

Mojave Water Agency
Water Supply Reliability and Groundwater Replenishment Program

CHAPTER 7: COMPARISON OF ALTERNATIVES

7.1 Introduction

CEQA (Section 15126.6) requires an assessment of a range of reasonable alternatives to a project that would meet most of the project objectives and could avoid or substantially lessen any significant environmental impacts associated with the proposed project. CEQA also requires that an EIR assess the No Project Alternative.

As described in Chapter 3 (Initial Screening of Alternatives), MWA has pursued a systematic and incremental approach to alternative development and analysis. The 2004 PEIR examined a wide range of potential project alternatives and operational scenarios (2004 PEIR Chapter 2), and identified 43 potential projects throughout MWA's service area. The Proposed Project includes elements of the 2004 PEIR potential supply enhancement projects which were considered to be appropriate for a water banking and exchange program.

Concurrent with completion of the 2004 PEIR, MWA initiated a screening-level engineering and environmental review of potential water banking projects (Bookman Edmonston 2004a, 2004b, 2005a, 2005b, 2005c, 2005d). This analysis began with a general analysis of tens of thousands of acres of potential recharge, conveyance, and water management facilities such as wells and pumping plants. These were evaluated based on engineering and operational feasibility; facilities unable to meet a substantial portion of banking and exchange program objectives at reasonable cost were eliminated.

The screening-level review initially resulted in identification of approximately 6,000 acres of potential recharge sites, with associated wells, pipelines, and other facilities, including use of the Mainstem Mojave River. These sites were then evaluated to determine, based on engineering and environmental screening, which specific parcels of land would be included in the array of Proposed Project facilities. Criteria for this screening were:

- Distance of recharge from the California Aqueduct. Parcels were sited as close to the California Aqueduct as feasible to reduce pipeline length, associated construction impacts on air quality, associated impacts to land use, associated impacts to biological resources, and associated impacts on buried cultural resources.
- Distance from known desert tortoise populations. Although the initial screening of alternatives identified a number of recharge sites north of Highway 18, the final array of alternatives does not include new facilities north of this demarcation zone in the West Mojave Plan.

- Avoidance of arroyo toad and riparian habitat impacts on the Mainstem Mojave River. The two potential off-channel recharge basin sites were selected to avoid high value riparian sites near Mojave Forks Dam, which may support arroyo toads.
- Avoidance of existing development. Recharge basins were sited to minimize the number of houses which would be adjacent to recharge. Thus, for example, the 330 acres of recharge basin sites for Oeste Recharge were selected to avoid sites with small parcel size and potential for short-term development.

After this initial narrowing of potential sites for recharge and associated facilities, MWA staff further reduced potential project scope and defined the acreage to be considered at each potential recharge site. Individual parcels at the various recharge sites were then selected for further evaluation, primarily based on proximity to the California Aqueduct and avoidance of potential impacts to desert tortoise and Mohave ground squirrel. Biological surveys and cultural resource surveys were then conducted, and several sites for Off-channel Mojave River Recharge were evaluated at a higher level of detail in terms of their hydrogeologic characteristics and appropriateness for recharge. During this process, all new recharge sites were sited to be south of State Highway 18 to (a) avoid and minimize potential for impacts to desert tortoise and Mohave ground squirrel and (b) to minimize costs associated with pumping return supplies into the California Aqueduct.

As a result, off-channel alternative recharge facilities carried forward for detailed analysis were downsized from the original 6,000 acres (Bookman-Edmonston 2004a) to about 800 acres. Three sites were then considered for the potential 100-acre Off-Channel Mojave River Recharge, with a site in the vicinity of Mojave Forks Dam being eliminated from detailed consideration following cultural and biological surveys which suggested that this site would have high potential of significant cultural and biological resources impacts, including impacts to the endangered arroyo toad and potential loss of riparian wetlands along the river channel.

The recharge and associated pipeline and well facilities carried forward for detailed analysis therefore represent a small subset of the originally considered alternatives, with other sites eliminated from consideration in an effort to (a) reduce potential environmental impacts and (b) reduce construction and long-term operations and maintenance costs.

7.2 Methodology

7.2.1 Facility-by-Facility Impact Analysis

The alternatives described in this Project EIR represent a continuum of project capacity and facilities from a No Project Alternative to a banking and groundwater replenishment program involving approximately 800 acres of new facilities. This continuum of new facility components was broken into three distinct alternatives for the purpose of evaluating relative impacts of logical increments of facility development and to accommodate modeling of the water management aspects of the Proposed Project. However, throughout the EIR, impacts have been described in terms of each increment of facility development so that the relative impacts of any

combination of facilities could be rapidly determined by the Mojave Water Agency Board of Directors. The logical progression represented by the three groupings of facilities -- from the Minimum Facilities Alternative with permanent effects to land use of less than 20 acres to the Large Projects Alternative with permanent effects to land use of over 800 acres -- provides MWA's Board of Directors with a set of progressively higher impact choices, but MWA may choose in the final analysis to construct a project composed of components of, for example, the Minimum Facilities Alternative plus one or another of the facilities from the Small Projects Alternative.

In selecting an alternative for final evaluation, MWA will utilize the facility-by-facility impact analysis provided in this Project EIR and compare the benefits and costs associated with a given combination of these facilities, making findings and determinations regarding the relative benefits of the proposed alternative when compared to the relative impacts.

7.2.2 No Project Alternative

Section 3.4.2 describes the No Project Alternative and notes that it is likely that under this alternative there would be development of recharge and associated facilities, consistent with the Proposed Project for:

- Mainstem Mojave River Recharge
- Mojave River Well Field and Pipelines (with a shorter pipeline)
- Cedar Avenue Detention Basin
- Antelope Wash Detention Basin (Ranchero Road)
- Oro Grande Wash
- Antelope Wash

The No Project Alternative description also indicates that recharge basin siting for off-channel Mojave River recharge and recharge at Alto and Oeste could be affected under the No Project Alternative by prior development of the sites described in the Proposed Project.

7.3 Comparison of Effects

The following comparison of alternatives (Tables 7-1 to 7-5) is structured to provide MWA with a basis for selection of a preferred alternative and the environmentally superior alternative.

7.3.1 Comparison of Project Alternatives

Evaluation of the relative environmental effects of the various Proposed Project alternatives depends on the importance assigned to the various categories of effect. For example, an argument may be made that the biological effects of the various alternatives are not of high priority, given the West Mojave Plan's low priority given to preserving habitats and special-status species in the area south of Highway 18. If biological resources and land use are given low priority and water quality impacts are given high priority, then the Large Projects

Alternative could be considered the environmentally superior alternative (among the three Proposed Project Alternatives).

On the other hand, if biological, aesthetic, and air quality effects were given high priority and water quality was given lower priority, then the Minimum Facilities Alternative would be the environmentally superior alternative. In short, the designation of environmentally superior alternative depends on the importance that decision makers attach to various categories of impact. The impact-related trends to be considered by decision makers in this evaluation are:

Aesthetics:	Impacts increase with project size.
Air Quality:	Temporary impacts increase with project size.
Biological Resources:	Impacts increase with project size.
Cultural Resources:	Impacts are not significantly affected by project size.
Geology and Soils:	Impacts are not significantly affected by project size.
Hazards and Hazardous Materials:	Impacts are not significantly affected by project size.
Land Use:	Impacts increase with project size.
Noise:	Impacts are not significantly affected by project size.
Public services and utilities:	Impacts are not significantly affected by project size.
Recreation:	Impacts are not significantly affected by project size.
Traffic:	Impacts are not significantly affected by project size.
Utilities and Service Systems:	Impacts are not significantly affected by project size.
Water Resources (Quality)	Impacts decrease with project size.
Water Resources (Hydrology)	Impacts decrease with project size.

The rationale for these conclusions is discussed briefly below:

Aesthetics: Aesthetic impacts tend to increase with project size because additional recharge facilities are required and these would abut some existing development and thus there are more people affected by changes in view as project size increases. Except at Antelope Wash, aesthetic impacts are all mitigated to a level of insignificance through aesthetic treatments.

Air Quality: Air quality impacts increase with project size and result in increasingly significant and unavoidable impacts. These impacts are temporary, related to construction. Long-term effects of recharge may be beneficial due to an increase in wetted area and to recharge basins capturing wind-borne dust.

Biological Resources: Both direct and indirect biological impacts increase with project size due to increased habitat loss and increased fragmentation of habitat and potential for facilities to affect wildlife movement. Primarily due to siting of facilities in disturbed areas to avoid impacts and elimination of areas with high biological sensitivity, potential impacts are low. Biological resource impacts would therefore have a low priority in selection of the environmentally superior alternative.

Cultural Resources: Cultural resources impacts are not significantly affected by project size because the added facilities are not in known sensitive areas and are increasingly distant from a water source. In a desert environment, significant settlement is not likely in the flat open space and dry washes that are used to expand recharge capacity.

Geology and Soils: Geology and soils impacts are not significantly affected by project size because new recharge would be located in non-sensitive areas, with little potential for liquefaction, mineral leaching, soil erosion, and other geologic effects. Potential for liquefaction along the Mainstem Mojave River, the only geologic impact that may be of any importance, is probably reduced if high volumes of recharge may be spread out over multiple facilities.

Hazards and Hazardous Materials: Impacts related to hazards and hazardous materials are most likely to occur in the urbanized areas and associated with pipeline construction and construction of pumping plants and similar facilities. These are neither significant nor significantly affected by project size.

Land Use: Land use impacts clearly increase as more land is required to expand recharge capacity, but none of the facilities are in conflict with existing and planned uses. Recharge and development are compatible uses. This increase in impacts may thus not be significant.

Noise: Noise impacts are not significantly affected by project size because a majority of the people affected by potential construction noise would be affected by the Minimum Facilities Alternative. Facilities added by the Small Projects Alternative and Large Projects Alternative are in more remote locations and would not affect many people for any extended period of time.

Public services and utilities: Impacts to public services and utilities do not significantly increase with project size because a majority of potential service impacts are in the urban areas affected by the Minimum Facilities Alternative and the Small Projects Alternative. Impacts at the remote locations for Large Project Facilities will be minor.

Recreation: Impacts to existing recreation are only affected by the Minimum Facilities Alternative and are thus not significantly affected by project size.

Traffic: Traffic impacts are not significantly affected by project size because facilities added to increase project recharge and conveyance capacity are not sited in areas where traffic is high and because they do not involve construction in or adjacent to roads that have high volumes of traffic.

Utilities and Service Systems: Impacts to utilities will be greatest in the urban areas affected by the Minimum Facilities Alternative. Potential for accidental impacts to utilities are lower where development is more sparsely distributed.

Water Resources (Quality): Water quality impacts decrease with project size because more recharge and conveyance capacity will allow MWA to import supplies during shorter periods of

time, when SWP water quality is seasonally of better quality. A larger project also allows MWA to recharge supplies when the capacity of the Mainstem Mojave River has been filled (either by recharge or by storm events). These positive effects of increasing project magnitude are somewhat offset by the increasing need to provide for pumping of groundwater to make returns to Metropolitan.

Water Resources (Hydrology): The minor potential for recharge in the Mainstem Mojave River to affect groundwater levels and thus affect flood flows decreases if, prior to the rainy season, MWA has expanded opportunities to recharge at other locations. Erosion and sediment transport effects on Unnamed Wash also decrease with project size due to lower reliance on deliveries to the Mojave River Mainstem.

A second and major consideration in comparing the Proposed Project Alternatives is the significance of impacts after mitigation. All project impacts are mitigated to a level of less than significant except aesthetic impacts associated with recharge at Antelope Wash and air quality impacts associated with construction. Considering only impacts after mitigation would lead to designation of the Minimum Facilities Alternative as the environmentally superior alternative.

A third consideration is that water quality impacts may not be significant under CEQA, but they are important to MWA, subarea producers, consumers, and the Regional Water Quality Control Boards. Thus while all of the Proposed Project Alternatives would allow MWA to improve the quality of water delivered to recharge, the improvement is enhanced by increased recharge and conveyance capacity. The ability to (a) take maximum SWP supplies in all years and (b) focus recharge on the months of March through July would optimize the quality of water delivered to recharge. In addition, greater project magnitude recharge capacity would allow for pre-delivery of more supplies to storage.

Energy Use and Energy Consumption: Construction energy use increases with Proposed Project magnitude, but the potential for reduced energy costs associated with rising groundwater levels also increases as the magnitude of the project increases. Thus, the net effect of the project on energy use and conservation does not vary significantly from alternative to alternative.

7.3.2 Comparison of Upstream and Downstream sites for Antelope Wash Recharge

Per the draft EIR Section 5.4.7.2, MWA considered relocation of the upstream Antelope Wash recharge basin to a downstream site. As described in Chapter 4 page 4-31, this would involve expanding recharge at the Ranchero Road site in lieu of developing the upstream Antelope Wash recharge site. The analysis of this option (Table 7A) suggests that it would not affect recharge capacity substantially and that subsurface soils conditions and groundwater water quality at the two sites is probably similar. This relocation would reduce pre-mitigation impacts to aesthetics, biological resources, and air quality (marginal), and use of energy (marginal). There would be a marginal and temporary increase in temporary noise impacts because there is more development in the vicinity of the Ranchero Road recharge site than at the upstream site, but implementation of best management practices for noise management will reduce this

temporary impact to a level of less-than-significant. Given that biological resources impacts to the sensitive and protected Joshua Tree/juniper habitat at the upstream recharge site would be avoided, the need for mitigation of project impacts at this site would also be substantially reduced. This would eliminate the need to purchase and provide for management of at least 68 acres of Joshua Tree/juniper habitat.

Table 7-A. Summary comparison of the effects of expanding recharge at the Rancho Road site in lieu of developing the upstream recharge site.

CATEGORY OF EFFECT	NET CHANGE IN PROJECTED IMPACT FROM EXPANDING RECHARGE AT THE RANCHO ROAD SITE IN LIEU OF DEVELOPING THE UPSTREAM RECHARGE SITE.
Aesthetics	Reduction in impact
Air Quality	Marginal reduction in impact
Biological Resources	Reduction in impact
Cultural Resources	No change
Geology and soils	No change
Hazards and hazardous materials	No change
Land use	No change
Noise	Marginal increase, mitigated
Public services and utilities	No change
Recreation	No change
Traffic	No change
Water resources (water quality)	No change
Water resources (hydrology)	No change
Population, housing, and growth	No change
Use of energy	Marginal reduction in impact
Cumulative impacts	No change

7.3.2 A Summary Decision Analysis

Table 7-1 is a decision matrix that summarizes the considerations outlined above, focusing on the most important aspects of the impact analysis, as discussed above and detailed on Tables 7-3 through 7-6.

7.3.2.1. Evaluation of sites for Off-Channel Mojave River Recharge.

Preliminary to selecting an alternative, it is appropriate to evaluate the relative impacts associated with the two potential sites for Off-Channel Mojave River Recharge (Small Projects Alternative). These sites have approximately equivalent potential for impacts related to:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Geology and Soils
- Noise
- Public Services and Utilities
- Recreation
- Utilities and Service Systems
- Water Resources (Water Quality)
- Water Resources (Hydrology)
- Energy Use and Energy Conservation

Any difference between these two sites in terms of the above CEQA impact categories is insignificant because impacts in these categories are mitigated to a level of less-than-significance. The two sites do vary somewhat in terms of their potential for impacts on land use. The east site is identified as partially agricultural in the California Digital Conservation Atlas (2004). The west site is designated as open space. Based on field surveys in 2005, actual use of the east site is no longer agricultural, although there is evidence of past use. The site is disturbed non-native grasses and disturbed Mojavean desert scrub, reflecting past agricultural use. The west site is dominated by non-native grassland and weedy species, reflecting its past use as a wastewater facility. Neither site has any history of public use. The primary open-space value of these sites would be in preserving views of the river and surrounding mountains from nearby housing and for people traveling along Arrowhead Lake Road. Agricultural use is inhibited to some extent by high percolation rates, which would mean that active farming would require high application of irrigation. Proposed Project effects to (a) 60 acres of marginal and currently unused land designated for agriculture and 40 acres of unoccupied land designated for low-density housing may thus be balanced by the (b) effects to 100 acres of designated open space that has been used in the past as a wastewater treatment facility. Given that recharge basins at either site will not affect scenic resources, these changes in land use are not significant.

In terms of environmental impacts, the distinction between the east and west sites for Off-channel Mojave River Recharge is thus insignificant. Both sites may be carried forward for final site evaluations, which would include comprehensive geotechnical studies and determinations of optimum recharge rates, costs, and benefits. Selection of either site may be made on the basis of findings related to these practical considerations; the sites may be considered as equivalent in terms of impacts.

7.3.2.2 Evaluation of Alternatives

If impacts that are not mitigated to a level of less-than-significant are focused on, the decision related to environmentally superior alternative depends entirely on the priority given to temporary construction-related air quality impacts versus SWP water quality impacts. Table 7-1 illustrates the sensitivity of alternative analysis to the priority placed on these two categories of impact where impacts are not mitigated to a level of insignificance. For this summary analysis, "scores" have been calculated for air quality impacts based on total fuel consumption (a measure of total emissions) and total recharge capacity (a measure of project operational ability to take better quality SWP supplies rapidly during wet years and wet seasons). Assuming 300 acres of annual construction of berms in the Mainstem Mojave River, these impacts are:

	<u>Air Quality (Gallons of Fuel)</u>	<u>Water Quality (Recharge Capacity)</u>
Minimum Facilities Alt.	291,100	92,275 af
Small Projects Alt.	474,211	122,775 af
Large Projects Alt.	914,900	182,175 af

These raw numbers can be converted to relative "score" by setting the lowest air quality value to 1 and assigning proportional scores to the higher values. This gives a proportional index of impacts; that is, the impacts associated with the Small Projects Alternative and Large Projects Alternative are expressed as a percent increase of the impacts of the Minimum Facilities Alternative. A similar index can be calculated for water quality benefits. Construction air quality impacts are "negatives" and can be assigned a negative value. Since higher scores are "better" for water quality, they can be assigned a positive value. Using this scoring summary method, the sensitivity of the alternatives can be compared (Table 7-1).

Table 7-1. Sensitivity of priority given to construction air quality and SWP water quality. Highest TOTAL score is best.

ALTERNATIVE	IMPACTS		
	Construction Air Quality	SWP Water Quality	TOTAL SCORE
SWP Water Quality Priority = Construction Air Quality			
Minimum Facilities	-1	1	0
Small Projects	-1.63	1.37	-0.26
Large Projects	-3.14	1.98	-1.16
SWP Water Quality Priority = 2 X Construction Air Quality			
Minimum Facilities	-1	2	1
Small Projects	-1.63	2.74	1.11
Large Projects	-3.14	3.96	0.82
Construction Air Quality = 2 X SWP Water Quality Priority			
Minimum Facilities	-1	1	0
Small Projects	-3.26	1.37	-1.89
Large Projects	-6.28	1.98	-4.3

Table 7-1 shows that, on a percentage basis, the relative total emissions from construction equipment increase more rapidly than the relative benefits of the project in terms of recharge capacity. Thus, only when SWP water quality is given high priority does increasing recharge capacity yield a higher score, and there is a drop-off in relative benefits versus air quality impacts for the Large Projects Alternatives. The benefits increase, but at a higher proportional increase in air quality impacts.

Larger projects will be constructed over a longer period of time, and the relative benefits versus impacts analysis is sensitive to construction schedule (Table 7-2). Making the reasonable assumption that construction fuel consumption is spread out over 2 years for the Minimum Facilities Alternative, 3 years for the Small Projects Alternative, and 4 years for the Large Projects Alternative, then annual fuel consumption (and related vehicle emissions) increase at a lower rate:

Minimum Facilities Alternative:	146,000 gallons
Small Projects Alternative:	158,000 gallons
Large Projects Alternative:	228,000 gallons

Table 7-2. Annual air quality impacts (fuel consumption) compared to SWP water quality (recharge capacity). Highest TOTAL score is best.

ALTERNATIVE	IMPACTS		
	Construction Air Quality	SWP Water Quality	TOTAL SCORE
SWP Water Quality Priority = Construction Air Quality			
Minimum Facilities	-1	1	0
Small Projects	-1.08	1.37	0.29
Large Projects	-1.56	1.98	0.42
SWP Water Quality Priority = 2 X Construction Air Quality			
Minimum Facilities	-1	2	1
Small Projects	-1.08	2.74	1.66
Large Projects	-1.56	3.96	2.40
Construction Air Quality = 2 X SWP Water Quality Priority			
Minimum Facilities	-1	1	0
Small Projects	-2.16	1.37	-0.79
Large Projects	-3.12	1.98	-1.14

Tables 7-1 and 7-2 suggest that the relative importance of air quality and water quality effects of the Proposed Project depends to a large extent on (a) the way in which air quality impacts are measured (total emissions versus annual emissions) and (b) the priority assigned to air quality impacts versus water quality benefits. It is interesting to note that if air quality is assigned a higher priority than water quality, the Minimum Facilities Alternative is always preferred. If water quality is assigned a higher priority, then the larger projects are preferred, although for the last increments of recharge, incremental benefits may be only marginal.

Table 7-3 suggests a different perspective. For the Minimum Facilities Alternative, with an annual recharge capacity of 92,275 acre-feet, simultaneous delivery of MWA's 2006 demand of about 36,000 acre-feet and a banking delivery of 50,000 acre-feet from Metropolitan (86,000 acre-feet in total) would take almost all year to deliver. The almost doubling of recharge capacity associated with the Large Projects Alternative would, however, allow this 86,000 acre-feet to be delivered in less than 6 months, allowing MWA and Metropolitan to focus on deliveries when water quality was best. In short, the water quality benefits of the Proposed Project depend on MWA's ability to take and store deliveries rapidly.

The disproportional benefits of greater recharge capacity are also related to balancing banking deliveries throughout MWA's service area. Much of the capacity of the Minimum Facilities Alternative lies in portions of MWA's service area where current annual capacity for recharge exceeds current annual demand. Repeated peak deliveries of banking supplies to these areas would therefore result in an unbalanced distribution of supplies, and lower ability to make returns to Metropolitan without affecting groundwater levels. Thus, while gross recharge capacity may reflect the capacity for recharge during an initial year, it may not reflect practical capacity over the term of the banking program. Based on these considerations, an alternative perspective on benefits is summarized on Table 7-3.

Table 7-3. Benefits of increasing recharge capacity.

ALTERNATIVE	BENEFITS				
	Alto Area Recharge	Other Area Recharge	Capacity for Delivery when Mojave River is Running		Months to recharge 90,000 acre-feet
			Alto	Other	
Minimum Facilities	48,000	44,275	0	44,275	11.7
Small Projects	76,500	44,275	28,500	44,275	8.8
Large Projects	137,900	44,275	89,900	44,275	5.9

As Table 7-3 suggests, increasing recharge in the Alto-Oeste area is critical to banking high volume deliveries in three respects: (a) taking deliveries in the Alto area where demand is greatest, (b) taking deliveries when the Mojave River is flowing, and taking combined MWA and Metropolitan deliveries simultaneously at a rate that allows for optimization of water quality. From this perspective, only the Large Projects Alternative (or at least a project somewhat greater than the Small Projects Alternative) allows for simultaneous delivery of MWA and Metropolitan banking supplies. From this perspective, the Minimum Facilities Alternative would not be assigned a baseline "score" of 1, as it was on Table 7-1.

Finally, Tables 7-4 through 7-9 summarize impacts of each element of the Proposed Project and detail mitigation commitments. Both construction and mitigation commitments impose an increasing environmental and financial cost on each increment of recharge. Although environmental impacts are mitigated to a level of less-than-significant, the magnitude of mitigation commitments needed to accomplish this is a measure of the total increase in impacts associated with increasing project scope. Mitigation costs should be considered as a measure of total impact and considered in the final decision analysis.

In addition, the Board should consider the difference between the Proposed Project and the No Project alternative and the analysis of the Environmentally Superior Alternative, discussed below.

7.3.3 Comparison of Project and No-Project Alternatives

The comparison of the Proposed Project alternatives to the No Project Alternative is strongly influenced by the problems associated with deferring construction of projects in a rapidly developing environment. First, at present, MWA has options for siting of facilities and has selected sites that avoid and minimize cultural and biological resource impacts. All new facilities are sited south of Highway 18 in an area of low potential for threatened and endangered species. Off-channel recharge along the Mainstem Mojave River has been sited well north of sensitive cultural resource sites and biological resources. Land use conflicts are, at present, relatively minor. While it is somewhat speculative to define impacts associated with potential re-siting due to prior development of the sites described in this Project EIR, the pattern of development in the Apple Valley/Hesperia area has been towards developing to the south and to the west. Thus, deferring the Proposed Project facilities under the No Project Alternative would probably mean facilities would be sited in the context of development of land to the south of Apple Valley and to the south and west of Hesperia. This trend is in fact encouraged in the

pending West Mojave Plan which designates a no survey zone south of Highway 18 and provides for lower mitigation measures for development in these areas than for areas north of Highway 18. There are thus sound reasons to expect that, if facilities are not developed now and are needed later, the current sites may not be available. Moving off-channel recharge along the Mainstem Mojave River to the south and Alto and/or Oeste recharge basins to the north would involve substantial potential environmental and cultural resource impacts.

Second, for factors such as noise and construction traffic, it does not appear prudent to defer facility development. In a rapidly growing region with limited road infrastructure, construction traffic effects cannot be expected to improve as development occurs and traffic increases. Similarly, more development would mean that more people would be exposed to construction and to construction-related noise.

Third, these increases in potential for impacts associated with the No Project Alternative would not be offset by decreases in impacts in other CEQA impact categories, except for construction-related effects to daily air quality impacts. For air quality, deferring projects results in the potential for phasing of construction and, therefore, a reduction in the intensity of emissions from construction equipment and from fugitive dust. This reduction in intensity of emissions from phasing and from probable improvements in diesel emissions control technology is attained by extending the duration of impact. The only factor which results in a net reduction in emissions over the 20-to-25-year project life is the potential for emissions control technology to result in lower diesel emissions. Otherwise, the net emissions of the Proposed Project and the No Project Alternative would be similar.

Fourth, all of the Proposed Project alternatives have a clear advantage over the No Project Alternative in terms of groundwater quality because they emphasize delivery of large quantities of SWP water during years and seasons when SWP water quality is better in terms of almost all constituents.

Fifth, the extent to which the No-Project Alternative may result in avoidance of impacts resulting from decisions not to pursue some facilities also needs to be explored. The Metropolitan modeling analysis suggests that from a water banking perspective, the additional recharge of the Small Projects Alternative does increase the magnitude of a banking program, but the management flexibility provided by additional recharge may be important to MWA in terms of managing groundwater levels along the Mainstem Mojave River, as outlined above. In terms of deferring facilities under a No Project Alternative, then, it is most likely that MWA would choose not to develop some of the larger recharge facilities of the Large Projects Alternative. This would reduce a range of effects -- aesthetics, air quality, biological resources, cultural resources, land use, noise, and others. The decrease in levels of these impacts would be associated with lower peak recharge capacity and lower operational flexibility.

A number of factors complicate this analysis. The actual recharge performance of recharge basins is difficult to predict precisely until recharge has been on-going for several years. Thus, monitoring during initial periods of operations would be required to determine whether to reduce

overall project scope. Second, there is no way to predict California's weather, and thus the timing and magnitude of Metropolitan deliveries to banking may not be known. Average annual precipitation seldom occurs, and weather in California is more characterized by extremes of wet and dry. Banking programs may need seemingly "excess" capacity to move and recharge water rapidly and in large volumes. In addition, all of the facilities of the Large Projects Alternative may prove to be necessary to provide recharge and conveyance capacity for MWA's 75,800 acre-feet of SWP contract supply.

Finally, the No Project Alternative does not compare favorably to the Proposed Project alternatives because the facilities for these alternatives will probably be pursued at some level over the 20-25 year term of the proposed banking and exchange program. MWA will require conveyance and recharge capacity for up to 75,800 acre-feet. This is roughly equivalent to the capacity required for MWA's planned 2006 supplemental water deliveries and an initial 40,000 acre-feet of Metropolitan water for banking. The nominal 90,000+ acre-feet of capacity for the Minimum Facilities Alternative and 120,000+ for the Small Projects Alternative would seem, by this measure, to be in excess of need, but these capacities has been estimated assuming 10 or 11 months of continuous operation. In many years it may be necessary to accommodate higher volumes of delivery under both the with-and-the-without project conditions. For example, in a wet year following drought, DWR may not declare a year to be "wet" and release 90% to 100% of contract amounts until March or April. Thus, the peak supply available for the year may only be available for the remainder of the year. Under either a banking and exchange program or MWA's own long-term program for water management, it may thus be necessary to have recharge capacity in excess of 75,800 acre-feet per year. It is probable, then, that MWA would site and construct recharge facilities to raise its total recharge capacity of up to 120,000+ acre feet per year, with the understanding that these facilities may be in use only 6-8 months out of the year.

In this context, the No Project Alternative and the Proposed Project Alternatives have offsetting effects:

<u>Category of Effect</u>	<u>Preferred Alternative</u>
Air Quality:	No Project Alternative
Hazards/Hazardous Materials:	No project Alternative
Noise:	Proposed Project Alternatives
Traffic:	Proposed Project Alternatives
Water Quality:	Proposed Project Alternatives

Given the uncertainty related to supply from Metropolitan and the recharge capacity of any set of recharge facilities, it is not possible to conclude with any certainty that the No Project Alternative would result in permanent deferral of Proposed Project facilities, although this seems to be more likely under the No Project Alternative than under the Proposed Project due to funding constraints. In addition, the No Project Alternative would not enhance groundwater quality as would occur for all three Proposed Project alternatives.

7.3.4 Designation of the Environmentally Superior Alternative

CEQA requires that an EIR identify the environmentally superior alternative of a project. Although the distinctions among alternatives are not strong, groundwater impacts of the No Project Alternative may offset the construction-related impacts of Proposed Project alternatives. The remaining distinctions among alternatives are small, and designation of the environmentally superior alternative depends on the priority placed on critical impact categories such as construction air quality and SWP water quality.

If priority is placed on permanent water quality effects rather than temporary (but significant) air quality effects, then the Large Projects Alternative (or variations of it involving scaling back of recharge development at Oeste, Alto, or Antelope Wash) may be considered the environmentally superior alternative.

If priority is placed on avoidance of significant air quality impacts, then the Small Projects Alternative, with phasing of recharge basin construction to reduce daily emissions may be considered the environmentally superior alternative.

As discussed above, the Proposed Project, Large Projects Alternative has been modified, as an impact avoidance/mitigation measure, to provide for expansion of recharge at the Ranchero Road site in lieu of developing the upstream recharge site. With this modification, Proposed Project pre-mitigation biological resource and aesthetic impacts would be reduced substantially, and construction-related air quality impacts and use of energy could be reduced marginally.

In addition, in response to comments from Department of Water Resources, MWA performed additional clarifying water quality analyses (Appendix A). This analysis focused on comparing indigenous groundwater quality in wells located near proposed recharge facility sites with average State Water Project water quality for the period 1988-2004. The analysis generally confirmed the draft EIR conclusion that water banking would have substantial water quality benefits, particularly in reducing concentrations of some mineral constituents in local groundwater. The analysis also tended to confirm that pump-back of a mix of groundwater and SWP supplies from recharge sites should be feasible. This additional analysis strengthened the conclusion that there would be substantial long-term benefits to water supply and water quality associated with the proposed project. In addition, the comments received from the Lahontan Regional Water Quality Control Board noted that "Board staff believes that the proposed groundwater banking project has many positive aspects for local water supply needs."

Given that the Large Projects Alternative has been modified to reduce pre-mitigation impacts to biological resources and aesthetics (as provided for in the draft EIR), given that the Large Projects Alternative provides for the highest potential level of permanent water quality benefits, given that the Large Projects Alternative's significant air quality impacts are of a temporary nature, and given that there was no public comment regarding the selection of the environmentally superior alternative, the Large Projects Alternative is designated as the environmentally superior alternative.

7.3.5 Designation of the Proposed Project

The draft EIR deferred identification of a Proposed Project Alternative, evaluating three facility and operational alternatives and the No Project Alternative. This was done to allow for public, organization, and agency comment on this issue so that MWA could take this comment into account before selecting a Proposed Project Alternative. There were not comments regarding this issue made during (a) the CEQA scoping process following the issuance of the Notice of Preparation in April of 2005 or (b) the draft EIR review during the period of October 28 through December 13.

The environmentally superior alternative, the Large Projects Alternative as modified by adoption of a mitigation measure providing for relocation of upstream Antelope Wash recharge to a site downstream as described in Chapter 4 page 4-31, is designated as the Proposed Project Alternative. *Per* the draft and final EIR discussion of air quality impacts and potential mitigations, MWA may phase adoption and implementation of various facilities included in the Large Projects Alternative.

Table 7-4. MWA Water Banking and Exchange Program, summary of environmental effects and mitigation, by facility. See Table 7-8 for detailed summary of mitigation commitments.

Facility	5.2 Aesthetics Effects		Mitigation Proposed	Significance Post- Mitigation
	Direct Impacts	Indirect Impacts		
Existing Recharge Facilities	No effect	No effect	No effect	No effect
Instream Mojave River Recharge	Temporary minor effect	Not significant	No mitigation proposed	Less than significant
SWP Delivery via Unnamed Wash	Effects of drop structures, unpaved maintenance road, and low levees will be minor.	No significant	No mitigation proposed	Less than significant
Mojave River Well Field	Pipelines will be buried. Well structures will be visible in urban areas.	No effect	Wells and other structures will be housed in structures compatible with local development	Less than significant
Off-Channel Mojave River Recharge: West	Land slopes away from road. No views affected.	No effects	No mitigation proposed	Less than significant
Off-Channel Mojave River recharge: East	Land slopes away from road. No views affected.	No effects	No mitigation proposed	Less than significant
Oro Grande Wash Recharge	Recharge basins may alter the view from adjacent housing.	No effects	Planted with drought-tolerant natives along perimeter maintenance roads.	Less than significant
Cedar Avenue Detention Basin Recharge	Levees on south and west will be closer to housing than current condition.	No effect	Planted with drought-tolerant natives along perimeter maintenance roads.	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	No effects: project will be constructed only if detention basin is built by City.	No effects	No mitigation proposed	Less than significant
Oeste Recharge and Wells	Low berms visible from nearby roads. Well structures visible.	No effects	Wells will be housed in structures compatible with local development	Less than significant
Alto Recharge and Wells	Low berms visible from nearby roads. Well structures visible.	No effects	Wells will be housed in structures compatible with local development	Less than significant
Antelope Wash Recharge	Recharge basins would alter the view of numerous people in an adverse manner; water view in some periods.	No effects	Outer berms will be contoured perimeter of basin maintenance road will be planted. MWA may consider other sites. Alternative downstream site selected.	Less than significant

5.3 AIR QUALITY				
Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post-Mitigation
Existing Recharge Facilities	No effect	No effect	No mitigation proposed	Less-than-significant
Instream Mojave River Recharge	Significant PM10 (fugitive dust)	Less-than-significant effects during construction	Fugitive dust management	Less than significant
SWP Delivery via Unnamed Wash	Significant PM10 (fugitive dust)	No effect	Fugitive dust management	Less than significant
Mojave River Well Field	Significant NOx emissions if 2+ units constructed at a time.	No effect	Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Off-Channel Mojave River Recharge: West	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Off-Channel Mojave River recharge: East	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Oro Grande Wash Recharge	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Cedar Avenue Detention Basin Recharge	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions PMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Antelope Wash Detention Basin (Ranchero Road)	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Oeste Recharge and Wells	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Alto Recharge and Wells	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.
Antelope Wash Recharge	Significant PM10 (fugitive dust) Significant NOx if 2+ units constructed at a time.	No effect; some potential trapping and reduction of dust during operations	Fugitive dust management Emissions BMP, including use of highway diesel fuel.	Significant if 2+ units constructed at a time.

5.4 BIOLOGICAL RESOURCES

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	No effect	No significant change in operations	None proposed	Less than significant
Instream Mojave River Recharge	No suitable resident habitat for wildlife will be affected.	More frequent surface flow and low potential to affect wildlife movement.	None proposed	Less than significant
SWP Delivery via Unnamed Wash	Loss of 6-8 acres of desert wash habitat. Temporary loss of non-native grasslands below road. Low potential for T&E species effects.	Less than significant effect on north-south wildlife movement due to proposed bridge crossings.	Habitat loss mitigated consistent with Las Flores Ranches pending HCP or 1:1	Less than significant
Mojave River Well Field	Loss of 1-2 acres of highly disturbed habitat. Low potential for T&E species effects.	No indirect effect	None proposed	Less than significant
Off-Channel Mojave River Recharge: West	Loss of 100 acres of disturbed non-native grassland. Low potential for T&E species effects.	Less than significant effect on north-south wildlife movement; east side of river movement unaffected.	Pre-construction survey. Habitat mitigation for special-status plants and animal species.	Less than significant
Off-Channel Mojave River recharge: East	Loss of 100 acres of disturbed non-native grassland and desert scrub. Low potential for T&E species effects.	Less than significant effect on north-south wildlife movement; west side of river movement unaffected.	Pre-construction survey. Habitat mitigation for special-status plants and animal species.	Less than significant
Oro Grande Wash Recharge	Loss of habitat: 13 acres disturbed; 37 acres desert scrub; 30 acres Joshua Tree. Low potential for T&E species effects.	Potential effect on north-south movement; less than significant because wildlife may effectively use levees.	Pre-construction survey. Habitat mitigation for special-status plants and animal species.	Less than significant
Cedar Avenue Detention Basin Recharge	Loss of 60 acres disturbed desert scrub. Low potential for T&E species effects.	No effect	Pre-construction survey. Habitat mitigation for special-status plants and animal species.	Less than significant
Antelope Wash Detention Basin (Ranchero Road)	Not applicable because initial construction of detention basin by City of Hesperia would remove all habitats.			

Oeste Recharge and Wells	Loss of habitat: 9 acres disturbed; 330 acres desert scrub Low potential for desert tortoise effects. Low to moderate potential for Mojave ground squirrel effects	Low potential for movement effects. Moderate to high potential raven use, and distance to known desert tortoise is <2 miles. Potential significant effects.	Pre-construction survey. Habitat mitigation for special-status plants and animal species.	Less than significant
Alto Recharge and Wells	Loss of habitat: 10 acres disturbed; 140 acres desert scrub. Some Joshua Tree habitat. Low potential for desert tortoise effects. Low to moderate potential for Mojave ground squirrel effects	Low potential for movement effects. Moderate potential raven use, and distance to known desert tortoise is <3 miles. Potential significant effects.	Avoidance of Joshua trees or mitigation for habitat loss. Pre-construction survey. Habitat mitigation for special-status plants and animal species.	Less than significant
Antelope Wash Recharge	Loss of habitat: 4 acres disturbed; 28 acres desert scrub; 68 acres Joshua Tree Low potential for T&E species effects Downstream site: 60 acres disturbed; 40 acres desert scrub	Potential effect on north-south movement; less than significant because wildlife may effectively use levees. Downstream site, low potential to affect wildlife movement.	Joshua Tree habitat loss mitigated at 1:1. MWA may consider other sites. Other site selected to reduce impacts.	Less than significant

5.5 CULTURAL RESOURCES

Facility	Potential for Buried Cultural Resources	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	None	No mitigation proposed	Less than significant
SWP Delivery via Unnamed Wash	Moderate	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Mojave River Well Field	Moderate to high	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Off-Channel Mojave River Recharge: West (including pipeline)	Moderate	Monitoring during construction Compliance with Federal and State	Less than significant

Off-Channel Mojave River recharge: East (including pipeline)	Moderate	requirements for cultural resources treatment Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Oro Grande Wash Recharge	Low, disturbed	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Cedar Avenue Detention Basin Recharge	Low	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	Low	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Oeste Recharge and Wells	Low	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Alto Recharge and Wells	Low	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant
Antelope Wash Recharge	Low	Monitoring during construction Compliance with Federal and State requirements for cultural resources treatment	Less than significant

5.6 GEOLOGY AND SOILS

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	Low potential liquefaction effects at existing facilities. Low potential for seismic-related damage to facilities. No soil erosion impacts	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	Low to moderate potential liquefaction effects.	None	Monitoring to maintain groundwater levels below 20 feet of surface.	Less than significant
SWP Delivery via Unnamed Wash	Some erosion and sediment transport at Unnamed Wash.	Some reduction in potential for sheet flow across floodplain.	Drop structures and levees to contain flow within 100-year floodplain.	Less than significant

Mojave River Well Field	Very low potential for construction related erosion.	None	Construction best management practices.	Less than significant
Off-Channel Mojave River Recharge: West (+pipeline)	Low potential for construction related erosion.	None	Construction best management practices.	Less than significant
Off-Channel Mojave River recharge: East (+ pipeline)	Low potential for construction related erosion.	None	Construction best management practices.	Less than significant
Oro Grande Wash Recharge	Very low potential for construction related erosion.	None	Construction best management practices.	Less than significant
Cedar Avenue Detention Basin Recharge	Very low potential for construction related erosion.	None	Construction best management practices.	Less than significant
Antelope Wash Detention Basin (Ranchero Road)	Very low potential for construction related erosion.	None	Construction best management practices.	Less than significant
Oeste Recharge and Wells	Very low potential for construction related erosion. Some sheet flow from recharge if seismically damaged.	None	Construction best management practices.	Less than significant
Alto Recharge and Wells	Very low potential for construction related erosion. Some sheet flow from recharge if seismically damaged.	None	Construction best management practices.	Less than significant
Antelope Wash Recharge	Very low potential for construction related erosion.	None	Construction best management practices.	Less than significant

5.7 HAZARDS AND HAZARDOUS MATERIALS

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	Potential for fuel and lubricant leaks during construction. Potential for surface water to affect groundwater.	None	Construction best management practices. Monitoring and local agency treatment as required.	Less than significant
SWP Delivery via Unnamed Wash	Potential for fuel and lubricant leaks during construction.	None	Construction best management practices	Less than significant
Mojave River Well Field	Potential for fuel and lubricant leaks during construction. Potential to encounter contaminated buried soils.	None	Construction best management practices	Less than significant

Off-Channel Mojave River Recharge: West (including pipeline)	Potential for fuel and lubricant leaks during construction. Potential to encounter contaminated buried soils.	None	Construction best management practices	Less than significant
Off-Channel Mojave River recharge: East (including pipeline)	Potential for fuel and lubricant leaks during construction. Potential to encounter contaminated buried soils.	None	Construction best management practices	Less than significant
Oro Grande Wash Recharge	Potential for fuel and lubricant leaks during construction.	None	Construction best management practices	Less than significant
Cedar Avenue Detention Basin Recharge	Potential for fuel and lubricant leaks during construction. Low potential to encounter contaminated buried soils.	None	Construction best management practices	Less than significant
Antelope Wash Detention Basin (Ranchero Road)	Not applicable. Excavation and grading would be done by City of Hesperia during detention basin construction.			
Oeste Recharge and Wells	Potential for fuel and lubricant leaks during construction.	None	Construction best management practices	Less than significant
Alto Recharge and Wells	Potential for fuel and lubricant leaks during construction.	None	Construction best management practices	Less than significant
Antelope Wash Recharge	Potential for fuel and lubricant leaks during construction.	None	Construction best management practices	Less than significant

5.8 LAND USE

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	None	None	No mitigation proposed	Less than significant
SWP Delivery via Unnamed Wash	None. Conveyance down wash is compatible with open space and floodplain use.	None	Continue coordination with Rancho Las Flores and lower watershed landowners.	Less than significant
Mojave River Well Field	Potential 0.11 acres of well structures in urban residential area.	None	Coordinate with adjacent property owners to minimize land-use conflict.	Less than significant
Off-Channel Mojave River Recharge: West	None. Recharge is a compatible use.	None	No mitigation proposed.	Less than significant

(including pipeline) Off-Channel Mojave River recharge: East (including pipeline) Oro Grande Wash Recharge Cedar Avenue Detention Basin Recharge Antelope Wash Detention Basin (Ranchero Road) Oeste Recharge and Wells	None. Recharge is a compatible use.	None	No mitigation proposed	Less than significant
	None. Recharge is a compatible use.	None	No mitigation proposed.	Less than significant
	None. Recharge is compatible with flood detention.	None	No mitigation proposed.	Less than significant
	None. Recharge is compatible with flood detention.	None	No mitigation proposed.	Less than significant
	330+ acres of low-density residential zoning converted to recharge	None	Coordinate with local officials to design recharge to be compatible in terms of noise, visual character, operation and maintenance	Less than significant
Alto Recharge and Wells	150+ acres of low-density residential zoning converted to recharge	None	Coordinate with local officials to design recharge to be compatible in terms of noise, visual character, operation and maintenance	Less than significant
Antelope Wash Recharge	None. Recharge is a compatible use in open space.	None	Coordinate with local officials to design recharge to be compatible in terms of noise, visual character, operation and maintenance.	Less than significant

5.9 NOISE

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	Noise effects to up to 50 residences: 2-3 weeks per year.	None	Construction noise minimization best management practices	Less than significant
SWP Delivery via Unnamed Wash	Low noise effects to <10 residences	Maintenance may involve vehicle use and low noise levels.	Construction noise minimization best management practices	Less than significant
Mojave River Well Field	Moderate noise effects for short periods of time to up to 750 residences	Low potential noise from wells.	Construction noise minimization best management practices. Wells to be placed in noise reducing structures.	Less than significant
Off-Channel Mojave River Recharge: West	Low noise effects to <15 residences	None	Construction noise minimization best management practices	Less than significant

(including pipeline) Off-Channel Mojave River recharge: East (including pipeline) Oro Grande Wash Recharge	Low noise effects to <15 residences	None	Construction noise minimization best management practices	Less than significant
Cedar Avenue Detention Basin Recharge	Low noise effects to <40 residences	Potential for maintenance noise to be heard at residences along the rim of the wash.	Construction noise minimization best management practices	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	Following City of Hesperia construction, additional low noise effects to <30 residences	Low potential for maintenance noise to be heard at residences along the rim of the wash.	Construction noise minimization best management practices	Less than significant
Oeste Recharge and Wells	Low noise effects to <5 residences	Low potential for maintenance noise at nearby residences.	Construction noise minimization best management practices	Less than significant
Alto Recharge and Wells	Low noise effects to <10 residences	Low potential for maintenance noise to be heard at nearby residences.	Construction noise minimization best management practices	Less than significant
Antelope Wash Recharge	Low noise effects to <60 residences and to airport	Low potential for maintenance noise to be heard at residences along the rim of the wash.	Construction noise minimization best management practices	Less than significant

5.10 PUBLIC SERVICES AND UTILITIES

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	None	None	No mitigation proposed	Less than significant
SWP Delivery via Unnamed Wash	None	None	No mitigation proposed	Less than significant
Mojave River Well Field	Short term delay and detouring of emergency vehicles along pipeline routes. Potential accidental damage to utility lines during construction	None	Selection of pipeline alignment with minimal potential for traffic and utility impacts. Traffic controls (see traffic discussion). Daily notification of all public	Less than significant

			services of location and timing of construction activities	
Off-Channel Mojave River Recharge: West (including pipeline)	None. Construction off road.	None	Traffic controls (see traffic discussion).	Less than significant
Off-Channel Mojave River recharge: East (including pipeline)	None. Construction in seldom used unpaved road.	None	Traffic controls (see traffic discussion).	Less than significant
Oro Grande Wash Recharge	None	None	No mitigation proposed	Less than significant
Cedar Avenue Detention Basin Recharge	None	None	No mitigation proposed	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	None	None	No mitigation proposed	Less than significant
Oeste Recharge and Wells	None	None	No mitigation proposed	Less than significant
Alto Recharge and Wells	None	None	No mitigation proposed	Less than significant
Antelope Wash Recharge	None	None	No mitigation proposed	Less than significant

5.11 RECREATION				
Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	Increase in West Fork Mojave River flow in fall and winter may affect swimming and fishing, may enhance rafting or kayaking.	None	Notification of recreation facilities on West Fork of pending releases from Silverwood Lake. Ramping of releases to avoid sudden changes in conditions.	Less than significant.
SWP Delivery via Unnamed Wash	No adverse effect. May provide recreation for future residents if development occurs.	None	No mitigation proposed.	Less than significant
Mojave River Well Field	Construction related effects on existing recreation along river.	None	Siting to reduce impacts as feasible. Const. best management practices.	Less than significant

Off-Channel Mojave River Recharge: West (including pipeline)	Construction related effects on existing recreation along river.	None	Siting to reduce impacts as feasible. Construction best management practices.	Less than significant
Off-Channel Mojave River recharge: East (including pipeline)	Construction related effects on existing recreation along river.	None	Siting to reduce impacts as feasible. Construction best management practices.	Less than significant
Oro Grande Wash Recharge	None	None	No mitigation proposed	Less than significant
Cedar Avenue Detention Basin Recharge	None	None	No mitigation proposed	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	None	None	No mitigation proposed	Less than significant
Oeste Recharge and Wells	None	None	No mitigation proposed	Less than significant
Alto Recharge and Wells	None	None	No mitigation proposed	Less than significant
Antelope Wash Recharge	None	None	No mitigation proposed	Less than significant

5.12 TRAFFIC

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	None	None	No mitigation proposed	Less than significant
SWP Delivery via Unnamed Wash	Construction crew traffic on Arrowhead Lake Road. Non-significant.	None	No mitigation proposed	Less than significant
Mojave River Well Field	Construction crew traffic. Traffic delays associated with short detours around construction in public rights of way. Temporary (1-day) parking and access delays as construction passes residences. Dump truck and other construction traffic on local roads.	None	Low-traffic pipeline alignment selected. Compliance with local traffic management requirements.	Less than significant
Off-Channel Mojave River Recharge: West	Construction crew traffic. Traffic delays associated with short detours around construction	None	Low-traffic pipeline alignment selected. Compliance with local traffic	Less than significant

(including pipeline)	in public rights of way. Dump truck and other construction traffic on local roads.		management requirements.	
Off-Channel Mojave River recharge: East (including pipeline)	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Low-traffic pipeline alignment selected. Compliance with local traffic management requirements.	Less than significant
Oro Grande Wash Recharge	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Compliance with local traffic management requirements.	Less than significant
Cedar Avenue Detention Basin Recharge	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Compliance with local traffic management requirements.	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Compliance with local traffic management requirements.	Less than significant
Oeste Recharge and Wells	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Compliance with local traffic management requirements.	Less than significant
Alto Recharge and Wells	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Compliance with local traffic management requirements.	Less than significant
Antelope Wash Recharge	Construction crew traffic. Dump truck and other construction traffic on local roads.	None	Compliance with local traffic management requirements.	Less than significant

5.13 WATER RESOURCES (WATER QUALITY)

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
GENERAL	No violation of Lahontan or Colorado River Basin Water Quality Objectives			Less than significant
Existing Recharge Facilities: Centro and Baja	Lower arsenic, chlorides, iron, sulfate, and TDS <i>versus</i> higher bromides and TOC	Net improvement in SWP water quality <i>versus</i> No Project Alternative	No mitigation proposed	Less than significant
Existing Recharge Facilities: Alto Floodplain	Lower arsenic, fluorides, iron, sulfate, and pH <i>versus</i> higher boron, chlorides, bromides, nitrates, TOC, sulfates, and TDS Low potential for surface water influence of groundwater.	Net improvement in SWP water quality <i>versus</i> No Project Alternative	Monitoring of groundwater quality in wells along Mojave River; treatment by local agencies if surface water influence is detected.	Less than significant
Existing Recharge Facilities: Alto Regional	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher	Net improvement in SWP water quality <i>versus</i> No Project	No mitigation proposed	Less than significant

	boron, bromides, chlorides, nitrates, sulfates, and TOC	Alternative		
Existing Recharge Facilities: Warren Valley	Lower arsenic, iron, and TDS versus higher bromides, chlorides, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Instream Mojave River Recharge	Lower arsenic, fluorides, iron, sulfate, and pH <i>versus</i> higher boron, chlorides, bromides, nitrates, TOC, sulfates, and TDS	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
SWP Delivery via Unnamed Wash	Lower arsenic, fluorides, iron, sulfate, and pH <i>versus</i> higher boron, chlorides, bromides, nitrates, TOC, sulfates, and TDS	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Mojave River Well Field	NA	NA	NA	NA
Off-Channel Mojave River Recharge: West (including pipeline)	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Off-Channel Mojave River recharge: East (including pipeline)	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Oro Grande Wash Recharge	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Cedar Avenue Detention Basin Recharge	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Antelope Wash Detention Basin Recharge (Ranchero Road)	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Oeste Recharge and Wells	Lower arsenic, fluoride, iron,	Net improvement in SWP water	No mitigation proposed	Less than

	pH, sulfate, and TDS <i>versus</i> higher boron, chlorides, and nitrates	quality versus No Project Alternative		significant
Alto Recharge and Wells	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Antelope Wash Recharge	Lower arsenic, fluorides, iron, pH, and TDS <i>versus</i> higher boron, bromides, chlorides, nitrates, sulfates, and TOC	Net improvement in SWP water quality versus No Project Alternative	No mitigation proposed	Less than significant
Effects on Metropolitan Water District Water Quality	None. Alternative supplies available to Metropolitan are SWP dry-year supplies or other banked supplies of similar water quality.	None	No mitigation proposed	Less than significant

5.14 WATER RESOURCES (HYDROLOGY)

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post-Mitigation
Existing Recharge Facilities	None	None	No mitigation proposed	Less than significant
Instream Mojave River Recharge	May reduce flood infiltration to the mainstem channel during initial winter storms. No effect on later floods which occur after watershed has been saturated.	Potential for some increase in early-season flows past the Narrows.	Monitoring to detect potential effects of rising groundwater levels; management of input as needed.	Less than significant
SWP Delivery via Unnamed Wash	Increased flow and frequency of flow will create incised channel and reduce floodplain overbank flow. Sediment recruitment and transport increased.	None	Monitoring and use of drop structures to reduce excess erosion.	Less than significant
Mojave River Well Field	None	None	None	Less than significant

Off-Channel Mojave River Recharge: West (including pipeline)	May reduce effects of Mainstem Recharge on flood infiltration by allowing late season SWP deliveries to be routed to other recharge sites.	None	None	Less than significant
Off-Channel Mojave River recharge: East (including pipeline)		None	None	Less than significant
Oro Grande Wash Recharge		None	None	Less than significant
Cedar Avenue Detention Basin Recharge		None	None	Less than significant
Antelope Wash Detention Basin (Ranchero Road)		None	None	Less than significant
Oeste Recharge and Wells	May reduce effects of Mainstem Recharge on flood infiltration by allowing late season SWP deliveries to be routed to other recharge sites.	None	None	Less than significant
Alto Recharge and Wells		None	None	Less than significant
Antelope Wash Recharge		None	None	Less than significant

5.15 GROWTH

Facility	Direct Impacts	Indirect Impacts	Mitigation Proposed	Significance Post- Mitigation
All Facilities	None	Effect of banking is to extend the period during which MWA can meet projected demands without seeking additional supplies. Project mitigates the adverse effects of planned growth on groundwater supplies and water quality. Metropolitan has alternative (if marginally more costly) sources for supplemental dry-year water via short-term transfers in dry years. The effect of banking and exchange is to marginally reduce cost of dry-year water supplies only.	None	Less than significant
Energy Use and Energy Conservation	Construction Fuel Impacts	Lower energy use associated with pumping from higher groundwater table. Lower fuels use associated with deliveries to banking and MWA during periods when hydropower is available.	None. Air Quality mitigations will minimize energy use during construction.	Less-than-significant

Table 7-5. Summary Matrix of Impacts, by Facility (LTS = Less than Significant after mitigation; S = Significant after Mitigation. Significant impacts are shaded for emphasis.)

FACILITY	POST-MITIGATION SIGNIFICANCE OF ADVERSE IMPACTS															
	Aesthetics	Air Quality	Biological	Cultural	Geology & Soils	Hazards & hazardous materials	Land Use	Noise	Public Services & Utilities	Recreation	Traffic	Water resources (Water Quality)	Water Resources (Hydrology)	Growth	Energy Use and Conservation	Cumulative Effects
Existing Recharge Facilities	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Instream Mojave River	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Recharge																
SWP Delivery via Unnamed Wash	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Mojave River Well Field	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Off-Channel Mojave River	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Recharge: West																
Off-Channel Mojave River recharge: East	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Oro Grande Wash	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Recharge																
Cedar Avenue Detention Basin Recharge	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Antelope Wash Detention Basin Recharge (Ranchero Road)	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Oeste Recharge and Wells	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Alto Recharge and Wells	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Antelope Wash Recharge	LTS	S	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Table 7-6. Comparison Minimum Facilities Alternative versus No Project Alternative, by Category of Impact

CATEGORY OF IMPACT	MINIMUM FACILITIES ALTERNATIVE	NO PROJECT ALTERNATIVE	PREFERRED ALTERNATIVE
Aesthetics	Minor effects in Mainstem Mojave River and at Unnamed Wash. Well structures visible in urban areas	Same level of projected impact	None
Air Quality	Significant if 2+ units of pipeline are constructed along with other facilities	Probably lower level of impact due to shortened pipeline (no connection to California Aqueduct)	NO PROJECT
Bio. Resources	Loss of 7-9 acres of habitat, low potential for impacts to threatened and endangered species	Same level of projected impact and mitigation	None
Cult. Resources	Potential for buried resources	Same level of projected impact	None
Geology and Soils	Low potential liquefaction effects. Some erosion and sediment transport. Some construction-related erosion.	Same level of projected impact	None
Hazards/Hazardous Materials	Potential lubricant and fuel leaks. Potential to encounter contaminated buried soils.	Marginally lower level of projected impact due to shortened pipeline	NO PROJECT
Land use	Compatible uses except for wells in residential.	Same level of projected impact	None
Noise	Construction noise along pipeline and well alignments	Phasing of construction could reduce number of people affected at one time. Delay may increase the number of people affected along the pipeline alignment.	PROPOSED PROJECT
Public Services and Utilities	Emergency vehicles may need to detour around construction. Potential accidental damage to utilities during construction.	Same level of effect	None
Recreation	Reservoir releases may affect type of recreation in West Fork. Potential construction effects on recreation along river.	Same level of effect	None
Traffic	Impacts during construction in public rights of way. Some construction related traffic (crews)	Same construction traffic, deferred projects would mean future construction when traffic volumes are heavier.	PROPOSED PROJECT
Water Resources: Water Quality	Banking deliveries will have better water quality than average SWP. Net import of some mineral constituents; net export of others.	Imported SWP supplies would be of poorer water quality versus Proposed Project deliveries.	PROPOSED PROJECT
Water Resources: Hydrology	May reduce flood infiltration into mainstem groundwater (first storm only). No probable effects on major flows. Incised channel may be created in Unnamed Wash.	Same, except that effects on mainstem infiltration will be somewhat deferred by delay in implementation of maximum recharge.	None
Growth	No direct effects. Project mitigates for effects of planned development.	None	None

Table 7-7. Comparison of Proposed Project Impacts, Small Projects Alternative versus No Project Alternative, by Category of Impact

CATEGORY OF IMPACT	SMALL PROJECTS ALTERNATIVE	NO PROJECT ALTERNATIVE	PREFERRED ALTERNATIVE
Aesthetics	Minor effects in Mainstem Mojave River and at Unnamed Wash. Well structures visible in urban areas. Some levees and recharge basins will alter views from adjacent housing.	Same level of projected impact.	None
Air Quality	Significant if 2+ units of any type of facility are constructed at the same time. Higher levels of impact than for other alternatives. Extended period of impact.	Probably lower level of impact due to shortened pipeline (no connection to California Aqueduct). More potential for phasing to lower daily emissions.	NO PROJECT
Bio. Resources	Loss of about 250 acres of habitat, low potential for impacts to threatened and endangered species	Same level of projected impact and mitigation, except that potential re-siting of off-channel Mojave River recharge would likely involve impacts to higher value resources to the south.	PROPOSED PROJECT
Cult. Resources	Potential for buried resources	Same level of projected impact, except that potential re-siting of off-channel Mojave River recharge would likely involve impacts to higher value resources to the south.	PROPOSED PROJECT
Geology and Soils	Low potential liquefaction effects. Some erosion and sediment transport. Some construction-related erosion.	Same level of projected impact	None
Hazards/Hazardous Materials	Potential lubricant and fuel leaks. Potential to encounter contaminated buried soils.	Marginally lower level of projected impact due to shortened pipeline.	NO PROJECT
Land use	Compatible uses except for wells in residential. Recharge is compatible with existing low-density housing and flood channel maintenance along Mainstem Mojave River.	Same level of projected impact	None
Noise	Construction noise along pipeline and well alignments. Construction noise at recharge basins.	Phasing of construction could reduce number of people affected at one time. Delay may increase the number of people affected along the pipeline alignment and around recharge basins, especially for off-channel Mojave River recharge basins.	PROPOSED PROJECT
Public Services and Utilities	Emergency vehicles may need to detour around construction. Potential accidental damage to	Same level of effect	None

	utilities during construction.		
Recreation	Reservoir releases may affect type of recreation in West Fork. Potential construction effects on recreation along river.	Same level of effect	None
Traffic	Impacts during construction in public rights of way. Some construction related traffic (crews).	Same construction traffic; deferred projects would mean future construction when traffic volumes are heavier.	PROPOSED PROJECT
Water Resources: Water Quality	Banking deliveries will have better water quality than average SWP. Net import of some mineral constituents; net export of others.	Imported SWP supplies would be of poorer water quality versus Proposed Project deliveries.	PROPOSED PROJECT
Water Resources: Hydrology	May reduce flood infiltration into mainstem groundwater (first storm only). No probable effects on major flows. Incised channel may be created in Unnamed Wash.	Same, except that effects on mainstem infiltration will be somewhat deferred by delay in implementation of maximum recharge.	None
Growth	No direct effects. Project mitigates for effects of planned development.	None	None

Table 7-8. Comparison of Proposed Project Impacts, Large Projects Alternative versus No Project Alternative, by Category of Impact.

CATEGORY OF IMPACT	LARGE PROJECTS ALTERNATIVE	NO PROJECT ALTERNATIVE	PREFERRED ALTERNATIVE
Aesthetics	Minor effects in Mainstem Mojave River and at Unnamed Wash. Well structures visible in urban areas. Some levees and recharge basins will alter views from adjacent housing. Antelope Wash impacts remains significant after mitigation. Relocation of antelope wash eliminates substantial pre-mitigation impact.	Lower <i>potential</i> level of projected impact, depending on whether Antelope Wash recharge is determined to be essential.	NO PROJECT None
Air Quality	Significant if 2+ units of any type of facility are constructed at the same time	Probably lower level of impact due to shortened pipeline (no connection to California Aqueduct). More potential for phasing to lower daily emissions.	NO PROJECT
Bio. Resources	Loss of about 750-800 acres of habitat, low potential for impacts to threatened and endangered species. Potential indirect effects on desert tortoise through predation. Effects reduced due to re-siting of Antelope Wash recharge.	Same level of projected impact and mitigation, except that potential re-siting of off-channel Mojave River recharge would likely involve impacts to higher value resources to the south. Re-siting of Oeste and Alto basins to the north could increase impacts to desert tortoise and Mohave ground squirrel. Re-siting of Antelope Wash recharge would be a benefit.	None
Cult. Resources	Potential for buried resources	Same level of projected impact, except that potential re-siting of off-channel Mojave River recharge would likely involve impacts to higher value resources to the south.	PROPOSED PROJECT
Geology and Soils	Low potential liquefaction effects. Some erosion and sediment transport. Some construction-related erosion.	Same level of projected impact	None
Hazards/Hazardous Materials	Potential lubricant and fuel leaks. Potential to encounter contaminated buried soils.	Marginally lower level of projected impact due to shortened pipeline.	NO PROJECT
Land use	Compatible uses except for wells in residential. Recharge is compatible with existing low-density housing and flood channel maintenance along Mainstem Mojave River. 480 acres of residential zoned land converted to recharge.	Same level of projected impact, except that re-siting may result in higher or lower levels of land use conflict.	None
Noise	Construction noise along pipeline and well	Construction phasing may reduce number of people	PROPOSED

	alignments. Construction noise at recharge basins.	affected simultaneously. Delay may increase number of people along the pipeline alignment and recharge basins and increase noise impacts for off-channel Mojave River recharge basins and basins at Alto and Oeste.	PROJECT
Public Services and Utilities	Emergency vehicles may need to detour around construction. Potential accidental damage to utilities during construction.	Same level of effect	None
Recreation	Reservoir releases may affect type of recreation in West Fork. Potential construction effects on recreation along river.	Same level of effect	None
Traffic	Impacts during construction in public rights of way. Some construction related traffic (crews).	Same amount of construction traffic, except that deferred projects would mean future construction when traffic volumes are heavier.	PROPOSED PROJECT
Water Resources: Water Quality	Banking deliveries will have better water quality than average SWP. Net import of some mineral constituents; net export of others.	Imported SWP supplies would be of poorer water quality versus Proposed Project deliveries.	PROPOSED PROJECT
Water Resources: Hydrology	May reduce flood infiltration into mainstem groundwater (first storm only). No probable effects on major flows. Incised channel may be created in Unnamed Wash.	Deferral of projects may result in less management flexibility in Mainstem Mojave River, inhibiting groundwater level management. Effects on mainstem infiltration will be somewhat deferred by delay in implementation of maximum recharge.	None
Growth	No direct effects. Project mitigates for effects of planned development.	None	None

Table 7-9. Detailed Summary of Mitigation Proposed

IMPACT	MITIGATION PROPOSED
Generally applicable actions incorporated into the Proposed Project Description	
General Construction Impacts	Chapter 4.5.1: Siting near existing facilities to reduce construction-related environmental impacts Chapter 4.5.3: When constructing in an urban setting MWA would comply with applicable city encroachment permit policies that specify work schedules and work practices intended to minimize construction impacts on traffic, local businesses, local residents, storm water runoff, and utilities and public services. Compliance with State General Stormwater Permit program for Construction Activities.
General Biological Impacts	Chapter 4.5.1: Siting that avoids known arroyo toad habitats and concentrates construction in the urbanizing areas of Hesperia, Victorville, Apple Valley, and Adelanto Chapter 4.5.2: Scheduling release of water from Silverwood Lake only during periods when the arroyo toad is estivating and only at rates which the 2003-2004 demonstration project showed to be fully contained within the main channel of the river Chapter 4.5.7: To prevent adverse impacts associated with wildlife incidental use of the construction area, MWA would implement the following avoidance and minimization measures where special status-species have been identified in or adjacent to the site in pre-construction surveys: a. Construction and maintenance personnel would participate in a USFWS/CDFG-approved environmental awareness program. b. Prior to initiation of construction activities, a qualified biologist would survey the area to confirm that no special-status species are present. If special-status species are present, they would be allowed to move away from construction activities.
General Cultural Resource Impacts	Chapter 4.5.3: Siting that avoids known significant cultural resource sites along the Mojave River.
General Aesthetic Impacts	Chapter 4.5.4: Where facilities would be visible, MWA would contain them in structures designed to be compatible with adjacent construction and in consultation with nearby residents.
General Air Quality Impacts	Chapter 4.5.5: MWA would adopt best management practices per the Mojave Desert Air Quality Management District.
General Noise Impacts	Chapter 4.5.6: Siting of the Proposed Project minimizes noise impacts. For areas adjacent to residential development MWA would comply with the following construction protocols: a. Permanent above-ground facilities (wells and treatment plant) would be contained within structures that would ensure that adjacent ambient noise levels are below the levels established for facilities in commercial and manufacturing areas. b. Except when more stringent standards apply to construction in the roadway, construction work would be limited to the hours from 7 AM to 7 PM, with no construction of weekends. c. Construction noise would be monitored on site by the construction contractor and portable noise attenuation barriers would be erected between construction and housing if construction noise measured at the exterior of adjacent housing exceeded 65 dBL.
Water Quality Impacts Related to Construction	Chapter 4.5.8: MWA would implement best management practices to avoid construction runoff during construction activities, including: a. Daily pre-construction inspection of all construction equipment to ensure that oil and/or gas/diesel fuel are not leaking from equipment; b. Secondary containment for fueling and chemical storage areas shall be provided during construction and Proposed Project operation; c. Secondary containment for equipment wash water shall be provided to ensure that wash water is not allowed to run off the site;

	<p>d. Silt traps and/or basins would be provided to prevent runoff from the construction site;</p> <p>e. Materials stockpiles would be covered to prevent runoff;</p> <p>f. Loose soils would be protected from potentially erosive runoff;</p> <p>g. If construction equipment is used within the river channel, it will be inspected routinely and any leaks found will be repaired. If necessary, the equipment would be fitted with secondary containment materials at potential oil/fuel leakage sites;</p> <p>h. MWA would comply with the terms and conditions of the State's General Stormwater Permit program for construction activities.</p> <p>i. MWA will prepare and implement a Storm Water Pollution Prevention Plan based on the guidance in CalTrans' <i>Storm Water Pollution Prevention Plan and Water Pollution Control Plan Preparation Manual</i>, March 2003.</p>
Specific Mitigation Commitments: Aesthetics	
Mojave River Well Field	Chapter 5.2.4.3: Wells would be enclosed in small structures designed to be consistent with structures in the immediate vicinity and/or MWA would plant screening vegetation.
Oro Grande Wash Recharge	Chapter 5.2.4.4: To mitigate these potential effects, where levee for recharge basins or canals would be constructed adjacent to existing development, MWA would plant native shrubs between the perimeter levee maintenance road and private property. Shrubs such as rabbit bush grow naturally at the site, would grow to a height of 3-5 feet without irrigation, and will provide a more natural view for property owners.
Oro Grande Wash Recharge	Chapter 5.2.4.4: To mitigate these potential effects, where levee for recharge basins or canals would be constructed adjacent to existing development, MWA would plant native shrubs between the perimeter levee maintenance road and private property. Shrubs such as rabbit bush grow naturally at the site, would grow to a height of 3-5 feet without irrigation, and will provide a more natural view for property owners.
Cedar Avenue Detention Basin Recharge	Chapter 5.2.4.5: To mitigate these potential effects, where levee for recharge basins or canals would be constructed adjacent to existing development, MWA would plant native shrubs between the perimeter levee maintenance road and private property. Shrubs such as rabbit bush grow naturally at the site, would grow to a height of 3-5 feet without irrigation, and will provide a more natural view for property owners.
Oeste Recharge and Wells	Chapter 5.2.4.8: MWA would enclose wells in structures designed to be consistent with structures in the immediate vicinity and/or would plant screening vegetation.
Alto Recharge and Wells	Chapter 5.2.4.9: Where levee for recharge basins would be constructed adjacent to existing development, MWA would plant low vegetation on the levee berm and/or native vegetation as a screen for the levee. Wells would be sited to minimize impacts to residential areas and enclosed in small structures designed to be consistent with structures in the immediate vicinity.
Antelope Wash Recharge	<p>Chapter 5.4.2.10: MWA would contour the outer berms of recharge facilities and would plant native shrubs between the perimeter levee maintenance road and private property. Shrubs such as rabbit bush grow naturally at the site, would grow to a height of 3-5 feet without irrigation, and will provide a more natural view for property owners.</p> <p>Per Section 5.4.7.2, upstream Antelope Wash recharge was re-evaluated during the public comment period, as a mitigation measure to reduce biological resources impacts. The upstream site will be relocated to an expanded recharge area in Antelope Wash at Ranchero Road.</p>
Specific Mitigation Commitments: Air Quality	
All Facilities	<p>Chapter 5.3.8.2: MWA will implement all of the fugitive dust control measures required by Rule 403 (Fugitive Dust):</p> <p>a. Use periodic watering for short-term stabilization of Disturbed Surface Area (maintaining moist disturbed surfaces);</p> <p>b. Take action sufficient to prevent project-related trackout onto paved surfaces;</p> <p>c. Cover loaded haul vehicles while operating on Publicly Maintained paved surfaces;</p> <p>d. Stabilize graded site surfaces upon completion of grading;</p>

	<p>e. Cleanup project-related Trackout or spills on Publicly Maintained paved surfaces within 24-hours;</p> <p>f. Reduce non-essential Earth-Moving Activity under High Wind conditions</p> <p>g. Feasible mitigation such as use of highway diesel fuels and use of additional pollution equipment to trap exhaust particulates or NOx would be implemented as part of the project,</p> <p>h.. MWA would evaluate potential for phasing of construction to reduce emissions</p>
Specific Mitigation Commitments: Biological Resources	
Facilities habitat losses	<p>a. Pre construction surveys for special status species. If special status species are found, avoidance and minimization protocols will be initiated. Occupied habitat will be mitigated at a 1:1 ratio. For Unnamed Wash, habitat loss will be mitigated consistent with Las Flores Ranches pending HCP or 1:1. Avoidance of Joshua trees or mitigation for habitat loss. At Antelope Wash upstream site, MWA may consider other sites. Per this commitment, upstream Antelope Wash recharge was re-evaluated during the public comment period, as a mitigation measure to reduce biological resources impacts. The upstream site will be relocated to an expanded recharge area in Antelope Wash at Ranchero Road.</p> <p>b. Per response to comments from California Department of Fish and Game, for burrowing owls, MWA will implement avoidance and minimization protocols if owls are found at facility sites or, if avoidance is not feasible provide off-setting mitigation in consultation with CDFG.</p> <p>c. As provided in the EIR, MWA will survey for special-status species prior to construction. Per response to CDFG, if Mojave fringe-toed lizards are found during such surveys, MWA will notify CDFG and initiate consultation regarding appropriate avoidance and mitigation.</p>
Specific Mitigation Commitments: Cultural Resources	
All Facilities	<p>Chapter 5.5.5: MWA will avoid impacts if feasible on identified cultural resources including prehistoric and historic archeological sites, locations of importance to Native Americans, human remains, and historic buildings and structures. Methods of avoidance may include, but not be limited to, project re-route or re-design, project cancellation, or identification of protection measures such as capping or fencing.</p> <p>MWA will retain archeological monitors during construction for ground-disturbing activities that have the potential to impact significant archeological remains as determined by a qualified archeologist.</p> <p>Based on this policy and the results of literature search and field surveys, MWA would implement the monitoring provision above for all facilities located adjacent to the Mainstem Mojave River, including:</p> <ul style="list-style-type: none"> • The Mojave River Well Field • The Well Field Delivery Pipelines • Off-Channel Mojave River Recharge (east or west site) and the supply pipeline to this site <p>If the eastern site is selected for Off-Channel Mojave River Recharge, MWA would also design the recharge to avoid the recently identified historic farmhouse site and/or provide for a suitable archeological testing and recovery program consistent with State of California and Federal policy.</p> <p>Because previously unrecorded and/or unanticipated archaeological deposits, features, and Native American burials may be encountered during implementation of the Project, the Project Archaeologist would prepare a <i>Construction Phase Monitoring and Cultural Resources Treatment Plan</i> prior to Project construction. The purpose of this <i>Plan</i> would be to clearly outline and expedite the process by which the Mojave Water Agency will resolve any</p>

	significant impacts upon newly discovered, historically significant cultural resources, including consultation with the State Historic Preservation Officer (SHPO), thereby eliminating untimely and costly delays in construction. Specifically, the <i>Plan</i> would outline the process by which cultural resource discovery notifications are made and treatment plans are implemented, describe the cultural resource classes anticipated during Project construction, describe the treatment options for each cultural resource class, and detail procedures for implementing treatment. In addition, the <i>Plan</i> would summarize the Native American involvement in the Project (including a sample Native American Burial Agreement), outline the procedures for curation of materials recovered during site treatment (including a proposed Archaeological Curation Agreement with a facility that meets California curation standards), and address report requirements. This <i>Plan</i> would be submitted to the SHPO for review and comment prior to Project construction.
Specific Mitigation Commitments: Geology and Soils	
Mojave River Recharge, Hesperia, Lenwood, and Hodge	Chapter 5.6.4.2: MWA will monitor existing well levels and establish an additional system of shallow monitoring wells to track changes in groundwater levels as the plume of recharged water moves downstream to the extraction well field. These wells will allow real-time management of recharge rates to minimize the potential for groundwater levels under developed areas to rise to within 20 feet of the surface.
All recharge areas	Chapter 5.6.3.3: To mitigate for the potential for short-term declines in local wells as a result of the project, MWA will monitor groundwater levels at all project-related extraction sites and at adjacent sites. If MWA determines that water levels at these adjacent wells have declined as a result of MWA extractions, MWA will either (a) reduce extractions or (b) compensate the owner of the affected well for the increased energy costs associated with the decline in well level.
All facilities	Chapter 5.6.4.4: To ensure minimization of potential leaks at facilities due to seismic events and provide for rapid repair, MWA will maintain a small stockpile of rock at each recharge facility where levee damage might result in minor flooding of adjacent property to ensure that any levee damage can be rapidly patched to reduce potential for erosive flows.
Unnamed Wash	Chapter 5.6.4.6: Drop structures will be constructed as part of the Proposed Project to reduce excess erosion and sediment transport. Levees will be placed along the edge of the 100-year floodplain to contain releases.
Facilities in a Flood Zone	<i>Per</i> response to comments from San Bernardino County DPW Water Resources Division, MWA will coordinate with the County Flood Control District and local flood control officials during design to ensure that facilities within a flood zone do not conflict with Master Plans of Drainage and County/Local flood management. If necessary, permits will be requested from the Flood Control District and U.S. Army Corps of Engineers. MWA will inform the Flood Control District of any substantial changes in the proposed project.
Specific Mitigation Commitments: Hazards and Hazardous Materials	
All excavations	Chapter 5.7.3.2: Prior to construction all sites will be evaluated to identify past uses that may have resulted in soil contamination. If the site assessment identifies a potential for contaminated soils, MWA would conduct further analysis to confirm this finding and would either (a) re-site or redesign the area to avoid impacts of (b) remediate the contamination to meet Regional Water Quality Control Board standards. During construction of pipelines in areas that cannot be assessed prior to construction, MWA would provide for monitoring of excavated soils and construction contracts will specify monitoring procedures and proper procedures for reporting and responding to potentially contaminated soils. Excavated materials containing hazardous waste will be handled, transported, and disposed of in accordance with applicable regulations.
All activities	Chapter 5.7.3.4: To reduce the potential for the project to affect emergency response plans or evacuation plans, MWA will implement traffic management that minimizes potential for traffic delays.

Specific Mitigation Commitments: Land Use	
Unnamed Wash	Chapter 5.8.1.2: MWA would continue to coordinate with Rancho Las Flores to ensure compatibility of the Unnamed Wash feature of the Minimum Facilities Alternative with the proposed development;
General	Chapter 5.8.1.2: MWA would coordinate with city and town officials to develop methods for ensuring long-term compatibility of recharge and associated facilities with planned existing development; and design of facilities to minimize adverse indirect effects on noise, and other factors that may affect perceived incompatibility of such facilities with residential and commercial development.
Specific Mitigation Commitments: Noise	
All facilities as applicable	<p>Chapter 5.9.4.2: MWA will restrict construction to daylight time periods consistent with local ordinances; construction along roads in developed areas will therefore be practically limited to the period from 8:30 am to 4:30 pm.</p> <p>MWA will require construction contractors to utilize available noise management technology (muffling) and to maintain noise suppression equipment on construction machinery to ensure that noise emissions are minimized at the source. Equipment not in use for more than 5 minutes will be turned off.</p> <p>If pile driving equipment is necessary, pile holes will be pre-drilled if feasible and vibratory pile driving equipment will be used whenever possible.</p> <p>MWA will require construction contractors to locate fixed construction equipment such as generators as far as possible from noise-sensitive receptors.</p> <p>During construction of wells, pipelines, and associated facilities such as pump stations and chloramination facilities in areas where construction is within 400 feet of a residence or business, construction noise will be periodically monitored on site and at the residence or business. If noise levels are found to exceed those mandated by local ordinance, MWA will, to the extent feasible and in consultation with the resident or business, install temporary noise barriers along the boundary of the construction site to further reduce noise impacts. Barriers may be installed along the boundary of the construction zone or on private property, depending on conditions and the permission of the landowner/resident.</p> <p>In addition, once construction areas for fixed location construction such as well drilling pads have been cleared and construction can commence, MWA will install temporary noise barriers around the construction site, to the extent feasible, to block noise transmission.</p> <p>At recharge basin sites where there is adjacent development, MWA will initially construct outer levees along the boundary with adjacent development. This will allow construction of inner levees and basins behind a mound of earth, which will reduce noise levels for adjacent residents and businesses.</p> <p>MWA will notify residents and noise-sensitive receptors in the affected areas several weeks in advance of operations that would generate noise in excess of local standards. Information distributed will describe the operations and duration of the project.</p> <p>All stationary equipment will be designed, constructed, and operated to comply with all local noise ordinances.</p>

Specific Mitigation Commitments: Public Services	
Minimum Facilities Alternative	Chapter 5.10.4.2: For the Well Field Delivery Pipeline system, MWA would implement traffic controls (as noted in the discussions of traffic and noise impacts). In addition, MWA would coordinate with providers of public services prior to initiating construction to ensure that police, fire, and emergency service providers were aware of the location of any construction activities in the public right of way. During construction in roads, this coordination would occur daily to precisely define the areas where traffic delays might occur.
Specific Mitigation Commitments: Recreation	
Minimum Facilities Alternative	Chapter 5.11.3.2: MWA will notify recreation providers along the West Fork of the Mojave River when deliveries from Silverwood Lake will be made and will ramp such deliveries up in 50-cfs increments to avoid sudden increases in downstream flow rates. A similar program will be developed for deliveries made via Unnamed Wash. MWA will coordinate siting of the potential Mojave River Well Field and associated facilities with local governments and the owners of private local facilities to minimize the effects and wells and pipelines on recreational activities along the river in this area (Bear Valley Road to Rock Springs).
Specific Mitigation Commitments: Traffic	
All facilities	Chapter 5.12.4.2: To minimize potential traffic effects associated with construction and operation of facilities, MWA will comply with all local encroachment permit requirements. In addition, MWA will: <ul style="list-style-type: none"> a. Schedule hauling of construction equipment (and water, if feasible) to and from the various construction sites prior to or following rush hours; b. Use off-road rights-of-way (road shoulders and sidewalks) for construction to the extent feasible; c. Encourage construction crews to carpool to construction sites; d. Identify and clearly mark emergency access routes around sites where construction takes place within the public right-of-way; e. On a daily basis, inform local emergency services of the location of all sites involving construction in the public right-of-way; and f. Jack and bore under Interstate 15.
Specific Mitigation Commitments: Water Resources (Water Quality)	
All Facilities	Chapter 5.13.8: To address potential for groundwater recharge to percolate through clay and fine-grained soils and result in leaching of minerals into indigenous groundwater, water quality in production and monitoring wells will be monitored to detect such potential influences. Wells will also be monitored for potential surface water influence, and recharge will be managed to reduce any effects identified. <p>As noted in draft EIR Section 5.13.8 and in MWA's clarifying response to comments from the Lahontan Regional Water Quality Control Board and San Bernardino County DPW Water Resources Division:</p> <ul style="list-style-type: none"> a. MWA will analyze corings from proposed recharge and/or well field sites to ensure that these facilities are not sited in areas where significant clay and fined-grained soils could result in substantial leaching of minerals into indigenous groundwater. Water quality will also be monitored routinely to detect any influence associated with leaching of minerals during recharge. b. Water quality in monitoring wells and all production wells will be monitored routinely in accordance with applicable regulations. c. For the Mojave River Well Field element of the Proposed Project, MWA will follow DHS guidance for evaluating the potential for these wells to be under the influence of surface water. d. If groundwater levels are detected rising to levels where recharge may cause water to become under the influence of surface water, MWA will divert deliveries to other facilities, or increase local extractions, as appropriate.

Specific Mitigation Commitments: Water Resources (Hydrology)	
Mojave River Recharge	<p>Chapter 5.14.5: MWA will monitor groundwater levels in the Mojave River Well Field for evidence of high groundwater levels in the floodplain outside of the mainstem channel. If there is substantial evidence that recharge is raising these levels to within 20 feet of the surface at the beginning of the storm season, then MWA could adjust operations by diverting some banked supplies to other recharge facilities. As noted in the draft EIR and in responses to comments from San Bernardino County DPW Water Resources Division, to reduce potential for in-channel/in-wash recharge operations to affect flood flows, MWA has sited these facilities in areas where existing and planned embankments would exert substantial control over flood flows and the effects of small temporary berms should be minimal. MWA will also coordinate design and construction of in-channel/in-wash facilities with San Bernardino County Flood Control, and will obtain permits from the Flood Control District and the U.S. Army Corps of Engineers, as appropriate.</p> <p>In general, per response to comments from San Bernardino County DPW Water Resources Division regarding local Master Plans of Drainage, MWA will also work with local communities during design, construction, and implementation of the proposed project facilities to avoid effects to drainage plans.</p> <p>Regarding Unnamed Wash, per response to comments from San Bernardino County DPW Water Resources Division and as provided for in the Proposed Project description, MWA will incorporate rock energy dissipation structures into the design of the channel at Unnamed Wash to minimize erosion and channel incision.</p>
SPECIFIC MITIGATION COMMITMENTS: USE OF ENERGY	
Best management practices associated with mitigation of air quality impacts will also serve to reduce potential construction and operation use of energy.	