8. Recommended 2013 Recharge Master Plan Update

8.1. Introduction

This section presents the recommended recharge master plan update based on the list of projects identified in Section 6 and the criteria described in Section 7. Specific projects are recommended in Tables 8-1c and 8-2c for production sustainability and yield enhancement projects, respectively. Implementation and financing plans are also described for the recommended projects.

8.2. Initial Project Screening

8.2.1. Production Sustainability Projects

Table 6-1 contains nine production sustainability projects that the Steering Committee and Watermaster approved for initial screening. In contrast to the yield enhancement projects, the production sustainability projects were described conceptually and needed further development prior to screening and ranking. In the winter and spring of 2013, Watermaster staff encouraged capable ~~appropriators~~ Appropriators to participate with the JCSD in projects that would supply the JCSD with water in-lieu of JCSD production from the parts of MZ3/MZ4/MZ5 where production sustainability is a concern. Members of the Steering Committee convened informal meetings to discuss various alternatives in which water could be provided to the JCSD and potentially to the CDA that would result in reduced production by the JCSD~~, and potentially the CDA's Chino II desalter well field.~~ From these meetings, subsequent discussions, and information provided by the City of Ontario, the Monte Vista Water District and others, four project categories were identified: 1) transfer of CDA water from CDA members to the JCSD in lieu of JCSD production; 2) supply of water from other Appropriator parties through new connections among the parties, potentially including new wells and pipelines; 3) oversizing the proposed Ontario Groundwater Recovery Project (OGRP) and using the increased supply to reduce CDA Desalter II production; and 4) the use of JCSD ASR wells to seasonally increase groundwater levels in the JCSD well field area. Figure 8-1 shows the locations of the existing water distribution systems, wells, and the proposed OGRP in the parts of MZ3/MZ4/MZ5 where production sustainability is a concern. The production sustainability projects considered herein include:

1. The City of Ontario could sell the JCSD up to 5,000 acre-ft/yr of its CDA deliveries from the Chino II Desalter without the construction of new additional facilities. The sales price would be Ontario's cost of water from the CDA of $920 per acre-ft.[1] Ontario and the JCSD take their Desalter II deliveries from a common reservoir in the JCSD service area, and Ontario would forego its deliveries from this reservoir and sell some or all of its share of CDA allocation from the Chino II Desalter to the JCSD. This would be an interim supply until Ontario needs its capacity in the Chino II Desalter to meet its water supply needs. As an interim supply, this project could

[1] CDA charge to the City of Ontario for fiscal 2013/14.

also be a proof-of-concept demonstration to determine the amount and timing of alternative supplies required to ensure production sustainability.

2. The City of Chino Hills and the Monte Vista Water District (MVWD) have proposed an in-lieu exchange project where the MVWD and Chino Hills would use more groundwater produced in Management Zone 1 and/or imported water, and Chino Hills would forego taking some of its 4,200 acre-ft/yr CDA Desalter I allocation, having that desalter water conveyed to the JCSD through existing CDA facilities. The JCSD would exchange annual production rights to Chino Hills and the MVWD equal to the amount of water supplied to the JCSD in this project. This proposal is modeled on the successful interim forbearance plan that was implemented during the development of the Management Zone 1 subsidence management plan. Similar to the Management Zone 1 ~~subsidence management plan~~forbearance plan, this project may be interim in nature, while a more permanent management strategy is developed by the affected party(ies).~~.~~

3. Other than through CDA facilities, there are no physical connections to the JCSD system from Chino Basin Appropriator parties that would permit a direct supply of water to the JCSD. A new connection would be required from the Ontario distribution system 1212 zone to the JCSD's 1100 zone. If this connection were constructed, Ontario could be a source of alternative supply as well as other Appropriators that could exchange water with the JCSD through Ontario's system. A new connection from the Cucamonga Valley Water District (CVWD) to the City of Ontario would be required to enable the CVWD to supply water to the JCSD. A new connection from the Fontana Water Company (FWC) to either the City of Ontario or directly to the JCSD would be required for the FWC to supply water to the JCSD. Other Appropriators may have the ability to connect to the City of Ontario to wheel water to the JCSD. Watermaster staff has encouraged the Appropriator parties that could participate in these water supply projects to review their capabilities and interests in participating in production sustainability projects and to provide Watermaster staff with alternative descriptions, operating plans, and costs. At the time this report was written, only three of the potential participants had provided alternatives to Watermaster staff. Watermaster staff developed two generic in-lieu or exchange projects to bracket the scale and cost of such projects that will improve production sustainability in the JCSD service area: Minimum (Min) Generic In-Lieu and Maximum (Max) In-Lieu projects. These projects are described in Appendix D and listed herein in Table 8-1a.

4. The City of Ontario has developed a project concept, the OGRP. The purpose of the OGRP is to produce groundwater near the southern leading edge of the South Archibald VOC plume, treat that water to remove VOCs, treat it again at the Chino II Desalter for nitrate and TDS reduction, and subsequently serve it. The locations of the OGRP wells and raw water pipeline are shown in Figure 8-1. Ontario has suggested that the OGRP could be oversized with the resulting surplus capacity used to reduce CDA Desalter II groundwater production, and thereby providing a

sustainable supply of raw water to the CDA Desalter II and helping to maintain higher groundwater levels in the JCSD well field area.

5. The JCSD has developed ASR wells that could be used to improve production sustainability but has not identified the water supply that would be used for injection or the magnitude and timing of that supply. As of the time of this report's preparation, the JCSD had not provided Watermaster staff with a plan to improve production sustainability with its ASR wells. Therefore, consideration of specific production sustainability projects utilizing the JCSD's ASR wells will not be included in the 2013 RMPU Amendment. Exclusion of the JCSD ASR project in the 2013 RMPU Amendment does not preclude them from future development and implementation before the next Recharge Master Plan update.

The water supply sources for the production sustainability projects include Chino Basin groundwater produced sufficiently far from the sustainability challenged area and imported water. For projects 2 and 3 described above, the JCSD would contribute its unused production rights to the Appropriator(s) that supplies them water to offset the water supply cost. The cost to produce and convey the water to the JCSD could be paid for by the JCSD or some other arrangement that could involve Watermaster. Some or all the cost to produce and convey water to the JCSD would be offset by the JCSD's avoided cost to produce and convey its own water. Table 8-1a contains the list of production sustainability projects considered for evaluation and ranking. The JCSD ASR well project is not included in Table 8-1a for the reasons described above. Table 8-1a contains project names, descriptions, new supplies generated by the projects, capital cost estimates, supplemental water costs, annual costs, unit costs, and ratings for water quality and reliability.

8.2.2. Yield Enhancement Projects

Table 6-1 contains 41 yield enhancement projects that the Steering Committee recommended and approved through the Watermaster process for initial screening. These projects involve the construction of new facilities and four proposals to increase the frequency of operations and maintenance at existing facilities. Watermaster, the IEUA, and WEI reviewed all of the projects based on the information that was readily available to define how each project would operate, to estimate their storm and recycled water recharge performance, and to estimate their cost. Certain projects listed in Table 6-1 were not analyzed as their projected unit costs were ~~where~~ higher than the initial screening level of $1,500 per acre-ft. Table 8-2a lists the projects that were advanced to detailed evaluation using the criteria described in Section 7. Table 8-2a contains the following:

- Project identification numbers, names, and descriptions
- Indications of when a project was combined with another project or projects to take advantage of increased yield or cost efficiencies
- Opportunities for IEUA and Watermaster joint financial participation pursuant to the Peace II Agreement
- Characterizations of the new storm water recharge created by the proposed projects

- Indications as to whether a project would be constructed for regulatory compliance purposes and whether a project was already constructed
- Capital cost opinions for stormwater improvements, annualized capital costs, operations and maintenance costs, total annual costs, and unit costs of stormwater recharge
- New recycled water recharge capacities and recycled water acquisition costs
- Capital cost opinions for recycled water, annualized capital costs, operations and maintenance costs, total annual costs, and unit costs of recycled water recharge
- New imported water recharge capacities and imported water acquisition costs
- Capital cost opinions for imported water, annualized capital costs, operations and maintenance costs, total annual costs, and unit costs of imported water recharge
- Total combined recharge capacities for all storm, recycled, and imported waters
- Indications of additional project benefits and contributions to production sustainability

The projected new stormwater recharge estimates are based on the updated and calibrated Wasteload Allocation Model (WLAM), which has been used in past recharge investigations and to support Watermaster's groundwater model. The capital and operation and maintenance costs are based on the IEUA's recent experience in the construction and operations of the CBFIP projects and other construction projects. The IEUA also provided estimates of new recycled water recharge capabilities for some of the proposed projects listed in Table 8-2a. Appendix D contains all available detailed drawings and cost opinions for each project listed in Table 8-2a. In total, Table 8-2a contains 54 projects and combinations of projects. Some of the projects are mutually exclusive as indicated in the notes. Table 8-2a was vetted thoroughly by the Steering Committee in the period of April through June of 2013.

8.3. Project Evaluation and Ranking

8.3.1. Production Sustainability Projects

8.3.1.1. Application of Section 7 Criteria

Table 8-1a contains the five production sustainability projects that were selected for screening by the Steering Committee. The purpose of Table 8-1a is to provide a detailed characterization of the projects in tabular form. Table 8-1b lists the same projects and the criteria upon which they will be screened. Table 8-1c lists the production sustainability projects in their order of preference, based on the screening criteria of Section 7 and as described below.

8.3.1.1.1. Reliability

To achieve the desired sustainability benefits, the water substituted for JSCD groundwater production must be at least as reliable as the current JCSD supplies. The production sustainability project must be sized, scalable, and sourced to ensure sustainability. The five

projects listed in Table 8-1b are all assumed to use Chino Basin groundwater as a source supply, produced from parts of the Basin that are sustainable, and/or imported water treated at an existing treatment plant. Therefore, the reliability for all five projects will be high and equivalent. The amount and timing of supply required to ensure sustainability is currently unknown. Two or more of the projects listed in Table 8-1b could be combined to ensure sustainability.

8.3.1.1.2. Cost

The capital costs vary greatly among the four projects and range from zero to about $10.6 million with unit costs ranging from $95 to $920 per acre-ft. There could be additional costs for the Max General In-Lieu and Min General In-Lieu projects if the water quality produced for these projects becomes degraded. There is also opportunity for the Appropriator(s) that constructs the new wells and conveyance facilities used in these projects to use these same facilities for other uses when not used to supply the JCSD.

8.3.1.1.3. Water Quality

The Ontario-CDA MZ3 In-Lieu, the Chino Hills/MVWD, and the OGRP projects will always produce potable water that can be used to replace JCSD groundwater production. For the Max General In-Lieu and Min General In-Lieu projects, water will be wheeled through an adjacent Appropriator's water system where it is assumed that the water will already be potable. The new wells associated with this project will presumably be sited to avoid water quality challenges and may in fact provide water quality benefits to the source agency. That said, future groundwater degradation could occur, necessitating treatment, and the level of risk is unknown.

8.3.1.1.4. Ease of Implementation

The facilities required to implement the Ontario-CDA MZ3 In-Lieu project and the Chino Hills/MVWD project exist, and these projects could be initiated quickly after an agreement between the parties is negotiated.

The OGRP project, if implemented, is several years out and is dependent on 1) other entities[2] paying for VOC treatment prior to delivery of the source water to the Chino II Desalter and 2) the project proponents obtaining substantial grant funding. The JCSD would benefit from reduced Chino II Desalter pumping at the existing wells by about 2,900 acre-ft/yr and would not receive any new water directly from the project.

The Max General In-Lieu and Min General In-Lieu projects would require an agreement between the JCSD and the Appropriator(s) that serves it water. Existing wells, potentially new wells, existing treatment plant capacity, or some combination of these will be required. Interconnections between the JCSD and the City of Ontario and potentially Ontario and other Appropriators will be required. There may also be other benefits to

[2] These parties include Aerojet, Boeing, General Electric, and Lockheed Martin.

participating Appropriators that include increasing their groundwater production capacity (joint use of wells) and improving conveyance capacity within their own distribution systems. The agreement(s) will need to consider the cost to construct and operate the improvements and economic consideration for the source water.

8.3.1.2. Ranking of Production Sustainability Projects

Table 8-1c shows a preliminary ranking of these projects by unit cost. The projects, in order of unit cost priority, are: the Min General In-Lieu project, the Chino Hills/MVWD project, the Max General In-Lieu project, the OGRP, and the Ontario-CDA MZ3 In-Lieu project. At the time this report was written, there were no cost estimates available for the Chino Hills/MVWD project, but it is believed to have an implementation cost less than the Max General In-Lieu and Min General In-Lieu projects. The Min General In-Lieu and Max General In-Lieu are ranked higher than the OGRP project even though their estimated unit cost is 50 percent greater ($150 per acre-ft versus $95 per acre-ft). The Min and Max General In-Lieu and Chino Hills/MVWD projects were rated higher than the OGRP project due to ease of implementation. The OGRP depends on substantial grant funding and cooperation with private entities, which is speculative at this time. In contrast, the Max and Min General In-Lieu and Chino Hills/MVWD projects can be more readily implemented and may provide benefits to the Appropriators that participate. The Ontario-CDA MZ3 in-Lieu project was ranked last due to its unit cost of greater than $900 per acre-ft.

Specific recommended projects will be identified through the implementation plan process described in Section 8.4.2.

8.3.2. Yield Enhancement Projects

8.3.2.1. Application of Section 7 Criteria

Table 8-2b lists the yield enhancement projects and summarizes their features pursuant to the screening criteria articulated in Section 7 herein. Some projects have two variants where the difference is how excavation cost is accounted for in the construction cost. Projects with an "a" attached to their identification numbers have their excavation costs reduced by 90 percent under the assumption that sand and gravel operators will extract the materials at their cost. Table 8-2b summarizes the project economics in Table 8-2a and includes information on the water quality and institutional challenges of each project. Table 8-2c contains the final rankings based on the Section 7 criteria and input from the Steering Committee. The application of the criteria is described below.

8.3.2.1.1. Confidence in Recharge Estimate

The WLAM was calibrated for selected recharge basins where the IEUA develops recharge estimates based on observed data. The results of these calibration efforts are contained in Appendix D. Subsequently, recharge estimates were developed for the proposed yield enhancement projects included in Table 8-2a as well as for the no-project condition at the proposed recharge sites. Pursuant to the screening and evaluation criteria contained in

Section 7, new recharge is estimated as 90 percent of the difference between the recharge estimate for the proposed project and the estimate of recharge for the no-project condition. This 10 percent reduction produces a reliable and conservative estimate of new recharge.

The IEUA prepared estimates of recycled water recharge capacity for some of the proposed projects listed in Table 8-2a. These estimates are based on the availability of recycled water that is not currently being recharged and will not be used to meet direct reuse demands; therefore, recycled water is considered highly reliable. The reliability of new recharge estimates is equal among the projects.

8.3.2.1.2. Location of Recharge

The locations of new storm and supplemental (imported and recycled) water recharge projects have been prioritized to assist Watermaster in its best efforts to balance recharge and discharge in every area and subarea of the basin. Prior modeling investigations (see Section 3) have demonstrated that the projected groundwater production plans could cause an imbalance in recharge and discharge in Management Zone 3 and the central part of Management Zone 2. The 2012 State of the Basin Report (WEI, 2013) section on historical groundwater level and storage changes supports this finding to some extent,[3] showing groundwater level declines in these areas through 2010 with a slight rebound in groundwater levels between 2010 and 2012. The increase in groundwater levels is a result of a combination of factors including a reduction in pumping~~,~~ and increase in supplemental water supply.~~,~~ ~~and recharge.~~ Watermaster has been aware of this potential imbalance since 2007 and has, pursuant to the Peace Agreement and Court Order authorizing the Peace Agreement, conducted technical evaluations to develop guidance on the recharge of supplemental water.[4] Watermaster's current recommended supplemental water recharge plan[5] calls for Watermaster to prioritize supplemental water recharge as follows:

- Recharge the first 6,500 acre-ft/yr of supplemental water in Management Zone 1 pursuant to the Peace Agreement.
- Recharge Management Zone 3 up to its maximum supplemental water recharge capacity (current supplemental water recharge capacity is 12,700 acre-ft/yr).
- Recharge Management Zone 2 up to its maximum supplemental water recharge capacity (current supplemental water recharge capacity is 28,300 acre-ft/yr).
- Recharge Management Zone 1 up to its maximum supplemental water recharge capacity (current supplemental water recharge capacity is 42,100 acre-ft/yr).[6]

This priority scheme was developed to balance recharge and discharge at the management zone level when supplemental water recharge is being done. Watermaster recharges imported water primarily to replenish overproduction, to store imported water for the

[3] Specifically, see Exhibits 19 and 20 in the 2012 State of the Basin Report.
[4] As required by Peace Agreement Section 5.1 items (i), (iii), (v), and (viii); OBMP Implementation Plan paragraph 9; and Watermaster Rules and Regulations Section 7.1 (b) (iv).
[5] 2009 Production Optimization and Evaluation of the Peace II Project Description (WEI, 2009)
[6] The supplemental water recharge capacities cited above are based on Table 6-3 in the 2010 Recharge Master Plan Update (WEI et al., 2010).

existing Dry-Year Yield program, and more recently for preemptive replenishment. The IEUA recharges recycled water in certain basins where the IEUA and Watermaster have a joint permit to recharge recycled water.

The yield enhancement projects are prioritized by management zone in Table 8-2c with the priorities that mirror the supplemental water recharge priority.

8.3.2.1.3. Expandability to Include Supplemental Water Recharge

The IEUA has identified recharge projects that could be used to recharge recycled water. These projects have been identified in Table 8-2a and feature prominently in Table 8-2c.

8.3.2.1.4. Cost

Watermaster, the IEUA, and WEI developed Level-5[7] cost opinions for each of the projects listed in Table 8-2a. The backup for these cost opinions is included in Appendix D. For projects that consist of only operations and maintenance activities, the IEUA prepared annual cost estimates based on their experience in basin operations and maintenance.

Table 8-2c lists recommended projects based on the unit cost of stormwater recharge and shows both the new stormwater recharge and recycled water recharge. All projects with unit costs less than $600 per acre-ft are included as recommended projects.

8.3.2.1.5. Water Quality Challenges

Storm water is considered an impaired water source for surface waters. After filtration through the soil and unsaturated zone, storm water is considered to be of suitable quality for potable uses.

There are some instances where storm and supplemental water recharge may cause or exacerbate existing groundwater quality challenges. Storm water and supplemental water recharge can cause groundwater mounding under recharge sites that can redirect movement of existing contaminant plumes. Recharge can also flush contaminants from the unsaturated zone to the saturated zone, thus mobilizing contaminants that could subsequently impact well water quality. Figure 8-2 shows the locations of all recharge projects listed in Table 8-2a by identification number and the locations of significant water quality anomalies. For example some of the concerns include:

- Increased recharge at the Ely Basins could redirect the GE Test Cell plume further to the west and impact down-gradient wells.

[7] See Recommended Practice Nu. 17R-97, Cost Estimate Classification System, http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=2&ved=0CDUQFjAB&url=http%3A%2F%2Fwww.aluminium.gl%2Fsites%2Fdefault%2Ffiles%2Fpdf%2Fnogletal%2Fcostestimatingsystemaace-208a.pdf&ei=VcQGUu6RBIaSyAHFjoDoAg&usg=AFQjCNH5E6v6F-qxcQXIDW894iTFN48eGA&sig2=wWQ1gparE5ed1pEVkrOpJg

- Increased recharge at the Wineville Basin could redirect the Kaiser Steel Mill plume and potentially impact down-gradient wells.
- Contaminants in the unsaturated zone near the CSI Basin could be mobilized with increased recharge and impact down-gradient wells.
- Contaminants that may exist in the soil and unsaturated zone from historical operations in and adjacent to the Vulcan Pit could be mobilized with increased recharge and impact down-gradient wells

The Steering Committee reviewed the locations of these water quality anomalies relative to the locations of potential yield enhancement projects and concluded that water quality impacts, if any, from new recharge at the potential yield enhancement projects would be determined and vetted during the preliminary engineering, CEQA and Watermaster Material Physical Injury review processes, and appropriate mitigation measures would be identified and committed to during these processes.

8.3.2.1.6. Institutional Challenges

The common potential institutional challenges to implement the projects listed in Table 8-2a consist of the following:

- Determination of a lead entity for California Environmental Quality Act (CEQA) review and project implementation
- Determination of who pays and who benefits
- Obtaining access to recharge sites and the ability to construct and operate recharge facilities
- Modification of the IEUA-Watermaster recharge permit to include recycled water recharge at new recharge basins and to increase recycled water recharge amounts at existing basins

Table 8-2b includes the institutional challenges at specific basins above and beyond those listed above.

8.3.2.2. Ranking of Yield Enhancement Projects

Table 8-2c contains the yield enhancement projects ranked using the Section 7 criteria and based on input from the Steering Committee. The projects are listed by management zone in order of increasing unit cost. The Project ID numbers with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project or leased to a mining operator. The Steering Committee reached consensus that all projects with unit costs of less than $600 per acre-ft would be considered for implementation. There are seven projects recommended for construction that will increase stormwater recharge by 5,000 acre-ft/yr

and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $400 per acre-ft and the capital cost is about $26,000,000. The distribution of recharge by management zone is listed below:

Distribution of New Recharge by Management Zone for the Yield Enhancement Projects (acre-ft/yr)

Management Zone	Stormwater Recharge	Recycled Water Recharge	Total
1	200	0	200
2	1,500	2,000	3,500
3	3,300	2,900	6,200
Total	5,000	4,900	9,900

Most of the new recharge is concentrated in Management Zone 3 and 2, which will contribute to production sustainability in these management zones and more specifically in the JCSD well field area.

Keeping a unit cost threshold of less than $600 per acre-ft, the projects were also ranked if the excavation costs were not reduced (Table 8-2d); as a melded unit cost (Table 8-2e), and as a melded unit cost without the reduction of the excavation costs (Table 8-2f). A review of the melded unit costs revealed that an increase in the threshold from $600 to $612 per acre-ft resulted in an additional 1,200 acre-ft of stormwater recharge as shown on Table 8-2g. The following describe the changes in the ranked project lists from Table 8-2c:

- **Without Discounted Excavation Costs (Table 8-2d).** Two projects in Management Zone 3 were eliminated from list; CSI Basin- PID 18 at $756 per acre-ft and Sierra Basin- PID 25 per $1,057 an acre-ft. Five projects would be recommended for construction that will increase stormwater recharge by about 4,900 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $430 per acre-ft and the capital cost is about $26,500,000.
- **Melded Unit Cost (Table 8-2e).** One project in Management Zone 3 and two projects in Management Zone 2 were added to the list; Declez Basin- PID 27, Turner Basin- PID 14, and Ely Basin – PID 15a. Ten projects would be recommended for construction that will increase stormwater recharge by about 5,560 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $474 per acre-ft and the capital cost is about $34,400,000.
- **Melded Unit Cost Without Discounted Excavation Costs (Table 8-2f).** One project in Management Zone 3 and one project in Management Zone 2 were added to the list; Declez Basin- PID 27, and Turner Basin- PID 14. Nine projects would be recommended for construction that will increase stormwater recharge by about 5,340 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr.

The average unit cost of stormwater recharge is about $480 per acre-ft and the capital cost is about $33,400,000.

- **Melded Unit Cost of $612 per acre-ft (Table 8-2g).** One project in Management Zone 3 and three projects in Management Zone 2 were added to the list; Declez Basin- PID 27, Turner Basin- PID 14, Ely Basin – PID 15a, and Lower San Sevaine Basin – PID 17a. Eleven projects would be recommended for construction that will increase stormwater recharge by about 6,780 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $612 per acre-ft and the capital cost is about $57,000,000.

The total capital costs increased about $8,000,000 from about $26,000,000 to about $34,000,000 when the threshold changed to a melded unit cost less than $600 per acre-ft from a unit cost of less than $600 per acre-ft. The increase in the melded unit cost from $600 to $612 per acre-ft results in a capital cost increase of about $23,000,000 from about $34,000,000 to about $57,000,000. The differences between the recommended projects with and without the reduction in excavation costs did not significantly change the average unit or capital costs. The various alternatives of the unit cost thresholds described above are shown in the summary table below:

Threshold	Yield (acre-ft/yr)	Recycled Water (acre-ft/yr)	Unit Cost ($)	Capital Cost ($)	Total Annual Cost ($)
Marginal Unit Cost < $600 (excavation discount)	5,033	4,936	415	26,252,000	2,087,887
Marginal Unit Cost < $600 (w/o excavation discount)	4,888	4,936	430	26,542,000	2,101,312
Melded Unit Cost < $600 (excavation discount)	5,560	4,936	474	34,412,000	2,638,307
Melded Unit Cost < $600 (w/o excavation discount)	5,340	4,936	480	33,402,000	2,564,345
Melded Unit Cost < $612 (excavation discount)	6,781	4,936	612	56,962,000	4,150,372

8.4. Final Project Recommendations and Implementation Plan

This section describes the overall implementation strategy, recommended projects, implementation plan and financing plan. There are two types of projects being considered in the 2013 RMPU: production sustainability and yield enhancement projects. The

magnitude of the production sustainability challenge is currently unknown and will depend on future groundwater production and recharge at existing recharge facilities, and the recharge at proposed yield enhancement projects located in Management Zones 2 and 3. The yield enhancement projects in Management Zones 2 and 3 being considered herein will provide some production sustainability benefits to the JCSD area where production sustainability challenges may occur in the future. Therefore it seems premature to recommend specific production sustainability projects ~~and associated implementation plan~~ until the magnitude of its production sustainability challenges~~the JCSD~~ can be more definitively characterized. ~~the magnitude of its production sustainability challenges.~~ The effort to definitively characterize the production sustainability challenges faced by JCSD and others is incorporated into first year of the implementation plan of the 2013 Recharge Master Plan Update.

8.4.1. Yield Enhancement and Production Sustainability Project Recommendations

Upon reviewing all available information, it is recommended that the parties proceed with additional characterization of the production sustainability challenges to determine the magnitude of sustainable groundwater production in the JCSD well field area with and without the yield enhancement projects proposed herein.

It is recommended that the yield enhancement projects listed in Table 8-2c be implemented according to the implementation and financing plan detailed in the following sections.

8.4.2. Implementation Plan

The implementation plan described below presents an orderly way to implement the yield enhancement projects and the production sustainability project(s) as needed. Time is of the essence in this implementation plan. The implementation plan is described by calendar year or years. Figure 8-3 is a graphical summary of the implementation plan.

8.4.2.1. Year 1 – 2014

Determine Need and Refine Production Sustainability Projects. The objectives of this work ~~is~~ are to definitively characterize the magnitude of the production sustainability challenges faced by the JCSD and others, and ~~-~~to define the magnitude and timing of water deliveries to the JCSD to ensure production sustainability. During this year, technical investigations will be done to define the ~~magnitude and timing~~ production sustainability challenges, to~~-~~ estimate the magnitude and timing of water deliveries to the JCSD to ensure production sustainability and to identify and refine alternative sources of supply. The end product of this work will be an optimized JCSD groundwater production plan, up to three alternative water supplies that will enable the JCSD to reduce groundwater production to sustainable levels, and a recommended project. This work will be done by the JCSD and participating Appropriators and facilitated by Watermaster.

There are benefits to developing sustainability projects as quickly as possible. Ideally sustainability projects could be developed in advance of the yield enhancement projects. Implementation of sustainability projects depend on the Appropriators willingness and ability to engage.

Contact Sand and Gravel Companies. Sand and gravel companies will be contacted to determine their interest in participating in yield enhancement projects.

Watermaster and the IEUA Yield Enhancement Project Implementation Agreement. The objective of this agreement is to define the roles of Watermaster and the IEUA in the planning, permitting, design, and implementation of the yield enhancement projects, and the cost allocations pursuant to the Peace II Agreement.

Appropriative Pool New Yield and Cost Allocation Agreement. Watermaster assumes that cost and ~~n~~New ~~y~~Yield will be allocated to the Appropriator parties based on their share of Operating Safe Yield. Any change in allocation method would first require a negotiation process to reach agreement among the appropriative pool parties. The objectives of this agreement ~~are to~~would be to determine which ~~appropriators~~ Appropriators wish to participate in the yield enhancement projects, the allocation of ~~yield~~ New Yield and cost among this group of ~~appropriators~~Appropriators, and the waiver of ~~new~~ New ~~yield~~ Yield and cost by ~~appropriators~~ Appropriators that choose not to participate in the ~~new~~ yield enhancement projects. ~~In the absence of a new agreement to allocate cost and new yield benefits, Watermaster will assume that cost and new yield will be allocated to the Appropriator parties based on their share of operating safe yield. The Appropriative Pool reserves the right to elect to allocate costs and new yield benefits based on a formula other than operating safe yield if the Appropriative Pool so chooses, as well as, applying this change on a retroactive or going forward basis from the time of determination.~~

Flood Control and Water Conservation Agreement. The parties to this agreement include San Bernardino County Flood Control District (SBCFCD), Watermaster, and the IEUA. The objectives of this agreement are to define the terms and conditions to jointly explore and construct new conservation works on SBCFCD and IEUA properties and to conduct flood control and water conservation activities utilizing those same conservation works on the properties. The agreement will define the project sites, facility improvements, construction and maintenance cost allocations, user or license fees, operating criteria (with flood control purposes taking priority over conservation for joint use facilities), and other conditions.

The SBCFCD will require Watermaster and the IEUA to fund SBCFCD engineering studies and analyses to demonstrate that all conservation improvements at flood control facilities will not negatively impact the operation and maintenance of SBCFCD facilities or reduce the level of the designed flood protection. All engineering studies and analyses shall be done and provided to SBCFCD for review and approval and an encroachment permit obtained from SBCFCD before the construction of any conservation improvements can commence. SBCFCD will require that all applicable Environmental Agencies' permits and

approvals be obtained and submitted to the SBCFCD before an encroachment permit can be issued.

Agreement with Property Owners. Develop an agreement among a property owner IEUA and Watermaster on the terms for use of land where land is required for a recharge project.

In addition to these agreements, the Watermaster will determine whether it is necessary to submit a Petition for Change with the State Water Resources Control Board for projects shown in 8-2c that are not included in the Watermaster's current diversion permits. The duration of the Petition for Change process is unknown but would likely be more than one year.

8.4.2.2. Years 2 and 3 – 2015 and 2016

Develop an Implementation Agreement among the Parties Participating in the Production Sustainability Project. The objective of this agreement would be to define the roles of the parties that would participate in the recommended production sustainability project; in the planning, permitting, design, and implementation of the production sustainability projects; and the cost allocations. This work will be done by the JCSD and participating Appropriators and facilitated by Watermaster.

Appropriative Pool Production Sustainability Cost Allocation Agreement. The objective of this agreement is to define how the Appropriators would participate in a production sustainability agreement and what, if any, production sustainability project costs will be borne by the Appropriators and how the projects costs would be allocated.

Preliminary Design of Recommended Yield Enhancement Projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to CEQA, provides information for identifying and acquiring construction and related permits, and produces updated ~~new~~ New ~~yield~~ Yield and cost estimates. This work will start in January 2015 and be completed in September 2015.

Prepare Environmental Documentation for Yield Enhancement Projects. CEQA will cover the recommended projects in Table 8-2c at the project level and the deferred projects at a programmatic level, based on the project descriptions contained herein. Watermaster will conduct a Material Physical Injury analysis in parallel with the CEQA process. This work will start in July 2015 and be completed in June 2016.

8.4.2.3. Years 3 and 4 – 2016 and 2017

Preliminary Design of Recommended Production Sustainability Projects. If new facilities are required, then one of the parties to the implementation agreement will contract for preliminary design. The level of design will be such that it enables the preparation of environmental documentation pursuant to the CEQA, provides information for identifying and acquiring construction and related permits, and produces cost estimates. This work will start in January 2016 and be completed in September 2016.

Prepare Environmental Documentation for Production Sustainability Projects. One of the parties to the implementation agreement will be the lead agency and contract for the preparation of environmental documentation. The lead agency will determine the type of environmental documentation and subsequently prepare it. This work will start in July 2016 and be completed in June 2017.

Prepare Final Designs and Acquire Permits for Production Sustainability Projects. One of the parties will contract for the development of final designs and acquire permits. This work will begin in July 2017 and be completed by December 2017.

Prepare Final Designs and Acquire Necessary Permits for the Yield Enhancement Projects. This work will begin in July 2016 and be completed by December 2017.

8.4.2.4. Years 5 and 6 – 2018 and 2019

Construct 2013 RMPU Amendment Production Sustainability Projects. One of the parties will contract for the construction of the recommended production sustainability project and construct the project during calendar 2018.

Construct 2013 RMPU Amendment Yield Enhancement Projects. The recommended projects will be constructed over the two-year period of 2018 and 2019.

8.4.3. Financing Plan

The financing plan for the production sustainability projects will developed during the second year of the implementation plan as part of the process to develop an implementation agreement among the parties participating in the production sustainability project and in the third year if some of the project costs are allocated among all Appropriators.

The financing plan for the yield enhancement projects consists of the following elements:

- Identify the IEUA and Watermaster cost share. Watermaster and the IEUA will determine each party's cost share based on the Peace II Agreement and on the benefit to the parties. This will be negotiated and memorialized in an agreement as identified in the Implementation Plan above.
- Once the scope of the Montclair Basins project is defined, the IEUA and Watermaster will request that the CBWCD consider contributing funding to recharge improvements at the Montclair Basins.
- Identify grant-funding share. The IEUA, Watermaster, and the Appropriators will combine their efforts to secure grant funding and low-interest financing from the State Water Resources Control Board, the DWR, and others.
- Allocation of cost and benefit among the Appropriators. Watermaster assumes that cost and ~~n~~New ~~y~~Yield will be allocated to the Appropriator parties based on their share of Operating Safe Yield. Any change in allocation method would first require a

negotiation process among the appropriative pool parties. ~~A NewYNYyThe Appropriators will determine the allocation of cost and new yield benefits from the recommended recharge projects. In the absence of a new agreement to allocate cost and new yield benefits, Watermaster will assume that cost and new yield will be allocated to the Appropriator parties based on their share of operating safe yield. The Appropriative Pool reserves the right to elect to allocate costs and new yield benefits based on a formula other than operating safe yield if the Appropriative Pool so chooses, as well as, applying this change on a retroactive or going forward basis from the time of determination.~~

- ~~Obtain bond financing~~Finance ~~for~~ the construction of recharge improvements. The IEUA, the TVMWD, the WMWD, and potentially certain Appropriator parties will use their ~~bonding capacity to obtain financing~~revenue structure and other means (municipal bonds, pay-as-you-go, etc. to construct the recommended yield enhancement projects.
- Apply pay-as-you-go for all the soft costs ~~of all efforts~~ through completion of the final design. The soft costs through completion of final design are:

Approximate Annual Costs for Pay-As-You-Go for All Soft Costs

Fiscal 2014	Fiscal 2015	Fiscal 2016	Fiscal 2017	Fiscal 2018
$ 100,000	$ 301,000	$ 301,000	$ 1,096,000	$ 1,096,000

- All costs associated with the development of implementing agreements, preliminary design, proof-of-concept, completion of the CEQA process, and final design will be paid for through Watermaster assessments pursuant to the Appropriative Pool New Yield and Cost Allocation Agreement.

A detailed financing plan will be developed in a process running in parallel to the development of the implementation agreements.

DRAFT Table 8-1a

Project Data for MZ3/MZ4/MZ5 Sustainability Projects[1]

Project	Benefiting Management Zone	Summary of Key Project Features	New Supply (acre-ft/yr)	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Other Annual Cost ($/acre-ft)	Supplemental Water Acquisition Cost ($)	Total Annual Cost ($)	Unit Cost ($/acre-ft)	Reliability of the Water Supply	Production Sustainability Score[4]
Min General In-Lieu	3	Construct two wells and related conveyance to move non-MZ3 groundwater or imported water to the JCSD.	5,800	$ 5,440,000	$ 354,000	$ 524,000	$ -	$ -	$ 878,000	$ 151	High	2
Max General In-Lieu	3	Construct four wells and related conveyance to move non-MZ3 groundwater or imported water to the JCSD.	11,600	$ 10,640,000	$ 692,000	$ 1,048,000	$ -	$ -	$ 1,740,000	$ 150	High	2
Chino Hills/MVWD Exchange Project	3	Chino Hills forgoes taking Desalter I water and provides that water to the JCSD. Chino Hills makes up the exchanged supply from MZ1 groundwater production or imported water treated at the WFA plant.	2,800	$ -	$ -	(see note 5 below)	$ -	$ -	(see note 5 below)		High	2
OGRP Project[2]	3	Installation of one well and extend OGRP raw water conveyance.	2,900	$ 4,222,500	$ 275,000	$ -	$ -	$ -	$ 275,000	$ 95	High	2
Ont-CDA MZ3 In-Lieu[3]	3	Ontario sale of 5,000 acre-ft/yr of their CDA water to the JCSD using existing connections.	5,000	$ -	$ -	$ -	$ 920	$ -	$ 4,600,000	$ 920	High	2

[1] The amount and timing of in-lieu supply required to ensure sustainability is unknown.

[2] The total estimated costs for the well and pipeline were derived from Table 9 of the Technical Report, Ontario Groundwater Recovery Project(Carollo, 2013). The production rate was assumed to be 2,000 gpm (2,900 acre-ft/yr at an operating factor of 90%).

[3] The Other Annual Cost for the CDA MZ3 In-Lieu project is the Fiscal Year 2013/14 gross cost/acre-ft for Ontario before the MWD local projects contribution. Source is Exhibit A of the June 6, 2013 CDA Special Board of Directors Meeting Agenda. Note that this cost does not reflect a credit for the avoided cost of pumping by JCSD.

[4] The production sustainability score is a tool to characterize a project's contribution to production sustainability in areas with sustainability challenges. Per the evaluation criteria described in Section 7, the score will be as follows: 0 – does not contribute to production sustainability, 1 – contributes minimally to production sustainability (a necessary but not sufficient condition of sustainability), and 2 – contributes significantly to production sustainability (a necessary and sufficient condition of sustainability).

[5] Annual and unit costs are unknown. The cost to produce and convey water to the JCSD could be paid for by the JCSD or some other arrangement that could involve the Watermaster. Some or all the cost to produce and convey the water to the JCSD would be offset by the JCSD's avoided cost to produce and convey its own water. There is a possibility of no new capital cost and that this alternative could be the lowest cost production sustainability alternative.

DRAFT Table 8-1b

Screening of MZ3/MZ4/MZ5 Sustainability Projects[1]

Project	New Supply (acre-ft/yr)	Unit Cost ($/acre-ft)	Capital Cost ($)	Reliability of the Water Supply	Water Quality Challenges	Ease of Implementation
Min General In-Lieu[2]	5,800	$ 151	$ 5,440,000	High	None[2]	b
Max General In-Lieu[2]	11,600	$ 150	$ 10,640,000	High	None[2]	b
Chino Hills/MVWD Exchange Project	2,800	(See note 5 on Table 8-1a)		High	None[2]	d
OGRP Project	2,900	$ 95	$ 4,222,500	High	None	c
Ont-CDA MZ3 In-Lieu	5,000	$ 920	$ -	High	None	a

[1] The amount and timing of in-lieu supply required to ensure sustainability is unknown.

[2] The water supplied will be wheeled through adjacent agency's water system where it is assumed that the water will already be potable. The new wells associated with this project will presumably be sited to avoid water quality challenges and may in fact provide water quality benefits to the source agency. That said, future groundwater degradation could occur necessitating treatment.

[3] Assumes that the water supply cost is offset by the JCSD's avoided production and annual transfer of an equal amount of water from their own production rights.

a - Requires an agreement between the City of Ontario and the JCSD. Ontario's position is that they will need to be compensated for their cost of the water.

b - Requires an agreement between the JCSD and others to construct, operate, and pay for the improvements.

c - Requires an agreement with non-Watermaster Parties that are adversarial to the project to cover VOC treatment costs and is dependent on grant funding.

d - Requires an agreement between the City of Chino Hills, the MVWD, the CDA, and the JCSD.

DRAFT Table 8-1c
Ranked MZ3/MZ4/MZ5 Sustainability Projects

Project	New Supply (acre-ft/yr)	Unit Cost ($/acre-ft)	Capital Cost ($)
Min General In-Lieu	5,800	$ 151	$ 5,440,000
Chino Hills/MVWD Exchange Project[1]	2,800	Unknown	Unknown
OGRP Project	2,900	$ 95	$ 4,222,500
Max General In-Lieu	11,600	$ 150	$ 10,640,000
Ont-CDA MZ3 In-Lieu	5,000	$ 920	$ -

[1] Annual and unit costs are unknown. The cost to produce and convey water to the JCSD could be paid for by the JCSD or some other arrangement that could involve the Watermaster. Some or all the cost to produce and convey the water to the JCSD would be offset by the JCSD's avoided cost to produce and convey its own water. There is possibility of no new capital cost and that this alternative could be the lowest cost production sustainability alternative.

DRAFT Table 8-2a
Project Data for Yield Enhancement Projects

Project ID	Project Combinations	Group[1]	Project	Man. Zone	Summary of Key Project Features	Potential Cost Share if Mutually Agreed?	Storm Water Recharge									Recycled Water Recharge							Imported Water Recharge							All Recharge			Additional Benefit	Production Sustainability Score[5]
							Baseline Storm Water Recharge (acre-ft/yr)	New Storm Water Recharge (acre-ft/yr)	Constructed for Regulatory Compliance?	Project Complete?	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Storm Water Recharge Unit Cost[2]	New Recycled Water Recharge (acre-ft/yr)	Recycled Water Acquisition Cost[3]	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Recycled Water Recharge Unit Cost[2]	New Imported Water Recharge (acre-ft/yr)	Imported Water Acquisition Cost[4]	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Imported Water Recharge Unit Cost[2]	Total New Storm and Supplemental Water (acre-ft/yr)	Total Capital Cost ($)	Total Unit Cost of All New Recharge		
Proposed Projects in Table 6-1 that Were Analyzed in Detail																																	
1		i	Montclair Basins	1	Transfer water between Montclair Basins and deepen MC 4	N	1,188	71	N	N	$ 5,450,000	$ 354,500	$ 2,631	$ 357,131	$ 4,997	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	71	$ 5,450,000	$ 4,997		0
1a		i	Montclair Basins	1	Transfer water between Montclair Basins and deepen MC 4	N	1,188	71	N	N	$ 5,050,000	$ 328,500	$ 2,631	$ 331,131	$ 4,633	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	71	$ 5,050,000	$ 4,633		0
2		i	Montclair Basins	1	New drop inlet structures to MC 2 and MC 3	N	1,188	248	N	N	$ 1,440,000	$ 93,700	$ 9,132	$ 102,832	$ 415	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	248	$ 1,440,000	$ 415		0
3		i	Montclair Basins	1	Automate inlet to MC 1[6]	N	1,188	0	N	N	$ 50,000	$ 3,300	$ (6,000)	$ (2,700)	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 50,000	$ -	Y[19]	0
4		i	Montclair Basins	1	Construct low-level drains from Basin 1 to 2 and 2 to 3	N	1,188	0	N	N	$ 790,000	$ 51,400	$ -	$ 51,400	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 790,000	$ -		0
5		i	North West Upland Basin	1	Increase drainage area and basin enlargement	N	29	93	N	N	$ 5,490,000	$ 357,100	$ 3,441	$ 360,541	$ 3,858	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	93	$ 5,490,000	$ 3,858		0
5a		i	North West Upland Basin	1	Increase drainage area and basin enlargement	N	29	93	N	N	$ 4,640,000	$ 301,800	$ 3,441	$ 305,241	$ 3,266	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	93	$ 4,640,000	$ 3,266		
6		i	Princeton Basin	2	Basin enlargement and increased drainage area[22]	N	48	0	N	N	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -		0
7		ii	San Sevaine Basins	2	Construct pump station, pump water from SS 5 to SS 3, and construct internal berm in SS 5[7]	Y	1,177	642	N	N	$ 1,775,000	$ 115,500	$ 23,641	$ 139,141	$ 217	1,911	$ 372,645	$ 1,775,000	$ 115,500	$ 45,311	$ 533,456	$ 279	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	2,553	$ 3,550,000	$ 263		0
8		ii	San Sevaine Basins	2	Extend IEUA recycled water pipeline to SS 3 and construct internal berm in SS 5[7]	Y	1,177	345	N	N	$ 1,310,000	$ 85,200	$ 12,719	$ 97,919	$ 283	1,911	$ 372,645	$ 1,310,000	$ 85,200	$ 45,311	$ 503,156	$ 263	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	2,256	$ 2,620,000	$ 266		0
9		i	San Sevaine Basins	2	Construct internal berms in SS 1 and SS 2 and install a gate between SS 1 and SS 2	N	1,177	0	N	N	$ 300,000	$ 19,500	$ -	$ 19,500	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 300,000	$ -	Y[20]	0
10		i	San Sevaine Basins	2	Increase CB13T capacity and power supply	N	1,177	0	N	N	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	1,235	$ 766,935	$ 1,980,000	$ 128,800	$ 29,283	$ 925,018	$ 749	1,235	$ 1,980,000	$ 749		0
11		i	Victoria Basin	2	Abandon the mid-level outlet and extend the lysimeters	Y	439	43	N	N	$ 75,000	$ 4,900	$ 1,576	$ 6,476	$ 151	120	$ 23,400	$ 75,000	$ 4,900	$ 2,845	$ 31,145	$ 260	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	163	$ 150,000	$ 231		0
12		ii	Lower Day Basin (2010 RMPU)	2	Inlet improvements, rebuilding embankment, elimination of mid-level outlet	N	395	789	N	N	$ 2,480,000	$ 161,300	$ 29,041	$ 190,341	$ 241	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	789	$ 2,480,000	$ 241		0
13		ii	Lower Day Basin	2	Install gate on mid-level outlet	N	395	75	N	N	$ 600,000	$ 39,000	$ 2,777	$ 41,777	$ 554	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	75	$ 600,000	$ 554		0
14		i	Turner Basin	2	Raise Turner 2 spillway[8]	N	1,226	66	N	N	$ 890,000	$ 57,900	$ 2,426	$ 60,326	$ 916	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	66	$ 890,000	$ 916		1
15		i	Ely Basin	2	Basin enlargement and increased drainage area	N	1,103	221	N	N	$ 9,120,000	$ 593,300	$ 8,122	$ 601,422	$ 2,726	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	221	$ 9,120,000	$ 2,726		0
15a		i	Ely Basin	2	Basin enlargement and increased drainage area	N	1,103	221	N	N	$ 3,200,000	$ 208,200	$ 8,122	$ 216,322	$ 981	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	221	$ 3,200,000	$ 981		
16		i	Ontario Bioswale Project	2	New bioswale	N	0	8	Y	Y	$ 650,000	$ 42,300	$ 277	$ 42,577	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	8	$ 650,000	$ -		0
17		i	Lower San Sevaine Basin (2010 RMPU)	2	New basin	Y	0	1,221	N	N	$ 22,715,000	$ 1,477,600	$ 44,947	$ 1,522,547	$ 1,247	500	$ 97,500	$ 22,715,000	$ 1,477,600	$ 11,855	$ 1,586,955	$ 3,174	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1,721	$ 45,430,000	$ 1,807		0
17a		i	Lower San Sevaine Basin (2010 RMPU)	2	New basin	N	0	1,221	N	N	$ 11,275,000	$ 733,500	$ 44,947	$ 778,447	$ 638	500	$ 97,500	$ 11,275,000	$ 733,500	$ 11,855	$ 842,855	$ 1,686	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1,721	$ 22,550,000	$ 942		0
18		i	CSI Storm Water Basin	3	Deepen basin by 10 feet	N	72	81	N	N	$ 900,000	$ 58,500	$ 2,998	$ 61,498	$ 755	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	81	$ 900,000	$ 755		0
18a		i	CSI Storm Water Basin	3	Deepen basin by 10 feet	N	72	81	N	N	$ 440,000	$ 28,600	$ 2,998	$ 31,598	$ 388	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	81	$ 440,000	$ 388		0
19		iii	Wineville Basin (2010 RMPU)	3	Gate the low-elevation outlet, replace embankment with dam, and construct a pneumatic gate on the spillway[9]	Y	5	2,157	N	N	$ 3,140,000	$ 204,300	$ 79,438	$ 283,738	$ 132	630	$ 122,850	$ 3,140,000	$ 204,300	$ 14,938	$ 342,088	$ 543	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	2,787	$ 6,280,000	$ 225		2
19a		iii	Wineville Basin (2010 RMPU)	3	Gate the low-elevation outlet, replace embankment with dam, and construct a pneumatic gate on the spillway[9]	Y	5	2,157	N	N	$ 2,445,000	$ 159,100	$ 79,438	$ 238,538	$ 111	630	$ 122,850	$ 2,445,000	$ 159,100	$ 14,938	$ 296,888	$ 471	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	2,787	$ 4,890,000	$ 192		2
20		iii	Jurupa Basin	3	Inlet improvements and CB-18 turnout modifications	N	234	421	N	N	$ 2,150,000	$ 139,900	$ 15,516	$ 155,416	$ 369	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	421	$ 2,150,000	$ 369	Y[21]	2
21		ii	RP3 Basin Improvements (2010 RMPU)	3	Inlet improvements and enlargement	N	628	406	N	N	$ 22,044,000	$ 1,434,000	$ 14,931	$ 1,448,931	$ 3,573	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	406	$ 22,044,000	$ 3,573		2
21a		ii	RP3 Basin Improvements (2010 RMPU)	3	Inlet improvements and enlargement	N	628	406	N	N	$ 13,464,000	$ 875,900	$ 14,931	$ 890,831	$ 2,197	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	406	$ 13,464,000	$ 2,197		
22		ii, iii	RP3 Basin Improvements (2013 RMPU)	3	Increase conservation storage[10]	Y	628	137	N	N	$ 2,645,000	$ 172,100	$ 5,062	$ 177,162	$ 1,289	2,905	$ 566,475	$ 2,645,000	$ 172,100	$ 68,879	$ 807,454	$ 278	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	3,042	$ 5,290,000	$ 324		2
22a		ii, iii	RP3 Basin Improvements (2013 RMPU)	3	Increase conservation storage[10]	Y	628	137	N	N	$ 1,855,000	$ 120,700	$ 5,062	$ 125,762	$ 915	2,905	$ 566,475	$ 1,855,000	$ 120,700	$ 68,879	$ 756,054	$ 260	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	3,042	$ 3,710,000	$ 290		2
23	Includes PID's 19,20,22	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	2010 RMPU Proposed Wineville Basin Improvements, Wineville 20 cfs PS to Jurupa, Improved Jurupa Basin Inlet, 40 cfs PS to RP3 Basin with Proposed 2013 RMPU RP3	Y	867	3,166	N	N	$ 11,662,000	$ 758,600	$ 311,014	$ 1,069,614	$ 338	3,535	$ 689,325	$ 11,662,000	$ 758,600	$ 83,817	$ 1,531,742	$ 433	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	6,701	$ 23,324,000	$ 388		2
23a	Includes PID's 19,20,22	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	2010 RMPU Proposed Wineville Basin Improvements, Wineville 20 cfs PS to Jurupa, Improved Jurupa Basin Inlet, 40 cfs PS to RP3 Basin with Proposed 2013 RMPU RP3	Y	867	3,166	N	N	$ 10,657,000	$ 693,300	$ 311,014	$ 1,004,314	$ 317	3,535	$ 689,325	$ 10,657,000	$ 693,300	$ 83,817	$ 1,466,442	$ 415	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	6,701	$ 21,314,000	$ 369		2
24		i	Vulcan Pit	3	Construct new inflow and outflow structures[11]	Y	0	857	N	N	$ 13,850,000	$ 901,000	$ 31,548	$ 932,548	$ 1,088	840	$ 163,800	$ 13,850,000	$ 901,000	$ 19,917	$ 1,084,717	$ 1,291	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1,697	$ 27,700,000	$ 1,189		1
25		i	Sierra	3	Deepen basin by 10 feet	N	12	64	N	N	$ 1,000,000	$ 65,100	$ 2,351	$ 67,451	$ 1,056	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	64	$ 1,000,000	$ 1,056		1
25a		i	Sierra	3	Deepen basin by 10 feet	N	12	64	N	N	$ 490,000	$ 31,900	$ 2,351	$ 34,251	$ 536	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	64	$ 490,000	$ 536		1
26		i	Sultana Avenue	3	Deepen basin by 10 feet	N	89	7	N	N	$ 1,026,200	$ 66,800	$ 258	$ 67,058	$ 9,556	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	7	$ 1,026,200	$ 9,556		1
26a		i	Sultana Avenue	3	Deepen basin by 10 feet	N	89	7	N	N	$ 502,200	$ 32,700	$ 258	$ 32,958	$ 4,697	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	7	$ 502,200	$ 4,697		1
27		i	Declez Basin	3	Reconstruct existing embankment and install a gate on the low level outlet[12]	N	674	241	N	N	$ 4,070,000	$ 264,800	$ 8,877	$ 273,677	$ 1,135	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	241	$ 4,070,000	$ 1,135		2
Operations and Maintenance[13]																																	
28		ii	Banana Basin (annual cleaning)	3	Increase frequency of basin maintenance (Increased infiltration rate to 0.6 ft/day)	Y	317	11	N	N			$ 3,183	$ 3,183	$ 294	130	$ 25,350	$ -	$ -	$ 38,159	$ 63,509	$ 489	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	141		$ 474		0
29		ii	Banana Basin (semiannual cleanings)	3	Increase frequency of basin maintenance (Increased infiltration rate to 0.72 ft/day)	Y	317	31	N	N			$ 15,192	$ 15,192	$ 495	155	$ 30,225	$ -	$ -	$ 76,744	$ 106,969	$ 690	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	186		$ 658		0
30		ii	Declez Basin (annual cleaning)	3	Increase basin maintenance frequency (Increased infiltration rate to 0.66 ft/day)	Y	674	16	N	N			$ 6,537	$ 6,537	$ 409	178	$ 34,710	$ -	$ -	$ 72,735	$ 107,445	$ 604	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	194		$ 588		0
31		ii	Declez Basin (semiannual cleanings)	3	Increase basin maintenance frequency (Increased infiltration rate to 0.78 ft/day)	Y	674	47	N	N			$ 32,923	$ 32,923	$ 701	210	$ 40,950	$ -	$ -	$ 147,109	$ 188,059	$ 896	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	257		$ 860		0
32		ii	Ely Basin (annual cleaning)	2	Increase maintenance frequency (Increased infiltration rate to 0.27 ft/day)	Y	1,103	44	N	N			$ 29,450	$ 29,450	$ 668	217	$ 42,315	$ -	$ -	$ 144,868	$ 187,183	$ 863	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	261		$ 830		0
33		ii	Ely Basin (semiannual cleanings)	2	Increase maintenance frequency (Increased infiltration rate to 0.33 ft/day)	Y	1,103	128	N	N			$ 127,949	$ 127,949	$ 997	258	$ 50,310	$ -	$ -	$ 257,342	$ 307,652	$ 1,192	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	386		$ 1,128		0
34		ii	Hickory Basin (annual cleaning)	2	Increase frequency of basin maintenance (Increased infiltration rate to 0.44 ft/day)	Y	353	7	N	N			$ 3,812	$ 3,812	$ 518	148	$ 28,860	$ -	$ -	$ 76,622	$ 105,482	$ 713	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	155		$ 703		0
35		ii	Hickory Basin (semiannual cleanings)	2	Increase frequency of basin maintenance (Increased infiltration rate to 0.52 ft/day)	Y	353	20	N	N			$ 17,640	$ 17,640	$ 877	175	$ 34,125	$ -	$ -	$ 153,435	$ 187,560	$ 1,072	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	195		$ 1,052		0
Proposed Projects in Table 6-1 that Were Not Analyzed																																	
36			Turner Expansion	2	Basin improvements to the basins east of Archibald Ave and new basins adjacent to Turner 4[14]																														
37			Upland Basin	1	Construct low level drain[15]																														
38			College Heights	1	Construct internal berms to reduce seepage to the Upland basin[16]																														
39			Lower Cucamonga Basin	2	Basin enlargement for distribution[17]																														
40			Management Zones 2 and 3 Capture, Pump and Recharge	2,3	Capture water in MZ-2 and 3 basins low in the system and pump to basins higher in the system[17]																														
41			Jurupa Basin	3	Inlet improvements and basin enlargement[17]																														
42			RP3 Basins	3	Inlet improvements[18]																														
43			Alder Basin	3	Deepen basin[17]																														

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; iv- the project is included in a "iii" group.
[2] The results of this table provide an estimate of the cost per acre-ft of recharge. These estimates are reconnaissance level (level 5) estimates, and additional technical work needs to be done to assure feasibility.
[3] The IEUA recycled water recharge rate was assumed to be $195/acre-ft per Table 2-9.
[4] The MWD imported water recharge rate was assumed to be untreated Tier 1 Service at a price of $621 an acre-ft per Table 2-9.
[5] The production sustainability score is a tool to characterize a project's contribution to production sustainability in areas with sustainability challenges. In simple terms, the score is as follows: 0 – does not contribute to production sustainability; 1 – contributes minimally to production sustainability (a necessary but not sufficient condition of sustainability); 2 – contributes significantly to production sustainability (a necessary and sufficient condition of sustainability).
[6] The automation of the inlet gate and flume data to MC 1 results in a reduction of O&M.
[7] With a 40-percent RWC limitation, an additional 1,911 acre-ft/yr of recycled water can be recharged.
[8] The baseline for the Turner 2 Spillway Project and the Turner Expansion includes the recharge from Turner 1, 2, 3, and 4.
[9] The results from the Wineville proof-of-concept project may render the project infeasible. Recycled water recharge was estimated to be 630 acre-ft/yr, assuming an infiltration rate of 0.10 ft/day over 30 acres.
[10] The maximum amount of recycled water that can be recharged is 12,800 acre-ft/yr at RP3 due to the RWC.
[11] Recycled water recharge based upon an estimated 0.1 ft/day infiltration at 40-acres for 7-months of operations. Actual RWC is unknown; recharge based upon an assumed RWC at 25% with the following flows: 840 AFY storm water, 1,800 AFY underflow, and diluent water the same at Banana Basin. The project includes the price of land at $14 million.
[12] Recycled water recharge operations will not benefit from the increased operating level.
[13] Based on available information, it can be assumed that basin infiltration can be increased 10 to 20% with annual cleaning and 20 to 50 % with cleaning twice a year. Field data needs to be established to determine optimum cleaning frequencies per basin.
[14] The Turner Basin expansion project was not included because it is currently under construction.
[15] The Upland Basin Project was removed by the IEUA because the basin performs well, and limited cleaning is needed.
[16] The College Heights project does not affect stormwater recharge.
[17] The projects did not pass the screening criteria and were not considered.
[18] The estimated total stormwater recharge gained by the 2010 RMPU RP3 inlet improvement is comparable to the currently achievable stormwater recharge at RP3 due to enhance stormwater recharge efforts by IEUA.
[19] Reduces the amount of lost water due to basin inlet constraints and clogging.
[20] Will increase the amount of time water can be recharged in SS-1 by solving the vector control issues.
[21] Will allow the Jurupa Basin to accept an additional 15 cfs from the CB 18 if Hickory and Banana Basins were offline.
[22] The SBCFCD did not allow the City of Ontario to connect the new 5th Street storm drain to the Princeton Basin. The SBCFCD required improvements to the Princeton Basin such as enlarging the basin by purchasing the adjacent property, deepening the basin, and enlarging the outlet structures in order to allow the diversion of the 15th St storm drain to the Princeton Basin. These costs made the improvement infeasible. The City of Ontario connected the 60" storm drain to the West Cucamonga channel to the south of the Princeton Basin. This information was not presented until after the model runs and cost estimates were completed.
a - The project includes excavation costs, and the capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

DRAFT Table 8-2b
Screening of Yield Enhancement Projects

Project ID	Project	Management Zone	Capital Cost	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	New Yield	Recycled Water	Unit Cost	Water Quality Challenges	Institutional Challenges
1	Montclair Basins	1	$ 5,450,000	$ 354,500	$ 2,644	$ 357,144	71	0	$ 4,997		c
1a	Montclair Basins	1	$ 5,050,000	$ 328,500	$ 2,644	$ 331,144	71	0	$ 4,634		c
2	Montclair Basins	1	$ 1,440,000	$ 93,700	$ 9,176	$ 102,876	248	0	$ 415		c
3	Montclair Basins	1	$ 50,000	$ 3,300	$ -	$ 3,300	0	0	--		c
4	Montclair Basins	1	$ 790,000	$ 51,400	$ -	$ 51,400	0	0	--		c
5	North West Upland Basin	1	$ 5,490,000	$ 357,100	$ 3,458	$ 360,558	93	0	$ 3,858		c, g
5a	North West Upland Basin	1	$ 4,640,000	$ 301,800	$ 3,458	$ 305,258	93	0	$ 3,267		c, g
6	Princeton Basin	2	$ -	$ -	$ -	$ -	0	0	--		c
7	San Sevaine Basins	2	$ 1,775,000	$ 115,500	$ 23,756	$ 139,256	642	1,911	$ 217		c, e, f
8	San Sevaine Basins	2	$ 2,620,000	$ 170,400	$ 12,781	$ 183,181	345	1,911	$ 530		c, e
9	San Sevaine Basins	2	$ 300,000	$ 19,500	$ -	$ 19,500	0	0	--		c
10	San Sevaine Basins	2	$ 1,980,000	$ 128,800	$ -	$ 128,800	0	0	--		c
11	Victoria Basin	2	$ 75,000	$ 4,900	$ 1,584	$ 6,484	43	120	$ 151		c, e, f
12	Lower Day Basin (2010 RMPU)	2	$ 2,480,000	$ 161,300	$ 29,182	$ 190,482	789	0	$ 242		c
13	Lower Day Basin	2	$ 600,000	$ 39,000	$ 2,791	$ 41,791	75	0	$ 554		c
14	Turner Basin	2	$ 890,000	$ 57,900	$ 2,438	$ 60,338	66	0	$ 916		c
15	Ely Basin	2	$ 9,120,000	$ 593,300	$ 8,162	$ 601,462	221	0	$ 2,727	b	
15a	Ely Basin	2	$ 3,200,000	$ 208,200	$ 8,162	$ 216,362	221	0	$ 981	b	
16	Ontario Bioswale Project	2	$ 650,000	$ 42,300	$ 279	$ 42,579	8	0	$ 5,652		
17	Lower San Sevaine Basin (2010 RMPU)	2	$ 45,430,000	$ 2,955,300	$ 45,165	$ 3,000,465	1,221	500	$ 2,458		d, e
17a	Lower San Sevaine Basin (2010 RMPU)	2	$ 22,550,000	$ 1,466,900	$ 45,165	$ 1,512,065	1,221	500	$ 1,239		d, e
18	CSI Storm Water Basin	3	$ 900,000	$ 58,500	$ 3,012	$ 61,512	81	0	$ 756	b	g
18a	CSI Storm Water Basin	3	$ 440,000	$ 28,600	$ 3,012	$ 31,612	81	0	$ 388	b	g
19	Wineville Basin (2010 RMPU)	3	$ 6,280,000	$ 408,500	$ 79,824	$ 488,324	2,157	630	$ 226	b	
19a	Wineville Basin (2010 RMPU)	3	$ 4,890,000	$ 318,100	$ 79,824	$ 397,924	2,157	630	$ 184	b	
20	Jurupa Basin	3	$ 2,150,000	$ 139,900	$ 15,591	$ 155,491	421	0	$ 369		
21	RP3 Basin Improvements (2010 RMPU)	3	$ 22,044,000	$ 1,434,000	$ 15,004	$ 1,449,004	406	0	$ 3,573		
21a	RP3 Basin Improvements (2010 RMPU)	3	$ 13,464,000	$ 875,900	$ 15,004	$ 890,904	406	0	$ 2,197		
22	RP3 Basin Improvements (2013 RMPU)	3	$ 2,645,000	$ 172,100	$ 5,087	$ 177,187	137	2,905	$ 1,289		f
22a	RP3 Basin Improvements (2013 RMPU)	3	$ 1,855,000	$ 120,700	$ 5,087	$ 125,787	137	2,905	$ 915		f
23	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	$ 23,324,000	$ 1,517,300	$ 311,014	$ 1,828,314	3,166	3,535	$ 577		d, e
23a	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	$ 21,314,000	$ 1,386,500	$ 311,014	$ 1,697,514	3,166	3,535	$ 536		d, e
24	Vulcan Pit	3	$ 27,700,000	$ 1,801,900	$ 31,701	$ 1,833,601	857	840	$ 2,140	b	d, e, g
25	Sierra	3	$ 1,000,000	$ 65,100	$ 2,362	$ 67,462	64	0	$ 1,057		g
25a	Sierra	3	$ 490,000	$ 31,900	$ 2,362	$ 34,262	64	0	$ 537		g
26	Sultana Avenue	3	$ 1,026,200	$ 66,800	$ 260	$ 67,060	7	0	$ 9,556		g
26a	Sultana Avenue	3	$ 502,200	$ 32,700	$ 260	$ 32,960	7	0	$ 4,697		g
27	Declez Basin	3	$ 4,070,000	$ 264,800	$ 8,920	$ 273,720	241	0	$ 1,135		
28	Banana Basin (annual cleaning)	3					11	130	$ 294		
29	Banana Basin (semiannual cleanings)	3					31	155	$ 495		
30	Declez Basin (annual cleaning)	3					16	178	$ 409		
31	Declez Basin (semiannual cleanings)	3					47	210	$ 701		
32	Ely Basin (annual cleaning)	2					44	217	$ 668	b	
33	Ely Basin (semiannual cleanings)	2					128	258	$ 997	b	
34	Hickory Basin (annual cleaning)	2					7	148	$ 518		
35	Hickory Basin (semiannual cleanings)	2					20	175	$ 877		

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.

Key to Water Quality Challenges

b - A potential water quality challenge has been identified with this project.

Key to Institutional Challenges

c - An agreement will be required with the property owner to construct and operate stormwater recharge facilities. Other agreements with resource agencies may also be required. The time required to negotiate and approve these agreements could range from one to two years.

d - This basin is not currently included in the Watermaster/IEUA recharge permit. Therefore, the existing permit will need to be amended to include recycled water at this basin. The time required to prepare the Title 22 engineering report and regulatory process is about two years.

e - The project includes a recycled water recharge component. The IEUA has discretion as to whether to participate or not in this project.

f - At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared. The capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

g - The Watermaster will have to submit a Petition for Change with the State Water Resources Control Board for the project because it is not included in the Watermaster's current diversion permits.

DRAFT Table 8-2c
Ranked Yield Enhancement Projects

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 500	$ 19,552,000	$ 1,582,914
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
Total MZ3			**3,311**	**2,905**	**$ 498**	**$ 20,482,000**	**$ 1,648,788**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
Total MZ2			**1,474**	**2,031**	**$ 228**	**$ 4,330,000**	**$ 336,222**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,033**	**4,936**	**$ 415**	**$ 26,252,000**	**$ 2,087,887**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 915	$ 1,855,000	$ 125,787

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23a includes Project IDs 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22a. The capital costs associated with Project IDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22a. The recycled water recharge associated with Project ID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23a is about $21,300,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.

DRAFT Table 8-2d
Ranked Yield Enhancement Projects (Without Discounted Excavation Costs)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
23	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 525	$ 20,772,000	$ 1,662,214
Total MZ3			**3,166**	**2,905**	**$ 525**	**$ 20,772,000**	**$ 1,662,214**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
Total MZ2			**1,474**	**2,031**	**$ 228**	**$ 4,330,000**	**$ 336,222**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**4,888**	**4,936**	**$ 430**	**$ 26,542,000**	**$ 2,101,312**
Other Projects							
19	iii	Wineville Basin (2010 RMPU)	2,157	2,905	$ 226	$ 6,280,000	$ 488,324
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	0	$ 1,289	$ 2,645,000	$ 177,187

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23 includes Project IDs 19, 20, and 22 and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22. The capital costs associated with Project IDs 19 and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22. The recycled water recharge associated with Project ID 19 was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23 is about $23,324,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

DRAFT Table 8-2e
Ranked Yield Enhancement Projects (Melded Unit Cost Under $600 acre-ft)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 500	$ 19,552,000	$ 1,582,914
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
27	i	Declez Basin	241	0	$ 1,135	$ 4,070,000	$ 273,720
Total MZ3			**3,552**	**2,905**	**$ 541**	**$ 24,552,000**	**$ 1,922,509**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
14	i	Turner Basin	66	0	$ 916	$ 890,000	$ 60,338
15a	i	Ely Basin	221	0	$ 981	$ 3,200,000	$ 216,362
Total MZ2			**1,760**	**2,031**	**$ 348**	**$ 8,420,000**	**$ 612,922**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,560**	**4,936**	**$ 474**	**$ 34,412,000**	**$ 2,638,307**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 915	$ 1,855,000	$ 125,787

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23a includes Project IDs 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22a. The capital costs associated with Project IDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22a. The recycled water recharge associated with Project ID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23a is about $21,300,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.

DRAFT Table 8-2f

Ranked Yield Enhancement Projects (Melded Unit Cost Under $600 acre-ft Without Discounted Excavation Costs)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
23	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 525	$ 20,772,000	$ 1,662,214
18	i	CSI Storm Water Basin	81	0	$ 756	$ 900,000	$ 61,512
25	i	Sierra	64	0	$ 1,057	$ 1,000,000	$ 67,462
27	i	Declez Basin	241	0	$ 1,135	$ 4,070,000	$ 273,720
Total MZ3			**3,552**	**2,905**	**$ 581**	**$ 26,742,000**	**$ 2,064,909**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
14	i	Turner Basin	66	0	$ 916	$ 890,000	$ 60,338
Total MZ2			**1,539**	**2,031**	**$ 258**	**$ 5,220,000**	**$ 396,560**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,340**	**4,936**	**$ 480**	**$ 33,402,000**	**$ 2,564,345**
Other Projects							
19	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 6,280,000	$ 488,324
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 1,289	$ 2,645,000	$ 177,187

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23 includes Project IDs 19, 20, and 22 and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22. The capital costs associated with Project IDs 19 and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22. The recycled water recharge associated with Project ID 19 was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23 is about $23,324,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

DRAFT Table 8-2g
Ranked Yield Enhancement Projects (Melded Unit Cost Under $612 acre-ft)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 500	$ 19,552,000	$ 1,582,914
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
27	i	Declez Basin	241	0	$ 1,135	$ 4,070,000	$ 273,720
Total MZ3			**3,552**	**2,905**	**$ 541**	**$ 24,552,000**	**$ 1,922,509**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
14	i	Turner Basin	66	0	$ 916	$ 890,000	$ 60,338
15a	i	Ely Basin	221	0	$ 981	$ 3,200,000	$ 216,362
17a	i	Lower San Sevaine Basin (2010 RMPU)	1,221	0	$ 1,239	$ 22,550,000	$ 1,512,065
Total MZ2			**2,981**	**2,031**	**$ 713**	**$ 30,970,000**	**$ 2,124,987**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**6,781**	**4,936**	**$ 612**	**$ 56,962,000**	**$ 4,150,372**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 915	$ 1,855,000	$ 125,787

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

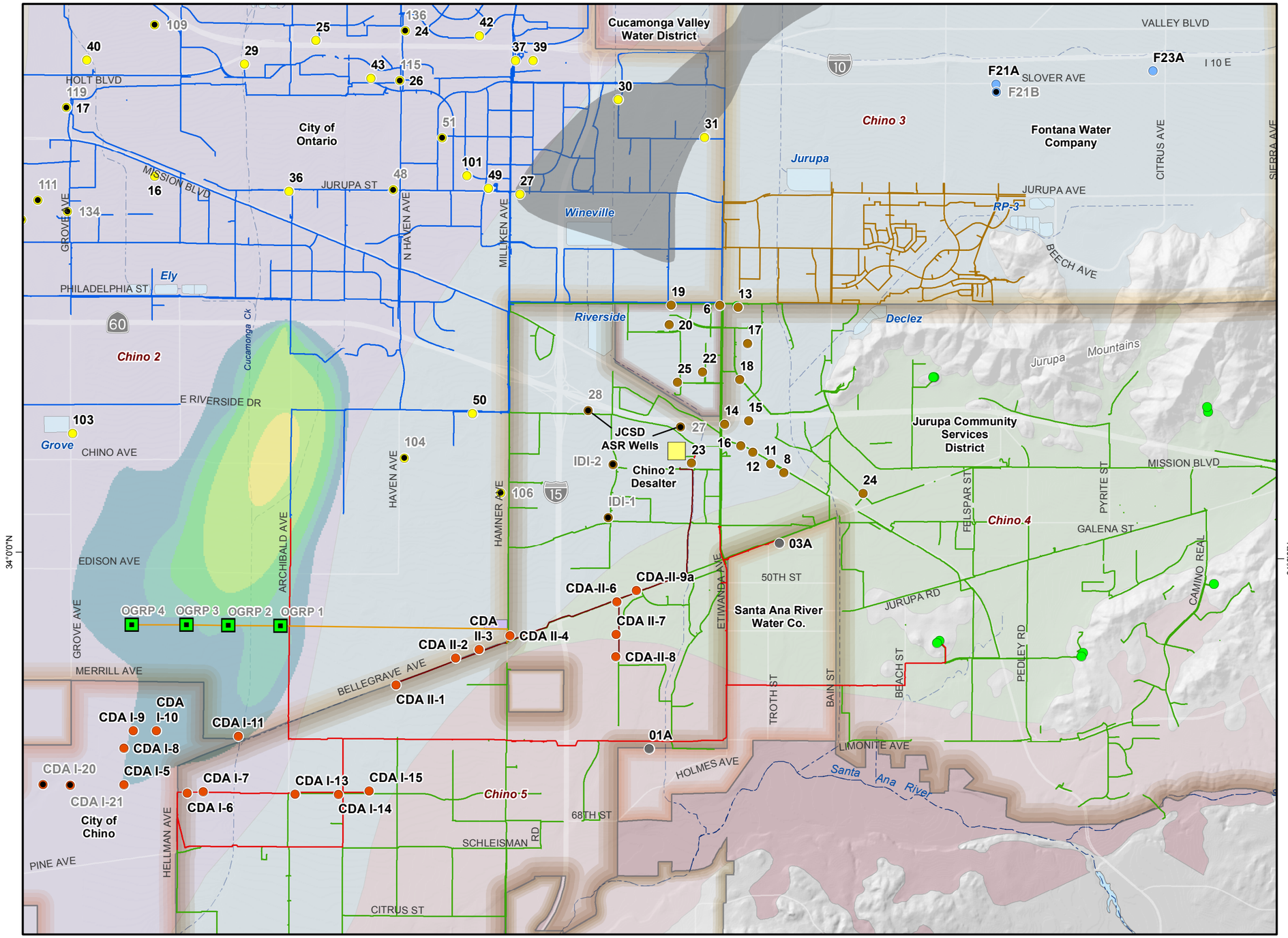
[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23a includes Project IDs 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22a. The capital costs associated with Project IDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22a. The recycled water recharge associated with Project ID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23a is about $21,300,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.



Water Supply Infrastructure

- City of Ontario Potable Water Mainlines
- JCSD Potable Water Mainlines
- FWC Potable Water Mainlines
- CDA Desalter I Product Water Pipeline
- CDA Desalter II Raw Water Pipeline
- JCSD Storage Reservoir
- OGRP Well
- OGRP Convyance Pipelines

Archibald South
VOC Concentration (ug/L)

- > 0 and ≤ 5
- > 5 and ≤ 10
- > 10 and ≤ 20
- > 20 and ≤ 50
- > 50 and ≤ 100

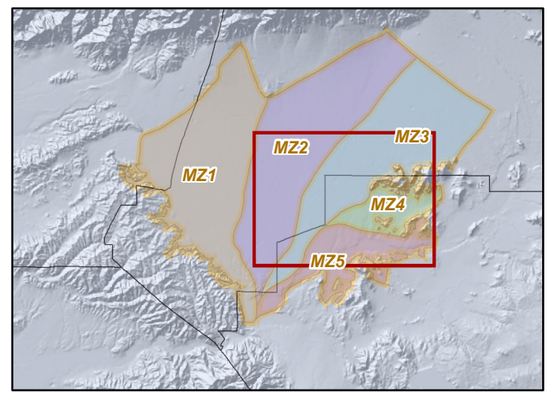
Production Wells

- Chino Desalter Authority
- City of Ontario
- Fontana Water Company
- Jurupa Community Services District
- Other Appropriators

Note: A black dot and gray label indicates that the well is not currently active but will be in the future or is a planned well

Other Features

- Flood Control and Conservation Basins



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Author: MJC
Date: 7/29/2013
Name: Figure_8_in_lieu

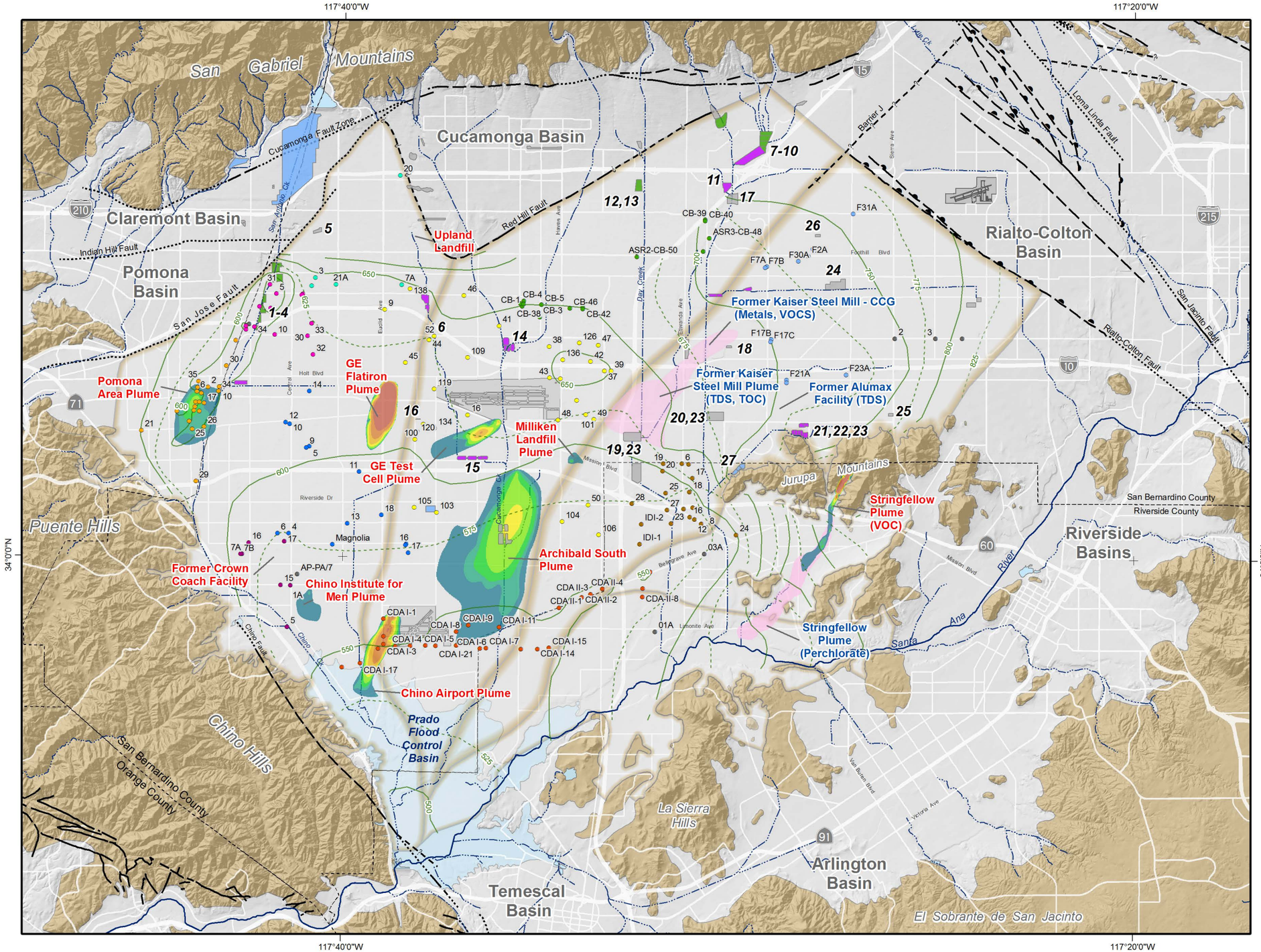
0 1 Miles
0 2 Kilometers

DRAFT

2012 Recharge Masterplan Update

In-Lieu Recharge/Exchange Project Configurations Submitted by Steering Committee Members

Figure 8-1



VOC Concentration (ug/L)

- > 0 and ≤ 5
- > 5 and ≤ 10
- > 10 and ≤ 20
- > 20 and ≤ 50
- > 50 and ≤ 100
- > 100 and ≤ 200
- > 200 and ≤ 500
- > 500

The VOC plumes shown on this map are generalized illustrations of the estimated spatial extent of TCE or PCE, based on maximum concentration measured over the 5-year period of August 2007 to July 2012. Interpretations of plume extent and boundary delineation were made based on measured concentrations and local groundwater flow patterns.

Other plumes (labeled by name and dominant contaminant)

1 — Yield Enhancement Project (Project ID is for locational reference from Table 8-2b)

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Spring 2012 Groundwater Elevation Contours *(feet above mean sea-level)*

CDA & Appropriator Production Wells

- Chino Desalter Authority
- City of Chino
- City of Chino Hills
- City of Ontario
- City of Pomona
- City of Upland
- Cucamonga Valley Water District
- Fontana Water Company
- Jurupa Community Services District
- Monte Vista Water District
- Other Appropriators

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Date: 20130612
File: Figure_8-_WQ_v2.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2013 Amendment to the 2010 RMPU

Delineation of Groundwater Contamination Plumes and Point-Sources of Concern in Relation to the Yield Enhancement Projects

Figure 8-2

Figure 8-3
Implementation Plan and Schedule

Implementation Step	Project Type (PS or YE)	Implementation Period											
		2014		2015		2016		2017		2018		2019	
Determine Need and Refine Production Sustainability Projects	PS												
Contact Sand and Gravel Companies	YE												
Watermaster and the IEUA Yield Enhancement Project Implementation Agreement	YE												
Appropriative Pool New Yield and Cost Allocation Agreement	YE												
Flood Control and Water Conservation Agreement	YE												
Select Final Set of Projects from the 2013 RMPU for Implementation	YE					*							
Determine the Need for Production Sustainability Projects	PS					*							
Develop an Implementation Agreement among the Parties Participating in the Production Sustainability Project	PS												
Appropriative Pool Production Sustainability Cost Allocation Agreement	PS												
Preliminary Design of Recommended Yield Enhancement Projects	YE												
Prepare Environmental Documentation	YE												
Preliminary Design of Recommended Production Sustainability Projects	PS												
Prepare Environmental Documentation for Production Sustainability Projects	PS												
Prepare Final Designs and Acquire Permits for Production Sustainability Projects	PS												
Prepare Final Designs and Acquire Permits for Yield Enhancement Projects	YE												
Construct 2013 RMPU Amendment Production Sustainability Projects	PS												
Construct 2013 RMPU Amendment Yield Enhancement Projects	YE												