The PCWA Letter indicates that PCWA has additional future treatment and delivery capacity of approximately 3.86 million gallons per day (mgd) of unallocated capacity at its Foothill Water Treatment Plant and Sunset Water Treatment

[32] Article 5(c) PCWA Contract.
[33] Letter to Matthew Brower from Brent Smith dated March 1, 2016 at page 2. (Hereafter, "PCWA Letter").
[34] PCWA Letter at page 1.
[35] PCWA Letter at page 2.

Plant.[36] The recent treated water supply quantities delivered by PCWA to the City are shown in **Table 4-2**.

Table 4-2 – Historic PCWA Water Supplies Delivered to the City of Lincoln

Year	Supply (AF)
2006	6,940
2007	7,736
2008	7,779
2009	7,724
2010	6,772
2011	5,672
2012	6,173
2013	7,825
2014	6,617
2015	5,425

4.3.2 PCWA Water Rights

Importantly, the City's water supplies contemplated in the PCWA Contract for delivery to the City are grounded in PCWA's water rights and contracts. In other words, the reliability of water supply delivery to the City is grounded in the underlying water rights and contracts held by PCWA.

PCWA's surface water supplies consist of water from the North Fork American River and its tributaries – including water stored in its Middle Fork Project (MFP) – under water right Permits 13856 and 13858; Central Valley Project (CVP) project supply under CVP Contract 14-060200-5082A from the American River; and water purchased from Pacific Gas & Electric Company (PG&E) from the Yuba and Bear Rivers under two contracts: the 1982 Zone 3 Contract Purchase Agreement and the February 27, 2015 Water Supply Agreement. PCWA uses a limited amount of surface water from small creeks under its pre-1914 appropriative water rights. Collectively, all of these water rights are the source waters constituting the supplies available under the PCWA Contract.[37] **Table 4-3** below depicts PCWA's available supplies for the City of Lincoln under PCWA's various water rights.

[36] PCWA Letter at page 2.
[37] The City of Lincoln's 2015 UWMP provides more detail on the underlying water reliability issues associated with PCWA's water rights and contracts.

Table 4-3 – PCWA Available Surface Supplies[38]

Supply	Average/ Normal	Single Dry Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
	af/yr	af/yr	af/yr	af/yr	af/yr
Pacific Gas & Electric	110,400	55,200	82,800	82,800	82,800
Middle Fork Project	120,000	80,400	120,000	120,000	120,000
Central Valley Project	32,000	16,000	24,000	24,000	24,000
Pre-1914	3,400	850	1,700	1,700	1,700
Total	265,800	152,450	228,500	228,500	228,500

At build-out, the City anticipates relying upon as much as 37,000 acre-feet per year of water from PCWA as part of its water supply portfolio necessary to meet its municipal and industrial demands.[39]

4.3.3 NID Surface Water Contract and PCWA Delivery Contract

NID supplies irrigation, wholesale, and retail water to Nevada County and Placer County customers. Agricultural water use accounts for nearly 90 percent of the total demand on NID water supply. The remaining water supplied to Placer County residential customers by NID is primarily delivered directly through PCWA's system to single-family residential accounts. NID's mountain watersheds cover 70,000 acres and include the upper portions of the Middle Yuba River above Milton Diversion, Canyon Creek above Bowman Reservoir, and Deer Creek.

The City and Nevada Irrigation District (NID) entered a temporary water supply contract for water deliveries to NID customers and developments that will be incorporated into the City's service area upon annexation.[40] Through this agreement, NID provides additional surface water to the City for deliveries into the NID service area. The water contemplated in this agreement is provided by NID to PCWA for treatment and delivery to the City.

The amount of water available to the City from NID is quantified as approximately 12,000 acre-feet based on the City's long-term demand estimates. Historically, NID has delivered through PCWA's system as much as 1,920 acre-feet of water to NID's service area within the City's boundaries. The actual amount of water that will be available to the City in the future, however, has not been finalized and the existing agreement has no clause expressly quantifying the available supply.

[38] Availability of CVP supply requires necessary diversion and conveyance infrastructure to be built. Full diversion of the MFP requires additional conveyance capacity at the American River Pump Station as well as construction of Ophir Water Treatment Plant.
[39] This total supply may be used in all areas within the City based upon the City's, NID's, and PCWA's mutual understandings at that time.
[40] This document is attached as **Appendix B**.

Nevertheless, NID's 2015 Draft UWMP posits that water shortages to its overall water supply would only occur in the driest of years. In 2015, the driest year in California's history, NID experienced no water shortages. All reductions in deliveries to end-users were mandated by SWRCB regulations requiring reductions in consumptive use. However, in the event that shortages were to occur, NID would equally reduce water supplies between its domestic water customers and the City.

In September 2004, the City, PCWA and the Nevada Irrigation District (NID) entered into a temporary raw water sales agreement pursuant to which NID supplied raw water to PCWA treatment facilities for delivery within the City's water service area. **Table 4-4** below summarizes NID water deliveries into the City's service area from 2008 until present. The delivery mechanism for these supplies has been PCWA's treatment and delivery systems.

Table 4-4 – Historic NID Water Supplies Delivered to the City of Lincoln[41]

Year	Supply (AF)
2008	1,664
2009	1,602
2010	1,481
2011	1,123
2012	1,298
2013	1,920
2014	1,640
2015	1,497

The City and NID are jointly planning a separate water treatment plant that would serve NID water and potentially PCWA water to various areas in Lincoln and Lincoln's SOI.[42] This proposed facility could deliver as much as 17,500 acre-feet of water per year.

4.3.4 NID Water Supplies

NID's water supplies consist of a variety of water rights and contracts that implicate the reliability of these supplies for current and future deliveries to the City. Specifically, NID has numerous pre-1914 appropriative water rights to waters in the Yuba River, Bear River and Deer Creek watersheds as well as post-1914 appropriative water rights to waters in the same watersheds. Collectively, these appropriative water rights allow for water diversions and collections to storage approximating 450,000 acre-feet of water each year. In addition to these rights, NID has a water supply contract with Pacific Gas &

[41] Historic NID water supplies delivered to the City of Lincoln include 10 percent above metered amounts to account for delivery losses. Actual water use in the NID service area within the City and SOI has been higher than total NID water deliveries through the PCWA system because of other NID raw water deliveries to those locations.

[42] The Water Facilities/Planning Phase Agreement is included in **Appendix C**.

Electric Company for as much as 54,000 acre-feet of water as well as riparian rights that can be used for riparian purposes.

NID Carryover Storage

NID operates a system of surface water storage reservoirs directly related to its appropriative water rights. The nine reservoirs, with a combined storage capacity of 279,985 acre-feet include: Jackson Meadows, Bowman, Jackson Lake, Sawmill, Faucherie, French, Rollins, Scotts Flat, and Combie. **Table 4-5** shows the reservoirs and their storage capacity.

Table 4-5 – Water Supply Reservoirs

Reservoir	Capacity, ac-ft
Jackson Meadows	69,205
Bowman	68,510
Jackson Lake	1,330
Sawmill	3,030
Faucherie	3,980
French	13,840
Rollins	65,988
Scotts Flat	48,547
Combie	5,555
Total Capacity	279,985

NID holds its total carryover storage in its reservoir system to not less than 78,000 acre-feet annually. NID's carryover storage average is 129,400 acre-feet per year.

NID anticipates that it will have approximately 477,000 acre-feet of water available in normal years and approximately 359,000 acre-feet available in dry years for its wholesale, retail, and raw water deliveries. **Table 4-6** below shows NID's normal year, single dry year, and multiple dry year supply reliability forecast.

Table 4-6 – NID Available Water Supplies

Supply	Average/ Normal	Single Dry	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
	af/yr	af/yr	af/yr	af/yr	af/yr
Watershed Runoff	221,500	221,500	221,500	221,500	221,500
Carryover Storage	201,985	129,400	129,400	129,400	129,400
PG&E Contract	54,361	8,000	8,000	8,000	8,000
Total	477,846	358,900	358,900	358,900	358,900

On February 4, 2004, the City and NID entered into a Memorandum of Understanding (MOU) to assess the feasibility of providing the City with a treated water supply. Among the numerous efforts undertaken pursuant to the MOU was completion of the *Lincoln Area Water Treatment Plant Planning and Site Study* (WTP Study) in August 2005. As described in the WTP Study, the treatment plant would be capable of meeting projected annual water demand of 17,500 acre-feet per year. Of this amount, approximately 70 percent would be allocated to the City, which is estimated to be approximately 12,000 acre-feet per year.

On July 4, 2007, the City and NID established a conceptual framework for the development of a treated water facility including a Framework for Collaboration. The Framework for Collaboration entered into between the City and NID is included in **Appendix D**. The City and NID contemplate moving forward under the following four definitive agreements:

1. Agreement on the respective service areas of NID and Lincoln;
2. Agreement regarding the planning required to install the water treatment plant and associated facilities, including environmental evaluation (adopted by NID Board and Lincoln City Council in 2007);
3. Agreement on terms and conditions of treated water service to be provided, at wholesale, by NID to Lincoln; and
4. Agreement on the financing and construction of the identified Project.

NID is currently working on completing the planning, design studies, and engineering details necessary to better define the project and its alternatives. Once this step is complete, NID plans to move forward with the environmental review process. NID had planned to start operating the plant by 2015. NID expects the planning, design, engineering, environmental review, and permitting to take many years. However, in the interim, the existing agreement to route NID water through PCWA treatment facilities for delivery to the City will serve as the mechanism for NID to provide water to the City.[43]

4.3.5 Groundwater Supplies and Management

The North American Groundwater Subbasin (Subbasin), the aquifer system underlying the City of Lincoln, is one of 18 subbasins that comprise the Sacramento Valley Groundwater Basin. The Subbasin lies within portions of Sutter, Placer, and Sacramento Counties. The Subbasin is identified by the California Department of Water Resources (DWR) in Bulletin 118-2003 as Basin No. 5-21.64. The approximate total storage of the North American Subbasin is 4.9 million acre-feet of water, across a surface land area of approximately 351,000 acres. This Subbasin is the primary groundwater source for the City.

[43] NID's 2015 UWMP incorporates a value of approximately 12,000 acre-feet per year of water that the City of Lincoln will use to meet its demands within NID's service area in the City of Lincoln. The 2008 NID Regional Water Supply Project, Land Use and Water Demands Memorandum confirms this number and is attached as **Appendix E**.

The City maintains a network of wells that are used to augment water supplies to manage peak flows, provide emergency back up, and address drought conditions. The wells are interspersed throughout the City's water infrastructure system. The City currently has five (5) active production wells on-line and available for automatic operation through a SCADA system dedicated to the City water system. Selected characteristics of the 5 active wells are shown in **Table 4-7** below.

Table 4-7 – Active Wells

Well Name	Design Capacity, gpm	Year Built/ Upgraded	Status
Well No. 2-Nicolaus Rd.	900	1984/1990/2015	Operational
Well No. 6-Westwood	800	2000	Operational
Well No. 7-Moore Rd.	1,100	2002	Operational
Well No. 8-Fiddyment	1,400	2004	Operational
Well No. 9-Nelson	2,300	2005	Operational

Groundwater quality from the City wells meets primary and secondary State standards and requires only on- site disinfection.

The City's wells are used to supplement supply and manage operational pressures in the lower pressure zones. Availability of surface water supplies from PCWA and NID will continue to reduce the City's reliance on its groundwater assets. As urbanization occurs, groundwater pumping for municipal and industrial demands will increase but will likely be more than offset by the reduction in groundwater pumping by private agricultural users. **Tables 4-8 and 4-9** below show the City's historic groundwater pumping as well as its projected groundwater pumping into the future.

Table 4-8 - Historic Groundwater Pumping

Acre Feet							
2008	2009	2010	2011	2012	2013	2014	2015
1,085	836	962	2,686	2,620	1,113	691	707

Table 4-9 - Projected Groundwater Pumping

Acre-feet				
2020	2025	2030	2035	2040
1,119	1,271	1,486	1,701	2,056

The City currently limits groundwater use during normal years to 10 percent of its build-out demand – which is anticipated to be approximately 3,600 acre-feet. To maximize the benefits of this groundwater supply it is critical that the wells are used as a peaking source only in the summer months with daily production increasing with the daily demands. This type of operation can help offset the peak day demands on the surface water supply and help manage pipe velocities in peak hour scenarios.

The current groundwater pumping system has a combined capacity of 8.5 mgd or about 75 percent of the current maximum day demand which is sufficient as an emergency supply for all but the hottest summer irrigation days. The total capacity of the system on any given day will vary depending on the number of wells in operational condition.

4.3.6 Western Placer County Groundwater Management Plan[44]

In 2006, a Memorandum of Understanding was signed by Lincoln, PCWA and the City of Roseville to proceed with the West Placer County Groundwater Management Plan (WPCGMP) effort. The Basin Management Objectives are listed below:

- Management of the groundwater basin shall not have a significant adverse effect on groundwater quality;
- Manage groundwater elevations to ensure an adequate groundwater supply for backup, emergency, and peak demands without adversely impacting adjacent areas;
- Participate in State and Federal land surface subsidence monitoring programs;
- Protect against adverse impacts to surface water flows in creeks and rivers due to groundwater pumping; and
- Ensure groundwater recharge projects comply with State and federal regulations and protect beneficial uses of groundwater.

The City, working with PCWA and others, developed the WPCGMP.[45] This effort builds upon and expands the geographic coverage of the City's own GMP.[46] As documented in both the City's GMP and the WPCGMP, the groundwater conditions underlying the City and the SOI indicate currently and historically stable groundwater elevations and reliable water quality.

The City is planning to install additional wells within the Lincoln Sphere of Influence to be able to, when necessary in back-up and emergency situations, meet 75% of the average day demand at build out (approximately 34 mgd) with groundwater. The City is conducting ongoing groundwater investigations to help determine optimal well spacing and pumping schedules.

The City will continue its field and theoretical analyses over the next few years, developing a Lincoln area groundwater model and quantifying recharge and recoverable

[44] A summary of the groundwater basin is included as **Appendix F** and the WPCGMP **is provided as Appendix G** to this document

[45] Adoption by the City of Lincoln of the WPCGMP occurred in December 2007. The WPCGMP can be viewed at the City of Lincoln Public Works Department.

[46] The City of Lincoln November 2003 Groundwater Management Plan can be viewed at the City of Lincoln Public Works Department.

groundwater volumes. The City is currently in discussions with the Regional Water Authority, PCWA, the County of Placer and the City of Roseville regarding the sharing of groundwater data in the Western Placer County area, and developing a mutually beneficial Integrated Water Resources Management Plan. The Integrated Water Resources Management Plan will address anticipated water use policies and goals regarding surface water, groundwater and reclaimed water in western Placer County. All parties signed a Memorandum of Agreement in the fall of 2007 allowing implementation of the actions in the WPCGMP.

The WPCGMP will likely be the basis technical document for groundwater supply in the City of Lincoln related to the 2014 Groundwater Sustainability legislation. At this time, the City and its regional partners are determining the nature and jurisdictional reach of the groundwater sustainability actions but there is no reason to conclude that the sustainability plan will differ from the WPCGMP currently in use.

In 2015, a review of the groundwater conditions in the area of the City was drafted to support the Water Supply Master Plan and 2015 UWMP update. The following information was taken from an internal memo about groundwater conditions:

> *Groundwater conditions in and around the City appear, in spite of the sever drought, relatively stable. The basin elevations have not seen significant long-term decline and in some cases have shown some recovery. Groundwater elevations have seen increased seasonal variability in some wells and decreased in others but the natural recharge has been sufficient to refill the basin in and around the City. This indicates that the basin in and around the City is operating within it's safe yield. Although basin decline was caused by the 2011 canal failure and resulting emergency pumping, the basin was able to completely refill with no apparent long-term effects in the City area. This indicates that the 2011 pumping may have been above the area's safe yield, but did not cause a permanent decline in groundwater capacity. Unbroken periods of well records are difficult to locate in the area of this review but neighboring wells with new and old data show consistent elevations.*

A hydrograph from the groundwater memo is provided **Appendix H** of this WSA. For the purposes of this WSA, groundwater is considered a reliable supply.[47]

4.3.7 PCWA Raw Water

The City receives PCWA raw water for irrigation purposes through the Caperton Canal. This delivery manifests through a raw water contract paid for by the City of Lincoln. The PCWA raw water offsets potential potable water use within the City of Lincoln.

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[47] Draft 2015 Groundwater Conditions and Long Term Planning WSMP Support Memo, Tully & Young, Inc.

4.3.8 NID Raw Water

Areas within the City and its Sphere of Influence receive NID raw water for irrigation purposes. This includes Turkey Creek Golf Course area as well as Lincoln Crossing. The water deliveries and payment obligations are not controlled by the City. The raw water offsets potential potable water use within the City of Lincoln.

4.4 Recycled Water

Lincoln's Wastewater Treatment and Reclamation Facility (WWTRF) became operational in 2004 for the purpose of treating wastewater generated within the City. The WWTRF is capable of producing tertiary treated recycled water that meets DHS requirements in Title 22 for unrestricted reuse. The 2008 WWTRF Expansion Plan contemplates the expansion of the capacity of the WWTRF to accommodate an increase in flow as the City of Lincoln's treated water demand increases in the coming years.

While plant capacity will dictate the potential recycled water supply from the WWTRF, treated water demand and the wastewater generated from such demand will drive the quantity of water available for reuse after treatment. Because it is not certain at this time whether the City of Lincoln will partner with Placer County and/or the City of Auburn, for use of Recycled Water, the recycled water availability analysis that follows assumes only the WWTRF is only treating wastewater generated by the City of Lincoln's treated water service customers is the available reclaimed supply for Lincoln.

The City of Lincoln has identified existing and potential recycled water users.[48] The City of Lincoln identifies three recycled water use categories, including Agricultural Irrigation (i.e., crops), Landscape Irrigation (i.e., parks, golf courses, road medians, highway landscaping), and Industrial/Commercial (i.e., cooling, washing, and other process uses) uses. The City's Recycled Water Master Plan indicates that significant infrastructure will be constructed throughout the City in order to deliver treated wastewater to end-users. Since 2000, the City has been installing "purple pipe" within the new developments that will use the recycled water produced by the City. Uses for recycled water include irrigation of parks, school grounds, and median landscapes (including along the Highway 65 Bypass right of way) as well as industrial cooling and process water for a few of the City's primary industries. Recycled water may be available to meet uses in various new developments.

The current design daily average dry weather flow capacity of the WWTRF is 5.9 MGD. The City recently completed a WWTRF expansion and upgrade to increase the design average dry weather flow from 4.2 MGD up to 5.9 MGD to accommodate regionalization

[48] City of Lincoln, Technical Memorandum 1, Recycled Water Users Description and Phasing, April 16, 2007 (Lincoln Recycled Water Tech. Memo 1).

with the Placer County Sewer Maintenance District 1 (SMD#1) Wastewater Treatment Plant. The City's Master Permit allows for an increase in the permitted average dry weather flow up to 8.4 MGD to accommodate growth within the City's service area and additional regionalization projects.

Recycled water from the WWTRF is currently utilized for agricultural purposes or is discharged into Auburn Ravine. The anticipated recycled water uses within the City has been projected to account for as much as 6,822 acre-feet per year of the anticipated build-out water demand.

4.5 Village 5 Water Supplies

Village 5 water demands will be met with a combination of surface water and groundwater as shown in **Table 4-10**. Treated surface water from PCWA will be the primary source of water for Village 5. Consistent with the City's goal, groundwater will be used to meet no more than 10 percent of Village 5's annual water demands during normal years – an average value when considering the need to provide backup, emergency and peak day water supplies to appropriately manage surface water deliveries.

Table 4-10 – Village 5 Water Supplies

Supply (AF)	2020	2025	2030	2035	2040
Groundwater	120	245	469	646	646
Surface Water	1,082	2,202	4,222	5,814	5,814
Total Supply	1,202	2,447	4,691	6,460	6,460

4.6 City of Lincoln's Projected Water Supply Reliability

The City of Lincoln has reliable and redundant water supplies. Specifically, the City has surface water supplies under its contractual relationships with PCWA and NID that are derived from two vast and wet watersheds – the American River system and the Yuba-Bear system. Both PCWA and NID have planned to serve their respective service areas within the City's existing boundary and Sphere of Influence – calculating the City's future demands into their planning documents, including their 2015 UWMPs. In addition, the City has access to groundwater throughout its service area as well as recycled and raw water to meet non-potable demands. Together this portfolio of water supplies is robust and provides ample security for the City's long term water planning. Importantly, as noted above, the City will only access and use water supplies that it needs in any given year. For example, even though PCWA has allocated approximately 37,000 acre-feet of water to meet the City of Lincoln's needs, the City, in any given year, will only access and pay for the volume of water it needs to meet its existing demands. As such, the City will not be taking excessive water assets through its system even though it may have the ability to call on those assets as needed.

SECTION 5 – SUFFICIENCY ANALYSIS

5.1 INTRODUCTION

The analysis detailed in this section provides a basis for determining whether sufficient water supplies exist to meet the estimated water demand of the Proposed Project.[49] The WSA must provide a reasoned analysis of the likely availability of the identified supplies to serve the Proposed Project, while considering the demands of existing and other future planned-for demands on those supplies. [50]

This section includes:

- Analysis of sufficiency of groundwater to serve the Proposed Project, considering variations in supply and demand characteristics under normal, single-dry and multi-dry hydrologic conditions.
- Analysis of sufficiency of PCWA and NID treated water to serve the Proposed Project, considering variations in supply and demand characteristics under normal, single-dry and multi-dry hydrologic conditions.
- Analysis of conclusions for purposes of determining water supply sufficiency.
- Alternatives analysis of sufficiency when considering recycled water supply sources that will be used to meet a portion of the demands of the Proposed Project.

5.2 GROUNDWATER SUPPLY SUFFICIENCY ANALYSIS

The sufficiency analysis integrates the water demands detailed in **Section 2** with the water supplies characterized in **Section 4** in light of existing and planned future water uses. The results are presented in **Table 5-1** beginning with "current" conditions (recognized as 2008 to 2015 period)[51] and continuing with 5-year increments from 2020

[49] CWC § 10910 (c)(4) provides that "If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses."

[50] *Vineyard Area Citizens for Responsible Growth, Inc*. v. *City of Rancho Cordova* (2007) 40 Cal.4th 412, 430-32.

[51] This period was chosen to represent the "current" condition because of the minor increase in housing over that period. To account for drought impacts to supply and demand as well as extra pumping to address a PCWA canal outage 2011, 2012, 2014, and 2015 are removed from the average calculation. Using a period of normal use is more accurate for long term planning.

through 2040. While the analysis at various intervals before build-out is important, the most critical projection for the sufficiency analysis occurs in 2040. This analysis assumes that the Proposed Project is fully constructed in line with the Specific Plan, well before 2040.

Table 5-1 incorporates the Proposed Project's water demand projection in **Table 2-3**, assuming the Proposed Project develops as detailed in **Section 1**, and presents "existing and planned future uses" on the North American Subbasin expected during normal years, years with emergency supply issues, and long-term average.[52] The emergency usage represents years like 2011 when PCWA's Bear River Canal failed and surface water supplies were limited. This City was able to pump the groundwater basin at nearly triple the extraction volume of 2010 enabling it to maintain service to customers. Lower pumping in the following years has resulted in a recovery of levels in the groundwater basin and trending of long term average use back down to the 10% target. The normal year and emergency usage values are effectively pumping targets to maintain the long-term average.

Table 5-1 – Projected Use of Groundwater Supplies

Groundwater	Estimated Supply (af/yr)					
	Current	2020	2025	2030	2035	2040
Normal Year	--	1,106	1,213	1,377	1,540	1,830
Emergency Usage	--	3,687	4,043	4,588	5,134	6,100
Long-Term Average	999	1,229	1,348	1,529	1,711	2,033

Note: The current long-term average, being from 2008 to 2015 requires the removal of drought years with low use and years with high use from canal outages. If viewed as a running average, the City's use is still high from impacts of the canal outage but the trend is dropping closer to the 10% target each year.

5.2.1 Existing and Planned Future Uses

As required by statute, the analysis of sufficiency needs to consider existing and planned future uses that would be served in addition to the Proposed Project. Since there are other users of the same groundwater basin, the identification of existing and planned future uses expands beyond the boundaries of the City.

5.2.1.1 Western Placer County

In Western Placer County, the cities of Lincoln and Roseville, PCWA, and California American Water Company will rely upon some groundwater to meet municipal and industrial demands. Because of the large amounts of surface water provided by PCWA, neither the City of Roseville, California Water Service Company (West Placer Service Area), nor PCWA currently pump groundwater. As a result of the surface water supplies from PCWA and NID, the City of Lincoln has and will continue to limit groundwater to 10% of its overall supplies to meet emergency and peak demands during normal years.

[52] See California Water Code Section 10910(c)(3)

Service areas of the Cities of Lincoln and Roseville, PCWA, and California American Water Company comprise a majority of the western portion of the North American Groundwater Subbasin. As described in Subsection 4.6.5, the implementation of the Western Placer Groundwater Management Plan (WPCGMP) will help ensure that groundwater levels are not significantly impacted as urban areas expand. It is likely that additional groundwater is available as high agricultural us converted to low urban use.

Private agricultural users in western Placer County also pump some groundwater to supplement surface water deliveries. This use is limited and, as described below, accounts for less than 5 percent of total agricultural water supplies. This is largely due to the availability of surface water supplies from PCWA. Groundwater pumping by private agricultural users is not anticipated to increase from existing uses as crop types are not likely to change substantially. Further, agricultural groundwater use will likely decrease as urbanization occurs throughout the area.

No significant changes are expected in groundwater pumping in dry years in the Western Placer County portion of the North American Subbasin.

5.2.1.2 Eastern Sutter County

The portion of eastern Sutter County that overlies the North American Subbasin includes the Natomas Central Mutual Water Company (NCMWC) and the South Sutter Water District (SSWD). NCMWC's service area includes over 33,000 acres, a portion of which lies in Sutter County. NCMWC has rights and entitlements to over 120,000 acre-feet per year of surface water from the Sacramento River. Groundwater within NCMWC is pumped by privately owned wells to supplement surface water supplies. It is estimated that rice accounts for over 80% of crops grown within NCMWC. Despite the predominance of this high water-using crop, groundwater levels within NCMWC's service area have remained relatively stable. Any shift toward different crop types or urbanization of these lands would likely reduce reliance on groundwater in the future.

SSWD covers approximately 57,000 acres and supplies surface water to supplement groundwater as needed. SSWD is considered a "supplemental" water district because it does not provide full service to landowners. Instead, SSWD allocates supplemental surface water supplies according to acreage of land owned. Similar to NCMWC, rice accounts for a majority of agricultural land use within SSWD's service area. Most of SSWD's customers are agricultural-based and use private wells to obtain the majority of their water supplies.

5.2.1.3 Future Groundwater Demand Growth Outside the City

The City of Lincoln does not expect any significant growth in groundwater use in the North American Subbasin. This is due to the prevalence of delivered surface water use in the area and the lack of undeveloped farmland in the area. Further urban growth will displace agricultural activities, and like existing farming and residential uses, continue to more heavily rely on surface water supplies.

5.2.1.4 Future Groundwater Demand Growth by the City

To understand whether future groundwater uses within the areas of the SOI are similar to historic and existing uses of groundwater for irrigated agricultural, and therefore reasonably certain to exist, an analysis was completed for the 2008 General Plan Update EIR. Primary data sources and assumptions used in the analysis include:

1. Data:
    a. Existing and anticipated future crop acreage data for the lands within the Adopted 2008 General Plan Update area but outside the previous City boundaries - ECORP Consulting as used in the Adopted 2008 General Plan Update
    b. Evapotranspiration rates, crop coefficient values and precipitation – California Irrigation Management Information System (CIMIS) for Station #131 (Fair Oaks)
    c. Irrigation methods and associated irrigation efficiencies – Technical Memo: On-Farm Irrigation Systems Management (June 1994) prepared in support of the Bureau of Reclamation, Mid-Pacific Region’s Central Valley Project Improvement Act Programmatic EIS
2. Assumptions:
    a. Groundwater is used to regionally supplement PCWA raw water supplies:
        i. Early in the growing season for some PCWA contractors
        ii. Directly to irrigate crops with no surface water supplies
        iii. To supplement shortages in PCWA raw water based on a frequency of shortfalls once every 6 to 10 years (equivalent to a 10 to 15 percent occurrence of shortfalls in surface water supplies over multiple years).
    b. Groundwater use for early irrigations and for lands with no surface water is assumed to represent 10 percent of the total estimate of applied water
    c. Based on PCWA’s Integrated Water Resources Plan, shortages to users in Zone 5 are estimated to be 15 percent. Notations in the document, however, indicate raw water customers are cutback prior to wholesale treated water customers, which could lead to a conclusion that this assumption is too low of a reduction (i.e. shortages would be greater than 15 percent for irrigated agricultural customers).
    d. The long-term annual average of this shortage condition is represented by assuming an additional two percent of the applied water is met with groundwater every year (e.g. Nine of ten years has 100 percent surface supply and one year has only 85 percent).

e. Combined, groundwater is assumed to meet 12 percent of the annual applied water demand for the crops within the SOI under both existing and future conditions.

In order to understand the relationship between existing and future groundwater use within the Adopted 2008 General Plan Update area and estimates of annual applied water demands for agriculture needed to be calculated. **Table 5-2** indicates the estimated applied water use under the existing crop acreage and crop mix, as well as that expected after build-out according to the Adopted 2008 General Plan Update. Estimates of annual applied water for irrigation uses were derived by multiplying existing and projected acreages for various crop types by applied water demand factors.

Table 5-2 – Estimated Current and Future Groundwater Pumping by Agricultural Users in the City's SOI

Irrigated Acres in SOI			Applied Water	Total Applied Water (AF/yr)	
Crop	**Existing**	**Future**	**per Acer (feet)**	**Existing**	**Future**
Alfalfa	220	129	4.7	1,034	605
Orchards	100	95	4.4	441	418
Pasture	901	193	4.8	4,325	927
Rice	3,168	515	5.7	18,060	2,933
Row Crops	2,116	689	4.6	9,735	3,169
Totals	6,506	1,620	-	33,595	8,052

Using the conservative assumption that only 12 percent of the total applied water needs are met with groundwater, it is estimated that current use of groundwater within the SOI represents approximately 4,000 acre-feet annually. Under future conditions, groundwater use for irrigated crops is estimated to be about 1,000 acre-feet per year. This represents a reduction of about 3,000 acre-feet per year from current conditions as a result of irrigated lands taken out of production for new land uses proposed in the Adopted 2008 General Plan Update.

However, although not serving agricultural needs, these lands will have urban uses that will be served groundwater on an average of 10 percent of the demand. Thus, a comparison of the existing, sustained groundwater use to that anticipated upon conversion will help assess whether the urban uses increase, decrease or match the historic groundwater use on the same lands. In order to perform this comparison, only the portion of demand anticipated from the additional lands of the SOI should be compared.

As previously stated, the City's goal for groundwater use in normal years is 10 percent of the anticipated demand at build out. In the Adopted 2008 General Plan Update general plan that number was approximately 5,300 acre-feet per year. Given that the City already uses groundwater and has anticipated using groundwater to meet emergency, dry, and back-up water demand within the existing City, a portion of the anticipated future demand for groundwater is already represented in planning documents or reflected in the current and historic stable groundwater conditions underlying the City. Using the same 10 percent goal and the revised build-out demand of 35,986 developed from ongoing Water Master Planning efforts, approximately 3,600 acre-feet of groundwater had been anticipated to meet previously planned build-out demands. Therefore, the SOI acreage in the 2008 General Plan Update results in an incremental increase in the anticipated use of groundwater, while still remaining at a goal of 10 percent.

The increment of groundwater demand necessary to meet the expanded built-out water demand under the Water Master Planning efforts is therefore only about 1,600 acre-feet[53]. Comparing this to the estimated decrease in use of groundwater for irrigated agriculture indicates an offset of approximately 2,400 acre-feet . Thus, the incremental increase in use of groundwater as part of the City's water supply portfolio represents a 2,400 acre-feet net reduction in groundwater pumping within the SOI. As documented in the WPCGMP and the City's GMP, the groundwater elevations underlying the City and the SOI have remained stable at current conditions.

Therefore, it is safe to conclude that the increment of additional groundwater use for the City's planned growth would be fully offset with reduced pumping and still maintain current stable groundwater conditions. Continued monitoring and management of the groundwater as indicated in both the WPCGMP and the City's GMP will help maintain this condition over time while still providing a reliable increment of groundwater for the City's emergency, dry and peak water demand needs.

5.3 PCWA and NID Supply Sufficiency Analysis

The following section details the sufficiencies of PCWA and NID supplies for both normal, single-dry, and multi-dry year periods.

5.3.1 Normal Year Supply

During normal years, the City of Lincoln will rely upon a portfolio of water supplies consisting of treated surface water from PCWA and NID, groundwater and recycled water. Water supplies that are projected to be available to meet water demands projected as described in Section 2.5 are shown in **Table 5-3**.

Table 5-3 – Projected Water Supplies Needed for Demands

Source (AF)	2020	2025	2030	2035	2040
PCWA	8,939	9,766	11,400	12,491	13,035
NID	2,123	2,364	2,366	2,911	5,267
Groundwater	1,229	1,348	1,530	1,711	2,034
Total	12,291	13,478	15,296	17,113	20,336

[53] 3,600 acre-feet less the current ~1,000 acre-feet average use.

According to PCWA's 2015 UWMP and the City's 2015 UWMP, up to 37,000 acre-feet will be available to the City of Lincoln for use to meet municipal and industrial demands by build-out. However, with the recent slowdown in the economy and subsequent slow down in new construction, the City does not anticipate a need for more than about 18,000 acre-feet per year of treated surface water delivered by PCWA to meet demands through 2040.

As discussed in Section 4, the City is currently working with NID to ultimately receive approximately 12,000 acre-feet per year of treated water from NID facilities. No more than 5,300 acre-feet per year of water should be needed from NID through 2040.

As previously described, the City's goal is to use groundwater pumping for approximately 10 percent of demands during normal years. The amount of groundwater represented in **Table 5-3** is consistent with this goal.

5.3.2 Single-Dry and Multiple-Dry Year Sufficiency Analysis

During single-dry and multiple-dry water years, the City's surface water supplies may be subject to reductions due to characteristics of PCWA's and NID's sources of supply. As discussed in **Section 4**, the City could be subject to a reduction in PCWA supplies during a single-dry year and likely no reduction during multiple-dry years. These reductions are based on a full normal year delivery of 37,000 acre-feet at build-out conditions as allocated to the City by PCWA.[54] This document, as shown in **Table 5-3**, does not anticipate a need for PCWA supplies to surpass 15,000 acre-feet by 2040. Therefore, for this assessment projected single-dry year reductions are based on the PCWA maximum reduction of 25% in dry years.[55] PCWA's various supplies all have different dry year reduction values but the PCWA contract does not specify which water supply the City is to be served by. PCWA has indicated that supplies could be reduced by only 5 percent in multiple dry years.[56]

Based on analyses in NID's 2015 Draft UWMP, it is anticipated that the City's supply from NID would be subject to reductions during dry periods at the same level as other NID customers. NID, as demonstrated in 2015, may not reduce supplies at all during dry years.[57] Accordingly, the City is not anticipating any supply reduction from NID in dry or multi-dry years. To manage water supplies, the City will increase groundwater pumping to supplement any shortages resulting from curtailments to its PCWA and NID supplies, that allow it to stay within its long-term annual average pumping of 10%. Management of the City's water supplies during dry periods is shown in **Table 5-4**.

[54] Assuming the NID treatment plant is not online to supply NID water.
[55] Placer County Water Agency 2015 Urban Water Management Plan at 7-2.
[56] Placer County Water Agency 2015 Urban Water Management Plan at 7-3.
[57] All reduced water deliveries in NID's service area resulted from SWRCB's mandated water conservation requirements rather than a lack of supply in NID's system.

Conservative modifications to the estimated demands of the Proposed Project are made to reflect conditions expected during single-dry and multiple dry year events as follows:

Single dry year: Landscape irrigation demands will increase to reflect the generalized earlier start of the landscape irrigation season due to limited rainfall in the single driest year. Since this increase only applies to the outdoor portion of a customer's demand, an adjustment factor of 5 percent is applied to the total normal-year water demand values to conservatively reflect the expected increase in demand for water.

Multiple dry years: During multiple dry years, demands are also expected to increase during the first in a series of dry years – as discussed above for the single dry year condition. However, during the second and third consecutive dry years, demands also are expected to reflect water shortage contingency plans implemented by the municipal water purveyor.[58] During the second year, the water purveyor is assumed to request a reduction target of 10 percent. The resulting demand, however, only reflects a 5 percent reduction to accommodate conservatively low participation by customers. During the third year, the purveyor is expected to set a conservation target of 20 percent. For this analysis, the demands in the third year are only reduced by 10 percent to again reflect a conservatively low participation rate by the customers. Thus, during multiple dry conditions, demands both increase due to reduced effective precipitation, but also decrease (from the increased demand) to reflect implementation of short-term conservation measures.

Table 5-4 – Water Demand and Supply Comparisons during Normal, Single-Dry, and Multiple-Dry Years

Year	Projected Baseline Water Demand (AF)			Hydrologic Year Type	Water Supplies (Acre-feet)					
	City of Lincoln	Village 5	Total		PCWA Supply	NID Supply	Groundwater Supply*	Recycled Water	Total Supply	Surplus
2020	11,089	1,202	12,291	Normal	13,239	12,000	2,854	3,300	31,393	19,102
				Single Dry	9,929	12,000	2,523		24,452	12,162
				Multiple Dry	12,577	12,000	2,788		27,365	15,074
2025	11,030	2,447	13,478	Normal	15,421	12,000	3,117	3,748	34,286	20,808
				Single Dry	11,566	12,000	2,731		30,045	16,567
				Multiple Dry	14,650	12,000	3,040		33,438	19,960
2030	10,604	4,691	15,296	Normal	18,335	12,000	3,472	4,381	38,188	22,892
				Single Dry	13,751	12,000	3,013		33,145	17,849
				Multiple Dry	17,418	12,000	3,380		37,179	21,883
2035	10,653	6,460	17,113	Normal	21,187	12,000	3,820	5,015	42,022	24,909
				Single Dry	15,890	12,000	3,290		36,195	19,082
				Multiple Dry	20,128	12,000	3,714		40,857	23,744
2040	13,876	6,460	20,336	Normal	25,533	12,000	4,360	6,063	47,956	27,620
				Single Dry	19,150	12,000	3,721		40,934	20,598
				Multiple Dry	24,256	12,000	4,232		46,551	26,216

*GW pumping as listed in this table reflects the long term average projections from the 2015 UWMP. Actual pumping in a given year will be more inline with the discussion in **Section 5.2**.

[58] Though the municipal water purveyor does not exist yet for the Proposed Project, this WSA assumes that whatever purveyor is established will develop a water shortage contingency plan to address drought conditions. This would be consistent with the County's ordinance regarding water conservation.

As illustrated in the table above, the City's planned water supplies will be able to meet all current and future water demands in the depicted normal, single-dry, and multiple-dry water years without the need to implement demand reduction measures. Nevertheless, in the event that demand reduction is needed, in 2015, the City demonstrated its ability to reduce demands by over 25%.

5.4 Sufficiency Analysis Conclusions

As detailed in **Section 2**, this WSA estimates water demands for the Proposed Project to be 6,460 acre-feet per year at build-out during normal conditions (including non-revenue water demands).

Table 5-4 provides a detailed comparison of projected water demands and available water supplies. As shown in the table, surface water supplies are readily available and groundwater supplies are expected to be pumped as needed, with no identified "shortfall" between available supplies and projected demands.[59] Based on this representation, sufficient water will be available under all hydrologic conditions in each of the 5-year increments through 2040.

When compared to the normal historic pumping conditions in the North American Subbasin, the addition of the Proposed Project combined with planned growth in the City is expected to increase pumping during normal conditions from approximately 1,000 acre-feet (see **Table 5-3**) to approximately 2,100 – essentially doubling. Coupled with the City's conjunctive management efforts in partnership with PCWA – stabilizing groundwater elevations in the North American Subbasin – the Subbasin is expected to continue to sustainably provide for the supplemental groundwater needs of the City.

Groundwater elevations throughout western Placer County have remained relatively stable for the past 25 years. As documented in the WPCGMP, groundwater elevations in many locations have actually risen during that time. As urbanization occurs in and around western Placer County and the City of Lincoln, annual groundwater pumping from the North American Subbasin is not anticipated to change significantly from existing quantities for the following reasons:

- Availability of surface water supplies from PCWA and NID will continue to limit reliance on groundwater to meet municipal and industrial as well as agricultural water demands.

[59] The City of Lincoln utilizes its water assets on an as needed basis. As described in Section 4, the City does not acquire additional supply beyond its demand even though the surplus supplies are available from PCWA and NID. Groundwater is used as a backup supply and to manage system peaking.

- As urbanization occurs, groundwater pumping for municipal and industrial demands will increase but will likely be more than offset by the reduction in groundwater pumping by private agricultural users. This is demonstrated by the analysis shown in **Table 5-2**.

- Efforts by partners of the Western Placer County Groundwater Management Plan will help maintain sustainable groundwater resources in western Placer County.

Through 2040, the City will rely upon treated surface water from PCWA and NID, groundwater and recycled water to meet water demands within its service area. During single-dry and multiple-dry years, the City may experience curtailments of its treated surface water supplies from the PCWA WTP. Under extreme conditions, the City will increase groundwater pumping to offset this potential reduction in surface water supplies or reduce demands as demonstrated in the 2014-15 drought.[60]

Water demand projections were developed for the growth described in **Section 2.5**. Sufficient water will exist to meet all current and projected water demands through 2040 during normal, single-dry and multiple-dry years. PCWA's and NID's planned infrastructure development parallel the City's acquisition of water assets. If currently planned PCWA infrastructure improvements described below are completed, then the supply issues for the City are limited to the completion of the Phase 3 pipeline (currently in development). This increase in planned capacity would allow for additional deliveries sufficient to supply the City through the build-out of Village 5 without having to rely more heavily than necessary on groundwater.

With the combination of existing surface and potential groundwater supplies both the City and the Village 5/SUD B development have adequate supplies in all water year types from current conditions to the build-out of Village 5/SUD B.

5.5 Water System Capacity

The City of Lincoln has ample water supplies available from PCWA and NID to meet its long-term water demands while maintaining its 10% groundwater production goal. The City's system is designed to deliver peak flows under normal conditions coupled with fire suppression requirements. Thus, although sufficient supplies are available, the critical component is the ability of the infrastructure to deliver those supplies while still meeting fire safety needs. The sections below described the infrastructure development necessary to deliver the water supplies to meet the City's long-term needs.

[60] As shown in the 2011 catastrophic canal failure, the City did augment water supplies with increased groundwater pumping. Moreover, the SWRCB's 2015 mandated water conservation measures demonstrated the City's ability to conserve additional water even when PCWA and NID have adequate surface supplies to deliver..

5.5.1 Existing PCWA Treatment Plant Capacity

As discussed in the March 2, 2016 letter from PCWA described in **Section 4**, there is unused capacity in PCWA's existing treatment plants that could be used by the City to meet future growth needs. This is estimated to be about 4.5 mgd that Lincoln already has rights to but is not currently using. There is another 3.86 mgd available on a first come first serve basis in PCWA's existing facilities in 2016. Using 1150 gpd/EDU there was enough capacity in PCWA's treatment plant beyond what the City has rights to for over 4,000 additional EDUs. The City's usage relative to these EDU's is dependent upon the lot size and development potential. Nevertheless, one EDU has historically served approximately two houses in a medium density development.[61]

PCWA must deliver raw water to its treatment plants prior to treating and delivering the water to the City. PCWA's Ophir Pipeline Project will enable PCWA to deliver an additional 22,000 AF form the American River to its treatment facilities.

The connection from the treatment plant to the City's system results in a third limitation on system capacity. PCWA can deliver only 17.7 mgd through the existing connect with the City. An additional 5 mgd can be provided through the future Phase 3 pipeline and metering station. This Phase 3 pipeline is currently in the final planning stages and is scheduled for development.[62] The City's old 14" service pipeline was turned off in 2003 but remains connected for supply reliability and system redundancy. This pipeline remains in case of service interruption with the new pipeline but it is not intended to be utilized to serve additional demands.

5.5.2 Groundwater System Capacity

As discussed in the groundwater section, the City has an ample supply of water to accommodate future development. The City goal is to use groundwater for approximately 10 percent of normal demands. This system can provide more water for use in curtailment periods as well as peak demands. Two wells were retrofitted and brought online with one coming on in the fall of 2014 and the other in late 2015. This type of expansion of pumping capability will ensure groundwater system capacity to serve the City as it grows.

[61] An EDU is a measured volume of water that PCWA calculates to effectively deliver water supplies to the City of Lincoln and other retail providers. The EDU is a planning number that provides guidance in water supply availability – especially when paired with management efforts like utilizing groundwater to manage system peaking events.

[62] The latest Phase III project status can be obtained from the City Engineer.

Appendix A

PCWA Contract

C98-48

Placer County Water Agency

Business Center: 144 Ferguson Rd. • Mail: P.O. Box 6570 • Auburn, California 95604
(530) 823-4850 800-464-0030 TDD (530) 823-4966

March 10, 1998
File No. 407-4

Ms. Linda Stackpoole
City Clerk
CITY OF LINCOLN
1390 First Street
Lincoln, CA 95648

SUBJECT: PCWA - Lincoln Contract

Dear Linda:

I have been informed by the Agency's legal counsel, Mr. Ed Tiedemann, that the recently executed contract between the Agency and the City lacks the appropriate exhibits. Accordingly I am enclosing a copy of Exhibits "A", "B" and "C" which were shown as attachments to the contract when it was FAXED to Mr. Rodney Campbell by Mr. Tiedemann on February 19, 1998, but which were missing from the two signed originals which you forwarded to me last week. Please attach these exhibits to the City's original executed contract, and to any copies of same which you may have made and distributed. I am told by the Agency's planner, Mr. Einar Maisch, that there is a good chance that Exhibit "C" will change in the near future but that, at present, the enclosed are indeed the correct exhibits.

Linda, I apologize for this inconvenience. I hope it will not be too much trouble for your to track down your various copies and make the necessary correction. Call me (823-4861) with any questions or comments, and thank you again for your assistance.

Yours truly,

PLACER COUNTY WATER AGENCY

Barbara

Barbara Sloan
Clerk, Board of Directors

bms
enclosure

KRONICK
MOSKOVITZ
TIEDEMANN
& GIRARD
A PROFESSIONAL CORPORATION

EDWARD J. TIEDEMANN

February 19, 1998

VIA FACSIMILE (916) 645-9502
AND FIRST CLASS MAIL

Mr. Rodney Campbell
Director of Community Development
City of Lincoln
1390 First Street
Lincoln, CA 95648

Re: PCWA - Lincoln Contract

Dear Rod:

I am faxing to you today a copy of the PCWA - Lincoln Contract upon which I have marked the changes made to correct some typos and to clarify that the 7 percent in Article 5(c) refers to a 7 percent increase in any year rather than in each quarter. These changes are on pages 3, 5, 6, 8, and 9. If there are any other changes which need to be made, please let me know.

I am also mailing to you two clean copies of the contract for execution. As you know, the Agency's Board of Directors approved this contract on Tuesday. After it has been approved by your council, the Agency would like to have a signing ceremony at which time the Mayor and the Chairman of the Board can sign the contract.

Thank you for your cooperation in this matter.

Sincerely,

Ed

EDWARD J. TIEDEMANN

EJT:mjg
Enclosures
cc: David Breninger
Einar Maisch
Barbara Sloan
David Robertson

333743.1

CITY OF LINCOLN

COMMUNITY DEVELOPMENT DEPARTMENT
Planning Division • Building Division

TELEPHONE 645-3320
FAX 645-9502
1390 FIRST STREET - LINCOLN, CALIFORNIA 95648

March 6, 1998

Einar Maisch
Placer County Water Agency
P.O. Box 6570
Auburn, Ca. 95604

Re: Exhibit C, Amended City/Agency Contract

Dear Einar:

Enclosed are copies of the cleaned-up version of Exhibit C. If you believe this exhibit will meet our needs, please substitute this version onto your original. We will make the same change at our end. Should you have any concerns, please contact me at your convenience.

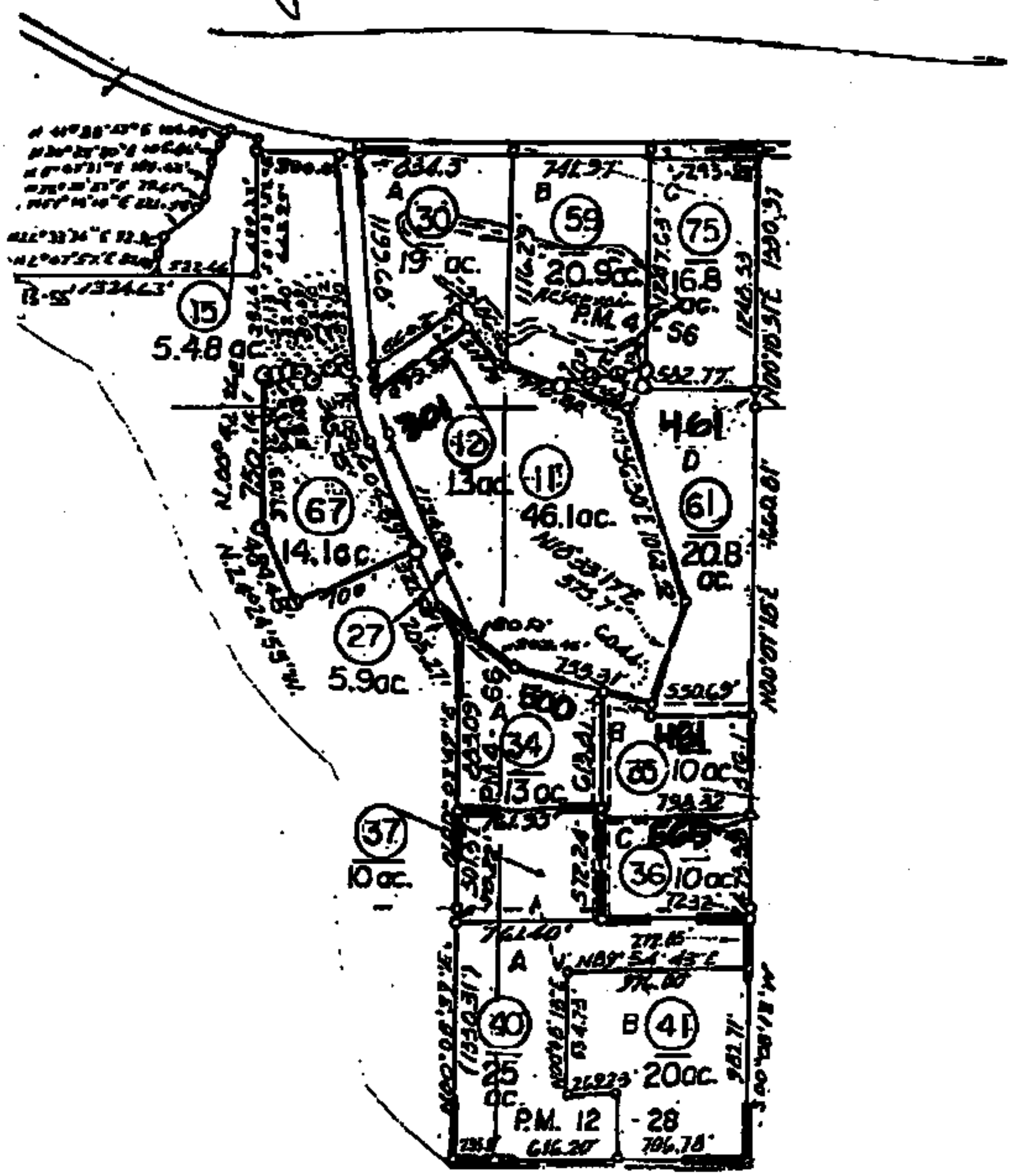
Sincerely,

Rodney Campbell
Director Community
Development

cc: Linda Stackpoole, City Clerk

Exhibit C

Customers outside of the city limits of Lincoln



CONTRACT BETWEEN PLACER COUNTY WATER AGENCY

AND CITY OF LINCOLN FOR A WATER SUPPLY

This contract made this 24th day of February, 1998, by and between the Placer County Water Agency, hereinafter referred to as the "Agency", a public agency created by the California Legislature by the Placer County Water Agency Act, and the City of Lincoln, a municipal corporation, located within the Agency, hereinafter referred to as "Lincoln."

RECITALS

The Agency and Lincoln entered into a water supply contract on May 3, 1977, which was superseded on July 1, 1991, by the June 20, 1991, water supply contract. This later contract was amended on February 11, 1992. The Agency and Lincoln now desire to enter into a new water supply contract to supersede the June 30, 1991, contract as amended.

NOW, THEREFORE, the parties hereto mutually agree as follows:

Article 1 - Term of Contract

This contract, which shall supersede the contract of June 20, 1991, as amended, shall be effective on April 1, 1998, and shall remain in effect through December 31, 2012.

Article 2 - Option for Continued Service.

After the expiration of the term of this contract, Lincoln shall be entitled to renewals of this contract for successive periods not to exceed twenty years at a time. The terms and conditions of each such renewal shall be agreed upon not later than one year prior to the expiration of the then existing contract and shall provide for service of water under the same conditions of service as provided for in the then existing contract including time, place, amount and rate of delivery as provided for herein.

Article 3 - Points of Delivery.

(a) All water furnished pursuant to this contract shall be delivered to Lincoln either (1) at Lincoln's Reservoir Number 1, until the 14-inch transmission line (hereinafter the "14-inch line") which was constructed pursuant to the May 3, 1977, contract is transferred to Lincoln as provided for in paragraph (b) of this Article, (2) at the place shown on Exhibit A attached hereto and incorporated herein by reference after the transfer of the 14-inch line, (3) at the terminus of the Penryn-Lincoln pipeline as provided for in Article 4, and/or (4) at such other locations that may be in the future agreed to by the parties. Lincoln may also elect to take delivery of water from the Agency at a point along the Agency's existing 18-inch line in Athens Road, provided that Lincoln pays the Agency's full PERC at the time of request for such delivery and complies with such additional terms and conditions as are appropriate for delivery at that location. All locations where water is to be delivered will be hereinafter referred to collectively as "points of delivery." Lincoln shall be solely responsible for operating and maintaining all facilities beyond the points of delivery.

(b) In order to provide for the transfer of the 14-inch line and the change in the point of delivery from Lincoln's Reservoir Number 1, the Agency and Lincoln will respectively do the following:

(1) The Agency will, within 24 months from the date of this contract, at the Agency's expense:

a. Design and construct a metering facility capable of metering deliveries to Lincoln, controlling the rate of flow to Lincoln, and also capable of providing flow data to the Agency's and Lincoln's central telemetry systems. The metering facility shall be located at the location identified on Exhibit A.

b. Endeavor to acquire, at no cost, adequate easements for the construction and maintenance of the new pipeline provided in (2) below.

c. Endeavor to require the relocation of the existing 14-inch line into public right-of-way across the proposed Whitney Oaks development, at no cost to Lincoln or the Agency, at the time such development occurs.

(2) Lincoln will, within 24 months from the date of this contract, at Lincoln's expense:

a. Construct a pipeline from the new metering facility to a location downstream of where the 14-inch pipeline connects to the 24-inch pipeline and disconnect the 14-inch pipeline from the Agency's 24-inch pipeline.

Within 60 days after these facilities become operational, the Agency will quitclaim to Lincoln all of the Agency's rights, title and interest in the 14-inch line and the Agency's right-of-way for such pipeline on an as-is basis without warranties as to the condition of the pipeline, and Lincoln shall thereafter be responsible for the operation, maintenance, repair and replacement of such facility. Lincoln shall be the lead agency under the California Environmental Quality Act for any actions that may be required by that law to provide for such conveyance, and the Agency shall cooperate with Lincoln in meeting the requirements of that Act. If for any reason, the conveyance of the 14-inch line to Lincoln is not completed within 24 months of the date of this contract, Lincoln shall reimburse the Agency for all expenses incurred by the Agency thereafter for the operation and maintenance of the 14-inch line until the conveyance is completed.

Article 4 - Penryn-Lincoln Pipeline.

(a) Notwithstanding any other provisions of this contract, the Agency shall not be required to deliver water to Lincoln in excess of the physical capacity of the 14-inch line operating under the force of gravity until such time as a pipeline from Penryn to Lincoln has been constructed pursuant to the provisions of this Article. In order to increase the conveyance capacity of water to Lincoln beyond the capacity of the 14-inch line, Lincoln shall advance to the Agency sufficient funds to provide for the construction of a pipeline from Penryn to Lincoln's point of delivery as shown on Exhibit B attached hereto and incorporated herein by reference. This pipeline is designated in this contract as the "Penryn-Lincoln" pipeline and shall be located in approximately the alignment shown on Exhibit B. The funds to be advanced by Lincoln shall be sufficient to cover the costs for the design, the environmental work, the acquisition of lands, easements and rights-of-way, and the construction of a 30-inch diameter pipeline in accordance with the Agency's standard specifications ("Base Costs"). The Agency may oversize all or any portion of the Penryn-Lincoln pipeline from 30 inches to a larger size by paying the incremental costs necessary to do so; provided, however, in the event Lincoln exercises its right to construct the Penryn-Lincoln pipeline pursuant to Article 4(b) of this contract, the Agency must notify Lincoln of its election to oversize within 90 days after Lincoln notifies the Agency of its election to construct the Penryn-Lincoln pipeline. Such notice shall set forth the extent of the oversizing sufficient to allow engineering of the Penryn-Lincoln pipeline in accordance with the Agency's standard specifications. The Agency shall thereafter provide progress payments for the construction of the oversizing within 20 days after receipt of billings from Lincoln so as to avoid any delay in the construction of the Penryn-Lincoln pipeline. The Agency's oversizing costs shall be the total construction cost multiplied by a fraction, the numerator of which is the increase in the diameter of the pipe over 30 inches which it elects to construct and the denominator of which is the total diameter of the pipe. For example, if the pipeline is oversized from 30 inches to 42 inches, the Agency's cost would be 12/42 of the construction contract amount.

(b) In lieu of advancing funds to the Agency for the construction of the Penryn-Lincoln pipeline, Lincoln may elect to construct the line and convey it to the Agency after completion, pursuant to the terms and conditions of a separate Pipeline Extension Agreement (PLX). The terms of the PLX shall be similar to those in PLX's routinely entered into between the Agency and developers which provide for the construction of pipelines and facilities by the developer which are to be provided to the Agency as a condition of water service, provided that the Penryn-Lincoln pipeline PLX shall include provisions which:

(i) warrant, for a period of three years following acceptance of the pipeline by the Agency, on behalf of and for the benefit of the Agency and for the benefit of the County of Placer, the pipeline and any roadwork necessary for its construction or maintenance; and

(ii) provide for reimbursement of the Agency's costs of administering the PLX, including, without limitation, the costs of engineering, supervision, and inspection, as well as any necessary costs of mediation, arbitration or attorney fees incurred by the Agency in connection with the PLX; and

(iii) confirm that the credit available to Lincoln, pursuant to Article 5(d) of this contract, shall be equal to the Base Costs specified in Article 4(a), the costs incurred in providing the warranty specified in Article 4(b)(i) of this contract, the costs of administering the construction contract, and the costs identified in Article 4(b)(ii) of this contract ("Total Costs".)

(c) When completed, the Agency will own, operate and maintain the Penryn-Lincoln pipeline up to the point of delivery to Lincoln. For portions of the Penryn-Lincoln pipeline which are not oversized by the Agency and are constructed with a diameter of 30 inches, the Agency shall reserve 100 percent of the capacity of the line for delivering water to Lincoln, and an equivalent capacity in the Agency's upstream transmission system from the Foothill Water Treatment Plant to Penryn. For portions of the Penryn-Lincoln pipeline which the Agency elects to oversize, the Agency shall reserve for Lincoln the proportion of the capacity of that line represented by the ratio of the cross-sectional area that a 30-inch line bears to the cross-sectional area of the line which is constructed. (For example, if the pipeline is oversized from 30 inches, with a cross-sectional area of 707 square inches, to 42 inches, with a cross-sectional area of 1385 square inches, then Lincoln shall be entitled to the use of 51 percent of the capacity of the 42-inch line.) If in the future, Lincoln is taking delivery of the full capacity reserved to it, then Lincoln shall also have the right to use any of the remainder of the capacity in that pipeline on the same basis as all other Agency customers.

Article 5 - Maximum Delivery Entitlements, Plant Expansion and Replacement Charges.

The Agency will supply Lincoln with water each year at the points of delivery, up to the maximum quantities provided for below, subject to the terms and conditions of this contract. As of the date of this contract, the maximum amount of water which Lincoln may require the Agency to deliver to Lincoln in a single day shall be 3,470,246 gallons ("maximum gpd"), which includes flow allowances for all payments received from Lincoln or from developers within Lincoln as of the date of this contract. For purposes of this contract, a day shall be the twenty-four hour period beginning one second after midnight.

(a) To be entitled to an increase in the maximum gpd, for each 1150 gallons per day of increased delivery Lincoln shall pay to the Agency, in advance, an amount of money equal to the Agency's Plant Expansion and Replacement Charges ("PERC fees"), as described in (b), for customers served water within the Agency's Zone No. 1 from the Foothill-Sunset Water System through a 5/8 by 3/4 inch metered connection, as such charges may be set from time to time.

(b) The Agency's current PERC fee is composed of four components: (1) a treatment plant component, the amount of which is generally intended to cover the costs of delivering raw water to the treatment plant and providing treatment and clearwell storage facilities; (2) a storage component, the amount of which is generally intended to cover the costs of providing distribution system storage facilities; (3) a transmission component, the amount of which is generally intended to cover the costs of providing regional transmission facilities; and (4) a planning component, the amount of which is generally intended to cover the costs of regional planning efforts. Hereafter, the Agency will not be providing distribution system storage and will be providing only a portion of the planning required by Lincoln. Therefore, the PERC fee components applicable to Lincoln from the date of this contract and thereafter shall be the Agency's treatment and transmission components and one-half the planning component. The Agency shall, at least annually, review the PERC fee to determine whether the fee should be adjusted to reflect changes in circumstances.

(c) Commencing on January 15, 1999, and continuing annually thereafter, the Agency shall notify Lincoln in writing of the then-remaining water and capacity which the Agency is able to deliver to and from the Foothill-Sunset Water System, and the amount of water and capacity which has been committed to and from the Foothill-Sunset Water System since the date of the immediately preceding report. Beginning in 1999 and each year thereafter, the maximum gpd shall be increased quarterly on April 15, July 15, October 15 and January 15 in proportion to the money paid to the Agency by Lincoln during the preceding three calendar months and shall be determined as follows:

> Each quarter the Agency shall divide the total amount of money it received during the preceding quarter from Lincoln by the total of the treatment component, the transmission component (to the extent not credited under Article 5(d)), and one-half the planning component of the Agency's PERC fee for that quarter for customers served water within the Agency's Zone No. 1 from the Foothill-Sunset Water System through a 5/8 by 3/4 inch metered connection. The quotient shall then be multiplied by 1150 gallons and this shall be the increase allowed in the maximum gallons per day. If the increase in any year is more than 7 percent above the maximum gpd for the previous year, and the Agency would have to construct new treatment plant or transmission facilities in order to provide for such increase, the Agency shall have a reasonable amount of time in which to design and construct such facilities before it shall be required to provide for the increase in excess of 7 percent. Consistent with the terms of this contract, funds can be paid by Lincoln at any time to initiate the design and construction of Agency facilities needed to increase the deliveries to Lincoln beyond the 7 percent increase described above.

(d) To the extent that Lincoln has advanced funds to the Agency pursuant to Article 4(a) for the construction of the Penryn-Lincoln pipeline, or has expended funds for construction of the Penryn-Lincoln pipeline pursuant to Article 4(b), Lincoln shall be given a credit for the number of transmission components represented by the amount of funds advanced or funds expended. To determine the number of transmission components credited, the amount of the funds advanced or costs expended shall be divided by the amount of the transmission component of the PERC at the time the funds are advanced or costs expended. This quotient shall be the number of transmission components considered to have been paid for, which credit shall be given as payments are made by Lincoln for additional delivery capacity pursuant to (c) above.

Article 6 - Storage Facilities.

Lincoln shall henceforth at its own expense provide all of its own storage facilities necessary to regulate pressures and provide for changing delivery rates from the Agency and the hourly changes in demands within its system, under normal operating conditions. Lincoln will provide to the Agency on a routine basis, but not more frequently than daily, the required daily volume of water to be delivered to Lincoln. At the option of the Agency, deliveries to Lincoln may be made at a uniform rate of delivery over a twenty-four hour period, or at fluctuating rates not to exceed plus or minus 10 percent of the daily average delivery rate, unless Lincoln's storage facilities become full and deliveries are temporarily stopped and then resumed at the same uniform or fluctuating rate as before, under normal operating conditions. The Agency shall operate flow control valves which regulate the flow of water from the Agency's system to Lincoln at the points of delivery. In an emergency situation, or planned maintenance outage, Lincoln shall have equal access to the Agency's clearwell storage capacity as other Agency customers if needed; however, Lincoln also agrees to utilize its alternative groundwater supplies and internal storage capacity to the maximum extent feasible in a given emergency or outage situation. During the non-peak season, generally from September to May, but not during a PG&E outage, Lincoln may exceed the maximum gpd to which it is entitled under the contract for purposes of performing maintenance on its system, provided the Agency determines it has the capability to provide such service and arrangements for such service acceptable to the Agency are made in advance.

Article 7 - Limitation on Agency Service.

Except for those properties that abut the existing Agency pipeline in Athens Road, the Agency, to the extent permitted by law, will not sell treated water and/or provide municipal water service within two miles of the Lincoln Airport or to areas within Lincoln's sphere of influence as of the date of this contract; provided, that Lincoln offers to furnish such service to those areas upon the same terms and conditions that it furnishes service to areas outside its city limits.

Article 8 - City Well System and Water Rights.

Lincoln may maintain and utilize its well system and may exercise such surface rights it may have for service within its service area. Water from these sources is intended as a backup water supply and Agency furnished water is intended as Lincoln's base water supply.

Article 9 - Measurement.

All water furnished pursuant to this contract shall be measured by the Agency at the points of delivery. Such measurements shall be with equipment chosen by the Agency and approved by Lincoln. All measuring equipment shall be installed and maintained by the Agency and the Agency shall pay for all installation and maintenance. The Agency shall have the primary obligation to measure the quantity of water delivered to Lincoln. Lincoln may request, at any time, investigation of the measurements being made as well as the charges associated with those measurements. Errors in measurement and charges discovered by the investigation will be corrected by the Agency. Lincoln may, at its own cost, at any time, inspect the measuring equipment and the records of such measurements for the purpose of determining the accuracy of the equipment and measurements.

Article 10 - Rates of Payment for Water.

(a) For all water furnished to Lincoln under this contract through the year 2001, Lincoln shall pay the Agency the applicable fixed rates and charges under the Agency's Zone No. 1 Schedule No. 1 - I & R Metered Industrial and Resale Service - Treated Water. In addition thereto, for these years Lincoln shall also pay the following percentage of the quantity rate for monthly quantities over 1,000,000 cubic feet charged to nonmunicipal-resale customers under that schedule for such service:

1998	77 percent
1999	78 percent
2000	79 percent
2001	80 percent

This reduction in the quantity rate charged to nonmunicipal-resale customers is to reflect the fact that Lincoln provides its own water storage and distribution system and provides for its own meter reading and collection.

(b) Prior to the end of 2001, the Agency shall provide for a thorough review by Agency staff and/or consultants of the equity of the rates being charged Lincoln and the Agency's costs of providing such service. The Agency may alter its rates and charges at any time as it deems necessary; provided, however, it shall not revise the percentages noted in (a) above prior to completing the review provided for herein. The Agency shall give Lincoln 45 days' written notice of its intention to consider any changes in rates and charges and shall hold a public hearing at which Lincoln and any members of the public can present evidence in support of or in opposition to any such proposed changes. No increase in rates to be charged to Lincoln shall become effective until 90 days after the Agency has notified Lincoln in writing of the rate change.

Article 11 - Payment in Lieu of Taxes.

Lincoln agrees to pay the Agency $30,000 within 30 days after the date of this contract as full and complete payment in lieu of taxes on property not within the Agency's Zone No. 1 that has been or will be furnished water delivered to Lincoln by the Agency.

Article 12 - Time and Method of Payments.

On or before the tenth day of each month, the Agency shall send Lincoln a statement of charges due for all water actually delivered to Lincoln during the preceding month. Lincoln shall pay all statements within twenty (20) days after they are received.

Article 13 - Water Shortages.

At times there may occur a shortage in the quantity of water available for delivery to Lincoln pursuant to this contract. In the event of any shortage (due to natural causes, casualties, regulatory requirements or any other causes) which causes the total quantity of water available to the Agency for distribution to Lincoln and to the Agency's other customers to be less than the total of all quantities required by Lincoln and the other customers, the Agency reserves the right to apportion the available water supply among Lincoln and others entitled to receive water from the Agency. In such events, no liability shall accrue against the Agency or any of its officers, agents or employees for any damage, direct or indirect, arising from such shortage or shortages. The Agency shall give Lincoln written notice as far in advance as possible of any such reduction in water service, which notice shall state the basis for the reduction and the anticipated duration. Also, if the Agency's supply of water for its Zone No. 1 is reduced by events outside the control of the Agency, or is being fully utilized by the Agency's then existing customers, and as a result the Agency is unable to increase its rate of delivery to Lincoln, then notwithstanding any other provision of this contract the Agency shall not be required to increase its rate of delivery to Lincoln.

Article 14 - Operation and Maintenance.

The Agency may temporarily discontinue or reduce the amount of water to be furnished to Lincoln as provided for herein for the purpose of maintaining, repairing, replacing, investigating or inspecting any of the facilities necessary for furnishing water to Lincoln. Insofar as it is feasible, the Agency will give Lincoln due notice in advance of any such temporary discontinuance or reduction, except in cases of emergency, in which case no advance notice need be given. The Agency shall schedule its routine maintenance of facilities so that to the extent feasible such discontinuances or reduction in delivery will result in minimum impact to Lincoln's customers.

Article 15 - Water Quality.

All water delivered by the Agency pursuant to this contract shall meet all applicable Federal, State of California and Placer County water quality requirements for water for domestic use. If public notification is required to be given to Lincoln's customers because the quality of the water fails to meet standards, Lincoln shall be responsible for sending such notices, and the Agency shall reimburse Lincoln for its reasonable costs in doing so. The Agency shall provide Lincoln with copies of any reports received by the Agency from health departments concerning the quality of the water being furnished to Lincoln.

Article 16 - <u>Responsibilities for Delivery and Distribution of Water</u>.

Neither the Agency nor its officers, agents or employees shall be liable for the control, carriage, handling, use, disposal, or distribution of water furnished to Lincoln pursuant to this contract after such water has passed the points of delivery, nor for the claims of damages of any nature whatsoever, including but not limited to, property damage, personal injury, or death, arising out of or connected with the control, carriage, handling, use, disposal or distribution of such water beyond the points of delivery, excepting any claim or action for damages based upon the quality of water prior to its reaching the points of delivery; and Lincoln shall indemnify, defend and hold harmless the Agency and its officers, agents and employees from any such damages or claims of damages, excepting damages or claims of damages based upon the quality of water prior to its reaching the points of delivery.

Article 17 - <u>Obligations of Lincoln to Make Payments</u>.

The obligations of Lincoln arising out of or pursuant or incidental to this contract shall constitute general obligations of Lincoln, and Lincoln shall use all the powers and resources available to it under the law to collect the funds necessary for and to pay its obligations to the Agency under this contract. Lincoln as a whole is obligated to pay to the Agency the payments becoming due under this contract, notwithstanding any individual default by its water users, constituents or others in the payment to Lincoln of assessments, taxes, tolls, or other charges levied by Lincoln.

Article 18 - Interest on Overdue Payments.

Interest shall accrue at the legal rate of interest charged on judgments issued in California courts on any unpaid charges to be paid by Lincoln to the Agency pursuant to this contract from their due date until paid, and Lincoln hereby agrees to pay such interest.

Article 19 - Default.

In the event of any default by Lincoln for a period of more than sixty (60) days in the payment of any money required to be paid to the Agency hereunder, the Agency in its discretion may suspend delivery of water during the period when Lincoln is delinquent in its payments or obligations due to the Agency under the terms of this contract. Action taken pursuant to this Article shall not deprive the Agency of or limit any remedy provided by this contract or by law for the recovery of money due or which may become due under this contract.

Article 20. - Remedies Not Exclusive.

The use of either party of any remedy for the enforcement of this contract is not exclusive and shall not deprive the party using such remedy of, or limit the application of, any other remedy provided by law.

Article 21. - Assignment.

The provisions of this contract shall appiy to and bind the successors and assigns of the respective parties, but no assignment or transfer of this contract, or any part hereof or interest herein, shall be valid without the consent of the non-assigning party.

Article 22. - Area Served by Lincoln.

Without the prior written consent of the Agency, water delivered to Lincoln pursuant to this contract shall not be sold or otherwise disposed of by Lincoln for use outside Lincoln's city limits as they may exist from time to time, except to those customers outside the city limits located in the area shown on Exhibit C attached hereto and incorporated herein by reference that are receiving service from Lincoln as of the date of this contract. The consent of the Agency shall not be unreasonably withheld. Refusal of the Agency to grant consent shall be based upon the lack of water or capacity in Agency facilities or the intention of the Agency to provide service to the area outside Lincoln's sphere of influence. Lincoln shall require annexation to the Agency's Zone No. 1 as a condition to providing water service to any new customers outside of Lincoln's city limits that are connected to Lincoln's water system after the date of this contract.

Article 23. - Opinions and Determinations.

Where the terms of this contract provide for action to be based upon opinion, judgment, approval, review or determination of either party, such terms are not intended to be and shall never be construed as permitting such opinion, judgment, approval, review or determination to be arbitrary, capricious or unreasonable.

Article 24. - Notices.

All notices, including but not limited to rate or PERC fee increases, that are required either expressly or by implication to be given by any party to the other under this contract shall be signed for the Agency and for Lincoln by such officers as they may, from time to time, authorize in writing to so act. All such notices shall be deemed to have been given and delivered personally if enclosed in a properly addressed envelope and deposited in a United States Post Office for delivery by registered or certified mail. Unless and until formally notified otherwise, all notices shall be addressed to the parties at their addresses as shown on the signature page of this contract.

Article 25. - Inspection of Books and Records.

The proper officers or agents of Lincoln shall have full and free access at all reasonable times to the account books and official records of the Agency insofar as the same pertain to the matters and things provided for in this contract, with the right at any time during office hours to make copies thereof at Lincoln's expense, and the proper representatives of the Agency shall have similar rights in respect to the account books and records of Lincoln.

Article 26. - Amendments.

This contract may be amended at any time by mutual written agreement of the parties, except insofar as any proposed amendments are in any way contrary to applicable law.

Article 27. - Waiver; Remedies Cumulative.

Failure by a party to insist upon the strict performance of any of the provisions of this contract by the other party, irrespective of the length of time for which such failure continues, shall not constitute a waiver of such party's right to demand strict compliance by such other party in the future. No waiver by a party of a default or breach of the other party shall be effective or binding upon such party unless made in writing by such party, and no such waiver shall be implied from any omission by a party to take any action with respect to such default or breach. No express written waiver of a specified default or breach shall affect any other default or breach and/or period of time specified. All of the remedies permitted or available to a party under this contract, or at law or in equity, shall be cumulative and alternative, and invocation of any such right or remedy shall not constitute a waiver or election of remedies with respect to any other available right or remedy.

Article 28. - Construction of Language of Agreement.

The provisions of this contract shall be construed as a whole according to its common meaning and purpose of providing a public benefit and not strictly for or against any party. It shall be construed consistent with the provisions hereof, in order to achieve the objectives and purposes of the parties. Wherever required by the context, the singular shall include the plural and vice versa, and the masculine gender shall include the feminine or neutral genders or vice versa.

Article 29. - Mitigation of Damages.

In all situations arising out of this contract, the parties shall attempt to avoid and minimize the damages resulting from the conduct of the other party.

Article 30. - Governing Law.

This contract, and the rights and obligations of the parties, shall be governed and interpreted in accordance with the laws of the State of California.

Article 31. - Captions.

The captions or headings in this contract are for convenience only and in no other way define, limit or describe the scope or intent of any provision or section of the contract.

Article 32. - Partial Invalidity.

If any provision in this contract is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way.

Article 33. - Relationship of the Parties.

The relationship of the parties to this contract shall be that of independent contractors. Each party shall be solely responsible for any workers compensation, withholding taxes, unemployment insurance and any other employer obligations associated with the described work or obligations assigned to them under this contract.

Article 34. - <u>Water Conservation</u>.

The Agency is required by federal and state laws and regulations to implement various water conservation measures and require its customers, whether they be retail, wholesale, or resale customers, to abide by these measures in order to prevent the waste of water. Lincoln shall, within its service area, implement the water conservation measures adopted by the Agency from time to time for the Agency's Zone No. 1 Water System and shall require its customers to comply with those measures to the same extent that other customers within the Agency's Zone No. 1 are required to do so.

Article 35. - <u>Year</u>.

The term "year" as used in this contract shall mean the calendar year beginning on each January 1.

IN WITNESS WHEREOF, the parties hereto have executed this Contract as of the date first above written.

ATTEST:

Clerk, Board of Directors
Placer County Water Agency
P.O. Box 6570
Auburn, California 95604

APPROVED AS TO FORM:

Placer County Water Agency Counsel

PLACER COUNTY WATER AGENCY

Chairman of the Board

ATTEST:

Clerk
City of Lincoln
511 5th Street
Lincoln, California 95648

APPROVED AS TO FORM:

Lincoln City Attorney

CITY OF LINCOLN

Mayor

503594.1

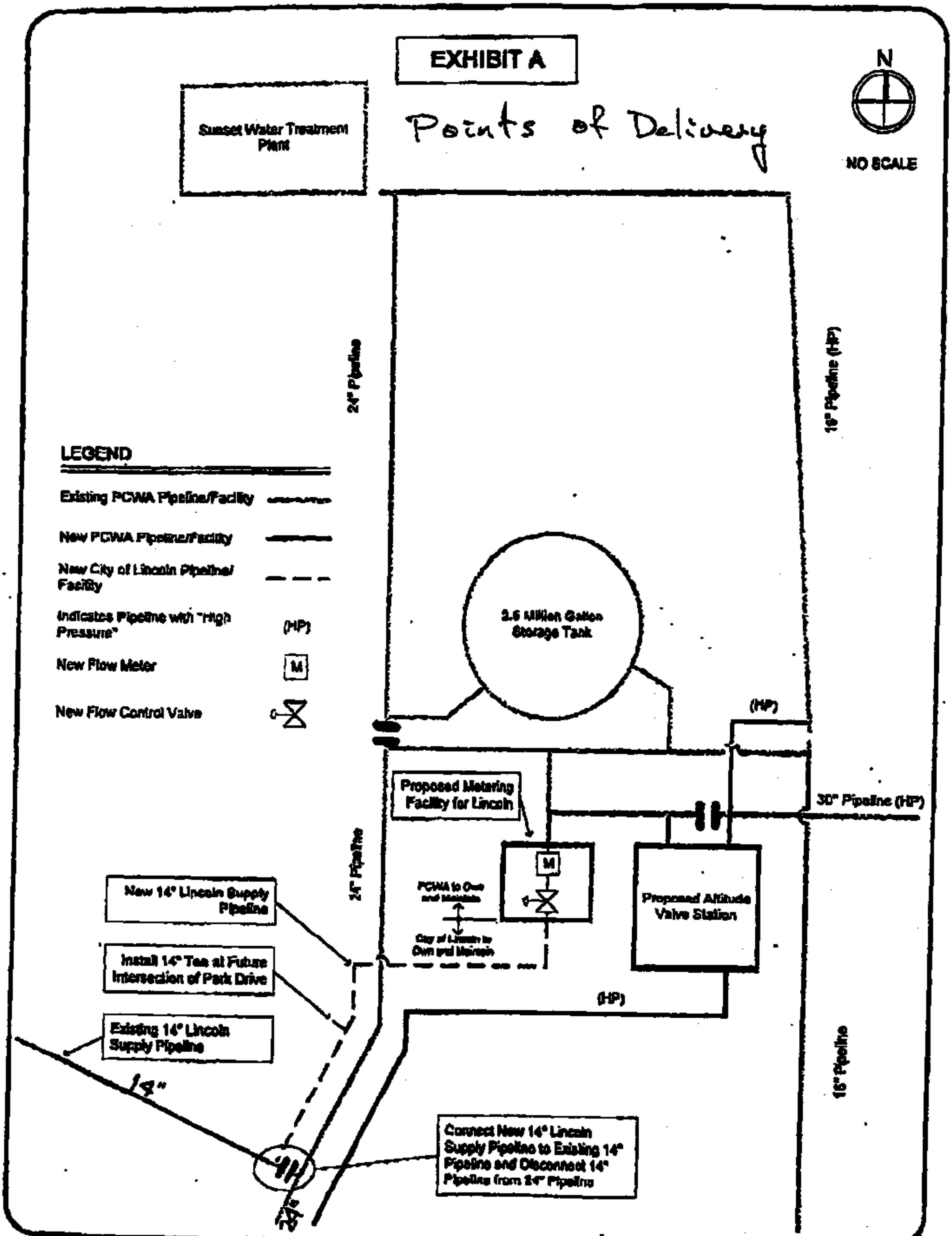


EXHIBIT A
Points of Delivery
N
NO SCALE
Sunset Water Treatment Plant
24" Pipeline
16" Pipeline (HP)
LEGEND
Existing PCWA Pipeline/Facility
New PCWA Pipeline/Facility
New City of Lincoln Pipeline/ Facility
Indicates Pipeline with "High Pressure" (HP)
New Flow Meter
M
New Flow Control Valve
2.5 Million Gallon Storage Tank
(HP)
30" Pipeline (HP)
Proposed Metering Facility for Lincoln
24" Pipeline
PCWA to Own and Maintain
City of Lincoln to Own and Maintain
Proposed Altitude Valve Station
New 14" Lincoln Supply Pipeline
Install 14" Tee at Future Intersection of Park Drive
Existing 14" Lincoln Supply Pipeline
(HP)
14"
16" Pipeline
Connect New 14" Lincoln Supply Pipeline to Existing 14" Pipeline and Disconnect 14" Pipeline from 24" Pipeline
24"

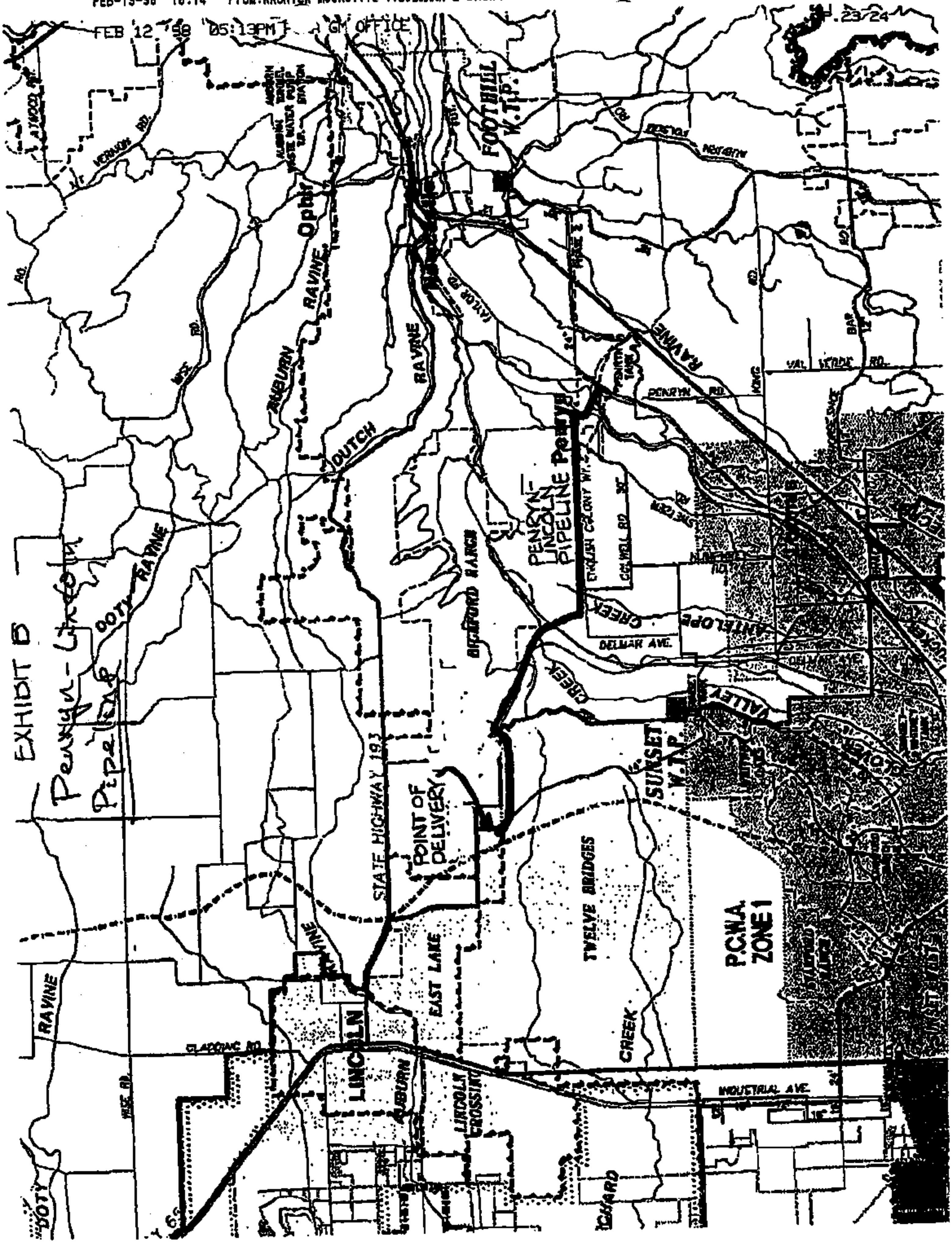
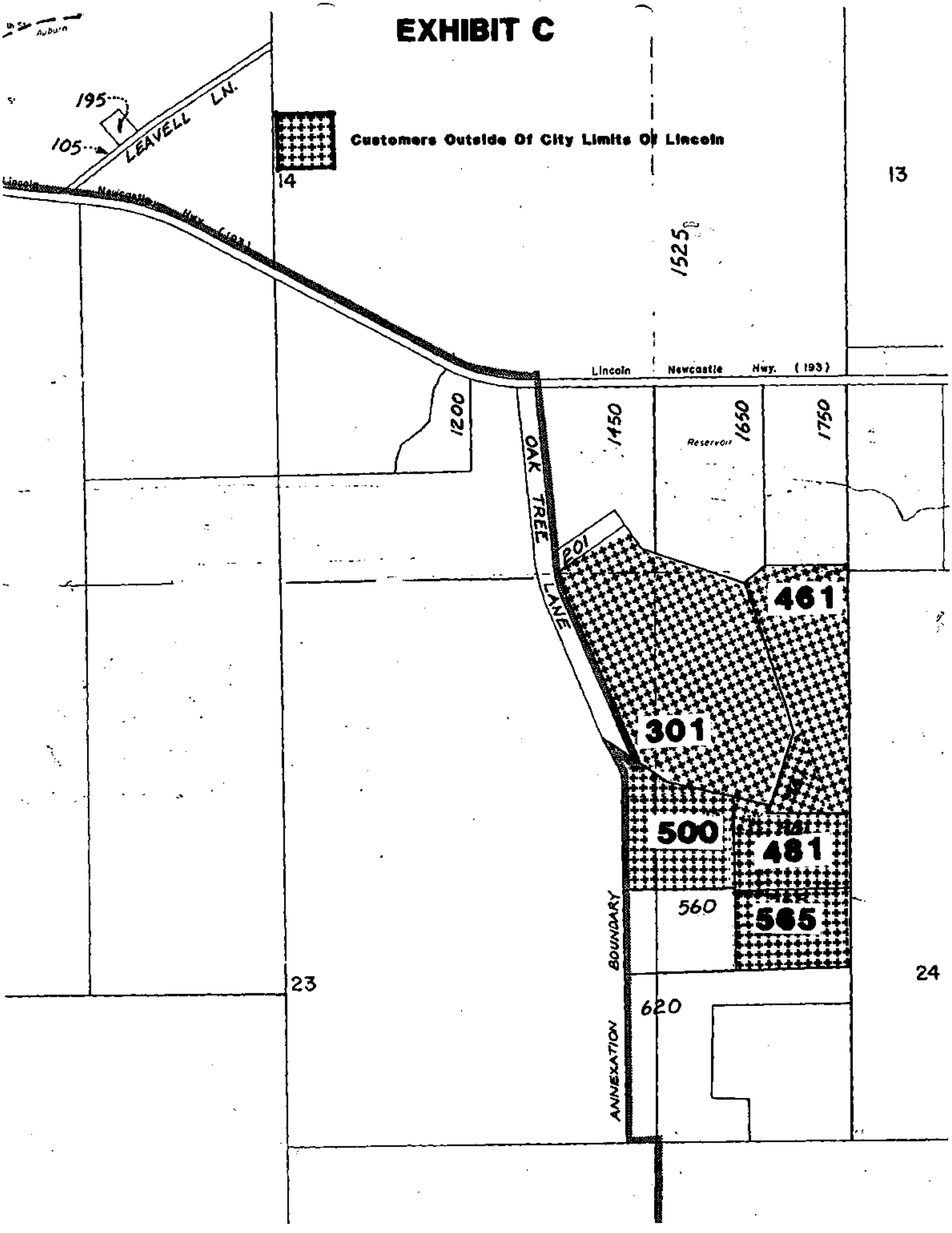


EXHIBIT B
Penryn-Lincoln Pipeline
FOOTHILL W.T.P.
Ophir
AUBURN RAVINE
DUTCH RAVINE
DOTY RAVINE
RAVINE
PENRYN-LINCOLN PIPELINE
BICKFORD RANCH
STATE HIGHWAY 193
POINT OF DELIVERY
SUNSET W.T.P.
TWELVE BRIDGES
P.C.W.A. ZONE 1
EAST LAKE
LINCOLN
ANTELOPE CREEK
VALLEY
CREEK
PENRYN RD.
VAL VERDE RD.
DELMAR AVE.
INDUSTRIAL AVE.
GLADDING RD.
ENGLISH COLONY WAY
MT. VERNON RD.

EXHIBIT C


Customers Outside Of City Limits Of Lincoln
LEAVELL LN.
195
105
14
13
1525
Lincoln Newcastle Hwy. (193)
1200
1450
1650
1750
Reservoir
OAK TREE LANE
201
461
301
500
481
560
565
23
24
620
ANNEXATION BOUNDARY

Appendix A-2

1999 PCWA Contract Supplement

SUPPLEMENT TO CONTRACT BETWEEN
PLACER COUNTY WATER AGENCY AND
CITY OF LINCOLN FOR A WATER SUPPLY

This Supplement to the February 24, 1998, water supply contract is made this 13th day of July, 1999, by and between the Placer County Water Agency, (the "Agency"), and the City of Lincoln ("Lincoln").

RECITALS

On February 24, 1998, the Agency and Lincoln entered into a water supply contract which is hereinafter referred to as "the Contract". The Contract provides, among other things, for the construction of a pipeline from Penryn to Lincoln which was therein referred to as the "Penryn-Lincoln Pipeline", but is hereinafter referred to as the "Penryn-Lincoln-Sunset Pipeline"; however, the Contract did not spell out the details for the design, construction and financing for that pipeline. The parties now wish to supplement the Contract by setting forth those details.

NOW, THEREFORE, THE PARTIES hereto mutually agree as follows:

1. Article 3 of the Contract is revised to read:

Article 3 – Points of Delivery and Transfer of 14 Inch Line

(a) All water furnished pursuant to the Contract shall be delivered to Lincoln at Lincoln's Reservoir No. 1 until completion of Phases 1a and 1b of the Penryn-Lincoln-Sunset Pipeline and thereafter at "Point A" shown on Exhibit B. Additional points of delivery may be constructed at either: (1) the terminus of Phase 3 upon completion of Phase 3 of the Penryn-Lincoln-Sunset Pipeline; (2) a new point of delivery to be mutually selected by the parties near the Agency's proposed Sunset tanks for delivery of up to 5-mgd and/or (3) at such other locations that may be agreed to in the future by the parties. Lincoln may also elect to take delivery of water from the Agency at a point along the Agency's existing 18-inch line in Athens Road, provided that Lincoln pays the Agency's full PERC at the time of request for such delivery and complies with such additional terms and conditions as are appropriate at that location. All locations where water is to be delivered shall be hereinafter referred to collectively as "points of delivery". Lincoln shall be solely responsible for all costs of operating and maintaining all of the facilities beyond the points of delivery, except that the cost for the construction of the delivery facilities at Point A shall be deemed to be a part of Phase 1 of the Penryn-Lincoln-Sunset Pipeline and paid for as provided for in Article 4.

(b) Upon completion of Phases 1a and 1b of the Penryn-Lincoln-Sunset Pipeline and relocation of the point of delivery to Point A, the Agency will immediately cut and cap the existing 14-inch transmission line which was constructed pursuant to the May 3, 1977 contract where it first enters the City limits of Lincoln, near the Sunset Water Treatment Plant (WTP). Within 60 days after the new delivery point at Point A becomes operational, the Agency will quitclaim to Lincoln all of the Agency's rights, title and interest in the 14-inch line which lie within the boundary of the City of Lincoln and the Agency's right-of-way for such pipeline on an as-is basis without warranties as to the condition of the pipeline, and Lincoln shall thereafter be responsible for the operation, maintenance repair and replacement of such facility.

2. Article 4 of the Contract is revised to read:

<u>Article 4 – Penryn-Lincoln-Sunset Pipeline.</u>

Notwithstanding any other provision of this contract, the Agency shall not be required to deliver water to Lincoln in excess of the physical capacity of the 14-inch line operating under the force of gravity until such time as Phases 1a and 1b of the Penryn-Lincoln-Sunset Pipeline have been constructed and accepted by the Agency as provided for herein. Thereafter the Agency shall not be required to deliver water to Lincoln in excess of 6,000,000 gallons per day (6-mgd) prior to completion of Phase 2 unless:

- Lincoln has deposited with the Agency the full $6,800,000 for the construction of Phase 2 as required by Article 4B below;
- The Agency has transmission capacity available in its system to meet Lincoln's request for deliveries in excess of 6 mgd, and Lincoln pays all the costs of obtaining such capacity;
- Lincoln has not in any way caused a delay in the construction of Phase 2; and
- Lincoln has paid all of the Agency's applicable charges, including all applicable Plant Expansion and Replacement Charges (PERC), required by the Contract.

The approximate alignment of the Penryn-Lincoln-Sunset Pipeline is shown on Exhibit B attached hereto and incorporated herein by reference, which exhibit replaces the former Exhibit B in the Contract. The Penryn-Lincoln-Sunset Pipeline shall be constructed in three phases, with all design and construction to be in accordance with the Agency's standards. The description, the financing and the responsibility for the design and construction of each phase is as follows:

A. Phase 1 Phase 1 shall consist of a 30-inch diameter pipeline and ancillary facilities which shall run from the Agency's existing 30-inch pipeline near the Sunset WTP north generally along the eastern boundary of the City of Lincoln, to point

"A", as shown in Exhibit "B", which is the common point to phases 1, 2 and 3. Phase 1 shall be designed and constructed in two sections as described below:

Phase 1a shall be designed and constructed by the Agency and shall be that section of Phase 1 described as beginning at the existing 30-inch pipeline near the Sunset WTP northerly past the Sunset WTP and proposed Agency 10 million gallons tank to the north property line of the Agency's 20 acre tank site.

Phase 1a ancillary facilities Agency shall include, but not be limited to:

- The installation of piping and valving stubs for the construction of an above ground combination altitude valve station and pressure reducing station, with building, necessary to tie into the Agency's proposed storage tanks to be located adjacent to the Sunset WTP and existing and/or proposed connecting piping;
- Relocation of two (2) existing raw water pipelines and two (2) electrical conduits around the Agency's proposed storage tanks;

Phase 1b shall be designed and constructed by Lincoln and shall be that section of Phase 1 described as beginning at the north property line of the Agency's 20 acre tank site running northerly generally along the eastern boundary of the City of Lincoln to point "A", as shown in Exhibit B.

Phase 1b ancillary facilities Lincoln shall include but not be limited to:

- A flow regulated delivery/metering facility, including telemetry and SCADA controls for automatic operation, at Point A with 20-mgd

- capacity; The Contract provides for the Agency's regulation of flow deliveries in order to eliminate peaking off the Agency's storage tanks.
- A non-flow regulated delivery/metering facility, including telemetry for monitoring use, at Point A, to serve a limited number of high elevation lots within Lincoln that will use Agency storage facilities for peaking.
- All required environmental mitigation.

Pressure regulation facilities required by Lincoln beyond the delivery/metering point(s) shall not be included in this Phase 1 project.

Lincoln shall design and construct Phase 1b pursuant to the terms and conditions of a separate pipeline extension agreement (PLX) with the Agency. The terms of the PLX shall be as set forth below in paragraph D of this Article 4. Construction of Phase 1b should be completed by June 1, 2000.

Lincoln shall fund the design, environmental compliance work and construction of Phase 1b, and Lincoln shall receive credits for this funding as provided for in Article 5(d) below. Lincoln shall not be required to provide funding for Phase 1a and shall not receive credits for Phase 1a.

B. Phase 2. Phase 2 shall consist of a 42-inch diameter pipeline and ancillary facilities. The eastern end of the Phase 2 pipeline shall tie into the Agency's existing 48-inch pipeline near the Agency's existing Penryn tank. The western end of the Phase 2 pipeline shall be at Point A, where it shall tie into the northern end of the Phase 1 pipeline and the delivery and metering facilities located at that point. The Phase 2 pipeline will generally follow the route shown on Exhibit B. Phase 2 shall also include the completion of the pressure reducing station adjacent to the Agency's proposed storage tanks and the Sunset WTP. Phase 2 shall be designed and constructed by the Agency. Construction of Phase 2 should be completed by June 1, 2002.

Lincoln shall provide funding for 51% of the design and environmental documentation costs and 30/42 of the construction costs, including environmental mitigation, of Phase 2, but not to exceed a total of $6,800,000, less the costs expended by Lincoln for Phase 1b. Lincoln shall fund its share of these costs by progress payments to the Agency. The Agency shall submit invoices to Lincoln each month setting forth the estimated amount of Lincoln's share of the Phase 2 costs that will be incurred by the Agency in the following month. Lincoln shall pay these invoices within 25 days of their receipt. Any over or under payments made by Lincoln shall be adjusted in the next succeeding invoice. Lincoln shall receive credits for the funds it has paid for Phase 2 as provided for in Article 5(d) below.

C. Phase 3. Phase 3 shall consist of a 30-inch diameter pipeline (or smaller, at Lincoln's option) and ancillary facilities. The southern end of the Phase 3 pipeline shall be at Point A. The northern end of this pipeline shall be near Lincoln's present raw water pond. This pipeline alignment shall generally follow Lincoln's eastern boundary as shown on Exhibit B. Ancillary facilities for Phase 3 shall include, but not be limited to, a flow regulated delivery/metering facility with automatic controls and telemetry at the northern terminus of this pipeline. Phase 3 shall be constructed by Lincoln pursuant to the terms and conditions of a separate PLX, the terms of which shall be as set forth below in paragraph D of this Article 4. Construction of Phase 3 should be completed by June 1, 2006. Lincoln shall fund the full cost for the design and construction of Phase 3, and upon its completion and acceptance by the Agency, Lincoln shall receive credits for this funding of Phase 3 as provided for in Article 5(d) below.

D. Terms of PLXs. The terms of the PLXs required for Phases 1b and 3 shall be similar to those in PLXs routinely entered into between the Agency and developers which provide for the acquisition of lands easements and rights of way and the construction of pipelines and facilities by the developer which are to be provided to the Agency as a condition of water service, provided that these PLXs shall also include provisions which:

(i) warrant, for a period of three years following acceptance of the facilities provided for in the PLX by the Agency, on behalf of and for the benefit of the Agency and for the benefit of the County of Placer, the pipeline and any roadwork necessary for its construction or maintenance; and

(ii) provide for reimbursement of the Agency's costs of administering the PLX, including, without limitation, the cost of engineering, supervision, and inspection, as well as any necessary costs of mediation, arbitration or attorneys' fees incurred by the Agency in connection with the PLX, and

(iii) confirm that the credit available to Lincoln, pursuant to Article 5(d) below shall be equal to the costs incurred by Lincoln for design and construction, the costs incurred in providing the warranty specified in paragraph D(i) above, the cost of administering the construction contracts, and the costs identified in paragraph D(ii) above.

E. Ownership of Penryn-Lincoln-Sunset Pipeline. When completed and accepted by the Agency, the Agency will own, operate and maintain the Penryn-Lincoln-Sunset Pipeline up to the points of delivery to Lincoln. The Agency shall reserve for the delivery of water to Lincoln 100% of the capacity of Phase 3, 51% of the capacity of Phase 2, and none of the capacity of Phase 1 of the Penryn-Lincoln-Sunset Pipeline and capacity in the Agency's upstream transmission system from the Foothill Water Treatment Plant to Penryn equivalent to that in a 30-inch pipeline. If in the future, Lincoln is taking delivery of the full capacities reserved to it, then Lincoln shall also have the right to use any of the remainder of the capacity in any phase of the Penryn-Lincoln-Sunset Pipeline on the same basis as all other Agency customers.

F. Installation of Meter to Determine Flow Into Phase 2. Lincoln shall have the right to have a meter(s) installed on the Phase 2 pipeline for the purpose of measuring the flow into that pipeline. If Lincoln requests the Agency to install such a meter(s), Lincoln shall deposit with the Agency funds estimated by the Agency to be sufficient to cover all of the Agency's cost for the meter(s), any necessary appurtenant facilities, and the installation of the meter. Any of the funds deposited by Lincoln not required for this work shall be refunded to Lincoln, and Lincoln shall pay the Agency for any costs for this work that exceeds the amount deposited within 30 days after a receipt of a statement from the Agency for such excess costs. Lincoln shall not be entitled to any reimbursement or credits for any of these costs, and the meter(s) and all appurtenant facilities shall be the property of the Agency. Lincoln shall be furnished the data showing the flows through such meter.

3. Article 5(d) of the Contract relating to credits for funds advanced or expended is revised to read:

(d) To the extent Lincoln has advanced funds to the Agency for the construction of Phase 2, or has expended funds for Phases 1b and 3 of the Penryn-Lincoln-Sunset Pipeline pursuant to Article 4, Lincoln shall be given a credit for the number of transmission components represented by the amount of funds advanced or expended, less any portion of those funds which Lincoln elects to have credited as PERC fee payments pursuant to Article 5(c) of the Contract for the purpose of increasing Lincoln's maximum delivery entitlement. To determine the number of transmission components credited, the amount of the funds advanced or costs expended, not credited towards the payment of PERC fees pursuant to Article 5(c) of the Contract, shall be divided by the amount of the transmission component of the PERC at the time the funds are advanced or costs expended. This quotient shall be the number of transmission components considered to have been paid, which credit shall be given as payments are made by Lincoln for additional delivery capacity pursuant to Article 5(c) of the Contract. Lincoln shall not be entitled to receive an increase in its maximum delivery entitlement pursuant to Article 5(c) of the Contract, and an additional credit for transmission components under this Article 5(d) for the same dollars advanced or expended. In other words, Lincoln must elect whether the funds advanced or the funds expended for construction for phases of the Penryn-Lincoln-Sunset pipeline are to result in increases in its maximum delivery entitlement or credits towards the transmission component for future PERC payments made pursuant to Article 5(c) of the Contract.

4. The Contract shall be supplemented by adding thereto a new Article 35 to read:

Article 35. Service to High Elevation Lots.

It is anticipated that there will be approximately 300 dwelling lots within Lincoln's service area at elevations higher than Lincoln's existing proposed storage tanks. The Agency hereby agrees that Lincoln may elect to take unregulated delivery from the Agency for these lots, provided that Lincoln first pays to the Agency the Agency's full PERC, as it exists at the time of such payment, for each of these lots. Upon such payment, Lincoln's maximum delivery entitlement as provided for in Article 5 of the Contract shall be increased as follows: The Agency shall divide the total amount of money received for these PERCs by the Agency's full PERC fee for customers served water within the Agency's Zone No. 1 from the Foothill-Sunset Water System through a 5/8 x 3/4 inch meter connection. The quotient shall then be multiplied by 1,150 gallons and this shall be the increased allowed in the maximum gallons per day.

5. Except as supplemented and revised herein, the provisions of the Contract remain in full force and effect.

6. Compliance with Environmental Laws. The effective date and implementation of this Supplement is subject to compliance with the California Environmental Quality Act ("CEQA"). The Agency and Lincoln acknowledge that this Supplement does not and cannot commit them to a definite course of action before compliance with CEQA, to the extent required. Lincoln and the Agency presently are in

the process of preparing the required environmental documentation for the phases of the proposed Penryn-Lincoln-Sunset Pipeline. Each party shall assist and cooperate with the other in the preparation of those documents.

IN WITNESS WHEREOF, the parties hereto have executed this Supplement to the Contract as of the date first above written.

ATTEST:

Clerk, Board of Directors
Placer County Water Agency
P.O. Box 6570
Auburn, California 95604

PLACER COUNTY WATER AGENCY

Chairman of the Board

APPROVED AS TO FORM:

Placer County Water Agency Counsel

ATTEST:

Clerk
City of Lincoln
~~511 5th Street~~ 1390 First St.
Lincoln, California 95648

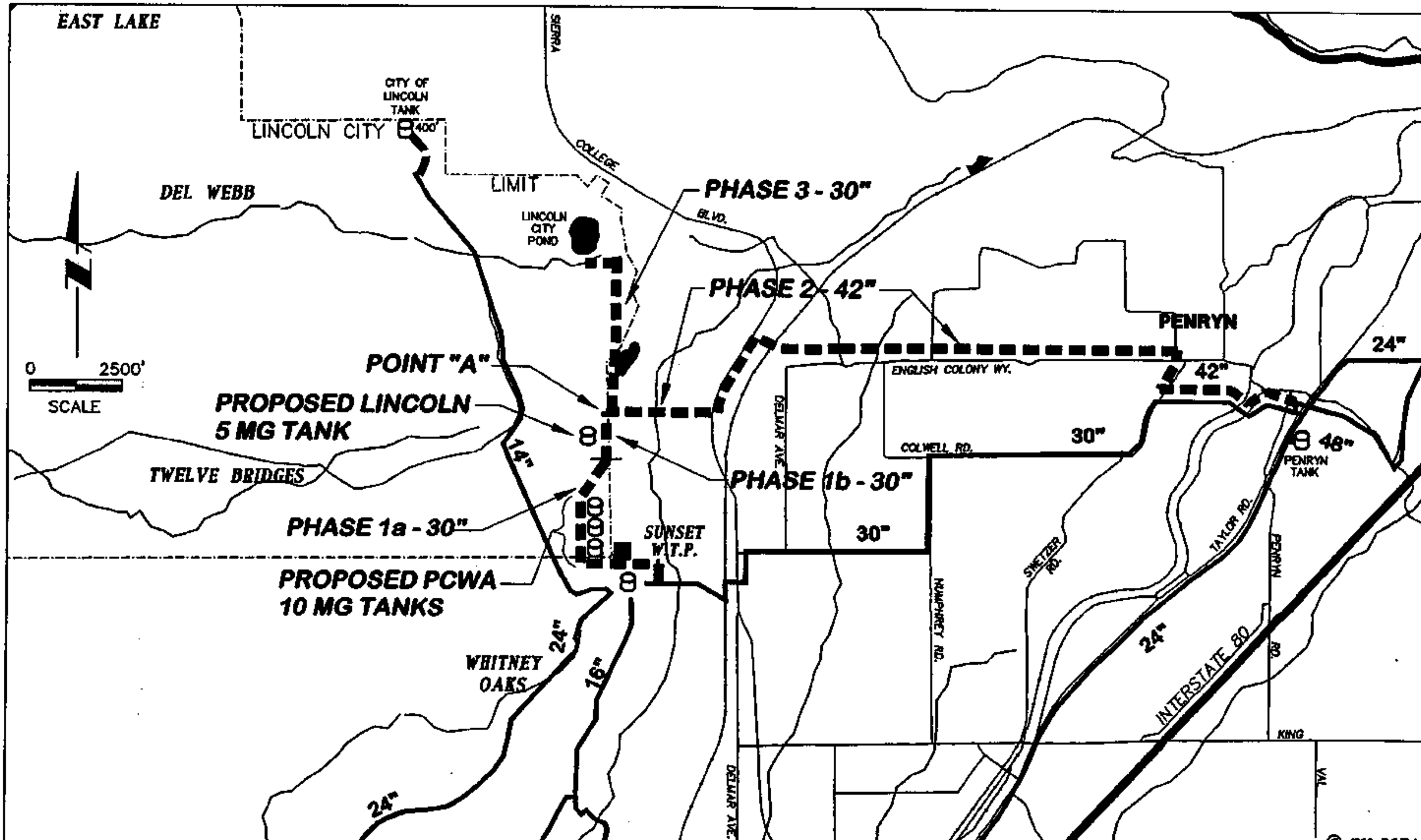
CITY OF LINCOLN

Mayor

APPROVED AS TO FORM:

Lincoln City Attorney

550164.1



PROJECT	DISCIPLINE		REFERENCES	DRAWN BY: DC CROSBY					DRAWING NO.	REV.
MAPS	GENERAL	EXHIBIT "B"	G.M. 98-08235	CHECKED BY: R. LUND					GB011	1
PLACER COUNTY WATER AGENCY		PENRYN/LINCOLN/SUNSET PIPELINE		DATE DRN. 1/29/99	SCALE AS SHOWN	1	7/9/99	Phase 1 modifications	EP	
						NO.	DATE REV.	REVISION DESCRIPTION	CHK.	SHEET 1 OF 1

Appendix A-3

2002 PCWA Contract Supplement

SUPPLEMENT TO WATER SUPPLY CONTRACT BETWEEN
PLACER COUNTY WATER AGENCY AND
THE CITY OF LINCOLN

This Supplement, which shall be effective November 7, 2002, is by and between the Placer County Water Agency ("Agency") and the City of Lincoln ("Lincoln").

RECITALS

WHEREAS, pursuant to the provisions of Lincoln's water supply contract with the Agency dated February 24, 1998, as amended on July 13, 1999, (the "Contract") the maximum delivery of water which Lincoln was entitled to receive as of November 6, 2002, was 10,165,406 million gallons per day (mgd); and

WHEREAS, on November 7, 2002, Lincoln requested the Agency increase Lincoln's maximum delivery to 11,671,906 mgd; and

WHEREAS, the Agency's ability to increase deliveries in its Zone No. 1 is severely limited until a permanent 100 cubic foot per second capacity American River Pump Station (the "Pump Station") is completed:

NOW THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The Agency shall increase Lincoln's maximum delivery to 11,671,906 mgd if Lincoln pays the Agency $6,565,065 on or before December 6, 2002, under the following terms and conditions. The parties concur with the attached Recap sheet giving Lincoln 9,171.48 full PERC credits and 978 restricted WCC credits until completion of the Pump Station or earlier as provided for herein in order to increase the maximum delivery to the 11,671,906-mgd. However, in order to enable the Agency to equitably apportion the remaining capacity in its Zone 1 water system until the completion of the

Pump Station, the maximum delivery to Lincoln shall be limited to 10,547,206 mgd until such completion; provided that if at any time after January 1, 2004, Lincoln believes it may need to have its maximum deliveries increased above this amount before the expected completion of the Pump Station, Lincoln and the Agency shall reevaluate the limit on the maximum deliveries to Lincoln. In determining whether to increase Lincoln's maximum above the 10,547,206 mgd the parties shall consider:

A. Lincoln's current usage and its projected demand during the next summer peak period and the construction progress of the ongoing subdivisions in Lincoln.

B. The Agency's uncommitted water supply and the projected demand of its other Zone No. 1 customers during the next summer peak period.

C. The status of the Pump Station.

2. Upon completion of the Pump Station, or sooner if the parties agree, the maximum delivery to Lincoln shall be increased to the 11,671,906 mgd, provided Lincoln has paid the $6,565,065 on or before December 6, 2002.

3. Until the completion of the Pump Station, the Agency shall limit the amount of connections any one party can purchase to the amount that it can use within the estimated time period before the completion of the Pump Station.

4. The Agency and Lincoln agree it is in their mutual benefit to try to increase the water supply to Lincoln from the Nevada Irrigation District and will work together to develop such supply.

5. The Agency and Lincoln agree it is in their mutual benefit to increase the available water supply in the Agency's service area through the aggressive use of integrated resources, including reclaimed water and will work together to develop this

supply. The Agency will assist the City in it's endeavor to acquire additional grant funds necessary to construct City reclamation facilities, as defined by the City's Reclamation Study recently completed by ECO:LOGIC.

6. The Agency has engaged the services of Montgomery Watson Harza to develop a water system infrastructure master plan consistent with the Agency's Water Forum Agreement to seek to develop its additional water supplies from the Sacramento River. The City of Lincoln will assist PCWA in the planning process.

7. The Agency agrees to allow Lincoln to design and construct the Phase 3 thirty inch diameter pipeline by June 1, 2006, in accordance with Article 4(c) of the Contract. The Agency agrees to credit Lincoln the full amount of the WCC, and not just the transmission component, for the construction costs of the Phase 3 pipeline, if requested by the City.

8. Any additional payments from Lincoln for increased delivery capacity, or credits given for the construction of the Phase 3 pipeline, shall be restricted in the same way and under the same conditions as the 978 credits identified in Article 1 of this agreement.

PLACER COUNTY WATER AGENCY	CITY OF LINCOLN
By: Lowell M Jarvis 12.05.02	By: [signature] 12/13/02
Chair, Board of Directors	City Manager

Attest:

[signature]
Clerk, Board of Directors

Attest:

[signature]
Clerk, City of Lincoln

721039.1

RECAP OF CITY OF LINCOLN PERC PAYMENTS AND CREDITS
PENRYN/LINCOLN PIPELINE CONTRIBUTIONS AND CASH PAYMENTS

ITEM	AMOUNT PAID	COMMENT	MAX CONTRACT DELIVERY RATE	FULL PERC CREDITED	WTP/Planning CREDIT	TRANSMISSION CREDITS	Cumulative Trans Credits
A		1/1/2001	4,492,596	3,906.61			
B-1	$4,800,000	Contribution to Agency const				(3,321.80)	(3,321.80)
B-2	$1,580,983	Lincoln const costs for Phase 1b				(1,094.11)	(4,415.91)
B-3	$243,250	Interest on Agency held funds		48.54		0.00	(4,415.91)
B-4	$544,370	Const costs billed to Lincoln		25.01		(289.99)	(4,705.89)
B-5	$2,139,900	10/12/2001			600.00	600.00	(4,105.89)
B-6	$5,321,218	3/30/2002			1,492.00	1,492.00	(2,613.89)
B-7	$10,091,397	10/29/2002		153.44	2,613.89	2,613.89	0.00
Subtotal Item B	$24,721,118		5,672,810	4,932.88			
	Total of Items A & B only	10/29/2002	10,165,406	8,839.48			
C	$6,565,065	11/7/2002					
		Full		332.00			
		Restricted		978.00			
Total Of Items A, B, & C	**$31,286,183**	Full	10,547,206	9,171.48			
		Restricted	1,124,700	978.00			

<u>The City PERC rate per EDU in effect during this period was:</u>

Transmission Component	$	1,445.00
Treatment & 1/2 Planning Component	$	3,566.50
Total Lincoln PERC	$	5,011.50
Increase in Maximum Contract Delivery rate in gpd per EDU	$	1,150.00

Negative ( ) credit amounts indicate the amount owed by the Agency to Lincoln.
Positive amounts indicate the amount used by Lincoln to increase its maximum contract delivery rate.

B-1,2,3,4 - Transmission credits related to construction of Penryn-Lincoln Pipeline.
B-5,6 - City payments to PCWA to go with transmission credits to increase City maximum delivery limit.
B-7 - City Payment to PCWA as Full PERC credit to increase City maximum delivery limit.
C - City payment to PCWA as Full PERC credit to increase City maximum delivery limit with restricted availability of 1.1 mgd until American River Pump Station is on-line.

Appendix A-4

2005 PCWA Contract Supplement

**MEMORANDUM OF UNDERSTANDING
BETWEEN CITY OF LINCOLN AND PLACER COUNTY WATER AGENCY
REGARDING WATER SERVICE**

This Memorandum of Understanding is entered into this 25th day of October, 2005, by and between the Placer County Water Agency ("Agency") and the City of Lincoln ("City").

WHEREAS, the Agency and the City have entered into a water supply contract dated February 27, 1998 and amended on July 13, 1999 and November 7, 2002.

WHEREAS, the pace of urban development within the Agency's service area, including within the City, is rapid and together with proposed changes in the General Plans of the City and the County of Placer, the Agency and the City are challenged to ensure that there is an adequate water supply and adequate infrastructure to meet all of the potential water needs within their service areas in a timely manner.

WHEREAS, the Agency and the City desire to work cooperatively on the implementation of both a local Integrated Resources Plan being developed by PCWA, and on a broader Plan being developed by the Regional Water Authority that include regional surface water diversion, treatment and delivery infrastructure, groundwater management, reclaimed water use, demand reduction and funding elements to adequately meet the future water needs within the Agency and the City.

WHEREAS, there is a need by the City to develop new water transmission facilities for City's proposed planning areas north of Athens Road, from Highway 65 west to Fiddyment Road, including future interties with the Agency at Industrial Boulevard and Fiddyment Road.

WHEREAS, the City has made extensive efforts to provide retail water service to the Thunder Valley Casino facilities on the north side of Athens Road and within the City's sphere of influence in a manner that is consistent with and supports the construction of the new transmission facilities mentioned above, including obtaining pending environmental regulatory approvals for said water service.

Now, therefore, the parties mutually agreed to the following principles for their collaboration on the provision of water in the future.

1. Once the City completes the necessary infrastructure required to serve the properties north of Athens Road, the City shall be the water purveyor for all new customers on the north side of Athens Road, and the Agency, to the extent permitted by law, will transfer its existing water customers, including the Thunder Valley Indian Casino, on the north side of Athens Road to the City, and the City shall defend, protect, hold harmless and indemnify the Agency in the event of any litigation against the Agency challenging the legality of the Agency transferring such customers to the City without the customer's approval.

2. The City and the Agency will work together to identify the City water facilities that may be needed to accept anticipated deliveries from the proposed Sacramento River diversion to serve lands within the City's sphere of influence.

3. The City agrees to work cooperatively with the Agency to develop funding mechanisms for joint use water facilities.

4. The City and Agency will work together with the City of Roseville and the County of Placer to develop a sub-regional Water Resources Plan that will effectively integrate surface water, groundwater, reclaimed water and demand reduction programs to efficiently and reliably meet the build-out demands of the parties' service areas. The goals of the plan will include sustaining groundwater levels and protecting groundwater quality; developing joint or cooperative groundwater management plans; optimizing the cost effective use of reclaimed water through exchanges between purveyors and the sale of surplus reclaimed water to meet some of the Agency's Zone 5 agricultural water demands in lieu of using water that could be treated to meet domestic demands within the City; and, implementing cost effective conservation measures.

5. The Agency will support the City's efforts to design and construct needed infrastructure for use of reclaimed/recycled water within and outside the City limits and sphere of influence, and support the City's efforts to acquire grants from Proposition 50, WRDA, and other sources.

6. The Agency and the City will work together to develop a new agreement that will specify conditions for the City's delivery of potable water from the Agency to the "high elevation lots" in the Verdera Development (including residential, commercial and golf course related development). This agreement will specify the wholesale billing and water accounting system through the existing master meter and the second master meter planned to supply the Verdera Development. The second master meter is planned at the proposed City Pond site at the end of the proposed Phase 3-Thirty (30") pipeline.

7. The City will support the Agency's water resource protection efforts, including: securing permits for the construction of the proposed Sacramento River diversion, securing the long term renewal of PCWA's Central Valley Project water supply contract and amending the CVP service area to include the MFP water rights place of use, securing an extension of time for Agency's water rights permits, relicensing of the Middle Fork Project, and the participation in relicensing of the PG&E Drum-Spaulding project and securing the renewal of the Agency's Yuba Bear River water supply contract.

8. The Agency will work cooperatively with the City and Nevada Irrigation District to develop a future potable water source for the portion of the City that is within the boundaries of NID

9. The Agency and the City agree to offer each other the opportunity to participate in any water studies conducted or commissioned by each as well as data and results as requested.

Placer County Water Agency

By: Pauline Ricucci
Chair

Attest:

Cheri Sprunck
Clerk of the Board of Directors

City of Lincoln

By: Tom Cosgrove
Mayor

Attest:

Linda L. Stackpoole
City Clerk, City of Lincoln

Appendix A-5

2005 PCWA Contract Supplement

MEMORANDUM OF UNDERSTANDING
BETWEEN CITY OF LINCOLN AND PLACER COUNTY WATER AGENCY
REGARDING WATER SERVICE

This Memorandum of Understanding is entered into this 25th day of October, 2005, by and between the Placer County Water Agency ("Agency") and the City of Lincoln ("City").

WHEREAS, the Agency and the City have entered into a water supply contract dated February 27, 1998 and amended on July 13, 1999 and November 7, 2002.

WHEREAS, the pace of urban development within the Agency's service area, including within the City, is rapid and together with proposed changes in the General Plans of the City and the County of Placer, the Agency and the City are challenged to ensure that there is an adequate water supply and adequate infrastructure to meet all of the potential water needs within their service areas in a timely manner.

WHEREAS, the Agency and the City desire to work cooperatively on the implementation of both a local Integrated Resources Plan being developed by PCWA, and on a broader Plan being developed by the Regional Water Authority that include regional surface water diversion, treatment and delivery infrastructure, groundwater management, reclaimed water use, demand reduction and funding elements to adequately meet the future water needs within the Agency and the City.

WHEREAS, there is a need by the City to develop new water transmission facilities for City's proposed planning areas north of Athens Road, from Highway 65 west to Fiddyment Road, including future interties with the Agency at Industrial Boulevard and Fiddyment Road.

WHEREAS, the City has made extensive efforts to provide retail water service to the Thunder Valley Casino facilities on the north side of Athens Road and within the City's sphere of influence in a manner that is consistent with and supports the construction of the new transmission facilities mentioned above, including obtaining pending environmental regulatory approvals for said water service.

Now, therefore, the parties mutually agreed to the following principles for their collaboration on the provision of water in the future.

1. Once the City completes the necessary infrastructure required to serve the properties north of Athens Road, the City shall be the water purveyor for all new customers on the north side of Athens Road, and the Agency, to the extent permitted by law, will transfer its existing water customers, including the Thunder Valley Indian Casino, on the north side of Athens Road to the City, and the City shall defend, protect, hold harmless and indemnify the Agency in the event of any litigation against the Agency challenging the legality of the Agency transferring such customers to the City without the customer's approval.

2. The City and the Agency will work together to identify the City water facilities that may be needed to accept anticipated deliveries from the proposed Sacramento River diversion to serve lands within the City's sphere of influence.

3. The City agrees to work cooperatively with the Agency to develop funding mechanisms for joint use water facilities.

4. The City and Agency will work together with the City of Roseville and the County of Placer to develop a sub-regional Water Resources Plan that will effectively integrate surface water, groundwater, reclaimed water and demand reduction programs to efficiently and reliably meet the build-out demands of the parties' service areas. The goals of the plan will include sustaining groundwater levels and protecting groundwater quality; developing joint or cooperative groundwater management plans; optimizing the cost effective use of reclaimed water through exchanges between purveyors and the sale of surplus reclaimed water to meet some of the Agency's Zone 5 agricultural water demands in lieu of using water that could be treated to meet domestic demands within the City; and, implementing cost effective conservation measures.

5. The Agency will support the City's efforts to design and construct needed infrastructure for use of reclaimed/recycled water within and outside the City limits and sphere of influence, and support the City's efforts to acquire grants from Proposition 50, WRDA, and other sources.

6. The Agency and the City will work together to develop a new agreement that will specify conditions for the City's delivery of potable water from the Agency to the "high elevation lots" in the Verdera Development (including residential, commercial and golf course related development). This agreement will specify the wholesale billing and water accounting system through the existing master meter and the second master meter planned to supply the Verdera Development. The second master meter is planned at the proposed City Pond site at the end of the proposed Phase 3-Thirty (30") pipeline.

7. The City will support the Agency's water resource protection efforts, including: securing permits for the construction of the proposed Sacramento River diversion, securing the long term renewal of PCWA's Central Valley Project water supply contract and amending the CVP service area to include the MFP water rights place of use, securing an extension of time for Agency's water rights permits, relicensing of the Middle Fork Project, and the participation in relicensing of the PG&E Drum-Spaulding project and securing the renewal of the Agency's Yuba Bear River water supply contract.

8. The Agency will work cooperatively with the City and Nevada Irrigation District to develop a future potable water source for the portion of the City that is within the boundaries of NID

9. The Agency and the City agree to offer each other the opportunity to participate in any water studies conducted or commissioned by each as well as data and results as requested.

Placer County Water Agency	City of Lincoln
By: Pauline Roccucci	By: Tom Cosgrove
Chair	Mayor
Attest:	Attest:
Cheri Sprunck	Linda L Stackpoole
Clerk of the Board of Directors	City Clerk, City of Lincoln

Appendix A-6

2006 PCWA Contract Supplement

SUPPLEMENT TO CONTRACT BETWEEN PLACER COUNTY WATER AGENCY AND CITY OF LINCOLN FOR A WATER SUPPLY

This Supplement to the February 24, 1998 water supply contract is made this 11 TH day of DECEMBER, 2006, by and between Placer County Water Agency ("Agency") and the City of Lincoln ("Lincoln").

RECITALS.

A. On February 24, 1998, the Agency and Lincoln entered into a water supply contract which is hereinafter referred to as "The Contract." The Contract provides, among other things, that Lincoln may increase its maximum delivery entitlement by paying to the Agency an amount equal to that portion of the Agency's Water Connection Charge (WCC) applicable to Lincoln.

B. The Agency is considering the construction of a 42 inch water pipeline through the Bickford Ranch Project ("the 42" pipeline") to provide service to Lincoln, as well as the Bickford Ranch Development, and Lincoln has offered to assist the Agency in financing the 42" pipeline by providing to the Agency $4,000,000, provided that Lincoln's maximum delivery entitlement is increased by that payment in accordance with the provisions of The Contract using the Agency's WCC in effect on November 2, 2006.

C. On November 2, 2006, the Agency Board of Directors agreed that Lincoln could increase its maximum delivery entitlement based on the WCC in effect on November 2, 2006, provided that Lincoln deposits $4,000,000 with the Agency and agrees to the terms of this Supplement to The Contract on or before December 13, 2006.

NOW THEREFORE, IT IS AGREED AS FOLLOWS:

1. Lincoln hereby agrees to pay the Agency $4,000,000 on or before December 13, 2006.

2. Lincoln also agrees to construct and convey to the Agency on or before June 1, 2008 new metering station to the Agency's specifications at Lincoln's City Pond Site to effect the delivery of water through the 42" pipeline to Lincoln's system, and to convey to the Agency fee title to sufficient land for the metering station and for the Agency to locate a pressure reducing station for its needs and to facilitate the operation and maintenance of the facilities, together with any necessary access easements provided that Lincoln's maximum delivery entitlement is increased by the audited costs for the metering station in accordance with the provisions of The Contract using the Agency's WCC in effect on November 2, 2006.

3. The Parties hereby agree that upon the Agency's receipt of the payment and the metering station and land title described in Paragraph 2, but not before June 1, 2008:

(a) Lincoln's maximum delivery entitlement under The Contract shall be increased in accordance with the provisions of The Contract on the basis of the WCC in effect on November 2, 2006;

(b) Lincoln shall have an exclusive reserved right to that portion of the capacity of the 42" pipeline equal to the proportion that the $4,000,000 bears to the total cost of the planning, design and construction of a minimum 42" diameter pipeline from the future Ophir Water Treatment Plant to the proposed metering station at Lincoln's Pond Site;

(c) The Agency will use any excess capacity that may exist in the Bickford Pump Station after meeting the demands of the Bickford Development to pump from the Agency's Foothill system through the 42" pipeline to meet Lincoln's demands for water until the Agency's Ophir water treatment plant, storage and transmission facilities are in service, after which the use of the Bickford Pump Station will not be necessary to delivery water to Lincoln through the 42" pipeline.

4. Lincoln shall not be required to pay the Agency's monthly service charges, the state and federal mandated charges and renewal and replacement charges for the EDU's associated with the $4,000,000 payment until the completion of the 42" pipeline and associated facilities to be completed by others, or until June 1, 2008, whichever occurs later. Thereafter these charges shall be assessed regardless of the completion of the metering station or delivery of any part of the increased delivery entitlement.

5. Lincoln is hereby granted an extension of time for completion of the 30 inch diameter Phase 3 pipeline described in the July 13, 1999 Supplement to the Contract until May 1, 2012.

6. Except as supplemented and revised here, the provisions of The Contract remain in full force and effect.

IN WITNESS WHEREOF, the parties have executed this Supplement to The Contract as of the date first written above.

PLACER COUNTY WATER AGENCY

Chair of the Board of Directors

PLACER COUNTY WATER AGENCY

Clerk, Board of Directors
P.O. Box 6570
Auburn, California 95604

APPROVED AS TO FORM:

Placer County Water Agency Counsel

CITY OF LINCOLN

Mayor

ATTEST:

Clerk, CITY OF LINCOLN
1390 First Street
Lincoln, California 95648

APPROVED AS TO FORM:

Lincoln City Attorney

Placer County Water Agency

Business Center: 144 Ferguson Rd. • Mail: P.O. Box 6570 • Auburn, California 95604-6570
(530) 823-4850 800-464-0030 www.pcwa.net

December 13, 2006

Gerald Johnson
City of Lincoln
640 5th Street
Lincoln CA 95648

RE: SUPPLEMENT TO CONTRACT BETWEEN
PLACER COUNTY WATER AGENCY AND
CITY OF LINCOLN FOR A WATER SUPPLY

Dear Mr. Johnson:

Enclosed find two copies of the contract referenced above, which was approved by the Board of Directors on December 11, 2006. Please execute both copies and return them to me. After I have obtained the Agency Chairman's signature, a fully executed original will be returned to you.

If you have any questions, please contact Brian Martin at 530.823.4801.

Sincerely,

Darcy Erickson

Darcy Erickson

Enclosures

Appendix B

October 2004 PCWA NID Treatment and Delivery Agreement

Temporary Water Sales Agreement Between the Nevada Irrigation District (NID), Placer County Water Agency (PCWA), and the City of Lincoln (Lincoln)

This agreement is made and entered into this 26th day of October, 2004, by and between the Nevada Irrigation District, hereafter referred to as "NID", Placer County Water Agency, hereafter referred to as "PCWA", and the City of Lincoln, hereafter referred to as "Lincoln".

Recitals

A. NID is authorized to provide water for irrigation, municipal and domestic use within its boundaries, in accordance with Division 11 of the California Water Code. PCWA is a county water agency created in 1959 by the California Legislature (statutes of 1957, Chapter 1234) and is authorized to provide water for the same uses within its service area.

B. NID's boundaries overlap portions of PCWA's Zone 1 service area and Lincoln's city limits.

C. Lincoln currently purchases treated surface water from PCWA pursuant to a long-term contract between Lincoln and PCWA, and delivers the treated water to its customers, some of whom are in that portion of the city that is also within the boundaries of NID.

D. NID currently does not have infrastructure to provide treated water within its service area in the vicinity of Lincoln.

E. NID and Lincoln have entered into an agreement for joint planning and site evaluation of a domestic water treatment plant to be owned by NID to serve Lincoln's long-term needs within NID's boundary.

F. PCWA currently has infrastructure in place to treat and deliver surface water to Lincoln for use by customers of Lincoln within NID's boundaries, but requires raw water from NID for treatment and delivery to Lincoln for re-delivery to residents within NID's boundaries.

G. NID has raw water available that can be temporarily delivered to PCWA for this purpose until such time as NID has other means available to serve Lincoln's needs within NID's boundary.

H. PCWA is desirous of substituting NID's water for the water PCWA now delivers to Lincoln for use within NID's boundaries so that it can reallocate a similar amount of water to PCWA customers which may include Lincoln, for use outside of NID's boundaries.

I. Lincoln is desirous of purchasing additional treated water capacity from PCWA's system throughout the life of this temporary water sales agreement.

AGREEMENT

Now, therefore, the parties mutually agree as follows:

1) NID agrees to sell PCWA raw water that will be delivered to PCWA's treatment plants. PCWA will treat and deliver equivalent quantities of water to Lincoln, less losses, for distribution to customers of Lincoln that are within the boundaries of NID as described in Exhibit A.

2) NID water delivered and sold to PCWA including a 10 percent loss factor will be measured and will be equal to an amount retailed by Lincoln to customers within the boundaries of NID plus the 10 percent loss factor.

3) Lincoln will ensure that all treated water use within NID's boundaries will be metered and Lincoln will provide such metered water sales information that will include a 10 percent loss factor to NID and PCWA on a monthly basis. An annual water balance will be completed by NID by January 31 of each year.

4) PCWA shall pay NID for water delivered at the NID's municipal rate for raw water, subject to changes to that rate authorized by NID's Board from time to time. (Rate Schedule 5-R)

5) Water sold and delivered by NID under the terms of this agreement is untreated water which has flowed in open canals, conduits and flumes, and which has been stored in reservoirs. Such water is not potable and NID does not represent or guarantee that it is fit for domestic purposes. PCWA shall be solely responsible for any treatment, storage, or transmission of said water to Lincoln for human consumption in accordance with laws and regulations applicable to potable water.

6) Raw water delivered by NID under this agreement is subject to scheduled and unscheduled outages. It will be PCWA and/or Lincoln's responsibility to provide an alternate treated water supply during such outages so that deliveries to Lincoln's customers by NID will not be disrupted.

7) It is understood and agreed that in a year which is considered or deemed by NID to be a drought year or in a year which in the estimation of NID requires rationing or curtailment of water use, NID at its discretion may impose a drought surcharge, and/or reduce or restrict the raw water service to PCWA, in proportion to any reduction, limitation or curtailment of treated water customers within the District.

8) It is understood and agreed that in any year in which PCWA determines it must ration or curtail water deliveries in its Zone 1, and if NID is able to deliver water to PCWA, for delivery to Lincoln, PCWA will make that water available to Lincoln for delivery to Lincoln's customers in NID's boundaries.

9) It is also understood that PCWA shall not be required to deliver water to Lincoln obtained from NID pursuant to this agreement whenever PCWA determines that it does not have sufficient capacity in its facilities to treat and deliver such water to Lincoln. PCWA will notify NID whenever PCWA does not have capacity to deliver such water to Lincoln.

10) This agreement is intended to be a temporary agreement to be in effect until such time as NID constructs a treatment plant and other facilities sufficient to enable NID to supply treated water to Lincoln for those customers within Lincoln that are also within NID's boundary. This agreement is not intended to usurp nor weaken NID's water rights nor customer base.

11) This Water Sales agreement may not be modified without the express written consent of NID, PCWA, and Lincoln.

12) NID, PCWA, and Lincoln will each comply with all legal requirements applicable to each of their respective services and obligations under this agreement.

City of Lincoln

Spencer Short
Mayor

Linda L Stackpoole
City Clerk

Nevada Irrigation District

George Leipzig
President
George Leipzig

Lisa Francis Tassone
Secretary
Lisa Francis Tassone

Placer County Water Agency

Chair of the Board

Cheri Sprunck
Board Secretary

NID Nevada Irrigation District

1036 W Main St • PO Box 459003 • Grass Valley, CA 95945 • (530) 273-6185
From Auburn & Lincoln: 1-800-222-4102 FAX: 477-2646 www.nid.dst.ca.us

November 23, 2004

Jerry Johnson
City Manager
City of Lincoln
1390 First Street
Lincoln, CA 95648

Dear Mr. Johnson,

I am writing this letter as added clarification of the Temporary Water Sales Agreement between the Nevada Irrigation District, Placer County Water Agency, and the City of Lincoln.

For the purpose of water sales and water sale auditing, the District is in agreement with the NID boundaries as depicted in the Eco:Logic map prepared July 15, 2004 by Lisa Haldane and titled " Figure 1: NID Service Area Boundary within City of Lincoln Proposed Sphere of Influence". The Eco:Logic map shows lots dissected by the NID boundary and to be served with District water highlighted in blue, and those highlighted in dark green excluded from the NID service area. The District is in agreement with the service area as delineated on the Eco:Logic map.

Item one of the Temporary Water Sales Agreement between NID, PCWA, and Lincoln refers to customers of Lincoln that are within the boundaries of NID as described in Exhibit "A". The District agrees that the Eco:Logic map shall be presented as Exhibit "A" in the agreement.

I hope this letter helps to clarify and finalize The Temporary Water Sales Agreement between NID, PCWA and Lincoln.

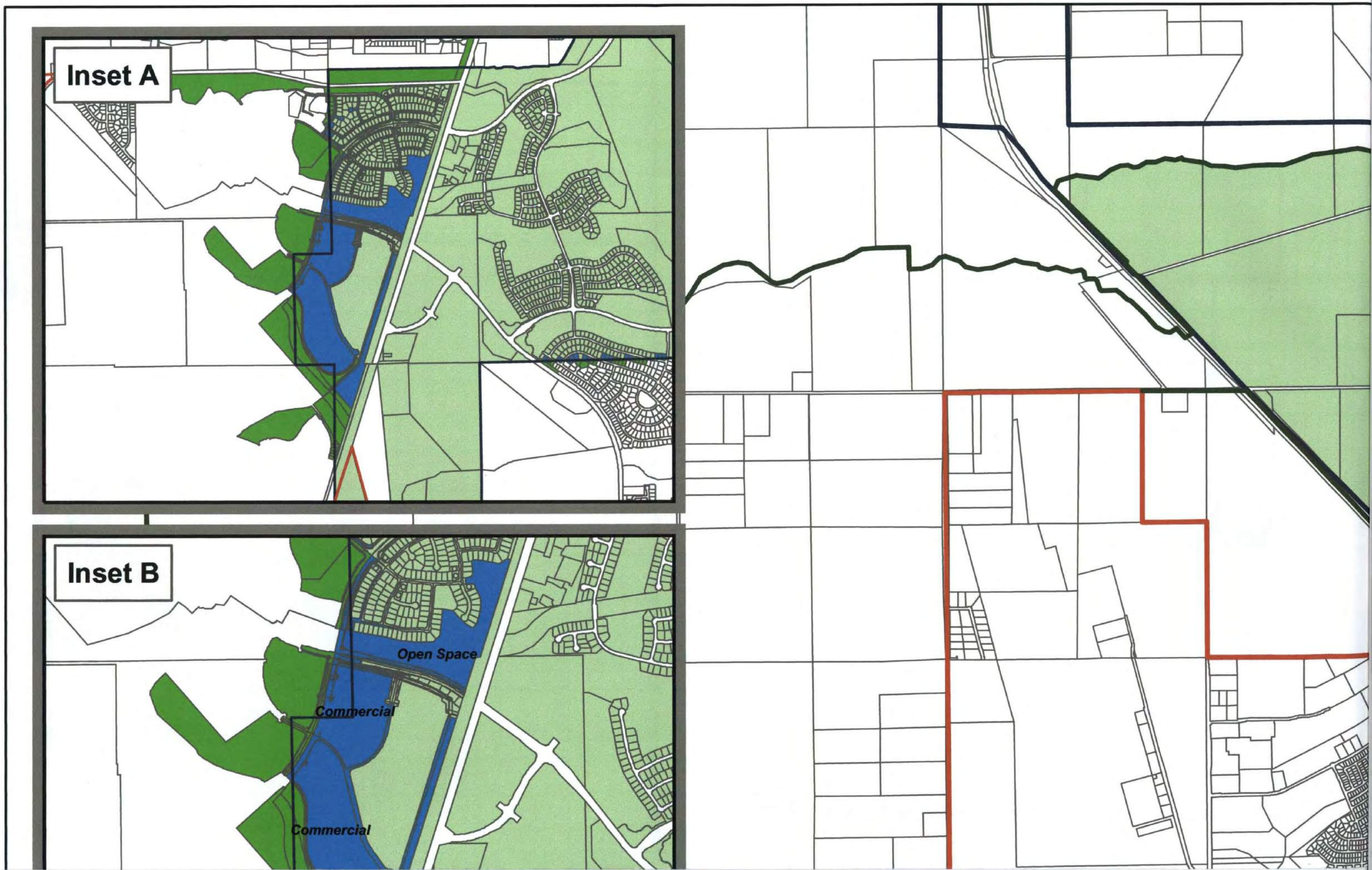
Sincerely,

Ron Nelson

Ron Nelson
General Manager

RN:DW:sm

cc: John Pedri
Brian Martin


Inset A
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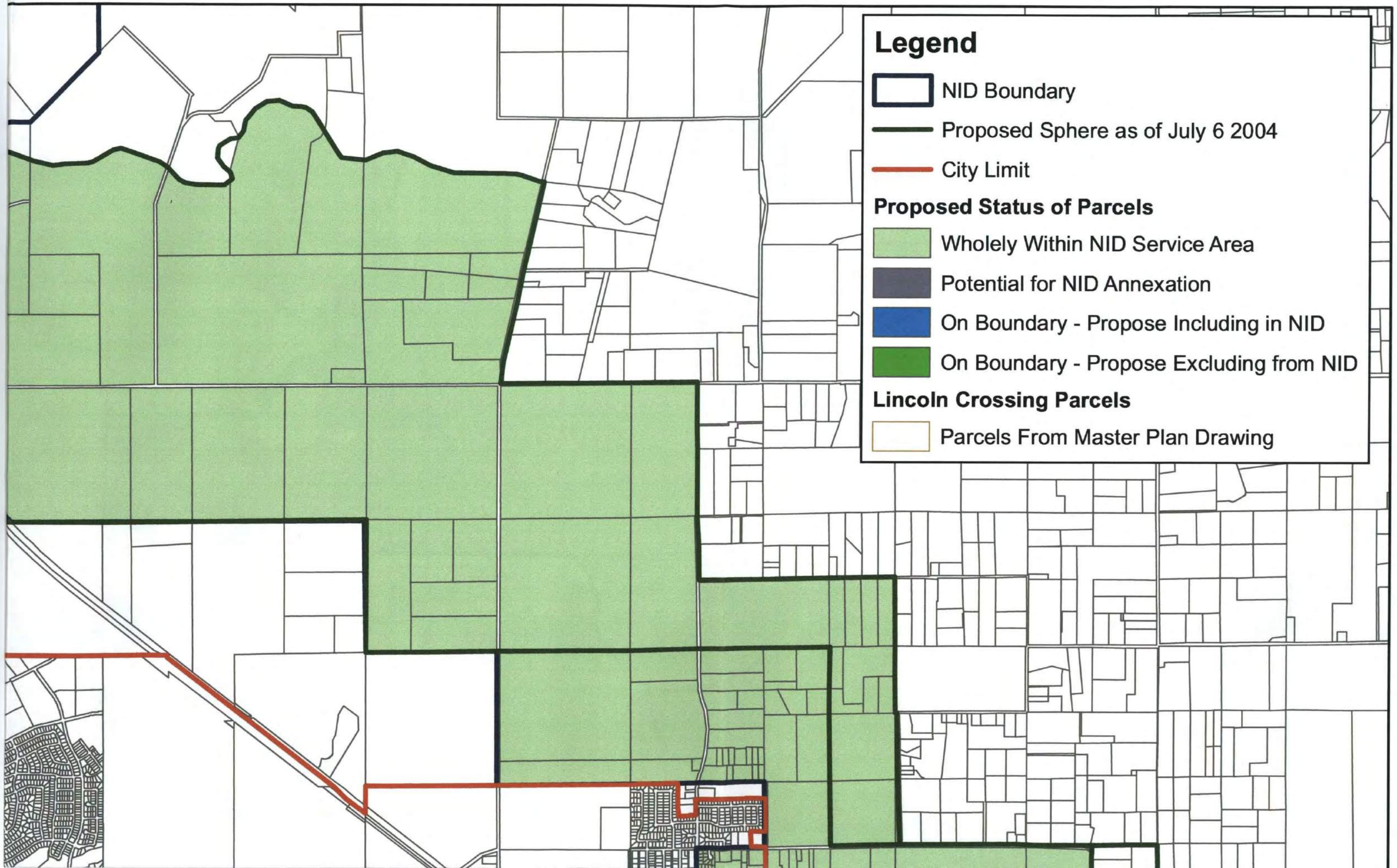
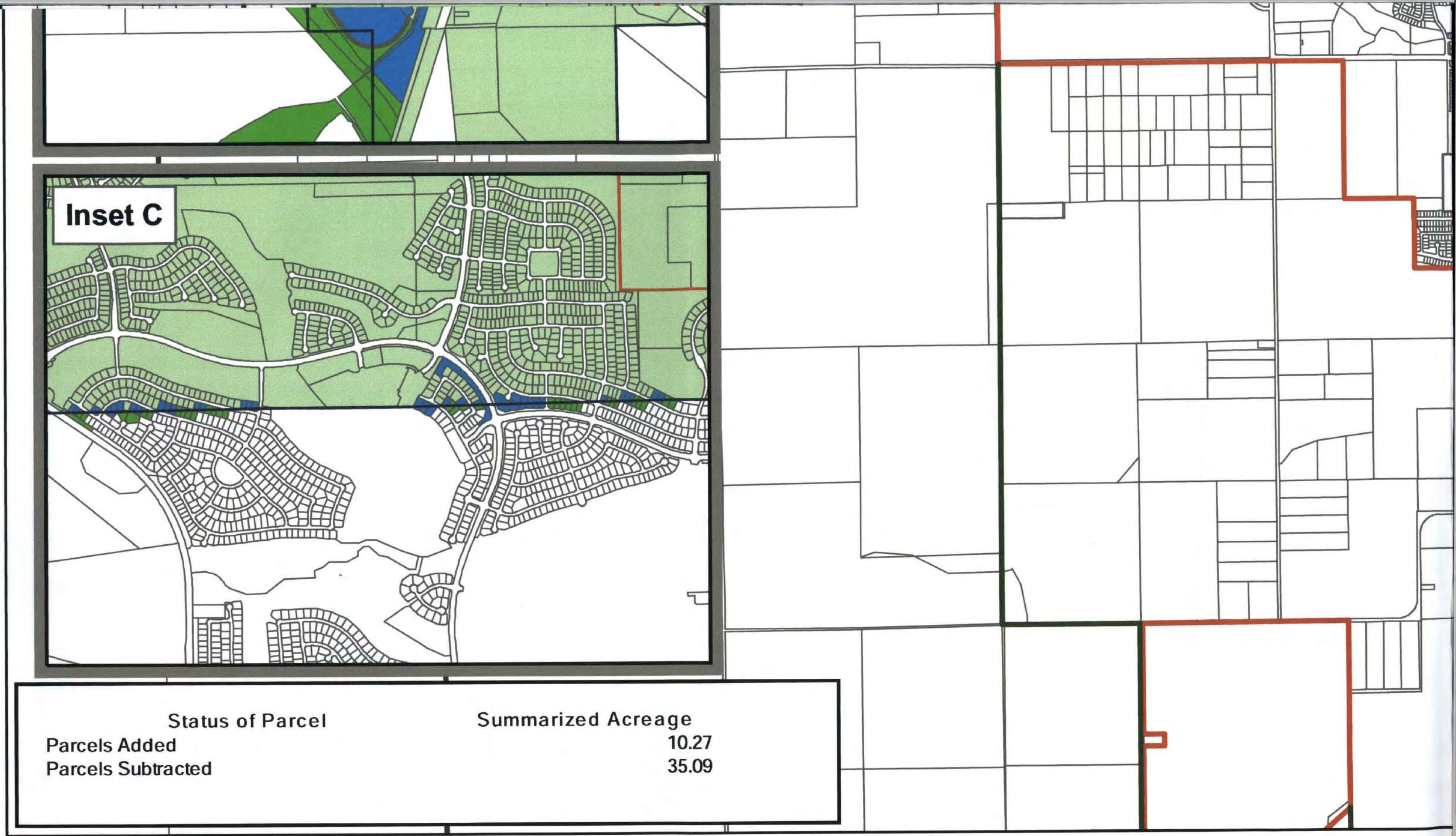
Open Space
Commercial
Commercial


Legend
NID Boundary
Proposed Sphere as of July 6 2004
City Limit
Proposed Status of Parcels
Wholely Within NID Service Area
Potential for NID Annexation
On Boundary - Propose Including in NID
On Boundary - Propose Excluding from NID
Lincoln Crossing Parcels
Parcels From Master Plan Drawing



Status of Parcel	Summarized Acreage
Parcels Added	10.27
Parcels Subtracted	35.09

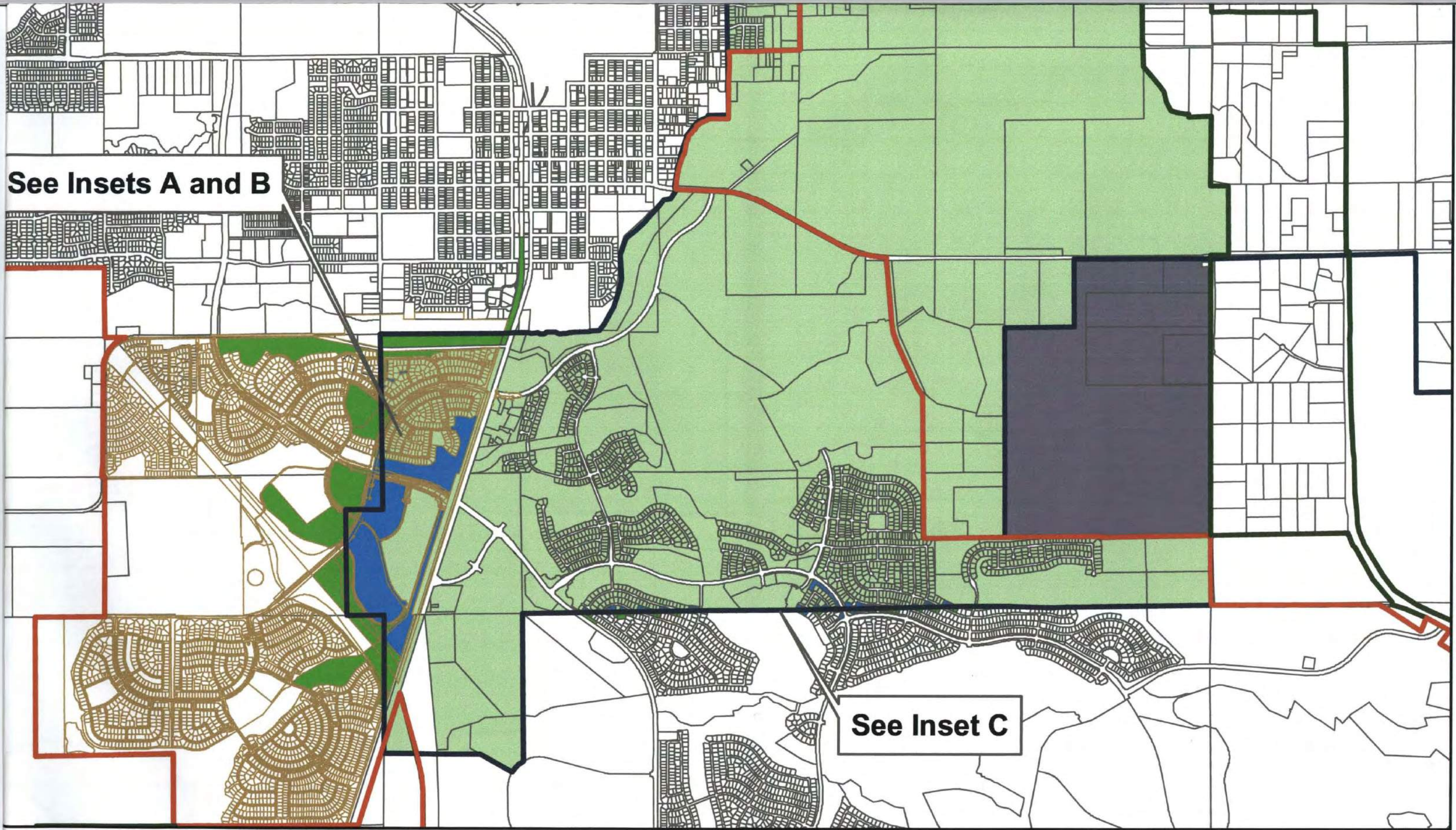
ECO:LOGIC

Prepared by: L Haldane

Figu

NID Service Area

City of Lincoln Propos



re 1:
Boundary within
ed Sphere of Influence

Draft: July 15 2004

ix cr file

Placer County Water Agency

Business Center: 144 Ferguson Rd. • Mail: P.O. Box 6570 • Auburn, California 95604-6570
(530) 823-4850 800-464-0030 www.pcwa.net

A Public Agency

November 24, 2004
File No. Facilities File

Mr. Gerald F. Johnson, City Manager
City of Lincoln
640 5th Street
Lincoln, CA 95648

SUBJECT: Application for Increasing City of Lincoln's Maximum Water Delivery per the 1998 City of Lincoln – PCWA Water Supply Contract/Supplement

Dear Mr. Johnson:

This letter is to acknowledge receipt of the City of Lincoln's (Lincoln) letter dated November 22, 2004 which requests increases in the maximum water delivery to the City of Lincoln.

The Agency will be processing Lincoln's request for the following at its December 2, 2004 meeting:

- 2,369 WCC (EDU's) at the rate of $6,815 per 1,150 gallons per day.
- 339 WCC (EDU's) at the rate of $8,122 per 1,150 gallons per day for the high service area with the City of Lincoln.

The Agency has no objection to Lincoln retaining the $4,000,405 for design and construction of the Phase 3 pipeline; however, the Agency cannot grant Lincoln credit for EDU's at the $6,815 rate. In Article 4C, Phase 3 of the "Supplement to Contract Between Placer County Water Agency and City of Lincoln for a Water Supply" dated July 13, 1999 the last sentence states the following:

> "Lincoln shall fund the full cost for the design and construction of Phase 3, and upon completion and acceptance by the Agency, Lincoln shall receive credits for this funding of Phase 3 as provided for in Article 5(d) below."

Consequently, the Agency will provide credit for the construction of the Phase 3 pipeline at the WCC rate in effect at the time of acceptance of the Phase 3 pipeline.

If you have any questions, please do not hesitate to call me at (530) 823-4886.

Sincerely,

Brian C. Martin

Brian C. Martin, P.E.
Director of Technical Services

BCM:bb

pc: PCWA Board of Directors
David Breninger
John Pedri

c:\nov04e

Placer County Water Agency

Business Center: 144 Ferguson Rd. • Mail: P.O. Box 6570 • Auburn, California 95604-6570
(530) 823-4850 800-464-0030 www.pcwa.net

January 27, 2005

Linda Stackpoole
City Clerk
City of Lincoln
640 5th Street
Lincoln, CA 95648

Re: Temporary Water Sales agreement Between NID, PCWA, and the City of Lincoln

Dear Ms. Stackpoole:

I received a copy of the above referenced contract from the City of Lincoln. The copy is signed by Mayor Short but the signatures by NID and PCWA are not original but photocopies. I understand that NID received the same photocopies as PCWA.

I have checked with our Agency legal counsel Ed Tiedemann and he advises that we should recirculate the three contracts to all parties to sign so that all parties end up with a fully executed original for their files. Accordingly, I have enclosed three copies for recirculation for original signatures. Please have the Mayor sign each document. Once the Mayor has signed the three contracts, please send them to NID for execution and thereafter for forwarding back to PCWA. I will send the City and NID fully executed originals.

Thank you.

Sincerely,

PLACER COUNTY WATER AGENCY

Cheri Sprunck

Cheri Sprunck
Agency Secretary/Clerk to the Board

Enc.
c: Gerald Johnson
Ronald Nelson, NID
David A. Breninger
Ed Tiedemann

Appendix C

NID City of Lincoln Water Facilities/Planning Phase Agreement

AGREEMENT FOR JOINT PLANNING AND SITE EVALUATION FOR DOMESTIC WATER TREATMENT PLANT

Nevada Irrigation District (NID) and the City of Lincoln (Lincoln), having agreed to cooperate and jointly evaluate the development of domestic water treatment capacity to serve areas of NID both within and outside the city limits of Lincoln, and to share the conclusions, results, recommendations of any evaluations in connection therewith, do hereby agree as follows.

<u>RECITALS</u>

1. Lincoln provides treated water service within its city limits and requires an assured wholesale supply of treated water in order to provide said service to meet the growing demands of Lincoln.

2. NID is an irrigation district whose political boundaries overlap portions of Lincoln's city limits and it is authorized to provide retail and/or wholesale water service within its political boundaries, including within Lincoln.

3. NID and Lincoln agree that NID should develop a source of treated water available for wholesale service to Lincoln for resale to all of Lincoln's customers within NID's boundaries and for retail distribution by NID to customers within NID's boundaries not otherwise served by Lincoln.

4. Lincoln currently purchases treated surface water at wholesale from Placer County Water Agency (PCWA) and, in part, is utilizing water received from PCWA for the provision of retail treated water service to customers of Lincoln that are within the political boundaries of NID.

5. Lincoln has experienced substantial growth in its political boundaries and in its population and said growth is expected to continue. Lincoln is currently evaluating an expansion of its city limits in order to accommodate additional growth projected within its sphere of influence. Such growth in the city boundaries shall expand the area in which the political boundaries of NID and Lincoln overlap.

6. Lincoln seeks a permanent supply of treated water from NID at wholesale in sufficient quantity to allow Lincoln to serve all those customers within NID who are within the city limits so that water purchased from PCWA can be used by Lincoln for demand projected to occur outside NID's boundaries.

7. NID does not have adequate treatment capacity within the vicinity of Lincoln and Lincoln and NID agree that a large treatment plant, able to serve all of Lincoln's wholesale requirements within NID, and NID's retail obligations not within the City of Lincoln is the most

efficient method of developing such capacity.

8. NID has initiated the planning for a treatment plant sufficient to provide both wholesale service to Lincoln and retail service to NID's customers.

9. On ___________ ___________, 2003, NID and City of Lincoln entered into a Memorandum of Understanding (MOU) acknowledging the importance and benefits of Lincoln acquiring treated water service from NID and of NID providing water to Lincoln to serve all of its customers who reside within the overlap area; and for NID to provide water for retail distribution to NID customers within the NID's boundaries that do not lie within the Lincoln city limits, and confirming the parties' mutual intent to work cooperatively to complete a water treatment planning and site study for a plant sized to assure adequate supplies of domestic water to provide such service ("Study"). NID and Lincoln have met and conferred and agree that it is appropriate to jointly undertake a water treatment plant planning and site study as the initial step in the development of adequate treated water capacity.

10. In order to ensure that the preparation of such a study can proceed on a timely basis, NID has already prepared and distributed a request for proposals (RFP) for the planning and site study. Lincoln has reviewed the RFP, has approved it, and desires to participate with and cooperate with NID in the development of the study and to share in the conclusions and recommendations made by the study and in consideration for its participation in and use of the study results, Lincoln has agreed to share with NID in the costs of the study.

NOW, THEREFORE, for adequate consideration, receipt of which is hereby acknowledged, NID and Lincoln do agree as follows.

AGREEMENT

1. Lincoln hereby ratifies the RFP heretofore issued by NID. Lincoln jointly with NID, will evaluate the responses to the RFP. NID and Lincoln will consult and jointly approve the consultant to be retained by NID.

2. Upon selection of the consultant, NID shall enter into a contract with the consultant. Lincoln will not be a signatory thereof but will review and approve the form of contract and NID will ensure that the consultant acknowledges Lincoln's joint interest with NID in the study and its conclusions. NID will be responsible for the day-to-day administration of the service agreement with the consultant performing the study. NID will, on an ongoing basis, consult with Lincoln on all matters relating to the administration of the service agreement with the consultant. NID shall not alter, expand or decrease, the scope of work set forth in the RFP without prior consultation and approval from Lincoln. Upon its request Lincoln shall be copied on all correspondence to and from the consultant and will participate in all scheduled conferences, by telephone, e-mail, or in person.

3. NID and Lincoln will each provide technical and administrative personnel as

required to monitor, direct, comment upon and review the study results. Lincoln and NID will each designate a technical working group ("Technical Committee") who will convene at least monthly, and more often if called by either party, for purposes of carrying out their responsibilities hereunder.

4. NID shall be responsible for payments to the consultant performing the study. Payments will be made in accordance with the progress payment schedule in the service agreement with the consultant. Lincoln shall reimburse NID for its share of the costs as invoiced by NID. Lincoln agrees that its share of the invoiced cost is 50%. Lincoln will not be responsible for any payments required as a result of change orders or scope changes approved by NID unless Lincoln has received prior notification thereof and it has agreed to pay its fifty (50%) percent share of such increased cost. All costs payable by Lincoln shall be billed by NID not more frequently than monthly and shall be paid by the City of Lincoln within _30_ days of invoicing by NID. Lincoln may, during business hours, request copies of and review all billings, invoices and records of NID underlying payment to the Consultant.

5. While it is agreed that the preliminary feasibility study under the RFP does not constitute a project under the California Environmental Quality Act ("CEQA"), NID and Lincoln will adhere to the requirements of the CEQA in the siting, design, and construction of the water facilities. The Technical Committee established under Paragraph 3 above shall, as part of its responsibilities, engage in routine evaluation of status of the project in light of the requirements of CEQA and will make appropriate recommendations to their respective governing bodies as to any steps that need to be initiated and/or modified as a result of compliance with CEQA.

6. This Agreement is whole and entire and may not be modified without the express written agreement of NID and Lincoln. Either party may terminate this Agreement with or without cause upon giving the other party thirty (30) days written notice thereof. During the thirty (30) day notice period, the parties shall meet in an attempt to determine the basis of any disagreement and an attempt to resolve same. Absent written agreement of the parties confirming the reestablishment of the agreement, the agreement will terminate, without further action, thirty (30) days after one or the other party gives notice of termination. In the event of termination, Lincoln and NID shall remain responsible for those consultant costs undertaken or incurred prior to the effective date of said termination. NID and Lincoln shall be jointly entitled to the consultant work product and supporting documents developed through the date of termination.

7. As long as this agreement remains in force and effect, no party will take any action in connection with the planning, design or siting of the treatment plant, as recommended by the study, absent the express joint approval of both Lincoln and NID.

8. It is agreed by Lincoln and NID that decisions regarding future annexation of Lincoln

into areas then served treated water by NID, and issues involving responsibility for service in such areas, including ownership of constructed facilities, water rates and capacity fees, is beyond the scope of the agreement and will require additional negotiations and agreement.

Agreed to this 24th day of February, 2004, at Lincoln,

California.

CITY OF LINCOLN

Spencer Short

Mayor

Linda J. Stackpoole

City Clerk

NEVADA IRRIGATION DISTRICT

George Leipzig

George Leipzig, President

Lisa Francis Tassone

Lisa ~~Francis~~ Tassone, Clerk of the Board

Appendix D

City of Lincoln NID Framework for Collaboration

**MEMORANDUM OF UNDERSTANDING
BETWEEN CITY OF LINCOLN AND NEVADA IRRIGATION DISTRICT
ESTABLISHING INTENTIONS AND CONCEPTUAL FRAMEWORK FOR THE
DEVELOPMENT OF A TREATED WATER FACILITY AND APPURTENANCES
NEEDED TO SERVE CITY OF LINCOLN AND NEVADA IRRIGATION DISTRICT**

RECITALS

WHEREAS, the City of Lincoln ("Lincoln") and Nevada Irrigation District ("NID"), collectively the "Parties" entered into a MOU, dated February, 2004, under which they have undertaken preliminary planning, including site evaluations, for the acquisition, construction, ownership and operation of a domestic water treatment plant and related facilities (the "Project"); and

WHEREAS, NID and Lincoln have coordinated their planning for the construction of said Project in anticipation that, through economies of scale and coordinated planning, substantial areas of NID, including those areas of Lincoln located within NID, can be served from a common treatment plant; and

WHEREAS, Lincoln operates a domestic water distribution system supplied by its own wells, and by Placer County Water Agency; and

WHEREAS, currently, surface water needed to serve those customers of Lincoln within NID's boundaries must be treated by Placer County Water Agency ("PCWA") at PCWA's Foothill Treatment Plant ("FTP") because NID has no treated water facilities within the vicinity of Lincoln; and

WHEREAS, the FTP capacity and NID raw water delivery to FTP limit the supply of treated water Lincoln can serve within the NID boundaries; and

WHEREAS, prudent planning for the long-term provision of water service within Lincoln will require the installation of an additional treatment plant to serve those areas within

Lincoln that are within NID as well as to serve NID customers outside Lincoln desiring treated water; and

WHEREAS, the Parties have regularly met for a period of 3 years in order to develop a common basis of understanding for the acquisition of said treated water capacity, its construction, ownership and operation by NID, and the terms under which service from said plant could be provided, at wholesale, to Lincoln to serve Lincoln customers residing within the NID boundaries, while also making service available to NID's own customers; and

WHEREAS, the Parties anticipate that the Project would move forward under four definitive agreements which will be (1) agreement on the respective service areas of NID and Lincoln; (2) agreement regarding the planning required to install the Project, including environmental evaluation; (3) agreement on terms and conditions of treated water service to be provided, at wholesale, by NID to Lincoln; and (4) agreement on the financing and construction of said Project; and

WHEREAS, the Parties, prior to negotiating and executing the definitive agreements referred to above, seek to establish under this MOU the framework under which the Project will proceed, and the concepts that will be pursued through the four agreements.

AGREEMENT

1. The Recitals set forth above are incorporated herein as so set forth in full.

2. Exhibit "A" hereto, the Framework for Collaboration, sets forth the intention of the Parties that will govern the negotiation of definitive agreements required to plan, finance, and construct, own and operate the Project.

3. Exhibit "A" shall not constitute an agreement of the Parties, but represents an agreed upon statement of the intentions of the Parties that they will seek, through good faith

negotiations, to incorporate into the four (4) definitive agreements described above.

4. The Framework for Collaboration shall further be used to set forth those conditions and restrictions that each of the Parties intend to implement through their agreements; and to provide a brief outline and yardstick to measure the progress of the Parties by the respective governing bodies.

5. It is the intent of the Parties to proceed immediately with development of the agreement regarding the planning required to install the Project, with development and approval of the other three agreements to follow as closely as practical.

6. This agreement shall be effective upon execution by both Parties in the spaces indicated below.

Dated:

CITY OF LINCOLN

____

4/13/07

____

CITY MANAGER

Dated:

NEVADA IRRIGATION DISTRICT

____

W.S. MILLER

4-25-07

____

PRESIDENT

Exhibit "A"

Framework for Collaboration

Between the City of Lincoln (LINCOLN) and the Nevada Irrigation District (NID)

Definitions:

Project Facilities: All or a portion of raw water and treated water facilities contemplated for construction by both LINCOLN and NID to ultimately provide treated water to customers of LINCOLN within the NID boundary and to NID customers located within the general area surrounding and outside of LINCOLN city limits. "Facilities" may include one or more hydroelectric plants operated incidental to the operations of the raw water and treated water facilities.

Project Phase: Specific and discrete units or combination of units of the infrastructure making up a portion of the total of all facilities as defined herein.

Intended Elements of Governing Agreements

A. Service Area Agreement

Water Rights:

- LINCOLN would not acquire water rights of NID, but a right to service. NID would be responsible for securing, maintaining, and, if feasible, expanding its surface water rights as needed to serve all of its customers, including Lincoln.
- Expansion of NID outside existing boundaries within the LINCOLN SOI would not be allowed under current policy.
- Service to LINCOLN, to the extent of its customers within NID, would not be curtailed except and to the extent that NID curtails its own domestic water customers using the same source water.
- NID and LINCOLN would agree to encourage treated water and irrigation water customers to employ water conservation practices.
- NID would support LINCOLN's management of the ground water basin within the LINCOLN SOI..
- LINCOLN would support NID's ownership of NID surface water rights and delivery and treatment infrastructure within and surrounding LINCOLN SOI.
- LINCOLN would support NID's requests to protect NID surface water infrastructure when affected by development within LINCOLN SOI.
- LINCOLN has developed a plan to distribute recycled water originating from LINCOLN'S Waste Water Treatment and Reclamation Facility (WWTRF) and to deliver same to areas within LINCOLN city limits within NID boundary. NID would support uses of recycled water for irrigation purposes within the developed areas in the overlap area between the NID boundary and LINCOLN city limits.
- LINCOLN would not distribute recycled water to areas outside LINCOLN city limits that are within the NID boundary without NID approval.
- NID recognizes LINCOLN's ability to provide recycled water to areas outside of the NID boundary.

Taxes:

- NID would support LINCOLN annexations that overlap lands within the NID boundary provided LAFCO does not impose unacceptable conditions on NID.
- LINCOLN would support the annexation of "island exclusions" into NID that are within the LINCOLN SOI prior to LINCOLN providing treated water service.
- Regarding annexations of "island exclusions", LINCOLN will support tax-sharing agreements with Placer County that allow a tax increment to NID, and that is consistent with tax sharing agreements for all other lands common to NID and LINCOLN.
- LINCOLN would not support any proposal to shift or reapportion general-purpose taxes that would result in a reduction of NID'S current tax base, future tax increment, or percent of overall general-purpose tax revenue. Base, increment, and percentage would be based on tax sharing agreement between NID and Placer County.

Changes in Organization:

- NID would support changes in LINCOLN'S SOI within the NID boundary to the extent feasible and practical, recognizing all demands within NID and the need to apportion NID resources in a reasonable manner.
- NID would support LINCOLN's applications to annex areas into its city limits that are within the NID boundary provided LAFCO conditions are reasonably acceptable to NID.
- LINCOLN would provide NID an opportunity to meet, discuss, and review documents with LINCOLN in draft stage, and provide written comments on updates to its General Plan, SOI, Groundwater Management Plan, proposed changes of organization to be filed with LAFCO, and Urban Water Management Plan.
- NID would provide LINCOLN an opportunity to meet, discuss, and review documents with NID in draft stage, and provide written comments on updates to NID's Raw Water Master Plan, Lincoln Treated Water Master Plan, petitions for changes of organization within Lincoln SOI, and Urban Water Management Plan.

Facility Ownership:

- NID would own and operate the raw water pipelines and canals, water treatment plant, treated water storage, and treated water pipelines and real property and easements where same are located up to and excluding the LINCOLN Hydraulic Grade Line Control Station (HGLCS) Point of Service.
- LINCOLN would own and operate the LINCOLN HGLCS Point of Service, and the water transmission and distribution system, all located downstream of the HGLCS.

Water Quality:

- NID would be liable for quality of the water up to the LINCOLN HGLCS Point of Service.
- LINCOLN would be liable for quality of the water downstream of the LINCOLN HGLCS Point of Service unless traced to water delivered from NID.

Future Water Service Expansion:

- LINCOLN would not serve treated water or extend LINCOLN's treated water distribution system beyond LINCOLN city limits within the NID boundary without NID approval. LINCOLN has produced a map showing all existing parcels lying outside LINCOLN city limits and within the NID boundary that currently receive water. Information on the map includes the classification of land use of such parcels and the size of the treated water meter serving each parcel.
- NID would not extend LINCOLN treated water system as discussed herein prior to completion of the project phase that first offers availability of treated water.
- Upon annexation of NID lands into LINCOLN city limits, LINCOLN would reimburse NID the then current value of NID'S out-of-pocket expenses, less depreciation, associated with such

NID treated water distribution components. NID would dedicate required treated water distribution components and easements to Lincoln upon such payment to NID.

- Treated water distribution components installed by NID that may be subject to dedication to the LINCOLN at some time in the future would be designed and constructed using mutually agreed-upon standards of NID and LINCOLN. Design and construction would also recognize that, subject to dedication, LINCOLN would eventually be responsible for operation, maintenance, and replacement of the treated water distribution components.
- NID may expand LINCOLN'S treated water distribution system into unincorporated areas, requiring LINCOLN and NID to jointly plan LINCOLN'S treated water distribution components that may, in the future, lend themselves to such an expansion. NID would reimburse or credit LINCOLN for all upgrades to LINCOLN'S system requested by NID on the basis of incremental upsizing of the new infrastructure.

Mutual Aid:

- LINCOLN and NID would provide mutual aid to each others customers during emergencies and planned routine maintenance activities.

B. Planning Phase Agreement

General:

- The Planning Phase would include regional water-service planning, identifying the proposed project and project alternatives, preparing preliminary design and preliminary cost estimates, compliance with the California Environment Quality Act (CEQA), consultation with regulatory agencies, identifying financing options, and public awareness.
- The Planning Phase will conclude at such time as the NID Board of Directors adopts a Notice of Determination to proceed with a project as defined in the CEQA process.

Implementation:

- NID would be the CEQA lead agency.
- NID would prepare requests for proposals (RFP's) for consulting services and select a firm(s) to perform the planning phase work, and NID would administer the consulting agreement, all in collaboration with the LINCOLN City Engineer.
- LINCOLN would participate with NID in all aspects of the Planning Phase including pre-design, selection of alternatives, selection of the proposed project (for CEQA purposes), and completion of the draft and final environmental impact report.
- LINCOLN would have joint approval with NID of the Planning Phase Consultant Service Agreement task orders, task order addenda, and pay requests.

Eligible Out-of-Pocket Costs:

- LINCOLN and NID would not request reimbursement for in-house labor, equipment, and materials cost; including overhead.
- LINCOLN and NID would request reimbursement for the other party's share of costs of outside services, such costs including contracted professional legal, engineering, and financial services.

Cost Sharing – Three-Step Approach:

- LINCOLN has collected capacity fees from parcels located within the NID boundary. These parcels will ultimately be provided service from the proposed new water treatment plant. LINCOLN would use such collected fees, or a credit for such fees, to initially fund all the Planning Phase costs.

- NID would participate in the Planning Phase costs at some time in the future, and to an extent determined by the success or failure of a project, all as determined by a three-step approach.

- First step:
  - LINCOLN would pay, on an interim basis, 100% of all Planning Phase Consultant Services costs, and 100% of all LINCOLN and NID outside services costs.
  - NID would pay all invoices for Planning Phase Consulting Services.
  - NID would bill LINCOLN monthly for 100% of the cost of NID outside services and 100% of Planning Phase consulting services paid to date.
  - LINCOLN would make payments within 45 days.
  - LINCOLN would provide NID, on a monthly basis, a detailed running accounting of LINCOLN'S outside services.

- Second step:
  - Should the Planning Phase fail to identify a project through the CEQA process or should a project fail to start construction, NID would reimburse LINCOLN 50% of LINCOLN'S cost of outside services, 50% of NID's outside services, and 50% of the cost of Planning Phase consulting services.

- Third step:
  - Should the Project proceed to construction, LINCOLN and NID would reallocate and carry forward the Planning Phase costs as a prorated share of the estimated facility costs. Estimated facility costs would be extrapolated from the engineering cost estimates provided during the CEQA process. Prorated LINCOLN and NID shares would be the sum of the following ratios:
    - LINCOLN and NID costs of shared portions of facilities and sole-use facilities as compared to the total project cost estimates.
    - LINCOLN and NID build-out demand ratios determined in the planning phase as compared to the total project cost estimates, less the cost of shared and sole-use facilities.

- Planning Phase funding does not correlate with, or reflect upon, allocation of costs associated with construction phase funding and construction phase cost allocation.

<u>C. Wholesale Treated Water Service Agreement</u>

<u>Lands Served:</u>
- No lands would be detached from the NID service area as a result of this Agreement.
- NID water would be used within the NID boundary under normal service conditions.

<u>Water Rates and Charges:</u>
- LINCOLN and NID independently establish their fees and charges. Challenges to LINCOLN'S schedule of fees and charges would not restrict LINCOLN'S obligation to pay NID'S established wholesale rate. Notwithstanding the foregoing, NID'S wholesale rate to LINCOLN must be established in accordance with law.
- LINCOLN and NID would collect their own Equivalent Dwelling Unit (EDU) () fees (NID terminology: "Capacity Charges" and "Meter Installation Charges") (LINCOLN'S terminology: "Public Facility Element Fees" and "Water Connection Fees").
- NID would collect EDU charges from customers outside of LINCOLN city limits. Upon future expansion of facilities required to provide treated water capacity, NID would credit against LINCOLN'S obligation to fund such expansion in an equal amount.

Water Deliveries:

- LINCOLN would request changes in daily water treatment plant production rates based on anticipated demands.
- LINCOLN would be responsible for control of the system hydraulic grade line and flow rate at the LINCOLN HGLCS Point of Delivery.
- NID would routinely provide LINCOLN with a list of NID project facilities (raw and treated) ranked according to their individual maximum capacities.
- LINCOLN would notify NID a minimum of 30 months in advance of anticipated demands that are expected to exceed the capacity of any portion of NID'S project facilities.
- Treated water deliveries to LINCOLN would be governed by NID'S then current Drought Contingency Plan.

Water Accounting:

- NID would own and operate "master" meters in two locations: 1) immediately downstream of the treated water storage tanks and 2) at the LINCOLN HGLCS ~~Point of~~ Delivery.
- All LINCOLN and NID treated water connections to the respective water systems would be metered.
- LINCOLN and NID meters would be read monthly, nearly simultaneously, and the results shared on a monthly basis.
- NID would bill LINCOLN monthly for the total of LINCOLN'S meter readings serving the overlap area, plus a reasonable loss factor (currently estimated by NID staff at 10%).
- NID would periodically, but not less than annually, compare usage records between the master meter, LINCOLN meter readings, and readings from NID meters served from LINCOLN, and would adjust flows operationally to reconcile deliveries to LINCOLN.

Wholesale Water Rate:

- NID would create a wholesale water rate, based on NID's system-wide allocated cost of service, to be charged to LINCOLN and other public entities receiving comparable service. Said rate would be modified from time to time. Wholesale rate-setting would be under the jurisdiction of NID. LINCOLN and other affected entities would participate as customers in the development of said rate with final discretion remaining with NID. Rate components may include, but not be limited to, account maintenance, meter maintenance and replacement, raw water component, treatment plant operations and maintenance, renewal and replacement of water system components providing service, and fees to cover State and Federal mandates.
- During the Planning Phase (see "Planning Phase Agreement" above), NID and LINCOLN would further collaborate on methods used and components to be included in setting of the wholesale water rates.
- Upon NID adopting changes in water rates or other charges affecting LINCOLN'S water bill, NID would give LINCOLN at least 90 days' notice prior to the effective date of such rates or charges.
- LINCOLN would continue to maintain a uniform service area-wide water rate for each of their retail customer classifications regardless of customer location, whether in or out of the NID boundary and within the same pressure zones.

System Operation, Monitoring, and Reporting:

- LINCOLN and NID would operate their respective treated water systems in accordance with all applicable current and future State and Federal regulations using certified operators; including flushing, monitoring, sampling, backflow prevention, and associated reporting programs.

- LINCOLN and NID would agree to share all monthly and monitoring information and required reporting information.

D. <u>Water Facilities Construction Agreement</u>

General:

- LINCOLN and NID would jointly determine the logical component of project facilities to be included in each project phase.
- This contemplated agreement would not apply to infrastructure to be financed, owned and operated by either LINCOLN or NID for their sole use, unless it is mutually agreed that such infrastructure would be included as part of the overall facilities and should be included with a project phase.
- LINCOLN and NID would determine separately the extent of Hydro components to be developed on their respective systems. (NID – on raw water system upstream or adjacent to the water treatment plant. LINCOLN – at their HGLCS Point of Service.)

Services Required to Implement Project Phases

- Services procured and provided to complete each project phase would include:
    - Engineering services (Consultants)
    - Land and Easement Acquisition
    - Construction Services (Contractors)
    - LINCOLN and NID Outside Services (Individuals or companies providing specialized services directly to LINCOLN or NID for general legal, engineering, and financial services relating directly to the facilities under consideration)
    - NID Engineering Services (In-house engineering performed by NID)
    - NID Construction Services (incidental construction performed by NID crews)
    - LINCOLN and NID In-house Services (provided by either LINCOLN or NID incidental to administering and monitoring of all the above services.)

Approvals Required for Project Phase Costs

Cost allocations would be mutually approved in writing by both LINCOLN and NID prior to incurring costs for any services associated with a project phase. The means and timing for such approval would be:

- Engineering Services: LINCOLN and NID would reach agreement prior to NID executing the agreements.
- Land and Easement Acquisition: LINCOLN and NID would each negotiate separately for lands and rights of ways required for their respective facilities component.
- Construction Services: LINCOLN and NID would agree to bid award amount prior to NID executing the contract(s).
- LINCOLN and NID Outside Services: LINCOLN and NID would agree to general scope, budget and schedule prior to either entity executing an agreement or contract.
- NID Engineering Services: LINCOLN would agree to general scope, budget and schedule prior to NID commencing the work.
- NID Construction Services: LINCOLN would agree to cost estimate and schedule prior to NID commencing the work.
- LINCOLN and NID In-House Services: Each entity would provide a monthly accounting of such services and each would reserve the right to challenge any such charges.

Execution of Project Phases:

- NID would prepare requests for proposals (RFPs) for engineering services in collaboration with LINCOLN City Engineer.
- NID would award construction contracts and provide construction contract administration in collaboration with the LINCOLN City Engineer.
- LINCOLN would participate during the design and design review process and would have joint design approval with NID.
- LINCOLN would have joint approval with NID of Engineering Services pay requests.
- LINCOLN would have a representative(s) on site to monitor construction progress.
- LINCOLN's on-site representative(s) would be consulted and have joint approval with NID, time permitting, prior to issuing field directives to the contractor.
- LINCOLN would participate in the preparation of, and would have joint approval with NID of construction progress payments and contract change orders.

Allocation of Project Phase Costs

- LINCOLN and NID would agree upon the cost allocation of project construction phase costs prior to entering into any contracts, agreements, or construction work, as it may relate to each project phase.
- Cost allocation of all project construction phase services would be based on prorated shares of facility construction costs. Cost allocations would be as follows:
    - NID would be allocated the construction costs, on an incremental-cost basis, of upsizing raw water transmission components for NID uses other than providing water to meet anticipated treated water service demands. NID would also be allocated the same prorated share of the cost of all remaining services. (See "Services Required to Implement Project Phases" above.)
    - NID would be allocated 100% of construction costs for portions of the facilities contemplated for the sole use of NID. NID would also be allocated the same prorated share of the cost of all remaining services
    - LINCOLN would be allocated the balance of the construction costs and remaining services costs. (Includes, among others, 100% of WTP and treated water storage facility costs.)
- NID would apply a credit against LINCOLN's share of construction costs, at the time of each future project phase; equal to all capacity charges collected by NID from NID treated water customers outside of LINCOLN city limits to be served by the NID Lincoln facilities.
- The cost allocation percentage would remain constant throughout execution of each project phase.
- Should actual construction costs vary from the cost estimates, then, and upon mutual agreement, final cost allocation for each project phase would be recalculated. Such recalculations would be completed as soon as possible; however, no later than the end of the warranty period for that particular project phase.

Construction Contract Liability

- LINCOLN would accept liability for additional costs of construction contracts caused by lack of project funding on LINCOLN's share of project costs.
- NID would accept liability for additional costs of construction contracts caused by lack of project funding on NID's share of project costs.
- NID would accept liability for additional costs associated with its unilateral decision to terminate a construction contract.
- Each party would bear their proportionate share of construction cost overruns and change-orders. Litigation with contractor shall be considered a construction cost.
- Each party would bear their proportionate share of unanticipated increases in construction costs that are not caused by either party.

Funding Mechanisms:

- LINCOLN and NID funding mechanism(s) would in no way encumber the other entity's facilities or financial resources.
- NID and LINCOLN would discuss funding mechanisms, including but not limited to, lease-back options and other forms of ownership arrangements. It is NID's and LINCOLN's intent for NID to be the owner of the facilities up to the LINCOLN HGLCS. LINCOLN would provide funding for their share of costs without encumbering the facilities.

Payment of Cost Allocations:

- NID would bill LINCOLN monthly for cost of services paid for by NID and associated with each project phase, less NID's allocation of NID costs, less NID's allocation of the cost of services paid for by LINCOLN, and less any capacity charge credits due LINCOLN.
- LINCOLN would pay NID within 45 days of billing.

NID Nevada Irrigation District
1036 W Main St • PO Box 459003 • Grass Valley, CA 95945 • (530) 273-6185
From Auburn & Lincoln: 1-800-222-4102 FAX: 477-2646 www.nid.dst.ca.us

April 25, 2007

Patricia Avila, City Clerk
City of Lincoln
640 Fifth Street
Lincoln, CA 95648

Re: Memorandum of Understanding
Between the City of Lincoln and Nevada Irrigation District
Establishing Intentions and Conceptual Framework for the
Development of a Treated Water Facility and Appurtenances
Needed to Serve City of Lincoln and Nevada Irrigation District

Dear Pat:

Enclosed please find one fully executed document referenced above.

If you have any questions, or require additional information, please feel free to give me a call.

Sincerely,

NEVADA IRRIGATION DISTRICT

Ina Francis Tassone

~~Lisa~~ Francis Tassone, CMC
Board Secretary

Enclosure *(As Stated Above)*

Appendix E

2008 NID Regional Water Supply Project, Land Use and Water Demands Memorandum

Nevada Irrigation District Regional Water Supply Project

Land Use and Water Demands

Prepared By: Cindy Bertsch, P.E.

Reviewed By: Gerry LaBudde, P.E.
David Price, P.E.

Date: September 2008

The purpose of this memorandum is to document water demand projections for the Lincoln area water treatment plant (WTP). This memorandum contains a description of current land uses within the anticipated service area and the associated treated water demand projections for the proposed Nevada Irrigation District (NID) Regional Water Supply Project. An estimate of the treated water demands is necessary to determine:

- The capacity of the WTP.
- The size of the raw and treated water storage facilities.
- The required raw water conveyance improvements including pipelines and canals.
- The sizing of treated water conveyance pipelines.
- The sizing and layout of the hydraulic control/metering station.

The potential for offsetting the amount of raw water used in the City of Lincoln's Sphere of Influence (SOI) resulting from a reduction in irrigation water delivered to those lands as they are converted from agricultural to urban uses will be discussed in a separate memorandum.

1.0 POTENTIAL SERVICE AREA FOR WTP

Lands in the Lincoln area that may potentially receive treated water from the new regional WTP can be separated into two service area classifications. The first is the portion of the City of Lincoln (City) proposed SOI within the NID service area boundary. The City SOI is described in the recently approved General Plan. The second is the unincorporated area of Placer County outside of the City SOI and inside the NID service area. Both service areas, for the purpose of this study, will be limited to lands below the 400-foot contour elevation to avoid the need to pump treated water. The anticipated service areas used to develop water demands are shown on Figure 1 and discussed below.

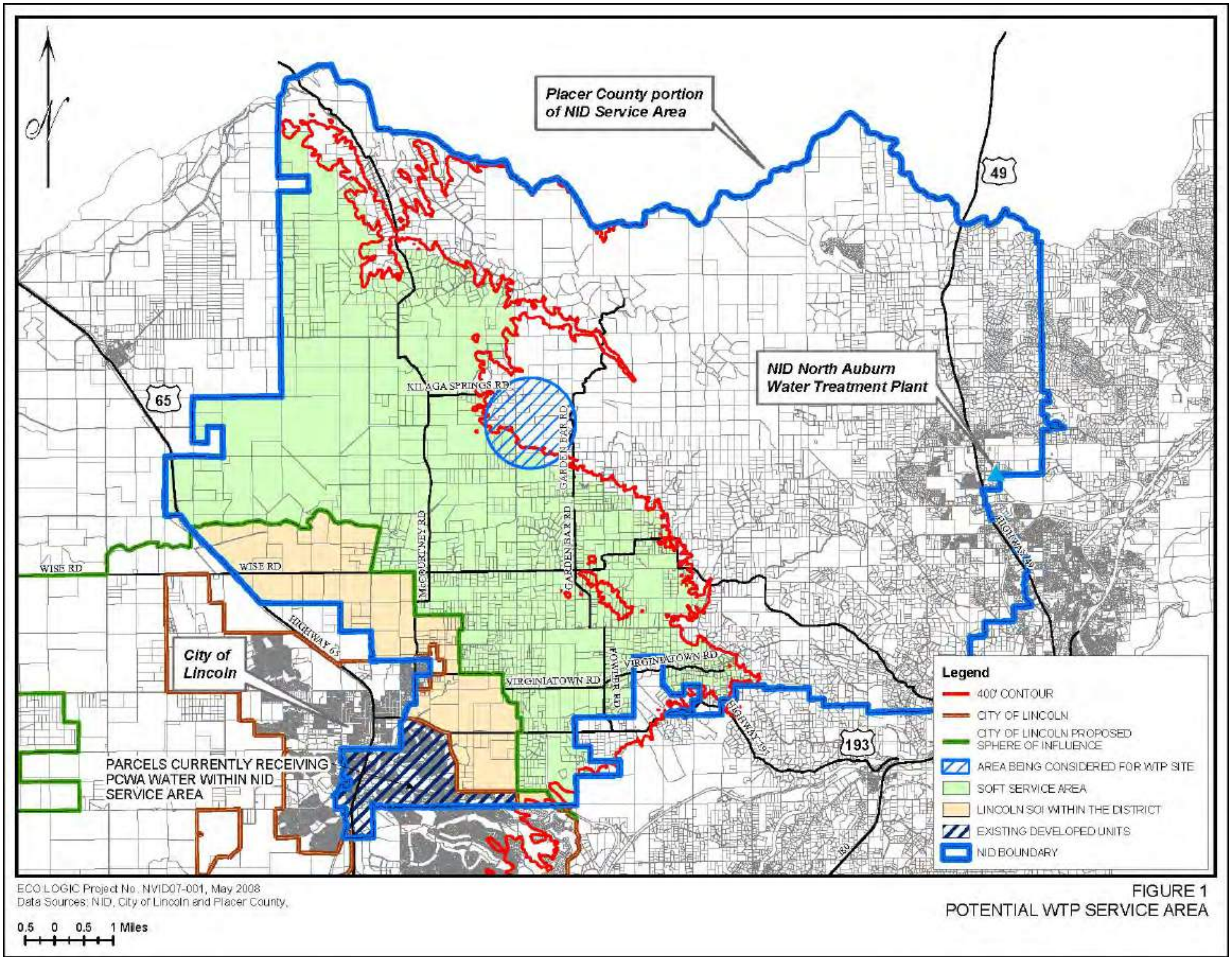


FIGURE 1
POTENTIAL WTP SERVICE AREA

1.1 City of Lincoln

The City's portion of the potential service area includes the proposed City SOI which lies within the NID service area. Portions of this area are currently developed and are included within the City limits. The balance of the proposed SOI remains generally undeveloped for urban uses. Lands undeveloped for urban uses are anticipated to annex into the City limits and receive treated water. Planned land uses within the City's portion of the potential service area are described in Section 2 of this memorandum. It should be noted that the City has no plans to expand beyond the current proposed SOI.

Presently, through an agreement involving Placer County Water Agency (PCWA), NID, and the City's raw water from the NID system is being delivered through PCWA treatment facilities, sold to the City of Lincoln, and served as treated water to the developed areas within the NID service area. This is a temporary arrangement until the NID Regional WTP and other related improvements are completed and service is provided by the proposed NID facilities. The existing treated water demand within the NID boundary will be included in Section 3 of this memorandum.

1.2 Unincorporated Area

The proposed WTP is being considered for an area approximately four miles northwest of the City Limits in a region west of Garden Bar Road, east of McCourtney Road and south of Kilaga Springs Road generally between elevations of around 500 to 650 foot mean sea level. This general area is shown in Figure 1. A detailed siting evaluation is being conducted to select the proposed site for the WTP within this area. Treated water transmission pipelines will extend from the WTP to the City boundary through unincorporated lands within Placer County and the NID service area. In addition to the transmission pipeline, land owners will have an opportunity to extend treated water service to their property through various NID policies and programs. These treated water line extensions would create an additional service area within the unincorporated area that is within the NID service area and outside of the City SOI. This area is referred to herein as the "Soft Service Area" (SSA) and is shown in Figure 1.

The SSA represents the area anticipated to be served by the proposed NID WTP within a reasonably foreseeable project horizon. It should be noted that the SSA may change over time. For example: the SSA may expand even further east, above the 400 foot elevation, through the installation of new pump zones.

In contrast to the SSA described above, the NID service area exterior boundary and the proposed City SOI are considered fixed or "hard" boundaries. These boundaries will not change for the purpose of this study.

The interest in receiving treated water within the SSA is unknown at this time and will depend on allowable land uses in the area, adequacy of the groundwater supply for private wells, customer requests, and the economics of extending treated water service. For the purposes of this study, only properties at or below the 400 foot elevation have been included in the potential SSA.

Treated water distribution system extensions will ultimately define the unincorporated SSA and will be driven by the desire or need for treated water from the new WTP and the cost of extending service as governed by NID's policies and programs. For the purposes of this study, it is assumed that those system extensions will eventually take place within the life expectancy of the project.

2.0 LAND USE

The objective of this study is to estimate water demands for the potential NID service area to be supplied by the new WTP. Water demand projections are based on water demand factors for various land uses anticipated by the City and Placer County within their respective jurisdictions. Land uses within the potential service area are discussed and quantified in this section.

2.1 CITY OF LINCOLN

Land use for the City of Lincoln falls into two general categories: developed and undeveloped, all within the NID service area. In general, the developed areas lie within the existing City limits and land undeveloped for urban uses lie outside the existing City limits but within the proposed City SOI.

Developed Areas

Areas in the City limits within the NID service area that are already developed and currently receiving treated water service per the PCWA/NID/City temporary agreement previously discussed are shown in Figure 2. Those areas include:

- Portions of the Lincoln Crossing development west of Highway 65
- Portions of the Twelve Bridges development east of Highway 65 and south of Highway 193.
- A small developed area in the northeastern portion of the City near Virginiatown Road.

Specific plans have been approved and City parcel maps completed for the above areas. Most of the anticipated area development is in place. Actual unit counts were used for the developed areas. Table 1 lists the areas of various existing land uses in combination with land uses allowed under City zoning for those smaller areas not yet developed.

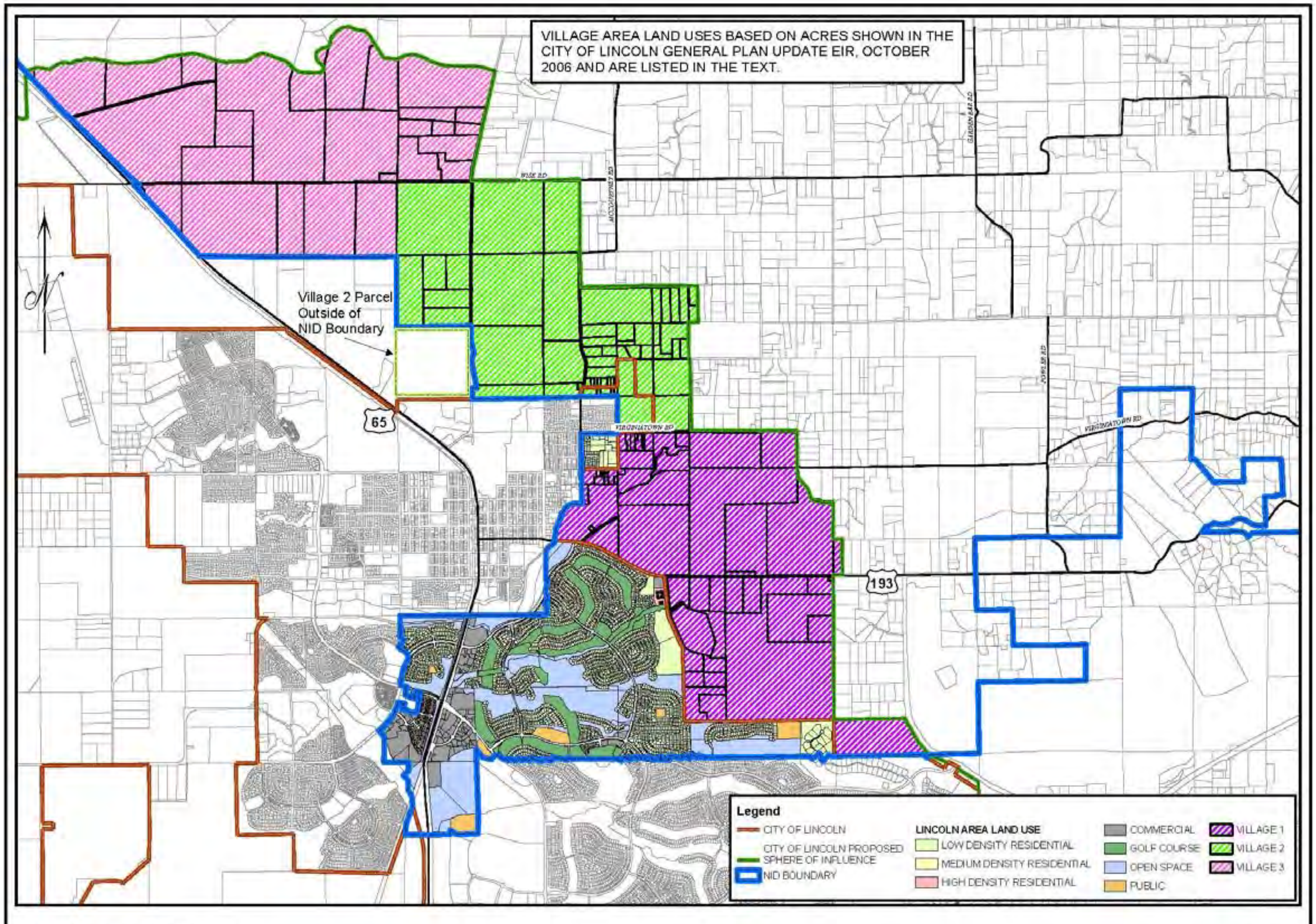


FIGURE 2
LINCOLN AREA LAND USE

Table 1
City of Lincoln Developed Land Use Areas [a,b]

	Existing Development Acres	Number of Residential Units (c, d)
Residential		
12 Bridges	597	2,920
Lincoln Crossing	83	454
Other Areas	33	83
Total	***713***	**3,457**
Commercial		
12 Bridges	108	-
Lincoln Crossing	45	-
Total	***153***	**-**
Open Space		
12 Bridges	400	-
Lincoln Crossing	62	-
Total	***462***	**-**
Public		
12 Bridges	49	-
Lincoln Crossing	2	-
Total	***51***	**-**
Major Roads (acres) (5% of Total Acreage)		
12 Bridges	63	-
Lincoln Crossing	10	-
Total	***73***	**-**
Total Developed Area	**1,452**	**3,457**

(a) Includes lands within the NID service area only.
(b) All acreages and units are derived from the City Zoning and Parcel Map GIS Database (2007).
(c) Units represent the number of existing service connections within each area.
(d) Water demand estimates for Commercial, Open Space, Public, and Infrastructure Right of Way are calculated based on area, therefore no residential units are assigned for these categories.

Undeveloped Areas

The lands undeveloped for urban uses which lie within the NID service area, but within the City SOI are referred to as Villages 1, 2, and 3 in the City of Lincoln March 2008 General Plan Update. These villages are shown in Figure 2. All of these villages lie within the NID service area with the exception of a small portion (12 percent) of Village 2, also shown in Figure 2. This portion of Village 2 will not be served by the proposed NID WTP and therefore has been excluded for the purpose of this study. The land uses proposed in the General Plan and associated acreages within these villages are summarized in Table 2.

Table 2
City Undeveloped Land Use Areas[(a)]
(Villages 1, 2, and 3)

	Undeveloped Areas (b, c) **Acres**	**Number of Residential Units** (b, c, d)
Residential		
Village 1	840	3,507
Village 2	748	3,409
Village 3	970	4,841
Total	***2,558***	***11,757***
Commercial		
Village 1	20	-
Village 2	9	-
Village 3	70	-
Total	***99***	***-***
Open Space		
Village 1	600	-
Village 2	502	-
Village 3	690	-
Total	***1,792***	***-***
Public		
Village 1	50	-
Village 2	0	-
Village 3	0	-
Total	***50***	***-***
Infrastructure Right of Way		
Village 1	270	-
Village 2	220	-
Village 3	310	-
Total	***800***	***-***
Total Undeveloped Area	**5,299**	**11,757**

(a) Includes lands within the NID service area only.
(b) From City of Lincoln March 2008 General Plan Update
(c) Village 2 acreages and units proportionally reduced by 12 percent. See explanation in text above.
(d) Water demand estimates for Commercial, Open Space, Public, and Infrastructure Right of Way are calculated based on area, therefore no residential units are assigned for these categories.

Another factor that will influence the water demand projections within the City of Lincoln is the final layout of General Plan Villages 1, 2 and 3. To date, land uses within the villages have been laid out conceptually, identifying the various uses including environmentally constrained areas, open space, roadways, commercial and residential development, etc. Development within these areas must comply with approved specific plans. The final layout in the approved specific plans may differ from the conceptual layout in the new General Plan and would affect the final water demand accordingly. Specific plans have not yet been developed: therefore, this study will rely on the land uses identified in the City's March 2008 General Plan.

2.2 UNINCORPORATED AREA

Land uses within the unincorporated portion of the NID service area for the proposed WTP, defined above as the SSA, were developed using parcel base mapping and land uses provided by Placer County Planning Department. Land uses are based on a GIS data base provided by Placer County Planning Department (July 2007) that represent land uses from the 1994 Placer County General Plan. General Plan land uses within the unincorporated area are shown in Figure 3. Based on the Placer County General Plan there are no non-residential land uses within the unincorporated SSA. The total acreage of the SSA is approximately 25,188 acres. Current land uses within the SSA include large parcels with allowable densities of 0.0125 to 1 units per acre (1 to 80 acre/unit minimums). The units per parcel were rounded up to the nearest integer to be conservative.

When NID was expanded in 1926, to include portions of Placer County, some land owners opted not to join the expanded NID service area. As a result there are a number of interior exclusions within the SSA accounting for approximately 3,420 acres, or 13.6 percent of the total 25,188 SSA acres. These interior exclusion parcels have the option to join the NID at anytime and, therefore, have been included as part of the SSA when calculating the number of potential units. The exclusion parcels within the NID service area are identified in Figure 3.

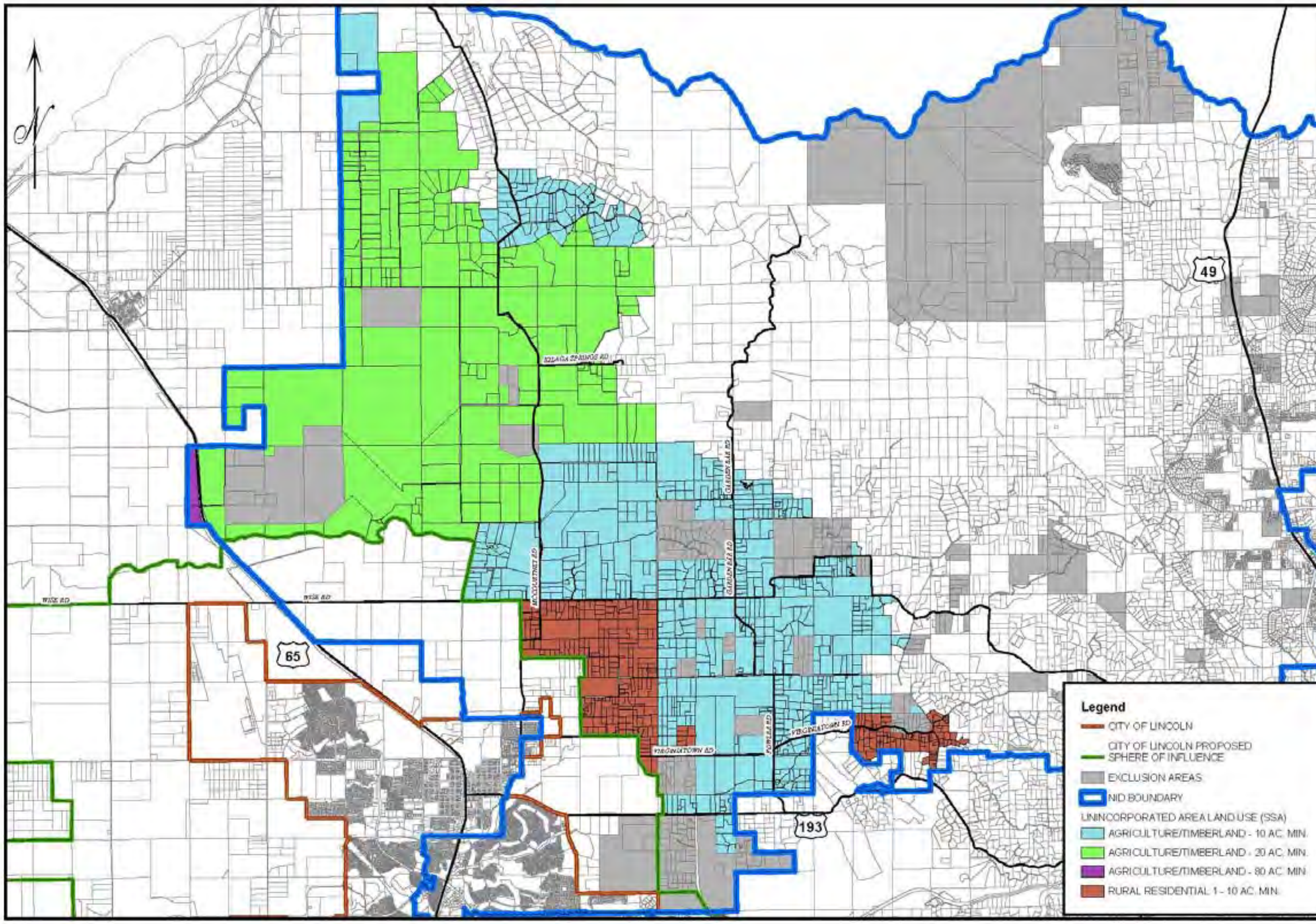
The area and number of units for the SSA are listed in Table 3. Placer County Community Development Resources Agency (CDRA) was contacted regarding future plans for modifying the land uses in the area. They indicated that there are currently no plans to modify the land uses within the SSA. CDRA will be asked to provide comments on this technical memorandum. Their comments, if any, will be addressed in the preliminary design report.

Table 3
Unincorporated Area Land Use Areas [(a)]

	Total Area within SSA Acres	Potential Number of Units
Residential (b)	25,188	4,738

(a) Based on land use information provided by Placer County (July 2007), based on the 1994 Placer County General Plan.

(b) All land uses within the SSA are identified either as Agricultural/Timberland (with 10 to 80 acre minimum lot areas), or Rural Residential (with 1 to 10 acre minimum lot areas). As such all units reported are assumed to be residential.



ECO:LOGIC Project No: NVID07-001, May 2008
Data Sources: NID, City of Lincoln and Placer County

0.5 0 0.5 1 Miles

FIGURE 3
SOFT SERVICE AREA LAND USE

3.0 WATER DEMANDS

Water demand projections are based on water demand factors and peaking factors coupled with land use. Three categories of water demand projections are required: 1) the maximum daily demand in million gallons per day (MGal/d) which is used to size the WTP and other project components, 2) the peak hour demand in gallons per minute (gpm) which is used to size the treated water transmission pipelines between the WTP and the City, and 3) the total annual consumption in acre-feet (AF) which is used to evaluate the impact on source water supplies. All three of these categories are derived from the estimated average annual demand, expressed in gallons per day (gpd), per unit or per acre, depending on land use classifications. The factors and the associated water demands based on land uses are discussed below.

3.1 WATER DEMAND AND PEAKING FACTORS

Average amount of water used per day over a year's time, or average annual day demand expressed in gallons per day (gpd) for the various types of land uses (residential, commercial, open space, etc.) is the basis for estimating water demands. Coupling these average annual day demand factors with peaking factors enables estimates of maximum day and peak hour water usage, and the total yearly water demand for various types of land use. Average annual day demands and peaking factors used in this study differ between water purveyors and depend on a number of factors such as demographics, cost of water, type of development, etc. These differences are reflected in the following tables.

Average annual day demands and peaking factors from the City General Plan dated March 2008 were used to estimate water demands for areas of the proposed City SOI within the NID service area. See Tables 4 and 5.

Table 4
City of Lincoln Residential Water Demand and Peaking Factors [a]

Land Use	Average Annual Day Demand (gpd/unit)	Average Day to Maximum Day/Peak Hour Peaking Factors	Maximum Day Demand (gpd/unit)	Peak Hour Demand (gpm/unit)
Rural Residential	1,092	2.5/4.0	2,730	3.0
Country Estate	1,092	2.5/4.0	2,730	3.0
Low Density	460	2.5/4.0	1,150	1.3
Medium Density	460	2.5/4.0	1,150	1.3
High Density	260	2.5/4.0	650	0.7

(a) Demand and peaking factors for the City of Lincoln from Water System Constraints Analysis, March 2006 – C. Frank Bradham.

Table 5
City of Lincoln Non-Residential Water Demand and Peaking Factors [a]

Land Use	% of Acreage for Application of Demand Factor	Average Annual Day Demand (gpd/acre)	Average Day to Maximum Day/Peak Hour Peaking Factors	Maximum Day Demand (gpd/acre)	Peak Hour Demand (gpm/unit)
Commercial/Industrial	100%	2,500	2.5/4.0	6,250	6.9
Public Facilities	100%	5,200	2.5/4.0	13,000	14.4
Open Space[b]	1%	5,200	2.5/4.0	13,000	14.4
Roads[c]	10%	5,200	2.5/4.0	13,000	14.4

(a) Demand and peaking factors for the City of Lincoln from Water System Constraints Analysis, March 2006 – C. Frank Bradham.

(b) Assume 1 percent of open space area to have potable water needs such as drinking and restrooms.

(c) Assume 10 percent of total road area to be irrigated with treated water.

Average annual day demands and peaking factors for the SSA were used to project estimated water demands and are based on the NID “Treated Water Master Plan Assumptions” dated March 12, 1997 with the exception of maximum to average day ratio, which was increased from 2.5 to 3.0. A larger ratio is based on the large size of the parcels in the area and the likelihood that there will be a potential to irrigate a larger area immediately around the residence than would be expected for smaller lots in urban settings. In addition, the development efficiency of 80 percent used in the NID assumptions were increased to 100 percent based on the much longer planning horizon associated with developing facilities for a new treated water service area vs. the 20-year NID Treated Water Master Plan Assumption. Average annual day water demands and peaking factors for the SSA are summarized in Table 6.

Table 6
Unincorporated Placer County Residential Water Demand and Peaking Factors [a]

Land Use	Average Annual Day Demand (gpd/unit) (b)	Average Day to Maximum Day/Peak Hour Peaking Factors	Maximum Day Demand (gpd/unit)	Peak Hour Demand (gpm/unit)
Low Density Residential	864	3.0/6.0	2,592	3.6
Medium Density Residential	576	3.0/6.0	1,728	2.4

(a) Development efficiency was assumed to be 100 percent.

(b) Demand factors for unincorporated Placer County based on the NID Treated Water Master Plan Update, 1997 except for an increase in the development efficiency to 100 percent and the maximum day to average day peaking factor (2.5 to 3.0) as described in text.

3.2 WATER DEMAND PROJECTIONS

Water demands were calculated based on the approved land uses within the potential service areas, coupled with the average annual day water demand factors and peaking factors associated with the various land uses (all as discussed in previous sections). Average day demands and maximum daily demands, as well as the annual average demand within each of the potential service areas are summarized in Table 7.

Water demand estimates developed for this study are planning level estimates. These estimates will be used for project pre-design and for development of a project description for CEQA purposes. A concerted effort has been made to ensure that the estimates are reasonably conservative.

Based on the current analysis at build out, the maximum day demand for treated water within the potential service area is estimated to be 39.3 MGal/d, with an average annual day demand of approximately 15.7 Mgal/d.

The maximum peak hour demand for the potential service area is estimated at 41,600 gpm (used for designing treated water transmission pipelines) and represents the SSA and the City demand. Peak hour demand entering the City's system through the proposed metering station is estimated to be 30,200 gpm; the estimated peak hour demand within the SSA is 11,400 gpm.

The estimated annual demand at build out within the proposed City SOI is approximately 11,790 AF/yr. Ten percent unaccounted for water is included for the overall City of Lincoln demand as provided in the Framework for Development of a Water Treatment Facility MOU between NID and the City, dated April 25, 2007 which is 1,179 AF/yr. The estimated annual demand for the SSA is approximately 3,786 AF/yr.

The total estimated annual demand for all areas, including NID areas within the Lincoln SOI and NID areas outside of the Lincoln SOI, within the potential service area is approximately 16,755 AF/yr, which includes the unaccounted water. Roughly 77 percent of the estimated demand is expected to occur within the proposed City SOI.

Various NID policies and programs provide for an extension of treated water within its service area. Unless there is a decrease in the utilization of groundwater or an increased development density within the unincorporated SSA as a result of rezoning, customer interest in extending the treated water into these developed areas will vary. As such, the projected water demands estimated for the unincorporated SSA portion of the potential service area may not be fully realized, but will be accounted for in this study for the planning and design of the water treatment facilities.

Table 7
Estimate of Water Demands within Study Area [(a)]

	Residential Demand				Non-Residential Demand[(c)]			Total		
	Units	Avg. Day, MGal/d	Max. Day MGal/d	Annual AF/yr	Avg. Day MGal/d	Max. Day, MGal/d	Annual AF/yr	Avg. Day MGal/d	Max. Day MGal/d	Annual AF/yr
City of Lincoln										
Twelve Bridges	2,920	1.3	3.3	1,472	0.9	2.1	999	2.2	5.4	2,471
Lincoln Crossing	454	0.2	0.5	234	0.1	0.3	150	0.3	0.8	384
Village 1	3,507	2.0	5.0	2,251	0.5	1.2	539	2.5	6.2	2,790
Village 2	3,409	1.7	4.2	1,889	0.2	0.4	182	1.9	4.6	2,071
Village 3	4,841	2.4	5.9	2,663	0.4	0.9	417	2.8	6.8	3,080
Additional Development Area [(b)]	83	0.05	0.1	54	0.8	2.1	940	0.85	2.2	994
Total City of Lincoln[(d)]	**15,214**	**7.7**	**19**	**8,563**	**2.9**	**7**	**3,227**	**10.55**	**26**	**11,790[(b)]**
Soft Service Area (SSA)	**4,738**	**4.1**	**12.3**	**3,786**	**0.0**	**0.0**	**0.0**	**4.1**	**12.3**	**3,786**
Unaccounted for Water [(e)]	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**1.1**	**1.1**	**1,179**
Total for Study Area	**19,952**	**11.7**	**31.3**	**12,349**	**2.9**	**7.0**	**3,227**	**15.7**	**39.3**	**16,755**

(a) Limited to area within the NID service area.

(b) An additional demand of 0.8 MGD was added for non-residential flow to accommodate potential commercial/industrial development based on inquiries from developers within the City of Lincoln.

(c) Placer County General Plan does not provide for non-residential uses within the SSA; therefore, this category for the Soft Service Area is zero.

(d) It should be noted that total annual demand estimated for the City (11,790 AF) is unchanged from that estimated in the August 2005 Site Study and acknowledged in the August 2007 Water Facilities/Planning Phase Agreement between the City and NID.

(e) Ten percent unaccounted for water is included for the overall City of Lincoln demand as provided in the Framework for Development of a Water Treatment Facility MOU between NID and the City, dated April 25, 2007. Unaccounted for water for the SSA is included in the demand factors and overall estimated water demand.

4.0 RECOMMENDATIONS

Based on the results of this estimate of water demands for the Nevada Irrigation District Regional Water Supply Project the following is recommended:

1. Determine NID water resources needed to accommodate a water demand of 16,755 acre feet per year of treated water in the Lincoln SOI and NID service area.
2. Determine the raw water offset resulting from the conversion of agricultural lands to urban uses within the SOI area.
3. Base pre-design of the raw water transmission pipelines, raw water storage, and water treatment plant (including treated water storage) to provide at least 40 Mgal/d maximum day demand at the WTP site.
4. Pre-design the treated water transmission pipelines to deliver at least 41,600 gpm peak hour demand into the transmission main leaving the water treatment plant. Assess transmission pipeline capacity accounting for demands within the SSA prior to entering the City, and consider reducing the pipeline diameter as required capacity decreases.
5. Pre-design the hydraulic control/metering station at the edge of the proposed City SOI to deliver at least 30,200 gpm peak hour demand.
6. Increase the size of the raw and treated transmission pipelines and storage facilities to accommodate NID master planning and other planned strategic facility uses.
7. Re-evaluate all estimated water demands and facility capacities during final design of project components.

Appendix F

North American Groundwater Subbasin Characteristics

NORTH AMERICAN GROUNDWATER SUBBASIN CHARACTERISTICS

Regional Physiographic Setting

The Lincoln service area is located in the northeastern part of California's Central Valley, bordering the foothills of the Sierra Nevada Mountain Range. The Central Valley is referred to as the Great Valley geomorphic province –a large structural depression underlain and bounded on the east by the gently westward-dipping Sierra Nevada and on the west by the complexly folded-faulted Coast Ranges (DWR, 1995). The surrounding mountains are generally composed of non-water bearing rocks, whereas the Great Valley is filled with waterbearing sediments accumulating from the surrounding mountains since the Cretaceous geologic period (140 to 65 million years ago). Most of the surface water within the Great Valley is derived from rivers and streams descending from the surrounding mountains and uplands. The Sacramento Valley, which the Lincoln service area is part of, comprises the northern one-third of the Great Valley. The large accumulation of sediments within the Great Valley were originally deposited in a marine environment from the Cretaceous to the Eocene period (the latter period spanning 60.5 to 38.6 million years ago), and as late as the Pliocene (6.7 to 3.4 million years ago) in some places; these sediments compose the lower layers of the Valley and contain predominantly brackish or saline water. From the mid- Eocene into the Miocene period (the latter spanning 29.3 to 6.7 million years ago) volcanic eruptions in the Sierra Nevada deposited pyroclastic rocks, lava flows, and mudflows down the western slopes; these volcanic rocks were eroded and deposited in marine and continental environments within the Great Valley. The Sacramento Valley was in its current configuration by the Pliocene period and fluvial (river and stream) sediment deposition dominated from that time forward. The Miocene-Pliocene age and younger volcanogenic and fluvial sediments, deposited in a continental environment, dominate the Sacramento Valley freshwater aquifer system. The base of freshwater deepens westward from about 400 ft. below sea level near the Sierra Nevada foothills to over 1200 ft. at the axis of the valley (approximately the location of the Sacramento River).

The Lincoln service area is located in the eastern central part of the Sacramento Valley Groundwater Basin, within the North American Sub-Basin as defined by DWR (2002).

Sacramento

The Sacramento Valley Groundwater Basin is an important resource, estimated by DWR to contain approximately 114 million acre-feet of water. Several fresh waterbearing zones (aquifers) are present within the 15,500 square mile surface area Basin, ranging in depth from near surface to 3,000 feet below surface.

North American Sub-Basin

The North American Groundwater Sub-basin lies within Sutter, Placer, and Sacramento Counties and is delimited by the Bear River on the north, the Feather River and the Sacramento River on the west, the American River on the south, and the Sierra Nevada foothills on the east. The eastern boundary represents the approximate edge of the alluvial basin, where little or no groundwater flows into or out of the groundwater basin from the Sierra Nevada basement rock; this boundary passes about 2 miles east of the town of Lincoln (DWR, 2002). The other boundaries –all major perennial rivers –represent partial groundwater divides, where at shallow depths there is little groundwater flow from the aquifer system on one side of the river to the aquifer system on the other side; however, at deeper depths there is groundwater flow across these boundaries. The eastern portion of the subbasin is characterized by low rolling dissected uplands. The western portion is nearly a flat flood basin for the Bear, Feather, Sacramento and American rivers, and several small east side tributaries. The general direction of drainage (land surface slope) is west-southwest at an average grade of about 5 percent. The approximate total storage of the North American Sub-Basin is 4.9 million acre-feet of water, assuming an aquifer thickness of 200 ft. across the total 351,000 acres of the basin and a specific yield of 7% (DWR, 2002).

Lincoln Sphere of Influence

Most of the Lincoln Sphere of Influence (SOI) lies within the North American Groundwater Sub-basin, although parts of the eastern section extend beyond the water-bearing sediments of the subbasin into the western reaches of the Sierra Nevada foothills. A number of studies related to groundwater have been performed recently in, or included, the Lincoln area. A fairly extensive aquifer mapping investigation of the Lincoln SOI, that incorporated geophysical surveys, drill hole and geology analysis, was carried out by a consultant to the City of Lincoln, Spectrum-Gasch, Inc. (1999), for purposes of assessing groundwater resources and identifying where they can best be developed. Earlier, a groundwater investigation was performed in the vicinity of Lincoln Airport by Boyle Engineering Corporation (1990), as a consultant to the City of Lincoln, to assess the groundwater production capability in that area. A comprehensive integrated ground-surface water model (IGSM) for the Northern American River service area, comprising western Placer and southern Sutter counties, was developed by MontgomeryWatson (1995), an engineering consulting company, and included a fairly extensive study of hydrogeology and hydrology of the region to provide proper input and calibration data for the model. This model has subsequently been used for a number of regional groundwater studies (DWR, 1995; Montgomery Watson, 1996). Localized hydrogeologic field investigations and groundwater modeling analysis have been conducted in the area just north of Lincoln by Teichert, Inc. and their consultant, Luhdorff & Scalmanini (1997), to evaluate the potential impacts of proposed aggregate mining in the area. As part of a recent grant, Lincoln worked cooperatively with DWR to characterize the subsurface during drilling for five new monitoring wells. The final report is due out in early 2006.

Aquifers

Groundwater aquifers can be confined (capped by an impervious layer) or unconfined (in direct communication with the surface, under atmospheric pressure conditions), and a confined aquifer may be highly confined (no direct connection with overlying aquifer/surface) or semi-confined (partially connected to overlying aquifer/surface). The aquifers in the Lincoln SOI vary from unconfined to semiconfined conditions.

The fresh water bearing deposits of the North American Groundwater Subbasin are divided into two broad aquifer systems based on lithologic and hydrologic differences. The division between the two is inexact due to the lithologic heterogeneity of the subbasin coupled with the lack of comprehensive information about geology and groundwater conditions in the subsurface. The abovementioned field investigations indicate that there is a significant amount of variability in these aquifer systems –their thickness, horizontal and vertical extent of individual geologic layers, presence of confining/semi-confining layers, and hydrologic properties. The hydrogeology of the two aquifer systems are briefly described below.

Upper Unconfined / Semi-Confined Aquifer System

This aquifer system occurs directly below surface and is composed of pre-Miocene age alluvium deposits. It varies in thickness from as much as 300 feet in the western part of the Lincoln SOI area to pinching out in the eastern part. The aquifer system contains generally thin sands and gravels that are laterally discontinuous, separated by low permeability clay and silt. Aquifer conditions appear to be unconfined based on the direct response of groundwater levels to imposed stresses. However, throughout much of the Lincoln area, except near creeks and ravines, a low permeability clay soil or “hardpan” layer exists near surface that likely restricts vertical flow and deep percolation into the aquifer. This horizon may act as an upper semi-confining layer to the aquifer in places.

Well production in the upper aquifer system is dependent on how much course grained aquifer material (sand or gravel) is intersected by the well, and has been reported as high as 1,800 gpm (MontgomeryWatson, 1995). Aquifer pumping tests performed in one of the geologic formations of this aquifer system, the Riverbank Formation (see below for description), indicated a hydraulic conductivity of 5,600 gallons per day per square foot (gpd/ft^2) and a specific yield of 10% (LSCE, 1997). However, hydraulic conductivity values of 75 to 750 gpd/ft^2 were assigned to the corresponding aquifer system in the calibrated groundwater model used in the same study, while values ranging from 100 to

150 gpd/ft^2 were used in the calibrated IGSM model for the Northern American River Service Area (Montgomery Watson, 1995).

Lower Semi-Confined Aquifer System

This aquifer system occurs below the upper aquifer system, separated by a semiconfining layer, and is composed of Miocene/Pliocene age clastic deposits of volcanic origin, that varies in thickness from greater than 200 feet in the western part of the area to less than 10 feet in the eastern part. This aquifer also contains significant amounts of low permeability clay and silt, but the coarse zones, although laterally discontinuous, appear to be somewhat thicker than those of the upper aquifer system. Aquifer conditions appear to be at least partially confined based on the limited response of groundwater levels to imposed stresses at shallow depths. The semi-confining layer dividing the two aquifer systems consists of a clay layer and/or a hard, consolidated volcanic tuff-breccia layer; both have varying thickness and spatial extent. The base of the lower aquifer system is defined by the base of the fresh water-bearing zone or the top of the regional geologic basement complex of the Sierra Nevada foothills, the former in the western part of the Lincoln area and the latter in the eastern part.

The lower aquifer system is capable of large well yields –two wells near Coon Creek are reported to produce approximately 3,000 gpm each (DWR, 1995) – but well yield is dependent on the combined thickness of sand or gravel intersected by the well. Aquifer pumping tests performed in two wells screened across this aquifer system indicated a hydraulic conductivity of 205 and 390 gpd/ft^2 (assuming the screened interval in the wells was equivalent to the total thickness of the aquifer); the storage coefficient was estimated to be $1.1x10^{-3}$ and $9.6x10^{-4}$ (Boyle, 1990). Hydraulic conductivity values of 100 to 150 gpd/ft^2 were used for the corresponding aquifer in the calibrated IGSM for the Northern American River service area (MontgomeryWatson, 1995). Wells located near Moore Road and Fiddyment Road southwest of downtown Lincoln have historically produced significant quantities of groundwater.

Geology

The two aquifer systems consist of a number of different geologic formations, classified by their age and how they were formed. In drill holes it is often difficult to distinguish between different geologic formations in subsurface, although there are marker beds that are readily recognized. The geologic formations making up the aquifer systems underlying the Lincoln area are described below.

Upper Unconfined/Semi-Confined Aquifer System

From youngest to oldest, the three geologic units that comprise the upper aquifer system include Holocene alluvium, the Pleistocene Riverbank Formation, and the Pliocene-Pleistocene Laguna Formation.

Alluvium

The youngest alluvium consists of unweathered gravel, sand and silt deposited by present-day creeks and drainages. These deposits are primarily located along the surface streams in the area. Their depositional thickness and areal coverage is not significant and they do not yield appreciable quantities of groundwater.

Riverbank Formation

The Riverbank Formation contains a heterogeneous mixture of silt, sand, gravel, and clay –exhibiting extreme grain size variability over short lateral and vertical distances (DWR, 1995). The formation often is differentiated into two members:

> Upper Member –an unconsolidated, dark brown to reddish-colored alluvium deposit composed of gravels, sands and silt with minor amounts of clay.
>
> Lower Member –a semi-consolidated, red-colored alluvium deposit composed of gravels, sands and siltstone that represent remnants of dissected alluvial fans.

The deposits are widespread throughout western Placer and northern Sacramento counties along the gently rolling foothills and often considered an important aggregate resource. Their thickness varies, with a maximum thickness of 50 to 75 ft. The formation is moderately permeable overall, with highly permeable coarse-grained zones. Where saturated, these deposits can yield appreciable quantities of groundwater.

Laguna Formation

This geologic unit is composed of a heterogeneous mixture of tan/brown inter-bedded alluvial sand, silt, and clay, with some gravel lenses –deposited by ancestral rivers and streams that drained the Sierra Nevada. The formation generally increases in thickness toward the west and has a maximum thickness of about 200 ft. In certain portions of Placer and Sacramento Counties, the Laguna Formation is similar in depth, thickness and composition to the overlying Riverbank Formation – but generally it is more fine-grained than overlying formations (DWR, 1995). Where this unit is saturated, appreciable quantities of groundwater can be produced, although most wells within the unit have low to moderate yields.

Lower Semi-Confined Aquifer System

The shallow aquifer system is underlain by Miocene-Pliocene clastic deposits of volcanic origin, known as the Mehrten Formation, that comprise the deeper semi-confined aquifer. The City of Lincoln municipal wells No. 2 and No. 4 appear to be constructed such that groundwater is produced from below the Laguna Formation, within this aquifer. Underlying the Mehrten Formation is the Ione Formation, an Eocene marine deposit that in parts of the Lincoln SOI, where it is shallow, contains fresh water, but otherwise contains brackish or saline water.

Mehrten Formation

The Mehrten Formation is composed of a sequence of fragmental volcanic rocks of late Miocene through middle Pliocene age that unconformably overlies marine and brackish water sediments of Eocene age. The formation consists of two distinct units:

- A sedimentary unit containing fluvial deposits composed of gray to black well-sorted sands with associated lenses of stream gravels containing cobbles and boulders, interbedded with blue to brown silts and clays.
- A dense, hard gray andesitic tuff-breccia formed by the solidification of ash mudflows emanating from volcanic eruptions to the east.

The sand and gravel beds within the sedimentary unit, which are individually 5 to over 20 feet thick, are highly permeable and saturated with primarily fresh water. Consequently, the sedimentary unit of the Mehrten is recognized as an important aquifer in much of the Sacramento Valley, producing significant fresh groundwater supplies throughout much of the Placer and Sacramento County regions. In contrast, the tuff-breccia, which ranges from a few feet to 30 feet thick, generally is impervious and acts as a confining layer where it occurs. DWR investigators indicate that, on a regional scale, the upper surface of the Mehrten Formation trends deeper from north to south (DWR, 1995). The Spectrum-Gasch investigation (1999) shows the Mehrten Formation, in the localized Lincoln SOI area, to be gently dipping westward (the dip estimated to be about one degree), and increasing in overall thickness with depth below surface.

Ione Formation

The Eocene Ione Formation lies below the Mehrten Formation, except in parts of the Lincoln GMP it unconformably underlies the Riverbank Formation and the Mehrten formation is absent. This unit contains marine deposits consisting of white to light yellow colored conglomerate, sandstone, and claystone. The Ione is recognized as the light colored clay visible in the Gladding-McBean quarry north of Lincoln. As the depth of the Ione Formation increases it has been recognized that water quality in this formation becomes poor, or more saline. The Boyle Engineering Corporation investigation of 1990 that was conducted for the City of Lincoln identified the contact between the Mehrten and the Ione Formations as the base of fresh water in the vicinity of Lincoln Airport. The Ione Formation has not been used extensively for groundwater production due to its generally low water yield and mostly poor water quality.

Groundwater Movement

Groundwater levels and flow direction in the Lincoln area have remained relatively stable through the historical record of monitoring well data (approximately 1950 to present). The regional groundwater flow direction is west-southwest, approximately parallel to Coon Creek in the northern part of the Lincoln area and southwesterly through most of the Lincoln SOI approximately parallel to Auburn Ravine. The sedimentary section comprising the aquifer systems dips to the west-southwest as well, at about five degrees or less –suggesting the unstressed groundwater flow direction is parallel to the slope of geologic bedding (Spectrum-Gasch, 1999). There is not enough monitoring well data to define the groundwater elevation contour map and, correspondingly, groundwater flow direction at a more localized scale throughout the Lincoln area. The City of Lincoln has been installing a monitoring well network across the Lincoln SOI. Five dedicated monitoring wells were installed in 2004 through a cooperative project with DWR.

In order to determine groundwater velocity it is necessary to know the groundwater level gradient (change in level over distance) and the hydraulic conductivity and porosity of the aquifer material. The ongoing groundwater level monitoring program is helping provide this information. While these parameters are not well defined across the Lincoln SOI, an estimate of representative groundwater velocity can be calculated for the area in the vicinity of the City of Lincoln Well 2 and Well 4, near the airport. Figure 4 shows groundwater elevation contours across this area computed from measurements in DWR monitored wells. Due to lack of data in the eastern portion of the SOI, groundwater elevations were inferred and are represented as dashed lines. The groundwater level gradient is approximately 300 feet horizontal distance per foot change in groundwater level. Boyle (1990) measured a hydraulic conductivity of 205 and 390 gpd/ft^2 in two wells in the airport vicinity that were apparently completed in the lower aquifer system (the Mehrten Formation). Taking the average of the two (298 gpd/ft^2) and assuming an average total porosity of 20%, the average groundwater velocity is about 0.6 feet per day. Using the same inputs for representative groundwater gradient and porosity applied for the range of reported hydraulic conductivities from abovementioned studies, the corresponding range in average groundwater velocity for the two aquifer systems is:

- Upper aquifer system: 0.15 to 1.5 feet per day
- Lower aquifer system: 0.2 to 0.8 feet per day

These values are within velocity ranges expected in alluvial aquifers.

Hydrographs from DWR monitored wells in the Lincoln area show no systemic decrease in groundwater levels since.

Further evidence that groundwater levels are stable in the Lincoln area at recent levels of pumping for a variety of climatic conditions is provided by the Integrated Groundwater and Surface Water Model (IGSM) simulation study performed for the American River Water Resources Investigation (DWR, 1995). The Northern American River Service Area IGSM model was used to simulate groundwater levels on a monthly time-step over the period 1922 to 1992, with water demands at 1992 level of development and crop acreage at 1990 level. Simulated groundwater level, averaged for the two aquifer systems, at a model node just north of Lincoln indicates no systematic change over the period, only seasonal variations.

Furthermore, another IGSM study performed as part of the American River Water Resources Investigation (USBR, 1994) indicates that even under projected 2030 water use demand, wherein unrestricted groundwater use is permitted to meet demand unmet by full delivery of surface water entitlements, simulated groundwater levels in the Lincoln area do not decline, on average, during 1922 to 1991 hydrologic conditions.

Other areas of the North American River Groundwater Subbasin have experienced significant declines in groundwater levels due to pumping extraction from the subbasin's aquifer systems. In particular, there is a deep cone of depression centered in northern Sacramento County near McClellan Air Force Base that extends into southwestern Placer County –as far north as about Pleasant Grove and as far east as about Roseville. This deepening cone of depression and the implications on the areas affected are discussed in the West Placer Groundwater Management Plan (PCWA, 1998). The cone of depression does not extend to or impact groundwater in the Lincoln SOI.

An aggregate mine has been proposed four miles north of Lincoln that will eventually excavate pits covering approximately 1,000 acres over the 85 year expected life of the mining operation. The mine would excavate and process sand, gravel, and granitic rock, creating a 45 ft. deep pit for the alluvial material and a 150 ft. pit for the granite. The pits will require dewatering and will be mined in phases for 35-40 yrs. (alluvium) and 85 yrs. (granite). The plan is to reclaim land as lakes, agriculture land, open space, and habitat areas. One of the primary concerns is the impact the dewatering will have on groundwater conditions in the area. The project plan proposes to help keep the impact on groundwater levels small by placing a low permeability overburden (e.g. clay) around the sides of pits as mining proceeds. The groundwater modeling study of the proposed project impact concludes that there will be lowered groundwater levels in the immediate vicinity of each mining pit, but groundwater levels south of Wise Road and east of Highway 65 will not be affected, according to a report prepared by Luhdorff and Scalmanini (1997). The study also shows that minor reductions in streamflow from lowering of the groundwater level will mostly be compensated for by the addition of water from the dewatering. These conclusions have not been substantiated.

The City of Lincoln is planning to install additional pumping wells within the Lincoln SOI to be able to meet 20 million gallons per day (MGD) demand with groundwater on a short-term basis. The increase in pumping will likely have minor effects on groundwater levels and flow direction, at least localized to the wells themselves (e.g. cones of depression around individual wells when they are in operation). The overall impact of the additional wells will depend on the well placement and depths, and the well pumping rates and schedules. In order to better manage local groundwater, the City developed and adopted a Groundwater Management Plan that contains Basin Management Objectives (BMOs) related to groundwater elevations, groundwater quality and direction of groundwater flow. The groundwater elevation BMO states that the City will not cause an adverse impact on groundwater elevations by pumping. The City, in a cooperation with DWR, installed five new monitoring wells and monitors these and other wells for groundwater elevations (see Figure 6) in order to meet this BMO.

Recharge

A comprehensive study of groundwater recharge area and rates specific to the Lincoln SOI has not been performed to date. The technical definition of recharge area is where the net saturated groundwater flow is directed away from the water table (Freeze and Cherry, 1979). Thus, to "perfectly" determine where there are recharge areas it is necessary to measure the shallow (just below the water table) groundwater head gradient in three dimensions across the groundwater basin – in essence requiring groundwater level measurements in a densely spaced network of monitoring wells, each containing three nested piezometers at discrete depths. In practice, the direct measurement of a groundwater basin's recharge area is impossible and instead a combination of monitoring well data and indirect methods of inference are employed to delineate probable recharge areas. Currently, there are several indirect indicators of the potential recharge areas within the Lincoln SOI. With the development of the monitoring well network, a more refined delineation of recharge areas will be possible. Through a grant received in 2005, the City will be able to work cooperatively with DWR to characterize recharge from local creeks.

The runoff characteristics and recharge potential of the soil throughout the Lincoln area have been investigated and mapped –providing a qualitative indication of the areal potential for deep percolation of surface water into the aquifer systems. Most of the soil cover across the North American Subbasin has been classified as having high runoff (low infiltration) potential, except in the vicinity of river and stream drainages (Montgomery Watson, 1995). A fairly large area surrounding Auburn Ravine, as well as Coon Creek, has been classified as having soils with moderate to high runoff potential (low to moderate infiltration potential). DWR (1995) characterizes the soil cover across the area as having a dense subsoil that limits deep percolation of water applied at the surface; less dense soils occur in the vicinity of creeks such as Coon Creek and Auburn Ravine, potentially providing better deep percolation and recharge. Boyle (1990) also identified the Markham Ravine drainage as a probable area of groundwater recharge and Spectrum-Gasch (1999) identified the Orchard Creek drainage, along with Auburn Ravine, as probable areas of significant recharge based on the inferred shallow depth to the upper aquifer zone in these areas. As part of Lincoln groundwater investigations, several boreholes were drilled along Auburn Ravine. The thick clay layer encountered may indicate that Auburn Ravine does not contribute significantly to recharge.

The eastern boundary of the area marks the geologic contact between the alluvial sediments of the groundwater basin and the non-water bearing basement rocks of the Sierra foothills. The northern boundary is the Bear River drainage that is a probable shallow hydrologic divide, with groundwater flow occurring predominantly parallel to the river and, thus, most of the groundwater to the north of the river never flowing south of the river. The southern boundary of the denoted recharge area was selected to roughly correspond with the southern extent of the Orchard Creek and Auburn Ravine drainages – probable areas of groundwater recharge – and is positioned closer to the City of Lincoln than the northern boundary because flow is in a predominantly southwesterly direction through this area (away from Lincoln). The western boundary was selected at a significant distance down gradient of the SOI; even though the groundwater flow direction is to the west-southwest here, it is possible there could be a localized change in the flow direction as a result of the proposed additional City of Lincoln pumping. Most of the recharge within the boundary is likely occurring in the vicinity of the stream drainages, as discussed above. The recharge areas will be better mapped by looking at the pattern of monitoring well groundwater levels versus well depth throughout the area in the City of Lincoln groundwater resources investigation and through the 2006 Lincoln DWR recharge study.

Quantitative estimates of groundwater recharge rates, by type (e.g. stream inflow, deep percolation), for subregions of the North American River Subbasin were calculated using the IGSM model developed for the Northern American River Service Area –as part of the baseline study (MontgomeryWatson, 1995). The modeling study itemizes the groundwater budget for the twenty year period from 1970 to 1990, including all major types of recharge into and discharge from the aquifer systems, but the accounting is not provided for the specific area incorporated in the Lincoln SOI. Table 4 shows the 1970 to 1990 average simulated groundwater budget for the two subregions in the model that include the Lincoln SOI: Subregion 5, located just north of downtown Lincoln (3962 acres), and Subregion 6, encompassing the southern and western portions of the Lincoln SOI, as well as the 24,508 acre area to the west of the SOI (MontgomeryWatson, 1995).

Table E-1 – Average Simulated Groundwater Budget 1970–1990

Groundwater Inflow/Outflow Component	Subregion 5 (acre-feet/year)	Subregion 6 (acre-feet/year)
Deep Percolation	3,194	20,154
Gain from Streams	0	3,903
Boundary Inflow	832	-52
Other Recharge	0	1,930
Pumping Extraction (Outflow)	3,877	28,393
Change in Storage	149	-273
Max. Decrease in Storage for Period	-1,668 in 1977	-20,012 in 1977
Max. Increase in Storage for Period	2,041 in 1983	15,171 in 1982
1990 Storage (1000 acre-feet)	15.7	559.9

The IGSM model predicts that most of the groundwater recharge into the two combined model subregions is due to deep percolation (78%), followed by gain from streams (13%). The areal distribution of the simulated deep percolation is not reported and, thus, the contribution from the Auburn Ravine, Coon Creek, and other stream drainage areas versus outlying areas cannot be determined. The IGSM groundwater budget results suggest that deep percolation is the major contributor to groundwater recharge, which is in contradiction to the soil mapping results, described above, which show a predominance of high runoff / low infiltration soil cover and, consequently, low potential for deep percolation recharge. The reason for this discrepancy is not clear and highlights the need for a more comprehensive investigation of groundwater recharge in the area. Studies currently being planned by the City will better characterize the nature of recharge to the basin. A simple approximation of the simulated groundwater recharge into the actual Lincoln SOI for each subregion can be made by multiplying the recharge component by the fraction of the subregion area in the Lincoln SOI. Using this approach, the approximate total simulated groundwater recharge into the aquifer systems underlying the Lincoln SOI, averaged over the period 1970-1990, is 17,153 acre-ft./yr., of which 11,664 acreft./yr. occurs as deep percolation and 3,697 acre-ft./yr. as inflow from streams or canals.

As part of the groundwater management planning process, a useful future study would be to refine and recalibrate the simulation model using updated information about local Lincoln area groundwater conditions, then to perform additional simulation runs using historical precipitation and streamflow records with current applied water demands. As part of this modeling study a sensitivity analysis of input hydrogeologic parameters (e.g. soil and streambed permeability) should be performed to determine the range of values across which they can vary and still produce acceptable model results. Such a study would estimate the groundwater budget (recharge and discharge components, and change in storage) of the aquifer systems directly underlying the Lincoln SOI across a range of realistic conditions. In addition, modeling runs could be made using estimated future demand scenarios to assess the potential impact of additional pumping wells on groundwater conditions. The RWA groundwater model currently being developed for the Sacramento area could be expanded to include the Lincoln area.

Estimated Groundwater Quantity

A recent investigation of groundwater resources in the Lincoln SOI mapped the top and base of the upper aquifer sequence across much of the SOI area using fairly widespread geophysical surveys and drill hole data (Spectrum-Gasch, 1999). This investigation provides the best available spatial coverage of data about the subsurface of the Lincoln SOI, including:

Well logs, geophysical (electric) logs, and/or pumping data from over 200 drill holes, 67,000 feet of seismic reflection data and 12,000 feet of seismic refraction data (geophysical methods performed along survey lines that provide a cross-section image of the subsurface).

The investigators used the processed geophysical surveys and well data to map what they refer to as the upper productive aquifer zone within the Lincoln SOI –the base of the zone defined by the top of the Mehrten Formation tuff/breccia unit or a thick clay layer and the top of the zone defined by the bottom of a surficial clay-rich layer. The results indicate the productive zone pinches out to the east, along a north-south line close to Highway 65. East of this line the only potential aquifer material is the Ione Formation and fractured granitic bedrock. West of this line the productive aquifer zone thickens westward, although there are localized variations in thickness. There are also known variations in the presence and number of clay interbeds and hydrologic properties in the aquifer zone, but these properties cannot be determined from the data. The thickness of the upper aquifer system exceeds 300 feet near the western boundary of the Lincoln SOI, south of Lincoln Airport.

Spectrum-Gasch (1999) used the results of their investigation to calculate a conservative estimate of groundwater reserves underlying the 25,200 acre Lincoln SOI. They inferred that approximately 9,000 acres of the SOI is underlain by the productive aquifer zone, predominantly in the western two miles. They assumed a nominal aquifer thickness of 100 feet across this area, producing 900,000 acre-feet of total aquifer volume. They then assumed an average porosity of 15% and recovery factor of 50% (this is the same as a specific yield of 7.5%), resulting in a yield of 67,500 acre-feet of groundwater. This yield is reduced by 30% to account for discontinuities in the aquifer zone, such as interbedded clay, leaving an estimated total recoverable groundwater yield of 47,250 acre-feet.

The Northern American River Service Area IGSM modeling study (Montgomery Watson, 1995) modeled the aquifer systems as two semi-confined aquifers. Within the Lincoln SOI the two aquifers pinch out east of Lincoln and increase in thickness to the west-southwest, having a maximum thickness of about 140 feet (upper aquifer) and 175 feet (lower aquifer) at the western edge of the SOI. As part of the model calibration for the baseline study the total volume of groundwater stored within the aquifer system at the end of 1990 is reported for specified subregions of the model, two of which include the Lincoln SOI (see Table 4 above). At the end of 1990 total groundwater storage of the aquifer systems underlying the Lincoln SOI was approximately 287,800 acre-ft., based on a simple summation of the approximate fraction of the area in each model subregion that is within the Lincoln SOI multiplied by the storage in that subregion; this approximation assumes the storage is equally distributed across the model subregion. Other important modeling results include:

- The average change in storage across the Lincoln area is small, suggesting the localized groundwater system is stable over the long term (see Table 4 above).
- Year-to-year variations in storage across the Lincoln area are quite large, suggesting the groundwater system is sensitive, and responds quickly, to variations in annual precipitation and the resulting changes in groundwater usage (see Table 4 above).

There is a significant discrepancy between the two estimates of groundwater storage in the Lincoln SOI derived from the geophysics and well data study (Spectrum-Gasch, 1999) and the ground-surface water simulation model study (Montgomery Watson, 1995). The Spectrum-Gasch prediction of recoverable groundwater yield is only 16% of IGSM model estimate of total groundwater storage. The difference is likely due to a number of factors:

- The Spectrum-Gasch study only considers what they call the upper productive aquifer zone, which probably somewhat corresponds with the upper aquifer system as defined for the North American River Subbasin and used in the IGSM model. The IGSM model also includes the lower aquifer system.
- Spectrum-Gasch assumes an average saturated aquifer thickness of 100 ft. across the area where it occurs, even though the thickness in their three-dimensional model varies between zero and over 300 ft.

- Spectrum-Gasch assumes an average specific yield of 7.5% whereas the IGSM model specific yield is between 8% and 12%. · Spectrum-Gasch considers the aquifer zone to be discontinuous, containing a total of 30% by volume of non-aquifer material, whereas the IGSM model assumes the aquifer is continuous.

- Spectrum-Gasch assumes 50% of the groundwater is recoverable.

A reasonable conclusion is that these two estimates represent approximate lower (47,250 acre-feet) and upper (287,800 acre-feet) limits of the total recoverable groundwater storage; this large range in possible values could be considerably reduced with better estimates of aquifer geometry and aquifer hydrologic properties. The simulation model does not include the new information provided by the Spectrum-Gasch investigation. A refined and calibrated model over the Lincoln area using this and additional future information; could more accurately calculate a groundwater budget to correspond to the boundaries of the Lincoln SOI, and generate much more robust estimates of groundwater storage, as well as recharge and discharge components. The City is planning to develop such a surface water – groundwater model by expanding the RWA model.

DWR Documentation of Non-Overdraft Conditions

The City of Lincoln overlies the North American Subbasin (Basin), which is part of the larger Sacramento Valley Groundwater Basin. DWR documentation was reviewed to determine if DWR has identified the Basin underlying the City to be in a state of overdraft, or if any DWR documentation has projected overdraft within the Basin. The following DWR documents were reviewed for this analysis:

Bulletin 118-80 (DWR, 1980), Bulletin 118-3 (DWR, 1974), Bulletin 118-6 (DWR, 1978), and the draft basin description for the Bulletin 118 Update 2002. Additional historical groundwater elevation data collected by DWR was reviewed for wells within the City of Lincoln’s designated sphere of influence. The period of record for each well is plotted and included in this analysis.

Generally, the documents reviewed describe conditions of overdraft in southwestern Placer County and northern Sacramento County, located to the southwest of the City of Lincoln. Groundwater elevations directly underlying the City were not described to be in a long-term state of decline. Groundwater elevation data, Figures 7 - 16, support the conclusion that groundwater elevations are not declining within the vicinity of Lincoln.

Bulletin 118-80

Bulletin 118-80 examined groundwater basins in the state of California and designated basins in a state of critical overdraft. Bulletin 118-80 did not designate the Basin overlying Lincoln as critically overdrafted. The report did find the portion of the

Sacramento Valley Basin located in northern Sacramento County as critically overdrafted. This area is located to the southwest of the City of Lincoln.

Bulletin 118 Update 2002

Draft documentation located on the DWR website for the Bulletin 118 Update 2002 was reviewed for the North American Subbasin. The report cited Placer County Water Agency (1999) as finding that "groundwater elevations in southwestern Placer County and northern Sacramento County have generally decreased, with many wells experiencing declines at a rate of about one and one-half feet per year for the last 40 years or more."

Bulletin 118-3

Bulletin 118-3 evaluates groundwater resources in Sacramento County. While the document does not specifically discuss groundwater conditions in Placer County the document does show a cone of depression in groundwater elevation for northern Sacramento County in the spring of 1968.

Bulletin 118-6

Bulletin 118-6 evaluates groundwater resources in the Sacramento Valley. Groundwater contours within this document, and supporting documentation: *Groundwater Conditions in the Sacramento Valley, California, 1912, 1916, and 1971*, show a cone of depression in groundwater elevations located in northern Sacramento County and southwestern Placer County.

Historic Groundwater Elevations

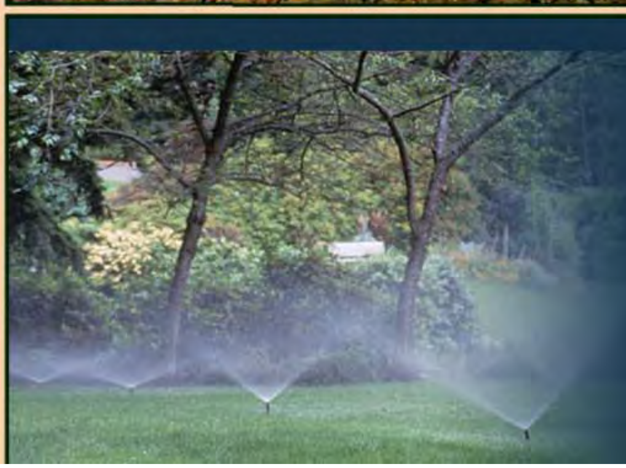
Over the past 40 years groundwater elevations underlying Lincoln have remained relatively stable.

Appendix G

Western Placer County Groundwater Management Plan

CITY OF ROSEVILLE CALIFORNIA | PCWA | City of Lincoln | California American Water

WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN



NOVEMBER 2007

MWH

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Abbreviations and Acronyms

AB	Assembly Bill
AEG	Applied Engineering and Geology
AF	acre-feet
AFB	Air Force Base
ARB	American River Basin
ARPS	American River Pump Station
ARWRI	American River Water Resources Investigation
ASR	Aquifer Storage and Recovery
BMO	Basin Management Objective
CAW	California American Water Company
cfs	cubic-feet per second
CGS	California Geological Survey
COC	constituents of concern
CPS	Comprehensive Planning Study
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
DCW	Diamond Creek Well
DHS	Department of Health Services
DMS	Data Management System
DTSC	Department of Toxic Substances Control
DU	dwelling units
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Assessment and Protection
EMD	Environmental Management Department
EPA	Environmental Protection Agency
FRWA	Freeport Regional Water Authority
GAMA	National Groundwater Ambient Monitoring Assessment
GMP	Groundwater Management Plan
gpd/ft	gallons per day per foot
gpm	gallons per minute
GPS	Global Positioning System
IRWMP	Integrated Regional Water Management Plan
IWRP	Integrated Water Resources Plan
JPA	joint powers authority
Lincoln	City of Lincoln

LSCE	Luhdorff & Scalmanini Consulting Engineers
LUSTs	leaking underground storage tanks
M&I	Municipal and industrial
MCL	Maximum Contaminant Level
MFP	Middle Fork Project
MOU	memorandum of understanding
NARIGSM	North American River Integrated Groundwater Surface Water Model
NCMWC	Natomas Central Mutual Water Company
NGS	National Geodetic Survey
NID	Nevada Irrigation District
PBE	Physical Barrier Effectiveness
PCAs	Potential Contaminating Activities
PCE	tetrachloroethene
PCWA	Placer County Water Agency
PG&E	Pacific Gas and Electric
PNWA	Placer Nevada Wastewater Authority
RAP	Remedial Action Plan
Roseville	City of Roseville
ROWD	Report of Waste Discharge
RWA	Regional Water Authority
SB	Senate Bill
SCEP	Strategic Capital Expenditure Plan
SCWA	Sacramento County Water Agency
SGA	Sacramento Groundwater Authority
SJWD	San Juan Water District
SKS	Saracino, Kirby, and Snow
SMWA	Sacramento Metropolitan Water Authority
SOI	sphere of influence
SOP	Standard Operating Procedure
SSWD	South Sutter Water District
Sub-Basin	North American River Groundwater Sub-Basin
Successor Effort	Water Forum Successor Effort
SVOCs	semi-volatile organic compounds
SWRCB	State Water Resources Control Board
TCE	trichloroethylene
TDS	total dissolved solids
THM	trihalomethane

TPH	total petroleum hydrocarbons
TRC	Technical Review Committee
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
VOCs	volatile organic compounds
WF	Water Forum
WFA	Water Forum Agreement
WPCGMP	Western Placer County Groundwater Management Plan
WPWMALS	Western Placer Waste Management Authority Landfill Site
WSIP	Water Systems Infrastructure Plan
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
WWTRF	Wastewater Treatment and Recycling Facility

Executive Summary

Executive Summary

Executive Summary

OVERVIEW

The Western Placer County Groundwater Management Plan (WPCGMP) is a planning tool to assist the City of Roseville, the City of Lincoln, Placer County Water Agency (PCWA), and the California American Water Company (CAW) in an effort to maintain a safe, sustainable and high-quality groundwater resource within a zone of the North American River Groundwater Sub-basin (Sub-basin). These plan participants have identified a range of specific goals, objectives, and actions that collectively provide a "road map" for future implementation of the WPCGMP by a governing body. As a "living document," the WPCGMP is intended to be periodically updated and refined to reflect progress made in achieving the WPCGMP's objectives and as conditions change in the region. The document outlines a series of required, recommended, and voluntary actions that will promote on-going modification of the WPCGMP's depth and content.

Lastly, a Groundwater Management Plan (GMP) is a required "baseline" document for agencies seeking grant funds from the State of California. Moreover, state agencies that award grants on a competitive basis often give preference to GMPs that have been adopted and implemented by multiple agencies.

WPCGMP GOAL AND PURPOSE

The goal of the WPCGMP is to maintain the quality and ensure the long-term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area. To meet that goal, the purpose of this WPCGMP is to serve as the initial framework for coordinating the many independent management activities into a cohesive set of management objectives and related actions necessary to meet those objectives.

GMP REQUIREMENTS

The California Groundwater Management Act and Assembly Bill 3030 and Senate Bill 1938 guide the preparation of GMPs and contain numerous technical requirements and provisions which are briefly summarized as follows:

- A GMP contains an inventory of water supplies and describes water uses with a given region.
- A GMP establishes groundwater Basin Management Objectives (BMOs) that are designed to protect and enhance the groundwater basin.
- A GMP identifies monitoring and management programs that ensure the BMOs are being met.
- The GMP outlines a stakeholder involvement and public information plan for the groundwater basin.

WHY PREPARE THE WPCGMP?

The WPCGMP is being prepared primarily to position basin partners for future groundwater planning activities. These activities are summarized as follows:

- A GMP develops a framework or baseline on which to build future planning efforts.
- Preparing a GMP is a good planning procedure for managing a groundwater basin.
- A GMP is a prerequisite in applying for State grant funding opportunities.

WPCGMP PARTNERS

The preparation of the WPCGMP is a joint effort by the Cities of Roseville and Lincoln, PCWA, and CAW. Placer County has been an active participant in the GMP's development; however, the County has not formally joined the WPCGMP as a full partner. In addition, the California Department of Water Resources (DWR) has been an active participant in development of the WPCGMP. Through adoption of the WPCGMP, these plan participants are building upon previous groundwater management efforts in the basin.

STAKEHOLDER INVOLVEMENT

Plan participants have conducted a series of briefings and public meetings to inform and involve stakeholders in the WPCGMP. Stakeholder groups briefed on the WPCGMP were: Roseville Public Utility Commission; Lincoln City Council; Placer County Water Agency Board of Directors; Sacramento Groundwater Authority and its member agencies; and the Water and Environment Caucuses of the Water Forum.

Plan participants have provided presentations and/or informational materials to adjacent agencies and organizations including the South Sutter Water District, Natomas Central Mutual Water Company, Nevada Irrigation District, San Juan Water District, City of Rocklin, City of Citrus Heights, Rio Linda/Elverta Community Water District, Yuba County Water Agency, Sacramento Suburban Water District, and Camp Far West Water District.

A public open house to present elements and objectives of the WPCGMP was held June 14, 2007, at the City of Lincoln's McBean Pavilion. A database of approximately 1,200 individuals and organizations was utilized to promote the open house via a direct mail invitation. Invitees included regional water purveyors, businesses, developers, environmentalists, local government agencies, growers, ranchers, and all private well operators within the unincorporated portion of the WPCGMP study area. In support of these outreach activities, plan partners have maintained a project website at www.wpcgmp.org.

FUTURE GOVERNANCE STRUCTURE

Following adoption of the WPCGMP by all plan partners, an implementation agreement will be established. As part of this implementation agreement, a designated governance body will be appointed by the plan participants and tasked to oversee and facilitate the implementation of management actions intended to meet the established BMOs. The governance body's work and costs will be divided among the four plan participants.

Groundwater Management Plan

GROUNDWATER MANAGEMENT PLAN

SECTION 1

Introduction

SECTION 1

Introduction

The City of Roseville (Roseville), the City of Lincoln (Lincoln), Placer County Water Agency (PCWA), and California American Water Company (CAW) have cooperatively developed this Western Placer County Groundwater Management Plan (WPCGMP) as detailed in this and subsequent sections. These entities, collectively referred to as the WPCGMP plan participants, joined to develop this groundwater management plan (GMP) because they all share some level of interest in the North American River Groundwater Sub-basin (Sub-basin). A component of the Sacramento Valley Groundwater Basin, the Sub-basin is roughly bounded by the American River to the south, the Sierra Nevada foothills to the east, the Bear River to the north, and the Sacramento River to the west. The WPCGMP area includes the Sub-Basin's eastern edge, Sacramento County to the south, the western edge of PCWA's service area, and Bear River to the north. Although the participants are not the only users of the Sub-basin, their political boundaries do cover the majority of the area where Placer County overlies the Sub-basin, as illustrated in Figure 1-1.

1.1 REPORT ORGANIZATION

This document was prepared in accordance with the California Groundwater Management Act and Assembly Bill 3030 (AB3030) and Senate Bill 1938 (SB 1938), and includes the following sections;

Section 1. Introduction. This section provides the geographic setting, city and agency background, and summarizes other water resource management efforts implemented by entities located within and immediately adjacent to the WPCGMP area.

Section 2. Water Resources Setting. Prior to managing a basin, available water supplies must be identified and quantified. This section presents information on the availability of different water supplies and how they could be used within the WPCGMP area. This section also provides a description of the groundwater basin highlighting the unique hydrogeologic setting, an understanding of water quality issues, and a description of groundwater and surface water infrastructure currently in-place within the WPCGMP area.

Section 3. Management Plan Elements. This section identifies the five plan components (Stakeholder Involvement, Monitoring Program, Groundwater Resource Protection, Groundwater Sustainability, and Planning Integration) that constitute a GMP. An important aspect of this section is the identification of Basin Management Objectives (BMOs) and the actions necessary for BMO implementation.

Section 4. Plan Implementation. This section provides a schedule for implementing the BMOs, plan components, and actions; presents reporting criteria; and provides a description of the governance body and financing necessary to implement the WPCGMP.

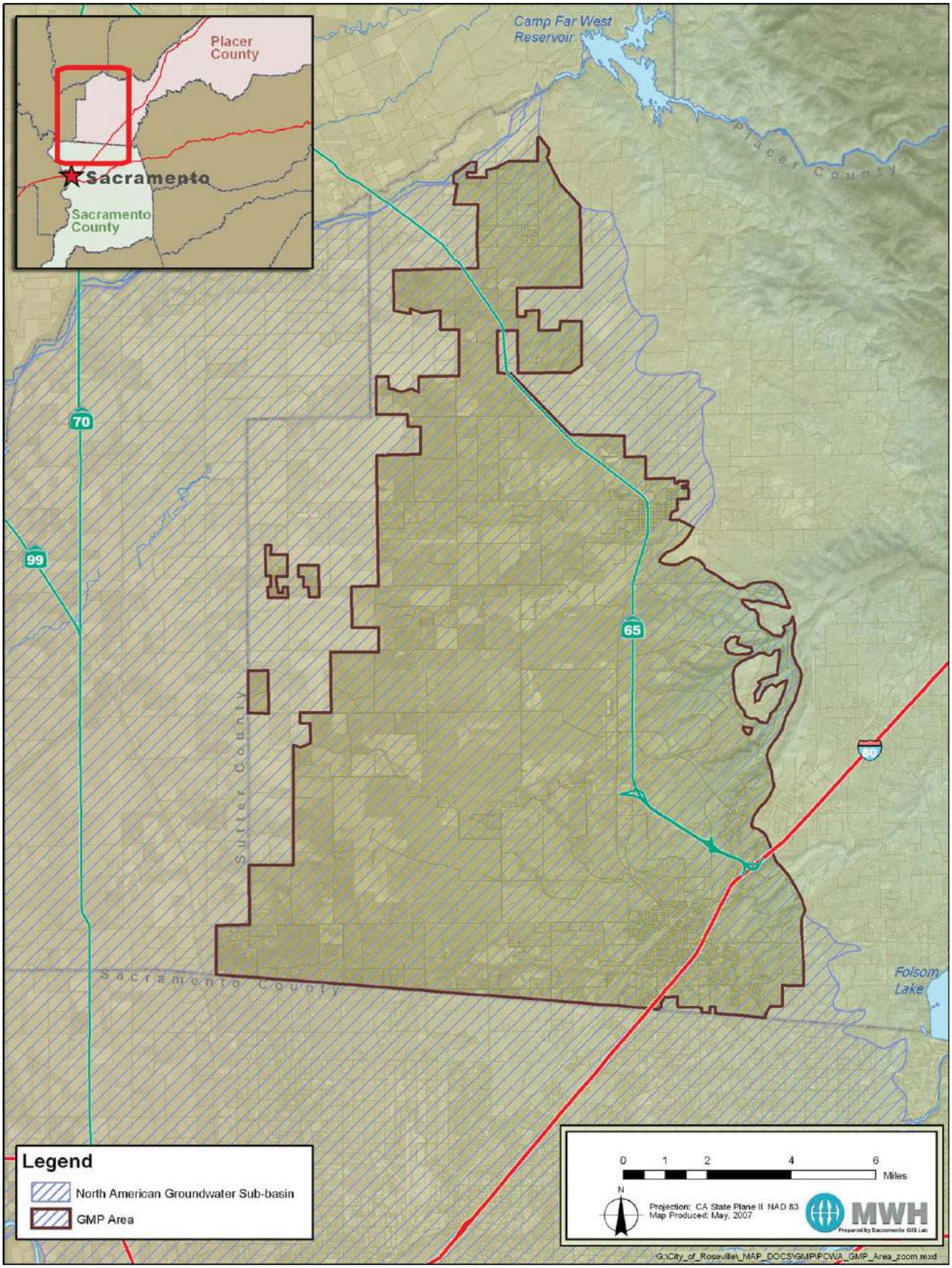

Figure 1-1 – WPCGMP Area

1.2 PURPOSE AND GOALS OF THE WPCGMP

The goal of the WPCGMP is to maintain the quality and ensure the long-term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area. To meet that goal, the purpose of this WPCGMP is to serve as the initial framework for coordinating the many separate management activities into a cohesive set of BMOs and related implementation actions.

1.3 BACKGROUND

The following subsection presents background information on each plan participant. For reference, Figure 1-2 illustrates the extents of each participant's service area and/or city limits.

1.3.1 Roseville

Established in 1909, Roseville is an incorporated city located approximately 16 miles northeast of Sacramento, California in Placer County. It encompasses approximately 36 square miles with a population of approximately 104,000 people (Figure 1-1).

Roseville is responsible for providing all water (potable water service including treatment, water distribution and water conservation), wastewater (wastewater collection and treatment), recycled water (irrigation), and stormwater (protecting the water quality of Roseville's creeks), and other utility services to Roseville's residents, businesses and schools in its service area.

Currently, Roseville is experiencing a significantly higher rate of population growth than the national average. This growth has caused new urbanization in the north and northwest portions of the city. Historically, Roseville's water supply has come solely from Folsom Lake, which is treated at Roseville's Water Treatment Plant (WTP). In order to provide water for backup demands, Roseville currently maintains four municipal supply wells to augment surface water supplies during daily and peak demand periods. To further maintain water reliability, Roseville is currently evaluating the feasibility of conjunctive use programs including direct groundwater recharge through Aquifer Storage and Recovery (ASR) and the use of spreading basins and passive groundwater recharge through in-lieu surface water delivery.

City of Roseville ASR well

1.3.2 Lincoln

Lincoln is an incorporated city located in western Placer County and has a population of approximately 35,000 people as of December 2005. Lincoln's city limits for the proposed 2006 General Plan Update are shown on Figure 1-2. Similar to Roseville, Lincoln is experiencing a high rate of population growth causing urbanization within Lincoln's boundaries. Lincoln primarily relies on PCWA to meet its treated water supply need. To accommodate dry-year, emergency, and daily peak demands, Lincoln owns and operates several municipal water supply wells. Lincoln also has a conjunctive use program, which includes the use of recycled water from its Wastewater Treatment and Recycling Facility (WWTRF), groundwater and raw surface water supplies, in addition to the treated potable supplies from PCWA.

1.3.3 PCWA

Placer County Water Agency was created in 1957 through approval of "The Placer County Water Agency Act" by the California State Legislature for the purpose of developing and operating major water facilities in Placer County. PCWA is self-governed by an independently elected five-member Board of Directors and is under administrative direction of a general manager. The boundaries of PCWA generally coincide with the boundaries of Placer County.

PCWA carries out a broad range of responsibilities including water resource planning and management, retail and wholesale supply of irrigation water and drinking water, and production of hydroelectric energy.

PCWA is working toward obtaining a better understanding of groundwater in western Placer County through the implementation of different groundwater planning projects. At present, self-supplied and agricultural use of groundwater in the region is extensive. PCWA wishes to understand the magnitude of groundwater use and replenishment as it considers future water supply planning opportunities that exist in its primary surface water system.

The PCWA water system was established in 1968. PCWA supplies wholesale and retail water to a variety of customers including residential, commercial, industrial, and agriculture. A significant amount of raw water irrigates pastures, orchards, rice fields, farms, ranches, golf courses, and other uses. PCWA retails treated water to customers residing in the Placer County communities of Colfax, Auburn, Loomis, Rocklin, small portions of Roseville, and in the vast unincorporated areas of western Placer County. PCWA also wholesales treated water to Lincoln and several smaller special districts who then retail water to their customers. PCWA provides raw water to Roseville, San Juan Water District, and Sacramento Suburban Water District on a contract basis. These agencies provide their own treatment and then retail the water to their customers.

As described below, and summarized in **Table 1-1**, PCWA has established five retail service zones within Placer County (four of which are illustrated on **Figure 1-2**):

- Zone 1 was created in 1968 for the purpose of financing the purchase of Pacific Gas and Electric's (PG&E) Lower Drum Division Water System. This system provided water service to the communities of Auburn, Bowman, Ophir, Newcastle, Penryn, Loomis, Rocklin, and Lincoln. It has four WTPs and one groundwater well and associated storage and distribution systems. Zone 1 encompasses approximately 125 square miles. Today, Zone 1 includes territory under the land use authorities of Auburn, Rocklin, Lincoln, a portion of Roseville, Loomis, and Placer County. Zone 1 is separated into Upper Zone 1 and Lower Zone 1 to delineate the higher elevation service areas of Auburn, Bowman, and Ophir from the remaining lower elevation areas.
- Zone 2 was created in 1979 and provides retail water service to a small residential development of 47 units located in an unincorporated area southwest of Roseville. Formerly supplied by groundwater, the system was converted to surface water in 2004. Zone 2 is under the land use authority of Placer County.
- Zone 3 is a water system acquired from PG&E in 1984 that serves Colfax and portions of Placer County along the Interstate 80 corridor extending from Bowman to Alta. This zone utilizes surface water and has four water treatment plants.
- Zone 4 was created in 1996 and is located in the unincorporated Martis Valley portion of eastern Placer County. Zone 4 is served entirely by groundwater.
- Zone 5 was created in 1999 and assumed the boundaries of Placer County Zone 29. It was created to reduce reliance on groundwater supplies by providing surface water for commercial agriculture in the western-most section of Placer County. Zone 5 is served entirely by raw surface water supplies.

1.3.4 CAW

California American Water Company is a wholly-owned subsidiary of American Water, a provider of water services throughout North America. Within the WPCGMP area, CAW operates its West Placer Water System (WPWS) – an area with approximately 1,100 customer connections in 2005 (see **Figure 1-2**) – under a franchise agreement with the County of Placer. The WPWS is one of 10 service areas of CAW's Sacramento District.

Table 1-1. PCWA Retail Service Zones

PCWA Retail Service Zones	Locations	Water Service Provided
Zone 1 [1]	Auburn to Newcastle, Lincoln, Loomis, Rocklin, Granite Bay and Roseville, plus unincorporated areas	Treated and raw water
Zone 2	A small residential area of 46 customers (Bianchi Estates), southwest of Roseville	Treated water
Zone 3	Applegate, Colfax, Alta, and Monte Vista	Treated and raw water
Zone 4	Water from three wells is used to serve the Lahontan, Timilick, Hopkins Ranch, and Martis Camp developments in the Martis Valley	Treated water
Zone 5 [2]	Irrigation water for commercial agriculture in far western Placer County	Raw water

[1] Zone 1 is separated into Upper Zone 1 and Lower Zone 1 based on the system configuration. Upper Zone 1 is solely met by PG&E water while Lower Zone 1 also receives Middle Fork Project (MFP) water.

[2] Zone 5 was created in 1999 to reduce reliance on groundwater supplies by providing surface water for commercial agriculture in the western-most section of Placer County.

11 x 17 service area map goes here

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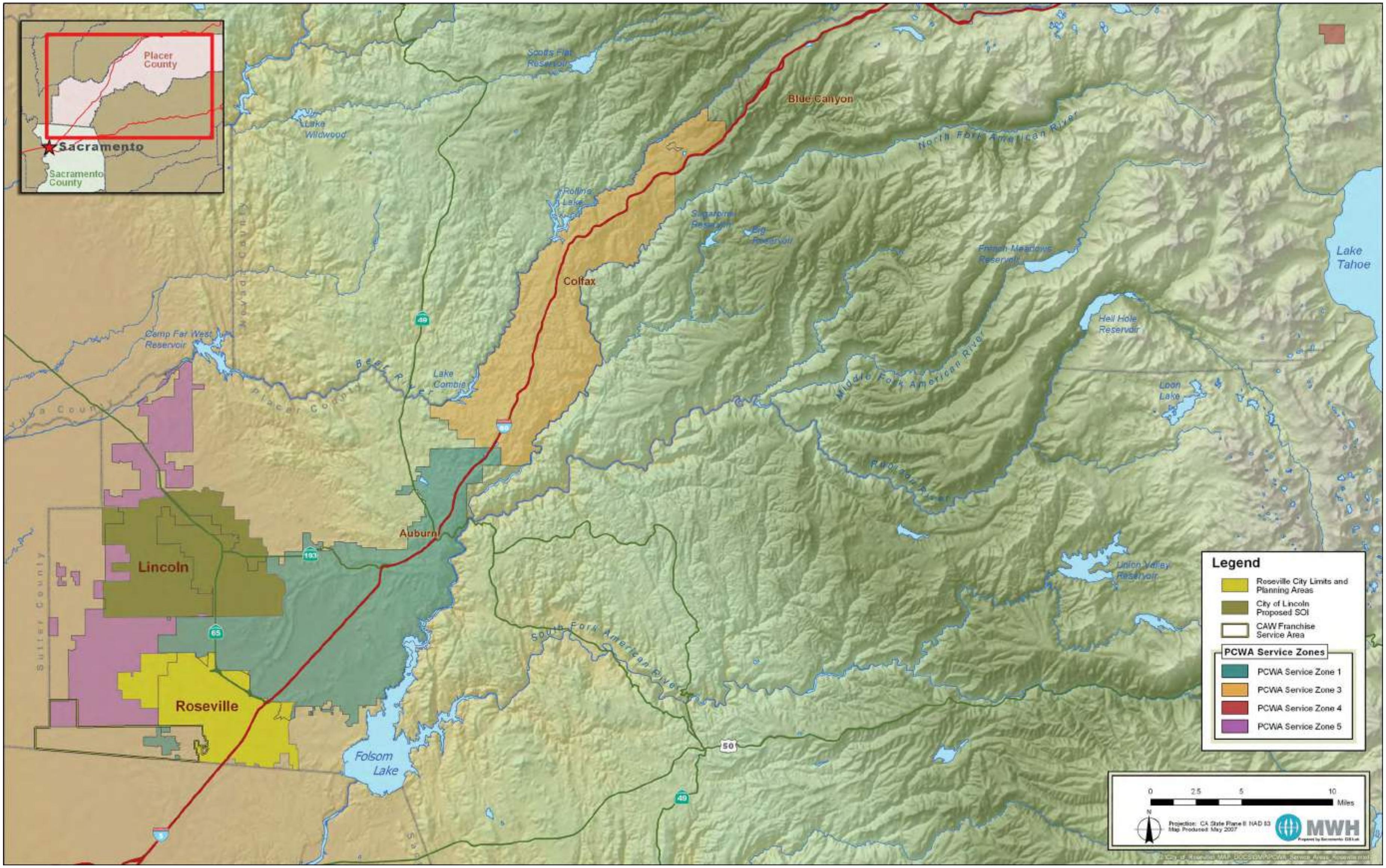
Figure 1-2 – Service Area/City Limits of WPCGMP Participants



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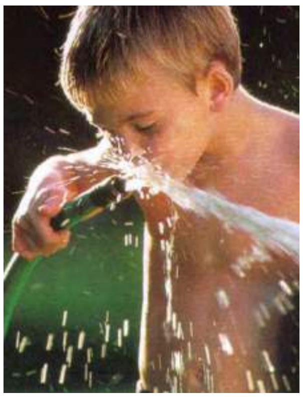
Recent residential developments in WPWS are required to use surface water exclusively. The water is provided under a wholesale agreement with PCWA and delivered via a wheeling agreement with the City of Roseville.

CAW intends to continue serving WPWS area customers predominately with PCWA-supplied surface water. However, PCWA and CAW intend to incorporate the conjunctive use of groundwater as needed to achieve the highest levels of water supply reliability.

1.3.5 Other Adjacent Entities



The following subsection provides background information on other local and regional entities immediately adjacent or within the WPCGMP area including Placer County, South Sutter Water District, Natomas Central Mutual Water Company, the Sacramento Groundwater Authority (SGA), and the Regional Water Authority (RWA), (**Figure 1-3**). These agencies, like the WPCGMP participants, each have some level of interest in the North American groundwater basin, and therefore are likely to have some interest in its management.

1.3.5.1 Placer County

Placer County serves a population of over 300,000 from its border with Sacramento County to the Nevada state line. County communities include Roseville, Lincoln, Rocklin, Loomis, Auburn, Foresthill, Colfax, Tahoe City, and Kings Beach. Placer County, as an entity, does not provide water service to customers, but provides services including Agricultural and Environmental permitting. In addition, Placer County government serves as the land use authority for unincorporated areas.

1.3.5.2 Natomas Central Mutual Water Company (NCMWC)

NCMWC is located in northwestern Sacramento County and southern Sutter County, adjacent to the Sacramento River (Figure 1-3). It provides irrigation water to approximately 280 members/shareholders for agricultural use. NCMWC has water rights and contracts to Sacramento River water. Surface water is supplemented with groundwater from privately owned wells.

1.3.5.3 South Sutter Water District (SSWD)

SSWD is located in southern Sutter and western Placer counties, with the Bear River as the northern boundary and stretching southwest between Highway 65 and Highway 70 to Pleasant Grove and Curry Creeks (Figure 1-3). SSWD was formed in 1954 to develop, store, and distribute surface water supplies to supplement groundwater supplies as needed. SSWD is considered a "supplemental" water district because it does not provide full service to landowners. Instead, it allocates supplemental surface supplies according to acreage of land owned. SSWD covers 57,012 acres with approximately 82 percent in rice production. Most of the SSWD's customers are agriculture-based and utilize private wells to obtain the majority of their water supplies.

1.3.5.4 Nevada Irrigation District (NID)

NID is an independent public agency governed by an elected board that supplies nearly 25,000 homes, farms and businesses in Nevada and Placer counties in the foothills of Northern California's Sierra Nevada Mountains. NID collects water from the mountain snowpack and stores it in a system of 10 reservoirs. As water flows to customers in the foothills, it is used to generate clean hydroelectric energy and to provide public recreational opportunities. NID supplies both treated drinking water and irrigation water.

1.3.5.5 San Juan Water District (SJWD)

SJWD is a community services district created by a vote of the citizens in 1954. It wholesales water to Citrus Heights and Fair Oaks Water Districts, Orange Vale Water Company, the City of Folsom (north of the American River), and periodically to Sacramento Suburban Water District. Additionally, SJWD retails water to customers in Granite Bay and the northeast portion of Sacramento County.

SJWD does not have access to groundwater in its retail service area which includes a very small portion of the southeast corner of the WPCGMP area. SJWD is a participating agency of the Sacramento Groundwater Authority (SGA), and is actively involved in implementing SGA's GMP completed in 2003.

1.3.5.6 Sacramento Groundwater Authority (SGA)

SGA is a joint powers authority (JPA) created to manage the portion of the North American River Groundwater Sub-basin directly south of the WPCGMP area. The SGA boundary includes only the portion of Sacramento County north of the American River (Figure 1-3), referred to as the North Area Basin. SGA's formation[1]

[1] The SGA was originally formed in 1998 as the Sacramento North Area Groundwater Management Authority. In 2002, it was renamed the Sacramento Groundwater Authority.

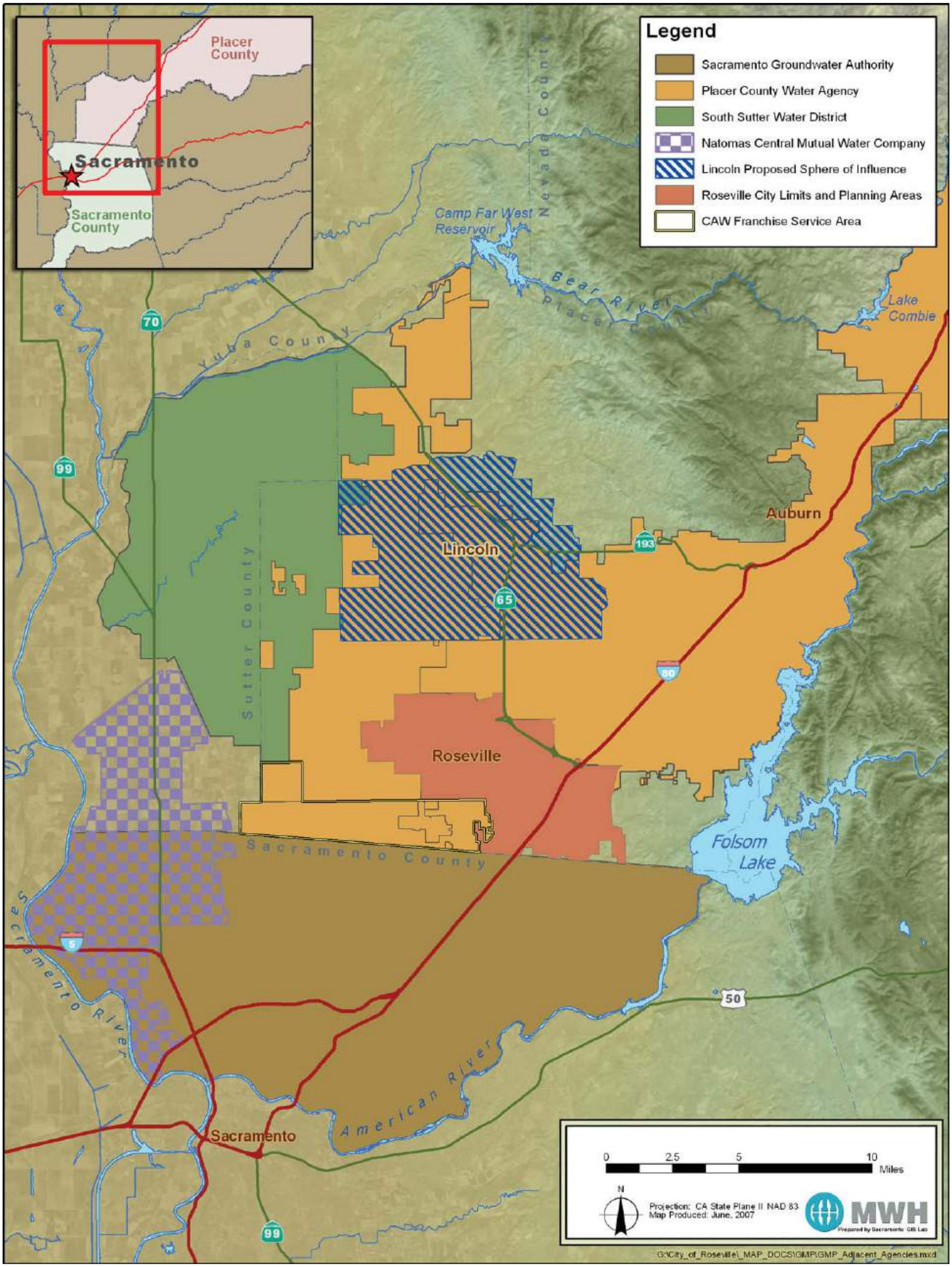


Figure 1-3 – Adjacent Entity Service Areas in 1998 was a result of a coordinated effort by the Sacramento Metropolitan Water Authority (SMWA) and the Water Forum[1] (WF) to establish an appropriate groundwater management structure for the North Area Basin. The cities of Citrus Heights, Folsom, Sacramento, and the County of Sacramento, signatories to the JPA, hold police powers to manage the underlying groundwater basin. These entities delegate authority to SGA, which in turn manages the basin through representatives of 14 local water purveyors and one representative from agricultural and self-supplied groundwater pumpers. These representatives serve as the SGA Board of Directors[2].

SGA's management responsibility is a commitment to not exceed the average annual sustainable yield of the North Area Basin, which was estimated to be 131,000 acre-feet[3] in the Water Forum Agreement (WFA).

1.3.5.7 Regional Water Authority (RWA)

RWA represents a number of regional water supply interests and assists members in protecting and enhancing the reliability, availability, affordability, and quality of water resources. One of the principal missions of RWA is facilitating implementation of the conjunctive use program prescribed by the WFA. RWA currently has 19 water purveyor members and three associate members[4], spanning Placer, Sacramento, Yolo, and El Dorado counties. Roseville, Lincoln, PCWA, and CAW are members of RWA.

1.4 EXISTING GMPS

The following subsection provides a summary of the GMPs completed by WPCGMP participants and the adjacent entities including SGA, SSWD, and NCMWC.

1.4.1 WESTERN PLACER GROUNDWATER MANAGEMENT PLAN

In November 1996, PCWA adopted a Resolution of Intent to draft an AB3030 compliant GMP for the western Placer County region of their service area. The plan area included the cities of Roseville and Rocklin and the unincorporated portion of western Placer County, west of Highway 65 and outside of Lincoln. PCWA and Roseville adopted this joint Western Placer GMP in 1998. In 2003, PCWA updated the plan to achieve Senate Bill 1938 (SB1938) compliance. The goal of the plan was to manage groundwater resources to the benefit of western Placer County and to support the Placer County General Plan. This goal was pursued through a coordinated effort with all stakeholders in the plan area and implementation of activities consistent with other groundwater management planning efforts in the region. The plan identified certain implementation activities:

- Monitoring groundwater levels and groundwater quality.
- Identifying groundwater recharge opportunities, with particular emphasis on the area adjacent to the Placer/Sacramento County line.
- Identifying conjunctive use opportunities for non-residential uses in the area north of Pleasant Grove Creek.
- Evaluating the safe yield of the groundwater basin underlying the study area.
- Maximizing groundwater management coordination with all jurisdictions, landowners, and the general public within western Placer County, with those jurisdictions in north Sacramento County portion of the basin, and with the appropriate State and federal agencies.

1.4.2 LINCOLN GROUNDWATER MASTER PLAN (2003)

Lincoln completed and adopted a SB1938 compliant GMP in 2003. Its GMP provides a framework to effectively manage and protect its groundwater resources and includes BMOs as well as a series of management actions to be implemented. The GMP mission statement and primary groundwater management goal is to "ensure a viable resource for use by the City (Lincoln) to meet backup, emergency and peak demands without adversely affecting adjacent areas."

The 2003 GMP boundaries includes the City of Lincoln's sphere of influence (SOI), an area that extends slightly beyond the current

[1] The Water Forum is a diverse group of business and agricultural leaders, citizens groups, environmentalists, water managers, and local governments in the Sacramento Region that joined together to equally fulfill the objectives of water supply reliability and environmental values of the Lower American River. In 1999, the WF approved the comprehensive Water Forum Agreement (WFA) to fulfill those objectives. The WFA is available online at http://www.waterforum.org or contact the Water Forum office at (916) 808-1999.

[2] SGA Board members include representatives of California American Water Company, Carmichael Water District, Citrus Heights Water District, City of Folsom, City of Sacramento, County of Sacramento, Del Paso Manor Water District, Fair Oaks Water District, Natomas Central Mutual Water Company, Orangevale Water Company, Rio Linda/Elverta Community Water District, Sacramento Suburban Water District, San Juan Water District, Golden State Water Company, and individual representatives from agriculture and self-supplied groundwater users (principally parks and recreation districts).

[3] This value was estimated based on water use and facilities in the basin at the time of the WFA. This value was based on a number of assumptions, and was not intended to be a fixed value that could not be modified as conditions and assumptions changed in the basin. Examples of changed conditions include new or improved water conveyance, treatment, and storage facilities or changes in water supply contracts.

[4] The membership of the RWA encompasses water users in both Sacramento County and Placer County including: California American Water Company, Carmichael Water District, Citrus Heights Water District, City of Folsom, City of Lincoln, City of Roseville, City of Sacramento, City of West Sacramento, Del Paso Manor Water District, El Dorado Irrigation District, Fair Oaks Water District, Fruitridge Vista Water Company, Orangevale Water Company, Placer County Water Agency, Rancho Murieta Community Services District, Rio Linda/Elverta Community Water District, Sacramento Suburban Water District, San Juan Water District, and the Golden State Water Company. Associate members do not directly retail drinking water and do not vote in RWA matters. Associate members include: El Dorado County Water Agency, Sacramento Municipal Utility District, and Sacramento Regional County Sanitation District.

city limits (see Figure 1-3). Lincoln anticipates it will expand its current SOI as part of its 2006 General Plan Update. A draft version of the General Plan Update was published on October 3, 2006.

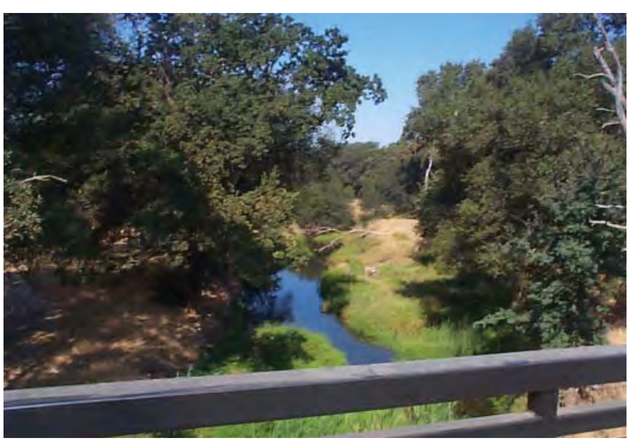
In addition to its planning benefit, the Lincoln GMP contains a sophisticated array of geophysical information regarding the basin underlying its SOI. Technical information collected to date, which have been included in the 2003 GMP and in subsequent investigations, has generated an extensive data set that Lincoln intends to use to further understand and manage its underlying groundwater resources. With assistance from an AB303 grant from the California Department of Water Resources (DWR), Lincoln installed five new multi-completion monitoring wells in 2005 to aid in basin management activities.

The GMP provides a framework process that describes the series of steps necessary to manage the basin, beginning with collecting the necessary data and developing a stakeholder participation program.

The Lincoln GMP contains the following BMOs:

- Maintain groundwater elevations at a level that will ensure an adequate groundwater supply for backup, emergency and peak demands, without causing significant adverse impacts to adjacent areas.
- Preserve overall groundwater quality by stabilizing existing groundwater contaminant migration, avoiding known contaminated areas, and protecting recharge areas.
- Ensure that the direction of groundwater flow continues its southwesterly flow pattern despite additional groundwater extraction or other potential influences.

To achieve these BMOs, Lincoln recognized that a substantial number of management actions must be continued or implemented. In many instances these actions apply to more than one BMO and relate to multiple AB 3030 management plan objectives. Table 1-2 summarizes the management actions that as of 2003 (1) have already been undertaken, (2) are slated for implementation and have a budget, or (3) are still in the planning stages.



1.4.3 SGA GROUNDWATER MANAGEMENT PLAN

SGA adopted its GMP in December 2003 to establish goals, management objectives, and components needed to manage the groundwater basin. SGA's GMP provides a starting point from which SGA will continually assess the status of the groundwater basin and make appropriate management decisions to ensure a sustainable resource. SGA's GMP contains the following management objectives:

American River

- Maintain or improve groundwater quality in the SGA area for the benefit of basin groundwater users.
- Maintain or improve groundwater elevations that result in a net benefit to basin groundwater users.
- Protect against any potential inelastic land surface subsidence.
- Protect against adverse impacts to surface water flows in the American River and Sacramento River.
- Protect against adverse impacts to water quality resulting from interaction between groundwater in the basin and surface water flows in the American River and Sacramento River.

1.4.4 SSWD GROUNDWATER MANAGEMENT PLAN

On February 23, 1993, SSWD adopted a Resolution of Intention to draft a GMP (SSWD, 1997). Subsequent to adopting this resolution, SSWD had directed the preparation of a report on groundwater conditions within SSWD. The report covers the period 1970 through 1993 and updated a prior report for the period 1963 to 1968. The plan area included all SSWD land located within Sutter and Placer counties.

SSWD's primary goal in developing the GMP was "to work cooperatively with landowners within the district to most efficiently manage the groundwater resources and to continue with an efficient and effective conjunctive use program." The plan included components identified in California Water Code section 10753.7, which are:

- Monitoring (groundwater levels and quality)
- Conjunctive use program and mitigation of overdraft
- Relations with State and Federal regulatory agencies
- Well construction policies and administration of well abandonment and destruction program

1.4.5 NCMWC Groundwater Management Plan

In 2000, NCMWC adopted a GMP for its service area in both Sacramento and Sutter counties (Luhdorff & Scalmanini Consulting Engineers (LSCE), 2000). This GMP applies to NCMWC's Sutter County service area while, SGA's GMP covers the Sacramento County portion of NCMWC's service area. No additional information is available from this GMP.

1.5 OTHER MANAGEMENT EFFORTS

Over the past several decades, water supplies of the region have been affected by:

- Extended drought and wet periods
- Increased push to dedicate surface water for environmental purposes
- Declining groundwater levels
- On-going and potential impacts to surface water quality and groundwater quality

At the same time, demand for water in the region has continued to grow. To address these challenges, water purveyors in the region have invested substantial time and resources in a progression of regional planning efforts. This section summarizes the planning efforts that were led by WPCGMP participants.

1.5.1 Roseville

The following subsection provides a summary of relevant Roseville planning efforts.

1.5.1.1 Urban Water Management Plan (2005)

Roseville's Urban Water Management Plan (UWMP) was originally adopted in 1986, and has been updated in 1991, 2002, 2003 and 2005. The Roseville UWMP provides a framework for public participation for the planning of water resource supply and water use provisions for all residential, commercial, industrial, institutional/government, landscape/recreational, and agricultural sectors. The UWMP includes a supply and demand comparison, outlines future projects to meet projected water use including water supply, treatment, storage, distribution and groundwater well facilities, and contains water demand management measures and water shortage contingency plans. The plan also identifies Roseville's current water recycling program and future opportunities.

1.5.1.2 General Plans (1992, 1993 and 2004)

Although Roseville's first General Plan was adopted in 1963, and consisted basically of a land use map, the first comprehensive General Plan for Roseville was adopted in 1977. While various elements were updated since 1977, the 1992 General Plan represented the first comprehensive update since that time. The 1992 General Plan did not include land use allocations beyond those previously identified, but it did include substantial policy revisions. Since the 1992 update, land use allocations have been modified by the Roseville City Council several times with the adoption of the Del Webb, North, Highland Reserve North, and Stoneridge Specific Plans, and with the annexation of the Pleasant Grove Waste Water Treatment Plant (WWTP) and Foothill Business Park properties. However, the core polices of the 1992 update were retained. A technical update to the General Plan was accomplished in January 2003, and it focused on updating information that had changed as a result of previous City Council actions (adoption of specific plans and update of the Capital Improvement Program, etc).

Also, in 2003 the General Plan was updated with the adoption of the West Roseville Specific Plan, annexation, and sphere of influence amendment. With the adoption of the Specific Plan and annexation, several revisions to the General Plan occurred including inclusion of the Roseville's previously adopted Guiding Principles for development west of Roseville, a change in land use allocation, and map revisions. The General Plan integrates Roseville's nine adopted specific plans. These plans are incorporated as a part of the General Plan and should be referred to for specific requirements.

The Roseville General Plan is designed to be:

- Long-range: However imperfect the vision of the future is, almost any development decision has effects lasting more than 20 years. In order to create a useful context for development decisions, the General Plan looks towards the year 2010 and beyond.
- Comprehensive: The General Plan provides direction to coordinate all major components of the community's physical development.
- General: Because it is long-range and comprehensive the General Plan, in most cases, is general. The plan's purpose is to serve as a framework for detailed public and private development proposals. It establishes requirements for additional planning studies, which must be completed prior to any future specific plan to modify the General Plan land use allocation.

The Roseville General Plan serves to:

- Enable Roseville's Council and planning commission to establish long-range development policies.

Table 1-2. City of Lincoln GMP Management Action Plans

Action	Elevation	BMO Quality	Gradient	AB3030 Component
1. Develop and implement a groundwater monitoring program				
a. Expand the network	X	X	X	7
b. Collect relevant well and aquifer data	X	X	X	7
c. Establish data collection methods and frequency	X	X	X	7
d. Develop a groundwater database	X	X	X	7
e. Identify water quality constituents of concern	X	X	X	1, 7
f. Monitor fresh water/saline water interface	X	X	X	1, 7
g. Monitor status of known contaminant sites	X	X	X	3, 7
h. Annually prepare and present data	X	X	X	7
i. Research and apply for relevant grant funding	X	X	X	7
2. Improve understanding of groundwater basin				
a. Develop and utilize a groundwater model	X			1, 2, 3, 5, 6, 8
b. Characterize and evaluate local conditions	X			1, 2, 3, 5, 6, 8
c. Develop a water budget, estimate the perennial yield	X			5, 6, 8
d. Research and apply for relevant grant funding	X			1, 2, 3, 5, 6, 8
3. Continue long-term planning and evaluation of potential projects				
a. Explore conjunctive use opportunities	X		X	5, 6, 8, 10
b. Develop a recharge program	X		X	5, 6, 10
c. Review proposed development plans	X	X	X	2, 12
d. Research and apply for relevant grant funding	X	X	X	5, 6, 10
4. Establish operational requirements for City production wells				
a. Develop spacing and well operation guidelines	X	X	X	1, 3, 9
b. Establish policies and protocols for BMOs	X	X	X	7, 8
5. Develop and implement a Groundwater Protection Program				
a. Conduct a search for abandoned wells		X		1, 4
b. Review permits for the destruction of wells		X		1, 4
c. Establish standard well construction policies		X		3, 9
d. Determine well requirements to minimize saline upconing		X		1, 9
e. Map known contaminated sites		X		3
f. Research and apply for relevant grant funding		X		1, 3, 4, 9
6. Continue Public Participation				
a. Make results of monitoring program available	X	X	X	7
b. Continue Advisory Committee	X	X	X	11, 12
c. Engage state and federal regulatory agencies				11
d. Continue to engage local agencies and interests				11

- Provide a basis for judging whether private development proposals and public projects are in harmony with the policies.
- Guide public agencies and private developers in designing projects that are consistent with Roseville's policies.

Regarding groundwater recharge and water quality, Roseville's goals outlined in the General Plan are to:

- Continue to improve surface water quality and accommodate water flow increases.
- Enhance the quality and quantity of groundwater resources.

Plans to protect the Roseville's water resources and water quality include the development of standards for urban run-off, monitoring groundwater, and protection of waterways and groundwater recharge areas.

1.5.1.3 Aquifer Storage and Recovery (ASR) Phase I and II Testing at the Diamond Creek Well

Roseville's ASR program is being developed with the intention of using the aquifer to store surplus water in "wet" years for extraction during times of peak demand as part of a conjunctive use program. Roseville's ASR program is currently being evaluated using a two phase test approach. Phase I testing was completed in 2005 and consisted of a relative short duration pilot scale cycle test (cycle test). This is followed by a scheduled 30-month Phase II demonstration test. Both phases of testing are being conducted at the Diamond Creek Well (DCW) in the northwest portion of Roseville.

Constructed in 2002, the DCW is used for backup water supply and was specifically designed for ASR use. Three monitoring wells were constructed adjacent to the DCW for the purpose of data collection during testing. Potable water from the Roseville WTP is conveyed to the DCW for the purpose of ASR testing.

1.5.1.3.1 Phase I Pilot Scale Testing (Cycle Test)

Roseville submitted a Report of Waste Discharge (ROWD) on January 7, 2003, as a requirement of the Central Valley Regional Water Quality Control Board (CVRWQCB) to permit an ASR Phase I cycle test. The CVRWQCB granted a waiver to allow testing on May 6, 2003. The Phase I cycle test was performed from May 5, 2004, to September 20, 2004, and consisted of three general stages of data collection: baseline, injection, and extraction.

The baseline stage consisted of a series of monitoring and sampling events. The injection stage of the cycle test consisted of 26 days of continuous surface water injection at an average flow rate of approximately 1,375 gallons per minute (gpm). The total volume of water injected was 158 acre-feet (AF). During the extraction stage, flow rates averaged approximately 3,434 gpm. The total volume of water extracted during three phases was 439 AF, representing 278 percent of injected water volume. During the three stages of cycle testing groundwater elevation and quality data were frequently collected at the DCW and at the nearby monitoring wells.

Data from this Phase I cycle test were used to provide an understanding of local changes in groundwater elevations and quality, and to explore additional ASR testing (Phase II). Cycle testing showed very favorable conditions with no apparent adverse impacts to groundwater levels and overall improvements to groundwater quality.

1.5.1.3.2 Phase II Demonstration Testing

Roseville submitted a second ROWD to the CVRWQCB on May 16, 2005, for Phase II demonstration testing. This ROWD was granted by the CVRWQCB on August 5, 2005. Phase II activities began in November 2005 and are scheduled to conclude in 2008. The primary objectives of Phase II are to further evaluate system operation and to determine the fate and transport of trace levels of disinfection byproducts stored underground. Phase II ASR demonstration testing includes five stages of data collection as follows:

a) One month baseline

b) Six months of injection totaling 1,094 AF of water at a rate of 1,375 gallon per minute (gpm)

c) Eleven months of injected water storage in the aquifer

Diamond Creek ASR Well

d) Ten months of extraction at 2,500 gpm recovering 3,314 acre-feet of water

e) Two months of post testing

Although final results of Phase II extraction tests are pending, and therefore not yet analyzed, prior results and recent correspondence with the CRVWQCB indicate that Roseville will be able to work towards designing and permitting a full-scale ASR system within its jurisdiction.

1.5.1.4 Dry Creek Recycled Water Groundwater Re charge Study (2004)

The Dry Creek Recycled Water Groundwater Recharge Feasibility Study identifies and evaluates potential opportunities to recharge groundwater in Placer and Sacramento counties through application of recycled water. The study identifies and screens possible direct and in-lieu recharge opportunities and then evaluates these opportunities based on economics, legal considerations, public perception, and potential for groundwater benefit. The four principal goals of the study are to:

1. Identify the potential market in the region for recycled water for irrigation purposes.
2. Evaluate participation in the SGA's regional groundwater banking and exchange program.
3. Investigate the institutional and regulatory issues that exist in implementing a recycled water/groundwater recharge program.
4. Identify mechanisms for protecting Roseville's existing water rights.

The potential benefits provided by the recharge programs are estimated assuming the water is used for two general purposes:

1. A component of a regional water transfer program such as that undertaken by the SGA in 2002.
2. A source of dry-year water supply for Roseville.

The study also quantifies the potential benefit that a recycled water recharge program may have on the underlying groundwater aquifer. When a system is established by the SGA to give credit to agencies that contribute to groundwater recharge, the study will serve as the foundation for Roseville to integrate their program with SGA's efforts.

The study recommends that water purveyors in the Sacramento region will need to look for more sophisticated alternatives for supplying water. Recycled water is an underutilized resource that can help to augment existing water supplies. The Dry Creek Recycled Water Groundwater Recharge Feasibility Study can help Roseville to continue to meet water users' needs, while ensuring the long-term sustainability of the region's groundwater basin and protecting the Lower American River through cooperation with the SGA.

1.5.2 LINCOLN

The following subsection provides a summary of relevant Lincoln planning efforts.

1.5.2.1 Reclamation Master Plan (2004)

Recognizing the value of water and in conjunction with State Water Resources Control Board's policy encouraging the reclaimed water, Lincoln developed a Reclamation Master Plan to distribute reclaimed water to industry, landscaping and park facilities within Lincoln. The Reclamation Master Plan lays out steps for development of a reclaimed water distribution system incorporating the Reclamation Booster Pump Station constructed with the WWTRF and converted sewer force mains. It also defines the phases for project implementation based on available reclaimed water, varying reclamation demands of different users at different times, and costs.

1.5.2.2 UWMP (2005)

In compliance with DWR requirements, Lincoln updated its UWMP in 2005. The Lincoln UWMP outlines a public outreach strategy, water supplies, water quality, water demands, and supply and demand comparisons. The UWMP also describes Lincoln's recycled water usage and plans for expansion, water conservation measures, its progress toward conservation implementation, and a water shortage contingency plan.

1.5.2.3 General Plan Update (2006)

Lincoln's General Plan Update was published on October 3, 2006. The update serves several purposes, including:

- To provide a description of current conditions in the city that can be used to assess the current state of development in the city and highlight the trends impacting the city.
- To provide the public with information on Lincoln and to provide opportunities for meaningful participation in the planning and decision-making process.
- To identify planning issues, opportunities, and challenges that should be addressed in the General Plan update.
- To ensure that the General Plan is current, internally consistent, and consolidated for ease of use.
- To improve coordination between the city and local, State, and Federal agencies regarding land use and resource issues.
- To provide guidance for city departments in the planning and evaluation of future land and resource decisions.

1.5.3 PCWA

The following subsection provides a summary of relevant PCWA planning efforts.

1.5.3.1 Integrated Water Resources Plan (IWRP)

This document presents an assessment of the water supply and demand situation in western Placer County. The objectives of this IWRP are as follows:

- Provide a baseline for organized water resources planning within Placer County.
- Coordinates water resources planning for all of the communities in western Placer County.
- Develop water demand versus supply scenarios to create strategy for normal and dry year conditions.
- Provide water demand planning guidance to help PCWA plan for water treatment and conveyance facilities.

The IWRP considers several growth scenarios beyond those in Placer County's current General Plan. Groundwater and reclaimed water were considered as future water supplies, along with updated water demand factors and increased water conservation. The main conclusion of the IWRP is that there is adequate water supply within western Placer County to meet all the demands for each of the growth scenarios.

1.5.3.2 Western Placer County Groundwater Storage Study (2005)

The objective of PCWA's Western Placer County Groundwater Storage Study is to develop alternatives for increasing groundwater storage and conjunctive use in western Placer County. Increased conjunctive use could lead to greater reliability of water supply for agricultural water users and greater water management flexibility for PCWA. North American River Integrated Groundwater Surface Water Modeling data were used to evaluate sustainable yield in the study area. The study was conducted with grant support from DWR through Proposition 13 bond funds (the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act).

1.5.3.3 Water Systems Infrastructure Plan (2003)

PCWA prepared the Water Systems Infrastructure Plan (WSIP) which outlined a plan to ensure a reliable, long-term water supply for its customers, based on anticipated growth in PCWA's service area. The objectives of the WSIP are:

1. To provide a comprehensive, detailed evaluation of PCWA's water supplies.
2. To identify the possible alternatives of water diversion, treatment, and conveyance facilities to maximize the use of PCWA's water entitlement.

The WSIP includes:

- A review of water demands
- A description available water supplies and an outline of the related constraints and condition
- A frameword for reviewing the development of three logical increments of new surface water supplies and an evaluation of the reliability of PCWA's surface water distribution
- A description of PCWA's water distribution system and operations
- Identification of a timeline for constructing new capital facilities based on projected growth scenarios for each water supply alternative
- Development of a set of reliability criteria, test of the alternative infrasturcture
- Development of a Capital Improvement Project List and comparison of the needed water connection charge for each alternative Infrastructure Program Alternative
- An Environmental Sensitivity Study and a general sensitivity analysis for several identified near-term projects.

1.5.3.4 UWMP (2005)

In compliance with DWR requirements, PCWA updated its UWMP in 2005. According to the UWMP, PCWA provides retail water service to approximately 220,000 people in Placer County. Water service is provided for approximately 36,000 agricultural, municipal, and industrial connections, with both raw and treated water, in the cities of Auburn, Colfax, Loomis, and Rocklin, and to most of the small communities in unincorporated western Placer County along the I-80 corridor below Alta. PCWA also provides treated water to several mutual water companies within its Zone 1 service area that operate their own distribution systems. UWMP also describes the wholesale water deliveries of treated water to Lincoln and CAW and untreated water off of its canal system to several smaller water utilities that provide their own treatment and distribution service. PCWA also provides surface water out of the American River that is diverted and used by SJWD, Roseville, and Sacramento Suburban Water District. These wholesale customers are required to prepare their own UWMPs.

1.5.4 CAW

The following subsection provides a summary of relevant CAW planning efforts.

1.5.4.1 West Placer Water System Comprehensive Planning Study (2006)

The West Placer Water System is a new system and is expected to grow. CAW developed the Comprehensive Planning Study (CPS) to provide a review and analysis of the supply, production, and distribution facilities for the West Placer Water System. The primary goal of the CPS is to identify and prioritize capital improvements that are necessary to ensure that the West Placer Water System can safely and reliably meet current and projected water demands, while continuing to provide safe, adequate, and reliable service through the planning period. The CPS addresses the following elements:

- Customer demand projections through the year 2020.
- Evaluation of the adequacy for existing and future source of supply.
- Production facility assessment including existing and proposed water quality, treatment, and safety standards.
- Analysis of the water system transmission, distribution, and storage needs through modeling.

As described in the CPS, the current population of CAW's West Placer Service Area is 3,041 (SACOG, 2006). Demographic estimates for the project growth scenario are based on land use. According to the Enhanced General Plan growth scenario, anticipated by 2020 build-out of the West Placer Services Area will have approximately 24,500 residential dwelling unites (DU) (16,721 residential customer connections.) . According to the CPS, this will equate to a 2020 demand of 15,748 acre-feet per year.

Current sources of supply for the West Placer Service Area rely on treated surface water supplies from PCWA. This supply is conveyed through Roseville's distribution system to CAW's connection point in West Placer. Groundwater is available for emergency use only through an interconnection with the CAW Antelope system via the Cook-Riolo inter-tie. The current Placer County franchise agreement with CAW restricts the use of groundwater.

The CPS provides an analysis of the production facilities and distribution system in the West Placer Service Area and outlines specific project recommendations. These recommendations include improvements to production, storage, and distribution facilities. Projects identified in the CPS have been divided into two groups: Priority A and Priority B. Priority A projects are expected to be incorporated into CAW's Strategic Capital Expenditure Plan (SCEP) as the budget allows. Priority A projects are needed to comply with current or anticipated future regulations, address significant safety concerns, or ensure that adequate water supplies are available to meet projected demands. Priority A projects include:

- Walerga Road Tank and Booster Station
- Additional PCWA Supply Connection at PFE Road
- Crowder Lane Control System Upgrades
- Disinfection Byproducts Study

Priority B projects address longer-term needs, that relate to future growth or improvements that enhance system reliability. This may include developer-funded transmission and distribution facilities.

1.5.4.2 UWMP (2005)

The Northern Division of CAW completed its UWMP in 2005 under the terms of AB 797 (1983). The Northern Division of CAW is the largest private water operation in Sacramento County and consists of ten districts serving 171,000 people in the operating service area including Antelope, Arden, Lincoln Oaks, Parkway, Suburban/Rosemont, Security Park (Sunrise), West Placer, Isleton, Walnut Grove, and Lakefield.

The West Placer Service Area within the Northern Division of the CAW is located within the WPCGMP region (see Figure 1-2). CAW has a franchise agreement to supply water to the West Placer Service Area as it develops in future years. The West Placer Service Area is the only portion of the Northern Division of CAW that relies exclusively on surface water, which is supplied from PCWA. Currently, CAW serves less than 1,000 customers in the West Placer service area, but is expected to grow to as many as 18,000-22,000 connections as the area approaches build-out. Some newly developing areas in the West Placer Service Area are provided with recycled water from Roseville's Dry Creek Wastewater Treatment Plant. This recycled water is used for irrigation of landscaping in parks, street medians, the Morgan Creek Golf Country Club, and open space areas. As part of UWMP implementation, CAW will continue to support the use of reclaimed water for irrigation and potentially other uses in the West Placer Service Area.

1.5.5 REGIONAL

The following subsection provides a summary of regional planning efforts.

1.5.5.1 Placer County General Plan (1992 and 1994)

The Placer County General Plan consists of two types of documents: the Countywide General Plan, and a set of more detailed community plans covering specific areas of the unincorporated County.

The Countywide General Plan provides an overall framework for development of the County and protection of its natural and cultural resources. The goals and policies contained in the Countywide General Plan are applicable throughout the County, except to the extent that County authority is preempted by cities within their corporate limits.

Adopted in the same manner as the Countywide General Plan, a community plan provides a more detailed focus on a specific geographic area within the unincorporated county. The goals and policies contained in a community plan supplement and elaborate upon, but do not supersede, the goals and policies of the Countywide General Plan.

The Countywide General Plan consists of two documents: the General Plan Background Report and the General Plan Policy Document. The Background Report inventories and analyzes existing conditions and trends in Placer County. It provides the formal supporting documentation for general plan policy, addressing 11 subject areas: land use, housing, population, economic conditions and fiscal considerations, transportation and circulation, public facilities, public services, recreational and cultural resources, natural resources, safety, and noise.

The General Plan Policy Document includes the goals, policies, standards, implementation programs, quantified objectives, the Land Use Diagram, and the Circulation Plan Diagram that constitute Placer County's formal policies for land use, development, and environmental quality.

The General Plan Policy Document is divided into three main parts. Part I describes the Countywide Land Use Diagram and allowable uses and standards for each of the designations appearing on the diagram. Part I then describes standards for land use buffer zones. Finally, Part I describes the Countywide Land Use Diagram, standards for the roadway classification system on the diagram, and standards for transit corridors.

Part II contains explicit statements of goals, policies, standards, implementation programs, and quantified objectives. Part II is divided into the following ten sections, which roughly correspond to the organization of issues addressed in the General Plan Background Report. These are as follows: Land Use, Housing (adopted separately June 22, 1992), Transportation and Circulation, Public Facilities and Services, Recreational and Cultural Resources, Natural Resources, Agricultural and Forestry Resources, Health and Safety, Noise, and Administration and Implementation.

Part III of the Policy Document consists of general standards for the consideration of future amendments to the General Plan.

Ultimately, the intent of the Placer County General Plan is to protect the County during future urban growth and to partially provide an understanding of the approval process necessary to protect/promote groundwater interests.

1.5.5.2 Water Forum Agreement and Successor Effort

Beginning in 1993, the Water Forum process brought together a diverse group of stakeholders comprised of business and agricultural leaders, citizens' groups, environmentalists, water managers, and local governments to evaluate available water resources and the future water needs of the Sacramento region, including communities from Sacramento, Placer and El Dorado counties. These stakeholders identified two coequal objectives to guide in the development of the Water Forum Agreement (WFA):

- Provide a reliable and safe water supply for the region's economic health and planned development through the year 2030.
- Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River.

The WFA also established a Water Forum Successor Effort (Successor Effort) to administer the implementation of the agreement. The Successor Effort:

- Ensures continuity between the Water Forum and the Successor Effort.
- Preserves existing technical expertise.
- Avoids the costs, confusion and delays inherent in transferring the Successor Effort to a different organization.
- Avoids creating another redundant government entity.

All parties which signed the Water Forum Agreement; including Roseville, PCWA, and CAW are Water Forum signatories and are full participants in the Successor Effort. In addition, there is a supplementary funding agreement which includes the City of Sacramento, the County of Sacramento and the other agencies (including agencies outside of Sacramento County) which, consistent with the funding principles, are paying to support the work of the Successor Effort. It is important to note that:

- All WFA signatories have equal standing in the Successor Effort whether they are a public agency, investor-owned utility, or citizen interest/advocacy organization.
- Though Water Forum Successor Effort staff will be employees or contractors of the City of Sacramento, the Successor Effort representatives will provide over-all policy direction for work by staff.

1.5.5.3 American River Basin Integrated Regional Water Management Plan (IRWMP)

Regional Water Authority (RWA), Freeport Regional Water Authority (FRWA), and Sacramento County Water Agency (SCWA), along with the various members and stakeholders, have developed the American River Basin (ARB) Integrated Regional Water Management Plan (IRWMP). The ARB region encompasses all of Sacramento County and most of Placer and El Dorado counties, except the areas in the Tahoe Basin, which are part of a separate planning area. An IRWMP is a comprehensive planning document prepared on a regional scale that identifies priority water resources projects and programs with multiple benefits. An IRWMP relies upon specific and focused local and sub-regional planning efforts for its foundation, and investigates a broad spectrum of water resource issues including water supply, flood management, water quality, environmental restoration, environmental justice, stakeholder involvement, and far-reaching community and statewide interests. A key difference in IRWMPs (as compared to other planning documents) is that IRWMPs integrate multiple water management strategies to solve multiple priority challenges.

The ARB IRWMP was adopted in May 2006. As projects/programs outlined in the IRWMP are implemented, the plan itself will be reviewed periodically to address changes, identify issues of concern, and provide for additional study and analysis. New projects/programs will continue to be identified and incorporated. The participants designed the IRWMP as a living document that can be readily updated as the needs of the region change over time.

PCWA, Roseville, Lincoln, and CAW are involved in the ARB IRWMP through their participation in RWA.

1.5.5.4 Other Ongoing Groundwater Management Related Activities within the WPCGMP Area

In addition to the on-going programs by plan participants, there are several other on-going groundwater-related activities within the WPCGMP area. Coordination between these efforts and plan participants will be discussed in more detail later in this WPCGMP. The activities closely related to the plan participant's groundwater management efforts include, but are not limited to, the following:

- Monitoring of groundwater levels and quality by the California Department of Water Resources (DWR).
- Monitoring of groundwater quality by the U.S. Geological Survey (USGS) as part of its National Groundwater Ambient Monitoring Assessment (GAMA) Program.
- Monitoring of site investigations and remediation efforts at known leaking underground storage tanks (LUSTs) coordinated by the CVRWQCB.
- Soil contamination investigation and remediation activities at miscellaneous sites in the WPCGMP area, including the Union Pacific Railroad Yard in Roseville, California and the Alpha Explosives Facility just north of Lincoln.

1.6 AUTHORITY TO PREPARE AND IMPLEMENT A WPCGMP

The authority of plan participants to manage this portion of the Sub-basin is provided through a memorandum of understanding (MOU). Council members and/or board of directors for Roseville, Lincoln, PCWA, and CAW elected to prepare this WPCGMP as one of the tools necessary to effectively manage the basin. These plan participants are preparing this WPCGMP consistent with the provisions of CWC § 10750 et seq. as amended January 1, 2003. This document does not supersede the specific objectives and actions included in Lincoln's 2003 WPCGMP, or otherwise infringe on the autonomy or authority of Roseville, Lincoln, PCWA or CAW, unless otherwise agreed upon as described in Section 4 of this document.

1.7 WPCGMP COMPONENTS

The WPCGMP includes both required and voluntary components.

Table 1-3 lists these components and indicates the section(s) in which each component is addressed.

Table 1-3. Location of WPCGMP Components

Description	Section(s)
A. CWC § 10750 et seq., Required Components (1)	
1. Documentation of public involvement statement.	3.5 & App. A
2. Basin Management Objectives (BMOs).	3.3
3. Monitoring and management of groundwater elevations, groundwater quality, inelastic land surface subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality or are caused by pumping.	3.6
4. Plan to involve other agencies located within groundwater basin.	3.5
5. Adoption of monitoring protocols by basin stakeholders.	3.6
6. Map of groundwater basin showing area of agency subject to GMP, other local agency boundaries, and groundwater basin boundary as defined in DWR Bulletin 118.	Fig. 1-3
7. For agencies not overlying groundwater basins, prepare GMP using appropriate geologic and hydrogeologic principles.	N/A
B. DWR's Recommended Components (2)	
1. Manage with guidance of advisory committee.	3.5.3
2. Describe area to be managed under GMP.	1 & 2
3. Create link between BMOs and goals and actions of GMP.	Table 3-1
4. Describe GMP monitoring program.	3.6
5. Describe integrated water management planning efforts.	1.5 & 3.9
6. Report on implementation of GMP.	4.1
7. Evaluate GMP periodically.	4.2
C. CWC § 10750 *et seq.*, Voluntary Components (3)	
1. Control of saline water intrusion.	3.7.6
2. Identification and management of wellhead protection areas and recharge areas.	3.7.3 & 3.7.4
3. Regulation of the migration of contaminated groundwater.	3.7.5
4. Administration of well abandonment and well destruction program.	3.7.2
5. Mitigation of conditions of overdraft.	3.8
6. Replenishment of groundwater extracted by water producers.	3.3
7. Monitoring of groundwater levels and storage.	3.6
8. Facilitating conjunctive use operations.	3.8.1
9. Identification of well construction policies.	3.7.1
10. Construction and operation by local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.	2.3
11. Development of relationships with state and federal regulatory agencies.	3.5.4
12. Review of land use plans and coordination with land use planning agencies to assess activities that create reasonable risk of groundwater contamination.	3.9

[A] CWC § 10750 *et seq.* (seven required components). Recent amendments to the CWC § 10750 *et seq.* require GMPs to include several components to be eligible for the award of funds administered by DWR for the construction of groundwater projects or groundwater quality projects. These amendments to the CWC were included in Senate Bill 1938, effective January 1, 2003.

[B] DWR Bulletin 118 (2003) components (seven recommended components).

[C] CWC § 10750 *et seq.* (12 voluntary components). CWC § 10750 *et seq.* includes 12 specific technical issues that could be addressed in GMPs to manage the basin optimally and protect against adverse conditions.

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SECTION 2

Water Resources Settings

SECTION 2

Water Resources Setting

This section describes the current understanding of surface and subsurface features of the WPCGMP area, which is located in the North American River Groundwater Sub-Basin (Sub-Basin) underlying western Placer County. Locations and classification of the different types of groundwater users within the Sub-Basin are shown in **Figure 2-1.** Within the WPCGMP boundaries, public retail water purveyors currently rely on a combination of groundwater and surface water. Groundwater and surface water supplies available for use within the Sub-Basin are briefly summarized below.

Roseville currently utilizes surface and recycled water. Surface water is treated at Roseville's Water Treatment Plan (WTP). However, Roseville plans to use groundwater in the future as a backup water supply source to meet daily and peak seasonal demands.

Lincoln primarily uses treated surface water delivered by PCWA, and relies on groundwater for emergency outages and as a backup water supply source during daily and peak demand periods. Lincoln also provides recycled water from its wastewater treatment recycling facility (WWTRF) for nearby agricultural uses, and is working on expanding the use of recycled water to include non-potable commercial, industrial, and public landscaping needs.

PCWA provides treated surface water for urban users and raw water for agricultural and irrigation and rural users to it's five service zones. PCWA also provides limited groundwater supplies to areas isolated from its surface water delivery system and as a backup supply to the Sunset Industrial Park.

CAW provides treated surface water, purchased from PCWA, for CAW's West Placer Service Area which includes the Dry Creek/West (Placer Vineyards) region, Dry Creek/East region, and a portion of the Curry Creek region. CAW currently does not use groundwater within the West Placer Service Area.

2.1 GROUNDWATER CONDITIONS

This subsection provides a description of general groundwater conditions including the groundwater basin, the geology/hydrogeology, groundwater elevation, and groundwater quality within the WPCGMP area.

2.1.1 Groundwater Basin

This subsection provides a description of the underlying groundwater Sub-basin. The Sub-Basin is defined by DWR as the area bounded on the west by the Feather and Sacramento Rivers, on the north by the Bear River, on the south by the American River, and on the east by the Sierra Nevada Range (DWR, 2003). The Sub-basin is located within the Sacramento Valley Groundwater Basin. DWR Bulletin 118 (2003) provides additional information about the Sub-Basin on the agency's Web site[1] including:

- Surface Area: 548 square miles.
- The eastern Sub-basin boundary is a north-south line extending from the Bear River south to Folsom Reservoir. This represents the approximate edge of the alluvial basin where little or no groundwater flows into or out of the groundwater basin from the Sierra Nevada.

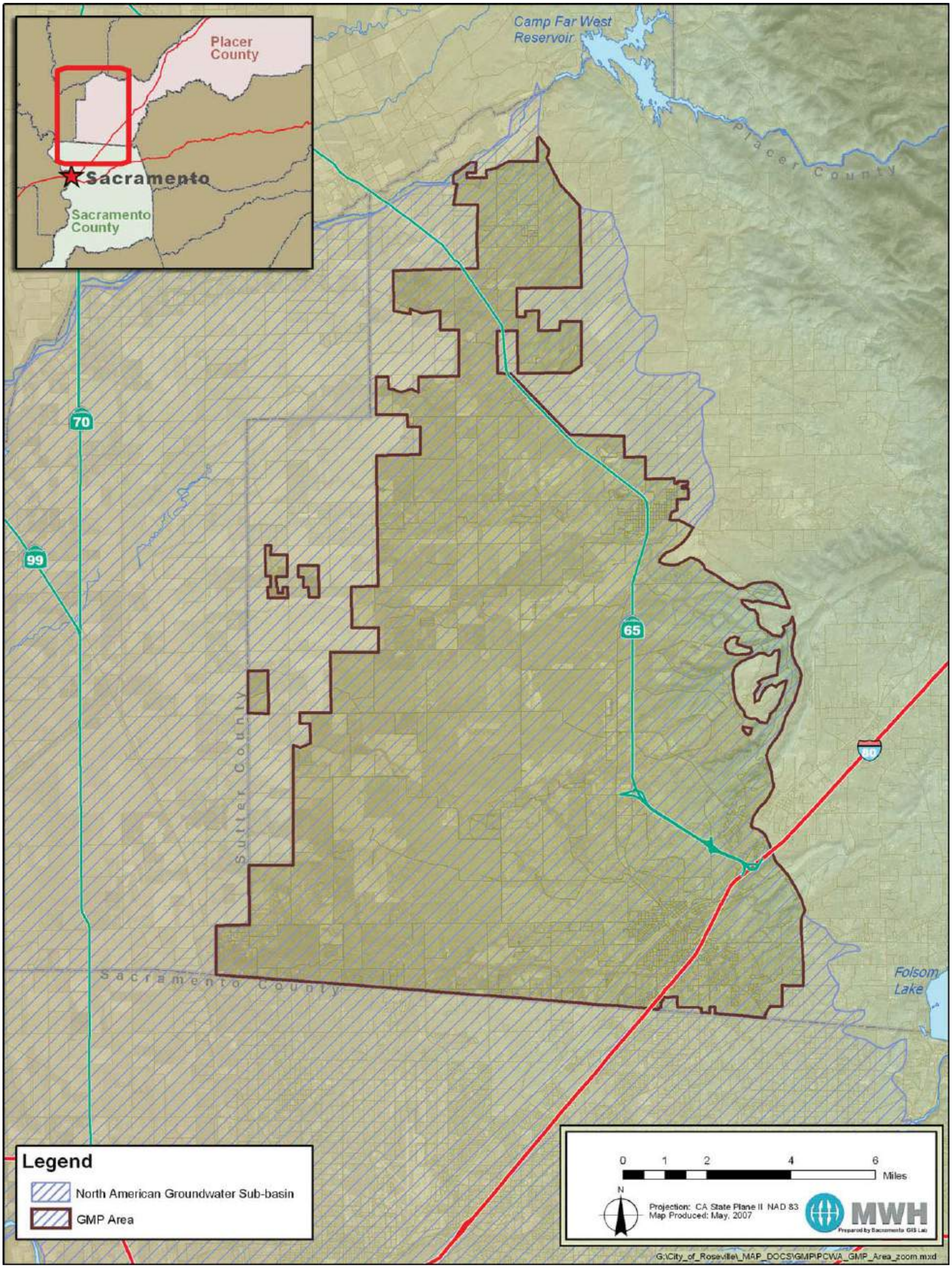


Figure 2-1 – North American Groundwater Subbasin and WPCGMP Area

- The western portion of the Sub-basin consists of nearly flat flood basin deposits from the Bear, Feather, Sacramento and American Rivers, and several small east side tributaries

2.1.2 Geology/Hydrogeology

This subsection provides a regional description of the geologic and hydrogeologic conditions of the underlying groundwater Sub-basin. The California Geological Survey (CGS) and DWR identifies and describes the surface geology and various hydrogeologic formations that constitute the water-bearing deposits underlying the Sub-Basin, respectively.

2.1.3 Hydrostratigraphy

The CGS mapped the surface geology of western Placer County as shown on **Figure 2-2.** Recent alluvial deposits comprise most of the western study area; chiefly clay and silt materials occur adjacent to the Sacramento and Feather Rivers (CGS, 1987 and 1992). These deposits are relatively impermeable. Typically, basin deposits are more coarse grained near to the foothills and therefore are more permeable. Modified from DWR Bulletin 118-3, the stratigraphic profile shown in **Figure 2-3** provides a conceptual representation of the basin's geologic formations and illustrates that the water bearing formations form a wedge that generally thickens from east to west to a maximum thickness of about 2,000 feet under the Sacramento and Feather Rivers (DWR, 1980 and 2003).

Per DWR Bulletin 118-3, the upper unconfined aquifer system consists of the Riverbank (formerly known as Victor) and Turlock Lake/Laguna (formerly known as Fair Oaks-Laguna) formations; the lower semi-confined aquifer system consists primarily of the Mehrten formation. These two systems constitute the major water producing aquifers in the region. They are composed of lenses of sand, silt, and clay, inter-bedded with coarse-grained stream channel deposits that store water.

The degree of confinement typically increases with depth below the ground surface. However, due to the heterogeneous nature of the alluvial depositional system, semi-confined conditions can be encountered at shallow depths in the aquifer. At approximately 1,000 to 1,500 feet depth, lies the base of fresh water. Below this boundary lies water originating from marine sediments where total dissolved solids levels (salinity) are too high to be used as a reliable municipal water source. There is no regionally confined aquifer system such as that created in the San Joaquin Valley by the Corcoran Clay layer due to the lack of extensive fine grained layers in the subsurface of the Study Area.

Lincoln Hydrogeology - Seismic and Downhole Geophysical Survey Understanding

Lincoln, as a result of several extensive investigations initiated in 1997, using seismic surveys and downhole geophysical tools, has gained a substantial understanding of the portion of the basin underlying Lincoln's SOI (Saracino, Kirby, and Snow. 2003). As an example of information gained, the following is a summary of survey results for five monitoring wells drilled in the winter of 2004.

1. Most of the flow capacity (predicted production) is estimated to occur in relatively few discrete aquifer zones that make up a small percentage of the total depth section intersected by each well.
2. The relative flow profile indicates the existence of thin zones that are significantly more productive than the remainder of the depth section. These thin zones have a disproportionately large contribution to the overall well flow capacity – representing depth-specific, highly transmissive "freeways" for groundwater to flow. The large variability of the estimated discrete depth flow capacity attests to the heterogeneous nature of the geologic material in this area – mostly alluvial sediments.
3. An example of a monitoring well in the most productive aquifer zone is across the interval 278 to 353 ft below ground surface (bgs), which is not in Mehrten Formation – instead it is in a "clean," quartz-rich sand/gravel aquifer section that appears to be alluvial sediments pre-dating the deposition of the Mehrten Formation. The log derived estimated transmissivity for this zone is on the order of 100,000 gallons per day per foot (gpd/ft).
4. The primary aquifer zones intersected in the four wells appear to be fairly well confined, based on the presence of low permeability zones that directly overlie and underlie the aquifer zones.
5. The estimate of formation ground water salinity indicates no aquifer zones have salinity greater than 500 ppm, mostly less than 300 ppm, although some low permeability, non-aquifer zones appear to have higher ground water salinity.

2.1.4 Recharge and Extraction of Groundwater

Evaluating changes in aquifer conditions requires an understanding of the dynamic processes and interactions that are taking place as extractions and recharge of the aquifer occur. Conceptual models of the aquifer that describe induced recharge, aquifer storage, and

[1] At: http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/basins/5-21.64_North_American.pdf.

differences between localized and regional effects on the aquifer are discussed below. These conceptual models are meant to clarify concepts; not all aspects of groundwater hydraulics are described. These models only apply to the Sub-Basin and adjoining sub-basins within Sacramento and western Placer Counties.

Recharge. Groundwater in the Sub-Basin moves from sources of recharge to areas of discharge. Recharge to the Sub-basin system occurs along active river and stream channels where extensive sand and gravel deposits exist, particularly along the Feather, Bear, American, and Sacramento River channels. Additional recharge occurs along the eastern boundary of the Sub-Basin within western Placer County at the transition point from the consolidated rocks of the Sierra Nevada to the alluvial deposited basin sediments (where the semi-confined Mehrten formation is exposed at the ground surface). This typically occurs through fractured granitic and metavolcanic rock that makes up the Sierra Nevada foothills. Other sources of recharge within the area include deep percolation associated with applied irrigation water and precipitation, as well as from smaller streams that bi-sect the region (i.e. Auburn Ravine and Coon Creek).

Changes in the groundwater surface elevation (or potentiometric surface) result from changes in groundwater recharge, discharge, or extraction. In some instances, this change in groundwater elevation can induce natural recharge at locations where rivers or streams and the aquifer are hydraulically connected. To the extent that a hydraulic connection exists, as groundwater conditions change, the slope or gradient of the groundwater surface may change as well. A steeper gradient away from the stream would induce higher recharge from surface water into the aquifer.

The rate of recharge from streams that are hydraulically disconnected from the groundwater surface is indifferent to changes in groundwater elevations or gradient. This is typically true with smaller streams where the groundwater surface is located far below the streambed. In such cases, surface water percolates

Roseville Hydrogeology - Aquifer Storage and Recovery (ASR) Program Exploratory Borehole, Monitoring Well, and Production Well Finding

From 2002-2006, Roseville installed 4 production wells and 4 monitoring wells in the northwest portion of the city limits as part of its Aquifer Storage and Recovery (ASR) program. To support the ASR program, Roseville initiated the collection of a comprehensive set of hydrogeologic data at these wells; including lithologic, geophysics, well pump tests, and groundwater elevation and quality. This data was collected and/or analyzed by multiple ASR program partners including; the City of Roseville, the U.S. Geological Survey, Lawrence Livermore National Laboratory, Department of Water Resources, Schlumberger Water Services, and MWH. Much of this data has been fully documented in well construction and/or ASR testing reports. A general summary of some of these findings is provided in the following paragraphs.

Borehole drilling, lithologic characterization and geophysical logging was conducted to depths of approximately 500-700 feet below ground surface (bgs), depending on the well location. Based on this data, the top of the targeted aquifer zone (Mehrten Formation) was found at depths ranging from approximately 300 to 525 feet bgs with a thickness ranging from approximately 100-200 feet. At each location, the Mehrten Formation was identified by the presence of dark colored, volcanic deposits commonly referred to as "black sands" (DWR, 1974). However, soil cuttings collected from the Mehrten Formation at each well show that grain size varies significantly from one location to another. At two locations, the largest grain sizes were course sands, while at two other locations large gravels and cobbles were encountered. In all cases, however, layers of sands and gravels within the Mehrten Formation were interbedded with layers of silts and clays with varying thicknesses. Lastly, the presence of thick clay layers above and below the Mehrten Formation in nearly all wells suggests that the Mehrten Formation is fairly well-confined.

The results of production well pumping tests revealed very high production rates of 1,800 to 3,500 gallons per minute (gpm), with specific capacities ranging from 20-75 gallons per foot (gal/ft). Groundwater flow profiling tests performed at several of the wells suggests that the majority of groundwater pumped at each well is produced from a few relatively thin (5-10 feet thick), highly productive zones within the Mehrten Formation.

Overall, water quality within the Mehrten Formation was found to be excellent, with all constituents meeting maximum contaminant levels (MCLs) for drinking water. The one exception was at a monitoring well located towards the western boundary of Roseville where iron, manganese and TDS were found at levels exceeding the MCL. Here, the Mehrten Formation is located approximately 550-700 ft bgs. At this location, the production well was screened to draw groundwater above the Mehrten Formation (at the bottom of the Laguna Formation) where better water quality was observed.

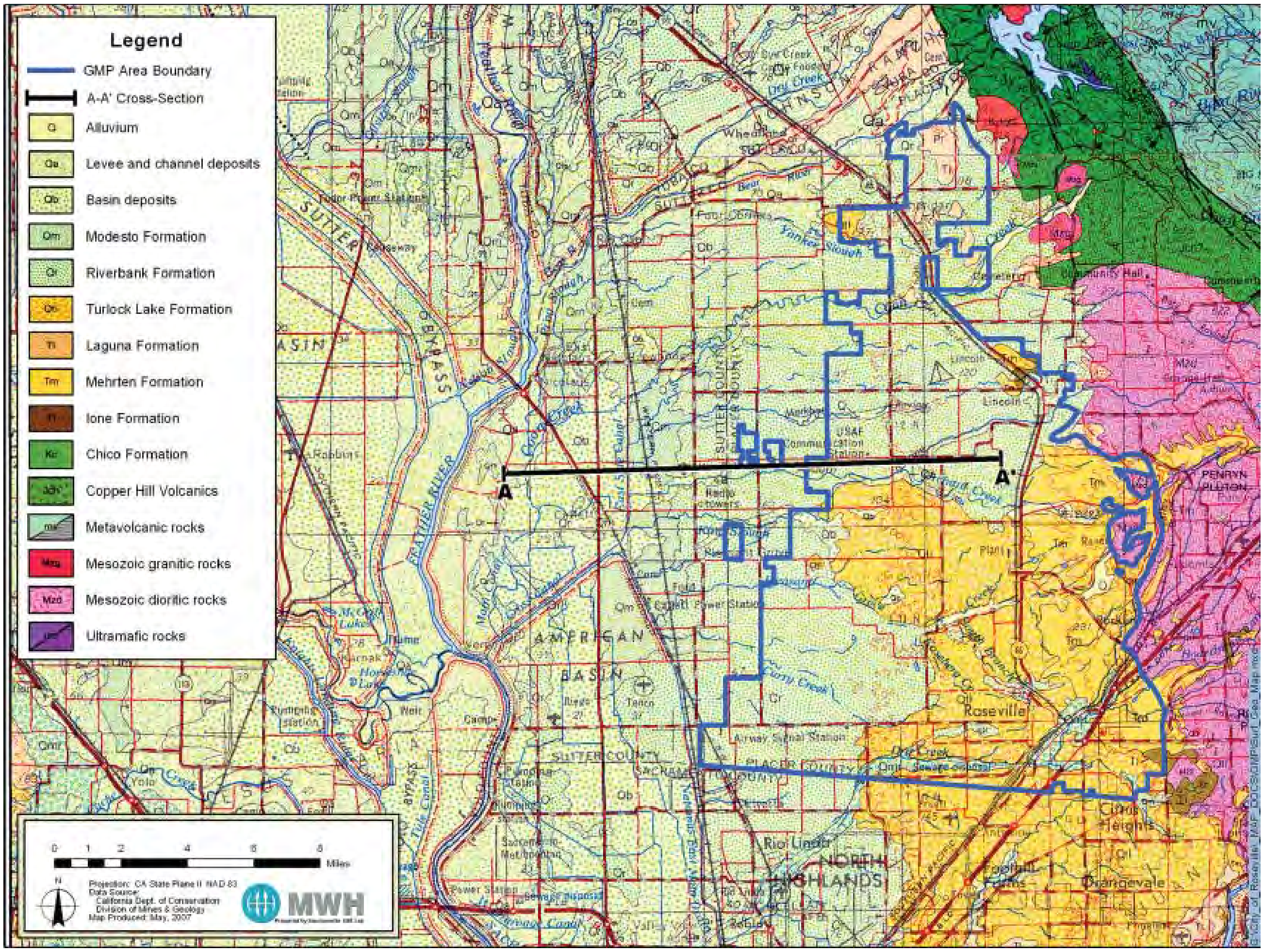


Figure 2-2 – Geology of Region

through the unsaturated zone to the groundwater and its rate is a function of the aquifer materials underlying the streambed and the water level in the surface stream. The rate of infiltration under these conditions is not controlled by the change in elevation of the underlying groundwater. In the case of larger rivers, the American and Sacramento Rivers are considered to be hydraulically connected. This WPCGMP recognizes the importance of maintaining hydraulic connections with the larger river sources for sustainability of the groundwater supply and the environmental benefits of keeping water flowing in the riverbed.

Localized Impacts of Groundwater Extraction. When extractions occur from a single well, a localized cone of depression is formed around the well. The shape and depth of the cone of depression depends on several factors including, but not limited to: (1) the rate of extraction; (2) the presence of nearby sources of recharge and/or extraction;, (3) aquifer transmissivity; (4) natural impervious barriers or earthquake faults; and (5) the "confined" or "unconfined" state of the aquifer, (i.e., storage coefficient). Over time, extraction from an unconfined aquifer can de-water the aquifer around the well. However, when extraction ceases, the water level within the aquifer typically rebounds to its pre-extraction condition.

A confined or semi-confined aquifer behaves differently since the water is under pressure from a recharge source. Instead of de-watering the aquifer, a change in confining pressure occurs as a result of extractions; the aquifer remains saturated. In a confined aquifer, the pressure or piezometric surface elevation decline is more dramatic than in an unconfined aquifer; however, the recovery to pre-extraction conditions is typically much faster.

Regional Impacts of Groundwater Extraction. Large regional cones of depression can form in areas where multiple groundwater extraction wells are in operation. The location and shape of a regional cone of depression is influenced by the same factors as a single well. A regional cone of depression within western Placer County and a larger cone of depression within Sacramento County

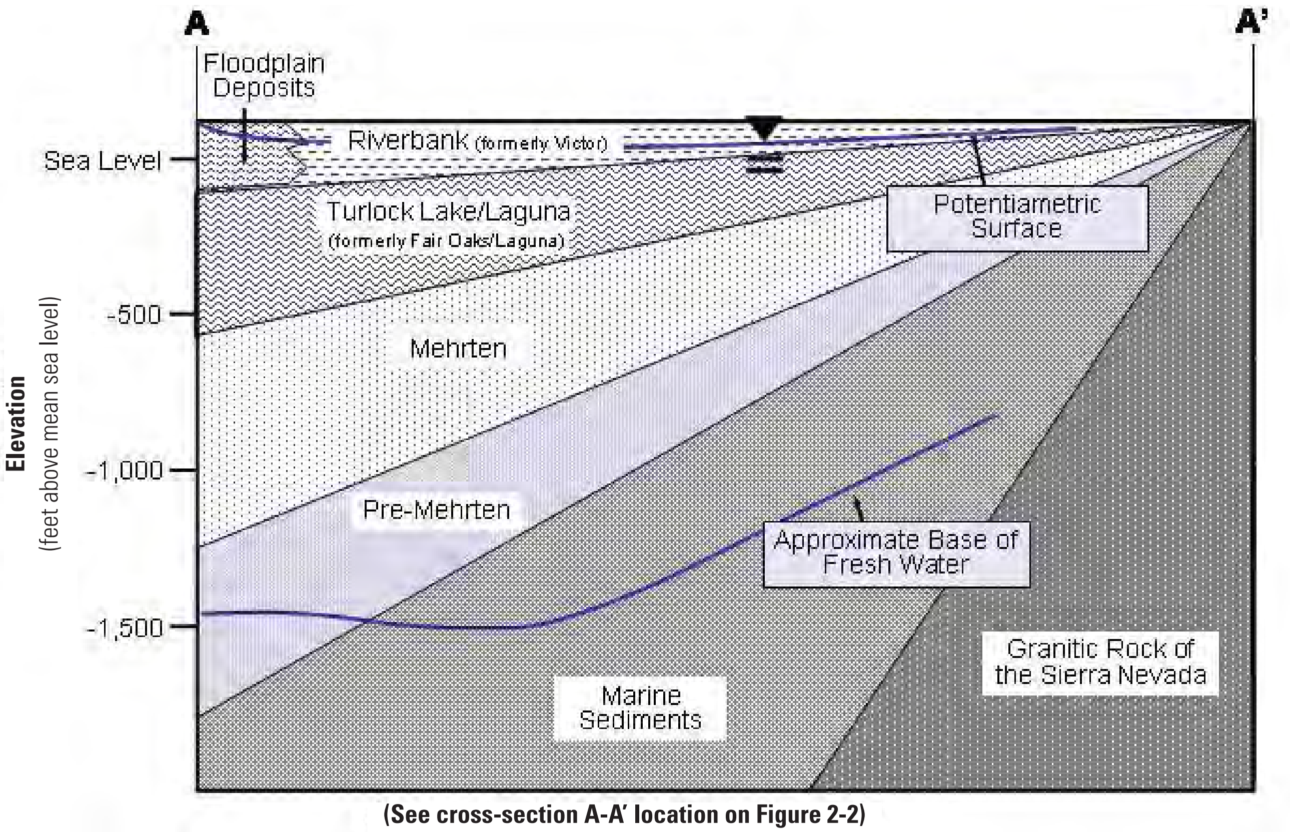


Figure 2-3 – Stratigraphic Profile

is shown on **Figure 2-4**. This map was prepared using water elevation data from DWR's water data library available on-line at: http://wdl.water.ca.gov. The map contours were determined using the Inverse Distance to a Power method.

The Inverse Distance to a Power gridding method was used to contour the water elevation data posted on **Figure 2-4.** This contouring method is a weighted average interpolator and is best used when there is a uniform distribution of data. With Inverse Distance to a Power, data are weighted during interpolation such that the influence of one point relative to another declines with distance from the grid node. Normally, Inverse Distance to a Power behaves as an exact interpolator. When calculating a grid node, the weights assigned to the data points are fractions, and the sum of all the weights is equal to 1.0.

Fluctuations in regional cones of depression are measured over years and result from: changes in recharge, and changes in extractions from increasing and decreasing water demands. For example, a sequence of successive dry years can decrease the amount of natural recharge to the aquifer. If this is coupled with a coinciding increase in groundwater extraction, an imbalance is created between natural recharge and extractions. Consequently, groundwater elevations would decrease in response to this imbalance. Over time, the shape and location of the aquifer's regional cone of depression fluctuates.

Intensive use of the groundwater basin has resulted in a general lowering of groundwater elevations near the center of the Sub-basin away from the sources of recharge as shown in **Figure 2-4.**

Spring 2006 Groundwater Elevation Contours. Provided within this subsection is an evaluation of a groundwater elevation contour map for the entire Sub-Basin during spring[2] of 2006 based on DWR information. Spring groundwater elevations are generally about 10 to 20 feet higher than during the fall season. This is because during the spring, the basin has been replenished by winter rainfall and less intensive agricultural activities in winter while prolonged dry season and extensive pumping reduces groundwater storage and lowers groundwater elevations leading to a seasonal cone of depression in the fall months, which is later recovered to some extent in the following spring. For example, during spring 2006 groundwater elevations ranged from 80 feet mean sea level (msl) along the foothills to -30 feet msl in the central portion of Sacramento County and -20 feet msl in the southern portion of Placer-Sutter County.

A regional cone of depression persists in the northern Sacramento and southern Placer-Sutter County area, respectively. Generally groundwater elevations are significantly higher on the eastern edge of the Sub-basin near the Sierra Nevada foothills, and lower on the western edge of the groundwater Sub-basin mimicking surface elevations.

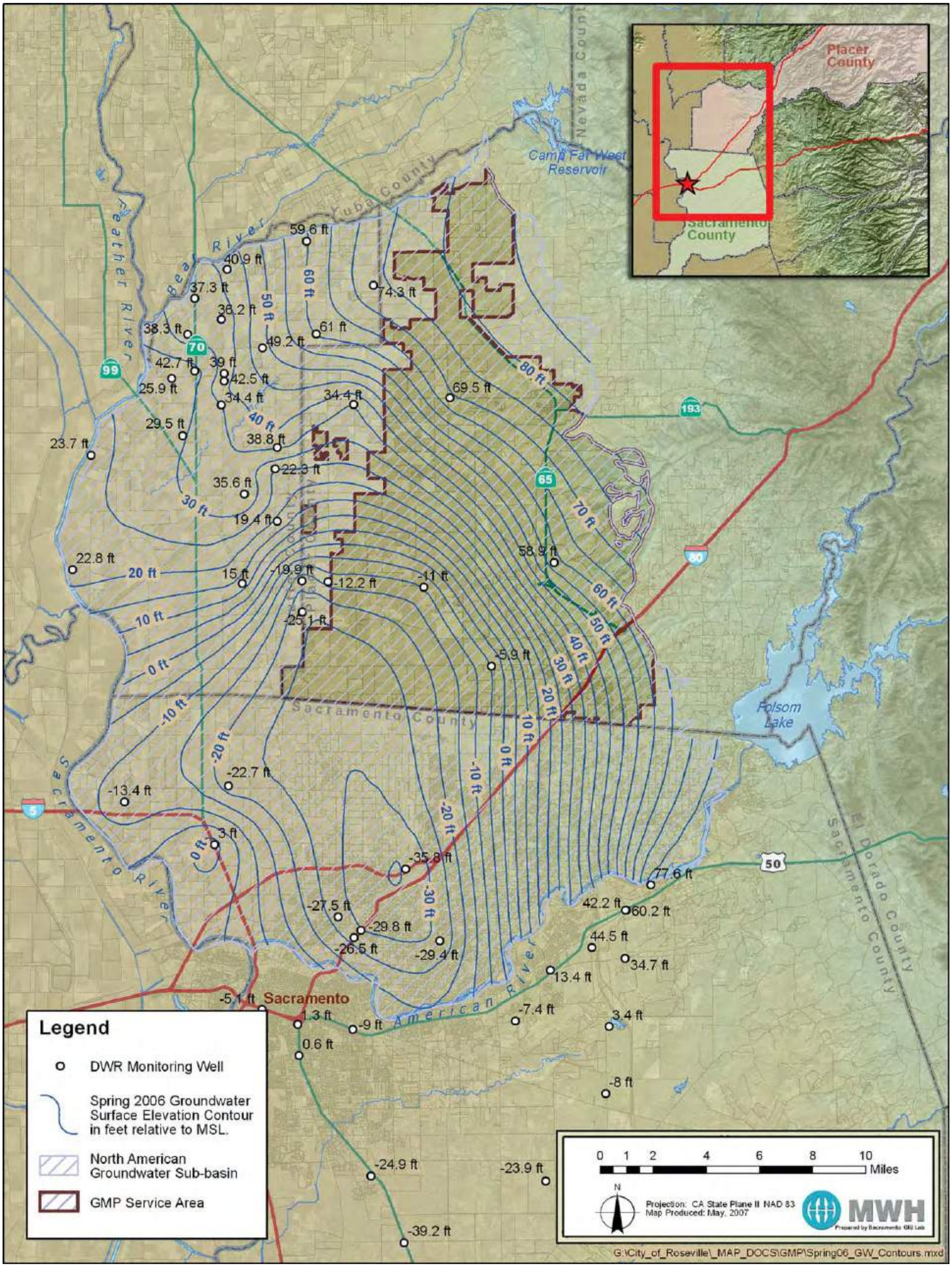


Figure 2-4 – Groundwater Elevation Map

2.1.5 Groundwater Elevation Trends

Groundwater elevation hydrographs for 13 representative wells in the Sub-basin are shown on **Figure 2-5.** Wells closest to Sacramento County experienced declines in groundwater elevations from the late 1940s (earliest measurements) to approximately 1980. Such declines can be primarily attributed to meeting urban and agricultural water demands from groundwater pumping. After 1980, wells 10N05E08L002 and 10N05E12D001 appear to have stabilized. Well 10N06E10C001, located at the edge of Roseville, continued to experience declining groundwater elevation until 1997 when the elevation drop was approximately 65 feet from its 1947 level. All three of these wells now exhibit stabilized groundwater elevations implying that the basin is in a state of equilibrium.

Specifically for Lincoln, DWR documentation was reviewed during preparation of their 2003 GMP to determine if DWR has identified the portion of the groundwater basin underlying the City to be in a state of overdraft, or if any DWR documentation has projected overdraft within the Lincoln Sphere of Influence (SOI). The following DWR documents were reviewed for this analysis: Bulletin 118-80 (DWR, 1980), Bulletin 118-3 (DWR, 1974), Bulletin 118-6 (DWR, 1978), and the draft basin description for the Bulletin 118 Update (DWR, 2002a). Additional historical groundwater elevation data collected by DWR was reviewed for wells in Lincoln's designated SOI.

Generally, the documents reviewed describe conditions of overdraft in southwestern Placer County and northern Sacramento County, as shown in **Figure 2-4**, located to the southwest of Lincoln. Groundwater elevations directly underlying Lincoln, however, were not described to be in a long-term state of decline. Therefore, the groundwater elevation data contained in those reports, as well as nearly 20 years of data at various sites around Lincoln, further support the conclusion of this WPCGMP that indicate groundwater elevations are not significantly declining within the vicinity of Lincoln.

For wells along the Placer-Sutter County border, the further the distance from Sacramento County line to the north, the higher the groundwater elevations, ranging from about -20 msl at well 11N05E18R001 to about 50 feet msl at well 13N04E23A002. These groundwater elevations varied with the year-to-year hydrologic conditions, but no obvious long-term trend over the most recent 10 years appears to be present.

For wells about one mile from the Bear River, or along the northern boundary of the WPCGMP area, groundwater elevations are relatively stable. The groundwater elevations increase in wells located further upstream toward the Sierra Nevada foothills, from about 30 feet msl for well 13N04E29A002 to nearly 75 feet msl for well 13N05E03J001.

For the remaining wells in **Figure 2-5,** for example in the northeastern quadrant of the WPCGMP area, groundwater elevations are relatively stable or have small persistent increases in groundwater elevations over the last 15 years of record. Their elevations range from 30 to 60 feet msl (wells 12N05E14R001, 13N05E24J001, and 13N05E22C003).

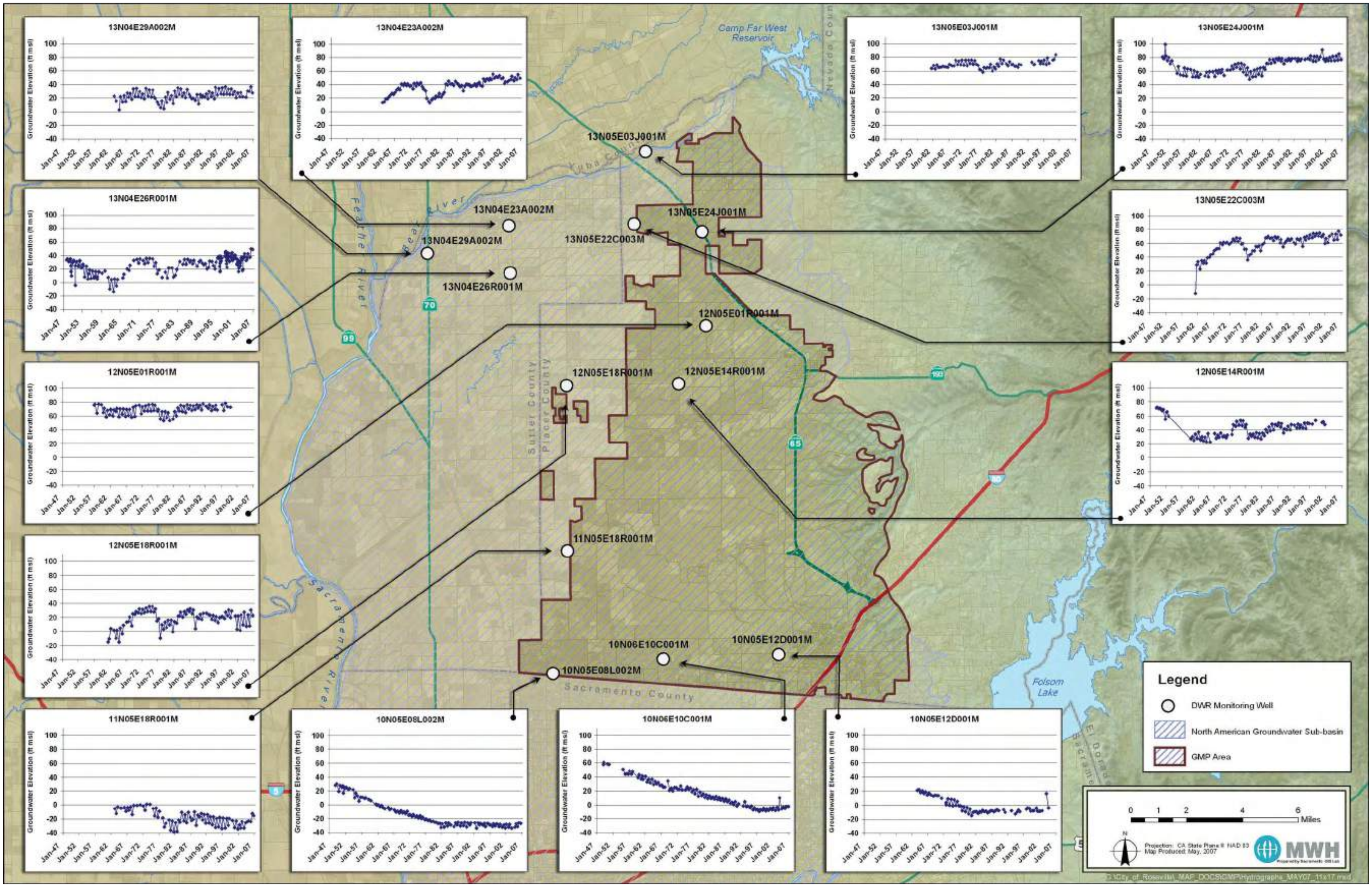
From 1995 to 2005, groundwater elevations were maintained and the declining elevation trend was dampened. Such stabilization was in part due to groundwater management activities stemming from the WFA restraining further increases in groundwater pumping and implementation by Sacramento Suburban Water District of an in-lieu recharge program by reducing groundwater pumping when excess surface water through the San Juan Water District treatment and conveyance system existed. The supply of surface water stems from the regional cooperation between PCWA and a group of northern Sacramento County water purveyors to permit the use of up to 29,500 AF/year of Middle Fork Project (MFP) surface water for interim use in the northern Sacramento County region.

2.1.6 Groundwater Quality

The groundwater quality in the upper aquifer system is regarded as superior to that of the lower aquifer system. The upper aquifer is preferred over the lower aquifer principally because the lower aquifer system (specifically the pre-Mehrten formation) contains higher concentrations of iron and manganese, and in some cases arsenic. Water from the upper aquifer generally does not require treatment (other than disinfection). The lower aquifer system also has higher concentrations of total dissolved solids (TDS, a measure of salinity) than the upper aquifer, although it typically meets standards as a potable water supply. In general, at depths of approximately 1,200 feet or greater (actual depth varies throughout the basin), the TDS concentration can exceed 2,000 milligrams per liter (mg/L). At such concentrations, the groundwater is considered non-potable without treatment.

[2] Spring data are based on field measuring from April through June.

Figure 2-5 – Groundwater Elevation Hydrographs



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Background Water Quality. The chemistry and quality of groundwater for the Sub-Basin has been described in detail in the DWR Feasibility Report, American Basin Conjunctive Use Project, June 1997. A comparison of groundwater quality data with applicable water quality standards and guidelines for drinking and irrigation indicate elevated levels of TDS, specific conductance, chloride, sodium, bicarbonate, boron, fluoride, nitrate, iron, manganese, and arsenic in some locations of the Sub-basin (DWR, 1997).

Total Dissolved Solids. The Secondary (aesthetic) Maximum Contaminant Level (MCL) concentration for TDS is 500 mg/L. A review of readily available data (described in the following paragraphs) indicate that TDS concentrations in groundwater are below the MCL throughout much of the region, therefore TDS concentrations should not limit the potable use of groundwater by the overlying agencies.

Regionally high TDS levels exist in the WPCGMP area along the Sacramento River extending from the Sacramento International Airport northward to Bear River. The highest levels of TDS can be found in an area extending just south of Nicholas to Verona, between Reclamation District 1001 and the Sutter Bypass. Some wells in this area have had TDS exceeding 1,000 mg/L (DWR, 1997). Specifically concentrations of TDS in excess of 7,000 mg/l have been reported in a DWR monitoring well located 2 miles east of Nicholas.

This DWR well (AB-1-deep), is screened to sample groundwater at depths of 950-970 feet bgs. This well was intentionally completed at this depth to observe the groundwater quality below the base of fresh water in this portion of the WPCGMP area. In addition, historic groundwater quality data collected from wells located throughout much of Placer and northern Sacramento counties show TDS levels ranging from 160-336 mg/L, with the average concentration being 228 mg/L (USGS, 2001a). These data generally represent groundwater quality at depths less than 600 feet bgs.

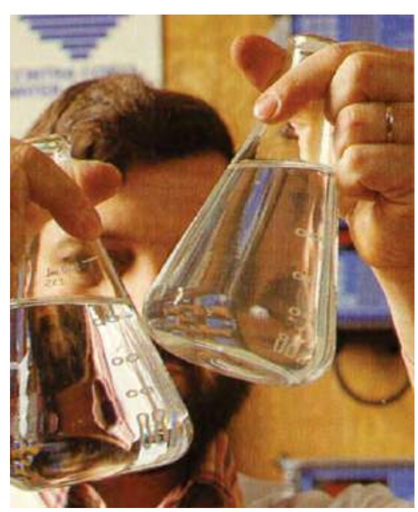
Locally TDS data has been collected by Roseville and Lincoln in their respective groundwater production wells. TDS concentrations in Lincoln production wells range between 230 and 330 mg/L (Lincoln, 2003). TDS concentrations in Roseville production wells range between 230 and 470 mg/L (Roseville, 2005).

Iron and Manganese. The Secondary MCLs for iron and manganese is 0.3 and 0.05 mg/L, respectively. A review of readily available data (described in the following paragraphs) indicates that iron and manganese concentrations in groundwater exceed the MCLs in parts of the region, possibly limiting the potable use of groundwater by the overlying agencies or, at least, requiring treatment of the groundwater prior to use.

Concentrations of iron in groundwater from several wells near the Sacramento International Airport exceed the Secondary MCL and elevated concentrations were also noted in DWR monitoring well AB-1-deep (DWR, 1997). Manganese has also been reported at elevated concentrations in the western portion of the WPCGMP area, within several wells located along the Sacramento River at reported concentrations exceeding 0.20 mg/L (DWR, 1997). Historic groundwater quality data in the region show iron concentrations ranging from 0.003-0.048 mg/L, with an average concentration of 0.012 mg/L, and manganese concentrations ranging from 0.0009 to 0.090 mg/L with an average concentration of 0.009 mg/L (USGS, 2001a). These data generally represent groundwater quality at depths less than 600 feet bgs.

Local iron and manganese groundwater quality data has been collected by Roseville and City of Lincoln in their respective groundwater production wells. Iron and manganese concentrations in City of Lincoln production wells range between non-detect and 1.8 mg/L and non-detect and 0.07 mg/L, respectively (Lincoln, 2003). Iron and manganese concentrations in Roseville production wells range between non-detect and 0.85 mg/L, and non-detect and 0.023 mg/L, respectively (Roseville, 2005).

Arsenic. The Primary MCL for arsenic is 0.010 mg/L, effective as of January 2006. A review of readily available data indicates that arsenic is present in groundwater throughout many areas of the region, and in some places exceeding the MCL. Overall, the extent of areas where arsenic exceeds the MCLs in groundwater is believed to be sporadic and isolated and, currently, arsenic concentrations in groundwater are not significantly affecting the use of groundwater as a potable water supply.



Arsenic concentrations were observed at low to moderate levels in wells in the southwestern portion of the WPCGMP area.

Arsenic concentrations in some wells in this area neared 0.050 mg/L. Historic groundwater quality data in the region show arsenic concentrations ranging from 0.001-0.018 mg/L, with an average concentration of 0.05 mg/L (USGS, 2001a). These data generally represent groundwater quality at depths less than 600 feet bgs.

Local arsenic groundwater quality data has been collected by Roseville and Lincoln in their respective groundwater production wells. Arsenic concentrations in Lincoln production wells range between non-detect and 4.8 mg/L (Lincoln, 2003). Arsenic concentrations in Roseville production wells range between non-detect and 0.0035 mg/L (Roseville, 2005).

Nitrate. The Primary MCL for nitrate is 45 mg/L. A review of readily available data indicate that concentrations of nitrate in groundwater is well below the MCL throughout the region, therefore nitrate should not limit the use of groundwater as a potable water supply for overlying agencies.

Historic groundwater quality data in the region show nitrate concentrations ranging from 0.06 – 16 mg/L, with an average concentration of 5.9 mg/L (USGS, 2001a). These data generally represent groundwater quality at depths less than 600 feet bgs.

Local nitrate groundwater quality data has been collected by Roseville and Lincoln in their respective groundwater production wells. Nitrate concentrations in Lincoln production wells range from 5 to 10 mg/L (Lincoln, 2005). Nitrate concentrations in Roseville production wells range from 0.8 to 21 mg/L (Roseville 2005).

Known "Principal" Plumes/Contaminated Sites. Principal groundwater plumes or contaminated sites are known to exist within the WPCGMP area as discussed below, and shown on Figure 2-6. There are approximately 350 leaking underground storage tank sites [Central Valley Regional Water Quality Control Board (CVRWQB), 2005] and 40 other spill (SL) sites (DTSC, 2005) within Placer County that may have resulted in soil and/or groundwater contamination, however most of those sites pose little or no threat to the WPCGMP area.

The summaries provided in this section are based on information from one or more of the following sources; the City of Lincoln Groundwater Management Plan [Saracino, Kirby and Snow (SKS), 2003], the Roseville Sanitary Landfill Semi-Annual Water Quality Monitoring Report (CH2M Hill, 2005), the California Department of Toxic Substances' Control (DTSC) Site Mitigation and Brownfield Reuse Program website (DTSC, 2005), the Leaking Underground Storage Tank Quarterly Report [Central Valley Regional Water Quality Control Board (CVRWQB), 2005] and the Region 9 Cleanup Sites in California website (USEPA, 2005).

Alpha Explosives

Alpha Explosives is a 23-acre site located approximately five (5) miles north-northwest of the Lincoln and about 1,500 feet north of Coon Creek (SKS, 2003). Nitrate and perchlorate concentrations exceed drinking water MCLs in local groundwater and are the primary constituents of concern (COC) at the site. In a 1999 report by Anderson Consulting Group, it was reported that a plume of nitrate impacted groundwater extended approximately 600 feet north and south and 1,300 feet west of this site. Since 2002, Alpha Explosives, with State Water Resources Control Board (SWRCB) oversight, has been operating a pilot-scale study to evaluate the potential for using bioremediation to treat the soil and groundwater.

Roseville Sanitary Landfill

The Roseville Sanitary Landfill encompasses 115 acres near Galleria Boulevard and Berry Street in Roseville. The groundwater underneath the landfill is impacted by a variety of organic and inorganic constituents. Of primary concern are TCE, tetrachloroethene (PCE), carbon tetrachloride, vinyl chloride and other VOCs. A corrective action program was implemented in 1994-1995 that included the construction of an engineered landfill cover and implementation of a groundwater monitoring program. Since the landfill was capped in December 1995, COC concentrations in the groundwater have generally decreased. Groundwater in the vicinity of the landfill flows west-northwest.

Union Pacific Railroad – Roseville Railyard

The 640-acre Union Pacific Railroad site is located near Roseville Road and Vernon Street in Roseville. At this site, the Diesel Shop Operable Unit is responsible for locomotive maintenance and repair, and related structures, and has been active for more than 80 years. COCs in the shallow groundwater at this site are diesel fuel and chlorinated solvents. The primary COCs are total petroleum hydrocarbons (TPH), with smaller amounts of VOCs, semi-volatile organic compounds (SVOC) and lead. Contamination is mostly limited to the upper aquifer, although small amounts of PCE have been detected in the lower aquifer zone (150-160 feet bgs). It is not know if this site is the source of the PCE in the lower aquifer.

The Remedial Action Plan (RAP) for portions of the site was approved in 2003 and includes groundwater monitoring for COCs and natural attenuation. A RAP for the North Area of the site was approved in 2001 and includes groundwater extraction. The extracted groundwater is treated with an air stripper and on-site industrial wastewater treatment plant.

Deluxe Cleaners

Deluxe Cleaners is a former dry cleaning facility located on Vernon Street in Roseville. A preliminary assessment conducted in 1991 resulted in a No Further Action declaration under CERCLA. How-

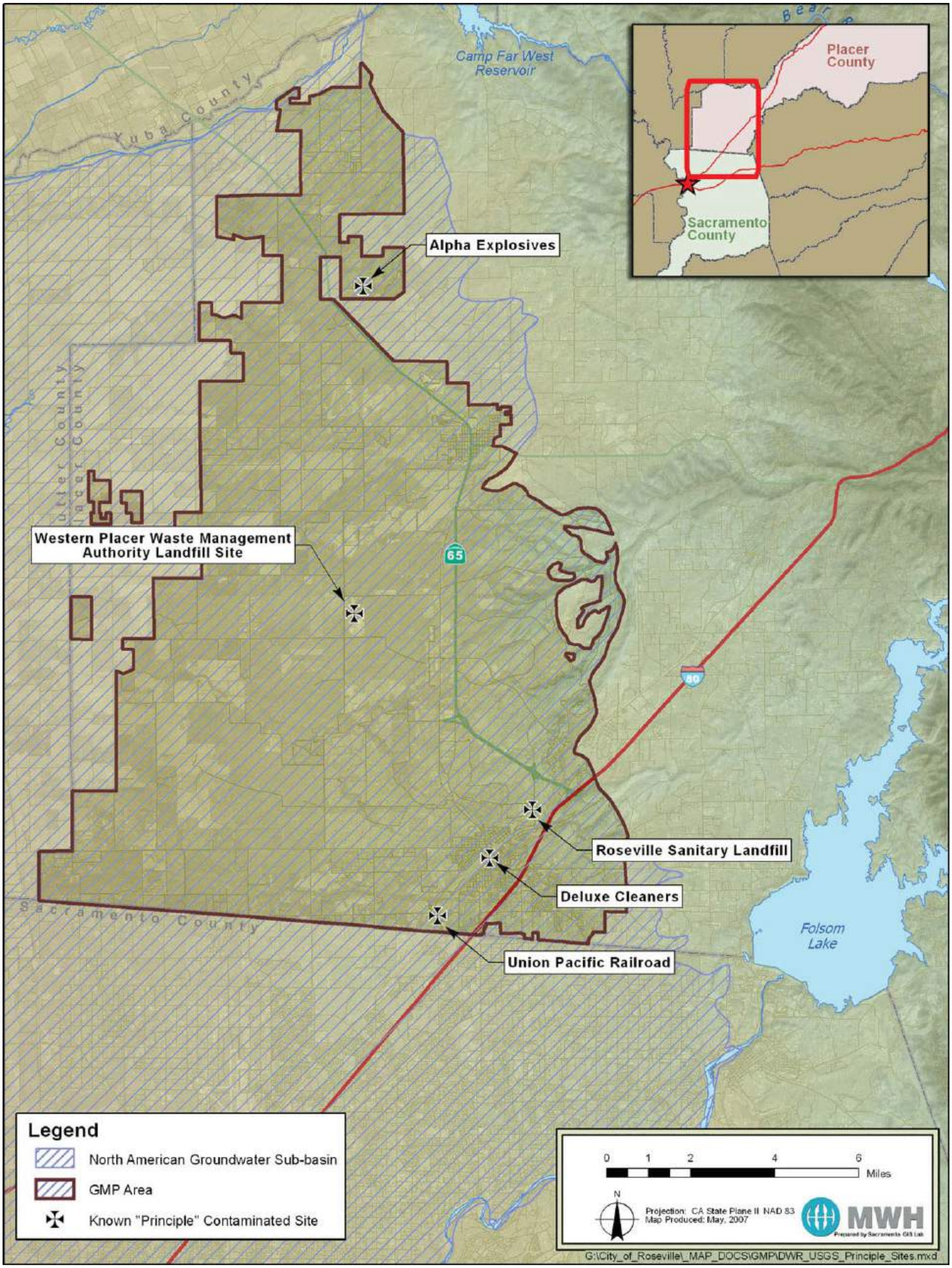


Figure 2-6 – Principle Contamination Sites ever, since then high levels of TCE and PCE have been detected in the soil and groundwater underneath the site. In addition, TCE, PCE, and chloroform were detected in an emergency municipal well approximately 0.25 miles away from the site. As of 2004, the CVRWQCB had resumed investigations at the site.

Western Placer Waste Management Authority Landfill Site (WPWMALS)

WPWMALS is an active landfill at the southeast corner of Athens and Fiddyment Roads within Placer County. The members of the WPWMA are City of Lincoln, City of Rocklin, City of Roseville, and County of Placer. A recent water quality analysis report indicates degradation of groundwater, first identified in 1995 with a corrective action plan approved by the RWQCB in 1997, continuing, and identifies constituents of concerns in the on-site monitoring wells.

Other Sites

There are approximately 350 leaking underground storage tank sites (CVRWQB, 2005) and 40 other spill (SL) sites (DTSC, 2005) within Placer County that may have resulted in soil and/or groundwater contamination, however most of those sites pose little or no threat to the WPCGMP area as they are small in scale and not considered "principal".

2.2 SURFACE WATER CONDITIONS

This section provides a summary description of surface water conditions of the major rivers and streams within the, or of importance, to the WPCGMP area.

2.2.1 American River

The American River drainage basin encompasses approximately 1,900 square miles. Folsom Reservoir is the principal reservoir in the basin with a storage capacity of 975,000 AF. Several smaller upstream reservoirs contribute another 820,000 AF of storage capacity. Nimbus Dam impounds Lake Natoma downstream of Folsom Dam and regulates releases from Folsom Reservoir to the lower American River. The entrance facilities to the Folsom South Canal are located along the south shore of Lake Natoma immediately upstream of Nimbus Dam. The mean annual flows in the lower American River is 3,300 cfs and the design capacity of the channel for flood flows is 115,000 cfs.

2.2.2 Sacramento River

The Sacramento River drainage basin upstream of the WPCGMP area encompasses approximately 23,500 square miles and produces an average annual runoff of about 17,000,000 AF as measured at the Freeport gauging station (below the confluence of the American River). Principal reservoirs controlling flows in the lower Sacramento River include Lake Shasta (4,522,100 AF), on the Sacramento river upstream of Redding, Trinity Lake (2,448,000 AF), which regulates deliveries made to the Sacramento from the Trinity River Basin, Lake Oroville (3,538,000 AF), and Folsom Reservoir (975,000 AF). Based on the 30-year record of data for the period 1968 through 1998, which spans a variety of water year types, individual monthly average flows have ranged from a low of 4,500

Confluence of Sacramento and American Rivers

cfs in October 1978 to a maximum of 87,000 cfs in January 1997. Overall the monthly flows of all 30 years range between 13,000 and 40,600 cfs, with the lowest flows occurring in October and peak flows in February. The 30-year average monthly flow during the wetter months of December through May is 32,200 cfs. During the typically drier months of June through November, the average monthly flow is 16,500 cfs.

2.2.3 Feather River

The Feather River drains approximately 3,700 square miles starting at its confluence with the Sacramento River near Yuba City and expanding east and northeast to the western slopes of the Sierra Nevada. Oroville Dam is the primary reservoir on the river with a storage capacity of approximately 3,500,000 AF; the second largest reservoir is Lake Almanor (Canyon Dam) with a storage capacity of 1,300,000 AF. The total storage in the watershed is approximately 5,200,000 AF. Water level data recorded from 1968-1998 on the Lower Feather River shows average monthly streamflows ranging from 2,400 cfs in October to 8,200 cfs in January. The maximum average monthly streamflow was 40,700 cfs, recorded in January 1997.

2.2.4 Bear River

The Bear River watershed encompasses approximately 292 square miles in Placer, Yuba and Sutter Counties. Camp Far West Reservoir is the principle reservoir on the river and has a storage capacity of approximately 104,000 AF, however two smaller impoundments (Lake Combie and Rollins Lake) exist in the upper watershed. Mean monthly flow rates, based on 76 years of data, range from approximately 1,200 cfs in February to 17 cfs in July. The highest mean monthly flow rate was 5,200 cfs in February 1986.

2.2.5 Dry Creek

The Dry Creek watershed encompasses approximately 101 square miles in Placer and Sacramento Counties. The watershed in highly developed and the creek is subject to highly variable flows affected by runoff events. Mean monthly flow rates based on 1999-2004 data show that stream flows range from 228 cfs in February to

13 cfs in July. During the dry season, much of Dry Creek's flow is treated effluent from the Roseville/Dry Creek Wastewater Treatment Plant.

2.2.6 Auburn Ravine

The Auburn Ravine watershed drains approximately 79 square miles, originating north of the City of Auburn and ending at the confluence with the East Side Canal. The surrounding land use is generally urbanized in the upper reaches of the stream and rural in the lower reaches of the stream. During winter, the stream flows mostly originate as precipitation runoff or wastewater treatment plant discharges. In the summer, flows are provided by Yuba, Bear, and American River waters that are diverted to Auburn Ravine for irrigation deliveries, as well as wastewater treatment plant discharges. Peak winter flows are typically several hundred cfs and the average 100-year flow is estimated to be approximately 17,000 cfs. Annual flows are typically lowest in October, when irrigation demands decrease and rains are not yet adequate to supply sufficient flows.

2.2.7 Coon Creek

The Coon Creek watershed drains an area that starts north and east of the City of Auburn and ends at its confluence with the East Side Canal. Coon Creek forms at the confluence of Orr Creek and Dry Creek west of Auburn. The watershed is urbanized in the upper basin near Auburn and Lincoln and rural on valley floor. Peak stream flows are typically several hundred cfs during the winter and the 100-year flow is estimated to be approximately 22,000 cfs. In the summer, upper basin flows are provided by diversions from the Bear River and lower basin flows (valley floor) are primarily agricultural return flows. Annual flows are typically lowest in October, when irrigation demands decrease and rains are not yet adequate to supply sufficient flows.

2.3 SURFACE WATER QUALITY

The following subsection describes the surface water quality of the major rivers and streams within the, or of importance to the WPCGMP area.

2.3.1 American River

Surface water quality in the American River is a function of the mass balance of water quality from tributary streams, diversions, minor agricultural return flows, subsurface drainage flows, with other impacts resulting from permitted discharges from M&I sources, urban runoff and spills. In general, the quality of water in the American River is high from the river's headwaters to its confluence with the Sacramento River. It is low in alkalinity, low in disinfection by-product precursor materials, low in mineral content, and low in organic contamination. Limited data also indicate that the water is low in microbial contamination from Giardia and Cryptosporidium. Turbidity levels in the American River tend to be higher in the winter than summer because of higher flows associated with winter storms.


American River

2.3.2 Sacramento River

Sacramento River water quality is largely influenced by a mass balance of water quality from upstream reservoir release operations, tributary flows (including the lower American River), agricultural runoff, subsurface drainage flows, and diversions, with other impacts resulting from permitted discharges from M&I sources, urban runoff and spills. In general, the quality of the Sacramento River is high in the vicinity of the WPCGMP area. There are moderate amounts of alkalinity and minerals and low levels of disinfection by-product precursors. Turbidity levels in the Sacramento River are higher during the winter and early spring months, usually associated with reservoir releases or runoff from storm events. There are very infrequent detections of organic chemicals, most of which are pesticides or herbicides from upstream agricultural operations. Data collected to date, indicate that there is a low prevalence of Giardia and Cryptosporidium in the river, with protozoa only detected sporadically and at very low concentrations.

The characterization of Sacramento River water quality in the vicinity of the North American River Sub-Basin is based on Sacramento River Watershed Sanitary Survey reports (Archibald and Wallberg, 1995 & Montgomery Watson, 2000).

2.3.3 Feather River

Water quality in the Lower Feather River, downstream of Oroville Dam, is listed as a Section 303(d) impaired water quality segment. Diazinon, an organophosphorus insecticide, is the primary constituent of concern in the river. Mercury (from mining activities) and other pesticides are also present in the waters. The upper Feather River forks, upstream of Oroville Dam, generally suffer from elevated suspended sediment loads, especially during runoff events. The descriptions and summaries of the Feather River are partially based on the USGS's Water Quality in the Sacramento River report (Domagalski et. al., 2000).

2.3.4 Bear River

Throughout the Bear River watershed, surface water quality is affected by upstream reservoir releases and diversions, and past mining activities. In the Lower Bear River basin, water quality is also impacted by agricultural runoff. The primary water quality concerns in Bear River stem from past mining activities, which have resulted in heavy metals such as mercury accumulating in the river sediment.

2.3.5 Dry Creek

Surface water quality in Dry Creek is largely influenced by urban activities. During summer months, the water quality may closely resemble that of highly treated wastewater effluent as it provides a majority of the stream flow during that time. In the fall, water quality likely contains trace metals, organic chemicals and other urban contaminants commonly found after the first rains of the season. The Dry Creek descriptions and water quality summaries are based upon information provided in the Dry Creek Watershed Coordinated Resource Management Plan (Placer County and Sacramento County, 2003).

2.3.6 Auburn Ravine

Water quality in Auburn Ravine is affected by the quality of urban stormwater runoff, wastewater treatment plant discharges, failing septic systems along the ravine, and agricultural return flows, as well as the quantity of irrigation water, which acts to dilute these sources of constituent loading. Water quality analyses have revealed high concentrations of heavy metals such as copper, lead and mercury. The source of these pollutants is primarily stormwater runoff, although wastewater treatment plant discharges are a significant source of copper and lead at times. Diazinon is the only pesticide detected in recent Auburn Ravine samples.

Auburn Ravine Diversion

2.3.7 Coon Creek

Coon Creek water quality is also influenced by urban stormwater runoff, wastewater treatment plant discharge, and agricultural return flows, as well as the quantity of irrigation water, which acts to dilute these sources of constituent loading. Analyses have shown that the water quality is most negatively affected by excess nutrients which result in depleted dissolved oxygen levels. The primary sources of the excess nutrients are wastewater treatment plant discharges and creek-side cattle grazing operations. Diazinon is the only pesticide detected in recent Coon Creek samples. The descriptions and water quality summaries of Auburn Ravine and Coon Creek are based on the Auburn Ravine/Coon Creek Ecosystem Restoration Plan (Placer County, 2002).

2.4 WATER USE

This section provides a description of plan participant's water use. Current and future water demands and surface water supplies, groundwater supplies and recycled water supplies are presented. **Table 2-1** provides a summary of plan participant's urban water use in the WPCGMP area and **Figure 2-7** provides projected annual water demands.

2.4.1 ROSEVILLE

The following sections are a summary of Roseville's water use.

2.4.1.1 Demands

In 2004, Roseville's total water demand was 32,612 AF. Roseville's projected water demand is expected to increase to 55,792 AF in 2025, which is shown in **Figure 2-7**.

2.4.1.2 Surface Water Supplies

Existing Conditions. Roseville currently has a surface water supplies of up to 66,000 AF/year diverted from Folsom Lake. These supplies include a 32,000 AF/year Central Valley Project (CVP) contract with the U.S. Bureau of Reclamation, a 10,000 AF/year contract with PCWA with 20,000 AF/year of options, and a 4,000 AF/year contract with SJWD which is available in Water Forum designated wet and normal years.

Proposed and existing Roseville and other plan participant water facilities are shown on **Figure 2-8**.

Future Conditions. Future considerations for Roseville include the improvements of its facilities to maximize the use of all of its surface water supplies.

2.4.1.3 Groundwater

Existing Conditions. Currently, Roseville does not utilize groundwater, but is pursuing opportunities to use banked groundwater supplies for back up, and peak daily demands. Roseville has four groundwater production wells (Atlantic, Oakmont, Darling Way, and Diamond Creek), three of which are ready for aquifer storage and recovery (ASR) operations with one additional well (Woodcreek North) scheduled to be completed by summer 2008 (**Figure 2-8**). A summary of Roseville's and plan participant production municipal wells is presented on **Table 2-2**.

Future Conditions. Roseville is implementing conjunctive use projects including their ASR program at the Diamond Creek Well and evaluating the feasibility of direct and in-lieu groundwater recharge as part of the Dry Creek Recycled Water Groundwater Recharge Feasibility Study in an effort to maximize the yield of both their surface water and groundwater supplies.

2.3.1.4 Recycled Water

Existing Conditions. Roseville owns and operates two regional waste water treatment plants (WWTP): Dry Creek and Pleasant Grove WWTP; both facilities provide full Title 22 (tertiary) treatment. Plant inflows are from within Roseville City limits, SJWD, and part of PCWA Zone 1. Roseville owns and operates a recycled water distribution system for landscape irrigation within the city limits (Roseville, 2000). Delivered in ubiquitous purple pipes, the city delivered 2,045 acre-feet of recycled water in 2005.

Future Conditions. It is anticipated that Roseville will continue to expand its system to more fully utilize and optimize recycled water supplies. Treated effluent that exceeds Roseville's recycled water demands could potentially be made available for in-lieu groundwater recharge purposes. The Dry Creek Recycled Water Groundwater Recharge Feasibility Study identifies and evaluates potential opportunities to recharge groundwater in Placer and Sacramento Counties through application of recycled water as described in Section 1.5.1.4.

2.4.2 LINCOLN

The following sections provide a summary of Lincoln's water use.

2.4.2.1 Demands

In 2004, Lincoln's total water demands were 7,539 acre-feet. With anticipated expansion of the city limits in the 2006 Draft General Plan EIR, demand is projected to reach 53,000 acre-feet (Environmental Science Associates (ESA), 2006).

2.4.2.2 Surface Water

Existing Conditions. Lincoln is located in PCWA's Zone 1 service area. Surface water deliveries are purchased from PCWA, which are treated at the Sunset and Foothill Water Treatment Plants. In 2004, Lincoln purchased 7,241 acre-feet of surface water from PCWA. Lincoln also purchases raw water from Nevada Irrigation District (NID).

Future Conditions. Lincoln will primarily meet future demands with surface water from PCWA and NID. Recycled water and groundwater will also be used to supplement these primary sources.

Table 2-1. Urban Water Use in the WPCGMP Area

Water Purveyors	Surface Water Supply/Contract Amounts		Treated Water Demand (AF/year)		Currently Groundwater Pumping?
			2004	Projected 2025	
PCWA	PG&E	100,400	*38,035 (Zone 1 only) (2)*	*73,994 (Zone 1 and 5) (2)*	No
	MFP	65,000 (1)			
	CVP	35,000			
	Total	*200,400*			
City of Roseville	MFP transfer from PCWA	30,000	*32,612 (3)*	*55,792 (3)*	No (4)
	CVP	32,000			
	San Juan	4,000			
	Total	*66,000*			
City of Lincoln	PCWA	34,000(5)	7,539(6)	53,000(6)	Yes (7)
	NID	12,000(5)			
	Total	*46,000 (5)*			
CAW West Placer Service Area	Total Treated Water Purchased from PCWA		0(8)	15,748(9)	No

mgd – million gallons per day **WTP** – water treatment plant **PG&E** - Pacific Gas & Electric **CVP** - Central Valley Project **MFP**- Middle Fork American River Project

(1) PCWA's entitlement is equal to the total of the Middle Fork American River Project (MFP) entitlement (120,000 AF/year) less transfers to City of Roseville and San Juan Water District (30,000 and 25,000 AF/year, respectively). The temporary 29,000 AF/year of MFP transfer currently under contract to Sacramento Suburban Water District located in Sacramento County is included in the 120,000 AF/year amount.

(2) *Source* : Placer County Water Agency 2005 Urban Water Management Plan

(3) *Source* : City of Roseville 2005 Urban Water Management Plan

(4) Roseville has three backup supply wells to meet potential peak demands only. These wells are equipped for aquifer storage and recovery. Additional wells may be operational by the end of 2008.

(5) *Source* : City of Lincoln 2006 General Plan Update

(6) *Source* : City of Lincoln 2005 Urban Water Management Plan. Volume includes recycled water supplies. Estimated through 2030.

(7) City of Lincoln wells operate as backup and emergency supply and to manage daily peak demands (goal is to average 10% of annual demand)

(8) Currently unknown value assumed to be zero

(9) Total water demand for West Placer Service Area at build out (year 2020) based on demands provided in the Water System Comprehensive Planning Study (2006)

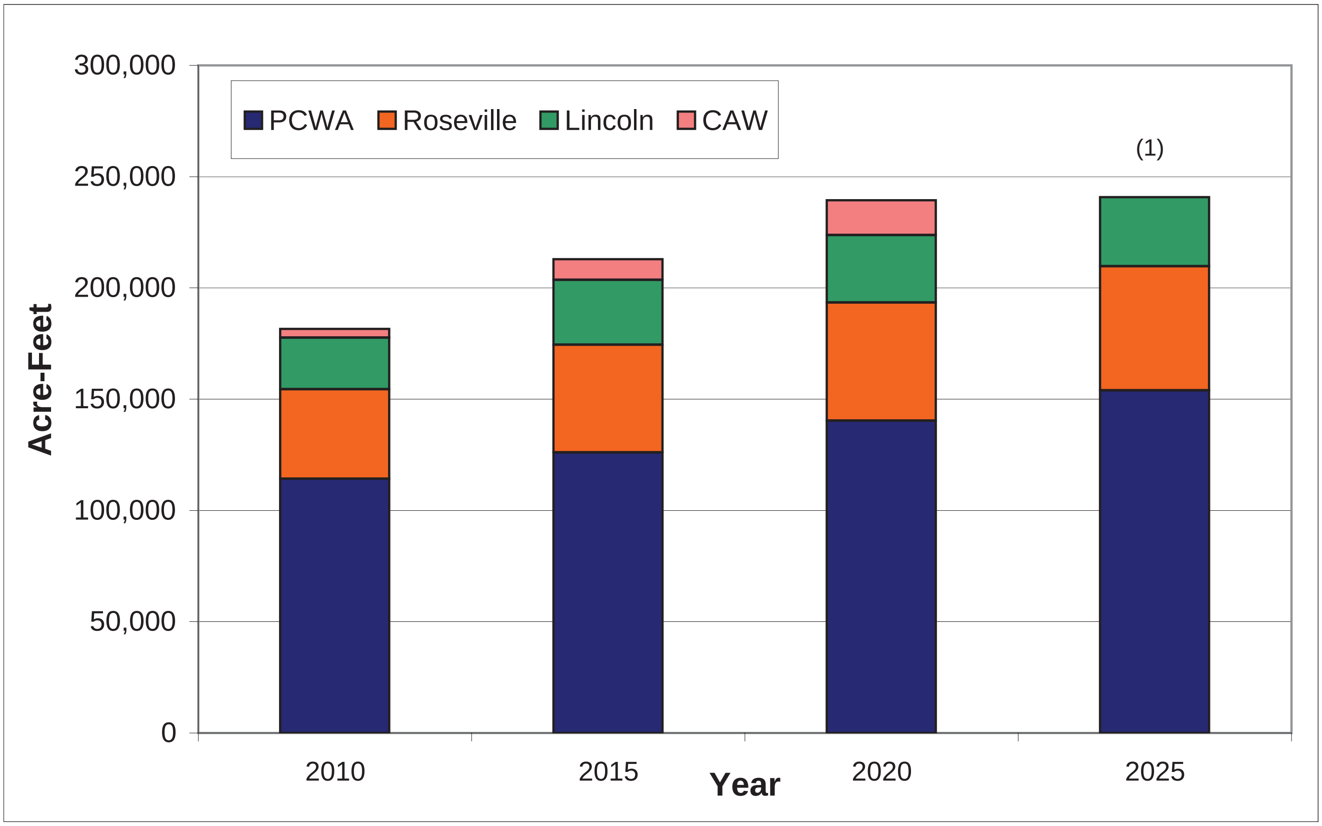


Figure 2-7 – Projected Water Demands (treated and raw water)

2.4.2.3 Groundwater

Existing Conditions. The City utilizes groundwater from five wells to provide emergency, back up, and peaking supplies as a source for its backup water supply. Liquid chlorine (sodium hypochlorite) is added to the pumped groundwater at the well site for preventative disinfection. All well sites have 10,000-gallon pressure tanks. In 2004, Lincoln pumped 298 acre-feet of groundwater.

Future Conditions. The City has plans to increase the number of municipal water supply wells in order to increase water supply reliability, provide emergency supplies and help meet peak demand. Studies by Spectrum-Gasch (1999) and Boyle Engineering (1990) show that groundwater resources are available in the Lincoln area. The City is currently completing additional groundwater investigations. The results of these investigations will be analyzed and used to help determine optimal well spacing and pumping schedules. The City estimates additional wells will be built. Geologic logging, bore hole geophysical logging and aquifer stress tests have been and will continue to be conducted as the City expands its well capacity.

2.4.2.4 Recycled Water

Lincoln recently completed a new Wastewater Treatment and Reclamation Facility (WWTRF) for the purpose of treating wastewater generated within the City.

Existing Conditions. The 3.3 MGD WWTRF began operation in 2004 and generated an initial 2.4 MGD of average dry weather flow with expansion capacity to 12 MGD. Flow is expected to increase to 6 MGD over the next 5 to 10 years. The WWTRF replaced the former Waste Water Treatment Plant, which is being decommissioned. Effluent from the WWTRF undergoes treatment processes that include oxidation, coagulation, clarification, filtration, and disinfection with ultraviolet light.

Recycled water from the WWTRF is currently used for irrigation on approximately 400 acres at three sites, including:

1. Approximately 170 acres at West Placer Waste Management Authority (Lastufka) property, south of the WWTRF
2. 105 acres at Antonio Mountain Ranch, south of the WWTRF
3. 117 acres at the Warm Springs site, west of the WWTRF

During the non-irrigation season, effluent is stored for future use. Areas that currently receive recycled water are capable of using approximately 400 million gallons per year in normal precipitation conditions.

The WWTRF is capable of producing recycled water that meets DHS requirements in Title 22 for unrestricted reuse. Projects currently in design will allow construction of the necessary distribution system to deliver additional recycled water to users within the city limits by 2008. It is anticipated that these new users may

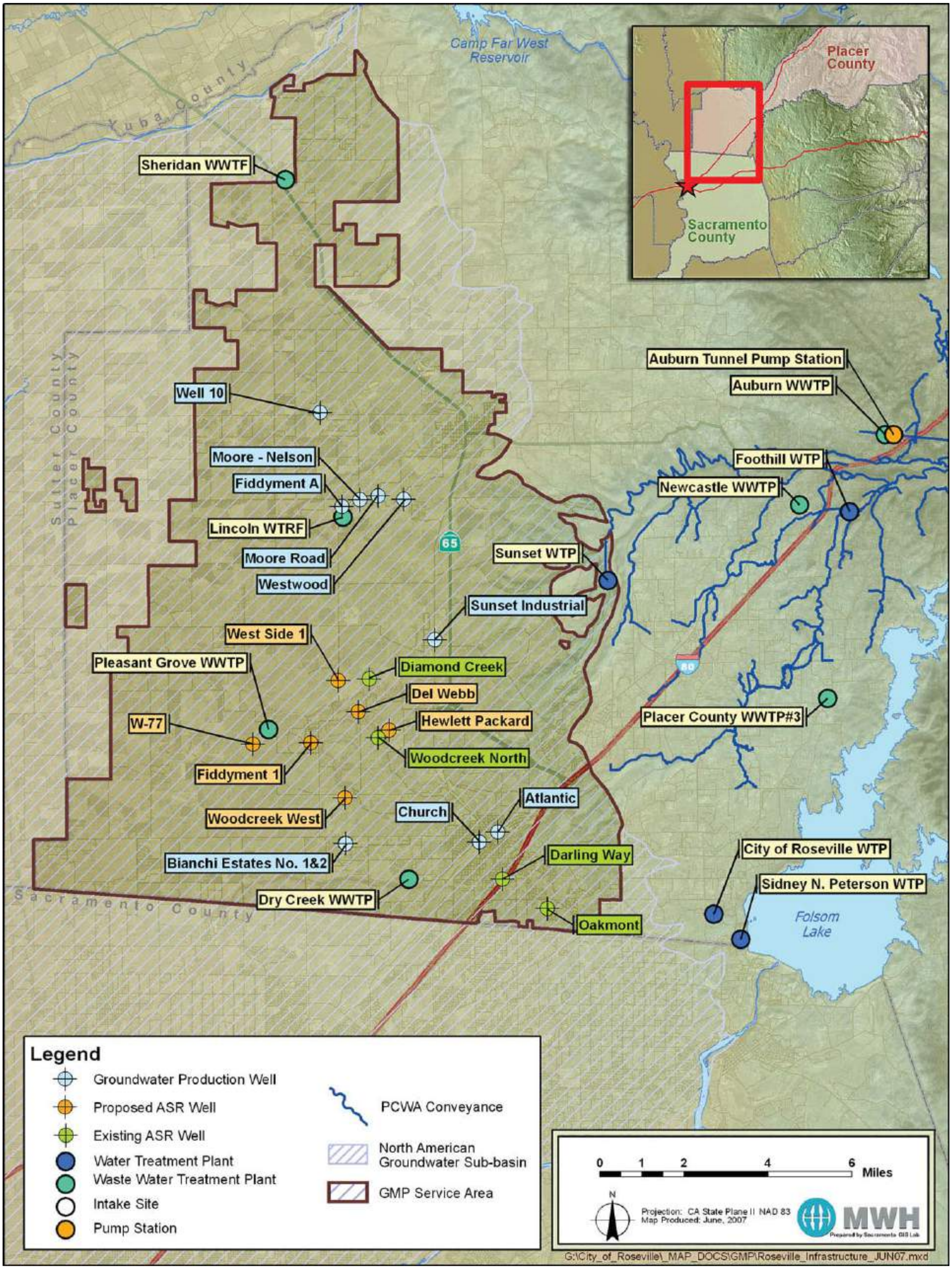


Figure 2-8 – Existing Roseville/Lincoln/PCWA/CAW Facilities account for as much as 1,400 AF/year of recycled water by 2010 (including irrigation of the proposed Highway 65 Bypass right of way).

Effluent produced by the Lincoln WWTRF is of sufficient quality to allow unrestricted reuse, including the farming of salinity sensitive crops.

Future Conditions. Further, the City is in the process of updating its General Plan and new build-out wastewater flow projections are estimated to be approximately 22 to 24 MGD. The Placer Nevada Wastewater Authority (PNWA), comprised of western Placer and Nevada County public agency jurisdictions, is considering expansion of the Lincoln WWTRF as a regional wastewater treatment and reclamation facility. If implemented for this purpose, the total average wastewater flow at an expanded WWTRF could be as much as 32 MGD, at build-out.

The goal of the Lincoln reclamation project is to utilize all reclamation water produced by the WWTRF. The 2002 Reclamation Study competed during the planning phase for the WWTRF improvements revealed nearly 25,000 AF/year of potential industrial and agricultural demand for recycled water in the greater Lincoln area. Some of these users have been incorporated into the Reclamation Master Plan and others may be included in the future as wastewater flows to the WWTRF increase.

2.4.3 PCWA

The following sections are a summary of PCWA's water use.

2.3.3.1 Demands

Currently, PCWA provides treated drinking water for urban areas and raw water for agricultural irrigation and rural uses.

2.4.3.1.1 Urban

Treated water customers include M&I entities primarily located within Zone 1. Urban water demands were approximately 28,000 AF in 2000. As part of PCWA's Water Systems Infrastructure Plan (WSIP), the 2005 treated water demand was projected to be approximately 35,000 AF. Projections suggest that treated water demand will increase to 81,380 AF by 2030 (PCWA, 2003). Existing M&I treated water customers receive water from four WTPs operated by PCWA (two are located in the Upper Zone 1 system and two are in the Lower Zone 1 service area). The four WTP's have a total treatment capacity of 78 MGD.

2.4.3.1.2 Agricultural

Raw water customers generally obtain water service for irrigation, livestock, and, more recently, golf courses and other public landscaped areas. Raw water customers obtain water service through a series of canals and waterways.

Table 2-2. Summary of Plan Participant Production Wells in the WPCGMP Area

Owner	Well Name	State Well ID	Installation Date	Pump Capacity (gpm)	Well Depth (ft bgs)	Boring Depth (ft bgs)	Well Diameter (in)	Operational Status
City of Roseville	Diamond Creek	11N06E17D003M	11/6/2002	2,700	460	502	20	Emergency M&I supply
	Woodcreek North	11N06E20	9/28/2006	2,000 (est.)	530	540	20	Estimated Pump Station Completion June 2008.
	Fiddyment 1	--	5/1/2006	1,800 (est.)	513	520	18	Not yet in service. Awaiting pump station construction
	W-77	--	4/1/2006	1,800 (est.)	526	531	18	Not yet in service. Awaiting pump station construction
	Atlantic St.	- -	1947	800	290	290	14	Emergency M&I supply
	Church St.	10N06E02B01	1947	800	245	245	14	Emergency M&I supply
	Oakmont	10N07E18D	12/18/1977	2,000	356	370	16	Emergency M&I supply
	Darling Way	10N06E12M01	5/26/1958	1,000	303	304	14	Emergency M&I supply
City of Lincoln	Well 2	- -	1984	950	275	285	14 (to 120 ft) 6 (120 to 274 ft)	Out of service. 6" well screen installed in 1990. Equipment modifications to be completed 2006 will increase pump capacity to 950 gpm.
	Well 4	- -	7/14/1990	500	320	320	16 (to 280 ft) 8 (278 to 320 ft)	Out of service. Originally drilled to 290 and constructed to 284 ft. Well deepened to 320 and 8" screen installed below 280 ft. Excessive sand in the discharge. To be replaced by Well 10.
	Well 6 (Westwood)	12N06E28	- -	800	- -	- -	16	Operational
	Well 7 (Moore Road)	12N06E20	9/27/2001	1,000	300	309	16	Operational
	Well 8 (Fiddyment A)	12N06E30	9/1/2004	1,400	317	347	16	Operational
	Well 9 (Moore-Nelson)	12N06E29	- -	1,800	340	350	16	Not yet in service. Pump station construction in progress.
	Well 10	--	- -	- -	- -	- -	- -	Currently in design, Scheduled for construction in 2006.
PCWA	Bianchi Estates #1[1]	10N06E05L03M	9/24/1979	550	400	- -	12	Emergency M&I supply
	Bianchi Estates #2[1]	10N06E05L04M	10/12/1979	500	335	- -	12	Emergency M&I supply
	Sunset Industrial	11N06E09H01M	Aug-64	800	198	- -	14	Emergency M&I supply

[1] Supply has been replaced with surface water (2003)
- - Information Not Available

Agricultural water demand in the WPCGMP area is equal to the summation of the product of irrigation demand and cropped area for each crop or use type. This demand changes with time given the hydrologic wet/dry conditions, and the amount of evapotranspiration that occurs with each crop or use type that can be accounted for on a daily basis. PCWA estimates the Zone 5 agricultural demand in 2030 to be 70,000 acre-feet.

2.4.3.2 Surface Water

Existing Conditions. PCWA's surface water entitlements include: water purchased from Pacific Gas and Electric Company (PG&E) from its Drum-Spaulding Project (100,400 AF/year), MFP water (120,000 AF/year), and CVP contract water (35,000 AF/year). PCWA has transfer agreements[3] with Roseville, San Juan Water District, and Sacramento Suburban Water District for 30,000, 25,000, and 29,000 AF/year of MFP water, respectively. PG&E water, which has been fully utilized, is diverted along PG&E canals at various diversion points. MFP water is diverted at the American River Pump Station (ARPS) near the Auburn Dam site, downstream of the confluence of the North and Middle Fork of the American River. PCWA currently does not have facilities to exercise its CVP entitlement; the authorized point of diversion of which is at Folsom Lake. Contract entitlement amounts described above are for normal and wet conditions; under dry and critical conditions, PCWA water supplies are subject to curtailment, and alternative water supplies or cutbacks in raw water deliveries will be necessary to meet demands.

PCWA Canal

PCWA also shares raw water canal capacity with NID and South Sutter Water District. Through interim purchase agreements, PCWA has obtained temporary water supplies from these agencies, purchasing a few thousand acre-feet per year on a case-by-case basis in the recent past. However, these purchases are not considered permanent water supplies.

Future Conditions. To meet its future demands PCWA will continue to rely on surface water, groundwater, and recycled water.

2.4.3.3 Groundwater

Existing Conditions. Currently PCWA does not pump groundwater to an appreciable extent. Groundwater can be pumped at the Sunset Industrial Park as a backup supply, however, elevated levels of silica make this practice a 'last resort' situation. Also, isolated portions of the Martis Valley (outside the WPCGMP area) are served by small amounts of groundwater to meet local needs.

Most of the agricultural pumping is met by self-supplied groundwater in PCWA's Zone 5.

Future Conditions. PCWA is evaluating conjunctive use projects including PCWA's Western Placer County Groundwater Storage Study to possibly develop alternatives for increasing groundwater recharge and storage with conjunctive use operations in western Placer County. This study is described in further detail in Section 1.5.3.2. PCWA as part of its water connection charge projects has developed a groundwater supply program to serve at times of emergencies, backup to the surface water system and peaking.

2.4.3.4 Recycled Water

Existing Conditions. PCWA currently does not own or operate wastewater treatment or recycled water distribution facilities. Only the cities of Auburn, Lincoln, and Roseville have their own WWTP for their respective city limits; the remaining Zone 1 wastewater goes to the two regional WWTPs located in Roseville.

Future Conditions. In the future PCWA may consider utilizing recycled water from Roseville or Lincoln for agricultural and/or groundwater recharge uses.

2.4.4 CAW

The following sections are summary of CAW's West Placer Service Area's water use.

2.4.4.1 Demands

Existing demands within the California American Water Company's (CAW) West Placer Service Area are entirely for M&I and include the Dry Creek/West (Placer Vineyards) region, Dry Creek/East region, and a portion of the Curry Creek region. CAW demands are based on projected land use changes in the West Placer Service Area from rural to urban as part of a residential master planned communities.

The West Placer Service Area accounts for approximately 1,100 of the estimated 56,800 total active customer connections in the Sacramento District of CAW (CAW, 2006). The current population of customer connections of the CAW West Placer Service Area is 3,041 and projected growth based upon land use is expected to reach approximately 24,500 to 28,000 residential dwelling units (DU) according to growth scenario (SACOG, 2006).

2.4.4.2 Surface Water

Existing Conditions. Currently, CAW uses surface water supplied by PCWA and conveyed through Roseville's distribution system as the sole source of water in the service area. In the future, treated surface water will be delivered to the service area from the future Sacramento River Diversion facility. The Sacramento River Diversion facility is intended to allow withdrawals from the Sacramento River in order to relieve some of the withdrawals currently made from the American River. After construction of the facility, the proposed water supply will be part of PCWA's pending amendatory CVP contract with USBR for 35,000 AF/year.

Future Conditions. In the future CAW will have an increased demand for surface water which is anticipated to be provided by PCWA.

2.4.4.3 Groundwater

Existing Conditions. Currently groundwater is not used within the CAW West Placer Service Area. This existing condition is a result of a 1995 franchise agreement with Placer County that mandates no use of groundwater to prevent overdraft due to lack of policy control. CAW is of the understanding that this franchise agreement predates more recent conjunctive use planning studies and technical data that had enabled water agencies to plan to use groundwater conjunctively while sustaining a healthy groundwater basin.

Future Conditions. In the future, dry year supply is projected to be made up of surface water and groundwater. The contract between CAW and PCWA which does not allow use of groundwater in the West Placer water system will need to be clarified for future dry year supply. Although CAW intends to use surface water supplies to meet future demands, CAW also intends to supplement surface water supplies with groundwater using conjunctive use techniques for peaking and backup water supply reliability.

2.4.4.4 Recycled Water

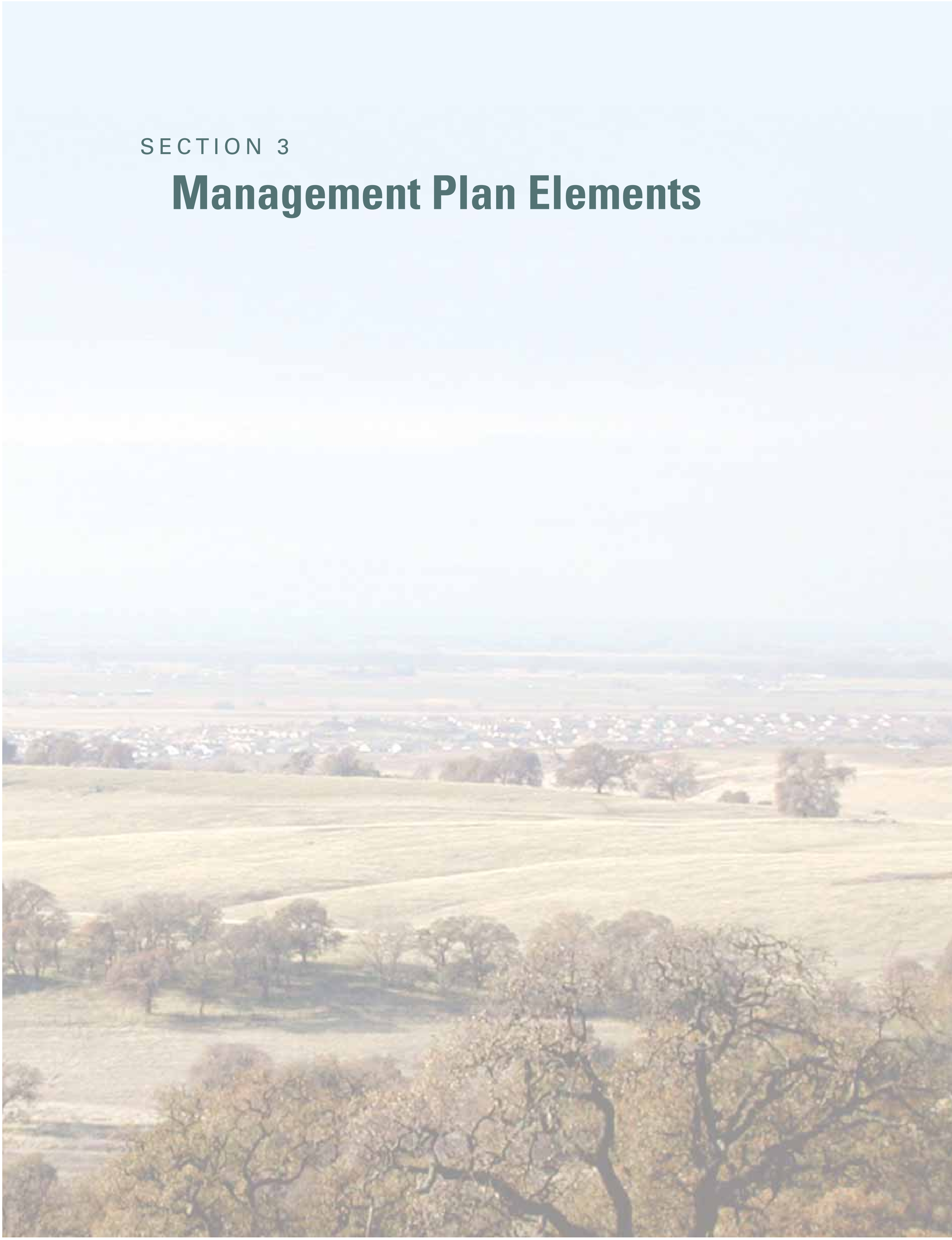
Existing Conditions. CAW currently does not own or operate wastewater treatment or recycled water distribution facilities. However, Roseville supplies recycled water to major golf course (Morgan Creek Golf Course) within the West Placer Service Area.

Future Conditions. Recycled water will continue to be available within the West Placer Service Area from Roseville. Additional recycled water use may be investigated.

[3] Sacramento Suburban Water District has a temporary transfer agreement with PCWA to receive up to 29,000 AF/year of MFP water. In the WSIP, it is anticipated that PCWA will take back the MFP water to meet its buildout demand.

SECTION 3

Management Plan Elements



SECTION 3

Management Plan Elements

The elements of this WPCGMP include an overall goal, a set of definable basin management objectives (BMOs), and a series of plan components that discuss and identify the actions necessary for meeting the goal and objectives (**Figure 3-1**).

The purpose of this section is to describe the actions set forth for management of the groundwater basin. The term "BMO" is defined in some detail under differing conditions where impacts may occur to the WPCGMP area if the BMO criteria are exceeded. The BMOs are intended to be specific enough to hold the management of the basin to quantitative values (where possible) but flexible so as to be adaptive to increased knowledge of how the groundwater basin behaves over time as better monitoring data is collected.

3.1 GROUNDWATER MANAGEMENT GOAL

The overarching goal of this WPCGMP is to maintain the quality and ensure the long term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area.

3.2 MAKE UP OF A BMO

A BMO has four main components: 1) specific objective(s) that can be scientifically measured with some level of confidence, 2) a clearly defined monitoring program designed to collect data necessary to evaluate the BMO's performance, 3) a reporting method of representing monitored data to identify success or forewarn of challenges with the management of the groundwater, and 4) programs and/or actions that are available to remedy a problem, if one is determined to exist. Each of these are explained in greater detail with references to sections in the Water Code, citations from other GMPs completed in the Sacramento Valley, and the California Groundwater Management Guidelines (Groundwater Resources Association of California, Second Edition, 2005).

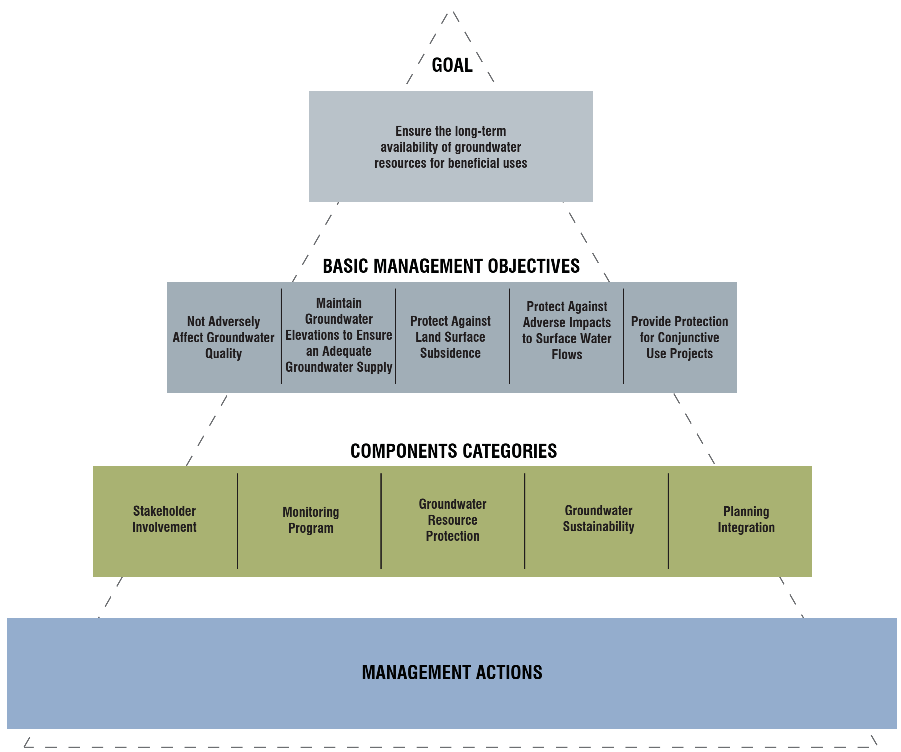
The California State Water Code § 10753.7 (a) (1) states that the required components of management objective for the basin follow the excerpt below:

(1) Prepare and implement a groundwater management plan that includes basin management objectives for the groundwater basin that is subject to the plan. The plan shall include components relating to the monitoring and management of groundwater levels within the groundwater basin, groundwater quality degradation, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater pumping in the basin.

This portion of the Water Code implies that BMO's need to have sufficient specificity in numerical objectives so as to be scientifically defensible in its implementation through monitoring and management programs. For example, one objective might be a BMO that states that groundwater elevations will not fall below 100 feet below the ground surface in any location within the basin (example only). A monitoring program can be developed to measure groundwater elevations at key locations in the basin twice a year. This data is entered into a Database Management System (DMS) that compares the measured results to the BMO for a determination of performance. A report is generated that allows the WPCGMP governance body[1] of the groundwater basin to evaluate the data, make a judgment on the level of concern, and, if needed, perform certain functions to remedy the problem (i.e. implementation of specific programs or changes to daily pumping operations).

Based on Section 2 of this WPCGMP, what we understand about groundwater and its hydrologic properties, and an understanding that land use conditions change from year to year applying differing stresses on the aquifers, the remedy to a particular problem may or may not be in the area where the detected problem occurs. A good example is the regional cone of depression in the southern portion of the WPCGMP area. The regional cone is dependent on pumping throughout the north portion of Sacramento County to a certain degree, and pumping throughout the southern WPCGMP area. So a problem in one management area, may require actions in another management area to remedy the situation.

Figure 3-1 – Organization of Management Plan Elements



As mentioned earlier, the BMO's need to be specific and measurable. For this reason, the selection of BMO's and the values attached to each have to: 1) be evaluated on the reasonableness of measuring the BMO's performance, 2) have the ability to provide clear and continuous reporting on the BMO's performance, and 3) indicate action items that are necessary in meeting the BMO. For this reason, considerable thought and significant attention needs to be given to each BMO in this WPCGMP to satisfy these criteria.

3.3 BASIN MANAGEMENT OBJECTIVES

To meet the goal stated above, the plan participants have adopted five BMOs. These BMOs include the following:

3.3.1 BMO #1 – Management of the groundwater basin shall not have a significant adverse affect on groundwater quality.

BMO #1 is intended to preserve overall groundwater quality by stabilizing groundwater contamination, avoiding known contaminated areas, and protecting recharge areas. Currently there is insufficient data to allow the plan participants to understand all of the groundwater quality characteristics for the entire WPCGMP area. However, what is understood about groundwater quality in the WPCGMP area is groundwater that is analyzed for potential supply for potable use by Roseville and Lincoln meets Department of Health Services (DHS) public health criteria.

Within the WPCGMP area, there are documented occurrences of isolated groundwater contamination. The plan participants will make use of groundwater within the basin that is not hindered by contamination, and that such use does not cause or exacerbate degradation of the quality of the resource either at the contamination sites or from naturally occurring contaminants present in the groundwater. Where groundwater contamination is currently documented or if it occurs in the future, the plan participants will coordinate and cooperate with appropriate State and Federal regulatory agencies and with other responsible parties. The plan participants will pursue all actions within their powers that result in the containment and eventual remediation of the contaminant.

Natural recharge of groundwater occurs primarily from percolation of irrigation water, infiltration along creeks and drainages, infiltration of precipitation, and subsurface flow. Protection of natural recharge is an important element of this BMO.

Implementation of this BMO will allow for a better understanding of groundwater quality in the WPCGMP area and how changes in groundwater quality may be influenced by management practices and implementation of conjunctive use programs. As additional data from the monitoring program becomes available, this BMO will be more clearly defined and corrective actions established. By meeting this BMO, the plan participants will not adversely affect groundwater quality for the benefit of basin groundwater users.

[1] A proposed governance body is discussed in Section 4.

3.3.2 BMO #2 – Manage Groundwater Elevations to ensure an adequate groundwater supply for backup, emergency, and peak demands without adversely impacting adjacent areas.

Over the past several decades, extensive groundwater pumping by agriculture, and more recently by urban development, has resulted in a persistent cone of depression in the southern Placer and northern Sacramento County areas. Due to the recent import of surface water into Sacramento County, southern Placer County groundwater elevations have stabilized at or near the cone of depression and some areas have recovered (See Hydrograph 10N06E0C001M in **Figure 2-5**). Results of the Sacramento County Water Forum Agreement (WFA) studies indicate that extensive lowering the aquifer can have adverse impacts on all groundwater users in the basin ranging from increased energy costs, to the need to deepen existing private and public wells, or even construction of new wells.

Full implementation of the conjunctive use programs in the basin may result in short term water levels being drawn down below previous historic lows, (this is a result of additional groundwater extraction during the drier and driest years). The intent of this BMO is to ensure an adequate groundwater supply by monitoring groundwater elevations within the WPCGMP area to maintain an acceptable "operating range." The future governance body will develop operation criteria for the future management of elevations to insure fluctuations during these times be quantified and then minimized so that overall groundwater elevations in the WPCGMP area do not adversely affect the availability of groundwater.

3.3.3 BMO #3 - Participate in State and Federal Land Surface Subsidence Monitoring Programs.

Land subsidence can cause significant damage to essential infrastructure. As with groundwater quality, historic land surface subsidence data within the WPCGMP area is limited. However, the general understanding, based on DWR and National Geodetic Survey data is that historic land surface subsidence has been minimal in the WPCGMP area, with no known significant impacts to existing infrastructure. Given the historical trends, the potential for future land surface subsidence from groundwater extractions in the WPCGMP area appears remote. However, the plan participants intend to participate in State and Federal Land Surface Subsidence Programs.

DWR has recently begun developing a program to monitor subsidence in the Sacramento Valley. This program referred to as the Sacramento Valley - Land Surface Elevation Monitoring Program is in the beginning stages as DWR is gathering local support. DWR is actively seeking partners interested in cooperatively developing a land surface elevation network of Global Positioning System (GPS) monuments. Current project partners include Yuba County Water Agency and Butte, Glenn, and Tehama Counties. Participation ranges in form from financial assistance to in-kind staff hours. WPCGMD participants have agreed to join the DWR effort.

3.3.4 BMO #4 - Protect Against Adverse Impacts to Surface Water Flows in Creeks and Rivers due to groundwater pumping.

The intent of this BMO is to protect against adverse impacts to in stream water quality and quantity resulting from interaction between groundwater in the basin and surface water flows in the American and Sacramento River due to groundwater pumping.

At the present time, the flow regime is such that groundwater is not discharging to the river systems (i.e., rivers in the region are termed as losing streams to the groundwater) in the WPCGMP area. It is the intent of this WPCGMP that controllable operations of the groundwater system do not negatively impact the water quality and quantity of the area's rivers and streams regardless of potential stream flow depletion due to groundwater pumping or

an accretion due to artificial groundwater recharge. The adopting governance body of this WPCGMP will seek to gain a better understanding in cooperation with SGA and others of potential impacts of adverse groundwater and surface water interactions.

3.3.5 BMO #5 – Ensure Groundwater Recharge Projects Comply with State and Federal Regulations and protect beneficial uses of groundwater.

With the implementation of conjunctive use projects through direct artificial recharge using spreading basin, field flooding or injection wells (i.e. ASR projects[2]), protection of groundwater users of artificial recharged water is currently of key regulatory importance. For this reason, the intent of this BMO is to recognize that the governance body will comply with appropriate State and Federal regulations when implementing groundwater recharge projects.

3.4 WPCGMP COMPONENTS

The WPCGMP includes a variety of components that are required by CWC § 10753.7, recommended by DWR Bulletin 118 (2003), optional under CWC § 10753.8, and other components that the plan participants have already begun. These components can be grouped into five general categories: 1) stakeholder involvement, 2) monitoring program, 3) groundwater resource protection, 4) groundwater sustainability, and 5) planning integration. Each category and its components are presented in this section. Under each component is a discussion, proposed actions, and identification of the objectives toward which the component is directed.

3.5 COMPONENT CATEGORY 1: STAKEHOLDER INVOLVEMENT (REQUIRED)

The management actions taken by the future governance body may have a wide range of impacts on a broad range of individuals and agencies that ultimately have a stake in the successful management of the basin. The local consumer may be most concerned about water rates or assurances that each time the tap is turned a steady, safe stream of water is available. To the industrial, agricultural, or agricultural-residential private well owner, they want to make sure their wells are safe from dewatering and degradation of water quality, and that energy costs do not increase significantly. To the environmental community and non-governmental organizations, they will want assurances that management of the basin does not create adverse environmental affects in the region. To large State and Federal water resource agencies, the degree to which the actions taken under this WPCGMP can achieve local supply reliability and further banking and exchange programs provides opportunities for State and Federal water programs to meet statewide needs, particularly in drier years.

To address the needs of all the above stakeholders, this WPCGMP pursues several means of achieving broader involvement in the management of the WPCGMP area. These include: (1) involving members of the public and other interested parties, 2) involving other agencies within and adjacent to the WPCGMP area, (3) using advisory committees for development and implementation of the WPCGMP, (4) developing relationships with state and federal water agencies, and (5) pursuing a variety of partnerships to achieve local supply sustainability. Each of these is discussed further below.

3.5.1 Involving the Public

Groundwater in California is a public resource, and the WPCGMP Technical Review Committee (TRC) is committed to involving the public in the development and implementation of the WPCGMP. The primary reason for the WPCGMP is to "to maintain the quality and ensure the long-term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area." In order to meet this goal, the plan participants must intelligently manage current and future use of the shared groundwater Sub-basin underlying their city limits/service areas, respectively. To effectively manage this resource the plan participants must have public input and, ultimately, public approval at each decisive step. The plan participants understand that this can be accomplished only when the public is continually involved in the decision-making process.

May 2007 celebration of Roseville's first ASR well

The development of the WPCGMP was completed in many stages as entities interested in the development of this plan were added periodically and participated in the TRC. Roseville initially intended to create a GMP that covered an area comprised of their city limits. Soon after, PCWA agreed to develop a joint plan with Roseville. This partnership expanded the study boundaries to include that portion of PCWA's service area which is located within the Sub-

[2] In particular for ASR projects within the Central Valley, regulatory agencies are focusing on projects where chemically treated potable water is used as the source water used for recharge. Chemical treatment with the use of chlorine, when in the presence of dissolved organic carbon, causes the formation of disinfection by-products such as Trihalomethanes (THM). THMs routinely sampled and analyzed in potable source water, used for recharge, are at levels well below public drinking water criteria established DHS. However, based on the regulatory concerns, it is the intent of this WPCGMP to provide controls over who uses artificially recharged groundwater. These controls include monitoring the proposed position of new wells when being drilled into potential artificial recharged groundwater "bubble" areas and areas in a down gradient groundwater flow directions or providing surface water deliveries for preexisting groundwater users. For this reason, the adopting governance body of this WPCGMP will work in coordinately with State and Federal regulators on conjunctive use projects within the study area to protect beneficial uses of groundwater.

basin. In addition to Roseville, the new study area includes the City of Lincoln and portions of the City of Rocklin. This expansion led to the project being named the WPCGMP.

In recognition that effectiveness of the WPCGMP is dependent on the agreed management decisions of all groundwater users in the area, the City of Lincoln accepted an invitation from Roseville and PCWA to become a GMP partner. CAW, a private water purveyor with a service area along the southwest edge of Placer County, joined the effort in early 2007 as a partner. The City of Rocklin is not a groundwater user; the city's municipal water supply needs are provided by PCWA. Finally, Placer County has been an active participant in the GMP's development; however, as the County is not a water purveyor it has not formally joined the WPCGMP as a full partner.

In accordance with CWC § 10753.2, public notices were published by GMP partners as required (Appendix A). These notices were supported by a variety of outreach and information activities conducted by plan participants as summarized in WPCGMP Public Outreach and Information Plan (Appendix B). It is anticipated the outreach plan will be adapted to meet the needs of the WPCGMP and its stakeholders as conditions in the basin change.

Table 3-1: Public notices published during development of the WPCGMP per CWC § 10753.2

Partner	Public Notice	Date and Publication
City of Roseville	Notice of intent to adopt a resolution to prepare a GMP	July 15 & 22, 2005; The Sacramento Bee
	Text of adopted resolution published	November 18 & 25, 2005; The Sacramento Bee
	Notice of public hearing to consider adoption of GMP	June 30 & July 7, 2007; Roseville Press Tribune
	Notice of public hearing to adopt GMP	[1]July 27, 2007; Posting of City of Roseville agenda to adopt a GMP
	Resolution of adoption	August 1, 2007
City of Lincoln	Notice of intent to adopt a resolution to prepare a GMP	November 30 & December 7, 2006; Lincoln News Messenger
	Text of adopted resolution published	February 1 & 8, 2007; Lincoln News Messenger
	Notice of public hearing to consider adoption of GMP	February 1 & 8, 2007; The Lincoln News Messenger
	Notice of public hearing to adopt GMP	[1]November 21, 2007, 2007; Posting of City of Lincoln agenda to adopt a GMP
	Resolution of adoption	November 27, 2007
Placer County Water Agency	Notice of intent to adopt a resolution to prepare a GMP	October 19 & 26, 2006; The Sacramento Bee/ Auburn Journal
	Text of adopted resolution published	November 9 & 16, 2006; The Sacramento Bee/ Auburn Journal
	Notice of public hearing to consider adoption of GMP	August 2 & 9, 2007; The Sacramento Bee/ Auburn Journal
	Notice of public hearing to adopt GMP	1August 31, 2007; Posting of PCWA agenda to adopt a GMP
	Resolution of adoption	September 6, 2007

[1] Agenda items posted in Compliance with Section 54954.2 of the California Brown Act.

Once the plan participant group was set, the TRC engaged in a series of briefings to inform and gauge specific stakeholder groups' interest and involvement in the WPCGMP. Stakeholder groups briefed on the plans development were: Roseville Public Utility Commission; Lincoln City Council; Placer County Water Agency Board of Directors; Sacramento Groundwater Authority; and the Water Caucus of the Water Forum. This activity was supported by a project website (www.wpcgmp.org). The website featured a history of plan development, plan content, participant contact information, links, public notices and other information materials. The plan participants will continue to use their respective websites to distribute information on WPCGMP implementation activities to the public until the governance body of the WPCGMP is in place (as described in detail in **Section 4.6**).

In addition to stakeholder briefings, the TRC hosted the WPCGMP Open House, June 14, 2007, at the McBean Pavilion in Lincoln. Meeting invitees included area water purveyors, regional environmental organizations, local landowners, business owners, government agencies, and other interested parties. This meeting provided the TRC the opportunity to discuss the GMP with the public and other stakeholders and incorporate their ideas and comments to the document. The draft WPCGMP was released for formal public comment following a July 11, 2007, public hearing by the Roseville City Council. Once public comments are received and incorporated to the document as necessary, the Roseville City Council is anticipated to adopt the plan by August 1, 2007. Formal adoption by other plan partners will begin following adoption by the City of Roseville.

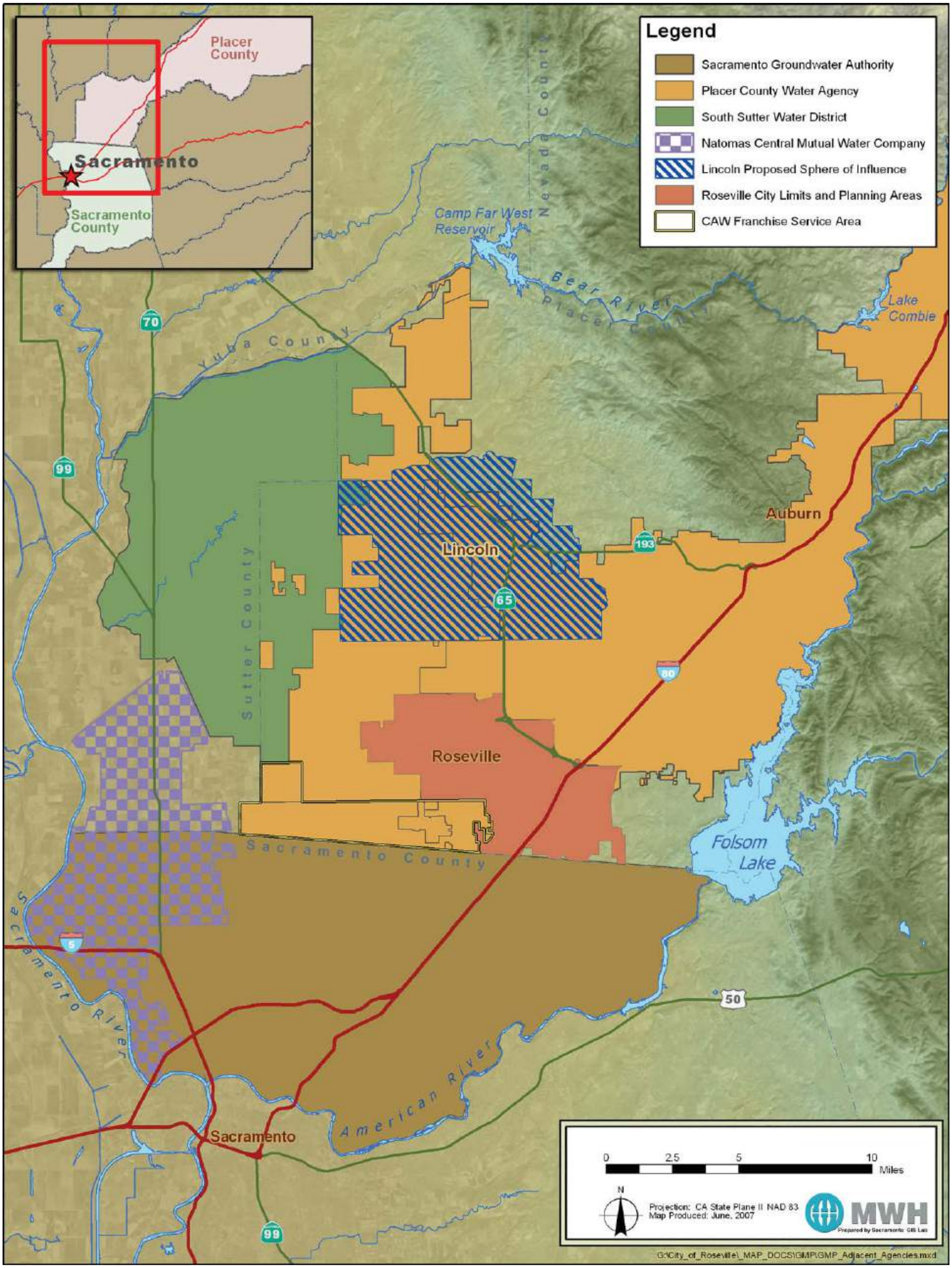
Actions — The governance body will take the following actions:

- Continue efforts to encourage public participation as opportunities arise.
- Review and take actions from the Public Outreach Plan as necessary during implementation of various aspects of the WPCGMP.
- Continue to provide briefings to the Water Forum Successor Effort on WPCGMP implementation progress.
- Work with basin stakeholders to maximize outreach on WPCGMP activities including the use of the plan and plan participants' websites.

3.5.2 Involving Other Agencies Within and Adjacent to the WPCGMP Area

Figure 3-2 shows adjacent purveyors within the WPCGMP area and some of the key adjacent entities that the WPCGMP has been coordinating with during development of this WPCGMP. Plan participants have provided briefings, presentations, and/or workshops to multiple adjacent agencies including the Sacramento Groundwater Authority (SGA) and its member agencies. Plan participant outreach has also included the Water and Environment Caucuses of the Water Forum, South Sutter Water District (SSWD), Natomas Central Mutual Water Company (NCMWC), Nevada Irrigation District (NID), San Juan Water District, City of Rocklin, City of Citrus Heights, Rio Linda/Elverta Community Water District, Yuba County Water Agency, Sacramento Suburban Water District, and Camp Far West Water District.

Figure 3-2 – Adjacent Agency Service Areas



Beginning in August 2007, Roseville's City Council, PCWA's Board of Directors, Lincoln's City Council, and CAW management plans to adopt the WPCGMP. This WPCGMP recognizes Placer County, South Sutter Water District, Sacramento Groundwater Authority, Natomas Central Mutual Water Company, and Nevada Irrigation District as a partner in managing the Sub-basin and has requested their review and assistance in the preparation of this WPCGMP.

Actions — The governance body of the WPCGMP will take the following actions:

- Continue a high level of involvement with SGA, SSWD, NCMWC, NID and other interested parties in implementing the WPCGMP.
- Provide copies of the adopted WPCGMP and subsequent annual reports to representatives from the SGA, SSWD, NCMWC, NID and other interested parties.
- Meet with representatives from the SGA, SSWD, NCMWC, NID and other interested parties, as needed.
- Coordinate a meeting with other self supplied groundwater pumpers in the WPCGMP area to inform them of the plan participant's management responsibilities and activities, and develop a list of other self supplied groundwater pumpers concerns and needs to the plan participant's management.
- Coordinate a meeting with the agricultural groundwater pumpers in the WPCGMP area to inform them of the plan participant's management responsibilities and activities, and develop a list of agricultural groundwater pumpers concerns and needs to the plan participant's management.

3.5.3 Utilizing Advisory Committees

The plan participants have and will continue to use advisory committees in development and implementation of this WPCGMP. Prior to beginning development of the WPCGMP, the plan participants developed a group made up primarily of plan participants staff, named as the TRC to guide development of the WPCGMP. The TRC consisting of Roseville, PCWA, Lincoln, Placer County, CAW, and DWR staff and a representative from agricultural interests within the WPCGMP area and met periodically approximately on a bimonthly basis during the development of this WPCGMP.

Actions — The plan participants will take the following action:

- Upon adoption of the WPCGMP, the TRC will periodically meet to discuss scheduling and functions to guide implementation of the plan and provide these recommendations to the WPCGMP governance body.

3.5.4 Developing Relationships with State and Federal Agencies

Working relationships between the governance body and local, state, and federal regulatory agencies are critical in developing and implementing the various groundwater management strategies and actions detailed in this WPCGMP.

The TRC has developed on-going working relationships with local, state, and federal regulatory agencies (e.g., Placer County, Environmental Management Department (EMD), California DHS, etc.).

Actions — The governance body of the WPCGMP will take the following action:

- Continue existing and develop new working relationships with local, State, and Federal regulatory agencies.

3.5.5 Pursuing Partnership Opportunities

This WPCGMP is committed to facilitating partnership arrangements at the local, State, and Federal levels. Over the past decade, the greater Sacramento-area water community and other local leaders have made great strides toward regional planning and collaboration on water issues. The historic WFA, which involved over 40 stakeholders and seven years of facilitated discussions, resulted in a regional framework to balance the competing demands for increased use of surface and groundwater with the environmental needs of the Lower American River through the year 2030. Several important partnerships have been formed to implement the WFA as well as provide a host of other benefits to water agencies and the customers that they serve.

While the facilities necessary to implement, develop and expand conjunctive use programs in the WPCGMP area have not been fully identified, the potential exists to develop and expand facilities on a Sub-basin wide level to achieve broader regional and statewide benefits. The needed facilities, however, would require substantial resources. To investigate any further opportunities would require resources provided through partnerships with potential beneficiaries.

Actions — The governance body of the WPCGMP will take the following actions:

- Continue to promote partnerships that achieve both local supply reliability and achieve broader regional and statewide benefits.
- Continue to track and apply for grant opportunities to fund regional groundwater management activities and local water infrastructure projects.

3.6 COMPONENT CATEGORY 2: MONITORING PROGRAM (REQUIRED)

At the heart of this WPCGMP is a monitoring program capable of assessing the current status of the basin and predicting responses in the basin as a result of future management considerations. The program includes monitoring groundwater elevations, monitoring groundwater quality, monitoring and assessing the potential for land surface subsidence resulting from groundwater extraction, and developing a better understanding of the relationship between surface water and groundwater along the Feather, Bear, American, and Sacramento Rivers and other smaller streams. Also important is the establishment of monitoring protocols to ensure the accuracy and consistency of data collected.

3.6.1 Groundwater Elevation Monitoring

DWR has collected a significant amount of groundwater elevation measurements extending from prior to 1950 to 2007. DWR's program collects biannual (spring and fall) groundwater level data from more than 32 wells throughout Placer County. In addition, over the past seven years the City of Lincoln has begun to collect extensive groundwater elevation measurements from production and monitoring wells within its service area. Plan participants have used some of this most recent data to generate a groundwater contour map for the WPCGMP area (see **Section 2.1.4**). However, because DWR only monitors and measures certain wells within the County, Roseville and Lincoln, groundwater contour maps for the County or the WPCGMP area have not been created on a consistent basis. As such, it is difficult to compare a historic contour map with a recent one. For this reason, plan participants are establishing a standardized network of wells that combines those monitored by DWR and other water purveyors. It is the plan participants' intent that the wells comprising this program be maintained as a consistent long-term network that represents overall groundwater elevation conditions in the basin. **Figure 3-3** shows the wells that will be evaluated to develop this network.

Wells will be selected to provide uniform geographic coverage throughout the approximately 192.5 square mile WPCGMP area, and in an area around the northern, western, eastern and southern perimeter of the WPCGMP area. The well network will be developed by first establishing a network of sampling grids using the following method:

- Overlay a matrix of evenly spaced points over the entire WPCGMP area.
- Surround matrix of points with polygons.
- Conform the boundaries of the polygons to WPCGMP area boundaries and regenerate area grids.

The resulting grid, shown on Figure 3-3, includes approximately 50 polygons of roughly equal area of about five square miles each. Plan participants will try to establish at least one monitoring well within each of the polygons to act as the future monitoring network.

Plan participants will give preference to wells currently in DWR's monitoring program. These wells will be evaluated first because (a) they have long records of historic groundwater level data and are useful in assessing trends within the groundwater basin, (b) uniform protocols were used in measuring and recording the water level data, and (c) these are typically non-producing wells, so water level readings represent relatively static levels.

Second, the plan participants will identify other municipal and private wells with well construction information, long records of groundwater elevation data and giving preference to those wells with the lowest recent extraction volumes.

Actions— Additional actions by the plan participants will include:

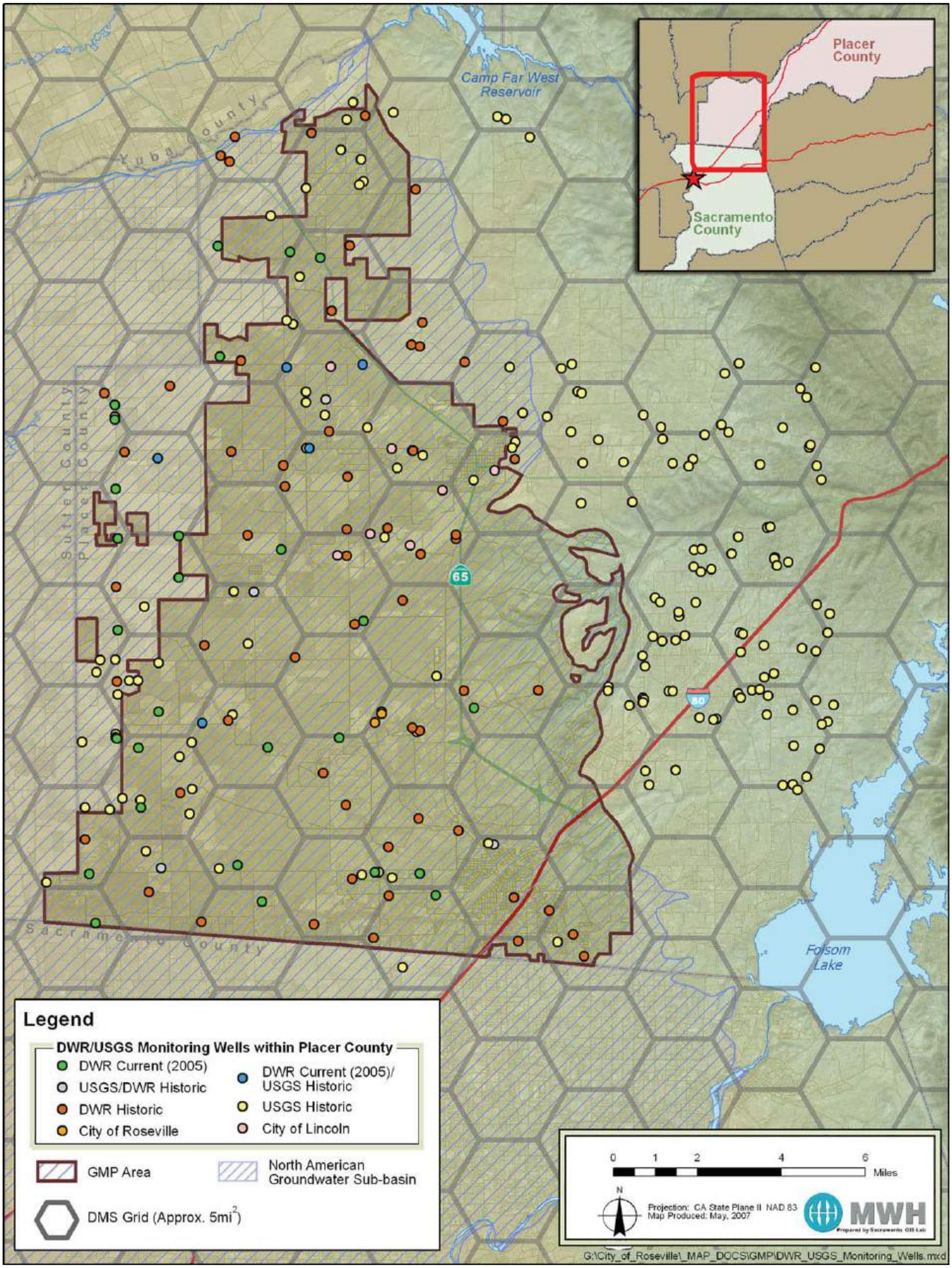
- Coordinate with DWR and others to identify an appropriate group of wells for monitoring for a spring 2008 set of groundwater elevation measurements.
- Coordinate with DWR and others to ensure that the selected wells are maintained as part of a long-term monitoring network.
- Coordinate with DWR to ensure that the timing of water level data collection by other agencies coincides within one month of DWR data collection. Currently DWR collects water level data in the spring and fall.
- Coordinate with other agencies to ensure that needed water level elevations are collected and verify that uniform data collection protocols are used among the agencies.
- Consider ways to fill gaps in the monitoring well network by identifying suitable existing wells or identifying opportunities for constructing new monitoring wells.
- Assess groundwater elevation trends and conditions based on the monitoring well network annually.
- Assess the adequacy of the groundwater elevation monitoring well network annually.
- Identify a subset of monitoring wells that will be monitored more frequently than twice annually to improve the plan participants' understanding of aquifer responses to pumping throughout the year.

3.6.2 Groundwater Quality Monitoring

Because most of the wells in the basin are used for agricultural purposes, an extensive record of water quality data is not available for most wells. More recently public water supply wells have been constructed in the WPCGMP area, and therefore water quality data is available for these wells. These wells are listed on **Table 2-3**. Roseville and Lincoln have compiled available historic water quality data for constituents monitored as required by DHS under CCR Title 22.

This level of monitoring is sufficient under existing regulatory guidelines to ensure that the public is provided with a safe and reliable backup drinking water supply. Based on the limited list of contaminated sites identified in Section 2.1.3, it may be advisable to have in place a network of shallow (less than 200 feet deep) monitoring wells on the eastern edge of the basin where recharge

Figure 3-3 – DWR, USGS, Roseville and Lincoln Wells



primarily occurs to serve as an early warning system for contaminants that could make their way to greater depths in the basin where production wells extracts groundwater. Over the past several years, Lincoln has begun to install such a network. In addition, Roseville has constructed three monitoring wells located adjacent to the Diamond Creek Well to collect groundwater elevation and quality data during direct recharge as a result of their Aquifer Storage and Recovery (ASR) program. Additional monitoring wells for groundwater elevation and quality data collection are anticipated as Roseville expands their ASR program in western portions of the City.

Figure 2-8 shows existing WPCGMP area production wells. CCR Title 22 water quality reporting is required by DHS for each of these public drinking water sources. The plan participant's water quality monitoring network includes these wells. The water quality monitoring well network may be expanded to include additional DWR and privately owned wells based on the outcome of coordination meetings with these agencies and various landowners.

Actions— The following actions will be taken by the plan participants to monitor and manage groundwater quality:

- Coordinate with cooperating agencies to verify that uniform protocols are used when collecting water quality data.
- Coordinate with local, state, and federal agencies to identify where wells may exist in areas with sparse groundwater quality data. Identify opportunities for collecting and analyzing water quality samples from those wells.
- Assess the adequacy of the groundwater quality monitoring well network annually.

3.6.3 Land Surface Elevation Monitoring

Subsidence of the land surface resulting from compaction of underlying formations affected by head (groundwater level) decline is a well-documented concern throughout much of the Central Valley. During a typical pumping season, changes in land surface elevation can be observed as a result of both elastic and inelastic subsidence in the underlying basin. Elastic subsidence results from the reduction of pore fluid pressures in the aquifer system and typically rebounds when pumping ceases or when groundwater is otherwise recharged resulting in increased pore fluid pressure. Inelastic subsidence occurs when pore fluid pressures decline to the point that aquitard (a silt or clay bed of an aquifer system) sediments collapse resulting in permanent compaction and reduced ability to store water in that portion of the aquifer.

While some land surface subsidence is known to have occurred as a result of groundwater extraction west of the Sacramento River, it is believed that the extent of subsidence east of the Sacramento River has been minimal. DWR maintains 13 extensometer stations in the northern Sacramento Valley: 3 in Glenn County, 5 in Butte County, 2 in Colusa County, 1 in Sutter County, and 2 in Yolo County.

According to DWR there is no documented evidence of land subsidence in the WPCGMP area (DWR, 1997). However, data from an extensometer indicate a small amount of downward land surface displacement occurred during the 1994, 1995, and 1996 summer irrigation seasons. This limited data set indicates that the land surface subsides and rebounds with groundwater elevation declines and increases, respectively. According to DWR, these records, based on this limited data set, show no permanent land subsidence has occurred at this station, which is located west of the WPCGMP area approximately at the intersection of Highway 99 and the Natomas Cross Canal.

Historical benchmark elevation data for the period from 1912 through the late 1960s obtained from the National Geodetic Survey (NGS) has been used to evaluate land subsidence in north Sacramento County. From 1947 to 1969 the magnitude of land subsidence measured at benchmarks north of the American River in Sacramento County ranged from 0.13 feet to 0.32 feet, with a general decrease in subsidence in a northeastward direction. This decrease is consistent with the geology of the area: formations along the eastern side of the Sacramento Valley are older than those on the western side and are subject to a greater degree of pre-consolidation making them less susceptible to subsidence. The maximum documented land subsidence of 0.32 feet was measured at both benchmark L846, located approximately two miles northeast of the former McClellan AFB, and benchmark G846, located approximately one mile northeast of the intersection of Greenback Lane and Elkhorn Boulevard.

Whether this is inelastic subsidence is indeterminate from the data, but it is clear that the magnitude of the potential subsidence of benchmarks during the above mentioned periods appears negligible.

An extensometer measures subsidence at a single point. To monitor subsidence within the WPCGMP area key survey stations would need to be located. NGS approved stations using a ground positioning system (GPS) or conventional leveling will determine the change in a single point land surface elevation and ultimately be used to evaluate land subsidence within the WPCGMP area.

As described previously, DWR has recently begun developing a program to monitor subsidence in the Sacramento Valley. This program referred to as the Sacramento Valley - Land Surface Elevation Monitoring Program is in the beginning stages as DWR is gathering local support. Land surface elevation data collected as part of this program could be used by cooperating agencies to evaluate if subsidence is being caused by groundwater pumping. DWR is actively seeking partners interested in cooperatively developing a land surface elevation network of GPS monuments. Current project partners include Yuba County Water Agency and Butte, Glenn, and Tehama Counties. Participation ranges from financial assistance to in-kind staff hours. WPCGMP participants have joined the effort.

DWR has identified a gap of subsidence data in Placer County. DWR estimates that 8 monuments would be needed to fill the gap. DWR has provided a rough per monument dollar estimate of $4,500. For this reason, it is estimated that $36,000 worth of monuments would be necessary to fill the gap. DWR will evaluate the information provided by Roseville and Lincoln and decide whether the survey points meet NGS standards.

Actions — While available data and reports indicate that land surface subsidence is not a concern in the WPCGMP area, the plan participants are interested in monitoring for potential land surface subsidence, which may include:

- Coordinate with other agencies, particularly the DWR, USGS, and SGA to determine if there are other suitable benchmark locations in the WPCGMP area to aid in the analysis of potential land surface subsidence.

3.6.4 Surface Water Groundwater Interaction Monitoring

The interaction between groundwater and surface water has not been extensively evaluated within the WPCGMP area. Due to the fact that only IGSM modeling results are available for the WPCGMP area, the plan participants recommend the following actions:

Actions — The plan participants will pursue actions to better understand the relationship between surface and groundwater in the WPCGMP area, including:

- Work cooperatively with DWR and others to compile available stream gage data and information on tributary inflows and diversions from the Feather, Bear, and Sacramento rivers to quantify net groundwater recharge or discharge between gages in the WPCGMP area.
- Coordinate with local, State, and Federal agencies to identify available surface water quality data from the Feather, Bear and Sacramento rivers proximate to the WPCGMP area.
- Correlate groundwater level data from wells in the vicinity of river stage data to further establish whether the river and water table are in direct hydraulic connection, and if the surface water is gaining or losing at those points.
- Continue to coordinate with local, State, and Federal agencies and develop partnerships to investigate cost-effective methods that could be applied to better understand surface water-groundwater interaction along the Feather, Bear, and Sacramento rivers.
- Perform evaluations of accretion/depletion interactions for local streams that bisect the WPCGMP, such as Auburn Ravine and Coon Creek.

3.6.5 Protocols for the Collection of Groundwater Data

Through the work completed as part of the SGA's GMP, MWH has evaluated the accuracy and reliability of groundwater data collected by cooperating agencies within the Sacramento Region (MWH, 2002). The evaluation indicated a significant range of techniques, frequencies and documentation methods for the collection of groundwater level and quality data. Although the groundwater data collection protocol may be adequate to meet the needs of individual agencies, the lack of consistency yields an incomplete picture of basin-wide groundwater conditions. Other types of groundwater data collection protocols are included in Sections 3.5.1 and 3.5.2 above.

Actions — To improve the comparability, reliability and accuracy of groundwater data within the WPCGMP area and SGA, the plan participants will take the following actions:

- Use a Standard Operating Procedure (SOP) for collection of water level data by each of the cooperating agencies. Appendix C includes a SOP for Manual Water Level Measurements. This SOP was prepared using guidance documents available through the Environmental Protection Agency (EPA) and was included in a technical memorandum developed for SGA summarizing the accuracy and reliability of groundwater data (MWH, 2002).
- Provide cooperating agencies with guidelines on the collection of water quality data developed by DHS for the collection, pretreatment, storage, and transportation of water sample.
- Provide training on the implementation of these SOPs to cooperating agencies, if requested.

3.6.6 Groundwater Data Management System

In order for the plan participants to achieve their primary objective of sustaining the groundwater resource within the WPCGMP area, it was essential to develop a data storage and analysis tool, or DMS. The DMS was developed by MWH under contract with the USACE. Other local sponsors included SGA and its member agencies, DWR, and SCWA.

The DMS is a public domain application developed in a Microsoft Visual Basic environment and is linked to a SQL database containing North American Basin purveyor data. The DMS provides the end-user with ready access to both enter and retrieve data in either tabular or graphical formats. Security features in the DMS allow for access restrictions based on a variety of user permission levels. Data in the DMS include:

- Well construction details.
- Known locations of groundwater contamination and potentially contaminating activities.
- Long-term monitoring data on monthly extraction volumes.
- Water elevations.
- Water quality
- Aquifer characteristics based on well completion reports.

The DMS allows for the viewing of regional trends in groundwater elevation and quality not previously available to the plan participants. The DMS has the capability of quickly generating well hydrographs and groundwater elevation contour maps using historic groundwater level data. The DMS also has the ability to view water quality data for CCR Title 22 required constituents as a temporal concentration graph at a single well or any constituent can be plotted with respect to concentration throughout the WPCGMP area. Presentation of groundwater elevation and quality data in these ways will be useful for making groundwater basin management decisions.

Groundwater data from a select group of Roseville's ASR compatible backup water supply wells and monitoring wells has already been loaded into the DMS. Other plan participants are currently in the process of evaluating the future use of the DMS. If used throughout the WPCGMP area, data transfer protocols will be established so that groundwater data in both the SGA and WPCGMP areas (by cooperating agencies, DWR, USGS, etc.) can be readily appended to the database and analyzed through the DMS. Annual summaries of groundwater monitoring data would then be prepared using the analysis tools in the DMS and presented in the update to the State of the Basin report (see Section 4).

Again, if the DMS were widely used and once fully populated and quality-control checked a summary of existing basin conditions would be prepared. From this, an initial summary analysis would be performed on at least an annual basis to assess the impacts of current and future plan participants' management actions on the groundwater system.

Actions — If widely used, to maintain and improve the usability of the DMS, plan participants will take the following actions:

- Provide users staff with training and use of a Data Management System (DMS).
- Populate and update a DMS with available groundwater, water quality, well, and surface water data.
- Develop list of recommended enhancements to a DMS.
- Provide resources for maintaining and updating a DMS.
- Provide resources for maintaining, updating and utilizing a groundwater model or the North American River IGSM.
- Develop and present a biennial State of the Basin Report.

3.7 COMPONENT CATEGORY 3: GROUNDWATER RESOURCE PROTECTION

Monitoring well containment box

Plan participants consider groundwater protection to be one of the most critical components of ensuring a sustainable groundwater resource. In this WPCGMP, resource protection includes both the prevention of contamination from entering the groundwater basin and the remediation of existing contamination plumes. Prevention measures include proper well construction and destruction practices, development of wellhead protection measures, and protection of recharge areas. Measures to prevent contamination from human activities as well as contamination from natural substances such as saline water bodies from entering the potable portion of the groundwater system will be addressed as part of this component category.

3.7.1 Well Construction Policies

Placer County typically administers the well permitting program for the entire County, with the exception of lands within Roseville and Lincoln city limits. Placer County Environmental Management Department (EMD) well permitting program is detailed in Placer Counties Municipal Code sections 13.08, which define the purpose of the Well Water code as:

It is the purpose of this article to protect the health, safety, and general welfare of the people of the county of Placer by ensuring that the groundwater of this county will not be polluted or contaminated. To this end, minimum requirements are contained in this article for construction, reconstruction, repair, and destruction of water wells, cathodic protection wells, and monitoring wells. (Prior code § 4.800)

Placer County Municipal Code sections 14.11.030 defines the permit requirements as:

- a) When Required. No person shall dig, bore, drill, deepen, modify, repair, or destroy a water well, cathodic protection well, observation well, or monitoring well without first applying for and receiving a permit as provided in this article unless exempted by law.
- b) Penalty for Failure to Obtain Permit. Any person who commences any work for which a permit is required by this article without having previously obtained a permit shall be required, if subsequently granted a permit for this work, to pay double the standard permit fee.
- c) Emergency Work. The above provisions shall not apply to emergency work required on short notice to maintain drinking water or agricultural supply systems. For the emergency work, when county offices are closed, a permit may be issued after such work has commenced, provided the following conditions are met:
- The permit application is made the first day county offices are open following said work; and
- The well system serves an existing structure or facility or agricultural operation; and
- The person responsible provides written documentation to the enforcement agency that such work was urgently necessary; and
- Conformance with Standards. Demonstrate that all work performed was in conformance with the technical standards as designated in Section 13.08.060. (Prior code § 4.808)

The Well Water Code as part of the Placer County's Municipal Code may be found at the web address below:

http://ordlink.com/codes/placer/index.htm

Roseville's Environmental Utilities Engineering Division is the permitting agency for wells located within the Roseville's city limits. For this reason, Roseville is aware of proposed and active wells within the Roseville's city limits. In order to permit a well in Roseville, a Well Construction Application and Permit Form must be filed with the environmental utilities department. An engineer from Roseville provides inspection services when new wells are constructed including observations during well seal grouting.

This process is detailed in the Roseville's Well Water Code as part of the Roseville's Municipal Code. Roseville's Municipal Code section 14.11.010 defines the purpose of the Well Water code as:

It is the purpose of this chapter to protect the health, safety and general welfare of the people of the City of Roseville by ensuring that the ground waters of the City will not be polluted or contaminated. It is also the purpose of this chapter that all ground waters be used to the benefit of the people of the City of Roseville. To this end, minimum requirements are contained in this chapter for construction, reconstruction, repair, use and destruction of water wells, cathodic protection wells, monitoring wells, and soil boring activities undertaken to investigate the environmental condition or water-bearing capacities of a property. (Ord. 2895 § 1 (part), 1995.)

The City Municipal Code sections 14.11.030 defines the permit requirements as:

No person shall dig, bore, drill, deepen, modify, repair or destroy a water well, cathodic protection well, observation well, monitoring well or any other excavation that may intersect ground water without first applying for and receiving a well permit as provided in this chapter unless exempted by law. (Ord. 2895 § 1 (part), 1995.)

The Well Water Code as part of the Roseville's Municipal Code may be found at the web address below:

http://bpc.iserver.net/codes/rosevill/index.htm

Starting in 1998, Lincoln assumed the responsibility from the Placer County EMD for the construction of all private and public wells within the city limits. Lincoln's Public Works Department has a permitting process in place to facilitate this responsibility. Typically, Lincoln does not allow the permitting of new private wells within city limits.

Actions — The plan participants will take the following actions:

- Ensure that the SGA, SSWD, NCMWC, NID, and others are provided a copy of the plan participants/Placer County's well ordinance and procedures and understand the proper well construction procedures.
- Provide a copy of the most recently delineated plume extents (if any) to the SGA, SSWD, NCMWC, NID, and others.
- Coordinate with the SGA, SSWD, NCMWC, NID, and others to provide guidance as appropriate on well construction. Where feasible and appropriate, this could include the use of subsurface geophysical tools prior to construction of the well to assist in well design.

3.7.2 Well Abandonment and Well Destruction Policies

Placer County typically administers the well destruction program for the entire County, with the exception of lands within the Roseville and Lincoln city limits. Placer County EMD well destruction program is detailed in Placer County's Muncipal Code sections 13.08.100., which defines the purpose of the Well Water code as:

"Except as otherwise specified, the standards for the construction, modification or destruction of wells shall be as set forth in:

- *a) Department of Water Resources Bulletin 74-81. The California Department of Water Resources Bulletin 74-81, "Water Well Standards, State of California," except as modified by subsequent revisions.*
- *b) All Subsequent Supplements and Revisions. All subsequent Bulletin 74-81 supplements or revisions issued by the Department of Water Resources, once the revised standards have been reviewed at appropriate public hearings. (Prior code § 4.820)*

Roseville's Municipal Code sections 14.11.030 defines abatement of abandoned wells as:

All persons owning an Abandoned Well as defined shall destroy it, following the guidelines set forth in Bulletin 74-90 and this chapter. (Ord. 2895 § 1 (part), 1995.)

Similar well construction policies, starting in 1998, Lincoln assumed the responsibility from the Placer County EMD for the permitting of all well destructions within the city limits. Lincoln's Public Works Department has a permitting process in place to facilitate this responsibility.

One concern expressed by the plan participants is that some abandoned domestic or agricultural wells may not been properly destroyed. For this reason, the plan participants plan to take the following actions.

Actions — The plan participants will take the following actions:

- Review DWR well records for all known wells in the WPCGMP area which were reported abandonment and destruction. Rate and provide a survey on the confidence of proper destruction based on the information provided on the report.
- Ensure that the SGA, SSWD, NCMWC, NID, and others are provided a copy of the Roseville/Lincoln /Placer County's code and understanding the proper destruction procedures and support implementation of these procedures.
- Follow up with the SGA, SSWD, NCMWC on the reported abandoned and destroyed wells to confirm the information collected from DWR. Follow up with the SGA, SSWD, NCMWC, and NID on the reported abandoned and destroyed wells to confirm the information collected from DWR.
- Provide a copy of the information of abandoned and destroyed wells in Placer County to fill gaps in County records (if any).
- Meet with Placer County EMD and DWR to ensure that wells in the WPCGMP area are properly abandoned or destroyed.
- Meet with the Placer County Farm Bureau and Placer County Agricultural Commission to encourage them to help educate farmers regarding the identification and proper destruction of abandoned wells.
- Obtain "wildcat" map from California Division of Oil and Gas to ascertain the extent of historic gas well drilling operations in the area as these wells could function as conduits to groundwater if not properly destroyed.

3.7.3 Wellhead Protection Measures

Identification of wellhead protection areas is a component of the Drinking Water Source Assessment and Protection (DWSAP) Program administered by DHS. DHS set a goal for all water systems statewide to complete Drinking Water Source Assessments by mid-2003. Roseville has completed their required assessments by performing the three major components required by DHS:

- Delineation of capture zones around source wells
- Inventory Potential Contaminating Activities (PCAs) within protection areas
- Analyze the vulnerability of source wells to PCAs

Delineation of capture zones includes using groundwater gradient and hydraulic conductivity data to calculate the surface area overlying the portion of the aquifer that contributes water to a well within specified time-of-travel periods. Typically, areas are delineated representing 2-, 5-, and 10-year time-of-travel periods. These protection areas need to be managed to protect the drinking water supply from viral, microbial, and direct chemical contamination.

Inventories of PCAs include identifying potential origins of contamination to the drinking water source and protection areas. PCAs may consist of commercial, industrial, agricultural, and residential sites, or infrastructure sources such as utilities and roads. Depending on the type of source, each PCA is assigned a risk ranking, ranging from "very high" for such sources as gas stations, dry cleaners, and landfills, to "low" for such sources as schools, lakes, and non-irrigated cropland.

Vulnerability analysis includes determining the most significant threats to the quality of the water supply by evaluating PCAs in terms of risk rankings, proximity to wells, and Physical Barrier Effectiveness (PBE). PBE takes into account factors that could limit infiltration of contaminants including type of aquifer, aquifer material (for unconfined aquifers), pathways of contamination, static water conditions, hydraulic head (for confined aquifers), well operation, and well construction. The vulnerability analysis scoring system assigns point values for PCA risk rankings, PCA locations within wellhead protection areas, and well area PBE; the PCAs to which drinking water wells are most vulnerable are apparent once vulnerability scoring is complete.

It is important that Roseville account for PCAs that exist in adjacent regions. PCA and capture zone information can be added to the DMS to aid in assessing wellhead protection. The DMS includes a feature that will automatically calculate wellhead protection areas if no data are available or if new well locations are proposed.

Actions — The plan participants will take the following actions:

- Request that the SGA, SSWD, NCMWC, and NID provide vulnerability summaries from the DWSAP to the plan participants governance structure to be used for guiding management decisions in the basin.
- Contact groundwater basin managers in other areas of the state for technical advice, effective management practices, and "lessons learned", regarding establishing wellhead protection areas.

3.7.4 Protection of Recharge Areas

PCWA has evaluated surface geology within and directly adjacent to the WPCGMP boundary for the purpose of delineating areas of potentially high recharge rates (PCWA, 2005). Lincoln has also identified protection of natural recharge areas a key element of its management objectives (Lincoln, 2003). Natural recharge of area groundwater resources occurs primarily from percolation of irrigation water, infiltration along the creeks and drainages, infiltration of precipitation, and subsurface inflow. Natural recharge rates can be maintained by keeping the major recharge areas free of impervious surfaces.

The efficiency of direct recharge through surface spreading, as opposed to natural recharge, is highly related to the infiltration rate of the surficial soil. Surface soils map for the WPCGMP area from the U.S. Department of Agriculture, showing soil classes with different infiltration rate, have been evaluated by PCWA. The best candidates would be pasture lands for stock grazing because flooding these vacant lands combined with proper land rotation will have little or no negative impacts on the agricultural economy. Native lands not reserved for habitat conservation might also be candidates. Areas along or near natural streams may be good candidates for spreading activities due to the presence of subsurface alluvium and channels potentially useable for conveyance, although spreading may pose environmental impacts. Areas where canals, treated water systems, or possibly wastewater treatment plants are nearby may also be good candidates due to the proximity to potential water sources. Current recharge that may be of interest include the following:

- Nevada irrigation District (NID) Bear River – Use of NID Canal to deliver raw surface water to recharge basins.
- Dry Creek Waste Water Treatment Plant (WWTP) – Convey recycled water via Dry Creek and divert water to recharge basins.
- Dry Creek WWTP – Create new diversion facilities on Dry Creek in Placer County for basin recharge from Dry Creek WWTP.

Currently the only artificial recharge site in the WPCGMP area is the Roseville ASR program, which is currently in a demonstration phase of testing. Plan participants are interested in implementing actions designed to protect future recharge areas both artificial and natural for the Roseville ASR program and other future artificial recharge sites in the WPCGMP area.

The runoff characteristics and recharge potential of the soil throughout the Lincoln area have been investigated and mapped (Saracino, Kirby, and Snow, 2003) – providing a qualitative indication of a real potential for deep percolation of surface water into the aquifer systems. Most of the soil cover across the North American Subbasin has been classified as having high runoff (low infiltration) potential, except in the vicinity of river and stream drainages (Montgomery Watson, 1995). A fairly large area surrounding Auburn Ravine, as well as Coon Creek, has been classified as having soils with moderate to high runoff potential (low to moderate infiltration potential). DWR (1995) characterizes the soil cover across the area as having dense subsoil that limits deep percolation of water applied at the surface; less dense soils occur in the vicinity of creeks such as Coon Creek and Auburn Ravine, providing better deep percolation and recharge. Boyle (1990) also identified the Markham Ravine drainage as a probable area of groundwater recharge and Spectrum-Gasch (1999) identified the Orchard Creek drainage, along with Auburn Ravine, as probable areas of significant recharge based on the inferred shallow depth to the upper aquifer zone in these areas.

Actions — The plan participants will take the following action:

- Develop a recharge program that identifies major natural recharge areas, quantifies current recharge rates, identifies potential sources of surface water that could be utilized for recharge, and methods for recharging groundwater.
- Identify potential activities that could adversely affect recharge quantities or qualities and formulate cohesive policies that the plan participants can use to manage or mitigate potential impacts.

3.7.5 Control of the Migration and Remediation of Contaminated Groundwater

Contaminated groundwater within the WPCGMP area is limited in comparison to groundwater contamination documented in the SGA area. However, within the WPCGMP area, groundwater contamination has been documented at the Union Pacific Railroad (UPRR) Roseville Yard, Alpha Explosives, Deluxe Cleaners, Roseville Sanitary Landfill, and Western Placer Waste Management Authority Landfill Site as described in Section 2.1.3. Although not documented within this WPCGMP, other sites of concern include localized contamination from industrial/commercial point sources such as other dry cleaning facilities and numerous fuel stations throughout the WPCGMP area.

While the plan participants do not have authority or the responsibility for remediation of this contamination, they are committed to coordinating with responsible parties and regulatory agencies to stay informed on the status and disposition of known contamination in the WPCGMP area.

There are a number of historic, current, and proposed activities in and near Lincoln that have the potential to contaminate groundwater. These activities, described in Lincoln's 2003 GMP, are not the only potential sources of contamination to Lincoln's groundwater. The activities included in the report are derived from information provided by Applied Engineering and Geology (AEG, 2003). These identified activities represent locations where there has been, is, or may be certain contaminants that have caused or could cause an adverse impact to groundwater within Lincoln's Sphere of Influence. Information to develop the locations was compiled from various sources including: Placer County Division of Environmental Health, Regional Water Quality Control Board, GeoTracker Database, AEG's files, Department of Toxic Substances Control, Environmental Data Resources, consultant reports, and others.

Actions — The plan participants will take the following actions:

- Map and monitor known contaminated sites while coordinating with known responsible parities (if any) to develop a network of monitoring wells to act as an early warning system for public supply wells.
- If detections occur in these monitoring wells, work with the responsible parties and the potentially impacted areas of the SGA, SSWD, NCMWC and NID to develop strategies to minimize the further spread of contaminants.
- Provide the SGA, SSWD, NCMWC and others with all information on mapped contaminant plumes and LUST sites for their information in developing groundwater extraction patterns and in the siting of future production or monitoring wells.
- Inform the SGA, SSWD, NCMWC, and NID of the presence of the interface and the approximate depth of the interface below their service area for their reference when siting potential wells.
- Establish and isolate zones around known contamination plumes so as to limit the placement of production wells whose pumping might otherwise exacerbate the contamination. Add offset requirements for landfills

3.7.6 Control of Saline Water Intrusion

Saline water intrusion from the Sacramento/San Joaquin River Delta (Delta) is not currently a problem in the WPCGMP area, and is not expected to become a problem in the future. Higher groundwater elevations associated with recharge from the American and Sacramento Rivers have maintained a historical positive gradient preventing significant migration of any saline water from the Delta into the Placer County region. These groundwater gradients will continue to serve to prevent any localized pumping depressions in the basin from inducing flow from the Delta into the WPCGMP area.

Actions — The plan participants will take the following actions:

- Track the progression, if any, of saline water bodies moving toward the east from the Delta. Because this is a highly unlikely scenario, this action will be limited to communicating with DWR's Central District Office on a biennial basis to check for significant changes in TDS concentrations in wells. DWR has a regular program of sampling water quality in select production wells throughout the adjacent Solano, San Joaquin, and Yolo counties. This will serve as an early warning system for the potential of saline water intrusion from the Delta.
- Determine and monitor the elevation of the fresh water/saline water vertical interface. Analyze for trends in sodium, chloride, and TDS that may indicate upconing of saline water.
- Observe TDS concentrations in plan participant's municipal wells that are routinely sampled under Title 22. This data will be readily available as part of the DMS and are already an on-going task for the annual review of basin conditions.
- Inform all stakeholders of the presence of the salinity interface and the approximate depth to the interface for their reference when siting potential wells. The plan participants will also ensure that Placer County EMD, along with Roseville and Lincoln, issues well permits, is aware of the interface. The plan participants will provide a map indicating the contour of the elevation of the base of fresh water in Placer County to EMD for their reference when issuing well permits.

3.8 COMPONENT CATEGORY 4: GROUNDWATER SUSTAINABILITY

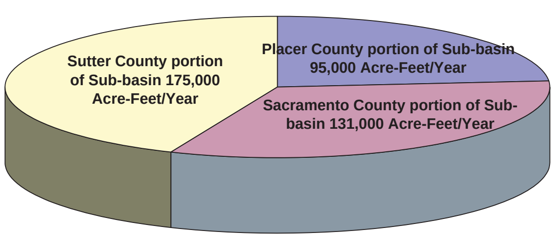
To ensure a long-term viable supply of groundwater, the plan participants are seeking to maintain the amount of groundwater stored in the basin over the long-term.

As described within the western Placer County Groundwater Storage Study, the calculated sustainable yield for the entire North American River Groundwater Subbasin is equal to 400,000 AF/year (PCWA, 2005). The Water Forum set the sustainable yield for Sacramento County portion of the subbasin at 131,000 AF/year with the remaining approximate 269,000 AF/year split 175,000 and 95,000 AF/year for Sutter and Placer County, respectively.

The "Long-term Average Sustainable Yield" definition for purposes of this WPCGMP is the average groundwater extraction calculated over a period of time commencing with the adoption of the WPCGMP. Given that agricultural groundwater extractions are estimated based on land use and crop type approximately every five years commensurate with the DWR Land Use Survey, each new year of data is added to the next and then averaged over the entire period of record. The 2000 extraction data will be added to the 2005 extraction data which will be added to the 2010 extraction data and so on. The "long-term" average is the average of the total extraction over the period of record (i.e. 2000 to 2010 in this example).

To ensure a sustainable resource, the plan participants continue to move forward with conjunctive use programs in the WPCGMP area including protection of natural recharge areas, pursuit of additional surface water supplies, increased use of recycled water, groundwater recharge and implementation of the WFA water conservation element. Current conjunctive management activities are described below.

Figure 3-4 – Recommended Sustainable Yield for the North American Groundwater Sub-Basin



3.8.1 Conjunctive Management Activities

Two primary activities will result in an improved ability to sustain the viability of the groundwater resource for the region. Conjunctive management is an activity that includes the planning and construction of facilities to increase the available surface water supply to the area as well as to create opportunities for the banking and exchange of water with local in-basin partners after local needs are met. These partnerships will result in increased surface water and perhaps revenue to pay for some of the necessary capital improvements to help sustain the resource in a cost-effective way (Conjunctive Management Activities).

The plan participants are committed to expanded direct recharge activities and have investigated a variety of ways of recharging water into the available storage space in the basin (see **Sections 1.5.1.3., 1.5.1.4.**, and **1.5.3.2**). Opportunities for direct recharge from overlying land in the basin exist through recharge basins (e.g., abandoned aggregate mining pits or wetland habitat reserves) or through ASR. Roseville is currently implementing ASR programs where treated surface water is being injected into the groundwater and recovered through wells in the summer months and dry years. Most of the potential recharge opportunities could occur by providing raw or treated surface water or recycled water to municipal and agricultural users in-lieu of their extracting groundwater.

Actions — The plan participants will take the following actions:

- Continue to investigate conjunctive use opportunities within the WPCGMP area.
- Continue to investigate opportunities for the development of direct recharge facilities in addition to in-lieu recharge (e.g. injection wells or surface spreading facilities, through constructed recharge basins or in river or streambeds.

3.8.2 Demand Reduction

Another way to maintain the sustainable yield of the basin and continue to achieve in-lieu recharge is by reducing demand for potable water supplies by conservation and through the use of recycled water for landscape irrigation.

Water Conservation. Roseville, as a signatory to the WFA; Lincoln, as a signatory to the California Urban Water Conservation Council's Memorandum of Understanding; and PCWA, as a signatory to both; are committed to implementing water conservation programs. As part of their respective agreements, each agency has implemented most, if not all, of the water conservation Best Management Practices (BMPs) listed in **Tables 3-2** and **3-3**.

Water Recycling. Currently Roseville and Lincoln have recycled water programs. Recycled water is currently produced at Roseville's regional WWTPs at Dry Creek and Pleasant Grove Creek. Effluent from Roseville's treatment plants is tertiary treated and meets Title 22 full body contact requirements for use of recycled water.

Roseville has made upgrades to transmission pipelines to allow more than 6 million gallon per day (MGD) of recycled water for use at area parks and golf courses. Roseville plans to expand its existing recycled water distribution system to reduce demands for potable water in the City and to minimize discharges to Dry Creek and Pleasant Grove Creek.

Wastewater from Lincoln is treated at a City-owned Wastewater Treatment and Reclamation Facility (WWTRF) located west-southwest of the downtown area. The 3.3 MGD WWTRF began operation in 2004 and generated an initial 2.4 MGD of average dry weather flow with expansion capacity to 12 MGD in 2020. The WWTRF replaced the Waste Water Treatment Plant, which has been decommissioned. Effluent from the WWTRF undergoes treatment processes that include oxidation, coagulation, clarification, filtration, and disinfection. This level of treatment allows the effluent to meet California Department of Health services (DHS) unrestricted reuse criteria (Eco:Logic, 2001).

Wastewater effluent from the Lincoln WWTRF is utilized for irrigation on approximately 382 acres at three sites. During the non-irrigation season, effluent is stored for future use. Areas that currently receive recycled water are capable of using 1.8 MGD. Lincoln initiated a Wastewater Reclamation Study to determine the potential for reclaiming treated wastewater from the new WWTRF. According to an administrative draft, the objectives of the study are to:

- Identify potential reclamation areas near the plant.
- Review water supplies available in the area.
- Analyze applicable wastewater recycling regulations and summarize their impact on wastewater treatment facilities
- Evaluate the market for wastewater reclaiming opportunities.
- Identify and prioritize the most likely projects for wastewater reclamation.
- Actions. The plan participants will take the following actions:
- Continue to participate in their respective conservation efforts.
- Coordinate with City of Lincoln, SGA, SSWD, NCMWC, NID, and others to investigate further opportunities for expanded use of recycled water throughout the WPCGMP area.

3.9 COMPONENT CATEGORY 5: PLANNING INTEGRATION

With the number of water purveyors and cities serving the Western Placer County area, the need to integrate water management planning on a regional scale is a high priority. Individual purveyors and cities derive their supplies from the American River, the Sacramento River, the groundwater basin, or some mix of these sources. Their infrastructure systems are mostly independent; where interconnections do exist between purveyors or cities, they are typically for emergency purposes only.

3.9.1 Existing Integrated Planning Effort

The plan participants, or subsets thereof, are part of various existing integrated planning efforts. These efforts include the WFA, ARB IRWMP, and Integrated Surface and Groundwater Modeling.

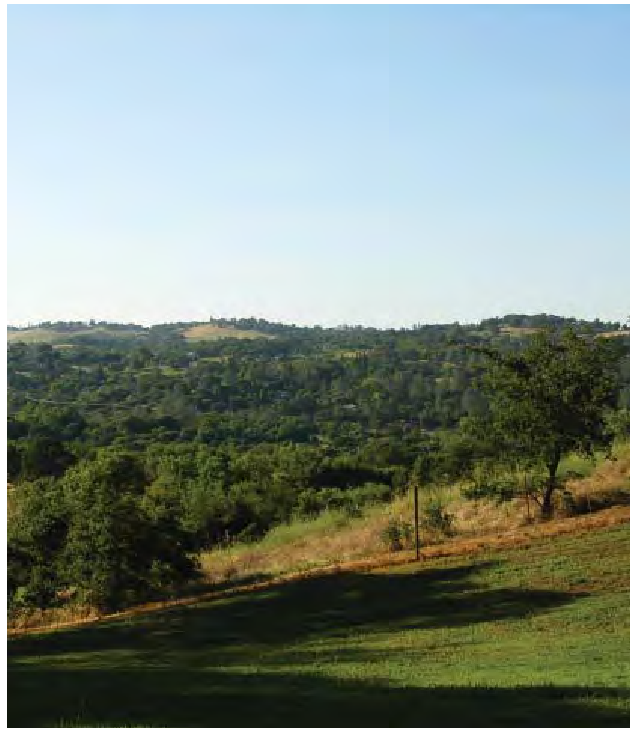
- Water Forum Agreement. The WFA, as described in Section X, provides a regional conjunctive use framework with commitments from individual purveyors concerning groundwater and surface water operations, including limitations on surface water diversions from the lower American River during dry years. PCWA, Roseville, and CAW are all signatories to the WFA.
- ARB IRWMP. Regional Water Authority (RWA), Freeport Regional Water Authority (FRWA), and Sacramento County Water Agency (SCWA), along with it various members and stakeholders, have developed the American River Basin (ARB) Integrated Regional

Table 3-2: Water Conservation Best Management Practices Implemented by Roseville and PCWA

Water Forum Agreement Water Conservation Best Management Practices
1. Interior and exterior water audits and incentive programs for single-family residential, multi-family residual, and institutional customers
2. Plumbing retrofit of Existing Residential Accounts
3. Distribution System Water Audits, Leak Detection and Repair
4. Non-residential Meter Retrofit
5. Residential Meter Retrofit
6. Large Landscape Water Audits and Incentives for Commercial, Industrial, Institutional, and Irrigation Accounts
7. Landscape Water Conservation Requirements for New and Existing Commercial, Industrial, Institutional and Multifamily Developments
8. Public Information
9. School Education
10. Commercial and Industrial Water Conservation
11. Conservation Pricing for Metered Accounts
12. Landscape Water Conservation for New/Existing Single Family Homes
13. Water Waste Prohibition
14. Water Conservation Coordinator
15. Ultra-low Flush Toilet Replacement Program for Non-Residential Customers

Table 3-3: Water Conservation Best Management Practices Implemented by Lincoln and PCWA

California Urban Water Conservation Council's Water Conservation Best Management Practices
1. Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers
2. Residential Plumbing Retrofits
3. System Water Audits, Leak Detection and Repair
4. Metering With Commodity Rates
5. Large Landscape Conservation Programs and Incentives
6. High-efficiency Washing Machine Rebate Programs
7. Public Information Programs
8. School Education Programs
9. Conservation Programs for Commercial, Industrial, and Institutional Accounts
10. Wholesale Agency Programs
11. Conservation Pricing
12. Water Conservation Coordinator
13. Water Waste Prohibition
14. Residential Ultra-Low-Flush Toilet Replacement Programs



Water Management Plan (IRWMP). The IRWMP, as described in Section 1, is a comprehensive planning document prepared on a regional scale that identifies priority water resources projects and programs with multiple benefits. The ARB IRWMP was adopted in May 2006. As projects/programs outlined in the IRWMP are implemented, the plan itself will be reviewed periodically to address changes, identify issues of concern, and provide for additional study and analysis. New projects/programs will continue to be identified and incorporated. The participants designed the IRWMP as a living document that can be readily updated as the needs of the region change over time. PCWA, Roseville, Lincoln, and CAW are involved in the ARB IRWMP through their participation in RWA.

- Integrated Surface Water and Groundwater Modeling. Plan participants continue to use and build on existing groundwater models for the Western Placer County area. The Integrated Groundwater and Surface Water Model, or IGSM, is a finite element, quasi three-dimensional, numerical model that provides a comprehensive simulation of all major components of the hydrological cycle in accordance with mass balance and water budget accounting procedures. Elements of the hydrologic cycle addressed by IGSM include precipitation, runoff, groundwater recharge, evaporation, consumptive use, groundwater extraction and injection, and subsurface inflow and outflow along the model boundaries. The simulation also includes interactions between surface streams and lakes, and aquifers.

- The IGSM, as a data intensive model, requires information like hydrogeology, hydrostratigraphy, land use, water use, and precipitation. An IGSM subregion, which is a group of model elements, typically represents a water district, irrigation district, city, other management areas, or unincorporated lands. Water and land use budgeting in the IGSM is performed on a subregion-by-subregion basis. Two types of simulation runs are made using the: the dynamic run is mostly used for calibration of the model where changes in pumping and land use are occurring over time based on real or forecasted data; the static run is typically used for planning purposes and assists in looking at the change in the groundwater basin from one condition to another condition. Dynamic run calibrates input data using historical land use and water demand to produce a relationship in understanding how historical groundwater conditions are affected by historical hydrologic conditions. With fixed levels of land and water use, static runs are used to evaluate how the groundwater basin responds throughout a series of historical hydrologic conditions. This is typically the hydrologic period from water year 1922 to 1995.
- Three IGSM applications, North American River, Sacramento County, and San Joaquin County IGSM (NARIGSM, SCNIGSM, and SJCIGSM), were developed under the American River Water Resources Investigation (ARWRI) in the 1990s to simulate groundwater conditions in the Sacramento Valley. These models joined together cover the North and South American groundwater subbasins in the Sacramento Valley Basin and part of the San Joaquin Valley Basin. These IGSM models have been updated and applied widely to regional and local groundwater studies. SGA is currently updating the portion of the SCNIGSM model that lies in northern Sacramento County.

[3] American River Water Resources Investigation (ARWRI) was completely cooperatively between Bureau of Reclamation and DWR in the mid 1990's. Objectives of the ARWRI include meeting projected year 2030 water demands in the five counties (El Dorado, Placer, Sacramento, San Joaquin, and Sutter counties) and stabilizing the groundwater basins.

Actions— The plan participants will take the following action:

- Continue to move forward with existing WFA and IRWMP implementation efforts.
- Coordinate with SGA and Sutter County on regional hydrologic modeling efforts and updates.

3.9.2 Potential Future Integrated Planning Efforts

Along with integrating the above mentioned existing planning efforts, plan participants recognize that there are potential future integrated planning efforts as described below.

Roseville and PCWA are already implementing integrated planning and management in the region through participation in their respective water efficiency programs (see Section 3.8.2.), and through the Roseville's recycled water program (see Section 3.8.2.).

Although not integrated, the following are other planning efforts which the plan participants will work toward integrating when appropriate.

- Urban Water Management Planning. Roseville, Lincoln, PCWA, and CAW are required to prepare Urban Water Management Plans (UWMP). These plans, as defined by CWC § 10610 et seq., require public water suppliers with more than 3,000 customers or that deliver more than 3,000 AF of water annually to identify conservation and efficient water use practices to help ensure a long-term, reliable water supply. As described in Sections 1.5.1.1., 1.5.2.1., 1.5.3.4., & 1.5.4.2., Roseville, Lincoln, PCWA, and CAW have submitted updated UWMPs to DWR.
- DWSAP Program. The DWSAP Program is administered by DHS. As a first step to a complete source protection program, DHS required water systems to conduct a preliminary assessment. The assessment includes the "delineation of the area around a drinking water source through which contaminants might move and reach that drinking water supply; an inventory of PCAs that might lead to the release of microbiological or chemical contaminants within the delineated area; and a determination of the PCAs to which the drinking water source is most vulnerable (http://www.dhs.ca.gov/ps/ddwem/dwsap/overview.htm)." The assessments only apply to agencies that deliver groundwater for public drinking water supply. Roseville and Lincoln have completed DWSAPs for their existing groundwater production wells.
- Land Use Planning. Effective January 1, 2002, State law required (SB610 and SB221) that a water supplier take certain actions to confirm sufficiency of water supply as a condition to approval of some new development projects. These actions involve the development of Water Supply Assessments and Written Verifications at the request of the land use authority. These documents provide an assurance that adequate water supplies are available before a project moves forward.

Actions— The plan participants will take the following action:

- Integrate other existing planning efforts where appropriate or communicate these planning efforts and subsequent planning actions to each plan participant.

Table 3-4: Summary table listing Action Items and showing which BMOs they support.

Action Items Related to BMO	BMO No. 1. Management of the groundwater basin shall not have a significant adverse effect on groundwater quality.	BMO No. 2. Manage Groundwater Elevations to ensure an adequate groundwater supply for backup, emergency, and peak demands without adversely impacting adjacent areas.	BMO No. 3. Participate in State and Federal Land Surface Subsidence Monitoring Programs.	BMO No. 4. Protect Against Adverse Impacts to Surface Water Flows in Creeks and Rivers due to groundwater pumping.	BMO No. 5. Ensure Groundwater Recharge Projects Comply with State and Federal Regulations and protect beneficial uses of groundwater.
Component No. 1 Stakeholder Involvement					
Involving the Public	✓	✓			
Involving Other Agencies Within & Adjacent to the WPCGMP area	✓	✓	✓	✓	✓
Using Advisory Committees	✓	✓	✓	✓	✓
Developing Relationships with State and Federal Agencies	✓	✓	✓	✓	✓
Pursuing Partnership Opportunities			✓		✓
Component No. 2 Monitoring Program					
Groundwater Elevation Monitoring		✓			✓
Groundwater Quality Monitoring	✓				✓
Land Surface Elevation Monitoring			✓		
Surface Water Groundwater Interaction Monitoring				✓	
Protocols for Collection of Groundwater Data	✓	✓			
Groundwater Data Management System	✓	✓	✓	✓	✓
Component No. 3 Groundwater Resource Protection					
Well Construction Policies	✓				
Well Abandonment and Destruction Policies	✓				
Wellhead Protection Measures	✓				
Protection of Recharge Areas	✓				
Control of the Migration and Remediation of Contaminated Groundwater	✓				
Control of Saline Water Intrusion	✓				
Component No. 4 Groundwater Sustainability					
Conjunctive Management Activities	✓	✓	✓	✓	✓
Demand Reduction	✓	✓	✓	✓	✓
Component No. 5 Planning Integration					
Existing Integrated Planning Efforts (Urban Water Management Planning, DWSAP Program, Land Use Planning, and Integrated Surface water and Groundwater Modeling)	✓	✓	✓	✓	✓

3.10 SUMMARY OF SECTION 3

Table 3-4 provides a summary of Section 3 for quick reference and for use in further sections. The table correlates which activities are related to one or more BMOs.

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SECTION 4

Plan Implementation

SECTION 4
Plan Implementation

This section summarizes the various plan implementation activities for the WPCGMP.

Table 4-1 summarizes the action items presented in Section 3 with an implementation schedule. Many of these actions involve coordination by the plan participants with other local, State and Federal agencies within six months of the adoption of this GMP. A few activities involve assessing trends in basin monitoring data for the purpose of determining the adequacy of the monitoring network. These assessments will be made as new monitoring data become available for review by the plan participants and results will be documented in a biennial State of the Basin report.

4.1 BIENNIAL GMP IMPLEMENTATION REPORT

Plan participants will report on the progress made implementing the WPCGMP in a biennial State of the Basin report. The report will summarize groundwater conditions in the WPCGMP area and document groundwater management activities from the previous year. Much of the data used in the biennial State of the Basin report will come from the monitoring and successful implementation of the action items stated above and from data collected and potentially entered into a data management system (DMS). This report will include:

- A water budget: estimate of perennial yield;
- A description of data collection methods and frequencies;
- Identification of water quality constituents of concern with a summary and an interpretation of water quality data;
- Improved characterization of the groundwater basin through interpretation of the cross section(s);
- A summary and interpretation of groundwater elevation data;
- A summary of management actions during the period covered by the report with a discussion, supported by monitoring results, of whether these actions are achieving progress in meeting BMOs;
- Any special studies relevant to groundwater or the implementation actions; and
- A summary of any plan component changes, including the addition or modification of BMOs during the period covered by the report.

The biennial State of the Basin report will be completed by the second quarter of the first year and by the end of the first quarter every other year and will report on conditions and activities completed through December 31st of the prior year(s). The biennial State of the Basin report will try to coincide with SGA's State of the Basin reporting schedule.

4.2 FUTURE REVIEW OF WPCGMP

This WPCGMP is the first regionally coordinated groundwater management effort in Western Placer County. As such, implementation of many of the identified actions will likely evolve as the WPCGMP plan participant's appointed governance body actively manages and learns more about the subbasin. Many additional actions will also be identified in the biennial report described above. The WPCGMP is therefore intended to be a living document, and it will be important to evaluate all of the actions and objectives over time to determine how well they are meeting the overall goal of the plan. The WPCGMP governance body plans to evaluate this entire plan within five years of adoption.

4.3 FINANCING

It is envisioned that implementation of the WPCGMP, as well as many other groundwater management-related activities will be funded from a variety of sources including the cost share program established by the WPCGMP plan participants in an implementation agreement; in-kind services by other agencies; State or Federal grant programs; and local, State, and Federal partnerships. Some of the items that would likely require additional resources include:

- Monitoring for groundwater quality or elevations in non-purveyor wells.
- Customization of the DMS interface.
- Preparation of WPCGMP biennial reports.
- Updates of the overall WPCGMP.
- Update of data sets and recalibration/improvement of existing groundwater model.
- Collection of future subsidence data.
- Construction of monitoring wells where critical data gaps exist.
- Stream-aquifer interaction studies.
- Implementation of the WPCGMP including:
- Committee coordination.
- Project management.
- Implementation of regional conjunctive use program.

During year one of plan implementation, an estimate of some of the likely costs associated with the actions outlined in Table 4-1 will be prepared.

Table 4-1 Summary of WPCGMP Actions

Description of Action	Implementation Schedule	Reoccurance Schedule
Plan Component #1 - Stakeholder Involvement		
Involving the Public		
1. Continue efforts to encourage public participation as opportunities arise.	6 months	On-going
2. Review and take actions from a Public Outreach Plan as necessary during implementation of various aspects of the WPCGMP.	6 months	On-going
3. Continue to provide briefings to the Water Forum Successor Effort on WPCGMP implementation progress.	6 months	On-going
4. Work with basin stakeholders to maximize outreach on WPCGMP activities, including the use of the plan and plan participants' websites.	6 months	On-going
Involving other Agencies adjacent to the WPCGMP area		
1. Continue a high level of involvement with SGA, SSWD, NCMWC, NID and other interested parties in implementing the WPCGMP.	6 months	On-going
2. Provide copies of the adopted WPCGMP and subsequent annual reports to representatives from the SGA, SSWD, NCMWC, NID and other interested parties.	12 months	24 months
3. Meet with representatives from the SGA, SSWD, NCMWC, NID and other interested parties, as needed.	6 months	On-going
4. Coordinate a meeting with other self supplied groundwater pumpers in the WPCGMP area to inform them of the plan participant's management responsibilities and activities, and develop a list of other self supplied groundwater pumpers concerns and needs to the plan participant's management.	6 months	12 months
5. Coordinate a meeting with the agricultural groundwater pumpers in the WPCGMP area to inform them of the plan participant's management responsibilities and activities, and develop a list of agricultural groundwater pumpers concerns and needs to the plan participant's management.	6 months	12 months
Utilizing advisory committees		
1. Upon adoption of the WPCGMP, the TRC will periodically meet to discuss scheduling and functions to guide implementation of the plan and provide these recommendations to the WPCGMP governance body.	6 months	6 months
Developing relationships with State and Federal Agencies		
1. Continue existing and develop new working relationships with local, state, and federal regulatory agencies.	6 months	On-going
Pursuing Partnership Opportunities		
1. Continue to promote partnerships that achieve both local supply reliability and achieve broader regional and statewide benefits.	6 months	On-going
2. Continue to track and apply for grant opportunities to fund regional groundwater management activities and local water infrastructure projects.	6 months	On-going
Plan Component #2 - Monitoring Program		
Groundwater Elevation Monitoring		
1. Coordinate with DWR and others to identify an appropriate group of wells for monitoring a Fall 2007 and future groundwater elevation measurements.	6 months	12 months
2. Coordinate with DWR and others to ensure that the selected wells are maintained as part of a long-term monitoring network.	6 months	12 months
3. Coordinate with DWR to ensure that the timing of water level data collection by other agencies coincides within one month of DWR data collection. Currently, DWR collects water level data in the spring and fall.	6 months	12 months
4. Coordinate with other agencies to ensure that needed water level elevations are collected and verify that uniform data collection protocols are used among the agencies	6 months	12 months
5. Consider ways to fill gaps in the monitoring well network by identifying suitable existing wells or identifying opportunities for constructing new monitoring wells.	6 months	12 months
6. Assess groundwater elevation trends and conditions based on the monitoring well network annually.	6 months	12 months
7. Assess the adequacy of the groundwater elevation monitoring network annually.	6 months	12 months
8. Identify a subset of monitoring wells that will be monitoring more frequently than twice annually to improve the plan participants' understanding of aquifer responses to pumping throughout the year.	6 months	12 months
Groundwater Quality Monitoring		
1. Coordinate with cooperating agencies to verify that uniform protocols are used when collecting water quality data	6 months	12 months
2. Coordinate with local, state, and federal agencies to identify where wells may exist in areas with sparse groundwater quality data. Identify opportunities for collecting and analyzing water quality samples from those wells.	6 months	12 months
3. Assess the adequacy of the groundwater quality monitoring well network annually.	6 months	12 months
Land Surface Elevation Monitoring		
1. Coordinate with other agencies, particularly DWR, USGS and SGA to determine if there are other suitable benchmark locations in the WPCGMP area to aid in the analysis of potential land surface subsidence	Immediately	24 months
Surface Water Groundwater Interaction Monitoring		
1. Work coorperatively with DWR and others to compile available stream gage data and information on tributary inflows and diversions from the Feather, Bear, and Sacramento Rivers to quantify net groundwater recharge or discharge between gages in the WPCGMP area.	12 months	12 months
2. Coordinate with local, state, and federal agencies to identify available surface water quality data from the Feather, Bear, and Sacramento rivers proximate to the WPCGMP area.	12 months	12 months
3. Correlate groundwater level data from wells in the vicinity of river stage data to further establish whether the river and water table are in direct hydraulic connection, and if the surface water is gaining or losing at those points	12 months	12 months
4. Continue to coordinate with local, state, and federal agencies and develop partnerships to investigate cost-effective methods that could be applied to better understand surface water-groundwater interaction along the Feather, Bear, and Sacramento rivers.	12 months	On-going
5. Perform evaluations of accretion/depletion interactions for local streams that bisect the WPCGMP, such as Auburn Ravine and Coon Creek.	12 months	12 months
Protocols for the Collection of Groundwater Data		
1. Use a Standard Operating Procedure (SOP) for collection of water level data by each of the cooperating agencies. Appendix C includes a SOP for Manual Water Level Measurements. This SOP was prepared using guidance documents available through the Environmental Protection Agency (EPA) and was included in a technical memorandum developed for SGA summarizing the accuracy and reliability of groundwater data (MWH, 2002).	6 months	On-going
2. Provide cooperating agencies with guidelines on the collection of water quality data developed by DHS for the collection, pretreatment, storage, and transportation of water samples (DHS, 1995).	6 months	On-going
3. Provide training on the implementation of these SOPs to cooperating agencies, if requested.	6 months	12 months
Groundwater Data Management System		
1. Provide users staff with training and use of a Data Management System (DMS).	9 months	none
2. Populate and update a DMS with available groundwater, water quality, well, and surface water data.	9 months	12 months
3. Develop list of recommended enhancements to a DMS.	15 months	12 months
4. Provide resources for maintaining and updating a DMS.	Immediately	On-going
5. Provide resources for maintaining, updating and utilizing a groundwater model or the North American River IGSM.	15 months	12 months
6. Develop and present an biennial State of the Basin Report	12 months	12 months

Description of Action	Implementation Schedule	Reoccurance Schedule
Plan Component #3 - Groundwater Resource Protection		
Well Construction Policies		
1. Ensure that the SGA, SSWD, NCMWC, NID and others are provided a copy of the plan participants/Placer County's well ordinance and procedures and understand the proper well construction.	6 months	none
2. Provide a copy of the most recently delineated plume extents (if any) to the SGA, SSWD, NCMWC, NID, and others.	6 months	none
3. Coordinate with the SGA, SSWD, NCMWC, NID, and others to provide guidance as appropriate on well construction. Where feasible and appropriate, this could include the use of subsurface geophysical tools prior to construction of the well to assist in well design.	6 months	none
Well Abandonment and Well Destruction Policies		
1. Review DWR well records for all known wells in the WPCGMP area which were reported abandonment and destruction. Rate and provide a survey on the confidence of proper destruction based on the information provided on the report.	6 months	none
2. Ensure that the SGA, SSWD, NCMWC, NID, and others are provided a copy of the Roseville/ Lincoln/Placer County's code and understanding the proper destruction procedures and support implementation of these procedures.	6 months	none
3. Follow up with the SGA, SSWD, NCMWC on the reported abandoned and destroyed wells to confirm the information collected from DWR. Follow up with the SGA, SSWD, NCMWC, and NID on the reported abandoned and destroyed wells to confirm the information collected from DWR.	6 months	none
4. Provide a copy of the information of abandoned and destroyed wells in Placer County to fill gaps in County records (if any).	6 months	none
5. Meet with Placer County EMD and DWR to ensure that wells in the WPCGMP area are properly abandoned or destroyed.	6 months	none
6. Meet with the Placer County Farm Bureau and Placer County Agricultural Commission to encourage them to help educate farmers regarding the identification and proper destruction of abandoned wells.	6 months	none
7. Obtain "wildcat" map from California Division of Oil and Gas to ascertain the extent of historic gas well drilling operations in the area as these wells could function as conduits to groundwater if not properly destroyed.	6 months	none
Wellhead Protection Measures		
1. Request that the SGA, SSWD, NCMWC, and NID provide vulnerability summaries from the DWSAP to the plan participants governance structure to be used for guiding management decisions in the basin.	6 months	none
2. Contact groundwater basin managers in other areas of the state for technical advise, effective management practices, and "lessons learned", regarding establishing wellhead protection areas.	6 months	none
Protection of Recharge Areas		
1. Develop a recharge program that identifies major natural recharge areas, quantifies current recharge rates, identifies potential sources of surface water that could be utilized for recharge, and methods for recharging groundwater.	24 months	none
2. Identify potential activities that could adversely affect recharge quantities or qualities and formulate cohesive policies that the plan participants can use to manage or mitigate potential impacts.	24 months	none
Control of the mitigation and remediation of contaminated groundwater		
1. Map and monitor known contaminated sites while coordinating with known responsible parities (if any) to develop a network of monitoring wells to act as an early warning system for public supply wells.	18 months	none
2. If detections occur in these monitoring wells, work with the responsible parties and the potentially impacted areas of the SGA, SSWD, NCMWC and NID to develop strategies to minimize the further spread of contaminants.	18 months	none
3. Provide the SGA, SSWD, NCMWC and others with all information on mapped contaminant plumes and LUST sites for their information in developing groundwater extraction patterns and in the siting of future production or monitoring wells.	18 months	none
4. Inform the SGA, SSWD, NCMWC, and NID of the presence of the interface and the approximate depth of the interface below their service area for their reference when siting potential wells.	18 months	none
5. Establish and isolate zones around known contamination plumes so as to limit the placement of production wells whose pumping might otherwise exacerbate the contamination. Add offset requirements for landfills.	18 months	none
Control of Saline Water Intrusion		
1. Track the progression, if any, of saline water bodies moving toward the east from the Delta. Because this is a highly unlikely scenario, this action will be limited to communicating with DWR's Central District Office on a biennial basis to check for significant changes in TDS concentrations in wells. DWR has a regular program of sampling water quality in select production wells throughout the adjacent Solano, San Joaquin, and Yolo counties. This will serve as an early warning system for the potential of saline water intrusion from the Delta.	12 months	24 months
2. Determine and monitor the elevation of the fresh water/saline water vertical interface. Analyze for trends in sodium, chloride, and TDS that may indicate upconing of saline water.	6 months	12 months
3. Observe TDS concentrations in plan participant's municipal wells that are routinely sampled under Title 22. This data will be readily available as part of the DMS and are already an on-going task for the annual review of basin conditions.	6 months	12 months
4. Inform all stakeholders of the presence of the salinity interface and the approximate depth to the interface for their reference when siting potential wells. The plan participants will also ensure that Placer County EMD, along with Roseville and Lincoln, issues well permits, is aware of the interface. The plan participants will provide a map indicating the contour of the elevation of the base of fresh water in Placer County to EMD for their reference when issuing well permits.	12 months	12 months
Plan Component #4 - Groundwater Sustainability		
Conjunctive Management Activities		
1. Continue to investigate conjunctive use opportunities within the WPCGMP area.	6 months	On-going
2. Continue to investigate opportunities for the development of direct recharge facilities in addition to in-lieu recharge (e.g. injection wells or surface spreading facilities, through constructed recharge basins or in river or streambeds.	6 months	On-going
Demand Reduction		
1. Continue to participate in their respective conservation efforts.	12 months	On-going
2. Coordinate with City of Lincoln, SGA, SSWD, NCMWC, NID, and others to investigate further opportunities for expanded use of recycled water throughout the WPCGMP area.	12 months	On-going
Plan Component #5 - Planning Integration		
Existing Integrated Planning Efforts		
1. Coordinate with SGA and Sutter County on regional hydrologic modeling efforts and updates.	9 months	24 months

SECTION 5

References

SECTION 5
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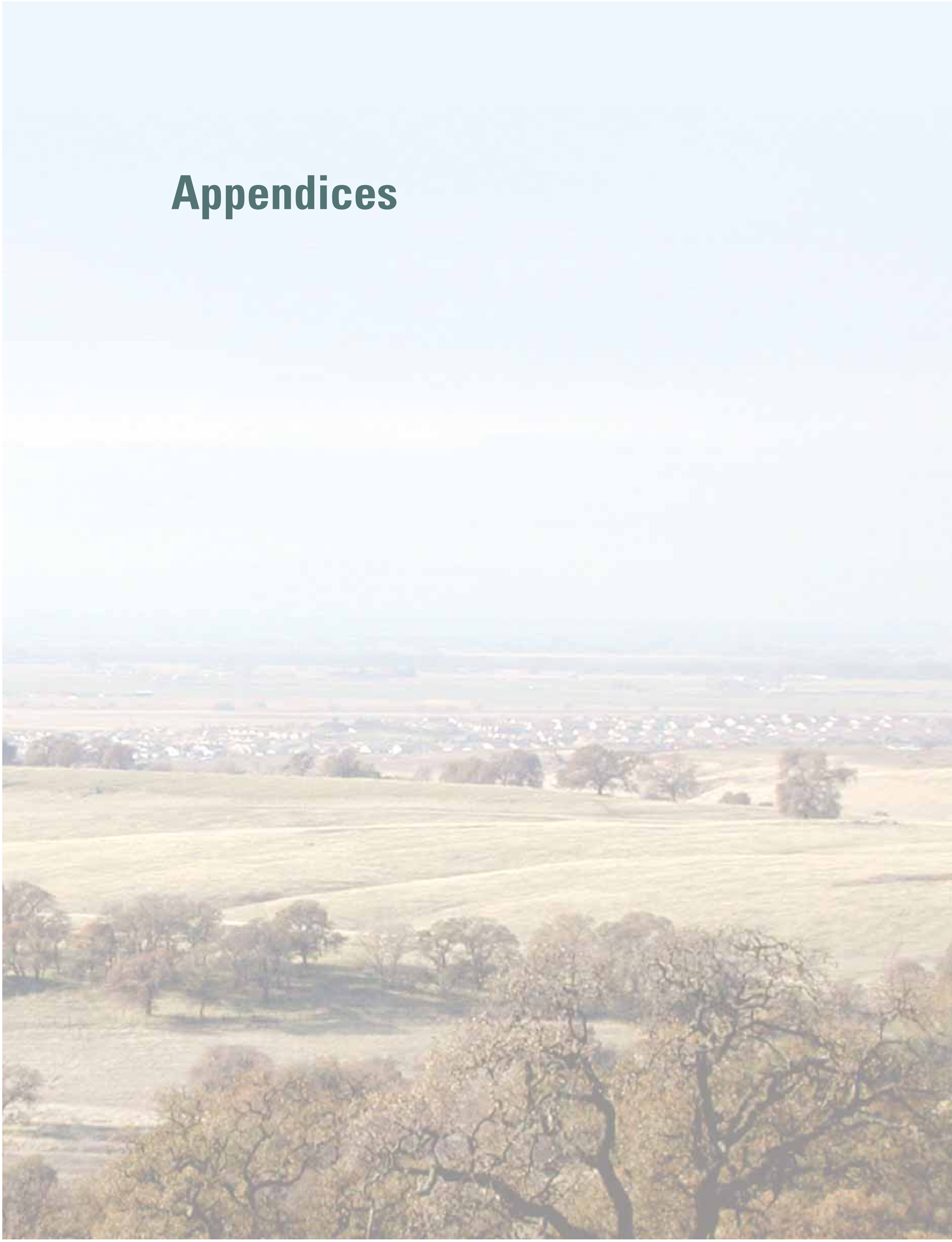
Appendices



APPENDIX A

WPCGMP Participants' Public Notices

NO 573 PUBLIC NOTICE

NOTICE OF ROSEVILLE CITY COUNCIL MEETING AGENDA ITEM FOR RESOLUTION OF INTENTION TO PREPARE A GROUNDWATER MANAGEMENT PLAN

The Roseville Environmental Utilities Department will ask the Roseville City Council to consider the adoption of a resolution of intention to prepare a Groundwater Management Plan (GMP) with Placer County Water Agency (PCWA) at its regularly scheduled 7:00 p.m., August 3, 2005 meeting. This matter will be included as an item on the Roseville City Council meeting agenda. The public is invited to attend the meeting which will be conducted at the Council Chambers located at City Hall, 311 Vernon Street, Roseville CA.

The City of Roseville (City) has developed and uses groundwater as an integral part of its water supply portfolio. Although the City relies primarily on surface water, it occasionally uses groundwater to meet peak demands (particularly during summer months). Additionally, groundwater is a reliable supply for the City during drought. The objective of the GMP is to strengthen the City¼s understanding and enhance the management of the groundwater resource. For more information on the preparation of the GMP, please contact the City's Project Manger, Mr. Ken Glotzbach, City of Roseville Environmental Utilities Department, at (916) 746-1751.

Run 2Ti, July 15 & 22, 2005

$597.08 = 2 Fridays

R3 Sacramento Bee
11/18/05

NO. [illegible] PUBLIC NOTICE

RESOLUTION NO. 05-[illegible]

A RESOLUTION OF THE CITY OF ROSEVILLE DECLARING ITS INTENT TO PREPARE A GROUNDWATER MANAGEMENT PLAN AND ADOPT A STATEMENT OF PUBLIC PARTICIPATION

[illegible]

Milestones

of the Mare Island shipyard, St. Peter's Chapel and Officers' Row Mansions and gardens. A lunch will be hosted on the grounds. There will be a stop at the Jelly Belly factory on the way.

The trip will take place

Recreation is offering a trip to the Strauss Festival in Elk Grove. The show features elegantly costumed dancers and professional musicians playing the music of Vienna's Waltz King, Johann Strauss, Jr.

The event takes place from

will get their chance to help at a Bloodsource Blood Drive, held from 11 a.m. to 5 p.m. today at the United Artists movie theater, 520 North Sunrise Ave.

For information call (800) 995-4420 extension11014.

PUBLIC NOTICE

Intent to Review and Adopt Proposed Western Placer County Groundwater Management Plan

The City of Roseville (City) will hold a public hearing to review and consider the adoption of the proposed Western Placer County Groundwater Management Plan (WPCGMP). The City has released a DRAFT version of the WPCGMP for public review. A copy of the proposed WPCGMP can be accessed online at www.wpcgmp.org or may be obtained for the cost of reproduction at the Office of the City Clerk, City of Roseville, located at City Hall, 311 Vernon Street, Roseville, CA.

The public hearing will be on July 18, 2007 at 7:00 p.m. at the regularly scheduled meeting of the City Council held in Council Chambers located at City Hall, 311 Vernon Street, Roseville, CA. The public is invited to provide comments on the WPCMP up to and including the close of the public comment portion of this agenda item at the City Council meeting scheduled for July 18, 2007. Any protests by landowners in the area covered under the WPCGMP must comply with the requirements set forth in Water Code section 10753.6 and be provided to the City of Roseville, in writing, prior to the close of the public comment portion of this agenda item at the July 18, 2007 7:00 p.m. meeting of the City Council.

The WPCGMP outlines a series of actions to protect Roseville's crucial groundwater resources in the western portion of the County. The overall goal of the WPCGMP is to maintain water quality and to ensure the long term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCMGP area. To achieve this goal, the WPCGMP sets forth five management objectives and five primary plan components identifying specific actions to be implemented for the purpose of maintaining the overall health of the underlying groundwater basin.

For more information please contact Ken Glotzbach at (916) 746-1751 or kglotzbach@roseville.ca.us.

October 2005 in order to reach out to families affected by Down syndrome in Placer County and beyond.

"I look at (Malachi), he's an absolute joy, he's the love of our lives — both boys are the loves of our lives," Haskin said. "That was kind of my urge to start the coalition, because there are other families like us out there."

Haskin operates the coalition out of the family's Roseville home. Haskin has a bachelor's degree in child development and worked with children with disabilities for more than a decade before Malachi was born.

"I loved it, and after Malachi was born I just really felt this is what I was called to do," she said. "I just felt like God put it in my heart."

The coalition is designed to educate the public and to provide charitable resources, ... port.

"The one comment we get time and time again, why they keep coming back, is that it's so positive, the focus is so positive," Haskin said. "People tell me I'm not being realistic. I'm just choosing to focus on the positive instead of dwelling on the negative."

Haskin said she wishes

RICO VAN HOUTRYVE/THE PRESS-TRIBUNE

Malachi Haskin's parents say their son is capable of accomplishing the same goals as any young boy.

even harder.

The Haskins and coalition volunteers are currently focusing their efforts on Cruisin' for Down Syndrome, a car show and family friendly event that will be held at the Gold Country Fairgrounds in Auburn today.

The car show, in its third year, is actually the reason the coalition exists in the first place, Haskin said. Kahla Campbell, a family friend and Folsom High graduate, planned and produced the inaugural car show and donated the proceeds to Haskin as start-up money for the coalition.

"We just love doing the car show," she said. "My husband and I love cars – our first date was a car show – and we try to take something everybody loves, but also do something to raise awareness. In everything we do, we try to raise awareness."

The inaugural show pro-

in a fun way.

Weimar resident Cynthia Meikle said she and her hus- ... to have a network of people with kids who have the same diagnosis," Cynthia Meikle ... and they're just like any other children. They're special and unique."

PUBLIC NOTICE

Intent to Review and Adopt Proposed Western Placer County Groundwater Management Plan

The City of Roseville (City) will hold a public hearing to review and consider the adoption of the proposed Western Placer County Groundwater Management Plan (WPCGMP). The City has released a DRAFT version of the WPCGMP for public review. A copy of the proposed WPCGMP can be accessed online at www.wpcgmp.org or may be obtained for the cost of reproduction at the Office of the City Clerk, City of Roseville, located at City Hall, 311 Vernon Street, Roseville, CA.

The public hearing will be on July 18, 2007 at 7:00 p.m. at the regularly scheduled meeting of the City Council held in Council Chambers located at City Hall, 311 Vernon Street, Roseville, CA. The public is invited to provide comments on the WPCMP up to and including the close of the public comment portion of this agenda item at the City Council meeting scheduled for July 18, 2007. Any protests by landowners in the area covered under the WPCGMP must comply with the requirements set forth in Water Code section 10753.6 and be provided to the City of Roseville, in writing, prior to the close of the public comment portion of this agenda item at the July 18, 2007 7:00 p.m. meeting of the City Council.

The WPCGMP outlines a series of actions to protect Roseville's crucial groundwater resources in the western portion of the County. The overall goal of the WPCGMP is to maintain water quality and to ensure the long term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCMGP area. To achieve this goal, the WPCGMP sets forth five management objectives and five primary plan components identifying specific actions to be implemented for the purpose of maintaining the overall health of the underlying groundwater basin.

For more information please contact Ken Glotzbach at (916) 746-1751 or kglotzbach@roseville.ca.us.

Roseville

R6

RESOLUTION NO. 07-426

ADOPTING THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

WHEREAS, on August 3, 2005, the City Council authorized staff to prepare a groundwater management plan; and

WHEREAS, in order to promote regionally consistent and cooperative groundwater management goals and objectives, staff proposed development of a joint plan with Placer County Water Agency; and

WHEREAS, the Ground Water Management Plan was prepared in accordance with the California Groundwater Management Act, AB3030 and SB 1938; and

WHEREAS, the City Council has reviewed the proposed Western Placer County Groundwater Management Plan;

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Roseville hereby adopts the Western Placer County Groundwater Management Plan, pursuant to California Water Code Section 10753.

PASSED AND ADOPTED by the Council of the City of Roseville this 1st day of August, 2007, by the following vote on roll call:

AYES	COUNCILMEMBERS:	Allard, Roccucci, Garcia, Garbolino, Gray
NOES	COUNCILMEMBERS:	None
ABSENT	COUNCILMEMBERS:	None

Jim Gray
MAYOR

ATTEST:

Audrey Mynner
for City Clerk

Placer County Water Agency
PO BOX 6570
Auburn, CA 95604

DECLARATION OF PUBLICATION
(C.C.P. 2015.5)

COUNTY OF SACRAMENTO

STATE OF CALIFORNIA

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 379071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

October 19, 26, 2006

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on October 26, 2006.

Amy Oke

(Signature)

NO 302 PUBLIC NOTICE

NOTICE OF PLACER COUNTY WATER AGENCY BOARD OF DIRECTORS MEETING AGENDA ITEM FOR RESOLUTION OF INTENTION TO PREPARE AN UPDATED WEST PLACER GROUNDWATER MANAGEMENT PLAN

The Placer County Water Agency Board of Directors will consider the adoption of a resolution of intention to update the Agency's West Placer Groundwater Management Plan (WPGMP) at its regularly scheduled meeting on November 2, 2006 at 2:00 pm. The public is invited to attend the meeting and be heard on this matter, which meeting will be held at Placer County Board of Supervisors Chambers, 175 Fulweiler Avenue, Auburn, California.

Placer County Water Agency primarily relies on surface water supplies to meet the demands of its customers. The Agency has recently adopted an Integrated Water Resources Plan (August 2006) that recommends the use of groundwater in its supply strategy for anticipated future demands, particularly during periods of drought. The purpose of reviewing and updating the West Placer Groundwater Management Plan is to develop objectives for sustainable use of groundwater in the supply strategy for West Placer County. This new WPGMP will be prepared in partnership with the City of Roseville, the City of Lincoln, and Placer County. For further information about preparation of the WPGMP, please contact Mr. Tony Firenzi of the Placer County Water Agency Engineering Department at (530) 823-4886.

2T: October 19, 26, 2006

Placer County Water Agency
PO BOX 6570
Auburn, CA 95604

DECLARATION OF PUBLICATION
(C.C.P. 2015.5)

COUNTY OF SACRAMENTO

STATE OF CALIFORNIA

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interest ed in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 379071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

November 9, 16, 2006

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on November 16, 2006.

Amy Hew
(Signature)

NO 433 PUBLIC NOTICE

RESOLUTION NO. 06 - 45 OF THE BOARD OF DIRECTORS OF THE PLACER COUNTY WATER AGENCY DECLARING ITS INTENT TO UPDATE ITS WEST PLACER GROUNDWATER MANAGEMENT PLAN AND ADOPT A STATEMENT OF PUBLIC PARTICIPATION

WHEREAS, one of the responsibilities of Placer County Water Agency (Agency) is to provide for sustainable use of groundwater resources within Placer County; and

WHEREAS, the Agency adopted a West Placer Groundwater Management Plan on October 6, 1998 and updated this plan on November 6, 2003; and

WHEREAS, the Agency needs to update the 2003 plan to reflect current water resources planning in western Placer County and the practices of its Integrated Water Resources Plan accepted on August 17, 2006; and

WHEREAS, the Agency intends to prepare, adopt, and implement this updated groundwater management plan in partnership with the City of Roseville, the City of Lincoln, and Placer County;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Placer County Water Agency that:

1. The Board intends to prepare, adopt, and update its West Placer Groundwater Management Plan. Among other content, the updated groundwater management plan will include basin management objectives, plan components and management actions. The plan components will also include stakeholder input, monitoring, sustainable use and protection of groundwater resources, and implementation.
2. The Agency further intends to provide for and allow for public involvement in the preparation of this updated groundwater management plan. The plan for public involvement includes outreach and workshops with stakeholders.

The foregoing resolution was duly passed at meeting of the Board of Directors of the Placer County Water Agency held on November 2, 2006, by the following on roll call:

AYES DIRECTORS: Lowell Jarvis, Mike Lee, Otis Wollan, Chair Alex Ferreira

NOES DIRECTORS: None

ABSENT DIRECTORS: Pauline Roccucci

Signed and approved by me after its passage this 2nd day of November, 2006.

Chair, Board of Directors
Placer County Water Agency

ATTEST
Clerk, Board of Directors
Placer County Water Agency

2TJ November 9, 16, 2006

PROOF OF PUBLICATION

STATE OF CALIFORNIA
County of Placer

I am a citizen of the United States and a resident of Placer County. I am over the age of eighteen years, and not a party to the below mentioned matter. I am the principal clerk of The Auburn Journal, a newspaper of general circulation, which is printed and published in the City of Auburn, County of Placer. This newspaper has been judged a newspaper of general circulation by the Superior Court of the State of California, in and for the County of Placer, on the date of May 26, 1952 (Case Number 17407). The notice, of which the attached is a printed copy (set in type not smaller than nonpareil) has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

November 9, 16

In the year of 2006

I certify, under penalty of perjury, that the foregoing is true and correct.

DeeAnn Ogan

Signature

Dated in Auburn, California

November 16, 2006

The following space is reserved for the County Clerk's filing stamp

PROOF OF PUBLICATION OF

1614290 1614490

Public Notice

See attached

PROOF OF PUBLICATION
THE AUBURN JOURNAL
1030 High St. P.O. Box 5910
Auburn, CA 95604-5910

PROOF OF PUBLICATION

PUBLIC NOTICE

RESOLUTION NO. [illegible] OF THE BOARD OF DIRECTORS OF THE PLACER COUNTY WATER AGENCY DECLARING ITS INTENT TO UPDATE [illegible] WEST PLACER GROUNDWATER MANAGEMENT PLAN AND ADOPT A STATEMENT OF PUBLIC PARTICIPATION

WHEREAS, [illegible] Placer County Water Agency [illegible] Placer County [illegible]

WHEREAS, the Agency adopted the West Placer Groundwater Management Plan [illegible]

WHEREAS, the Agency [illegible]

[illegible]

Chair, Board of Directors

Placer County Water Agency

[illegible]

Clerk, Board of Directors

Placer County Water Agency

[illegible]

Published in Auburn Journal: November 9, 16, 2006

PROOF OF PUBLICATION

THE AUBURN JOURNAL

1030 High St. P.O. Box 5910

Auburn, CA 95604-5910

PROOF OF PUBLICATION

STATE OF CALIFORNIA
County of Placer

I am a citizen of the United States and a resident of Placer County. I am over the age of eighteen years, and not a party to the below mentioned matter. I am the principal clerk of The Auburn Journal, a newspaper of general circulation, which is printed and published in the City of Auburn, County of Placer. This newspaper has been judged a newspaper of general circulation by the Superior Court of the State of California, in and for the County of Placer, on the date of May 26, 1952 (Case Number 17407). The notice, of which the attached is a printed copy (set in type not smaller than nonpareil) has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

October 19

26

In the year of 2006

I certify, under penalty of perjury, that the foregoing is true and correct.

Dee Ann Ogao

Signature

Dated in Auburn, California

October 26, 2006

The following space is reserved for the County Clerk's filing stamp

PROOF OF PUBLICATION OF

16140090

Notice of Placer County Water Agency Board of

Directors Meeting Groundwater Mgt. Plan

PROOF OF PUBLICATION
THE AUBURN JOURNAL
1030 High St. P.O. Box 5910
Auburn, CA 95604-5910

NO 452 PUBLIC NOTICE

Intent to Review and Consider Adoption of An Updated West Placer County Groundwater Management Plan

The Placer County Water Agency (Agency) will hold a public hearing to review and consider the adoption of an updated West Placer County Groundwater Management Plan (WPCGMP). The Agency has released a DRAFT version of the updated WPCGMP for public review. A copy of the proposed updated WPCGMP can be accessed online at www.pcwa.net or may be obtained for the cost of reproduction at the Agency's Business Center located at 144 Ferguson Road in Auburn, CA.

The public hearing will be on August 16, 2007 at 2:00 p.m. at the regularly scheduled meeting of the Agency Board of Directors located at the Business Center. The public is invited to provide comments on the proposed updated WPCMP up to and including the close of the public comment portion of this agenda item at the Board meeting scheduled for August 16, 2007. Any protests by landowners in the area covered under the WPCGMP must comply with the requirements set forth in California Water Code Section 10753.6 and be provided to the Placer County Water Agency, in writing, prior to the close of the public comment portion of this agenda item at the August 16, 2007 2:00 p.m. meeting of the Board of Directors.

The reasons for updating the Agency's West Placer County Groundwater Management Plan are to reflect progress made towards conjunctive use in west Placer County and to establish an inter-Agency document that aligns policy. This plan was prepared in partnership with the City of Roseville, City of Lincoln, and California-American Water Company. In summary, the proposed WPCGMP outlines a series of actions to protect crucial groundwater resources in the western portion of the County. The overall goal of the WPCGMP is to maintain water quality and to ensure the long term availability of groundwater to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCMGP area. To achieve this goal, the updated WPCGMP sets forth five management objectives and five primary plan components identifying specific actions to be implemented for the purpose of maintaining the overall health of the underlying groundwater basin. Actions of the WPCGMP will be implemented in partnership with the participants of the plan development.

For more information please contact Tony Firenzi at (530) 823-4886 or tfirenzi@pcwa.net.

2Ti August 2, 9, 2007

PB

File

060028E

P 3

16189229
PUBLIC NOTICE
Intent to Review and Consider Adoption of An Updated West Placer County Groundwater Management Plan

The Placer County Water Agency (Agency) will hold a public hearing to review and consider the adoption of an updated West Placer County Groundwater Management Plan (WPCGMP). The Agency has released a DRAFT version of the updated WPCGMP for public review. A copy of the proposed updated WPCGMP can be accessed online at www.pcwa.net or may be obtained for the cost of reproduction at the Agency's Business Center located at 144 Ferguson Road in Auburn, CA.

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For more information please contact Tony Firenzi at (530) 823-4886 or tfirenzi@pcwa.net.

Published in Auburn Journal: August 2, 9, 2007

AGENDA

BOARD OF DIRECTORS
.PLACER COUNTY WATER AGENCY

September 6, 2007
2:00 p.m., Regular Meeting

Placer County Water Agency Business Center
American River Room
144 Ferguson Road
Auburn, California

Members of the Board of Directors:

LOWELL JARVIS, District 3
Chairman of the Board

GRAY ALLEN, District 1
ALEX FERREIRA, District 2

MIKE LEE, District 4, Vice Chairman
OTIS WOLLAN, District 5

* * * * * * * * * * * *

A. CALL TO ORDER
   1. Roll Call
   2. Pledge of Allegiance
   3. Introductions & Presentations

B. PUBLIC COMMENT: This is the time for any member of the public to address the Board of Directors on any matter not on the agenda that is within the subject matter jurisdiction of the Agency. Directors and Agency staff are limited by law to brief responses and clarifying questions to such comments and Directors may request staff to report back to the Board concerning such matter and direct staff to put the matter on a future agenda. Any item that is on this agenda may be addressed by the public during the Board's consideration of that item. Comments shall be limited to ***five minutes*** per person, or such other time limit as may be imposed by the Chair, in order to enable the Board to complete its agenda within a reasonable period of time.

C. REPORTS BY DEPARTMENT HEADS

D. AGENDA CHANGES AND REVIEW

E. CONSENT CALENDAR: All items listed under the consent calendar are considered to be routine and will be approved by one motion. There will be no separate discussion of these items unless a member of the Board, audience, or staff requests a specific item be removed from the consent calendar for separate action. Any item so removed will be taken up following the motion to approve the consent calendar.

1. Approve and file:
   a. August 2, 2007, minutes.
   b. Check Register 07-16 expenses disbursed.
   c. Budget transfers, as recommended by the Director of Financial Services. ***See attached and other non-routine budget transfers that may be included as part of specific items that follow.***
   d. Matters related to the Board of Directors as follows:
      1) Expenses for previous months;
      2) Anticipated expenses in excess of $500.00; ***none at this time.***
      3) Anticipated costs of transportation, lodging, and associated fees for travel outside the State of California to be paid by the Agency; ***none at this time.***
   e. General Manager's expense reimbursement claim summary.

2. Approve Quitclaim of Easement for portion of the Sugarloaf Canal pipe with Keith K. Clayton.

3. Receive Report on Review for CEQA for Lakeshore Water Treatment Plant Grading project, declare the project categorically exempt from CEQA and authorize the filing of the Notice of Exemption.

4. Approve Right of Way and Easement Agreement and payment of $5,000 to Mary O. Dutra for the easements for the Foothill Raw Water Supply Pipeline project.

5. Approve the Submittal of PCWA General Manager David A. Breninger's name to Association of California Water Agencies for the National Water Resources Association Board of Directors for the term 2008-09.

6. Approve passage of **Resolution No. 07-__ adopting the updated West Placer County Groundwater Management Plan.**

7. Adopt **Resolution No. 07-__ initiating proceedings for annexation of Dry Creek Elementary School to Zone No. 1 and setting a public hearing thereon.**

8. Receive and file PCWA's bond rating upgrade dated July 2007.

F. AGREEMENTS AND CONTRACTS: Items listed below include award of bid proposals, new contracts, sole source contracts and agreements, amendments to existing construction contracts and professional services agreements, and various change orders, and may be approved by one motion or some combination thereof.

Award:

1. Approve the following with Black and Veatch:
   a. Engineering Services Contract for various Middle Fork Project Betterments.
   b. Task Order No. 2007-01 for Middle Fork Betterments in an amount not to exceed $25,740.00.

2. Approve Settlement Agreement between Placer County Water Agency and Sacramento Municipal Utility District and authorize General Manager to send letters to the State Water Resources Control Board and to the Federal Energy Regulatory Commission as provided in the agreement.

Existing:

3. Approve Amendment No. One with Starr Consulting for treatment plant water quality consulting services for the Auburn Water Treatment Plant project, Ophir WTP Pipelines project, and the Sacramento River Diversion project in an amount not to exceed $19,690.00.

4. Approve the following for the Foothill Raw Water Supply Pump Station project, Contract #2005-09, with Pacific Mechanical Corporation:
   a. Contract Change Order No. Twenty One in the increased amount of $46,839.00.
   b. Progress Pay Estimate No. Seventeen in the amount of $3,462,542.05.

5. Approve Amendment No. One to the On-call Supervisory and Data Acquisition Services Consulting Contract with MCC Control Systems, LP in an amount not to exceed $100,000.00.

6. Approve Change Order No. 1 for Contract P-06-02 Paving Services, Intermountain Slurry Seal, Inc., to extend the contract period through September 12, 2008, with a possible price increase, not to exceed 5%.

7. Approve Amendment No. Three to contract with Richard C. Harlan for five-year safety inspections and reports for French Meadows and Hell Hole Dams.

G. WATER AVAILABILITY AND WATER SUPPLY

1. Zone 1 water service; take action as appropriate.
   a. Treated Water
      1) Four Facilities Agreements (FA) for a total of 7.5 acre feet or 11.5 equivalent dwelling units (EDUs)
         - FA 2193, Sierra de Montserrat, Amendment No. Two, Loomis
         - FA 2223, Wade Simmons Waterline, Revision No. 1, Newcastle
         - FA 2284, Jack in the Box, Rocklin
         - FA 2392, Stanford Plaza – Lot 58 Phase 1B, Rocklin
      2) Single Connections (In fill): Four applications for a total of 2.6 acre feet or 4.0 EDUs
   b. Raw Water: None

2. Zone 4 water service; take action as appropriate.
   a. Treated Water
      1) Two Facilities Agreements (FA) for a total of 9.2 acre feet or 14.0 EDUs
         - FA 2287, Timilick Phase 2 Residential (formerly Eaglewood Phase 2 Residential), Revision No. 1, Martis Valley
         - FA 2342, Martis Camp Unit No. 2, (formerly Siller Ranch), Amendment No. 1, Martis Valley

3. Requests for response from Agency on water availability; take action as appropriate.
   a. SB 221 (tentative map)
   b. SB 610 (environmental process)
   c. All other requests or information

4. Reports and response on water resource policy, planning and management issues and interests; take action as appropriate:
   a. Water rights and contracts
   b. Land use and water policy
   c. Water supply, service, and infrastructure system
   d. Water use efficiency and conservation
   e. American River Pump Station Project
   f. Sacramento River Diversion Project
   g. Regional water matters
   h. Delta and State water matters

H. MIDDLE FORK AMERICAN RIVER PROJECT, (FERC PROJECT 2079), RELICENSING PROGRAM

1. Report on relicensing process, schedule, and activities; take action as appropriate.

2. Report on financial matters and services; take action as appropriate.

I. GENERAL ITEMS

1. Receive report on Renewal and Replacement Projects and Water Connection Charge Projects to be undertaken within the next five years. Take action as appropriate.

2. Consider the following for Agency's intention to undertake Renewal and Replacement and Water Connection Charge Projects; take action as appropriate:
   a. At 2:00 p.m. or as soon thereafter as can be heard, open the noticed public hearing, note any comments received by the Agency and solicit comments from the public with respect to the Agency's intention to undertake projects.
   b. If comments are received which are sufficient to warrant modifications, the hearing may be continued to a later Board of Directors' meeting to allow sufficient time for the Agency to respond to comments.
   c. If no comments are received which are sufficient to warrant continuation of the hearing, staff recommends that the Board adopt **Resolution No. 07-__ determining to proceed with projects.**

3. Consider $35 million of 2007 debt for Capital Improvement Projects and adopt **Resolution No. 07-__ authorizing the sale of Second Senior Water Revenue Certificates of Participation, Series 2007, and associated debt documents and related actions.** Take action as appropriate.

   *(**NOTE:** Prior to adoption, temporarily adjourn as PCWA Board of Directors and convene as the Board of Directors of the PCWA Public Facilities Corporation in special session; see Supplemental Agenda attached.)*

4. Review activities scheduled for PCWA Fiftieth Anniversary commemoration.

J. REPORTS BY DIRECTORS: In accordance with Government Code § 54954.2(a), Directors may make brief announcements or brief reports on their own activities. They may ask questions for clarification, make a referral to staff or take action to have staff place a matter of business on a future agenda.

K. REPORTS BY LEGAL COUNSEL

L. REPORTS BY GENERAL MANAGER

M. CLOSED SESSION

N. REPORT FROM CLOSED SESSION

O. ADJOURNMENT

THE NEXT RESOLUTION NUMBER IS 07-25

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Clerk to the Board at (530) 823-4860. Notification by Wednesday noon preceding the meeting will enable the Agency to make reasonable arrangements to ensure accessibility to this meeting. [28 CFR 35.102-35.104 ADA Title II]

In accordance with Government Code Sec. 54954.2(a) this notice and agenda were posted in the Agency's outdoor bulletin board at the Placer County Water Agency Business Center at 144 Ferguson Road, Auburn, California, on August 31, 2007.

Schedule of Upcoming Board Meetings

- **Thursday, September 13, 2007, 5:30 p.m.** – Special Board of Directors meeting at Placer County Water Agency Business Center, 144 Ferguson Road, Auburn, California. 50th Anniversary Celebration
- **Thursday, September 20, 2007, 2:00 p.m.** – Regular Board of Directors meeting at Placer County Water Agency Business Center, 144 Ferguson Road, Auburn, California.

9/7/07 pc. Tony
file
E6
PCWA
P5

RESOLUTION NO. 07-25 OF THE BOARD OF DIRECTORS OF THE PLACER COUNTY WATER AGENCY ADOPTING THE UPDATED WEST PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

WHEREAS, On November 2, 2006 the Board of Directors passed Resolution 06-45 declaring its intent to update its West Placer County Groundwater Management Plan and adopt a statement of public participation; and

WHEREAS, the Agency prepared an updated plan in partnership with the City of Roseville, City of Lincoln, and California-American Water Company in order to promote regionally consistent and cooperative goals and objectives; and

WHEREAS, the updated West Placer County Groundwater Management Plan was prepared in accordance with the California Groundwater Management Act, Assembly Bill 3030, and Senate Bill 1938; and

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Placer County Water Agency hereby adopts the updated West Placer County Groundwater Management Plan.

The foregoing resolution was duly passed at meeting of the Board of Directors of the Placer County Water Agency held on September 6, 2007, by the following on roll call:

AYES DIRECTORS: Gray Allen, Alex Ferreira, Mike Lee, Otis Wollan, and Chairman Lowell Jarvis

NOES DIRECTORS: None

ABSENT DIRECTORS: None

Signed and approved by me after its passage this 6th day of September, 2007.

Lowell Jarvis

Chair, Board of Directors
Placer County Water Agency

ATTEST:

Chris Sarnak

Clerk, Board of Directors
Placer County Water Agency

z:/ns.wpgmp.resolution.9-6-07

L1

From: legals [mailto:legals@goldcountrymedia.com]
Sent: Wednesday, November 22, 2006 9:07 AM
To: Sharon Crawford
Cc: Greg Young
Subject: Re: City of Lincoln legal notice of public hearing

Scheduled as requested

Your order number is: # 16144303 this is the number that I will need if you call me.
The order number will change with every ad you place with us.

To view your legals on line it has to be done the day it is published only. Do the following:
Good luck.

1. goldcountrymedia.com.
2. Gold Country Media Front.
3. On the left side click on paper name.
4. Go to classified, Legals/Public Notices.

Thank for placing your legal ad with Gold Country Media Legal Department.

Terry Clark
Legal Advertising Consultant
Direct phone number (916) 774-7946

----- Original Message -----
From: Sharon Crawford
To: legals@goldcountrymedia.com
Cc: Greg Young
Sent: Tuesday, November 21, 2006 11:46 AM
Subject: City of Lincoln legal notice of public hearing

Wendy,
Please publish the attached legal notice in the 11/30th and the 12/7th issues of the Lincoln News Messenger. Please confirm receipt of this e-mail.
If you have any questions, please call me.
Thank you,

Sharon Crawford
Public Works Department
Office Supervisor
640 Fifth Street
Lincoln, CA 95648
(916) 645-8576
(916) 645-6152 (fax)

L1

-----Original Message-----
From: gyoung@tullyandyoung.com [mailto:gyoung@tullyandyoung.com]
Sent: Thursday, December 07, 2006 4:16 PM
To: Greg Young
Subject: Email-A-Friend for goldcountryclassifieds.com classifieds

This ad was sent to you by gyoung@tullyandyoung.com from http://www.goldcountryclassifieds.com/.

16144303
 <B>NOTICE OF PUBLIC HEARING
 </B> <B>NOTICE IS HEREBY GIVEN</B> that the City Council of the City of Lincoln will conduct a public hearing on Tuesday, December 12, 2006 at the hour of 6:30 p.m. or thereafter at the McBean Park Pavilion, 65 McBean Park Drive, regarding the City's intent to adopt a resolution of intention to (1) prepare an update to the City of Lincoln Groundwater Management Plan (GMP), adopted in November 2003, and (2) cooperate in the preparation of the Western Placer County Groundwater Management Plan (WPCGMP) with the City of Roseville, the Placer County Water Agency and the County of Placer, pursuant to the Groundwater Management Act (California Water Code §10750 et seq.). Interested persons are invited to attend.
 If you have questions, please contact John Pedri in the Department of Public Works at (916) 645-8576.
 Published in Lincoln News Messenger: November 30, December 7, 2006

L2

RESOLUTION NO. 2006-259

A RESOLUTION OF THE LINCOLN CITY COUNCIL OF INTENTION TO (1) C0-DRAFT THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN WITH THE CITY OF ROSEVILLE, PLACER COUNTY WATER AGENCY AND PLACER COUNTY, AND (2) UPDATE THE CITY OF LINCOLN'S 2003 GROUNDWATER MANAGEMENT PLAN PURSUANT TO THE GROUNDWATER MANAGEMENT ACT (WATER CODE, §§ 10750 et seq.)

WHEREAS, pursuant to the Groundwater Management Act (Water Code, §§ 10750 et seq.) the City of Lincoln (City) adopted a Groundwater Management Plan (GMP) in November of 2003; and

WHEREAS, the adopted City of Lincoln GMP addressed the monitoring and management associated with the portion of the basin directly underlying the City; and

WHEREAS, the City has been actively implementing management actions included in the adopted GMP; and

WHEREAS, the Groundwater Management Act encourages the periodic review and update of adopted GMPs; and

WHEREAS, the Utility Director desires to update the City's adopted GMP to reflect actions taken over the past two (2) years since its adoption; and

WHEREAS, the City of Roseville and the Placer County Water Agencies also have adopted groundwater management plans in recent years; and

WHEREAS, the City of Lincoln, the City of Roseville, the Placer County Water Agency, and the County of Placer (hereinafter referred to as the Parties) have service areas that include the same groundwater basin; and

WHEREAS, it is the expressed intent of the Legislature to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions; and

WHERESAS, the Parties recognize the value of cooperating for more effective groundwater management as it relates to the overall quality and reliability of this collective resource in the broader groundwater basin; and

WHEREAS, the City of Lincoln is a local agency authorized to adopt a groundwater management plan, whether an update of the City-only GMP or a regional plan, pursuant to the provisions of the Groundwater Management Act; and

L2

WHEREAS, Water Code §10753.2 requires that, before preparing a Groundwater Management Plan, a local agency must first hold a public hearing to consider whether to adopt a Resolution of Intent to Draft a Groundwater Management Plan; and

WHEREAS, following the publication of notice required by law, the City held a public hearing on December 12, 2006 , to receive public comment on whether it should adopt a resolution of intention to (1) update the City of Lincoln GMP and (2) co-draft a regional Groundwater Management Plan; and

WHEREAS, after considering the public comment and other information presented at the hearing, the Lincoln city Council determined that it is in the best interest of the City to (1) prepare an update to its currently adopted GMP, and (2) participate with the other Parties in the cooperative preparation of a regional Groundwater Management Plan.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF LINCOLN DOES HEREBY RESOLVE AS FOLLOWS:

1. The Lincoln City Council deems it advisable and in the best interest of the City to (1) prepare an update to the City of Lincoln GMP, adopted in November 2003, and (2) cooperate in the preparation of the Western Placer County Groundwater Management Plan with the City of Roseville, the Placer County Water Agency and the County of Placer.

2. The City hereby declares its intention to (1) update the 2003 GMP, and (2) co-draft the Western Placer County Groundwater Management Plan, pursuant to Water Code §10750 et seq.

3. The Director of Public Works is directed to take any additional action necessary and appropriate to implement this resolution.

PASSED and ADOPTED this 12th day of December, 2006, by the following roll call vote:

AYES: COUNCILMEMBERS: Stackpoole, Cosgrove, Short, Santini, Nakata
NOES: COUNCILMEMBERS:
ABSENT: COUNCILMEMBERS:

ATTEST:
Patricia Avila
CITY CLERK

Date: January 25, 2007
Publish: February 1, 2007 and February 8, 2007

Customer No. 17CI160

----- Message from "Greg Young" <gyoung@tullyandyoung.com> on Thu, 4 Oct 2007 12:25:36 -0800 -----

To: "Greg Young" <gyoung@tullyandyoung.com>, "Greg Young" <gyoung@tullyandyoung.c

Subject: Greg Young wanted you to see this (from GoldCountryClassifieds.com)

From: **Greg Young**,

16201689
NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the City Council of the City of Lincoln will conduct a public hearing on Tuesday, October 23, 2007 at the hour of 6:30 p.m. or thereafter at the McBean Park Pavilion, 65 McBean Park Drive, regarding the City's intent to review and consider adoption of the Western Placer County Groundwater Management Plan (WPCGMP), pursuant to the Groundwater Management Act (California Water Code §10750 et seq.). Interested persons are invited to attend.

L3

A copy of the proposed WPCGMP can be accessed online at www.wpcgmp.org or may be obtained for the cost of reproduction in the City's Public Works Department, at 640 Fifth Street, Lincoln, CA 95648.

If you have questions, please contact John Pedri, Director of Public Works at (916) 645-8576.

Patricia Avila
City C lerk
Date: October 1, 2007
Published in Lincoln News Messenger: October 4, 11, 2007

----- Message from "Sharon Crawford" <scrawfor@ci.lincoln.ca.us> on Mon, 6 Nov 2006 08:14:12 -0800 -----

To: "Greg Young" <gyoung@tullyandyoung.com>

Subject: FW: Staff Report and Resolution for GMP

Greg,

L3

Gwen found the reso & staff report as attached.

Sharon

From: Gwendolyn Scanlon
Sent: Monday, November 06, 2006 8:10 AM
To: Sharon Crawford
Subject: Staff Report and Resolution for GMP

Thanks,

Gwen

Gwendolyn Scanlon
Office Assistant II
Department of Public Works
City of Lincoln
640 Fifth Street
Lincoln, CA 95648
916-645-4070 ext. 227
916-645-6152 fax

Lincoln All-America City 2006

City of
Lincoln

CITY COUNCIL/REDEVELOPMENT AGENCY MEETING AGENDA

A CLOSED SESSION WILL BE HELD AT 5:30 PM, NOVEMBER 27, 2007, IN THE MAIN CONFERENCE ROOM OF CITY HALL, 640 FIFTH STREET TO DISCUSS:

1. Conference with Real Property Negotiator-City Manager- Pursuant to Government Code Section 54956.8 – APN #019-290-003 – Sundance - Lakeview Properties, LLC et al

November 27, 2007
6:30 PM

PLEASE NOTE: THE CITY COUNCIL MEETING WILL BE HELD AT THE MCBEAN PARK PAVILION, LOCATED AT 65 MCBEAN PARK DRIVE, LINCOLN, CALIFORNIA 95648.

1. **ROLL CALL**

2. **PLEDGE OF ALLEGIANCE**

   INVOCATION – *Bill Rontani, St. James Episcopal Church*

3. **PRESENTATIONS –** ***none***

4. **CONSENT AGENDA**

NOTICE TO THE PUBLIC

All matters listed under the Consent Agenda are considered to be routine and all will be enacted by one motion. There will be no separate discussion of these items unless a member of the City Council or a citizen requests a specific item to be removed from the Consent Agenda for separate action. Any items removed will be considered after the motion.

5.1 **CITY MANAGER'S DEPARTMENT**
A. Adopt **Resolution 2007-196** approving warrants of October 29 *and* November 5, 2007.
B. Approve minutes of the November 13, 2007 Council meeting.
C. Adopt **Resolution 2007-197** in support of issuing a Tom Bradley commemorative stamp.

5.2 **COMMUNITY DEVELOPMENT DEPARTMENT**
A. **Ordinance 827B** adding Section 16.48.060 to the Lincoln Municipal Code Pertaining to Temporary Political signs. ***(second reading).***

5.3 **LIBRARY**
A. Approve Administrative Policy No. 99 regarding Library Meeting Room Policy.

6. CITIZENS ADDRESSING THE COUNCIL

Policy for Citizens Addressing the Council:

As in the past, we will listen respectfully to what any citizen addressing Council may have to say regarding an item NOT scheduled for a public hearing or another matter of concern affecting the City of Lincoln. However, those addressing the Council will be limited to five minutes, unless extended by the Mayor. Comments from the audience WITHOUT coming to the podium will be disregarded or ruled out of order. ALL comments/questions should be addressed to the Mayor. In most cases questions will be either answered during the meeting, in writing, or in some cases, the issue will be set for a future agenda.

7. PUBLIC HEARINGS

7.1 COMMUNITY DEVELOPMENT DEPARTMENT

A. Ordinance 828B Amending Chapter 15 of the Lincoln Municipal Code Pertaining to the Adoption of International and Uniform Building Codes

Council needs to allow for a staff report regarding the proposed Ordinance amending Chapter 15 of the Lincoln Municipal Code.

Action Required:
-Open the required public hearing to receive testimony.
- Waive reading and introduce **Ordinance 828B** amending Chapter 15 of the Lincoln Municipal Code pertaining to the adoption of International and Uniform Building Codes. ***(first reading)***

8. STAFF REPORTS

8.1 CITY MANAGER'S DEPARTMENT

A. Relocation Plan and Move for the Lincoln Archives Building

Council needs to allow for a brief staff report regarding the relocation plan and subsequent move of the Lincoln Archives.

Action Required:
-Approve the relocation plan of the Lincoln Archives to the Civic Center with the offer of assistance of the Public Works Department to accomplish this move.

8.2 PUBLIC WORKS DEPARTMENT

A. Western Placer County Groundwater Management Plan

Council needs to allow for a brief staff report regarding the Western Placer County Groundwater Management Plan (WPCGMP).

Action Required:
-Motion to adopt **Resolution 2007-198** (1) Adopting the Western Placer County Groundwater Management Plan *and* (2) Approving the Memorandum of Agreement for

Implementation of the Western Placer County Groundwater Management Plan (WPCGMP) and authorizing the City Manager and City Clerk to execute the WPCGMP.

B. Quiet Zone Evaluation of Public Streets at Grade Crossings of the Union Pacific Railroad Tracks Within the City of Lincoln

Council needs to allow for a staff report and PowerPoint presentation regarding the Quiet Zone Evaluation draft report prepared by Railroad Controls Limited.

Action Required:
-Provide staff with further direction.

9. **COUNCIL INITIATED BUSINESS**

10. **COUNCIL COMMITTEE REPORTS**

11. **ADJOURNMENT**

RESOLUTION NO. 2007-198

A RESOLUTION OF THE LINCOLN CITY COUNCIL TO (1) ADOPT THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN, AND (2) APPROVE THE MEMORANDUM OF AGREEMENT FOR IMPLEMENTATION OF THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

WHEREAS, pursuant to the Groundwater Management Act (Water Code, §§ 10750 et seq.) the City of Lincoln (City) adopted a Groundwater Management Plan (GMP) in November of 2003; and

WHEREAS, the adopted City of Lincoln GMP addressed the monitoring and management associated with the portion of the basin directly underlying the City; and

WHEREAS, the City has been actively implementing management actions included in the adopted GMP; and

WHEREAS, the Groundwater Management Act encourages the periodic review and update of adopted GMPs; and

WHEREAS, the City of Lincoln, City of Roseville, Placer County Water Agency and California-American Water Company have jointly prepared the Western Placer County Groundwater Management Plan (WPCGMP) to join together in a regional plan; and

WHEREAS, the City of Lincoln, following required public noticing, held a Public Hearing on the WPCGMP on October 23, 2007; and

WHEREAS, the City of Lincoln is a local agency authorized to adopt a groundwater management plan, and

WHEREAS, the City of Lincoln, City of Roseville, Placer County Water Agency and California-American Water Company have also drafted a Memorandum of Agreement for Implementation of the WPCGMP (Implementation MOA), and

WHEREAS, the Implementation MOA addresses how the Parties intend: (1) to coordinate their efforts in implementing the WPCGMP; (2) to memorialize the Parties' express understanding relating to such efforts; and (3) to allocate costs to be expended in administering the WPCGMP's implementation, and

WHEREAS, after considering the public comment and other information presented at the hearing, the Lincoln City Council determined that it is in the best interest of the City to (1) adopt the WPCGMP, and (2) approve the Implementation MOA.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF LINCOLN DOES HEREBY RESOLVE AS FOLLOWS:

1. The Lincoln City Council deems it advisable and in the best interest of the City to (1) adopt the Western Placer County Groundwater Management Plan, and (2) approve the Memorandum of Agreement for the Implementation of the Western Placer County Groundwater Management Plan.

2. The City hereby agrees to (1) adopt the Western Placer County Groundwater Management Plan, and (2) approve the Memorandum of Agreement for the Implementation of the Western Placer County Groundwater Management Plan.

3. The Director of Public Works is directed to take any additional action necessary and appropriate to implement this resolution.

PASSED and ADOPTED this 27th day of November, 2007, by the following roll call vote:

AYES: COUNCILMEMBERS: Stackpoole, Cosgrove, Short, Santini, Nakata

NOES: COUNCILMEMBERS: None

ABSENT: COUNCILMEMBERS: None

Kent Nakata

Kent Nakata, Mayor

ATTEST:

Patricia Avila

Patricia Avila, City Clerk

APPROVED AS TO FORM:

City Attorney

APPENDIX B

WPCGMP Public Outreach Plan

TASK 2.4: STAKEHOLDER INVOLVEMENT

Setting

Developed in stages since early 2005, the Western Placer County Groundwater Management Plan (GMP) is a collaborative effort by local water purveyors to monitor urban pumping of groundwater reserves during normal and wet years. Moreover, by employing groundwater management practices that maintain and enhance underground supplies in Western Placer County, the program will provide for greater water supply reliability during drought periods. The GMP's staged approach stems from the inclusion of new partners at various intervals in the planning process, with the City of Roseville serving as the original proponent. Other partners, in order of their formal inclusion, are Placer County Water Agency (PCWA), City of Lincoln, and California American Water (CalAm). Although Placer County is not yet a formal participant in the GMP, staff has been active participants.

When completed, the GMP will feature four key elements, the content of these satisfy Senate Bill 1938 requirements: basin goals, basin management objectives (BMOs), plan components, and management actions. All major GMP elements have been developed and reviewed by staff at each partner agency. These elements are now ready for presentation to elected officials, key stakeholders and other interested parties for their input and feedback.

Goals and Objectives

Provide a public involvement mechanism for elected officials, water purveyors, farmers, ranchers, environmentalists and other interested parties to comment, validate and rank current and future GMP measures and action items. Through various public outreach methods, plan proponents will seek to gather support and acceptance of the proposed GMP.

Discussion

MWH will facilitate presentations/workshops to the boards/councils of each partner agency and conduct a public meeting for key stakeholders and other interested parties. Meetings will be supported by public notices, creation of a stakeholder database, a public website and a GMP Workbook.

2.4.1: BOARD/COUNCIL PRESENTATIONS:

MWH will facilitate one presentation to the boards/councils of each partner agency (total of five). Presentations will feature a 15-minute PowerPoint presentation, followed by a 30 minute question-and-answer session. The presentation schedule, in order, will be City of Roseville, Placer County Water Agency, City of Lincoln, CalAm, and Placer County. MWH will further coordinate presentations to the City of Roseville Public Utilities Commission and the Water Caucus of The Water Forum. MWH will also attend various one-on-one briefings with locally elected officials as necessary. Stakeholder interest cards will be provided at each meeting for members of the public wishing to be added to the stakeholder database.

Supporting elements:

- Agenda Packet: GMP and Joint Powers Agreement (JPA) administrative drafts, and GMP Fact Sheet
- Print and electronic copies of the GMP PowerPoint presentation
- Stakeholder interest cards

2.4.2: STAKEHOLDER INVOLVEMENT:

MWH will facilitate a partner-led public meeting at a location geographically convenient for interested parties and key stakeholders, such as Nevada Irrigation District, South Sutter Water District, Natomas Central Mutual Water Company, Rio Linda/Elverta Community Water District, and Yuba County Water Agency. Beverages and light snacks will be served. The three-hour workshop will present the GMP, gather stakeholder feedback, and provide attendees the opportunity to rank how various actions and measures meet their expectations. Overarching components of the GMP will be posted on a stand-alone website for stakeholders to review prior to the workshop.

Supporting elements:

- GMP Workbook
- GMP Website
- Public Notices
- Stakeholder Database

Workshop Invitees:

- All Neighboring Water Purveyors
- Environmental Caucus of The Water Forum
- Placer County Farm Bureau
- Placer County Agriculture Commissioner
- Placer County Planning Commission
- Developers, major landowners
- Environmental groups
  - The Nature Conservancy, Sierra Club, Foothill Water Network, Dry Creek Conservancy/American Basin Water shed group (Linda Creek, Coon Creek, Secret Ravine, Auburn Ravine, Dry Creek)

2.4.3: SUPPORTING ELEMENTS:

- GMP Workbook – MWH will develop a 16-page workbook for distribution at the GMP Workshop. The black and white workbook will be printed two-sides on 8.5x11 inch paper, folded once to form a 5.5x8.5 booklet. The document will serve two key functions: a vehicle to inform stakeholders of plan actions and measures; and as a stakeholder survey. The GMP Workbook will be divided into four chapters – Goals, Basin Management Objectives, Plan Components and Management Actions. Participants will be provided opportunities to rate elements on a sliding scale and provide written revisions. The document may be collected at the meeting or returned by U.S. Mail. Survey results will be compiled and utilized for completion of the GMP.
- GMP Website – MWH will develop a five-page project website. This site will support the Stakeholder Workshop and serve as a vehicle to distribute draft documents for public comment. The recommended URL is www.wpcgmp.org. Written to a layperson, the site will include:
  - Home – To contain names of each partner agency, synopsis of the program.
  - Background – Historical account of the groundwater basin and the chronology of project proponent participation.
  - About – Brief review of project purpose and key elements as required by state regulation
  - Documents – A repository for posting the GMP Fact Sheets, GMP Workbook, PowerPoint presentations, and other materials.
  - Contact Us – To include project proponents and the consultant team.
- Public Notices – MWH will prepare public notices for publication in local newspapers by project proponents, as necessary, in support of the Stakeholder Workshop.

- Stakeholder Database – MWH, in collaboration with project proponent staff, will compile a database of key stakeholders. This list will include mail, email, phone and fax. It will also incorporate contact information collected via stakeholder interest cards collected at board/council presentations.

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APPENDIX C

Standard Operation Procedures for Groundwater Elevation Monitoring

STANDARD OPERATING PROCEDURE

For

MANUAL WATER LEVEL MEASUREMENTS

TABLE OF CONTENTS

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to set guidelines for the determination of the depth to water and separate phase chemical product (i.e., gasoline or oil) in a water supply well, monitoring well, or piezometer. These standard operating procedures may be varied or changed as required, dependent on site conditions, and equipment limitations. In all instances, the actual procedures employed will be documented and described on the field form. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Generally, water-level measurements taken in piezometers, or wells are used to construct water table or potentiometric surface maps and to determine flow direction as well as other aquifer characteristics. Therefore, all water level measurements in a given district should preferably be collected within a 24-hour period and the WPCGMP area within one week. However, certain situations may produce rapidly changing groundwater levels that necessitate taking measurements as close in time as possible. Large changes in water levels among wells may be indicative of such a condition. Rapid groundwater level changes may occur due to:

- Atmospheric pressure changes
- Changes in river stage, impoundments levels, or flow in unlined ditches
- Pumping of nearby wells
- Precipitation
- Tidal influences

2.0 METHOD SUMMARY

A survey mark should be placed on the top of the riser pipe or casing as a reference point for groundwater level measurements. If the lip of the riser pipe is not flat, the reference point may be located on the grout apron or the top of the outer protective casing (if present). The measurement reference point should be documented on the groundwater level data form. All field personnel must be made aware of the measurement reference point being used in order to ensure the collection of comparable data. Before measurements are made, water levels in piezometers and monitor wells should be allowed to stabilize for a minimum of 24 hours after well construction and development. Measurements in water supply wells need to be noted as questionable if pumping has or is occurring. In low yield situations, recovery of water levels to equilibrium may take longer. All measurements should be made as accurately as possible, with a minimum accuracy of 0.1 feet. Future measurements may have to be more accurate (measurements to the nearest 0.01 foot may be needed for conjunctive use projects, etc.). Ideally, the minimum measurement accuracy is 0.1 feet and the recommended accuracy is 0.01 feet.

If there is reason to suspect groundwater contamination, water level measuring equipment must be decontaminated and, in general, measurements should proceed from the least to the most contaminated wells. This SOP assumes an absence of contamination and no need for air monitoring or decontamination.

Open the well and monitor the headspace with the appropriate air-monitoring instrument if the presence of volatile organic compounds is suspected. For electrical sounders lower the device into the well until the water surface is reached as indicated by a tone or meter deflection. Record the distance from the water surface to the reference point. Measurement with a chalked tape will necessitate lowering the tape below the water level and holding a convenient foot marker at the reference point. Record both the water level as indicated on the chalked tape section and the depth mark held at the reference point The depth to water is the difference between the two readings. Remove measuring device, replace riser pipe cap, and decontaminate equipment as necessary. Note that if a separate phase is present, an oil/water indicator probe is required for measurement of product thickness and water level.

3.0 POTENTIAL PROBLEMS

1. Cascading water, particularly in open-hole or rock wells, may interfere with the measurement.
2. Some older types of electric sounders are only marked at five-foot intervals. A surveyor's tape is necessary to extrapolate between the 5-foot marks.
3. Oil or other product floating on the water column can insulate the contacts of the probe on an electric sounder and give false readings. For accurate level measurements in wells containing floating product, a special oil/water level indicator is required, and the corrected water level must be calculated.
4. Tapes (electrical or surveyor's) may have damaged or missing sections, or may be spliced inaccurately.
5. An airline may be the only available means to make measurements in sealed production wells but the method is generally accurate only to approximately 0.2 foot.
6. When using a steel tape, it is necessary to lower the tape below the water level in order to make a measurement. This assumes knowledge of the approximate groundwater level.

4.0 EQUIPMENT

The electric water level indicator and the chalked steel tape are the devices commonly used to measure water levels. Both have an accuracy of 0.01 feet. Other field equipment may include:

- Air monitoring instrumentation
- Well depth measurement device (sounder)
- Chalk
- Ruler
- Site logbook
- Paper towels and trash bags
- Decontamination supplies (assumed unnecessary)
- Groundwater level data forms

5.0 PROCEDURES

5.1 Preparation

1. Determine the number of measurements needed, the methods to be employed, and the equipment and supplies needed.
2. Decontaminate or pre-clean equipment, and ensure that it is in working order.
3. Coordinate schedule with staff and regulatory agency, if appropriate.

4. If this is an initial visit, perform a general site survey prior to site entry in accordance with a current approved site specific Health and Safety Plan (id applicable).
5. Identify measurement locations.

5.2 Procedures

Procedures for determining water levels are as follows:

1. If possible, and when applicable, start at those wells that are least contaminated and proceed to those wells that are most contaminated.
2. Rinse all the equipment entering the well.
3. Remove locking well cap, note well ID, time of day, and date on the groundwater level data form.
4. Remove well cap.
5. If required by site-specific condition, monitor headspace of well with a photoionization detector (PID) or flame ionization detector (FID) to determine presence of volatile organic compounds, and record results in logbook.
6. Lower water-level measuring device into the well. Electrical tapes are lowered to the water surface whereas chalked steel tapes are lowered generally a foot or more below the water surface. Steel tapes are generally chalked so that a 1-to 5-foot long section will fall below the expected water level.
7. For electrical tapes record the distance from the water surface, as determined by the audio signal or meter, to the reference measuring point and record. For chalked tapes, an even foot mark is held at the reference point, once the chalked section of the tape is below the water level. Both the water level on the tape and the foot mark held at the reference point is recorded. The depth to the water is then the difference between the two readings. In addition, note the reference point used (top of the outer casing, top of the riser pipe, ground surface, or some other reproducible position on the well head). Repeat the measurement.
8. Remove all downhole equipment, replace well cap and locking steel caps.
9. Rinse all downhole equipment and store for transport to the next well.
10. Note any physical changes, such as erosion or cracks in protective concrete pad or
11. Note any physical changes, such as erosion or cracks in protective concrete pad or variation in total depth of well on groundwater level data form.

6.0 CALCULATIONS

To determine groundwater elevation above mean sea level, use the following equation:

$$\mathbf{E_w = E - D}$$

where:

E_W = Elevation of water above mean sea level (feet) or local datum

E = Elevation above sea level or local datum at point of measurement (feet)

D = Depth to water (feet)

7.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality assurance/quality control (QA/QC) procedures apply:

1. All data must be documented on the groundwater level data forms.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified.
3. Each well should be tested at least twice in order to compare results. If results do not agree to within 0.02 feet, a third measurement should be taken and the readings averaged. Consistent failure of consecutive readings to agree suggests that levels are changing because of one or more conditions as indicated in Section 1, and should be noted on the field form.
4. Results should be compared to historical measurements while in the field and significant discrepancies noted and resolved if possible.
5. Wells for which no or questionable measurements are obtained need to have the codes entered on the field form as follows:

	No Measurement		Questionable Measurement
0	Discontinued	0	Caved or deepened
1	Pumping	1	Pumping
2	Pumphouse locked	2	Nearby pump operating
3	Tape hung up	3	Casing leaking or wet
4	Can't get tape in casing	4	Pumped recently
5	Unable to locate well	5	Air or pressure gauge measurement
6	Well destroyed	6	Other
7	Special	7	Recharge operation at nearby well
8	Casing leaking or wet	8	Oil in casing
9	Temporarily inaccessible		
D.	Dry well		
F.	Flowing well		

6. The surveyor(s) must complete all fields on the field form and initial. Upon return from the field, appropriate corrective actions need to be communicated and completed prior to the next survey event.
7. All data entered into electronic spreadsheet or database should be double-keyed or hard copy printed and proofed by a second person.
8. Questionable wells or measurements noted during data compilation need to result in corrective actions if applicable.

8.0 HEALTH AND SAFETY

This SOP assumes that only uncontaminated wells are being measured. If not, a current approved site Health and Safety Plan should be consulted..

9.0 REFERENCES

Driscoll, F.G. 1986. Groundwater and Wells. Second Edition. Chapter 16. *Collection and Analysis of Pumping Test Data.* pp 534-579. Johnson Filtration Systems Inc. St. Paul, Minnesota.

U.S. Environmental Protection Agency (USEPA), 1986. RCRA Groundwater Monitoring Technical Enforcement Guidance Document, pp. 207.

USEPA, 1987, A Compendium of Superfund Field Operations Methods. EPA/540/p-87/001 Office of Emergency and Remedial Response Washington, D.C. 20460.

USEPA, 2000. Environmental Response Team SOP 2043, 10 pages Feb. 11 2000.

APPENDIX D

AGENCIES - RESOLUTIONS OF ADOPTION

RESOLUTION NO. 2007-198

A RESOLUTION OF THE LINCOLN CITY COUNCIL TO (1) ADOPT THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN, AND (2) APPROVE THE MEMORANDUM OF AGREEMENT FOR IMPLEMENTATION OF THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

WHEREAS, pursuant to the Groundwater Management Act (Water Code, §§ 10750 et seq.) the City of Lincoln (City) adopted a Groundwater Management Plan (GMP) in November of 2003; and

WHEREAS, the adopted City of Lincoln GMP addressed the monitoring and management associated with the portion of the basin directly underlying the City; and

WHEREAS, the City has been actively implementing management actions included in the adopted GMP; and

WHEREAS, the Groundwater Management Act encourages the periodic review and update of adopted GMPs; and

WHEREAS, the City of Lincoln, City of Roseville, Placer County Water Agency and California-American Water Company have jointly prepared the Western Placer County Groundwater Management Plan (WPCGMP) to join together in a regional plan; and

WHEREAS, the City of Lincoln, following required public noticing, held a Public Hearing on the WPCGMP on October 23, 2007; and

WHEREAS, the City of Lincoln is a local agency authorized to adopt a groundwater management plan, and

WHEREAS, the City of Lincoln, City of Roseville, Placer County Water Agency and California-American Water Company have also drafted a Memorandum of Agreement for Implementation of the WPCGMP (Implementation MOA), and

WHEREAS, the Implementation MOA addresses how the Parties intend: (1) to coordinate their efforts in implementing the WPCGMP; (2) to memorialize the Parties' express understanding relating to such efforts; and (3) to allocate costs to be expended in administering the WPCGMP's implementation, and

WHEREAS, after considering the public comment and other information presented at the hearing, the Lincoln City Council determined that it is in the best interest of the City to (1) adopt the WPCGMP, and (2) approve the Implementation MOA.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF LINCOLN DOES HEREBY RESOLVE AS FOLLOWS:

1. The Lincoln City Council deems it advisable and in the best interest of the City to (1) adopt the Western Placer County Groundwater Management Plan, and (2) approve the Memorandum of Agreement for the Implementation of the Western Placer County Groundwater Management Plan.

2. The City hereby agrees to (1) adopt the Western Placer County Groundwater Management Plan, and (2) approve the Memorandum of Agreement for the Implementation of the Western Placer County Groundwater Management Plan.

3. The Director of Public Works is directed to take any additional action necessary and appropriate to implement this resolution.

PASSED and ADOPTED this 27th day of November, 2007, by the following roll call vote:

AYES: COUNCILMEMBERS: Stackpoole, Cosgrove, Short, Santini, Nakata

NOES: COUNCILMEMBERS: None

ABSENT: COUNCILMEMBERS: None

Kent Nakata

Kent Nakata, Mayor

ATTEST:

Patricia Avila

Patricia Avila, City Clerk

APPROVED AS TO FORM:

City Attorney

9/7/07 pc. Tony file E6

PCWA

P5

RESOLUTION NO. 07- 25 OF THE BOARD OF DIRECTORS OF THE PLACER COUNTY WATER AGENCY ADOPTING THE UPDATED WEST PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

WHEREAS, On November 2, 2006 the Board of Directors passed Resolution 06-45 declaring its intent to update its West Placer County Groundwater Management Plan and adopt a statement of public participation; and

WHEREAS, the Agency prepared an updated plan in partnership with the City of Roseville, City of Lincoln, and California-American Water Company in order to promote regionally consistent and cooperative goals and objectives; and

WHEREAS, the updated West Placer County Groundwater Management Plan was prepared in accordance with the California Groundwater Management Act, Assembly Bill 3030, and Senate Bill 1938; and

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Placer County Water Agency hereby adopts the updated West Placer County Groundwater Management Plan.

The foregoing resolution was duly passed at meeting of the Board of Directors of the Placer County Water Agency held on September 6, 2007, by the following on roll call:

AYES DIRECTORS: Gray Allen, Alex Ferrêira, Mike Lee, Otis Wollan, and Chairman Lowell Jarvis

NOES DIRECTORS: None

ABSENT DIRECTORS: None

Signed and approved by me after its passage this 6th day of September, 2007.

Lowell Jarvis

Chair, Board of Directors
Placer County Water Agency

ATTEST:

Clerk, Board of Directors
Placer County Water Agency

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Roseville

R6

RESOLUTION NO. 07-426

ADOPTING THE WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

WHEREAS, on August 3, 2005, the City Council authorized staff to prepare a groundwater management plan; and

WHEREAS, in order to promote regionally consistent and cooperative groundwater management goals and objectives, staff proposed development of a joint plan with Placer County Water Agency; and

WHEREAS, the Ground Water Management Plan was prepared in accordance with the California Groundwater Management Act, AB3030 and SB 1938; and

WHEREAS, the City Council has reviewed the proposed Western Placer County Groundwater Management Plan;

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Roseville hereby adopts the Western Placer County Groundwater Management Plan, pursuant to California Water Code Section 10753.

PASSED AND ADOPTED by the Council of the City of Roseville this 1st day of August, 2007, by the following vote on roll call:

AYES COUNCILMEMBERS: Allard, Roccucci, Garcia, Garbolino, Gray

NOES COUNCILMEMBERS: None

ABSENT COUNCILMEMBERS: None

Jim Gray
MAYOR

ATTEST:

Audrey Mynner
for City Clerk

CITY OF ROSEVILLE CALIFORNIA

PCWA

City of Lincoln

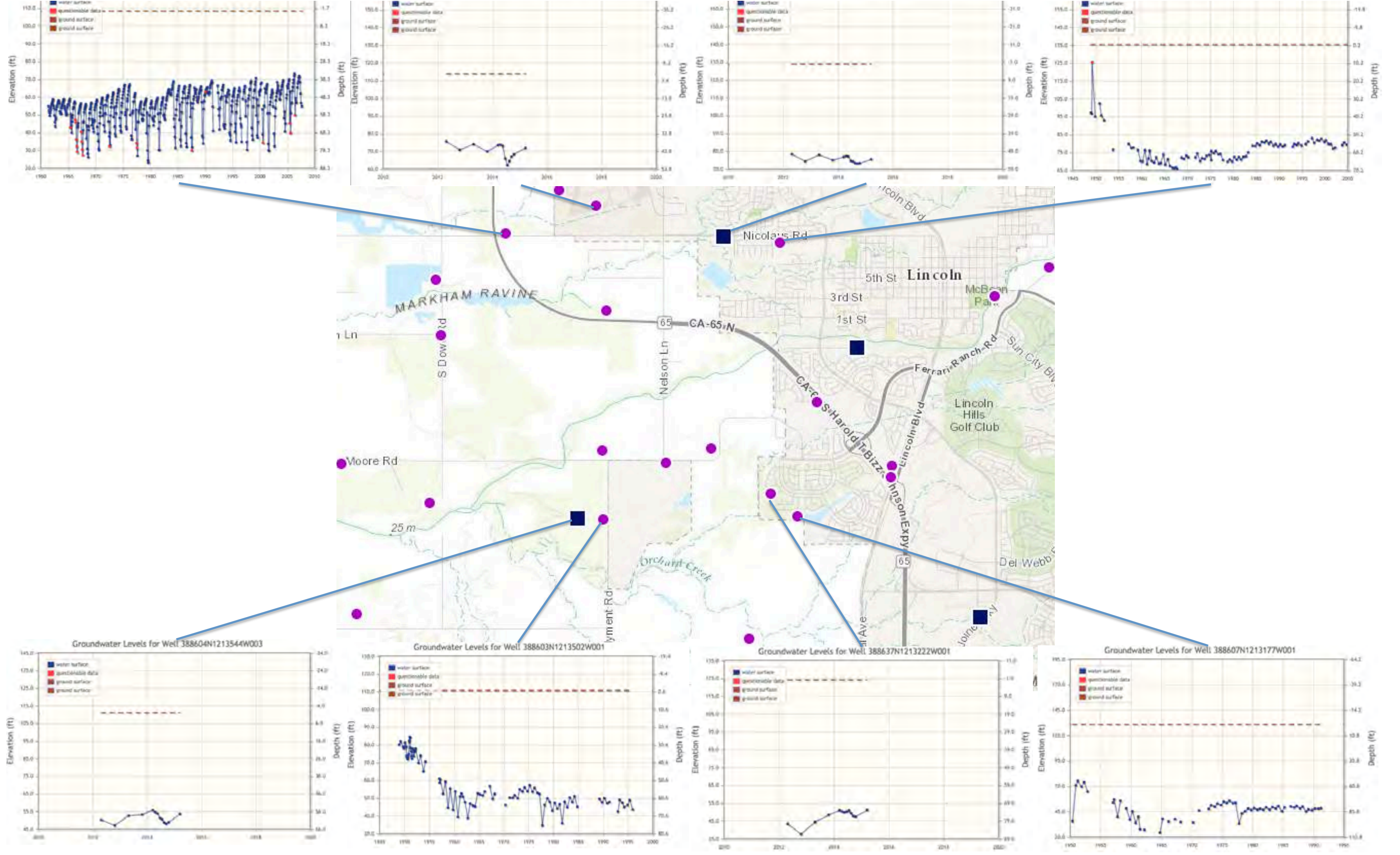
California American Water

WESTERN PLACER COUNTY GROUNDWATER MANAGEMENT PLAN

MWH

Appendix H

Hydrograph



Groundwater Levels for Well 388604N1213544W003
Groundwater Levels for Well 388603N1213502W001
Groundwater Levels for Well 388637N1213222W001
Groundwater Levels for Well 388607N1213177W001
water surface
questionable data
ground surface
Elevation (ft)
Depth (ft)
Lincoln
Nicolaus Rd
5th St
3rd St
1st St
McBean Park
MARKHAM RAVINE
CA-65 N
65
S Dowd Rd
Nelson Ln
Ferrari Ranch Rd
Sun City Blvd
Lincoln Hills Golf Club
CA-65 S Harold T Bizz Johnson Expy
Lincoln Blvd
Moore Rd
25 m
Orchard Creek
Del Webb