TO: BOARD OF DIRECTORS

FROM: BRUCE BUEL BSB

DATE: AUGUST 22, 2007

AGENDA ITEM
B
AUGUST 29, 2007

EDIT WATER PROJECTS PRIORITY LISTING

ITEM

Receive and edit recommended Water project priorities listings from Cannon's Draft Water and Sewer Master Plan [PROVIDE POLICY GUIDANCE].

BACKGROUND

Attached from Cannon Associates is a cover letter, a listing of water projects and plan sheet assuming that NCSD succeeds in securing an Intertie with the City of Santa Maria and that NCSD develops a Desalination Project West of the District.

Larry Kraemer and Jeff Spannbauer from Cannon will present these materials to your Honorable Board and answer questions.

RECOMMENDATION

The intent of this item is to provide sufficient information to your Honorable Board so that you can discuss the options presented and edit the proposed listings. Staff also requests that the Board discuss the costs set forth in the listing to determine which projects should be included in the 2008-2012 Combined Water System Financial Plan.

ATTACHMENTS

- Cannon Cover Letter
- Water Projects Listing
- Water Plan Sheet

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Cannon ASSOCIATES

ENGINEERS
PLANNERS
SURVEYORS

Document Transmittal

August 22, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813
Jeff Spannbauer, RCE 66131

Subject: Proposed Water System Improvement Projects

A computer model of the water distribution system was developed to analyze existing conditions, determine system conditions with future supplemental water sources, predict system response to various demand scenarios, and identify appropriate system improvements to respond to existing and future needs. This memo presents the basis for that model, an explanation of the various source and demand scenarios considered, a discussion of potential system deficiencies, and a list of recommended projects to respond to these needs.

Water System Analysis

Each of the three major components of the water system (distribution, supply, and storage) was analyzed in the effort to develop the list of recommended projects. The following summary provides a discussion of the supplemental water supply assumptions used in developing the master plan scenarios, a description of the tools used in this process, a brief definition of the system evaluation criteria, and results of the analysis.

Supplemental Water Supply

NCSD is developing outside sources of supplemental water to help offset existing groundwater use and to meet future needs. Several iterations of water supply scenarios have been considered over the past several months as part of the on-going Water Alternatives Evaluation Study. For purposes of this analysis, it was assumed that supplemental water sources would include state water (CCWA) from the City of Santa Maria and desalinated water. The table below shows the assumptions made for transitioning from current conditions using wells, to CCWA/wells, and ultimately to desalination/wells. In general, near-term can be defined as needing to occur between now and the Year 2010, Interim by 2020, and Future by 2030.

Annual Water Supply (AF) from Sources				
Source\Condition	**Current**	**Near-Term**	**Interim**	**Future**
NCSD Wells	3,000	1,000	1,000	1,000
CCWA	-	2,500	1,500	0
Desalination	-	0	2,000	5,200
Total	3,000	3,500	4,500	6,200

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Note that these scenarios all show a dramatic reduction in District well usage from current levels. Wells will primarily be used to offset seasonal peak demand, once the supplemental water sources are on line.

Tie-in locations to the existing system were assumed to be near the intersection of Thompson and Tefft for CCWA and at Highway 101/Willow Road for the desalinated water. The analysis for CCWA supplemental water assumed a fixed-flow condition, that is, a constant volume of supplemental water would be supplied at a rate equivalent to no more than the average daily demand of the system.

The analysis showed that the optimal location for a CCWA tie-in is as close as possible to the existing storage facilities, and into as large a diameter water line as is reasonable. The ideal tie-in point would be directly into the Quad tanks. This location would result in essentially no additional pressure on the system.

In regard to Desalination, it was assumed that desalinated water can be provided on an as-needed basis, much as the District's wells are operated currently, to meet the future maximum daily demand requirements.

Computer Model, Calibration, and System Configuration

To create the computer model, a base map of the existing water distribution system was first prepared in AutoCAD. GIS data provided by NCSD was used to create the base map showing parcel lines, contours, and the water system itself. Separate NCSD/County of SLO-provided maps were used to delineate service areas and sphere-of-influence boundaries, as well as land use types within current and future service areas.

The model was created in WaterGems (version 8 by Haestad Methods) and calibrated using results of fire flow tests performed on the system. SCADA data on tanks and field pump data were incorporated into the model. Friction factors within the model were adjusted so that predicted results using the model approximated actual fire flow test results. Because of the limited pressure range available for field pump data, flow curves outside of the available range were extrapolated based on measured data.

Once the model was calibrated for existing conditions, alternative system configurations were developed through an iterative process to meet existing and future demand projections and analyzed under the supplemental water supply scenarios (described above). Existing and future water use demands were based on Scenario 1 – Existing Land Use projections discussed in Tech Memo 1.

Evaluation Criteria and Results

The District's *distribution system* design criteria specify that pipeline velocities must remain at or below five feet per second, and that residual pressures remain at or above 20 psi, under all system-demand conditions.

The two most significant events that a distribution system experiences are a fire flow occurring on the Maximum Day Demand of the year, and the Peak Hourly flowrate. Flow bottlenecks were analyzed under these two "worst case" scenarios. Service connection pressures and main line velocities were used to evaluate the system's performance. It was determined that peak hour demand scenarios strain the system backbone; max daily demand plus fire flow placed the most strain on the smaller arterial pipelines throughout the system. If the model showed that the system did not meet these criteria for any of the existing and future conditions, system improvements were identified and incorporated into the listing of recommended projects.

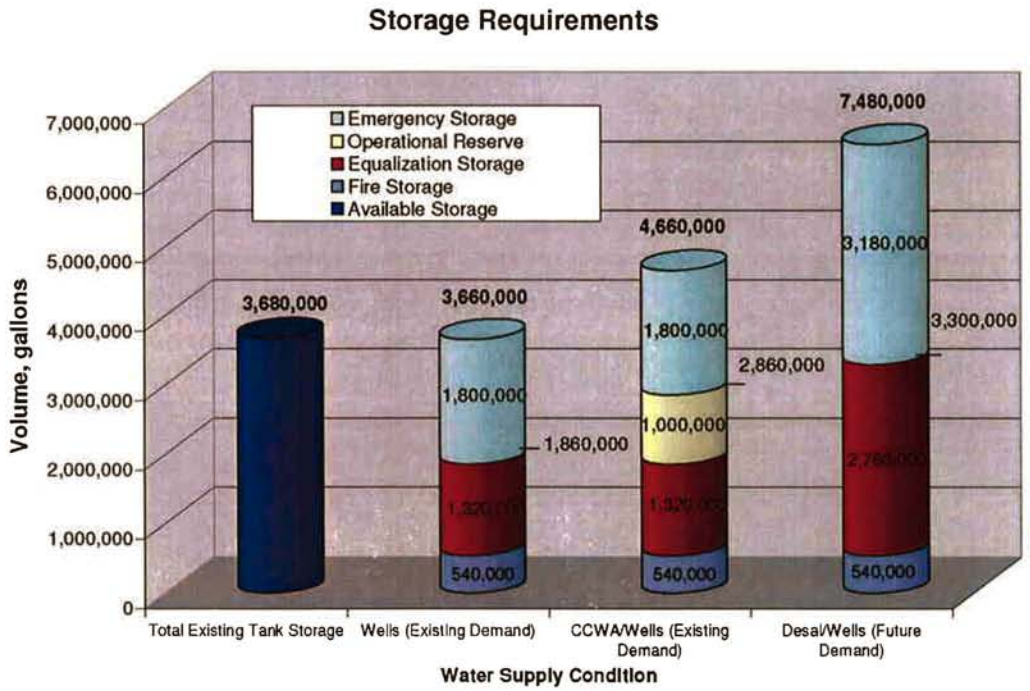
The table below shows the values used in the evaluation of the District's system.

WATER DEMAND PROJECTIONS[1], gallons per minute

	Existing Condition (3,000 AF/YR)	Future Condition (6,200 AF/YR)
Average Day Demand (ADD)	1,860	3,872
Maximum Day Demand (MDD)	3,162	6,590
Peak Hour Demand (PHD)	7,030	14,650

1. Results from Technical Memorandum No. 1

District *tank storage* requirements specify that sufficient volume be maintained for fire flow storage (maximum anticipated fire flow for specified duration), emergency storage of at least 50 gallons per day per capita for three days, and equalization storage to maintain availability of water during peak conditions. The following graph illustrates the District's storage requirements based on the master-plan water supply scenarios described above.



The District's existing tank storage is adequate to meet current and future needs. This analysis assumes that existing wells with standby emergency back-up power will receive credit for the emergency storage requirement, CCWA Operational Reserve storage will not be needed once the Desalination Supply is on-line, and the combination of Desalination Supply and wells will be capable of supplying future Maximum Daily Demand.

District *supply* requirements specify that the supply system be capable of replenishing maximum daily demand draw on the system within 24 hours. At present, the pumping capacity of the existing wells is approximately 3,920 gpm, which is slightly greater than the maximum day

demand of 3,142 gpm. Some jurisdictions require that systems be analyzed with the largest producing well out of service. If this were the case here, NCSD would not have sufficient capacity to meet this requirement. As described above, the District is in the process of developing supplemental water supplies to increase its capacity. The District will need to remain aware of this requirement and develop the necessary water supply sources and capacity to stay ahead of demand.

Recommended Projects

The attached project list includes three categories of recommended projects:

- *Near-term projects*, which address existing system needs and/or projects necessary to bring CCWA water on-line;
- *Interim-term projects*, which address longer-term projects and/or projects necessary to tie-in the desalination facility. Note that projects related to the desalination facility itself are identified in a separate document;
- *Long-term projects*, which address those necessary to serve future development as the Nipomo area grows.

Note that one project, the Willow-Road pipeline extension, actually falls under Interim-term projects as far as addressing the District's development needs. However, it is included with the Near-term projects to coordinate the pipeline extension with the County's planned extension of Willow Road. This coordination will save the District construction costs that would be required later to install the pipeline into the completed road. While not technically necessary at this time, the pipeline extension will also improve system performance.

Within each category, projects are prioritized according to District need:

- Priority 1 projects address issues related to life, safety, and ability to serve customers;
- Priority 2 projects address operational improvements, efficiency improvements, water quality improvements, etc.;
- Priority 3 projects include long term operation and maintenance projects, and situations where the code is currently met but where service could be improved, such as the proposed water pressure improvements in the Summit Station area.

These projects were developed based on system deficiencies identified during model runs, model analysis and discussions with NCSD staff about solutions, and cost analysis for the proposed solutions to determine the most effective options.

Attachments:

- Recommended Water System Improvements Table
- Recommended Water System Improvements Exhibit

RECOMMENDED WATER SYSTEM IMPROVEMENTS

Improvements to meet NEAR-TERM needs

DISTRIBUTION SYSTEM	Diam. (in)	Unit	Quantity	Unit Cost[1]	Total Cost[2]
PRIORITY 1 - ELIMINATING EXISTING BOTTLENECKS					
Camino Caballo - Blue Gum west to existing 16" main	16	LF	1,325	$200	$265,000
Willow Road - Pomeroy west to Misty Glen Place	14	LF	1,500	$180	$270,000
Grande from Cyclone to Orchard	8	LF	660	$140	$92,400
Frontage from Story to Banyon	12	LF	290	$170	$49,300
Frontage from Hill to Grande	12	LF	1,180	$170	$201,000
				Subtotal	*$878,000*
PRIORITY 1 - ELIMINATING EXISTING BOTTLENECKS - BLACKLAKE					
Misty Glen Place - Willow Road north to existing 8" main	8	LF	85	$140	$11,900
				Subtotal:	*$11,900*
PRIORITY 1 - SLO COUNTY DRAINAGE PROJECT - RELOCATING WATER MAINS					
Tefft Street Box Culvert Improvements	10	LF	150	$160	$24,000
Thompson Avenue Arch Culvert Improvements	8	LF	150	$140	$21,000
Mallagh Arch Culvert Improvements	8	LF	150	$140	$21,000
Mallagh Box Culvert Improvements	8	LF	150	$140	$21,000
Burton Street Box Culvert Improvements	8	LF	150	$140	$21,000
				Subtotal	*$108,000*
PRIORITY 1 - BACKBONE IMPROVEMENTS TO ACCOMMODATE NEW SUPPLY AT THOMPSON & MEHLSCHAU					
North Dana Foothill Road - Quad Tanks to Mehlschau	24	LF	4,900	$260	$1,280,000
Mehlschau - North Dana Foothill Road to Thompson	24	LF	5,650	$260	$1,470,000
Thompson - Mehlschau to High School	14	LF	900	$180	$162,000
Disinfection: conversion for chloramination at each well.		LS	1	$960,000	$960,000
Pressure reducing station at CCWA tie-in.		LS	1	$75,000	$75,000
				Subtotal	*$3,950,000*
PRIORITY 1 - WILLOW ROAD EXTENSION IMPROVEMENTS					
Mehlschau - Thompson to Oakglen	18	LF	2,900	$250	$725,000
Freeway Crossing - Oakglen to Frontage at Mehlschau	18	LF	250	$1,500	$375,000
N. Frontage - Hwy 101 Crossing to Sandydale	16	LF	600	$200	$120,000
N. Frontage - Hwy 101 Crossing to Willow Road Extension	12	LF	3,650	$170	$621,000
Willow Extension - N. Frontage to Hetrick	12	LF	4,600	$170	$782,000
Willow Extension - Hetrick to Pomeroy	12	LF	3,700	$170	$629,000
				Subtotal	*$3,252,000*
PRIORITY 2 - OPERATIONAL IMPROVEMENTS					
Standpipe Mixing		LS	1	$200,000	$200,000
Eureka Well - Conversion from Electricity to Natural Gas		LS	1	$110,000	$110,000
Security System		LS	1	$121,000	$121,000
				Subtotal	*$431,000*
PRIORITY 2 - LOOPING DEAD-END MAINS					
Brytec Ct - extend 8" dead-end to Division	8	LF	20	$140	$2,800
N. Blume - extend 8" dead-end to Grande	8	LF	370	$140	$51,800
N. Crosby - extend 8" dead-end to Camino Caballo	8	LF	90	$140	$12,600
Eve Street - from Burton to Thompson	8	LF	440	$140	$61,600
Colt Lane from Glory to Amado	8	LF	1,800	$140	$252,000
Grove from Oakglen to Colt	8	LF	650	$140	$91,000
Branch from Wilson to Carrillo	8	LF	730	$140	$103,000
Camino Caballo from Lindon to Frontage	8	LF	500	$140	$70,000
				Subtotal	*$645,000*
PRIORITY 3 - PIPE REPLACEMENT PROGRAM					
Replace 5% of Valves per year (1840 total)		EA	92	$2,000	$184,000
Replace 5% of Fire Hydrants per year (660 total)		EA	33	$2,200	$72,600
Replace 5% of Air/Vac's per year (205 total)		EA	11	$1,500	$16,500
Replace 10% of Water Meters per year (3000 total)		EA	300	$500	$150,000
				Subtotal:	*$424,000*
PRIORITY 3 - SUMMIT STATION PRESSURE/FIRE PROTECTION UPGRADES					
Hydro-pneumatic Tanks, Booster Pump Station, & Valving		LS	1	$500,000	$500,000
				Subtotal:	*$500,000*
				Total cost to meet NEAR-TERM needs:	***$10,200,000***

NOTES:
1. Cost Estimate derived from adjusting 2001 Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
2. Costs rounded to 3-significant figures.

RECOMMENDED WATER SYSTEM IMPROVEMENTS						
Improvements to meet INTERIM-TERM needs						
DISTRIBUTION SYSTEM	**Diam. (in)**	**Unit**	**Quantity**	**Unit Cost[1]**	**Total Cost[2]**	
PRIORITY 1 - BACKBONE IMPROVEMENTS TO ACCOMMODATE NEW SUPPLY AT WILLOW & HWY 1						
Willow Road from Hwy 1 to Bevington Well (parallel)	24	LF	6,800	$260	$1,770,000	
					$1,770,000	
PRIORITY 1 - BACKBONE IMPROVEMENTS TO MEET INTERIM NEEDS						
S. Oakglen - Tefft to Amado	14	LF	3,050	$180	$549,000	
Amado - S. Oakglen to Highway 101	14	LF	650	$180	$117,000	
Freeway Crossing - Oakglen to Frontage at Amado	14	LF	250	$1,400	$350,000	
N. Frontage - Sandydale to Lindon	16	LF	650	$200	$130,000	
N. Frontage - Lindon to Juniper	14	LF	1,600	$180	$288,000	
Calle Fresa - Pomeroy to Camino Caballo	10	LF	1,200	$160	$192,000	
S. Frontage - Tefft to Hill Street	12	LF	900	$170	$153,000	
S. Frontage - Grande to Banyon	12	LF	2,250	$170	$383,000	
S. Frontage - Story to Southland	12	LF	1,850	$170	$315,000	
				Subtotal	*$2,480,000*	
			Total cost to meet INTERIM-TERM needs:		***$4,250,000***	
NOTES:						
1. Cost Estimate derived from adjusting 2001 Master Plan Estimate April 2001 cost to May 2007 ENR CCI.						
2. Costs rounded to 3-significant figures.						

RECOMMENDED WATER SYSTEM IMPROVEMENTS					
Improvements to meet FUTURE-TERM needs					
DISTRIBUTION SYSTEM	**Diam. (in)**	**Unit**	**Quantity**	**Unit Cost[1]**	**Total Cost[2]**
PRIORITY 1 - BACKBONE IMPROVEMENTS TO ACCOMMODATE FUTURE NEEDS					
N. Frontage - from Willow Road Extension to Future Road	12	LF	4,450	$170	$757,000
N. Frontage - from Future Road to Summit Station	10	LF	1,100	$160	$176,000
Future Road - N. Frontage to Pomeroy	12	LF	6,200	$170	$1,060,000
Pomeroy - Willow to Future Road	12	LF	3,600	$170	$612,000
Pomeroy - Future Road to Summit Station	10	LF	2,050	$160	$328,000
Willow Road from Bevington Well to Misty Glen Place	18	LF	4,900	$250	$1,230,000
Mesa - Charro to Viva	10	LF	8,100	$160	$1,300,000
Viva - Mesa to Camino Caballo	10	LF	2,650	$160	$424,000
Evergreen - Dead End to Mesa	8	LF	1,350	$140	$189,000
Orchard - Southland to Joshua	12	LF	8,500	$170	$1,450,000
Joshua - Orchard to S. Frontage	12	LF	3,350	$170	$570,000
S. Frontage - Southland to Joshua	12	LF	8,600	$170	$1,470,000
Hutton - Joshua to Cuyama	12	LF	6,300	$170	$1,080,000
Southland - Frontage to Orchard	10	LF	3,900	$160	$624,000
				Subtotal	*$11,300,000*
PRIORITY 1 - ELIMINATING BOTTLENECKS - BLACKLAKE					
Augusta Drive - extend 8" to future line in Pomeroy	8	LF	20	$140	$2,800
				Subtotal:	*$2,800*
PRIORITY 2 - PROPOSED LOOPS					
Widow Lane / Twilight - extend 8" to loop dead-ends	8	LF	1300	$140	$182,000
Tanis - extend 6" dead-end to Nellie	8	LF	900	$140	$126,000
Spruce - extend 6" dead-end to Nellie	8	LF	250	$140	$35,000
Bristlecone - extend 6" dead-end to Nellie	8	LF	200	$140	$28,000
Terrace - extend 6" dead-end to Souza	8	LF	1850	$140	$259,000
Souza - Terrace to Oakglen	8	LF	300	$140	$42,000
Glenhaven - San Ysidro to Amber	8	LF	800	$140	$112,000
Hunter Ridge - Pomeroy to Glenhaven	8	LF	1050	$140	$147,000
Future Road - Glenhaven to Pomeroy (between Jennie and Ten Oaks)	8	LF	1050	$140	$147,000
Future Road - Honey Grove to Drumm	8	LF	650	$140	$91,000
				Subtotal	*$1,170,000*
				Total cost to meet FUTURE-TERM needs:	***$12,500,000***

NOTES:
1. Cost Estimate derived from adjusting 2001 Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
2. Costs rounded to 3-significant figures.