City of Los Angeles
Integrated Resources Plan

Implementation Strategy

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Prepared For:

City of Los Angeles

Department of Public Works

Bureau of Sanitation

and

Department of Water and Power

Prepared By:

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Section 1
Background

The Integrated Resources Plan (IRP) is a strategic facilities plan for the City's wastewater, runoff, and recycled water programs. As part of developing the IRP, over 20 preliminary alternatives were developed and evaluated through a participatory decision-making stakeholder process. From the preliminary alternatives, four alternatives were selected for further evaluation in an Environmental Impact Report (EIR), prepared in accordance with California Environmental Quality Act (CEQA) requirements. As part of finalizing the EIR and transitioning into implementation, staff is recommending a preferred alternative for implementing the City's wastewater, runoff, and recycled water programs for 2020.

Section 2
Recommended Alternative

2.1 Selection Approach

To select a recommended alternative, staff relied on: (1) the information contained in the EIR (including the project objectives, environmental analysis, and public comments on the Draft EIR) and (2) updated IRP Facilities Plan quadrant analysis that evaluated the preliminary alternatives originally discussed in the IRP facilities Plan. This section also provides a summary of the alternatives evaluated in the IRP Facilities Plan to provide context for the selection process for the Recommended Alternative.

2.1.1 Background on Alternatives Evaluated in IRP Facilities Plan and EIR

For the IRP Facilities Plan, the City of Los Angeles conducted extensive and iterative stakeholder meetings with a Steering Group to develop alternatives that would achieve the multiple objectives of the IRP Facilities Plan. The Steering Group comprises interested parties and individuals with an interest in the long-term planning of the City's recycled water, runoff management and wastewater systems. The City of Los Angeles, in association with the Steering Group, developed over 20 preliminary project alternatives that addressed future (2020) wastewater, recycled water, and runoff needs. The City of Los Angeles used the information from the Steering Group as the basis for ranking preliminary alternatives, and those that ranked lowest were eliminated from further consideration. The details of the development and evaluation of the preliminary project alternatives are contained in the *IRP Facilities Plan, Volume 4: Alternatives Development and Analysis* (City of Los Angeles, 2004). The remaining alternatives were further evaluated in terms of the extent to which they addressed wastewater needs, provided leadership in water resources, and incorporated fiscal conditions. Applying various criteria, the alternatives initially considered by City were reduced to four as described in the IRP Facilities Plan and subsequently carried forward for analysis in the IRP EIR. (In addition to these build alternatives; a no-build alternative was also evaluated in the Draft EIR to comply with the requirements of CEQA to assess a No Project alternative.)

The alternatives evaluated in both the IRP Facilities Plan and in the EIR are:

- ***Alternative 1: Expansion of Hyperion Treatment Plant (Hyperion) to 500 million gallons per day (mgd) with high potential for water resources projects (Hyperion Alternative):*** Alternative 1 would focus the expansion of wastewater treatment capacity only at Hyperion by increasing its current capacity of 450 mgd to 500 mgd. Alternative 1 would also upgrade the Donald C. Tillman Water Reclamation Plant (Tillman) to advanced treatment and add wastewater storage at Tillman and wastewater and recycled water storage at the Los Angeles-Glendale Water

Reclamation Plant (LAG). In addition, Alternative 1 would reuse up to 42,000 acre-feet per year of recycled water for non-potable reuse, as well as manage up to 42 percent of the dry weather and 47 percent of the wet weather urban runoff generated in the City.

- ***Alternative 2: Donald C. Tillman Water Reclamation Plant (Tillman) Expansion (to 80 mgd) and Los Angeles-Glendale Water Reclamation Plant (LAG) Expansion (to 30 mgd) with high potential for water resources projects (Tillman-LAG Alternative):*** Alternative 2 would focus the expansion of wastewater treatment capacity at Tillman by increasing its assumed derated capacity of 64 mgd to 80 mgd and LAG by increasing its assumed derated capacity of 15 mgd to 30 mgd. Both of these plants would be upgraded to advanced treatment, and wastewater storage at Tillman and wastewater and recycled water storage would be added at LAG. In addition, Alternative 2 would reuse up to 53,200 acre-feet per year of recycled water, as well as manage up to 42 percent of the dry weather and 47 percent of the wet weather urban runoff generated in the City.

- ***Alternative 3: Tillman Expansion (to 100 mgd) with moderate potential for water resources projects (Tillman Moderate Alternative):*** Alternative 3 would focus the expansion of wastewater treatment capacity only at Tillman by increasing its assumed derated capacity of 64 mgd to 100 mgd and upgrading its treatment processes to advanced treatment. This alternative would add wastewater storage at Tillman and wastewater and recycled water storage at LAG. In addition, Alternative 3 would reuse up to 43,400 acre-feet per year of recycled water, as well as manage up to 26 percent of the dry weather and 39 percent of the wet weather urban runoff generated in the City. This alternative would manage less urban runoff than the other alternatives.

- ***Alternative 4: Tillman Expansion (to 100 mgd) with high potential for water resources projects (Tillman High Alternative***): Alternative 4 would focus the expansion of wastewater treatment capacity only at Tillman by increasing its assumed derated capacity of 64 mgd to 100 mgd and upgrading its treatment processes to advanced treatment. This alternative would add wastewater storage at Tillman and wastewater and recycled water storage at LAG. In addition, Alternative 4 would reuse up to 56,100 acre-feet per year of recycled water, as well as manage 42 percent of the dry weather and 47 percent of the wet weather urban runoff generated in the City.

- ***No Project Alternative***: Under the CEQA No Project Alternative, integrated improvements to the wastewater treatment and collection system, recycled water system, and runoff system would not occur. Individual projects would likely be necessary in the future, but would be designed and constructed as localized system needs occur rather than being planned in a system-wide integrated manner, and would be subject to environmental documentation on a case-by-case basis.

All alternatives would also include three new sewer alignments to provide needed wastewater conveyance capacity in the system and prevent sanitary sewer overflows. These proposed sewer alignments include:

- ***Glendale-Burbank Interceptor Sewer (GBIS)***: GBIS would be comprised of approximately 5 ¾ miles of 8-foot diameter interceptor sewer and associated structures that would provide sewer relief of the North Outfall Sewer (NOS) from the vicinity of Griffith Park (LA Zoo) to the vicinity of Toluca Lake. The Draft EIR evaluated two GBIS alignments at a project level, the GBIS South Alignment and the GBIS North Alignment. The GBIS South Alignment would extend from the Los Angeles zoo area and generally follow a westward corridor along Zoo Drive, Forest Lawn Drive, and Valley Spring Lane, terminating near U.S. Highway 101 near Moorpark Street. The GBIS North Alignment would extend generally northward from the Los Angeles Zoo area, cross the Los Angeles River, then head westward along the north side of the Los Angles River to Riverside Drive, and would follow Riverside Drive west to the vicinity of U.S. Highway 101. The Draft EIR evaluated both of these routes to provide a comprehensive assessment of the possible GBIS alignments. The Draft EIR anticipated that only a single GBIS alignment would be recommended in the Final EIR.

- ***Northeast Interceptor Sewer Phase II (NEIS-II):*** NEIS II would be comprised of approximately 5 ½ miles of 8-foot diameter interceptor and associated structures from the vicinity of Glassell Park to a point north of LAG. The Draft EIR evaluated two NEIS II alignments at a project level, the NEIS II East Alignment and the NEIS II West Alignment. The NEIS II East Alignment extends from the Eagle Rock area and generally follows a north-south corridor located to the west of San Fernando Road to the vicinity of the Los Angeles Zoo. The NEIS II West Alignment would also extend from the Eagle Rock area northward to the vicinity of the Los Angeles Zoo, but would use an alignment located west of the Los Angeles River through Griffith Park. The Draft EIR evaluated both of these routes to provide a comprehensive assessment of the possible NEIS II alignments. The Draft EIR anticipated that only a single NEIS II alignment would be recommended in the Final EIR.

- V***alley Spring Lane Interceptor Sewer (VSLIS):*** VSLIS would be comprised of approximately 8 ½ mile interceptor and associated structures that would extend from the Toluca Lake area, northwest to Tillman. (This project was evaluated at a program-level in the Draft EIR and would require further study/analysis.)
  All alternatives would increase the amount of recycled water that is used for non-potable reuse, but would do so at different levels. Similarly, the alternatives differ in the amount of groundwater replenishment with recycled water that may be utilized.

  Regarding runoff, the alternatives differ somewhat in they ways they would manage dry and wet weather runoff. As an example, Alternatives 1, 2 and 4 would manage up to 42 percent of the dry weather runoff and up to 47 percent of the wet weather runoff generated in the city from a ½ inch storm event, while

Alternative 3 would manage up to 26 percent of the dry weather and up to 39 percent of the wet weather urban runoff generated in the City. Because Alternative 3 would manage less wet weather runoff than the other alternatives, Alternative 3 would not capture wet weather runoff from residential, schools and government properties for onsite storage/use in cisterns for later reuse, or provide onsite percolation of runoff from schools and government properties, whereas the other Alternatives would. To further illustrate the differences, Alternative 3 would not divert runoff from inland creeks for treatment and beneficial use, while the others would. For these inland areas, Alternative 1 would utilize low-flow diversions of dry weather runoff to the sewer system, whereas Alternatives 2 and 4 would divert to wetlands or urban runoff plants for beneficial use.

The IRP alternatives make use of different mixes of components and different levels of use intensity to meet the project goals. Although they may not substantially differ from one another in terms of wastewater capacity, recycled water use, or runoff management, they represent a reasonable range of alternatives given the City's existing wastewater treatment and conveyance infrastructure, runoff infrastructure, recycled water infrastructure, existing and future regulatory environment, and future population projections. Future population projections were developed by the Southern California Association of Governments (SCAG).

2.1.2 EIR Alternatives Analysis

Also discussed in the Draft EIR (see Table ES-1 in the Draft EIR Executive Summary), the majority of the potentially significant impacts are associated with components that are common to all of the IRP alternatives, such as the proposed new sewer alignments. Differences in impacts between alternatives are most prevalent when considering alternate locations of proposed wastewater treatment facilities. For example, all proposed alternatives would result in potential odor impacts related to increased wastewater treatment capacity, but the potential for impact differs depending on where a given alternative focuses the expansion of treatment capacity.

For that reason, Alternative 1 was identified as the Environmentally Superior Alternative because it would result in lower use of energy and less air pollutant emissions.

In addition to considering the relative differences in environmental impacts among the alternatives, staff also considered the comments received on the Draft EIR. (Chapter 3 in Volume 2 of the Final EIR contains copies of the comments received and responses to those comments.) Staff also reviewed the comments on the Draft EIR that focused on system-wide issues to help identify the Recommended Alternative. In general, the comment letters that made recommendations for specific systemwide alternatives emphasized the following:

- Expand treatment plants in areas distant from homeowners (e.g., the Homeowners of Encino requested that Alternative 1 be selected because it avoids expansion of Tillman in the Sepulveda Basin).

- Maximize sustainability and select either Alternative 2 and/or Alternative 4, because either of these alternatives would use a watershed approach (e.g., Mono Lake Committee),

- Maximize use and reuse of urban runoff (e.g., Heal the Bay) and maximize recycled water production at LAG (e.g., City of Glendale).

In the consideration of the comments on the Draft EIR regarding the Recommended Alternative, staff prioritized comments that addressed system sustainability.

During the public comment period for the Draft EIR, numerous comments were received on the proposed GBIS alignments. Many who commented in the Burbank area expressed concern about potential GBIS construction and facilities at the Valley Heart shaft site, Riverside East shaft site, and Riverside West shaft site, all of which are located along the eastern half of the GBIS North Alignment. Toluca Lake area residents and Forest Lawn also commented on the GBIS South Alignment, in particular, the western portion of the GBIS South Alignment. In addition, comments were received on a possible construction shaft site and air treatment facility at Woodbridge Park due to its proximity to the school as well as the use and access of the Park. Interim communication occurred between the City of Los Angeles and the City of Burbank subsequent to the close of the public comment period. These interim activities included meetings and correspondence that focused on the relative merits of the proposed alignments for GBIS. The meetings were conducted to review constraints and issues associated with an alignment along the Los Angeles River channel, review any additional information provided by the city of Burbank related to their concerns about the GBIS alignments, and consider other measures to further reduce potential impacts to residents.

2.1.3 Quadrant Analysis

To assist further in the identification of a Recommended Alternative, City staff revisited the previous alternatives ranking process conducted for the Facilities Plan (IRP Facilities Plan, Volume 4: Alternatives Development and Analysis (City of Los Angeles, 2004). In this plan, staff applied the guiding principles of the IRP, using a quadrant analysis method to evaluate the costs and benefits of the alternatives.

The primary objectives of the IRP are to:

- Protect Health and Safety of the Public

- Provide Effective Management of System Capacity

- Protect the Environment

- Enhance Cost Efficiency
- Protect Quality of Life
- Promote Education

To meet these objectives, a set of guiding principles was developed with assistance from stakeholders, which provided instructions on how to meet the objectives in the context of the three service functions evaluated (recycled water, runoff management, and wastewater):

- Produce and use as much recycled water as possible from existing and planned facilities
- Reduce the amount of rainfall-dependent inflow and infiltration as much as possible
- Increase the level of water conservation beyond what is currently planned
- Increase the amount of dry weather runoff that is diverted and treated or captured and beneficially used
- Increase the amount of wet weather urban runoff that can be captured and beneficially used
- Focus on lower-cost solutions, within the framework of the other guiding principles.

To apply the quadrant approach for the four IRP alternatives, staff conducted the following steps:

- Defined the benefits for the separate service functions (i.e., wastewater, recycled water and runoff management).
- Plotted the benefits and costs for each alternative on the quadrant chart for each separate service function.
- Compared the results by service function and identified "clear winners", "clear losers" and "possible second choices" for each service function
- Compared the service function quadrant charts and counted the number of times each alternative was a clear winner or second choice.
- Evaluated results and selected recommended alternative and implementation strategies.

See Appendix A of this document for additional background on the updated quadrant analysis. For the quadrant analysis, staff defined benefits as follows:

- **Recycled water**. The guiding principle for recycled water is to maximize volume of recycled water (in acre-foot per year) from wastewater effluent that could be beneficially used to offset other sources of drinking water. The city assigned higher benefits to alternatives that produced and used higher amounts of recycled water.

- **Runoff management.** The IRP guiding principles also included increasing the amount of dry weather and wet weather urban runoff that is diverted and treated or captured and beneficially used. For the quadrant analysis, runoff management benefits for both dry and wet weather runoff were defined as a combination of potential volume of runoff managed and volume of runoff beneficially used. For this analysis, beneficial use was defined as options that offset potable water use, and the greater the level of potable water offsets (with treated runoff), the higher .management is to maximize options that offset potable water use, such as: smart irrigation, urban runoff plants, local/neighborhood solutions (cisterns, on-site percolation, neighborhood recharge), and non-urban regional recharge.

- **Wastewater.** On the basis of past investment and resources at the Hyperion Treatment Plant and the anticipated permit requirements, wastewater benefits were defined in direct correlation to the volume of wastewater treated at that plant. A high benefit was assigned to alternatives that enhanced capacity at Hyperion, a medium benefit to alternatives that enhanced capacity at one upstream plant (e.g., Tillman) and a low benefit to alternatives that enhanced capacity at both Tillman at LAG.

Using the defined benefits and estimated costs, staff evaluated each alternative for each service function, and then considered them as an integrated system. Staff compared each service function chart and counted the number of times an alternative was the clear winner or second choice. The resulting ranking was as follows:

1. Alternative 4 (highest ranking for recycled water, dry weather runoff and wet weather runoff, and possible second choice for wastewater): Alternative 4 as the Recommended Alternative is attributable to great extent to its recycled water benefits. Changes in future regulations regarding the use of recycled water or future policy decisions regarding the use of recycled water for groundwater replenishment could reduce these recycled water benefits. If those conditions occurred, then Alternative 1 could be considered a potential second choice, on the basis of its lower costs and moderate benefits.

2. Alternative 1 (highest ranking for both wastewater and wet weather runoff, and possible second choices for dry weather runoff and recycled water)

3. Alternative 2 (highest ranking for recycled water, wet weather runoff and dry weather runoff, but not desirable for wastewater): Alternative 2 was ranked third and therefore not preferred, because it produced similar recycled water and runoff management benefits than as Alternative 4, but at higher costs. Also, it provided low benefits for the wastewater system, since it relied on

expansion of two water reclamation plants, thereby impacting multiple neighborhoods.

4. Alternative 3 (possible second choices for wastewater and recycled water): Alternative 3 was ranked last and therefore not preferred, due to its lower recycled water, wastewater and runoff benefits compared to all the other alternatives. In addition, its costs were similar to Alternative 1, which provided more benefits.

In addition to the environmental impacts of the IRP Alternatives, City staff relied on the comments on the Draft EIR in conjunction with the alternatives ranking evaluation discussed above to identify the Recommended Alternative. Because Alternative 4 was ranked the highest in the ranking evaluation summarized above, and because Alternative 4 was also recommended in comments (received on the Draft EIR) that focused on system-wide issues and sustainability issues, Alternative 4 has been selected as the Recommended Alternative.

2.2 Recommended Alternative

On the basis of the analysis conducted in the EIR, the comments received on the Draft EIR, and the quadrant analysis conducted by staff, Alternative 4 (expansion at Tillman with high potential for water resources projects) is the recommended IRP alternative. Alternative 4 reserves the ability for future needed expansion at Tillman, while recognizing groundwater replenishment potential.

Alternative 4 includes expanding Tillman to 100 mgd, adding new collection system sewers, adding storage to Tillman and LAG, and adding a truck loading facility, digesters and secondary clarifiers to the Hyperion Treatment Plant.

In addition, Alternative 4 includes increasing the amount of effluent from Tillman and LAG that is recycled, onsite percolation of wet weather runoff at schools and government properties, and neighborhood-scale percolation at vacant lots, parks/open space in the east valley. The timing and specifics of runoff management implementation will be coordinated with the Total Maximum Daily Load (TMDL) requirements and subsequent Implementation Plans. Alternative 4 also calls for continued implementation of water conservation programs, such as smart irrigation devices to reduce outdoor water use and urban runoff.

Alternative 4 is recommended based on its recycled water benefits. If in the future the use of recycled water from Tillman for groundwater replenishment or other recycled water uses is considered infeasible based on a combination of factors (including public acceptability, costs, future regulations, and the need for additional treatment capacity) then Alternative 1 would be considered the Recommended Alternative.

The Recommended Alternative also includes adding advanced treatment to LAG at existing capacity, if regulatory permit requirements result in a need for advanced treatment to discharge to the Los Angeles River or if recycled water requirements

result in higher treatment requirements. Implementation would require partnership and coordination with the City of Glendale.

Recommended NEIS II Alignment
In evaluating which NEIS II alignment would be recommended for implementation, staff considered the following:

- Constructability
- Availability of right-of-way
- Other factors including hazardous materials and accessibility

Based on these considerations, staff has identified the NEIS II West Alignment, Option B as the recommended NEIS II alignment. The shaft sites that would be used to construct the NEIS II West Alignment are the Division Street shaft site, the Crystal Springs shaft site, and the Pecan Grove shaft site.

Recommended GBIS Alignment
In evaluating which GBIS alignment would be considered for implementation, staff considered the following:

- Key Concerns about potential impacts
- Surface construction activity
- Contingency response
- System relief

Based on these considerations, staff has identified a GBIS alignment that connects the eastern half of the GBIS South Alignment with the western half of the GBIS North Alignment, with a short section of tunnel beneath Pass Avenue in the city of Burbank. Because the GIBS North and GBIS South Alignments have been evaluated in the Draft EIR, and because the recommended GBIS Alignment contains portions of both of these GBIS alignments, the recommended GBIS Alignment does not constitute a new project component (i.e., the recommended GBIS Alignment combines portions of the GBIS North Alignment and GBIS South Alignment in a way that further minimizes impacts.) The former proposed alignments would be joined by a ½ mile connector along Pass Avenue, which would not result in new significant impacts.

To further minimize potential impacts, the following shaft sites are proposed with the recommended GBIS alignment: Pecan Grove shaft site with an air treatment facility, Travel Town shaft site, Barham shaft site, Caltrans North Hollywood Maintenance Yard shaft site with an air treatment facility, and the GBIS Optional Alignment A (Riverside Branch) along the alignment's west end.

The Pecan Grove shaft site is recommended because it would avoid potential impacts to the Los Angeles Zoo parking lot. The Caltrans North Hollywood Maintenance Yard shaft site is recommended because it would avoid a construction shaft site and air treatment facility at Woodbridge Park. The ½ mile connector along Pass Avenue was developed in response to concerns expressed by the local community. Staff sent 7,600 announcement notices, which included list provided by Burbank to inform the affected community that "The City is considering alignment modifications for the Glendale Burbank Interceptor Sewer (GBIS) alignments analyzed in the DEIR to minimize potential impacts to the residential neighborhoods. The alignment modifications being considered, which will be analyzed as part of the final EIR, would connect the eastern portion of the GBIS South Alignment along Forest Lawn Drive with the western portion of the GBIS North Alignment in Riverside Drive through a corridor in the public right-of-way in or in the vicinity of Pass Avenue."

As a result of the interim coordination with the City of Burbank, staff has also included additional voluntary improvement measures that the City of Los Angeles will implement to address traffic, noise and vibration concerns.

Section 3
Recommended Implementation Strategy

3.1 Introduction

The IRP Alternatives discussed in the EIR include components that are well defined and components that are more conceptual. The well-defined components in the EIR were site specific, and therefore detailed project-level environmental analysis was conducted. The conceptual components were evaluated in the EIR at a program-level. For those program-level components, there may be additional detailed study and environmental analysis required by CEQA before they can be implemented.

The implementation strategy for the IRP will be directed by certain "triggers" that include policy decisions regarding recycled water and groundwater replenishment, regulatory decisions regarding more restrictive permits for discharge of water into the Los Angeles River, and the need for additional wastewater treatment capacity.

For example, the decision to upgrade to advanced treatment at Tillman will be dependent on future regulations regarding discharge to the Los Angeles River, future regulations regarding the use of recycled water, and/or policy decisions regarding use of recycled water for groundwater replenishment, thereby requiring partnership between the Department of Public Works and DWP. If groundwater replenishment is not feasible based on a combination of factors (including public acceptability, costs, or future regulations when expansion is needed, then expansion could occur at Hyperion Treatment Plant (i.e., Alternative 1).

Also, if regulatory permit requirements result in a need for advanced treatment to discharge to the Los Angeles River or if recycled water requirements result in higher treatment requirements, then advanced treatment could be added to LAG at existing capacity, which would require partnership and coordination with the City of Glendale.

The implementation strategy for the IRP is organized into three categories of projects:

- ***Go-Projects:*** projects that have been evaluated in the IRP EIR as a site-specific project and are recommended to be implemented immediately because their associated triggers have been reached.

- ***Go If Triggered Projects:*** projects that are recommended to be implemented in the future, once a certain trigger is reached.

- ***Go-Policy Directions:*** Specific directions to staff on the next studies and evaluations required to provide progress on the programmatic elements in the Recommended Alternative.

All of the Go-Projects and most of the Go If Triggered Projects were evaluated in the EIR at a project-level. Because the conservation, runoff management, and recycled water components of the Recommended Alternative were evaluated in the EIR as programmatic elements, they require Go-Policy Decisions regarding the future study and environmental analysis that will be required before implementation.

The Department of Public Works is responsible for developing the 10-year Wastewater Capital Improvement Program (WCIP). This program includes replacement, rehabilitation, and expansion of the City's wastewater treatment and collection facilities. The Department of Public Works is also responsible for watershed protection, which includes compliance with TMDLs and beneficial use of runoff. Using a similar process, staff develops a CIP for the watershed protection program as part of the annual budget process. The Department of Water and Power is responsible for implementation of recycled water projects and water conservation programs, and its associated CIP.

3.2 Go-Projects for Immediate Implementation

Go-Projects represent projects from the Recommended Alternative that have been evaluated at a project-level in the EIR, and are recommended for immediate implementation because the flow or regulatory triggers have already been met. Estimated costs are presented in Section 3.5. The following Go-Projects are recommended for immediate City Council approval:

- ***Construct Wastewater Storage Facilities at Tillman (Prepare concept report and subsequent design and construction)***: There is a shortage of wastewater conveyance capacity (sewers) in the western and central portion of the Valley, as well as a shortage of treatment capacity at Tillman during wet weather conditions. Adding up to 60 million gallons of storage will be necessary to provide the needed wet weather wastewater storage and operational storage. (Estimated to be online by 2011, estimated total capital cost of $120 million[1])

- ***Construct Wastewater Storage Facilities at Los Angeles Glendale Water Reclamation Plant (LAG) (Prepare concept report and subsequent design and construction):*** LAG provides recycled water for DWP and Glendale for reuse. The volume of recycled water that can be delivered to customers is limited by the daily variation of flows at the plant. Therefore, providing an up to 5 million gallon storage facility for daily operational wastewater storage will provide more efficient plant operations by making plant inflows more constant, which would also improve recycled water flows to the customers. (Estimated to be online by 2012, estimated total capital cost of $20 million[1])

[1] Costs are presented in 2006 dollars (March 2006 ENR CCI for Los Angeles.) Capital costs include construction costs and non-construction costs including program management, engineering studies/design services, construction management and start-up costs. Costs are expected to be greater than listed as a result of inflation as projects will be constructed in the future.

- ***Construct Recycled Water Storage at Los Angeles Glendale Water Reclamation Plant (LAG) (Prepare concept report and subsequent design and construction):*** The use of recycled water from LAG is dependent on the seasonal and daily demands for the water, which can fluctuate during the day and during the rainy season. Therefore, providing up to 5 million gallons of recycled water storage will allow LAG to deliver recycled water to customers at times when wastewater flows are low (i.e., during the night.) (Estimated to be online by 2012, estimated total capital cost of $8 million[1])

- ***Construct Hyperion Treatment Plant Solids Handling and Truck Loading Facility (Prepare preliminary design and subsequent design and construction):*** Hyperion processes biosolids removed from wastewater generated from throughout the city. A new solids handling and truck loading facility will provide more efficient operations and will also meet future solids handling production. (Estimated to be online by 2012, estimated total capital cost of $89 million[1]),

- ***Construct Glendale-Burbank Interceptor Sewer (GBIS), Combined Alignment – Option A (Design and Construction)***: GBIS is needed to provide relief or additional capacity in the near future to prevent overflows and spills. GBIS would include construction and operation of approximately 5 ¾ miles of 8-foot-diameter (inside) interceptor sewer and associated structures, including diversion structures, drop structures, maintenance hole structures, and air treatment facilities (if needed). The specific GBIS alignment would begin at the Pecan Grove shaft site, would travel beneath Zoo Drive, then head beneath the northern-most hillside in Griffith Park to reach the Travel Town Shaft Site. It would extend under Forest Lawn Drive to the Barham Shaft Site. GBIS would then be tunneled northwest beneath the Los Angeles River to Pass Avenue, head northward beneath Pass Avenue to Riverside Drive then turn westward beneath Riverside Drive to the western terminus. As part of the Draft EIR public review, the community expressed their opposition to the use of the Woodbridge Park due to the proximity to the school as well as the use and access of the Park. After thorough review of the alternative and the DEIR comments, it is concluded that the Caltrans North Hollywood Maintenance Yard is the most viable option. (Estimated to be online by 2016, estimated total capital cost of $196 million[1])

- ***Construct North East Interceptor Sewer (NEIS) Phase II, West Alignment – Option B (Design and Construction):*** NEIS II would relieve the section of the North Outfall Sewer (NOS) south of LAG and convey additional flow from the GBIS to provide relief or additional capacity in the near future to prevent overflows and spills. The proposed NEIS II would include construction and operation of approximately 5 ½ miles of 8-foot-diameter (inside) interceptor sewer and associated structures, including diversion structures, drop structures, maintenance hole structures, and air treatment facilities (if needed). NEIS II extends from an existing NEIS (Phase I) at the Division Shaft site. It would cross State Route 2, the Los Angeles River, Interstate 5 to Griffith Park Shaft site. It would extend from the Crystal Springs (Picnic Grounds) shaft site, travel westward beneath Griffith Park Drive, then go

north beneath the golf courses to its terminus at Pecan Grove. ADD: (Estimated to be online by 2016, estimated total capital cost of $230 million[1])

Total estimated capital costs for Go Projects in ($2006) are presented in Section 3.5. Detailed rate impacts and subsequent budget approval will be conducted as part of the Public Works annual budget approval process.

3.3 Go if Triggered Projects

Alternative 4 also includes potential projects that will go if triggered by an action, flow, or regulation. Once triggered, these projects will be included in the WCIP as part of the annual budget process. Therefore, we are recommending that Council direct staff to monitor the triggers for these projects, and if triggered, proceed with implementation of the following projects that have been evaluated as site-specific projects in the EIR. Estimated costs are presented in Section 3.5.

- ***Potential upgrades at Tillman to advanced treatment (current capacity):*** Tillman currently provides tertiary-treated recycled water for irrigation use and environmental benefits to the Lake Balboa and the Wildlife Lake at Sepulveda Basin, and the Los Angeles River. If triggered by regulations and/or decision to reuse Tillman recycled water for groundwater replenishment, then additional advanced treatment (e.g., microfiltration and reverse osmosis with ultra violet disinfection) could be required. This will require coordination with Public Works and DWP. (Estimated trigger review for new permit requirements by 2007, estimated trigger review for groundwater replenishment by 2010, estimated total capital cost of $339 million[1])

- ***Potential expansion of Tillman to 100 mgd with advanced treatment:*** If triggered by increase in population, regulations, and/or groundwater replenishment decision, then Tillman could be expanded to 100 mgd with advanced treatment. Will require coordination between Public Works and DWP. (Estimated trigger review for new SCAG population projections by 2008. Based on 2004 projections, expansion would occur after year 2025. Estimated trigger review for groundwater replenishment by 2010. Estimated total capital cost of $210 million[1], assuming 20 mgd of secondary treatment, MF/RO and UV disinfection)

- ***Potential upgrade of LAG to advanced treatment (current capacity):*** LAG currently provides tertiary-treated recycled water for irrigation use and environmental benefits to the Los Angeles River. If triggered by regulations, availability of downstream sewer capacity, and/or decision to reuse, then advanced treatment at current capacity could be required. Would be subject to partnership between Public Works and City of Glendale. (Estimated trigger review for new permit requirements by 2007, estimated total capital cost of $105 million[1])

- ***Design/construction of secondary clarifiers at Hyperion to provide operational performance at 450 mgd:*** The existing secondary clarifiers at Hyperion are performing below their rated capacity of 450 mgd. Staff is currently investigating

ways to optimize the existing secondary clarifiers to get them operating up to 450 mgd. If these options prove to be unsuccessful, then new secondary clarifiers will be needed to provide operational performance at 450 mgd. (Estimated trigger review by 2008, estimated total capital cost of $92 million[1])

- ***Design/construction of up to 12 digesters at Hyperion:*** If triggered by increased biosolids production in the service area, additional digesters will be required at Hyperion. (Estimated trigger review for new SCAG population projections by 2008. Based on 2004 projections, expansion would occur after year 2025. Estimated total capital cost of $303 million[1])

We also recommend that Council direct staff to monitor the triggers for the following project, and if triggered, proceed with detailed alignment study and associated environmental review for the following project that has been evaluated as a programmatic element in the EIR:

- ***Prepare alignment study, environmental documentation, and subsequent design/construction of Valley Spring Lane Interceptor Sewer:*** To provide additional sewer conveyance capacity between Tillman and the Valley Spring Lane/Forman Avenue Diversion structure, a new sewer will be required, which would require subsequent environmental analysis. (Estimated to be online by 2020, estimated total capital cost of $156 million[1])

The total estimated capital cost (in $2006) for Go If Triggered projects are presented in Section 3.3. Detailed rate impacts and subsequent budget analysis will be conducted as part of the Public Works annual budget process.

In the unlikely event that the overall framework for recycled water changes to disallow its use so Alternative 1 is the Recommended Alternative, then the following potential project would replace the "Potential expansion of Tillman to 100 mgd with Advanced Treatment" project described above:

- ***Potential expansion of Hyperion to 500 mgd:*** If triggered by increase in population, regulations, and/or groundwater replenishment decision, then Hyperion could be expanded to 500 mgd, through the addition of 50 mgd of secondary clarifiers. (Estimated trigger review for new SCAG population projections by 2008. Based on 2004 projections, expansion would occur after year 2025. Estimated trigger review for groundwater replenishment by 2010. Total estimated capital cost of $46 million)

3.4 Go-Policy Directions

The following recommended Go-Policy Directions provide direction to staff on immediate activities and actions for recycled water, water conservation, and runoff management. The timing of these actions may be dependent on staff and funding availability. It is recommended that Council approve these policy directions. Any resulting impacts on existing City policy should be reported back to Council for action. Staff should also provide status updates.

Although these policy directions are covered programmatically in the Final EIR for the IRP, more specific environmental documentation may be needed as these policies are developed and implemented.

It should be noted that Section 4 of this document provides a listing of currently identified related projects for recycled water, water conservation and runoff management. Additional projects will be developed as part of the corresponding capital improvement program and will be included in the annual report to the City Council.

Recycled Water – Non-Potable Uses

1. Direct DWP and Public Works to work together to maximize use of recycled water for non-potable uses in Terminal Island Treatment Plant service area, west side, and LAG services areas. DWP to conduct additional Tier 1 and 2 customer analysis to verify the potential demands and feasibility. Develop a long-range marketing strategy for recycled water that includes a plan for recruiting (and keeping) new customers.
2. Direct Building and Safety to evaluate and develop ordinances to require installation where feasible of dual plumbing for new multi-family, commercial and industrial developments, schools and government properties in the vicinity of existing or planned recycled water distribution systems in coordination with LA River Revitalization Master Plan. Proximity and demand will be considered when determining feasibility. The dual plumbing will consist of separate plumbing and piping systems, one for potable water and the second for recycled water for non-potable uses such as irrigation and industrial use.
3. Direct Public Works and DWP to coordinate where feasible the design/construction of recycled water distribution piping (purple pipe) with other major public works projects, including street widening, and LA River Revitalization Master Plan project areas. Also coordinate with other agencies, including MTA and Caltrans on major transportation projects.

Recycled Water - Indirect-Potable Uses (Groundwater Replenishment)

4. Direct DWP to develop a public outreach program to explore the feasibility of implementing groundwater replenishment with advanced treated recycled water.

Recycled Water - Environmental Uses

5. Direct DWP and Public Works to continue to provide water from Tillman to Lake Balboa, Wildlife Lake, and the Japanese Garden at Sepulveda Basin, and the LA River to meet baseline needs for habitat, i.e., approximately 27 mgd through flow-through lakes).

Water Conservation

6. Direct DWP to continue conservation efforts, including programs to reduce outdoor usage, including using smart irrigation devices on City properties, schools and large developments (those with 50 dwelling units or 50,000 gross square feet or larger), and to increase incentives to residential properties.

7. Direct DWP to work with Building and Safety in continued conservation efforts, including evaluating and considering new water conservation technologies, including no-flush urinal technology.
8. Direct DWP to continue conservation efforts, including working with Building and Safety to evaluate and develop policy that requires developers to implement individual water meters for all new apartment buildings
9. Direct DWP to continue conservation awareness efforts, including increasing education programs on the benefits of using climate-appropriate plants with an emphasis on California friendly plants for landscaping or landscaped areas developed in coordination with LA River Revitalization Master Plan, and to develop a program of incentives for implementation.
10. Direct Planning to consider the development of City Directive to require the use of California friendly plants in all City projects where feasible and not in conflict with other facilities usage.

Runoff Management – Wet Weather Runoff

11. Direct Public Works to review SUSMP (Standard Urban Stormwater Management Plan) requirements to determine ways to require where feasible on-site infiltration and/or treat/reuse, rather than treat and discharge, including in-lieu fees for projects where infiltration is infeasible (e.g., similar programs developed by City of Santa Monica.)
12. Direct Building and Safety to evaluate and modify applicable codes to encourage all feasible Best Management Practices (BMPs) for maximizing on-site capture and retention and/or infiltration of stormwater instead of discharge to the street and storm drain, including porous pavement. (This is currently handled through variances). Direct Public Works and Department of Planning to evaluate the possibility of requiring porous pavements in all new public facilities in coordination with LA River Revitalization Master Plan, and large developments greater than 1 acre. Program feasibility should consider slope and soil conditions.
13. Direct Department of Planning to evaluate ordinances that would need to be changed to reduce the area on private properties that can be paved with non-permeable pavement (i.e., change/support landscape ordinance and encourage the use of permeable pavement).
14. Direct Public Works to evaluate and implement integration of porous pavements into the sidewalks and street programs where feasible. For example, conduct pilot program in East Valley, taking into consideration soil conditions and Proposition O project criteria, as well as along the future LA River Revitalization Master Plan.
15. Direct Public Works and DWP and Department of Recreation and Parks to prepare a concept report and determine the feasibility of developing a powerline easement demonstration project (for greening, public access, stormwater management, and groundwater replenishment).
16. Direct Public Works and DWP to work with LAUSD to determine the feasibility of developing projects for both new schools and for retrofitted schools, as well as

government/city-owned facilities with stormwater management BMPs. [Provide wet weather runoff storage (cisterns) to beneficially use wet weather runoff for irrigation. Also, schools and government properties to reduce paving and hardscape and add infiltration basins to allow percolation of wet weather runoff into the ground where feasible.] As appropriate, integrate with LAUSD's new schools development program.

17. Direct Public Works, General Services, and Recreation and Parks to identify sites that can provide onsite percolation of wet weather runoff in surplus properties, vacant lots, parks/open space, abandoned alleys in East Valley, and along the LA River in the East Valley where feasible. Program feasibility should consider slope and soil conditions.
18. Direct Public Works and General Services and the Department of Transportation (DOT) to maximize unpaved open space in City-owned properties and parking medians through using all feasible BMPs and by removing all unnecessary pavement.
19. Direct Public Works to include all feasible BMPs in the construction or reconstruction of highway medians under its jurisdiction.
20. Direct Public Works to coordinate with the Million Trees LA team on identifying potential locations of tree plantings that would provide stormwater benefit, with consideration of slope and soil conditions

Runoff Management - Dry Weather Runoff

21. In the context of developing TMDL implementation plans, direct Public Works to consider diversion of dry weather runoff from Ballona Creek to constructed wetlands, wastewater system, or urban runoff plant for treatment and/or beneficial use. Coordinate with the Department of Recreation and Parks. Coordinate and evaluate the impact with the LA River Master Plan.
22. In the context of developing TMDL implementation plans, direct Public Works to consider diversion of dry weather runoff from inland creeks and storm drains that are tributary to the Los Angeles River to wastewater system or constructed wetlands or treatment/retention/infiltration basins with consideration for slope and topography.

General

23. Direct the Department of Planning to consider opportunities to incorporate IRP policy decisions in the General Plan, Community Plan, and Specific Plan updates or revisions, and in the future LA River Revitalization Master Plan and Opportunity Areas.
24. Direct Department of Recreation and Parks to coordinate with Public Works on including stormwater management BMPs in all new parks.
25. Direct General Services in coordination with Planning and Public Works to evaluate feasibility of all City properties identified as surplus for potential development of multiple-benefit projects to improve stormwater management, water quality and groundwater recharge.

3.5 Potential Fiscal Impacts

Tables 1 through 4 provides a summary of the estimated capital costs for the Go Projects, Go if Triggered Projects, and the estimated projects resulting from implementation of the Go Policy Directions.

Table 1 **IRP Recommended Alternative** **Estimated Capital Costs – Go Projects**	
Go Projects	**Estimated Capital Cost (2006$)[1] Millions**
Treatment	
Wastewater Storage at Tillman (60 Million Gallon with Real Time Control)	$120
Wastewater Storage at LAG (5 Million gallons with Real Time Control)	$20
Recycled Water Storage at LAG (5 Million gallons with Real Time Control)	$8
HTP Solids Handling/Truck Loading Facility	$89
Collection System	
Glendale Burbank Interceptor Sewer (GBIS)	$196
North East Interceptor Sewer (NEIS) Phase 2	$230
Total Go Projects	**$663**

Notes:

[1] Costs are presented in 2006 dollars (March 2006 ENR CCI for Los Angeles.) Capital costs include construction costs and non-construction costs including program management, engineering studies/design services, construction management and start-up costs. Costs are expected to be greater than listed as a result of inflation as projects will be constructed in the future.

Table 2 **IRP Recommended Alternative** **Estimated Capital Costs – Go if Triggered Projects**	
Go If Triggered Projects	**Estimated Capital Cost (2006$)[1] Millions**
Treatment	
Tillman Upgrade to Advanced Treatment and UV Disinfection (current capacity 80 mgd)	$339
Tillman Expansion to 100 mgd (Secondary, MF/RO and UV) (add 20 mgd)[2]	$210
LAG Upgrade to Advanced Treatment (existing - 20 mgd capacity) (MF/RO and UV)	$105
HTP Secondary Clarifiers (add 100 mgd to get capacity to 450 mgd)	$92
HTP Digesters (12 total)	$303
Valley Spring Lane Interceptor Sewer (VSLIS)	$156
Total Go If Triggered Projects	**$1,205**
Notes:	

[1] Costs are presented in 2006 dollars (March 2006 ENR CCI for Los Angeles.) Capital costs include construction costs and non-construction costs including program management, engineering studies/design services, construction management and start-up costs. Costs are expected to be greater than listed as a result of inflation as projects will be constructed in the future.

[2] In the unlikely event that the overall framework for recycled water changes to disallow its use so Alt. 1 is the Recommended Alternative, then "Expansion of Hyperion to 500 mgd (add 50 mgd) would replace the "Potential expansion of Tillman to 100 mgd with Advanced Treatment" project, at a total estimated capital cost of $46 million.

Table 3
IRP Recommended Alternative
Runoff Management Estimated Capital Costs

Runoff Management Projects	Estimated Capital Cost (millions) (2006$)[1]
Dry Weather Urban Runoff	
Smart irrigation (reduce runoff by ~10 mgd)	$116.2
Divert runoff from Compton Creek to URP (~2 mgd)	$69.0
Divert runoff from Ballona Creek to URP (~3 mgd)	$103.0
Divert runoff from various Inland Creeks to URPs and Wetlands (up to 16 mgd)	$392.9
Subtotal Dry Weather Urban Runoff	$681.1
Wet Weather Urban Runoff	
Treat and beneficially use/discharge (coastal area - 160 mgd)	$1,039.4
Neighborhood recharge in vacant lots (east valley)	$389.3
Neighborhood recharge in parks/open space	$123.8
Neighborhood recharge in abandoned alleys	$17.6
Non-urban regional recharge (east valley)	$87.1
Cisterns (onsite storage use) - Schools	$70.7
Cisterns (onsite storage use) - Government	$44.7
Onsite percolation - Schools	$51.9
Onsite percolation - Government	$17.3
New/Redevelopment Areas - Onsite treat/discharge	$0
Subtotal Wet Weather Urban Runoff	$1,841.8
Total	**$2,522.9**

Notes:

[1] Capital costs are expected to be greater than listed as a result of inflation as projects will be constructed in the future.

Table 4
IRP Recommended Alternative
Recycled Water Estimated Capital Costs

Recycled Water Projects	Estimated Capital Cost (2006$)[1]
Recycled Water Pipelines	$364.2
Recycled Water Pumping	$49.7
Diurnal Storage	$108.2
End User Retrofit	$105.1
Total	**$627.2**

Notes:

[1] Capital costs are expected to be greater than listed as a result of inflation as projects will be constructed in the future.

3.6 Potential Related/Impacted Agencies and Departments

The following City departments and outside agencies could be impacted by this implementation strategy:

- Department of Public Works – Bureau of Sanitation, Bureau of Engineering, Bureau of Contract Administration, Bureau of Street Services.
- DWP
- Department of Recreation and Parks
- Planning Department
- Environmental Affairs Department
- Department of Building and Safety
- Community Redevelopment Agency
- Metropolitan Transit Authority (MTA)
- Los Angeles Department of Transportation (DOT)
- LAUSD

Section 4
Information on Projects Underway (For Information Only, No Action Required)

4.1 Introduction

Staff has made progress on parallel projects that meet the overall IRP objectives and guiding principles. These projects and programs are presented in this section for information only.

Recycled Water and Water Conservation
As part of its 5-year update to the Urban Water Management Plan (UWMP), DWP staff included recycled water, water conservation, and runoff management elements that are aligned with the IRP, demonstrating their commitment to collaboration with Public Works on integrated planning.

Also, the following recycled water projects are underway to continue to provide recycled water to irrigation customers:

Sepulveda 4 Pipeline (CEQA completed by DWP)

Hansen Area Phase 1 Pipeline and Tank Storage (CEQA completed by DWP)

Central City Elysian Pipeline (CEQA not initiated)

Runoff Management
As part of the TMDL compliance strategy, Public Works has developed an implementation plan to meet the Santa Monica Bay Beaches Wet Weather Bacteria TMDL requirements. This plan utilizes an integrated watershed resources approach to implement projects in a phased iterative manner that would provide the greatest opportunity for success in improving water quality at the Santa Monica Bay Beaches.

Public Works has also taken the lead in developing a Proposition O program that will improve water quality at the beaches, rivers, and lakes within the City of Los Angeles. This program includes the solicitation of project ideas from the public and the development of conceptual plans for those projects that are approved by the Citizen's Oversight Advisory Committee (COAC). In a multi-phase process, the City will allocate $500 million, as approved by the bond measure, for these projects.

The first round of Proposition O has completed and the City is in the process of completing conceptual plans for several projects including:

- Santa Monica Bay/Ballona Creek BMP Project
- Santa Monica Bay Beaches Wet Weather Bacteria TMDL Project-Phase 1

- Santa Monica Beaches Low Flow Diversions Upgrades
- Catch Basin Opening Screen Covers to meet 30% Trash Reduction Milestone
- Proposition O projects under funding review include:
- South Los Angeles Wetlands Park
- Echo Park Lake Restoration Project
- LA Zoo Parking Lot Retrofit Project
- Freemont High Community Gardens Project
- Cabrito Paseo Walkway and Bike Path Project
- Parking Grove in El Sereno Project
- Rosecrans Recreational Center Stormwater Enhancement Project
- Lake Machado Ecosystem – Water Quality/Habitat Improvement Project
- Peck Park Canyon Enhancement Project

Appendix A
Quadrant Analysis of Final Alternatives

A.1 Approach to Evaluating Alternatives

To evaluate the final alternatives, the team used a quadrant analysis method to evaluate the costs and benefits of the alternatives. This analysis was originally conducted as part of the evaluation of the preliminary alternatives in the Facilities Plan and is summarized in the IRP Facilities Plan *(IRP Facilities Plan, Volume 4: Alternatives Development and Analysis* (City of Los Angeles, 2004). The concept of the quadrant analysis is to use a grid to plot the benefits and costs of each alternative. As shown in Figure 1, different quadrants are more optimal than others, based on the ranking of benefits to costs. For example, the upper left quadrant (shown in green in the figure) is more desirable, because it reflects alternatives with high benefits and low costs. The lower right quadrant (shown in pink in the figure) would be least desirable, because it reflects alternatives with low benefits and high costs.

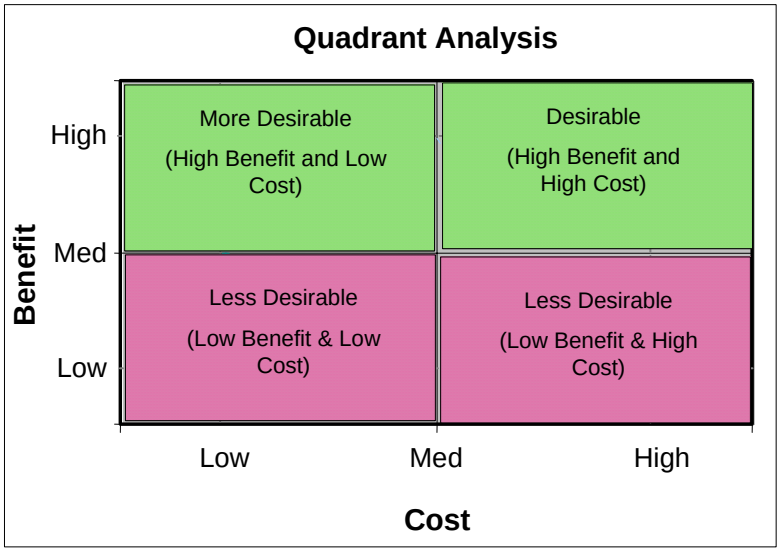


Figure 1
Quadrant Analysis Approach to Evaluating Alternatives

As shown in Figure 2, when plotting the benefits and costs on the quadrant chart, alternatives in the most desirable quadrant (high benefit and low cost) would be considered more desirable than an alternative with higher cost but the same or lower benefit because it most clearly meets the established and ranked criteria. Similarly, an alternative with a lower benefit for the same cost would be considered less desirable. If costs are of concern, then a potential second choice would be an alternative with lower costs (compared to the desirable alternative) and slightly lower benefits. If costs are not of

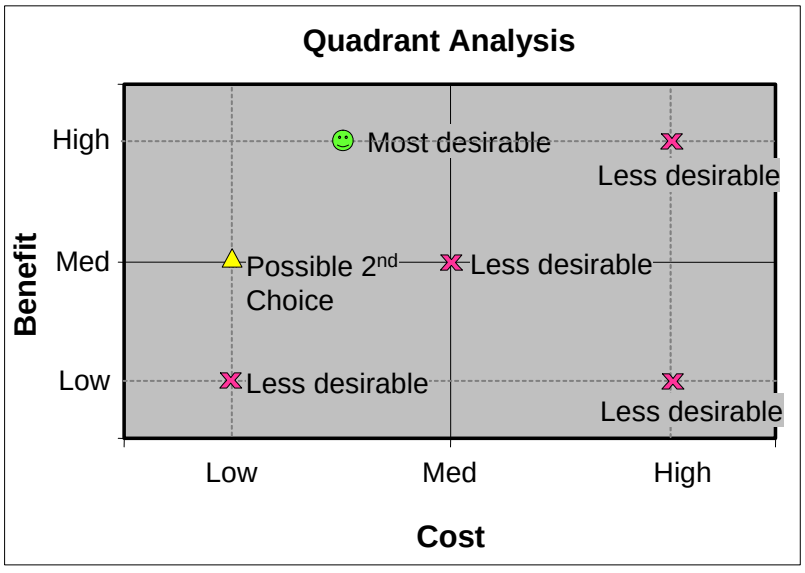


Figure 2
Illustration of Ranking Scenarios

concern, then a possible second choice would be an alternative with higher costs (compared to the desirable alternative) and slightly higher costs. These possible ranking scenarios are shown in Figure 2.

To apply the quadrant analysis approach for the IRP, the City conducted the following steps:

- Defined the benefits for the separate service functions (i.e., recycled water, dry and wet runoff management, and wastewater).
- Plotted the benefits and costs for each alternative on the quadrant chart for each separate service function.
- Compared the results by service function and prioritized the highest ranking to the lowest ranking alternative for each service function
- Compared the service function quadrant charts and counted the number of times each alternative achieved first or second place ranking.

As discussed earlier, this analysis was originally conducted as part of the evaluation of the preliminary alternatives in the Facilities Plan and is summarized in the IRP Facilities Plan *(IRP Facilities Plan, Volume 4: Alternatives Development and Analysis* (City of Los Angeles, 2004). The evaluation was used to select the four alternatives that would be further evaluated in the Draft EIR. Now we are using the same analysis to assist staff in identifying the preferred alternative. Where possible, staff did not rescale the results of the analysis, despite having four alternatives to compare, rather than over 12 from the facilities plan. Therefore, the cost and benefits definitions, as well as the results for recycled water and wet weather runoff management are unchanged from the analysis conducted in the Facilities Plan. For dry weather runoff, the benefits were slightly modified to take into account both volume of runoff managed and the beneficial use of the runoff. For wastewater management, the benefits were redefined to prevent "double counting" of recycled water benefits.

A.2 Recycled Water Analysis

A.2.1 Definition of Recycled Water Benefits

An IRP guiding principle is to produce and use as much recycled water as possible from existing and planned facilities. Therefore, higher benefits were assigned to alternatives that produced and used higher amounts of recycled water.

Recycled water benefits were defined as:

- Volume of recycled water (in acre-foot per year) from wastewater effluent that could be beneficially used for irrigation and industrial purposes.

A.2.2 Recycled Water Results

Using the defined benefits, the City assigned recycled water costs and benefits scores for the alternatives. Table 1 presents a summary of the results.

Table 1
Alternative Analysis – Potential Recycled Water Costs and Benefits

Alternative[1]	Recycled Water Costs		Recycled Water Benefits	
	Results	Capital Cost ($ mil)[2]	Results	Why (volume)
Alt 1	Med	$374	Med	Up to 38,700 AF/yr
Alt 2	Med-High	$516	Med-High	Up to 49,900 AF/yr
Alt 3	Med	$443	Med	Up to 40,100 AF/yr
Alt 4	Med-High	$544	Med-High	Up to 52,800 AF/yr

Notes:
[1] For detailed discussion of components of each alternative, see Facilities Plan Volume 4, Section 6.
[2] Capital costs are from the IRP Facilities Plan, Volume 4, are presented in $2004 dollars, and are appropriate for conducting relative comparisons. The costs for the preferred alternative will be updated to $2006 dollars and fined-tuned in Volume 5 (Implementation Strategy).

Figure 3 shows the quadrant chart for the recycled water benefits and costs. As shown in the figure, Alt 2 and 4 are more desirable, because they provide Med High benefits with Med- High costs. Alternatives 1 and 3 are possible second choices if cost is a concern.

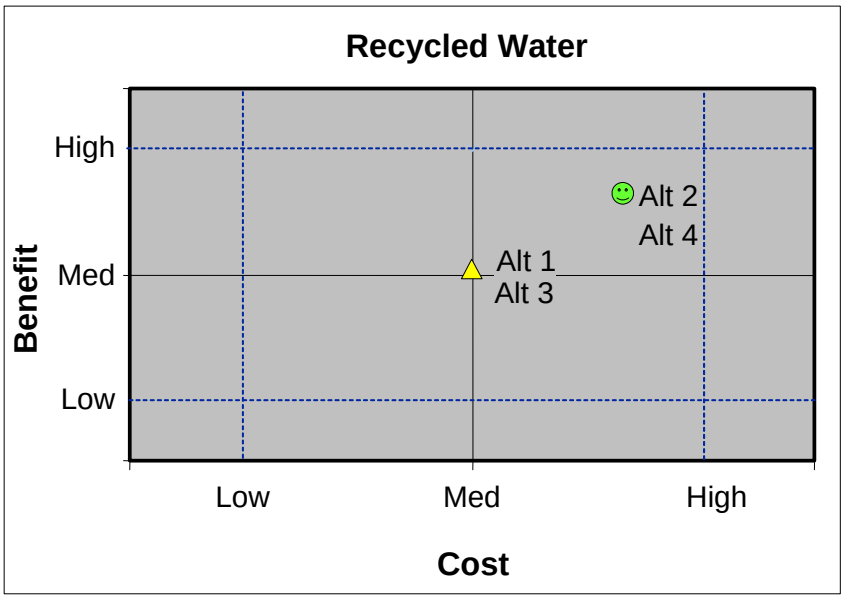


Figure 3
Quadrant Analysis – Recycled Water

A.3 Runoff Management Analysis

A.3.1 Definition of Runoff Management Benefits

The IRP guiding principles also included increasing the amount of dry weather and wet weather urban runoff that is diverted and treated or captured and beneficially used. Therefore, for the quadrant analysis, runoff management benefits for both dry and wet weather runoff were defined as a combination of potential volume of runoff managed and volume of runoff beneficially used. Beneficial use was defined as options that offset potable water use or provide natural treatment methods (e.g., constructed wetlands). The definitions of runoff management benefits for both dry and wet weather runoff were defined as a combination of:

- Volume of runoff managed
- Volume of runoff beneficially used

For this analysis, beneficial use was defined as options that offset potable water use, such as: smart irrigation, urban runoff plants (URPs), local/neighborhood solutions (cisterns, on-site percolation, neighborhood recharge), and non-urban regional recharge.

A.3.2 Runoff Management Results

A.3.2.1 Dry Weather Runoff

Using the defined benefits, the City assigned dry weather runoff management costs and benefits scores for the alternatives. Table 2 presents a summary of the results.

Table 2
Alternative Analysis – Dry Weather Runoff Costs and Benefits

	Dry Runoff Costs		Dry Weather Runoff Benefits		
Alternative[1]	Results	Capital Cost ($ mil)[2]	Results	Why (volume)	Why (beneficial use)
Alt 1	Med	$274	Med-High	High - 42 percent managed	Med - Smart irrigation & diversion to wastewater system, and reuse through some URPs/wetlands
Alt 2	High	$591	High	High - 42 percent managed	High – Smart irrigation & reuse through URPs/wetlands
Alt 3	Med	$250	Med	Med - 26 percent managed	Med – Smart irrigation & reuse through some URPs/wetlands
Alt 4	High	$591	High	High - 42 percent managed	High – Smart irrigation & reuse through URPs/wetlands

Notes:
[1] For detailed discussion of components of each alternative, see Facilities Plan Volume 4, Section 6.
[2] Capital costs are from the IRP Facilities Plan, Volume 4, are presented in $2004 dollars, and are appropriate for conducting relative comparisons. The costs for the preferred alternative will be updated to $2006 dollars and fined-tuned in Volume 5 (Implementation Strategy).

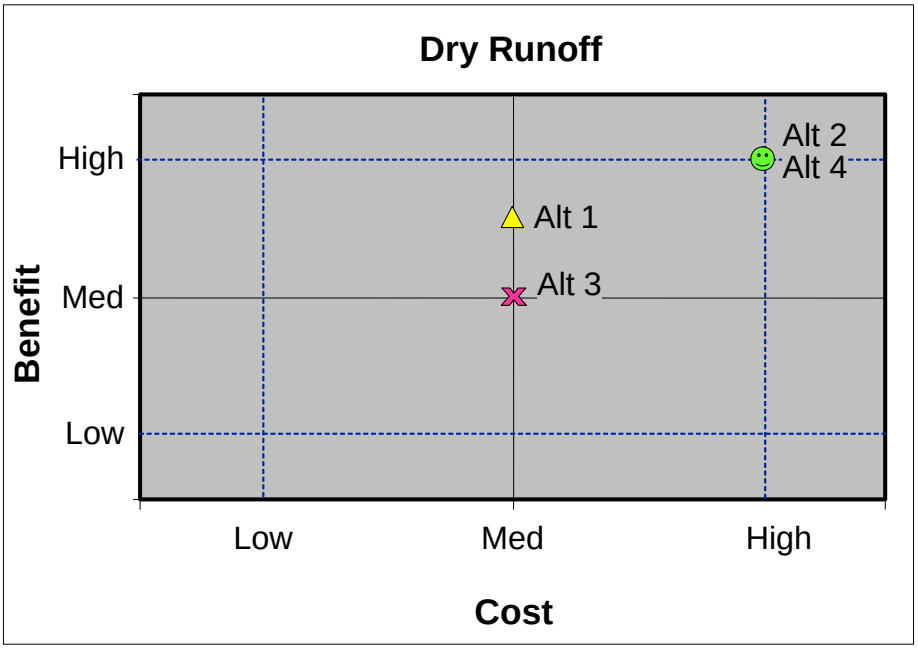


Figure 4 shows the quadrant chart for the dry weather runoff benefits and costs. As shown in the figure, Alternatives 2 and 4 provide high benefit. Alternative 1 is a potential second choice if cost is a concern, because it provides medium-high benefits at medium costs. Alt 3 is not selected because it generates fewer benefits than Alternative 1 for the same cost.

Figure 4
Quadrant Analysis - Dry Weather Runoff

A.3.2.2 Wet Weather Runoff

Using the defined benefits, the City assigned wet weather runoff management costs and benefits scores for the alternatives. Table 3 presents a summary of the results.

Table 3
Alternative Analysis – Wet Weather Runoff Costs and Benefits

	Wet Runoff Costs		Wet Weather Runoff Benefits		
Alternative[1]	Results	Capital Cost ($ mil)[2]	Results	Why (volume)	Why (beneficial use)
Alt 1	Med	$1,597	Med - High	High – 47 percent[3]	High – Onsite percolation and storage/use
Alt 2	Med	$1,597	Med - High	High – 47 percent[3]	High – Onsite percolation and storage/use
Alt 3	Med	$1,666	Med	Med – 39 percent[3]	Med – Neighborhood recharge
Alt 4	Med	$1,597	Med - High	High – 47 percent[3]	High – Onsite percolation and storage/use

Notes:
[1] For detailed discussion of components of each alternative, see Facilities Plan Volume 4, Section 6.
[2] Capital costs are from the IRP Facilities Plan, Volume 4, are presented in $2004 dollars, and are appropriate for conducting relative comparisons. The costs for the preferred alternative will be updated to $2006 dollars and fined-tuned in Volume 5 (Implementation Strategy).
[3] Percent of estimated runoff generated from a ½ inch storm citywide.

Figure 5 shows the quadrant chart for the wet weather runoff benefits and costs. As shown in the figure, Alt 1, 2, and 4 are of greater merit, because they provide medium-high benefits with medium costs. Alt 3 is not selected because it provides fewer benefits at the same cost as the other alternatives.

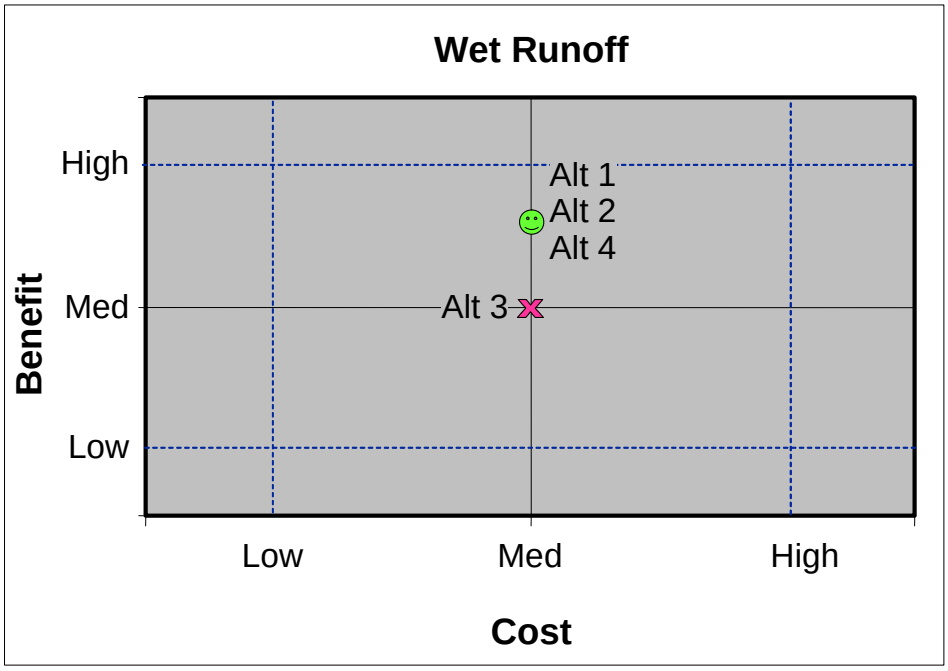


Figure 5
Quadrant Analysis – Wet Weather Runoff

A.4 Wastewater Analysis

A.4.1 Definition of Wastewater Benefits

On the basis of past investment and resources in the Hyperion Treatment Plant, wastewater benefits were defined in direct correlation to the volume of wastewater treated at that plant. Therefore, for the quadrant analysis, a high benefit was assigned to alternatives that enhanced capacity at Hyperion, a medium benefit to alternatives that enhanced capacity at one upstream plant (e.g., DCT) and a low benefit to alternatives that enhanced capacity at both DCT at LAG.

A.4.2 Wastewater Results

Using the defined benefits, the City assigned wastewater costs and benefits scores for the alternatives. Table 4 presents a summary of the results.

Table 4
Alternative Analysis – Wastewater Costs and Benefits

	Wastewater Costs		Wastewater Benefits	
Alternative[1]	Results	Capital Cost ($ mil)[2]	Results	Why
Alt 1	Low	$631	High	Expands Hyperion
Alt 2	High	$841	Low	Expands upstream at Tillman and LAG
Alt 3	Med	$817	Med	Expands upstream at Tillman
Alt 4	Med	$817	Med	Expands upstream at Tillman

Notes:
[1] For detailed discussion of components of each alternative, see Facilities Plan Volume 4, Section 6.
[2] Capital costs are from the IRP Facilities Plan, Volume 4, are presented in $2004 dollars, and are appropriate for conducting relative comparisons. The costs for the preferred alternative will be updated to $2006 dollars and fined-tuned in Volume 5 (Implementation Strategy).

Figure 6 shows the quadrant chart for the wastewater benefits and costs. As shown in the figure, Alt 1 is the highest ranked when considering wastewater only, because it provides high benefit (i.e., expands at Hyperion) with low costs. Alt 3 and 4 are potential second choices, because they expand at DCT with medium costs. Alt 2 is not desirable, because it provides fewer benefits at higher costs.

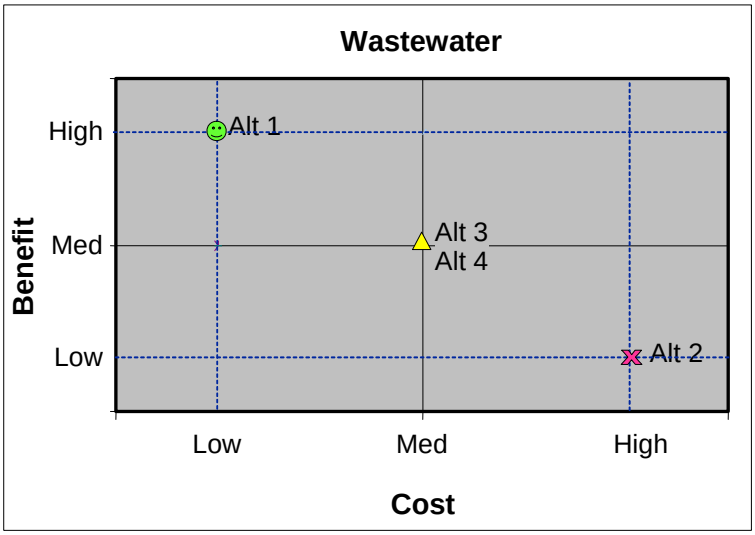
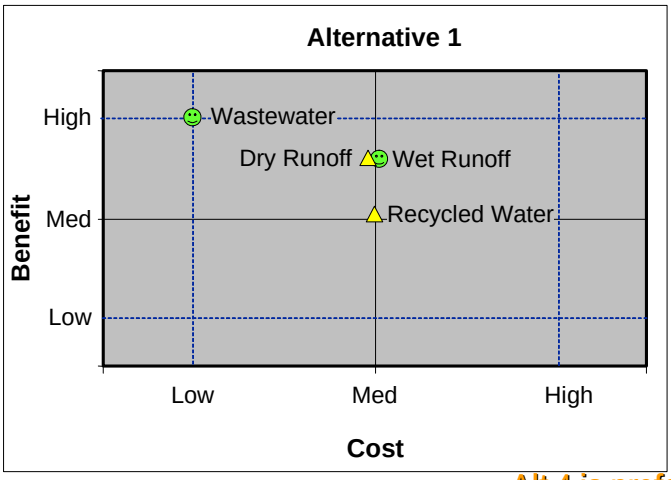


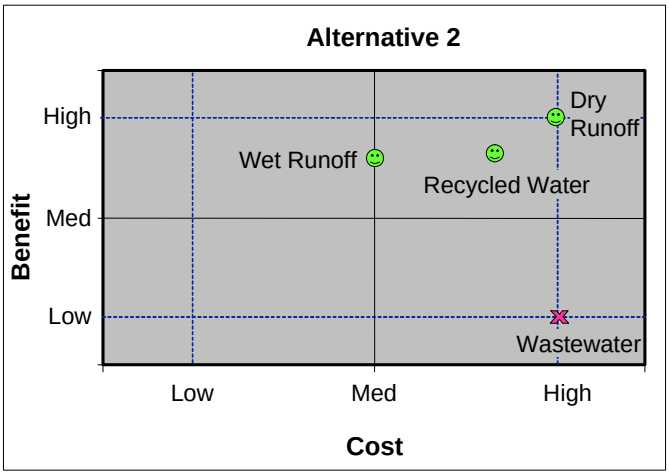
Figure 6
Quadrant Analysis – Wastewater

A.5 Integrated Results

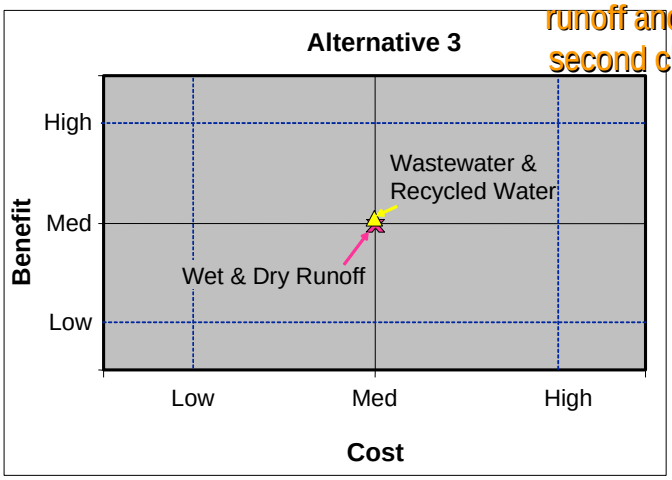
After evaluating the alternatives for each service function, the next step was to consider the alternatives as an integrated system. The City compared each of the service function quadrant charts (Figures 3 through 6) and counted the number of times each alternative was ranked first or second.

Figure 7 presents a summary of the four alternatives and how they scored relative to the four service functions.





Alt 4 is preferred, since is the clear winner for dry and wet weather runoff and recycled water, and second choice for wastewater



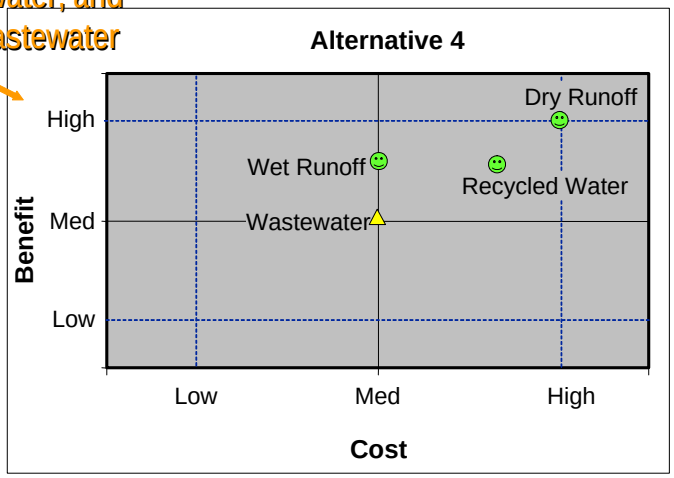


Figure 7
Quadrant Analysis – Integrated Results

Using the defined benefits and estimated costs, staff evaluated each alternative for each service function, and then considered them as an integrated system. After counting the times each alternative ranked as first or second choice and analyzing the results, the staff recommended the following ranking of alternatives:

5. Alternative 4 (highest ranking for recycled water, dry weather runoff and wet weather runoff, and possible second choice for wastewater): Alternative 4 as the Preferred Alternative is attributable to great extent to its recycled water benefits. Changes in future regulations regarding the use of recycled water or future policy decisions regarding the use of recycled water for groundwater replenishment could reduce these recycled water benefits. If those conditions occurred, then Alternative 1 could be considered a potential second choice, on the basis of its lower costs and moderate benefits.

6. Alternative 1 (highest ranking for both wastewater and wet weather runoff, and possible second choices for dry weather runoff and recycled water)

7. Alternative 2 (highest ranking for recycled water, wet weather runoff and dry weather runoff, but not desirable for wastewater): Alternative 2 was ranked third and therefore not preferred, because it produced similar recycled water and runoff management benefits than as Alternative 4, but at higher costs. Also, it provided low benefits for the wastewater system, since it relied on expansion of two water reclamation plants, thereby impacting multiple neighborhoods.

8. Alternative 3 (possible second choices for wastewater and recycled water): Alternative 3 was ranked last and therefore not preferred, due to its lower recycled water, wastewater and runoff benefits compared to all the other alternatives. In addition, its costs were similar to Alternative 1, which provided more benefits.