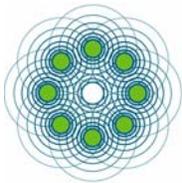


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# Los Angeles Basin Water Augmentation Study Neighborhood Retrofit Project Concept Plan

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March 2006



**The Los Angeles and San Gabriel Rivers  
Watershed Council**

and



**TreePeople**

TREEPEOPLE

Funding Provided By:

**RECLAMATION**  
*Managing Water in the West*



**Los Angeles & San Gabriel Rivers Watershed Council  
Los Angeles Basin Water Augmentation Study**

**Neighborhood Retrofit Project Concept Plan**

**1. INTRODUCTION**

The Water Augmentation Study is a long-term research program led by the Los Angeles and San Gabriel Rivers Watershed Council (Watershed Council). The purpose of the program is to assess whether the capture and infiltration of stormwater at localized sites throughout the region is a viable means of augmenting water supply, without adversely affecting groundwater quality. The study began in 2000 in collaboration with representatives from federal, state and local public agencies. The focus of the early phases of the study was to monitor the fate and transport of runoff-borne pollutants by measuring stormwater quality at the surface, as it infiltrates through the soil and as it mixes with groundwater. During the next phase of our research we will assess through modeling how much additional groundwater recharge is possible, and whether the additional recharge will provide sufficient water supply to offset the cost of infiltration facilities and extraction, compared with the cost of developing new water supplies. We plan to implement one or more demonstration projects on a neighborhood scale, incorporating both infiltration and water conservation strategies. We will also assess other potential benefits and barriers to infiltration (environmental, regulatory, social, economic), and develop a strategy for regional implementation.

The purpose of the neighborhood project is to demonstrate an integrated, comprehensive approach to water management by retrofitting a residential street with state of the art Best Management Practices (BMPs) to address runoff, water conservation, pollution reduction and treatment, flooding, and habitat restoration. Determining the location of demonstration project areas will incorporate a community-based approach providing opportunities for watershed education and neighborhood involvement in designing projects. The demonstration projects will be monitored for water quality as well as for reduction of runoff and water use, and other benefits. Managing storm runoff, promoting outdoor water conservation, and meeting water quality standards are increasingly challenging in developed urban areas. While there are regulations that require certain management practices on new and redevelopment, there is little incentive to retrofit existing infrastructure that covers the majority of the urbanized area. The neighborhood-scale projects are intended to provide real-world models of watershed-based design that serve to integrate many on-going efforts in the region to address flood management, water quality, and environmental restoration.

This Concept Plan outlines the goals and the steps required to implement neighborhood-scale retrofit projects. It documents the project goals, potential design features, our approach to developing and applying site selection criteria, recommendations for public and agency outreach, and the legal and regulatory issues affecting project approval that must be resolved prior to implementation. This document is also intended as a guide to inform and assist other entities embarking on similar projects.

## 2. PROJECT GOALS

The primary goals of the Water Augmentation Study (WAS) neighborhood project are to demonstrate how alternative runoff management practices can be incorporated into existing development and infrastructure, and to create a model that can be replicated and expanded in other parts of the Los Angeles basin, as well as adapted to other regions. While the primary purpose of the project will be to increase infiltration and groundwater recharge, there are a number of secondary goals and benefits that may be realized through the project design. These include:

- reduce stormwater and dry weather runoff volumes
- improve flood management
- increase water conservation and reuse
- reduce outdoor water use
- reduce impermeable surface area
- habitat creation/restoration
- recreation facility enhancement/creation
- public education to increase community awareness of watershed issues

These goals will be addressed to the maximum extent appropriate depending on the features and conditions of the selected project site, and the willingness of individual property owners to participate in the demonstration.

### **Project Scope**

The selected project site must be a minimum of one block or approximately twenty homes. A larger neighborhood could be considered, depending on drainage characteristics and cost implications. The target neighborhood will be primarily single family residential. An adjacent neighborhood with similar land use and drainage characteristics must also be available to serve as a control site, against which post-project changes can be compared.

The project design will incorporate appropriate sustainable practices and BMPs to maximize runoff capture and other environmental benefits. Design decisions will be made in conjunction with landowners based on site conditions. Some of the specific techniques under consideration include:

- Cisterns to capture roof or surface runoff for irrigation
- Underground infiltration facilities to increase retention capacity
- Dry-wells for driveway or parkway to increase infiltration
- Runoff pre-treatment for “first flush,” such as trash screens, media filtration
- Mulching program to slow runoff and increase infiltration, reduce irrigation
- Day-lighting storm drains for stream restoration and/or habitat creation
- Native or drought tolerant landscaping for water conservation
- Evapotranspiration measurements and irrigation controllers for water conservation
- Bio-swales and graded landscaping (berms) to capture, filter, and infiltrate runoff
- Gutter or alley pavement alterations to incorporate permeable paving
- Alley pavement removal to increase infiltration and open space for habitat/recreation

- Seattle “Sea Streets” type street edge design to capture and filter street runoff
- Permeable driveways or walkways to capture runoff
- French drains in driveways or walkways to capture runoff
- Redirected downspouts from storm drain system into landscaping
- Rain barrels

### **3. POTENTIAL PROJECT OPPORTUNITIES**

There is increasing interest by municipal agencies, watershed groups, community and environmental organizations in implementing multipurpose projects that promote infiltration, runoff capture for reuse, habitat restoration, and/or park creation, that have goals similar to those we are trying to achieve. The intention in developing this neighborhood demonstration project is to work with others to leverage multiple efforts and resources in order to accomplish the project goals. To this end, we reviewed other projects and planning efforts in the Los Angeles area that could lead to formation of partnerships to implement one or more neighborhood demonstration projects, or could help identify project locations that might already have some community awareness and support. Most of the watershed and other types of plans reviewed include a discussion of appropriate best management practices and other methods to improve water quality and habitat, and have a list of demonstration projects recommended for additional study. Other projects may be opportunities for linkages to the neighborhood retrofit. Relevant plans and projects researched included:

- City of Los Angeles Integrated Resources Plan
- Ballona Creek Watershed Management Plan
- Integrated Regional Water Management Plans for the Los Angeles region
- Mountains Recreation and Conservation Authority watershed project assessment
- North East Trees “street ends” projects
- Pacoima Wash open space and park projects
- Santa Monica Watershed Management Plan
- San Gabriel River Master Plan
- Sun Valley Watershed Management Plan
- Upper San Gabriel River Watershed Management Plan
- Verdugo Basin Groundwater Storage and Conjunctive Use Feasibility Study

### **4. SITE SELECTION**

Initial areas selected for field review were determined based on a number of factors. We first considered hydrologic conditions to identify potentially suitable areas for infiltration on a broad scale. The eastern portion of the San Fernando Valley, because of its sandy soils and deep groundwater, is generally considered good for infiltration. Other parts of the Los Angeles basin are less suitable because of the presence of clay layers that may inhibit percolation to groundwater, or the potential for liquefaction due to shallow groundwater. As discussed above, our review of existing planning efforts also yielded a number of potential areas for investigation.

Selection criteria were developed from a variety of sources, including those used for similar projects in other regions, planning efforts in our region, regulatory guidelines, and input from the WAS Technical Advisory Committee. We conducted field reconnaissance to survey potential

areas and identified a number of neighborhoods that might be appropriate, based on the goals of the project and preliminary selection criteria. The criteria were further refined into minimum required characteristics, initial evaluation criteria that could be determined through site visits and minimal research, and more specific selection criteria that would require extensive public and agency outreach to properly assess.

**Required Criteria**

The following list indicates the minimum required criteria that must be met in order for a location to be further evaluated:

- Predominantly single-family residential land use
- Adjacent to similar block for control site for monitoring changes
- Appropriate soils for infiltration
- Proximity to groundwater (within the range of 30 – 200 feet)
- No known soil contamination below the site
- Street width and use adequate for BMP installation
- No steep grade or cross slope present
- Not near critical slope areas

**Evaluation Criteria**

Sites that passed the initial screening were then evaluated based on the preliminary evaluation criteria shown in the table below, and assigned points based on how well criteria were met. Those candidate sites that rank highest after initial evaluation will be included in the outreach efforts to select a final site.

<b>Preliminary Evaluation Criteria</b>	<b>Points</b>
<b>Size, land use</b>	<b>8</b>
Minimum - street block - approximately 20 homes	2
Project size fundable on demo scale (maximum \$10 million).	2
Not adjacent to industrial land use (surface water contamination)	2
Linked to adjacent open space, restoration or recreational project	2
<b>Physical characteristics</b>	<b>48</b>
Potential for groundwater recharge	7
Non-arterial residential street	3
Adequate off-street parking available	3
No metro or school bus route through site	1
Easement potential or already in place	2
Representative site - similar to the overall watershed characteristics.	3
Alley access	3
Need for infrastructure improvements at demo site	
• Sidewalks	2
• Curb and Gutter	2
• Landscaping	3
• Drainage/flooding issues	5
• Alley improvements	1
Similar land use in surrounding neighborhood	1

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Infrastructure improvements also needed throughout the community	1
Proximate to existing BMPs - other monitoring or maintenance efforts to partner & increase cost savings	1
Good baseline data - soil and groundwater ( <i>Needs to be verified</i> )	2
Pride of Ownership	8
<b>Neighborhood demographics</b>	<b>8</b>
High percentage of owner occupied units	2
Relatively low occupancy turnover	2
Not likely to undergo redevelopment	2
Median income below County average	2
<b>Project readiness</b>	<b>9</b>
Runoff or Watershed Management Plan in place	3
Project already in concept phase	3
Possible and desirable to expand the pilot in this location	3
<b>Total Part 1</b>	<b>73</b>
<b>Additional Site Selection Criteria</b>	<b>Points</b>
<b>Willing community</b>	<b>21</b>
Community advocates for project	5
Community awareness of issues	3
High participation level	5
Participants accept public nature of project	3
Outreach delivery system in place (Neighborhood Council, etc.)	5
<b>Ability to attract funding</b>	<b>26</b>
Funding Source project criteria -- good match	3
Matching funds available	10
• Local citizen group or NGO	
• Agency	
Meets one or more agencies water management objectives	2
Multiple project Partners	5
Area slated for street or other infrastructure improvements	6
<b>Political support</b>	<b>30</b>
Local government supporter/manager or council person who is champion	5
Institutional support with capacity to assist	5
Willing funding partners	5
Regulatory cooperation for variances	5
Partner agency or organization willing to undertake ownership and management responsibilities	10
<b>Total Part 2</b>	<b>77</b>
<b>Total Points</b>	<b>150</b>

**Evaluation of Potential Sites**

Sites evaluated in the field included neighborhoods in Sun Valley, Pacoima, Elysian Valley, Atwater Village, Lafayette Park, and south Los Angeles. Other areas were reviewed and not selected for field evaluation. These are discussed further below. At this preliminary stage,

several Pacoima and Sun Valley neighborhoods have the best potential for meeting the project criteria. Given the existence of a Stakeholder Group and an adopted Watershed Management Plan, Sun Valley appears to be the most likely candidate. Existing efforts and potential projects are discussed below. Final site selection will result from the Public Outreach Program to be conducted in 2006.

### **Pacoima and Pacoima Wash**

Pacoima, part of the City of Los Angeles, is an economically disadvantaged region that has flooding issues and great potential for community engagement. The neighborhood adjacent to Broadous School, where an infiltration project was previously installed, represents one potential opportunity to pursue a neighborhood retrofit project. The homes adjacent to Pacoima Wash may also be good candidate sites. Pacoima Beautiful, a local community group, is currently working with the Mountains Recreation Conservation Authority (MRCA) on a project plan for the Pacoima Wash that crosses Pacoima, San Fernando, and Sylmar. Cal Poly Pomona's Studio 606 developed a conceptual plan and presented their ideas to the San Fernando City Council in June 2005. The next step is to convene a stakeholder group to work on the plan. The group will include local political and government agency representatives, LAUSD, Pacoima neighborhood councils, and community groups. The goal is to be as inclusive and transparent as possible so that neighbors on both sides of the Wash are part of the process and support the project, which may be a multi-year, multi-million dollar process. MRCA may have funding for a portion of the project and there is great political support from Steve Veres on the San Fernando City Council, and from Assembly member Cindy Montanez. There may be an opportunity for partnership by integrating a neighborhood block project of single family homes along the Wash with the larger open space plans. Updates on these projects will be obtained as part of our final site selection.

Marlene Grossman, founder of Pacoima Beautiful, is also very interested in alley ways. She was involved in developing a (currently unfunded) proposal in partnership with USC and TreePeople to convert nuisance alleys to recreational areas with underground infiltration basins. Marlene sees a link between Broadous Elementary (one of the WAS monitoring sites), the neighboring alleyways and the Wash. Pacoima Beautiful has an excellent track record of engaging the community and mobilizing volunteers.

### **Sun Valley**

The Sun Valley Watershed Management Plan, developed by Los Angeles County Public Works in partnership with a consulting team that included TreePeople, contains a number of project components that would support the goals of the WAS neighborhood project. For example, each of the Plan alternatives requires 20 – 40% participation by homeowners to incorporate on-site infiltration and/or detention. Sun Valley, also part of the City of Los Angeles, does not have a storm drain system and has major flooding problems in many neighborhoods.

Many of the hydrologic studies necessary to assess feasibility for infiltration have been done, and the local community is engaged through a stakeholder group formed several years ago to address flooding and other resource issues in the area. The Watershed Management Plan and accompanying Program EIR have been adopted by the County Board of Supervisors, which

clears the way for Plan implementation. There are a number of candidate sites in Sun Valley that we screened in the field that would be suitable for a retrofit project.

### **Ballona Creek Watershed**

The Ballona Creek Watershed Management Plan identifies a street retrofit, similar to Seattle’s SEA streets design, as one of its target demonstration projects. We field surveyed two sites that had been suggested as candidate locations. The first, near Lafayette Park just west of downtown, did not meet the initial criteria for the WAS retrofit as it is a steep street with mature landscaping and heavy traffic.

The second neighborhood was near Vermont Square Park in south Los Angeles. This area met the initial screening criteria but did not rank as highly as Sun Valley or some sites in Pacoima. Overall, the need for infrastructure improvements seemed low compared with other areas we reviewed.

### **Elysian Valley and Atwater Village**

North East Trees (NET) has been involved in a number of projects to develop open space and small parks in underserved communities. One of its most recent design projects, the Breese-Bimini Slough Ecology Park in Koreatown, incorporates sustainable elements into the park design including a state-of-the-art drip irrigation system, a low water use native plant palette, recycled broken concrete, permeable surfaces, and a bio-filtration vegetated swale to convey street runoff. NET has obtained grant funding to design and construct a “street end” infiltration project to intercept trash and recharge street runoff, and provide neighborhood green space at the end of the street. NET evaluated several potential locations adjacent to the Los Angeles River in Elysian Valley and Atwater Village that might be suitable, and is currently in the design phase at the selected site in Elysian Valley. This project might serve as a springboard for a neighborhood-wide implementation of other BMPs and conservation techniques, particularly since the community is already engaged in the process and feasibility studies will be conducted to investigate jurisdictional issues and hydrology. This area did not meet the criteria for the WAS retrofit project because the streets are very narrow and are heavily used for parking, thus space for BMP installation would be limited.

### **Other Areas Considered**

While our goal is to find a suitable site, given the size of our region we must also be somewhat selective in our choice of areas for deeper investigation. Thus not all potential sites or projects were included in our review. Some larger areas that might have suitable neighborhoods were initially considered but not chosen for further review for very general reasons, even though upon closer inspection there might be quite suitable sites. A few of the other regions considered but not investigated closely are discussed below.

*Santa Monica* – politically, the city of Santa Monica is probably the most feasible area in which to pursue a project such as this, and there is already much similar work planned or in progress. Since one of the goals of the project is to demonstrate applicability in other regions, it seemed

best to implement in a larger municipality. We will incorporate Santa Monica’s leadership as an example to build upon in addressing the still-untested regulatory and building code issues in the City of Los Angeles.

*San Gabriel River Master Plan* – there are many good projects included in the Plan but none that seemed to be a close fit or expandable into a neighborhood retrofit that would meet our goals.

*Upper San Gabriel River Watershed Management Plan* – this Plan had not yet progressed to the stage of identifying projects, so opportunities for partnerships are not as far along as in other areas.

*Verdugo Basin* – the *Verdugo Basin Groundwater Storage and Conjunctive Use Feasibility Study* has identified infiltration and runoff management as a goal and is currently seeking funding to retrofit a small park. While some streets in the foothills lack sidewalks and storm drains, the need for infrastructure improvements is not as strong as in other regions. This area is also very steep and could present some engineering challenges for stormwater capture that are not typical of many other parts of the Los Angeles basin.

## 5. LEGAL AND INSTITUTIONAL FEASIBILITY

The unique nature of the project requires addressing a number of legal and institutional issues. The discussion below draws a good deal of its information from NRDC’s *Out of the Gutter* publication and *Technical Memorandum 6 – Agencies Coordination, Policy or Regulatory Changes and Recommendations* from the Sun Valley Watershed Management Plan. Major considerations and potential obstacles are outlined below along with recommended next steps.

The neighborhood retrofit plan considers modifications to both public and private property. Modification to each land use has its own set of challenges.

### **Public Property**

Approval for modifications to city owned streets, alley, parkways and curbs and gutters (if present) would need to be sought from the following agencies:

**The City of Los Angeles Bureau of Street Services** (<http://www.lacity.org/BOSS/>) has five Divisions of whose participation is of relevance to the project:

1) The *Street Tree Division* handles urban forest management for the City and regulates tree selection and spacing and is in charge of trimming established trees. The Division’s Tree selection guidelines - <http://www.lacity.org/BOSS/StreetTree/treeguide.htm> will need to be reviewed for the parkway planting design and any variances or special maintenance needs will need to be discussed with agency staff.

2) The *Street Maintenance Division* handles street cleaning for the Bureau. Any modifications that may affect motorized street-sweeper or otherwise cause a deviation from normal cleaning practices must be discussed with this division.

3) The *Investigation and Enforcement Division* uses a permit based system to regulate construction related operations including the use of cranes, the placement and storage of building materials and equipment, the construction of protective fences, walkthrough canopies, the importing/exporting of earth materials, fire apparatus tests (excess water on streets), and imperilment of lateral support of streets and sidewalks. Construction activities will need to be coordinated with this Division

4) The *Engineering Division* provides engineering services for the construction of streets in the City, including activities such as curb ramps, pedestrian facilities, landscape and streetscape, bikeways, street-safety related projects, and street widening and reconstruction. This Division will be an invaluable resource for creating a design that meets traffic flow and Fire Department access requirements.

The *Streetscape Section* of the Engineering Division prepares plans and specifications, and manages construction of streetscape projects in the City of Los Angeles. A streetscape project is defined by the Division as “any street or sidewalk-related enhancement for community identity and beautification in the public right-of-way, including streetlights, trees, crosswalks, street furniture, bus stops and landscape plantings.”

5) The *Resurfacing and Reconstruction Division* is responsible for resurfacing projects throughout the City. A list of scheduled projects for the 2005-6 fiscal year can be found at: <http://www.lacity.org/BOSS/Resurfacing/schrepair0506.pdf> . This Division should be contacted to discuss the status of the projects listed and to see what additional projects are slated for future improvements. It may be possible to pool resources by choosing a retrofit site that is already on the books for needed repairs.

Developing a good working relationship and enlisting the partnership of the Bureau of Street Services management staff early on will assist in smoothing the way for any variance or Division coordination requests that may be needed.

*Next Actions:*

- Set up appointment with Nazario Saucedo, Assistant Director for Bureau of Street Services, (213)485-5681, NSAUCEDA@BSS.LACITY.ORG
- Meet with and seek support of Board of Public Works member Paula Daniels who oversees the Bureau of Street Services and the Bureau of Sanitation

**Los Angeles Department of Transportation ([www.lacity.org/LADOT](http://www.lacity.org/LADOT))**

In partnership with other agencies, LADOT plans and funds major transportation improvements on freeways, rail lines, city streets, transit stations, parking garages, and bicycle and pedestrian facilities. The department should be contacted and consulted to determine the need for their involvement.

*Next Actions:*

- Research and contact appropriate representative to discuss project.

**Los Angeles City Fire Department - <http://www.lafd.org/>**

Fire Department Access Issues: In many cases street widths and paving requirements are determined by fire code. Without modification from the existing code, adequate space for stormwater retention and storage and may not be available and paving material choice may be restricted on publicly-owned streets.

The Fire Department's Hydrants and Access Unit is responsible for ensuring minimum requirements for fire department emergency access and fire hydrant placement. [Division 9](#) of the Fire Code outlines the fire access issues. The Department's website encourages consultation with the Hydrants and Access Unit early in the planning process for any project. The Hydrants and Access Unit is open from 7 A.M. and 4:30 P.M., Monday through Friday, at (213) 482-6543. This Unit may also need to review the project during the building permit approval process or for clearance of a condition of approval placed by another city agency.

Low Impact Development projects in the Northwest and other areas of the country have designs that vary from current LA City Fire Access Code and still provide adequate fire department access and maximize public safety. For example, other cities such as Seattle have addressed this issue to create modified streets such as their Street Edge Alternative (SEA) Streets and Broadview Greengrid Projects. One design consideration was to include sidewalks rated for fire truck access.

A whitepaper on fire department access and public safety concerns from stakeholders in the Santa Clara Valley ("SCV Potential Hurdles" in the Appendix) should also be considered in the design process. Considerations in this document include concerns regarding trash and utility vehicle access in addition for fire trucks.

Next Actions:

- Review Seattle Public Utilities site examples at:  
[http://www.seattle.gov/util/About\\_SPU/Drainage\\_&\\_Sewer\\_System/Natural\\_Drainage\\_Systems](http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems)
- Contact Seattle Public Utilities for information on their process to obtain Fire Department variances
- Review Los Angeles Fire Department access requirements and street requirements:  
[http://www.lafd.org/prevention/hydrants/division\\_9\\_fc.htm](http://www.lafd.org/prevention/hydrants/division_9_fc.htm) and  
[http://www.lafd.org/prevention/pdfforms/stndrd\\_str\\_dim\\_cond.pdf](http://www.lafd.org/prevention/pdfforms/stndrd_str_dim_cond.pdf)
- Set up meeting with Los Angeles City Fire Department Hydrants and Access Unit. Include planning deputies from City Council offices in the meeting and discussions.
- Review SVC document and incorporate access and public safety concerns into design considerations and public outreach planning

**Los Angeles Department of City Planning (<http://cityplanning.lacity.org/>)**

City planning should also be contacted and consulted about their possible role. The following excerpt from the planning department website describes the potential role of this department: “The Department investigates and reports on applications for amendments to zoning regulations, and passes upon zone variance and conditional use applications. ....The Department conducts studies relating to environmental quality, and provides advice and assistance relative to environmental matters.”

Next Actions:

- Research and contact appropriate representative at City planning department to discuss any requirements for project review or approval

**Other**

General Maintenance

City or other agency partner must agree to long term maintenance of public property improvements including streets, curbs, sidewalks, parkway landscaping. Landscaping concerns include watering (especially during plant establishment), weeding and tree trimming.

Public Involvement

In addition to the above mentioned agencies, property owners adjacent to the proposed improvements should be notified and consulted early in the design process to discuss preferred design features and potential parking and other impacts to their street. Willingness to assist with parkway landscape maintenance can also be explored with property owners. The process suggested for homeowner involvement is detailed in the attached public outreach plan.

Private Property

Private property modifications will require the consent and cooperation of the homeowner and will likely require some variance from current building codes. Installation of BMPs such as berms, swales, dry wells, mulching and redirected downspouts on private property will be voluntary but highly encouraged. Major issues to be addressed and next action steps for each are as follows:

**Department of Building and Safety - <http://www.ladbs.org/>**

City of Los Angeles building code (Sections 7013.9 and 7013.10) requires that all roof water be routed to the street if the underlying natural ground exceeds 3 percent slope, or if more than 3 feet of compacted fill (or 1 foot of un-compacted fill) is present. All pads with cut or fill shall slope a minimum of 2 percent to an approved drainage device or public street. Thus, building codes tend to discourage on site retention, storage, and infiltration.

The Department of Building and Safety also oversees approval of grading plans.

Code modification or a variance will be needed to allow increased infiltration by redirection of rainwater down spouts onto permeable areas. Modification of existing lot and building setback codes to allow cistern installation or other BMPs may also be necessary.

The existing building codes were developed based on sound geotechnical principles of maintaining slope and soil stability by routing drainage away from building sites. However, in some cases, (particularly in permeable soils of the Sun Valley and Pacoima area), onsite infiltration may be performed without compromising slope stability or causing erosion.

The creation of a site-specific exemption to existing drainage requirements may be the most feasible. This will require a soils report and review by the City Grading Department based on the site-specific soils conditions present.

The Department of Building and Safety defers to the **City of Los Angeles Watershed Protection Division** for review of installation of BMPs to meet the Standard Urban Stormwater Mitigation Plan (SUSMP) requirements. Since the BMPs suggested in this plan are consistent with the intent of meeting SUSMP, we should coordinate with both departments to obtain the required variances.

Next Actions:

- Review City of Boardman, Oregon and Issaquah, Washington, and Santa Monica, CA design standards and compile most relevant examples
- Obtain soils report for the site finalists
- Meet with City of Los Angeles Watershed Protection Division to:
  - Discuss code variances or exemptions they have reviewed to meet SUSMP regulations
  - Present stormwater management design standard examples and co-develop a list of recommended design exemptions to present to Building and Safety
- Meet with Building and Safety, City Grading Department and City of Los Angeles Watershed Protection to:
  - Present soils report and recommend design standards for exemptions
  - Discuss process and next steps

**Homeowner Consent and Cooperation**

It is a goal of the study to have active participation and cooperation from homeowners in the chosen block. Community engagement and participant recruitment is covered in the public outreach plan. The following considerations will need to be addressed for any onsite BMPs.

Recruitment

This issue is covered primarily in the public outreach plan. A volunteer application used by Seattle Public Utilities to screen likely candidates for their *Raincatcher Program* is included in the Appendix.

### Length of Study

Lead entities (City and Watershed Council) will agree to install and maintain BMPs for up to two years, after which maintenance will be the homeowner's responsibility. Ideally the onsite BMPs will remain in place for a much longer period. Project funding partners and the TAC should discuss and determine the ideal length of time for maintenance and monitoring of the onsite BMPs and work together to lengthen time period for monitoring.

### Change of property ownership

The property owner will need to agree to require the transfer any BMP maintenance obligations to new owners as a condition of property transfer.

### Maintenance

Once in place, many of the proposed BMPs require little additional maintenance beyond typical landscape care or occasional cleaning. Careful choice of the plant palette will also minimize additional care. Still, a document outlining responsibilities of public entities and property owners will reduce misunderstanding. Seattle Public Utilities has an excellent example in their "Care Manual for Natural Drainage Systems." This pamphlet gives care tips, states who is responsible for what, and provides contact numbers for assistance or questions. The document is included in the Appendix.

### Access agreements or easements for Maintenance or Monitoring

There are a number of municipalities around the Country that have developed maintenance and access agreements for stormwater BMPs on private property. Samples agreements from Abermarle County VA, Montgomery MD, Cambria PA and Oak Creek WI are included in the Appendix.

Modification of existing easement access for meter reading or power line and sewer maintenance can also be explored with agency partners.

## **Other**

### Funding restrictions

Some capital improvement grants require a guarantee of improvement maintenance for much longer than two years. There are also restrictions on gifts of public funds to private property owners. As we pursue additional funding, we will need to carefully review all restrictions and determine which funding sources are better suited to onsite BMP installation. Rebates are a popular form of incentive for state and federal agencies.

### Incentives

The topic of incentives is further discussed in the community outreach plan. Potential incentives need to be defined by conducting community outreach to determine the best motivators for the chosen community and through exploration with agency partners to identify available incentives and/or develop a special incentive program for this project.

Some possible incentives include:

- Rebates for ET irrigation controllers, downspout extension, or other BMPs

- Giveaways like free mulch, compost bins or rain-barrels
- Yard signs (i.e. “healthy watershed home”)
- Landscaping or other BMP installation and maintenance instruction
- Free workshops for participants
- Public recognition – awards, media attention etc.

Next Actions:

- Explore best agreement vehicle for property ownership transfer including review of LA County SUSMP deed requirements.
- Discuss maintenance and monitoring access issues with agency partners
- Conduct community outreach to determine best incentive programs

**Both Public and Private Property**

**Public Safety**

Another overarching concern is to ensure the project is designed to guarantee public safety. In addition to meeting regulatory safety requirements we must address any real or perceived concerns from the public. Interviews will be conducted with potential participants as part of our outreach plan to identify concerns.

**Vector Management**

Inherently, the retention of stormwater for infiltration, treatment, or subsequent reuse involves storage of water. In cases where standing water is present for a period of greater than 72 hours, vectors such as mosquitoes can breed. These vectors can often pass through very small openings. Eradication of mosquito breeding areas is important for limiting the spread of diseases such as West Nile Virus, and will be mitigated in BMP designs.

Next Actions:

- Coordinate design and construction of stormwater facilities with vector specialists such as the Greater Los Angeles County Vector Control District (GLACVCD) and the California Department of Health Services.
- Review Publication 8125, *Managing Mosquitoes in Stormwater Treatment Devices* included in Appendix.
- Avoid creation of standing water bodies unless they are vector-proof or exposed to vector predators.
- During design, utilize existing studies and information such as those produced by the University of California and the Mosquito and Vector Control Association of California (these publications are included in the Appendix).
- Include the public in the development of designs early in the process so they understand how the system is going to work and what measures are being taken to protect their safety.

- Develop set of talking points for public and media outlining design considerations made to ensure public safety.

## **Liability**

Public property - Liability issues need to be addressed by implementing parties early in the design process. It is presumed that the lead agency will assume construction liability with the appropriate transfer of liability to the awarded contractor who will carry adequate liability insurance. Project design will seek to minimize safety and liability concerns in excess of those normally assumed in a traditionally developed public right of way.

Private property – Installation agreements must outline homeowner responsibility for upkeep of BMPs during the study period and all liability should be transferred to homeowners at the end of the study period.

### Next Actions:

- Discuss design and construction steps needed minimize liability with implementing agency.
- Determine appropriate liability clause for homeowner agreement
  - Review maintenance access agreements listed under “Access Agreements” above for sample language

## **Other Regulatory Issues and Concerns**

### **Water Rights**

At the neighborhood retrofit project scale, water rights issues should not be an obstacle.

The 1979 San Fernando Judgment (Judgment) limits the City of Los Angeles to 43,660 acre-feet per year of Native Safe Yield in the San Fernando Groundwater Basin, which includes all sources of groundwater recharge derived from precipitation. At present, there is no mechanism in the Judgment that recognizes increased recharge from projects such as the proposed neighborhood retrofit.

If the pilot study suggests the feasibility of larger scale implementation then a mechanism for credit of additional recharge will need to be considered. The ULARA Watermaster and the Los Angeles Department of Water and Power would need to explore amending the Judgment to allow for an adjustment in the Native Safe Yield based on quantifiable, long-term increases in groundwater recharge. Amending the Judgment in this manner may require a re-evaluation of the Safe Yield of the San Fernando Groundwater Basin.

### **Water Quality**

The Regional Water Quality Control Board currently encourages onsite retention of stormwater runoff, but it also expresses concern about adequate protection of groundwater quality. The

Regional Board could impose regulations that would require a higher treatment standard for recharged stormwater which could significantly increase project costs. One of areas of concern is the uncertain effects regarding water quality of stormwater before and after treatment, and the reliability of treatment systems. These concerns can be mitigated with appropriate monitoring of the project.

Monitoring conducted for the WAS to date includes sites in Sun Valley and Pacoima, and show no negative impacts to groundwater from infiltration. Several individuals from the Regional Board and the Department of Health Services have reviewed the monitoring results and are supportive of this project. Further discussions are needed to ensure that any potential issues or concerns related to this larger-scale project are addressed early in the planning phase.

Next Actions:

- Engage Regional Board and Department of Health Services staff in the project design process and enlist their assistance in developing monitoring protocols.

### **County Flood Control**

Current flood control design manuals and guidelines may not adequately address the value of stormwater retention or detention as a means of flood control, focusing primarily on conveyance as the method for solving flood control problems. If the pilot study suggests the feasibility of larger scale implementation then such alternative techniques for flood control management would need to be addressed in the larger regional context.

Next Actions:

- Develop a comprehensive list of flood control design manuals and guidelines currently used by the County for design of flood control facilities.
- Review the manuals and guidelines to identify where changes can be made to encourage stormwater retention, detention, and groundwater recharge.
- Recommend changes to existing criteria, or alternative designs that would encourage stormwater retention and recharge in new facilities, or retrofits of existing facilities.
- Recommend appropriate monitoring and operation and maintenance guidelines for the alternative methods.

### **Landscape Ordinances**

In response to Assembly Bill 2717, the California Urban Water Conservation Council (CUWCC) convened a task force in 2005 that developed a set of recommendations to further the implementation of the State Water Efficient Landscape Model Ordinance (adopted in 1993 <http://www.owue.water.ca.gov/docs/WaterOrdIndex.cfm> ). The Task Force made additional recommendations beyond the model ordinance including the use of ET controllers and other runoff reduction measures. The neighborhood project site design will seek to reflect and promote the recommendations of the taskforce to whatever extent possible.

Next Actions:

- Review local landscape ordinance and compare to state model ordinance
- Incorporate applicable AB2717 Task Force recommendations in site design planning

### **Regulations Relating to BMPs**

Some stormwater best management practices that encourage water infiltration rather than conveyance have special regulations governing them. For example BMPs that may result in standing water will fall under the jurisdiction of the Department of Health and Safety and Vector Control. Regular contact with the Regional Water Quality Control Board will assure that all current regulations for project construction, maintenance and monitoring are met.

One regulation of particular note is the EPA's classification of certain drywells as injection wells. Complete information about this regulation can be found at:

<http://www.epa.gov/safewater/uic/regdefs.html>

Section 146.5(e) is more explicit about Class V wells, which are recharge wells used to replenish the water in an aquifer;

## **6. PRELIMINARY DESIGN CONCEPTS**

Based on Seattle's experiences with a similar project, our goal will be to maximize use of the public right-of-way. The design concept for public property will consider BMPs such as parkway swales, curb cuts to allow runoff to enter landscaped areas, permeable paving in gutters, or underground storage for enhanced infiltration. Considerations that affect site design include width of the right-of-way, whether sidewalks are present, road grade, subsurface infrastructure (e.g. water, gas and/or sewer lines), some means of protecting stability of the road bed, subsurface soil and geology, and depth to groundwater. Residents will be engaged in the design process so that the resulting project is viewed as an asset to the neighborhood.

Homeowner participation will be solicited and welcomed, but it is not a requirement of this project to install BMPs on private property. For residents wishing to participate in the retrofit, designs will be prepared with their input and approval. BMPs will be selected based on ease of maintenance and compatibility with the existing structure. Some options include sealed rain barrels, driveway and/or sidewalk drains connected to drywells, redirecting roof downspouts into rain gardens, replacing landscaping with more drought-tolerant species, irrigation controllers, and replacing concrete with permeable pavers. Site constraints will drive the choice of BMPs as well, for example whether they have an irrigation system or roof gutters already in place. We will not consider potentially high maintenance BMPs such as green roofs, even though they may be appropriate in some situations.

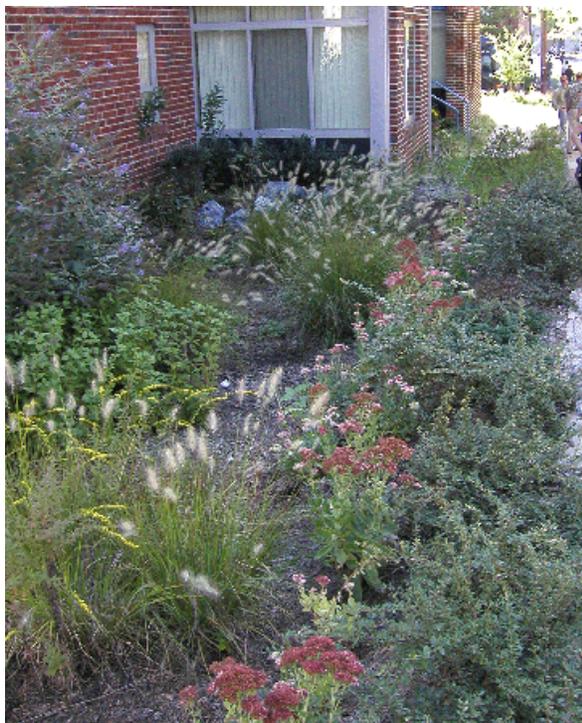


**Left:** Tree wells that filter street runoff; **right:** parkway with curb cuts that allow runoff into landscaping.



**Left:** driveway drain conveys runoff to underground storage; **right:** permeable concrete gutters.

Plant material for landscaping, both on public and private property, will be chosen based on its compatibility with the local climate, ease of maintenance, and habitat value. Another major consideration for the design will be the aesthetics of the project. The project as a whole needs to be both a pleasing showcase and easily interpreted by visitors.



**Left:** garden with “engineered” soil to enhance infiltration; **right:** permeable alternatives to concrete patio.

We will incorporate lessons learned, design elements, and recommendations from other programs and projects that have been implemented locally and elsewhere. Santa Monica, for example, has been a regional leader in creating policies and practices for better onsite management of stormwater runoff on existing properties and for new development. Of particular relevance for this project are the model ordinance, website page for residential design, and public education resources. Programs in the northwest and in Maryland also address urban neighborhood retrofits, stormwater capture, and low-impact design techniques. Links to these resources are listed in the Appendix.

## **7. METHODOLOGY TO MEASURE SUCCESS AND OUTCOMES**

To measure the success and outcomes of the neighborhood project, we will evaluate both physical and social changes as a result of the project implementation. Physical parameters to be measured include runoff reduction, water conservation, increase in habitat, and other environmental benefits. Social benefits and outcomes to be assessed include economic impacts, behavioral changes, and the educational value of the project.

A monitoring program will be developed to measure physical changes as a result of the project, including wet and dry weather flow volumes discharged, water quality, estimated volume of recharge, and changes in water use. Depending on the extent of landscape change, biological surveys may also be conducted to assess habitat changes. These parameters will be measured in both the control and project site, before and after implementation. Pre-implementation monitoring will be conducted for up to one year. Post-implementation monitoring will be conducted for a minimum of two years.

Analysis of potential economic impacts will be focused on change, if any, in property values. We will identify control areas based on similar demographics and housing stock, and obtain data on home prices in the area at the start of the project and within two years of implementation. Real estate appraisals may be also conducted in the project and control areas before and after project implementation. These results will be interpreted in the context of market activity and variability, and weighed against any other independent changes not related to the retrofit project.

While success measures for physical results can be quantified, other outcomes may be more qualitative. Post-implementation surveys of residents both in and adjacent to the project area will be conducted to assess changes in behavior and awareness:

- Reduced water use in landscaping areas
- Use of more drought tolerant plants
- Reduced dry-weather runoff
- Greenwaste reduction – increase in mulching
- Perceived value of project (aesthetics, environmental amenity, etc)
- Surrounding community awareness of project and potential interest in participating in a similar project
- Agency staff and public official awareness and endorsement of project

The results of the monitoring program will be used to assess the potential for this type of project to be implemented on a broader scale.

## **8. OUTREACH AND FUNDING**

### **Agency Outreach**

Before conducting the public outreach plan, many of the regulatory, funding, incentive and possible design constraint issues raised in this Concept Plan should be addressed with each of the agencies identified above. It is important to have agency buy-in, likely funding assurance, and an agreed upon process and set of design suggestions before contacting community members to enlist their participation. Although we cannot anticipate every issue that may arise, the presentation of a well-developed plan with a coalition of supporters will be necessary to secure the comfort, commitment and support of the community for a neighborhood site.

### **Identify Project Partners**

Project partners will depend in part on the majority landowner in the project site, which is assumed to be the City of Los Angeles. The City's Bureau of Sanitation, Watershed Protection Division has expressed interest in serving as the lead agency for this project. There are many links between this project and work underway at the City, which may bring additional partners from other City divisions.

The City of Los Angeles' *Integrated Resources Plan* (IRP) is an extensive infrastructure planning process for the management of water, wastewater and runoff throughout Los Angeles. The planning process included an extensive public outreach effort during the development of

alternative management approaches. The IRP includes “Leadership” projects – local neighborhood solutions that will demonstrate how the goals of the IRP may be carried out on a larger scale. The Leadership projects will allow the City to test various approaches to confirm their feasibility from a number of perspectives: technological, operability, public acceptance, agency policy and regulation. Because the City has been engaged publicly in the IRP process, and is investigating technical and regulatory feasibility for some of their more “visionary” ideas, the Leadership projects provide an excellent partnering opportunity for the WAS.

The City is also participating in development of an Integrated Water Resources Management Plan for Los Angeles County, in consultation with other stakeholders (the County and other cities, state and federal agencies and community groups). The goal of the IRWMP is to strategically plan and address issues related to various water-oriented benefits, such as water supply reliability, water recycling and conservation, water quality, stormwater management and flood protection, and other benefits like greener neighborhoods, parks and habitat restoration. This plan will also be a necessary step in obtaining state funding for multi-purpose projects under Proposition 50, Chapter 8.

The Building Industry Association of Southern California (BIA) and the Construction Industry Coalition on Water Quality (CICWQ) have been promoting the concept of integrated, regional approaches to stormwater management and water quality issues, rather than isolated projects on individual developments. CICWQ sponsored a study in 2003 to review the potential for regional solutions in Los Angeles County, and proposed a model project to illustrate the benefits of a regionally-based approach in comparison with individual on-site solutions. Through the BIA or CICWQ, the development community may be approached as an additional partner for the neighborhood project.

Depending on the exact location of this project, other agencies may be interested in participating in project implementation, including the County of Los Angeles Department of Public Works, the Los Angeles City Council – LA River Ad Hoc Committee, or the City of Los Angeles Department of Water and Power.

### **Funding Sources**

The ongoing partnership with the US Bureau of Reclamation and local agencies that form the Technical Advisory Committee for the WAS have committed some funding for implementation of the neighborhood retrofit project. While past appeals for federal appropriations to supplement Reclamation’s budget have been successful, this is an uncertain process. We are working on a Congressional bill, to be introduced in Congress sometime in the next few months, which would add a specific line item for this project within the Title XVI program. This would enable more direct funding for this project through the federal budget process. Federal funding will require matching funds from state or local sources. Upcoming grant opportunities through state propositions 40 and 50 could provide this additional funding. Additionally, a Los Angeles bond measure passed in November 2004 (Measure O) will provide \$500 million to fund TMDL implementation and stormwater management projects.

The next steps in funding will be to apply for state grant funds under Proposition 40’s Integrated Watershed Management Program, for which this project is an ideal fit.

Next Actions:

- Conduct interviews with candidates for lead agency role to determine interest and identify process and timeline needed to secure formal agency commitment (complete)
- Secure lead agency and develop grant concept proposal for Consolidated Grants Program (complete)
- Agency outreach to formalize additional project partnerships
- Secure funding sources for project construction
- After refinement of the legal review checklist, schedule meetings with agencies outlined in this plan including: Bureau of Street Services, Building and Safety, Regional Water Quality Control Board, LA City Fire Department, City Planning, and others to seek their guidance and enlist their support. Determine which meetings with regulating agencies the lead agency would like participate in.
- Develop forum for on-going involvement for all interested regulating, or reviewing parties (this could be the TAC, or another forum)
- Public Outreach and Community Engagement
- Finalize site selection
  - Conduct technical studies (soil stability, hydrology, depth to groundwater, etc)
  - Prepare preliminary site design
  - Prepare preliminary construction budget

A tentative schedule and budget follow:

TASK	Schedule		Estimated Budget
	Start	End	
Project Administration, Contract Management & Reporting	01-06	12-08	\$150,000
Outreach and final site selection	01-06	04-06	\$50,000
Planning/Design/Engineering/Environmental Documentation	04-06	09-07	\$750,000
Project construction and construction management	09-07	04-08	\$2,300,000
Neighborhood Project Monitoring Program	10-06	12-08	\$875,000
<b>TOTAL</b>			<b>\$4,125,000</b>

**9. IMPLEMENTATION**

Once a final site has been selected, implementation steps will begin. An action plan will be developed with the lead agency which addresses requirements for approvals, permitting, and environmental review. A monitoring plan will be prepared and pre-construction monitoring will be conducted. The preliminary site design prepared during the outreach phases will be formalized into final designs and permitted construction drawings. It is our goal to complete construction in early 2008.

## **Attachment A**

**TreePeople**, Community Outreach Plan for the Water Augmentation Study Neighborhood Retrofit Project

## **Appendix**

Albemarle County, Virginia Water Resources Management, **Stormwater Management/BMP Facilities Agreement**

California Department of Health Services, **A Three-Year Assessment of Vector Production in Structural Best Management Practices in Southern California**

Cambria County, Pennsylvania Jackson Township, **Stormwater Management Ordinance**

**City of Boardman Development Code**

**City of Issaquah Stormwater Management Policy for Low Impact Development**

**City of Santa Monica Model Ordinance**

**Excerpt from LA Fire Department Code**

**Fire Department Roadway Standards**

Montgomery County, Maryland Department of Environmental Protection, **Stormwater Management and Right-of-Way Agreement**

Oak Creek Wisconsin, **Stormwater Management Practices Maintenance Agreement**

Santa Clara Valley Urban Runoff Pollution Program, **Understanding Potential Hurdles to Using Better Site Designs For Water Quality Protection- *Addressing Fire Department & Public Safety Concerns***

Seattle Public Utilities, **Practically Easy Landscape Maintenance A Care Manual for Natural Drainage Systems**

Seattle Public Utilities, **Volunteer Application**

TreePeople, **Fostering Behavioral Change: A Review of Contemporary Methodologies** (Literature and Technology Review)

University of California, Division of Agriculture and Natural Resources, Publication 8125, **Managing Mosquitoes in Stormwater Treatment Devices**

## **Programs and Ordinances**

### **City of Santa Monica:**

City of Santa Monica residents website page:

[http://santa-monica.org/epd/residents/Urban\\_Runoff/urban.htm](http://santa-monica.org/epd/residents/Urban_Runoff/urban.htm)

City of Santa Monica public brochure:

[http://santa-monica.org/epd/residents/Urban\\_Runoff/pdf/UR\\_Brochure.pdf](http://santa-monica.org/epd/residents/Urban_Runoff/pdf/UR_Brochure.pdf)

### **Washington State:**

Pierce County, Washington Best Management Practices webpage- includes illicit stormwater discharge ordinance:

<http://www.co.pierce.wa.us/pc/services/home/environ/water/wq/bmpmanual.htm>

Puget Sound Action Team website that includes a variety of resources including the Lacey, WA “Zero Discharge” ordinance:

[http://www.psat.wa.gov/Publications/LID\\_studies/ordinances\\_regulations.htm](http://www.psat.wa.gov/Publications/LID_studies/ordinances_regulations.htm)

Seattle Public Utilities programs including “Raincatcher” and natural drainage design:

[http://www.seattle.gov/util/About\\_SPU/Drainage\\_&\\_Sewer\\_System/Projects/Residential\\_Stormwater\\_Control/index.asp](http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Projects/Residential_Stormwater_Control/index.asp)

### **Low Impact design concepts & examples:**

Draft Truckee Meadows Low Impact Development Manual :

[http://www.cityofreno.com/gov/pub\\_works/stormwater/management/land\\_use/](http://www.cityofreno.com/gov/pub_works/stormwater/management/land_use/)

NRDC’s “Stormwater Strategies,” especially case studies from the southwest:

<http://www.nrdc.org/water/pollution/storm/stoinx.asp>

Prince George's County (Maryland) Environmental Services Division (ESD) pioneered a different approach to stormwater management with their Low Impact Development program. For more information (publications, articles, etc.) on LID, contact ESD at (301) 883-5943.

### **Other Resources:**

Kirkland, Washington private stormwater maintenance FAQ

<http://www.ci.kirkland.wa.us/depart/pw/surface/privmain.htm>

Los Angeles County Department of Public Works, **Final Technical Memorandum No. 6 Agencies Coordination, Policy or Regulatory Changes, and Recommendations**

Maryland’s Stormwater Management Program:

<http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/index.asp>

The **Stormwater Manager's Resource Center** is designed specifically for stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues: <http://www.stormwatercenter.net/>

USEPA. “National Management Measures to Control Non-Point Source Pollution from Urban Areas,” November 2005: <http://www.epa.gov/owow/nps/urbanmm/>

State Water Resources Control Board “NPDES Stormwater Cost Survey,” January 2005: <http://www.owp.csus.edu/research/npdes/>