

Appendix G

Cost Estimating Assumptions

Appendix G

Cost Estimating Assumptions

This appendix details West Yost’s assumptions for estimating probable construction costs for the recommended water system facilities. Construction costs were developed based on a combination of data supplied by manufacturers, published industry standard cost data and curves, construction costs for similar facilities built by the City of Lincoln (City) and/or other public agencies, and construction costs previously estimated by West Yost for similar facilities with similar construction cost indexes.

The costs presented in this appendix are for construction only and do not include estimating or construction uncertainties (e.g., variations in final quantities) or cost estimates for engineering, legal services, environmental review, inspections, and/or contract administration. Some of these items are referred to as contingency costs and are addressed in the last section of this appendix. It should also be noted that the construction costs presented in this appendix represent capital infrastructure costs and do not include costs for purchase of additional surface water supplies, supply reliability, or operation and maintenance.

All estimated construction costs have been adjusted to reflect August 2025 dollars based on the construction cost index (CCI) of 20-cities average (13913.52). These costs should be used for conceptual cost estimates only and should be updated regularly. Construction costs presented in this appendix are not intended to represent the lowest prices in the industry for each type of construction or higher costs based on current supply-chain issues and/or construction volatility experienced in 2021 and 2022; rather they are representative of average or typical construction costs.

These planning-level construction cost estimates have been prepared for guidance in evaluating various facility improvement options and are intended only for budgetary purposes within the context of this master planning effort. Cost estimates prepared for this master planning effort are developed in accordance with the guidelines of the Association for the Advancement of Cost Engineering (AACE) International for a Class 5 Estimate. AACE International defines a Class 5 Estimate in the following manner:

Class 5 Estimate: This estimate is prepared based on limited information, where little more than proposed plant type, its location, and the capacity are known. Strategic planning purposes include, but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used would include cost/capacity curves and factors, scale up factors, and parametric and modeling techniques. Typically, little time is expended in the development of this estimate. The expected accuracy ranges for this class estimate are –20 to – 50 percent on the low side and +30 to +100 percent on the high side.

The following sections of this appendix describe the assumptions used to estimate the probable construction costs for the planning and design of recommended water system facilities for the City’s water system:

- Water System Construction Costs
- Contingency Costs

WATER SYSTEM CONSTRUCTION COSTS

The following sections present the construction cost estimates used to project probable construction costs for recommended water system facilities in the City’s water system and are categorized by type of improvement, including the following:

- Potable Water Pipelines
- Treated Water Storage Tanks
- Treated Water Booster Pump Stations
- Groundwater Production Wells
- Aquifer Storage and Recovery Wells
- Pressure or Flow Regulating Stations and Valves
- Backup Power Generators Plug-In Adaptors

Potable Water Pipelines

Unit construction costs for potable water pipelines 8- through 20-inches in diameter are provided in Table 1. These unit costs are categorized by typical pipeline construction either in developed areas (e.g., in urban or suburban roads) or undeveloped areas (e.g., across open fields or in rural roads) and are representative of pipeline construction under common or normal conditions. Special or difficult conditions would increase costs significantly.

The unit construction costs presented below are based on recent bids provided by the City and generally include pipeline materials, trenching, placing and jointing pipe, valves, fittings, hydrants, service connections, placing imported pipe bedding, native backfill material, and partial asphalt pavement replacement, if required. However, the costs presented in Table 1 do not include jacking and boring pipe or constructing boring and receiving pits. Jack and bore costs are shown in Table 2 and should be added where required.

Pipeline Size	Unit Construction Cost, dollars/linear foot(b)	
	Developed Areas	Undeveloped Areas
8-inch diameter	490	320
12-inch diameter	680	485
16-inch diameter	825	640
18-inch diameter	885	690
20-inch diameter	935	670
24-inch diameter	1070	840
30-inch diameter	1260	1090

(a) Based on August 2025 CCI of 20-cities average (13913.52).
(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Pipeline Size	Unit Construction Cost, dollars/linear foot ^(b)
12-inch diameter (24-inch diameter casing)	1,070
16-inch diameter (30-inch diameter casing)	1,335
18-inch diameter (32-inch diameter casing)	1,420
24-inch diameter (36-inch diameter casing)	1,605

(a) Based on August 2025 CCI of 20-cities average (13913.52).
 (b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Treated Water Storage Reservoirs

Table 3 summarizes the estimated construction costs for treated water storage reservoirs between the size range of 1.0 to 4.0 MG. These costs generally include the installation of the storage reservoirs, site piping, earthwork, paving, instrumentation, and related sitework. These costs are representative of construction under normal excavation and foundation conditions and would be significantly higher for special or difficult foundation requirements.

Capacity, MG	Estimated Construction Cost, million dollars ^(b)	
	Above-ground Concrete	Above-ground Steel
1.0	3.6	2.6
2.0	4.7	3.5
3.0	6.0	4.4
4.0	7.1	5.3
5.0	8.2	6.4
6.0	9.4	7.3

(a) Based on August 2025 CCI of 20-cities average (13913.52).
 (b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Treated Water Pump Stations

Pump stations may be required to lift water to the operating hydraulic grade of the City’s pressure zones. Estimated construction costs for pump stations, as shown in Table 4, are based on enclosed stations with architectural and landscaping treatment suitable for residential areas. Pump station costs can vary considerably, depending on architectural design, pumping head, and pumping capacity. Therefore, these costs presented below are representative of construction under common or normal conditions and would be significantly higher for special or difficult conditions.

Pump station cost estimates include the installation of the pumps, site piping, earthwork, paving, a chemical feed system (hypochlorite), on site backup/standby power generator, SCADA, and related sitework.

Firm Capacity, mgd^(b)	Estimated Construction Cost, million dollars^(c)
0.5	1.5
1	1.5
2	1.7
3	1.9
4	2.2
5	2.5
6.5	2.8

(a) Based on August 2025 CCI of 20-cities average (13913.52).
 (b) Equal to the total pumping capacity with the largest pump out of service or on standby.
 (c) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Groundwater Production Wells

Well construction costs are based on construction activities including pilot hole drilling, water quality/soil sampling, pilot hole reaming, well construction, well development and providing the necessary housing, pump, motor, automatic control equipment, discharge piping, SCADA, and disinfection equipment.

Construction costs for new groundwater wells are estimated to be approximately \$2,244,295 per well (assuming a well capacity between 100 gallons per minute [gpm] and 500 gpm). These estimates are based on recent bids for similarly sized wells and representative of construction under normal drilling conditions. Costs would be significantly higher for special or difficult locations, or if specialized wellhead treatment is required.

Aquifer Storage and Recovery Wells

Aquifer storage and recovery (ASR) wells are used to inject treated surface water into a suitable aquifer during times when surplus water is available. The same wells are used to withdraw the stored water from the aquifer when other supplies are limited. ASR well construction costs include the construction of the ASR well; all required civil, mechanical, and electrical equipment; above ground facilities (i.e., masonry building); conveyance pipelines; ASR flow control valves, piping, and mechanical and controls; and one monitoring well. Cost of land purchase or lease is not included.

Construction costs for new ASR wells are estimated to be approximately \$2,881,100 per well assuming an 18-inch diameter well (constructed to a depth of 500 feet), conveyance pipeline length of 200 feet, and one monitoring well (constructed to a depth of 500 feet). These estimates are based on construction costs from West Yost’s expertise with ASR wells and information from other public agencies and are representative of construction under normal drilling conditions. Costs would be significantly higher for special or difficult locations, or if specialized wellhead treatment is required.

Pressure or Flow Regulating Stations and Valves

Interconnections (i.e., pressure regulating stations or check valves) are required to provide water supply between pressure zones during peak demands and/or emergency conditions. The construction cost for a new pressure regulating station or an existing pressure regulating station upgrade under normal conditions is estimated to be approximately \$323,195. The construction cost for a new pressure regulating station or an existing pressure regulating station upgrade under special or difficult conditions (e.g., construction in high traffic areas) is estimated to be approximately \$406,630. The construction cost for a new check valve connection is estimated to be approximately \$7,395, should it be deemed necessary with the installation of PRV stations but are not required.

Construction cost estimates for a pressure regulating station include the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.

Backup Power Generators Plug-In Adaptors

On-site backup power plug-in adaptors and transfer switches are recommended so pumps can continue delivering water to the distribution system in the event of a power outage. Generators should be sized to meet the power demands of the pumps. The construction cost to retrofit existing facilities with a plug-in adaptor and transfer switch is estimated to be approximately \$237,640 per location. This cost is representative of construction under normal conditions and would be significantly higher for special or difficult conditions.

CONTINGENCIES AND OTHER PROJECT COSTS

Contingency costs must be reviewed on a case-by-case basis because they will vary considerably with each project. However, to assist City staff with budgeting for these future construction projects, contingency costs have been added to the planning budget as percentages of the estimated construction cost using these two categories: Construction Contingency Costs and Other Project Cost Allowances.

- **Construction Contingency Costs:** 15 percent

The construction costs presented above are representative of the construction of water system facilities under normal construction conditions and schedules; consequently, it is appropriate to allow for estimating and construction uncertainties unavoidably associated with the conceptual planning of projects. Factors such as unexpected construction conditions, the need for unforeseen mechanical items, and variations in final quantities are only a few of the items that can increase project costs. An allowance of 15 percent of the base construction cost will be included to cover such project related construction contingencies.

- **Other Project Cost Allowances: 30 percent**
 Other project costs have been divided into three (3) subcategories, totaling 30 percent (10 percent engineering, 10 percent construction management, and 10 percent program implementation)
 - Engineering costs associated with new facilities include preliminary investigations and reports, right-of-way acquisition, foundation explorations, preparation of drawings and specifications during construction, surveying and staking, sampling of testing material, and start-up services. For this study, engineering costs are assumed to be 10 percent of the base construction cost estimate.
 - Construction management covers such items as contract management and inspection during construction. The cost of these items can also vary, but for the purpose of this study, it is assumed that construction management charges will equal approximately 10 percent of the base construction cost estimate.
 - Program implementation costs cover items such as legal fees, environmental/CEQA compliance requirements, financing expenses, administrative costs, and interest during construction. The cost of these items can also vary, but for the purpose of this study, it is assumed that program implementation costs will equal approximately 10 percent of the base construction cost estimate.

An example application of these allowances to a project with an assumed base construction cost of \$1.0 million is shown in Table 5. As shown, the total cost of all project construction contingencies (construction, design, construction management, and administration costs) is approximately 49.5 percent of the base construction cost for each project.

Cost Component	Percent	Cost, dollars
Estimated Base Construction Cost before Mark-ups ^(a)	-	1,000,000
Construction Contingency Costs	15	150,000
Estimated Construction Cost with Contingency	-	\$1,150,000
Other Project Costs		
Engineering	10	115,000
Construction Management	10	115,000
Program Implementation	10	115,000
Total Project Cost Allowances	-	345,000
Estimated Total Project Cost		\$1,495,000
^(a) Assumed cost of an example project.		

Concord

1001 Galaxy Way, Suite 310
Concord CA 95420
925-949-5800

Davis

2020 Research Park Drive, Suite 100
Davis CA 95618
530-756-5905

Irvine

25 Edelman, Suite 120
Irvine, CA 92618
949-420-3030

Lake Oswego

5 Centerpointe Drive, Suite 130
Lake Oswego OR 97035
503-451-4500

Medford

3235 Hillcrest Park Drive, Suite 106
Medford OR 97504
458-299-0843

Oceanside

804 Pier View Way, Suite 100
Oceanside CA 92054
760-795-0365

Phoenix

4505 E Chandler Boulevard, Suite 265
Phoenix AZ 85048
602-337-6110

Pleasanton

6800 Koll Center Parkway, Suite 150
Pleasanton CA 94566
925-426-2580

Sacramento

100 Howe Avenue, Suite 110S
Sacramento CA 95825
916-306-2250

San Diego

11545 West Bernardo Court, Suite 209
San Diego CA 92127
858-505-0075

Santa Rosa

2235 Mercury Way, Suite 105
Santa Rosa CA 95407
707-543-8506