CHAPTER 7
Recommended Capital Improvement Program

7.1 OVERVIEW

This chapter presents the recommended and prioritized capital improvement program for the City of Santa Rosa’s existing and buildout water systems. These recommended water system improvements were previously described in Chapters 5 and 6. This chapter recommends that these capital improvement projects be constructed during three distinct periods; near-term (existing); intermediate (around 2020 to 2025); and prior to the estimated buildout year of 2035. This chapter identifies improvements at a master plan level and does not constitute design of such improvements. Subsequent detailed design will be required to determine the exact sizes and locations of these proposed improvements.

This capital improvement program (CIP) chapter also provides estimates of probable construction costs and a prioritized implementation schedule for the capital improvement projects.

7.2 COST ESTIMATING METHODS

Construction costs are presented in March 2014 dollars based on an Engineering News Record (ENR) Construction Cost Index (CCI) of 9702 (20 Cities Average). Construction costs were developed based on data supplied by manufacturers, published industry standard cost data and curves, construction costs for similar facilities built by the City of Santa Rosa and/or other public agencies, bids on other water facilities design projects and from standard cost estimating guides.

The total CIP cost includes a construction contingency of 20 percent of the base construction costs, and an additional 35 percent markup to the base construction costs with construction contingency to account for other professional services during design and construction including program management/administration.

- Construction Contingency: 20 percent
- Other Contingencies (Professional Services): 35 percent of base construction costs plus Design and Construction Contingency as itemized below:
  - General Contingency: 15 percent
  - Design and Planning: 15 percent
  - Administration and Overhead: 5 percent
- Other Contingencies x Construction Contingency: 7 percent (35 percent x 20 percent)

1 2012-9Construction Cost worksheet.xlsx, dated 7/22/2013.
In summary, the total CIP cost includes mark-ups equal to 62 percent of the estimated base construction costs. The construction costs do not include costs for annual operation and maintenance. A complete description of the assumptions used in the development of the estimated probable construction costs is provided in Appendix E.

7.3 RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

7.3.1 Overview

Table 7-1 presents a summary of the overall recommended capital improvement program by project type to mitigate existing system deficiencies, and to meet future growth in the City’s water service area. It should be noted that, as discussed with City staff, any pipeline required to be installed within a City designated specific plan area (North Station, Downtown, Southeast, and Southwest) or as part of a new development project must be fully funded and installed by the project proponents. Therefore these facilities and corresponding costs are not included in Table 7-1.

<table>
<thead>
<tr>
<th>Improvement Type</th>
<th>Existing</th>
<th>Intermediate</th>
<th>Buildout</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipelines</td>
<td>$13,270,000</td>
<td>$4,393,000</td>
<td>$707,000</td>
<td>$18,370,000</td>
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<tr>
<td>Hydrants</td>
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<td>Generators</td>
<td>$712,000</td>
<td>$0</td>
<td>$0</td>
<td>$712,000</td>
</tr>
<tr>
<td>Pump Upgrades</td>
<td>$1,031,000</td>
<td>$2,916,000</td>
<td>$665,000</td>
<td>$4,612,000</td>
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<tr>
<td>Groundwater Wells(e)</td>
<td>$4,860,000</td>
<td>$0</td>
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<td>$26,730,000</td>
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<tr>
<td><strong>Total Capital Improvement Cost</strong></td>
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<td>$7,309,000</td>
<td>$23,242,000</td>
<td>$50,442,000</td>
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</tbody>
</table>

(a) Costs shown are based on historical values compiled from various pipeline projects and other cities' bid tabs, scaled to March 2014 dollars with an ENR CCI of 9702 (20 City Average).

(b) Total cost is rounded to nearest $1,000.

(c) Costs include mark-ups equal to 62 percent (Construction Contingency: 20 percent of construction cost; other contingencies 35 percent; and 7 percent from “other contingencies” x Construction Contingency (35 percent x 20 percent)).

(d) Costs for these intermediate improvements are proportionately allocated to existing and future customers based on the proportionate increase in pipeline capacity; see Table F-2 in Appendix F. (The $7.3M in recommended intermediate improvements includes $2.3M allocated to existing customers and $5.0M to future customers; see Table 7-2.)

(e) Costs based on Table 7-2 from 2013 Groundwater Master Plan; base construction cost estimated at $1.5M per well with the WMP Update mark-ups applied (see footnote (c)).

2 This 35 percent markup is applied to the 20 percent contingency, which is equal to 7 percent and brings the total mark-up to 62 percent: $20 + 35 + (35 x 20) = 20 + 35 + 7 = 62
Chapter 7
Recommended Capital Improvement Program

The total cost for the recommended improvements is $50.4 million (M). Of this amount, $22.2M ($19.9M + $2.3M from Intermediate) is required to address existing system deficiencies, and $28.2M ($5.0M from Intermediate + $23.2M) is required to support future planned growth as discussed below. The individual improvement projects are listed in Appendix F, and their general locations are illustrated on Figures 7-1 and 7-2.

7.3.2 Cost Allocation

Project costs were allocated to existing and future customers, depending on whether projects are needed to mitigate existing water system deficiencies, or are needed to support future growth. The costs for water facilities required solely to address existing system deficiencies were allocated to existing customers, and the improvement costs required solely to support future customers and system growth through buildout were allocated to future customers. As noted above, pipelines required to be installed within a City designated specific plan area or as part of a new development project must be fully funded and installed by the project proponents; therefore, these facilities and corresponding costs are not included in this CIP.

Improvements recommended for construction prior to buildout conditions occurring were prioritized to be constructed between 2020 and 2025, an intermediate timeframe. The improvement costs for projects designated in the 2020 to 2025 timeframe were proportionately allocated to existing and future customers based on capacity.

Table 7-2 presents a summary of the allocation of the improvement costs to existing and future customers. The total cost allocation to existing customers is $22.2M, and the cost to future customers is $28.2M.

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3 Costs for $7.3M in recommended intermediate improvements are proportionately allocated to existing ($2.3M) and future ($5.0) customers based on the proportionate increase in pipeline capacity, as shown in Table 7-2.

4 Itemized descriptions for groundwater wells have not been included in Appendix F nor are their locations shown on Figures 7-1 and 7-2 because only general locations have been identified and specific locations have not been determined. Additional details for the groundwater wells can be found in the 2013 Groundwater Master Plan.
<table>
<thead>
<tr>
<th>Pressure Zones</th>
<th>Improvement Type</th>
<th>Quantity</th>
<th>2015 Cost to City Customers</th>
<th>2020 Cost to City Customers</th>
<th>2025 Cost to City Customers</th>
<th>Buildout Cost to City Customers</th>
<th>Cost Allocation to Existing City Customers</th>
<th>Cost Allocation to Future City Customers</th>
<th>Total Capital Cost (includes mark-ups)(d)</th>
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<td><strong>Near-Term Projects</strong></td>
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<td>$0</td>
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<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
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<td>$3,648,000</td>
<td>$3,661,000</td>
<td>$23,242,000</td>
<td>$22,206,063</td>
<td>$28,235,938</td>
<td>$50,442,000</td>
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</tbody>
</table>

(a) Costs shown are based on historical values compiled from various pipeline projects and other cities’ bid tabs, scaled to March 2014 dollars with an ENR CCI of 9702 (20 City Average).
(b) Total cost is rounded to nearest $1,000.
(c) Costs are not included for pipelines within a designated Specific Plan Area (North Station, Downtown, Southeast, and Southwest), as they are expected to be fully funded and installed by the project proponents.
(d) Costs include mark-ups equal to 62 percent (Construction Contingency: 20 percent of construction cost; Professional Services: 35 percent of construction cost plus 35 percent of construction contingencies).
(e) Costs based on Table 7-2 from 2013 Groundwater Master Plan; base construction cost estimated at $1.5M per well with the WMP Update mark-ups applied (see footnote (d)).
7.3.3 Pipelines

Most of the near-term and buildout recommendations are for pipeline improvements, either to address fire flow deficiencies or to meet buildout water demands. For the buildout system, improvements that involve replacing existing pipeline with a larger diameter pipeline are categorized as intermediate improvements; and the improvement costs are allocated to existing and future customers based on the capacity due to increased growth/demand. For improvements that involve providing additional system looping to the City’s system, the costs are equally allocated to existing and future customers. The improvement costs for buildout improvements that are required to serve the new development within the City’s adopted Urban Growth Boundary service area are fully allocated to future customers. However, as discussed and agreed to by City staff, pipeline costs for improvements required within a designated specific plan area (i.e., North Station, Downtown, Southeast, and Southwest), or as part of future developments, were not to be included in the calculation of City CIP costs, and these separate pipeline costs will be the sole responsibility of the project proponents for these proposed projects.

Pipeline improvement recommendations are grouped geographically into CIP projects. For example, six pipeline improvement recommendations to address fire flow deficiencies in Pressure Zone R10 are grouped together as CIP945, and 24 pipeline improvement recommendations to meet buildout demand at the edge of the southwest corner of the Aqueduct Pressure Zone are grouped together as CIP901.

Recommended pipeline projects are shown on Figures 7-1 and 7-2. Details of recommended pipeline projects to meet existing system deficiencies are tabulated in Appendix Table F-1, and recommended projects to meet future demands are tabulated in Appendix Table F-2. A graphical timeline schedule for general construction of these recommended improvements is presented on Figure 7-3. Details of this preliminary schedule to construct the pipelines recommended to meet buildout demands will be predicated on the City’s actual rate of growth and increase in water demand.

7.3.4 Pump Stations

Appendix Table F-1 includes recommendations for near-term improvements at Pump Stations S3, S13 and S14. These improvements are recommended to address fire flow deficiencies in the existing water system. The CIP recommendations for these pump stations involve replacing existing pumps with larger-capacity pumps. Cost estimates for pump replacements include costs for the pumps and installation labor. Cost estimates assume building expansions are not necessary. The 62 percent contingency mark-up includes allowances for modest electrical, instrumentation, internal piping, valves and other site modifications.

Appendix Table F-2 includes a new booster pump station, S9B, in the Farmers Lane Extension area near Reservoir R11 to serve as a backup and emergency booster pump station to Bennett Valley (R9) Pressure Zone. With the future growth in the Farmers Lane Extension area, this new booster pump station will provide additional reliability and operational flexibility to serve Pressure Zone R9 (particularly with the decommissioning of existing Reservoir R9C). In the emergency event that the existing S9 Pump Station has to be taken offline, this new booster pump station could provide supply to Pressure Zone R9 and fill Reservoirs R9A and R9B.
Booster pump station cost estimates include the installation of the booster pumps, site piping, earthwork, paving, on-site backup/standby power generator, electrical, SCADA, and related sitework.

Appendix Table F-2 also includes recommendations for future improvements at Pump Stations S7 and S17. These improvements are recommended to address storage deficiencies projected for the future water system. The CIP recommendations for pump stations involve replacing existing pumps with larger-capacity pumps. Cost estimates for pump replacements include costs for the pumps and installation labor. Cost estimates assume building expansions are not necessary. The 62 percent contingency mark-up includes allowances for modest electrical, instrumentation, internal piping, valves and other site modifications.

### 7.3.5 Storage

This report does not include any CIP recommendations for additional storage facilities.\(^5\)

### 7.3.6 Emergency Backup Power Generators

Appendix Table F-1 includes recommendations for near-term improvements to emergency power supply at Pump Stations S3 and S10. On-site backup power generators are recommended to provide power to pumps so that water can be pumped into the distribution system in the event of a power outage. These generators should be sized to meet the power demands of the pumps. The construction cost for a new on-site backup power generator is estimated to be approximately $356,000, including contingency costs. This cost is representative of construction conducted under normal conditions, and would be significantly higher for special or difficult conditions, such as on a very constrained site with difficult foundation materials, etc.

### 7.3.7 Groundwater Wells

A total of eleven groundwater wells were recommended based on the City’s 2013 Groundwater Master Plan. Based on further pumping and storage evaluations completed for this Water Master Plan Update, two of these wells are recommended for the existing system and the remaining wells are recommended for the buildout water system. The base construction cost for a new groundwater well is estimated at $1.5M.

### 7.3.8 Required On-going Rehabilitation Improvements

In addition to the need to construct system improvements to meet current and projected potable water system demands, the City should also plan to repair or replace aging water system infrastructure. The decision to repair or replace existing facilities should be based primarily on facility condition.

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\(^5\) The City is currently evaluating the potential demolition of Reservoir R5. Since the City is currently evaluating alternative options to serve the R5 Pressure Zone, no CIP costs have been included in this report to address this issue.
Corroding pipelines with reasonable structural integrity may often be repaired (instead of replaced), as it is more cost-effective and less disruptive than replacement and usually provides a comparable useful life for the pipeline. Extremely deteriorated pipelines must be replaced, as these facilities cannot be repaired in a cost-effective manner. All 4-inch diameter pipelines should be replaced, as these pipelines are typically undersized for the increased flows required to be conveyed under current demand conditions. The replacement of these 4-inch diameter pipelines can be coordinated with other City’s improvement projects (i.e., sewer replacement, road work, etc.). The City has an active pipeline rehabilitation and replacement program; therefore, the costs for this program are not included in this CIP.

Similarly, costs associated with the required on-going rehabilitation and repair of reservoirs, pump stations, valves, and other facilities are not included in this Water Master Plan Update.

### 7.4 SUMMARY

Based on our evaluation of the City’s existing and future water systems, West Yost identified the need for approximately $50.4M in improvement projects located throughout the City’s existing and future water service area. Appendix Tables F-1 and F-2 detail the individual projects, and Table 7-2 summarizes the projects by timeframe and project type. Table 7-2 also presents the cost allocation to the existing and future customers. The total improvement cost allocation to existing customers is $22.2M, and to future customers is $28.2M.

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6 Itemized descriptions for groundwater wells have not been included in Appendix F nor are their locations shown on Figures 7-1 and 7-2 because only general locations have been identified and specific locations have not been determined. Additional details for the groundwater wells can be found in the 2013 Groundwater Master Plan.
FIGURE 7-1
City of Santa Rosa
Water Master Plan Update

RECOMMENDED NEAR-TERM IMPROVEMENTS

NOTES
1. Some locations with deficient fire flow do not have related CIP recommendations because
their fire flow requirements can be met by supplementing flow from nearby hydrants.
2. Specific locations for new groundwater wells are not shown because they have not been determined yet (only general locations have been identified).

LEGEND
- SCWA Reservoir
- City Reservoir
- Recommended Near-Term Pump Station Improvement for Existing System
- Existing Pump Station (No Recommended Improvement)
- City Well
- SCWA Aqueduct System
- City Pipelines
- Recommended Near-Term CIP Projects
- Urban Growth Boundary
- Specific Plan Area

PRESSURE ZONE (RESERVOIR)
- FOOTTINGROVE 1 (R1A, R1B)
- FOOTTINGROVE 2 (R2A, R2B)
- FOOTTINGROVE 3 (R3)
- SKYFARM (R4)
- MONTECITO HIGH LEVEL (R4A, R4B)
- FOOTTINGROVE UNIT 2 LOWER LEVEL (R16)
- FOOTTINGROVE UNIT 2 HIGH LEVEL (R17)
- RINCON REDUCED (R6)
- RINCON HIGH LEVEL (R7)
- LOS ALAMOS (R8)
- BENNETT HIGH LEVEL (R9A, R9B, R9C)
- FAIRWAY (R10)
- SOUTHEAST ZONE 2 (R11)
- OAKMONT HIGH LEVEL (R12A, R12B)
- WILD OAK (R13)
- WILD OAK UPPER LEVEL (R14)
- MEADOW RIDGE / OAKMONT
- A1, A2, A3, A5
- A2, A4, A6
- A8
- AB

0 2,500 5,000
Scale in Feet

Rezone Area in A4 to R4R3

Santa Rosa Aqueduct
West Santa Rosa Pipeline
Petaluma Aqueduct
Sonoma Aqueduct
SCWA SUPPLY
Russian River-Cotati Intertie Pipeline
TO COTATI
Annadel Tank 2
West Santa Rosa Plant
North Santa Rosa Station
Southwest
Southeast
Downtown Station
Meadow Ridge / Oakmont

1. Some locations with deficient fire flow do not have related CIP recommendations because their fire flow requirements can be met by supplementing flow from nearby hydrants.
2. Specific locations for new groundwater wells are not shown because they have not been determined yet (only general locations have been identified).
2. Project CIP951, a hydrant installation on Incline Dr at Hidden Valley Dr in Zone 4 (Intermediate Timeframe) is not shown on this figure.

3. CIP projects to meet buildout demands within designated Specific Plan Areas are assigned a CIP number and shown on this figure, but their costs for construction are not included in CIP tables.

4. Specific locations for new groundwater wells are not shown because they have not been determined yet (only general locations have been identified).

NOTES
1. Some locations with deficient fire flow do not have related CIP recommendations because their fire flow requirements can be met by supplementing flow from nearby hydrants.
New Hydrant to Address Fire Flow Deficiencies

**Aqueduct Zone**
- CIP927

**Hillside Zones**
- CIP928
  - CIP929
  - CIP930
  - CIP931
  - CIP932

**Replacement Pipelines to Address Fire Flow Deficiencies**
- Aqueduct Zone
  - CIP922
  - CIP923
  - CIP924

**Upgrade Pump Stations**
- S3, S13, and S14
  - CIP932

**Backup Power Generators** at S3 and S10
- CIP933

**New Groundwater Wells**
- GW-A-007, GW-B-002

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**New Pipelines to Meet Buildout Demand**
- Aqueduct Zone
  - CIP900
  - CIP901

**Hillside Zones**
- CIP902
  - CIP903
  - CIP904
  - CIP905

**NOTES:**
1. Existing demand is based on the average demand for the years 2002-2012.
2. CIPs with new pipelines within designated Plan Areas and future development areas are assigned a CIP number and shown on this figure, but their costs for construction are not included in CIP tables.