Executive Summary

Executive Summary

Introduction

Lebanon's *Water System Master Plan*, completed in May 2007, documented the need for the city to replace its water treatment plant (WTP). The city's existing plant has a maximum capacity of 3.8 million gallons per day (mgd). Water demands within the city reached 3.7 mgd in the summer of 2008, just shy of the maximum amount of water that can be supplied to the customers. An expansion of the existing WTP is not recommended because of aging equipment, significant structural limitations, chemical safety issues, and a very constrained site.

The May 2007 master plan presented a supply development flowchart, which outlined a step-by-step approach for the city to evaluate and implement a replacement for the WTP. The early steps—evaluating the potential for obtaining water from river bank wells—have been completed, with the conclusion that a river bank well source combined with a lower level of treatment was not a viable alternative. The city is now implementing the next step of developing a conceptual design for a new canal or river intake and a new WTP.

The city desires to replace the existing WTP with a new plant having an initial capacity of 6 mgd, with expansion capability to an ultimate capacity of 14 mgd. The current conceptual design project consists of the following main elements:

1. Intake site selection and development of conceptual design for a new intake
2. Evaluation of potential WTP sites, including development of conceptual layout for a new WTP
3. Water treatment process selection

The overall project goal was to develop conceptual designs for the intake, treatment plant, finished water storage, and transmission piping, and a cost estimate for the project so that the city could move forward with budgeting, design, and construction.

Water Treatment Plant Site Selection

Evaluating potential sites for the city's new water treatment plant was a major component of the current project. The goal of the evaluation was to recommend one or more sites for the city's consideration for purchase and development.

The city's existing WTP property is small and will not accommodate an expansion. Furthermore, to reduce the risk of accidental water contamination from an automobile accident or overland storm runoff, locating the WTP so that the raw water intake can be moved upstream on the canal or to the South Santiam River is desirable. Ideally, the new WTP site would have ready access to a raw water intake on either the Santiam Canal or the South Santiam River to give the city flexibility to use either source.

Alternatives

Three possible locations for a site were identified by city staff, and are shown in **Exhibit ES-1.** These locations were identified as follows:

1. River Drive property (including the Canal Diversion property that is currently owned by Albany or one or more properties located along River Drive between River View Street and Chestnut Lane)
2. Tree Farm property (property that fronts on River Drive, and is situated between River Drive and Fuller Lane, and is south of the intersection of River Drive and Mountain River Drive)
3. Weyerhaeuser property (property that is currently owned by Weyerhaeuser Company, which is located at the north end of Mayfly Street with the South Santiam River to the east; northeast of Riverview Elementary School).

Evaluation of Alternatives

Many factors were considered in identifying and qualitatively evaluating sites. Site size, geometry, and the ability to accommodate future plant or storage expansions were very important. Other factors included the hydraulic (elevation) requirements for raw water and finished water pumping, access to a river intake or a canal intake, road access, utility access, security, property permitting, and potential impacts on neighbors.

Each of the sites also was assessed with respect to its location in or near a floodplain. In accordance with federal regulations, a water treatment plant is generally considered a critical facility that must maintain operations during or soon after a flood. Therefore, as a rule, water treatment plants should be located above the 500-year floodplain or the structures should have their finished floor elevation set above the 500-year floodplain.

The analysis and findings for the transmission pipeline needs are presented in Section 4, Transmission Pipe Evaluation. The Tree Farm site has the least transmission piping needs and therefore, the lowest cost for this aspect of site development. The piping needs for the Weyerhaeuser property are similar but slightly higher. The costs for piping from the River Drive site to the city’s distribution system are significantly higher than for the other two sites.

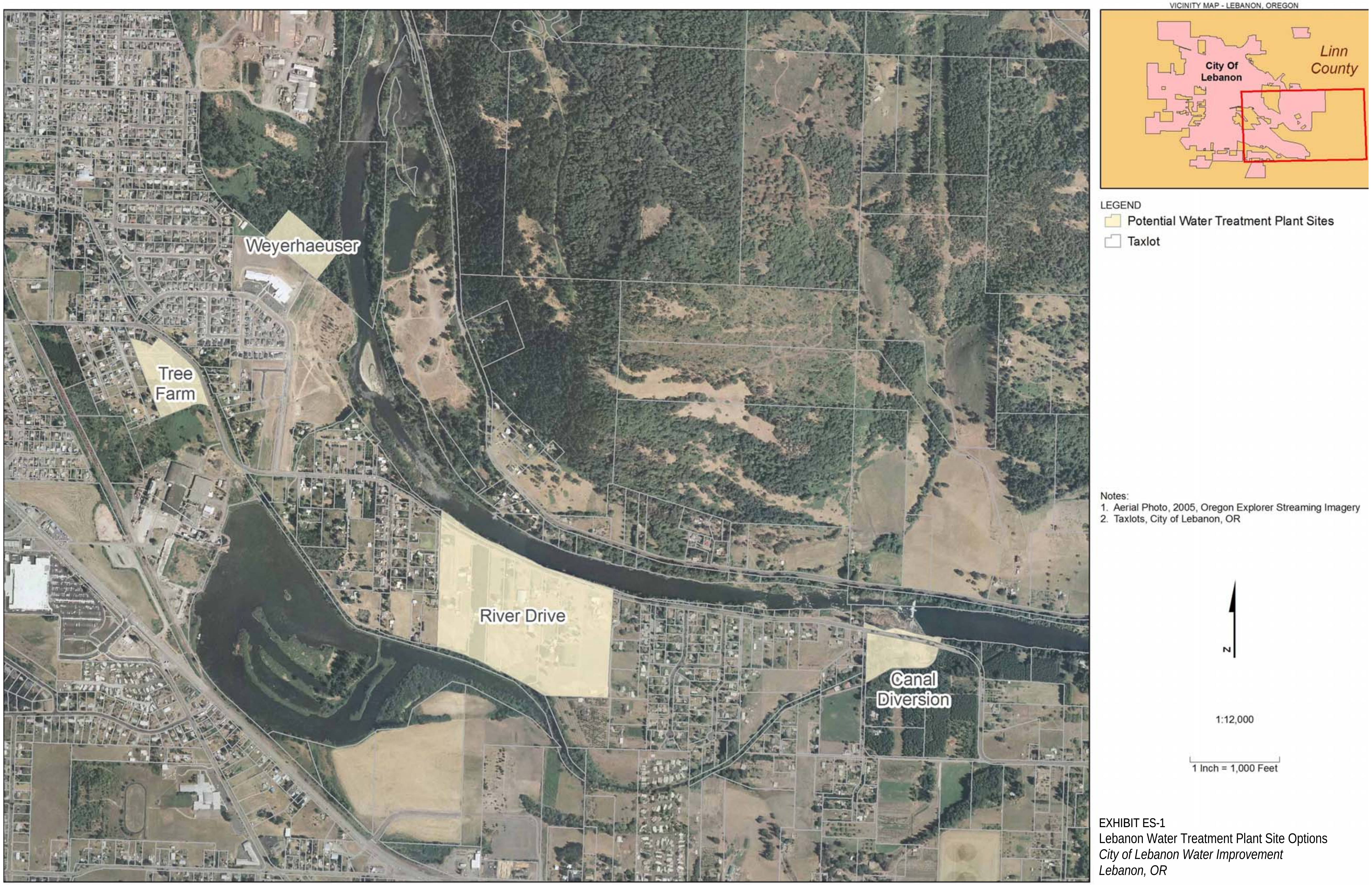

EXHIBIT ES-1
Lebanon Water Treatment Plant Site Options
City of Lebanon Water Improvement
Lebanon, OR

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Site Costs

Exhibit ES-2 presents a breakdown of costs for the three site options. Cost categories include property purchase price, frontage road improvements, site work, wetlands mitigation, electrical service upgrades, and transmission pipelines. The costs presented are budget-level, and are relative costs that are presented for comparison and selection among the alternatives. They do not include a contingency. The actual costs will vary depending on market conditions, site-specific findings, the scope of the final design, and other factors. A cost for property purchase has been included in the table but this should be understood to be a very preliminary number.

The sum of the costs for the River Drive and the Tree Farm sites are similar and at this conceptual level of analysis are considered equal to one another. The cost for using the Weyerhaeuser site is substantially greater because of the excavation and fill and wetlands mitigation requirements.

EXHIBIT ES-2
Lebanon Water Treatment Plant Site Costs
City of Lebanon Water Improvement
Lebanon, OR

Item	River Drive	Weyerhaeuser	Tree Farm
Purchase Price	$400,000	$0	$400,000
Frontage Road Improvements	$0	$500,000	$1,200,000
Extra Excavation/Preparation	$0	$3,200,000	$0
Wetlands Mitigation	$82,000	$410,000	$82,000
Electrical Power Service	$400,000	$400,000	$400,000
Transmission Pipeline	$1,750,000	$990,000	$770,000
Total	**$2,600,000**	**$5,500,000**	**$2,900,000**

Site Recommendations

Either the River Drive or the Tree Farm site is recommended because of both non-cost and cost factors. Both sites have ready access to a canal intake, appear to require minimal site work, and are expected to have nearly equal costs. Both sites could access a river intake, but the River Drive sites are closer to a likely intake location, and would require less raw water transmission piping. Nevertheless, the Tree Farm site is preferred because more of the development cost will be invested in making frontage road improvements (turning lane, wider traffic lanes, sidewalks, and drainage) that provide benefits to city residents. The largest portion of the River Drive site cost is devoted to transmission piping which does not provide the same secondary benefits as road improvements. In addition, the longer transmission pipeline needed for the River Drive site results in higher energy costs for pumping. As a result, the Tree Farm site is more favorable from a long-term operating cost perspective.

Intake Site Selection and Design Alternatives

The potential new intake locations that were considered as part of this conceptual design were on the South Santiam River and on the Santiam Canal upstream of the city's existing intake. A river intake may allow the city to eliminate or reduce annual costs paid to the City of Albany for operation and maintenance of the Santiam Canal. (Lebanon's long-term responsibility for operation and maintenance of the Santiam Canal, regardless of whether the canal is used for a water source, is yet to be determined.) Disadvantages of a river intake include greater capital and operating costs, and greater uncertainty related to river bottom topography and its impact on the intake location and cost. In addition, a river intake will require extensive permitting to comply with the Endangered Species Act, which will require a significant effort and additional cost.

The advantages of a canal intake include lower capital and operating costs, less involved permitting requirements, and better-defined and narrower channel topography. Disadvantages include a possibly greater risk of exposure to chemical contamination, and possibly, continued financial obligation for canal maintenance that might otherwise be avoided.

CH2M HILL and Lebanon staff concur that for phase one development, an intake on the Santiam Canal is recommended for the following reasons:

- The diversion structure at the canal headworks controls flow and can help prevent damage from water-carried debris.
- The fish screen at the canal headworks reduces screening requirements at the intake itself, allowing for a smaller intake structure.
- Less permitting is required for the canal than for the river because the canal does not provide fish habitat
- The canal is in closer proximity to the most favorable sites (Tree Farm and River Drive sites). Therefore raw water transmission piping requirements are minimized.
- For all of the above reasons, a canal intake has a lower capital cost.

Transmission Pipeline Evaluation

Each of the three potential WTP sites has different finished water transmission pipeline needs. A property located along River Drive will require a longer length of transmission piping because it is further away from the existing water distribution system. The Tree Farm and Weyerhaeuser sites are located closer to the city's existing system and require shorter lengths and smaller diameter pipelines to connect to the system.

A hydraulic computer model of the city's water distribution system was used to evaluate the finished water transmission pipeline needs for the city's new WTP. **Exhibit ES-3** summarizes the phase one finished water transmission pipeline needs. The Tree Farm and Weyerhaeuser sites require the least piping, and the River Drive site requires substantially more pipe to connect it to the existing distribution system.

EXHIBIT ES-3
Summary of Transmission Pipeline Length by Water Treatment Plant Site (feet of pipe)
City of Lebanon Water Improvement
Lebanon, OR

Site	Pipe Length by Diameter			
	16-inch	20-inch	24-inch	Total Length
River Drive	3,520	-	4,930	8,450
Tree Farm	4,790	-	-	4,790
Weyerhaeuser	4,660	1,230	-	5,890

Treatment Process Selection

Building on work from the May 2007 *Lebanon Water System Master Plan*, the project team engaged in a comprehensive approach to identify and evaluate suitable treatment processes for a new water treatment plant. Activities included the following:

- Workshops to identify evaluation criteria, review existing and possible future regulatory requirements, and identify appropriate treatment processes
- Site visits to representative water treatment facilities
- Laboratory analyses to confirm the effectiveness of in-line coagulation in reducing disinfection byproduct precursors for the membrane filtration treatment option
- External review of process selection methodology and water quality data by three independent water industry professionals

Following an analysis and comparison of a wide range of treatment options, two process alternatives were identified for detailed capital and life cycle cost analyses.

Evaluation Criteria

All identified treatment alternatives were expected to provide finished water quality in compliance with current regulatory requirements and meeting the aesthetic goals of producing water with acceptable taste and odor characteristics. Therefore, finished water quality was not used as an evaluation criterion. The following four criteria for evaluating treatment alternatives were identified and prioritized:

- **Operations and maintenance**: requirements for energy use; number, type, and amounts of chemicals needed; level of operator attention; materials and equipment replacement needs such as for membrane modules; and the intensity and complexity of equipment operation and maintenance.
- **Expandability**: ability of the process to be phased with an initial capacity of at least 6 mgd and an ultimate capacity of 14 mgd. Processes that can be expanded more rapidly, in smaller-capacity increments (for example 2-mgd increments) were rated more highly.

- **Raw water robustness**: ability of process to handle rapid changes in raw water quality. These changes have been observed periodically in the South Santiam River during storm events or resulting from reservoir operations or turnover events in the upstream Corps of Engineers' reservoirs.

- **Flexibility**: ability of the process to adapt to or be modified to achieve the potential treatment goals presented by future regulations (for example reduction in turbidity levels, pharmaceutical concentrations, etc.).

Operations and maintenance considerations were ranked as most important, followed in order by the robustness of the process to handle changes in raw water quality, the ability to modify the process to handle potential future regulatory requirements, and the ease of expanding treatment capacity.

Treatment Plant Design Capacity

Based on findings from the 2007 *Lebanon Water Master Plan*, and as decided early in this project by the City of Lebanon, the conceptual design for the WTP shall be based on the following production capacities:

- Initial construction: 6 mgd
- Ultimate capacity: 14 mgd

The 6-mgd capacity represents a 50 percent increase over the existing WTP's 4-mgd capacity. Demand projections indicate that at the current ratio of industrial to residential water consumption, a 6-mgd WTP would serve the community until approximately 2040. Therefore, the 6 mgd capacity could accommodate a sudden step-increase in water demand if a new industry, requiring a relatively large quantity of potable water, were to locate in the city in the near future. Lebanon staff has made it a priority to provide an additional 2 mgd for industrial development in a relatively short time.

The ultimate 14-mgd capacity represents projected buildout demands within the city, according to the 2007 *Lebanon Water Master Plan*. The 14 mgd ultimate capacity is slightly more than the city's certificated water rights of 12.3 mgd but less than the total of the city's permitted and certificated rights, which is 23.9 mgd.

Regulatory Impacts and Their Treatment Implications

In summary the water quality/regulatory drivers and corresponding treatment solutions include the following:

- Surface Water Treatment and Turbidity Regulations—Either conventional media or membrane filtration will achieve compliance with turbidity and particle removal regulations. Additional treatment steps do not appear to be needed to address *Cryptosporidium* but that conclusion remains uncertain until the city completes further source water analyses.

- Lead and Copper Rule—Soda ash is recommended to ensure compliance with lead corrosion standards in Lebanon's system

- Disinfection Byproducts Rule—Either conventional media filtration with post-filtration disinfection or in-line coagulation/membrane filtration with post-filtration disinfection is expected to achieve compliance with the more stringent, new Disinfection Byproducts Rule. The process facility sizing (chemical facilities, solids handling) and capital costs for alternatives were developed assuming that alum would be used because other coagulants will generally require a lower dose.
- Disinfection—Chlorine is suitable for primary and secondary disinfection provided that the primary feed point is located downstream of filtration.
- Backwash Waste and Solids Handling—Solids lagoons with supernatant discharge to the canal are planned. This assumes that an NPDES permit can be obtained for the discharge. Obtaining a discharge permit is less certain than in past years, but still appears feasible.

In addition, all process alternatives included space for future ozone addition to address future regulation of contaminants of emerging concern, possible taste and odor issues, or to provide additional disinfection credit.

Alternative Identification

Two general categories of treatment processes were evaluated: conventional media filtration options similar to the city's existing WTP, and membrane filtration options using both pressure and immersed membrane systems. Subsets of these general categories differed primarily in the degree of pre-treatment prior to filtration.

Membrane filtration systems are compact, requiring a smaller footprint than conventional media filters with pretreatment. The modular configuration also allows for rapid expansion to increase capacity. An advantage of membrane filters is that their effectiveness in removing pathogens does not depend on operator control. The membranes provide a positive barrier to pathogens without respect to balancing coagulant and alkalinity adjustments.

Several pretreatment processes were considered for the conventional media filtration plant. These included in-line or direct filtration (with no or minimal flocculation and sedimentation stages), open basin sedimentation, plate settlers, tube settlers, ballasted flocculation, upflow clarification, and pulsed bed clarification. Parallel plate settlers were judged as the most favorable selection for Lebanon if conventional media filtration is selected.

Provisions for the future addition of ozone treatment were included with all options because of possible future regulatory requirements.

Alternative Ranking

Each treatment process alternative was rated based on a scoring of the four criteria. Staff collectively decided if a particular alternative was very favorable, favorable, neutral, undesirable, or very undesirable when a given criterion was considered.

The membrane filtration options were ranked most highly. The modularity and ease of capacity expansion of pressure membranes was particularly appealing to Lebanon staff. The smaller footprint was also an advantage of these systems. Disadvantages included greater mechanical complexity and reliance on computers for control of the systems.

While conventional filtration with flocculation and sedimentation pretreatment ranked lower than the membrane alternatives, treatment with this process was considered to be reliable and effective, and this alternative provides additional advantages if treatment with ozone is considered likely.

The following two treatment alternatives were evaluated further including order of magnitude cost estimates:

- Pressure membrane filtration preceded by in-line coagulation
- Conventional media filtration preceded by coagulation, flocculation, and plate settlers

Treatment Plant Costs

Both capital and life cycle costs were estimated for the two treatment process alternatives, conventional media filtration and pressure membrane filtration.

Construction costs for the two 6-mgd alternatives were estimated as follows:

- Pressure membrane filtration: $19,500,000
- Conventional media filtration: $20,000,000

These costs are for November 2008 and include a 30 percent contingency. These costs do not include costs for engineering, administration, or permitting. At this conceptual design level of cost estimation, capital costs for the two alternatives are virtually identical.

The membrane filtration alternative had a slightly higher annual operating cost than the conventional filtration alternative. However, in combination with a somewhat lower capital cost for the membrane alternative, the resulting net present value of the two alternatives could be considered equal.

Carbon Footprint

A computer model was used to assess the effect of either treatment alternative on green house gas emissions. The total green house gas emissions (converted to carbon dioxide equivalents) resulting both from construction and from operation of the two alternative plants were estimated.

Construction of a conventional filtration WTP was estimated to release approximately four times the green house gas emissions as construction of the membrane filtration plant. The reason for the disparity in this "single-emission" event is largely because of the larger amounts of concrete required for the conventional filtration plant, and the greater excavation required for below-grade reservoirs.

Power consumption is the largest ongoing contributor to green house gas emissions for both types of plants. Membrane filtration had a larger contribution to green house gas emissions from power requirements than a conventional filtration option because of the greater energy required to pump water through the membranes. The opposite was true for chemical use; the conventional filtration option requires higher doses of coagulant and other chemicals than the membrane option and has correspondingly higher emissions associated with chemical manufacture and transport. Higher chemical use also contributed to greater emissions associated with solids disposal for the conventional filtration option.

The life cycle greenhouse gas emissions for the two alternatives are similar when ongoing emissions are considered.

Recommended Treatment Option

The recommended treatment process option is the use of pressure membrane filtration. This recommendation, which primarily reflects the city's judgment, is based on the following comparison factors between the two options:

- The capital costs for the two options are nearly equal
- The net present values (present worth) of the two options are nearly equal
- The greenhouse gas emission projections for the two options are nearly equal
- The non-cost factor analysis, summarized in Exhibit 5-9, favors the membrane filtration option
- The membrane option has a smaller footprint, which gives the city greater flexibility in selection of a site and may reduce permitting investment
- Lebanon staff was favorably impressed with membrane plants they visited.

Distribution Storage

The new WTP will require clearwell storage to meet needs for disinfection, backwashing of filters, pumping level fluctuation, short-term plant shutdowns, and in-plant water use. In addition to these needs at the treatment plant, municipal water systems also require storage within the distribution system to fulfill fire protection, emergency supply, and equalization needs.

The city has two existing distribution storage reservoirs: 5th Street Reservoir and East Grant Street Reservoir. Both have a volume of 2.0 million gallons. According to the criteria used in the city's May 2007 *Water System Master Plan*, the city's system has a storage deficit of from 1.1 to 1.7 million gallons compared to the 2010 storage need. This deficit will grow as demands grow.

This conceptual design report recommends construction of an additional 2 to 3 million gallons of storage as part of the initial plant construction to meet near-term distribution storage needs. However, as the new plant will be more reliable than the existing plant and because the new plant will include a clearwell that provides some backup storage under most conditions, the city could delay adding the distribution storage for 5 to 10 years.

Several options for providing an additional 2 million gallons of distribution storage were identified and compared. If financing allows, increasing the storage at the WTP, included in phase one of the project, from 2 to 4 million gallons to address the deficit is recommended. However, installing only the 2 million gallon clearwell and planning to add another 2 million gallons within 5 to 10 years also could be acceptable. Two options could be considered if the city includes the additional 2 million gallons as part of the initial WTP project. Designing both options, and bidding one as part of the base bid and one as a bid alternative, may be beneficial because the city could make a final decision based on firm prices. One option is to include two 2-million gallon steel tanks. The second is to replace the two steel tanks with a single 4-million gallon prestressed concrete tank. A concrete tank does not require periodic repainting, so two tanks are not necessary. The conceptual level cost estimates for the two options are similar.

Project Description

The proposed project includes the construction components summarized in **Exhibit ES-4**. Some of the components, such as the frontage road improvements or finished water pipeline improvements, are specific to the Tree Farm site. A site location on River Drive is equally feasible and if the River Drive site is selected instead of the Tree Farm site, some of the construction components listed in this table will be modified. An example site plan, based on the Tree Farm site, is shown in **Exhibit ES-5**.

The project will provide the city with a new intake on the canal, a water treatment plant capable of producing 6 mgd, and a storage tank and finished water pumping system that can deliver up to 9 mgd for short periods. The selected treatment process uses pressure membrane filtration. This is a reliable and robust process that will consistently produce a high quality drinking water for the community, while minimizing the use of chemicals and labor requirements.

EXHIBIT ES-4
Summary of Proposed Project
City of Lebanon Water Improvement
Lebanon, OR

Construction Component	Description
Frontage road improvements	The Tree Farm property is located within the City of Lebanon city limits. As such, development of this property will require widening of the frontage road (River Drive), installation of a center turn lane, installation of a sidewalk, and associated utility and storm drainage improvements.
Wetlands mitigation	The development of the Tree Farm site may require 1 acre of wetlands mitigation.
Electrical transmission	Pacific Power, the local electrical power utility, has indicated that an extension of high voltage power lines will be needed to supply the necessary power for a plant located at the Tree Farm site.
Santiam Canal intake	The initial phase of the treatment plant will include a 7 mgd intake on the Santiam Canal.
Raw water pump station	The water from the intake will be pumped into the water treatment plant.
Water treatment plant	The conceptual design for the water treatment plant consists of an in-line coagulant feed system followed by pressure membranes. The plant will include chemical feed systems needed for the membrane system, plus a bulk hypochlorite system for chlorine disinfection, a liquid feeder for fluoride, and a dry chemical feed system for soda ash (for corrosion control). The building housing the membrane and chemical systems is anticipated to be a single story structure with a concrete floor slab on grade. The plant is sized for an initial capacity of 6 mgd with allowances for future expansion to 14 mgd.
Clearwell	The project cost is based on providing one 2 million gallon steel clearwell tank. A second 2 million gallon tank will be needed within 5-10 years to address a current distribution storage deficit. If funds are available, the city could consider the installation of two 2 million gallon steel tanks as part of the initial WTP project or bidding an alternative of a single 4 million gallon prestressed concrete tank.
Finished water transmission pipeline	The Tree Farm site requires approximately 4,800 feet of 16-inch diameter pipe for connection to the city's existing distribution mains.

Project Cost Estimate

The cost estimates presented in this study are order-of-magnitude estimates for November 2008. They have not been escalated to the expected mid-point of construction.

Order of magnitude cost estimates are defined by the American National Standards Institute and the Association for the Advancement of Cost Engineering International as "approximate estimates made without detailed engineering data." Estimates of this type are normally expected to be accurate within plus 50 percent or minus 30 percent. This range of accuracy implies that there is a high probability that the final project cost will fall within the range.

A 30 percent contingency has been included in the facility cost estimates as a provision for unforeseeable, additional costs within the general bounds of the project scope. No contingency was added to the site development costs, which are those costs associated with purchasing property, implementing frontage road improvements, excess excavation, extending electrical power transmission lines, and other site improvements discussed earlier. The facility contingency is used as a means to reduce the risk of possible cost overruns. The contingency in these estimates addresses unknowns related to bids and to the project scope. Bid uncertainties include market conditions and material cost changes. The scope uncertainties consist of project changes that may occur during final design and implementation.

The cost estimates have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimates. The final cost for the project will depend on such criteria as actual labor and material costs, competitive market conditions, actual site conditions, final project scope, and other variables. As a result, the final project cost will vary from this estimate. Project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help assure proper project evaluation and adequate funding.

The total project cost is estimated as $25,700,000. **Exhibit ES-6** provides an itemized list of costs. The costs do not account for demolition expenses for the existing water treatment plant nor for the proceeds of the sale of the existing plant site if the city elects to sell the property.

EXHIBIT ES-6
Project Cost Estimate (Based on using the Tree Farm site)
City of Lebanon Water Improvement
Lebanon, OR

Project Component	Cost Estimate	Basis for Estimate
Property purchase	$400,000	Provided by city
Frontage road improvements	1,200,000	Provided by city
Wetlands mitigation	82,000	Provided by city
Electrical transmission	400,000	Pacific Power—preliminary estimate based on Pacific Power's discussions with CH2M HILL
Water treatment plant, including: intake on Santiam Canal, raw water pump station, finished water pump station, and one 2 MG steel clearwell tank; includes 30 percent contingency	19,500,000	CH2M HILL's in-house water treatment plant cost estimating software and conceptual level sketches for some components
Finished water transmission pipeline	770,000	CH2M HILL hydraulic modeling to select pipe size and connection points, and city input for feasible routing; unit cost of $10 per diameter inch per foot used
Subtotal	**$22,350,000**	
Allowance for engineering and administration	3,350,000	15% of subtotal
Total Project	**$25,700,000**	

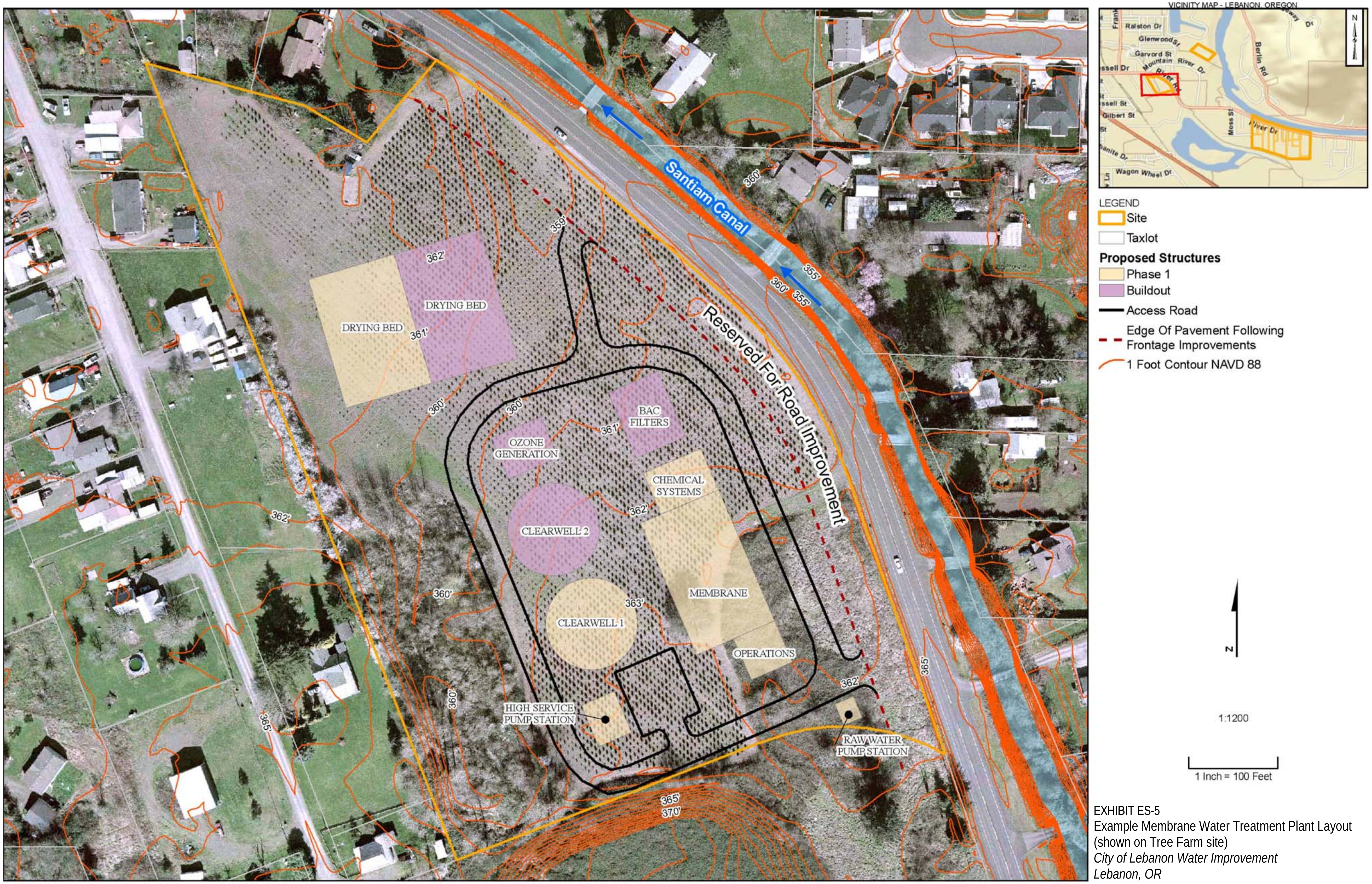

EXHIBIT ES-5
Example Membrane Water Treatment Plant Layout (shown on Tree Farm site)
City of Lebanon Water Improvement
Lebanon, OR

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Project Implementation

Project Phasing

Phase one of the project will consist of a WTP sized to produce 6 mgd. The design of the plant will allow a future expansion to 14 mgd, which equals the buildout demand that was projected for Lebanon in the May 2007 *Water System Master Plan*. The phase one intake will be sized for 7 mgd, so that a second intake of the same size can be added in the future to provide the buildout demand of 14 mgd.

The finished water transmission pipelines will be sized to allow for at least the 6 mgd phase one plant. The actual capacity of the finished water transmission pipelines will be 9 mgd, as discussed in Section 4 of this report, to allow for pumping rates from the plant to be 150 percent of the plant production capacity.

Depending on the city's available budget, the city may include only one 2 million gallon clearwell as part of the phase one construction or alternatively, two 2 million gallon or one 4 million gallon clearwell. The additional 2 million gallons of storage for the phase one project would be provided to meet the city's distribution storage needs.

Permitting Needs

Several federal, state, and local permitting and environmental review requirements may apply to the City of Lebanon's water system expansion project. The report outlines the steps necessary to strategically position the project to be "shovel-ready" and to receive funds from the proposed 2009 federal economic stimulus package. The permitting process may require 6 to 12 months or longer.

The state's Safe Drinking Water Revolving Loan Fund (SDWRLF) is a likely source of low interest loan money or possibly grant money, depending on the passage and implementation of the proposed 2009 economic stimulus package. To be eligible for funds through the SDWRLF, the City of Lebanon must submit a Letter of Interest with project and financial information to DWP. If eligible for funding, the proposed project will be placed on the DWP's Project Priority List, and the City of Lebanon can submit a final application for funds. This application must include, among other items, certification that the project conforms to local comprehensive plans and land use regulations (detailed below). The City of Lebanon must also demonstrate to the DWP that the project will conform to all applicable state and federal requirements. Because the funds originate from a federal source, the project must comply with a variety of "cross-cutting" federal laws, executive orders, and federal policies (detailed below).

Finally, prior to beginning construction or certain non-construction activities (final design, real estate acquisition, and contract bids), the project must undergo review in accordance with the State Environmental Review Process (SERP) (detailed below). The SERP program is equivalent to the federal National Environmental Policy Act (NEPA) review.

A zoning change will be required for either the Tree Farm or River Drive sites to allow WTP development because both sites are zoned for residential use. In addition, because the River Drive site is outside Lebanon's city limits, a conditional use permit will be needed for this site.

The federal "cross-cutting" requirements include compliance with the following environmental and related programs. Not all may apply to the city's project and additional ones may apply, depending on the final location and nature of the project.

- National Environmental Policy Act
- National Historic Preservation Act
- Archeological and Historic Preservation Act
- Protection of Wetlands
- Flood Plain Management
- Endangered Species Act
- Clean Water Act
- Environmental Justice Order

The State Environmental Review Process would be initiated after the city submits the application for a loan under the State Revolving Fund program. At the request of the city, the DWP can determine if the proposed project is categorically excluded from further environmental review.

According to a posting on the DWP website, projects that are able to enter into a loan agreement by June or July 2009 would be best positioned to receive economic stimulus funds from the proposed 2009 federal economic stimulus package. The city will have needed to submit a letter of interest by February 2, 2009, to qualify for the stimulus package money according to recent information issued by the DWP.

Project Implementation Options

Oregon allows three commonly practiced project delivery models for public works projects, each offering various advantages. The three processes are summarized below. Each of them may be suitable for the city's project depending to a large extent on the preferences of the city. The CM-GC process may offer advantages to the city, particularly to accelerate construction activities so that the city can qualify for economic stimulus package funding. Even if this funding is not sought or obtained, a CM-GC process offers advantages and is gaining popularity as an effective means for delivering public works projects in Oregon.

- Design-Bid-Build (D-B-B) – The engineer prepares contract documents for bidding, bids are advertised, and the lowest, responsible/responsive bidder is selected. This was the only approach used for public works projects for many years and is still the most common delivery method.

- Construction Manager/General Contractor (CM-GC) – A contractor is selected early in the design process (typically, once the design is 30-60 percent completed). The selected contractor works closely with the owner and engineer during the remainder of the final design, providing value engineering and cost estimating. The contractor develops a guaranteed maximum price (GMP) from the final contract documents. This approach has been used frequently for construction of schools and prisons in Oregon and has recently been applied more and more commonly to public works projects such as water treatment plants.

- Design-Build (D-B) – A single entity is responsible for the engineering and construction activities. D-B can provide time savings and, in some cases, cost savings. However, the procurement of a D-B firm is a more complicated process than for the selection of an engineering or construction firm for either the D-B-B or CM-GC approach. The D-B process requires the city to complete about a 20 percent level design to ensure that a common understanding of the project is agreed to by D-B firms. To receive the maximum benefit of potential overall project cost savings, clients must relinquish control over many of the details of the design and final product.

Project Design and Construction Schedule

Exhibit ES-7 illustrates possible project schedules for implementation of the city's new intake and water treatment plant. Two schedules are shown, one illustrating a conventional design-bid-build delivery and one illustrating a CM-GC delivery. The duration for designing, bidding, and constructing the water improvements may total three and one-half years. Although not specifically shown in the figure, the CM-GC process could allow the city to begin early construction on portions of the project if that became important to secure economic stimulus funding or to accelerate the project completion.

Neither schedule includes the time required to process land use zoning change or for the preparation and processing of permits. Additionally, the city will need to consider the following tasks in scheduling the project:

1. Purchase property, which may include a boundary survey
2. Confirm electrical power needs and enter into negotiations with Pacific Power for the extension of the high voltage service conductors to the project site
3. Negotiate purchase or easements for the intake facility, and for the raw water and finished water pipelines

When times for property purchase, permitting, and related tasks are added to the design and construction schedule, the project implementation is estimated to require from four to four-and-one-half years. Therefore, if the city initiated the project in June 2009, water from the new plant will be delivered to the city by approximately June 2013 or later. There may be possibilities to shorten this project duration if necessary to accomplish the city's needs.

EXHIBIT ES-7
Project Design and Construction Schedules
City of Lebanon Water Improvement
Lebanon, OR