DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

May 23, 2005

Office of the Chief
Regulatory Branch

DEPARTMENT OF THE ARMY NATIONWIDE PERMIT AUTHORIZATION

City of Calabasas
Attention: Charles Mink
26135 Mureau Road
Calabasas, California 91302

Dear Mr. Mink:

This is in reply to your letter (No. 200501094-JLB) dated February 2, 2005, concerning our permit authority under Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344) over your proposal to remove a concrete channel and constuct habitat enhancements according to the design and specifications in your February 2, 2005 application, in Las Virgenes Creek in Calabasas, Los Angeles County, California.

The Corps of Engineers has determined that your proposed activity complies with the terms and conditions of nationwide permit NW27 as described in enclosure 1.

Furthermore, you must comply with the following non-discretionary Special Conditions:

Special Conditions:

1. No less than 30-days prior to beginning construction, you must submit a schedule for restoration monitoring and reporting, including proposed success criteria, subject to approval by USACE.

2. Within 45-days of completing the project, you must send a post-project completion report that includes pre- and post-project photos and a complete set of as-built plans. Please be aware that maintenance and other remedial actions within the jurisdiction of USACE may require DA permits.

3. You must submit an annual monitoring report based on the agreed upon success criteria, and additionally include information on any damage to the restoration site; and any remedial measures either undertaken or proposed that may or may not need DA permits.

This letter of verification is valid through March 19, 2007. All nationwide permits expire on March 19, 2007. If you either contract the work or begin construction on or before March 19,

2007 you will have an additional 12 months to complete the activity under the attached nationwide permit terms and conditions. If the work is not under construction or contract by March 19, 2007 the work will be subject to regulations in effect at the time when you re-apply for a permit. It is incumbent upon you to remain informed of changes to the nationwide permits. If the Corps of Engineers modifies, reissues, or revokes any nationwide permit at an earlier date, we will issue a public notice announcing the changes.

A nationwide permit does not grant any property rights or exclusive privileges. Also, it does not authorize any injury to the property or rights of others or authorize interference with any existing or proposed Federal project. Furthermore, it does not obviate the need to obtain other Federal, state, or local authorizations required by law.

Thank you for participating in our regulatory program. If you have any questions, please contact Joshua L. Burnam, D.Env. of my staff at (213) 452-3294.

Sincerely,

for Antal Szijj
Acting Chief, North Coast Section

Enclosure

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

CERTIFICATION OF COMPLIANCE WITH DEPARTMENT OF THE ARMY NATIONWIDE PERMIT

Permit Number: *200501094-JLB*

Name of Permittee: City of Calabasas

Date of Issuance: *May 23, 2005*

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S Army Corps of Engineers
Regulatory Branch
ATTN: CESPL-CO-R-200501094-JLB
P.O. Box 532711
Los Angeles, California 90053-2325

Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this nationwide permit you may be subject to permit suspension, modification, or revocation procedures as contained in 33 CFR 330.5 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit condition(s).

_____ _____

Signature of Permittee Date

NATIONWIDE PERMIT NUMBER NW27 TERMS AND CONDITIONS

1. Nationwide Permit NW27 **Terms:**

Your activity is authorized under NW27 subject to the following terms:

27. *Stream and Wetland Restoration Activities.* Activities in waters of the United States associated with the restoration of former waters, the enhancement of degraded tidal and non-tidal wetlands and riparian areas, the creation of tidal and non-tidal wetlands and riparian areas, and the restoration and enhancement of non-tidal streams and non-tidal open water areas as follows:

(a) The activity is conducted on:

(1) Non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland enhancement, restoration, or creation agreement between the landowner and the U.S. Fish and Wildlife Service (FWS) or the Natural Resources Conservation Service (NRCS) or voluntary wetland restoration, enhancement, and creation actions documented by the NRCS pursuant to NRCS regulations; or

(2) Any Federal land; or

(3) Reclaimed surface coal mined lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining or the applicable state agency (the future reversion does not apply to streams or wetlands created, restored, or enhanced as mitigation for the mining impacts, nor naturally due to hydrologic or topographic features, nor for a mitigation bank); or

(4) Any private or public land;

(b) Notification: For activities on any private or public land that are not described by paragraphs (a)(1), (a)(2), or (a)(3) above, the permittee must notify the District Engineer in accordance with General Condition 13; and

(c) Only native plant species should be planted at the site, if permittee is vegetating the project site.

Activities authorized by this NWP include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms; the installation of current deflectors; the enhancement, restoration, or creation of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or create stream meanders; the backfilling of artificial channels and drainage ditches; the removal of existing drainage structures; the construction of small nesting islands; the construction of open water areas; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation; mechanized landclearing to remove undesirable vegetation; and other related activities.

This NWP does not authorize the conversion of a stream to another aquatic use, such as the creation of an impoundment for waterfowl habitat. This NWP does not authorize stream channelization. This NWP does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed. However, this NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands, on the project site provided there are net gains in aquatic resource functions and values. For example, this NWP may authorize the creation of an open water impoundment in a non-tidal emergent wetland, provided the non-tidal emergent wetland is replaced by creating that wetland type on the project site. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Reversion. For enhancement, restoration, and creation projects conducted under paragraphs (a)(2) and (a)(4), this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion. For restoration, enhancement, and creation projects conducted under paragraphs (a)(1) and (a)(3), this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or creation activities) within five years after expiration of a limited term wetland restoration or creation agreement or permit, even if the discharge occurs after this NWP expires. This NWP also authorizes the reversion of wetlands that were restored, enhanced, or created on prior-converted cropland that has not been abandoned, in accordance with a binding agreement between the landowner and NRCS or FWS (even though the restoration, enhancement, or creation activity did not require a Section 404 permit). The five-year reversion limit does not apply to agreements without time limits reached under paragraph (a)(1). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate State agency executing the agreement or permit. Prior to any reversion activity, the permittee or the appropriate Federal or State agency must notify the District Engineer and include the documentation of the prior condition. Once an area has reverted back to its prior physical condition, it will be

subject to whatever the Corps regulatory requirements will be at that future date. (Sections 10 and 404)

Note: Compensatory mitigation is not required for activities authorized by this NWP, provided the authorized work results in a net increase in aquatic resource functions and values in the project area. This NWP can be used to authorize compensatory mitigation projects, including mitigation banks, provided the permittee notifies the District Engineer in accordance with General Condition 13, and the project includes compensatory mitigation for impacts to waters of the United States caused by the authorized work. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition.

2. Nationwide Permit General Conditions:

The following general conditions must be followed in order for any authorization by an NWP to be valid:

1. *Navigation.* No activity may cause more than a minimal adverse effect on navigation.
2. *Proper Maintenance.* Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
4. *Aquatic Life Movements.* No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.
5. *Equipment.* Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.
6. *Regional and Case-By-Case Conditions.* The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)). Additionally, any case specific conditions added by the Corps or by the state or tribe in its Section 401 Water Quality Certification and Coastal Zone Management Act consistency determination.
7. *Wild and Scenic Rivers.* No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).
8. *Tribal Rights.* No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
9. *Water Quality.* (a) In certain states and tribal lands an individual 401 Water Quality Certification must be obtained or waived (See 33 CFR 330.4(c)).

   (b) For NWPs 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the state or tribal 401 certification (either generically or individually) does not require or approve water quality management measures, the permittee must provide water quality management measures that will ensure that the authorized work does not result in more than minimal degradation of water quality (or the Corps determines that compliance with state or local standards, where applicable, will ensure no more than minimal adverse effect on water quality). An important component of water quality management includes stormwater management that minimizes degradation of the downstream aquatic system, including water quality (refer to General Condition 21 for stormwater management requirements). Another important component of water quality management is the establishment and maintenance of vegetated buffers next to open waters, including streams (refer to General Condition 19 for vegetated buffer requirements for the NWPs).

   This condition is only applicable to projects that have the potential to affect water quality. While appropriate measures must be taken, in most cases it is not necessary to conduct detailed studies to identify such measures or to require monitoring.
10. *Coastal Zone Management.* In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).
11. *Endangered Species.* (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS the District

Engineer may add species-specific regional endangered species conditions to the NWPs.

(b) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at http://www.fws.gov/r9endspp/endspp.html and http://www.nfms.gov/prot_res/esahome.html respectively.

12. *Historic Properties.* No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

13. *Notification.*

(a) *Timing*: where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a preconstruction notification (PCN) as early as possible. The District Engineer must determine if the notification is complete within 30 days of the date of receipt and can request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the notification is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:

(1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified in writing by the District or Division Engineer that an Individual Permit is required; or

(3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Notification*: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.);

(4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));

(5) For NWP 7 (Outfall Structures and Maintenance), the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed;

(6) For NWP 14 (Linear Transportation Crossings), The PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the US and a statement describing how temporary losses of waters of the US will be minimized to the maximum extent practicable;

(7) For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing;

(8) For NWP 27 (Stream and Wetland Restoration), the PCN must include documentation of the prior condition of the site that will be reverted by the permittee;

(9) For NWP 29 (Single-Family Housing), the PCN must also include:

(i) Any past use of this NWP by the Individual Permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose

of this NWP, parcels of land measuring ¼-acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than ¼-acre in size, formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(10) For NWP 31 (Maintenance of Existing Flood Control Projects), the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information identifying the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site;

(11) For NWP 33 (Temporary Construction, Access, and Dewatering), the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources;

(12) For NWPs 39, 43 and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization for losses of waters of the US were achieved on the project site;

(13) For NWP 39 and NWP 42, the PCN must include a compensatory mitigation proposal to offset losses of waters of the US or justification explaining why compensatory mitigation should not be required. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

(14) For NWP 40 (Agricultural Activities), the PCN must include a compensatory mitigation proposal to offset losses of waters of the US. This NWP does not authorize the relocation of greater than 300 linear-feet of existing serviceable drainage ditches constructed in non-tidal streams unless, for drainage ditches constructed in intermittent non-tidal streams, the District Engineer waives this criterion in writing, and the District Engineer has determined that the project complies with all terms and conditions of this NWP, and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;

(15) For NWP 43 (Stormwater Management Facilities), the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with state and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the US. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

(16) For NWP 44 (Mining Activities), the PCN must include a description of all waters of the US adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the US, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for all aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities);

(17) For activities that may adversely affect Federally-listed endangered or threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work; and

(18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

(c) *Form of Notification*: The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(18) of General Condition 13. A letter containing the requisite information may also be used.

(d) *District Engineer's Decision*: In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the

applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed compensatory mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the District Engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

(e) *Agency Coordination*: The District Engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

For activities requiring notification to the District Engineer that result in the loss of greater than ½-acre of waters of the US, the District Engineer will provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(f) *Wetland Delineations*: Wetland delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than ¼-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

14. *Compliance Certification*. Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:

    (a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;

    (b) A statement that any required mitigation was completed in accordance with the permit conditions; and (c) The signature of the permittee certifying the completion of the work and mitigation.

15. *Use of Multiple Nationwide Permits*. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).

16. *Water Supply Intakes*. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

17. *Shellfish Beds.* No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.
18. *Suitable Material.* No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the CWA).
19. *Mitigation.* The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.

    (a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).

    (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

    (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.

    (d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWPs. For example, ¼-acre of wetlands cannot be created to change a ¾-acre loss of wetlands to a ½-acre loss associated with NWP 39 verification. However, ½-acre of created wetlands can be used to reduce the impacts of a ½-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.

    (e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed.

    (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineers may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.

    (g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the US.

    (h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.
20. *Spawning Areas.* Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized.
21. *Management of Water Flows.* To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow.

    This condition is only applicable to projects that have the potential to affect waterflows. While appropriate measures must be taken, it is not necessary to conduct detailed studies to identify such measures or require monitoring to ensure their

effectiveness. Normally, the Corps will defer to state and local authorities regarding management of water flow.

22. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to the acceleration of the passage of water, and/or the restricting its flow shall be minimized to the maximum extent practicable. This includes structures and work in navigable waters of the US, or discharges of dredged or fill material.
23. *Waterfowl Breeding Areas.* Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.
24. *Removal of Temporary Fills.* Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.
25. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.

    (a) Except as noted below, discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the US may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the USFWS or the NMFS has concurred in a determination of compliance with this condition.

    (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.
26. *Fills Within 100-Year Floodplains.* For purposes of this General Condition, 100-year floodplains will be identified through the existing Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps.

    (a) *Discharges in Floodplain; Below Headwaters.* Discharges of dredged or fill material into waters of the US within the mapped 100-year floodplain, below headwaters (i.e. five cfs), resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, 43, and 44.

    (b) *Discharges in Floodway; Above Headwaters.* Discharges of dredged or fill material into waters of the US within the FEMA or locally mapped floodway, resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, and 44.

    (c) The permittee must comply with any applicable FEMA-approved state or local floodplain management requirements.
27. *Construction Period.* For activities that have not been verified by the Corps and the project was commenced or under contract to commence by the expiration date of the NWP (or modification or revocation date), the work must be completed within 12-months after such date (including any modification that affects the project).

    For activities that have been verified and the project was commenced or under contract to commence within the verification period, the work must be completed by the date determined by the Corps.

    For projects that have been verified by the Corps, an extension of a Corps approved completion date may be requested. This request must be submitted at least one month before the previously approved completion date.

3. Regional Conditions for the Los Angeles District

In accordance with General Condition Number 6, "Regional and Case-by-Case Conditions," the following Regional Conditions, as added by the Division Engineer, must be met in order for an authorization by any Nationwide to be valid:

1. For coastal watersheds from the southern reach of the Santa Monica Mountains in Los Angeles County to the San Luis Obispo County/Monterey County boundary, all road crossings must employ a bridge crossing design that ensures passage and/or spawning of steelhead *(Oncorhynchus mykiss)* is not hindered in any way. In these areas, bridge designs that span the stream or river, including designs for pier- or pile-supported spans, or designs based on use of a bottomless arch culvert simulating the natural stream bed (i.e., substrate and streamflow conditions in the culvert are similar to undisturbed stream bed channel conditions) shall be employed unless it can be demonstrated the stream or river does not support resources conducive to the recovery of federally listed *Anadromous salmonids,* including migration of adults and smolts, or rearing and spawning. This proposal also excludes approach embankments into the channel unless they are determined to have no detectable effect on steelhead.

2. For the State of Arizona and the Mojave and Sonoran (Colorado) desert regions of California in Los Angeles District (generally north and east of the San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountain ranges, and south of Little Lake, Inyo

County), no nationwide permit, except Nationwide Permits 1 (Aids to Navigation), 2 (Structures in Artificial Canals), 3 (Maintenance), 4 (Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities), 5 (Scientific Measurement Devices), 6 (Survey Activities), 9 (Structures in Fleeting and Anchorage Areas), 10 (Mooring Buoys), 11 (Temporary Recreational Structures), 20 (Oil Spill Cleanup), 22 (Removal of Vessels), 27 (Stream and Wetland Restoration Activities), 30 (Moist Soil Management for Wildlife), 31 (Maintenance of Existing Flood Control Projects), 32 (Completed Enforcement Actions), 35 (Maintenance Dredging of Existing Basins), 37 (Emergency Watershed Protection and Rehabilitation), and 38 (Cleanup of Hazardous and Toxic Waste), or other nationwide or regional general permits that specifically authorize maintenance of previously authorized structures or fill, can be used to authorize the discharge of dredged or fill material into a jurisdictional special aquatic site as defined at 40 CFR Part 230.40-45 (sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle-and-pool complexes).

3. For all projects proposed for authorization by nationwide or regional general permits where prior notification to the District Engineer is required, applicants must provide color photographs or color photocopies of the project area taken from representative points documented on a site map. Pre-project photographs and the site map would be provided with the permit application. Photographs should represent conditions typical or indicative of the resources before impacts.

4. Notification pursuant to general condition 13 shall be required for projects in all special aquatic sites as defined at 40 CFR Part 230.40-45 (sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle-and-pool complexes), and in all perennial watercourses or waterbodies in the State of Arizona and the Mojave and Sonoran (Colorado) desert regions of California in Los Angeles District (generally north and east of the San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountain ranges, and south of Little Lake, Inyo County), excluding the Colorado River from Davis Dam downstream to the north end of Topock and downstream of Imperial Dam.

5. Notification pursuant to general condition 13 shall be required for projects in all areas designated as Essential Fish Habitat by the Pacific Fishery Management Council (i.e., all tidally influenced areas).

6. Notification pursuant to general condition 13 shall be required for projects in all watersheds in the Santa Monica Mountains in Los Angeles and Ventura counties bounded by Calleguas Creek on the west, by Highway 101 on the north and east, and by Sunset Boulevard and Pacific Ocean on the south.

7. Individual permits shall be required for all jurisdictional vernal pools.

8. Individual permits shall be required in Murrieta Creek and Temecula Creek watersheds in Riverside County for new permanent fills in perennial and intermittent watercourses otherwise authorized under NWPs 39, 42 and 43, and in ephemeral watercourses for these NWPs for projects that impact greater than 0.1 acre.

9. Individual permits shall be required in San Luis Obispo Creek and Santa Rosa Creek in San Luis Obispo County for bank stabilization projects, and in Gaviota Creek, Mission Creek and Carpinteria Creek in Santa Barbara County for bank stabilization projects and grade control structures.

4. **Further information**:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
   ( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
   (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.
   (a) This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
   (b) This permit does not grant any property rights or exclusive privileges.
   (c) This permit does not authorize any injury to the property or rights of others.
   (d) This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
   (a) Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
   (b) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
   (c) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity

authorized by this permit.

(d) Design or construction deficiencies associated with the permitted work.

(e) Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

   (a) You fail to comply with the terms and conditions of this permit.

   (b) The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

   (c) Significant new information surfaces which this office did not consider in reaching the original public interest decision.

   Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 330.5 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measure ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. This letter of verification is valid for a period not to exceed two years unless the nationwide permit is modified, reissued, revoked, or expires before that time.

7. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition H below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

8. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

9. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of your permit.

State of California – The Resources Agency
ARNOLD SCHWARZENEGGER, *Governor*

DEPARTMENT OF FISH AND GAME
1508 North Harding Avenue
Pasadena, CA 91104
(626) 797-3170

March 8, 2005

Mr. Syd Temple
Questa Engineering Corp.
1220 Brickyard Cove Road, Ste, 206
Pt. Richmond, CA 94801

Re: Lake or Streambed Alteration Notification
Notification No: 1600-2005-0018-R5
Project: Las Virgenes Creek Stream Restoration
Water: Las Virgenes Creek
County: Los Angeles

Dear Mr. Temple:

The Department of Fish and Game (Department) received your Notification and deemed it complete on 2/7/05.

The purpose of this letter is to inform you that the Department failed to meet our deadline for the project you described in the above-referenced notification. As a result, and as explained in greater detail below, you do not need a Lake or Streambed Alteration Agreement from the Department of Fish and Game to complete the project you described in your notification.

Under the Fish and Game Code section 1602, (a) (4) (D) the Department had a total of 60 days to act on your notification by submitting to you project conditions the Department believes are necessary to protect existing fish and wildlife resources. This means that **from the date of this letter,** by law you may go forward with your project without an Agreement from the Department.

If you decide to complete the project as described in your notification, please keep a copy of this letter and the Notification available at the project site. The project described in the Notification includes not only the project impacts, but also includes all of your proposed minimization and mitigation measures.

Your project must terminate no later than 5 years from the date of this letter. Your project

is described as the restoration of 500 feet of partially armored and urbanized Las Virgenes Creek with a stable, natural, vegetated channel from Highway 101 south to the Agoura Road Bridge, City of Calabasas, Los Angeles County. Gradient improvements to allow fish passage will also be a component of this project.as well as public access paths along the eastern bank of the channel. If the project changes so that it differs from the one described in the original notification, including but not limited to working outside the specified work period dates, you will need to submit a new notification to the Department for that project.

If you have any questions regarding this matter, please contact Scott Harris, Associate Wildlife Biologist at the above address or telephone number.

Sincerely,

Scott Harris
Associate Wildlife Biologist

Dr. Alan Lloyd
Secretary for Environmental Protection

California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

Charles S. Mink
City of Calabasas
26135 Mureau Road
Calabasas, CA 91302

WATER QUALITY CERTIFICATION FOR PROPOSED LAS VIRGENES CREEK RESTORATION PROJECT (Corps' Project No. 2005-01094-JLB), LAS VIRGENES CREEK, CITY OF CALABASAS, COUNTY LOS ANGELES (File No. 05-007)

Dear Mr. Mink:

Regional Board staff has reviewed your request on behalf of City of Calabasas (Applicant) for a Clean Water Act Section 401 Water Quality Certification for the above-referenced project. Your application was deemed complete on May 6, 2005.

I hereby issue an order certifying that any discharge from the referenced project will comply with the applicable provisions of sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act, and with other applicable requirements of State law. This discharge is also regulated under State Water Resources Control Board Order No. 2003 - 0017 - DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges that have received State Water Quality Certification" which requires compliance with all conditions of this Water Quality Certification.

The Applicant shall be liable civilly for any violations of this Certification in accordance with the California Water Code. This Certification does not eliminate the Applicant's responsibility to comply with any other applicable laws, requirements and/or permits.

Should you have questions concerning this Certification action, please contact Dana Cole, Section 401 Program, at (213) 576-5733.

Jonathan S. Bishop
Executive Officer

5/16/05
Date

DISTRIBUTION LIST

Sydney Temple
Questa Engineering Company
1220 Brickyard Cove Road, Suite 206
Pt. Richmond, CA 94807

Oscar Balaguer
State Water Resources Control Board
Division of Water Quality
P.O. Box 944213
Sacramento, CA 94244-2130

Betty Courtney
California Department of Fish and Game
Streambed Alteration Team
4949 View Ridge Avenue
San Diego, CA 92123

Joshua Burnam
U.S. Army Corps of Engineers
Regulatory Branch, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

Steven John
U.S. Environmental Protection Agency
600 Wilshire Boulevard, Suite 1460
Los Angeles, CA 90017

Tim Vendlinski
Supervisor, Wetlands Regulatory Office (WTR-8)
US EPA, Region 9
75 Hawthorne
San Francisco, CA 94105

Ken Berg
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

ATTACHMENT A

Project Information
File No. 05-007

1. Applicant:

Charles S. Mink
City of Calabasas
26135 Mureau Road
Calabasas, CA 91302

Phone: (818) 878-4225 Fax: (818) 878-4215

2. Applicant's Agent:

Sydney Temple
Questa Engineering Company
1220 Brickyard Cove Road, Suite 206
Pt. Richmond, CA 94807

Phone: (510) 236-6114 EXT 220 Fax: (510) 236-2423

3. Project Name: Las Virgenes Creek Restoration Project

4. Project Location: City of Calabasas area, Los Angeles County

Longitude: 118o 42' 4"; Latitude: 34o 8' 38"

5. Type of Project: Restoration of riparian habitat.

6. Project Description:

Purpose: The project will remove 500 feet of concrete lined channel and replace it with a natural bed stream and extensive native riparian plantings.

Description: In 1977, a trapezoidal concrete channel lining with a 45-foot bottom width was constructed in the Las Virgenes Creek between Route 101 and the Agoura Road Bridge, disrupting the wildlife corridor between the Baldwin Open Space and Malibu Creek State Park. The concrete channel is to be removed by the program called the Las Virgenes Creek Restoration Project. This project places priority on the viable habitat and wildlife connectivity so as to enable the City to implement the best restoration strategy suitable for this area that can meet the stated project goals while still providing adequate flood and erosion control. The restoration project will also include a river-walk setting

		to facilitate pedestrian access and community enjoyment.
7.	Federal Agency/Permit:	U.S. Army Corps of Engineers NWP No. 27 (Permit No. 2005-01094-JLB)
8.	Other Required Regulatory Approvals:	California Department of Fish and Game Streambed Alteration Agreement
9.	California Environmental Quality Act Compliance:	The City of Calabasas approved the project's Negative Declaration on March 3, 2005.
10.	Receiving Water:	Receiving water from Basin Plan (Hydrologic Unit No. 404.22)
11.	Designated Beneficial Uses:	MUN, REC-1, REC-2, WARM, COLD, WILD, RARE, MIGR, SPWN, WET
12.	Impacted Waters of the United States:	Non-wetland waters (vegetated streambed): 0.00 temporary and 0.50 permanent acres Non-wetland waters (unvegetated streambed): 0.00 temporary and 0.50 permanent acres
13.	Dredge Volume:	None
14.	Related Projects Implemented/to be Implemented by the Applicant:	The Applicant has not identified any related projects carried out in the last 5 years or planned for implementation in the next 5 years.
15.	Avoidance/ Minimization Activities:	The Applicant has proposed to implement several Best Management Practices, including, but not limited to, the following:

- All construction will be completed under dry creek bed conditions.
- Temporary water diversions will be constructed upstream of the project site.
- Summer low flow water will be redirected into the downstream channels so that no loss of water to downstream reaches occurs.
- Extensive use of erosion control blankets, hydroseeding, revegetation, bio-degradable coir (cocnut palm fiber) blocks, planted rock revetment, and the creation of a lower flow channel configuration.

16. Proposed Compensatory Mitigation:

- The Applicant proposes to create 0.5 acres of streambed (vegetated) and enhance approximately 1.0 acres of streambed (vegetated).
- Since the project is restoration, the Regional Board will not require any additional compensatory mitigation.

17. Required Compensatory Mitigation:

See Attachment B Conditions of Certifications, Additional Conditions for modifications and additions to the above proposed compensatory mitigation.

ATTACHMENT B

Conditions of Certification
File No. 05-007

STANDARD CONDITIONS

Pursuant to §3860 of Title 23 of the California Code of Regulations (23 CCR), the following three standard conditions shall apply to this project:

1. This Certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and Article 6 (commencing with 23 CCR §3867).

2. This Certification action is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent Certification application was filed pursuant to 23 CCR Subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. Certification is conditioned upon total payment of any fee required pursuant to 23 CCR Chapter 28 and owed by the Applicant.

ADDITIONAL CONDITIONS

Pursuant to 23 CCR §3859(a), the Applicant shall comply with the following additional conditions:

1. The Applicant shall submit to this Regional Board copies of any other final permits and agreements required for this project, including, but not limited to, the U.S. Army Corps of Engineers' Section 404 Permit and the California Department of Fish and Game's Streambed Alteration Agreement. **These documents shall be submitted prior to any discharge to waters of the State**.

2. The Applicant and all contractors employed by the Applicant shall have copies of this Certification, the approved maintenance plan, and all other regulatory approvals for this project on site at all times so they are familiar with all conditions set forth.

3. Fueling, lubrication, maintenance, operation, and storage of vehicles and equipment shall not result in a discharge or a threatened discharge to waters of the State. At no time shall the Applicant use any vehicle or equipment which leaks any substance that may impact water quality. Staging and storage areas for vehicles and equipment shall be located outside of waters of the State.

4. No construction material, spoils, debris, or any other substances associated with this project that may adversely impact water quality standards, shall be located in a manner which may result in a discharge or a threatened discharge to waters of the State.

5. The Applicant shall implement all necessary control measures to prevent the degradation of water quality from the proposed project in order to maintain compliance with the Basin Plan. The discharge shall meet all effluent limitations and toxic and effluent standards established to comply with the applicable water quality standards and other appropriate requirements, including the provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act. This Certification does not authorize the discharge by the applicant for any other activity than specifically described in the 404 Permit.

6. The discharge shall not: a) degrade surface water communities and populations including vertebrate, invertebrate, and plant species; b) promote the breeding of mosquitoes, gnats, black flies, midges, or other pests; c) alter the color, create visual contrast with the natural appearance, nor cause aesthetically undesirable discoloration of the receiving waters; d) cause formation of sludge deposits; or e) adversely affect any designated beneficial uses.

7. The Applicant shall allow the Regional Board and its authorized representative entry to the premises, including all mitigation sites, to inspect and undertake any activity to determine compliance with this Certification, or as otherwise authorized by the California Water Code.

8. Application of pesticides must be supervised by a certified applicator and be in conformance with manufacturer's specifications for use. Compounds used must be appropriate to the target species and habitat. All pesticides directed toward aquatic species must be approved by the Regional Board. Pesticide utilization shall be in accordance with State Water Resources Control Board Water Quality Order Nos. 2004-0008-DWQ and 2004-0009-DWQ.

9. The Applicant shall not conduct any construction activities within waters of the State during a rainfall event. The Applicant shall maintain a five-day (5-day) clear weather forecast before conducting any operations within waters of the State.

10. The Applicant shall utilize the services of a qualified biologist with expertise in riparian assessments during all construction activities where clearing involves areas to be partially cleared (i.e. some vegetation is to remain in the same reach or in an adjacent reach). The biologist shall be available on site during construction activities to ensure that all protected areas are marked properly and ensure that no vegetation outside the specified areas is removed. The biologist shall have the authority to stop the work, as necessary, if instructions are not followed. The biologist shall be available upon request from this Regional Board for consultation within 24 hours of request of consultation.

11. No activities shall involve wet excavations (i.e., no excavations shall occur below the seasonal high water table). A minimum **5-foot** buffer zone shall be maintained above the existing groundwater level. If construction or groundwater dewatering is proposed or anticipated, the Applicant shall file a **Report of Waste Discharge** to this Regional Board and obtain any necessary NPDES permits/Waste Discharge Requirements prior to discharging waste. Sufficient time should be allowed to obtain any such permits (generally 180 days). If groundwater is encountered without the benefit of appropriate permits, the Applicant shall cease all activities in the areas where groundwater is present, file a Report of Waste Discharge to this Regional Board, and obtain any necessary permits prior to discharging waste.

12. All project/construction activities not included in this Certification, and which may require a permit, must be reported to the Regional Board for appropriate permitting. Bank stabilization and grading, as well as any other ground disturbances, are subject to restoration and revegetation requirements, and may require additional Certification action.

13. All surface waters, including ponded waters, shall be diverted away from areas undergoing grading, construction, excavation, vegetation removal, and/or any other activity which may result in a discharge to the receiving water. If surface water diversions are anticipated, the Applicant shall develop and submit a Surface Water Diversion Plan to this Regional Board. The plan shall include the proposed method and duration of diversion activities, erosion and sediment controls, and a map or drawing indicating the locations of diversion and discharge points. The plan shall be submitted prior to any surface water diversions. If surface flows are present, then upstream and downstream monitoring for pH, temperature, dissolved oxygen, turbidity, and total suspended solids shall be implemented. These constituents shall be monitored on a daily basis during the first week of diversion activities, and then on a weekly basis, thereafter, until the in-stream work is complete. Results of the analyses shall be submitted to this Regional Board by the 15th day of each subsequent sampling month. A map or drawing indicating the locations of sampling points shall be included with each submittal. Diversion activities shall not result in the degradation of beneficial uses or exceedance of water quality objectives of the receiving waters. Any such violations may result in corrective and/or enforcement actions, including increased monitoring and sample collection.

14. The Applicant shall restore all areas of TEMPORARY IMPACTS to waters of the United States and all other areas of temporary disturbance which could result in a discharge or a threatened discharge to waters of the State. Restoration shall include grading of disturbed areas and revegetation with native species. The Applicant shall implement all necessary Best Management Practices to control erosion and runoff from areas associated with this project.

15. The Applicant shall also provide restoration for the proposed permanent impacts to **1.00 acres** of vegetation within waters of the United States/Federal jurisdictional wetlands by creating and enhancing riparian habitat at a minimum 1.5:1 area replacement ratio (1.50 acres).

16. All open space and mitigation areas shall be placed within a conservation easement to ensure preservation in perpetuity. Documentation of proper easement placement shall be submitted to the Regional Board within one year.

17. The Applicant shall submit to this Regional Board **Annual Mitigation Monitoring Reports** by **January 1st /May 1st** of each year for a minimum period of **five (5) years** after planting or until mitigation success has been achieved. The report shall describe in detail all of the project/construction activities performed during the previous year and all restoration and mitigation efforts; including percent survival by plant species and percent cover. This report shall include as a minimum, the following documentation:

    (a) Color photo documentation of the pre- and post-project and mitigation site conditions;

    (b) Geographical Positioning System (GPS) coordinates in decimal-degrees format outlining the boundary of the project and mitigation areas;

    (c) The overall status of project including a detailed schedule of work;

    (d) Copies of all permits revised as required in Additional Condition 1;

    (e) Water quality monitoring results for each reach (as required) compiled in an easy to interpret format;

    (f) A certified Statement of "no net loss" of wetlands associated with this project;

    (g) Discussion of any monitoring activities and exotic plant control efforts; and

    (h) A certified Statement from the permittee or his/her representative that all conditions of this Certification have been met.

18. Prior to any subsequent maintenance activities within the subject drainages, including clearing, maintenance by-hand, and/or the application of pesticides, the Applicant shall submit to this Regional Board a NOTIFICATION of any such activity. Notification shall include: (a) the proposed schedule; (b) a description of the drainage's existing condition and/or capacity; (c) the area of proposed temporary impact within waters of the State; (c) a description of any existing aquatic resources (e.g., wetland/riparian vegetation); and (d) any

proposed compensatory mitigation. Notifications must be submitted a minimum of **three (3) weeks** prior to commencing work activities.

19. All applications, reports, or information submitted to the Regional Board shall be signed:

    (a) For corporations, by a principal executive officer at least of the level of vice president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which discharge originates.

    (b) For a partnership, by a general partner.

    (c) For a sole proprietorship, by the proprietor.

    (d) For a municipal, State, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

20. Each and any report submitted in accordance with this Certification shall contain the following completed declaration:

    "I declare under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

    Executed on the _____ day of _____ at _____.

    _____ (Signature)
    _____ (Title)"

21. All communications regarding this project and submitted to this Regional Board shall identify the Project File Number **05-007**. Submittals shall be sent to the attention of the Nonpoint Source Unit.

22. Any modifications of the proposed project may require submittal of a new Clean Water Act Section 401 Water Quality Certification application and appropriate filing fee.

23. The project shall also comply with all requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity, Order No. 99-08-DWQ. All stormwater treatment systems shall be

located outside of any water of the State and shall not be used as a wetland or riparian mitigation credit.

24. Coverage under this Certification may be transferred to the extent the underlying federal permit may legally be transferred and further provided that the Applicant notifies the Executive Officer at least 30 days before the proposed transfer date, and the notice includes a written agreement between the existing and new Applicants containing a specific date of coverage, responsibility for compliance with this Certification, and liability between them.

25. The Applicant or their agents shall report any noncompliance. Any such information shall be provided verbally to the Executive Officer within 24 hours from the time the Applicant becomes aware of the circumstances. A written submission shall also be provided within five days of the time the Applicant becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

26. *Enforcement:*

    (a) In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under State law. For purposes of section 401(d) of the Clean Water Act, the applicability of any State law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this Certification.

    (b) In response to a suspected violation of any condition of this Certification, the State Water Resources Control Board (SWRCB) or Regional Water Quality Control Board (RWQCB) may require the holder of any permit or license subject to this Certification to furnish, under penalty of perjury, any technical or monitoring reports the SWRCB deems appropriate, provided that the burden, including costs, of the reports shall be a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

    (c) In response to any violation of the conditions of this Certification, the SWRCB or RWQCB may add to or modify the conditions of this Certification as appropriate to ensure compliance.

27. This Certification shall expire five (5) years from date of this Certification. The Applicant shall submit a complete application prior to termination of this Certification if renewal is requested.

CITY of CALABASAS

Notice of Determination

To: County Clerk, Room 2001
County of Los Angeles
12400 East Imperial Highway
Norwalk, CA 90650

From: City of Calabasas
Environmental Services Division
26135 Mureau Road
Calabasas, CA 91302-3172

Subject:
Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title:
Las Virgenes Creek Stream Restoration Project

Project Location:
A 500-ft segment of Las Virgenes Creek within the City of Calabasas, between Hwy 101 and the Agoura Road Bridge.

Project Description:
The project seeks to remove approximately 500 feet of partially armored, highly urbanized creek channel and replace it with a stable, natural, revegetated channel. The restoration reach extends from Highway 101 (south) to the Agoura Road Bridge.

The purpose of this notice is to advise the State, County, City and General Public that the City Council of the City of Calabasas has made the following determination regarding the above described project:

1. The project will not have a significant effect on the environment.
2. An MND was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation Measures were made a condition of the approval of the project.
4. A Statement of Overriding Considerations was not adopted for this project.
5. Findings were made pursuant to CEQA Guidelines Section 15091.

Document Availability:
This is to certify that the MND and project record may be examined at:
The City of Calabasas Public Counter
26135 Mureau Road
Calabasas, CA 91302-3172

Rob Hull

Robin Hull
City of Calabasas
Environmental Services Manager
(818) 878-4225 ext. 306

April 4 2005
Date

Date received for filing and posting at the Los Angeles County Clerk:

26135 Mureau Road
Calabasas, CA 91302-3172
(818) 878-4225
Fax (818) 878-4215

CITY of CALABASAS

FILED
FEB 08 2005
CONNY B. McCORMACK, COUNTY CLERK
J. BAKER DEPUTY

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

DATE: February 2, 2005

LEAD AGENCY: City of Calabasas, Public Works Department

CONTACT PERSON: Rubin Hull, Environmental Services Manager

TELEPHONE: (818) 878-4225 ext. 306

TO: ☒ Los Angeles County Clerk
Attn: Environmental Filing
12400 Imperial Highway, Suite 2001
Norwalk, CA 90650

☐ Governor's Office of Planning & Research
1400 Tenth Street, Room 1311
Sacramento, CA 95814

PROJECT INFORMATION

TITLE: Las Virgenes Creek Stream Restoration Project

LOCATION: A 500-ft segment of Las Virgenes Creek within the City of Calabasas, between Hwy 101 and the Agoura Road Bridge.

DESCRIPTION: The project seeks to remove approximately 500 feet of partially armored, highly urbanized creek channel and replace it with a stable, natural, revegetated channel. The restoration reach extends from Highway 101 (south) to the Agoura Road Bridge.

APPLICANT: City of Calabasas, Public Works Department

COMMENT PERIOD:
The review period of the proposed Mitigated Negative Declaration begins on February 9, 2005 and ends March 2, 2005. Written comments should be received on or before March 2, 2005. Comments should refer to the project by name and be addressed to:

05 0013735

26135 Mureau Road
Calabasas, CA 91302-3172
(818) 878-4225
Fax (818) 878-4215

THIS NOTICE WAS POSTED
ON FEB 08 2005
UNTIL MAR 08 2005
REGISTRAR RECORDER

City of Calabasas
Planning and Environmental Programs Division
26135 Mureau Road
Calabasas, CA 91302-3172
Attention: Alex Farassati

The City Council will hold a public hearing to take action on the proposed project and the environmental finding on March 2, 2005 at 7:30 PM at Calabasas City Hall, City Council Chambers, 26135 Mureau Road. Copies of the documentation can be reviewed in the Planning and Environmental Programs Division, City Hall, First Floor (handicapped accessible location). City Hall business hours are 7:30AM - 5:30PM, Monday through Thursday, and 7:30AM - 2:00PM on Friday. Please telephone in advance to assure staff availability at (818) 878-4225.

Alex Farassati

Alex Farassati, Planner

February 2, 2005

INITIAL STUDY CHECKLIST

1. **Project Title:** Las Virgenes Creek Stream Restoration Project

2. **Case Processing Numbers:**

3. **Lead Agency Name and Address:** City of Calabasas
26135 Mureau Road
Calabasas, California 91302

4. **Contact Person and Phone Number:** Chuck Mink, Roxanne Hughes
(818) 878-4225

5. **Project Location:** A 500-ft segment of Las Virgenes Creek within the City of Calabasas, between Hwy 101 and the Agoura Road Bridge.

6. **Project Sponsor's Name and Address:** City of Calabasas
26135 Mureau Road
Calabasas, California 91302

7. **General Plan Designation:** Existing: Business, Retail (BR)
Proposed: Business, Retail (BR)

8. **Zoning:** Existing: Commercial, Retail (CR)
Proposed: Commercial, Retail (CR)

9. **Project Description:**

The project seeks to remove approximately 500 feet of partially armored, highly urbanized creek channel and replace it with a stable, natural, re-vegetated channel. The restoration reach extends from Highway 101 (south) to the Agoura Road Bridge. The project reach consists of three general sections: the upstream natural channel, the middle concrete trapezoidal channel, and the channelized portion below Agoura Road Bridge. The upstream section, a natural bed with rock riprap side slopes, is approximately 40 feet long and extends from the downstream edge of the Highway 101 box culvert to the beginning of the concrete trapezoidal channel. The middle section consists of a concrete trapezoidal channel that is relatively flat, and extends for approximately 370 feet. The section below Agoura Road Bridge is 92 feet long; the upstream half of the section is channelized, and the downstream half consists of grouted rock riprap. Finished concrete bridge piers form the bridge foundations and line this section of the project reach below the Agoura Road Bridge.

The primary goals of the proposed project are to achieve stable compound channel morphology and significant native riparian vegetation and habitat. The overall restoration plan is made up of six main components:

a) gradient control;
b) bank slope reconfiguration;
c) fish passage improvement;
d) erosion control;
e) flood control;
f) public access.

A set of plan sheets is attached as part of this project description.

Gradient control along the restoration reach would be achieved with five vertical drops at varying intervals. The drops would consist of rock weirs with pools and runs in between drops. As these drops would be constructed to allow for fish passage, they have been designed following National Marine Fisheries Service (NMFS) and California Department of Fish and Game (CDFG) guidelines. The typical drop structure will drop 15 inches. The rock weirs (drop structures) would be keyed deeply into the banks of the creek so that flow would not "flank" or go around the structures, making them ineffective as a gradient control. Reducing the gradient would reduce sediment transport, encourage bar and floodplain development, and increase the chances of developing a stable low flow channel and associated floodplain channel morphology for the creek. All rock/stone revetments would be planted with long willow stakes to ensure that vegetation cover would become part of the overall cover of the structure.

The existing concrete bank slopes are 1.5 (H) to 1 (V). The concrete slopes would be removed as part of the proposed project. At the existing slope, planting and establishing riparian vegetation will be difficult. For the restoration of the bank slopes to be successful, the angle of the slope would be reduced to a minimum of 2:1. The project's bank slope configuration would be achieved by retaining the existing bank tops at their current position and constructing a retaining wall at the top of the bank (see sheet 4 and 7). This would keep the project within the existing easement right-of-ways and top-of-bank boundaries of the project while reducing the slope of the creek bank. This technique would allow the lower bank slopes to be laid back at a 2:1 slope but still retain existing top of bank boundaries.

Fish passage will be achieved by construction of the rock weir gradient control structures (discussed above) and removal of the concrete channel beneath the bridge. The channel bed would be returned to the natural ground surface. An additional rock weir gradient control structure would be added beneath the bridge and the channel would be graded to a compound configuration.

Effective erosion control within the channel is the primary goal of the restoration efforts. Although the erosion potential of the channel and banks decreases as the project ages and mature stable vegetation is established, effective erosion protection is critical during the initial phases of the project construction and establishment. The proposed project includes a combination of erosion control measures that would protect erosion up to 5,000 cfs (or about a 10-year protection level). Erosion control measures that would be implemented include: (a) coir fiber blocks installed along the low-flow channel and (b) willow-staked loose rock revetment installed in both the low-flow

channel and the bank slope toes. Rock toe protection would extend 5 to 6 vertical feet up the bank slope. This rock would be planted with willow stakes and backfilled with channel bed sediments and topsoil for greater rock erosion control. Additional erosion control would be accomplished through an extensive riparian planting program, which would divide planting for the channel into several different planting zones shown on sheet 12 of the enclosed plans. A temporary irrigation system will need to be installed to ensure adequate irrigation during the vegetation establishment period.

The flood control aspects of the channel are important. Because revegetation of the project reach would increase frictional resistance, predicted water surface elevations show flooding can occur in the upper portions of the project reach. Specifically, overbank flooding could occur from Station 575 to 700. This would cause shallow flooding in the adjacent parking lot. This localized flooding would be prevented by the construction of a 200-foot length floodwall along the west creek bank top to ensure a 3-foot freeboard above the capitol flood water surface elevation.

The proposed project also includes public access. This is particularly important because the project is adjacent to a shopping mall and café. Currently, a maintenance access path extends for the project length along the top of the eastern bank. The concrete path would be removed and replaced with a 6ft-wide compacted dirt access path. An additional path would be constructed along the eastern bank, within the proposed 4ft-wide retaining wall. A wooden, hexagonal gazebo would be constructed over the creek and supported by piers. Pedestrian ramps to the gazebo would ensure handicapped accessibility following American Disability Act (ADA) standards.

10. **Surrounding Land Uses and Setting**:

The project site is located in a highly urbanized area. A commercial shopping center lies to the east of the project reach; a business park is located to the west of the project reach.

11. **Other public agencies whose approval is required** (e.g. permits, financing approval, or participation agreements):

- U.S. Army Corps of Engineers – Clean Water Act section 404 permit
- Regional Water Quality Control Board - Section 401 Water Quality Certification
  California Department of fish and Game – Streambed Alteration Agreement

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

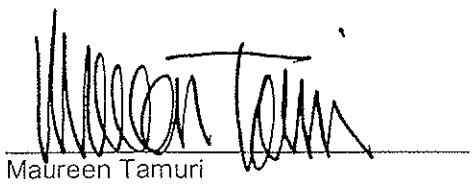
The proposed project may have an impact on the environmental factors listed below, and would have at least one "Potentially Significant Impact" on the environment as indicated by the checklist on the following pages.

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Hazards & Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Mineral Resources
- Noise
- Population/Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities/Service Systems
- Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	
I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	X
I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	
I find that the proposed project MAY have a "potential significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	
I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to an earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	



Maureen Tamuri
City of Calabasas
Director of Planning and Community Development

2.2.05
Date

EVALUATION OF ENVIRONMENTAL IMPACTS
(Requirements specified in CEQA Guidelines)

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 17, "Earlier Analysis," may be cross-referenced).

5) Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c) (3) (d). In this case, a brief discussion should identify the following:

   (a) Earlier Analysis Used. Identify and state where they are available for review.

   (b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   (c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The analysis of each issue should identify: (a) the significance criteria or threshold used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significance.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact

(1) **LAND USE AND PLANNING**. Would the project:

a)	Physically divide an established community?				X
b)	Conflict with an applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c)	Conflict with any applicable habitat conservation plan or natural communities conservation plan?				X
d)	Result in direct or indirect population related growth inducement impacts (significantly expand employment opportunities, remove policy impediments to growth, or contribute to potential extensions of growth inducing infrastructure)?				X

LAND USE AND PLANNING DISCUSSION:

a) The project would not result in the physical division of an established community. ***No impact*** would occur.

b) The proposed project does not involve any changes in land use, General Plan designations, or zoning. ***No impact*** to land use plans, policies, or regulations would occur.

c) The proposed project does not conflict with habitat conservation plans. Rather, the proposed project would be constructed in accordance with the *Las Virgenes Gateway Master Plan*, the *Malibu Creek Watershed Management Area Plan*, and the *Las Virgenes, McCoy and Dry Canyon Creeks Master Plan for Restoration.* Therefore, ***no impact*** would occur.

d) The proposed creek restoration project would project would not affect human population growth in any way. ***No impact*** to population growth would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact

(2) **BIOLOGICAL RESOURCES**. Would the project:

a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U. S. Fish and Wildlife Service?		X		

b) Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U. S. Wildlife Service?				X
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, other approved local, regional, or state habitat conservation plan?				X
g) Result in damage to, loss of, or removal of native oak trees or other locally identified specimen trees of significance?				X

BIOLOGICAL RESOURCES DISCUSSION:

a) Biological conditions along the project site were discussed in the *Preliminary Design and Feasibility Analysis for Stream Restoration of Las Virgenes Creek* (Questa Engineering Corporation, 2004). The report includes a biological reconnaissance of the project site and a California Natural Diversity Database (CNDDB) search of special-status species with recorded occurrences within the Calabasas and Malibu Beach USGS 7.5-minute quadrangles. The CNDDB is maintained by the California Department of Fish and Game (CDFG) and provides occurrences of listed or sensitive plants, animals, and plant communities that correspond to USGS quadrangles.

Review of the CNDDB indicates three special-status wildlife species and two special-status plant species occur within the project Las Virgenes watershed (see **Tables 1** and **2**). The three special-status wildlife species with recorded occurrences within the project USGS quadrangles (California red-legged frog, Coastal California gnatcatcher, and Southwestern pond turtle) are all unlikely to occur at the project site due to lack of appropriate habitat conditions. The two special-status plant species (Braunton's milk vetch, San Fernando Valley spineflower) are unlikely to occur in the vicinity of the project reach due to lack of availability of preferred habitat and distance from extant communities.

The habitat of the California red-legged frog is permanent ponds and streamsides in grasslands, woodlands, and forests with emergent vegetation that provides cover. Red-legged frogs require cool water. Deep pools are necessary for many aspects of the frog's life cycle. Because of physical barriers to corridor migration and lack of suitable habitat within the trapezoidal concrete channel, the California red-legged frog is considered unlikely to occur at the project site.

The Coastal California gnatcatcher is an obligate, permanent resident of coastal sage scrub habitat below 2500 feet above mean sea level (MSL) in Southern California and Mexico. It occurs in low, coastal sage scrub in arid washes,

on mesas and slopes. This small bird is currently designated as threatened throughout its entire range by the US Fish and Wildlife Service (USFWA). In 2003, the USFWA proposed approximately 495,795 acres (775 square miles) of land in portions of Ventura, Los Angeles, Orange, Riverside, San Bernandino, and San Diego counties as critical habitat for the bird. None of the designated habitat occurs within the Las Virgenes watershed. The Coastal California gnatcatcher is unlikely to occur at the project site due to lack of coastal scrub habitat and distance from extant populations.

The Southwestern pond turtle is typically found in ponds, marshes, and rivers with aquatic vegetation. Optimal habitat is characterized by the presence of adequate emergent basking sites, emergent vegetation, and the presence of suitable shelter or protection in the form of undercut banks, submerged vegetation, mud, rocks, and logs. Due to the lack of permanent or nearly permanent water, or basking sites such as partially submerged logs, vegetation mats, or open mud banks at the project site, the Southwestern pond turtle is unlikely to occur at the project site.

Table 1

Recorded occurrences of special status wildlife species within the CNDDB Frazier Mountain quadrangle. Status of all species is based on the CDFG Threatened and Endangered Animals List for California, September 2003.

Species	Federal Status	State Status	CDFG Status	Potential to Occur at the Project Site
CALIFORNIA RED-LEGGED FROG *RANA AURORA DRAYTONII*	Threatened	None	Species of Concern	Unlikely
COASTAL CALIFORNIA GNATCATCHER *Polioptila californica californica*	Threatened	None	Species of Concern	Unlikely
SOUTHWESTERN POND TURTLE *Emys (Clemmys) marmorata pallida*	Species of Concern	None	Species of Concern	Unlikely

Braunton's milk-vetch is a federally endangered plant that occurs in closed-cone coniferous forests, chaparral, coastal scrub, and valley and foothill grassland habitats. It is often found in recently burned or disturbed areas, or in stiff gravelly clay soils overlying granite or limestone. One record was found in the CNDDB database for an occurrence approximately 2 miles northeast of the project site in 1998 within the Ahmanson Ranch development area near Laskey Mesa in southwestern Ventura County.

The San Fernando Valley spineflower is a special-status plant species that is a candidate for federal listing and a state endangered species. This variety of spineflower was thought to be extinct, having not been seen since 1929 until it was rediscovered on the Ahmanson Ranch site in 1999. It is generally found in coastal scrub habitat on sandy soils associated with the Modelo Formation. It is found often in sparsely vegetated areas where soils are thin, compacted or bedrock is exposed. The spineflower is also found along the interface between coastal sage

scrub habitat and non-native grasslands. The recorded occurrences were located within the Ahmanson Ranch site in areas of open soil habitats concentrated along the outer southern rim of the Laskey Mesa.

Table 2

Recorded occurrences of special status plant species within the CNDDB Frazier Mountain quadrangle. Status of all species is based on the CDFG Threatened and Endangered Animals List of California, September 2003. California Native Plant Society (CNPS) list designations are based on the Inventory of Rare and Endangered Vascular Plants (2003).

Species	Federal Status	State Status	R-E-D code*	CNPS**	Potential to Occur at the Project Site
BRAUTON'S MILK VETCH *Atragalus brauntonii*	Endangered	None	3-3-3	1B	Unlikely
SAN FERNANDO VALLEY SPINEFLOWER *Chorizanthe parryi var fernandina*	Candidate	Endangered	3-3-3	1B	Unlikely

* *R-E-D Code. **rarity**, which addresses the extent of the plant; **endangerment**, which embodies the perception of the plant's vulnerability to extinction for any reason; and **distribution**, which focuses on the overall range of the plant. In each case, higher numbers indicate greater concern.*

*** CNPS Plant lists:1A: Plants presumed extinct in California; 1B: Plants rare, threatened or endangered in California and elsewhere; 2: Plants rare, threatened, or endangered in California, but more common elsewhere.*

None of the identified special status species are likely to occur within the proposed restoration reach based on habitat requirements, the distance from extant populations, or physical obstacles to species migration. All of the occurrences were located in the upper watershed (i.e. Ahmanson Ranch area) above developed portions of Las Virgenes Creek; thus, though migration through the watershed and use of the creek as a wildlife corridor is possible, the potential for any of the special status species to occur within the project vicinity is unlikely.

Although the likelihood that special-status wildlife and plant species occur along the project reach is low, and the proposed project will have long-term benefits to riparian habitat, it is still possible that short-term impacts could occur during construction activities. Implementation of ***Mitigation Measures BIO-1*** through ***BIO-4*** would reduce construction-related impacts on endangered, threatened, or rare species to ***less-than-significant*** levels.

b) Rehabilitation of the project reach would be a step towards restoring a link of the highly urbanized creek system through Ventura and Los Angeles counties. Riparian habitat along the project reach is significantly degraded. The concrete trapezoidal channel hinders wildlife migration. Restoration efforts would result in the establishment of significant native riparian vegetation and habitat along the project site.

Las Virgenes Creek, a tributary to Malibu Creek, is not considered to be habitat for migratory fish. The CNDDB database indicates that designated Southern California Steelhead Stream habitat exists along Malibu Creek from approximately one-half mile upstream of the mouth at the upper lagoon to Ringe Dam. This stream corridor encompasses Southern steelhead and Pacific lamprey spawning range. The CNDDB shows no recorded occurrences of the Southern Steelhead within the project watershed due to the fact that Ringe Dam prevents fish

migration north of the dam. However, in the event that the dam is either removed or modified to allow fish passage, the project reach could potentially provide a corridor between the pristine coastal scrub habitat of the Ahmanson Ranch area to the Southern Steelhead Stream habitat below Ringe Dam.

The proposed project would result in an improvement to riparian habitat and a potential improvement to sensitive natural habitat located downstream of the project site. Therefore, ***no impact*** to riparian habitat or other sensitive natural community would result.

c) Notable wetland habitat was not evident during the June 2004 biological reconnaissance conducted by Questa staff. However, it is possible that seasonal wetlands do occur during the rainy season along the upstream natural channel and along the channelized portion below Agoura Road Bridge. If this is the case, channel restoration efforts may affect seasonal wetlands along the project reach. However, seasonal wetlands will likely reestablish themselves upon project completion. Therefore, potential project impacts associated with seasonal wetlands are considered ***less-than-significant***.

d) Currently, the project reach acts as an obstacle to wildlife migration and the movement of resident fish and other aquatic organisms along Las Virgenes Creek. While Las Virgenes Creek is not considered to be habitat for migratory fish species, nonmigratory fish are expected to live along the project reach. Implementation of the proposed project would not further interfere with the movement of wildlife or nonmigratory fish, except during construction. With the proposed stabilization of the creek channel and planting of native riparian trees and vegetation, migratory corridors would be extended and enhanced along the project site. Movement of wildlife and nonmigratory fish would be temporarily impeded during construction, however, this is considered a ***less-than-significant*** impact.

e) The proposed project does not conflict with existing policies or ordinances protecting biological resources. Therefore, ***no impact*** would occur.

f) The proposed project does not conflict with existing plans and policies protecting biological resources. Rather, the proposed project would be constructed in accordance with the *Las Virgenes Gateway Master Plan*, the *Malibu Creek Watershed Management Area Plan*, and the *Las Virgenes, McCoy and Dry Canyon Creeks Master Plan for Restoration*. Therefore, ***no impact*** to adopted habitat conservation plans would occur.

g) The proposed project would not result in damage to, loss of, or removal of native oak trees or other locally identified specimen tree of significance. ***No impact*** to heritage trees would occur.

BIOLOGICAL RESOURCES MITIGATION MEASURES:

BIO-1 ***As close to the beginning of construction as possible, but not more than 14 days prior to construction, a qualified biologist should conduct a final pre-activity survey of the construction zone to ensure that no special status wildlife and/or plant species have recently occupied the site. If any special status wildlife and/or plant species are found, exclusion zones should be established and maintained until all construction activities are completed. In some cases it may be preferable to***

remove and/or relocate the individual plant or animal. If special status species are found during the preconstruction survey, the biologist should be present immediately prior to construction activities that have the potential to impact special status species to identify and protect potentially sensitive resources.

BIO-2 Large shrubs should be avoided to the extent possible to minimize impact to wildlife habitat.

BIO-3 The City of Calabasas Engineering and Public Works Department shall secure appropriate permits from the US Army Corps of Engineers, the CDFG, and the Los Angeles Regional Water Quality Control Board (RWQCB). At the time of this Initial Study, permits applications have been submitted to the agencies. Once the permits have been granted, the Engineering and Public Works Department shall comply with any additional measures imposed as permit conditions beyond those proposed and outlined in this document.

BIO-4 The contractor hired for project construction shall implement erosion control and water quality Best Management Practices (BMPs) to reduce discharges to live streams during and after construction. These measures are listed and described in Section 7 – Hydrology and Water Quality.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(3) **AIR QUALITY**. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?		X		
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		X		
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X

AIR QUALITY DISCUSSION:

a) Less than significant with mitigation incorporation. The U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (ARB) have established ambient air quality standards for common pollutants. The EPA has jurisdiction under the Federal Clean Air Act to develop Federal Air Quality Standards and require

individual states to prepare State Implementation Plans to attain these standards. The ARB has jurisdiction under the California Health and Safety Code and the California Clean Air Act to develop California Air Quality Standards, to require regional plans to attain these standards, and to coordinate the preparation by local air districts of plans required by both the Federal and State Clean Air Acts. The Federal and State standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. In general, the California State standards are more stringent[1].

ARB has divided California into 15 separate air districts to better manage pollution. The City of Calabasas is located with the South Coast Air Quality Management District (AQMD). This district includes Orange County, the western portion of San Bernardino County, the western portion of Riverside County, and most of Los Angeles County except for Antelope Valley. The South Coast AQMD is responsible for developing air quality plans and implement air quality control measures for its respective district. Currently, the air in this district does not regularly meet all federal and state air quality standards. Policies and measures aimed at compliance with federal and state standards were proposed in the 2003 Air Quality Management Plan (AQMP)[2].

The proposed project does not involve the construction of infrastructure that would result in a long-term increase in air emissions that would result in changes to regional air quality. However, project construction activities may result in short-term changes to air quality in the immediate vicinity of the project site. Temporary increases in air quality may result from earthmoving activities. Dust can be emitted by the action of equipment and vehicles and as a result of wind erosion over exposed earth surfaces. Grading and earthmoving activities, although minimal, comprise the major source of construction dust emissions, but traffic and general disturbance of the soil also generate dust emissions. Short-term impacts would be mostly related to particulate matter emissions, but an increase in exhaust emissions produced during the transport of workers and machinery to and from the site could also occur.

These impacts are temporary, and therefore considered to be ***less-than-significant*** with the implementation ***Mitigation Measures AIR-1*** through ***AIR-5***.

b-c) Short term air quality impacts associated with project construction would be ***less-than-significant*** with the implementation of ***Mitigation Measures AIR-1*** through ***AIR-5***.

d) There are no sensitive receptors (schools, elderly homes, specific crops) in the vicinity of the project reach that would be exposed to substantial pollutant concentrations. ***No impact*** would occur.

e) Heavy machinery powered by diesel engines that would be used during project construction may create localized odors during the duration of construction operations. It is unlikely that these odors would be noticeable by humans not on the project site. No permanent odors would be created. Therefore, ***no impact*** associated with questionable odors would occur.

1 California Air Resources Board (ARB). Online. 29 Dec. 2003

AIR QUALITY MITIGATION MEASURES:

AIR-1: During clearing, grading, or earth moving activities, water shall be sprayed on exposed surfaces and loose dirt and soils to prevent dust from leaving the site. At a minimum, all exposed areas and areas of vehicle movement should be wetted down in the morning and after work is completed for the day and whenever winds exceed 15 mph.

AIR-2: Stockpiled earth material will be sprayed as needed to minimize dust generation.

AIR-3: During construction, the amount of disturbed area will be minimized, and on-site vehicle speeds limited to 15 mph or less.

AIR-4: All trucks hauling dirt, soil, or other loose material shall be covered or shall maintain at least 1 foot of freeboard (minimum vertical distance between the top of the load and the top of the trailer).

AIR-5: After clearing, grading, earthmoving, or excavation is completed, the entire area of disturbed soil shall be treated by watering, re-vegetating, and/or spreading soil binders to minimize dust generation.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(4) CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resources pursuant to Section 15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature?				X
d) Disturb any human remains, including those interred outside of formal cemeteries?				X
e) Result in physical disruption of an identified sacred place or other ethnographically documented location of significance to native Californians?				X

CULTURAL RESOURCES DISCUSSION:

a) CEQA defines a historical resource as any resource that: is associated with events that made that have made a significant contribution to broad patterns of California's history and cultural heritage; is associated with lives of persons important in our past; embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual, or possesses high artistic values; or has yielded or may be likely to yield information important in prehistory or prehistory.

2 South Coast AQMB. 2003 Air Quality Management Plan. Online. 20 Dec. 2004.

The project site consists of roughly 500 feet of highly urbanized creek channel, 370 feet of which consists of a concrete trapezoidal channel. The proposed project does not involve the demolition, destruction, relocation, or alteration of historical resources. ***No impact*** to historical resources would occur.

b) An archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it: contains information needed to answer important scientific questions; has a special or particular quality, such as being the oldest of its type or the best available example of its type; or is directly associated with a scientifically-recognized important prehistoric or historic event or person.

The project site is located in a highly urbanized area of the City of Calabasas. There are no known archaeological resources within or in close proximity to the project site. Due to the fact that project development would occur in a partially armored active stream channel that has undergone significant geomorphic changes, it is unlikely that archaeological resources are present at the project site. Implementation of ***Mitigation Measures CUL-1*** though ***CUL-2*** would reduce any potential project-related impacts associated with archaeological resources to ***less-than-significant*** levels.

c) There are no known unique geological features within the vicinity of the project area. There are no known fossil-bearing surficial sediments in the project area. ***No impact*** to unique geological features would occur.

d) There are no known human remains in the vicinity of the project site. ***No impact*** to human remains would occur.

CULTURAL RESOURCES MITIGATION MEASURES:

CUL-1: If deemed necessary by the City of Calabasas Planning Department, a qualified archaeological monitor shall be present to monitor significant earth movement at the project site.

CUL-2: In the event that artifacts of archaeological significance are uncovered, a qualified archaeologist shall be empowered to halt construction in the immediate vicinity of such unearthed artifacts until disposition of the site has been determined by the City Planning Department.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(5) GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				X
(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area, or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
(ii) Strong seismic ground shaking?				X
(iii) Seismic-related ground failure, including liquefaction?				X
(iv) Landslides?				X

b) Result in substantial soil erosion or the loss of topsoil?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X
d) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
e) Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
f) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?				X
g) Result in remediation scars (benched slopes, etc.) whose dimensions cannot be predicted with reasonable accuracy based on a preliminary geotechnical report?				X

GEOLOGY AND SOILS DISCUSSION:

a-i) No known active or potentially active faults have been mapped across the project area and the area is not located in a Fault Rupture Hazard Zone as established by the Alquist-Priolo Earthquake Fault Zoning Act. No evidence of active faulting has been reported at the project site or in the immediate vicinity. ***No impact*** would occur.

a-ii) The project site is located in a seismically active region of California. Expected seismic shaking intensity and risk to structures at the site is dependent on the distance of the site's structures from the causative fault and earthquake epicenter, the character of the earthquake, and the underlying geologic and soil conditions. The California State Mining and Geology Board defines active faults as faults that have had surface displacement within Holocene time (within the last 11,000 years). Active faults in the vicinity of the project site are listed in **Table 3**.

Table 3

Active Faults in the Vicinity of the Project Site.

Fault	Approximate Distance (miles)	Direction from Project Site	Last Displacement
Malibu Coast	1	south	Holocene
Cayetano	3.5	north	Holocene
San Fernando	3.5	northeast	Historic
Hollywood Fault	4	southeast	Holocene
San Gabriel	4.5	north	Holocene
Newport Inglewood	4.5	southeast	Holocene
San Andreas	8	northeast	Historic

Source: Jennings, Charles, 1994. *Fault Activity Map of California and Adjacent Areas.* California Division of Mines and Geology

Notes: Historic displacement is displacement that has occurred within the last 200 years; Holocene displacement is displacement that occurred between 200 and 11,000 years ago.

Implementation of the proposed project would not increase the exposure or risk to people of structures associated with seismic shaking. The City of Calabasas requires that buildings and structures be designed in accordance with the California Building Code (CBC) design requirements for buildings and structures in Seismic Zone 4 (Type B faults). Geotechnical recommendations for the foundation of the proposed gazebo and retaining walls were included in the *Geotechnical Engineering Investigation* for the proposed project in accordance with CBC design requirements (GeoSoils Consultants Inc., 2004).

No impact associated with strong seismic shaking would occur.

a-iii) Liquefaction hazards may be present in loose, saturated soils, such as sands or silty sands, in which the space between individual particles is completely filled with water. Subsurface investigations performed during the *Geotechnical Engineering Investigation* indicate subsurface soils consist of gravelly, silty, coarse sand and sandy, silty clay from 0 to 15-20 feet bgs. From 15-20 to 50 feet bgs., site soils consist of interbedded, silty, gravelly sand, sandy silt, silty, coarse and fine sand and sandy clay. Soils at the project site may be susceptible to liquefaction under saturated conditions[3].

Laboratory soil testing and recommendations for site development and retaining wall design are included in the *Geotechnical Engineering Investigation* for the proposed project. The proposed project will adhere to geotechnical design recommendations included in the report. Therefore, ***no impact*** associated with liquefaction hazards would occur.

a-iv) Slope stability analyses were performed as part of the Geotechnical Engineering Investigation to assess the impact of the proposed project on the stability of the creek banks. The results of the analyses indicate the proposed slopes will have a factor-of-safety greater than minimum code requirements. Therefore, ***no impact*** associated with slope stability would occur.

b) Implementation of the project would not result in a long-term increase in soil erosion or loss of topsoil. One of the primary goals of the project is to achieve stable compound channel morphology. Proposed gradient control structures, bank slope reconfiguration, planted rock/stone revetment, riparian planting, and biotechnical bank stabilization methods would mitigate the potential for long-term erosion and soil loss along the project reach.

Effective erosion control during the initial phases of the project construction and establishment is mandatory. Temporary impacts from construction-related activities would result in disturbance of the ground surface and removal of vegetation and concrete cover. Construction activities would expose disturbed and loosened soils to erosion from rainfall, wind, and water. The channel erosion potential would decrease over time as the mature stable vegetation is established. Short-term increases in soil erosion during construction activities would be reduced to ***less-than-significant*** levels through implementation of ***Mitigation Measures WQ-1*** through ***WQ-3*** as discussed in Section 7.

3 California Division of Mines and Geology, 1998. Seismic Hazard Zones, Calabasas Quadrangle. Open File Report 97-13.

Section 7 – Hydrology and Water Quality.

Erosion control measures to address erosion after construction but during the initial phases of the proposed project were included in the *Preliminary Design and Feasibility Analysis*. The measures include softer biotechnical approaches that integrate vegetation and biodegradable products, such as fiber blankets, biologs, coir blocks, small rock revetment with stakes, rip rap, and planted gabion structures. These measures can effectively reduce erosion and while allowing for the vegetation to mature during the first three to five years after project construction. See project plan sheets for erosion control details.

c) There are no known unique geological features within the vicinity of the project area. There are no known fossil-bearing surficial sediments in the project area. ***No impact*** to unique paleontological resources or geological features would occur.

d-e) The proposed project is not located on a geologic unit or soils that are unstable or that would become unstable as a result of the project. Geotechnical design recommendations based on site soil conditions were included in the *Geotechnical Engineering Investigation.* ***No impact*** associated with slope stability or expansive soils would occur.

f) The proposed project does not involve the construction of a septic system and/or alternative wastewater disposal system. ***No impact*** would occur.

g) The dimensions of all proposed restoration features are depicted in both plan form and cross-sectional views in enclosed plan sheets. ***No impact*** associated with unpredictable dimensions of remediation scars would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(6) HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?		X		
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an exiting or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X

f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g)	Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wild lands?				X

HAZARDS AND HAZARDOUS MATERIALS DISCUSSION:

a) The proposed project does not involve the construction of a facility or structure associated with the routine transport, use, or disposal of hazardous materials. No releases of hazardous materials or substances are expected to occur as a result of the implementation of the proposed project. There is, however, a slight risk of fuel and other petroleum spills during construction. Implementation of ***Mitigation Measure HAZ-1*** would reduce potential impacts associated with the routine transport, use, or disposal of hazardous materials during construction to ***less-than-significant*** levels.

b) Hazardous materials (i.e. fuel and other petroleum products) would likely be present at the project site during the construction period. However, with the incorporation of ***Mitigation Measure HAZ-1***, temporary impacts associated to the accidental release of hazardous materials are considered ***less-than-significant***.

c) The proposed project is not located within one-quarter mile of an existing or proposed school. Temporary emissions due to construction activities are addressed **Section 3 – Air Quality**. Other hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste are not predicted to result from the implementation of the proposed project. ***No impact*** to existing or proposed schools would occur.

d) The project site is not listed as a hazardous materials site. ***No impact*** would occur.

e-f) The project site is not located within an airport land use plan area, or within two miles of a public use airport. It is also not located within the vicinity of a private airstrip. ***No impact*** would occur.

g) Implementation of the proposed project would not interfere with an adopted emergency response/evacuation plan. ***No impact*** would occur.

h) Implementation of the proposed project would not increase the risk of wildfires in the project vicinity. The proposed project would not involve the construction of structures that would result in an increase in exposure of people and property to wildfires hazards. ***No impact*** would occur.

HAZARDS AND HAZARDOUS MATERIALS MITIGATION MEASURES:

*HAZ-1: **Incorporate a hazardous materials plan into the overall SWPPP. The SWPPP is subject to approval by the Los Angeles RWQCB. This portion of the plan shall include, but not be limited to, the following:***

- *The SWPPP shall include measures for containing hazardous materials, such as accidental fuel spills.*
- *No construction equipment shall be left overnight in the creek channel.*
- *All refueling and/or maintenance of heavy equipment shall take place at a minimum of 100 feet away from the top of bank of the creek channel.*
- *All personnel, contractors, and subcontractors shall comply with all applicable standards and conditions set forth by the RWQCB.*

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(7) **HYDROLOGY AND WATER QUALITY**. Would the project:				
a) Violate any water quality standards or waste discharge requirements?		X		
b) Substantially degrade groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off site?		X		
d) Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
e) Otherwise substantially degrade water quality?				X
f) Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
g) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
h) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
i) Inundation by seiche, tsunami, or mudflow?				X

HYDROLOGY AND WATER QUALITY DISCUSSION:

a) Construction of the proposed project would involve some grading and earthwork within the Las Virgenes Creek channel. Disturbed and exposed surfaces would be susceptible to the erosional forces of wind and water and could result in the degradation of water quality in Las Virgenes Creek. Implementation of *Mitigation Measures WQ-1* through *WQ-3* would reduce potential construction-related impacts to water quality to *less-than-significant* levels.

b) The proposed project does not require additional water supplies that could substantially deplete existing groundwater supplies, or result in a net deficit in aquifer volume or lowering of the local groundwater table. While the revegetation plan associated with the project would likely include irrigation of riparian plantings during dry months for a period of 2-3 years after construction, or until the plantings are well established, this water would likely be derived from the Las Virgenes Municipal Water District and would not affect local groundwater levels.

The proposed project would not result in the construction of additional structures or impervious surfaces that would interfere with groundwater recharge. In fact, removal of the 370-foot long trapezoidal concrete channel would improve groundwater recharge along the project reach.

No impact to groundwater resources would occur.

c) The proposed project would not result in an increase in erosion or siltation on- or off-site. Erosion control measures inherent in the project description would address the potential erosion and/or siltation along the project site in the long term and during the initial phases of the project and create a geomorphically-stable stream channel. Construction-related erosion and siltation impacts would be addressed by ***Mitigation Measures WQ-1*** through ***WQ-3***. Temporary construction impacts associated with erosion and siltation are considered ***less-than-significant*** with mitigation.

d) The proposed project would not create or contribute additional runoff to Las Virgenes Creek. However, the project could potentially raise water surface elevations above the creek banks and cause localized flooding in the parking area to the west of the site during large storm events.

Existing and post-construction hydraulic conditions along the project reach are discussed in the *Preliminary Design and Feasibility Analysis for Stream Restoration, Las Virgenes Creek*. A HEC-RAS hydraulic model was developed to determine existing conditions and provide an analysis of the impact of restoring the channel to a more natural condition. Three different scenarios were modeled: existing conditions, proposed conditions – right after construction, and proposed conditions – with full vegetation established.

The existing 370-foot trapezoidal concrete segment of the project reach is vegetation-free, has low frictional resistance, and is capable of transporting a high discharge rate within a relatively small cross-sectional area. Revegetation that would occur as part of the proposed project would increase frictional resistance and decrease flow velocity along the project reach. Once the vegetation has fully matured, the restoration project would significantly alter the efficiency of the channel in conveying flow and would raise flood levels. The hydraulic modeling indicated the rise in flood levels could cause shallow flooding in the parking areas to the west of the channel. Potential flooding that would result once vegetation is fully established would be mitigated by the 200-foot long floodwall along the western creek bank. The floodwall would a 3-foot freeboard above the capitol flood water surface elevation.

Given that the floodwall is inherent in the project description, ***no impact*** associated with flooding would occur.

e) See response to Item 7-a. ***No impact*** would occur.

f) The proposed project does not involve the construction of any housing units within the 100-year flood hazard zone of Las Virgenes Creek. ***No impact*** would result.

g) The proposed rock weirs (drop structures) would effectively reduce slope while facilitating fish passage. These weirs would not impede flows in such a way that would result in increased flooding on- or off-site. ***No impact*** would occur.

h) The proposed project would not result in an increased exposure of people or structures to flood hazards associated with the potential failure of a levee or dam. ***No impact*** would occur.

i) The project site is not located near a lake or large body of water. The project is not located in an area that is susceptible to mudflows. ***No impact*** associated with seiches, tsunamis, or mudflows would result.

HYDROLOGY AND WATER QUALITY MITIGATION MEASURES:

WQ-1: The Los Angeles RWQCB would require that, prior to construction, a project SWPPP be prepared that identifies BMPs to reduce erosion of disturbed soils during construction activities. The plan would describe measures that would be used to minimize wind and water erosion and the transport of sediments during construction. The SWPPP would be subject to approval by the RWQCB, pursuant to the States NPDES Construction Permit requirements and Section 401 of the Clean Water Act. The plan would be prepared and approved before construction activities begin. At a minimum, the plan shall include the following measures:

- *Temporary measures such as flow diversion, temporary ditches, and silt fencing.*
- *Surface disturbance of soil and vegetation would be kept to a minimum; existing access and maintenance roads would be used wherever feasible.*
- *Any stockpiled soil would be placed and sloped so that it would not be subject to accelerated erosion.*
- *Discharge of all project-related materials and fluids into the creek would be avoided to the extent possible by using hay bales or silt fences, constructing berms or barriers around construction materials, or installing geofabric in the area of disturbance.*
- *After ground-disturbing activities are complete, all graded or disturbed areas would be covered with protective material such as mulch, or re-seeded with native plant species. The plan would include details regarding seeding material, fertilizer, and mulching.*
- *Measures outlined in Mitigation Measure HAZ-1.*

WQ-2: Limit in-channel construction activities to the summer low-precipitation period. The channel bottom and channel banks shall be dewatered during the construction period.

WQ-3: Ensure that construction activities do not result in increased turbidity during and after construction.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(8) **AESTHETICS**. Would the project:				
a) Obstruct any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive development open to public view?				X
b) Substantially damage scenic resources including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the project site and its surroundings?				X
d) Create sources of incompatibility with the existing scenic and aesthetic environment, community or residents' quality of life?				X
e) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				X
f) Significantly impact any existing streetscape or public space which has been designed to provide areas of public assembly and congregation?				X
g) Conflict with adopted design guidelines or development standards which have been implemented to improve the quality of architecture in the community?				X

AESTHETICS DISCUSSION:

a) The proposed project would result in the enhancement of a 500-foot length of highly urbanized creek channel. Implementation of the proposed project would improve the aesthetics of the creek channel by promoting native riparian vegetation in the creek channel. ***No impact*** to scenic vistas or views would occur

b) The portion of Highway 101 adjacent to the project site is designated as an eligible state scenic highway[4]. However, the proposed removal of the concrete trapezoidal channel and the creation of a natural revegetated creek channel would improve the aesthetics of the project site. Therefore, ***no impact*** to state scenic highways would occur.

c-d) The proposed restoration of the creek channel and enhancement of riparian habitat would enhance the visual character and quality of the site and its surrounds. The project would be compatible with the existing scenic and aesthetic environment, community, and residents' way of life. ***No impact*** to visual character or quality would occur.

e) The project does not involve the installation of any large outdoor lights that could be a source of substantial light or glare. ***No impact*** to daytime or nighttime views of the area would occur.

4 California Scenic Mapping System. *Officially Designated State Scenic Highways and Historic Parkways*, Los Angeles County. Online. 21 Dec. 2004.

f) The project would not impact any streetscape or public space that has been designed to provide areas of public assembly and congregation. ***No impact*** would occur.

g) The project would not conflict with adopted design guidelines or development standards. ***No impact*** would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(9) MINERAL AND NATURAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

MINERAL AND NATURAL RESOURCES DISCUSSION:

a-b) The project would not affect the availability of mineral resources in the vicinity of the project site. No impact would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(10) NOISE. Would the project:				
a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, or in rural areas, an increase in ambient noise levels greater than 5 dbs?				X
d) A substantial, temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

NOISE DISCUSSION:

a-c) The proposed project would not result in the exposure of people to long-term noise levels exceeding local noise standards. The project would not generate excessive ground vibration. The project would not result in a substantial permanent increase in ambient noise levels. ***No impact*** would occur.

d) The project would result in the generation of temporary construction noise. Project construction is expected to last 2 months. Temporary increases in noise levels during project construction would result from construction activities and the use of heavy machinery. Earthwork and the placement of rock rip rap are the activities expected to generate the most noise. Noise levels in construction areas would temporarily increase and could be heard by people in adjacent structures. Implementation of ***Mitigation Measures NOI-1*** though ***NOI-2*** would reduce temporary impacts associated with elevated noise levels to ***less-than-significant*** levels.

e) The project site is not located within an airport land use plan area, or within two miles of a public use airport. It is also not located within the vicinity of a private airstrip. ***No impact*** would occur.

NOISE MITIGATION MEASURES:

NOI-1: Construction activities shall be limited to daylight hours; weekdays from 7:00 am to 7:00 pm, and Saturdays 9:00 am to 5:00 pm, and no work on Sundays.

NOI-2: Equipment and trucks used for construction of the project shall use the best available noise control techniques. Where feasible, quieter equipment and methods of construction shall be employed.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(11) **POPULATION AND HOUSING**. Would the project:				
a) Result in impacts to an established ethnic community?				X
b) Create substantial demands for affordable low income housing in a jurisdiction which does not have an adequate stock of such housing?				X
c) Result in substantial conflicts between type, size, and quality of proposed and existing housing in the project vicinity?				X
d) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X

POPULATION AND HOUSING DISCUSSION:

a-d) The proposed project would not result in impacts to an established ethnic community. The project would not result in the construction of housing or structures that would attract additional visitors or residents to the area. The project would not displace any housing or people nor would it necessitate the construction of additional housing elsewhere. Therefore, ***no impact*** on population and housing would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact

(12) **PUBLIC SERVICES.** Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?

a) Fire protection				X
b) Police protection				X
c) Schools				X
d) Parks				X
e) Other public facilities				X

PUBLIC SERVICES DISCUSSION:

a-e) The project would not result in the alteration of and/or increase in demand for public services. ***No impact*** would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact

(13) **RECREATION.** Would the project:

a) Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

RECREATION DISCUSSION:

a-b) The project would not result in an increase in the use of existing neighborhood or regional parks or other recreational facilities. The project also does not require the construction or expansion of recreational facilities. Therefore, ***no impact*** to recreational resources would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact

(14) **TRANSPORTATION/TRAFFIC.** Would the project:

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			X	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency or City General Plan Circulation Element threshold?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards related to existing intersections or roadway design features (e.g., sharp curves or dangerous intersections), or to incompatible uses (e.g., residential traffic conflicts with farm equipment)?				X
e) Result in inadequate secondary or emergency access?				X
f) Result in inadequate parking capacity?				X
g) Conflict with adopted policies or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X

TRANSPORTATION/TRAFFIC DISCUSSION:

a-b) The project is located in a highly urbanized area of Los Angeles County. The project area has adequate internal circulation capacity including entrance and exit routes. Construction vehicles at the project site would not significantly impact traffic on adjacent streets, nor exceed level-of-service standards. Temporary truck traffic to and from the project site during construction is considered ***less-than-significant***.

c) The project would not result in a change in air traffic patterns. ***No impact*** would result.

d) The project would not increase hazards due to a design feature or incompatible uses. ***No impact*** would occur.

e) The proposed project would not affect emergency access to the adjacent shopping center or business park. ***No impact*** would occur.

f) Construction vehicles would temporarily be parked in a temporary staging area located in the Albertsons and Starbucks parking lot east of the creek. During the four months of construction, the capacity of this parking area would be reduced. However, the size of the staging area would be minimized to the maximum extent possible. The short-term impact to parking in the eastern shopping center would be ***less-than-significant***.

g) The proposed project does not impact any plans, policies, or programs aimed at supporting alternative transportation. ***No impact*** would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(15) UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs for a minimum ten year period?			X	
g) Comply with federal, state, and local statues and regulations related to solid waste?				X
h) Provide for on-site source separation and recycling facilities which are adequately sized for the proposed use?				X

UTILITIES AND SERVICE SYSTEMS DISCUSSION:

a) The proposed project would not result in an increase in wastewater generation nor the need for additional treatment capacity. ***No impact*** would occur.

b) No water or wastewater facilities would need to be constructed. The revegetation plan would likely include seasonal irrigation of new plantings for 2-3 years after construction, or until they become well-established. However, it is not likely the construction of the irrigation system would result in environmental effects. ***No impact*** would occur.

c) The project would not require the construction of new stormwater drainage facilities nor the expansion of existing facilities. ***No impact*** would occur.

d) Irrigation of new plantings along the project reach would be temporary (2-3 years) and would only occur during dry months. Irrigation water would likely be derived from the Las Virgenes Municipal Water District. The irrigation of new plantings would result in ***less-than-significant*** impacts to water resources.

e) See response to Item 15-a. ***No impact*** would occur.

f-h) The project would not result in the generation of waste. Local landfills would not be affected. Recycling facilities would not be needed. ***No impact*** would occur.

Issues and Supporting Information	Potentially Significant Impact	Less Than Significant Impact with Mitigation Measures	Less Than Significant Impact	No Impact
(16) MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?		X		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects)?				X
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

MANDATORY FINDINGS OF SIGNIFICANCE DISCUSSION:

a) Without mitigation, the proposed project has the potential (although unlikely) to result in short-term impacts to air quality, biological resources, cultural resources, geology (soil erosion), hazards and hazardous materials, hydrology and water quality, and noise. Mitigation Measures have been developed to address these concerns. These Mitigation Measures were described under each topic summary. Implementation of these measures would reduce short-term impacts to ***less-than-significant*** levels. In the long-term, the proposed project would substantially increase the quality of the environment in the project area. No permanent detrimental impacts would result from project construction.

b) The project does not have any potentially cumulative impacts. ***No impact*** would occur.

c) The development of the project, as proposed, would not cause any substantial adverse environmental effects to human beings, either directly or indirectly. All potentially adverse environmental impacts associated with the project would be mitigated to a less of ***less-than-significant*** through the implementation of the Mitigation Measures identified above.

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

May 23, 2005

Office of the Chief
Regulatory Branch

DEPARTMENT OF THE ARMY NATIONWIDE PERMIT AUTHORIZATION

City of Calabasas
Attention: Charles Mink
26135 Mureau Road
Calabasas, California 91302

Dear Mr. Mink:

This is in reply to your letter (No. 200501094-JLB) dated February 2, 2005, concerning our permit authority under Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344) over your proposal to remove a concrete channel and constuct habitat enhancements according to the design and specifications in your February 2, 2005 application, in Las Virgenes Creek in Calabasas, Los Angeles County, California.

The Corps of Engineers has determined that your proposed activity complies with the terms and conditions of nationwide permit NW27 as described in enclosure 1.

Furthermore, you must comply with the following non-discretionary Special Conditions:

Special Conditions:

1. No less than 30-days prior to beginning construction, you must submit a schedule for restoration monitoring and reporting, including proposed success criteria, subject to approval by USACE.

2. Within 45-days of completing the project, you must send a post-project completion report that includes pre- and post-project photos and a complete set of as-built plans. Please be aware that maintenance and other remedial actions within the jurisdiction of USACE may require DA permits.

3. You must submit an annual monitoring report based on the agreed upon success criteria, and additionally include information on any damage to the restoration site; and any remedial measures either undertaken or proposed that may or may not need DA permits.

This letter of verification is valid through March 19, 2007. All nationwide permits expire on March 19, 2007. If you either contract the work or begin construction on or before March 19,

2007 you will have an additional 12 months to complete the activity under the attached nationwide permit terms and conditions. If the work is not under construction or contract by March 19, 2007 the work will be subject to regulations in effect at the time when you re-apply for a permit. It is incumbent upon you to remain informed of changes to the nationwide permits. If the Corps of Engineers modifies, reissues, or revokes any nationwide permit at an earlier date, we will issue a public notice announcing the changes.

A nationwide permit does not grant any property rights or exclusive privileges. Also, it does not authorize any injury to the property or rights of others or authorize interference with any existing or proposed Federal project. Furthermore, it does not obviate the need to obtain other Federal, state, or local authorizations required by law.

Thank you for participating in our regulatory program. If you have any questions, please contact Joshua L. Burnam, D.Env. of my staff at (213) 452-3294.

Sincerely,

for Antal Szijj
Acting Chief, North Coast Section

Enclosure

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

CERTIFICATION OF COMPLIANCE WITH DEPARTMENT OF THE ARMY NATIONWIDE PERMIT

Permit Number: *200501094-JLB*

Name of Permittee: City of Calabasas

Date of Issuance: *May 23, 2005*

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S Army Corps of Engineers
Regulatory Branch
ATTN: CESPL-CO-R-200501094-JLB
P.O. Box 532711
Los Angeles, California 90053-2325

Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this nationwide permit you may be subject to permit suspension, modification, or revocation procedures as contained in 33 CFR 330.5 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit condition(s).

_____ _____

Signature of Permittee Date

NATIONWIDE PERMIT NUMBER NW27 TERMS AND CONDITIONS

1. Nationwide Permit NW27 Terms:

Your activity is authorized under NW27 subject to the following terms:

27. *Stream and Wetland Restoration Activities.* Activities in waters of the United States associated with the restoration of former waters, the enhancement of degraded tidal and non-tidal wetlands and riparian areas, the creation of tidal and non-tidal wetlands and riparian areas, and the restoration and enhancement of non-tidal streams and non-tidal open water areas as follows:

(a) The activity is conducted on:

(1) Non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland enhancement, restoration, or creation agreement between the landowner and the U.S. Fish and Wildlife Service (FWS) or the Natural Resources Conservation Service (NRCS) or voluntary wetland restoration, enhancement, and creation actions documented by the NRCS pursuant to NRCS regulations; or

(2) Any Federal land; or

(3) Reclaimed surface coal mined lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining or the applicable state agency (the future reversion does not apply to streams or wetlands created, restored, or enhanced as mitigation for the mining impacts, nor naturally due to hydrologic or topographic features, nor for a mitigation bank); or

(4) Any private or public land;

(b) Notification: For activities on any private or public land that are not described by paragraphs (a)(1), (a)(2), or (a)(3) above, the permittee must notify the District Engineer in accordance with General Condition 13; and

(c) Only native plant species should be planted at the site, if permittee is vegetating the project site.

Activities authorized by this NWP include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms; the installation of current deflectors; the enhancement, restoration, or creation of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or create stream meanders; the backfilling of artificial channels and drainage ditches; the removal of existing drainage structures; the construction of small nesting islands; the construction of open water areas; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation; mechanized landclearing to remove undesirable vegetation; and other related activities.

This NWP does not authorize the conversion of a stream to another aquatic use, such as the creation of an impoundment for waterfowl habitat. This NWP does not authorize stream channelization. This NWP does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed. However, this NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands, on the project site provided there are net gains in aquatic resource functions and values. For example, this NWP may authorize the creation of an open water impoundment in a non-tidal emergent wetland, provided the non-tidal emergent wetland is replaced by creating that wetland type on the project site. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Reversion. For enhancement, restoration, and creation projects conducted under paragraphs (a)(2) and (a)(4), this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion. For restoration, enhancement, and creation projects conducted under paragraphs (a)(1) and (a)(3), this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or creation activities) within five years after expiration of a limited term wetland restoration or creation agreement or permit, even if the discharge occurs after this NWP expires. This NWP also authorizes the reversion of wetlands that were restored, enhanced, or created on prior-converted cropland that has not been abandoned, in accordance with a binding agreement between the landowner and NRCS or FWS (even though the restoration, enhancement, or creation activity did not require a Section 404 permit). The five-year reversion limit does not apply to agreements without time limits reached under paragraph (a)(1). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate State agency executing the agreement or permit. Prior to any reversion activity, the permittee or the appropriate Federal or State agency must notify the District Engineer and include the documentation of the prior condition. Once an area has reverted back to its prior physical condition, it will be

subject to whatever the Corps regulatory requirements will be at that future date. (Sections 10 and 404)

Note: Compensatory mitigation is not required for activities authorized by this NWP, provided the authorized work results in a net increase in aquatic resource functions and values in the project area. This NWP can be used to authorize compensatory mitigation projects, including mitigation banks, provided the permittee notifies the District Engineer in accordance with General Condition 13, and the project includes compensatory mitigation for impacts to waters of the United States caused by the authorized work. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition.

2. Nationwide Permit General Conditions:

The following general conditions must be followed in order for any authorization by an NWP to be valid:

1. *Navigation.* No activity may cause more than a minimal adverse effect on navigation.
2. *Proper Maintenance.* Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
4. *Aquatic Life Movements.* No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.
5. *Equipment.* Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.
6. *Regional and Case-By-Case Conditions.* The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)). Additionally, any case specific conditions added by the Corps or by the state or tribe in its Section 401 Water Quality Certification and Coastal Zone Management Act consistency determination.
7. *Wild and Scenic Rivers.* No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).
8. *Tribal Rights.* No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
9. *Water Quality.* (a) In certain states and tribal lands an individual 401 Water Quality Certification must be obtained or waived (See 33 CFR 330.4(c)).

   (b) For NWPs 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the state or tribal 401 certification (either generically or individually) does not require or approve water quality management measures, the permittee must provide water quality management measures that will ensure that the authorized work does not result in more than minimal degradation of water quality (or the Corps determines that compliance with state or local standards, where applicable, will ensure no more than minimal adverse effect on water quality). An important component of water quality management includes stormwater management that minimizes degradation of the downstream aquatic system, including water quality (refer to General Condition 21 for stormwater management requirements). Another important component of water quality management is the establishment and maintenance of vegetated buffers next to open waters, including streams (refer to General Condition 19 for vegetated buffer requirements for the NWPs).

   This condition is only applicable to projects that have the potential to affect water quality. While appropriate measures must be taken, in most cases it is not necessary to conduct detailed studies to identify such measures or to require monitoring.
10. *Coastal Zone Management.* In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).
11. *Endangered Species.* (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS the District

Engineer may add species-specific regional endangered species conditions to the NWPs.

(b) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at http://www.fws.gov/r9endspp/endspp.html and http://www.nfms.gov/prot_res/esahome.html respectively.

12. *Historic Properties.* No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

13. *Notification.*

(a) *Timing*: where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a preconstruction notification (PCN) as early as possible. The District Engineer must determine if the notification is complete within 30 days of the date of receipt and can request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the notification is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:

(1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified in writing by the District or Division Engineer that an Individual Permit is required; or

(3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Notification*: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.);

(4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));

(5) For NWP 7 (Outfall Structures and Maintenance), the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed;

(6) For NWP 14 (Linear Transportation Crossings), The PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the US and a statement describing how temporary losses of waters of the US will be minimized to the maximum extent practicable;

(7) For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing;

(8) For NWP 27 (Stream and Wetland Restoration), the PCN must include documentation of the prior condition of the site that will be reverted by the permittee;

(9) For NWP 29 (Single-Family Housing), the PCN must also include:

(i) Any past use of this NWP by the Individual Permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose

of this NWP, parcels of land measuring ¼-acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than ¼-acre in size, formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(10) For NWP 31 (Maintenance of Existing Flood Control Projects), the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information identifying the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site;

(11) For NWP 33 (Temporary Construction, Access, and Dewatering), the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources;

(12) For NWPs 39, 43 and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization for losses of waters of the US were achieved on the project site;

(13) For NWP 39 and NWP 42, the PCN must include a compensatory mitigation proposal to offset losses of waters of the US or justification explaining why compensatory mitigation should not be required. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

(14) For NWP 40 (Agricultural Activities), the PCN must include a compensatory mitigation proposal to offset losses of waters of the US. This NWP does not authorize the relocation of greater than 300 linear-feet of existing serviceable drainage ditches constructed in non-tidal streams unless, for drainage ditches constructed in intermittent non-tidal streams, the District Engineer waives this criterion in writing, and the District Engineer has determined that the project complies with all terms and conditions of this NWP, and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;

(15) For NWP 43 (Stormwater Management Facilities), the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with state and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the US. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

(16) For NWP 44 (Mining Activities), the PCN must include a description of all waters of the US adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the US, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for all aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities);

(17) For activities that may adversely affect Federally-listed endangered or threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work; and

(18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

(c) *Form of Notification*: The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(18) of General Condition 13. A letter containing the requisite information may also be used.

(d) *District Engineer's Decision*: In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the

applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed compensatory mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the District Engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

(e) *Agency Coordination*: The District Engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

For activities requiring notification to the District Engineer that result in the loss of greater than ½-acre of waters of the US, the District Engineer will provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(f) *Wetland Delineations*: Wetland delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than ¼-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

14. *Compliance Certification*. Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:

(a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;

(b) A statement that any required mitigation was completed in accordance with the permit conditions; and (c) The signature of the permittee certifying the completion of the work and mitigation.

15. *Use of Multiple Nationwide Permits*. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).

16. *Water Supply Intakes*. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

17. *Shellfish Beds.* No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.
18. *Suitable Material.* No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the CWA).
19. *Mitigation.* The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.

    (a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).

    (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

    (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.

    (d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWPs. For example, ¼-acre of wetlands cannot be created to change a ¾-acre loss of wetlands to a ½-acre loss associated with NWP 39 verification. However, ½-acre of created wetlands can be used to reduce the impacts of a ½-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.

    (e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed.

    (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineers may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.

    (g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the US.

    (h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.
20. *Spawning Areas.* Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized.
21. *Management of Water Flows.* To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow.

    This condition is only applicable to projects that have the potential to affect waterflows. While appropriate measures must be taken, it is not necessary to conduct detailed studies to identify such measures or require monitoring to ensure their

effectiveness. Normally, the Corps will defer to state and local authorities regarding management of water flow.

22. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to the acceleration of the passage of water, and/or the restricting its flow shall be minimized to the maximum extent practicable. This includes structures and work in navigable waters of the US, or discharges of dredged or fill material.
23. *Waterfowl Breeding Areas.* Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.
24. *Removal of Temporary Fills.* Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.
25. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.

    (a) Except as noted below, discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the US may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the USFWS or the NMFS has concurred in a determination of compliance with this condition.

    (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.
26. *Fills Within 100-Year Floodplains.* For purposes of this General Condition, 100-year floodplains will be identified through the existing Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps.

    (a) *Discharges in Floodplain; Below Headwaters.* Discharges of dredged or fill material into waters of the US within the mapped 100-year floodplain, below headwaters (i.e. five cfs), resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, 43, and 44.

    (b) *Discharges in Floodway; Above Headwaters.* Discharges of dredged or fill material into waters of the US within the FEMA or locally mapped floodway, resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, and 44.

    (c) The permittee must comply with any applicable FEMA-approved state or local floodplain management requirements.
27. *Construction Period.* For activities that have not been verified by the Corps and the project was commenced or under contract to commence by the expiration date of the NWP (or modification or revocation date), the work must be completed within 12-months after such date (including any modification that affects the project).

    For activities that have been verified and the project was commenced or under contract to commence within the verification period, the work must be completed by the date determined by the Corps.

    For projects that have been verified by the Corps, an extension of a Corps approved completion date may be requested. This request must be submitted at least one month before the previously approved completion date.

3. Regional Conditions for the Los Angeles District

In accordance with General Condition Number 6, "Regional and Case-by-Case Conditions," the following Regional Conditions, as added by the Division Engineer, must be met in order for an authorization by any Nationwide to be valid:

1. For coastal watersheds from the southern reach of the Santa Monica Mountains in Los Angeles County to the San Luis Obispo County/Monterey County boundary, all road crossings must employ a bridge crossing design that ensures passage and/or spawning of steelhead *(Oncorhynchus mykiss)* is not hindered in any way. In these areas, bridge designs that span the stream or river, including designs for pier- or pile-supported spans, or designs based on use of a bottomless arch culvert simulating the natural stream bed (i.e., substrate and streamflow conditions in the culvert are similar to undisturbed stream bed channel conditions) shall be employed unless it can be demonstrated the stream or river does not support resources conducive to the recovery of federally listed *Anadromous salmonids,* including migration of adults and smolts, or rearing and spawning. This proposal also excludes approach embankments into the channel unless they are determined to have no detectable effect on steelhead.

2. For the State of Arizona and the Mojave and Sonoran (Colorado) desert regions of California in Los Angeles District (generally north and east of the San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountain ranges, and south of Little Lake, Inyo

County), no nationwide permit, except Nationwide Permits 1 (Aids to Navigation), 2 (Structures in Artificial Canals), 3 (Maintenance), 4 (Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities), 5 (Scientific Measurement Devices), 6 (Survey Activities), 9 (Structures in Fleeting and Anchorage Areas), 10 (Mooring Buoys), 11 (Temporary Recreational Structures), 20 (Oil Spill Cleanup), 22 (Removal of Vessels), 27 (Stream and Wetland Restoration Activities), 30 (Moist Soil Management for Wildlife), 31 (Maintenance of Existing Flood Control Projects), 32 (Completed Enforcement Actions), 35 (Maintenance Dredging of Existing Basins), 37 (Emergency Watershed Protection and Rehabilitation), and 38 (Cleanup of Hazardous and Toxic Waste), or other nationwide or regional general permits that specifically authorize maintenance of previously authorized structures or fill, can be used to authorize the discharge of dredged or fill material into a jurisdictional special aquatic site as defined at 40 CFR Part 230.40-45 (sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle-and-pool complexes).

3. For all projects proposed for authorization by nationwide or regional general permits where prior notification to the District Engineer is required, applicants must provide color photographs or color photocopies of the project area taken from representative points documented on a site map. Pre-project photographs and the site map would be provided with the permit application. Photographs should represent conditions typical or indicative of the resources before impacts.

4. Notification pursuant to general condition 13 shall be required for projects in all special aquatic sites as defined at 40 CFR Part 230.40-45 (sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle-and-pool complexes), and in all perennial watercourses or waterbodies in the State of Arizona and the Mojave and Sonoran (Colorado) desert regions of California in Los Angeles District (generally north and east of the San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountain ranges, and south of Little Lake, Inyo County), excluding the Colorado River from Davis Dam downstream to the north end of Topock and downstream of Imperial Dam.

5. Notification pursuant to general condition 13 shall be required for projects in all areas designated as Essential Fish Habitat by the Pacific Fishery Management Council (i.e., all tidally influenced areas).

6. Notification pursuant to general condition 13 shall be required for projects in all watersheds in the Santa Monica Mountains in Los Angeles and Ventura counties bounded by Calleguas Creek on the west, by Highway 101 on the north and east, and by Sunset Boulevard and Pacific Ocean on the south.

7. Individual permits shall be required for all jurisdictional vernal pools.

8. Individual permits shall be required in Murrieta Creek and Temecula Creek watersheds in Riverside County for new permanent fills in perennial and intermittent watercourses otherwise authorized under NWPs 39, 42 and 43, and in ephemeral watercourses for these NWPs for projects that impact greater than 0.1 acre.

9. Individual permits shall be required in San Luis Obispo Creek and Santa Rosa Creek in San Luis Obispo County for bank stabilization projects, and in Gaviota Creek, Mission Creek and Carpinteria Creek in Santa Barbara County for bank stabilization projects and grade control structures.

4. **Further information:**

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
   ( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
   (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.
   (a) This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
   (b) This permit does not grant any property rights or exclusive privileges.
   (c) This permit does not authorize any injury to the property or rights of others.
   (d) This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
   (a) Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
   (b) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
   (c) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity

authorized by this permit.

(d) Design or construction deficiencies associated with the permitted work.

(e) Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

   (a) You fail to comply with the terms and conditions of this permit.

   (b) The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

   (c) Significant new information surfaces which this office did not consider in reaching the original public interest decision.

   Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 330.5 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measure ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. This letter of verification is valid for a period not to exceed two years unless the nationwide permit is modified, reissued, revoked, or expires before that time.

7. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition H below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

8. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

9. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of your permit.

State of California – The Resources Agency ARNOLD SCHWARZENEGGER, *Governor*

DEPARTMENT OF FISH AND GAME
1508 North Harding Avenue
Pasadena, CA 91104
(626) 797-3170

March 8, 2005

Mr. Syd Temple
Questa Engineering Corp.
1220 Brickyard Cove Road, Ste, 206
Pt. Richmond, CA 94801

Re: Lake or Streambed Alteration Notification
Notification No: 1600-2005-0018-R5
Project: Las Virgenes Creek Stream Restoration
Water: Las Virgenes Creek
County: Los Angeles

Dear Mr. Temple:

The Department of Fish and Game (Department) received your Notification and deemed it complete on 2/7/05.

The purpose of this letter is to inform you that the Department failed to meet our deadline for the project you described in the above-referenced notification. As a result, and as explained in greater detail below, you do not need a Lake or Streambed Alteration Agreement from the Department of Fish and Game to complete the project you described in your notification.

Under the Fish and Game Code section 1602, (a) (4) (D) the Department had a total of 60 days to act on your notification by submitting to you project conditions the Department believes are necessary to protect existing fish and wildlife resources. This means that **from the date of this letter,** by law you may go forward with your project without an Agreement from the Department.

If you decide to complete the project as described in your notification, please keep a copy of this letter and the Notification available at the project site. The project described in the Notification includes not only the project impacts, but also includes all of your proposed minimization and mitigation measures.

Your project must terminate no later than 5 years from the date of this letter. Your project

is described as the restoration of 500 feet of partially armored and urbanized Las Virgenes Creek with a stable, natural, vegetated channel from Highway 101 south to the Agoura Road Bridge, City of Calabasas, Los Angeles County. Gradient improvements to allow fish passage will also be a component of this project.as well as public access paths along the eastern bank of the channel. If the project changes so that it differs from the one described in the original notification, including but not limited to working outside the specified work period dates, you will need to submit a new notification to the Department for that project.

If you have any questions regarding this matter, please contact Scott Harris, Associate Wildlife Biologist at the above address or telephone number.

Sincerely,

Scott Harris

Scott Harris
Associate Wildlife Biologist

Dr. Alan Lloyd
Secretary for Environmental Protection

California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Arnold Schwarzenegger
Governor

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Charles S. Mink
City of Calabasas
26135 Mureau Road
Calabasas, CA 91302

WATER QUALITY CERTIFICATION FOR PROPOSED LAS VIRGENES CREEK RESTORATION PROJECT (Corps' Project No. 2005-01094-JLB), LAS VIRGENES CREEK, CITY OF CALABASAS, COUNTY LOS ANGELES (File No. 05-007)

Dear Mr. Mink:

Regional Board staff has reviewed your request on behalf of City of Calabasas (Applicant) for a Clean Water Act Section 401 Water Quality Certification for the above-referenced project. Your application was deemed complete on May 6, 2005.

I hereby issue an order certifying that any discharge from the referenced project will comply with the applicable provisions of sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act, and with other applicable requirements of State law. This discharge is also regulated under State Water Resources Control Board Order No. 2003 - 0017 - DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges that have received State Water Quality Certification" which requires compliance with all conditions of this Water Quality Certification.

The Applicant shall be liable civilly for any violations of this Certification in accordance with the California Water Code. This Certification does not eliminate the Applicant's responsibility to comply with any other applicable laws, requirements and/or permits.

Should you have questions concerning this Certification action, please contact Dana Cole, Section 401 Program, at (213) 576-5733.

Jonathan S. Bishop
Executive Officer

5/16/05
Date

DISTRIBUTION LIST

Sydney Temple
Questa Engineering Company
1220 Brickyard Cove Road, Suite 206
Pt. Richmond, CA 94807

Oscar Balaguer
State Water Resources Control Board
Division of Water Quality
P.O. Box 944213
Sacramento, CA 94244-2130

Betty Courtney
California Department of Fish and Game
Streambed Alteration Team
4949 View Ridge Avenue
San Diego, CA 92123

Joshua Burnam
U.S. Army Corps of Engineers
Regulatory Branch, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

Steven John
U.S. Environmental Protection Agency
600 Wilshire Boulevard, Suite 1460
Los Angeles, CA 90017

Tim Vendlinski
Supervisor, Wetlands Regulatory Office (WTR-8)
US EPA, Region 9
75 Hawthorne
San Francisco, CA 94105

Ken Berg
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

ATTACHMENT A

Project Information
File No. 05-007

1. Applicant:

Charles S. Mink
City of Calabasas
26135 Mureau Road
Calabasas, CA 91302

Phone: (818) 878-4225 Fax: (818) 878-4215

2. Applicant's Agent:

Sydney Temple
Questa Engineering Company
1220 Brickyard Cove Road, Suite 206
Pt. Richmond, CA 94807

Phone: (510) 236-6114 EXT 220 Fax: (510) 236-2423

3. Project Name:

Las Virgenes Creek Restoration Project

4. Project Location:

City of Calabasas area, Los Angeles County

Longitude: 118o 42' 4"; Latitude: 34o 8' 38"

5. Type of Project:

Restoration of riparian habitat.

6. Project Description:

Purpose: The project will remove 500 feet of concrete lined channel and replace it with a natural bed stream and extensive native riparian plantings.

Description: In 1977, a trapezoidal concrete channel lining with a 45-foot bottom width was constructed in the Las Virgenes Creek between Route 101 and the Agoura Road Bridge, disrupting the wildlife corridor between the Baldwin Open Space and Malibu Creek State Park. The concrete channel is to be removed by the program called the Las Virgenes Creek Restoration Project. This project places priority on the viable habitat and wildlife connectivity so as to enable the City to implement the best restoration strategy suitable for this area that can meet the stated project goals while still providing adequate flood and erosion control. The restoration project will also include a river-walk setting

		to facilitate pedestrian access and community enjoyment.
7.	Federal Agency/Permit:	U.S. Army Corps of Engineers NWP No. 27 (Permit No. 2005-01094-JLB)
8.	Other Required Regulatory Approvals:	California Department of Fish and Game Streambed Alteration Agreement
9.	California Environmental Quality Act Compliance:	The City of Calabasas approved the project's Negative Declaration on March 3, 2005.
10.	Receiving Water:	Receiving water from Basin Plan (Hydrologic Unit No. 404.22)
11.	Designated Beneficial Uses:	MUN, REC-1, REC-2, WARM, COLD, WILD, RARE, MIGR, SPWN, WET
12.	Impacted Waters of the United States:	Non-wetland waters (vegetated streambed): 0.00 temporary and 0.50 permanent acres Non-wetland waters (unvegetated streambed): 0.00 temporary and 0.50 permanent acres
13.	Dredge Volume:	None
14.	Related Projects Implemented/to be Implemented by the Applicant:	The Applicant has not identified any related projects carried out in the last 5 years or planned for implementation in the next 5 years.
15.	Avoidance/ Minimization Activities:	The Applicant has proposed to implement several Best Management Practices, including, but not limited to, the following:

- All construction will be completed under dry creek bed conditions.
- Temporary water diversions will be constructed upstream of the project site.
- Summer low flow water will be redirected into the downstream channels so that no loss of water to downstream reaches occurs.
- Extensive use of erosion control blankets, hydroseeding, revegetation, bio-degradable coir (cocnut palm fiber) blocks, planted rock revetment, and the creation of a lower flow channel configuration.

16. Proposed Compensatory Mitigation:

- The Applicant proposes to create 0.5 acres of streambed (vegetated) and enhance approximately 1.0 acres of streambed (vegetated).
- Since the project is restoration, the Regional Board will not require any additional compensatory mitigation.

17. Required Compensatory Mitigation:

See Attachment B Conditions of Certifications, Additional Conditions for modifications and additions to the above proposed compensatory mitigation.

ATTACHMENT B

Conditions of Certification
File No. 05-007

STANDARD CONDITIONS

Pursuant to §3860 of Title 23 of the California Code of Regulations (23 CCR), the following three standard conditions shall apply to this project:

1. This Certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and Article 6 (commencing with 23 CCR §3867).

2. This Certification action is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent Certification application was filed pursuant to 23 CCR Subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. Certification is conditioned upon total payment of any fee required pursuant to 23 CCR Chapter 28 and owed by the Applicant.

ADDITIONAL CONDITIONS

Pursuant to 23 CCR §3859(a), the Applicant shall comply with the following additional conditions:

1. The Applicant shall submit to this Regional Board copies of any other final permits and agreements required for this project, including, but not limited to, the U.S. Army Corps of Engineers' Section 404 Permit and the California Department of Fish and Game's Streambed Alteration Agreement. **These documents shall be submitted prior to any discharge to waters of the State.**

2. The Applicant and all contractors employed by the Applicant shall have copies of this Certification, the approved maintenance plan, and all other regulatory approvals for this project on site at all times so they are familiar with all conditions set forth.

3. Fueling, lubrication, maintenance, operation, and storage of vehicles and equipment shall not result in a discharge or a threatened discharge to waters of the State. At no time shall the Applicant use any vehicle or equipment which leaks any substance that may impact water quality. Staging and storage areas for vehicles and equipment shall be located outside of waters of the State.

4. No construction material, spoils, debris, or any other substances associated with this project that may adversely impact water quality standards, shall be located in a manner which may result in a discharge or a threatened discharge to waters of the State.

5. The Applicant shall implement all necessary control measures to prevent the degradation of water quality from the proposed project in order to maintain compliance with the Basin Plan. The discharge shall meet all effluent limitations and toxic and effluent standards established to comply with the applicable water quality standards and other appropriate requirements, including the provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act. This Certification does not authorize the discharge by the applicant for any other activity than specifically described in the 404 Permit.

6. The discharge shall not: a) degrade surface water communities and populations including vertebrate, invertebrate, and plant species; b) promote the breeding of mosquitoes, gnats, black flies, midges, or other pests; c) alter the color, create visual contrast with the natural appearance, nor cause aesthetically undesirable discoloration of the receiving waters; d) cause formation of sludge deposits; or e) adversely affect any designated beneficial uses.

7. The Applicant shall allow the Regional Board and its authorized representative entry to the premises, including all mitigation sites, to inspect and undertake any activity to determine compliance with this Certification, or as otherwise authorized by the California Water Code.

8. Application of pesticides must be supervised by a certified applicator and be in conformance with manufacturer's specifications for use. Compounds used must be appropriate to the target species and habitat. All pesticides directed toward aquatic species must be approved by the Regional Board. Pesticide utilization shall be in accordance with State Water Resources Control Board Water Quality Order Nos. 2004-0008-DWQ and 2004-0009-DWQ.

9. The Applicant shall not conduct any construction activities within waters of the State during a rainfall event. The Applicant shall maintain a five-day (5-day) clear weather forecast before conducting any operations within waters of the State.

10. The Applicant shall utilize the services of a qualified biologist with expertise in riparian assessments during all construction activities where clearing involves areas to be partially cleared (i.e. some vegetation is to remain in the same reach or in an adjacent reach). The biologist shall be available on site during construction activities to ensure that all protected areas are marked properly and ensure that no vegetation outside the specified areas is removed. The biologist shall have the authority to stop the work, as necessary, if instructions are not followed. The biologist shall be available upon request from this Regional Board for consultation within 24 hours of request of consultation.

11. No activities shall involve wet excavations (i.e., no excavations shall occur below the seasonal high water table). A minimum **5-foot** buffer zone shall be maintained above the existing groundwater level. If construction or groundwater dewatering is proposed or anticipated, the Applicant shall file a **Report of Waste Discharge** to this Regional Board and obtain any necessary NPDES permits/Waste Discharge Requirements prior to discharging waste. Sufficient time should be allowed to obtain any such permits (generally 180 days). If groundwater is encountered without the benefit of appropriate permits, the Applicant shall cease all activities in the areas where groundwater is present, file a Report of Waste Discharge to this Regional Board, and obtain any necessary permits prior to discharging waste.

12. All project/construction activities not included in this Certification, and which may require a permit, must be reported to the Regional Board for appropriate permitting. Bank stabilization and grading, as well as any other ground disturbances, are subject to restoration and revegetation requirements, and may require additional Certification action.

13. All surface waters, including ponded waters, shall be diverted away from areas undergoing grading, construction, excavation, vegetation removal, and/or any other activity which may result in a discharge to the receiving water. If surface water diversions are anticipated, the Applicant shall develop and submit a Surface Water Diversion Plan to this Regional Board. The plan shall include the proposed method and duration of diversion activities, erosion and sediment controls, and a map or drawing indicating the locations of diversion and discharge points. The plan shall be submitted prior to any surface water diversions. If surface flows are present, then upstream and downstream monitoring for pH, temperature, dissolved oxygen, turbidity, and total suspended solids shall be implemented. These constituents shall be monitored on a daily basis during the first week of diversion activities, and then on a weekly basis, thereafter, until the in-stream work is complete. Results of the analyses shall be submitted to this Regional Board by the 15th day of each subsequent sampling month. A map or drawing indicating the locations of sampling points shall be included with each submittal. Diversion activities shall not result in the degradation of beneficial uses or exceedance of water quality objectives of the receiving waters. Any such violations may result in corrective and/or enforcement actions, including increased monitoring and sample collection.

14. The Applicant shall restore all areas of TEMPORARY IMPACTS to waters of the United States and all other areas of temporary disturbance which could result in a discharge or a threatened discharge to waters of the State. Restoration shall include grading of disturbed areas and revegetation with native species. The Applicant shall implement all necessary Best Management Practices to control erosion and runoff from areas associated with this project.

15. The Applicant shall also provide restoration for the proposed permanent impacts to **1.00 acres** of vegetation within waters of the United States/Federal jurisdictional wetlands by creating and enhancing riparian habitat at a minimum 1.5:1 area replacement ratio (1.50 acres).

16. All open space and mitigation areas shall be placed within a conservation easement to ensure preservation in perpetuity. Documentation of proper easement placement shall be submitted to the Regional Board within one year.

17. The Applicant shall submit to this Regional Board **Annual Mitigation Monitoring Reports** by **January 1st /May 1st** of each year for a minimum period of **five (5) years** after planting or until mitigation success has been achieved. The report shall describe in detail all of the project/construction activities performed during the previous year and all restoration and mitigation efforts; including percent survival by plant species and percent cover. This report shall include as a minimum, the following documentation:

    (a) Color photo documentation of the pre- and post-project and mitigation site conditions;

    (b) Geographical Positioning System (GPS) coordinates in decimal-degrees format outlining the boundary of the project and mitigation areas;

    (c) The overall status of project including a detailed schedule of work;

    (d) Copies of all permits revised as required in Additional Condition 1;

    (e) Water quality monitoring results for each reach (as required) compiled in an easy to interpret format;

    (f) A certified Statement of "no net loss" of wetlands associated with this project;

    (g) Discussion of any monitoring activities and exotic plant control efforts; and

    (h) A certified Statement from the permittee or his/her representative that all conditions of this Certification have been met.

18. Prior to any subsequent maintenance activities within the subject drainages, including clearing, maintenance by-hand, and/or the application of pesticides, the Applicant shall submit to this Regional Board a NOTIFICATION of any such activity. Notification shall include: (a) the proposed schedule; (b) a description of the drainage's existing condition and/or capacity; (c) the area of proposed temporary impact within waters of the State; (c) a description of any existing aquatic resources (e.g., wetland/riparian vegetation); and (d) any

proposed compensatory mitigation. Notifications must be submitted a minimum of **three (3) weeks** prior to commencing work activities.

19. All applications, reports, or information submitted to the Regional Board shall be signed:

    (a) For corporations, by a principal executive officer at least of the level of vice president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which discharge originates.

    (b) For a partnership, by a general partner.

    (c) For a sole proprietorship, by the proprietor.

    (d) For a municipal, State, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

20. Each and any report submitted in accordance with this Certification shall contain the following completed declaration:

    "I declare under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

    Executed on the _____ day of _____ at _____.

    _____ (Signature)
    _____ (Title)"

21. All communications regarding this project and submitted to this Regional Board shall identify the Project File Number **05-007**. Submittals shall be sent to the attention of the Nonpoint Source Unit.

22. Any modifications of the proposed project may require submittal of a new Clean Water Act Section 401 Water Quality Certification application and appropriate filing fee.

23. The project shall also comply with all requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity, Order No. 99-08-DWQ. All stormwater treatment systems shall be

located outside of any water of the State and shall not be used as a wetland or riparian mitigation credit.

24. Coverage under this Certification may be transferred to the extent the underlying federal permit may legally be transferred and further provided that the Applicant notifies the Executive Officer at least 30 days before the proposed transfer date, and the notice includes a written agreement between the existing and new Applicants containing a specific date of coverage, responsibility for compliance with this Certification, and liability between them.

25. The Applicant or their agents shall report any noncompliance. Any such information shall be provided verbally to the Executive Officer within 24 hours from the time the Applicant becomes aware of the circumstances. A written submission shall also be provided within five days of the time the Applicant becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

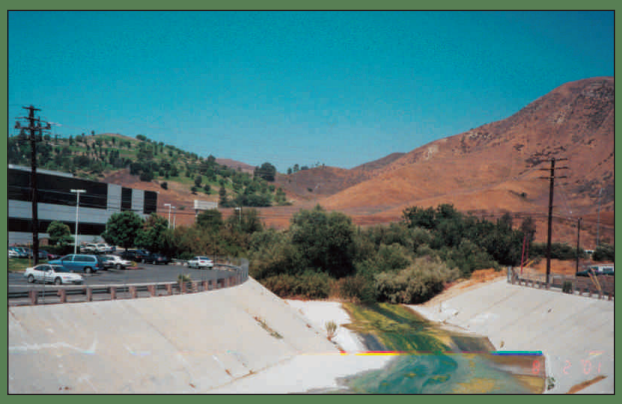
26. *Enforcement:*

    (a) In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under State law. For purposes of section 401(d) of the Clean Water Act, the applicability of any State law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this Certification.

    (b) In response to a suspected violation of any condition of this Certification, the State Water Resources Control Board (SWRCB) or Regional Water Quality Control Board (RWQCB) may require the holder of any permit or license subject to this Certification to furnish, under penalty of perjury, any technical or monitoring reports the SWRCB deems appropriate, provided that the burden, including costs, of the reports shall be a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

    (c) In response to any violation of the conditions of this Certification, the SWRCB or RWQCB may add to or modify the conditions of this Certification as appropriate to ensure compliance.

27. This Certification shall expire five (5) years from date of this Certification. The Applicant shall submit a complete application prior to termination of this Certification if renewal is requested.



September, 2003

Las Virgenes, McCoy, and Dry Canyon Creeks Master Plan for Restoration

Phase I: Comprehensive Final

Prepared For:
City of Calabasas
Department of Public Works
26135 Mureau Road
Calabasas, California 91302-3172

Prepared By:
EDAW, Inc.
1420 Kettner Boulevard, Suite 620
San Diego, California 92101

EDAW

CITY OF CALABASAS
LAS VIRGENES, MCCOY, AND DRY CANYON CREEKS
MASTER PLAN FOR RESTORATION

PHASE I: COMPREHENSIVE STUDY

Prepared for:

City of Calabasas
Public Works Department
26135 Mureau Road
Calabasas, California 91302

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Disclosure:
This project has been funded wholly or in part by the USEPA Assistance Agreement. The contents of this document do not necessarily reflect the views and policies of the USEPA, the State, nor does mention of trade names or commercial products constitute endorsement or recommendation for use. The City of Calabasas contracted with EDAW, Inc. to complete this project for $222,288, which includes $120,320 of State Board funds contracted through Agreement No. 00-164-250-0.

September 2003

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EXECUTIVE SUMMARY

The City of Calabasas (City) has three main creeks that flow through its boundaries: Las Virgenes Creek in the Malibu Creek watershed, and Dry Canyon and McCoy Creeks in the Los Angeles River watershed. These three creeks serve to convey storm water flows to the lower watershed during the wet season. Smaller flows associated with rare summer storm runoff, irrigation runoff, industrial/commercial runoff, and natural seeps and springs, pass through the creeks on the way to Malibu Creek and the Los Angeles River. The results of local water quality monitoring indicate that Las Virgenes Creek has elevated levels of nutrients, selenium, coliform, scum, and trash, while Dry Canyon Creek and McCoy Creek have elevated levels of nutrients, coliform, and trash. It should also be noted that two other creeks, Cold and Stokes Creeks, lie within the City's boundaries. These creeks comprise such a minor portion of the City's watercourses that they were not addressed in this study. Although not specifically addressed, these two creeks may benefit from some of the general recommendations made in this report.

In order to address these water quality concerns, the City applied for, and received a 205(j) grant from the State Water Resources Control Board (SWRCB). The overall objectives of the grant study were to: establish baseline environmental conditions; evaluate historical changes in the watershed; define opportunities and constraints for improving water quality (related both to Total Maximum Daily Loads and aquatic habitat); assess opportunities and constraints to restore creek and riparian habitat; and identify recreational and educational facilities and opportunities.

In order to accomplish the stated objectives, a combination of field evaluation and computer modeling were employed. The field evaluation revealed that all three creeks are exhibiting the signs of an urbanizing watershed; increased flow velocity, down cutting of the creek channel, and increased dry season flow. However there are opportunities for both aquatic and riparian habitat improvement throughout the study area. The computer modeling revealed that there was insufficient water quality monitoring data to run a calibrated Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) model; however, there was sufficient data available to utilize a non-calibrated model. Therefore a non-calibrated BASINS model was used to evaluate the implementation of a series of source control measures and Best Management Practices (BMPs) to reduce the nutrients reaching the creeks.

The modeling results conclude that source control measures were more effective at reducing nitrate loading than removing ammonia and phosphate from runoff within this watershed.

Structural BMPs were more effective at reducing ammonia and phosphate loading than were source control measures.

A survey for native fish habitat for the City's three creeks was also conducted. This survey recommended that arroyo chub be the first species to be re-introduced because it is the most resilient of the seven native species that have the potential to survive in the study area. Other recommendations include educating residents about not introducing unwanted aquarium and bait fish, removing barriers (such as those in the Calabasas Golf and County Club), and conducting further water quality and water quantity studies to determine which sites are suitable for re-introduction of other native fish.

Based on the field evaluation and information provided by the City Planning Department, there are opportunities to improve educational and recreational opportunities within the City. These opportunities include: implementing the Trails Master Plan for the City (currently under consideration), adding watershed specific signage throughout the City, constructing monument/signage at creek sites that are adjacent to and accessible to two local schools, and contacting specific landowners (particularly livestock owners) to inform them of the storm water requirements.

CHAPTER 1.0
INTRODUCTION

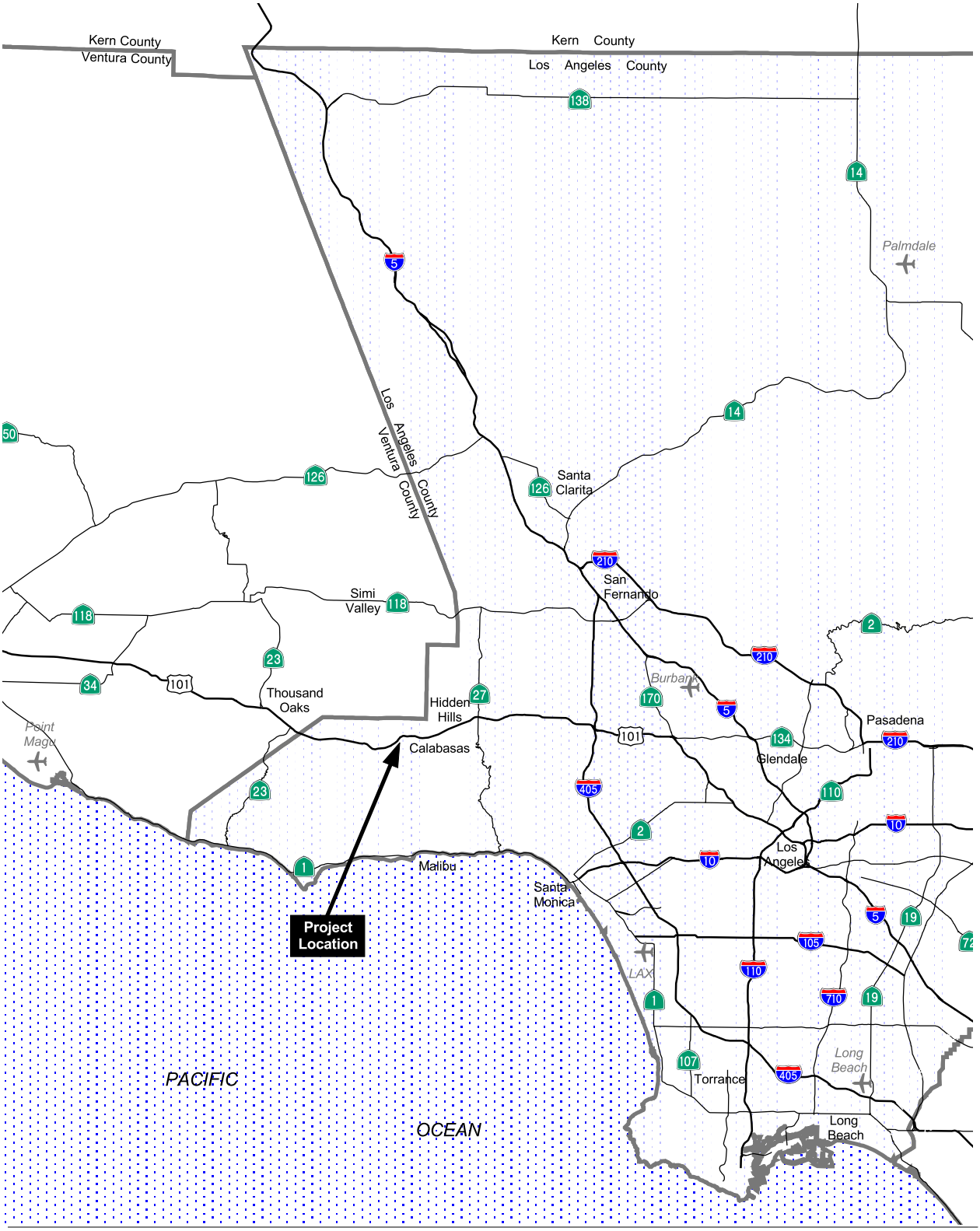
1.1 BACKGROUND

Calabasas (City) has three main creeks that flow through its boundaries: Las Virgenes Creek in the Malibu Creek watershed, and Dry Canyon and McCoy Creeks, in the Los Angeles River watershed (Figure 1.1). Both watersheds, Malibu Creek and Los Angeles River, are areas of regional prime concern. The Malibu Creek watershed is important because of its prominent wildlife corridor and significant planning areas within the Santa Monica Mountains National Recreation Area (SMMNRA). McCoy and Dry Canyon Creeks confluence to form Calabasas Creek, also referred to as Arroyo Calabasas, which is one of the two creeks forming the headwaters of the Los Angeles River. Being situated in the headwaters presents a great challenge and opportunity to protect and enhance the Los Angeles River watershed from its source.

Two corridors for wildlife movement have been identified within the Malibu Creek watershed, and for this reason the watershed provides a key function for habitat linkage to the surrounding natural areas of the Santa Monica Mountains, Simi Hills, Santa Susana Mountains, and beyond. As one of the dual headwaters of the Los Angeles River, McCoy, and Dry Canyon Creeks provide an opportunity for coordination with the Santa Monica Mountains Conservancy's Los Angeles River projects, as well as habitat for wildlife. This study is envisioned to provide a specific, detailed implementation plan with which to direct efforts to protect and enhance these creeks.

The Las Virgenes Creek watershed is approximately 89 percent undeveloped, although the stream has been altered considerably below the Ventura County-Los Angeles County jurisdictional line. Below the county jurisdictional line to Agoura Road, the creek has been straightened, riprapped, relocated, and given other treatments typical of an urbanizing area. This has caused accelerated water flow velocity below the concrete reach.

Previous studies of the Malibu Creek watershed have provided some baseline information for its tributary, Las Virgenes Creek. However, Dry Canyon and McCoy Creeks have gone largely unstudied. Dry Canyon and McCoy Creeks have both been adversely affected by urbanization similar to the effects on Las Virgenes Creek. Large segments of these two creeks flow through gated communities and private properties. Also, the flood control systems take the creeks



Source: Southern California Association of Governments (SCAG) and California Spatial Information Library (CaSIL)

NORTH

5 0 5 10 15 Miles

1 inch = 10 miles

Figure 1-1
Regional Location Map

underground for some stretches. These developments have largely ignored the creek as a resource, and many areas are inaccessible to the public. This inaccessibility is due to several factors: fencing of concrete-lined areas, steep slopes, and ravines created by erosion; lack of resource information; and virtually no trails around the riparian area to accommodate human use. Finding good access points to the creeks, with the least amount of disturbance for outdoor education and increased appreciation of the creek's resource is a major goal of this study.

The three creeks pass through Calabasas serving to convey storm water flows to the lower watershed during the wet season, typically October to April. Smaller flows associated with rare summer storm runoff, irrigation runoff, industrial/commercial runoff and natural seeps and springs pass through the creeks on the way to Malibu Creek and the Los Angeles River. In addition to conveying water from the upper watershed, the three creeks also transport contaminants. The results of local monitoring programs indicate that Las Virgenes Creek has elevated levels of nutrients, selenium, coliform, scum, and trash, while Dry Canyon Creek and McCoy Creek have elevated levels of nutrients, coliform, and trash.

In 1999, the City submitted a 205(j) grant application to the State Water Resources Control Board (SWRCB) to prepare a management plan for Las Virgenes, Dry Canyon and McCoy Creeks, within the City boundaries. The grant was subsequently approved in the fall of 1999. The 205(j) grant program is a federally funded program focusing on water quality planning for local public agencies. Funded projects under the 205(j) program may include broad-based watershed planning or plans aimed at resolving specific water quality concerns. The U.S. Environmental Protection Agency (EPA) grants the funds annually to the SWRCB, which distributes the funds competitively to public agencies and administers the grants. With the increasing water-related regulations applicable to the City, it is desirable to have a master plan document addressing these regulations and ways to achieve compliance.

1.2 GOAL

The overall goal of the project is to create a road map of opportunities for improving the natural environment, with an emphasis on water quality, within the City's boundaries. This project goal coincides with the goals outlined in the Calabasas General Plan. The goal of the Conservation, Environmental Design, and Open Space Element of the General Plan is to:

- Preserve significant environmental features within Calabasas and the City's General Plan study area, and provide for their wise management;

- Define limits on the natural resources needed to support urban and rural life within Calabasas and the City's General Plan study area, and to ensure that those resources are used wisely, and not abused, and
- Maintain an open space system that will conserve natural resources, preserve scenic beauty, promote a healthful atmosphere, provide space for a variety of active and passive recreational activities and protect public safety.

1.3 OBJECTIVES

The overall purpose of the restoration master plan is to describe specific projects that should be implemented throughout the watersheds of the three creeks in a phased approach that will primarily improve water quality as well as enhance habitat, increase recreational facilities, and provide educational opportunities. The following are the overall objectives of the master plan:

- Establish baseline environmental conditions of the existing habitat within the three creeks.
- Evaluate historical land use and vegetation changes within the watersheds.
- Define opportunities and constraints for improving water quality parameters targeting specific Total Maximum Daily Load (TMDL) contaminants for the three creeks.
- Define opportunities and constraints for improving water quality to enhance existing creek habitat for species such as arroyo chub and steelhead trout.
- Define opportunities and constraints to restore creek and riparian habitat.
- Define opportunities and constraints to improve recreational facilities/features within the study area.
- Define opportunities and constraints to provide educational facilities/features within the study area.

1.4 METHODS

1.4.1 Pre-field Survey Evaluation of Existing Data

1.4.1.1 Previous Projects Conducted in the area

Prior to conducting the field survey, previous project reports for work conducted within the study area were reviewed. With Dry Canyon and McCoy Creeks being located at the top of the Los Angeles River watershed, there has been little emphasis placed on studying their features and characteristics. Therefore, very little information was available for these two creeks. As Las Virgenes Creek is located in the Malibu Creek Watershed, slightly more information was available in the way of previous studies. However, much of this information is for Malibu Creek itself, with limited focus on Las Virgenes Creek.

A Protection and Revitalization Plan for Las Virgenes Creek (2001)

One of the previous studies that focused exclusively on Las Virgenes Creek was a graduate study conducted by Bradley Owens, completed in 2001. This study, A Protection and Revitalization Plan for Las Virgenes Creek, was envisioned to be "used by the community as a reference and inspiration for stewardship, and to create plans that include 'big ideas' that positively influence the area for many generations."

With that goal in mind, the study compared quantity and duration of storm water runoff from the predevelopment era to the development within the Las Virgenes Watershed in 1999. As expected, the analysis shows that as development (impervious surfaces) of the watershed increased, the peak flows within the creek also increased. Mr. Owens also identified areas of the creek that were concrete lined and determined that the combination of increased flow with the increase in velocity from the concrete lining would increase erosion downstream of the concrete areas. In addition to the flow studies conducted by Mr. Owens, he also qualitatively identified habitat improvement areas, areas to enhance wildlife corridors, and potential areas to increase public access to Las Virgenes Creek.

The Malibu Creek Watershed: A Framework for Monitoring Enhancement and Action (1998)

The Malibu Creek Watershed: A Framework for Monitoring Enhancement and Action was completed in 1998, by the Graduate Department of Landscape Architecture, California State Polytechnic University, Pomona. The study was prepared for Heal the Bay and the California State Coastal Conservancy. The stated purpose of the project was to design a citizen-monitoring

program to evaluate the water quality of the entire Malibu Creek watershed and target areas for future studies, protection restoration, and enhancement.

The report provides an overview of the Malibu Creek watershed and the geologic and hydrologic processes taking place within the watershed. One of the main discussion points of the report is what processes change in an urbanizing watershed and how urbanization can change erosion and sedimentation as well as water quality. In addition, the report provides a lengthy discussion about citizen monitoring and the importance of organizing the data collection.

1.4.1.2 Water Quality Data

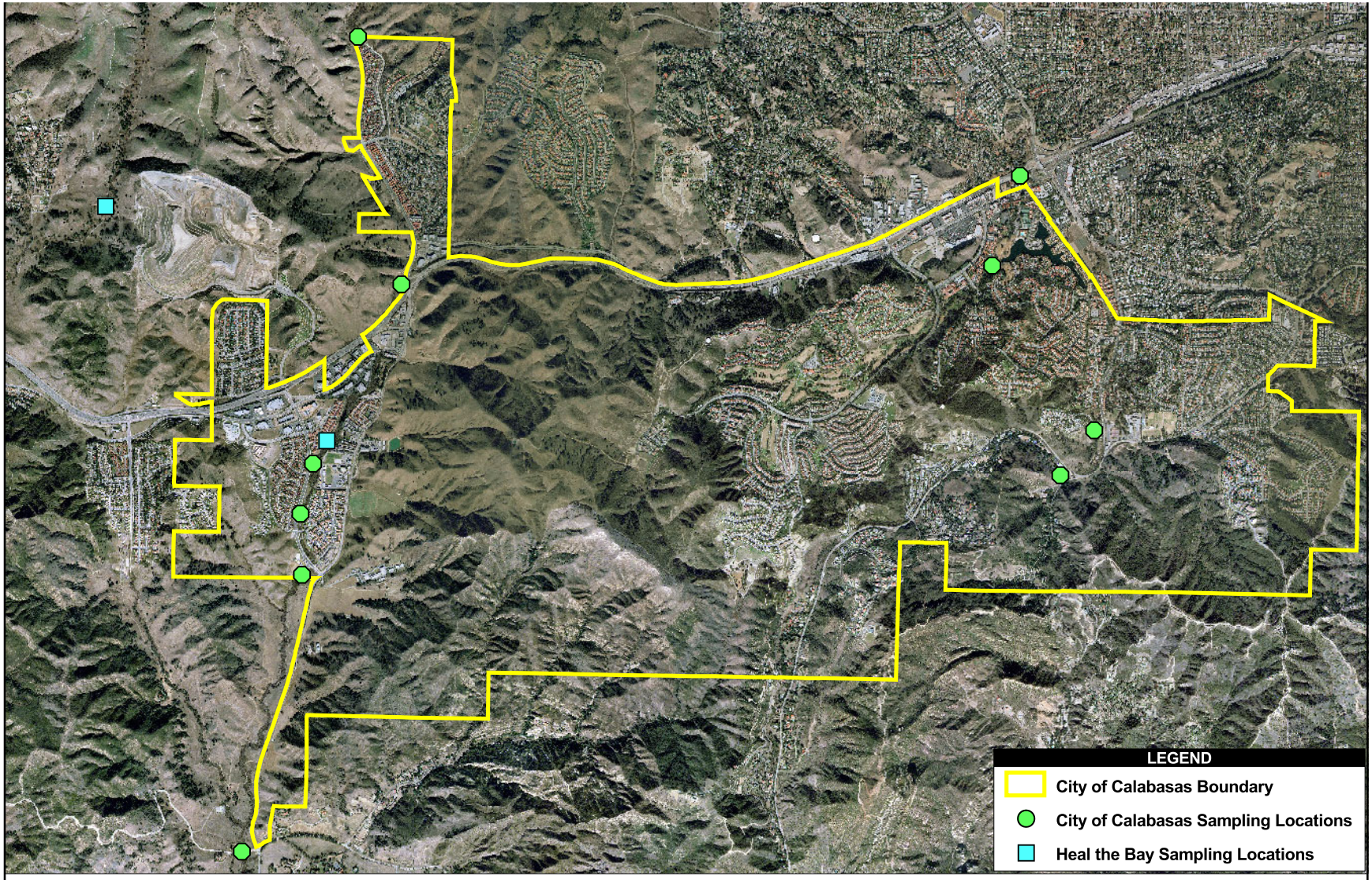
Water quality data are collected by various agencies and organizations within both the Malibu Creek watershed and the Los Angeles River watershed. However, there are limited monitoring stations within Calabasas (Figure 1.2). The two main groups that complete the monitoring within the project area are the City with the Adopt-a-Creek Program and Heal the Bay's Stream Team. The Ventura County Department of Public Works also has one monitoring station on Las Virgenes Creek, near the Los Angeles County-Ventura County jurisdictional line. Water quality data collected for this project are presented in Appendix C, including data on nutrients, dissolved oxygen, temperature, pH, fecal coliform, and other consituents from the three creeks.

City of Calabasas Adopt-a-Creek Program

The Adopt-a-Creek Program uses City staff teamed with volunteers to conduct quarterly monitoring at a total of 10 stations: 6 along Las Virgenes Creek and 2 each for McCoy and Dry Canyon Creeks. At each station a total of 9 parameters are measured in the field and 42 parameters are assessed by laboratory analysis (Table 1.1). The overall results are sent to the Regional Water Quality Control Board – Los Angeles Region (RWQCB-LA) periodically.

Heal the Bay – Stream Team

Heal the Bay sponsors the Stream Team, which is a group of volunteers who conduct water quality monitoring throughout the Malibu Creek watershed. Under the leadership of Heal the Bay staff, these volunteers have also conducted habitat assessments within the watershed. The Stream Team conducts monthly monitoring at three stations along Las Virgenes Creek. At each station, 17 parameters are measured in the field, and 1 parameter is determined by laboratory analysis. In addition to the constituent analysis, the Stream Team also evaluates the Index of Biological Integrity (IBI) for discrete stream segments. The IBI evaluations use benthic macroinvertebrates to determine long-term vitality of the specific stream based on the community of invertebrates identified.



Source: Mountains Restoration Trust, 2002; Calabasas Public Works Department; Heal the Bay

Figure 1.2
Water Quality Sampling Locations

Table 1.1. Overview of the Water Quality Analysis Conducted in the Las Virgenes Creek Watershed

Constituents Sampled	Adopt-a-Creek	Analysis Method	Stream Team	Analysis Method	Ventura County	Analysis Method
Air Temperature	X	Thermometer	X			
Water Temperature	X	LaMotte DO 4000 Meter	X	YSI 55 or 550		
Water Clarity	X	Visual	X	Visual		
Water Color	X	Visual	X	Visual		
Odors	X		X			
Floatables	X	Visual	X	Visual		
Biological Floatables	X	Visual	X	Algae protocol		
Turbidity, NTU			X	LaMotte 2020 Turbidimeter		
pH	X	pH Tester2	X	Cole Parmer pH Testr2	X	na
Flow	X	Global Flow Probe	X	Flowmate II		
Chloride (Cl-), mg/l					X	na
Phosphorus, Dissolved, mg/l					X	na
Phosphorus (P) Total, mg/l	X	EPA 365.2			X	na
Phosphate (P04)			X	Ascorbic acid reduction	X	na
Ammonia Nitrogen (NH3-N), mg/l	X	EPA 350.2	X	LaMotte SMART Colorimeter	X	na
Nitrate Nitrogen (NO3-N), mg/l	X	EPA 353.3 and Cadmium reduction method	X	LaMotte SMART Colorimeter		
Nitrate (mg/l)					X	na
Nitrite Nitrogen (NO4-N), mg/l						
N03+N02+N ppm			X	Cadmium reduction method		
Total Kjeldahl Nitrogen (TKN), mg/l					X	na
Biological Oxygen Demand (BOD), mg/l					X	na
Chemical Oxygen Demand (COD), mg/l					X	na
Total Organic Carbon (TOC), mg/l					X	na
Dissolved Oxygen	X	Winkler Method, La Motte, EPA 4500-G, EPA 360.1	X	YSI Model 55 or 550		
Total Suspended Solids (TSS), mg/l					X	na
Total Dissolved Solids (TDS)	X	TDSTester 20	X		X	na
Conductivity			X (mS)	19830-00 Cole Parmer or YSI 30	X (umhos/cm)	na

Constituents Sampled	Adopt-a-Creek	Analysis Method	Stream Team	Analysis Method	Ventura County	Analysis Method
Total Hardness, mg/l	X	EPA 130.2			X	na
Coliform, Total, mpn/100ml	X	EPA 9221		IDEXX Quanti-tray 2	X	na
Coliform, Fecal, mpn/100ml	X	EPA 9221		IDEXX Quanti-tray 2	X	na
Enterococcus, Fecal, mpn/100ml	X	EPA 9230B	X	IDEXX Quanti-tray 2		
Streptococcus, Fecal, mpn/100ml					X	na
Arsenic, (As), Dissolved, µg/l					X	na
Arsenic, (As), Total, µg/l					X	na
Cadmium (Cd), Dissolved, µg/l					X	na
Cadmium (Cd), Total, µg/l					X	na
Chromium (Cr), Dissolved, µg/l					X	na
Chromium (Cr), Total, µg/l					X	na
Copper (Cu), Dissolved, µg/l	X	EPA 200.8			X	na
Copper (Cu), Total, µg/l	X	EPA 200.8			X	na
Lead (Pb), Dissolved, µg/l					X	na
Lead (Pb), Total, µg/l					X	na
Mercury (Hg), µg/l					X	na
Mercury (Hg), Dissolved, ng/l					X	na
Mercury (Hg), Total, ng/l					X	na
Nickel (Ni), Dissolved, µg/l					X	na
Nickel (Ni), Total, µg/l					X	na
Selenium (Se), Dissolved, µg/l					X	na
Selenium (Se), Total, µg/l	X	EPA 200.8			X	na
Silver (Ag), Dissolved, µg/l					X	na
Silver (Ag), Total, µg/l					X	na
Zinc (Zn), Dissolved, µg/l	X	EPA 200.8			X	na
Zinc (Zn), Total, µg/l	X	EPA 200.8			X	na
Aldrin	X	EPA 508				
Chlordane-alpha	X	EPA 508				
Chlordane-gamma	X	EPA 508				
Clorneb	X	EPA 508				
Chlorthalonil	X	EPA 508				
DCPA	X	EPA 508				
4,4'-DDD	X	EPA 508				
4,4'-DDE	X	EPA 508				

Constituents Sampled	Adopt-a-Creek	Analysis Method	Stream Team	Analysis Method	Ventura County	Analysis Method
4,4'-DDT	X	EPA 508				
Dieldrin	X	EPA 508				
Endosulfan I	X	EPA 508				
Endosulfan sulfate	X	EPA 508				
Endrin	X	EPA 508				
Endosulfan II	X	EPA 508				
Etridiazole	X	EPA 508				
HCH-alpha	X	EPA 508				
HCH-beta	X	EPA 508				
HCH-delta	X	EPA 508				
HCH-gamma	X	EPA 508				
Heptachlor	X	EPA 508				
Heptachlor epoxide	X	EPA 508				
Hexachlorobenzene	X	EPA 508				
Methoxychlor	X	EPA 508				
cis-Permithrin	X	EPA 508				
Propachlor	X	EPA 508				
Trifluralin	X	EPA 508				
Diazinon, µg/l	X	EPA 507				
Chlorpyrifos, µg/l	X	EPA 507				
Macroinvertebrates			X	IBI Method		
Toxicity (TIE)					X	na

mg/l = milligrams per liter
µg = micrograms per liter
NTU = nephelometric turbidity unit
DCPA= dicyclopentenyl acrylate
na = not available

1.4.1.3 Aerial photographs

Aerial photographs were used to identify both existing and historic conditions within the watersheds.

Historic

Historical aerial photographs of the area were reviewed from the collection located at California State University Northridge. The photographs reviewed were from 1960, 1975, and 1989 (see Figures 1.3, 1.4a, 1.4b and 1.5). Figure 1.3, from 1960 (unknown scale), shows primarily the McCoy Creek watershed with Mulholland Highway near the bottom of the photograph. Figure 1.4a, and 1.4b, from 1989 (unknown scale), show the study area. The Las Virgenes Creek watershed is shown in Figure 1.4a, and the McCoy and Dry Canyon Creek watersheds shown in 1-4b. Figure 1.5 from 1975 (unknown scale) show the entire study area with Las Virgenes Creek on the left and McCoy and Dry Canyon Creek shown on the right of the photograph. The evaluation of these photographs was used to determine the land use history of the watersheds (see Section 2.1, Land Use).

Current

A recent aerial photograph (2002) for the project area was supplied by Mountains Restoration Trust. This photograph was used to evaluate current land use within the study area and for use in developing field and report maps.

1.4.1.4 Cooperating Organizations

The following organizations were contacted and supplied information for this study:

- Las Virgenes Municipal Water District
- Mountains Restoration Trust
- Los Angeles County Department of Public Works – Watershed Division
- Heal the Bay
- Resource Conservation District of the Santa Monica Mountains
- California Department of Parks – Malibu Creek State Park
- Regional Water Quality Control Board, Los Angeles Region

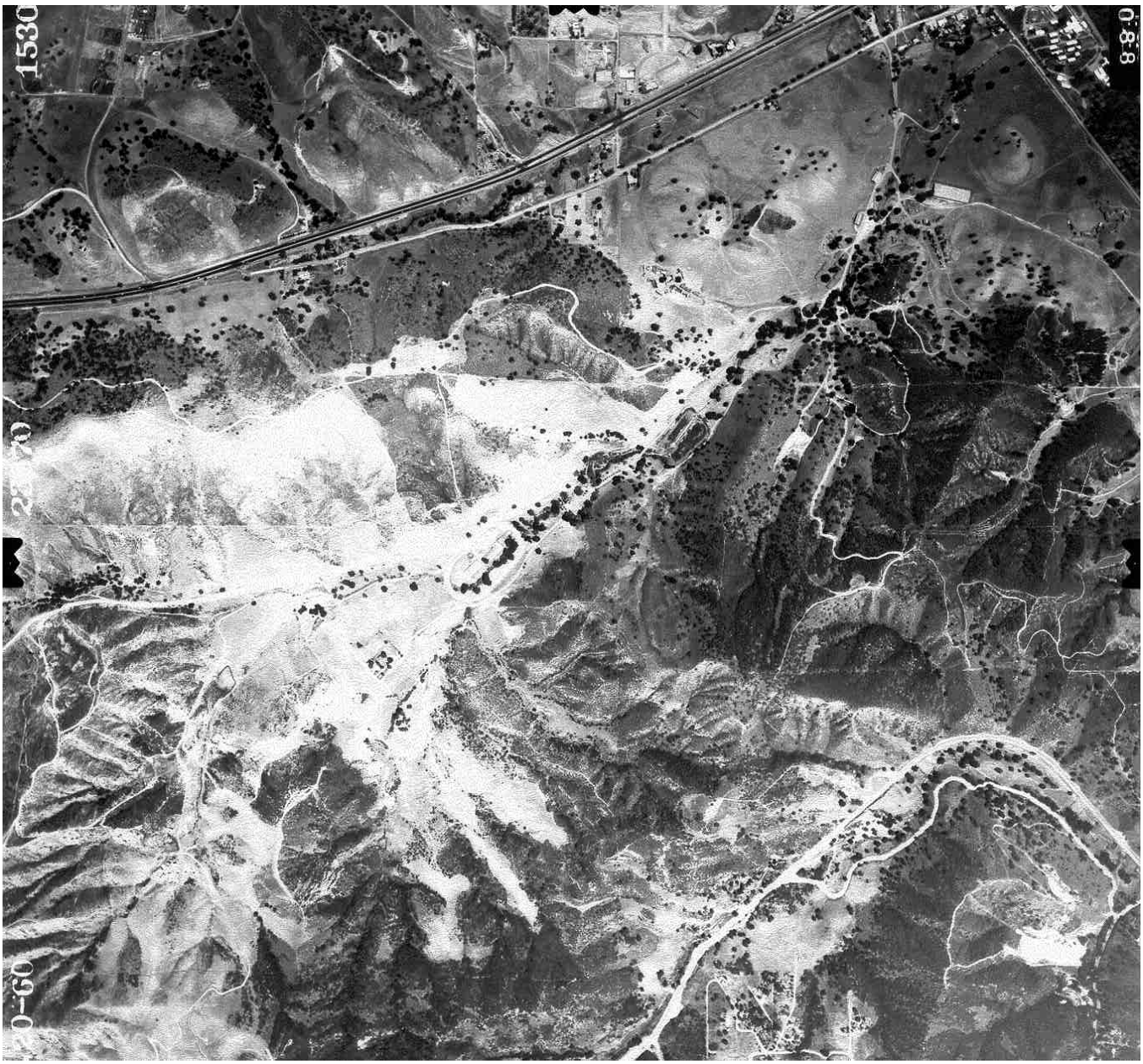
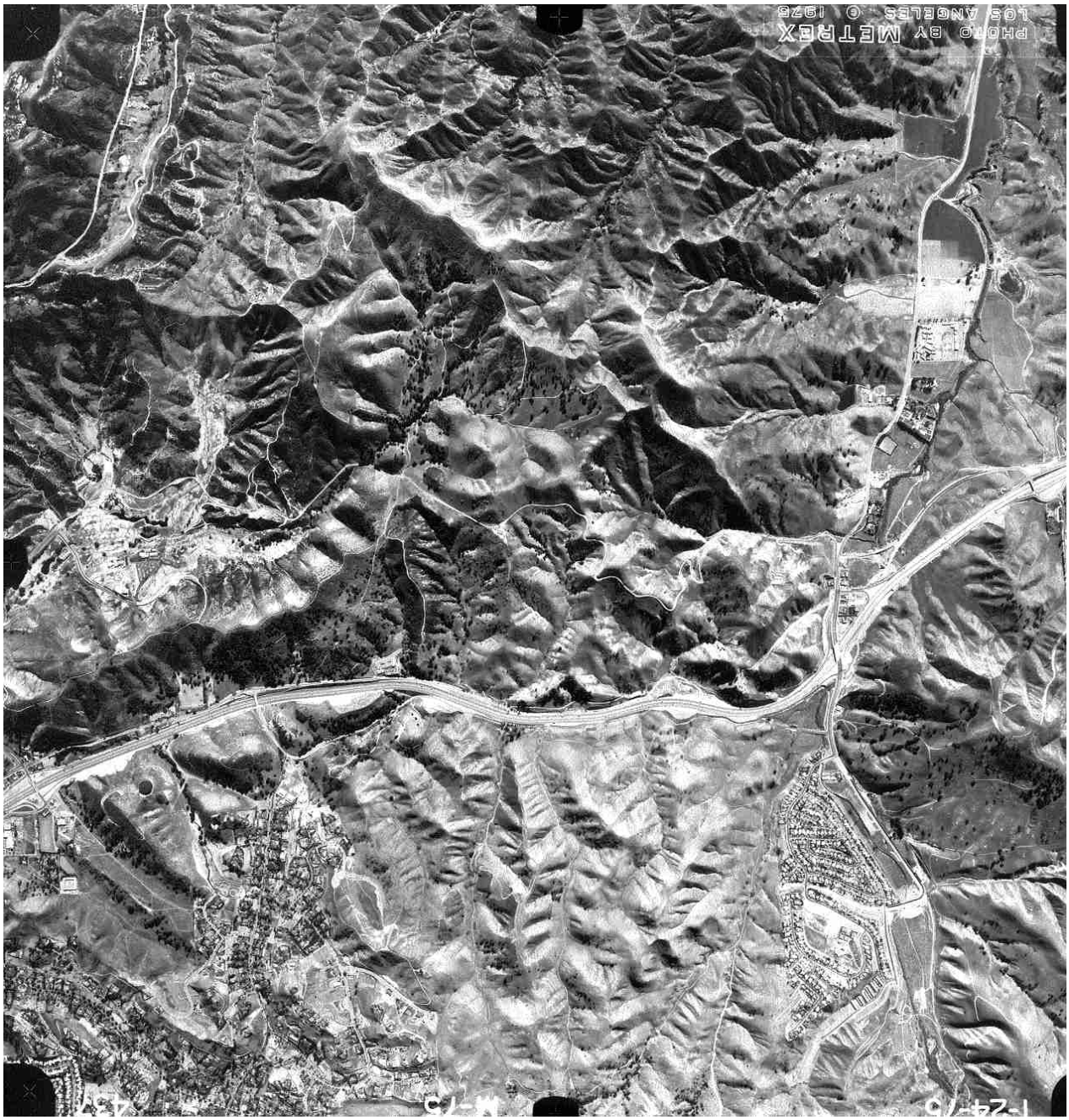


Figure 1.3
Historical Aerial Photograph
May 20, 1960

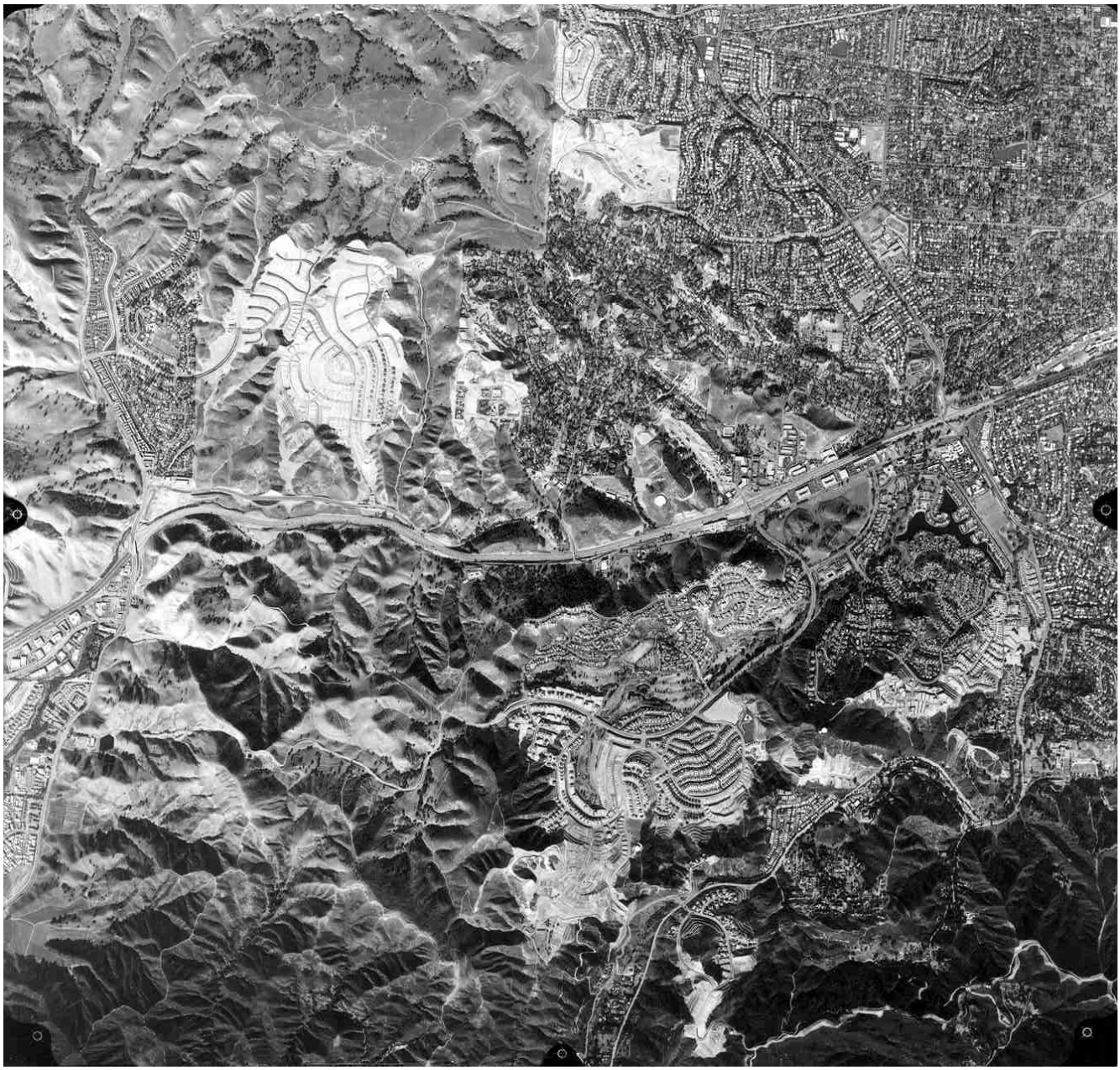


NORTH

Figure 1.4a
Historical Aerial Photograph
January 24, 1975

NORTH

Figure 1.4b
Historical Aerial Photograph
January 24, 1975



NORTH

Figure 1.5
Historical Aerial Photograph
December 12, 1989

Graphics 1K154.01 Calabasas\Figures\Fig1_51989.fh8 np (Bradyd) 7/1/03

1.4.2 Field Survey Evaluation

1.4.2.1 Watershed Survey

A driving survey was conducted for each of the three watersheds to evaluate land use practices, storm water program controls, approximate location of storm drain outlets, appropriate potential signage locations, and identification of potential park, education, and recreation facility locations.

1.4.2.2 Stream Walk (Habitat Assessment)

Baseline conditions for Las Virgenes, Dry Canyon, and McCoy Creeks were assessed during field visits performed in January and March 2003. The riparian assessment procedure developed for this project evaluated physical and hydrological properties of stream reaches, presence of plant and animal species, and adjacent vegetation communities and land uses. Each stream was walked from the upper reaches to lower, and unique characteristics were photographed and documented on field maps. This information was then used to identify potential areas for habitat restoration as described in Chapter 4.0.

1.4.3 Modeling

The watershed modeling was completed by Everest International Consultants (Everest) (Appendix A). Everest, as part of the EDAW team, worked collaboratively with the City to develop restoration measures and the model was then used to simulate the corresponding flow and water quality conditions.

The purpose of the watershed modeling study was to develop restoration measures and assess the effectiveness of those measures, at improving water quality within the creeks. The following objectives were developed to achieve this purpose:

- Select appropriate watershed model.
- Acquire information needed to conduct watershed modeling.
- Identify any data gaps related to the scope of work.
- Develop conceptual models of the two watersheds.
- Perform watershed modeling to establish existing/baseline conditions.

- Develop restoration measures aimed at improving water quality.
- Conduct watershed modeling to analyze and evaluate measures.

Scope of Modeling Study

The scope of the watershed modeling study was limited to an analysis of watershed hydrology and nutrients. Existing, available water quality and flow information and data were used for the modeling study as resources were not available to conduct additional data collection for these parameters. The nutrient model simulations were focused on the portion of the creeks that flow through the City's boundaries, along with the corresponding watershed areas. The original intent of the study was to conduct the watershed modeling using a calibrated model. However, an initial review of the available data revealed that the data are insufficient for model calibration; therefore, the scope was modified to allow the use of an uncalibrated watershed model for alternative development and evaluation. The uncalibrated model was used to perform a relative comparison for nutrient reductions between different model simulations.

Approach

The study approach based on the application of a numerical watershed model was developed to meet the study objectives. Potential models were reviewed and a suitable model was selected that met the purpose and objectives of the study. Conceptual models of the three sub-watersheds under existing conditions were developed, and the model was used to establish existing conditions. The results of the existing condition simulations were used to establish baseline values for subsequent comparison with the various restoration measures. The EDAW team worked collaboratively with the City to develop restoration measures, and the model was then used to simulate the corresponding flow and water quality conditions. The results of the model simulations conducted with the restoration measures were compared to the baseline results to determine the effectiveness of the various restoration measures at improving water quality. The results of the various alternatives were also compared against one another to gauge the effectiveness of the restoration measures. This last step provided useful information in the development of the overall restoration alternatives for the creeks.

<u>Watershed Model Selection</u>

The EPA has developed a suite of numerical models and a graphical user interface that can be used to analyze watershed hydrology and water quality. This system, known as the Better Assessment Science Integrating Point and Nonpoint Sources (BASINS), is a multipurpose

environmental analysis system designed for the application of watershed approaches to improve water quality. The BASINS system supports the development of TMDLs as required by Section 303(d) of the Clean Water Act. The BASINS suite allows for flexible analysis at varying geographic scales and it includes a compilation of environmental data from various government agencies migrated into a geographic information system (GIS) framework. Environmental data are available for watersheds as defined by hydrologic unit codes (HUCs). BASINS allows for manipulation of watershed characteristics to delineate watershed boundaries and calculate setup parameters for the component simulation models that comprise the BASINS system.

The Hydrological Simulation Program – Fortran (HSPF) model, a component of the BASINS system, was selected for this study for the following three reasons. First, HSPF is a component of BASINS and BASINS is one of the models currently accepted for use by the EPA for loading allocation determination as part of the TMDL program. Second, the model was capable of meeting all the technical requirements of the study purpose, including simulation of watershed hydrology, stream flows, and contaminant loading. The model also allows for relatively easy incorporation of watershed restoration measures such as best management practices (BMPs) (e.g., CDS units), land use changes (e.g., conversion of urban areas to open space), and source control (e.g., reclaimed water use changes). Third, HSPF is currently being used by the RWQCB-LA to establish the TMDL allocations for nutrients and bacteria within the Malibu Creek watershed.

HSPF Model Description

HSPF is a comprehensive watershed modeling package for simulation of watershed hydrology and water quality for both conventional and toxic organic pollutants. It is the only comprehensive model of watershed hydrology and water quality that allows the integrated simulation of land and soil contaminant runoff processes with in-stream hydraulics, water temperature, sediment transport, nutrient, and sediment-chemical interactions (EPA 2001a).

HSPF simulates the movement of water, sediment, and contaminants over the land surface and through the soils of a watershed; computes resultant flows, sediment transport, and contaminant concentrations in the collecting streams; and provides water discharge, sediment discharge, and contaminant loading to the receiving waters. In summary, HSPF simulates all the hydrological processes within the hydrologic cycle.

For a given watershed with known characteristics such as land uses, vegetative cover, and soil conditions, HSPF computes the transport of water, sediment, and contaminants throughout the

watershed on a continuous basis under continuous meteorological forcing such as precipitation, temperature changes, and evaporation. HSPF permits complex physical and chemical interactions and transformations of contaminants in the watershed and streams, thereby providing relatively accurate estimates of contaminant loading into the receiving water. The model outputs simulation results in the form of time histories of runoff flow rate, sediment load, and contaminant concentrations at any point of interest within the watershed.

Given the long-term periods of analysis and the comprehensive nature of the processes being simulated, HSPF requires extensive hydrology and water quality data for successful application. Data are needed to characterize the watershed, creek, hydrology, meteorology, and water quality. In addition, for optimal accuracy of the modeled output, the input data should cover the same period of record, or the various data records should be verified to make sure all data are representative of the period being modeled. The data required to conduct watershed modeling using HSPF are listed below.

Watershed Characteristics

- Topography
- Land use
- Soil characteristics
- Water table depth

Creek Characteristics

- Thalweg elevation profiles
- Cross-section geometries for main channel and overflow planes
- Bottom conditions (earth, vegetation type, rock types)
- Creek rating curve for depth versus flow
- Seasonal variation of creek characteristics

Hydrology

- Continuous precipitation records for local area at hourly interval and corresponding creek flow at multiple locations for each creek (Las Virgenes Creek 5 to 10 locations; McCoy and Dry Canyon Creeks 1 to 3 locations per creek)
- Groundwater data, including flow and water table depths

Meteorology

- Evapotranspiration
- Temperature (minimum and maximum) and dew point
- Wind
- Solar radiation
- Cloud cover

Water Quality

- Location, type, and concentration of point sources of contaminants
- Location, type, and concentration of nonpoint sources of contaminants

HSPF Model Calibration Discussion

As with any numerical model, HSPF requires calibration to provide accurate estimates of the various model outputs for a given watershed. Typically, the model will be calibrated by first performing simulations over a given period and then comparing the output to measured values of flow, contaminant loading, and contaminant concentrations. The various model parameters (e.g., initial contaminant storage, atmospheric deposition, and friction) will then be adjusted within accepted limits until the model results match the measured values within an acceptable limit. Therefore, successful calibration requires simultaneous, continuous flow and water quality constituent measurements across the watershed at a level sufficient to resolve the expected variation of these parameters.

The City has been monitoring water quality since 1998 as part of the Adopt-A-Creek Program. The monitoring program consists of instantaneous measurements of various water quality constituents accomplished through direct measurements as well as grab sample collection and

subsequent analysis. Instantaneous flow measurements were usually collected; however, no continuous flow measurements were collected as part of the program. Given that no continuous flow or water quality constituent measurements were made within the portion of the three sub-watersheds located within Calabasas, the data were insufficient to conduct a meaningful calibration of the HSPF model for this study. Hence, instead of using a fully calibrated HSPF model, a conceptual model built upon literature values was used for this study. Nevertheless, the conceptual model was verified against analytical methods in flow estimates, as well as comparison with other studies in the regions for pollutant loadings. Details about the conceptual model setup are provided in section 3 of Appendix A.

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CHAPTER 2.0
SITE ASSESSMENT

2.1 LAND USE

This section outlines the changes in land use of the Calabasas area from historic time to the present. Various sources were used to develop this land use perspective, including aerial photographs and City resources.

2.1.1 Historic Land Use

For thousands of years Native Americans occupied the coastal California region. The Chumash is the first known tribe to inhabit the area now known as the City of Calabasas. In addition to the Chumash, the Gabrieleno/Tongva inhabited the area just south of Calabasas and then extended into the Los Angeles basin area. The mild climate and abundant flora and fauna in the area provided ample resources for hunting and gathering. Such resources enabled the Chumash to construct permanent villages, which were connected by established trails. Despite the permanence of their settlements, the Chumash lifestyle had a limited impact on the region (City of Calabasas 1994).

The Chumash had little contact with non-Native Americans until the 18th century, when the Spanish began exploring California. Spaniards such as Gaspar de Portola and Juan de Anza journeyed along the coast via trails established by Native Americans. Shortly after the arrival of such explorers, Spanish missionaries traveled into California to convert Native Americans to Christianity. They established 21 missions on the Californian coastline from San Diego to San Francisco. San Fernando Rey de España and San Gabriel Arcángel are the two closest missions to Calabasas and are both located in Los Angeles County. The missions forever changed the way of life for Native Americans in California. The missionaries introduced livestock, exotic plants, and roads.

El Camino Real, translated as "The Royal Highway," was the main artery for moving goods and information between the missions. Today Ventura Freeway (Highway 101) runs close to the original alignment of El Camino Real. With the establishment of more missions, travel along El Camino Real intensified. The increased road use, combined with agricultural settlements, escalated impacts on the land (California Missions 2002; Maslach 2000).

While the presence of the missions changed land use patterns and cultural traditions in California, it was the arrival of the Spanish-Mexican ranchers that began to significantly impact the land. At the beginning of the 19th century, the Mexican government granted large ranches in California to Mexican citizens. The new landowners brought intensive land uses to the area. To stake their land claim, the ranchers built permanent structures, planted crops, and introduced large herds of longhorn cattle. Furthermore, they established additional infrastructure to help communication and trade between settlers and missions.

Heavy grazing and clearing of trees for agriculture had a large impact on the native plants and trees. Native grasses could not compete with weeds and exotic plants brought by the Mexicans. Meadows were quickly established in grazing areas where live and valley oak once thrived (Maslach 2000).

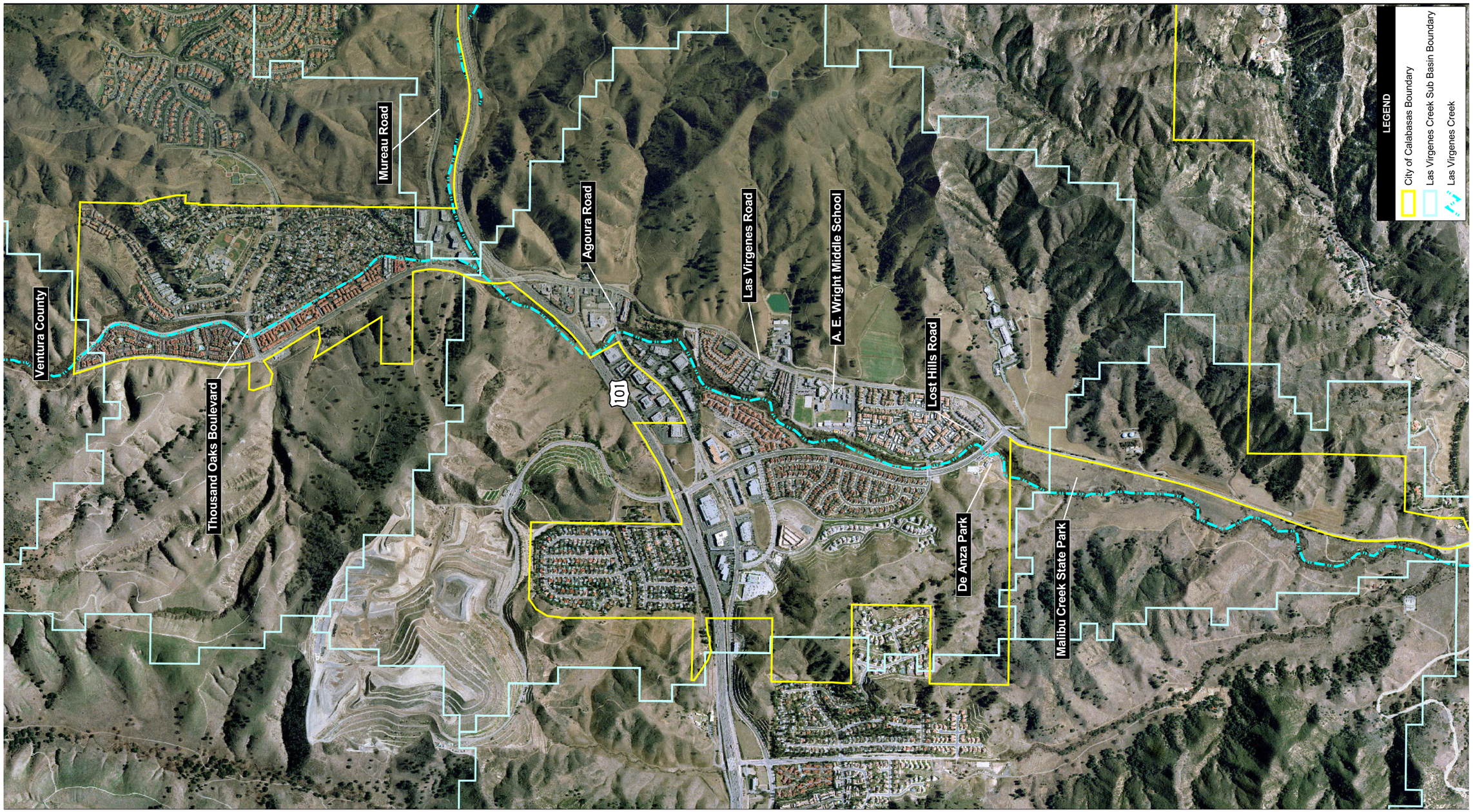
Meanwhile, American homesteaders trying to stake their own claims in California moved into the Calabasas region in the mid-19th century. By the end of the century, Mexican and American ranches were broken into small farms. Soon, however, water ran low due to limited surface and well water in the area. Eventually this water shortage forced the ranchers to leave for more hospitable land.

The beginning of the 20th century brought new land uses to the Calabasas region. The area's proximity to the metropolis of Los Angeles made the mountainous region a desirable spot for recreation, filmmaking, and suburban residential development. The area began to grow substantially after 1958, in conjunction with the formation of the Las Virgenes Municipal Water District (LVMWD).

Las Virgenes Creek

Las Virgenes Creek is part of the Malibu Creek watershed. As shown in Figure 2.1, the creek begins in the undeveloped area of Ventura County and extends south to join Liberty Canyon Creek just north of Mulholland Highway. The area surrounding Las Virgenes Creek developed slowly during the 20th century. Due to the creation of Malibu Creek State Park (MCSP) and SMMNRA, much of the land is preserved in a natural state.

Las Virgenes Creek is an important area within the Malibu Creek watershed due to passing through MCSP and SMMNRA as it flows into Malibu Creek and eventually the Pacific Ocean. The area has long been desirable for filming and recreation and is deemed a significant national resource area protecting the rare Mediterranean ecosystem and our cultural heritage.



Source: Mountains Restoration Trust, 2002

500 0 500 1000 Feet

Scale: 1 : 6,000; 1 inch = 500 feet

Figure 2.1
Watershed Map
Las Virgenes Creek

GIS\1K154\APRS\lasvirgenes_11x17_wshed.apr UTM83mZ11 (T. Huntley) 9/02/03

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In the early 1900s, a group of businessmen acquired land to create Crags Country Club in present-day MCSP. The club employees maintained a farm on the property and added recreational activities. By 1941, the club was closed and 20th Century Fox began to film movies on the land. In 1946, the studio decided to purchase the property. Numerous films and commercials were filmed in the dramatic scenery until the State of California bought the land in 1974. MSCP was established to restore and preserve the natural beauty of the area, opening to the public in 1976. Two years later, SMMNRA was established through combined efforts of public and private entities.

The area adjacent to the intersection of Ventura Freeway and Las Virgenes Road experienced little land use development until the 1940s. In the 1940s, the area south of the freeway was dotted with agriculture. This area continued to experience limited growth until the 1980s. North of Ventura Freeway, land development occurred earlier, with a few houses established in the 1940s. By the 1970s, the area was developed as a residential subdivision and, throughout the 1980s and 1990s, the area experienced heavy development up to the Ventura County jurisdictional line.

Today, Las Virgenes Canyon is a mix of open space and developed land. Most of the development is residential with limited commercial development near the Ventura Freeway. Unlike Dry Canyon or McCoy Creeks, most of Las Virgenes Creek flows in its natural state from the Simi Mountains to Malibu Creek.

Dry Canyon Creek

Dry Canyon Creek is part of the Los Angeles River watershed. As shown in Figure 2.2, Dry Canyon Creek begins in the Calabasas Highlands area, flows parallel to Mulholland Drive, then north along Old Topanga Canyon Road to the confluence with Calabasas Creek. Dry Canyon Creek and its surroundings have been highly impacted by large residential developments since the start of the 20th century although there are numerous patches of open space spotting the canyon. Dry Canyon Creek's tributary along Old Topanga Canyon Road maintains its rural character.

At the turn of the 20th century, most of the land surrounding the northern end of Dry Canyon Creek was agricultural. Harry Warner of Warner Brothers Pictures owned a large parcel on the eastern side of Calabasas. In 1921, he donated a portion of his estate to the newly founded Motion Picture and Television Fund (MPTF).

In the 1920s, the first residential subdivision in Calabasas was built in the mountains just east of Dry Canyon Creek. William Lingenbrick and C. Henry Taylor purchased 140 acres of land to build an artists' colony for the large number of movie directors, writers, sculptors, and architects in the region. In 1931, the development was named "Park Moderne." The area still exists today, located behind Calabasas High School.

Even with the new development, the predominant land uses around Dry Canyon Creek continued to be agriculture and open space until post-World War II. After the war, Edison Company envisioned building a large residential development with the atmosphere of a country club. Calabasas Park was created from their vision. The first section was built near Dry Canyon Creek in the 1960s and included the creation of artificial Lake Calabasas.

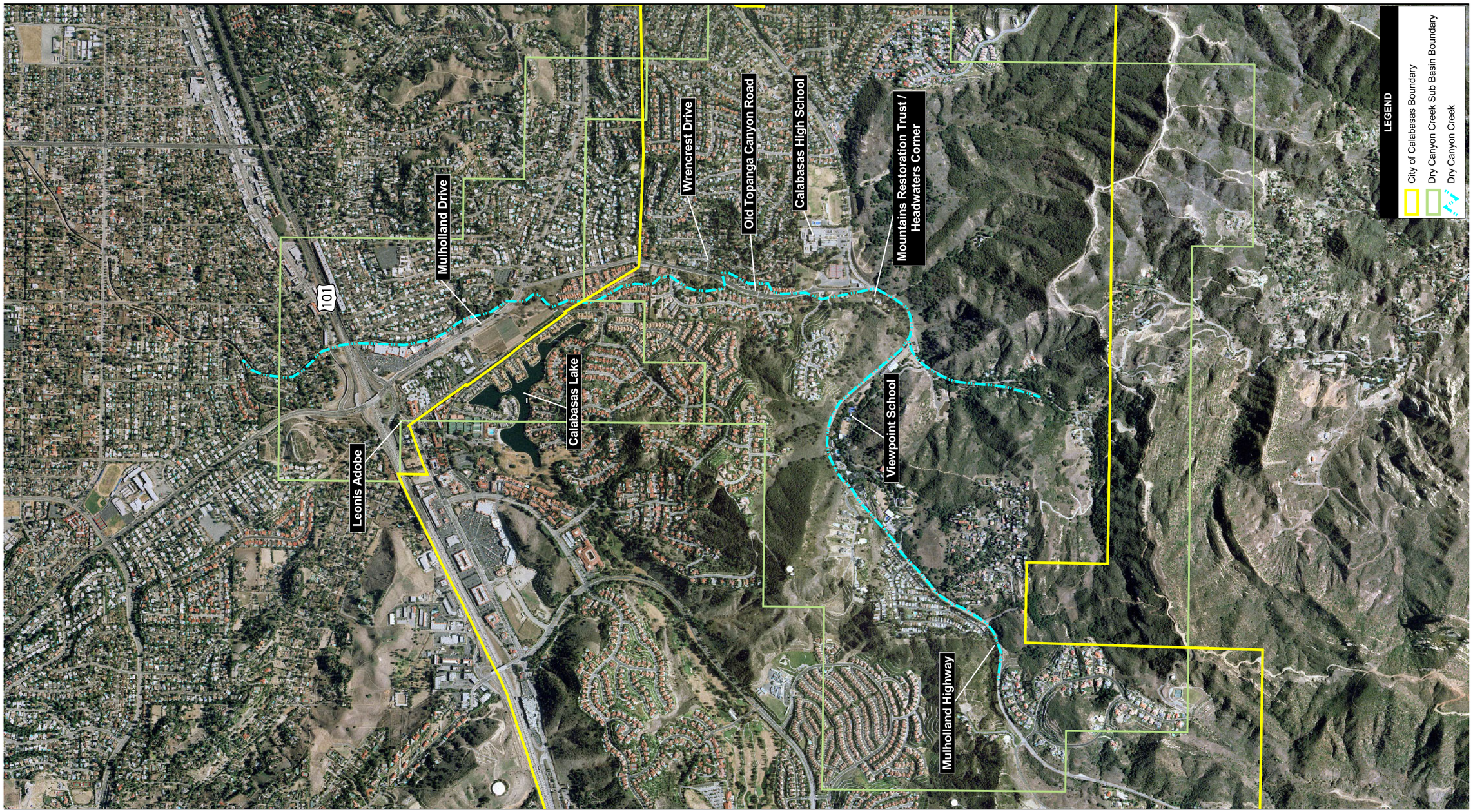
The growth of large housing developments in Calabasas made it necessary to increase the number of roads in the area. New roads for the housing developments were built and, starting in 1955, Ventura Boulevard, which ran close to the original El Camino Real, was upgraded to become the Ventura Freeway (Highway 101).

By the 1970s, agricultural land had mostly disappeared from east Calabasas. Moreover, the eastern region was considered fully built out by the late 1980s. Today Dry Canyon is suburban with a mix of multiple-family and single-family residences in the northern area and rural residential housing in the mountainous southern region. Due to roadway and residential development, most of Dry Canyon Creek runs through private property and in some areas in underground pipes.

McCoy Creek

McCoy Creek is also part of the Los Angeles River watershed. As shown in Figure 2.3, McCoy Creek flows from within the New Millennium housing development, parallel to Parkway Calabasas, continues in a northeast direction, past Calabasas Lake, past Leonis Adobe, and into the Calabasas Creek. McCoy Creek and the adjacent area were greatly impacted by large suburban housing developments after World War II. While most of the natural landscape has been altered, some of the cultural resources were saved from demolition and preserved.

The famous Leonis Adobe is located near the intersection of the Ventura Freeway and Mulholland Drive. The adobe was built in 1844, by an unknown person. Miguel Leonis and his wife Espiritu lived in the house together for 10 years until his death in 1889. Their son Juan



Source: Mountains Restoration Trust, 2002

500 0 500 1000 Feet

Scale: 1 : 6,000; 1 inch = 500 feet

Figure 2.2
Watershed Map
Dry Canyon Creek

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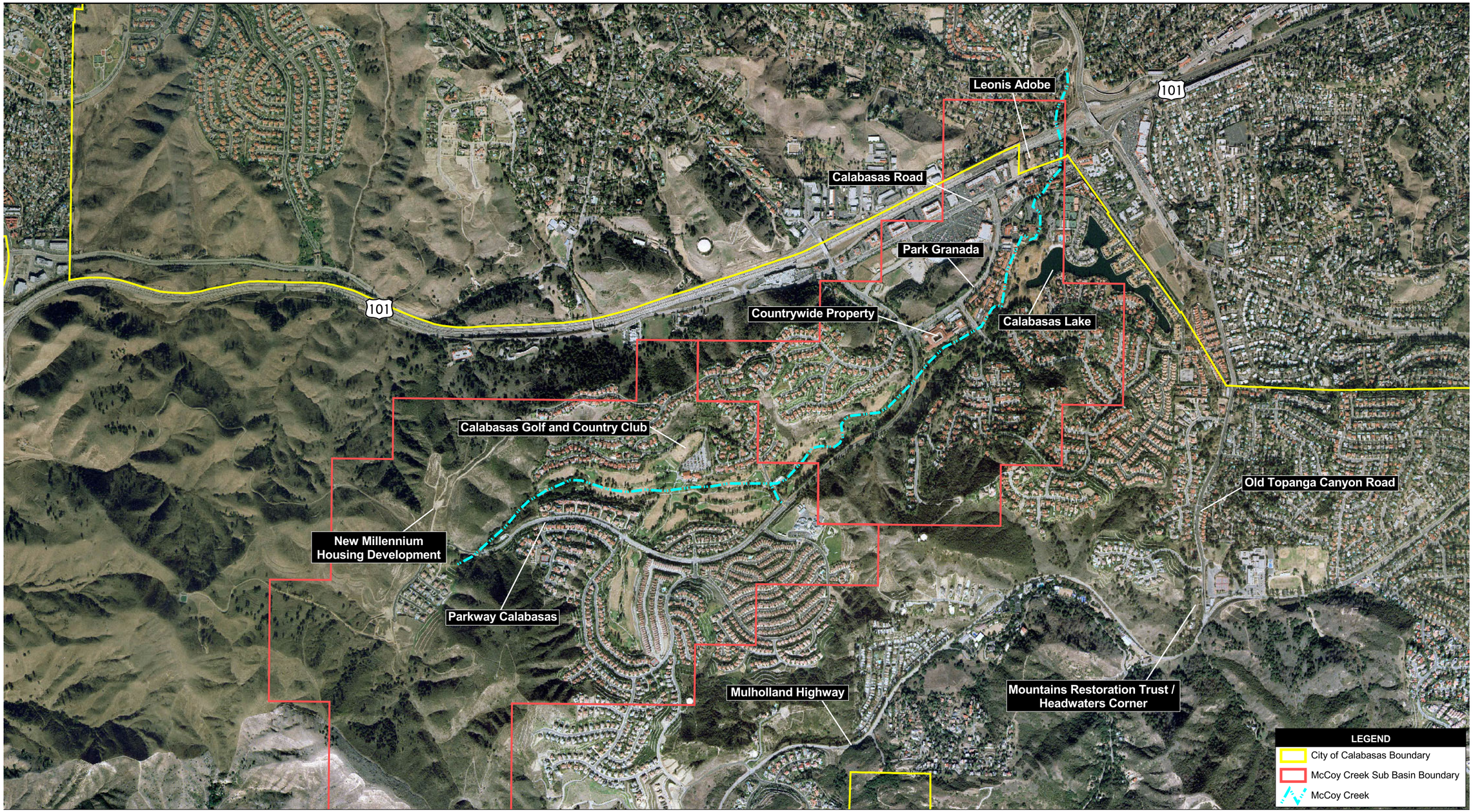

Source: Mountains Restoration Trust, 2002

NORTH

500 0 500 Feet

Scale: 1 : 6,000; 1 inch = 500 feet

Figure 2.3
Watershed Map
McCoy Creek

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Mendez inherited the ranch and adobe after Espiritu's death in 1906. Over the next 15 years, Mendez sold pieces of the ranch. He sold the last parcel in 1921.

From the 1920s to the end of World War II, McCoy Canyon was characterized by a few mountain homes and open space. With the creation of Calabasas Park in the 1960s, McCoy Canyon was forever changed. As part of its country club residential vision, Edison Company built a Tennis and Swim Club near the Leonis Adobe and continued residential build-out of McCoy Canyon. Near the top of the canyon, the Calabasas Golf and Country Club was built, surrounded by large rural residential houses.

The creation of Calabasas Park increased development pressures in the Canyon. Leonis Adobe was almost demolished in the early 1960s, when Kathy Beachy purchased it in 1963. In 1975, Leonis Adobe was listed on the National Register of Historic Places. Preserving Leonis Adobe was the start of restoring Old Town Calabasas and its history. The Plummer House, once the oldest house in West Hollywood, was moved adjacent to the adobe in 1983. With the adobe saved and the addition and restoration of other historic buildings, the area opened as Old Town Calabasas in 1998 (Leonis 2002; City of Calabasas 1994).

Today, McCoy Canyon is characterized by gated, large, single-family homes and the golf course. Old Town is preserved and the Leonis Adobe and Plummer House are museums. Connecting Old Town to the residential areas of McCoy Canyon is Parkway Calabasas. It is a fully improved four-lane roadway, which follows adjacent to McCoy Creek. During the land development, McCoy Creek was rerouted down the mountains with sections now underground.

2.1.2 Current Land Use

Current land use within the City is outlined within the City's General Plan (Figure 2.4). As stated, the Calabasas General Plan is intended to be a "constitution" for local decision makers. The General Plan addresses immediate, mid-, and long-term issues concerning environmental sensitivity and preservation needs, public services, the economic vitality of the community, and environmental constraints. Land use and policy determinations can thus be made within a comprehensive framework that incorporates public health, safety, and "quality of life" considerations in a manner that recognizes the resource limitations and the fragility of the community's natural environment.

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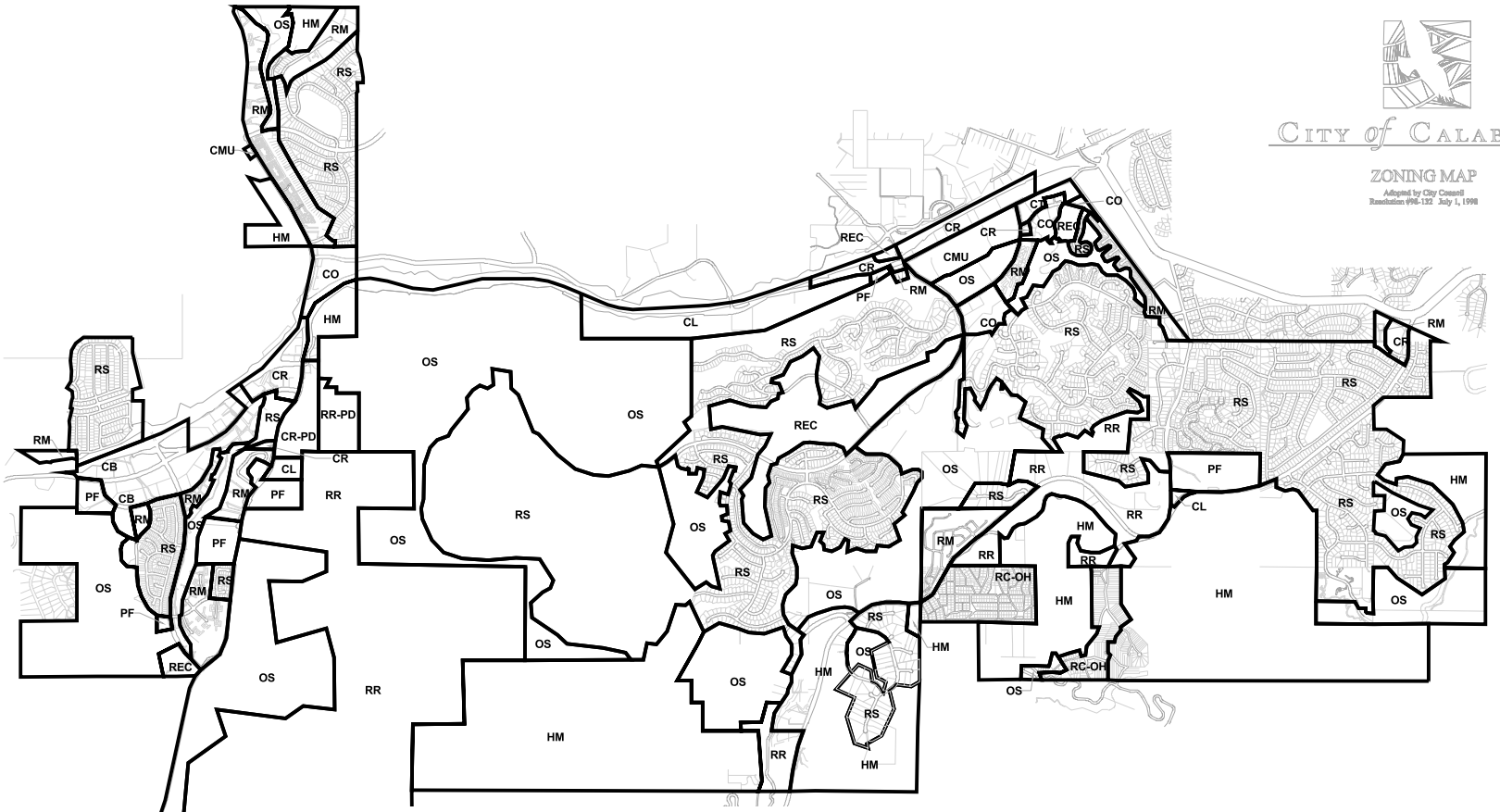


Source: City of Calabasas

Figure 2.4
Current Land Use/ Zoning Map

The Calabasas area has continued to develop from historic times to present. This continued development is represented by a decrease in open space and increase in the urban area within the study area (Table 2.1).

Table 2.1. Land Use Within the Study Area

Watershed	Open Space Area (acres)	Urban Area (acres)	Agricultural Area (acres)
Las Virgenes Creek	10,281	1,325	101
Dry Canyon Creek	2,082	909	0
McCoy Creek	1,339	383	0

Las Virgenes Creek

Narrow stretches of land designated as Open Space (OS) are located along the eastern bank of Las Virgenes Creek near the northern City boundary and along the east side adjacent to Lost Hills Road continuing along both banks southeast toward Agoura Road. Both areas are positioned between various residential uses. In addition, much of the City's land to the east of, but not adjacent to, the southernmost reaches of Las Virgenes Creek is designated for OS use. The purpose of lands with this designation is to protect public health and safety, preserve sensitive environmental resources, or manage resources.

A small area southwest of the intersection of Lost Hills Road and Las Virgenes Road has been designated as Public Facilities (PF). This designation is assigned to land held by public agencies for the primary purpose of providing active and passive recreational opportunities. The land adjacent to Las Virgenes Creek is currently being used or is designated for residential, and commercial uses.

All lands located within 500 feet of Las Virgenes Road are within the viewshed designated by the Scenic Corridor overlay zone. All development and proposed land use within this zoning district require a special land use permit and must include elements that ensure enhancement and beautification of the scenic corridor.

According to City Public Works personnel all housing and commercial areas in the watershed are connected to a sanitary sewer system. The wastewater generated by these uses are pumped to and treated by the Las Virgenes Municipal Water District.

Dry Canyon Creek

Near the northern border of Calabasas, Dry Canyon Creek is flanked on each side primarily by residential uses. As the creek winds northeast along Mulholland Highway, it is bordered by a mix of residential uses and lands designated Hillside-Mountainous (HM). HM lands have a Maximum Land Use Intensity of one dwelling unit per 10 acres, or one dwelling unit per existing lot, whichever is greater. Because of physical constraints and safety issues on certain properties, some parcels cannot be built upon.

East and west of the intersection of Dry Canyon Cold Creek Road and Mulholland Highway, the north bank of the creek is adjacent to land designated as OS. Separated from this area by a small residential use is a second OS designation, which borders the creek for a short distance. The opposite bank of the creek in this area is bordered by HM lands.

All lands located within 500 feet of Mulholland Highway are within the Scenic Corridor overlay zone. Within the viewshed, all development and proposed land use require a special land use permit and must include elements that ensure enhancement and beautification of the scenic corridor.

According to City Public Works personnel there is an unknown number of active septic systems, possibly approximately 50, within the watershed. There is no information currently available as far as location or condition of these systems. All other housing and commercial uses within the watershed are connected to the sanitary sewer system.

McCoy Creek

The area northwest of the golf course along McCoy Creek, designated as open space on the land use and zoning maps, is now undergoing major development based on the review of the aerial photograph. The development in this area is known as New Millennium development.

McCoy Creek is primarily surrounded by commercial and residential land designations. A long segment of the stream flows through lands designated as OS and occupied by a golf course. A small segment of the creek located near the northern City border is adjacent to the OS land designation that includes Lake Calabasas.

According to City Public Works personnel all housing and commercial areas in the watershed are connected to a sanitary sewer system. The wastewater generated by these uses are pumped to and treated by the Las Virgenes Municipal Water District.

2.1.3 Future Land Use

Future land use is difficult to determine at this time and will depend on the actions of the City Council as well as actions taken by adjoining jurisdictions. Land use is governed by the City General Plan; however, this plan can be changed, updated, and amended at different times to allow for changes in future land use. In the Las Virgenes Creek watershed, land use is not only governed by the City, but also by Ventura County, Los Angeles County, and the City of Agoura Hills. In the Dry Canyon and McCoy Creek watersheds, land use is governed by both Calabasas and the City of Los Angeles.

It can be expected that the area in and around Calabasas will continue to develop with the resulting increase in impervious area within the watersheds. This increase in impervious area will increase runoff quantity and velocity unless controls are mandated on all new development with the watersheds. However, all of the contributing municipalities are subject to NPDES Permit regulations and do impose strict urban storm water mitigation requirements on all new developments. NPDES development planning regulations focus on minimizing impervious surfaces, implementing peak flow controls, and providing structural pollution prevention devices for filtration of storm water runoff from urban development.

2.2 BIOLOGY

Biological resources within the study area were compiled based on a site visits, and a review of existing environmental documentation for the region. Information reviewed included the California Natural Diversity Data Base (CNDDB) (CDFG 2003) as well as documents pertaining to Malibu Creek State Park, and the Santa Monica Mountains National Recreation Area. The most through information concerning biology in the study area is from studies conducted within Malibu Creek State Park. There was very little existing information specific to the Los Angeles River Watershed, therefore except where specifically noted the species can be expected to occur throughout the study area.

Plant Communities

Based on vegetation surveys of the area, as well as descriptions provided in R.F. Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California*, the plant life of the study area can be divided into six different plant communities, i.e., chaparral, oak woodland and valley oak savanna, riparian woodland, grassland, coastal sage scrub, and fresh water

wetland. These plant communities are briefly described below. In addition, this section provides information on sensitive plant species that have the potential to occur within the study area.

Chaparral

The chaparral plant community covers much of the undisturbed hillside areas north of the Ventura – Los Angeles County line as well as limited areas within the study area. Chaparral consists of a variety of plants that thrive in poor, dry, sandy, rocky soils. In addition, the plant species associated with chaparral have evolved in a landscape that is subject to periodic fires, and hence have developed adaptations to fire that allow for their continued survival or reestablishment following fire. Heavy chaparral cover provides hillside stabilization thereby minimizing erosion, which in turn minimizes sedimentation loading into the creeks. Chaparral species in the study area include, but are not limited to, ceanothus (*Ceanothus* spp.), chamise (*Adenostema fasciculatum*), currant (*Ribes sp*), fuchsia-flowered gooseberry (*Ribes speciosum*), black sage (*Salvia mellifera*), purple sage (*Salvia leucophylla*), holly-leaf cherry (*Prunus ilicifolia*), holly-leaf redberry (*Rhamnus ilicifolia*), laurel sumac (*Malosma laurina*), mountain mahogany (*Cercocarpus betuloides*), poison oak (*Toxicodendron diversilobum*), scrub oak (*Quercus berberidifolia in Jepson*), sugar bush (*Rhus ovata*), and toyon (*Heteromeles arbutifolia*) (McAuley 1996b).

Oak Woodland and Valley Oak Savanna

The oak woodland plant community is dominated by coast live oaks (*Quercus agrifolia*). In some areas, thick oak woodland, which also includes elderberry (*Sambucus mexicana*), walnut (*Juglans californica*), laurel sumac, and several herbaceous plants, forms a forest environment. A number of small shrubs and animals live within the protective borders of the oak woodland. Oak woodland communities are considered sensitive because of their scarcity, limited range, and high wildlife value. Valley oaks (*Quercus lobata*) once covered large areas of flatlands forming open savannas, but now only a few isolated stands remain. The valley oak is the largest native oak, and grows in fertile soils. The valley oak woodlands just south of the study area in Malibu Creek State Park, define the southernmost extent of this species' range. This range also extends east into the Dry Canyon Creek watershed. However, within the Dry Canyon Creek watershed the valley oak woodland has been disturbed by increased development in the area.

Riparian Woodland

Riparian communities are situated along stream courses and adjacent stream banks. Most riparian species are restricted to areas of a high water table (e.g., drainages), and require moist,

bare mineral soils for germination and establishment, much like the conditions following periodic flooding (Holland 1986). The riparian woodland plant community consists of plants located along primarily along Las Virgenes Creek, and at a much smaller scale along Dry Canyon Creek. The trees and plants associated with the riparian habitat include sycamore trees (*Platanus racemosa*), cottonwoods (*Populus* spp.), California bay (*Umbellularia californica*), ash (*Fraxinus* spp.), cattail (*Typha latifolia*, and *T. domingensis*), mule fat (*Baccharis salicifolia*), willows (*Salix* spp.), and a variety of flowering plants.

Grasslands

Grasslands consist of low-growing herbaceous species dominated by annual and perennial grasses and forbs. Grazing and cultivation in the Las Virgenes Creek watershed have left very little native grass. The native grasses (e.g., purple needle-grass, *Nassella pulchra*; California brome, *Bromus carinatus*; and blue wildrye, *Elymus glaucus*) that are present are located in the area south of the City in Malibu Creek State Park. Within the park they occur in small, isolated patches, remnants of the former large expanses of native grasses that once characterized the foothills and flatlands. Today, the dominant grasses in the study area are introduced, nonnative grasses (e.g., various bromes, *Bromus* spp.; wild oats, *Avena* spp.; and ryegrasses, *Lolium* spp.). Open fields contain a mix of grasses and flowering plants (McAuley 1996b). Forbs found in the grassland community within the study area include, but are not limited to, California poppy (*Eschscholzia* spp.), tarweed (*Hemizonia* spp.*Madia* spp.), lupines (*Lupinus* spp.), lilies (variety), clover (*Trifolium* spp.), asters (variety), fennel (*Foeniculum vulgare*), and coyote melon (*Cucurbita* spp.) is also found throughout the area.

Coastal Sage Scrub

Coastal sage scrub is one of the major shrub-dominated (scrub) communities within California. This community occurs on xeric sites (i.e., sites that receive only a small amount of moisture) with shallow soils. Sage scrub species are typically drought deciduous plants with shallow root systems. Both of these adaptations allow for the occurrence of sage scrub species on these xeric sites. Coastal sage scrub, which includes buckwheat (*Eriogonum* spp), sages (*Salvia* spp.), yucca (*Yucca whipplei*), foothill needlegrass (*Nasella lepida*), and cacti (various), is considered a sensitive habitat by CDFG (Holland 1986) because this community's relatively few remaining acres supports an extremely high number of sensitive species. Coastal sage scrub is found throughout the study area with a major community in the upper Dry Canyon Creek watershed.

Freshwater Wetland

Freshwater wetland is a community dominated by perennial, emergent monocots (flowering plants that have one seed leaf), which grow in standing fresh water. This plant community can be found in very isolated areas along Las Virgenes and Dry Canyon Creeks as well as near seeps and springs. There is a large wetland dominated by Yerba Mansa (*Anemopsis californicum*) to the east of Las Virgenes Road by the sheep herders' quarters. Freshwater marsh species common in study area include cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), and sedges (*Carex* spp.).

Sensitive Plants

Sensitive plant species are those that are candidates, proposed, or listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or the California Department of Fish and Game (CDFG), and those plants that are considered sensitive species by the California Native Plant Society (CNPS 2001). There are several plant species found within, or in areas adjacent to, Calabasas that are considered to be sensitive. All of these species, and their potential for occurrence within the study area, and within MCSP, are presented in Table 2.2. A total of five sensitive plants occur within the park. Four of these [i.e., Santa Susana tarplant (*Deinandra minthornii)*, marcescent dudleya (*Dudleya cymosa* ssp. *marcescens*), Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*), and Lyon's pentachaeta (*Pentachaeta lyonii*)] are associated with chaparral and coastal scrub habitats. The fifth species is round-leaved filaree (*Erodium macrophyllum*), is associated with clay soils within grasslands and woodlands. Known locations for these five species within the study area are noted in Table 2.2.

Table 2.2. Sensitive Plant Species Known From the MCSP and Calabasas Region

Species	Habit and Habitat	Potential for Occurrence*	CNPS	CDFG	USFWS
Braunton's milkvetch *Astragalus brauntonii*	A perennial herb associated with chaparral, coastal scrub, valley and foothill grasslands, closed-cone coniferous forest, and in carbonate soils of recent burned or disturbed areas. Blooms March-July.	Moderate potential to occur within the MCSP. Suitable habitat is present and the occurrence may have been an isolated accidental one resulting from a storm or flood. No known presence.	1B	--	FE

Species	Habit and Habitat	Potential for Occurrence*	CNPS	CDFG	USFWS
Coulter's saltbrush *Atriplex coulteri*	A perennial herb associated with alkaline and clay soils of coastal dunes, coastal bluff scrub, coastal scrub, and valley and foothill grasslands. Blooms March-October.	Low potential to occur within the study area. Only known population in the region is located west of the park on the coastal bluffs of Point Dume.	1B	--	--
Malibu baccharis *Baccharis malibuensis*	A deciduous shrub found in chaparral, coastal scrub, and cismontane woodlands. Blooms in August.	Moderate potential to occur within the study area. Known populations are found along Las Virgenes Road at the base of Stokes Canyon.	1B	--	--
Plummer's mariposa lily *Calochortus plummerae*	A perennial herb found in granitic substrates of chaparral, coastal sage scrub, cismontane woodland, lower montane coniferous forest, and foothill grasslands. Blooms May-July.	Moderate potential to occur on-site. Suitable habitat occurs throughout the study area.	1B	--	FSC
San Fernando Valley spineflower *Chorizanthe parryi* var. *Fernandina*	An annual herb associated with sandy soils of coastal scrub. Blooms April-June.	Low potential to occur within the study area.	1B	SE	FC
Parry's spineflower *Chorizanthe parryi* var. *parryi*	An annual herb associated with sandy or rocky soils of coastal scrub and chaparral. Blooms April-June.	Low potential to occur on-site.	3	--	--
Santa Susana tarplant *Deinandra minthornii*	A deciduous shrub associated with sandstone soils of chaparral and coastal scrub. Blooms July-November.	Present. This shrub is known to occur within study area. A population has been recorded on Calabasas Peak. Most populations are reported from the Santa Susana Mountains.	1B	SR	--
Blochman's dudleya *Dudleya blochmaniae* ssp. *blochmaniae*	A perennial herb found in clay or serpentine soils of coastal bluff scrub, chaparral, coastal scrub, and valley and foothill grasslands. Blooms April-June.	Moderate potential to occur within the study area.	1B	--	--

Species	Habit and Habitat	Potential for Occurrence*	CNPS	CDFG	USFWS
Santa Monica Mountains dudleya *Dudleya cymosa* ssp. *agourensis*	A perennial herb associated with rocky or volcanic soils of chaparral and cismontane woodlands. Blooms May-June.	Low potential to occur within the study area. Suitable habitat occurs within the MCSP, but the closest known population is located in the Santa Monica Mountains Recreation Area, on Cornel Road.	1B	--	FT
Marcescent dudleya *Dudleya cymosa* ssp. *marcescens*	A perennial herb found in volcanic soils of chaparral habitats. Blooms April-June.	Present. This perennial herb is found in three different locations within MCSP.	1B	SR	FT
Santa Monica Mountains dudleya *Dudleya cymosa* ssp. *ovatifolia*	A perennial herb associated with volcanic soils of chaparral and coastal scrub habitats. Blooms March-June.	Present. This inconspicuous herb occurs within MCSP at the Udell Gorge Natural Preserve.	1B	--	FT
Many-stemmed dudleya *Dudleya multicaulis*	A perennial herb found in clay soils of coastal scrub, chaparral, and valley and foothill grasslands. Blooms April-July.	Low potential to occur on-site. Suitable habitat occurs within the MCSP, but the closest known population is located on the south side of Chatsworth Reservoir.	1B	--	--
Round-leaved filaree *Erodium macrophyllum*	An annual herb associated with clay soils of cismontane woodlands and valley and foothill grasslands. Blooms March-May.	Present. This annual herb has been found within MCSP. The exact location of this plant was not recorded, but is noted to occur within oak woodland habitat within the park.	2	--	--
Lyon's pentachaeta *Pentachaeta lyonii*	An annual herb associated with openings in chaparral, coastal scrub, and valley and foothill grasslands. Blooms March-August.	Present. This annual herb is found just south of the study area, approximately 0.5 mile south of Mulholland Hwy.	1B	SE	FE
Sonoran maiden fern *Thelypteris puberula* var. *sonorensis*	A perennial rhizomatous herb associated with meadows, streams and seeps. Fertile January-September.	Low potential to occur on-site.	2	--	--

* Potential for occurrence is based on California Natural Diversity Data Base (CNDDB) 2002 records, and other documents cited herein.

USFWS: FE = Federally Endangered, FT = Federally Threatened, FSC = Federal Species of Concern.

CDFG: SE = State Endangered, ST = State Threatened, CSC = State Species of Concern, SR = State Rare.

CNPS: 1B = Species considered rare, threatened, or endangered in California and elsewhere.
2 = Species considered rare, threatened, or endangered in California, but more common elsewhere.
3 = Species considered but need more information.

Exotic Non-native Plant Species

Exotic plant species are those plants that arrived in an area through human actions. Exotic plants are considered "invasive weeds" when they colonize natural areas and dominate or displace natural communities. Some potential impacts resulting from exotic plant infestation include (1) alteration of ecosystem processes, such as nutrient cycling, erosion, and fire frequency; (2) suppression of native plant recruitment and growth; (3) reduction of wildlife resources, such as food, cover, and nesting habitat; and (4) potential negative visual impacts in areas of heavy infestation.

Exotic plants that are considered invasive weeds often have several characteristics that enable them to compete successfully with native plants by rapidly becoming established and precluding the growth of the native species. Some invasive weeds have more than one method of reproduction. In particular, they can reproduce vegetatively through the sprouting of stem and root segments, as well as sexually through seed production. Often, invasive weeds reach reproductive maturity quickly and produce large amounts of readily dispersed seeds that remain viable for long periods. In addition, invasive weeds tolerate a wide range of habitat conditions and, in many cases, are favored by repeated disturbance.

One particularly invasive plant species that occurs within the study area is the giant reed (*Arundo donax*). The giant reed, a hydrophyte, grows along lakes, streams, drainages, and other wet sites. It can grow quickly and uses large amounts of water. Giant reed reproduces vegetatively through fragmented stem nodes and rhizomes; therefore, floods and other disturbances break up clumps of individuals, which then float downstream where they root and invade other areas. Many of the occurrences of giant reed occur along Dry Canyon Creek and are located on private property.

Additionally, invasive plants can also be introduced through local landscape practices. The main ornamental landscape plants that crowd into native areas are the Virginia creeper (*Parthenocissus* spp.), Periwinkle (*Vinca major*), and Eucalyptus. These invasive plants can be found throughout the study area.

Animal Communities

The diversity of habitat types found within the study area provide habitat for a variety of animals. The natural setting of Malibu Creek State Park and Ventura County are home to a number of sensitive, threatened, and endangered species, as determined by the USFWS and/or

the CDFG. The following section provides an overview of general wildlife and associated habitats that occur within and adjacent to the study area.

Aquatic Life

Aquatic life consists of a variety of fish and invertebrates that occur within the waters of the drainages and impoundments throughout the study area. The one native fish currently associated with the Las Virgenes Creek watershed is the arroyo chub (*Gila orcutti*). Historically, two additional native fish were found in Las Virgenes Creek, the southern steelhead (*Oncorhynchus myskiss*) and the Pacific lamprey (*Lampetra tridentate*). The crayfish (*Astacus fluviatilis*), an exotic aquatic invertebrate, is known to inhabit Las Virgenes Creek (Appendix B).

Dry Canyon and McCoy Creek, being located at the top of the watershed, and subject to the potential of dry channels in the summer, do not have any native fish currently associated with them. However, based on the field assessment there is a potential for reintroduction of native fish, but further water quality and quantity studies should be undertaken before attempting to do so (Appendix B).

Of the seven native fish to have potentially inhabited McCoy and Dry Canyon Creeks, the steelhead, lampreys, and stickleback were the first fish to disappear from the Los Angeles River watershed in the 1940s and 1950s. These species apparently were more sensitive to water quality issues than the dace, chub, and sucker, which lasted longer and still occur in a few places in the Los Angeles River watershed. This indicates that the chubs, sucker, and dace would be the easiest to reestablish in the Calabasas streams although there is still the issue of barriers and long segments of concrete channels to consider. Steelhead are known to survive as freshwater populations upstream of barriers to the ocean provided water quality and water quantity are adequate.

Amphibians

The transitional area at the interface between the water in the study area and the riparian and upland habitats supports a variety of amphibians, including the California newt (*Taricha tarosa*), Pacific treefrog (*Pseudacris regilla*), California treefrog (*Pseudacris cadaverina*), and California toad (*Bufo boreas halophilus*). Amphibians are typically associated with mesic areas along streams, or under leaf litter and other objects where moisture is present. Within the study area these conditions are associated with the riparian and oak woodlands, and freshwater wetland

habitats that occur primarily along Las Virgenes Creek, and to a lesser extent Dry Canyon Creek.

Reptiles

Several reptile species are known to occur within the study area, including the southwestern pond turtle (*Clemmys marmorata pallida*), San Diego horned lizard (*Phrynosoma coronatum blainvillei*), coastal western whiptail (*Cnemidophorus tigris multiscutatus*), San Bernardino ringneck snake (*Diadophis punctatus modestus*), San Diego mountain kingsnake (*Lampropeltus zonata pulchra*), and coastal rosy boa (*Lichanura trivirgata roseofusca*). The pond turtle prefers permanent streams or ponded areas, typically associated with riparian woodlands and freshwater wetlands within all three creeks. The horned lizard, western whiptail, and ringneck snake are often found in coastal sage scrub and chaparral habitats. The rosy boa also prefers to inhabit sage scrub and chaparral but is strongly associated with streams in proximity to these communities. The kingsnake is often found in riparian and oak woodland settings.

Birds

The broad and diverse vegetation communities, topography, hydrology, and geology combine to provide a variety of habitats for several resident and migratory bird species within the study area. In particular, the riparian woodland, freshwater wetland, and aquatic habitats attract migratory birds by providing valuable resources for nesting, foraging, and protective cover. Bird species typically associated with the riparian and oak woodlands within the study area include Cooper's hawk (*Accipiter cooperi*), black phoebe (*Sayornis nigricans*), phainopepla (*phainopepla nitens*), and Nuttall's woodpecker (*Picoides nuttallii*). The upland coastal sage scrub, chaparral, and grassland habitats within the study area support species such as wrentit (*Chamaea fasciata*), lesser goldfinch (*Carduelis psaltria*), and bushtit (*Psaltriparus minimus*).

Mammals

Development in the study area has destroyed a great deal of natural habitat, limiting animals to pockets of land in which they can survive. These areas are located primarily in Malibu Creek State Park and in Ventura County and provides ideal habitat for many mammals, which flourish in an area untouched by development. Typical large mammals that have potential in the study area include the nonnative red fox (*Vulpes vulpes*), the native gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), bobcat (*Felis rufus*), and mountain lion (*Felis concolor*). These mammals roam the hillsides and feed on

rodents, small mammals, berries, amphibians, and reptiles. Large mammals typically use a variety of vegetation communities, including riparian and oak woodlands for cover, grassland and scrub vegetation for forage, and marsh and aquatic communities as sources of water. Small mammals in the study area include Botta's pocket gopher (*Thomomys bottae*), bats (including *Myotis* spp. and *Tadarida* spp.), brush rabbit (*Sylvilagus bachmani*), California ground squirrel (*Spermophilus beecheyi*), raccoon (*Procyon lotor*), mice (including *Peromyscus* spp. and *Reithrodontomys* sp.), woodrats (*Neotoma* spp.), ring tail cat (*Bassariscus astutus*) and others. Small mammals are associated with a wide range of habitats, including the coastal sage scrub, chaparral, grassland, and riparian communities.

Sensitive Animals

Sensitive wildlife are those animal species that are candidates, proposed, or listed as threatened or endangered by the USFWS or CDFG, and those animals that are considered species of concern or are listed as protected or fully protected by the state (CDFG 2003). Additionally, raptors protected under the federal Bald Eagle Protection Act are also considered sensitive species. The USFWS had maintained "Category 2" (C2) and "Category 3" (C3) species candidate lists, which had the similar function as the state lists for species of concern. However, USFWS has since discontinued the recognition of that term and has dropped the C2 and C3 candidate designations in 1995. CDFG has designated all former C2 and C3 species as "federal species of concern." This is a state designation and does not confer any federal protection or status. There are several fish, amphibian, reptile, bird, and mammal species found within, or in areas adjacent to, the study area that are considered to be sensitive, as well as other sensitive species whose distributional range and habitats coincide with the study area. All of these species, and their potential for occurrence within the study area, are presented in Table 2.3.

One sensitive fish species, the arroyo chub, is known to inhabit Las Virgenes Creek. The arroyo chub is considered a species of concern by the CDFG. Historically, the southern steelhead trout, inhabited Las Virgenes Creek, and is listed by the USFWS as endangered, and the CDFG considers both as species of concern. Northern San Diego County represents the present-day southern limit of steelhead distribution in California. The Malibu Creek Watershed steelhead represent an especially important resource, the last of a local race that has survived in the hot, dry climate of Southern California (Appendix B).

Table 2.3. Sensitive Animal Species Known from Malibu Creek State Park or Within the Study Area

Species	Habitat	Potential for Occurrence*	CDFG	USFWS
Fish				
Arroyo chub *Gila orcutti*	Slow-moving streams with mud or sand bottoms.	Known from Las Virgenes Creek	CSC	--
Southern steelhead *Oncorhynchus mykiss irideus*	Stream habitat with riffles on coarse gravel or sand is required for spawning.	Known from Malibu Creek, from Rindge Dam to the ocean but currently blocked from returning to Las Virgenes Creek by Rindge Dam.	CSC	FE
Amphibians				
Arroyo toad *Bufo californicus*	Breeds in shallow, slow-moving intermittent streams on sand or cobble substrate; over-winters in adjacent uplands.	Low potential to occur within the study area along ephemeral or intermittent streams.	CSC	FE
Red-legged frog *Rana aurora draytonii*	Frequents marshes, slow parts of streams, lakes, reservoirs, ponds, and other usually permanent water sources.	Low potential to occur within the study area, in areas of permanent surface water north of the Ventura County line.	CSC	FT
Reptiles				
Southwestern pond turtle *Clemmys marmorata pallida*	Permanent or near permanent bodies of water associated with marsh and riparian vegetation.	Known from several locations along all three creeks	CSC	--
San Diego horned lizard *Phrynosoma coronatum blainvillei*	Frequents a variety of habitats from sage scrub and chaparral to coniferous and broadleaf woodlands; often found on sandy or friable soils with open scrub.	Known from the study area south to Tapia Park.	CSC	--
California horned lizard *Phrynosoma coronatum frontale*	Frequents a variety of habitats from sage scrub and chaparral to coniferous and broadleaf woodlands; often found on sandy or friable soils with open scrub.	High potential to occur within the study area.	CSC	--
Coast patch-nosed snake *Salvadora hexalepis virgultea*	Prefers open coastal sage scrub, chaparral, riparian habitat, grasslands, and agricultural fields with friable or sandy soils.	Moderate potential to occur within study area. Suitable habitat occurs throughout most of the Malibu Creek State Park.	CSC	--
San Diego mountain kingsnake *Lampropeltis zonata pulchra*	Prefers rock outcrops in pine and oak woodlands with moisture present, but can occur in other habitats such as chaparral and wet meadow.	Known from Stunts Ranch and Cold Creek Canyon Preserve. High probability to occur in suitable habitats along all three creeks.	CSC	--

Species	Habitat	Potential for Occurrence*	CDFG	USFWS
Two-striped garter snake *Thamnophis hammondi*	Habitat occurs along streams with rocky beds and permanent freshwater.	High potential to occur within the study area. Known from Malibu Creek State Park.	CSC	--
Birds				
Least bittern *Ixobrychus exilis hesperis*	Fresh and brackish water marshes, usually near open water sources.	Moderate potential to occur in suitable freshwater marsh habitat within the study area.	CSC	--
Cooper's hawk *Accipiter cooperii*	Nests primarily in oak woodlands but occasionally in willows or eucalyptus.	High potential to occur within the woodland and riparian habitats within the study area.	CSC	--
Swainson's hawk *Buteo swainsoni*	Builds relatively fragile nests in shrubs and trees along wetlands and drainages, and in windbreaks in fields and around farmsteads.	Low potential to occur within the study area. Not known to nest in southern California.	CT	--
Golden eagle *Aquila chrysaetos*	Forages in grassy and open scrub habitats; nests primarily on cliffs, with secondary use of large trees.	Known to occur within Malibu Creek State Park.	CSC	BEPA
Southwestern willow flycatcher *Empidonax traillii extimus*	Restricted to wide bands of dense riparian woodlands of willow, cottonwood, oak, and other deciduous shrubs and trees.	Low potential to occur within the study area due lack of wide bands of suitable riparian habitat.	CE	FE
California horned lark *Eremophila alpestris actia*	Resident of grasslands and open habitats such as agricultural fields, beaches, and disturbed areas.	Moderate potential to occur in the grasslands in the study area.	CSC	--
Coastal California gnatcatcher *Polioptila californica californica*	Coastal sage scrub habitats, typically on gentle slopes.	High potential to occur within Malibu Creek State Park in suitable areas of coastal sage scrub habitat. Known to occur in the area east of Las Virgenes Road.	CSC	FT
Loggerhead shrike *Lanius ludovicianus*	A variety of habitats, occurring wherever bushes or trees are scattered on open ground.	High probability to occur within the study area, particularly in areas with open vegetation.	CSC	--
Least Bell's vireo *Vireo bellii pusillus*	Restricted to riparian woodland and scrub, particularly in areas with an understory of dense young willows or mulefat with a canopy of tall willows.	Moderate potential to nest within the riparian woodland habitat along Las Virgenes Creek.	CE	FE
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	Prefers grassy or rocky slopes with open scrub, particularly coastal sage scrub.	High probability to occur within the study area throughout the scrub and grassland habitats.	CSC	--

Species	Habitat	Potential for Occurrence*	CDFG	USFWS
Mammals				
San Diego desert woodrat *Neotoma lepida intermedia*	Inhabits a variety of scrub habitats where it constructs large middens, usually consisting of small twigs, cactus pads, and other plant material.	High probability to occur in the study area.	CSC	--

* Potential for occurrence is based on California Natural Diversity Data Base (CNDDB) 2002 records, and other documents cited herein.
USFWS: FE = Federally Endangered, FT = Federally Threatened, BEPA = Bald Eagle Protection Act.
CDFG: CE = State Endangered, CT = State Threatened, CSC = State Species of Concern.

Although no sensitive amphibians are known to occur within the study area, two sensitive amphibian species, the arroyo toad (*Bufo californicus*), and the red-legged frog (*Rana aurora draytonii*) have been documented north of the Ventura County line. The arroyo toad and red-legged frog are federally listed by the USFWS as endangered and is considered a CDFG species of concern.

The southwestern pond turtle, San Diego horned lizard, and San Diego mountain kingsnake are all considered reptile species of concern by the CDFG. The pond turtle is known to occur along all three creeks. The CNDDB also contains a record of the San Diego mountain kingsnake in the Cold Creek Preserve area.

Several of the migrant and resident bird species of the study area are considered sensitive by the federal or state resource agencies. One sensitive species, the golden eagle (*Aquila chrysaetos*), is a CDFG species of concern and is federally protected under the Bald Eagle Protection Act. The coastal California gnatcatcher (*Polioptila californica californica*), listed by the USFWS as threatened, and considered a species of concern by the CDFG, has been documented to the north of Mulholland and east of Las Virgenes Road.

Exotic Non-native Animal Species

The aquatic invertebrate species of biological resource management concern in Las Virgenes are the crayfish and bull frog. Both species have been introduced and prey on native amphibians and fishes. The presence of these species threatens the ecosystem of the Malibu Creek Watershed.

The Virginia opossum (*Didelphis virginiana*) is a nonnative mammal species that was first introduced to northern California in 1910 and has expanded its range down the entire length of

the state. This opportunistic feeder competes with native small mammals for food and other resources.

Wildlife Movement Corridors and Habitat Linkages

A wildlife corridor can be defined as a linear landscape feature of sufficient width and buffer to allow animal movement between two patches of comparatively undisturbed habitat, or between a patch of habitat and some vital resources. Regional corridors are defined as those linking two or more large areas of natural open space. Local corridors are defined as those allowing resident animals to access critical resources (food, cover, and water) in a smaller area that might otherwise be isolated by urban development.

Habitat linkages can be defined as large areas of natural open space that provide connectivity to regional biological resources. These linkages are not narrow corridors through which wildlife species must pass to access critical resources. Instead, habitat linkages are wide enough to allow relatively free movement of wildlife species along multiple paths between resources.

Wildlife corridors and habitat linkages are essential in geographically diverse settings, and especially in urban settings, for the sustenance of healthy and genetically diverse animal communities. At a minimum, they promote colonization of habitat and genetic variability by connecting fragments of like habitat, and they help sustain individual species distributed in and among habitat fragments. Habitat fragments, by definition, are separated by otherwise foreign or inhospitable habitats, such as urban/suburban tracts. Isolation of populations can have many harmful effects and may contribute significantly to local species extinction.

A viable wildlife corridor consists of more than a path between habitat areas. To provide food and cover for transient species as well as resident populations of less mobile animals, a wildlife corridor must also include pockets of vegetation.

Malibu Creek State Park currently serves as a functioning wildlife habitat linkage within the Santa Monica Mountains. The natural open space provides biological resources that attract wildlife from throughout the region by providing protective cover, water, and forage for a variety of species, including the mountain lion, mule deer, and coyote. The park provides direct habitat linkages with other areas of open space.

Malibu Creek State Park is the starting point for local wildlife movement corridor functions within the Santa Monica Mountains and is a potential regional corridor. The vegetated drainages

outside the study area, including Malibu Creek and Liberty Canyon, are natural corridors which provide local routes for a variety of wildlife species to move between resources in Malibu Creek State Park and open space in Ventura County. The southern steelhead is the one notable species that faces difficulty moving through the Malibu Creek corridor. Currently, the southern steelhead can only travel along Malibu Creek from the ocean to Rindge Dam, at which point it cannot continue farther upstream into the tributaries of Malibu Creek such as Las Virgenes Creek.

The upper Dry Canyon watershed serves as a wildlife corridor and linkage between Topanga State Park and the Cold Creek Preserve extending down to Malibu Creek State Park. The upper Dry Canyon watershed also serves as a critical corridor for the open space areas in and around the subdivisions of Calabasas Park to the protected areas of the SMMNRA.

The City also has plans to restore a critical corridor located on Las Virgenes Creek between the Agoura Road bridge and the 101 Freeway. This site will link the Baldwin open space withthe Malibu Creek State Park, while restoring riparian habitat and improving the aesthetics of this creek section adjacent to a new shopping center.

2.3 HYDROLOGY/HYDRAULICS

2.3.1 Existing Conditions

Baseline conditions for Las Virgenes, McCoy, and Dry Canyon Creeks were assessed during field visits performed in January 2003 and a follow-up visit in March. The riparian assessment procedure developed for this project evaluated physical and hydrological properties of stream reaches, presence of plant and animal species, and adjacent vegetation communities and land uses.

Las Virgenes Creek

Las Virgenes Creek crosses the northern boundary of Calabasas flowing south out of undeveloped, gently rolling hills and through a willow forest (Table 2.4). A short segment of incised dirt channel lined with emergent wetland vegetation transitions to a 20-foot wide trapezoidal concrete channel that is flanked by dense residential uses. From Thousand Oaks Boulevard, south to Parkmor Road, the channel flows through a box culvert. Tributary to this reach is a detention basin that drains runoff from a large development to the west and runs east under Las Virgenes Road to the creek. At Parkmor Road, the culvert goes underground and

resurfaces south of the commercial uses northeast of the intersection of Las Virgenes Road and the Ventura Freeway. A tributary that flows west along the north side of the Ventura Freeway joins the creek there.

Table 2.4. Characteristics of Las Virgenes Creek

Reach	Characteristics		
	Physical	Hydrological	Biological
Upstream of City boundary	2:1 bank slope	intermittent	willow forest
City boundary to Parkmor	20 ft concrete trap/box channel	low flow	sparse vegetation (weeds, grasses)
Parkmor to south of Mureau	underground channel	medium flow	None
Eastern tributary north of the 101 Freeway	Concrete channel	medium flow	Willow forest
Las Virgenes Rd to the 101 Freeway	concrete/riprap, gentle slope, braiding	medium flow	willow forest emergent wetlands
101 Freeway to Agoura Rd	50 ft concrete trapezoidal channel	medium flow	willow saplings
Agoura Rd to Las Virgenes Rd	natural bottom, gentle slope, floodplain encroachment	medium flow	willow forest, mulefat scrub, emergent wetlands
Malibu Creek State Park	meandering channel, some incision	medium flow	willow forest, mulefat scrub

The creek passes west under Las Virgenes Road into a stretch of willow forest that extends along the north side of the Ventura Freeway (outside the City's boundaries) approximately 1,500 feet before crossing under the highway to the south. Along this reach, the creek is bordered to the northwest by a small floodplain and disturbed hillside and to the southeast by riprap and concrete stabilizing structures. The natural portion of the channel in this reach is characterized by meanders, riffle/pool complexes, and a gentle slope. In some areas, the banks show signs of instability, and there are bar formations in the channel.

Just south of the Ventura Freeway, Las Virgenes Creek flows through a 50-foot-wide trapezoidal concrete channel for a distance of approximately 300 feet. Sediment deposits on the concrete bottom support some vegetation, including willow saplings. Both sides of the channel are bordered by commercial uses with large asphalt parking lots. The concrete channel ends after passing south under Agoura Road.

South of Agoura Road, Las Virgenes Creek flows approximately 3 miles through dense residential and commercial uses before passing south into MCSP. Throughout this reach, most of the creek maintains a natural soft bottom with small pockets of mulefat scrub, southern willow

scrub, and emergent wetlands combined with primarily willow forest vegetation. Pockets of exotic vegetation such as eucalyptus, tamarisk, and vinca exist along the banks.

While much of the channel in this stretch is characterized by a gentle slope and shallow depth, development encroaches on the creek floodplain, and in several locations cement structures have been installed to stabilize banks or channelize the stream for short distances. In addition, storm water outlets drain into the creek periodically throughout this segment. In some places, restriction of flow has led to channel incision or bank instability.

North of the intersection of Lost Hills Road and Las Virgenes Road, the Resource Conservation District of the Santa Monica Mountains (RCD) has completed the Las Virgenes Creek Stream and Habitat Restoration project, a riparian habitat improvement project. The creek passes under Lost Hills Road through a concrete culvert, then flows adjacent to De Anza Park and into MCSP.

As the creek flows through MCSP, it maintains a fairly natural course due to the lack of development within the floodplains. Las Virgenes Road parallels the creek south about 300 feet from the eastern bank. Throughout this reach, the creek is characterized by a meandering channel incised in some locations due to increased flow from the upper watershed.

Dry Canyon Creek

The upper extent of the Dry Canyon Creek watershed is located in the Calabasas Highlands area and is located parallel to Mulholland Highway, just upstream of the Viewpoint School. In this area, the creek channel supports large willows, and surrounding upland vegetation consists of chaparral and coastal sage scrub (Table 2.5). After emerging from the underground culvert and passing south under Mulholland Highway, the creek bends to the southwest adjacent to Viewpoint School, where the bottom and banks have been stabilized with concrete and rock walls.

Table 2.5. Characteristics of Dry Canyon Creek

Reach	Characteristics		
	Physical	Hydrological	Biological
Top of watershed	natural channel	intermittent	oak woodland
Mountains Restoration Trust/Headwaters Corner	concrete bottom, stone wall stabilizing bank	low flow	disturbed oak woodland
Wrencrest Drive to Park Ora	natural channel, walls constraining floodplain	medium flow	southern willow scrub
Park Ora to City boundary	natural bottom with meanders	medium flow	mature trees

Dry Canyon Creek then passes south of the horse stable southwest of the intersection of Mulholland Highway and Old Topanga Canyon Road where areas of the creek bank have been stabilized with a mixture of rocks and concrete. A wooden bridge also crosses the creek at this location.

Before crossing back under Mulholland Highway to the north, the creek is joined by a tributary that flows north along Old Topanga Road. The tributary flows adjacent to the road collecting runoff from storm water culverts and street flows and is constricted in several locations by driveway culverts. The surrounding vegetation community along this segment is primarily oak woodland.

North of the Mulholland Highway/Old Topanga Canyon Road intersection, Dry Canyon Creek flows through Mountains Restoration Trust property, then along the west side of Old Topanga Canyon Road before passing into an underground culvert south of Palm Drive. The creek travels underground for about 0.5 mile before emerging in a residential area near Wrencrest Drive. As the creek continues to the north, the channel is characterized by a gentle slope, natural bottom, and riparian vegetation. The floodplain in this area is constricted by crib walls that stabilize the adjacent terrace for surrounding residential uses.

The crib wall on the western side of the creek ends near the northern boundary of Calabasas and the floodplain expands into a park area containing mature oak trees. A 12-foot-wide cement ramp descends from Park Paloma above to the west into the creek channel.

North of Calabasas, Dry Canyon Creek crosses into Los Angeles City. The natural channel is then contained in a box culvert that continues under the Ventura Freeway. North of the Ventura Freeway, Dry Canyon Creek joins McCoy Creek to form Calabasas Creek.

McCoy Creek

The top of the McCoy Creek watershed is located in the New Millennium housing development, which is located at the end of Parkway Calabasas. The creek emerges from a cement underground culvert under Parkway Calabasas at the east end of the New Millennium property and flows through an area of native vegetation and natural channel until passing into a golf course, which flanks the creek on both sides for the next 0.6 mile (Table 2.6).

Table 2.6. Characteristics of McCoy Creek

Reach	Characteristics		
	Physical	Hydrological	Biological
New Millennium to golf course	gentle slope – emerges from culvert from community	low flow	riparian oak woodland
Golf course	modified channel, floodplain encroachment	moderate flow	turf grass, ornamentals
Park Capri to the Swim and Tennis Center	natural channel with downcutting, some bank stabilization	moderate flow	oak woodland/turf upland vegetation
Swim & Tennis Center to Calabasas Road	north bank stabilized with cement, check structures in channel	moderate flow	some natives planted on banks

Upstream of the golf course, approximately 175 feet of the creek channel, vegetation is primarily natural, then the bank vegetation transitions to turf grass and ornamentals. The segment flowing through the golf course is restricted at several locations by cart path and road crossings, underground culverts, and bank stabilizing structures. Just west of Park Entrada, the creek is joined from the south by a tributary that crosses under Parkway Calabasas from Bay Laurel School. The confluence is lined with concrete.

McCoy Creek passes under Parkway Calabasas through two box culverts and empties onto the private grounds of Countrywide Financial. Within the Countrywide site, the creek is maintained as a natural park with recreational uses available to employees.

The Countrywide Financial property ends at Park Capri where the creek flows under the road and into the park adjacent to Lake Calabasas. In the western portion of the park the creek is bordered to the north by high-density residential uses. Gabions stabilize the north bank along some of this stretch. The southern bank is natural and contains oak woodland vegetation that transitions to turf grass closer to the lake. A concrete lake overflow structure drains into the creek south of the Calabasas Tennis and Swim Center. Downstream of the overflow, concrete has been used to stabilize the east and west banks of the creek.

Near the northern boundary of Calabasas, the creek channel has been stabilized with riprap and check structures before it crosses under Calabasas Road in Old Town Calabasas. On the north side of Calabasas Road, the creek crosses under the Ventura Freeway to join Dry Canyon Creek and form Calabasas Creek.

2.4 WATER QUALITY

2.4.1 Regulatory Setting for Water Quality

The RWQCB-LA adopted the Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (The Basin Plan) in 1994 for the purpose of preserving and enhancing water quality and protecting designated beneficial uses of all regional waters. The Basin Plan incorporates all applicable state and Regional Board plans and policies and other pertinent water quality policies and regulations. The Basin Plan also defines beneficial uses of surface waters and identifies the potential, existing, and intermittent beneficial uses of each waterbody within the region. Additionally, the Basin Plan identifies Water Quality Objectives for inland surface waters within the region.

Waterbodies that do not or are not expected to attain the Water Quality Objectives are identified on the 303(d) list of impaired surface waters within the Los Angeles Region. Each pollutant that contributes to the impairment of a beneficial use of the waterbody is listed, and a TMDL for each is developed and implemented.

2.4.1.1 Beneficial Uses

The three major streams within Calabasas, McCoy Creek, Dry Canyon Creek, and Las Virgenes Creek, drain into two different watersheds: Malibu Creek and the Los Angeles River. These waters share a number of existing, intermittent or potential beneficial uses, which include:

- Municipal and Domestic Supply (MUN) – Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- Water Contact Recreation (REC-1) – Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or bathing in natural hot springs.
- Noncontact Water Recreation (REC-2) – Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

- Warm Freshwater Habitat (WARM) – Uses of water that support warm water ecosystems including, but not limited to, preservation of enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- Wildlife Habitat (WILD) – Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

McCoy Canyon Creek and Dry Canyon Creek also share the following intermittent uses:

- Ground Water Recharge (GWR) – Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

Las Virgenes Creek has the following additional existing or potential beneficial uses:

- Cold Freshwater Habitat (COLD) – Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- Rare, Threatened, or Endangered Species (RARE) – Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.
- Migration of Aquatic Organisms (MIGR) – Uses of water that support habitats necessary for migration, acclimatization between freshwater and saltwater, or other temporary activities by aquatic organisms, such as anadromous fish.
- Spawning, Reproduction, and/or Early Development (SPWN) – Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
- Wetland Habitat (WET) – Uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions that enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.

2.4.1.2 Water Quality Objectives

The Basin Plan outlines the water quality objectives that are used in conjunction with beneficial uses to act as water quality standards. When the water quality standards are exceeded then there is the potential for enactment of a TMDL (see Section 2.4.1.3).

Narrative or numerical water quality objectives have been developed for numerous parameters and apply to all inland surface waters in the region.

Ammonia

The neutral, un-ionized ammonia species (NH3) is highly toxic to fish and other aquatic life. The ratio of toxic NH3 to total ammonia (NH4 + NH3) is primarily a function of pH, but it is also affected by temperature and other factors. Additional impacts can also occur as the oxidation of ammonia lowers the dissolved oxygen content of the water, further stressing aquatic organisms. Ammonia also combines with chlorine to form chloramines – persistent toxic compounds that extend the effects of ammonia and chlorine downstream. When ammonia oxidizes, it forms nitrates.

Bacteria, Coliform

Total and fecal coliform bacteria are used to indicate the likelihood of pathogenic bacteria in surface waters. Water quality objectives for total and fecal coliform bacteria vary with the beneficial uses of the water body. In waters designated for water contact recreation (REC-1), the fecal coliform bacteria concentration shall not exceed a log mean of 200/100 milliliters (ml) (based on a minimum of not less that four samples for any 30-day period), nor shall more than 10% of samples collected during any 30-day period exceed 4000/100 ml.

Biological Oxygen Demand (BOD)

The 5-day BOD test indirectly measures the amount of degradable organic material in water by measuring the residual dissolved oxygen after a period of incubation (usually 5 days at 20 degrees Centigrade [ºC]), and is primarily used as an indication of efficiency of wastewater treatment processes. The Basin Plan states that waters shall be free of substances that result in increases in the BOD that adversely affect beneficial uses.

Exotic Vegetation

Exotic (nonnative) vegetation introduced in and around streams is often of little value as habitat for aquatic-dependant biota. Exotic plants can quickly out compete native vegetation and cause other water quality impairments.

Floating Material

Floating materials can be an aesthetic nuisance as well as provide substrate for undesirable bacterial and algal growth and insect vectors. The Basin Plan states that waters shall not contain floating materials, including solids, liquids, foams, and scum in concentrations that cause a nuisance or adversely affect beneficial uses.

Mineral Quality

Mineral quality in natural waters is largely determined by the mineral assemblage of soils and rocks and faults near the land surface. Point and nonpoint source discharges of poor quality can degrade the mineral content of natural waters. High levels of dissolved solids render waters useless for many beneficial uses. For the Malibu Creek Watershed the objectives are total dissolved solids (TDS) 2,000 mg/l, sulfate 500 mg/l, chloride 500 mg/l, and nitrogen 10 mg/l.

Nitrogen (Nitrate, Nitrite)

Excess nitrogen in surface waters can lead to excess aquatic growth and can contribute to elevated levels of NO3 in groundwater. Waters shall not exceed 10 mg/l nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO3-N + NO2-N), 45 mg/l as nitrate (NO3), 10 mg/l as nitrate-nitrogen (NO3-N) or 1 mg/l as nitrite-nitrogen (NO2-N).

Oil and Grease

Oil and grease are not readily soluble in water and form a film on the water surface. Oily films can coat birds and aquatic organisms, impacting respiration and thermal regulation, and cause death. Oil and grease can also cause nuisance conditions (odors), are aesthetically unpleasant, and can restrict a wide range of beneficial uses.

Dissolved Oxygen (DO)

Adequate DO levels are required to support aquatic life. Depression of DO can lead to anaerobic conditions resulting in odors, or in extreme cases, in fish kills. As a minimum, the mean annual DO concentration of all waters shall be greater than 7 milligrams per liter (mg/l), and no single determination shall be less than 5.0 mg/l, except when natural conditions cause lesser concentrations.

pH

The hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. While a pH of "pure" water at 25ºC is 7.0, the pH of natural waters is usually slightly basic due to the solubility of carbon dioxide from the atmosphere. Minor changes from natural conditions can harm aquatic life.

Solid, Suspended, or Settleable Materials

Surface waters carry various amounts of suspended and settleable materials from both natural and human sources. Suspended sediments limit the passage of sunlight into waters, which in turn inhibits growth of aquatic plants. Excessive deposition of sediments can destroy spawning habitat, blanket benthic organisms, and abrade the gills of larval fish. Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.

Turbidity

Turbidity is an expression of the optical property that causes light to be scattered in water due to particulate matter such as clay, silt, organic matter, and microscopic organisms. Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in natural turbidity attributable to controllable water quality factors shall not exceed an increase of 20% when the natural turbidity is 0 to 50 nephelometric turbidity units (NTUs).

Wetland Objectives

In addition to the regional objectives for inland surface waters (including wetlands), the following objectives apply for the protection of wetlands in the region.

Hydrology

Natural hydrologic conditions necessary to support the physical, chemical, and biological characteristics present in wetlands shall be protected to prevent significant adverse effects on:

- Natural temperature, pH, DO, and other natural physical/chemical conditions;
- Movement of aquatic fauna;
- Survival and reproduction of aquatic flora and fauna; and
- Water levels.

Habitat

Existing habitats and associated populations of wetland fauna and flora shall be maintained by:

- Maintaining substrate characteristics necessary to support flora and fauna that would be present naturally,
- Protecting food supplies for fish and wildlife,
- Protecting reproductive and nursery areas, and
- Protecting wildlife corridors.

2.4.1.3 Storm Water Requirements

Discharge and runoff into inland surface and ocean waters in the Los Angeles Region are controlled by a number of quality standards and implementation plans. These include permitting and waste discharge requirement programs that address point source pollutants as well as storm water and nonpoint source programs that address urban runoff. The City of Calabasas is subject to the urban runoff requirements described in Order No. 01-182, NPDES Permit No. CAS004001 – Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Incorporated Cities Therein, Except the City of Long Beach, which was issued by the RWQCB-LA, in 2001. Permittees include the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cites within the Los Angeles County Flood Control District. The Regional Board finds in the permit that the Permittees' proposed Storm Water Quality Management Plan (SQMP) incorporating the

additional and/or revised provisions contained in the Order would meet the minimum requirements of federal regulations.

The objective of the order is to protect the beneficial uses of receiving waters in Los Angeles County. To accomplish this, permittees are required to:

- Ensure that the discharge of non-storm water to the municipal separate storm sewer system (MS4) has been effectively prohibited except in specified allowable instances.
- Ensure that storm water discharges from the MS4 neither cause nor contribute to the exceedance of water quality standards and objectives, nor create conditions of nuisance in the receiving waters.
- Specify BMPs in the SQMP that will be implemented to reduce the discharge of pollutants in storm water to the maximum extent practicable (MEP).
- Coordinate with the Principal Permittee (the Los Angeles County Flood Control District) to implement a Public Information and Participation Program (PIPP).
- Implement programs to minimize storm water pollution impacts from industrial and commercial facilities, development and redevelopment projects, construction sites, and public agencies.
- Eliminate all illicit connections and illicit discharges to the storm drain system.

Total Maximum Daily Loads

Under section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These impaired waters do not meet water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop Total Maximum Daily Loads (TMDLs) for these waters.

A TMDL specifies the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and allocates pollutant loadings among point and nonpoint pollutant sources. By law, EPA must approve or disapprove lists and TMDLs established by states, territories, and authorized tribes. If a state, territory, or authorized tribe submission is inadequate, EPA must establish the list or the TMDL. EPA issued regulations in 1985 and 1992 that implement section 303(d) of the Clean Water Act - the TMDL provisions.

In February 2003, the RWQCB-LA approved the 2002 Clean Water Act Section 303(d) list of impaired waterbodies, which identifies seven pollutants for Las Virgenes Creek, including high coliform count, nutrients (algae), organic enrichment/low dissolved oxygen, scum/foam-unnatural, sedimentation/siltation selenium, and trash.

The EPA is developing TMDLs in 2003 for coliform count and nutrients in Malibu Creek, which are scheduled to be adopted by the RWQCB-LA within a year. A trash TMDL is expected to be developed for the Malibu Creek watershed by 2004 (Table 2.7).

Table 2.7. TMDLs for Las Virgenes, McCoy, and Dry Canyon Creeks

Creek	303(d) Listing	TMDL Schedule	EPA Priority
Las Virgenes	High coliform count	2003 (draft under review)	High
	Nutrients (algae)	2003	High
	Organic enrichment/low dissolved oxygen	2002 (but not completed yet)	High
	Scum/foam-unnatural	2002 (but not completed yet)	High
	Sedimentation/siltation	No date	Low
	Selenium	2004	High
	Trash	2004	Medium
McCoy	Fecal coliform	Not specified	Low
	Nitrate	Not specified	Low
	Nitrate as nitrogen	Not specified	Low
	Selenium, total	Not specified	Low
Dry Canyon	Fecal coliform	Not specified	Low
	Selenium, total	Not specified	Low

McCoy Creek and Dry Canyon Creek were both identified on the 2002 impaired water body list (303(d) list). Both drainages have been identified as impaired for fecal coliform and total selenium, which can impact warm freshwater and wildlife habitat beneficial uses. In addition, McCoy Creek has been listed as impaired for nitrate, and nitrate as nitrogen, which can impact groundwater recharge beneficial uses.

2.4.1.4 Pollutant Sources

The NPDES Permit No. CAS004001 identifies development and urbanization as causing an increase in pollutant load, volume, and discharge velocity due to two main factors: conversion of pervious ground cover to impervious surfaces such as paved highways, streets, rooftops and parking lots; and creation of new pollution sources as the increased density of human population

brings proportionately higher levels of vehicle emissions, vehicle maintenance wastes, pet wastes, trash, and other anthropogenic pollutants.

The Permit cites the seven highest priority industrial and commercial critical source types as identified by the County of Los Angeles: wholesale trade (scrap recycling, auto dismantling), automotive repair/parking, fabricated metal products, motor freight, chemical and allied products, automotive dealers/gas stations, and primary metal products. In addition, automotive service facilities and food service facilities sometimes discharge polluted washwaters to the MS4 and have been identified as a major cause of widespread contamination and water quality problems.

Local Sources of Pollutants

Based on information provided by public agencies, published values from prior studies, and field observations the main source of pollutants in the local watersheds is non-point source related. These sources include; over irrigation of landscaping, erosion of native soils, septic systems, livestock, pet and yard waste and other human related activities (Table 2.8).

Table 2.8. Local Sources of TMDL Pollutants

Pollutant	Pollutant Source
Coliform	Septic system failure Livestock waste Pet waste Decomposition of organic debris Trash
Nutrients	Livestock waste Reclaimed water irrigation Septic system failure Landscape and yard waste Atmospheric deposition
Organic enrichment/low dissolved oxygen	Decomposition of organic debris Trash
Scum/foam-unnatural	Numerous potential sources
Sedimentation/siltation	Erosion of native soil
Selenium	Erosion of native soil
Trash	Human activities

2.4.1.5 Best Management Practices

The Permit requires that the SQMP specify BMPs that will be implemented to reduce the discharge of pollutants in storm water to the maximum extent practicable. For example, Landscape and Recreational Facilities Management requirements include implementation of procedures to encourage retention and planting of native vegetation and to reduce water, fertilizer, and pesticide needs.

The Permit includes provisions that promote customized initiatives, both on a countywide and watershed basis, in developing and implementing cost-effective measures to minimize discharge of pollutants. For example, if a Permittee identifies a need to implement additional or different controls than described in the countywide SQMP, a Permittee may develop and request RWQCB approval for implementation of a Local SQMP that is customized to reflect the conditions in the area under the Permittee's jurisdication. A Permittee group can also apply to substitute a regional or subregional storm water mitigation program to substitute in part or wholly for the Standard Urban Stormwater Mitigation Plan (SUSMP) requirements set forth in the Development Planning Program of the Permit. The proposed substitute program will be considered for approval by the RWQCB if its implementation will result in equivalent or improved storm water quality, protect stream habitat, promote cooperative problem solving by diverse interests, be fiscally sustainable and include secure funding, and be completed in 5 years including the construction and start-up of treatment facilities.

Existing City Programs

Storm water BMPs are implemented on both public and private land throughout the City of Calabasas. Pursuant to Title 17, Land Use and Development, Chapter 17.56 and Title 8, Health and Safety Chapter 8.28 of the Calabasas Municipal Code relating to the control of pollutants carried by storm water runoff, all new developments are conditioned to include BMPs as applicable per the SUSMP requirements. The Environmental Services Manager in the Public Works Department has the primary responsibility for ensuring that the requirements are implemented. In addition, Chapter 17.26 of the Land Use and Development Code requires a percentage of property to remain pervious depending on the zoning of the property proposed for development. For example, thirty percent of pervious area is required for all new parking lots, with runoff either being directed to those pervious areas or media filtration or like BMP installed to remove oil and grease from storm water flowing over parking lots, with the developer required to submit proof of ongoing maintenance of the media filtration or like device prior to issuance of

building permits. These requirements are implemented during the Development Review Committee (DRC) for all development priority projects.

In addition to BMPs implemented on new developments, the City has also implemented structural BMPs in certain priority locations around the City. To date, the City has installed 41 catch basin filter inserts and two in-line gross solids removal units in the municipal storm drain system, with an additional gross solids removal unit to be installed in the near future. Based on the results of this study and subsequent project-specific investigations, the City will continue to seek funding for and implement additional storm water BMPs designed to reduce pollutant loading to the receiving waters to the maximum extent practicable.

CHAPTER 3.0
PLANS AND POLICIES

3.1 CITY OF CALABASAS GENERAL PLAN

The City of Calabasas incorporated in 1991 as a response by local residents to the overly intense development in the region by Los Angeles County. The City's General Plan was adopted in 1995 to define what makes Calabasas a special place, delineate a vision for its future, and formulate programs to achieve that future. The General Plan is reviewed annually and can be amended up to four times per year to ensure that current conditions and social values are reflected.

The three primary watershed drainages that lie within the City's limits are surrounded by a mosaic of residential, recreational, and commercial uses, which developed over time and have been formalized in the General Plan as the City's Land Use Districts. In addition, a parks, recreation, and open space system is envisioned within Calabasas that will provide parks for urban residential neighborhoods, establish a comprehensive trails system, and meet the open space and recreational needs of Calabasas residents.

The preservation of remaining open space lands and the protection of significant environmental features within Calabasas are, according to the General Plan, the highest priorities of the City. This includes protecting significant environmental resources, maintaining public health and safety, managing the production of resources, and providing open space for public recreation. Open space for public recreation includes setting aside public parks and recreational areas as well as maintaining a system of trails that can be used for hiking, equestrian riding, and mountain biking. In addition to preserving existing open space, the General Plan calls for environmental design and site planning that works with nature to minimize the loss of resources, reduce the off-site impacts of development, and restore environmental and landscape quality that may have been compromised by past actions.

With respect to biotic resources, the General plan states, "It is a high priority of the City to protect and, where feasible, facilitate restoration of the biological productivity and quality of vegetative and wildlife habitats throughout the remaining open spaces within the General Plan study area." To accomplish this, the City has undertaken to identify and preserve large self-sustaining habitat management areas through public acquisition of lands and open space easements within significant resource areas. In addition, the City has adopted an oak tree

preservation ordinance and has extended similar protection to other stands of significant natural vegetation through the General Plan's Environmental Management and Development Review Programs.

The General Plan also calls for a number of specific policies intended to maintain water quality within natural drainages so that resource-dependent recreation and the biological capacity of riparian areas will not be adversely affected. These measures include protecting natural watershed areas within the General Plan study area, controlling water consumption by existing and new development through an emphasis on drought-tolerant planting techniques, use of water-efficient plumbing and water reclamation, and promoting the reduction of pollutants and sedimentation from existing uses through public education, erosion control, and implementation of workable BMPs.

As called for in the Water Resources Section II E. of the General Plan, the City of Calabasas has maintained full compliance with the NPDES Permit requirements. The City has a dedicated Environmental Services Manager (ESM) and Environmental Services Assistant to oversee the complete implementation of the permit requirements. As outlined in the goals and policies set forth in the General Plan, the City has an overall commitment to the protection and enhancement of their receiving waters that goes beyond minimal Permit compliance.

3.2 DRAFT WATERSHED MANAGEMENT AREA PLAN FOR THE MALIBU CREEK WATERSHED (JANUARY 2001)

Using the Las Virgenes Malibu Conejo Council of Governments as fiduciary agent, the watershed cities (Calabasas, Westlake Village, Agoura Hills, and Malibu) and Los Angeles County pooled funding and resources and hired a consultant to write the Draft Watershed Management Area Plan for the Malibu Creek watershed. Although never formally adopted as a policy document, this study was used as a basis for preparation of the Malibu Creek Watershed Management Area Plan that Los Angeles County submitted to the RWQCB to meet requirements of the 2001 Report of Waste Discharge. At this time, the watershed Cities and L.A. County are working together to develop Plan Blue, an urban runoff reduction plan. Plan Blue incorporates the previously completed Draft Watershed Management Area Plan (WMAP) and focuses on regionally consistent and cost-effective NPDES Permit implementation with a view towards overall watershed stewardship. The action plan developed in Plan Blue will not only be implemented in the Malibu Creek Watershed, but across the entire North Santa Monica Bay area which includes Topanga Canyon and several smaller rural watersheds that drain directly into Santa Monica Bay.

3.3 LOS ANGELES RIVER MASTER PLAN (JUNE 1996)

The Los Angeles River Master Plan (LARMP) creates a vision of the Los Angeles River as a resource. The LARMP goals are to guarantee flood protection to surrounding communities, provide diverse recreational opportunities, enhance river appearance, and create sustainable local economies. Combined, these goals seek to enrich the quality of life adjacent to the Los Angeles River.

3.4 SANTA MONICA MOUNTAINS NORTH AREA PLAN (OCTOBER 2000)

The Santa Monica Mountains North Area Plan (SMMNAP) is an element of the Los Angeles County General Plan. The SMMNAP serves as a planning tool to regulate development within the unincorporated area of the Santa Monica Mountains. The SMMNAP consists of five elements, two of which, the Conservation and Open Space and the Land Use and Housing Elements, affect water quality. The Conservation and Open Space Element prioritizes resource protection over land development. This principle recognizes that irreplaceable resources must be managed to protect biological habitats and corridors, water quality, scenic resources, open space, and recreation. The Land Use and Housing Element aims to protect significant environmental resources and avoid developments that negatively impact environmental resources. Existing communities are expected to maintain their unique character and create distinct boundaries between suburban and rural areas. Furthermore, the plan promotes accessible outdoor recreation.

3.5 LAS VIRGENES GATEWAY MASTER PLAN (DECEMBER 1998)

The City of Calabasas in the Las Virgenes Gateway Master Plan (LVGMP) seeks to establish a balance between the community and nature along the Las Virgenes corridor through specific land use and development plans. The LVGMP goals aim to promote the rural character of Calabasas, increase aesthetics, preserve the natural environment, and prevent significant environmental degradation. This plan may be used as a tool to obtain grants for public improvements, including trail construction and creek restoration.

3.6 LAS VIRGENES CORRIDOR DESIGN PLAN (JANUARY 1998)

The Las Virgenes Corridor Design Plan (LVCDP) is a comprehensive plan that aims to improve Las Virgenes Road from Mulholland Highway to the Ventura County jurisdictional line. The plan recommends methods to beautify the road and better circulation and traffic. Beautification

includes planwide landscaping to fit the natural environment, preserve views, and use native and noninvasive drought-tolerant plants. Circulation as well as recreational opportunities will be enhanced by a bikeway system running the length of the corridor.

CHAPTER 4.0
OPPORTUNITIES AND CONSTRAINTS

Numerous opportunities exist for implementation of specific projects related to the overall project objectives. Opportunities were defined as a potential for changing the existing conditions to suit the project objectives of: improving water quality related to TMDLs, improving water quality for native fish, restoring creek and riparian habitat, and improving recreational and educational facilities and features.

In order to effectively evaluate opportunities, constraints must also be identified. Constraints within the study area are conditions that would increase the expense, longevity, or physical difficulty of implementing any identified opportunity within the study area. There are some common constraints that projects would encounter, and those unique to specific locations along each of the creeks.

An important general constraint that would be faced by any restoration project is the California Environmental Quality Act (CEQA) review process. This process could include an Environmental Impact Report (EIR), and permits from regulatory agencies such as the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Department of Fish & Game and California Regional Water Quality Control Board. Because of the various requirements of the review process, permits and CEQA documentation can add considerable cost and time to even a small habitat improvement project. A programmatic approach that completed the CEQA and permitting process for many of the restoration projects at once would provide significant savings.

4.1 IMPROVING WATER QUALITY TARGETING THE SPECIFIC TMDLs

4.1.1 Opportunities

As stated previously, the identified TMDLs in the study area include: coliform (bacteria), nutrients, organic enrichment, scum/foam, sedimentation, Selenium and trash. There are numerous options for reducing each of the specific TMDLs through a combination of source control and structural BMPs. In addition to various controls on the contaminants, there should be improvements made in the water quality monitoring program throughout the study area to target TMDL pollutants in a manner that would provide conclusive data on compliance with

required water quality standards. With improved monitoring data more appropriate decisions could be made using the most up-to-date data.

An additional option for general water quality improvement is the implementation of a comprehensive storm water management program targeting TMDLs. This program, currently under development by the City, would provide source control measures for residential, commercial, and open space areas within the City. Potential source control options within this plan could include implementing Integrated Pest Management (IPM) practices, which would reduce the quantity of pesticide and herbicide currently applied in the study area by City Public Works contractors.

Coliform

Opportunities for reducing coliform will depend on the type of coliform identified in the study area. Coliform levels can be elevated from the decomposition of organic matter or from the feces of animals or humans. Water quality testing for total and fecal coliform can be used to determine relative levels of coliforms from organic versus feral sources. However, the difference between the two sources of fecal coliform (animal or human) can only be determined by more comprehensive water quality testing, which may include DNA testing.

Typically, organic matter can be controlled through source control options. These can include: increased frequency of street sweeping, proper disposal of lawn cuttings and similar landscape maintenance debris, and public outreach to inform the public of the concern.

If the bacteria are determined to be from feces then a different approach is required. This approach would include a comprehensive survey of all regions within the study area to determine the use of septic systems, the presence of livestock facilities and the condition of the sanitary sewer lines in the area. These three operations make up the primary sources of coliform in the study area.

After determining the locations of active septic systems in relation to local water courses and ground water elevations, it should be determined whether the systems are operating correctly. If any septic systems are determined to not be functioning properly immediate corrective action should be taken. Depending on the quantity and condition of septic uses in the area, it may be beneficial to implement a program to monitor the systems and require reporting on routine inspection and maintenance conducted by the facility owners.

Any existing livestock facilities should also be mapped relative to study area watercourses. Each facility's animal waste management procedures should be reviewed for adequacy and proper functioning. If a need for additional BMPs is identified, corrective action should be taken through partnering with the landowners to improve the runoff pollution prevention controls at their facilities.

Sanitary sewer systems are owned and operated by public entities that are required to implement maintenance programs and spill response procedures pursuant to State and Federal law. EPA has recently developed a comprehensive management framework called Capacity, Management, Operations, and Maintenance (CMOM) to further regulate and assist municipalities in developing more comprehensive sanitary sewer system management programs. These proposed EPA regulations will affect all publicly-owned collection systems and publicly owned treatment works (POTW) systems with collection systems attached. In the study area, the sanitary sewer trunk lines are owned and maintained by the local POTW, Las Virgenes Municipal Water District (LVMWD), and the smaller collection system is owned by the City and maintained through the Los Angeles County Sanitation District. Currently, LVWMD has an informal policy to provide immediate response and containment to overflows on the City's system until the Los Angeles County staff arrives. These partnerships need to be formalized, between the City, the County, and LVMWD to implement the EPA's CMOM programs.

Nutrients

As discussed in Chapter 5 and in Appendix A, there are combinations of source control and structural BMPs that can reduce nutrients (nitrate, ammonia, and phosphate) from entering into the study area waterways. The nutrient levels in receiving waters are dependant on source loadings in the watershed, runoff intensity, and physical, chemical, and biological interactions within the aquatic environment. Therefore decreasing the nutrient source within the watershed lowers the nutrient loading. Several of these sources are also coliform sources (sewage, manure, landscape waste, etc.) and can be addressed as discussed above. Additionally, increases in biological and chemical processes increase the removal of nutrients within the watershed.

The results of the modeling indicate that structural BMPs are more effective in reducing ammonia and phosphate loading than the nitrate loading. The modeling also indicates that nitrate loading is reduced most effectively by source control measure rather than structural BMPs.

Organic Enrichment/Low Dissolved Oxygen

Organic enrichment/low dissolved oxygen can be the result of several different issues occurring within the study area. Among other possibilities, it is certainly related to a combination of organic inputs into the study area creeks, as well as an increase in the water temperature and available sunlight. When there is high organic input into the creek, nutrient levels also increase. When a creek with high organics is subjected to warmer water temperatures and increased sunlight, plant (algae) growth increases. As the algae uses up the available nutrients it starts to die off. As the algae dies and decomposes, oxygen from the water consumed during this process and can reach levels too low to sustain aquatic life.

The opportunities for improving organic enrichment/low dissolved oxygen are interrelated with the nutrient controls and reductions outlined in the previous section. Additional measures that reduce organic enrichment and increase dissolved oxygen include; reducing the amount of concrete, which acts as a heat source, in the stream channel to reduce temperatures, increasing the shade canopy along the creek corridor, and allowing the creek to pass over rocks for turbulence to increase the quantity of dissolved oxygen in the water.

Scum/Foam

There are numerous ways that scum/foam can be created in the study area creeks. Some of the ways it can be created are from natural processes and some unnatural. An example of a natural process would be the growth of plants that produce natural surfactants, while an unnatural process would be the introduction of detergents from illegal dumping or illegal connection of washing facilities into the storm drain system. This TMDL is directed towards the unnatural processes. In addition to detergents, there are a variety of contaminants that when agitated in the creek can create foam. Reduction of scum and foam is accomplished by overall reductions in other non-point source contaminants such as nutrients, coliform, and trash.

Sedimentation/Selenium

Selenium is a naturally occurring element within the soils of the study area. Reducing soil erosion within the study area can reduce sedimentation and selenium within the creeks. Numerous opportunities exist for reducing erosion. The exact locations of these sites are identified in the riparian habitat enhancement section 4.1.3. In addition to the sites within the creek corridor, erosion also occurs along the shoulders of the main roadways within the study area. The road shoulders along Las Virgenes Road and Mulholland Highway are cleared of

vegetation to reduce the fire potential. However, once this vegetation is cleared the soil is not held in place and erodes during storm events. If another acceptable fire control option can be identified it should be implemented along the two main highways within the study area. One possible option that could be evaluated for the road shoulders could be a combination of gravel and some type of porous pavement.

Trash

Opportunities for reducing the trash entering the study area creeks include increased street sweeping, increased public outreach to the problem, and coordinated efforts with adjacent jurisdictions, and Caltrans. Caltrans is needed in the coordination so that any trash from the 101 Freeway can be removed before entering the study area. The primary area identified for trash reduction was a dirt turn-out next to the 101 Freeway just east of the westbound off ramp at Las Virgenes Road.

4.1.2 Constraints

Constraints for all water quality parameters within the study area relate to water quality monitoring data. Up to this point there has not been a comprehensive program in place to conduct simultaneous flow measurement and water quality sampling and analysis for the specific TMDL contaminants. Without comprehensive monitoring in place it will be extremely difficult to measure the effectiveness of either source control measures or structural BMPs on the water quality within the study area. Water quality sampling and testing is costly, including a high level of staff commitment, equipment costs, and laboratory fees. Flow monitoring is also costly, and has the added challenge of needing to install structural equipment within waterways. Not only is the equipment expensive, but the process of obtaining all necessary permits to install and operate the flow meters can also be a significant cost as well.

An additional constraint involves mapping of the current storm water conveyance system within the study area. For appropriate structural BMP placement it is imperative to accurately map the storm water drainage area for each specific region. Currently the available AutoCad mapping of the City's storm drain system is in need of updates and should be converted to GIS format so that it can be used in conjunction with local topographic mapping to identify the correct location for the structural BMPs. The majority of the municipal storm drain system is owned and maintained by Los Angeles County Public Works Department, with a few drains still under developer ownership in the process of transfer to the County and some drains owned by the City but maintained by the County through contracted services. Although Los Angeles County is in the

process of creating GIS based maps of their storm drain systems, there are proprietary issues that are impeding information sharing between the County and the cities within the County. At this time, the City would be required to purchase the current maps from the County at significant costs.

4.2 IMPROVING WATER QUALITY FOR STEELHEAD TROUT

4.2.1 Opportunities

Currently, steelhead trout (*Oncorhynchus mykiss*) are not found in the study area creeks. As identified in Native Fish Habitat Assessment Report (Appendix B), the steelhead were historically found in Las Virgenes Creek. Opportunities for improving the current water quality for the steelhead coincide with the TMDL improvement opportunities including shading the creek and reducing water temperatures. Reductions of algae blooms are also needed for optimal steelhead habitat. Steelhead require cool, highly oxygenated water for optimum survival rates. Currently, habitat is available within the study area for the steelhead.

The removal of barriers and concrete, as stated in the next section*, Opportunities for Aquatic and Riparian Habitat Enhancement and Restoration*, also facilitate steelhead movement. In addition, this section includes project sites identified for creating riffles, which benefit stealhead by providing one of their food sources, macro-invertebrates, with ideal their habitat. Increasing the survival of their food source may increase chances of steelhead's own survival if re-introduced.

4.2.2 Constraints

As related to the constraints for the TMDL requirements, appropriate water quality data are currently lacking to make a determination on potential steelhead reintroduction. The existing data do not include flow measurements, adequate temperature records, nor dissolved oxygen profiles necessary to make an informed decision on the success of steelhead reintroduction.

In addition to the water quality constraints for the steelhead, there are numerous structural barriers both within and outside the City. These barriers include the Rindge Dam and numerous concrete bridges and culverts on Malibu Creek as well as Las Virgenes Creek (Appendix B). This combination of constraints can also be viewed as a listing of opportunities to improve the water quality and habitat for reintroduction in the future.

4.3 AQUATIC AND RIPARIAN HABITAT ENHANCEMENT AND RESTORATION

4.3.1 Opportunities

Through analysis of the baseline data collected in January and March 2003, a number of opportunities for enhancement and restoration of riparian and aquatic habitat were identified for Las Virgenes, Dry Canyon, and McCoy Creeks (Figures 4.1, 4.2, and 4.3). Table 4.1 summarizes the types of improvements that could be implemented to improve habitat in and around the creeks. Most of the improvements involve the direct creation or restoration of wetland and riparian areas. Some improvements are related to maintaining existing habitat, such as removing sediment, controlling exotic plant species, and stabilizing banks to reduce erosion. Others would involve improving structural aspects of the stream by removing artificial structures such as a concrete bottom, or adding a channel meander.

Table 4.1. Number of Locations for Habitat Improvement Opportunities

Habitat Improvement Opportunity	LVC	DCC	MC
Stabilizing creek banks/channel incision/erosion	8	5	8
Monitoring channel incision/erosion	4	1	3
Pulling back creek banks	11	2	2
Creating/restoring wetland habitat	13	4	3
Creating/restoring riparian habitat	1	1	1
Removing concrete to reestablish soft creek bottom	2	2	
Removing artificial structural stabilization (e.g., crib walls, rip-rap)	4		
Revegetating creek banks/floodplain		4	1
Removing exotic plant species	3	2	1
Removing sediment		1	3
Improving physical creek structure	3	3	3
Adding pools/riffles or creating channel meander		3	

LVC = Las Virgenes Creek
DCC = Dry Canyon Creek
MC = McCoy Creek

Each of the three creeks within the study area presents a unique set of opportunities with respect to habitat improvement based on existing channel modifications, adjacent land uses, and natural conditions.

Las Virgenes Creek

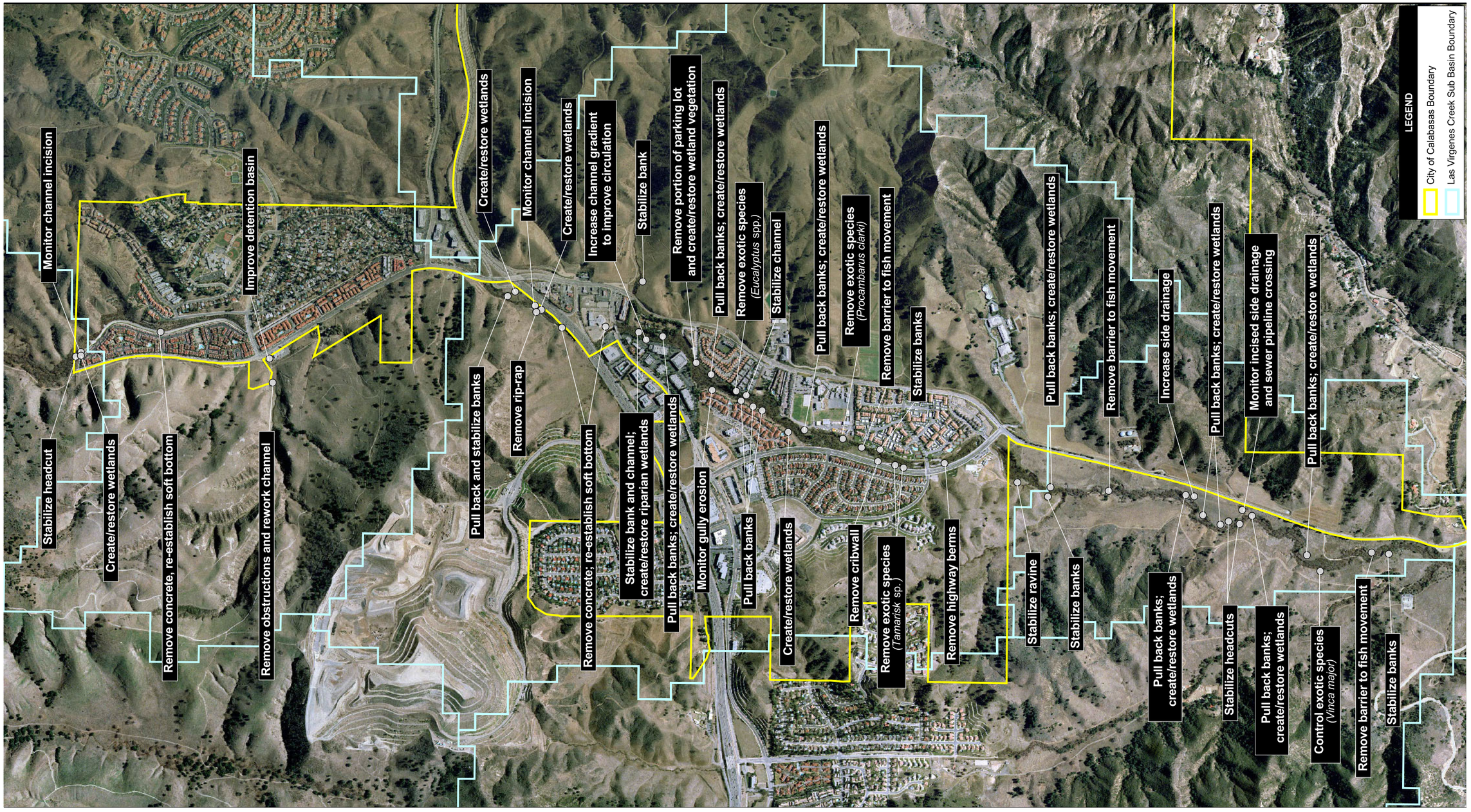
The largest category of habitat improvement opportunities for Las Virgenes Creek, 13 locations, is wetland habitat creation or restoration activities. Twelve sites have been identified where erosion or channel incision could be stabilized or monitored. The remaining opportunity sites would involve removal of artificial stabilization structures, channel maintenance, and improvement of the physical structure of the channel.

Locations that have been identified as possible wetland creation/restoration sites most often include channel alteration (pulling back the creek banks). These sites include the northernmost reach of the creek (near the Ventura County jurisdictional boundary within the City limits), directly north of the existing concrete portion of the Las Virgenes Creek channel (the reach located northwest of the intersection of Las Virgenes Road and the 101 Freeway), three areas south of Agoura Road adjacent to a commercial area, three areas along the reach flanked by residential uses (south to the intersection of Lost Hills Road and Las Virgenes Road), and five locations within Malibu Creek State Park.

Erosion control and monitoring could be implemented at the northernmost reach of the creek upstream of the concrete trapezoidal channel, along the channel as it passes northeast of Las Virgenes Road and the Ventura Freeway, in a number of locations along the reach that is restricted by commercial and residential uses between Agoura Road and the intersection of Lost Hills Road and Las Virgenes Road, and five identified locations within Malibu Creek State Park.

Other opportunities to improve habitat along Las Virgenes Creek include removing a portion of the concrete channel bottom north of Thousand Oaks Boulevard and restoring it to a natural soft creek bottom. The drainage channel and detention basin to the west of Las Virgenes Creek and Thousand Oaks Blvd could be improved by removing obstructions to drainage and reworking the channel and basin. Rip-rap could be removed along the segment of the creek northwest of Las Virgenes Road and the Ventura Freeway and a crib wall along the western bank north of Las Virgenes Road could be eliminated along with highway berms just south of the road. A concrete removal and creek restoration opportunity is also identified along the creek channel between the Ventura Freeway and Agoura Road Bridge, which the City has currently in the planning process.

Exotic species removal would be beneficial in three primary locations, a pocket of eucalyptus located adjacent to residential uses north of A.E. Wright Middle School, tamarisk in the area



Source: Mountains Restoration Trust, 2002

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Scale: 1 : 6,000; 1 inch = 500 feet

Figure 4.1
Habitat Improvement Projects
Las Virgenes Creek

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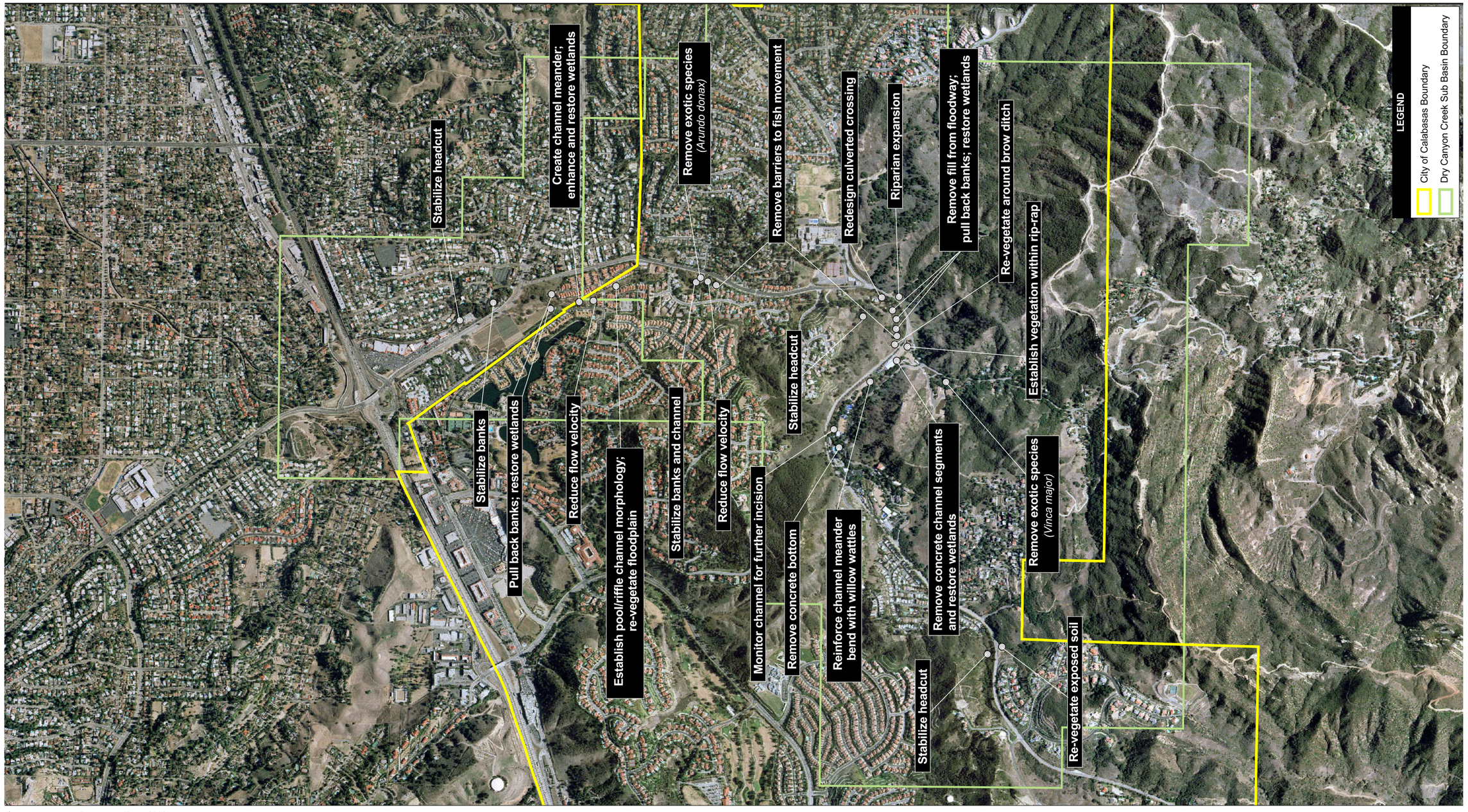

Source: Mountains Restoration Trust, 2002

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Scale: 1 : 6,000; 1 inch = 500 feet

Figure 4.2
Habitat Improvement Projects
Dry Canyon Creek

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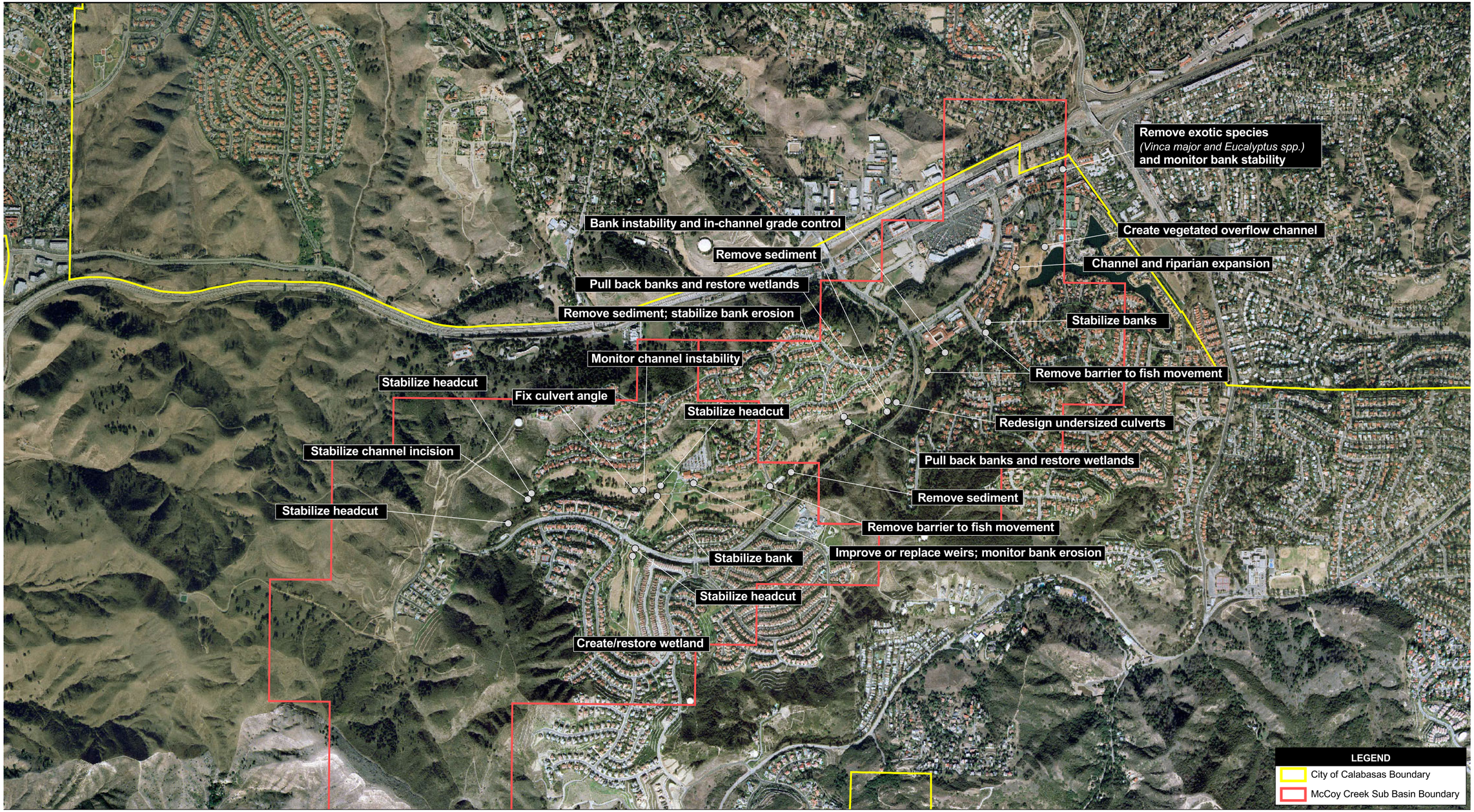

Source: Mountains Restoration Trust, 2002

NORTH

500 0 500 Feet

Scale: 1 : 6,000; 1 inch = 500 feet

Figure 4.3
Habitat Improvement Projects
McCoy Creek

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north of Las Virgenes Road, and *Vinca major* along the creek in Malibu Creek State Park in the southern portion of the study area.

Dry Canyon Creek

Along Dry Canyon Creek, habitat improvement opportunities primarily relate to erosion control (bank stabilization and revegetation of the floodplain), restoration of wetland and riparian habitat, and physical improvement of channel morphology. Six locations have been identified where stabilization or monitoring of erosion or bank incision are needed. Wetland or riparian habitat restoration would be beneficial in five locations. Revegetation of creek banks or the floodplain, or the removal of exotic species could be implemented in six locations. Physical improvements to the channel structure, such as adding pools and riffles or removing a concrete channel bottom, would be beneficial in nine locations.

Bank stabilization opportunities exist along the upper reaches of Dry Canyon Creek, along Mulholland Highway, along the segment adjacent to the Viewpoint School, and at Wrencrest Drive where the creek emerges from an underground channel.

Creation or restoration of wetland or riparian habitat could be accomplished adjacent to the horse stables west of Old Topanga Canyon Road on Mulholland Highway, on the Mountains Restoration Trust property along the north side of Mulholland Highway east of the intersection with Old Topanga Canyon Road, and adjacent to Park Paloma near the northern boundary of the City.

Revegetation of creek banks or floodplains would be beneficial along the upper reaches of Dry Canyon Creek along Mulholland Highway, around the brow ditch located north of the intersection of Mulholland Highway and Old Topanga Canyon Road, within the rip-rap located at the intersection of Mulholland Highway and Old Topanga Canyon Road, and adjacent to Park Paloma. Exotic plant species removal is needed along the tributary that flows north along Old Topanga Canyon Road (*Vinca major*), where the creek emerges from the underground channel at Wrencrest Drive (*Arundo donax*), and along the Mountain Restoration Trust's property near the intersection of Mulholland Highway and Old Topanga Canyon Road (Virginia Creeper).

Physical improvements of several types could be implemented along Dry Canyon Creek. Concrete channel segments could be removed southwest of the horse stables at Mulholland Highway and Old Topanga Canyon Road. Flow velocity could be reduced near Wrencrest Drive where the creek emerges from an underground channel and adjacent to Park Paloma. The

segment near Park Paloma would also be appropriate for establishment of pool/riffle channel morphology, and an upstream reach, near the City boundary, would benefit from an addition of a channel meander.

McCoy Creek

The largest category of opportunities for habitat improvement (11 locations) along McCoy Creek is related to stabilizing the creek banks to prevent or repair erosion and channel incision. Four locations would be appropriate for creating or restoring wetland and riparian habitat, physical channel improvements could be implemented in six locations, and exotic plant removal and revegetation could be performed in two locations.

Stabilization and monitoring of creek bank erosion and incision, as well as the removal of sediment, would be beneficial at a number of locations along McCoy creek. Most of the locations are just upstream of, or within the Calabasas Golf and Country Club, through which the creek flows. Wetland creation or restoration is feasible on the tributary south of Parkway Calabasas, at two locations toward the eastern end of the golf course north of Parkway Calabasas, and riparian expansion could be accomplished along the creek west of Lake Calabasas.

Additional physical improvements to the channel within the Calabasas Golf and Country Club include improvements to culverts and replacement of existing weirs. Bank stabilization and in-channel grade control could also be implemented along the portion of the creek located on Countrywide Financial property.

Exotic plant removal would be beneficial south of Calabasas Road near the northern City boundary, and a vegetated overflow channel for Lake Calabasas could be created near the Calabasas Tennis and Swim Center.

4.3.2 Constraints

Las Virgenes Creek

Because the suitable area for habitat restoration near the northern City boundary on Las Virgenes Creek extends outside the City, activities there may require coordination with the Los Angeles County Department of Public Works. In addition, removal of the concrete bottom along the trapezoidal channel south of the City's northern boundary or widening of the creek banks for

restoration purposes cannot impact the flood capacity of the channel. Residential uses in this area encroach on the floodplain along this reach.

Both the drainage and detention basin located south of Thousand Oaks Boulevard west of the creek, and the potential restoration area northwest of the intersection of the Ventura Freeway and Las Virgenes Road, lie outside the City boundary within an unincorporated area of Los Angeles County. Projects in these locations would require coordination with Los Angeles County Department of Public Works. For the restoration area, an additional constraint would be providing access to the project site. No access is available from the Ventura Freeway, and the north bank of the creek quickly rises to a steep incline. Access to the reach would only be possible from Las Virgenes Road. An additional restriction is the close proximity of the Ventura Freeway to the southern bank of the creek at this location.

Removal of concrete and reestablishment of a soft channel bottom in the channel between the Ventura Freeway and Agoura Road would be constrained by the encroachment of commercial businesses on both banks of the creek. The floodplain could not be expanded at this site. Locations of utilities in or near the channel would also affect the planning of structural alterations at this site. The City has recently released a Request for Proposals to contract for the creek restoration design work for this specific site. Grant funding is also secured to complete the construction/restoration phase of the project once the restoration design is approved by the granting agencies.

The area south of Agoura Road where restoration of riparian habitat could be implemented is accessed down a steep embankment, and covered with dense vegetation, both of which would make access to the area problematic. In addition, private property encroaches on the floodplain on each side of the creek along this stretch.

The region of the creek located north of A.E. Wright Middle School and adjacent to residential uses presents opportunities for a number of habitat restoration and improvement projects. The only known constraint for these projects is the boundary of private property along the floodplain.

The reach parallel to Lost Hills Road north of its intersection with Las Virgenes Road has been identified as an opportunity to improve habitat by removing a cribwall and exotic species (tamarisk). Access to this area is down a steep hillside where sensitive resources are present. The equipment needed to complete projects at this location could cause unacceptable damage to existing resources while accessing the area. Depending on the desired scope of work, the exotic

species could be removed by hand to minimize the disturbance to sensitive habitat, however the concrete removal would require heavy equipment.

The remaining opportunity locations are located south of the City boundary in Malibu Creek State Park. Projects in this area would require coordination with California State Parks. In some locations along this reach of the creek, it may also be necessary to coordinate with Las Virgenes Municipal Water District to identify the location of sewer lines.

Dry Canyon Creek

Much of the land through which Dry Canyon Creek flows is private property. In addition, all lands located within 500 feet of Mulholland Highway are within the Scenic Corridor overlay zone. Within the viewshed, all development and proposed land use requires a special land use permit and must include elements that ensure enhancement and beautification of the scenic corridor.

Along the creek parallel to Park Paloma, where floodplain revegetation and channel realignment have been identified as opportunities, mature oaks are present on the floodplain. This would necessitate carefully planning of any change in channel morphology to avoid impacts to these sensitive resources.

No known project constraints exist in the area identified as a possible wetland restoration and channel realignment site located between the City boundary and Lake Calabasas.

McCoy Creek

The major constraint on projects proposed for McCoy Creek would be coordination with the owners of the private property, such as the Calabasas Golf and Country Club, through which almost the entire length of the creek flows. An additional constraint exists at the location where the creek emerges from a gated community where a steep hillside would make access difficult. Also, the presence of mature oaks throughout the park adjacent to Lake Calabasas would necessitate careful planning of restoration projects to avoid impacts to this sensitive resource.

4.4 IMPROVE RECREATIONAL FACILITIES WITHIN THE STUDY AREA

4.4.1 Opportunities

Currently the City Planning Department is in the process of completing a Trails Master Plan for the study area. This Plan is being developed in partnership with the Santa Monica Mountains Conservancy with funding provided by the New Millennium development project. The Trails Master Plan will allow for comprehensive planning for a trail system throughout the study area (Figure 4.4). This Plan is currently undergoing internal review and revision and is expected to be available for public input in 2003. Within the Trails Plan there is a proposed trail (Calabasas-Cold Creek Trail) that would provide access to the McCoy Creek riparian area for recreational purposes.

An additional opportunity is to continue to assist Mountains Restoration Trust with open space acquisition particularly in the Headwaters Corner area. This would allow an additional area of access to the riparian area and provide for a valuable passive recreation, as well as educational area.

Other recreational facilities that are currently being planned by the City include two new parks. One at the intersection of Las Virgenes Road and Lost Hills Road, adjacent to De Anza Park, and the second near the intersection of Mulholland Highway and Old Topanga Canyon Road, to be named Wild Walnut Park.

4.4.2 Constraints

Constraints for improving recreational facilities include: purchasing appropriate and available parcels; coordinating between the Planning Department and Public Works Department to determine which Department will lead the effort to identify the appropriate parcels; and determining an adequate funding source for purchase, development and maintenance for any facility.

City of Calabasas Master Plan for Restoration

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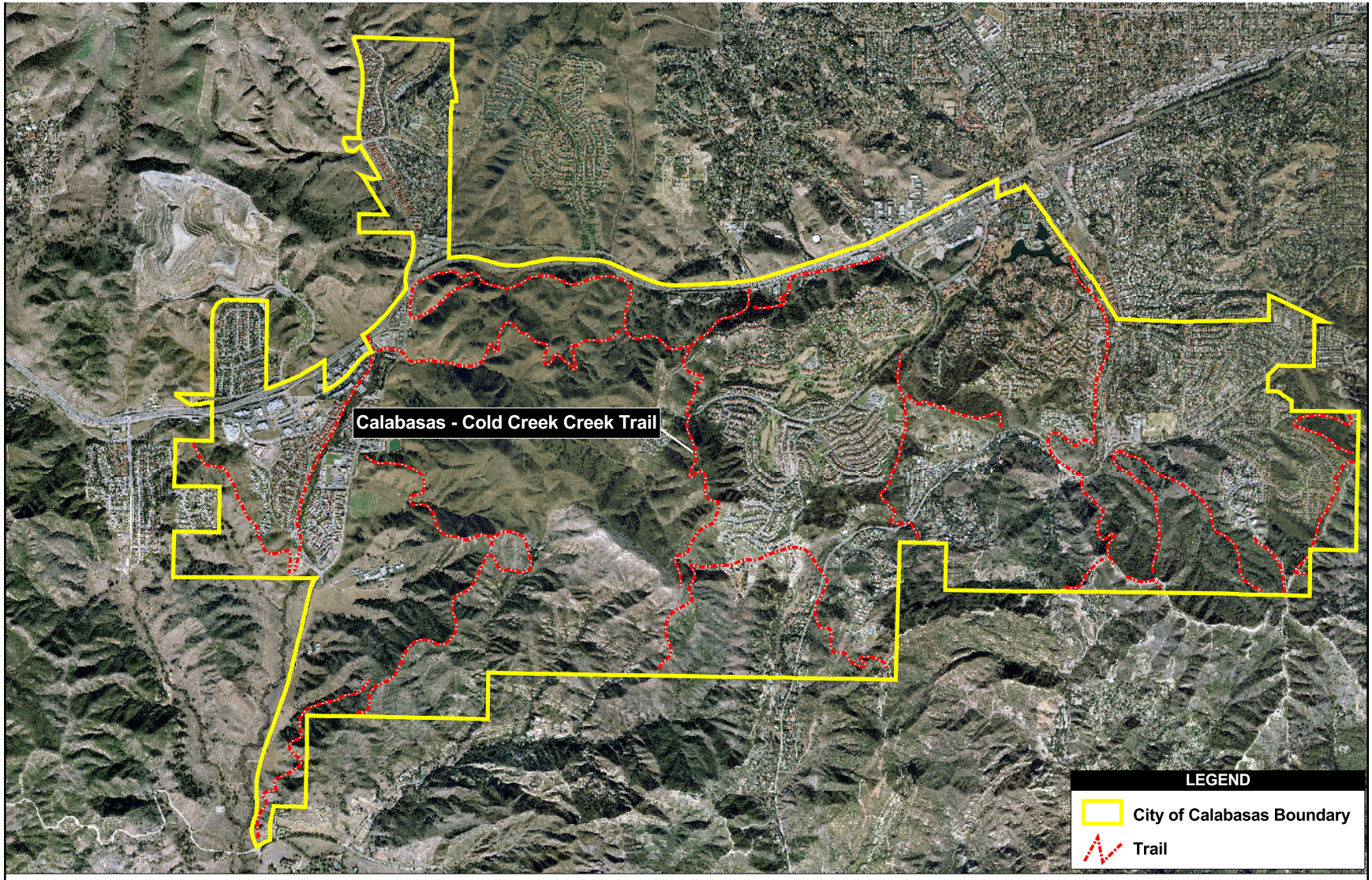

Source: Mountains Restoration Trust, 2002; Calabasas Public Works Department; Heal the Bay

NORTH

1 0 1 Mile

Figure 4.4
Proposed Trail Locations

4.5 IMPROVE EDUCATIONAL OPPORTUNITIES AND FACILITIES WITHIN THE STUDY AREA

4.5.1 Opportunities

Opportunities to improve educational facilities are numerous throughout the study area. These opportunities include:

- Placement of roadside signage to indicate the watershed boundaries so that motorists and pedestrians become more aware of the local geography and where the local creeks drain.
- Assist the Mountains Restoration Trust with the continuing effort to purchase the remainder of Headwater Corners and surrounding parcels on Dry Canyon Creek for continuing watershed education programs.
- Assist the Mountains Restoration Trust with the development of a citizen-monitoring program. Also partner with local groups to develop public participation in creek restoration projects.
- Include storm water pollution prevention and habitat protection signage along the proposed A.E. Wright footbridge crossing of Las Virgenes Creek. For example, the City could post a sign/kiosk explaining how the bridge was designed specifically to allow for fish passage as well as allowing flood flows to pass by unimpeded.
- Incorporation of education facilities into every watershed protection or enhancement project established in the City (i.e., educational placards adjacent to restoration sites).
- Implement educational signs with information about the riparian habitat along Las Virgenes Creek in both De Anza Park and the new park across the creek towards Las Virgenes Canyon Road. These signs can incorporate educational material on native plants, wildlife, and pollution prevention.
- Work with local schools to post pollution prevention messages in classrooms and at various locations on campus. This can include working with art classes to paint a clean water mural on campus or simply by placing pollution prevention posters in classrooms.

4.5.2 Constraints

Educational facility constraints include determining if the City or a local non-profit corporation would be the operator of the facility, identifying funding sources to purchase and develop the materials or a facility, and funding to maintain any new facility. Maintenance would also be required to remove graffiti defacing any signage. Cooperation and commitment from local schools would also be needed.

CHAPTER 5.0
ALTERNATIVES DEVELOPMENT

Water quality can be improved by altering processes that affect nutrient levels in receiving waters. Decreasing the nutrient source within the watershed lowers the nutrient loading. Limiting irrigation or preventing runoff from reaching the receiving water reduces the transport of nutrients. Increases in biological and chemical processes increase removal of nutrients within the watershed also. It is possible to implement several combinations of restoration measures to decrease nutrient levels in receiving waters.

For the purposes of this restoration master plan, three main categories of restoration measures alternatives were developed and analyzed: Creek Restoration Alternative; Watershed Management Alternative 1—Structural BMPs; and Watershed Management Alternative 2—Source Control. Each category was modeled using methods described in Section 1.4. The Creek Restoration Alternative included restoration measures that improved water quality primarily through habitat restoration and creek flow modification. Watershed Management Alternative 1 included restoration measures that improved water quality primarily through trapping nutrients prior to entering the creeks (e.g., sediment trap, CDS units, and treatment wetlands/bioswales). Watershed Management Alternative 2 included restoration measures that improved water quality primarily through reducing nutrient loading at the generation source (e.g., recycled irrigation water use changes). Each of the three alternatives is further described in the sections below.

To provide a baseline for comparison, the nutrient loadings based on historical land use was also modeled. The Historical Land Use scenario and each of three alternatives were modeled for each of the three creeks.

5.1 HISTORICAL LAND USE

The Historical Land Use scenario was developed to represent the baseline nutrient loadings in the absence of human urban land uses, with atmospheric deposition being the only nutrient input to the watershed. Urbanization typically impacts the watershed characteristics and increases nutrient loadings associated with anthropogenic sources. By eliminating urbanization, this scenario establishes the natural baseline and identifies the maximum possible improvement that can be achieved for the watershed.

5.2 CREEK RESTORATION ALTERNATIVE

The Creek Restoration Alternative was developed to represent the effects of restoration opportunities in and along the creeks. The creek restoration opportunities addressed were erosion control, channel modifications, and wetland restoration (Table 5.1).

Table 5.1. Creek Restoration Opportunities

Restoration Opportunities	Stream Modifications
Erosion Control	Stabilize bank and channel
Channel Modifications	Cease vegetation clearing
	Remove concrete and rip-rap
	Stabilize banks with bioengineering techniques
	Remove or improve flow restrictions (e.g., weirs or culverts)
	Pull back banks
	Enhance floodplain
Wetland Restoration	Remove eucalyptus, vinca, tamarisk, and other exotics
	Create and restore riparian wetlands

Specific restoration actions for Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek are identified in Figures 5.1, 5.2, and 5.3. Restoration measures include stabilizing the bank and channel, removing concrete banks, pulling back banks along the creek, removing concrete channels, and reestablishing soft bottom. Improvement of vegetative uptake due to wetland restoration was determined to be relatively localized and insignificant on a watershed scale; therefore, vegetative uptake improvements were not modeled. The nutrient uptake resulting from habitat restoration is insignificant compared to the other nutrient removal alternatives because the steep gradients of the creeks do not allow sufficient time for substantial nutrient uptake and the total area for potential restoration was small.

5.3 WATERSHED MANAGEMENT ALTERNATIVE 1—STRUCTURAL BMPS

Watershed Management Alternative 1 was developed to represent the effects of reducing nutrients from runoff by treating runoff on-site within the watershed using structural BMPs before the runoff reaches the creeks. Four general types of BMPs were identified to be applicable based on land use: detention basins, biofilters, infiltration basins, and pervious concrete. Detention basins capture runoff for treatment through sedimentation. Biofilters utilize

Source: Everest International Consultants, Inc.

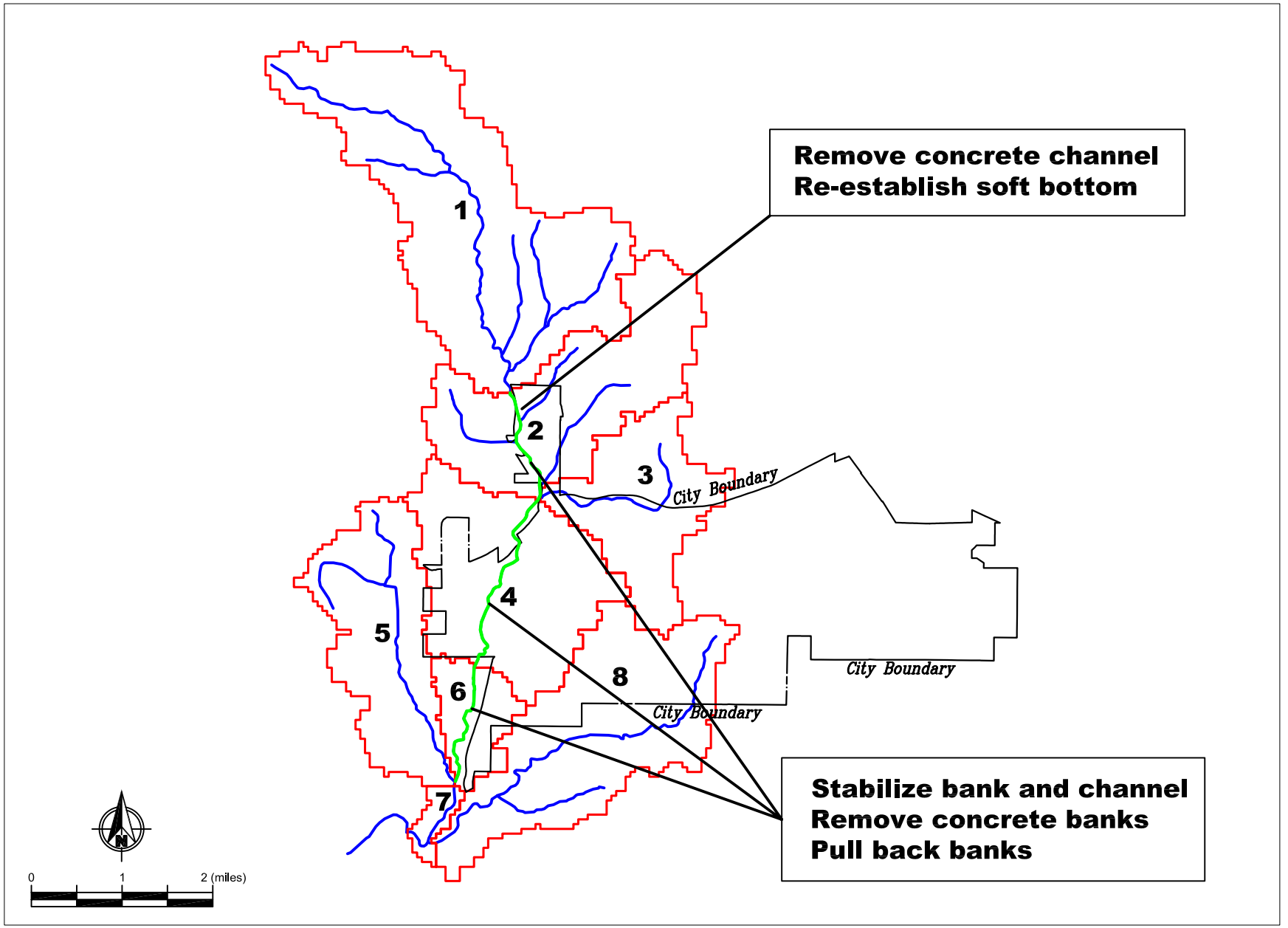

Figure 5.1
Creek Restoration Alternative for Las Virgenes Creek

Source: Everest International Consultants, Inc.

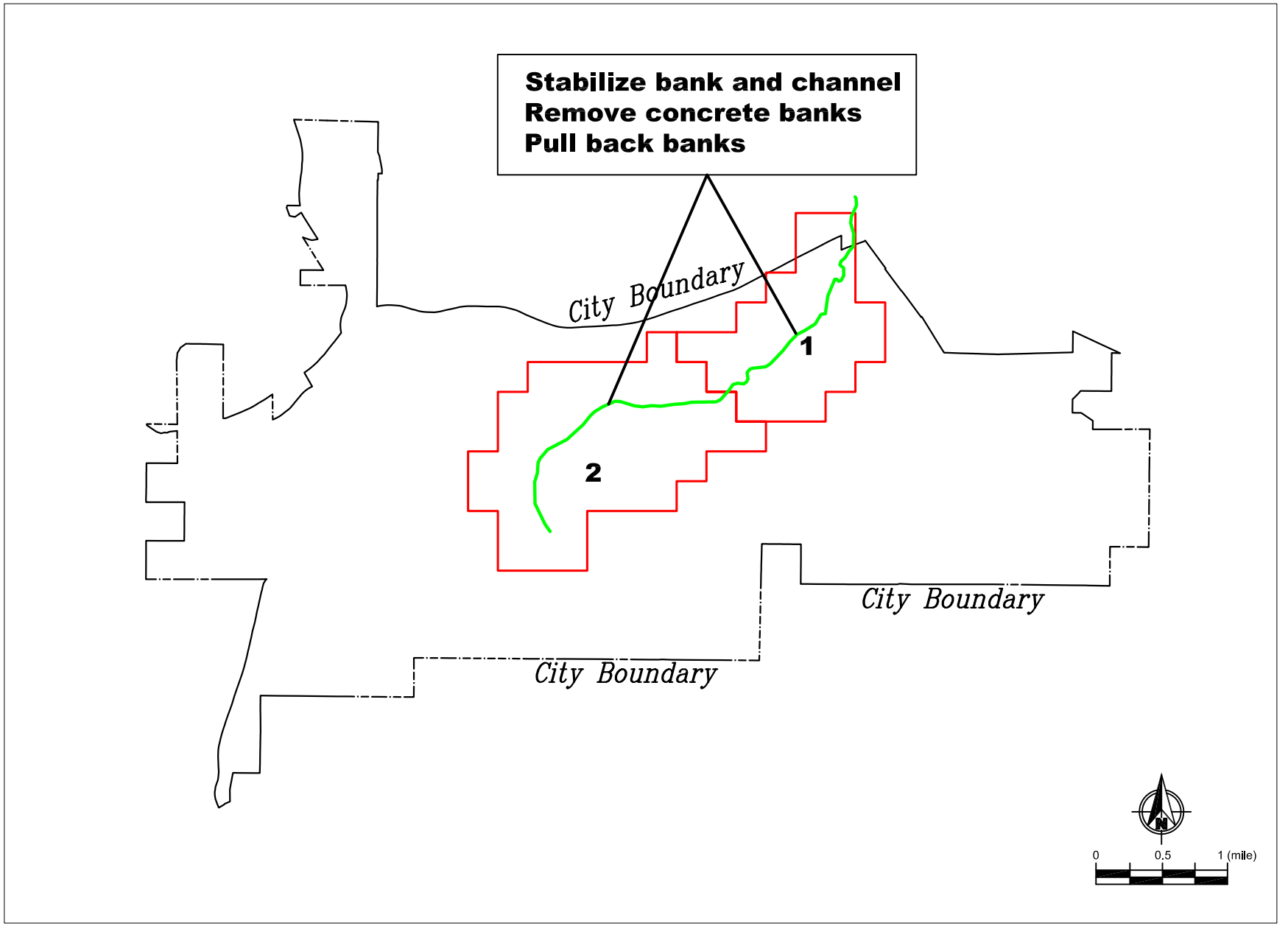

Figure 5.2 □
Creek Restoration Alternative for McCoy Creek

Source: Everest International Consultants, Inc.

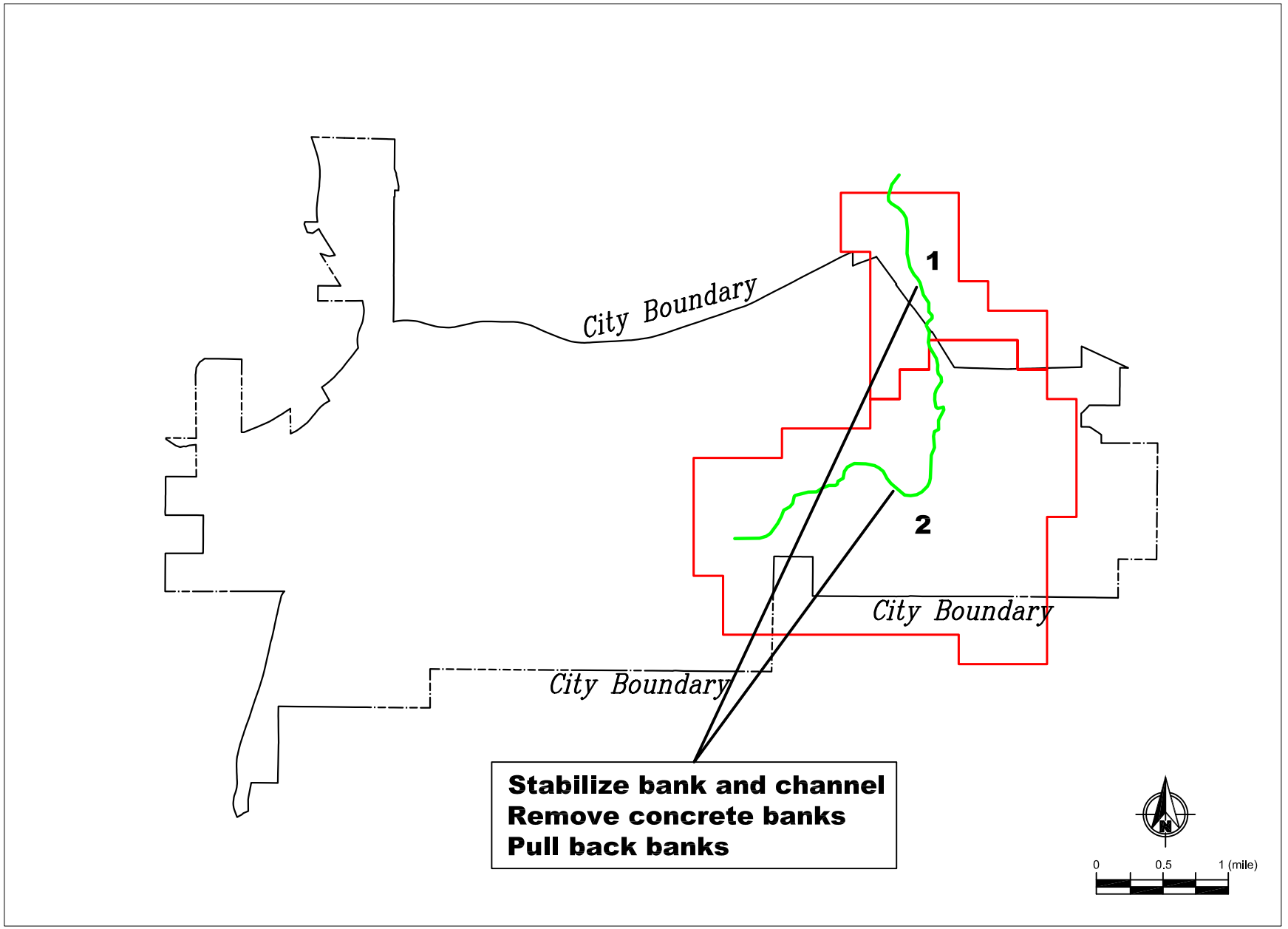

Figure 5.3
Creek Restoration Alternative for Dry Canyon Creek

vegetation to treat runoff and reduce surface runoff. Infiltration basins reduce surface runoff by increasing percolation into the ground and provide removal of contaminants. Similarly, pervious concrete reduces the runoff from impervious urban areas by promoting infiltration and contaminant removal.

The removal efficiencies used in the modeling of Watershed Management Alternative 1 were calculated based on average literature values (Appendix A). To account for the potential range in runoff trapping and poor performance of some structural BMPs, two scenarios were developed to represent Alternative 1. Alternative 1A was based on the assumption that the structural BMPs were successful at treating 50% of the runoff, while Alternative 1B was based on the assumption that the structural BMPs were successful at treating 100% of the runoff.

The use of structural BMPs is limited based on land use. Table 5.2 shows the applicable land uses for each structural BMP. The areas within the subwatersheds of each creek in which BMPs can be implemented are shown in Figures 5.4, 5.5, and 5.6. In some cases, multiple BMPs can be implemented within the same land use. (For example, both detention basins and biofilters can be implemented for agricultural land uses.) For land uses with two applicable BMPs, the efficiency was calculated based on the assumption that the BMPs would be linked in series such that the efficiency of the second BMP was applied to the output of the first BMP.

Table 5.2. Applicable Land Uses for Types of Structural BMPs

Type of BMP	Applicable Land Use
Detention Basins	Agricultural and Husbandry
Biofilters	Agricultural, Husbandry, Residential, and Commercial
Infiltration Basins	Residential and Commercial
Pervious Concrete	Residential

5.4 WATERSHED MANAGEMENT ALTERNATIVE 2—SOURCE CONTROL

Watershed Management Alternative 2 was developed to represent the effects of reducing nutrient loading through reductions in sources. Based on information presented in Section 3.3 of Appendix A, the most significant nutrient sources in the watershed were determined to be atmospheric deposition, septic systems, reclaimed irrigation water use, golf course fertilization, and livestock. It was not considered feasible to reduce atmospheric deposition of nutrients in the watershed modeling analysis (Appendix A) because atmospheric deposition occurs on a regional basis, which is beyond the geographic limits (watershed) of the analysis. Septic systems within

Source: Everest International Consultants, Inc.

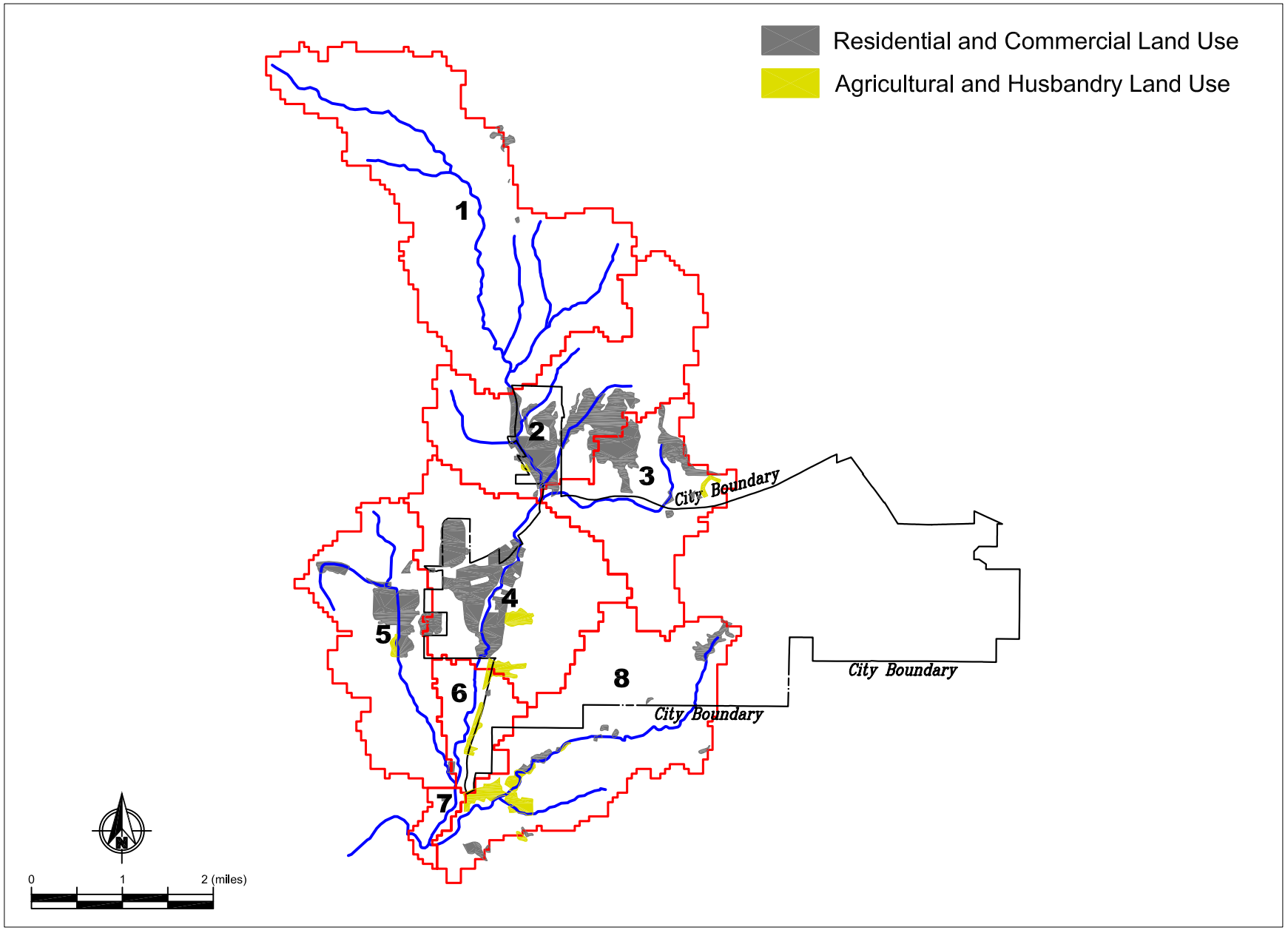

Figure 5.4

Watershed Management Alternative 1 - Structural BMPs for Las Virgenes Creek

Source: Everest International Consultants, Inc.

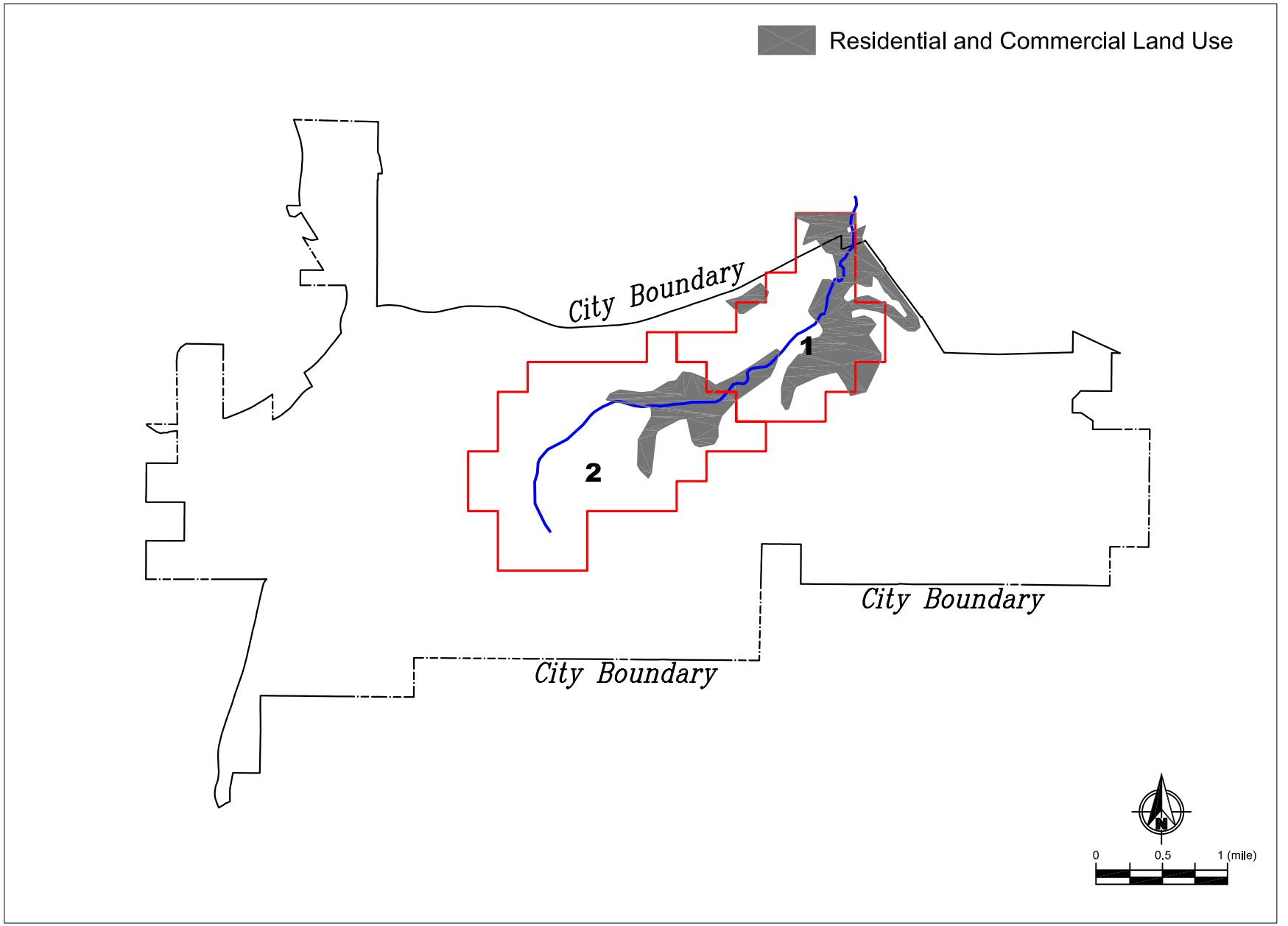

Figure 5.5
Watershed Management Alternative 1 - Structural BMPs for McCoy Creek

Source: Everest International Consultants, Inc.

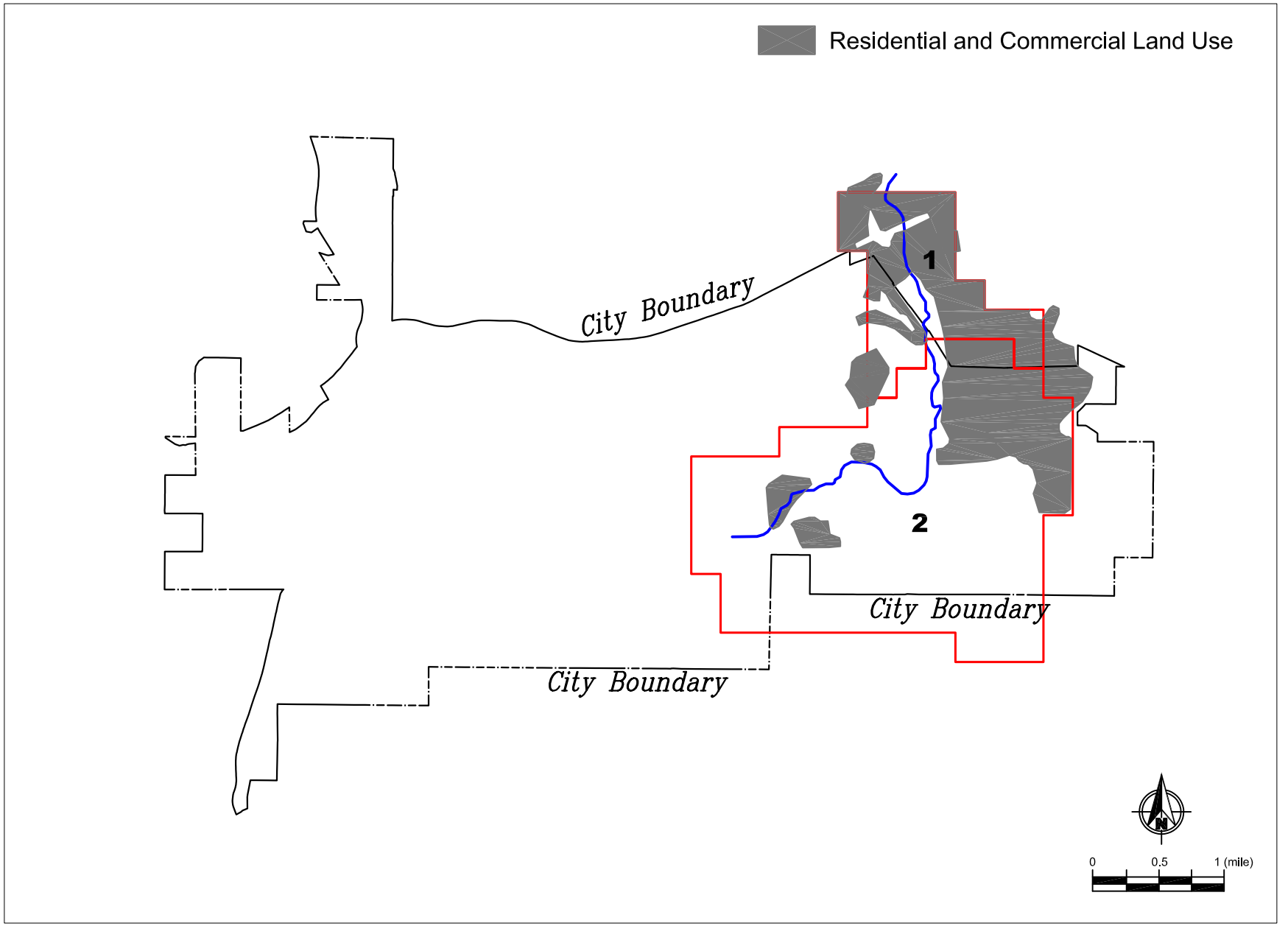

Figure 5.6
Watershed Management Alternative 1 - Structural BMPs for Dry Canyon Creek

the Las Virgenes Creek watershed occur downstream of the area of interest (City limits); therefore, changes in septic systems were not addressed in the watershed modeling analysis since those changes would not have any effect on the portion of the creek that flows through the City. The remaining sources of nutrients in the Las Virgenes watershed that were analyzed for control as part of the watershed modeling analysis were reclaimed irrigation water use and livestock. In the McCoy and Dry Canyon Creek watersheds the sources of nutrients that were analyzed for control were golf course irrigation, and reclaimed water irrigation, with some discussion regarding septic systems.

A reduction factor in nutrient loading was applied for each of the controllable sources within each watershed. Figures 5.7, 5.8, and 5.9 show the nutrient source reductions that were applied to the subwatersheds of each creek.

Similar to Watershed Management Alternative 1, two scenarios were developed for the Watershed Management Alternative 2. Alternative 2A was based on the assumption that the source control measures would be effective in achieving a 25% reduction in reclaimed water irrigation and livestock sources. Alternative 2B was based on the assumption that the source control measures would be effective in achieving a 50% reduction in nutrients.

A summary of the watershed model alternatives is given in Table 5.3.

Table 5.3. Summary of Watershed Model Simulations

Alternative	Description
Historical Land Use	No urban land uses and sources; open space only
Creek Restoration Alternative	Implementation of all creek restoration opportunities
Alternative 1A	Structural BMPs – 50% Runoff
Alternative 1B	Structural BMPs – 100% Runoff
Alternative 2A	Source Control Measures – 25% Source Reduction
Alternative 2B	Source Control Measures – 50% Source Reduction

Source: Everest International Consultants, Inc.

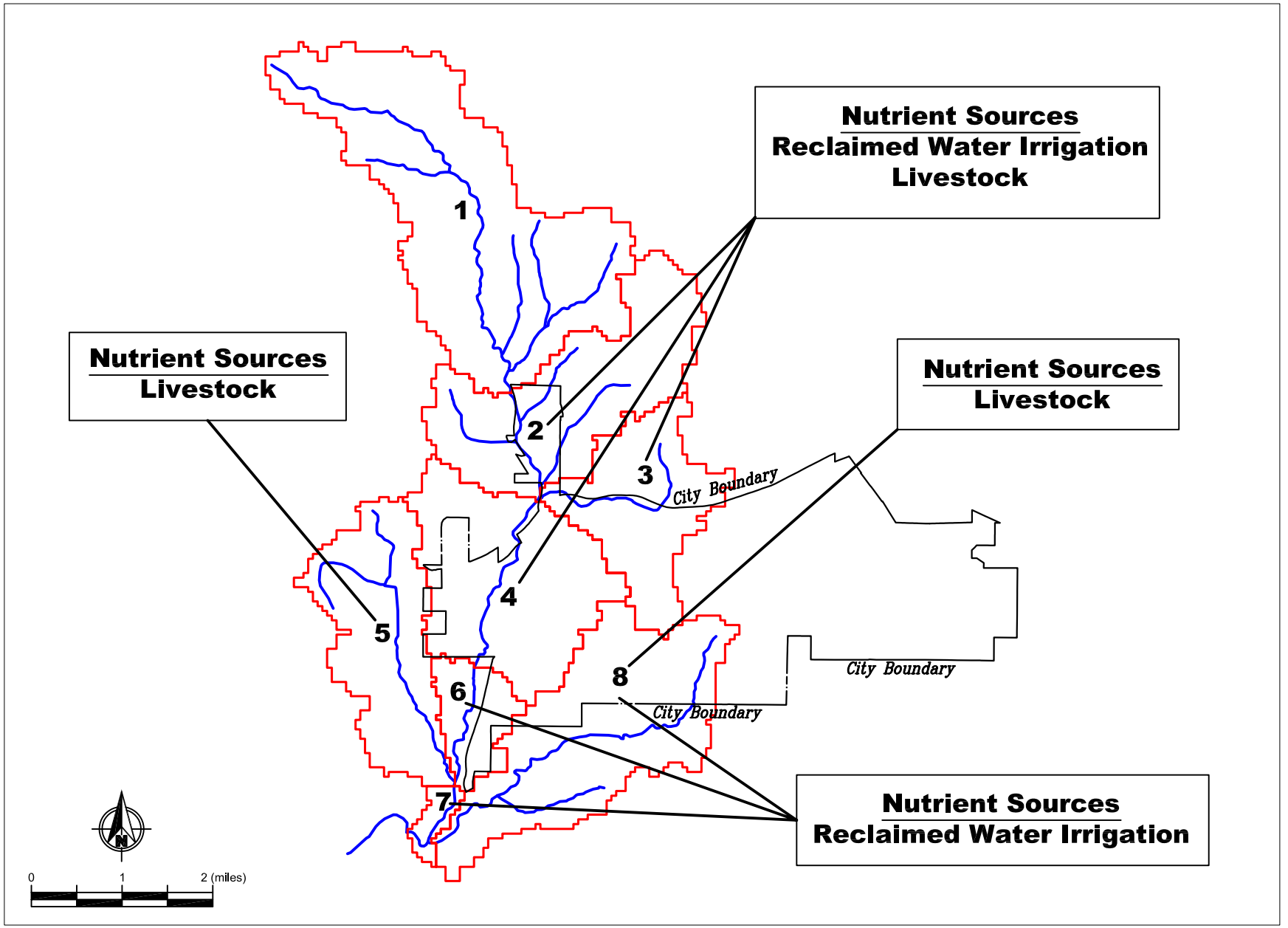

Figure 5.7

Watershed Management Alternative 2 - Source Control Measures for Las Virgenes Creek

Source: Everest International Consultants, Inc.

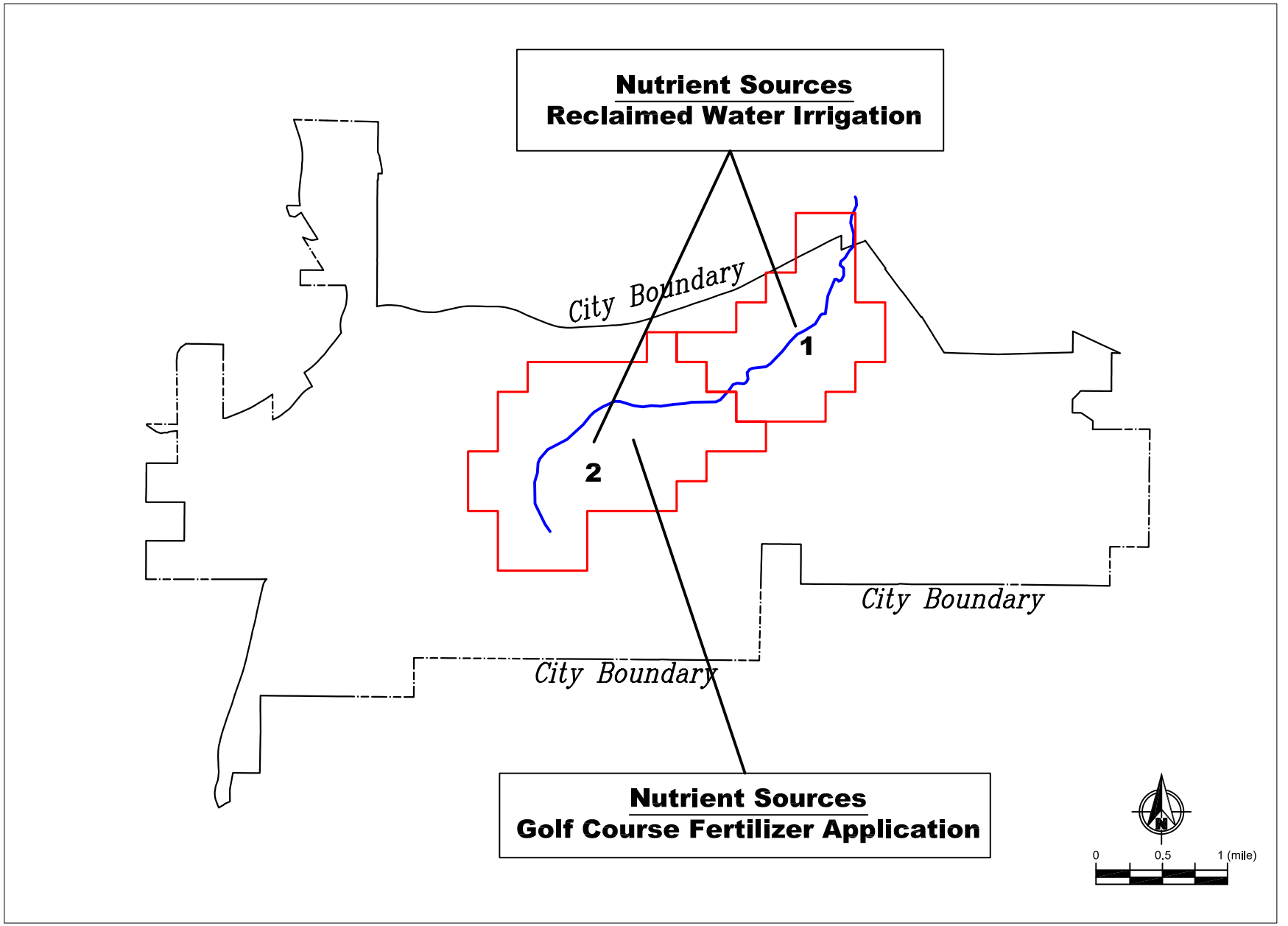

Figure 5.8
Watershed Management Alternative 2 - Source Control Measures for McCoy Creek

Souce: Everest International Consultants, Inc.

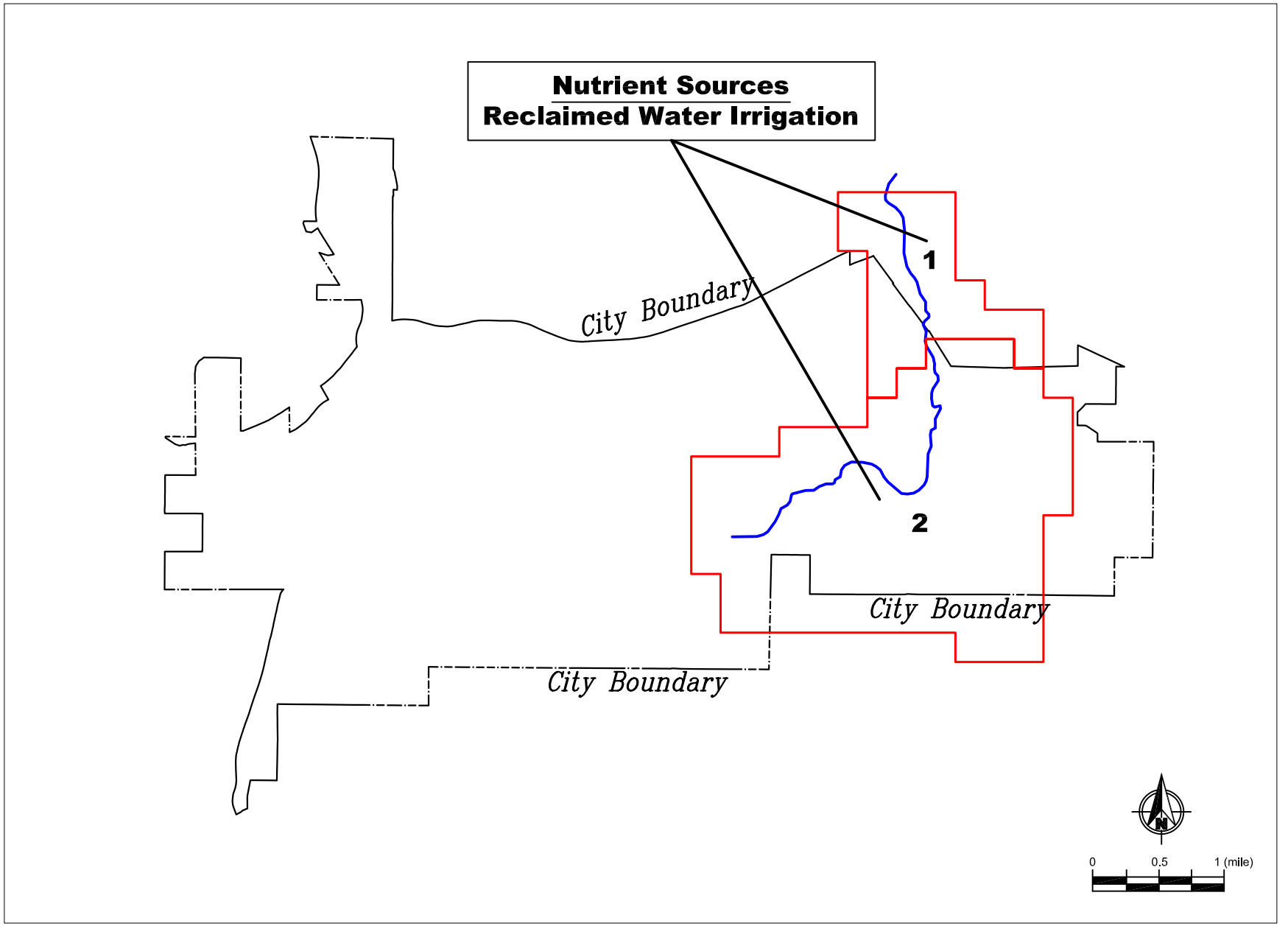

Figure 5.9

Watershed Management Alternative 2 - Source Control Measures for Dry Canyon Creek

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CHAPTER 6.0
ALTERNATIVES EVALUATION

Each alternative was simulated for a 3.75-year time period (October 1996 – June 2000) using the HSPF model. The results from the first year were not used to allow adequate time for the numerical model to reach a dynamic equilibrium. Therefore, nutrients were evaluated based on the average annual load (lbs/yr) over the last 2.75 years of the model results. The model output location for each of the three creeks was established at the downstream City limit (Figures 6.1, 6.2, and 6.3). Thus, the model results reflect the alternative restoration measures upstream of the output location.

The reduction in average annual loading (expressed as a percentage) at each output location was determined for each alternative and then compared to the loading under existing conditions. Table 6.1 presents the results of the model simulations, which are further summarized in the sections below.

6.1 HISTORICAL LAND USE EVALUATION

For the Historical Land Use scenario, all three creeks show notable reductions in loading ranging from 86% to 98% for nitrate, ammonia, and phosphate. The large percentage of potential nutrient loading reduction indicates that the major contribution of nutrients in both watersheds is from human and urban uses. The results also indicate there is a small quantity of nutrient loading attributable to natural sources (e.g., soil erosion and wildlife). Therefore, to achieve a 100% reduction in nutrients may require reductions in loading attributable to natural as well as human sources.

6.2 CREEK RESTORATION ALTERNATIVE

The Creek Restoration Alternative was found to have no detectable impact on nutrient loading for all three creeks. The simulations were based on implementation of all identified creek restoration opportunities within each creek, including bank stabilization, concrete removal, and vegetation clearing. Since the creek restoration opportunities focused primarily on hydrologic and/or habitat changes within the creek channel, neither the nutrient loadings from the watershed nor the water quality processes within the creek were substantially modified through

Source: Everest International Consultants, Inc.

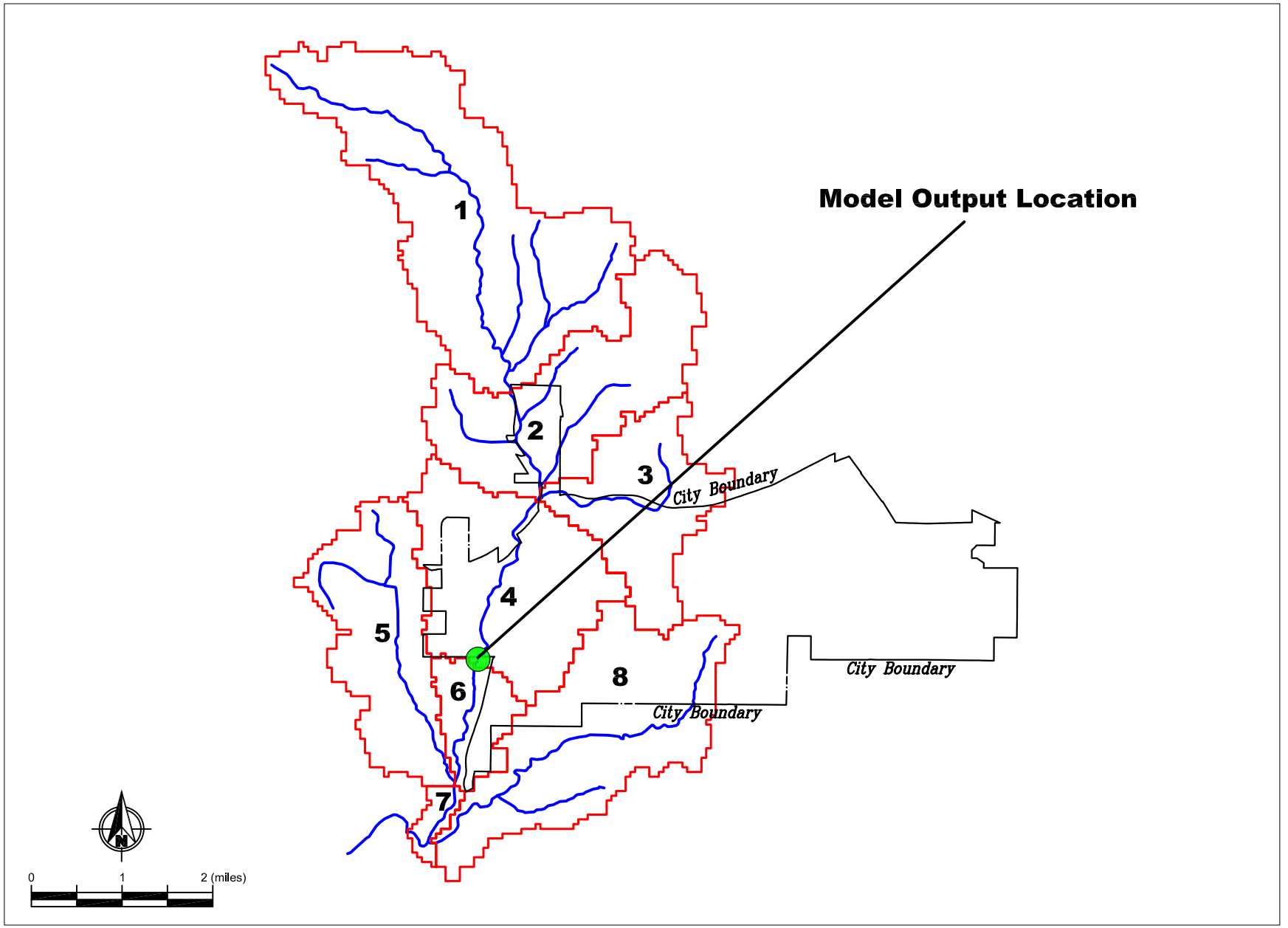

Figure 6.1
Model Output Location for Las Virgenes Creek

Source: Everest International Consultants, Inc.

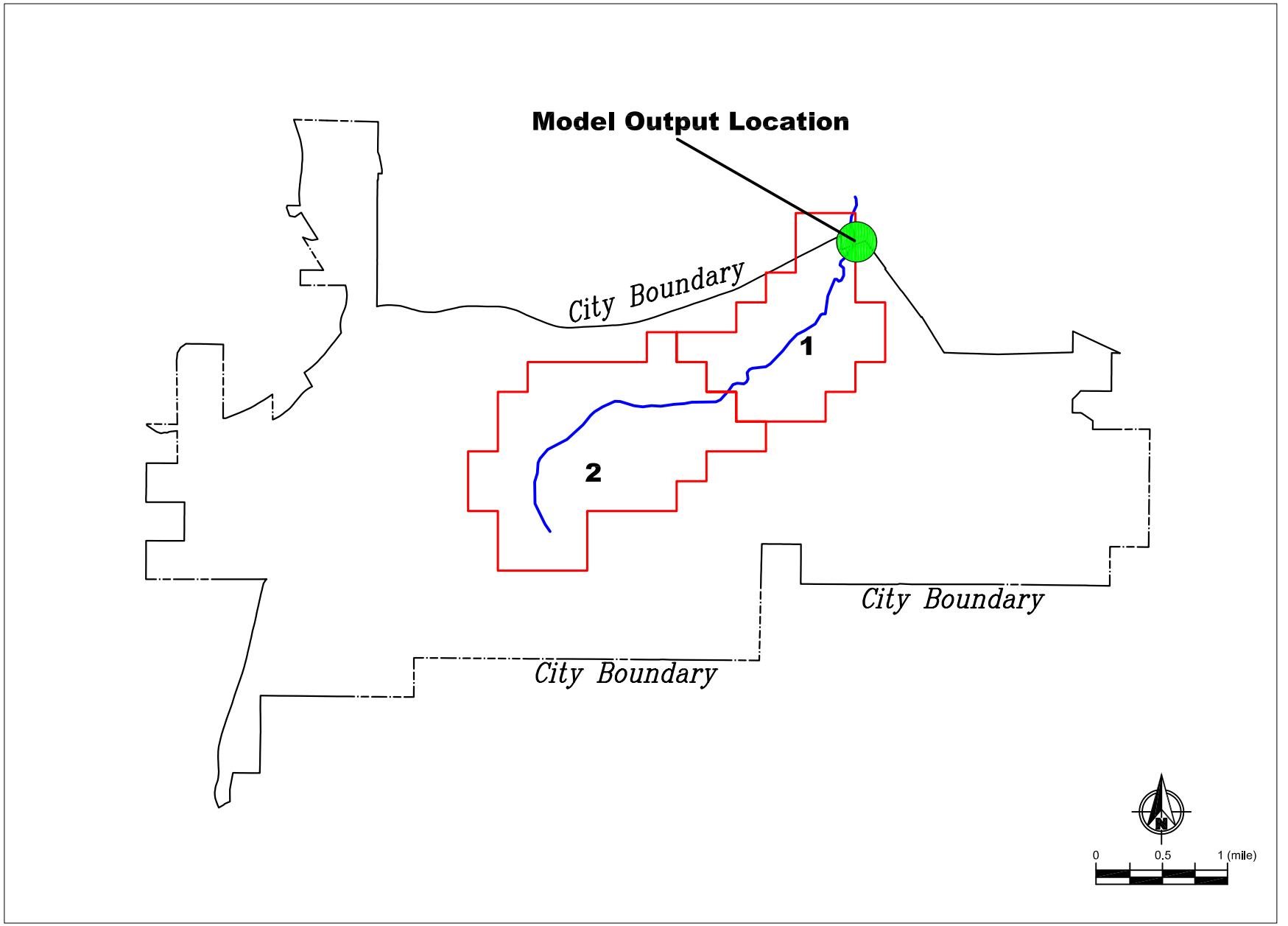

Figure 6.2 □
Model Output Location for McCoy Creek

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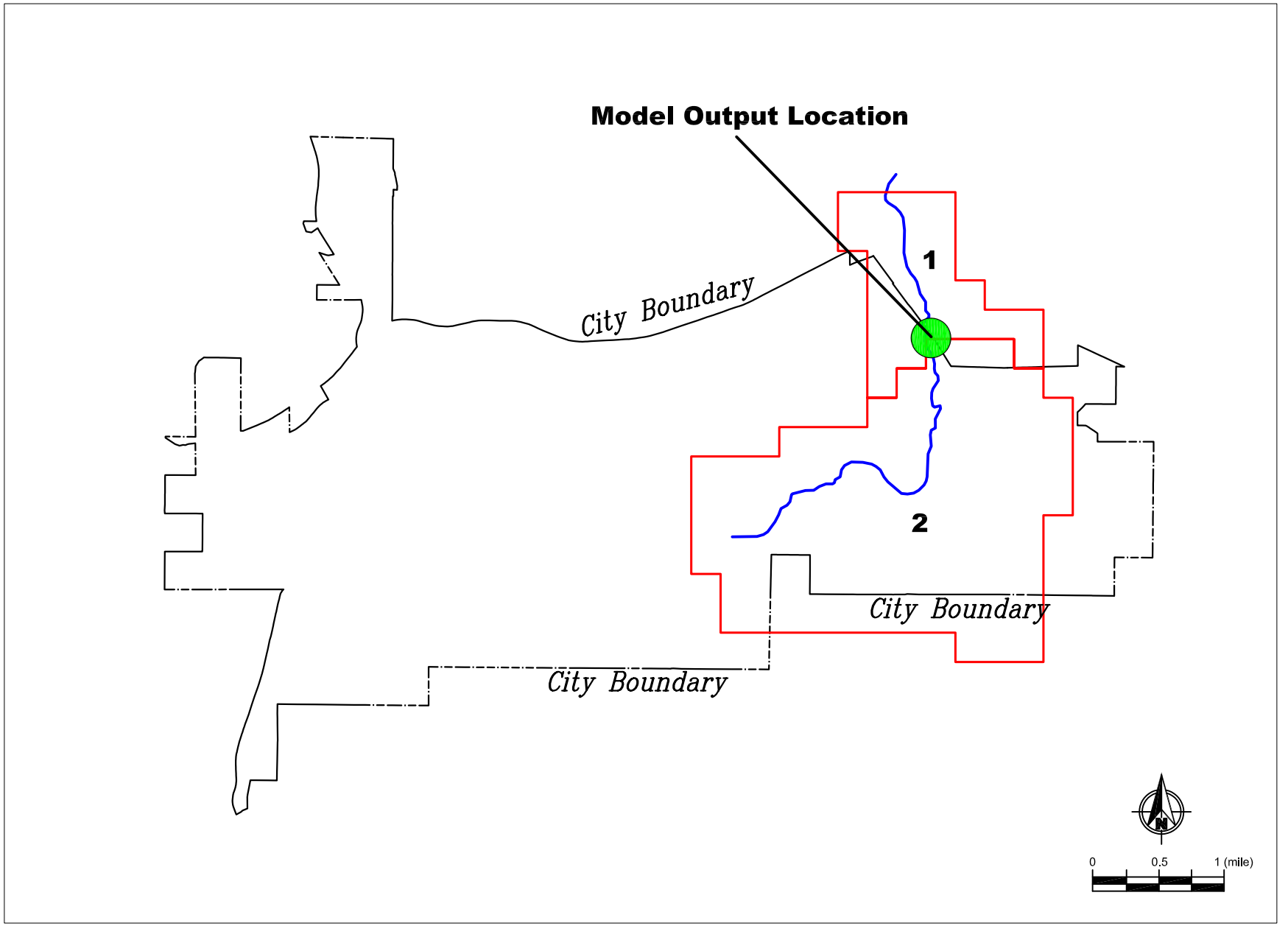

Figure 6.3
Model Output Location for Dry Canyon Creek

Table 6.1. Nutrient Loading Reductions by Alternative

Alternative	Creek	Percent Reduction (%)		
		Nitrate	Ammonia	Phosphate
Historical Land Use	Las Virgenes Creek	91	86	86
	McCoy Creek	98	96	98
	Dry Canyon Creek	98	98	93
Creek Restoration Alternative	Las Virgenes Creek	0	0	0
	McCoy Creek	0	0	0
	Dry Canyon Creek	0	0	0
Alternative 1A	Las Virgenes Creek	4	19	16
	McCoy Creek	2	13	7
	Dry Canyon Creek	5	28	21
Alternative 1B	Las Virgenes Creek	7	39	32
	McCoy Creek	4	26	14
	Dry Canyon Creek	9	55	42
Alternative 2A	Las Virgenes Creek	21	5	4
	McCoy Creek	16	3	8
	Dry Canyon Creek	17	2	2
Alternative 2B	Las Virgenes Creek	41	10	7
	McCoy Creek	33	6	15
	Dry Canyon Creek	35	4	5

implementation of the creek restoration measures. The model results of restoration alternatives for all three creeks indicated that nutrient loading would not be meaningfully affected through implementation of these measures. However, there could be water quality improvements for other pollutants if the identified restoration measures were implemented.

6.3 WATERSHED MANAGEMENT ALTERNATIVE 1—STRUCTURAL BMPS

The results of Watershed Management Alternative 1 modeling indicate that structural BMPs are more effective in reducing ammonia and phosphate loading than nitrate loading. Alternatives 1A and 1B provide a range of reduction based on the amount of runoff treated and the effectiveness of the various BMPs. The quantity of runoff treated with structural BMPs directly impacts the nutrient reduction such that nutrient loading is reduced in proportion to the volume of treated runoff. The percent reductions for Alternative 1B are approximately twice that of Alternative 1A, which corresponds to the treatment of twice as much runoff in Alternative 1B compared to Alternative 1A.

6.4 WATERSHED MANAGEMENT ALTERNATIVE 2—SOURCE CONTROL MEASURES

Watershed Management Alternatives 2A and 2B provided a range in nutrient reductions associated with implementation of a range in nutrient source control measures. Doubling the source control reduction from Alternative 2A (25%) to Alternative 2B (50%) approximately doubled the nutrient loading reduction. The source control measures are the most effective for nitrate reduction and less effective at reducing the loading for ammonia and phosphate.

CHAPTER 7.0
CONCLUSIONS

The following conclusions were developed from the results of this study.

- The City currently implements a variety of storm water pollution prevention and urban runoff regulations pursuant to the Land Development and Health and Safety Codes. The Environmental Services Manager in the Public Works Department is primarily responsible for implementation of these programs with support from the Planning Department and Code Enforcement staff. However, to date these programs do not adequately address/control non-point source pollution from entering the local creeks within the City.
- There is adequate habitat for native fish within the study area. However there is not adequate water quality information to ensure that the reintroduced fish would be able to survive year round.
- The non-native crayfish should be removed from Las Virgenes Creek to improve the survivability of the arroyo chub.
- There are not adequate data on the location and condition of septic systems within the City.
- There are other planning efforts within the City that should be identified at the City planning level. These efforts include: mitigation projects undertaken by private developers; property acquisition by non-profit environmental groups; and trails and parks planning being undertaken by City staff.
- A review of the available, existing data revealed that the water quality data are insufficient to perform a calibration of the model parameters. Continuous flow monitoring and corresponding water quality testing data need to be collected if a calibrated watershed model is to be completed.
- The results of the modeling revealed that human influences account for the majority of nutrient loading to the three creeks. The loading of nutrients (nitrate, ammonia, and phosphate) leaving the City limits under existing conditions with recent human influence was substantially higher than the loading under historical conditions without human influence.

- The results suggest that it is possible to exceed the RWQCB-LA water quality objectives for the study area in the absence of human influence. The overall water quality objectives are described in the Water Quality Control Plan (Basin Plan), and specific pollutants are described in TMDL development documents but have not been incorporated into the Basin Plan yet.

- The results of the sensitivity analysis revealed that increases and decreases in nutrient loading would result in significant changes in the model results.

- Although several habitat improvement opportunities are available throughout the watersheds, implementation of all the restoration measures identified for creek restoration will not result in meaningful reductions in nutrient loading. This is because the creek restoration alternatives will only change the hydraulics/hydrology of the creek and not the nutrient sources or processes. However, in addition to creating/enhancing wildlife habitat, creek restoration projects can be beneficial for controlling other parameters of concern such as dissolved oxygen levels, water temperature, erosion, and sedimentation.

- Implementation of structural BMPs would probably not be effective at reducing nutrient loading associated with nitrates.

- The results of the modeling indicated that implementation of structural BMPs could be effective at reducing nutrient loading attributed to ammonia and phosphate.

- The results of the modeling revealed that source control could be effective at reducing nutrient loading attributed to nitrate.

- There are numerous sources of GIS information for the City and surrounding area. This information is not easily accessible and in many cases stored in disparate coordinate systems, which may cause delays in projects undertaken by the City.

- The City does not have up to date public utilities infrastructure information in electronic format. This limits the ability to use GIS to identify to the areas that are drained by specific storm drains.

- The current available water quality information is inadequate to identify any potential pollutant "hot spots" within the City.

- The results of this study indicate that substantial reductions in nutrient loading (defined as reductions in nitrate, ammonia, and phosphate) will require implementation of a

comprehensive approach involving strategic implementation of structural BMPs and source control measures throughout the watersheds of the three creeks.

- The identified barriers to fish movement are both within and outside the study area. These barriers to movement divide fish populations into smaller segments and make them more vulnerable to small-scale impacts to the creeks.

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CHAPTER 8.0
RECOMMENDATIONS

The following recommendations are provided to improve the effectiveness of existing environmental programs within the City and to improve water quality in the City creeks.

GENERAL RECOMMENDATIONS

- Develop within the City a library of GIS layers and aerial photographs for the area. This data would include relevant environmental data as well as City infrastructure such as storm drains, water and reclaimed water lines, sewer lines, and septic systems. In addition, these data should be maintained with a consistent projection, such as North American Datum (NAD) 83 and could be accessed through the City webpage.
- Work with LVMWD to reduce nutrient levels in reclaimed water if feasible.
- Pursue implementation of automated irrigation control measures to reduce the volume of runoff from areas irrigated with reclaimed water. These control measures would focus on public areas such as median strips, parks and areas with large ornamental landscapes that use reclaimed water.
- Develop a field and/or literature program to verify the applicability of the regional contaminant loading rates to the two watersheds. If the regional rates are found to be not applicable, develop a watershed-specific contaminant loading program.
- Periodically perform a walking survey of the creeks to access the general condition of the creeks, identify new areas of erosion and monitor the areas identified from this project.
- Improve the overall effectiveness of the storm water program to work towards further reducing non-point source contamination. This would include but not limited to; developing alternative weed abatement techniques for City sidewalks and road shoulders, developing irrigation controls to limit runoff, increasing public outreach, as well as monitoring the effectiveness of street and catch basin cleaning to limit trash input into the creeks.
- Install signage at roadways entering the watershed to inform the public of the specific watershed and they are entering. The signs should be designed to raise watershed awareness of the general public and include pollution prevention messages.

- Increase the number of water quality monitoring stations to identify areas of increased contaminant loading.
- Modify the existing water quality monitoring program to provide sufficient data to calibrate the HSPF model.
- Pursue source control measures related to equestrian management and operational practices within the watershed to reduce nutrient loadings.
- Provide public outreach to reduce the fertilizer usage and over-watering in the area. Focus on residents and businesses closest to the creeks first and include outreach to businesses using reclaimed water.
- Coordinate with neighboring jurisdictions to implement structural BMPs at catch basin locations outside of the City boundary but draining into Las Virgenes Creek. These BMPs should focus on sediment control, particularly from the unincorporated areas west of the City boundary.
- Investigate the potential for further installation of commercially available BMPs within the commercial areas of the City.
- Implement structural BMPs throughout the watersheds to reduce nutrient loadings attributed to ammonia and phosphate.
- Conduct modeling of other constituents of concern to develop restoration measures for those constituents.
- Develop integrated alternatives, and simulate the alternatives to determine the effectiveness at improving overall water quality to eliminate single-objective alternatives focused on one or two constituents. This effort should include a cost-effectiveness analysis to optimize multiple objective alternatives.

Las Virgenes Creek

- Continue participation in watershed advocacy groups such as the Malibu Creek Watershed Advisory Council (MCWAC). This will allow for continued data sharing with other organizations located within the watershed.
- Coordinate with Los Angeles County Flood Control District to limit erosion near the City's northern border. This area is also identified for wetland creation and restoration.

- Coordinate with private landowners north of the 101 Freeway, within the City, to install structural BMPs within the large parking areas west of the creek. This can be combined with educational outreach for the residents located within this area on the importance of the storm water program.
- Coordinate with Caltrans and neighboring jurisdictions to limit non-point source pollution from entering the creek. This coordination would emphasize limiting the trash from freeway motorists as well as extensive erosion along the smaller tributaries intersecting Mureau Road.
- Restore a soft bottom creek channel in the area just south of the 101 Freeway by removal of the concrete channel and embankments. This site is located between Agoura Road and the 101 Freeway. The project is currently in the beginning stages of feasibility determination and design.
- Coordinate with the California Department of Fish and Game to develop and implement a program to eliminate crayfish and bull frogs from within the study area. This program would be implemented to improve the existing habitat for the only locally present native fish, the arroyo chub.
- Implement the identified habitat improvement projects discussed in chapter 4. The source control measures and BMPs stated in chapter 5 can also have multiple water quality improvements.

Dry Canyon Creek

- Participate in watershed advocacy groups such as the Los Angeles and San Gabriel River Watershed Council. This will allow for data sharing with other organizations located within the watershed.
- Conduct a survey of septic systems within the City to locate and quantify existing systems within the study area. The survey should include a means of determining the condition of identified septic systems and a mechanism for requiring immediate corrective action for inadequately maintained or failing systems.
- Continue to assist Mountains Restoration Trust with increased public participation activities including public outreach and the development of a citizen-monitoring program.
- Continue coordination with Mountains Restoration Trust to identify and purchase available property within the watershed. These selected acquisitions would include the purchase of the

remainder of Headwaters Corner and adjacent parcels, for consolidation with the existing Mountains Restoration Trust property.

- Implement the identified habitat improvement projects discussed in s chapter 4. The source control measures and BMPs stated in chapter 5 can also have multiple water quality improvements.

McCoy Creek

- Participate in watershed advocacy groups such as the Los Angeles and San Gabriel River Watershed Council. This will allow for data sharing with other organizations located within the watershed.
- Develop a working group of the private property owners within the watershed to share watershed information and coordinate habitat improvement projects. The working group should include, at a minimum, representatives from New Millennium, Calabasas Golf and Country Club, Countrywide Financial, and the Calabasas Tennis and Swim Center.
- Implement the identified habitat improvement projects discussed in chapter 4. The source control measures and BMPs stated in chapter 5 can also have multiple water quality improvements.
- Coordinate the identified habitat improvement projects, in the lower watershed, with the Lake Calabasas Homeowners Association.
- Coordinate with the Lake Calabasas lake managers to identify when the lake overflows into McCoy Creek.
- Provide storm water and water quality educational outreach to the Lake Calabasas Homeowners Association with the potential to expand the outreach to all residents in the future.

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APPENDIX A

WATERSHED MODELING ANALYSIS

Las Virgenes, McCoy, and Dry Canyon Creeks Master Plan for Restoration

Watershed Modeling Appendix

Final Report




Prepared for:
City of Calabasas

Prepared by:
Everest International Consultants, Inc.

EVEREST

August 29, 2003

LAS VIRGENES, MCCOY, AND DRY CANYON CREEKS MASTER PLAN FOR RESTORATION

WATERSHED MODELING APPENDIX

Final Report

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August 29, 2003

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1. INTRODUCTION

1.1 BACKGROUND

Las Virgenes Creek is located within Los Angeles County and Ventura County of the State of California. McCoy Creek and Dry Canyon Creek are located entirely within Los Angeles County. Las Virgenes Creek is located in the Malibu Creek Watershed, while McCoy Creek and Dry Canyon Creek are situated within the Los Angeles River Watershed. Portions of all three creeks run through the City of Calabasas (City), which is shown in Figure 1.1.

Existing beneficial uses of Las Virgenes Creek identified by the Los Angeles Regional Water Quality Control Board (LARWQCB) in the 1994 Basin Plan include water contact recreation, non-contact water recreation, warm freshwater habitat, wildlife habitat, rare species habitat, and wetland habitat (LARWQCB, 1994). Potential beneficial uses include municipal and domestic supply, cold freshwater habitat, migration of aquatic organisms, and spawning, reproduction and/or early development of fish. Existing beneficial uses of McCoy and Dry Canyon Creeks include groundwater recharge (intermittent), water contact recreation (intermittent), non-contact water recreation (intermittent), warm freshwater habitat (intermittent), and wildlife habitat. Potential beneficial uses of these two creeks include only municipal and domestic supply. All three creeks are listed under Section 303(d) of the Clean Water Act (CWA) for multiple pollutants that impair these beneficial uses. The schedule established by the LARWQCB for development of the nutrient total maximum daily load (TMDL) for all three creeks is December 2003.

The City received a grant from the U.S. Environmental Protection Agency (EPA) under Section 205(j) of the CWA to prepare a master restoration plan (Restoration Plan) for the three creeks as part of an overall watershed approach to improving water quality with a focus on meeting TMDL objectives. In July 2002, EDAW, Inc. (EDAW) was selected by the City to prepare the Restoration Plan. In addition to improving water quality, the Restoration Plan lays out alternatives to increase recreational opportunities, provide educational facilities, and enhance wildlife habitat.

A significant component of the study needed to prepare the Restoration Plan was the use of a numerical watershed model to simulate the flow of water and corresponding transport of contaminants. EDAW retained Everest International Consultants, Inc. (Everest) to perform the watershed modeling component of the study. The watershed modeling study is summarized in this document, which was prepared as an appendix to the Restoration Plan.

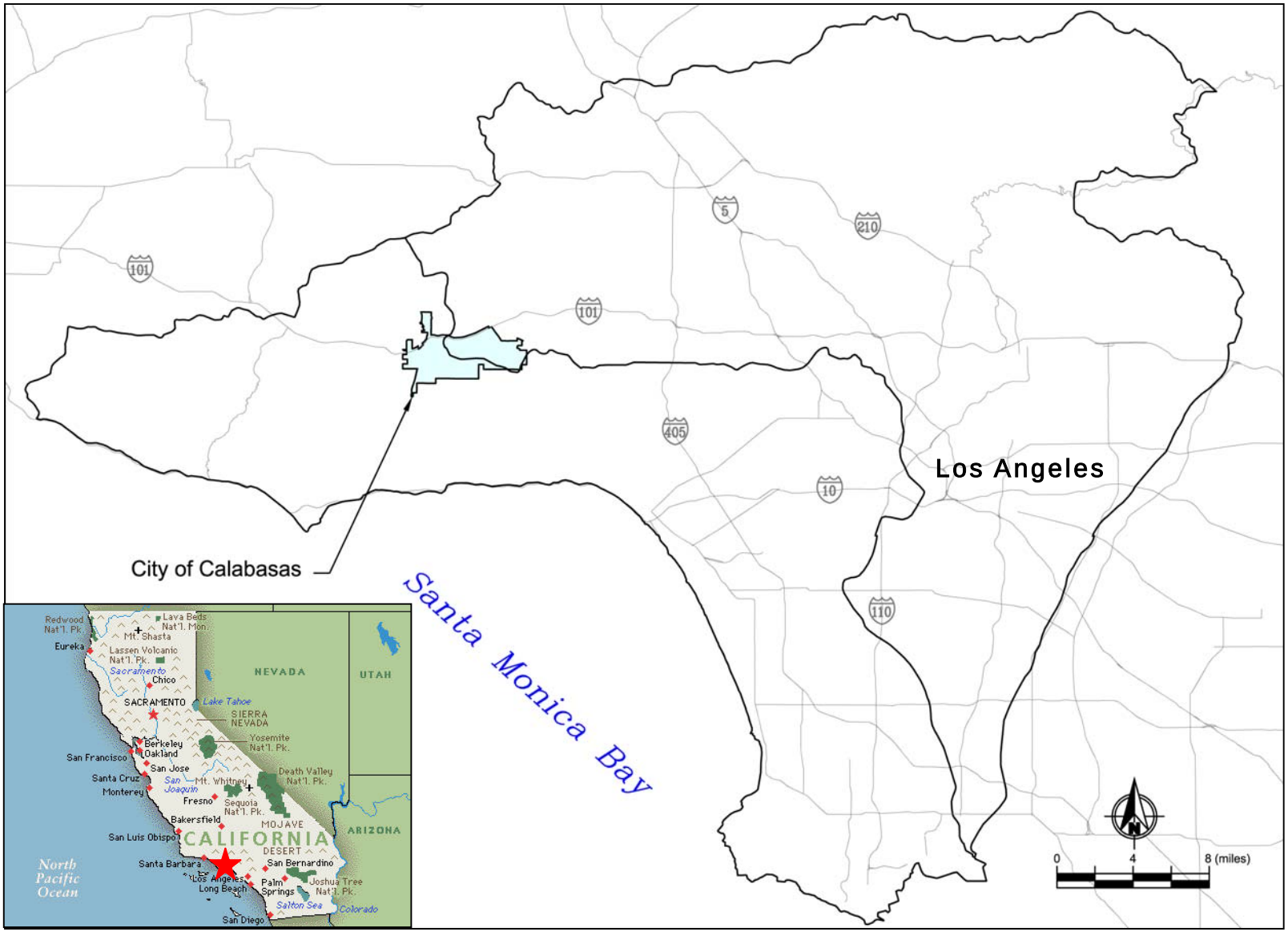

Figure 1.1 Location Map

1.2 PURPOSE AND OBJECTIVES

The purpose of the watershed modeling study was to develop restoration measures and assess the effectiveness of those measures at improving water quality within the creeks. The following objectives were developed to achieve this purpose.

- Select appropriate watershed model.
- Acquire information needed to conduct watershed modeling.
- Identify any data gaps related to the scope of work.
- Develop conceptual models of the two watersheds.
- Perform watershed modeling to establish existing/baseline conditions.
- Develop restoration measures aimed at improving water quality.
- Conduct watershed modeling to analyze and evaluate the restoration measures.

1.3 SCOPE OF STUDY

The scope of the watershed modeling study was limited to an analysis of watershed hydrology and nutrients. Existing, available information and data were used for the modeling study as funding was not available to perform additional field work. The nutrient model simulations were focused on the portion of the creeks that flow through the City boundaries, along with the corresponding watershed areas. The original intent of the study was to conduct the watershed modeling using a calibrated model. However, an initial review of the available data revealed that the data were insufficient for model calibration; therefore, the scope was modified to allow the use of an uncalibrated watershed model for alternative development and evaluation. The implication of this change in scope is discussed in Section 2.3.

2. WATERSHED MODELING APPROACH

A study approach based on the application of a numerical watershed model was developed to meet the study objectives. Potential models were reviewed and a suitable model was selected that met the purpose and objectives of the study. Conceptual models of the two watersheds under existing conditions were developed and the model was used to establish existing conditions. The results of the existing condition simulations were used to establish baseline values for subsequent comparison with the various restoration measures. The EDAW Team worked collaboratively with the City to develop restoration measures and the model was then used to simulate the corresponding flow and water quality conditions. The results of the model simulations conducted with the restoration measures were compared to the baseline results to determine the effectiveness of the various restoration measures at improving water quality. The results of the various alternatives were also compared against one another to gauge the effectiveness of the restoration measures. This last step provided useful information in the development of the overall restoration alternatives for the creeks.

2.1 WATERSHED MODEL SELECTION

The EPA developed a suite of numerical models and a graphical user interface that can be used to analyze watershed hydrology and water quality. This system, known as the Better Assessment Science Integrating Point and Nonpoint Sources (BASINS), is a multipurpose environmental analysis system designed for the application of watershed approaches to improve water quality. The BASINS system supports the development of TMDLs as required by Section 303(d) of the CWA. The BASINS suite allows for flexible analysis at varying geographic scales and it includes a compilation of environmental data from various government agencies migrated into a geographic information system (GIS) framework. Environmental data are available for watersheds as defined by hydrologic unit codes (HUC). BASINS allows for manipulation of watershed characteristics to delineate watershed boundaries and calculate setup parameters for the component simulation models that comprise the BASINS system.

The Hydrological Simulation Program – Fortran (HSPF) model, a component of the BASINS system, was selected for this study for the following three reasons. First, HSPF is a component of BASINS and BASINS is one of the models currently accepted for use by the EPA for loading allocation determination as part of the TMDL program. Second, the model was capable of meeting all the technical requirements of the study purpose including: simulation of watershed hydrology, stream flows, and contaminant loading. The

model also allows for relatively easy incorporation of watershed restoration measures such as best management practices (e.g., CDS units), land use changes (e.g., conversion of urban areas to open space), and source control (e.g., reclaimed water use changes). Third, HSPF is currently being used by the LARWQCB to establish the TMDL allocations for nutrients and bacteria within the Malibu Creek Watershed.

2.2 HSPF MODEL DESCRIPTION

HSPF is a comprehensive watershed modeling package for simulation of watershed hydrology and water quality for both conventional and toxic organic pollutants. It is the only comprehensive model of watershed hydrology and water quality that allows the integrated simulation of land and soil contaminant runoff processes with in-stream hydraulics, water temperature, sediment transport, nutrient, and sediment-chemical interactions (EPA, 2001a).

HSPF simulates the movement of water, sediment, and contaminants over the land surface and through the soils of a watershed, computes resultant flows, sediment transport, and contaminant concentrations in the collecting streams, and provides water discharge, sediment discharge, and contaminant loading to the receiving waters. In summary, HSPF simulates all the hydrological processes within the hydrologic cycle. Figure 2.1 illustrates graphically the hydrologic components of a typical hydrologic cycle.

For a given watershed with known characteristics (e.g., land uses, vegetative cover, and soil conditions), HSPF computes the transport of water, sediment, and contaminants throughout the watershed on a continuous basis under continuous meteorological forcing such as precipitation, temperature changes, and evaporation. HSPF permits complex physical and chemical interactions and transformations of contaminants in the watershed and streams, thereby providing relatively accurate estimates of contaminant loading into the receiving water. The model outputs simulation results in the form of time histories of runoff flow rate, sediment load, and contaminant concentrations at any point of interest within the watershed.

Given the long-term periods of analysis and the comprehensive nature of the processes being simulated, HSPF requires extensive hydrology and water quality data for successful application. Data are needed to characterize the watershed, creek, hydrology, meteorology, and water quality. In addition, for optimal accuracy of the modeled output, the input data should cover the same period of record or the various data records should be verified to make sure all data are representative of the period being modeled. The data required to conduct watershed modeling using HSPF are listed below.

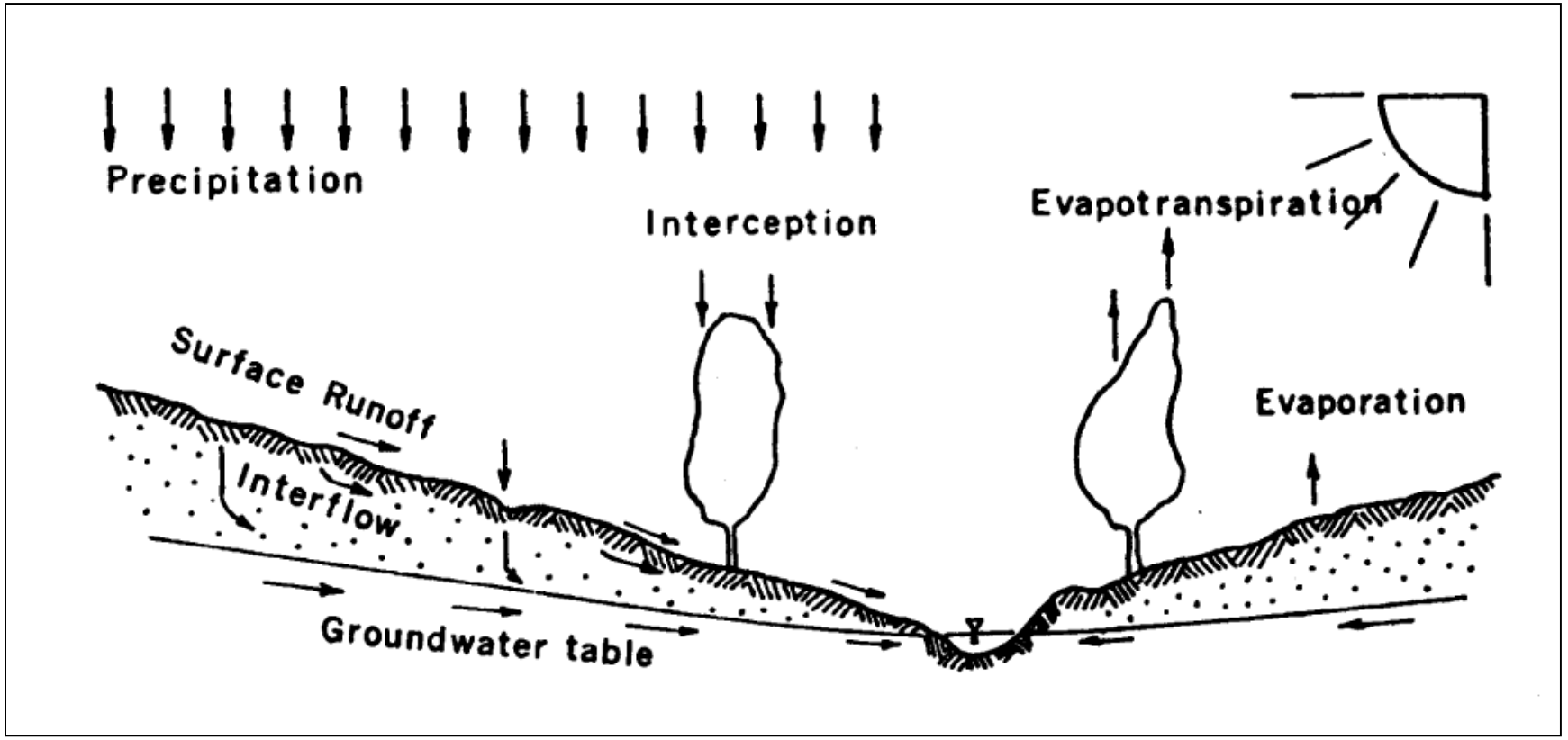

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Figure 2.1 Hydrologic Cycle

Watershed Characteristics

- Topography
- Land use
- Soil characteristics
- Water table depth

Creek Characteristics

- Thalweg elevation profiles
- Cross-section geometries for main channel and overflow planes
- Bottom conditions (earth, vegetation type, rock types)
- Creek rating curve for depth versus flow
- Seasonal variation of creek characteristics

Hydrology

- Continuous precipitation records for local area at hourly interval and corresponding creek flow at multiple locations for each creek (Las Virgenes Creek 5-10 locations; McCoy and Dry Canyon Creek 1-3 locations per creek)
- Groundwater data, including flow and water table depths.

Meteorology

- Evapotranspiration
- Temperature (minimum and maximum) and dew point
- Wind
- Solar radiation
- Cloud cover

Water Quality

- Location, type, and concentration of point sources of contaminants
- Location, type, and concentration of nonpoint sources of contaminants

2.3 HSPF MODEL CALIBRATION DISCUSSION

As with any numerical model, HSPF requires calibration to provide accurate estimates of the various model outputs for a given watershed. Typically, the model will be calibrated by first performing simulations over a given period and then comparing the output to measured values of flow, contaminant loading, and contaminant concentrations. The various model parameters (e.g., initial contaminant storage, atmospheric deposition, and friction) will then be adjusted within accepted limits until the model results match the measured values within an acceptable limit. Therefore, successful calibration requires simultaneous, continuous flow and water quality constituent measurements across the watershed at a level sufficient to resolve the expected variation of these parameters.

The City has been monitoring water quality since 1998 as part of the Adopt-A-Creek Program. The monitoring program consists of instantaneous measurements of various water quality constituents accomplished through direct measurements as well as grab sample collection and subsequent analysis. Instantaneous flow measurements throughout the City were usually collected; however, no continuous flow measurements were collected as part of the program. Given that no simultaneous, continuous measurements of flow and water quality constituents were made the data were insufficient to conduct a meaningful calibration of the HSPF model for this study. Hence, instead of using a fully calibrated HSPF model, a conceptual model built upon literature values was used for this study. Nevertheless, the conceptual model was still useful in providing a relative comparison for the watershed analysis. The conceptual model was verified against analytical methods in flow estimates, as well as comparison with other studies in the region for pollutant loadings. More detailed information regarding the conceptual model setup is provided in the next chapter.

3. CONCEPTUAL WATERSHED MODEL SETUP

The BASINS suite provides a compilation of regional environmental data for the major watersheds of the United States according to HUC. The regional data includes weather, topography, soil type, land use, and point sources of pollutant discharge. In addition, the National Hydrography Dataset (NHD) provides a spatial definition of water bodies within each major watershed of the U.S.

Las Virgenes Creek is located within the Santa Monica Bay Watershed, shown in Figure 3.1, which is designated as HUC-18070104. The Santa Monica Bay Watershed is composed of the Malibu Creek and Ballona Creek Watersheds. A segment of Las Virgenes Creek flows through the western edge of the City of Calabasas, while the upper portion of the Las Virgenes Creek is located within Ventura County. Las Virgenes Creek joins with Malibu Creek just below the downstream boundary of the City. McCoy and Dry Canyon Creeks are part of the Los Angeles River Watershed designated as HUC-18070105. Both creeks originate within the City and join to form Arroyo Calabasas which then flows into the Los Angeles River. Watershed data from the BASINS database, USGS, and NHD were obtained for the watersheds of the three creeks by cross-referencing with the corresponding HUC.

In addition to the data obtained above, meteorological and water quality data were needed to conduct the HSPF modeling. Several available sources were identified to obtain these data and the sources are summarized in Table 3.1. Precipitation data were obtained from the Los Angeles County Department of Public Works (LACDPW) Monte Nido rainfall station (Station No. 435) located just south of Calabasas. Evaporation data was obtained from the closest LACDPW pan evaporation station at Pacoima Dam (Id 33-A). The monthly minimum and maximum temperatures from the National Oceanic and Atmospheric Administration (NOAA) station in Ojai (Station 046399-06) were used to compute the potential evapotranspiration using a computer program based on the Hamon method (EPA, 2001b).

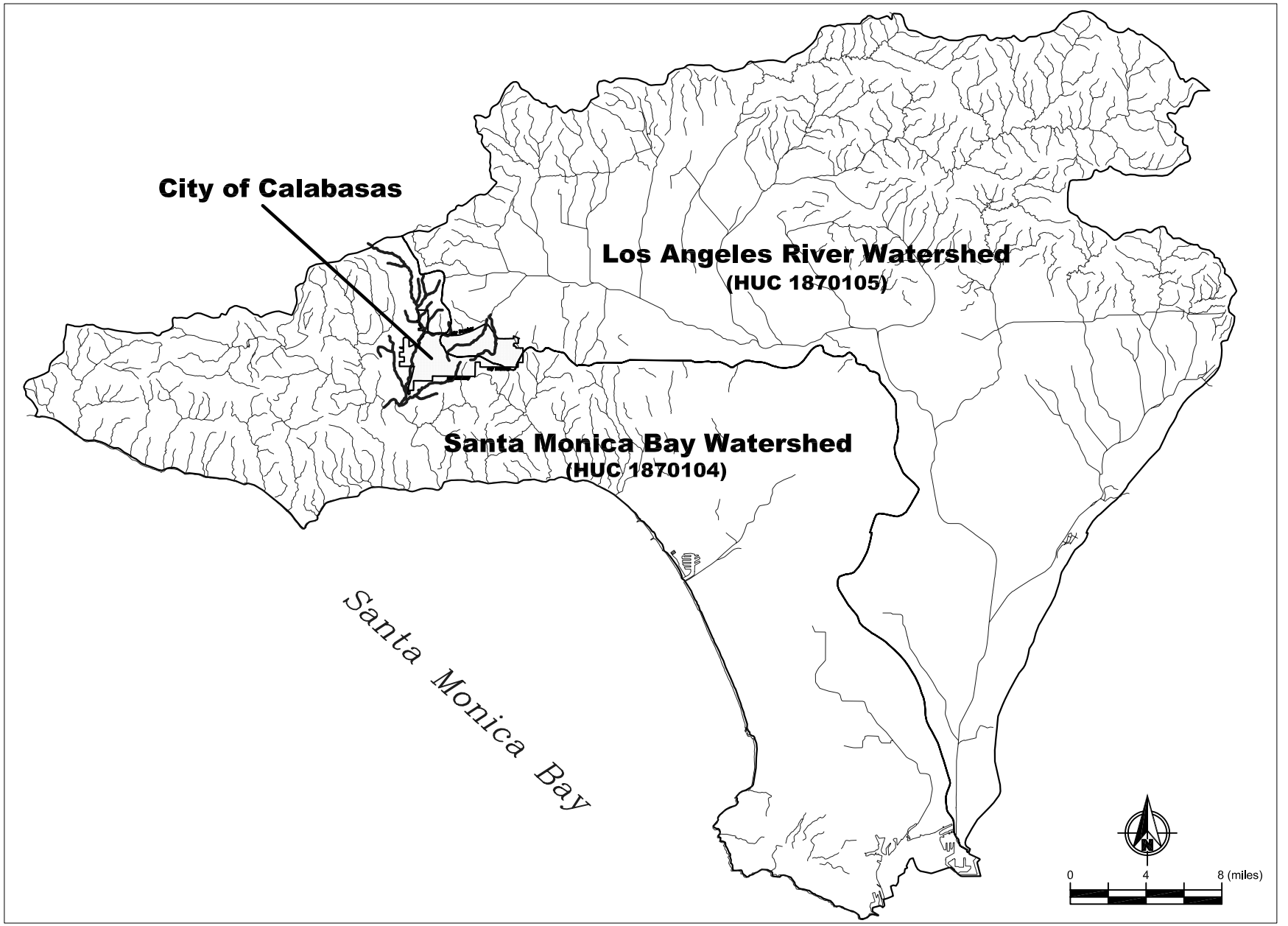

Figure 3.1 Santa Monica Bay and Los Angeles River Watersheds

Table 3.1 Summary of Available Site Specific Data

DATA	LOCATION	RECORD	SOURCE
Precipitation	Monte Nido	10/01/1996 – 9/30/2001	LADPW – Rainfall Station 435
Evaporation	Pacoima Dam	10/01/1996 – 9/30/2001	LADPW – Station Id 33-A
Temperature	Ojai	1/01/1990 – 6/30/2000	NOAA – Station 046399
Land Use	Las Virgenes Creek	1993	SCAG - Malibu Watershed Management Area Plan
Nitrate Ammonia Phosphate	Las Virgenes, McCoy, and Dry Canyon Creeks	Periodically 2001-2002	City of Calabasas
Nitrate Ammonia Phosphate	Las Virgenes Creek	Periodically 1998-2002	Heal the Bay

3.1 WATERSHED SETUP

The watershed boundaries for Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek were delineated based on regional topographic data provided from the BASINS database. The conceptual watershed model for Las Virgenes Creek extends downstream from the upper watershed to the discharge point into Malibu Creek. Figure 3.2 shows the eight subwatersheds used to define the HSPF model area. Las Virgenes Creek flows through the City boundaries in Subwatersheds 2, 3, and 4. The conceptual model extends beyond the area of interest to allow for comparison of the model results with available flow and water quality data at the outlet of Las Virgenes Creek into Malibu Creek (end of Subwatershed 7).

The conceptual watershed model for McCoy Creek is shown in Figure 3.3. McCoy Creek originates within Subwatershed 2 and flows in the northeast direction towards Subwatershed 1.

Dry Canyon Creek flows in a northerly direction from Subwatershed 2 to Subwatershed 1 as shown in Figure 3.4. Dry Canyon Creek exits the city limits at the downstream end of Subwatershed 2.

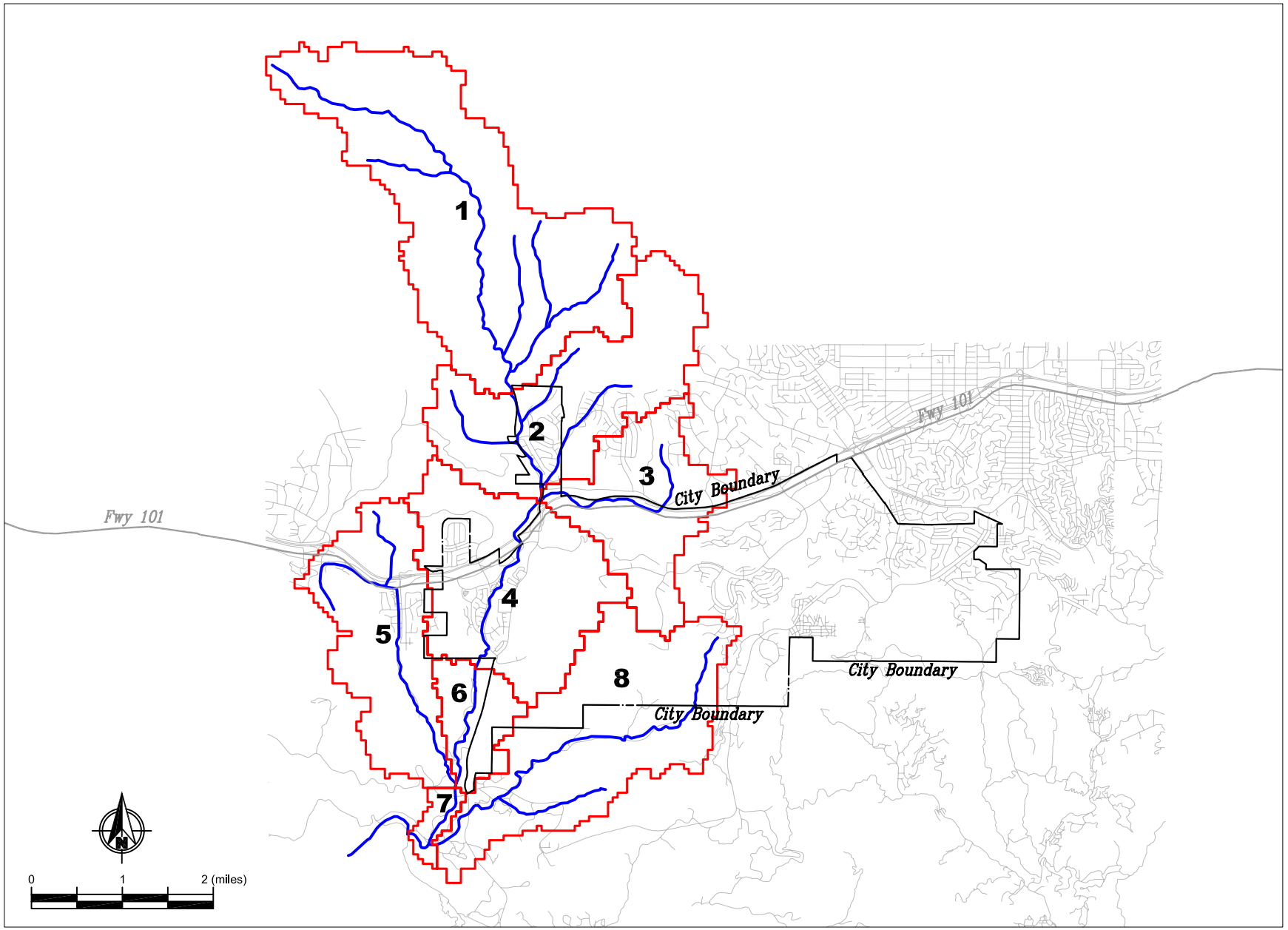

Figure 3.2 Conceptual Model Setup for Las Virgenes Creek

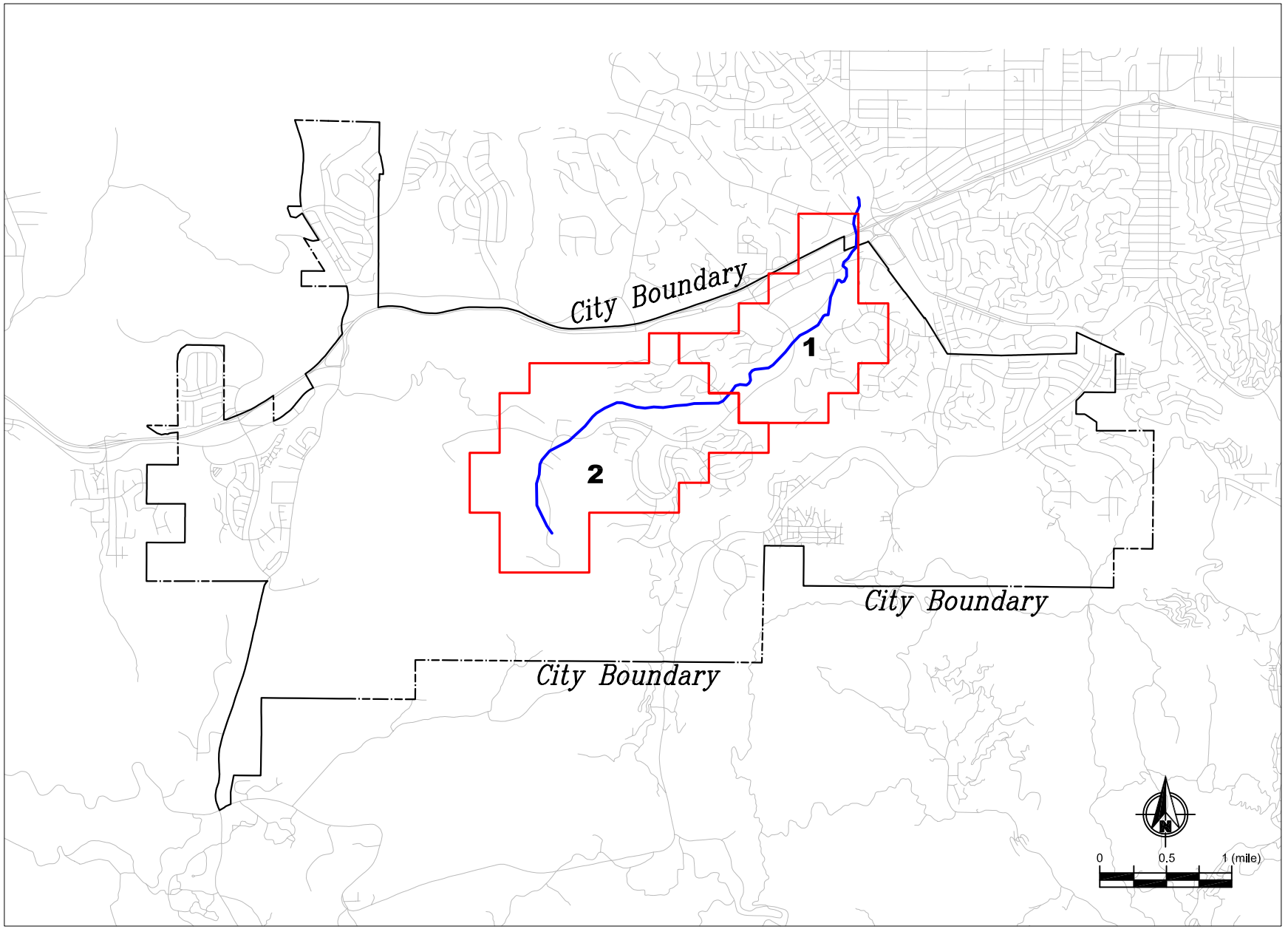

Figure 3.3 Conceptual Model Setup for McCoy Creek

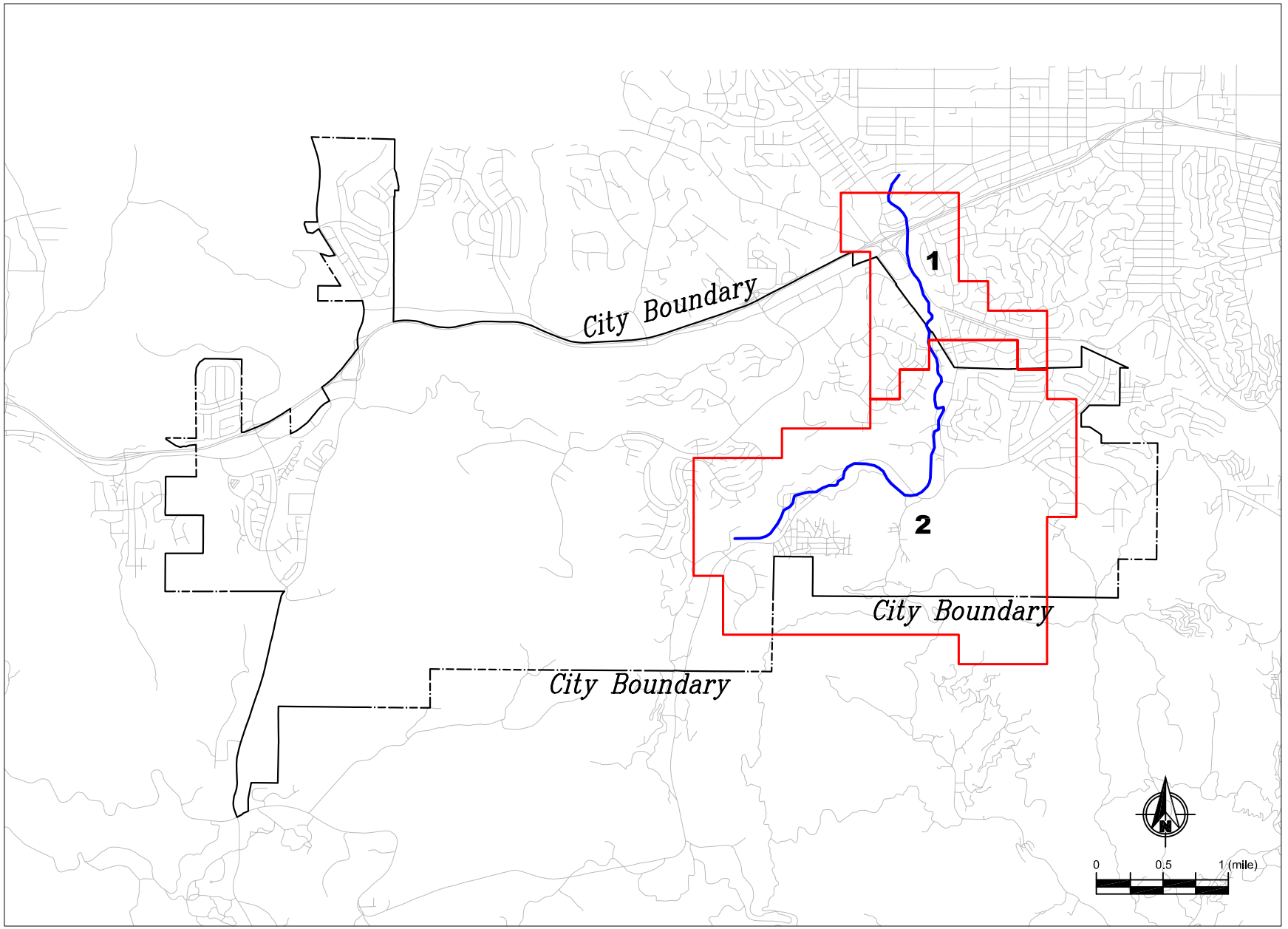

Figure 3.4 Conceptual Model Setup for Dry Canyon Creek

Land uses within the watersheds were obtained from the National Spatial Data Infrastructure and these data were refined with data from the Malibu Watershed Management Area Plan (WMAP) GIS Database. The land uses were grouped into three general categories (open space, urban, and agricultural). Open space included undeveloped area and rangeland. Urban lands comprise all developed areas including residential, commercial, and transportation areas. Agriculture lands are composed of agricultural and animal husbandry areas. Tables 3.2 through 3.4 summarize the areas and land use compositions within individual subwatersheds for Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek, respectively.

Table 3.2 Las Virgenes Creek Subwatersheds

SUBWATERSHED	AREA (ACRE)	LAND USE		DESCRIPTION
		TYPE	PERCENT OF SUBWATERSHED (%)	
1	4396	Open Space Urban	99.8 0.2	Outflow to Calabasas from undeveloped area of Ventura County
2	2465	Open Space Urban	82.0 18.0	Concrete section of Las Virgenes Creek
3	1616	Open Space Urban Agricultural	83.2 16.3 0.5	Tributary
4	2453	Open Space Urban Agricultural	73.4 24.3 2.3	Outflow from Calabasas
5	1940	Open Space Urban Agricultural	87.3 12.3 0.4	Liberty Canyon tributary
6	609	Open Space Urban Agricultural	92.0 2.0 6.0	Open section outside Calabasas
7	171	Open Space Urban Agricultural	99.0 0.5 0.5	Outflow to Malibu Creek
8	2845	Open Space Urban Agricultural	92.0 4.0 4.0	Stokes Creek tributary

Table 3.3 McCoy Creek Subwatersheds

SUBWATERSHED	AREA (ACRE)	LAND USE		DESCRIPTION
		TYPE	PERCENT OF SUBWATERSHED (%)	
1	646	Open Space Urban	59.3 40.7	Outflow from Calabasas to Los Angeles River
2	1076	Open Space Urban	88.9 11.1	Outflow from golf course

Table 3.4 Dry Canyon Creek Subwatersheds

SUBWATERSHED	AREA (ACRE)	LAND USE		DESCRIPTION
		TYPE	PERCENT OF SUBWATERSHED (%)	
1	598	Open Space Urban	16.0 84.0	Outflow to Los Angeles River
2	2393	Open Space Urban	83.0 17.0	Outflow from Calabasas

The Las Virgenes Creek and McCoy Creek watersheds are relatively undeveloped with open space accounting for 88.5% and 77.8% of the watersheds, respectively. It should be noted that the land use distribution for McCoy Creek watershed does not include the New Millennium Project in full build out. The Dry Canyon Creek watershed is substantially urbanized with only 30.4% open space. While open space and agriculture lands were assumed to be entirely pervious, urban lands were considered to have both pervious and impervious areas. The values of percent impervious land for urban land uses assumed for the present study were taken from LACDPW (1994) and the information is summarized in Table 3.5.

Table 3.5 Portion of Impervious Area

URBANIZED DESIGNATION	PERCENT IMPERVIOUS
Single Family	42
High Density	42
Multifamily Residential	70
Transportation	90
Commercial	89

Source: LACDPW, 1994

Soil characteristics within the watersheds were obtained from the State Soil Geographic (STATSGO) Data Base (NRCS, 1995a), which identifies the distribution of hydrologic soil groups based on soil map unit. The percentages of the soil groups identified within the watersheds were used to calculate the weighted averages of infiltration capacity index for the watersheds based on ranges shown in Table 3.6.

Table 3.6 Soil Groups and Infiltration Capacities

SCS HYDROLOGIC SOIL GROUP	INFILTRATION CAPACITY INDEX ESTIMATE		SOIL CHARACTERISTICS	RUNOFF POTENTIAL
	IN/HR	MM/HR		
A	0.4 – 1.0	10.0 – 25.0	Deep sand, deep loess, aggregated silts	Low
B	0.1 – 0.4	2.5 – 10.0	Shallow loess, sandy loam	Moderate
C	0.05 – 0.1	1.25 – 2.5	Clay loams, shallow sandy loam, low in organic content, high in clay	Moderate to High
D	0.01 – 0.05	0.25 – 1.25	Swell significantly when wet, heavy plastic clays, certain saline soils	High

Source: USEPA, 2000

Stream characteristics including cross sections and roughness conditions were estimated from observations made during field visits in February 2003. A representative cross section was assumed for each stream reach within each subwatershed of the three creeks.

3.2 METEOROLOGY

Meteorological conditions in the region that drive the hydrological processes in the watersheds were represented by long-term records of precipitation, temperature, and evaporation from stations maintained by LACDPW and NOAA. Table 3.7 lists the data periods and sources. The monthly minimum and maximum temperatures from the NOAA station were used to produce a record of potential evapotranspiration for the same period using WDMUtil, a meteorological data processor, based on the Hamon method (EPA, 2001b).

Table 3.7 Meteorological Data

DATA	LOCATION	RECORD PERIOD	SOURCE
Precipitation	Monte Nido	10/1/1996-9/30/2001	LADPW Rainfall Station 435
Evaporation	Pacoima Dam	10/1/1996-9/30/2001	LADPW Evaporation Station 33A
Temperature	Ojai	1/1/1990-6/30/2000	NOAA Station 046399

3.3 NUTRIENT SOURCE LOADINGS

Primary nutrient sources within the three watersheds were identified based on information provided by local agencies, published values from prior studies, as well as observations during site visits. Table 3.8 lists the primary nutrient sources.

Table 3.8 Primary Nutrient Sources

WATERSHED	PRIMARY NUTRIENT SOURCES
Las Virgenes Creek	• Atmospheric deposition • Reclaimed water irrigation • Livestock • Septic system
McCoy Creek	• Atmospheric deposition • Reclaimed water irrigation • Golf course fertilization
Dry Canyon Creek[1]	• Atmospheric deposition • Reclaimed water irrigation

[1] At the time modeling was completed there were no data available indicating the presence of septic systems in Dry Canyon Creek; therefore, it was assumed that there were no septic systems in Dry Canyon Creek. After completion of the modeling analysis, information became available indicating the presence of several septic systems within the Dry Canyon Creek watershed but the locations of those septic systems are still unknown.

Graphical representations of the nutrient sources for Las Virgenes, McCoy, and Dry Canyon Creeks are shown in Figures 3.5, 3.6, and 3.7, respectively. The atmospheric deposition rates of nitrate nitrogen (NO_3-N) and ammonia nitrogen (NH_4-N) were estimated from data obtained from the National Atmospheric Deposition Program/National Trends Network (NADP/NTN) Station CA42 in Tanbark Flat, CA to the east of Los Angeles. The nitrogen (N) deposition rates were input as wet deposition (precipitation-associated) and allowed to vary seasonally. The deposition rate of phosphate phosphorous (PO_4), which is not monitored by NADP/NTN, was assumed to be comparable to the nationwide average rate provided by Graham and Duce (1979). The total phosphorous (P) deposition rate (wet and dry) was input to the model as dry (or total) deposition and assumed constant throughout the year. Loadings from atmospheric deposition were applied uniformly to the entire watershed for all three creeks.

The loading rates from reclaimed irrigation water within the watersheds were determined based on effluent flow rates as well as nitrogen (N) and phosphorous (P) concentrations in the effluent from the Tapia Water Reclamation Facility (EPA/RWQCB, 2002). Since irrigation occurs most extensively within the City, the loadings were applied to all subwatersheds with a portion located within the City limits. For each subwatershed affected by irrigation, the total mass loads of nitrogen and phosphorous forms were computed based on the area of Calabasas contained within the subwatershed and divided by the total area of the subwatershed to provide loading rates of nitrogen and phosphorous from irrigation for the subwatershed.

The loading rates from livestock, septic systems, and golf course fertilization were estimated from information provided in EPA/RWQCB (2002). Loadings from these sources were applied to subwatersheds containing animal farming activities, rural residential land use, and golf courses, respectively. For each subwatershed affected by livestock, the total mass loads of nitrogen and phosphorous forms were computed based on the density and types of the animal population in the subwatershed and divided by the total area of the subwatershed to provide loading rates of nitrogen and phosphorous from livestock for the subwatershed. Similarly, for each subwatershed affected by septic systems and golf courses, the total mass loads of N and P phosphorous forms were computed based on the areas of rural residential land use and golf course contained within the subwatershed, respectively, and divided by the total area of the subbasin to provide loading rates of nitrogen and phosphorous from these sources for the subwatershed.

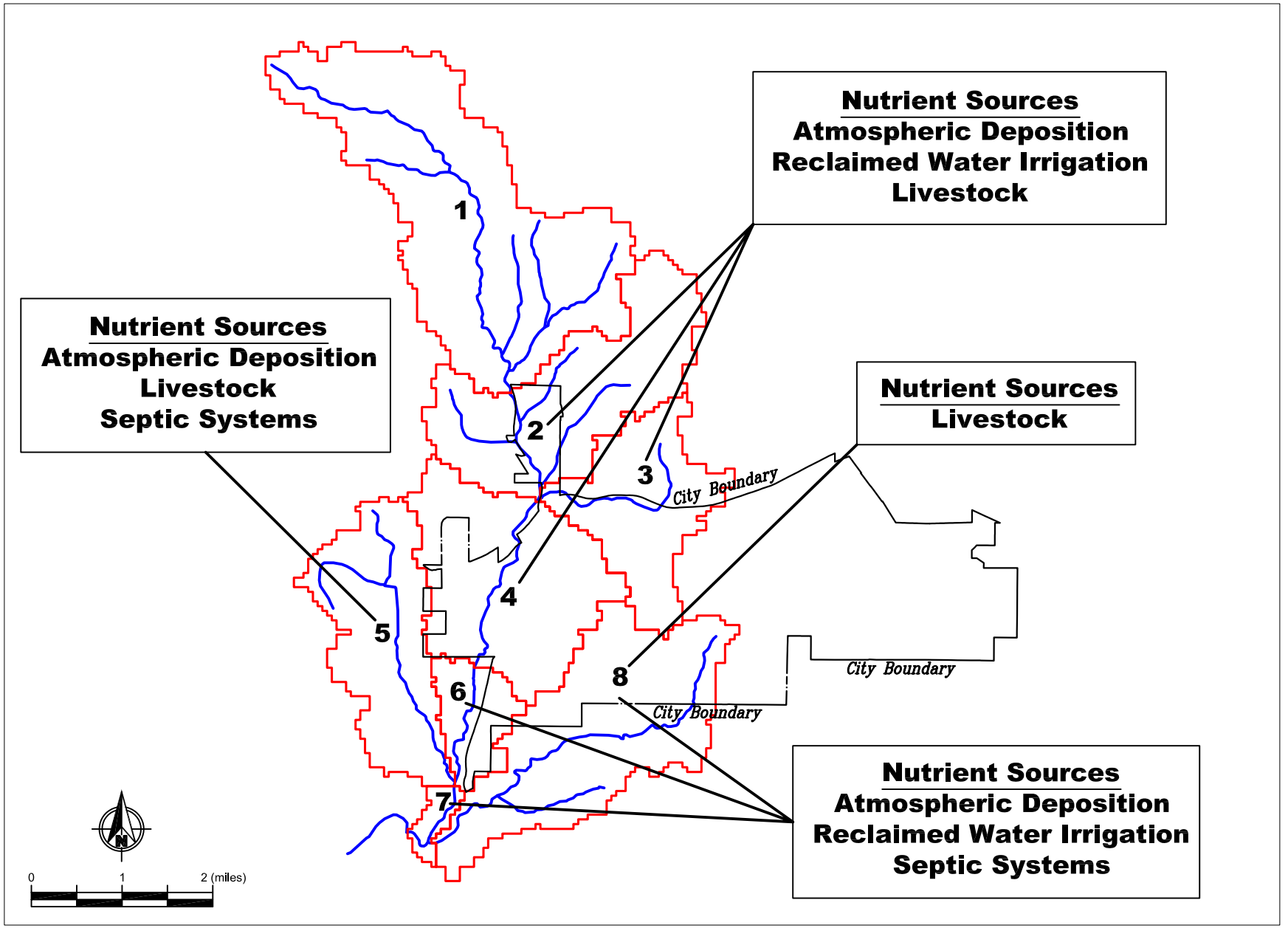

Figure 3.5 Nutrient Sources for Las Virgenes Creek

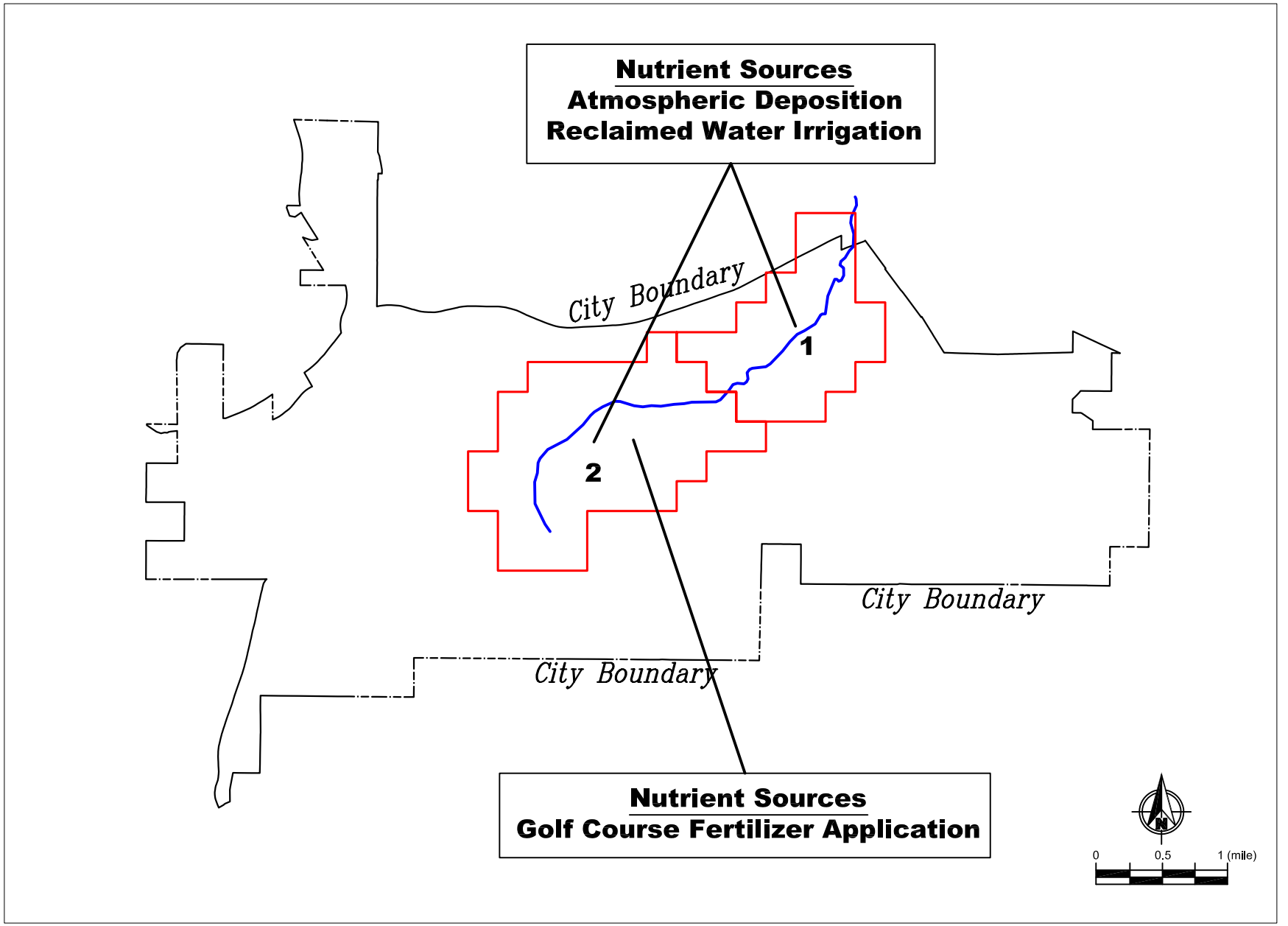

Figure 3.6 Nutrient Sources for McCoy Creek

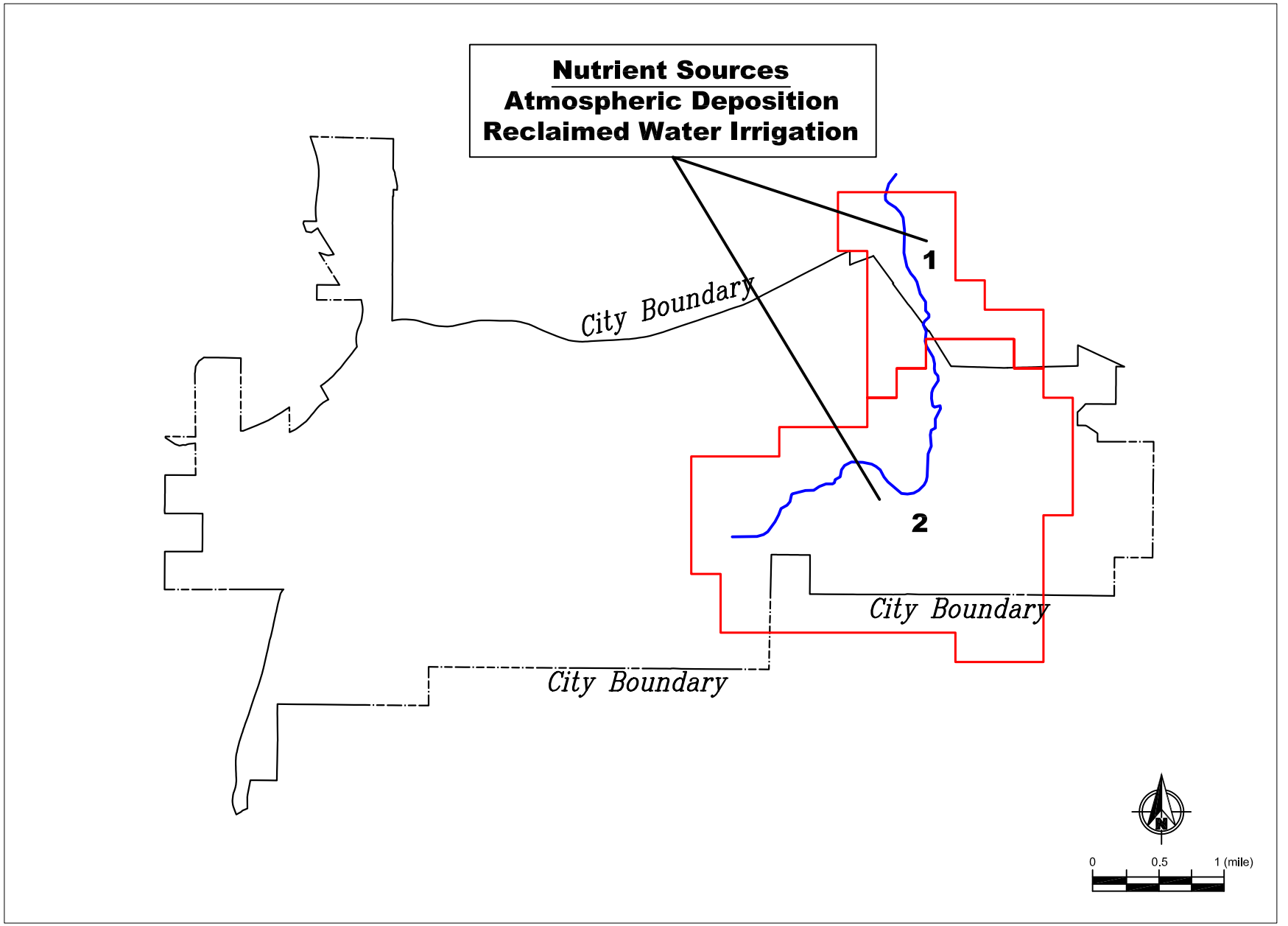

Figure 3.7 Nutrient Sources for Dry Canyon Creek

3.4 CONCEPTUAL MODEL VERIFICATION

Detailed calibration of the HSPF model set up for the three watersheds was not conducted for lack of site-specific water quality data at a level that would permit full calibration of the model. The City has been monitoring water quality since 1998 as part of the "Adopt-A-Creek Program". The monitoring program consists of instantaneous measurements of various water quality constituents accomplished through direct measurements as well as grab sample collection and subsequent analysis. Instantaneous flow measurements were usually collected; however, no continuous flow measurements were collected as part of the program. Given that no simultaneous, continuous measurement of flow and water quality constituents were made, the data were insufficient to conduct a meaningful calibration of the HSPF model.

Instead of full calibration, the model was qualitatively compared against the results of analytical estimates of flows within Las Virgenes Creek and total loadings provided in EPA/RWQCB (2002). Verification was based on loading per acre of watershed with the ranges of nutrient loadings for the Malibu Creek watershed (LACDPW, 2000; Stenstrom et al., 1993; UCLA, 2000; NRCS, 1995b). The nutrient loading trends were also compared to water quality data from the City. The model was found to provide reasonable results given the limited amount of data.

Hydrology

The conceptual watershed model for Las Virgenes Creek was used to check the hydrologic component of the watershed model setup. The conceptual model predicted peak flow rate for existing condition over a 24-hour period are compared with those calculated based on a commonly used analytical method (Rational Method) in Table 3.9. As shown in the table, the conceptual model predicted flow rates at each subwatershed match well with the Rational Method predictions.

Table 3.9 Comparisons of Conceptual Model and Rational Method Flows

SUBWATERSHED	FLOWS (CFS)	
	RATIONAL METHOD	CONCEPTUAL METHOD
1	64	73
2	132	160
3	42	62
4	253	331
5	45	63
6	262	345
7	360	497
8	50	87

Nutrient Loadings

The conceptual model predicted general trends of the nutrient loadings were compared to available monitoring data obtained from the City. An analysis of these data revealed that there is an increase in nutrient concentrations along Las Virgenes Creek moving from upstream to downstream through the City limits. The conceptual watershed models predicted the same general trend of increase in nutrient loadings along the creek through the City. As shown in Table 3.10, the model predicted nutrient loadings compared reasonably well to the values presented in the draft Malibu Creek watershed study (EPA/RWQCB, 2002) report for three separate locations (see Figure 3.8) within the Las Virgenes Creek watershed.

Table 3.10 Average Annual Nutrient Loading Comparisons

LOCATION	NUTRIENT	AVERAGE ANNUAL LOADING (LB/YR)	
		LAS VIRGENES CREEK CONCEPTUAL MODEL	DRAFT MALIBU CREEK WATERSHED STUDY
1	Nitrogen	23,075	19,300
	Phosphorus	8,060	2,075
2	Nitrogen	42,901	43,200
	Phosphorus	16,775	4,340
3	Nitrogen	20,184	14,460
	Phosphorus	3,341	1,640

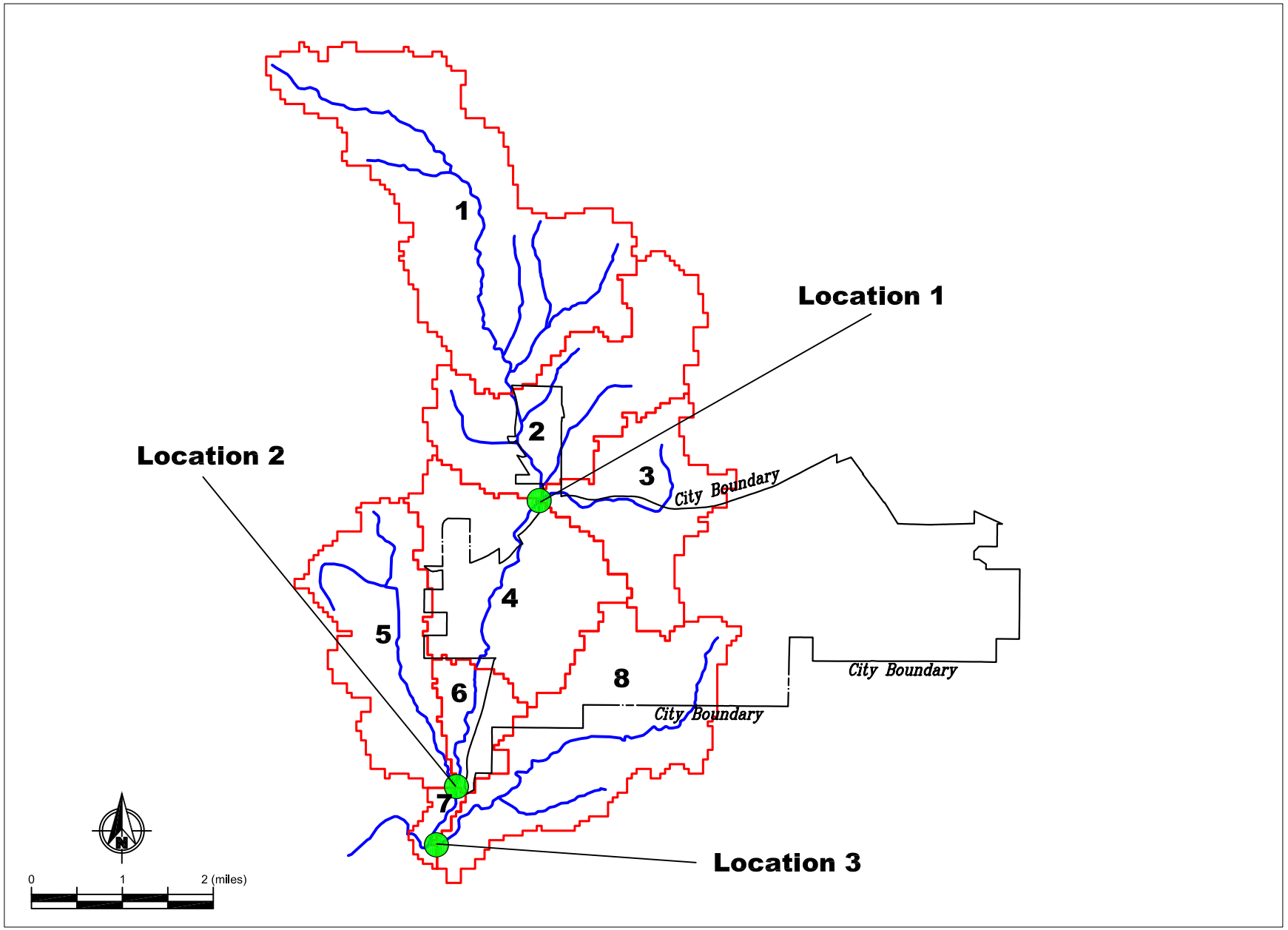

Figure 3.8 Locations for Nutrient Loading Comparison

Loading Sensitivity

Two simulations for each creek were conducted to determine the model sensitivity to the input nutrient loadings. For the sensitivity test, the total loading for each nutrient was increased by 50% and decreased by 50% from the existing condition. The model results were then compared based on percent changes in loading from the existing conditions. Table 3.11 summarizes the percent change for the sensitivity analysis.

Table 3.11 Nutrient Loading Sensitivity Analyses

NUTRIENT	SENSITIVITY CHANGE	PERCENT CHANGE (%)		
		LAS VIRGENES CREEK	MCCOY CREEK	DRY CANYON CREEK
Nitrate	50% Increase	46	33	38
	50% Decrease	46	33	35
Ammonia	50% Increase	23	12	16
	50% Decrease	23	10	9
Phosphate	50% Increase	39	24	38
	50% Decrease	38	24	38

The sensitivity test results show that an increase and a decrease in the input nutrient loadings result in similar percent changes from existing conditions. The nitrate sensitivity change resulted in relatively close changes for Las Virgenes (46%), McCoy Creek (33%), and Dry Canyon Creek (37%).

The results indicate that the absolute nutrient loading is sensitive to the input nutrient loading. The percent change in loading was similar regardless of whether or not the input nutrient loading was increased or decreased. Therefore, the model should only be used to compare relative changes in nutrient loading between alternatives and not to evaluate changes in absolute values. This illustrates the need for model calibration if the model results are to be used on an absolute basis (i.e., actual loading or concentration).

4. ALTERNATIVE DEVELOPMENT

4.1 OBJECTIVE

Nutrient levels in receiving waters are dependent on source loadings in the watershed, transformations on the watershed surface and in the soil environment, runoff intensity, and physical, chemical, and biological interactions within the aquatic environment of the receiving water. Water quality improvement can be achieved by altering these processes. Decreasing the nutrient source within the watershed lowers the nutrient loading. Limiting irrigation or preventing runoff from reaching the receiving water reduces the transport of nutrients. Increases in biological and chemical processes increase removal of nutrients within the watershed also.

Alternative restoration measures were developed to achieve these objectives, thereby reducing nutrient loading to the creeks. The alternative restoration measures were divided into three groups based on the primary mechanism for achieving reductions in nutrient loadings. Alternative restoration measures implemented within the creek (creek restoration) were developed to improve water quality primarily through habitat restoration and creek flow modification. Implementation of structural best management practices (BMPs) within the watershed were analyzed as a class of alternative restoration measures to reduce nutrient loading through methods focused primarily on trapping nutrients prior to entering the creeks (e.g., sedimentation trap, CDS units, and treatment wetlands/bioswales). Finally, source control methods were identified as a class of alternative restoration measures focused primarily on reducing nutrient loading at the generation source (e.g., recycled irrigation water use changes).

4.2 ALTERNATIVE DEVELOPMENT

To facilitate the development of watershed modeling alternatives, improvement goals were established that focused on nutrient reductions and reductions in secondary processes that affect nutrients (e.g., soil erosion). The goals are presented in Table 4.1, along with the corresponding control mechanisms and watershed restoration measures required to achieve each goal.

Table 4.1 Water Quality Improvement Goals, Control Mechanisms, and Watershed Restoration Measures

GOAL	CONTROL MECHANISM	WATERSHED RESTORATION MEASURE
Reduce Fertilizer Runoff	Transport	Structural BMPs
Decrease Husbandry Runoff	Transport	Structural BMPs
Reduce Septic System Failure	Source	Source Control
Modify Reclaimed Water Use	Source	Source Control
Reduce Erosion	Flow	Creek Restoration or Land Use Modification
Increase Vegetative Uptake	Removal	Creek Restoration or Land Use Modification

Since it is possible to implement various combinations of the alternative watershed restoration measures presented above, a clear methodology was needed to cost-effectively analyze the full range of options within a limited number of model simulations. This was done by combining all the restoration measures for each group into one alternative, thereby resulting in three alternatives for model simulation (Creek Restoration, Structural BMPs, and Source Control). To provide a baseline for comparison, a fourth alternative was developed based on the historical land uses that were thought to exist prior to the arrival of European man (i.e., open space/natural). This alternative (Historical Land Use) establishes an upper limit on the amount of improvement that can be achieved through watershed restoration since it reflects a watershed condition absent human influence.

4.3 HISTORICAL LAND USE

The Historical Land Use Alternative was developed to establish nutrient loadings in the absence of human activities. Urbanization impacts the watershed characteristics and increases nutrient loadings associated with anthropogenic sources. By eliminating urbanization, this alternative establishes the maximum possible improvement that can be achieved for the watershed. The alternative was based on the existing watershed without urban land use and with atmospheric deposition being the only nutrient input to the watershed.

4.4 CREEK RESTORATION

The Creek Restoration Alternative was developed to reduce erosion and increase vegetative uptake of nutrients through stream modifications. The alternative addresses all of the creek restoration opportunities, which included erosion control, channel modifications, and wetland restoration actions as identified in Table 4.2. These stream modifications do not impact the nutrient loadings from the watershed that enters the creek, but the modifications were modeled for completeness. In addition, nutrient uptake resulting from habitat restoration is insignificant compared to the other nutrient removal processes because the steep gradients of the creeks do not allow sufficient time for substantial nutrient uptake and the total area of restored habitat was small.

Table 4.2 Creek Restoration Opportunities

RESTORATION OPPORTUNITIES	STREAM MODIFICATIONS
Erosion Control	Stabilize bank and channel
Channel Modifications	Cease vegetation clearing
	Remove concrete and rip-rap
	Stabilize banks with bioengineering techniques
	Remove or improve flow restrictions (e.g. – weirs or culverts)
	Pull back banks
	Enhance floodplain
Wetland Restoration	Remove eucalyptus, vinca, tamarisk, and other exotics
	Create and restore riparian wetlands

Specific restoration actions for Las Virgenes Creek were identified along the main stem defined by the green segment in Figure 4.1. Creek characteristics were modified in Subwatersheds 2, 4, and 6. The concrete channel along the majority of the Subwatershed 2 and along the top of Subwatershed 4 will be removed. Modifications to stabilize the creek bank and channel were identified along the entire segment. Multiple wetland restoration sites were identified in Subwatersheds 2, 4, and 6. Restoration actions were identified for the entire length of McCoy Creek as shown in Figure 4.2. Restoration opportunities for Dry Canyon Creek were also identified along the entire creek. Figure 4.3 indicates the primary restoration actions for Dry Canyon Creek.

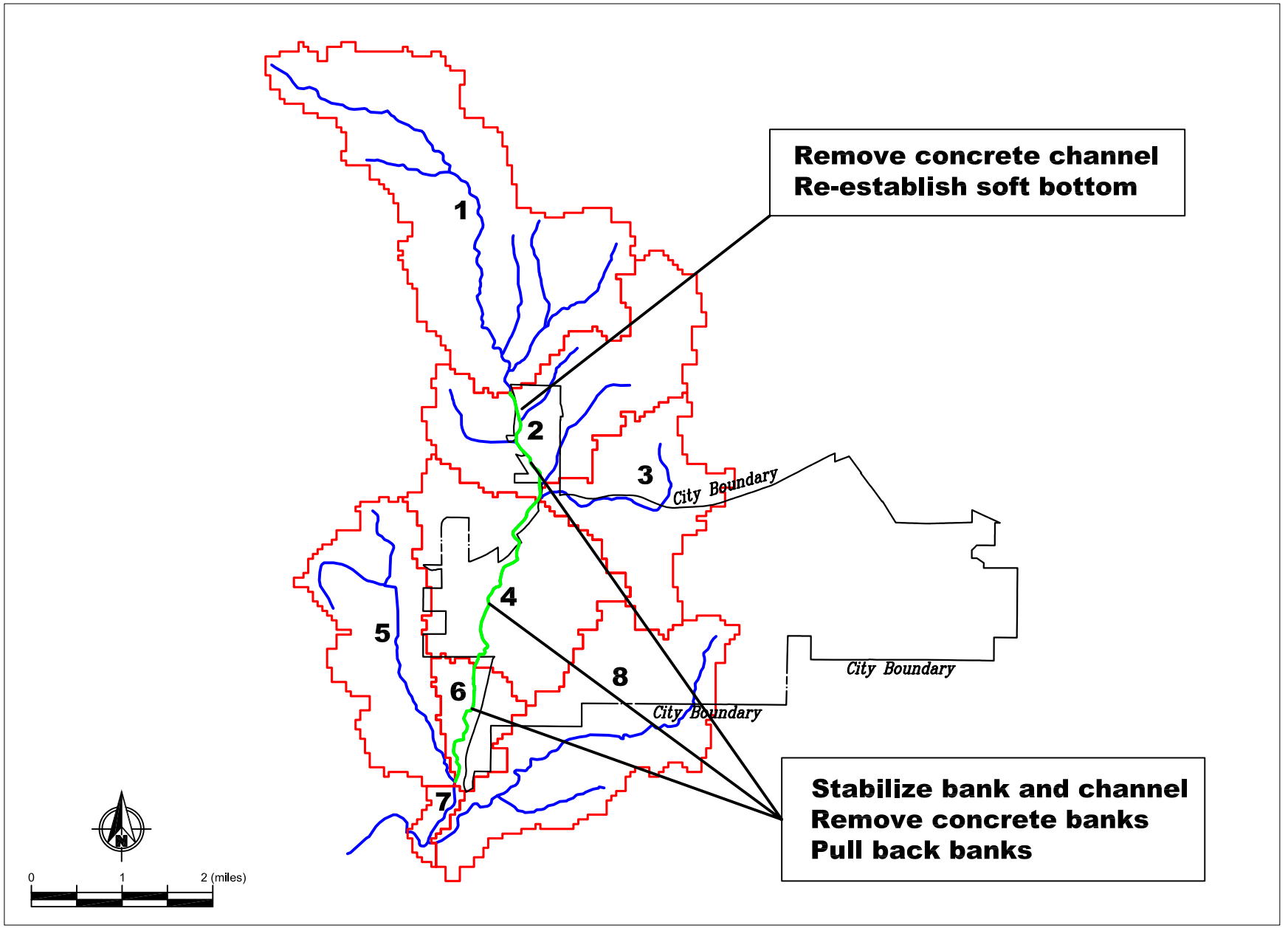

Figure 4.1 Creek Restoration Alternative for Las Virgenes Creek

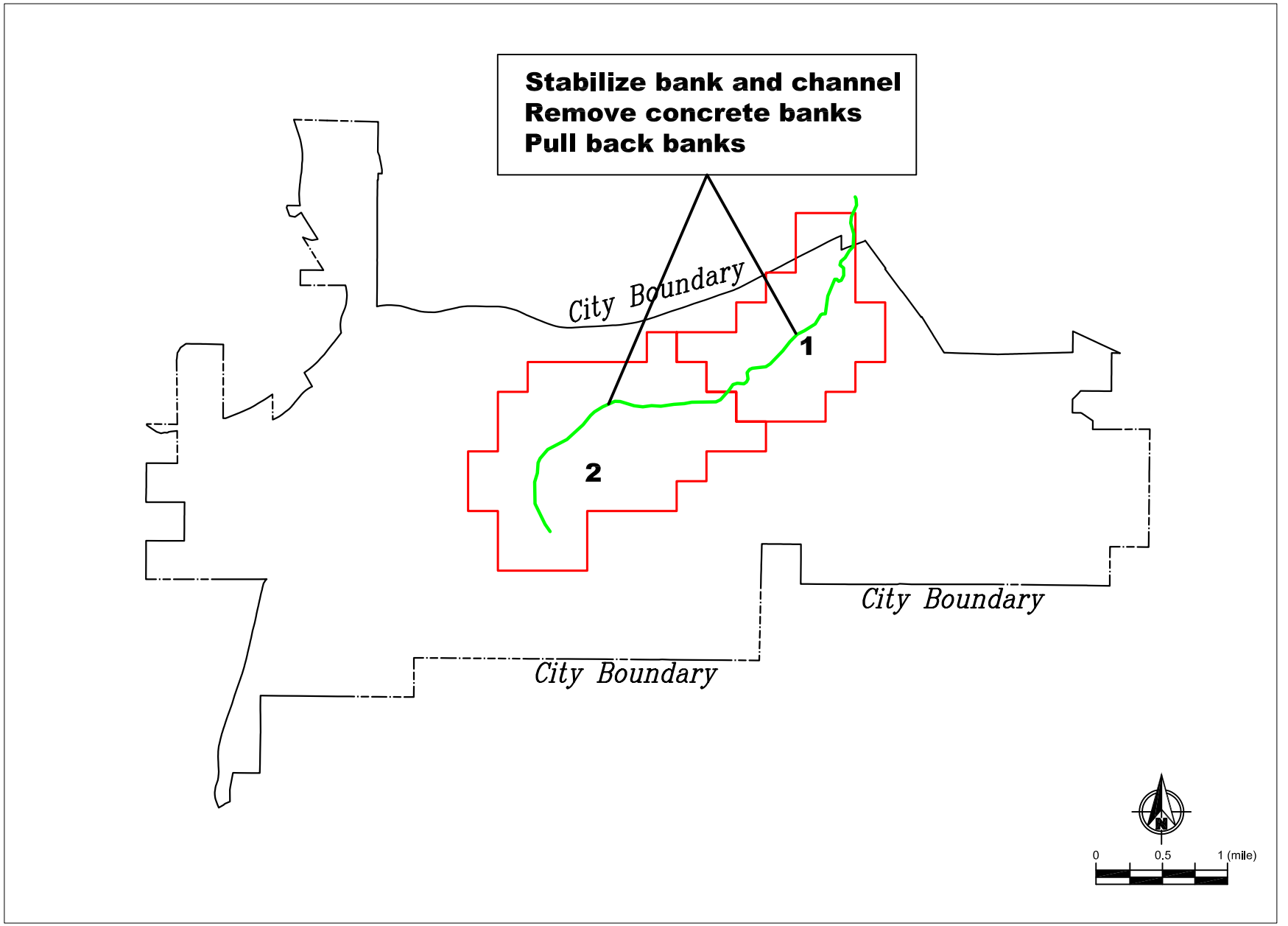

Figure 4.2 Creek Restoration Alternative for McCoy Creek

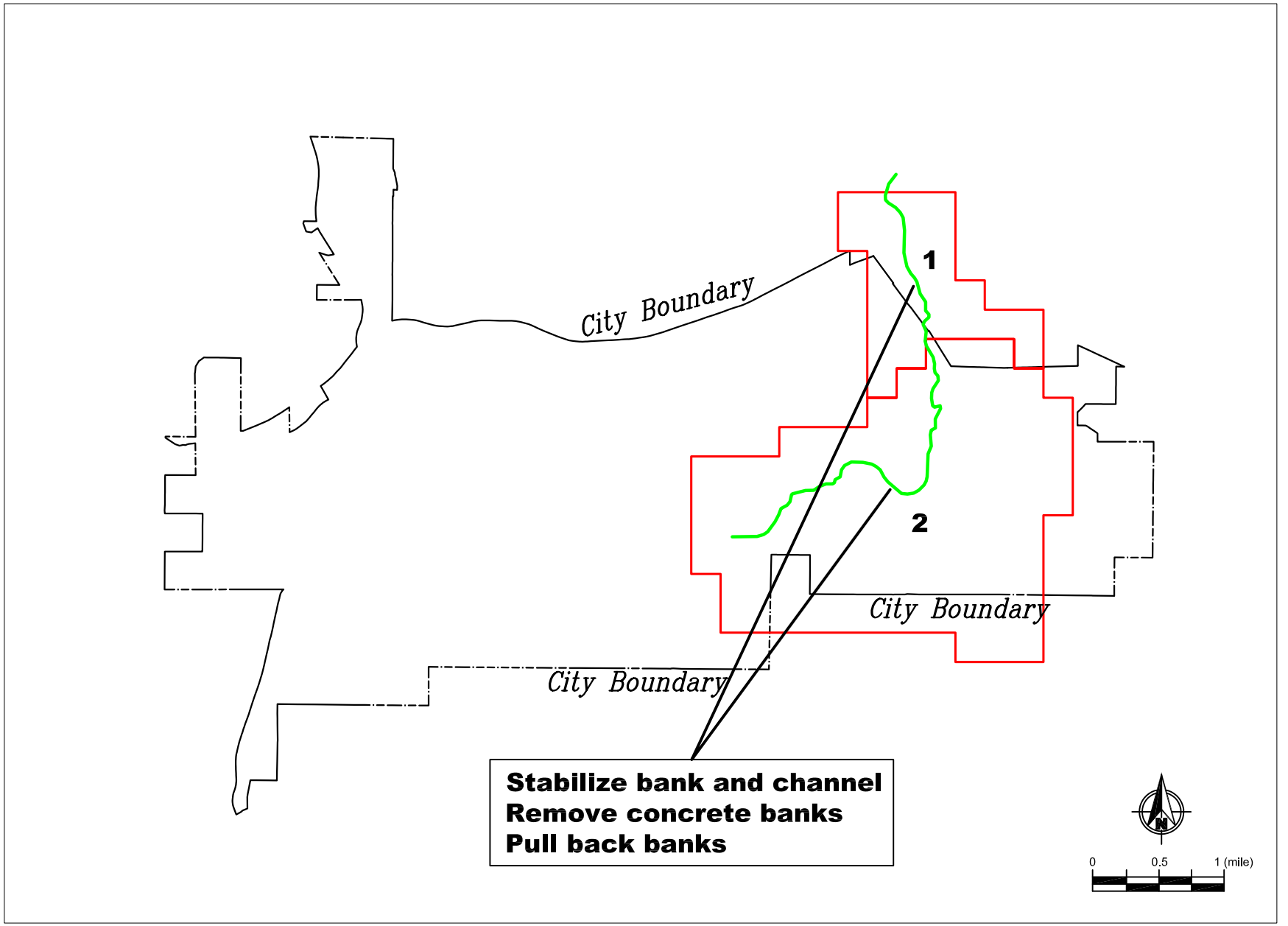

Figure 4.3 Creek Restoration Alternative for Dry Canyon Creek

The Creek Restoration Alternative was simulated by adjusting channel characteristics to reflect stream modifications for erosion control and channel modifications. Improvement of vegetative uptake due to wetland restoration was determined to be relatively localized and insignificant on a watershed scale; therefore, vegetative uptake improvements were not modeled.

4.5 WATERSHED MANAGEMENT ALTERNATIVE 1 – STRUCTURAL BMPS

Watershed Management Alternative 1 was developed to reduce nutrients from runoff by treating runoff on site within the watershed using structural BMPs before it reaches the creeks. Four general types of BMPs were identified to be applicable based on land use: detention basins, biofilters, infiltration basins, and pervious concrete. Detention basins capture runoff for treatment through sedimentation. Biofilters utilize vegetation to treat runoff and reduce surface runoff. Infiltration basins reduce surface runoff by increasing percolation into the ground and provide removal of contaminants. Similarly, pervious concrete reduces the runoff from impervious urban areas by promoting infiltration and contaminant removal.

Table 4.3 shows the typical values of removal efficiency for the BMPs considered for this alternative. The removal efficiencies were calculated based on average literature values (EPA, 1993; SWQTF, 1993; EPA, 1999; EPA, 2002; CASQA, 2003). The nitrogen and phosphorus removal efficiencies were similar for each type of BMP. These values were used to calculate the reduction of the nitrogen and phosphorus species by the BMPs. The nitrogen removal efficiency was assumed to be applicable for both nitrate and ammonia. The phosphorus removal efficiency was assumed to be applicable for phosphate.

Table 4.3 Average Removal Efficiencies of BMPs

TYPE OF BMP	AVERAGE REMOVAL EFFICIENCY (%)		APPLICABLE LAND USE
	NITROGEN	PHOSPHORUS	
Detention Basins	37.5	37.5	Agricultural and Husbandry
Biofilters	51.0	53.0	Agricultural, Husbandry, Residential, and Commercial
Infiltration Basins	70.5	70.5	Residential and Commercial
Pervious Concrete	80.0	60.0	Residential

Source: EPA, 1993; SWQTF, 1993; EPA, 1999; EPA, 2002; CASQA, 2003

The average removal efficiencies presented in Table 4.3 are based on complete treatment of all runoff and successful performance of each structural BMP. To account for the potential range in runoff trapping and poor performance of some structural BMPs, two scenarios were developed to represent Alternative 1. Alternative 1A was based on the assumption that the structural BMPs were successful at treating 50% of the runoff, while Alternative 1B was based on the assumption that the structural BMPs were successful at treating 100% of the runoff.

The use of structural BMPs is limited based on land use. In some cases, multiple BMPs can be implemented within the same land use. For land uses with two applicable BMPs, the efficiency was calculated based on the assumption that the BMPs would be linked in series such that the efficiency of the second BMP was applied to the output of the first BMP. For example, biofilters and infiltration basins were utilized in pervious residential and commercial land use areas. The biofilters can remove 51% of nitrate leaving behind 49% of nitrate assuming the biofilters are 100% effective. Infiltration basins were then linked to the biofilters to remove 70.5% of the nitrate remaining, thereby leaving 29.5% of the nitrate after biofilter treatment. Multiplying the portion remaining after biofilter treatment (49%) by the portion remaining after infiltration basin treatment (29.5%) yields an overall remaining nitrate of 14.5%. Therefore, the sequence of biofilters and infiltration basins has an overall removal efficiency of 85.5% (i.e., 100% - 14.5%).

The overall efficiency of each BMP for each land use within each subwatershed was applied to the nutrient loadings determined from existing conditions. The BMPs applicable to this alternative can be utilized only within the agricultural, residential, and commercial land uses; therefore, the loadings for these three land uses were reduced through application of the BMPs. This process is illustrated in Figure 4.4 as an example flow chart. The flow chart outlines the nitrate loading from the pervious urban area in Las Virgenes Creek Subwatershed 4 under Alternative 1A. The pervious urban area is composed of residential, commercial, and transportation land uses with the transportation land uses accounting for 26.4%. The structural BMPs of biofilters and infiltration basins can be utilized for the residential and commercial land uses; therefore, only 73.6% of the loading can be directed to the structural BMPs. The other 26.4% from the transportation land use enters the creek directly (i.e., no treatment). Based on the assumption of Alternative 1A, 50% of the nitrate loading bypasses the structural BMPs and enters the creek, while the other 50% is captured for treatment by the structural BMPs. Based on the overall removal efficiency discussed above, 85.5% of the treated loading is removed. Thus, 14.5% of the treated nitrate loading enters the creek. This process was applied for each land use in each subwatershed.

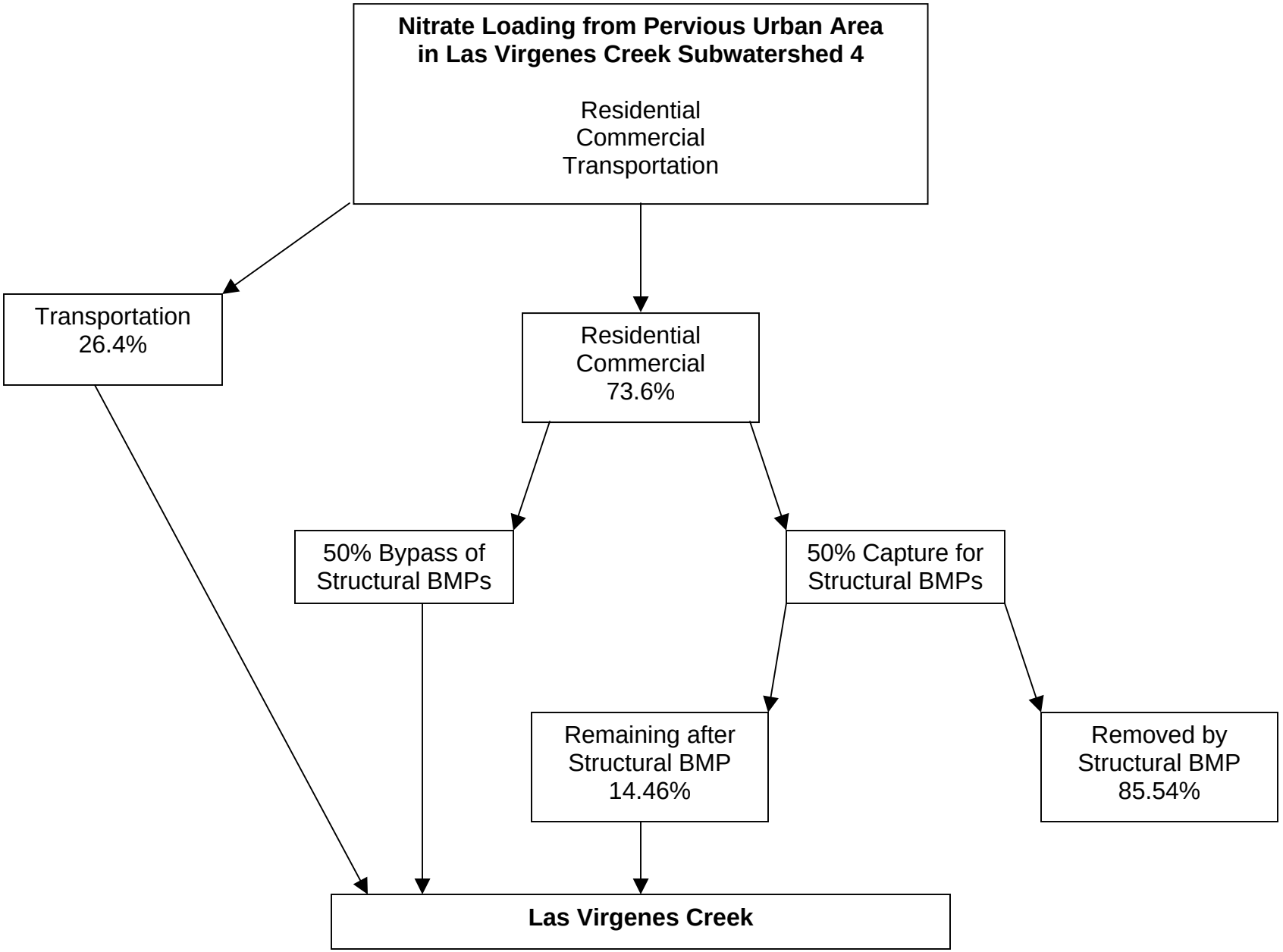

Figure 4.4 Example Flow Chart for Watershed Management Alternative 1A - Structural BMPs

The areas that BMPs can be used within the Las Virgenes Creek watershed are shown in Figure 4.5. The gray areas indicate the residential and commercial land uses and yellow indicates agricultural or husbandry land uses. As shown in the figure, BMPs can only be applied to a limited portion of the entire watershed.

The residential and commercial areas for the McCoy Creek watershed are shown in Figure 4.6. The gray areas indicate the portion of the watershed that BMPs could be implemented.

Figure 4.7 indicates the areas where structural BMPs can be implemented for Dry Canyon Creek. Again, the gray areas indicate the portion of the watershed that BMPs could be implemented.

4.6 WATERSHED MANAGEMENT ALTERNATIVE 2 – SOURCE CONTROL MEASURES

Watershed Management Alternative 2 was developed to reduce nutrient loading through reductions in sources. Based on information presented in Section 3.3, the four most significant nutrient sources in the watershed were determined to be atmospheric deposition, septic systems, reclaimed irrigation water use, golf course fertilization, and livestock. It was not considered feasible to reduce atmospheric deposition of nutrients as part of this study because atmospheric deposition occurs on a regional basis, which is beyond the geographic limits (watershed) of the study. Septic systems within the Las Virgenes Creek watershed occur downstream of the area of interest (City limits); therefore, changes in septic systems were not addressed in the current study since those changes would not have any effect on the portion of the creek that flows through the City. Septic systems within the Dry Canyon Creek watershed were not simulated because there were no available data indicating the presence of septic systems in the Dry Canyon Creek watershed at the time the modeling analysis was conducted. The remaining sources of nutrients that were analyzed for control as part of the study were reclaimed irrigation water use, golf course fertilization, and livestock.

A reduction factor (percent) in nutrient loading was applied for each of the controllable sources within each watershed. Figure 4.8 illustrates the nutrient source reductions that were applied to different subwatersheds of the Las Virgenes Creek watershed. For McCoy Creek watershed, the reclaimed water irrigation and golf course fertilizer source reductions were applied as shown in Figure 4.9. Figure 4.10 shows the only source reduction being considered for Dry Canyon Creek is reclaimed water irrigation.

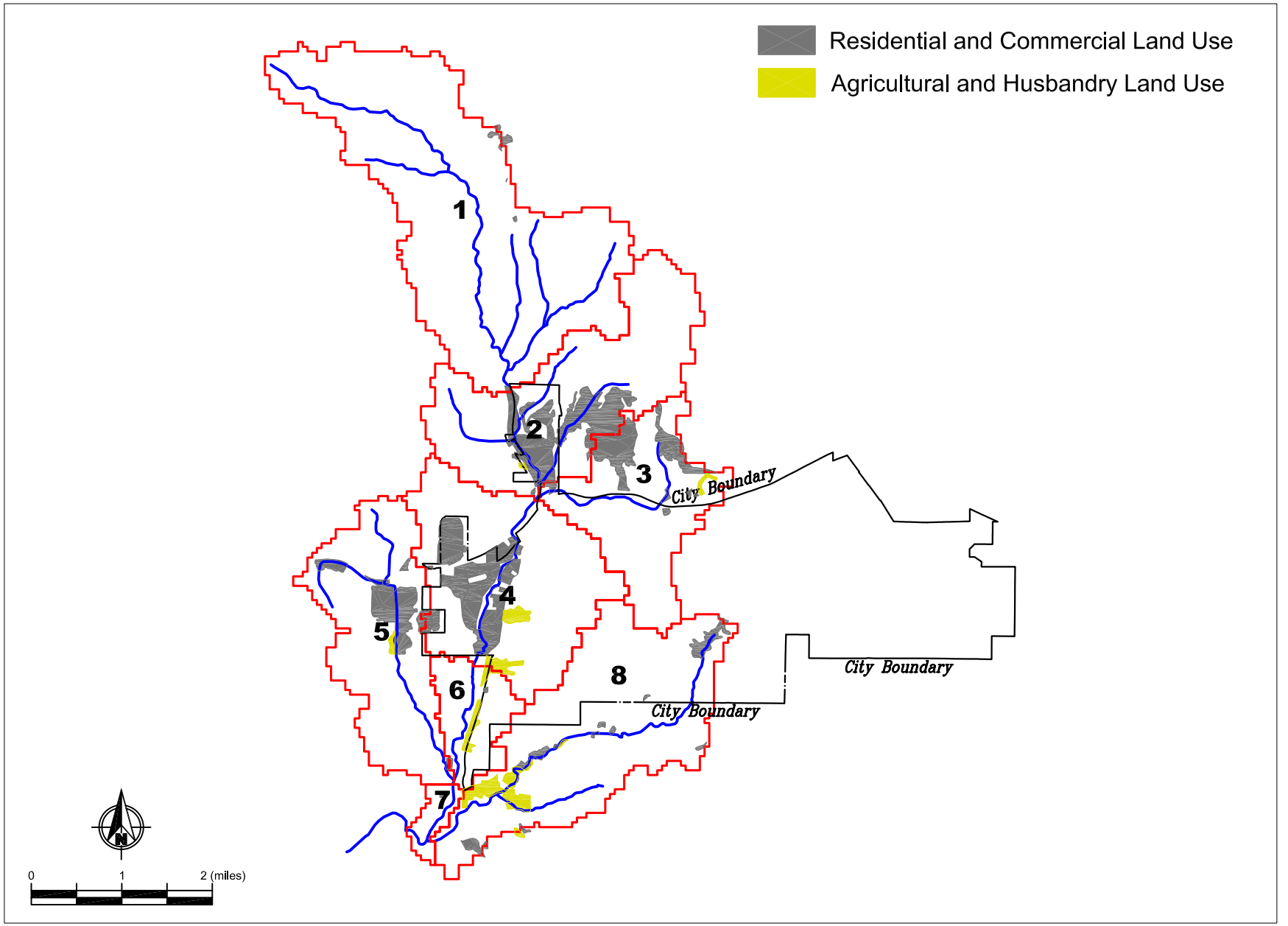

Figure 4.5 Watershed Management Alternative 1 - Structural BMPs for Las Virgenes Creek

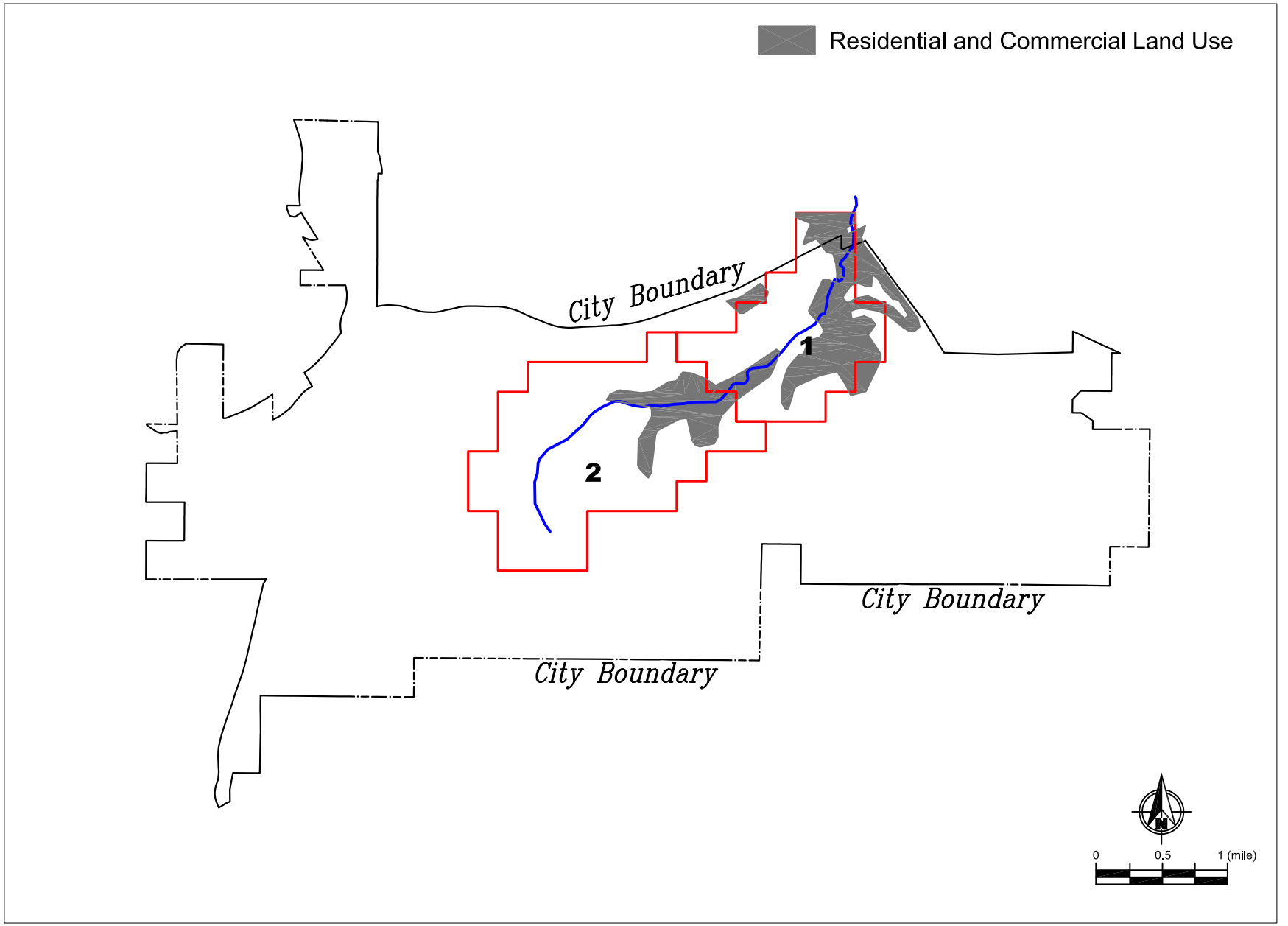

Figure 4.6 Watershed Management Alternative 1 - Structural BMPs for McCoy Creek

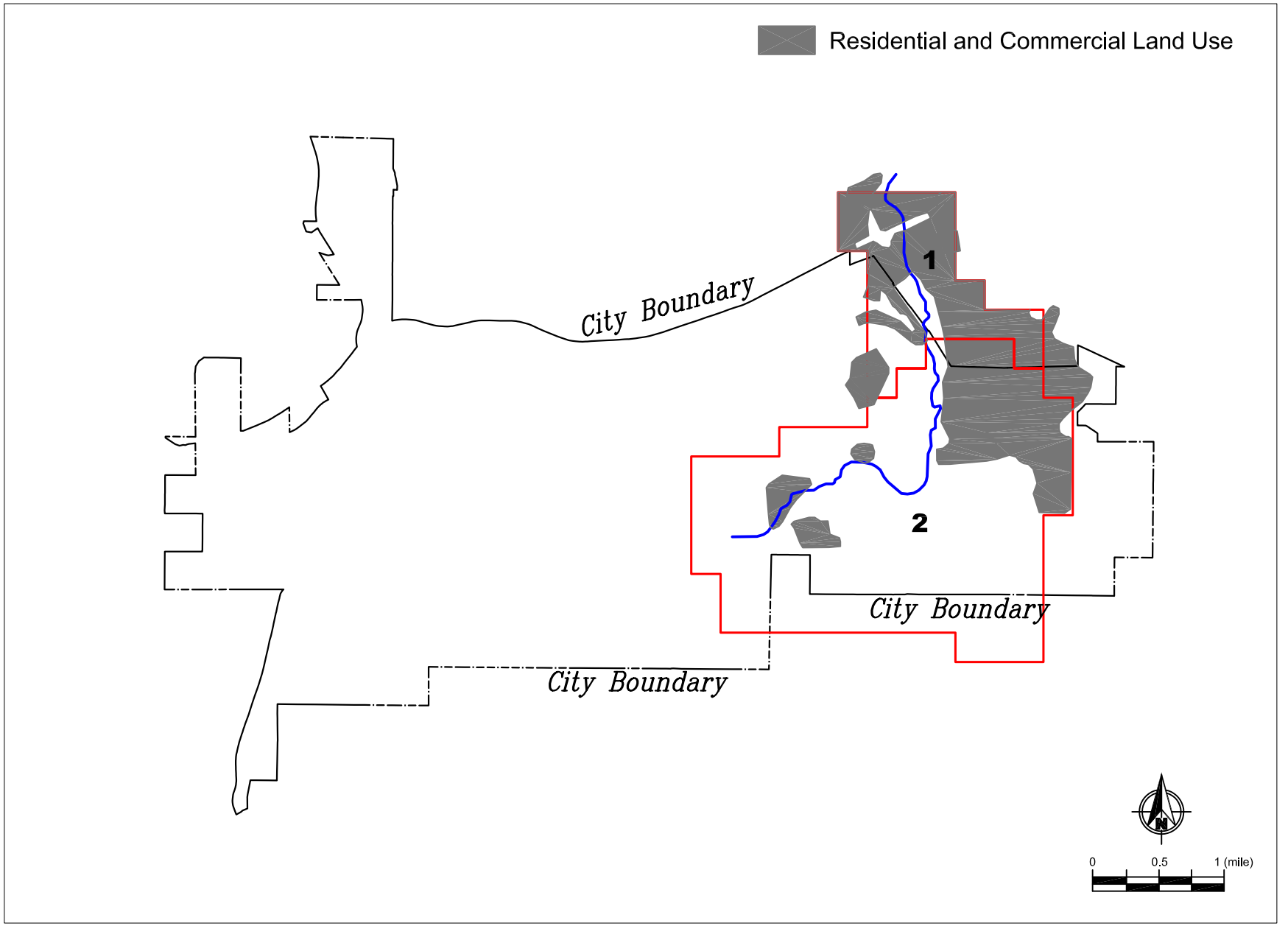

Figure 4.7 Watershed Management Alternative 1 - Structural BMPs for Dry Canyon Creek

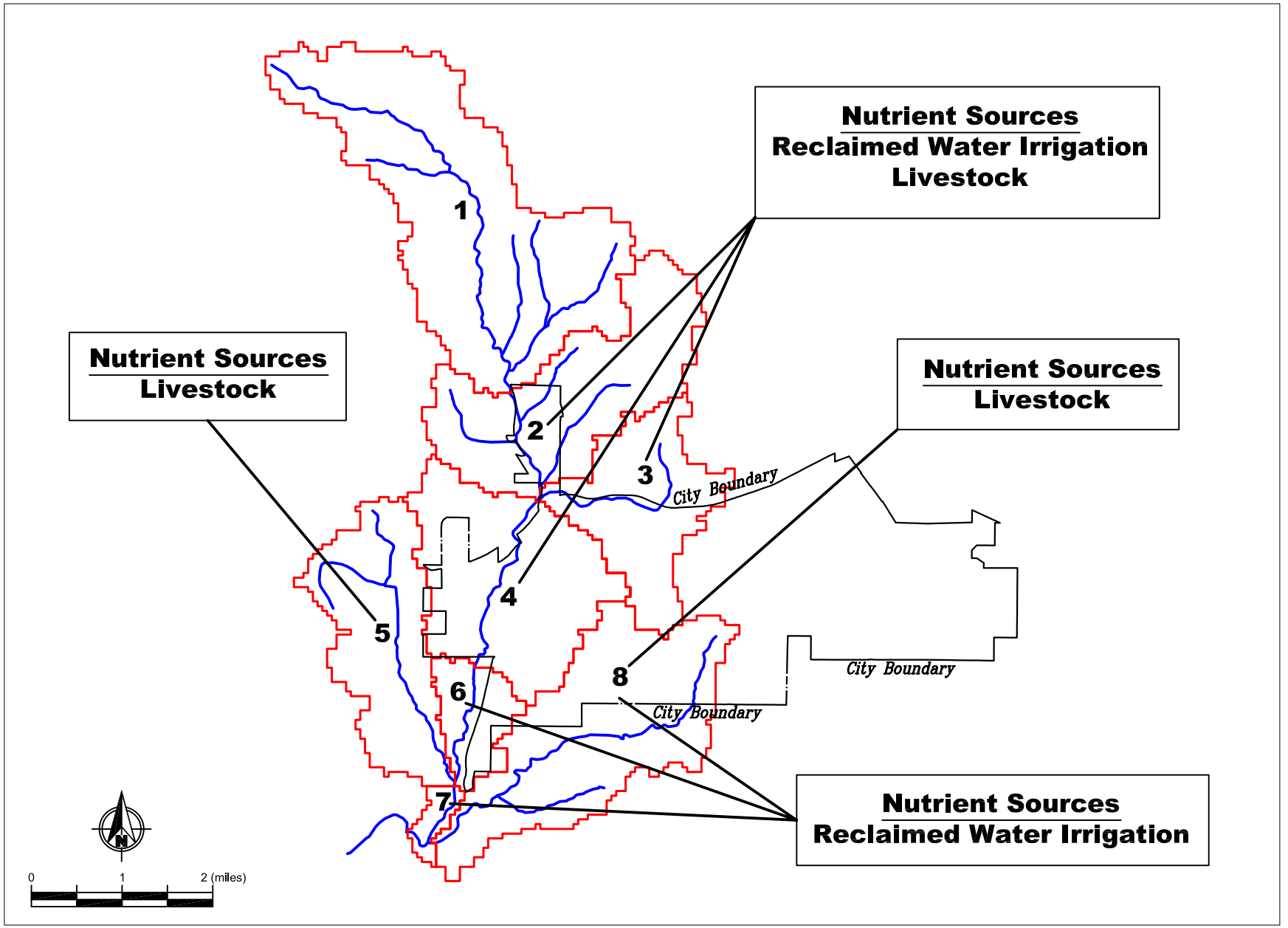

Figure 4.8 Watershed Management Alternative 2 - Source Control Measures for Las Virgenes Creek

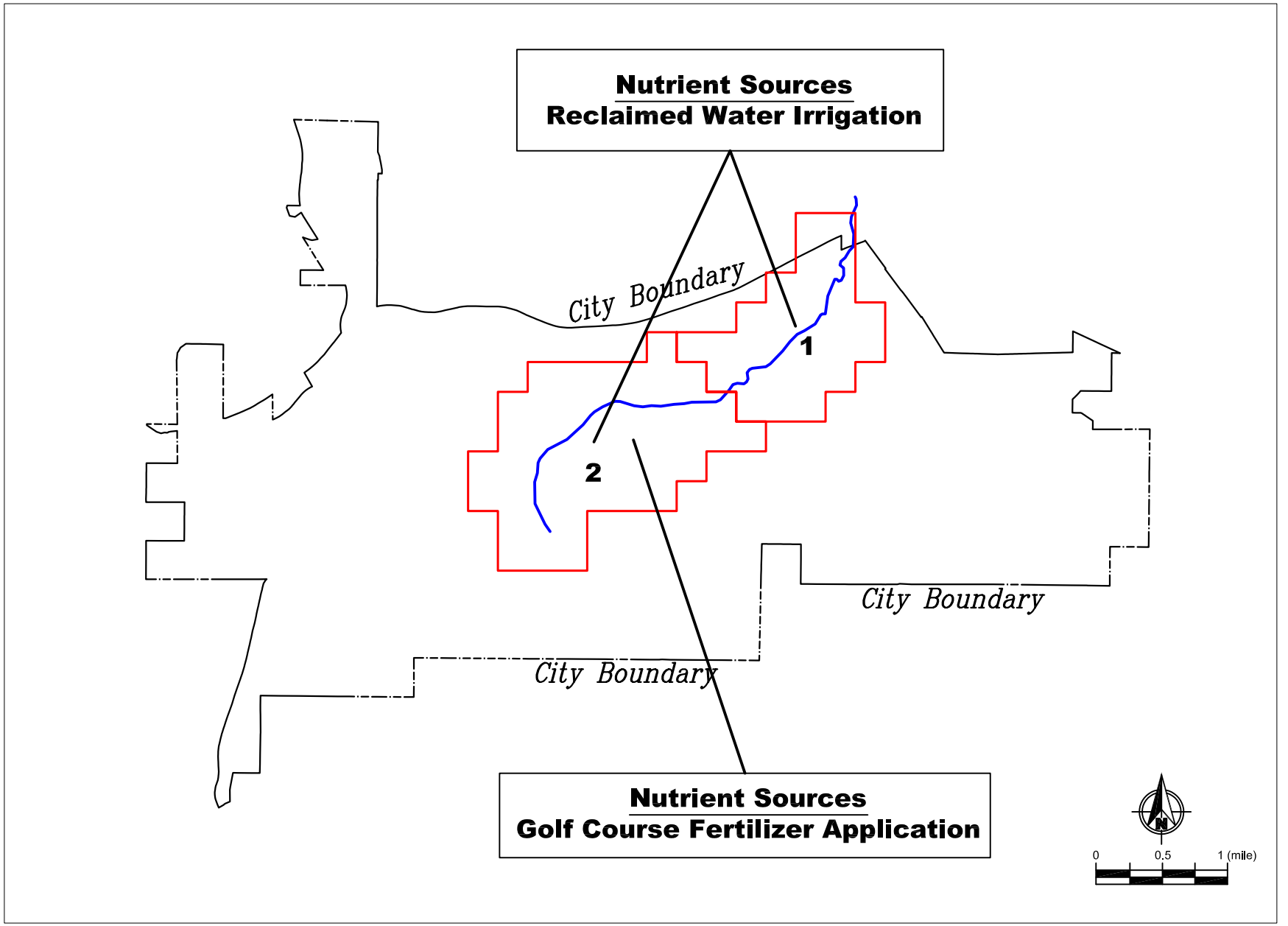

Figure 4.9 Watershed Management Alternative 2 - Source Control Measures for McCoy Creek

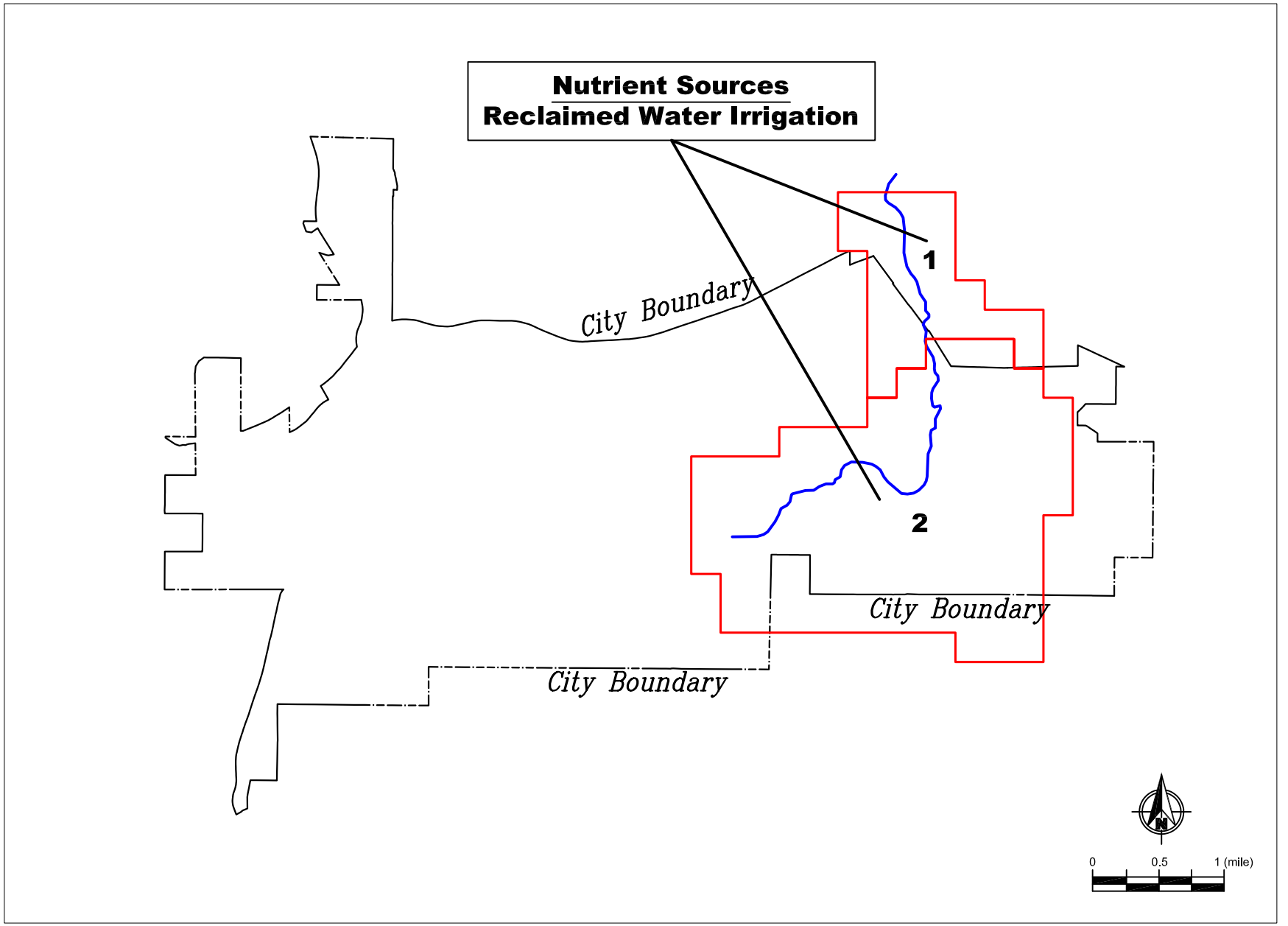

Figure 4.10 Watershed Management Alternative 2 - Source Control Measures for Dry Canyon Creek

Similar to Alternative 1, two scenarios were developed for the Watershed Management Alternative 2. Alternative 2A was based on the assumption that the source control measures would be effective in achieving a 25% reduction in reclaimed water irrigation and livestock sources. Alternative 2B was based on the assumption that the source control measures would be effective in achieving a 50% reduction in nutrients. The nutrient load reduction factor (percent) was applied for nitrate, ammonia, and phosphate.

A summary of the watershed model alternatives is given in Table 4.4.

Table 4.4 Summary of Watershed Model Simulations

ALTERNATIVE	DESCRIPTION
Historical Land Use	No urban land uses and sources; open space only
Creek Restoration	Implementation of all creek restoration opportunities
Alternative 1A	Structural BMPs – 50% Runoff
Alternative 1B	Structural BMPs – 100% Runoff
Alternative 2A	Source Control Measures – 25% Source Reduction
Alternative 2B	Source Control Measures – 50% Source Reduction

5. WATERSHED MODELING RESULTS

As discussed previously in Section 3.2, each alternative was simulated for a 3.75-year time period (October 1996 – June 2000). HSPF produced the nutrient loadings from the watershed over the entire simulation period. The results from the first year were not used to allow adequate time for the numerical model to reach a dynamic equilibrium. Therefore, nutrients were evaluated based on the average annual load (lbs/yr) over the last 2.75 years of the model results.

The nutrient loading under existing conditions was established for each creek at the downstream City limit. Figures 5.1, 5.2, and 5.3 show the three output locations for Las Virgenes, McCoy, and Dry Canyon Creek, respectively. The output location for Las Virgenes Creek is located at the downstream end of Subwatershed 4, thus the results reflect alternative restoration measures located upstream of the output location. Results for McCoy Creek were determined from the entire watershed (downstream end of Subwatershed 1). The City limits for Dry Canyon Creek are located at the downstream end of Subwatershed 2.

The reduction in average annual loading (expressed as a percentage) at each output location presented above was determined for each alternative and then compared to the loading under existing conditions. The results are shown as a percent reduction in loading from existing conditions instead of the absolute loading (lbs/yr) or change in loading (change in lbs/yr). As discussed in Section 3.3, comparison of the actual values of simulated loadings is not meaningful because the model was not calibrated. An uncalibrated model is most appropriately used to compare alternatives against a baseline condition (e.g., existing conditions) or against one another to determine relative effect.

The results of the model simulations for each creek are presented below in Sections 5.1 to 5.3. The results of the model simulations for all three creeks are summarized in Section 5.4.

5.1 LAS VIRGENES CREEK

The nitrate, ammonia, and phosphate reductions for Las Virgenes Creek are summarized in Table 5.1. The percent reduction for each alternative reflects the changes upstream of the output location (i.e., Subwatersheds 1 – 4) as shown in Figure 5.1.

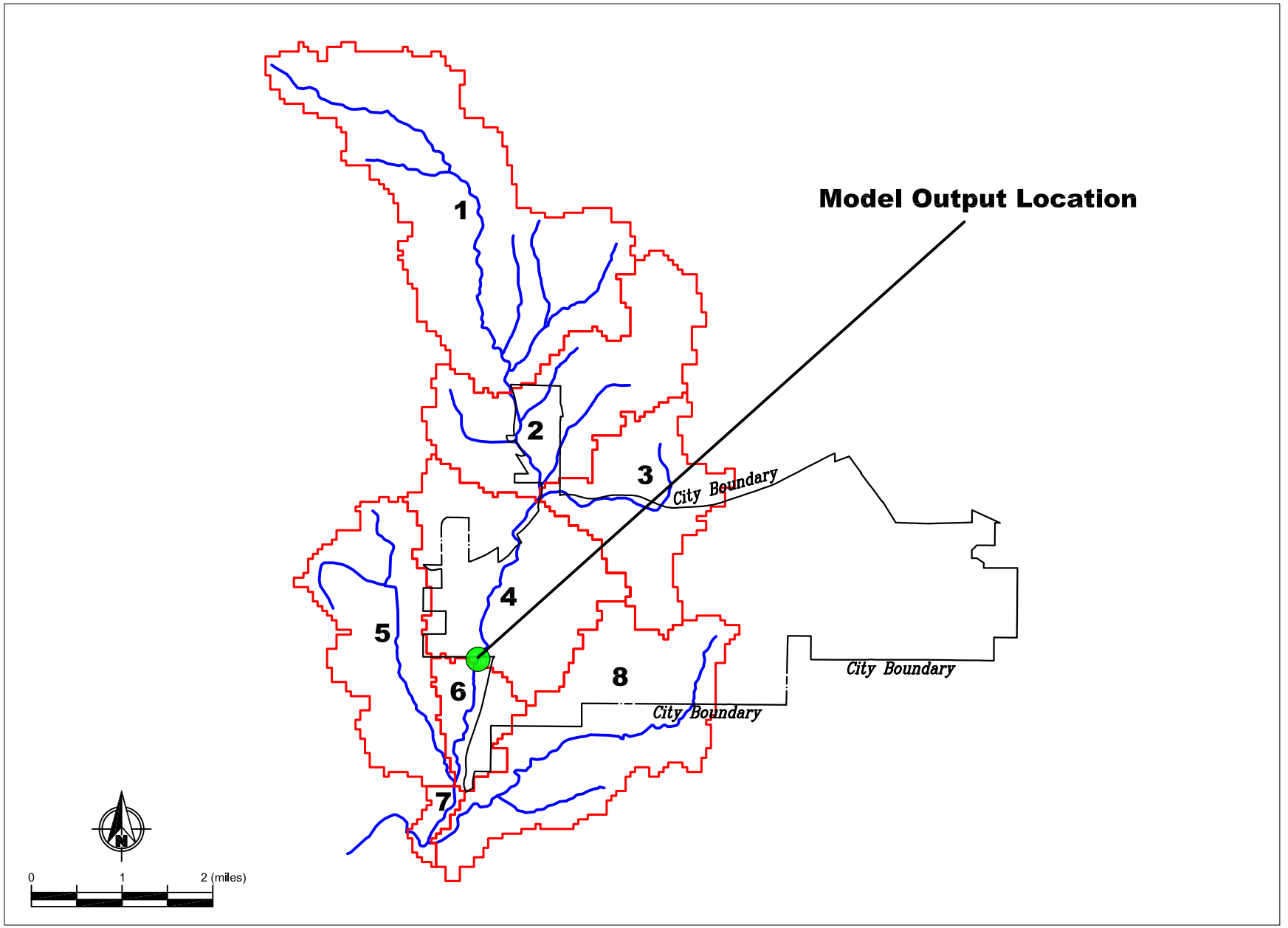

Figure 5.1 Model Output Location for Las Virgenes Creek

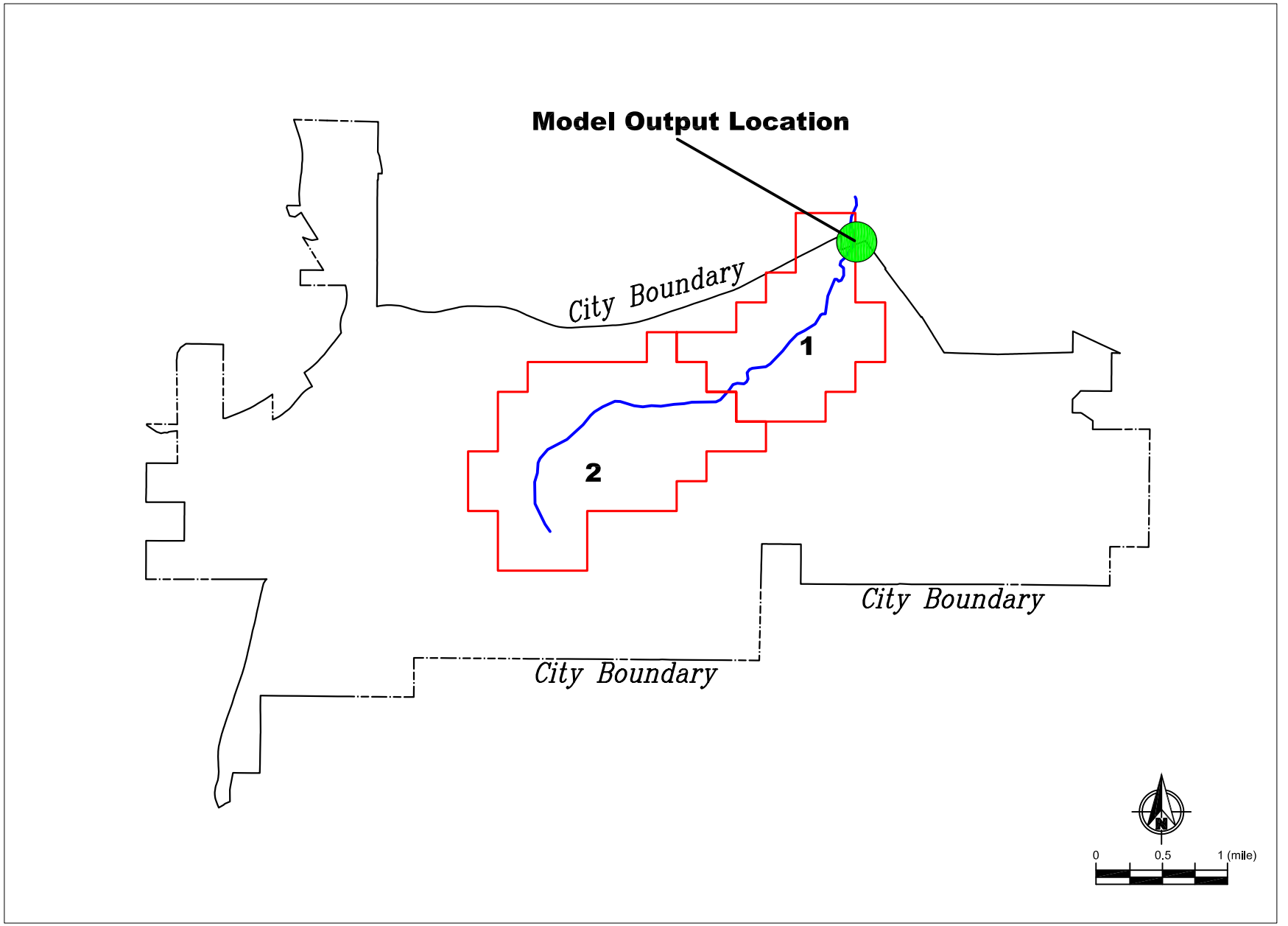

Figure 5.2 Model Output Location for McCoy Creek

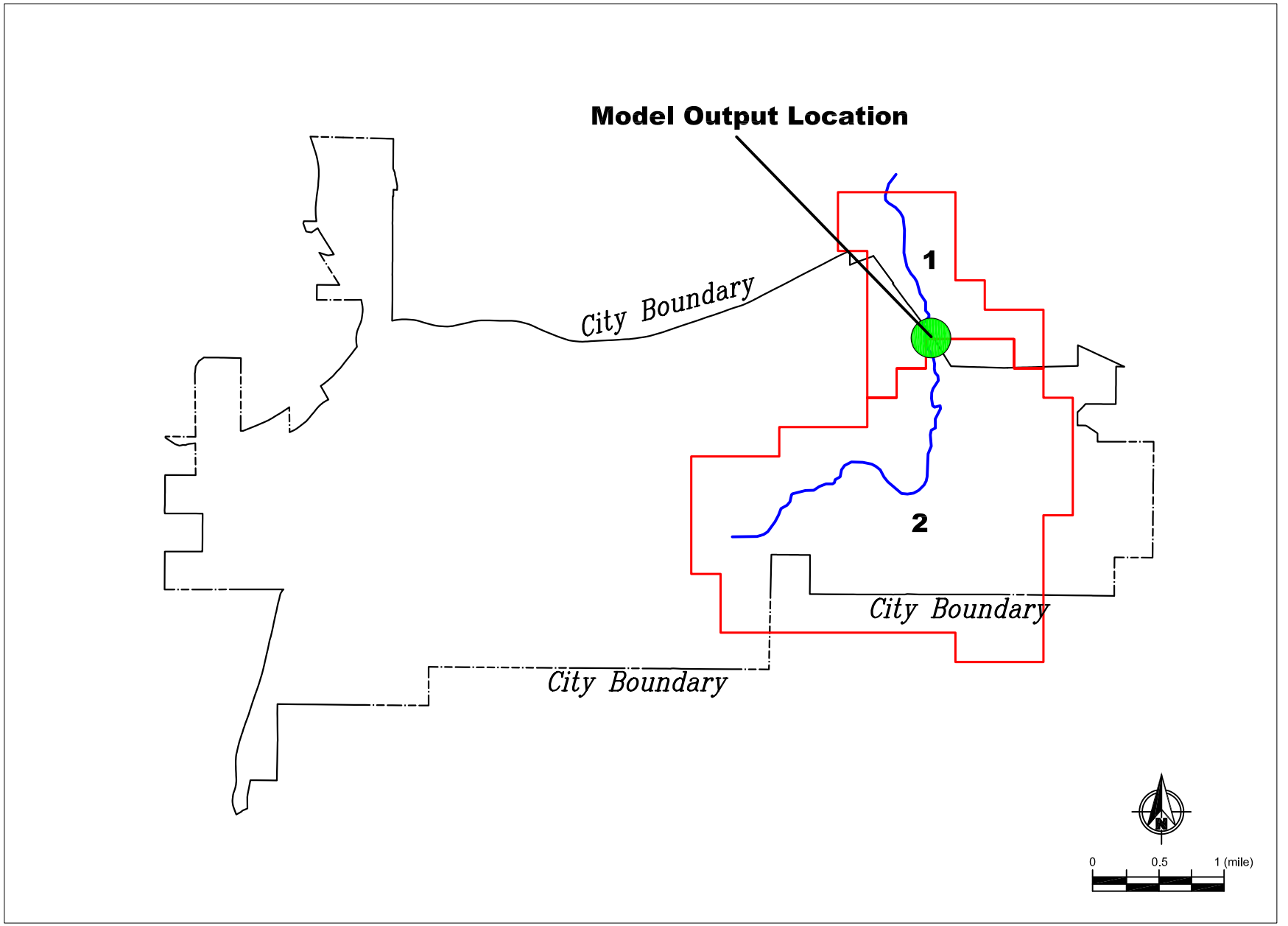

Figure 5.3 Model Output Location for Dry Canyon Creek

Table 5.1 Nutrient Loading Reductions for Las Virgenes Creek

WATERSHED ALTERNATIVE	PERCENT REDUCTION (%)		
	NITRATE	AMMONIA	PHOSPHATE
Historical Land Use	91	86	86
Creek Restoration Alternative	0	0	0
Alternative 1A	4	19	16
Alternative 1B	7	39	32
Alternative 2A	21	5	4
Alternative 2B	41	10	7

The Historical Land Use Alternative shows a significant reduction of 86-91% for nutrients. The potential reduction indicates that the major contribution of nutrients for the watershed is from human sources and urban land uses. The results also indicate that there is a natural nutrient loading attributable to natural source (e.g., soil erosion and wildlife). Therefore, to achieve a 100% reduction in nutrients would require reductions in loading attributable to natural as well as human sources.

The Creek Restoration Alternative was found to have no detectable impact on nutrient loading. This is because the modifications to the hydrological parameters associated with implementation of this alternative do not have any measurable impacts to nutrient loadings of the watershed. Meaningful reductions in nutrient loading within the watershed require restoration measures that focus on the water quality parameters (i.e., structural BMPs and source control).

As shown in the results of Alternative 1A, implementation of structural BMPs results in a 4%, 19%, and 16% loading reduction in nitrate, ammonia, and phosphate, respectively. The corresponding reductions are 7%, 39%, and 32% for Alternative 1B. The results indicate that structural BMPs are more effective in reducing ammonia and phosphate loading than nitrate loading. However, since structural BMPs can only be used in a limited portion of the watershed (see Figure 4.5), the overall nutrient reduction for the watershed is relatively low.

The model results show that implementation of source control measures under Alternative 2A would reduce loading of nitrate, ammonia, and phosphate by 21%, 5%, and 4% respectively. Implementation of Alternative 2B would reduce nitrate loading by 41%,

ammonia loading by 10%, and phosphate loading by 7%. As discussed in Section 4.6, the source control measures were only applied to nutrient sources associated with reclaimed water irrigation use and livestock. These results indicate that source control would be more effective in reducing nitrate loading compared to ammonia loading and phosphate loading. Since reclaimed water irrigation use is the dominant source of nitrate, source control measures show a greater impact on nitrate loading compared to implementation of structural BMPs. There is still a relatively substantial contribution of ammonia loading and phosphate loading due to atmospheric deposition that is not addressed under any of the alternatives investigated as part of this study.

5.2 McCoy Creek

Similar to Las Virgenes Creek, the results of McCoy Creek were determined at the downstream City limit (Figure 5.2). The nitrate, ammonia, and phosphate loading reductions of each alternative for McCoy Creek are shown in Table 5.2.

Table 5.2 Nutrient Loading Reductions for McCoy Creek

Watershed Alternative	Percent Reduction (%)		
	Nitrate	Ammonia	Phosphate
Historical Land Use	98	96	98
Creek Restoration Alternative	0	0	0
Alternative 1A	2	13	7
Alternative 1B	4	26	14
Alternative 2A	16	3	8
Alternative 2B	33	6	15

The Historical Land Use shows a 98%, 96%, and 96% reduction in nitrate, ammonia, and phosphate loading compared to existing conditions. The potential reduction indicates a greater contribution of nutrients from human sources and urban land uses compared to Las Virgenes Creek.

As with Las Virgenes Creek, the Creek Restoration Alternative showed no detectable reductions in nutrient loading. As explained previously, the creek modifications were limited to the hydrologic parameters, thus the changes did not affect nutrient loading.

Alternative 1A resulted in a 2% nitrate loading reduction, 13% ammonia loading reduction, and 7% phosphate loading reduction. Implementation of Alternative 1B would yield a reduction in nitrate, ammonia, and phosphate loading of 4%, 26%, and 14%, respectively. The reductions for both alternatives are similar to the simulated reductions for Las Virgenes Creek. Structural BMPs are more effective in reducing ammonia loading and phosphate loading compared to nitrate loading.

The model simulations revealed that implementation of Alternative 2A would result in a reduction in nitrate, ammonia, and phosphate loading of 16%, 3%, and 8%, respectively. Implementation of Alternative 2B approximately doubles the reductions attributed to Alternative 2A resulting in nitrate, ammonia, and phosphate loading reductions of 33%, 6%, and 15%, respectively. Implementation of source control measures would be more effective at reducing nitrate loading compared to ammonia loading and phosphate loading.

5.3 DRY CANYON CREEK

Figure 5.3 shows the location at the downstream end of Subwatershed 2 where the average annual load for Dry Canyon Creek was determined. Table 5.3 summarizes the nitrate, ammonia, and phosphate loading reductions for Dry Canyon Creek.

Table 5.3 Nutrient Loading Reductions for Dry Canyon Creek

WATERSHED ALTERNATIVE	PERCENT REDUCTION (%)		
	NITRATE	AMMONIA	PHOSPHATE
Historical Land Use	98	98	93
Creek Restoration Alternative	0	0	0
Alternative 1A	5	28	21
Alternative 1B	9	55	42
Alternative 2A	17	2	2
Alternative 2B	35	4	5

Similar to McCoy Creek, implementation of the Historical Land Use Alternative indicates high nutrient loading reductions with a 98% reduction in nitrate and ammonia as well as a 93% reduction in phosphate. These results reflect the fact that a significant portion of the

Dry Canyon Creek watershed is urbanized and these urban uses result in substantial impacts to nutrient loading.

Similar to the results for Las Virgenes Creek and McCoy Creek, implementation of the Creek Restoration Alternative will not result in any detectable reduction in nutrient loading for Dry Canyon Creek.

The model simulations indicated that implementation of Alternative 1A would yield a 5%, 28%, and 21% loading reduction in nitrate, ammonia, and phosphate, respectively. Implementation of Watershed Management Alternative 1B would lower nitrate, ammonia, and phosphate loadings by 9%, 55%, and 42%, respectively. The results suggest that implementation of structural BMPs would yield the greatest reductions in ammonia loading, followed by phosphate loading and nitrate loading. However, since additional data made available after completion of the modeling analysis revealed the presence of septic systems in Dry Canyon Creek and septic systems are a source of nutrients, implementation of structural BMPs may not be as effective for ammonia reduction in Dry Canyon Creek if a significant number of septic systems were present in the watershed because structural BMPs do not reduce septic system contributions. This underscores the importance of identifying the number and location of septic systems within the Dry Canyon Creek watershed.

Implementation of Watershed Management Alternative 2A would result in a 7% reduction in nitrate loading and a 2% reduction in loading attributed to ammonia and phosphate. The results indicated that implementation of Alternative 2B would reduce nitrate loading by 35% while reducing ammonia loading and phosphate loading by 4% and 5%, respectively. Implementation of the source control measures were found to have the greatest impact on reducing nitrate loading with less effectiveness at reducing ammonia loading and phosphate loading. Source control measures could be more effective at reducing ammonia if septic systems were determined to be a significant contributor of ammonia.

5.4 SUMMARY OF LOADING REDUCTION BY ALTERNATIVE

The results of the watershed modeling for nutrient loading are presented in Table 5.4 for all three creeks and all simulation alternatives. For the Historical Land Use Alternative, all three creeks show significant reductions in loading ranging from 86% to 98% for all three nutrients. McCoy and Dry Canyon showed the greatest reduction in nutrient loading; hence, greater potential for restoration measures to lower nutrient levels.

As discussed previously, the Creek Restoration Alternative was not expected to reduce nutrient loadings. The simulations were based on implementation of all identified creek

restoration opportunities within each creek, including bank stabilization, concrete removal, and vegetation clearing. Since the creek restoration opportunities focused primarily on hydrologic and/or habitat changes within the creek channel, neither the nutrient loadings from the watershed nor the water quality processes within the creek were substantially modified through implementation of the creek restoration measures. The model results of restoration alternatives for all three creek indicated that nutrient loading would not be meaningfully affected through implementation of these measures.

Watershed Management Alternative 1 simulated nutrient loading reductions based on the treatment of runoff using structural BMPs. Alternatives 1A and 1B provide a range of reduction based on the amount of runoff treated and the effectiveness of the various BMPs. The quantity of runoff treated with structural BMPs directly impacts the nutrient reduction such that nutrient loading is reduced in proportion to the volume of treated runoff. The percent reductions for Alternative 1B are approximately twice that of Alternative 1A, which corresponds to the treatment of twice as much runoff in Alternative 1B compared to Alternative 1A. The results for all three creeks show the greatest loading reduction in ammonia and phosphate compared to nitrate.

Alternatives 2A and 2B provided a range in nutrient reductions associated with implementation of a range in nutrient source control measures. Alternative 2A was based on a 25% reduction of the nutrient loading associated with reclaimed water irrigation and livestock sources and Alternative 2B was based on a 50% reduction in nutrient loading. Doubling the source control reduction (25% to 50%) approximately doubled the nutrient loading reduction. For example, the results for Las Virgenes Creek indicated a 21% and 41% reduction in nitrate loading for Alternative 2A and Alternative 2B, respectively. The ammonia loading reduction increased from 5% to 10% with an increase in source control for Alternative 2A and Alternative 2B, respectively. The 4% phosphate loading reduction of Alternative 2A was increased to a 7% phosphate loading reduction under implementation of Alternative 2B. The results for McCoy and Dry Canyon Creek followed the same trend. The source control measures are the most effective for nitrate reduction and less effective at reducing the loading for ammonia and phosphate.

A comparison of Alternative 1 and Alternative 2 revealed that Alternative 2 reduced nitrate loading more than Alternative 1. This indicates that source control measures were more effective at reducing nitrate loading than removing ammonia and phosphate from runoff within this watershed. Structural BMPs were more effective at reducing ammonia loading and phosphate loading than source control measures.

Table 5.4 Nutrient Loading Reductions by Alternative

ALTERNATIVE	CREEK	PERCENT REDUCTION (%)		
		NITRATE	AMMONIA	PHOSPHATE
Historical Land Use	Las Virgenes Creek	91	86	86
	McCoy Creek	98	96	98
	Dry Canyon Creek	98	98	93
Creek Restoration Alternative	Las Virgenes Creek	0	0	0
	McCoy Creek	0	0	0
	Dry Canyon Creek	0	0	0
Alternative 1A	Las Virgenes Creek	4	19	16
	McCoy Creek	2	13	7
	Dry Canyon Creek	5	28	21
Alternative 1B	Las Virgenes Creek	7	39	32
	McCoy Creek	4	26	14
	Dry Canyon Creek	9	55	42
Alternative 2A	Las Virgenes Creek	21	5	4
	McCoy Creek	16	3	8
	Dry Canyon Creek	17	2	2
Alternative 2B	Las Virgenes Creek	41	10	7
	McCoy Creek	33	6	15
	Dry Canyon Creek	35	4	5

6. CONCLUSIONS

Watershed modeling was conducted for Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek, which run through portions of the City of Calabasas. The modeling was useful in developing and assessing restoration measures for the three creeks aimed at improving water quality with a focus on nutrient reduction. Although available data were insufficient for calibrating the watershed model, the data were sufficient to develop and apply an uncalibrated model to the three creeks. The application of this model was used to gain an understanding of the dominant processes related to nutrient loading of the receiving water (i.e., creeks). The following conclusions were developed from the results of this study.

1. A review of the available, existing data revealed that the data were insufficient to perform a calibration of the model parameters. This limits the usefulness of the model because the accuracy of the model output values is unknown. The uncertainty in the model output means that the model results cannot be used to determine the effectiveness of restoration measures relative to absolute metrics such as the LARWQCB water quality standards. However, the uncalibrated model is useful for comparing the effectiveness of alternatives relative to a baseline condition (e.g., existing conditions) and against one another.

2. The results of the modeling revealed that human influences account for the majority of nutrient loading to the three creeks. The loading of nutrients (nitrate, ammonia, and phosphate) leaving the City limits under existing conditions with recent human influence was substantially higher than the loading under historical conditions without human influence. This conclusion supports the development of restoration measures as a means to improve water quality through nutrient reductions since these measures tend to focus on human influences.

3. The results suggest that it is possible to exceed the LARWQCB water quality standards (TMDL) in the absence of human influence. For example, based on the modeling simulations, the concentration of nitrates within the three creeks under historical conditions sometimes exceeded the water quality standard. Since the model was not calibrated it is not possible to draw a definitive conclusion; however, these results, coupled with the results of the sensitivity analysis (see Conclusion 4), reveal the importance of model calibration and input data quality.

4. The results of the sensitivity analysis revealed that increases and decreases in nutrient loading would result in significant changes in the model results. A 50%

change (+/-) in nitrate loading resulted in an average change of approximately 46%, 33%, and 36% in Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek, respectively. A 50% change (+/-) in ammonia loading resulted in an average change of approximately 23%, 11%, and 12% in Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek, respectively. A 50% change (+/-) in phosphate loading resulted in an average change of approximately 38%, 24%, and 38% in Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek, respectively. This level of sensitivity indicates the need to conduct calibration of the model if the results are to be used to provide absolute values of contaminant loadings.

5. Implementation of all the restoration measures identified for creek restoration will not result in meaningful reductions in nutrient loading. This is because the creek restoration alternatives will only change the hydraulics/hydrology of the creek and not the nutrient sources or processes.

6. Implementation of structural Best Management Practices (BMPs) would probably not be effective at reducing nutrient loading associated with nitrates. The results revealed that implementation of all the identified structural BMPs within Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek would only reduce nitrate loading by 4% to 9% compared to existing conditions. This is primarily because the structural BMPs can only be implemented over a relatively small portion of the watershed due to space, land use, or slope limitations; therefore, the overall reduction in nitrate loading attributed to the combined effects of these measures is relatively small.

7. The results of the modeling indicated that implementation of structural BMPs could be effective at reducing nutrient loading attributed to ammonia and phosphate. The results revealed that implementation of all the identified structural BMPs within Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek would reduce ammonia loading by 13% to 55% and phosphate loading by 7% to 42% compared to existing conditions. Structural BMPs may not be as effective for ammonia reduction in Dry Canyon Creek if septic systems were determined to be a significant contributor of ammonia, since structural BMPs do not reduce septic system contributions.

8. The results of the modeling revealed that source control could be effective at reducing nutrient loading attributed to nitrate. The results revealed that implementation of all the identified source control measures within Las Virgenes Creek, McCoy Creek, and Dry Canyon Creek would reduce nitrate loading by 17% to 41% compared to existing conditions. Source control measures could increase the ammonia reduction in Dry Canyon Creek if septic systems were determined to be a significant contributor of ammonia.

9. The results of this study indicate that substantial reductions in nutrient loading defined as reductions in nitrate, ammonia, and phosphate loading will require implementation of a comprehensive approach involving strategic implementation of structural BMPs and source control measures throughout the watersheds of the three creeks.

7. RECOMMENDATIONS

The following recommendations are provided to improve the water quality of the three creeks related to nutrient loading.

1. Pursue implementation of structural BMPs throughout the watersheds of the three creeks to reduce nutrient loadings attributed to ammonia and phosphate.

2. Pursue source control measures related to recycled water use within the watershed to reduce nutrient loadings attributed to nitrate to the three creeks. The following actions should be considered for implementation.

    a. Reduce nutrient levels in reclaimed water.

    b. Conduct a public outreach program to reduce fertilizer use.

    c. Reduce the use of reclaimed water to lower associated runoff; however, this action is probably not feasible since it would probably result in an increase in the use of imported water.

    d. Pursue implementation of irrigation control measures to reduce the volume of runoff from areas irrigated with reclaimed water (e.g., computerized irrigation control devices with moisture sensors).

    e. Conduct research to determine the uptake rate of nutrients associated with different types of grasses for the purpose of developing an integrated program of reclaimed water use for various turf types.

3. Pursue source control measures related to equestrian management and operational practices within the watershed to reduce nutrient loadings to the three creeks.

4. Conduct a survey of septic systems within the watersheds to determine the quantity, location, and condition of septic systems located within the study area to verify the assumptions used in the modeling study presented in this report and/or to update the modeling based on any significant changes in the assumptions.

5. Conduct a monitoring program to provide the data needed to calibrate the HSPF model for the site-specific conditions within the watersheds of the three creeks.

6. Calibrate and verify the HSPF model using data collected from Recommendation 5.

7. Perform updated modeling of the restoration alternatives with the calibrated and verified HSPF model developed under Recommendation 6.

8. Conduct modeling of other constituents of concern (e.g., bacteria) to develop restoration measures for those constituents.

9. Develop a field and/or literature program to verify the applicability of the regional contaminant loading rates to the two watersheds. If the regional rates are found to be not applicable, then develop watershed-specific contaminant loading rates.

10. Overlay results, develop integrated alternatives, and simulate the alternatives to determine the effectiveness at improving overall water quality to eliminate single-objective alternatives focused only on one or two constituents (e.g., trash or bacteria). This effort should include a cost-effectiveness analysis to optimize multiple objective alternatives.

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APPENDIX B

NATIVE FISH HABITAT ASSESSMENT

SURVEY FOR NATIVE FISH HABITAT IN STREAMS OF THE CITY OF CALABASAS WITH SPECIAL REFERENCE TO RESTORATION FOR NATIVE FISHES

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September 2003

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CHAPTER 1.0
INTRODUCTION

The southern California creeks draining the City of Calabasas historically had the potential to hold seven species of freshwater fishes. A few additional fish species that enter freshwater in estuaries near the coast in southern California would not have been expected this far inland. The streams in Calabasas are low gradient, mostly less than 2% slope or gradient. These streams historically could have supported most if not all of the inland freshwater species under pre-settlement, natural conditions. The distribution, biology, and current status of these species have been reviewed by Swift et al. (1993), Swift and Seigel (1993), Stephenson and Calcarone (1999), and Moyle (2002) and personal observations on these local fishes have been added as well.

The fishes possible in these streams can be divided into two groups (Table 1). One group is found in the Malibu Creek drainage that includes Las Virgenes Creek. Only three native species of freshwater fishes are historically known to have occurred in this creek: Pacific lamprey (*Lampetra tridentata*), rainbow trout or steelhead (*Oncorhynchus mykiss*), and arroyo chub (*Gila orcutti*). The second group may be found in the McCoy and Dry Canyon Creek drainages, which drain northwest into the Los Angeles River drainage that originally had the previous three species as well as four additional ones, Pacific brook lamprey (*Lampetra pacifica* spp.), Santa Ana speckled dace (*Rhinichthys osculus* ssp.), Santa Ana sucker (*Catostomus santaanae*), and unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*). The steelhead and Pacific lamprey are anadromous, meaning they reproduce in freshwater, go to sea as juveniles to mature, and return to freshwater streams to spawn. This behavior is similar to the close relatives of steelhead, the Pacific salmons found farther north. Unlike salmon, steelhead do not necessarily die after spawning and may go back to the ocean and return on one or more successive years to spawn again. All the other previously mentioned freshwater fish species are restricted to inland waters and would not have gone to sea. All but one of these species have been locally extirpated in Calabasas and only arroyo chubs still occur in Las Virgenes Creek. However, all the other fish were known historically from farther down in their respective drainages and it has been 50 or more years since some have been taken in the Los Angeles area (Swift and Seigel 1993). The purpose of this study was to survey the streams in Calabasas for these species and their habitat and offer recommendations for restoration towards bringing some or all of the native fishes back to the area.

Table 1
Potential Fish Species Historically Found in the Calabasas Area

Creek	Species of Fish
Las Virgenes Creek	Arroyo chub – *Gila orcutti* Pacific lamprey - *Lampetra tridentata* Steelhead trout - *Oncorhynchus mykiss*
Dry Canyon Creek* McCoy Creek*	Arroyo chub – *Gila orcutti* Pacific brook lamprey – *Lampetra pacifica* spp. Pacific lamprey - *Lampetra tridentate* Santa Ana speckled dace – *Rhinicthys osculus* spp. Santa Ana sucker – *Catostomus santaanae* Steelhead trout - *Oncorhynchus mykiss* Unarmored threespine stickleback – *Gasterosteus aculeatus williamsoni*

* known from the Los Angeles River

CHAPTER 2.0
METHODS

All the creek segments were walked and habitat features were noted with reference to freshwater fishes. The six main creek habitat types noted were bedrock, riffle, run, pool, artificial bottom, and barrier. Artificial habitats included culverts, concrete bottoms under bridges or other channels, and riprap and concrete walls constraining the lateral sides of the floodplain. Riffles are places where shallow, rapidly moving water causes some turbulence in passing, usually over shallow rocks, gravel, or boulders. Some riffles in the local streams are over clay with dense roots that create similar turbulence as found in other riffles. Runs are stretches with similar width and depth such that the water runs through relatively undisturbed; runs usually flow slower than riffles. Runs can have almost any substrate from mud to bedrock. Pools are areas that are particularly deep with shallower entrances and exits. Pools usually form below falls or near resistant features like tree stumps or large boulders where the water flow meets resistance causing it to scour the softer adjacent substrate away.

Substrates or bottom materials in the stream are usually classified by the size of the particles involved. Silt/clay has particles less than 0.05 inches in diameter, sand 0.05 to 0.08 inches in diameter, gravel 0.08 to 2.5 inches, cobble, 2.5 to 5 inches, rock 5.0 to 10 inches, and boulders more than 10 inches. Bedrock is solid immovable rock.

Cover or shelter is rated by the amount of protection or hiding space existing for fish in the water and can consist of aquatic vegetation, logs, brush, boulders, undercut banks, rock ledges, root masses, "bubble curtain" (the dense foam formed by falls), and rapid riffles. Just depth alone provides protection from predators that cannot see into deep pools or are unable to pursue fish in deeper water. To provide cover in the absence of any other places to hide, the depth has to be over about 45 centimeters (cm) (about 18 inches) for average-sized fishes 5 to 10 cm long (2 to 4 inches). Shallower water can suffice for smaller young and juveniles, and deeper water is needed for larger fishes. Turbidity also provides cover when present by blocking the fish from view.

Canopy is the amount of overhead protection from the sun or open sky that is present over the wetted portion of the stream channel. Canopy is usually provided by overhanging trees, streamside herbaceous vegetation, sedges, tules, cattails, or rock ledges. Occasionally bridges, pipeline crossings, and other artificial structures can provide beneficial canopy. While high canopy values can be beneficial by shading and cooling streams, excessive canopy can block all sunlight and reduce plant growth and productivity of the stream. Deciduous trees like willows

can be more desirable since they allow sunlight in winter and block the sun less in summer than darker evergreen species like oak, which strongly block the light all year.

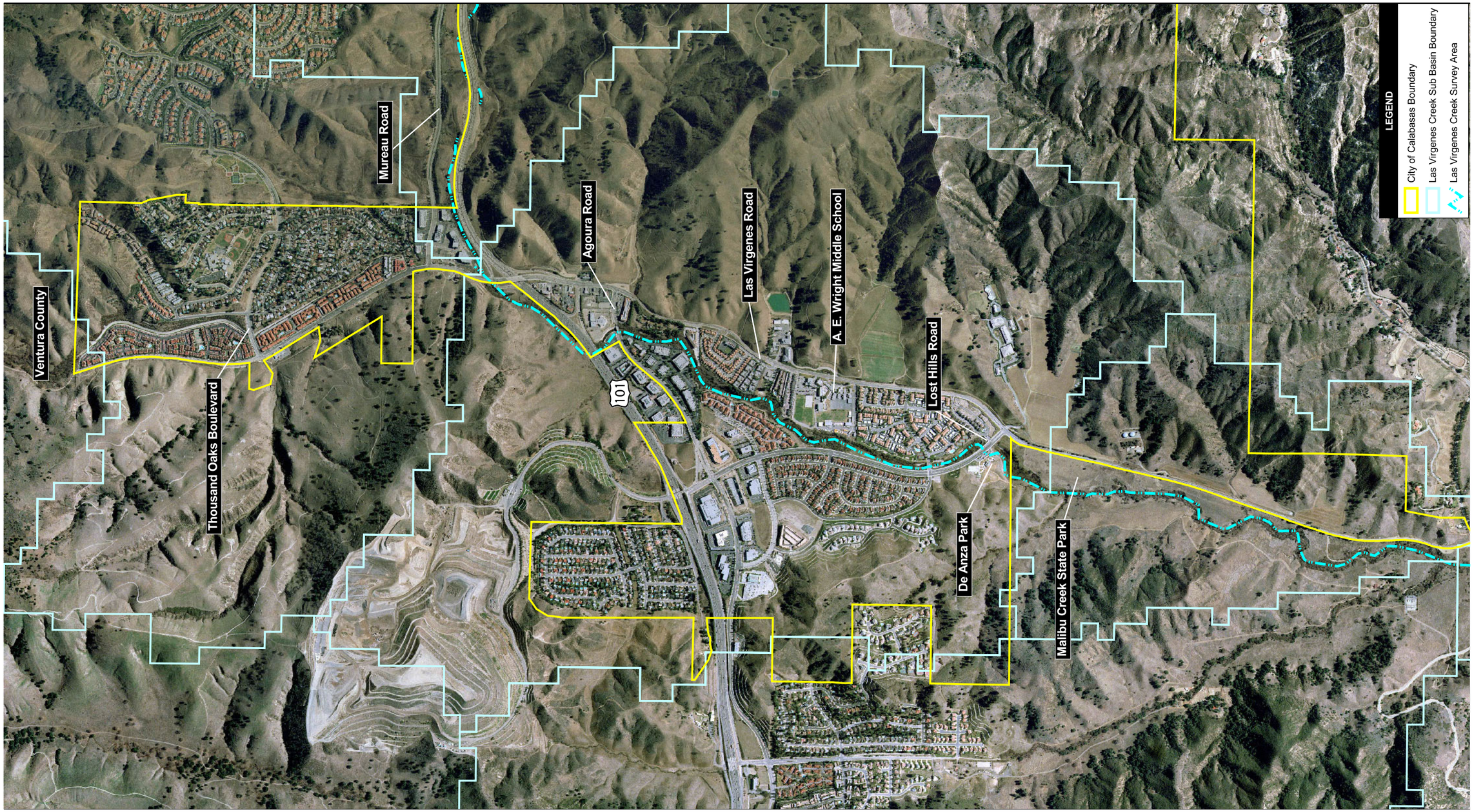
During the survey, temperature was measured and clarity of water was observed, and the conditions of adjacent shores and floodplain were assessed. Flow was estimated in cubic feet per second (cfs).

Observations were made of fishes present and representatives were preserved to verify identification and document existence at the time of the observations. All collections were made under the auspices of a California Department of Fish and Game Scientific Collecting Permit # 801137-03 (expires November 2, 2003). When referring to fishes, YOY means young-of-the-year, fish born in the year of the observations; juveniles refer to immature fish in at least their second season of life; and adult refers to sexually mature individuals. Fish lengths given here are in total length from the anteriormost point, usually the snout, but occasionally the protruding lower jaw, to the tip of the tail. Often fish length in scientific papers is given as standard length, from the tip of the snout to the base of the tail (caudal fin) and is 10% or so less than total length.

The following creeks were examined in the spring of 2003:

- Las Virgenes Creek above the 101 Freeway on 13 February from 09:30 to 10:00 and from Mulholland Drive upstream to the 101 Freeway on 12 March from 06:50 to 15:04 (Figure 1.1);
- upper Dry Canyon Creek and tributaries near junction of Old Topanga and Mulholland down to culvert at the north segment of Old Topanga; 12 March from 16:40 to 17:10, and Dry Canyon Creek from its exit from the culvert opposite the junction of Wrencrest Street and Old Topanga downstream to the cement-lined channel just above the 101 Freeway on 19 April from 12:40 to 14:35 (Figure 1.2); and
- McCoy Creek from about 300 meters above Calabasas Golf Course (100 meters above end of Ariella Drive on Parkway Calabasas) downstream through the golf course and downstream to entrance of Ed Edelman Tennis and Swim Center and crossing of Park Sorrento on 19 April from 08:10 to 12:10 (Figure 1.3).

Virtually all the stream reaches in these sections were walked and examined. Flowing water was present in all streams examined. The length of each creek segment for a particular habitat type was estimated and the summary totals by reach are presented in Table 2. These figures are to be treated as estimates and may vary somewhat from actual measured lengths. However, the relative proportion or percent of each habitat type is close to the estimated values.



Source: Mountains Restoration Trust, 2002

500 0 500 1000 Feet

Scale: 1 : 6,000; 1 inch = 500 feet

Figure 1.1
Fish Survey Area
Las Virgenes Creek

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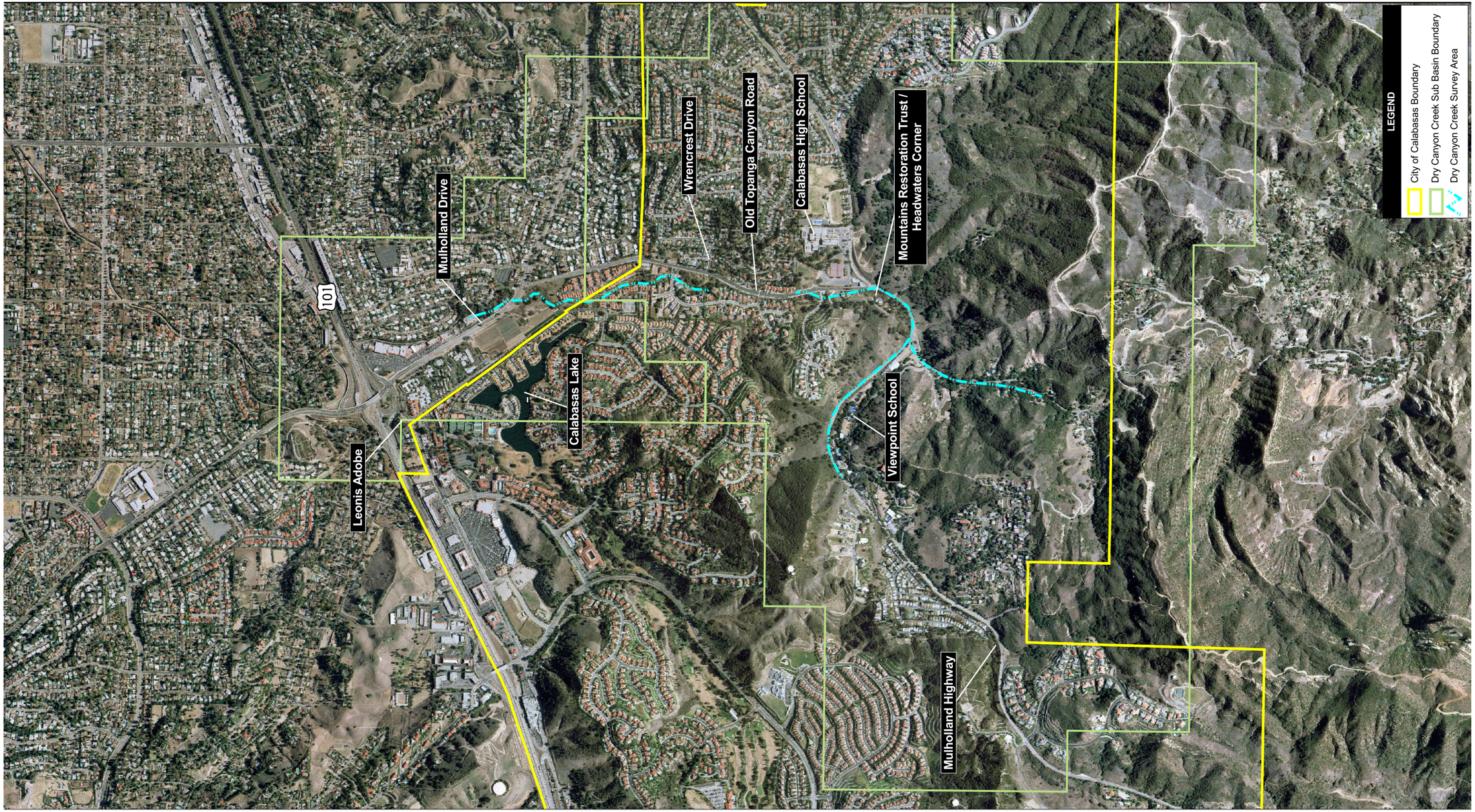

Source: Mountains Restoration Trust, 2002

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Scale: 1 : 6,000; 1 inch = 500 feet

Figure 1.2
Fish Survey Area
Dry Canyon Creek

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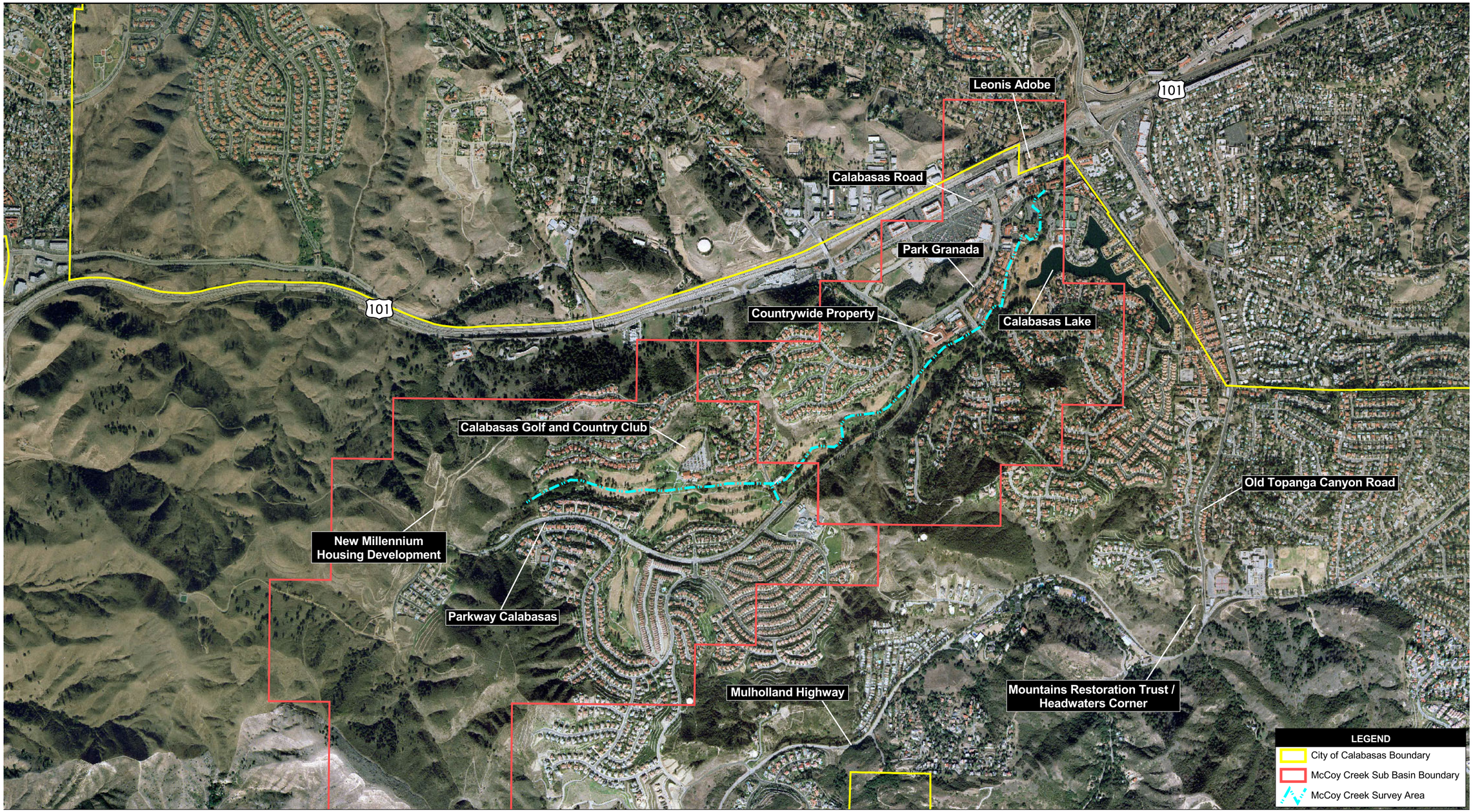

Source: Mountains Restoration Trust, 2002

NORTH

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Scale: 1 : 6,000; 1 inch = 500 feet

Figure 1.3
Fish Survey Area
McCoy Creek

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Table 2
Summary of Habitat Types in Las Virgenes, McCoy, and Dry Canyon Creek Drainages in Calabasas, California, Spring 2003

Creek	Artificial Bottom, meters	Bedrock, meters	Runs, meters	Riffles, meters	Pools, meters	Barrier, meters	TOTAL, meters
Las Virgenes Creek	211 (4.3%)	0	1,221 (25.1%)	1,394.5 (28.7%)	2,009 (41.3%)	27.5 (0.6%)	4,863
Dry Canyon Creek	163 (14.2%)	0	270 (23.5%)	166 (14.3%)	550 (48.0%)	0	1,149
McCoy Creek, downstream	109 (8.3%)	15 (1.1%)	386 (29.2%)	414 (31.4%)	396 (30%)	0	1,320
McCoy Creek, Golf Course	905 (55.2%)	50 (3.0%)	270 (16.5%)	251 (15.3%)	164 (10.0%)	0	1,640
TOTALS	1,388 (15%)	65 (0.7%)	2,147 (24%)	2,225.5 (25%)	3,119 (35%)	27.5 (0.3%)	8,972

Note: Totals do not include small portions of Las Virgenes Creek above the 101 Freeway, or Dry Canyon Creek drainage above Wrencrest Drive and Old Topanga Canyon Road as summarized in the text.

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CHAPTER 3.0
RESULTS

Approximately 8,972 meters (8.9 kilometers) of creek were examined for this study. This included about 4,863 meters of Las Virgenes Creek (plus about an estimated 1,200 meters above the 101 Freeway), 1,149 meters in Dry Canyon Creek, and about 2,960 meters in McCoy Creek (1,640 meters in and above Parkway Calabasas and 1,320 meters downstream of the downstream of Parkway Calabasas). The field survey excluded the shorter sections of Las Virgenes Creek and its tributary immediately above the 101 Freeway. Short segments of upper Dry Canyon Creek were spot-checked in the headwaters area. Flows were present in all the creeks surveyed: approximately 5 to 8 cfs in Las Virgenes Creek, 1 cfs or less in upper Dry Canyon Creek, 2 to 3 cfs in lower Dry Canyon Creek, and 2 to 3 cfs in McCoy Creek.

Las Virgenes Creek

Las Virgenes Creek was the largest continuous stream segment present and was an estimated 4,863 meters. Only 4.3% was artificial, mostly in the upper quarter of the stream segment; 25% was runs, 28.7% was riffles, 41.3% was pools, and 0.6% was barriers of some sort. At least four barriers to fish movement were present. One was a 1-meter-high falls over an eroded clay bank and another was a concrete water diversion structure also 1 meter high. Both of these barriers are between Mulholland Highway and Lost Hills Road bridges. Both had pools below them more than 1.5 meters deep and could be jumped by large steelhead, but not by other smaller fishes. The clay falls had been observed prior to this study on 10 April 2001 and, at that time, the water was only a few cm deep at the base of the falls, making it impassable to all fishes. Apparently high flows have since scoured out a very deep, brushy pool below these clay falls. About 200 meters above Lost Hills Road, a gunnited section of stream ends in a falls again about 1 meter high. Finally a 50 to 60 cm falls exists just downstream of Agoura Hills Road. In addition, very shallow gunnited areas exist under the Lost Hills Road, Meadow Creek Lane, and Agoura Road bridges. These areas are all very shallow and sloped and are probably barriers to fish movement up- and downstream. The canopy was mostly 70% or more except in the gunnite sections above and below the road bridges. Many pools were more than 1 meter deep and cover was good to excellent in many stretches.

Las Virgenes Creek and tributaries above the 101 Freeway occupied about another 500 to 600 meters from its crossing under the 101 Freeway upstream to the crossing of Las Virgenes Canyon Road. This stretch was relatively natural and had lots of gravel, cobble, and sand.

Several pools were deep and fast and a large volume of water was present during the visit. Above Las Virgenes Road, the main creek enters a completely concrete channel, only emerging from a concrete bottom much farther upstream on the Ahmanson Ranch Property at or near the Ventura County line. A tributary from the east lied along the north edge of the 101 Freeway for about another 500 meters and was about 80% natural sand and gravel bottom but included three segments with a concrete slope for substrate. These stretches upstream of the 101 Freeway were not entirely examined and are not included in the totals in Table 2.

Fishes were noted only in Las Virgenes Creek and only arroyo chub were seen. The arroyo chub were first encountered about 800 meters below Lost Hills Road, with crayfish also present, and became more common upstream to Agoura Hills Road. Just below Agoura Hills Road, 10 to 15 YOY chubs were observed indicating reproduction within the previous 2 to 4 weeks. Overall, a few hundred chubs were observed and three or four were preserved for verification. There were no steelhead, or Pacific lamprey, identified during the field visit.

The crayfish seen in the vicinity of the arroyo chub in upper Las Virgenes Creek were the nonnative or exotic red swamp crayfish (*Procambarus clarki*) long known to inhabit the Malibu Creek watershed. The crayfish is known to adversely affect native fish and amphibian species elsewhere in the Santa Monica Mountains.

Dry Canyon Creek

The farthest upstream segments of Dry Canyon Creek examined were above the junction of Old Topanga Canyon Road and Mulholland Highway. These segments are fairly steep and had very little water flowing, less than 0.5 cfs. The tributary upstream along Old Topanga Canyon Road was a series of step pools in bedrock and seemed too small to support fish. The main reach was constrained between Mulholland Highway and development in the canyon. The Mulholland reach was rocky and gravelly and had two pools deeper than 30 cm in a length of about 150 meters of creek examined. Farther downstream at the crossing of Old Topanga Canyon Road, before it goes underground in a concrete culvert, the pools were much larger and deeper, up to 1.2 meters deep. Rock and bedrock predominated in the 200-meter section along the Mountains Restoration Trust's Headwater Corners section. The gradient appeared to be 2% or more in these upstream areas; the substrate was almost completely gravel, cobble, rock, or bedrock; and the canopy was extensive, 80% or more.

The lower section of Dry Canyon Creek from Wrencrest Drive to the 101 Freeway was lower in gradient, estimated at mostly 0.5 to 1.5%. Of this stretch 14% of the creek length was artificial,

23.5% was runs, 14.3% was riffles, and 48% was pools. Many of the pools were deeper than 1 meter and often had boulders, brush, and logs for cover. Good portions of gravel, rock, and sand were present and only small areas of muddy substrate were observed. The canopy was generally 70% or more with both oaks and willows forming the canopy in different sections. The areas with less canopy were from about 100 meters above and below the Park Ora bridge. The floodplain was wide except above the Park Ora bridge for about 200 meters where it is constrained between vertical concrete brick walls about 10 to 15 meters wide. The only barrier to fish movement was a falls about 1 meter high at the downstream end of the Mulholland Drive bridge and falls of gunnite just downstream of the culvert opening at Wrencrest Drive at the upper end of the segment.

The only aquatic vertebrates encountered were small frog larvae (tadpoles) and a turtle in the lower portion of the creek. The tadpoles were hylid frog tadpoles, with possibly some western toad tadpoles, and a few individuals were vouchered in the Hertetology Collection of the Natural History Museum of Los Angeles County. The turtle was not seen well enough to positively identify the species. It was about 10 cm in carapace length and was seen in the large, deep pool just below the creek's emergence from the culvert at the end of Wrencrest Drive. Another disturbance in a pool about 150 meters downstream of Park Ora was almost certainly a turtle or large frog but the animal was not actually seen.

McCoy Creek

The section of McCoy Creek in the Calabasas Golf and Country Club (Golf Course) and above is highly artificial for a little more than half of its length, due to concrete lining or underground culverts (55.2%). The gradient above the Golf Course is about 2% or more. Only the lower portions of the creek are in fairly natural condition: runs 16.5%, riffles 15.3%, and pools 10%. Bedrock makes up the remaining 3%. Several barriers clearly impassable to fishes consist of the following: one pair of falls just above Park Entrada; one barrier 2 meters high just below Parkway Calabasas; and four low barriers, 50 to 80 cm high and lying about 30 meters from each other just upstream of the Golf Course where the stream turns natural again. These barriers look like old water works or debris dams; one barrier is broken down such that it probably does not affect fish movement. The other three barriers are vertical falls 40 to 60 cm high and are impassable to small fish. These falls create deep pools below, which is relatively good habitat for native fish. Only larger fish like steelhead or rainbow trout could jump over these falls. In addition, the road bridges at Parkway Calabasas, Park Capri, and Park Sorrento are floored with concrete and the flow is only a few centimeters deep and not passable by most fishes. The

bridge at Park Entrada has a natural soft bottom, which allows for normal channel development in the creek.

Downstream from the Golf Course the fish habitat is much better. Only 8.3% of the creek length in this reach is artificial, consisting of either culverts or cement lining, and 1.1% is bedrock. Riffles make up 31.4%, runs 29.2%, and pools 30% of this stretch. Many of the pools are more than 1 meter deep and often have boulders and logs providing much cover. Almost all of this area has 70% to 100% canopy, which keeps the stream well shaded. The gradient was estimated to be 1% to 1.5% in this section.

The only aquatic vertebrates encountered were small frog larvae (tadpoles). The tadpoles were hylid frog tadpoles, with possibly some western toad tadpoles, and a few individuals were vouchered in the Hertetology Collection of the Natural History Museum of Los Angeles County.

CHAPTER 4.0
SYNOPSIS OF BIOLOGY OF NATIVE SPECIES

The seven native species of freshwater fishes have a variety of habitat requirements and some of these needs are incompletely understood. Steelhead and lamprey require the coolest waters and largest streams since they attain the largest sizes among the locally known species. Santa Ana sucker also requires cooler water, but less consistently cold than steelhead and lampreys. The Santa Ana speckled dace and stickleback are intermediate in temperature requirements between the steelhead and sucker and the arroyo chub, which tolerates the warmest conditions. All of the local native fishes are the southern populations of mostly more northern cool and cold-water species and thus are adapted to the cooler range of aquatic conditions.

Steelhead Trout

Steelhead trout spend most of their juvenile and adult life in the ocean growing and they mature for 1 year or more. They return to local creeks during mid-winter high flows, usually from about 15 December to 15 April at temperatures of 8 to 12 degrees C. (46 to 54 degrees F.) to spawn in tributary streams. Adults can jump barriers up to 2 or more meters high but must have an unobstructed pool directly below the barrier at least one and a half times deeper than the height of the barrier. Of course, larger fish can jump higher barriers. Larger fish can also swim faster and overcome faster water while moving upstream. Usually fish move after peak flows, while water is still high but slower than at the peak. The females excavate a depression in large gravel in the shallow lower ends or tails of larger pools. One or more male steelhead fertilize the eggs as they are laid amongst the gravel and the female covers the eggs with more gravel. Thus a few inches of gravel free of finer sediment like sand or mud with water 50 to 80 cm (4 to 7 inches) deep is required. The water has to stay between about 9 to 12 degrees C. (48 to 54 degrees F.) for a total of 5 to 6 weeks for the young to emerge from the gravel and become free-living young steelhead trout. These juveniles only need shallow water, up to 10 cm (4 inches) deep at first but require deeper water with age. At first in quiet shallow marginal waters, intermediate-sized fishes, up to 10 cm (4 inches) long, tend to be found in riffles, fish 10 to 20 cm (4 to 8 inches) tend to be in runs, and larger fishes prefer deeper pools. Ideal temperatures appear to be about 15 to 18 degrees C. (60 to 66 degrees F.) and temperatures above 20 degrees C. (68 degrees F.) can be stressful or even lethal. Steelhead in freshwater feed largely on invertebrates, mostly insects, that are from the water or carried in from terrestrial sources. Insects are most abundant and numerous in riffles where production is highest for these invertebrates compared to runs and

pools. Thus riffles are desirable for high-quality trout habitat as well as for the other native species. The juvenile and adult steelhead can also reside in ponded water like coastal lagoons.

Lamprey

Adult lamprey spend their life in the ocean and, like steelhead, return to the freshwater streams to spawn in the coolest winter and early spring periods. Their spawning habits also require gravelly substrate and cold temperatures in the same range as for steelhead. The young lamprey in freshwater are called ammocoetes or ammocoetes larvae. They are elongate, worm-like, and almost eyeless and live in sandy and muddy substrate in well-oxygenated streams. They are usually buried in the bottom materials with their mouth at the surface feeding on detritus (decaying plant material). They spend a year or so growing to about 10 to 15 cm (4 to 6 inches) long and when the winter rains come they transform into the adult form with the development of large eyes and strong rasping teeth in their conical, jawless mouth. They migrate to the ocean for an adult life of parasitizing other fishes.

Santa Ana Speckled Dace and Arroyo Chub

Dace are often found in riffle and pool environments with lots of rock and cobble and faster flows. Dace reach only about 7.5 cm (3 inches) in length and mostly live only 1 year with some large individuals living for a second year. They spawn in the early spring (late March to early June) and their spawning habits involve crowding into rocky and gravelly riffles and laying eggs among the rocks and gravel. They hatch out in a week or so and the larvae also inhabit the shallowest margins of the stream near faster water. After a week or two the juveniles take up a benthic existence in moving water. Generally dace do not tolerate ponded, standing water but they will live in pools of streams where the flow is fairly slow. Dace, as well as arroyo chub, feed largely on aquatic invertebrates.

Arroyo chub are also stream fish but will inhabit ponds and lakes. They formerly were considered pests in some lakes and reservoirs when they multiplied profusely after being introduced. Chubs grow to about 15 cm (6 inches) in length and can live for 3 to 4 years. Like the steelhead, dace, and Santa Ana sucker, the female chubs average larger in size than the males. Male chub reach between 10 to 12.5 cm (4 to 5 inches) in total length. Chub are known to live for 2 to 4 years. They live in streams but will invade pools and slow-moving water more than dace and Santa Ana suckers. Arroyo chub will spawn in water from approximately 15 to 25 degrees C. (60 to 78 degrees F.) and appear to require flowing water to spawn. The females release the eggs against brush or vegetation trailing in slowly flowing water and the eggs adhere

to the vegetation. They take about 5 to 8 days to hatch at a size of 4 to 6 millimeters long (about one-quarter inch). These minute larvae are almost invisible along the shallowest quiet water near the edge of streams. Very small arroyo chub can be found during all of the 9 to 10 warmer months so spawning can take place for much of the year. As they grow they inhabit increasingly deeper water and resemble trout in living and feeding in the water column between the bottom and the surface. The largest individuals are usually hiding under rocks, logs, or other cover and often are not seen without snorkeling or netting. A study in the West Fork of the San Gabriel River found that large chub eat many of the same invertebrates (mostly insects) as the trout in the same stream.

Santa Ana Sucker

Santa Ana sucker attain larger sizes than chub and dace, up to 20 cm (8 inches) in length. Sucker live mostly on the bottom and have strong cartilaginous ridges on their jaws to scrape algae and invertebrates from rocks, logs, and other hard substrate. Sucker live virtually exclusively in flowing water and do not utilize ponds, lakes, and other standing water. They do live in pools in streams. Like the other native species, the size of the fish determines the depth of water inhabited; the smallest fish live in shallow margins and as they grow they inhabit deeper, faster water. Spawning takes place in slow flowing stream water in gravel and sand substrate. The suckers spawn in small groups depositing the adhesive eggs in the gravel. The eggs hatch out in 5 to 10 days and the larvae hatch out at 8 to 10 millimeters (about one-quarter to one-half inch), about twice the size of chub larvae. The larvae and early juveniles, up to about 20 millimeters (three-quarters of an inch) live at the surface and mid-water. Larger fish have the typical turned-down mouth of a sucker and become much more benthic, similar to the adults. Sucker start to spawn earlier than chubs and dace, at 12 to 20 degrees C. (54 to 68 degrees F.) and later than trout, which spawn at cooler temperatures.

Unarmored Threespine Stickleback

Threespine stickleback are small sized, the maximum at about 7.5 cm (3 inches), and mostly live for only 1 year. They are named for the three sharp spines on the back that are elevated to deter predators. The males become brightly colored in the breeding season with red on the sides and undersides of the head and anterior body. The rest of the body is bright green or bluish. The male builds a small mound-like nest of plant debris and excavates a tunnel through it. The female is attracted to the male's display and swims through the tunnel to lay her eggs. The male fertilizes them and guards the nest and eggs until they hatch in a few days. He protects the young for a few more days after which they become independent at about 7 to 10 millimeters

(one-quarter to three-eighths inch) in length. The stickleback spawn during most of the warm months, like arroyo chubs. When winters are light and streams are not disrupted, spawning may occur almost year-round. Possibly they cease spawning during the warmest months and resume in the late summer and/or early fall when the water cools. Stickleback have very small mouths and eat very small animal matter, smaller than the other native fishes. Stickleback prefer the slowest of flowing waters near the edges of slow moving portions of streams, often with abundant aquatic vegetation like water cress, veronicas, or cattails and sedges. Thus they are often also in relatively shallow water, less than 30 cm (12 inches) deep, although they may inhabit deeper water if larger predators are absent.

All of these native species prefer cool to cold water and do not do well in waters that are warm all the time, namely over the mid-20 degrees C. or low 80 degrees F. Trout are stressed in water over 70 degrees F. but most of the other species, except perhaps the cold water lampreys, can tolerate water temperatures into the low 80s. Water temperatures in the high 80s or more can be stressful to all the native species. Most of the creeks in Calabasas appear to have good canopy that shades the streams and may keep the water in the streams from warming up too much.

Part of the reason high temperatures are stressful is the lack of dissolved oxygen in the water. The warmer the water is the lower the capacity it has for holding oxygen. So warm water without riffles, falls, or other disturbances to mix in oxygen from the air will be too low in oxygen to support fishes. Oxygen is also produced by plants in the water during photosynthesis in the day time but ceases during the night and oxygen can drop to low levels. Organic and other materials in the water can also oxidize and use up oxygen in the water. Fish kills can occur in streams in the morning if oxygen has been used up over night by pollutants oxidizing the oxygen in the absence of photosynthesis.

Reproduction is restricted from a few weeks to 2 months in the late winter and spring for the steelhead, lamprey, sucker, and dace. The arroyo chub and stickleback can breed over a longer period during the warmer months of the year. In other areas of the southwestern United States, dace have been observed to spawn during high water events several times a year, but this does not occur in southern California. The stickleback is the only native fish in southern California with parental care.

Because of the seasonal and year-to-year variation in water flow, local populations of native fishes can fluctuate widely over the year and between years. Winter storm and flood flows often reduce populations to low numbers. Later in the spring, summer, and fall, numbers will increase greatly. These numbers are greatest during wet years and lowest during dry years when the

amount of aquatic habitat to support fishes shrinks. Because of southern California's Mediterranean climate, these fluctuations occur on an annual basis as well as on multi-year cycles of wet years and drought years.

Natural waters in coastal southern California are usually clear or nearly so, becoming turbid only during high winter flows or with local disturbance introducing sediments into the water. Arroyo chub, stickleback, and trout are mostly visual feeders and need clear water to thrive. The suckers, dace, and lamprey are less dependent on clear water but are still found most abundantly in clear streams.

Arroyo chubs, speckled dace, and stickleback are small in size and can tolerate the smallest streams. Trout and suckers attain larger sizes and tend to be restricted to larger streams. Lamprey are specialized for soft substrates where good flow also exists. Dace, trout, and lamprey invade the farthest upstream in local tributaries, into gradients of more than 3%; whereas, sucker do not go as far, remaining in gradients of about 2% or less. Stickleback and chub also remain mostly in lower-gradient streams, usually less than 2%, and these two species inhabit the slower parts of the streams.

The populations of native fishes also provide prey items for several other native species that historically, and perhaps presently, occur in the area. Garter snakes prey on fishes like stickleback, chub, and trout, as well as on tadpoles of tree and redlegged frogs. Some tree frog tadpoles were taken in Dry Canyon and McCoy creeks during the present study. Garter snakes and redlegged frogs certainly occurred historically in the area and might be considered for reintroduction as part of the recovery of these species.

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CHAPTER 5.0
DISCUSSION

The physical habitat of the streams appeared good to excellent in most stretches examined. Based on observed conditions, the amount of flow, kinds of substrate, depth of water, and presence of a variety of habitats are reasonable for the native fishes that occur there now (only arroyo chub in Las Virgenes Creek) or that might be restored to the area (steelhead and lamprey in Las Virgenes Creek and these and all the other species in Dry Canyon and McCoy creeks). However, this conclusion is based on a one-time survey in the spring when flows were relatively good and temperatures were still cool. The lack of any fish in Dry Canyon and McCoy creeks may indicate that the water does not flow year-round, and during the warm summer months water temperatures may increase to unacceptable levels for the fish to survive. It is also possible that the lack of fish in the creeks results from the creeks completely drying out during the summer months. The lack of exotic fishes is also encouraging since they often adversely impact the native species.

The abundance of sand, gravel, and rocks and a good proportion of riffles, runs, and pools with pool depth often 1 meter or more indicate all the habitat requirements of all the fish species discussed here. Good to excellent ratings for cover with rocks, boulders, logs, or brush in many pools and runs indicate adequate protection and hiding places for the native fish species. The canopy is extensive in almost all areas except near bridges and in the Golf Course where much of the stream is artificial. While helping to keep the streams cool, the heavy stands of oak canopy in some areas may be reducing productivity (photosynthesis) of the streams.

Two other observed features (barriers in the study area and those outside of Calabasas) and one unknown feature (water quality) are or may be detrimental to native fish populations. Several barriers to fish movement were noted in the surveys and are described in Section 3.0 of this report. These divide fish populations into smaller segments since interchange of individuals is rendered impossible or only possible in a downstream direction. Thus fish can go over the falls to the area downstream but downstream fish are unable to return. The steelhead and lamprey are migratory and thus would be denied entrance to the areas above barriers. In all the other species the young tend to drift or be washed downstream a few meters to a kilometer or two and as they grow they reinvade upstream areas. With barriers, the fish are unable to return. Even resident fish are divided into smaller reproductive populations that may be more vulnerable to extirpation.

The known barriers in the area were enumerated in Section 3.0 and other barriers are probably present downstream of Calabasas. At least two barriers are known downstream on Las Virgenes Creek. A third barrier on Malibu Creek, Rindge Dam, has prevented steelhead from entering the area since the late 1920s. There are some conservation efforts underway to possibly remove Rindge Dam, including a feasibility study conducted by the US Army Corp of Engineers and California State Parks. If Rindge Dam is removed, Las Virgenes Creek could become accessible to steelhead if the other barriers noted here are also removed or ameliorated. Downstream of Dry Canyon and McCoy creeks, Sepulveda Dam and the vast expanses of concrete-lined channels are barriers to movement of native fishes into and out of the Calabasas area. Even if the habitat is suitable in Calabasas, there is no way for native fish to naturally recolonize the area given the existing conditions downstream. The documented barriers in Dry Canyon and McCoy creeks would make it hard for the fish to survive without being able to exchange individuals. It is desirable to maintain the longest continuous segments of stream possible in order to maintain fish populations.

Water quality and quantity are currently unknown for these three creeks. Data were not available regarding the amount of water present year-round. Even with much lower flows in summer and fall, native fishes have the potential to survive in the many deep pools observed that should hold some water in the dry season. This presumes that excess nutrients, pollutants, or other factors of water quality are not making the water unsuitable for the native fishes. Most of these native fishes are known to live with some degradation of water quality in the Santa Clara and Santa Ana rivers, including tertiary treated wastewater treatment effluent. Thus some altered water quality is not necessarily detrimental and in many cases is providing the necessary water to support populations of native fishes elsewhere. The steelhead, lampreys, and stickleback were the first fish to disappear from the Los Angeles River watershed in the 1940s and 1950s. These species apparently were more sensitive to water quality issues than the dace, chub, and sucker, which lasted longer and still occur in a few places in the Los Angeles River watershed. This indicates that the chubs, sucker, and dace would be the easiest to reestablish in the Calabasas streams; the others would require more restoration, or at least work to identify the factors that have to be corrected. The Riverside-Corona Resource Conservation District has had success in maintaining self-reproducing populations of chub and dace in an outdoor artificial stream and were able to hold suckers in the same stream for most of a year. This means it is possible to bring populations of these fish back to areas where they have been extirpated.

CHAPTER 6.0
RESTOATION NEEDS AND RECOMMENDATIONS

Based on the previous chapters, the five main needs for restoration of native fishes in these streams in Calabasas can be divided into five categories: (1) habitat improvement, (2) barrier removal, (3) reintroduction of native fish species, (4) elimination and management of exotic species, and (5) improved access to the area from downstream sources of native fishes. Water quality and seasonal quantity should also be studied to determine if the quality and amount of water are appropriate for native fishes. Barriers should be removed and more natural substrate used to make these areas passable to native fishes. These barriers are formed by clay banks eroded headward, concrete vertical drops, and/or cement-lined channel bottoms that render them impassable to fishes. Thus, the solutions are different for each type of barrier.

The restoration of the physical conditions of the McCoy Creek is needed in the Golf Course area where the creek is mostly obliterated underground in culverts. The creek in the Golf Course, the main canyon, and the side canyon coming in from the southwest should be returned to surface flow and designed with no obstacles to upstream movement of fishes. A combination of riffles, pools, and runs could be established to provide habitat for native freshwater fishes. This higher-gradient, upper portion of the upper creek would normally have more riffles and pools than runs. Usually runs develop more in lower-gradient areas downstream that meander more. An upstream riffle and pool stretch with relatively high gradient in the Golf Course would be more amenable to the trout, sucker, and dace; whereas, the stickleback and chub would be more prevalent downstream of the Golf Course where gradients are lower and more quiet water runs and pools would be present. However, young of sucker and dace would drift downstream into the lower-gradient area in the spring and after growing bigger would tend to move back upstream into the higher-gradient areas.

The higher-gradient creek section in the Golf Course should be mostly rocks, gravel, and boulders stepped such that fish could freely move up- and downstream. In addition, riparian vegetation should be included to provide shade and keep the stream cool and better oxygenated. The design should prevent nutrients and pollutants from entering the stream and possible groundwater sources should be used to maintain high water quality and to keep water temperatures low. The large pond in the Golf Course should be kept free of exotic aquatic organisms that could adversely affect the native species. Arroyo chub and stickleback could thrive in a pond habitat if the water was appropriate for them. As observed during the survey, the water in this section was very greenish, as if plankton blooms were taking a lot of the

oxygen, and no fishes were observed. The barriers to fish movement upstream of the Golf Course should also be removed to maximize the amount of continuous stream available to native fishes.

Once longer, more continuous habitats are available, consideration should be given to introduction of native fishes, recognizing that only steelhead, lamprey, and arroyo chub are native to Las Virgenes Creek and all seven species are native to Dry Canyon and McCoy creek drainages of the Los Angeles River Basin. Steelhead would ultimately require removal of barriers downstream of Calabasas, but good habitat could be seeded with stocks of native steelhead that could be self-sustaining entirely in freshwater until downstream barriers were removed. It is not known whether lampreys would survive in such conditions but steelhead are known to survive as freshwater populations above barriers to the ocean. All the other native fish species could survive in the stream segments in Calabasas based on habitat assessment, however water quality and quantity needs on a year round basis are not currently known. Therefore before any fish species are brought in, studies should be done of the water conditions with particular reference to the amount of water present and the temperature range that occurs in these streams. The conditions appeared good during the survey partly since it was spring and water volumes were high and cool. The high winter flows had scoured out the streams making the habitat look good. These conditions showed that several aspects of the habitat are indeed in good condition; however, permanent populations of fishes depend on suitable features remaining intact year after year.

No exotic fish species were noted in the stream segments, but green sunfish, largemouth bass, and mosquitofish have been recorded in Las Virgenes Creek downstream of Mulholland. These exotic species could be in some of the deeper pools where they could not be detected during this survey. Mosquitofish are placed in many locations by the mosquito abatement districts, although some of these districts are working on finding native replacements, including threespine stickleback. In any case, no exotic fish were seen during the survey and apparently they are rare, absent, or perhaps much reduced by the recent winter rains.

Even though no exotic fish were identified, an exotic invertebrate and an exotic amphibian were identified. The exotic invertebrate identified was the crayfish, which is known to exist in many locations throughout the Malibu Creek watershed. The exotic amphibian identified was the bull frog which is prevalent throughout the study area. These exotics are known to adversely affect the native fishes, as well as amphibians, and need to be controlled or eliminated to successfully support the native fishes. Because of their proximity to large numbers of people, urban watersheds like these streams are known to attract introductions of unwanted aquarium and bait

fishes. A simultaneous educational effort should accompany any restoration effort. This can reduce inadvertent introductions of aquatic organisms and build local support for native species restoration.

The crayfish were identified in Las Virgenes Creek above Lost Hills Road. These invertebrates are known to impact native fish in various stream segments of the Malibu Creek watershed. Before efforts are made at native fish reintroduction these exotic invertebrates should be controlled or eliminated. The combination of exotic removal with habitat improvements will greatly improve the native fish reintroduction efforts.

One of the basic tenets of the Endangered Species Act is habitat restoration. Therefore, improving these streams should be looked upon favorably by the agencies that administer this Act. Of the fish species included here, steelhead and unarmored threespine stickleback are federally endangered, the sucker is federally threatened, and the dace and chub are California Species of Special Concern. The freshwater species of lamprey has been extirpated in southern California. The migratory lamprey is now being reviewed for possible consideration for the endangered species list. Thus, considerable coordination with the National Marine Fisheries Service (steelhead), the U.S. Fish and Wildlife Service (stickleback and sucker), and the California Department of Fish and Game (chub, dace, lamprey) will be required. They will most likely require detailed plans for bringing native species back to these stream, including monitoring of fish populations before, during, and after all projects to ensure that the results are assessed scientifically.

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CHAPTER 7.0
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EDAW

FEASIBILITY STUDY

FOR REMOVAL OF
CONCRETE LINING IN
LAS VIRGENES CREEK NEAR
AGOURA ROAD
CITY OF CALABASAS, CALIFORNIA

FEBRUARY, 2000

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FEASIBILITY STUDY

FOR REMOVAL OF CONCRETE LINING IN LAS VIRGENES CREEK NEAR AGOURA ROAD CITY OF CALABASAS, CALIFORNIA

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APPENDIX

1. INTRODUCTION

ASL Consulting Engineers (ASL) have been contracted by the City of Calabasas, California to provide Engineering Services for Widening of the Agoura Road Bridge over Las Virgenes Creek. As a part of the contract, the City requested ASL complete a Feasibility Study investigating removal of the concrete lining in the Las Virgenes Creek between Route 101 and the Agoura Road bridge. Exhibit "A" shows the project location. This report discusses the hydraulics under the existing condition and the impacts of the alternatives presented. General and technical features of available alternatives, cost comparisons and the permit requirements are also outlined in this report.

2. GOAL

The City of Calabasas is considering alternative channel options to the concrete trapezoidal channel that currently exists in Las Virgenes Creek between the Agoura Road Bridge and Route 101. The City of Calabasas has submitted the Environmental Enhancement and Mitigation Program (EEMP) application for grant funds to the Resources Agency of California to remove the concrete channel lining and reconfigure the Channel. The nature of the grant is of the kind wherein the improvement of the channel lining needs to support wildlife movement and support natural vegetation. Hence the goal of the proposed project is to:

- Facilitate wildlife movement by removing the concrete lining and providing a channel with natural vegetative growth within.
- Improve the overall aesthetics of the channel.

3. BACKGROUND

Based on City and County records, the existing concrete channel lining was constructed in 1977. Though the bottom width of the channel varies from 45 to 65 feet, about 230 linear feet of the downstream portion has a constant bottom width of 45 feet. The side slopes of the channel are 1.5:1 and height from the channel bed to the top of the side slopes is fairly uniform over the entire length and is approximately 18 feet. Exhibit "B" shows the existing plan and profile of the concrete lined trapezoidal channel.

LOCATION MAP

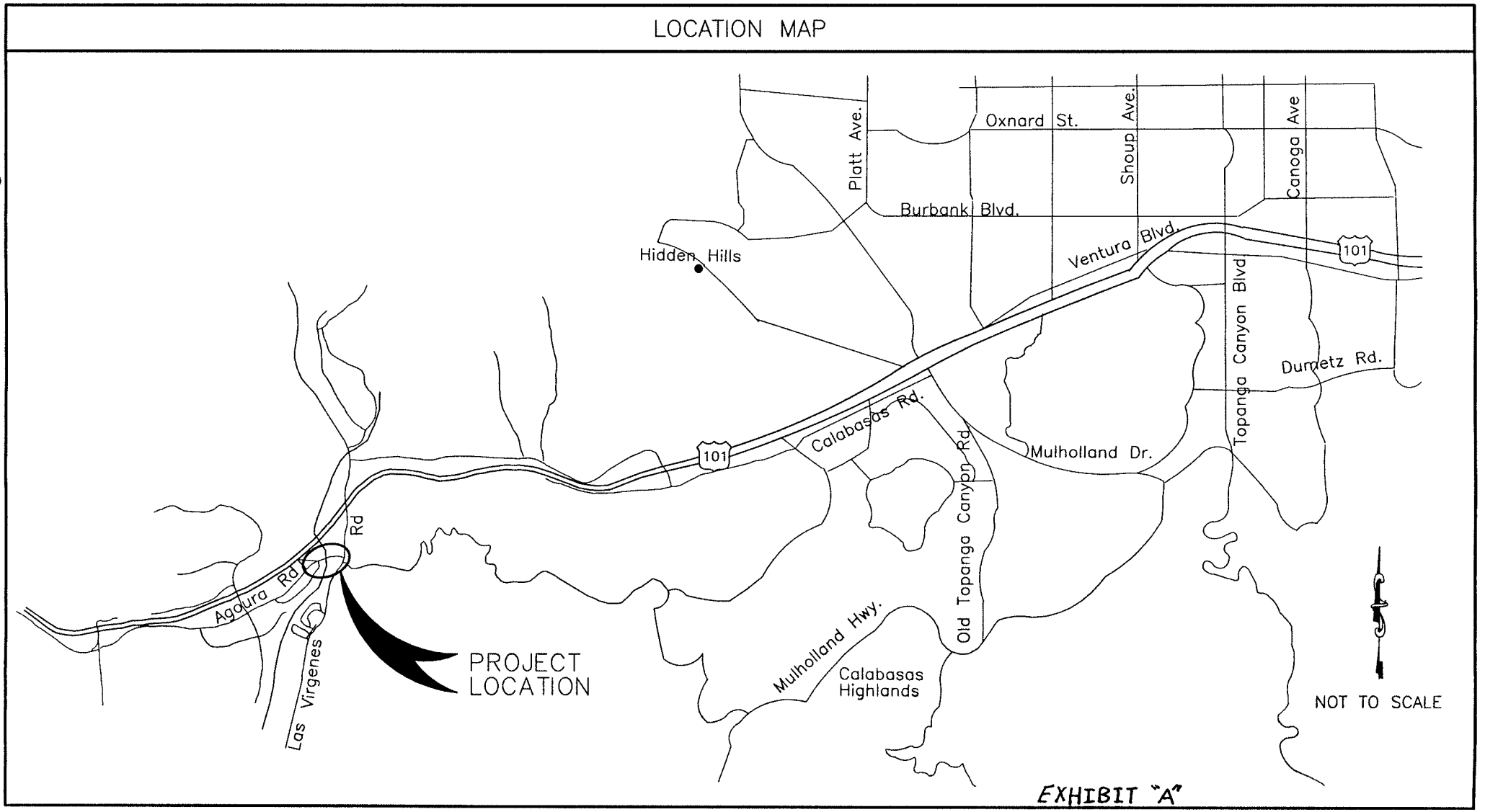

EXHIBIT "A"

This report discusses the hydraulics under the existing condition and the impacts of the alternatives presented. General and technical features of the available alternatives, the cost comparisons and the permit requirements are also outlined in this report.

The available cross section and channel slope in the limits of the study can accommodate a number of alternatives to the existing concrete lining. Supercritical flow and resulting high velocities do not sustain grass lined options. Any option which increases the cross section width requires increased right-of-way and costly easement acquisition. Table 1 lists various options considered and the relative advantages and disadvantages of each option.

TABLE 1
Conceptual Alternatives Considered

ALTERNATIVE	ADVANTAGES	DISADVANTAGES
Grass lined Trapezoidal Channel	Economical to construct and maintain, aesthetically blends with the surrounding, gives a natural look and supports wildlife habitat.	Cannot withstand velocities greater than 5 to 6 ft/sec and hence not suitable for intended purpose without incorporating concrete and/or riprap drop structures
Riprap lined Trapezoidal Channel	Moderately economical to construct and maintain. Supports limited vegetative growth and gives natural appearance under low to moderate (up to12 ft/sec) velocities.	Cannot withstand high velocities and may not support good vegetative growth due to movement of the media at high velocities. Does not accommodate easy wildlife movement.
Erosion Control Blanket Trapezoidal Channel	Supports wildlife habitat, supports vegetative growth and gives natural appearance.	Though withstands higher velocities (up to 20 ft/sec for short durations), still not feasible for intended application due to prevailing velocities higher than 20 ft/sec.
Gabion lined Trapezoidal Channel	Withstands high velocities (up to 25 ft/sec), supports limited vegetative growth with permanent anchor.	High initial construction cost. Moderate maintenance costs. Does not accommodate easy wildlife movement.
Concrete Block Revetment Trapezoidal Channel	Withstands high velocities (up to 26 ft/sec), provides the environment for vegetative growth with permanent anchor. Accommodates wildlife movement.	High initial construction cost. Moderate maintenance costs.

Gabions and Concrete Block Revetments are the only options, which meet velocity constraints, and therefore are the alternatives discussed in detail in this report. Other options not further discussed.

4. HYDRAULICS

Water Surface Elevations and other hydraulic and scour data are computed for existing condition and for conditions under proposed alternatives utilizing U.S. Army Corps of Engineers HEC-RAS computer program. The proposed alternatives, Gabions and Concrete Block Revetments, are discussed in the next section. Scour Analysis is based on the methods outlined in HEC-18, Evaluating Scour at Bridges, developed by Federal Highway Administration (FHWA). Cross sectional data of the channel used for hydraulic and scour analyses is obtained from available plans and supplemented by field survey.

Hydraulic and Scour Analyses are provided for eight conditions: four existing conditions and four proposed conditions. All the analyses were performed for a 50-year return period flow (Q_{50}) of 14,500 cfs in the channel. This flow is from the County of Los Angeles 1977 plans for construction of the existing concrete lined channel. The Hydraulic/Water Conservation Division of the Los Angeles County Department of Public Works (LAC/DPW) confirms this flow data is still valid. Table 2 shows the Manning's "n" (roughness coefficient) values considered for each of the eight conditions analyzed.

TABLE 2
Manning's "n" (Roughness Coefficient) Values

CONDITION	ANALYSIS NUMBER	Manning's "n"		REMARKS
		UPSTREAM	DOWNSTREAM	
EXISTING CONDITION	1	0.015	0.055	***n = 0.015 for concrete lining***: 4 "n" values are considered for 4 different possible conditions downstream of the Agoura Road bridge.
	2	0.015	0.075	
	3	0.015	0.025	
	4	0.015	0.035	
PROPOSED CONDITION	5	0.025	0.075	***Gabion Lining Option***: two extreme conditions are considered for downstream of the Agoura Road bridge.
	6	0.025	0.025	
	7	0.025	0.075	***Concrete Block Revetment Lining Option***: two extreme conditions are considered for downstream of the Agoura Road bridge.
	8	0.025	0.025	

Generally, the flow is supercritical in the upper half of the channel study section and jumps subcritical before crossing under the Agoura Road bridge. The computed increase in the water surface elevation at the bridge location ranges from 0.10 to 0.30 feet. The highest water surface elevation computed for the proposed conditions is 1.38 feet below the low chord of the bridge. Hence, no overtopping of the bridge is expected to occur for either of the two alternative linings proposed.

5. ALTERNATIVES

Steep slope and high velocity flow conditions in the location of the study limit the available options that have adequate resistance to erosion and still sustain vegetative growth and provide a more natural appearance. The area of the channel bottom and the side slope to be relined is approximately 3,600 square yards (32,400 square feet). After considering several channel-lining alternatives only two options meet the City's goals and hydraulic requirements:

a) Gabion structure
b) Concrete block revetment

a) **Gabion Structure**: The Gabion is a box structure made of hexagonal double-twisted wire mesh, either zinc coated or PVC coated and available in standard lengths of 6, 9 and 12 feet with a diaphragm every 3 feet. The boxes have a standard width of 3 feet and standard available heights (thickness) of 1, 1.5, 2 and 3 feet. The depth and the gradation of filling stones depend on flow conditions. With the use of proper geo-textile film separating the gabion from the bed material, it is expected that 18" (1.5') and 24" (2 foot) thick gabion would meet the requirements for the channel section under study. Steep slope and high velocity conditions in the upper 100 feet of the project requires a 24" thick gabion. Gabions will permit vegetation growth.

b) **Concrete Block Revetment**: Pre-formed mats consisting of interlocking concrete blocks, held together by cables, are commercially available and provide continuous erosion protection. The concrete block revetment can withstand high velocities and provide open space (10-20%) for vegetation growth. Revetment systems are normally

placed on filter fabric or a conventional graded filter to permit permeability and relieve hydrostatic pressure in the subgrade. The blocks are available in 6" and 9" thicknesses. For the application considered in this study, 9" thick block revetment is recommended for the upper 100 feet (because of steeper slope) and 6" for the lower 200 feet.

Table 3 contains the roughness coefficient, unit cost, and the anticipated total cost of construction for the two alternatives.

TABLE 3
Cost of Alternative Linings

ALTERNATIVE LINING	MANNING'S "n" (TYPICAL)	UNIT COST / SQUARE FEET	AREA TO BE COVERED (SQUARE FEET)	TOTAL COST
Gabion	0.025	$4.50	32,400	$ 145,800.00
Concrete block revetment	0.025	$6.80	32,400	$ 220,320.00

The costs shown in Table 3 include supply and installation of the materials including any filter material that may be necessary to improve the performance of the lining. Extracts from lining product literature are included in Appendix "A". The estimated number of working days required for the construction of the project using either of the two alternatives is 60 days.

It is recommended that the existing concrete encased 24" VCP sanitary sewer pipe that crosses under the channel at the upper end of the project be relocated with additional cover before either alternative lining is constructed.

6. PERMITS

Any construction activity and changes to the existing condition of a water course requires permits from various regulatory agencies. These permits are designed to protect and/or improve the functionality of the natural resources and public infrastructure. The permits that must be obtained before construction of the project are listed in Table 4.

TABLE 4
List of Necessary Permits

AGENCY	TYPE OF PERMIT
➢ Los Angeles County Flood Control District	➢ Encroachment Permit
➢ U.S. Army Corps of Engineers (U.S. ACOE)	➢ Section 404 Nationwide Permit
➢ California Department of Fish and Game	➢ 1601 Streambed Alteration Agreement
➢ California regional Water Quality Control Board (RWQCB)	➢ National Pollutant Discharge Elimination System (NPDES) Permit

It is estimated that the permit process will take eight weeks for each of the agencies. They should be pursued concurrently by submission of project plans and specifications to each agency. Telephone conversations with the Permits and Construction Division and the Hydraulics and Water Conservation Division of the Los Angeles County Department of Public Works (LACDPW) revealed that it is improbable the County would allow removal of the concrete lining from the channel. The staff from these divisions indicated that the City of Calabasas could most likely assume ownership and responsibility for the channel and remove the concrete lining once the County had relinquished the channel to the City. The City would assume all maintenance and liability for the channel.

See Appendix "B" for hydraulic calculations.

EXHIBIT "B"

APPENDIX "A" – GABION LITERATURE

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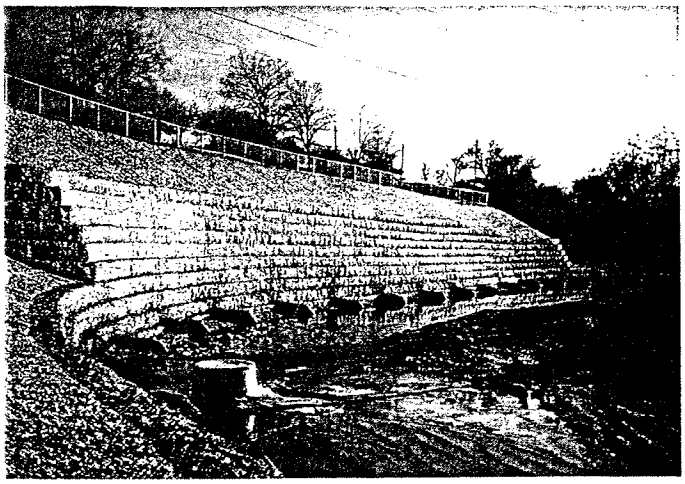

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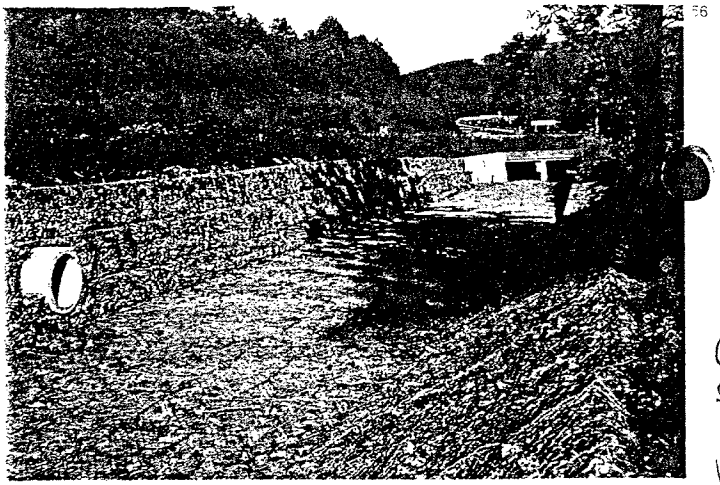

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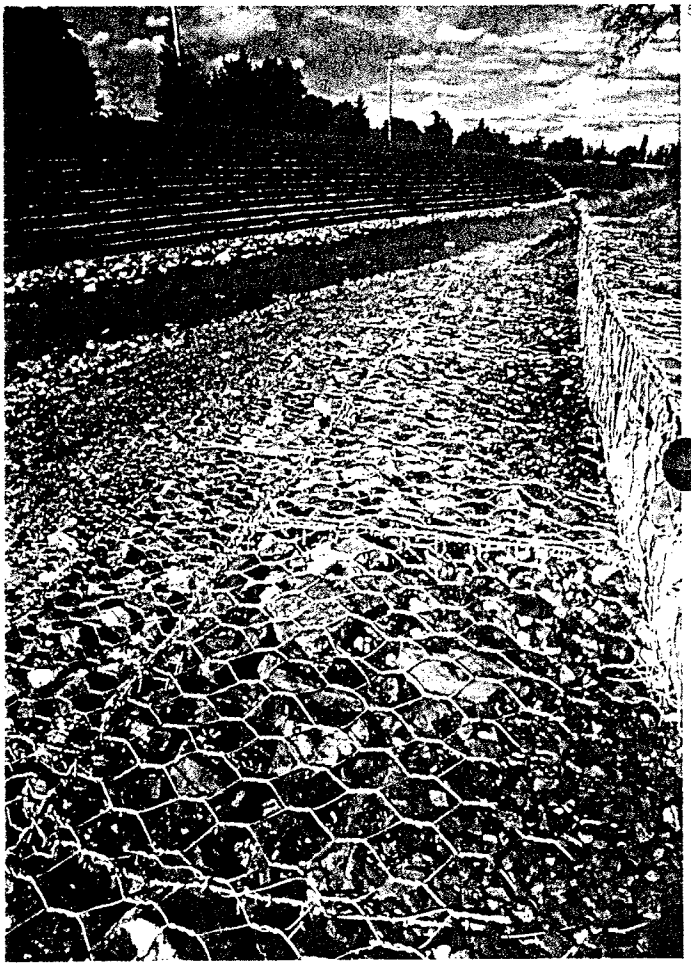

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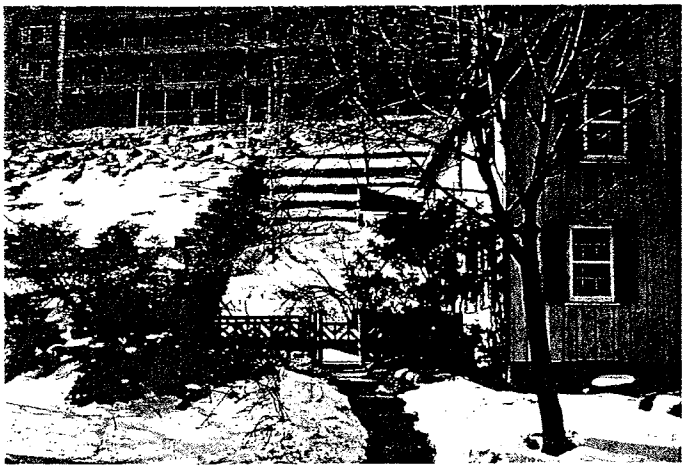

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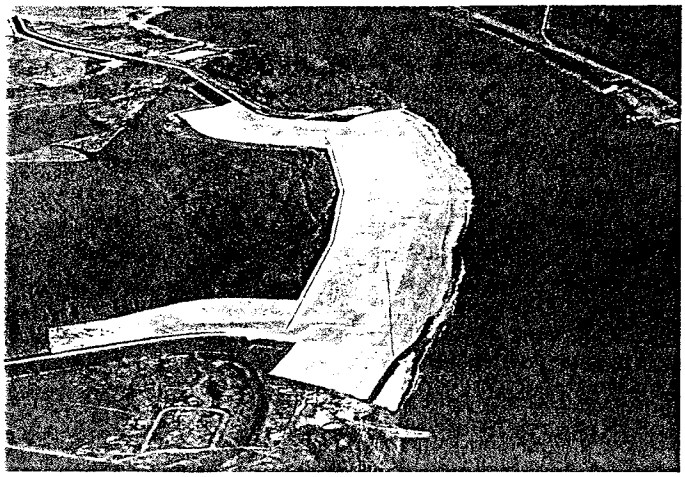

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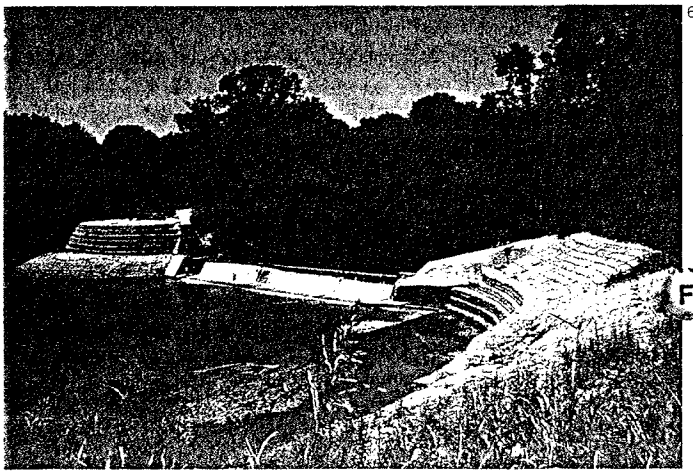

GRAZION

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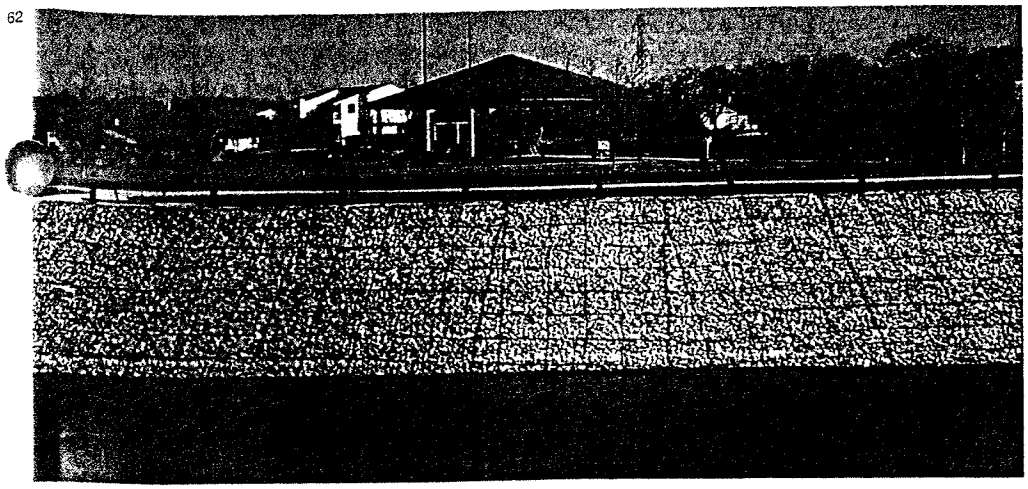

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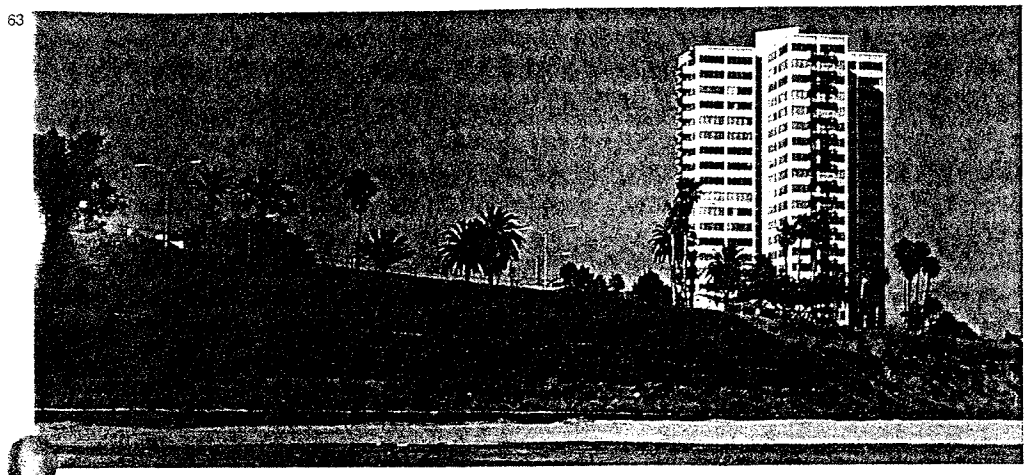

Fig. 55 - U.S.A. - Texas
Channel lining of the Little Walnut Creek.

Fig. 56 - U.S.A. - Maryland.
Protection of a natural water course along the Highway Alt. RT.40 going towards Frederick.

Fig. 57 - U.S.A. - Tennesse. Coke Country.
Rockfall netting protection along the Interstate 40.

Fig. 58 - U.S.A. - California.
Guadalupe river training near. S. Clara.

Fig. 59 - U.S.A. - New York.
Gabion retaining wall protecting a private property in Long Island.

Fig. 60 - U.S.A. - Louisiana.
Scour protection along the Old river.

Fig. 61 - U.S.A. - Kansas.
Dam protection carried out in 1989.

Fig. 62 - U.S.A. - Texas.
PVC coated gabion protection on Lake Arlington near Dallas.

Fig. 63 - U.S.A. - California.
Retaining and protection works carried out with PVC coated gabions along a shore road in Long Beach.

Fig. 64 - U.S.A. - Texas.
Step spillway at El Paso.

Fig. 65 - U.S.A. - Florida
Gabion and Reno mattress shoreline protection on the lake Okeechobee (1988).

Fig. 66 - U.S.A. - Texas
Gabion bridge abutment along the Shoal Creek near Austin.

GABION

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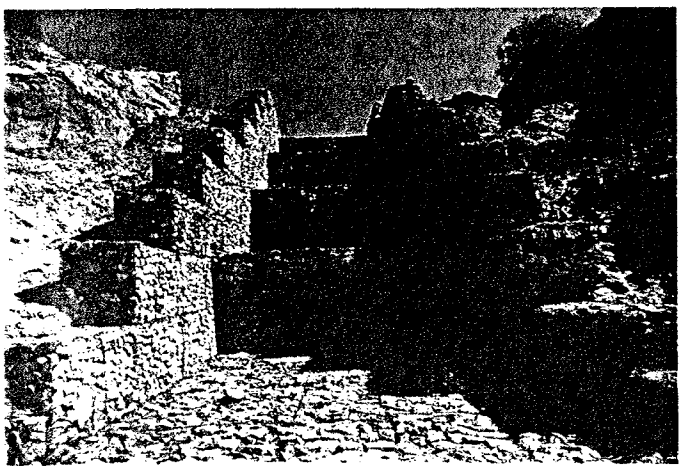

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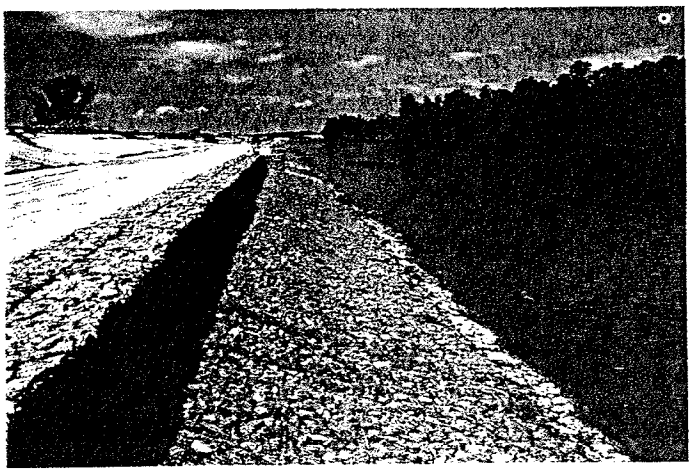

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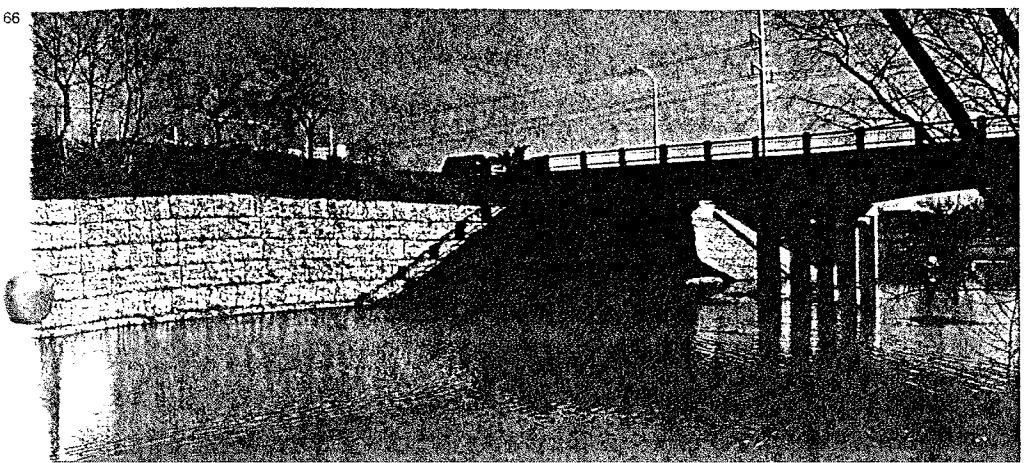

MACCAFERRI

Maccaferri Gabions, Inc. - California Office

FACSIMILE TRANSMITTAL SHEET

TO: ATTN: RAM	FROM: MAURIZIO DODI
COMPANY: ASL CONSULTING	DATE: 8/9/99
FAX NUMBER: (949) 727-7097	TOTAL NO. OF PAGES INCLUDING COVER: 18
PHONE NUMBER: (949) 727-7099	SENDER'S REFERENCE NUMBER:
RE: CHANNEL DESIGN INFORMATION/SPECIFICATIONS	YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

HERE ENCLOSED

Environmental Solutions

Administrative Headquarters
303 Governor Lane Blvd.
Williamsport, Maryland 21795-3116

Plants
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California Office - 3650 Seaport Blvd.
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1. Usual types of channel linings using Reno mattress and gabions and their natural integration process, due to the interaction with the water table and to vegetation growth.

. Types les plus courants de revêtements de canaux en matelas Reno et gabions et leur processus d'intégration à l'environnement, dû à l'échange avec la nappe phréatique et à la croissance de la végétation.

1. Tipologías más frecuentes de revestimientos en colchones Reno y gaviones. Proceso de integración natural de los mismos, debido al intercambio con con las capas freáticas y al crecimiento de la vegetación.

A: Trapezoidal section with bank lining
B: Trapezoidal section totally lined
C: Double trapezoidal section with lining of variable thickness
D: Longitudinal protection with gabions
E: Longitudinal protection with Terramesh® system

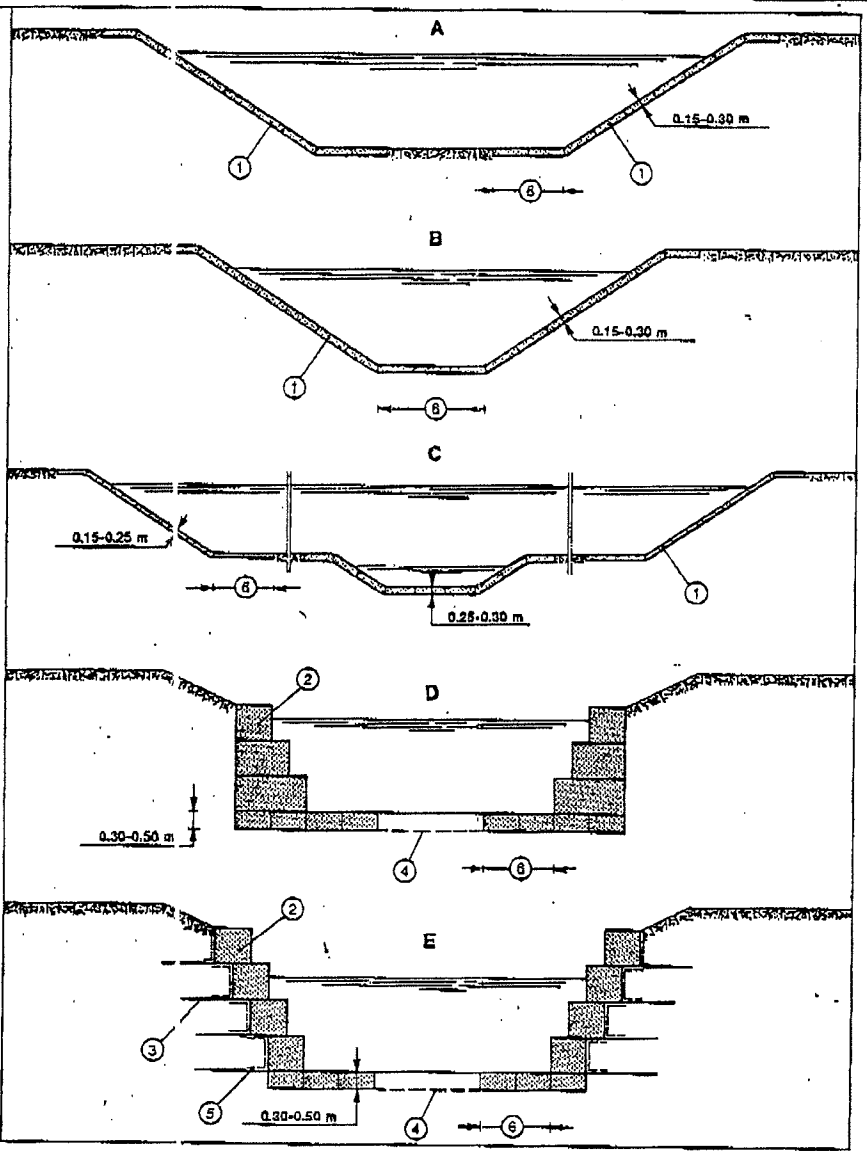
1: Reno mattress lining
2: Gabion structure
3: Reinforcing metal wire net
4: Possible lining of the river bed
5: Geotextile
6: Variable length

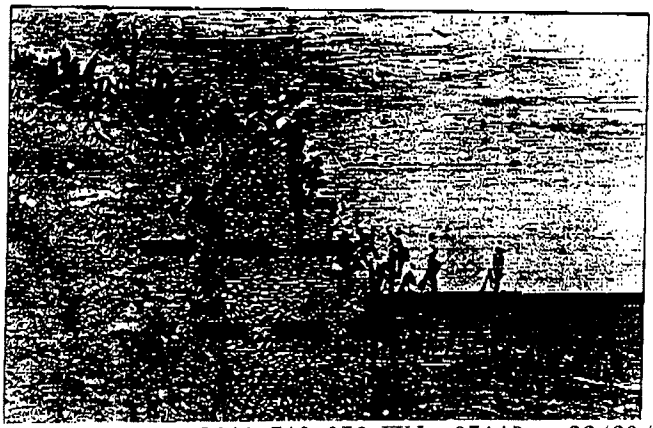
A: Section trapézoïdale avec revêtement des berges
B: Section trapézoïdale avec revêtement total
C: Section trapézoïdale composée avec revêtement en épaisseur variable
D: Défense longitudinale en gabions
E: Défense longitudinale avec le système Terramesh®

1: Revêtement en matelas Reno
2: structure en gabions
3: Grillage métallique renforcé
4: Eventuel revêtement du lit du fleuve
5: Geotextile
6: Longeur variable

A: Sección trapecial con revestimiento de las orillas
B: Sección trapecial con revestimiento completo
C: Sección de doble trapecio con revestimiento de espesor variable
D: Defensa longitudinal en gaviones
E: Defensa longitudinal con sistema Terramesh®

1: Revestimiento en colchones Reno
2: Estructura en gaviones
3: Red metálica de armadura
4: Eventual revestimiento del fondo
5: Geotextil
6: Largo variable





Linings laid in dry conditions

Reno mattresses and gabions are laid directly onto the ground to be protected (fig. 9), so the slope must be stable itself and must not be so steep as to cause the revetment to slide.
Flexible revetments generally offer greater guarantees of stability than rigid structures, and Reno mattress and gabions are designed to adapt to considerable soil movements without structural problems.
The units are normally laid down the slope of the bank, at right angles to the current.
However, if the banks and bed are to be covered completely, the units on the bed itself should be laid in the direction of flow (fig. 10).

Revêtements exécutés à sec

Les revêtements en matelas Reno et en gabions reposent directement sur le terrain à protéger (fig. 9); le terrain devra donc être suffisamment stable et sa pente ne devra pas provoquer le glissement de l'ouvrage.
Les revêtements souples cependant ont en général un facteur de sécurité à la stabilité plus élevé que celui des ouvrages rigides, puisque les matelas Reno et les gabions sont en mesure de s'adapter aux mouvements (mêmes importants) sans risques d'endommager la structure.
La disposition des éléments sur les berges est habituellement transversale au cours d'eau, soit selon la pente maximale des berges, et perpendiculaire au courant.
En revanche, lorsqu'il est prévu un revêtement complet de la section, il est de règle de disposer sur le fond les éléments longitudinalement au courant (fig. 10).

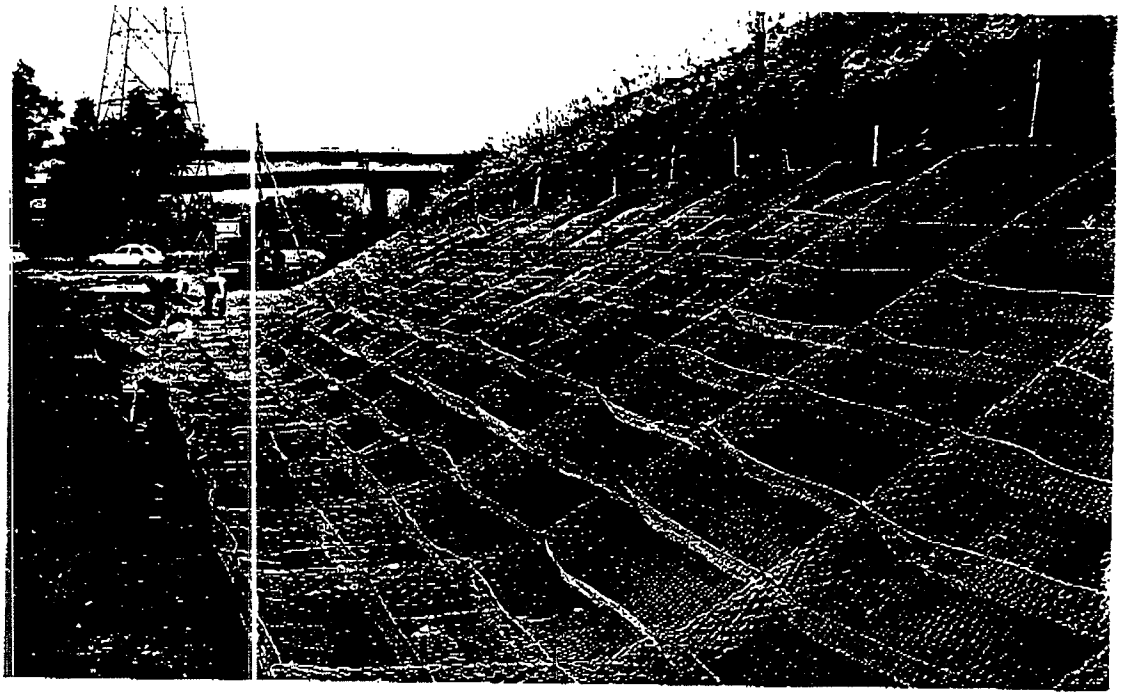
Revestimientos realizados en seco

Los revestimientos en colchones Reno y gaviones se apoyan directamente sobre el terreno que deben proteger (fig. 9): es necesario, por lo tanto, que el terreno sea suficientemente estable que su inclinación no produzca el deslizamiento del revestimiento.
De todas maneras, los revestimientos flexibles poseen, en general, un factor de seguridad de estabilidad superior al de las estructuras rígidas, y que los colchones Reno y los gaviones pueden adaptarse incluso a grandes movimientos sin que se perjudique la estructura.
Generalmente, los elementos están ubicados sobre las orillas transversalmente con respecto al curso de agua, es decir, según la máxima inclinación de las orillas y perpendicularmente a la corriente.
En cambio, cuando está previsto un revestimiento completo de la sección, es conveniente colocar los elementos sobre el fondo en sentido longitudinal con respecto a la corriente (fig. 10).

9, 10, 11. Placing Reno mattress on banks.

9, 10, 11. Disposition sur les berges des matelas Reno.

9, 10, 11. Ubicación de los colchones Reno sobre las orillas.



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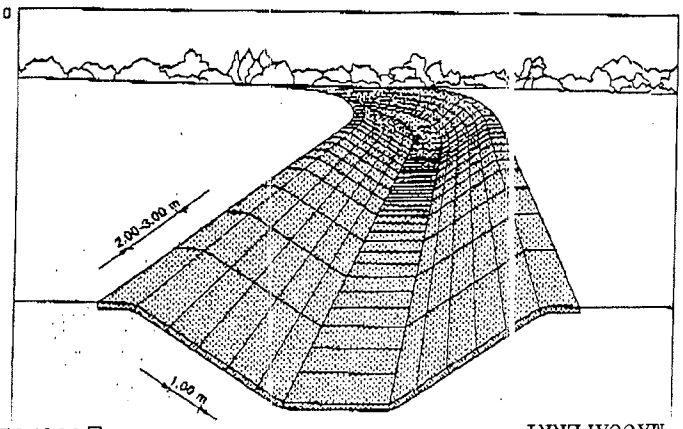
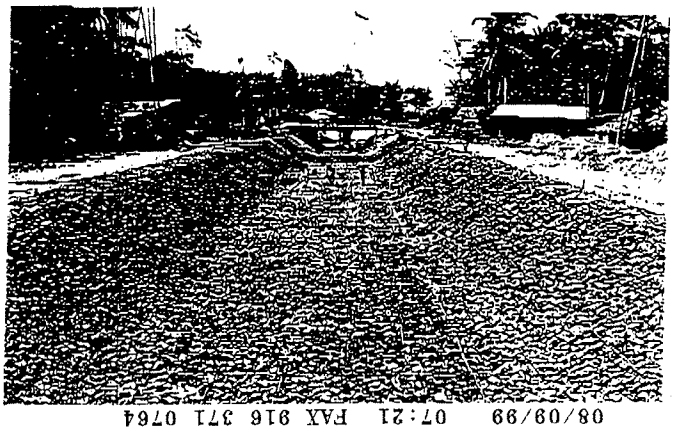




The banks are usually built with a 1:1.5 or 1:2 slope depending on the nature of the ground, using the maximum gradient for normal soils of medium consistency and the minimum for non-cohesive fine sands.

The revetment should be anchored with box gabion downstream or upstream the bank to eliminate all risk of the flow eroding the soil beneath or around it (fig. 12, 13).

It should also be noted that the stability of Reno mattress linings depends not only on the strength of the mesh, but also on the thickness of the lining and the grading of the stone fill (fig. 14): once the average water velocity is known, these parameters can be selected with the aid of table 2. The figures quoted are derived from tests on models carried out at the Colorado State University, Fort Collins in 1982-3, and are accurate for bed linings and reasonably accurate for bank revetments.

Normalement, les pentes des talus d'appui sont de 1:1.5 et 1:2; on adoptera la pente maxi. en présence de terres végétales de moyenne consistance et les pentes mini. pour les terrains sablonneux incohérents.

Nous conseillons de prévoir tant en amont qu'en aval du revêtement un ancrage en gabions-boîte bien assis dans la berge, et ce, pour éviter tout risque de contournement (fig. 12, 13).

Parmi les aspects liés aux caractéristiques hydrauliques, il est à noter que la résistance d'un revêtement en matelas Reno ne dépend pas seulement de la robustesse du grillage, mais aussi de la structure et de la taille de la pierraille de remplissage (fig. 14): pour le choix de ces paramètres, aussitôt la vitesse moyenne du courant connue, se rapporter au tableau 2 relatif aux revêtements de fond et, avec approximation, à ceux des berges aussi. Les valeurs données par le tableau résultent des essais sur maquette réalisés en 1982-83 auprès de l'université de Fort Collins dans le Colorado.

Normalmente, los taludes de apoyo se construyen con una pendiente de 1:1.5 y 1:2, según la naturaleza del terreno, reservando la pendiente máxima para los terrenos vegetales de mediana consistencia y la mínima para los terrenos arenosos sueltos.

Es aconsejable predisponer aguas arriba y aguas abajo del revestimiento, un diente de gaviones caja bien empotrado en el talud, que elimine cualquier riesgo de rodeo (fig. 12 y 13).

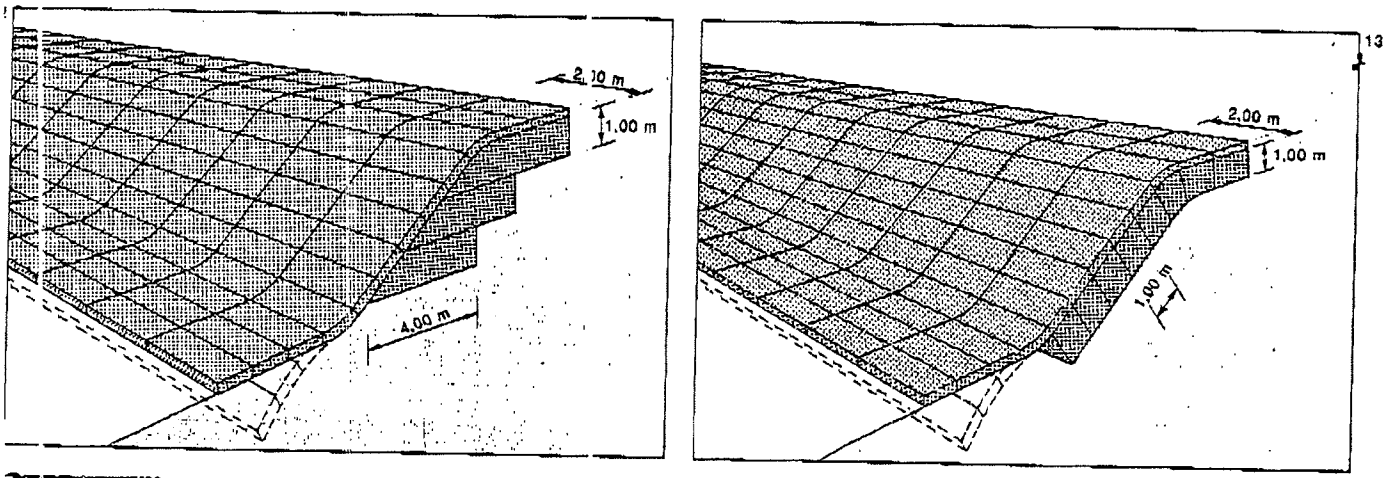
Entre los aspectos relacionados con las características hidráulicas, destacamos que la resistencia de un revestimiento en colchones Reno, depende de la robustez de la red metálica, del espesor de la estructura y del tamaño de las piedras de relleno (fig. 14): para elegir estos parámetros, conociendo la velocidad promedio de la corriente, es posible utilizar la tabla 2 válida para los revestimientos del fondo y, con buena aproximación, también para los de las orillas.

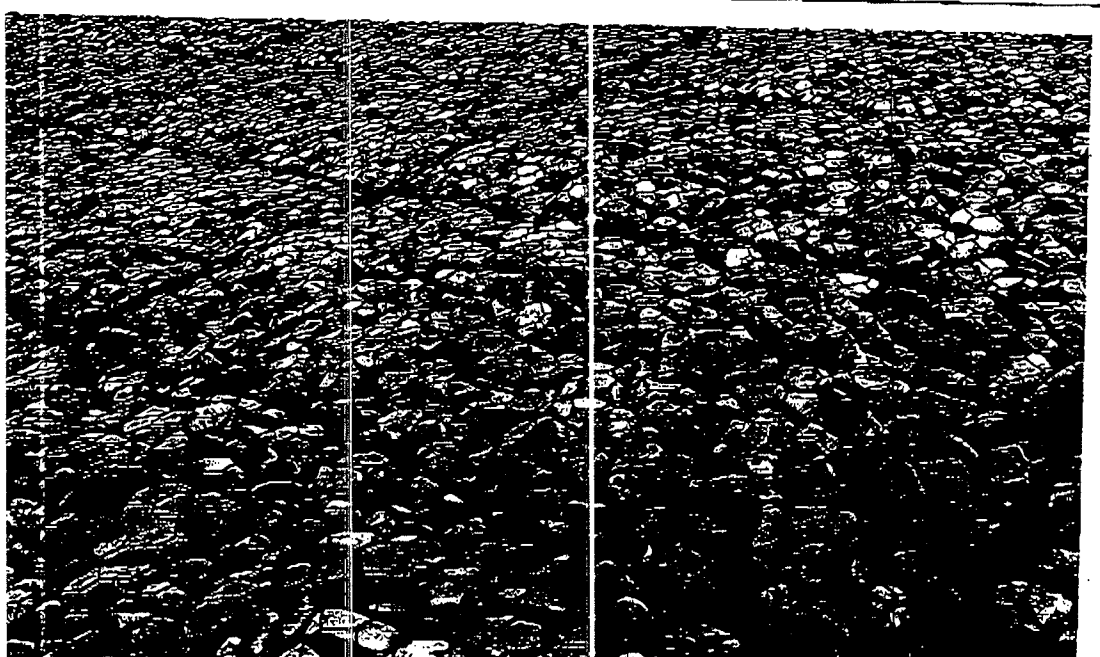
Los valores indicados son el resultado de pruebas sobre modelo, efectuadas en la Universidad de Fort Collins en Colorado en 1982-1983.

12, 13. Gabion anchorage:
(a) in steps shaped in-situ,
(b) continuous.

12, 13. Types d'ancrage sur gabions:
(a) à gradins façonnés in situ,
(b) continu.

12, 13. Tipos de empotramientos efectuados con gaviones:
(a) de escalones formados en obra,
(b) continuo.





14. Example of filling with rock fill of appropriate size.

14. Exemple de remplissage avec de la pierre de grosseur appropriée.

«Critical velocity» is the velocity at which the revetment will remain stable without movement of the fill, while «limit velocity» is that which is still acceptable although there is some deformation of the Reno mattress due to movement of the stones within the compartments (table 2).

It is essential for the longevity of the revetment that the mesh be protected against corrosion: Reno mattresses and gabions are therefore manufactured from meshes with a heavy zinc coating which complies with the strictest international standards.

However, when the lining is subjected to polluted or aggressive water, the risk of corrosion is increased. In this case Reno mattress and/or gabions made from wire which coated with both zinc and PVC, offering high resistance to chemicals, abrasion and aging, should be used.

On entend par «vitesse critique» la vitesse maximale supportable par le revêtement sans provoquer le déplacement de la pierraille de remplissage et par «vitesse limite» celle, encore acceptable, qui engendre de légères déformations dues à l'entassement de la pierraille dans le matelas Reno (tableau 2).

Nous fournissons ici aussi le tableau 3 qui montre quelques valeurs indicatives de la vitesse limite au fond des cours d'eau naturels.

La protection du grillage contre la corrosion est d'une importance vitale pour la durée du revêtement; c'est pourquoi les matelas Reno et les gabions sont constitués d'un grillage métallique galvanisé conformément aux plus sévères normes internationales.

Toutefois, nous conseillons en présence d'eaux polluées, ou de toute façon agressives, c'est-à-dire là où la corrosion est particulièrement forte, de recourir aux matelas Reno et/ou aux gabions galvanisés sous gaine PVC, insensibles aux attaques chimiques, aux phénomènes d'abrasion et à l'usure.

Por «velocidad crítica» se entiende la velocidad máxima que puede soportar el revestimiento sin que se produzcan movimientos de las piedras en el interior del colchón y, por «velocidad límite», la velocidad, aún aceptable, que determina deformaciones reducidas debido al amontonamiento de las piedras en el colchón Reno (tabla 2).

Para mayor comodidad, se agrega la tabla 3 con algunos valores indicativos de la velocidad límite en el fondo de los cursos de agua naturales.

La protección de la red contra la corrosión es de vital importancia para la duración del revestimiento; por esta razón, los colchones Reno y los gaviones están formados por una red metálica fuertemente galvanizada, en conformidad con las más rigurosas normas internacionales.

Sin embargo, en el caso de aguas contaminadas o corrosivas, es decir, donde el problema de la corrosión es más agudo, es aconsejable la utilización de colchones Reno y/o gaviones galvanizados y revestidos con una capa de PVC altamente resistente a los agentes químicos, los fenómenos abrasivos y al envejecimiento.

***Tab. 2** - Indicative Reno mattress and gabion thicknesses in relation to water velocities*

***Tab. 2** - Epaisseurs approximatives des revêtements en matelas Reno et en gabions en fonction de la vitesse du courant*

***Tab. 2** - Espesores indicativos de los revestimientos en colchones Reno y en gaviones en función de la velocidad de la corriente*

Type Type Tipo	Thickness Epaisseur Espesor m	Filling stones Pierraille de remplissage Pedrisco de relleno Stone size Granulométrie Dimensiones mm	d_{50}	Critical velocity (*) Vitesse critique (*) Velocidad crítica (*) m/s	Limit velocity (*) Vitesse limite (*) Velocidad límite (*) m/s
Reno mattresses Matelas Reno Colchones Reno	0.15-0.17	70-100	0.085	3.5	4.2
		70-150	0.110	4.2	4.5
	0.23-0.25	70-100	0.085	3.6	5.5
		70-150	0.120	4.5	6.1
	0.30	70-120	0.100	4.2	5.5
		100-150	0.125	5.0	6.4
Gabions Gabions Gaviones	0.50	100-200	0.150	5.8	7.6
		120-250	0.190	6.4	8.0

(*) The values of velocity reported were obtained experimentally for Froude numbers ≤1 (see page 33); values > have to be intended as purely indicative and approximated.

(*) Les valeurs des vitesses indiquées sont tirées expérimentalement des nombres de Froude ≤1 (voir page 33); les valeurs > sont purement indicatives.

(*) Los valores de velocidad indicados han sido calculados experimentalmente para números de Froude ≤1 (pág. 33); para valores >1, deben considerarse como puramente indicativos y muy en general.

***Tab. 3** - Limiting velocities at bed level for various soils*

***Tab. 3** - Valeurs indicatives de vitesse limite au fond*

***Tab. 3** - Valores indicativos de la velocidad límite en el fondo*

Bed material / Matériaux constituant le lit / Material del cauce			Velocity / Vitesse / Velocidad m/s	
			A	B
Fine sand. (*)	Sable fin(*)	Arena fina	0.45	0.75
Sandy clay. (*)	Terrain argileux-sablonneux (*)	Terreno arcilloso-arenoso	0.55	0.75
Soft clays	Terrain argileux-vaseux	Terreno arcilloso-limoso	0.60	0.90
Muds	Limons normaux	Limos normales	0.75	1.05
Coarse sand	Gravier fin	Grava fina	0.75	1.50
Medium clay	Argile compacte	Arcilla compacta	1.15	1.50
Gravel	Gravier ordinaire	Grava gruesa	1.20	1.85
Shingle	Cailloux et galets	Guijarros y pedrisco	1.50	1.70
Hard clay	Schistes argileux	Arcillas-esquistosas	1.85	1.85

A = No material carried in suspension

A = Courant sans transport de matériau colloïdal

A = Sin transporte de material coloidal

MACCAFERRI

ENVIRONMENTAL SOLUTIONS ™

Update: January 1999

Maccaferri Gabions, Inc. reserves the right to amend product specifications without notice and specifiers are requested to check as to the validity of the specifications they are using.

PRODUCT TECHNICAL DATA SHEET

Gabions – Galmac Coating

GALMAC COATED GABIONS

The gabion is a structure made of 8x10 hexagonal double twisted wire mesh type as per ASTM A975-97 (Fig. 1 and 2).
The wire used in the manufacture of the gabion is soft temper steel heavily coated with Galmac, consisting of a Zinc - 5% Aluminum Mischmetal Alloy.
The standard combinations mesh/wire are shown in Tab.1.
In order to reinforce the structure, all edges are selvedged with a wire having a greater diameter (Tab. 3).
The gabion is divided into cells by means of diaphragms positioned at approximately 3 ft centers (Fig. 1).
Dimensions, tolerances and sizes of gabions are shown at Tab. 2.

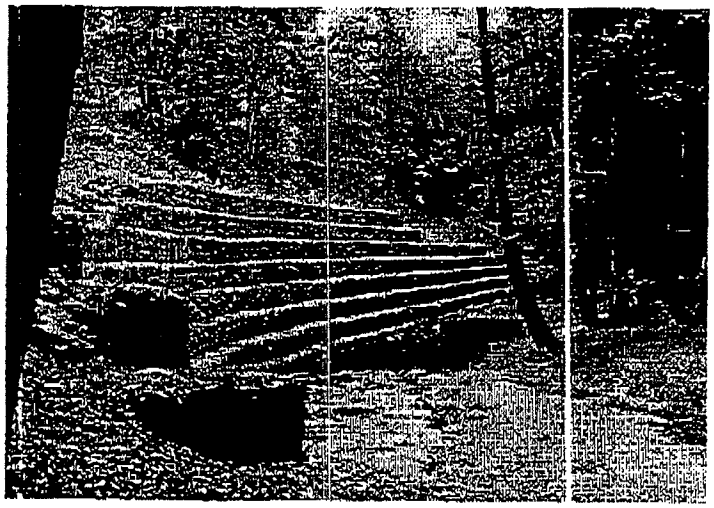


Fig. 1

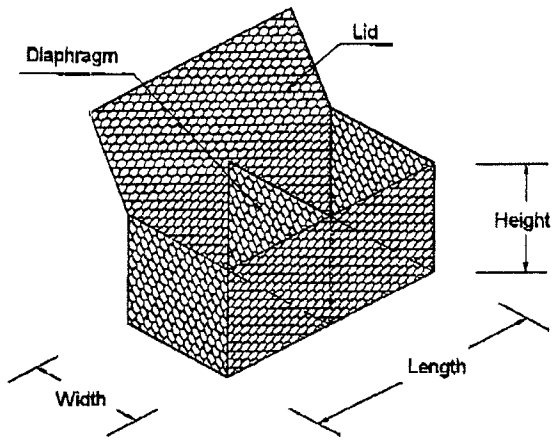
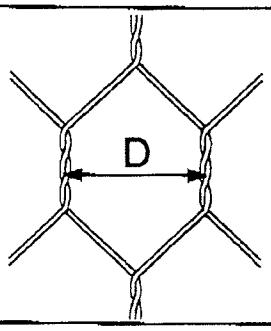


Fig. 2

MESH TOLERANCE
The tolerance on the opening of mesh "D" being the distance between the axis of twist, is according to ASTM A975-97



Wire

All tests on wire must be performed prior to manufacturing the mesh.

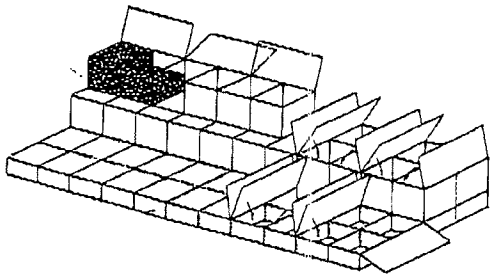
1. Tensile strength: both the wire used for the manufacture of gabions and the lacing wire, shall have a tensile strength of 54,039-68,259 psi (38-48 kg/mm^2) according to ASTM A856-97. Tolerances of wire shown at Tab. 4 meet the requirements of ASTM A856-97
2. Elongation: the test must be carried out on a sample at least 12 in. (30 cm) long. Elongation shall not be less than 12%, in accordance with ASTM A370-92.
3. Galmac coating: minimum quantities of Galmac shown at Tab. 4 meet the requirements of ASTM A856-97, Class 80.
4. Adhesion of Galmac: the adhesion of the Galmac coating to the wire shall be such that, when the wire is wrapped six turns round on a mandrel having four times the diameter of the wire, it does not flake or crack when rubbing it with the bare fingers, in accordance with ASTM A856-97.

Tab. 1	STANDARD MESH-WIRE		
Type	D in. (mm)	Tolerance	Φ Wire in. (mm)
8x10/Galmac	3.25 (83)	+/- 10%	0.120 (3.05)

GABIONS (8x10 mesh)

Letter Code	Length (ft)	Width (ft)	Height (ft)	Number of Cells	Capacity (cy)	Color Code
A	6	3	3	2	2	Blue
B	9	3	3	3	3	White
C	12	3	3	4	4	Black
D	6	3	1.5	2	1	Red
E	9	3	1.5	3	1.5	Green
F	12	3	1.5	4	2	Yellow
G	6	3	1	2	0.66	Blue-Red
H	9	3	1	3	1	Blue-Yellow
I	12	3	1	4	1.33	Blue-Green
SL	4.5	3	3	1	1.5	Brown

Tolerances of +/- 5% of the width, height, and length of the gabions shall be permitted.
Note: All sizes and dimensions are nominal.



Tab.4		Lacing Wire*	Mesh Wire	Selvedge Wire
Wire Mesh Diameter	Φ in. (mm)	0.087 (2.20)	0.120 (3.05)	0.153 (3.90)
Wire Tolerance	(+/-) Φ in. (mm)	0.004 (0.10)	0.004 (0.10)	0.004 (0.10)
Minimum Quantity of Galmac	oz/ft² (gr/m²)	0.80 (244)	0.80 (244)	0.80 (244)

* Lacing wire is supplied at a percentage of the gabion weight

ASSEMBLY AND INSTALLATION

Gabions are delivered on site unassembled in a collapsed form. Once the units are unfolded, the corners and diaphragms are bound together using either lacing wire (See Fig.4) or rings (See Fig.5) that are provided with the units. The lacing must be performed as described in the Product Installation Guide to insure proper strength and function of the gabions. Rings must be closed and spaced as shown in Figures 5 and 6. Upon proper lacing of the gabions, they are filled with stone whose minimum size is not less than dimension "D" of mesh, and maximum size is about 4" to 8". Before binding the lids down it is important to check the stone filling at the corners to insure proper shape. Each gabion must be connected to each other along all the adjacent corners. The tools necessary for the assembly of gabions are shown. For further information concerning the assembly and installations of gabions please consult the Products Installation Guide.

1) Pliers
2) Pliers with nipper
3) Nipper
4) Pneumatic Spenax tool
5) Manual Spenax tool

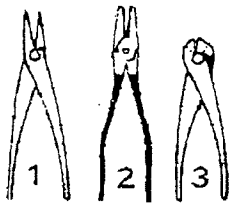


Fig.4 - Lacing

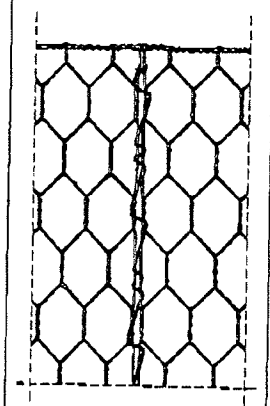


Fig.5 - Rings

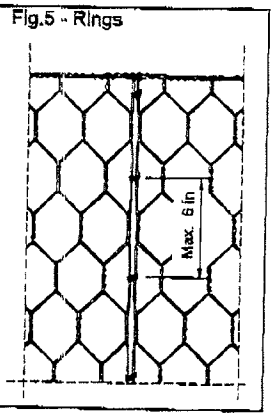
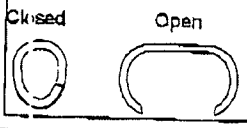
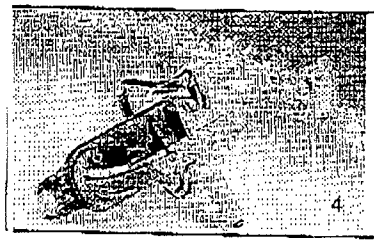
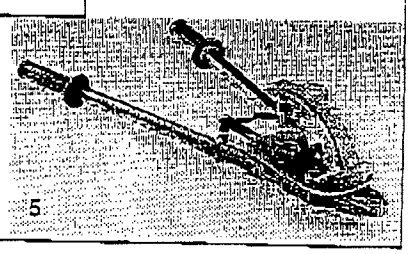


Fig.6 - Ring







Quantity Request: When requesting a quote, please specify:
- size of units (length x width x height, see fig. 1);
- type of mesh,
- type of coating,

Example: No.100 gabions 6' x 3' x 3' - Mesh type 8x10 - Galmac coated.

MACCAFERRI
ENVIRONMENTAL SOLUTIONS ™
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MACCAFERRI GABIONS INC.
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SPECIFICATIONS

STANDARD ZINC AND PVC COATED
DOUBLE TWIST
GABIONS

8X10 TYPE WIRE MESH FITTED WITH DIAPHRAGMS

MACCAFERRI GABIONS, INC.

MACCAFERRI GABIONS with the additional PVC coated sleeve can be used in a polluted environment, where soils or water is acidic, in salt or fresh water or wherever the risk of corrosion is present. Installation should be in accordance with the manufacturer's instructions.

Only hard, durable stone should be used as fill.

Throughout this publication the term "**GABIONS**" shall refer to the Maccaferri Gabions manufactured at the Williamsport plant, Williamsport, Maryland or as otherwise specified.

SPECIFICATIONS FOR STANDARD GABION MADE OF ZINC COATED DOUBLE TWIST, 8 X 10 TYPE MESH, FITTED WITH DIAPHRAGMS.

1) GENERAL DESCRIPTION

The standard type gabion shall be a flexible zinc coated gabion of the type and sizes specified below. It is made of wire mesh of the type and size and selvedges as specified in the following paragraphs. Each gabion may be divided by diaphragms into cells whose length shall not be greater than one and half times the width of the gabion.

Standard gabions shall be fabricated so as to be of a single unit construction-base, lids and sides shall be woven into a single unit and the ends connected to the base section in such a manner that strength and flexibility of the point of connection is at least equal to that of the mesh.

2) MESH

The mesh shall be hexagonal woven mesh with the joints formed by twisting each pair of wires
through three half turns. Because of their appearance, the joints are often termed triple twisted. The size of the mesh conforms to the specifications issued by the plant and shall be of **8 x 10 type** mesh. **Nominal mesh size is 3-1/4 x 4-1/2 inches.**

3) WIRE

All wire used in the fabrication of the gabions and in the wiring operations during construction
for the Zinc Coating and Tensile Strength shall be in accordance with the requirements of ASTM A 641-92, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire, for galvanized wire, class 3, soft temper, as measured before fabrication of the netting. The **nominal** diameter of the wire used in the fabrication of the netting shall be 0.120 inches.

4) ELONGATION OF WIRE

Test shall be made on the wire before fabrication of the gabions on a sample twelve inches long. Elongation shall not be less than 12%, in accordance with the requirements of ASTM A 370-92, Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

5) ZINC COATING (GALVANIZING)

All wire used in the fabrication of the gabions and in the wiring operations during construction
shall be coated to ASTM A 641-92 for Zinc coated (galvanized) carbon steel wire.

The minimum weight of the zinc coating shall be according to the figures shown in the table below when tested in accordance with ASTM A 90-93.

Nominal Diameter of Wire		Minimum weight of coating	
0.0866 inches	lacing wire	**0.70**	ozs./sq.ft.
0.120 inches	mesh	**0.85**	ozs./sq.ft.
0.1535 inches	selvedge	**0.90**	ozs./sq.ft.

The adhesion of the zinc coating to the wire should be such that, when wrapped around a mandrel in accordance with ASTM A 641-92, the zinc coating will not crack or flake to such an extent that any zinc can be removed by rubbing with the bare fingers.

6) SELVEDGES

All edges of the standard gabions including end-panels and the diaphragms, if any, shall be mechanically selvedged in such a way as to prevent unraveling of the mesh and to develop the full strength of the mesh. The wire used for the selvedge shall have a diameter greater than that of the wire used to form the mesh. namely:

For the 8 x 10 type mesh made of wire having a **nominal** diameter of 0.120 inches the selvedge shall be of wire having a **nominal** diameter of 0.1535 inches or greater.

7) DIMENSIONS OF ZINC-COATED GABIONS

Standard Zinc-Coated gabions shall have the following dimensions:

Nominal Length = 6 feet, 9 feet or 12 feet
Nominal Width = 3 feet
Nominal Height = 1 foot, 1 foot 6 inches or 3 feet

8) Lacing Wire

Sufficient lacing and connecting wire shall be supplied with the gabions for all wiring operations carried out in the construction of the gabion work. The lacing wire procedure consists of cutting a length of lacing wire approximately 1-1/2 times the distance to be laced (not to exceed 5 feet), securing one of the wire at the corner by looping and twisting, alternately lacing with single and double loops every other mesh opening at intervals of not more then six (6) inches (150 mm) and securing the other end of the wire to selvedges by looping and twisting.

The **nominal** diameter of lacing wire shall be 0.0866 inches.

8A) FASTENERS

Rings can be used in lieu of lacing wire for assembly and installation operations of Gabions. Rings shall be supplied with the same Zinc Coating as the mesh and the wire diameter of the rings shall be the same as the mesh. The wire used for the rings supplied by MACCAFERRI GABIONS, (Reference No. 11G40) shall be coated in accordance with ASTM A 641-92. Coating weight per ASTM A 90-93, also ASTM A 764-93, Class II, Type III. Tensile strength to be determined as per ASTM E 8/M.TP 2004. Spacing of the fasteners must not exceed six (6) inches.

9) DIAPHRAGMS

According to engineering requirements the gabions incorporate diaphragms to form cells having a length not greater than one and half the width of the gabion.

10) TOLERANCES

WIRE

Tolerances on the diameter of all wire in the above clauses shall be permitted in accordance with ASTM A 641-92 Table 3.

GABIONS

Tolerances of (+/-) 5% on the width, height and length of the gabions shall be permitted.

NOTES

All dimensions are subject to confirmation as manufacturing requirements may dictate that the
nominal sizes shall be varied from those given in Section 7, and tolerance shall apply to these adjusted dimensions.

MACCAFERRI GABIONS, Inc. reserves the right to amend these specifications without notice and specifiers are requested to check as to the validity of the specification they are using. The date of this issue is **February, 1993.**

SPECIFICATIONS FOR STANDARD GABIONS MADE OF GALVANIZED AND PVC COATED DOUBLE TWIST, 8 X 10 TYPE MESH, FITTED WITH DIAPHRAGMS.

1) GENERAL DESCRIPTION

The PVC coated gabion shall be a flexible zinc coated gabion of the type and sizes specified below. It is made of wire mesh of the type and size and selvedges as specified in the following paragraphs. Each gabion may be divided by diaphragms into cells whose length shall not be greater than one and half times the width of the gabion.

Standard GABIONS shall be fabricated so as to be of a single unit construction-base, lids and sides shall be woven into a single unit and the ends connected to the base section in such a manner that strength and flexibility of the point of connection is at least equal to that of the mesh.

2) MESH

The mesh shall be hexagonal woven mesh with the joints formed by twisting each pair of wires
through three half turns. Because of their appearance, the joints are often termed triple twisted. The size of the mesh conforms to the specifications issued by the plant and shall be of **8 x 10 type** mesh. **Nominal mesh size is 3-1/4 by 4-1/2 inches.**

3) WIRE

All wire used in the fabrication of the gabions and in the wiring operations during construction
for the Zinc Coating and Tensile Strength, shall be in accordance with the requirements of ASTM A 641-92, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire, for galvanized wire, class 3, soft temper, as measured before extrusion of the PVC coating and fabrication of the netting. The **nominal** diameter of the wire used in the fabrication of the netting shall be 0.1063 inches.

The **nominal** diameter of the steel wire core, used in the fabrication of the netting, shall be 0.1063 inches with a PVC coating, extruded onto the wire core, having a **nominal** thickness of 0.02165 inches, with an minimum thickness of 0.015 inches. An overall **nominal** diameter of 0.1496 inches is obtained.

4) ELONGATION OF WIRE

Test shall be made on the wire before coating with PVC and fabrication of the gabions on a sample ten inches long. Elongation shall not be less than 12%, in accordance with the requirements of ASTM A 370-92.

5) ZINC COATING (GALVANIZING)

All wire used in the fabrication on the gabions and in the wiring operations during construction
shall be coated to ASTM A 641-92 for Zinc Coated (galvanized) carbon steel wire.
The minimum weight of the zinc coating shall be according to the figures shown in the table below when tested in accordance with ASTM A 90-93.

Nominal Diameter of Wire		Minimum weight of coating
0.0866 inches	lacing wire	**0.70** ozs./sq.ft
0.1063 inches	mesh	**0.80** ozs./sq.ft.
0.1338 inches	selvage	**0.85** ozs./sq.ft.

The adhesion of the zinc coating to the wire should be such that, when wrapped around a mandrel in accordance with ASTM A 641-92, the zinc coating will not crack or flake to such an extent that any zinc can be removed by rubbing with the bare fingers.

6) SELVEDGES

All edges of the PVC coated gabions including end-panels and the diaphragms, if any, shall be
mechanically selvedged in such a way as to prevent unraveling of the mesh and to develop the full strength of the mesh. The wire used for the selvedge shall have a diameter greater than that of the wire used to form the mesh, namely:

For the 8 x 10 type mesh, made of wire having a **nominal** core diameter of 0.1063 inches, the selvedge shall be of wire having a **nominal** diameter of 0.1338 inches or greater.

7) DIMENSIONS OF PVC COATED GABIONS

Standard PVC coated gabions shall have the following dimensions:

Nominal Length = 6 feet, 9 feet or 12 feet
Nominal Width = 3 feet
Nominal Height = 1 foot, 1 foot 6 inches or 3 feet

8) LACING WIRE

Sufficient lacing and connecting PVC coated wire shall be supplied with the gabions for all wiring operations carried out in the construction of the gabion work. The lacing wire procedure consists of cutting a length of lacing wire approximately 1-1/2 times the distance to be laced (not to exceed 5 feet), securing one end of the wire at the corner by looping and twisting, alternately lacing with single and double loops every other mesh opening at intervals of not more than six (6) inches (150mm) and securing the other end of the wire to selvedges by looping and twisting.

The **nominal** diameter of lacing wire shall be 0.0866 inches and shall comply to the same specification as the wire used in the mesh.

8A) FASTENERS

Rings can be used in lieu of lacing wire for assembly and installation operations of the Gabions. Rings supplied shall be stainless steel. The wire diameter of the rings shall be the same as the mesh. The wire used for the rings supplied by MACCAFERRI GABIONS, (Reference No. 1SS40) shall be in accordance with ASTM A 313-92 type 302, class I. Load tests shall conform to ASTM A 370-92. Tensile strength to be determined as per ASTM E 8/MTP 2004. Spacing of the fasteners must not exceed six (6) inches.

9) P.V.C. COATING

All wire used in the fabrication of the gabions and in the wiring operations during construction
shall, after zinc coating have extruded onto it a coating of polyvinyl chloride, otherwise referred to as "P.V.C.". The coating shall be grey in color of **nominal** thickness 0.02165 inches and shall nowhere be less than 0.015 inches in thickness. It shall be capable of resisting deleterious effects of natural weather exposure, immersion in salt water and shall not show any material difference in its initial characteristics which are:

9A) INITIAL PROPERTIES OF PVC USED IN COATING

9A/1 SPECIFIC GRAVITY

Shall be 1.30 to 1.35 kg/Dm3, in accordance with ASTM D 2287-92, Table 1 when tested as specified in ASTM D 792-91.

9A/2 DUROMETER HARDNESS

Shall be 50 to 60 Shore D, in accordance with ASTM D 2287-92, Table 1 when tested as specified in ASTM D 2240-91 (ISO 868 1985).

9A/3 VOLATILE LOSS

At 105 degree C for 24 hours = shall not be higher than 2%
At 105 degree C for 240 hours = shall not be higher than 6% in accordance with ASTM D 2287-92 when tested as specified in ASTM D 1203-89 (ISO 176-1976).

9A/4 TENSILE STRENGTH

Shall not be less than 210 Kg/cm2 in accordance with ASTM D 412-92.

9A/5 ELONGATION

Shall not be less than 200% nor higher than 280% in accordance with ASTM D 2287-92, when tested as specified in ASTM D 412-92.

9A/6 MODULUS OF ELASTICITY AT 100% OF ELONGATION

Shall not be less than 190 Kg/cm2 when tested as specified in ASTM D 412-92.

9A/7 RESISTANCE TO ABRASION

The loss of weight shall not be more than 0.19 g in accordance with ASTM D 1242-92

9A/8 BRITTLENESS TEMPERATURE

Cold bend temperature = shall not be higher than -30 degrees C in accordance with Bss 2782-151A (84)
Cold flex temperature = shal not be higher than +15 degree C in accordance with BSS 2782-153A.

9A/9 CREEPING CORROSION

Maximum penetration of corrosion of the wire core from a square cut end shall be 25mm when the specimen has been immersed for 2000 hours in a 50% SOLUTION HC1 (hydrochloric acid 12 Be).

9B) Variation of the initial properties will be allowed, as specified hereunder, when the specimen is submitted to the following accelerate aging tests:

9B/1 SALT SPRAY TEST

According to ASTM B 117-94
Period of test - 3000 hours.

9B/2 EXPOSURE TO ULTRAVIOLET RAYS

According to ASTM D 1499-92a and ASTM G 23-93 using apparatus type E or as otherwise approved.
Period of test: 3000 hrs. at 63 degrees C or as otherwise agreed.

9B/3 EXPOSURE AT HIGH TEMPERATURE

According to ASTM D 1203-89, (ISO 176-1976), and ASTM D 2287-92
Period of test = 240 hours at 105 degree C

After the above tests have been performed the P.V.C. compound shall show the following properties:

9C) PROPERTIES AFTER AGING TESTS

9C/1 APPEARANCE OF COATED MESH

The vinyl coating shall not crack, blister or split and shall not show any remarkable change in color.

9C/2 SPECIFIC GRAVITY

Shall not show change higher than 6% of its initial value.

9C/3 DUROMETER HARDNESS

Shall not show change higher than 10% of its initial value.

9C/4 TENSILE STRENGTH

Shall not show change than 15% of its initial value.

9C/5 ELONGATION

Shall not show change higher than 25% of its initial value.

9C/6 MODULUS OF ELASTICITY

Shall not show change higher than 25% of its initial value.

9C/7 RESISTANCE TO ABRASION

Shall not show change of more than 10% of its initial value.

9C/8 BRITTLENESS TEMPERATURE

Cold Bend Temperature = Shall not be higher than -20 degree C
Cold Flex Temperature = Shall not be higher than + 18 degree C.

10) DIAPHRAGMS

According to engineering requirements the gabions incorporate diaphragms to form cells having a length not greater than one and half the width of the gabion.

11) TOLERANCES

WIRE

Tolerances on the diameter of all wire in the above clauses shall be permitted in accordance with ASTM A641-92 Table 3.

GABIONS

Tolerances of (+/-) 5% on the width, height and length of the gabions shall be permitted.

NOTES

All dimensions are subject to confirmation as manufacturing requirements may dictate that the **nominal** sizes shall be varied from those given in Section 7, and tolerances shall apply to these adjusted dimensions.

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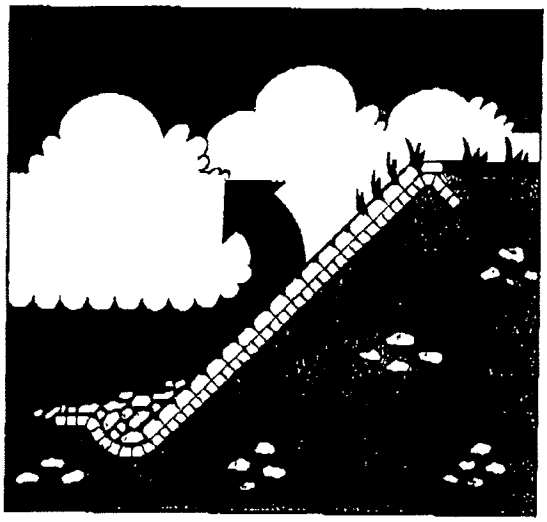
APPENDIX "B" – CONCRETE BLOCK REVETMENT LITERATURE

NICOLON

CORPORATION



Application/Design Guide

Preformed Concrete Block Revetment Systems

- Armorflex®
- Armorloc®

Nicolon's Commitment to Excellence

The Nicolon story traces its roots to 1953 when a catastrophic flood struck The Netherlands killing nearly 2,000 people. The resourceful Dutch, legendary for their barrier systems, immediately began developing a new generation of dike.

Their search for stronger building materials led them to Nicolon B.V. of Holland. Here they discovered an advanced line of tough industrial textiles and preformed concrete revetment systems capable of withstanding the most severe and erosive forces of water.

Recognizing the demand for such products extended far beyond the Dutch coast, Nicolon Corporation was established in Cornelia, Georgia in 1980.

Since then, Nicolon has continued its pioneering tradition with an extensive line of cost-effective products aimed at a wide range of complex engineering problems. For solutions to the unique challenges in construction today, look to the innovative problem-solver. Nicolon.

How to Use This Brochure

Inside this brochure, the practicing designer or contractor will find objective, technical information that will be useful in the design and specification of appropriate geotextile and concrete revetment systems.

Helpful diagrams, equations and illustrations are presented to guide the designer to an 'engineered solution' using Armorflex® and Armorloc®. We hope this brochure simplifies and enhances your selection of an appropriate revetment system.

Design Manuals From Nicolon

The Nicolon library includes a comprehensive line of independently authored design manuals. These valuable reference materials are available upon request to practicing designers. Titles include: **Design Manual for Armorform® Erosion Protection Mats, Designing Stable Channels with Armorflex® Articulated Concrete Block Revetment Systems, and Filtration Geotextile Design Manual**. For more information on Nicolon design manuals, call (404) 447-6272.

An Introduction and Explanation of the Problem

Protective Channel Liners for Waterways, Highways and General Construction Projects

Designers of waterways, highways and general construction projects often have to contend with the flowing forces of water. Whether contained in a small roadside ditch or a major river, most designers deal with these forces by building a channel and a channel lining.

When water flows in a channel, forces are developed that act both in the direction of the flow (the drag force) and perpendicular to the mean velocity (the lift force). When these forces are strong, soil particles in the channel bed will move and erosion takes place.

In channels with steep grades, the forces of gravity tend to pull soil particles down the slope, reducing the magnitude of water forces needed to cause erosion.

Naturally, nearly all channels experience some form of bank erosion or scour of the bottom. For this reason, protective liners are required.

Typical Solutions

Conventional channel protection systems include flexible meshes and blankets, rigid linings, and rock systems. These systems offer varying degrees of erosion protection; however, each suffers certain disadvantages.

For example, flexible linings, while inexpensive, are limited in the amount of hydraulic stress they can accommodate. They are not suited for long periods under water, and because most are designed as a reinforcing matrix for vegetation, they are at risk during the establishment of final cover.

Rigid linings, such as cast-in-place concrete, asphaltic concrete, grouted riprap, stone masonry and soil cement, are considered nonerodible, but they also have drawbacks. In addition to being expensive, rigid linings deteriorate, making them very susceptible to damage. These treatments tend to progressively fail when a portion of the lining is damaged.

Protective rock systems, such as riprap and stone filled baskets (gabions) are affordable if the rock is readily available. Many times this rock is not available. And when rock is available, it often includes a high percentage of stones too small to resist erosive flows. Plus, riprap can be hazardous to wildlife and pedestrians. Gabion installation is highly labor intensive, potentially requiring an extended construction schedule and gabions may be subject to corrosion if metal baskets are used.

The open cell structure of Armorflex® and Armorloc® concrete revetment systems nurture plant life, providing quicker, more stable revegetation.

The Nicolon Solution

Preformed Concrete Block Revetment Systems

Preformed concrete block revetment systems such as Armorloc® and Armorflex® provide a viable, cost-effective alternative to conventional channel protection systems.

Armorloc® preformed concrete blocks install easily by hand interlocking with each other to resist lateral movement and uplift. These affordable blocks are ideal for small, irregularly shaped installations.

Armorflex® is a pre-assembled mattress of blocks offering more stability than conventional systems. Easily installed above or below the water line, Armorflex® controls the toughest erosion problems.

Both Armorloc® and Armorflex® are attractive, ecologically neutral and functionally versatile. They provide combined durability and environmental sensitivity unmatched by meshes, blankets, rigid linings and rock systems.

Armorloc®

A rugged concrete revetment system, Armorloc® is ideal for difficult to reach sites where pre-assembled mat systems cannot be used.

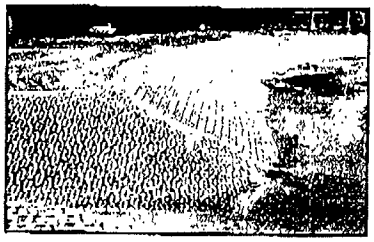
Armorloc® is easily installed by hand. The dovetail shape of each block positively interlocks with its six neighbors. Once blinded with gravel, a tremendous friction interlock prevents vertical displacement.

The cellular construction of the block allows free drainage of groundwater through the revetment while promoting the establishment of vegetation.

Armorloc® is installed on top of a specially chosen filtration geotextile. The geotextile filter ensures retention of the underlying soil particles.

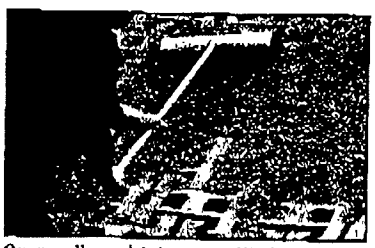
Another unique feature is Armorloc's® double tapering. The revetment can articulate to a 0.5 m radius, allowing the friction interlock to build up when blinded with gravel.

Visually appealing, Armorloc® features a gray textured finish. Gravel blinding blends the revetment into its surroundings. Topsoil can be spread above the normal water line and planted with vegetation for the ultimate green finish.



Ideal for small, irregularly-shaped installations, Armorloc's® interlocking block system prevents lateral movement and vertical displacement.

Beveled edges make Armorloc® easy to install by hand, even on difficult to reach sites where pre-assembled mat systems cannot be used.



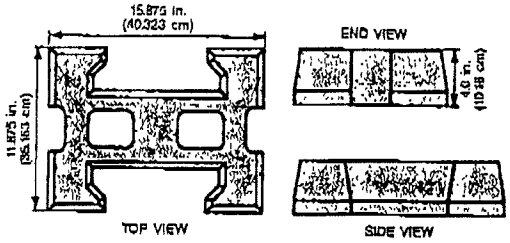
Open cells and joints are filled using dry, sharp sand, a medium that results in a positive friction interlock.

Installation

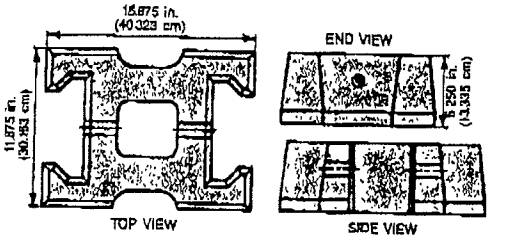
Armorloc® is delivered on crane off-load vehicles. The blocks are palletized and packaged in shrink-wrapping for security and ease of handling.

The tapered-edge blocks allow for comfortable, easy transfers by hand with an average installation rate of 8-10 square meters per man hour.

Highly versatile, Armorloc® is ideal for rivers, drainage channels, canals, marinas, boat ramps, dam crests and spillways, weirs and overflow channels, culvert and structure aprons, bridge abutment paving, and other similar uses.



Armorloc® 3510



Armorloc® 4511

Armorloc® Block Specifications (Typical Values)

	TECHNICAL DATA			DIMENSIONS & WEIGHTS				
BLOCK CLASS	SPECIFIC WEIGHT LBS./CU. FT.	COMPRESSIVE STRENGTH LBS./SQ. IN.	MAXIMUM ABSORPTION	THICKNESS INCHES	GROSS AREA BLOCK SQ. FT.	WEIGHT BLOCK LBS.	WEIGHT AREA LBS./SQ. FT.	OPEN AREA %
3510	130-150	4000	12 lbs./cu. ft.	4	1.0	130-35	130-35	25
4511	130-150	4000	12 lbs./cu. ft.	5.25	1.1	140-50	140-45	20

Armorflex®

Armorflex® is a family of articulated concrete block revetment systems. Designed to protect channel beds and banks from erosion scour and instability, Armorflex® offers the unique capability of adapting to minor changes in channel shape due to settlement, frost heave and slumping. At the same time, Armorflex® provides a nonerodible boundary between the channel subgrade and the water flow.

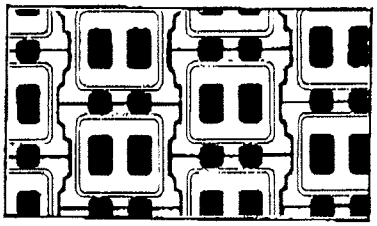
Armorflex® combines the benefits of lightweight blankets and meshes — porosity, flexibility, vegetation and habitat enhancement — with the desirable features of rigid linings.

Not surprisingly, it has proven to be a cost-effective, aesthetically attractive and functional alternative to riprap, gabions, structural concrete and other heavy-duty channel protection systems.

Armorflex® arrives on-site as a system of factory-assembled articulating mats interconnected by high-strength cables.

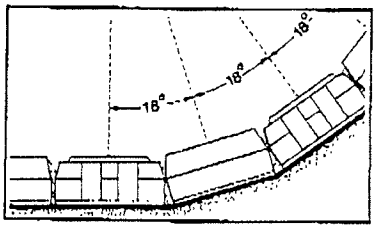
Installation

Armorflex® arrives on-site as a system of factory-assembled mats. These articulating mats consist of interlocking blocks held together by cable. Armorflex® is placed directly on the prepared subgrade using conventional construction equipment.



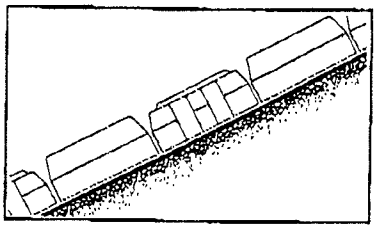
Stability.

Serving as an articulated mattress, Armorflex® provides continuous erosion protection against the destructive forces of water. The proper Armorflex® class is determined by the design velocity or wave height to which it will be subjected.



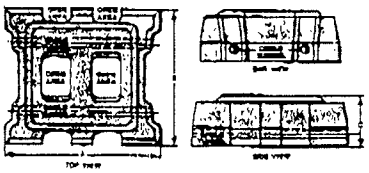
Flexibility.

Armorflex® blocks are interconnected by flexible cables, providing articulation between adjacent blocks. Block walls are designed with beveled relief to allow for flexibility in all directions.

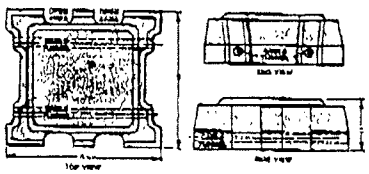


Permeability.

When placed on filter fabric or a conventional graded filter, the permeability of the revetment system relieves hydrostatic pressure in the subgrade. The system's capability for soil retention prevents leaching of subsoils through the installation.



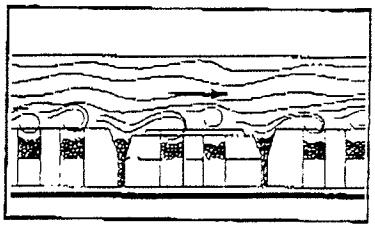
OPEN CELL BLOCK



CLOSED CELL BLOCK

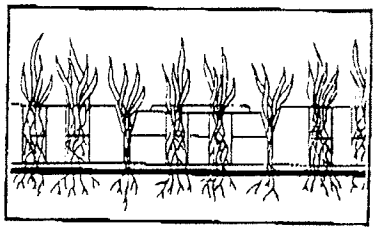
Flow Efficiencies.

Designed with open or closed cell blocks, Armorflex® provides the ideal combination of unit weight and surface roughness. The Armorflex® Manning Roughness Coefficient, n, has a value ranging from 0.026 to 0.034, depending on the block used.



Vegetation.

The open cells of Armorflex® provide the perfect environment for vegetation. Grass and small shrubs can penetrate the filter, providing an attractive, permanent anchor for the system. When vegetation is not desired, install Armorflex® with closed cells or fill open cells with stone.



Access.

Armorflex® is free of dangerous projections, so pedestrians, animals, vehicles and boats all have convenient, safe access to the water.

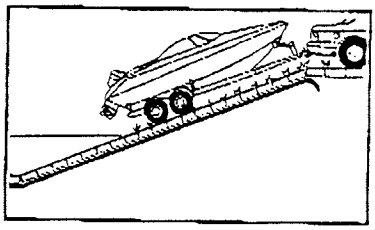


Table 1:

Armorflex® Block Specifications (Typical Values)

CONCRETE BLOCK CLASS		TECHNICAL DATA			DIMENSIONS & WEIGHTS					
		SPECIFIC WEIGHT LBS./CU. FT.	COMPRESSIVE STRENGTH LBS./SQ. IN.	MAXIMUM ABSORPTION	NOMINAL DIMENSIONS L	W	T	GROSS AREA/ BLOCK SQ. FT.	BLOCK WEIGHT LBS.	BLOCK WEIGHT LBS./SQ. FT.	OPEN AREA %
S-CLASS OPEN CELL	30S	130-150	4000	12 lbs./cu. ft.	13.0	11.5	4.75	0.98	31-36	32-37	20
	50S	130-150	4000	12 lbs./cu. ft.	13.0	11.5	6.0	0.98	45-52	45-53	20
S-CLASS CLOSED CELL	45S	130-150	4000	12 lbs./cu. ft.	13.0	11.5	4.75	0.98	39-45	40-45	10
	55S	130-150	4000	12 lbs./cu. ft.	13.0	11.5	6.0	0.98	53-61	54-62	10
	40	130-150	4000	12 lbs./cu. ft.	17.4	15.5	4.75	1.77	62-71	65-40	20
OPEN CELL	50	130-150	4000	12 lbs./cu. ft.	17.4	15.5	6.0	1.77	81-94	46-53	20
	60	130-150	4000	12 lbs./cu. ft.	17.4	15.5	7.5	1.77	99-113	56-64	20
	70	130-150	4000	12 lbs./cu. ft.	17.4	15.5	9.0	1.77	120-138	68-78	20
CLOSED CELL	45	130-150	4000	12 lbs./cu. ft.	17.4	15.5	4.75	1.77	78-89	43-50	10
	55	130-150	4000	12 lbs./cu. ft.	17.4	15.5	6.0	1.77	94-108	53-61	10
	75	130-150	4000	12 lbs./cu. ft.	17.4	15.5	7.5	1.77	120-138	68-78	10
	85	130-150	4000	12 lbs./cu. ft.	17.4	15.5	9.0	1.77	145-167	82-95	10

The Armorflex® Design Approach[1]

(1) A comprehensive design manual, developed by Simons, Li and Associates, is available through Nicolon Corporation.

Engineered Solutions Using Preformed Concrete Block Revetment Systems

This section presents an example illustrating use of the Factor of Safety methodology for mild channel gradients ($S < 0.10$). The example corresponds to the direct use of design charts for assessment of hydraulic stability using the various classes of Armorflex® revetment. The design charts incorporate an assumed 1.5 factor of safety. A complete design methodology including comprehensive design charts is available in the Armorflex® Design Manual. A computer program is also available to assist in designing for channel geometries and factors of safety not covered by the design charts.

Example

Given: **Design Discharge** $Q = 1{,}300$ cfs
Average Bed Slope $S = 0.020$ (2.0%)

A trapezoidal channel with 3H:1V sideslopes is proposed. Channel width is unconstrained; open cell revetment is preferred for the encouragement of native grasses. Flow depth is limited to 3.5 ft in order to meet required flowline elevation at the downstream end of the project.

The Solution

Step One

Assuming Armorflex® Class 30S or Class 50S will be used for erosion protection, select Manning's n of 0.032 from Table 2 and enter Figure 1 with standard bottom widths of 8 ft, 12 ft and 20 ft to determine depth of flow for preliminary sizing of channel.

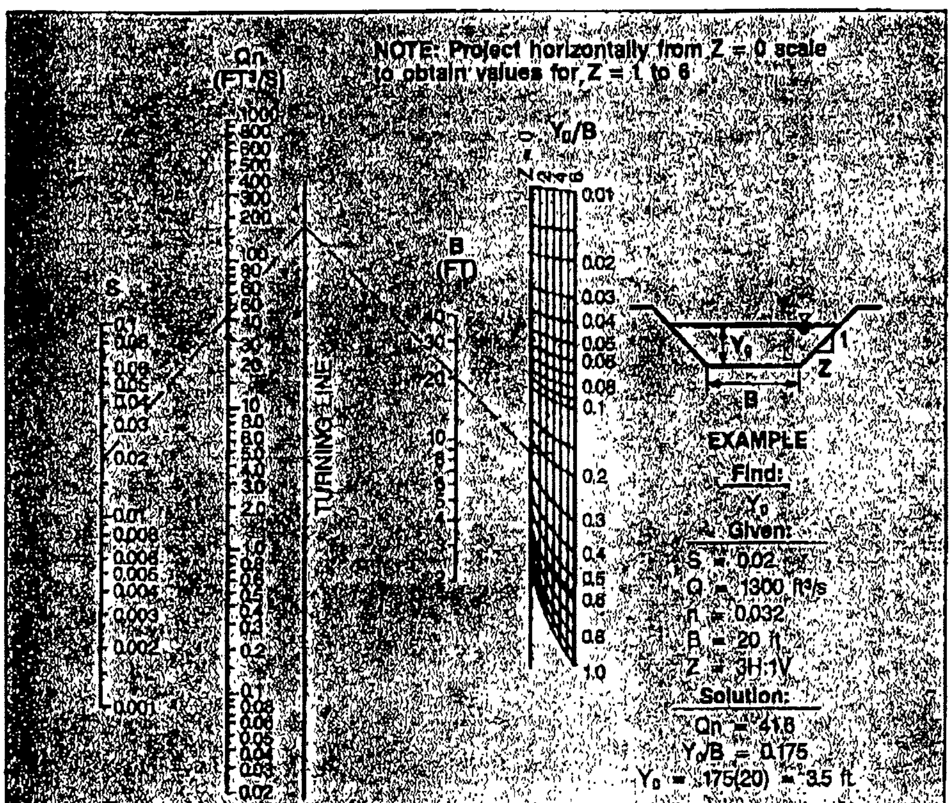


FIGURE 1: NOMOGRAPHIC SOLUTION OF THE MANNING'S EQUATION FOR TRAPEZOIDAL CHANNELS.

From Figure 1
with $Qn = (1300)(0.032) = 41.6$:

- Base width B = 8 ft, depth of flow = 4.6 ft
- Base width B = 12 ft, depth of flow = 4.2 ft
- Base width B = 20 ft, depth of flow = 3.5 ft

Choose base width B = 20 ft for trapezoidal channel.

Table 2:
Roughness Coefficients of Armorflex® Revetment Systems.

Block Class	Range of n-Values	Typical Value
30S (open)	0.029 - 0.035	0.032
50S (open)	0.029 - 0.035	0.032
45S (closed)	0.024 - 0.029	0.026
55S (closed)	0.024 - 0.029	0.026

Block Class	Range of n-Values	Typical Value
40 (open)	0.029 - 0.035	0.032
50 (open)	0.029 - 0.035	0.032
60 (open)	0.030 - 0.037	0.033
70 (open)	0.031 - 0.037	0.034

Block Class	Range of n-Values	Typical Value
45 (closed)	0.024 - 0.029	0.026
55 (closed)	0.024 - 0.029	0.026
75 (closed)	0.025 - 0.030	0.028
85 (closed)	0.025 - 0.030	0.028

Step Two

Determine the stability classes from Chart 1 (trapezoidal channel, B = 20, z = 3, ie. 3H:1V):

Entering Chart 1 with Q = 1,300 cfs and S = 0.020, the point falls above the stability line for Class 30S Armorflex® and below the stability line for Class 50S Armorflex® This indicates that Class 50S will provide stable erosion protection with a Factor of Safety greater than 1.5.

Choose Armorflex® Class 50S Revetment

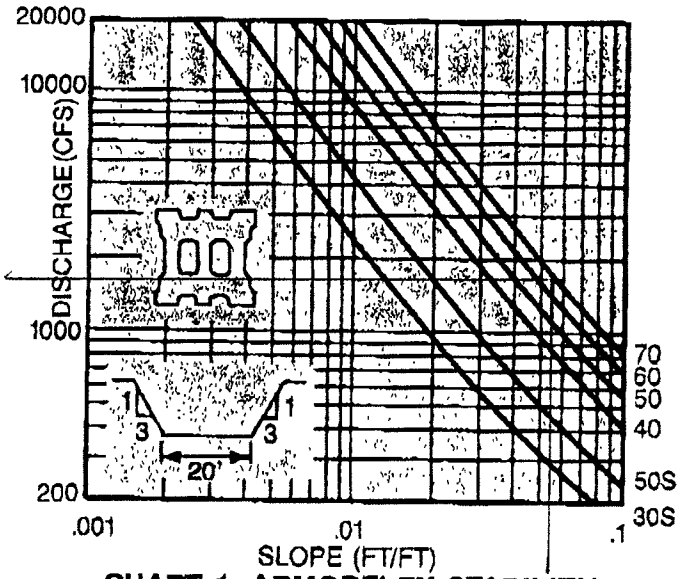


CHART 1: ARMORFLEX STABILITY

Step Three

Check hydraulic conditions for vegetated revetment using Figures 1 and 2, assuming final vegetation condition will correspond to Class C (moderate) retardance:

First iteration: Using depth of flow of 3.5 ft from Step 1, calculate:

- V = Q/A = 1300/[(.5)(20 + 41)(3.5)] = 1300/106.75 = 12.2 ft/s
- R = A/P = 106.75/[20 + (2 x 11.07)] = 2.53 ft
- VR = (12.2)(2.53) = 30.87

Extrapolating from Figure 2, the Manning's n value for fully vegetated conditions will be approximately 0.030, as the n versus VR relationship tends to asymptote to a constant n-value as the VR term increases beyond a value of about 20. Using this new value for Manning's n, hydraulic conditions are recomputed and the procedure repeated, yielding new values of the hydraulic conditions as follows:

- Depth of flow = 3.4 ft
- Hydraulic radius = 2.47 ft
- Velocity = 12.7 ft/s
- VR = (12.7)(2.47) = 31.4

Rechecking Figure 2, it is seen that the n-value will remain at approximately 0.030, indicating that the iterative procedure has converged to final values.

Step Four

Summarize hydraulic conditions for Armorflex® Class 50S channel with B = 20 ft, Q = 1,300 cfs, S = 0.020, and Z = 3H:1V:

Unvegetated

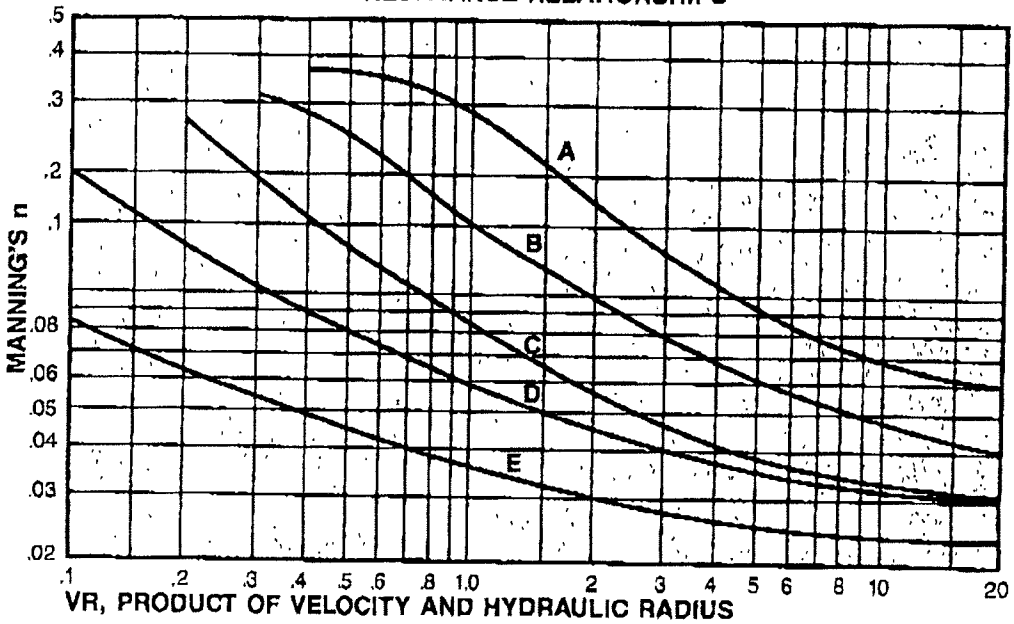
Depth	= 3.5 ft
Velocity	= 12.2 ft/S
Manning's n	= 0.032

Vegetated

Depth	= 3.4 ft
Velocity	= 12.7 ft/S
Manning's n	= 0.030

The accompanying table showing standard sizes of Armorflex® blocks can be used in specifying dimensions and weight of the selected Armorflex® class. Refer to Table 1 Armorflex® Block Specifications on page 4.

FIGURE 2: VEGETATIVE RESISTANCE RELATIONSHIPS



The figure right shows how the Manning's n value varies with the product of the flow velocity V and the hydraulic radius R for various vegetative retardance categories. These categories range from Class A, very high retardance, to Class E, very low retardance.

Disclaimer
The information presented herein will not apply to every installation. Dimensions and quantities shown are approximate only and will vary as a result of site conditions and installation procedures. No warranty or guarantee expressed or implied is made regarding the performance of any product, since the manner of use and handling are beyond our control.

Armorflex® and Armorloc® are Nicolon® products.

NICOLON
CORPORATION

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ARMORTEC
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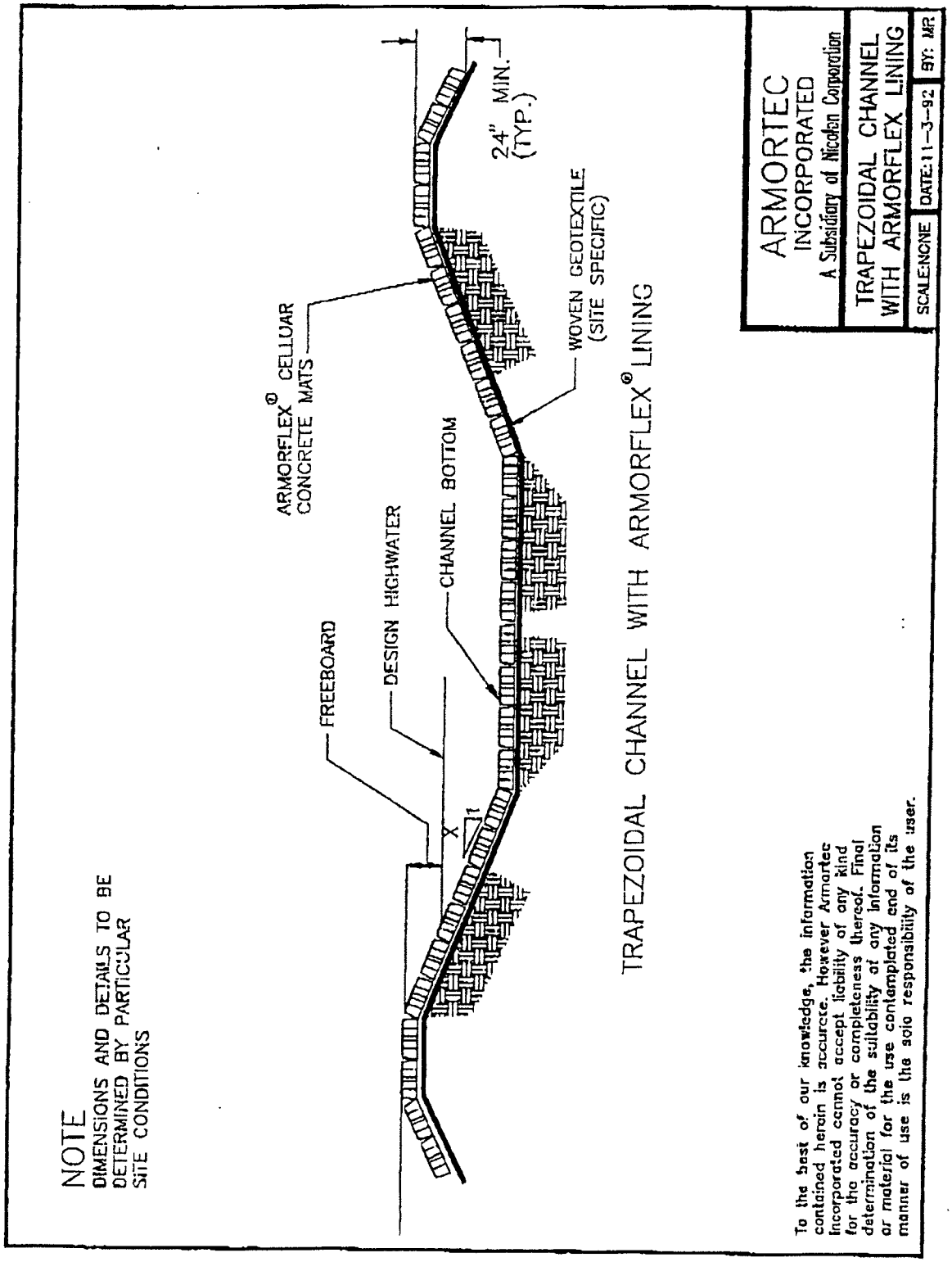

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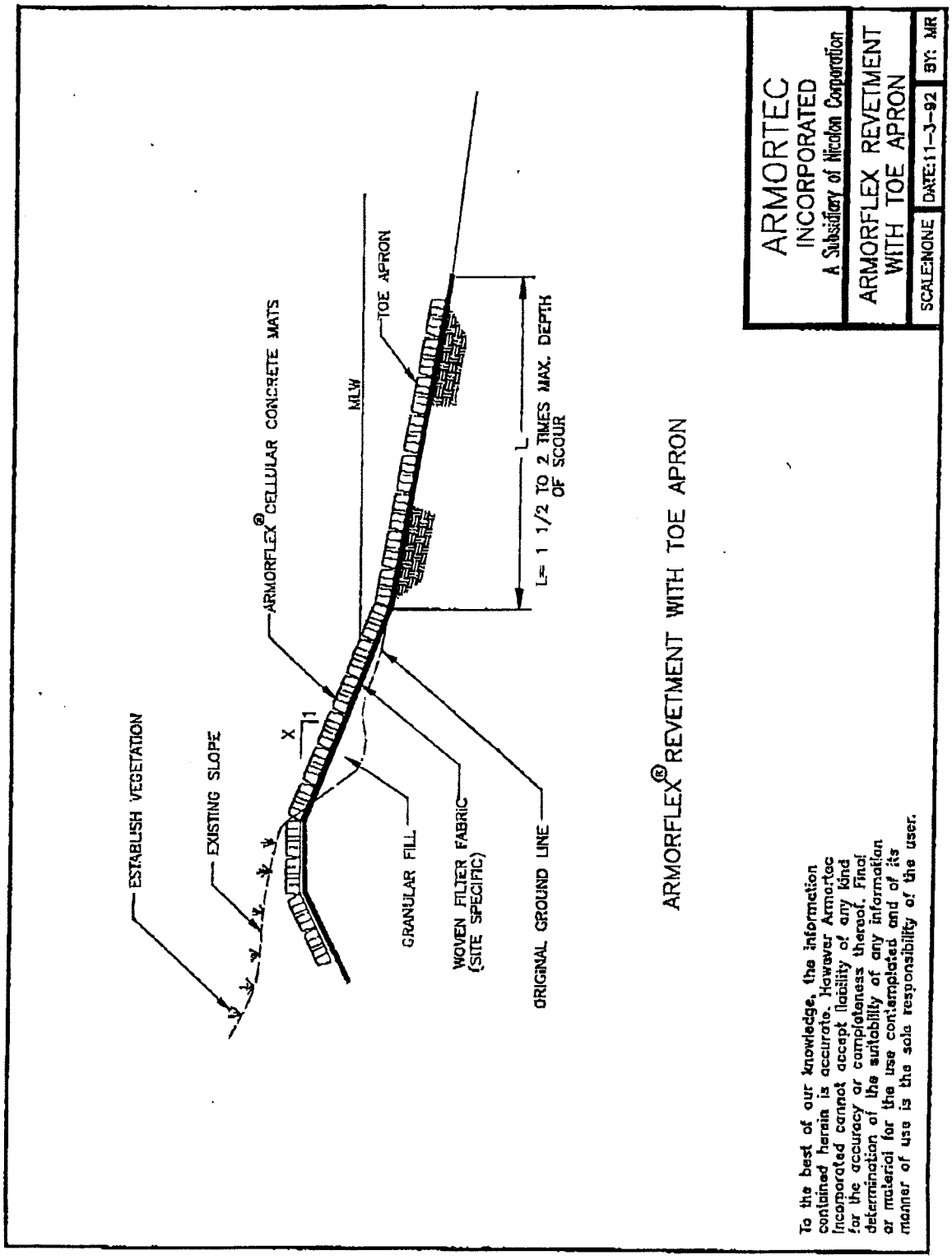
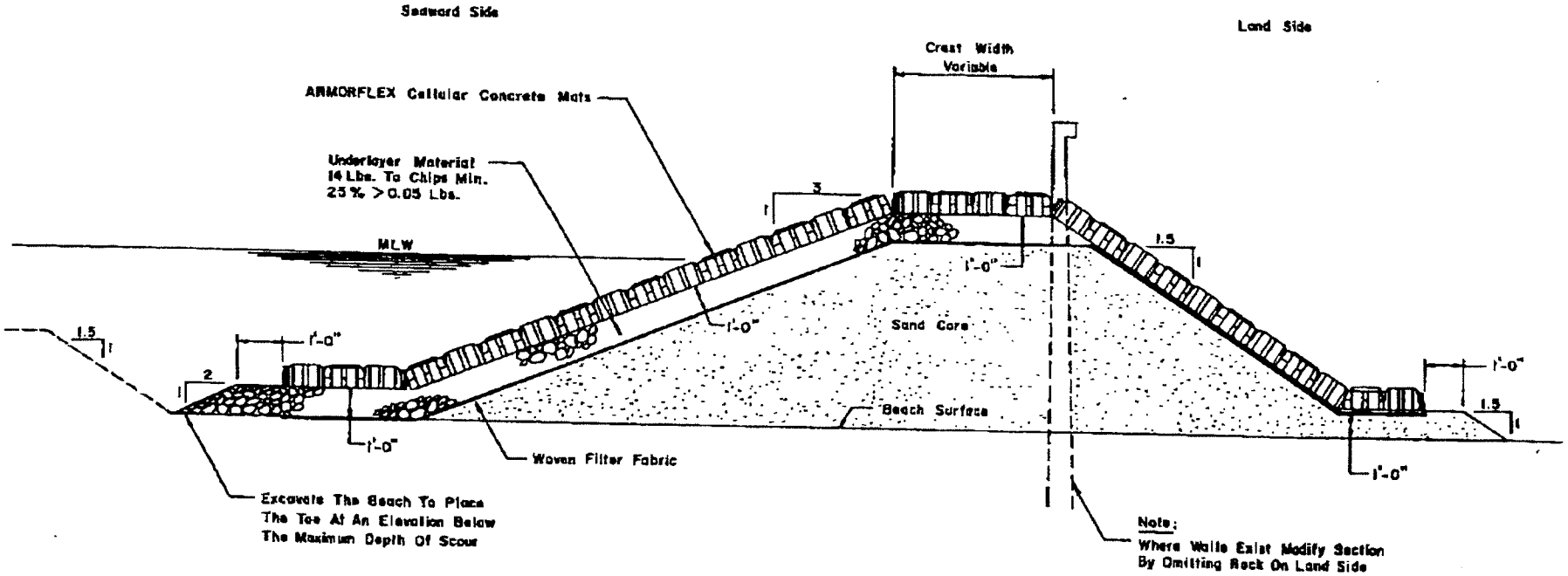


Dimensions And Details To Be Determined
By Particular Site Conditions.



ARMORFLEX - MOUND SEAWALL or levee

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ARMORFLEX
MOUND SEAWALL

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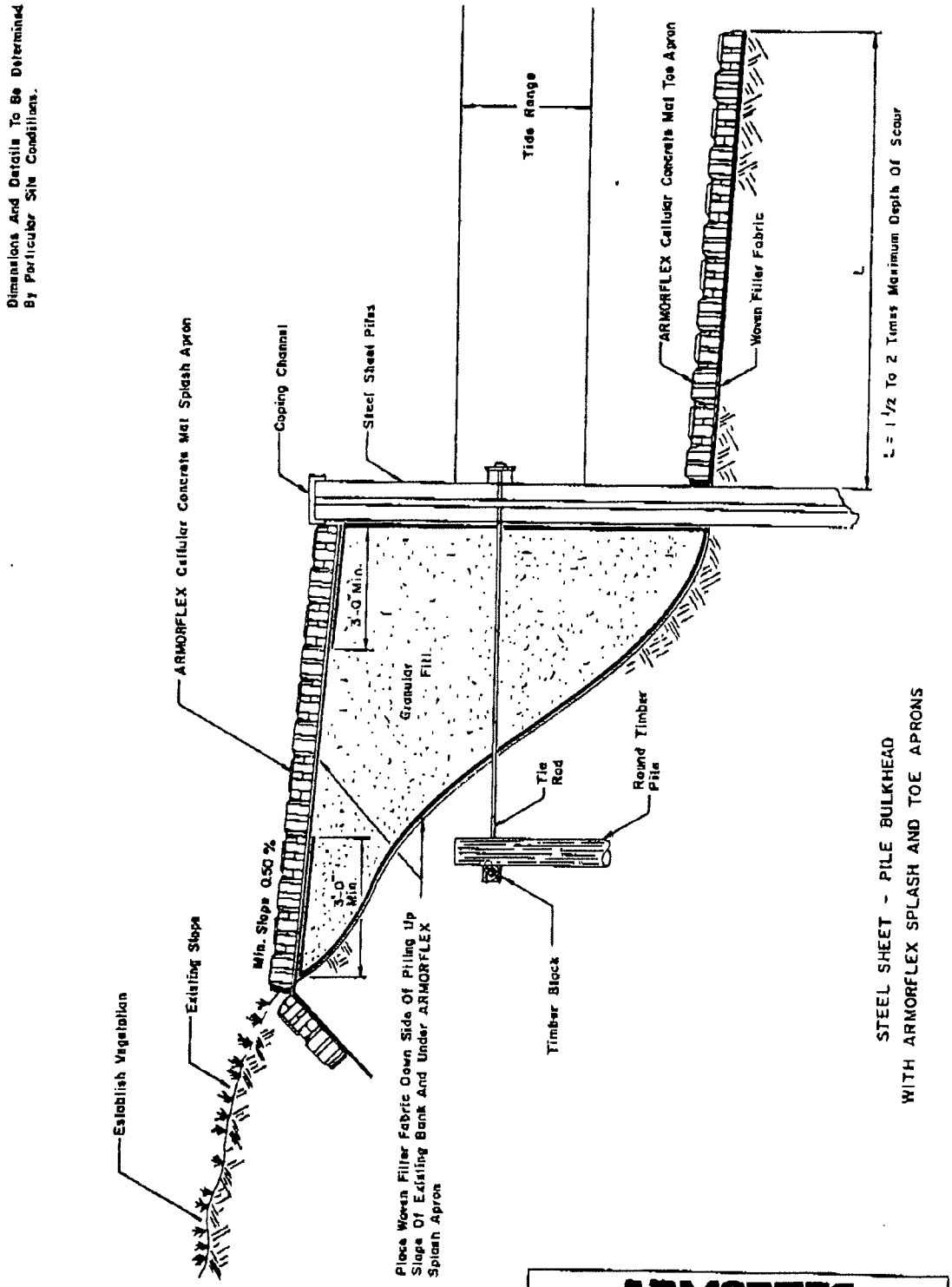

STEEL SHEET - PILE BULKHEAD
WITH ARMORFLEX SPLASH AND TOE APRONS

To the best of our knowledge, the information contained herein is accurate. However, Armortec, Incorporated cannot accept liability of any kind for the accuracy or completeness thereof. Final determination of the suitability of any information or material for the use contemplated and of its manner of use is the sole responsibility of the user.

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BULKHEAD - ARMORFLEX SPLASH & TOE APRONS

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→ EROSION TECHNOLOGIES, Inc.

~~GEOPRODUCTS COMPANY~~
P.O. Box 441, 7367 Noche Tapatia, Rancho Santa Fe, CA 92067
Tel: 619 756-3050 FAX: 619 756-0284
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To: Bob	Fax Number: 949 727 7097
Company: ASL Consulting	Date: 8/6/99
From: Eric Fish	Pages Including Cover: 6
Subject: Armorflex	

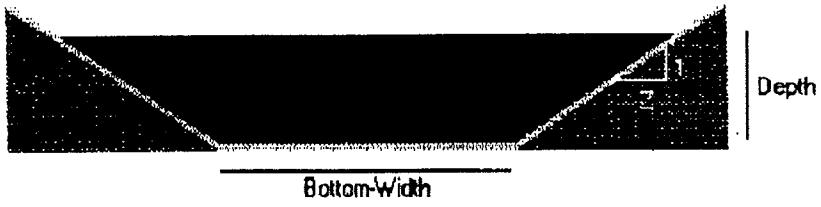
Comments:

August 6, 1999 11:29:54

Armorflex® Stability Analysis for Open-Channel Flow

Trapezoidal Channel Analysis

Bottom Width B (ft):	45.000
Bed Slope So (ft/ft):	0.0020
Side Slope Z (H:V):	1.500
Bend Coefficient Kb:	1.000
Discharge Q (cfs):	14500.000
Projection Height (in):	0.500



Block Type	n-Value	Depth	Velocity	Froude	Shear	Safety
Class 30S	0.032	18.38	10.87	0.53	2.29	1.49
Class 50S	0.032	18.38	10.87	0.53	2.29	1.77
Class 45S	0.026	16.46	12.64	0.64	2.05	1.52
Class 55S	0.026	16.46	12.64	0.64	2.05	1.74
Class 40	0.034	17.98	11.21	0.55	2.24	2.32
Class 50	0.034	17.98	11.21	0.55	2.24	2.45
Class 60	0.034	17.98	11.21	0.55	2.24	2.47
Class 70	0.034	17.98	11.21	0.55	2.24	2.39
Class 45	0.028	17.13	11.98	0.60	2.14	2.46
Class 55	0.028	17.13	11.98	0.60	2.14	2.60
Class 75	0.028	17.13	11.98	0.60	2.14	2.61
Class 85	0.028	17.13	11.98	0.60	2.14	2.48

Disclaimer: This program is designed to help the user select the proper class of Armorflex® block for use in open channel flow conditions. The results of this program can not be transferred to any other concrete block system.

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Armorflex® Stability Analysis for Open-Channel Flow

General Channel Analysis

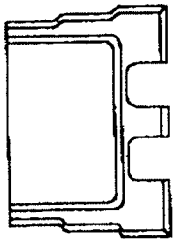
Top Width T (ft):	104.000
EGL Slope Sf (ft/ft):	0.0100
Max Side Slope Z (H:V):	1.500
Bend Coefficient Kb:	1.000
Velocity V (ft/s):	24.400
Max Flow Depth D (ft):	13.000
Discharge Q (cfs):	14500.000
Projection Height (in):	0.500

Note: Shape of channel bottom and sides is irregular, and is for illustration purposes only.

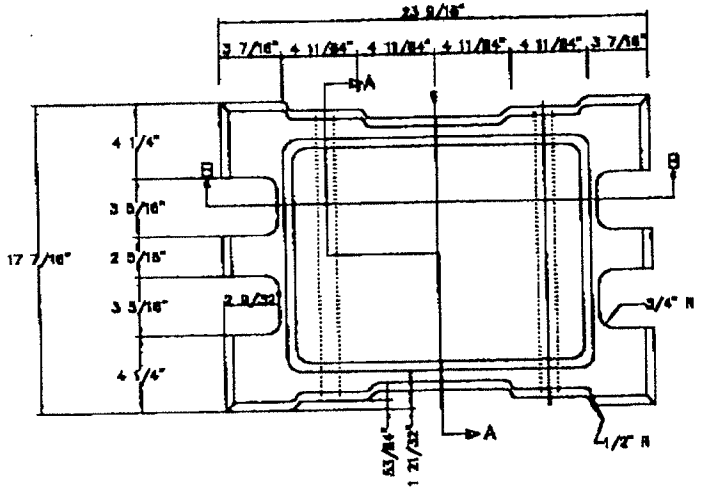
Block Type	n-Value	Depth	Velocity	Froude	Shear	Safety
Class 30S	N/A	13.00	24.40	1.80	8.11	0.36
Class 50S	N/A	13.00	24.40	1.80	8.11	0.49
Class 45S	N/A	13.00	24.40	1.80	8.11	0.44
Class 55S	N/A	13.00	24.40	1.80	8.11	0.56
Class 40	N/A	13.00	24.40	1.80	8.11	0.63
Class 50	N/A	13.00	24.40	1.80	8.11	0.74
Class 60	N/A	13.00	24.40	1.80	8.11	0.85
Class 70	N/A	13.00	24.40	1.80	8.11	0.96
Class 45	N/A	13.00	24.40	1.80	8.11	0.75
Class 55	N/A	13.00	24.40	1.80	8.11	0.90
Class 75	N/A	13.00	24.40	1.80	8.11	1.03
Class 85	N/A	13.00	24.40	1.80	8.11	1.11

Disclaimer: This program is designed to help the user select the proper class of Armorflex® block for use in open channel flow conditions. The results of this program can not be transferred to any other concrete block system.

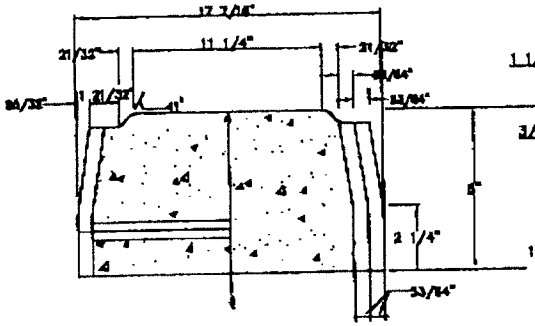
NOTE: HALF BLOCK WILL BE MANUFACTURED BY SIMPLY INSERTING A MODIFIED CORE ASSEMBLEY WITH A DIVIDER PLATE.



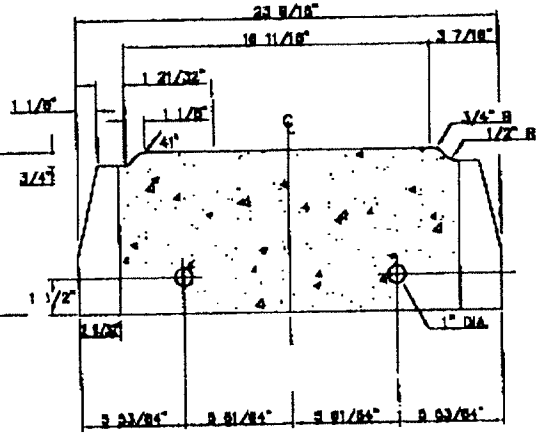
HALF BLOCK DETAIL
PLAN



TOP VIEW

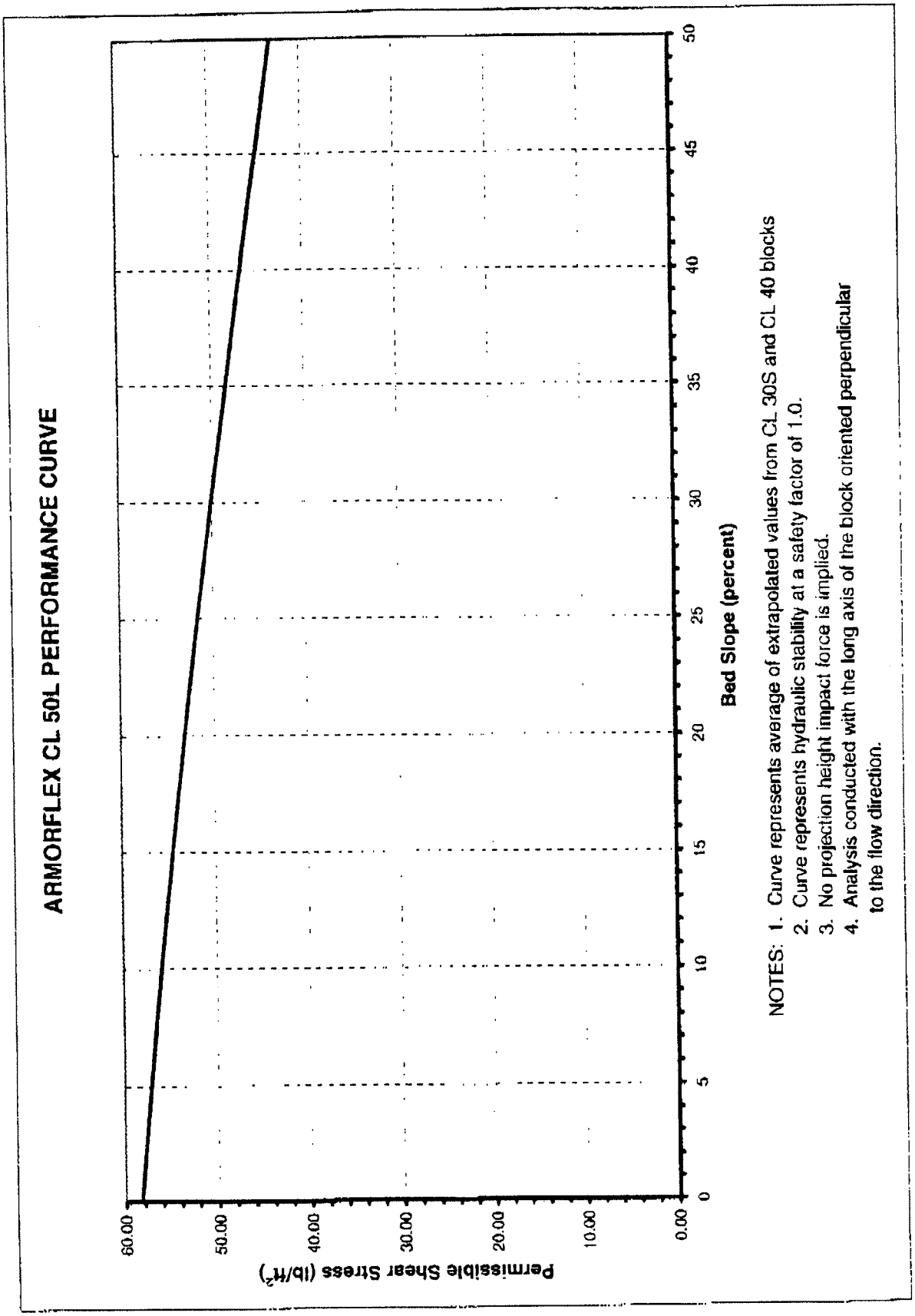


SECTION A–A

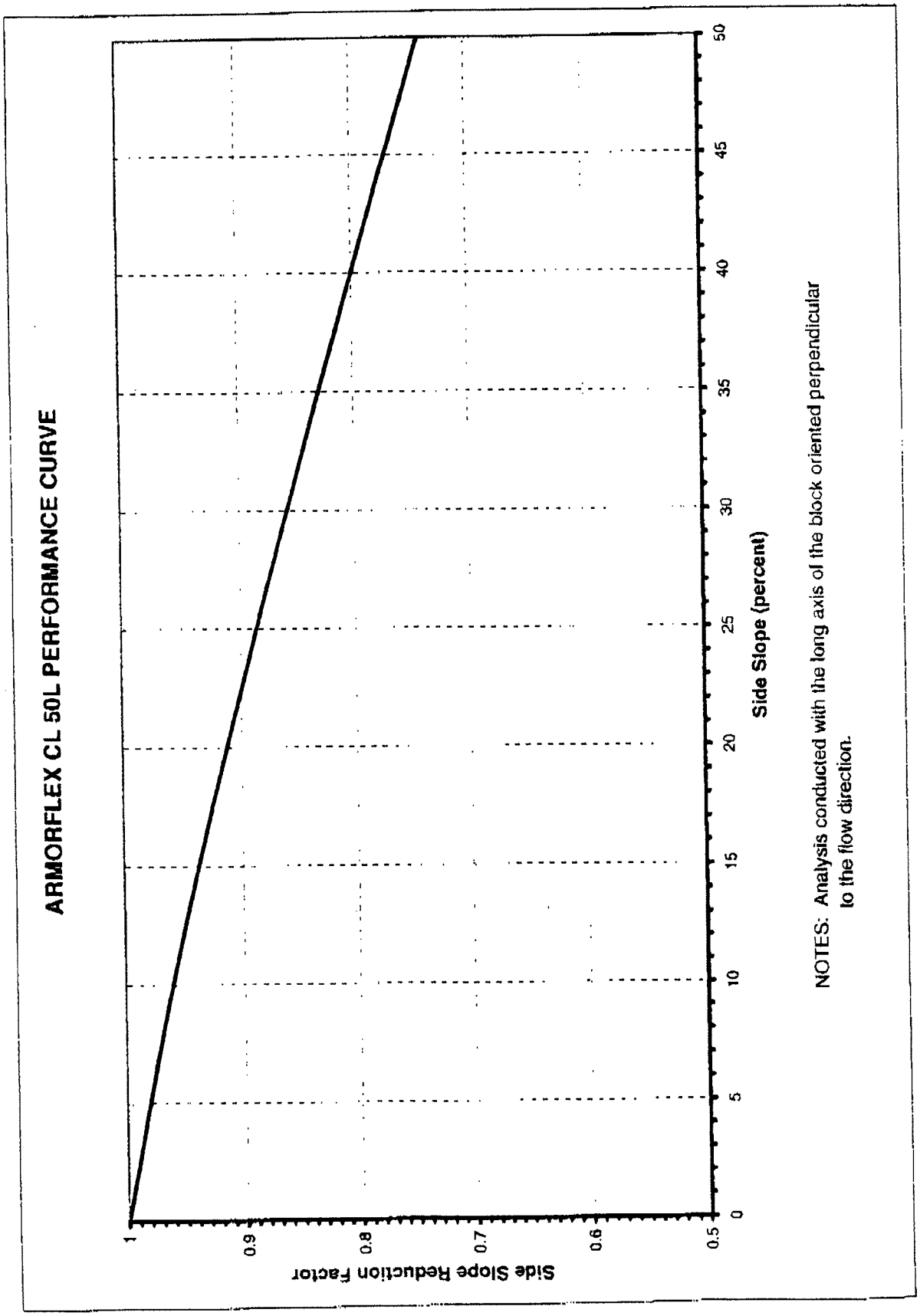


SECTION B–B

TITLE: ARMORFLEX CLASS L-55 BLOCK DETAIL		PREPARED BY: ARMORTEC	
		3850 PONTE PARKWAY SUITE 200 NORCROSS, GA 30092	(770) 409-9003 FAX (770) 662-9816
DESCRIPTION: BLOCK DIMENSIONS	DRAWN BY: DDW	DATE: 1-22-98	CAD FILE: DETAILS
	CHKD BY: MAT	SCALE: DIMEN'D	DRAWING NAME/NO. AFLEX-015



NOTES:
1. Curve represents average of extrapolated values from CL 30S and CL 40 blocks
2. Curve represents hydraulic stability at a safety factor of 1.0.
3. No projection height impact force is implied.
4. Analysis conducted with the long axis of the block oriented perpendicular to the flow direction.


ARMORFLEX CL 50L PERFORMANCE CURVE
Side Slope Reduction Factor
1
0.9
0.8
0.7
0.6
0.5
0
5
10
15
20
25
30
35
40
45
50
Side Slope (percent)
NOTES: Analysis conducted with the long axis of the block oriented perpendicular to the flow direction.

APPENDIX "C" – HYDRAULIC ANALYSES

HYDRAULIC/WATER CONSERVATION DIVISION
Hydrology and Hydrologic Development Unit

INFORMATION REQUEST SUMMARY

Date 8/3/99

Project Name: Las Virgines Creek

Project Location: Agoura Road Bridge downstream of the ventura Freeway, City of Calabasas

Project Engineer: Thuong T. Do

Technical Review by: T.T.Do

Information Requested: Updated value of the Q_{50} at subject project location.

Information Requested By: Y.S. Ramachandra - ASL Consulting Engrs (949) 727-7099.

Information To Be Used For: Hydraulic and Scour analyses for bridge widening.

Will Information Be Used In Any Litigation? ☐ Yes ☒ No

Information Provided: Capital Flood Q (Q_{50}) = 14,500 cfs (based on Ultimate development) posted and circled on attached map hereto. Fax (949) 727-7097.

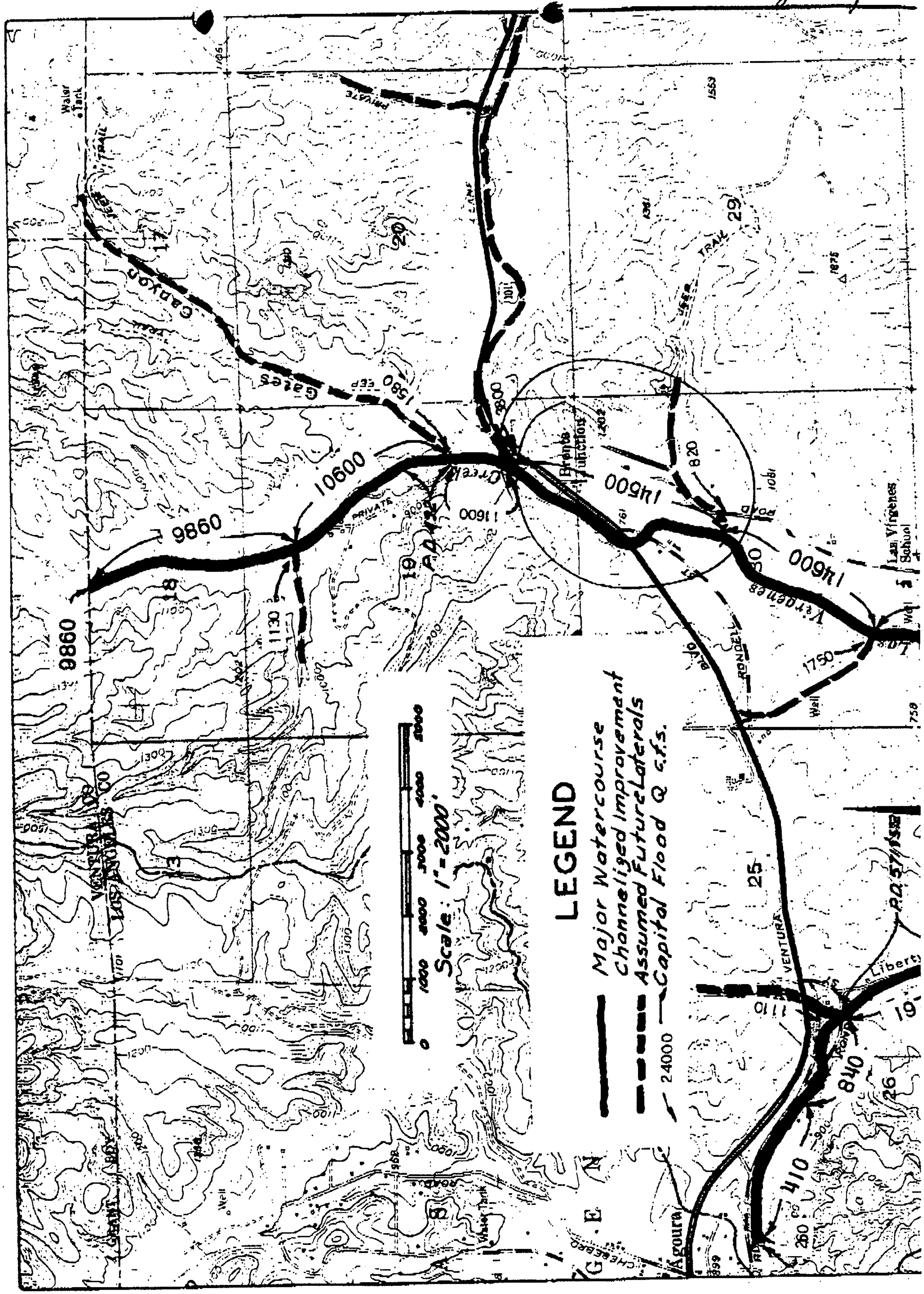
Date Provided: 8/3/99

References: Las VirginesCreek File.

Calculations, Comments, Etc...: None.

LAP\QREQUEST.TMP

Post-it® Fax Note 7671	Date 8/3/99	# of pages ▶ 02
To Y.S. RAMACHANDRA	From THUONG T. DO	
Co./Dept. ASL Consulting Engrs	Co. LAC/DPW	
Phone # (949) 727-7099	Phone # (626) 458-6141	
Fax # (949) 727-7097	Fax # (626) 457-5326	


LEGEND
Major Watercourse
Channeliged Improvement
Assumed Future Laterals
24000 Capital Flood Q c.f.s.
Scale: 1"=2000'
0 1000 2000 3000 4000 5000
Gates Canyon
9860
10600
11600
14600
1580
1130
3800
820
1750
1110
840
410
260
Brents Junction
Las Virgenes School
VENTURA CO
LOS ANGELES CO
Agoura
Liberty
RONDELL
VENTURA
PRIVATE
TRAIL

HEC-RAS Plan: Agoura Ex1 River: Agoura creek Reach: s/o highway 101

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	755.93	755.93	762.94	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.24	754.71	761.99	0.0029	23.75	610.64	48.77	1.00
s/o highway 101	700.21	14500.00	740.52	747.81	751.93	761.49	0.0478	29.68	488.55	82.13	2.14
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.28	0.0693	27.94	519.02	129.97	2.46
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.01	749.20	753.95	0.0018	17.82	813.49	87.09	1.03
s/o highway 101	480	14500.00	737.24	749.03	749.10	753.82	0.0018	17.56	825.76	88.11	1.01
s/o highway 101	453.61	14500.00	734.24	743.62	746.59	753.26	0.0046	24.92	581.91	76.12	1.59
s/o highway 101	341.72	14500.00	734.09	743.99	746.43	752.44	0.0038	23.33	621.50	77.66	1.45
s/o highway 101	254.72	14500.00	734.00	744.50	746.32	751.80	0.0031	21.68	668.73	79.47	1.32
s/o highway 101	223	Bridge									
s/o highway 101	200	14500.00	733.40	739.61	742.56	749.17	0.0894	24.82	584.21	105.21	1.86
s/o highway 101	186.5	14500.00	732.98	739.42	739.42	741.64	0.0269	11.96	1212.05	272.80	1.00
s/o highway 101	97.32	14500.00	730.29	738.25	738.25	740.61	0.0265	12.33	1175.56	249.21	1.00
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0265	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0232	16.33	887.71	107.47	1.00

PLAN 1 UPSTREAM $n = 0.015$ DOWNSTREAM $n = 0.055$ 8/4/99

HEC-RAS Plan: Agoura Exist River: Agoura creek Reach: s/o highway 101

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	755.93	755.93	762.94	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.24	754.71	761.99	0.0029	23.75	610.64	48.77	1.00
s/o highway 101	700.21	14500.00	740.52	747.81	751.93	761.49	0.0478	29.68	488.55	82.13	2.14
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.28	0.0693	27.94	519.02	129.97	2.46
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.01	749.20	753.95	0.0018	17.82	813.49	87.09	1.03
s/o highway 101	480	14500.00	737.24	749.03	749.10	753.82	0.0018	17.56	825.76	88.11	1.01
s/o highway 101	453.61	14500.00	734.24	743.62	746.59	753.26	0.0046	24.92	581.91	76.12	1.59
s/o highway 101	341.72	14500.00	734.09	743.99	746.43	752.44	0.0038	23.33	621.50	77.66	1.45
s/o highway 101	254.72	14500.00	734.00	744.50	746.32	751.80	0.0031	21.68	668.73	79.47	1.32
s/o highway 101	223	Bridge									
s/o highway 101	200	14500.00	733.40	740.28	742.56	747.87	0.1169	22.11	655.88	107.66	1.58
s/o highway 101	186.5	14500.00	732.98	739.42	739.42	741.64	0.0501	11.96	1212.05	272.80	1.00
s/o highway 101	97.32	14500.00	730.29	738.25	738.25	740.61	0.0492	12.33	1175.56	249.21	1.00
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0493	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0431	16.33	887.71	107.47	1.00

PLAN 2 UPSTREAM $n = 0.015$ DOWNSTREAM $n = 0.075$ 8/4/99

HEC-RAS Plan: Agoura Ex3 River: Agoura creek Reach: s/o highway 101

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	755.93	755.93	762.94	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.24	754.71	761.99	0.0029	23.75	610.64	48.77	1.00
s/o highway 101	700.21	14500.00	740.52	747.81	751.93	761.49	0.0478	29.68	488.55	82.13	2.14
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.28	0.0693	27.94	519.02	129.97	2.46
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.01	749.20	753.95	0.0018	17.82	813.49	87.09	1.03
s/o highway 101	480	14500.00	737.24	749.03	749.10	753.82	0.0018	17.56	825.76	88.11	1.01
s/o highway 101	453.61	14500.00	734.24	743.62	746.59	753.26	0.0046	24.92	581.91	76.12	1.59
s/o highway 101	341.72	14500.00	734.09	743.99	746.43	752.44	0.0038	23.33	621.50	77.66	1.45
s/o highway 101	254.72	14500.00	734.00	744.50	746.32	751.80	0.0031	21.68	668.73	79.47	1.32
s/o highway 101	223	Bridge									
s/o highway 101	200	14500.00	733.40	739.07	742.56	750.76	0.0251	27.44	528.50	103.31	2.14
s/o highway 101	186.5	14500.00	732.98	737.52	739.42	743.86	0.0280	20.20	717.66	247.30	2.09
s/o highway 101	97.32	14500.00	730.29	736.83	738.25	741.55	0.0157	17.43	832.09	231.78	1.62
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0055	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0048	16.33	887.71	107.47	1.00

PLAN 3 UPSTREAM $n = 0.015$ DOWNSTREAM $n = 0.025$ 8/4/99

HEC-RAS Plan: Agoura Ex4 River: Agoura creek Reach: s/o highway 101

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	755.93	755.93	762.94	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.24	754.71	761.99	0.0029	23.75	610.64	48.77	1.00
s/o highway 101	700.21	14500.00	740.52	747.81	751.93	761.49	0.0478	29.68	488.55	82.13	2.14
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.28	0.0693	27.94	519.02	129.97	2.46
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.01	749.20	753.95	0.0018	17.82	813.49	87.09	1.03
s/o highway 101	480	14500.00	737.24	749.03	749.10	753.82	0.0018	17.56	825.76	88.11	1.01
s/o highway 101	453.61	14500.00	734.24	743.62	746.59	753.26	0.0046	24.92	581.91	76.12	1.59
s/o highway 101	341.72	14500.00	734.09	743.99	746.43	752.44	0.0038	23.33	621.50	77.66	1.45
s/o highway 101	254.72	14500.00	734.00	744.50	746.32	751.80	0.0031	21.68	668.73	79.47	1.32
s/o highway 101	223	Bridge									
s/o highway 101	200	14500.00	733.40	739.17	742.56	750.42	0.0464	26.91	538.88	103.66	2.08
s/o highway 101	186.5	14500.00	732.98	738.52	739.42	741.98	0.0215	14.94	970.62	260.66	1.36
s/o highway 101	97.32	14500.00	730.29	737.98	738.25	740.64	0.0129	13.09	1107.32	246.47	1.09
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0107	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0094	16.33	887.71	107.47	1.00

PLAN 4 UPSTREAM $n = 0.015$ DOWNSTREAM $n = 0.035$ 8/6/99

HEC-RAS Plan: Agoura Pr5 River: Agoura creek Reach: s/o highway 101 MIXED FLOW REGIME GABION OPTION

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	751.67	755.94	766.13	0.0061	30.51	475.28	48.49	1.72
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	754.71	754.71	761.72	0.0021	21.23	682.85	48.92	1.00
s/o highway 101	700.21	14500.00	740.52	747.92	751.96	761.09	0.0452	29.12	497.92	82.60	2.09
s/o highway 101	635.21	14500.00	740.46	754.22	748.58	755.02	0.0013	7.19	2016.76	189.15	0.39
s/o highway 101	570.21	14500.00	740.40	752.64		754.75	0.0041	11.66	1243.27	135.32	0.68
s/o highway 101	522.36	14500.00	737.31	751.45		754.50	0.0026	14.02	1034.33	94.39	0.75
s/o highway 101	480	14500.00	737.24	751.36		754.38	0.0025	13.95	1039.28	95.25	0.74
s/o highway 101	453.61	14500.00	734.24	752.16		753.98	0.0012	10.81	1341.35	101.74	0.52
s/o highway 101	341.72	14500.00	734.09	752.03		753.84	0.0012	10.80	1343.01	101.79	0.52
s/o highway 101	254.72	14500.00	734.00	751.92	746.35	753.74	0.0012	10.81	1341.07	101.73	0.52
s/o highway 101	223 BR U	14500.00	734.00	751.55	746.53	753.61	0.0021	11.51	1259.90	96.63	0.56
s/o highway 101	223 BR D	14500.00	733.40	748.38	743.06	749.71	0.0138	9.26	1565.54	134.08	0.48
s/o highway 101	200	14500.00	733.40	748.40		749.60	0.0077	8.76	1654.36	138.18	0.45
s/o highway 101	186.5	14500.00	732.98	748.61		748.79	0.0012	3.38	4286.42	396.06	0.18
s/o highway 101	97.32	14500.00	730.29	748.51		748.69	0.0011	3.41	4255.75	351.40	0.17
s/o highway 101	43.32	14500.00	732.05	748.44		748.63	0.0012	3.49	4152.16	358.67	0.18
s/o highway 101	0	14500.00	731.01	743.90	743.90	748.08	0.0435	16.40	884.19	107.28	1.01

PLAN 5 UPSTREAM n = 0.025 DOWNSTREAM = 0.075 8/4/99

HEC-RAS Plan: Agoura Pr5 River: Agoura creek Reach: s/o highway 101 SUPERCRITICAL GABION OPTION

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	751.67	755.93	766.13	0.0061	30.51	475.28	48.49	1.72
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.06	754.71	762.07	0.0031	24.09	601.94	48.75	1.72
s/o highway 101	700.21	14500.00	740.52	747.79	751.93	761.58	0.0484	29.80	486.50	82.02	2.16
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.32	0.0696	27.99	518.07	129.91	2.47
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.20	749.20	753.94	0.0048	17.47	829.91	87.65	1.00
s/o highway 101	480	14500.00	737.24	749.01	749.10	753.82	0.0049	17.60	823.75	88.04	1.01
s/o highway 101	453.61	14500.00	734.24	743.69	746.59	753.16	0.0125	24.69	587.29	76.33	1.57
s/o highway 101	341.72	14500.00	734.09	745.56	746.43	751.40	0.0063	19.40	747.54	82.39	1.13
s/o highway 101	254.72	14500.00	734.00	746.32	746.32	751.19	0.0048	17.71	818.54	84.93	1.01
s/o highway 101	223 BR U	14500.00	734.00	746.53	746.53	751.48	0.0063	17.86	812.09	82.52	1.00
s/o highway 101	223 BR D	14500.00	733.40	739.89	743.06	750.19	0.2336	25.76	562.95	102.21	1.93
s/o highway 101	200	14500.00	733.40	740.61	742.56	747.44	0.0999	20.98	690.99	108.87	1.47
s/o highway 101	186.5	14500.00	732.98	739.42	739.42	741.64	0.0501	11.96	1212.05	272.80	1.00
s/o highway 101	97.32	14500.00	730.29	738.25	738.25	740.61	0.0492	12.33	1175.56	249.21	1.00
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0493	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0431	16.33	887.71	107.47	1.00

PLAN 5 UPSTREAM $n = 0.025$ DOWNSTREAM $n = 0.075$ 8/4/99

HEC-RAS Plan: Agoura Pr6 River: Agoura creek Reach: s/o highway 101 MIXED FLOW REGIME GABION OPTION

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	755.93	755.94	762.94	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	754.71	754.71	761.72	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	700.21	14500.00	740.52	747.92	751.93	761.09	0.0452	29.12	497.92	82.60	2.09
s/o highway 101	635.21	14500.00	740.46	753.88	748.58	754.73	0.0014	7.43	1952.39	189.15	0.41
s/o highway 101	570.21	14500.00	740.40	751.94		754.41	0.0052	12.61	1149.80	133.23	0.76
s/o highway 101	522.36	14500.00	737.31	750.17		754.06	0.0036	15.83	916.14	90.56	0.88
s/o highway 101	480	14500.00	737.24	749.17	749.11	753.82	0.0047	17.30	837.97	88.54	0.99
s/o highway 101	453.61	14500.00	734.24	750.77		753.03	0.0016	12.06	1202.62	97.56	0.61
s/o highway 101	341.72	14500.00	734.09	750.56		752.84	0.0017	12.12	1196.82	97.38	0.61
s/o highway 101	254.72	14500.00	734.00	750.37	746.35	752.69	0.0017	12.21	1187.40	97.09	0.62
s/o highway 101	223 BR U	14500.00	734.00	749.83	746.53	752.54	0.0030	13.21	1097.66	91.46	0.67
s/o highway 101	223 BR D	14500.00	733.40	747.35	743.06	748.95	0.0020	10.14	1430.01	130.22	0.54
s/o highway 101	200	14500.00	733.40	747.55		748.93	0.0011	9.43	1538.22	134.99	0.49
s/o highway 101	186.5	14500.00	732.98	748.32		748.51	0.0001	3.48	4172.37	392.18	0.19
s/o highway 101	97.32	14500.00	730.29	748.31		748.50	0.0001	3.46	4187.20	349.45	0.18
s/o highway 101	43.32	14500.00	732.05	748.30		748.49	0.0001	3.53	4102.02	357.13	0.18
s/o highway 101	0	14500.00	731.01	743.90	743.90	748.08	0.0048	16.40	884.19	107.28	1.01

PLAN 6 UPSTREAM $n = 0.025$ DOWNSTREAM $n = 0.025$

HEC-RAS Plan: Agoura Pr6 River: Agoura creek Reach: s/o highway 101 SUPERCRITICAL GABION OPTION

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	755.93	755.93	762.94	0.0021	21.23	682.87	48.92	1.00
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.24	754.71	761.99	0.0029	23.75	610.64	48.77	1.00
s/o highway 101	700.21	14500.00	740.52	747.81	751.93	761.49	0.0478	29.68	488.55	82.13	2.14
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.28	0.0693	27.94	519.02	129.97	2.46
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.20	749.20	753.94	0.0048	17.47	829.91	87.65	1.00
s/o highway 101	480	14500.00	737.24	749.01	749.10	753.82	0.0049	17.60	823.75	88.04	1.01
s/o highway 101	453.61	14500.00	734.24	743.69	746.59	753.16	0.0125	24.69	587.29	76.33	1.57
s/o highway 101	341.72	14500.00	734.09	745.56	746.43	751.40	0.0063	19.40	747.54	82.39	1.13
s/o highway 101	254.72	14500.00	734.00	746.32	746.32	751.19	0.0048	17.71	818.54	84.93	1.01
s/o highway 101	223 BR U	14500.00	734.00	746.53	746.53	751.48	0.0063	17.86	812.09	82.52	1.00
s/o highway 101	223 BR D	14500.00	733.40	739.80	743.06	750.44	0.0272	26.18	553.96	101.89	1.98
s/o highway 101	200	14500.00	733.40	739.27	742.56	750.11	0.0224	26.43	548.66	104.00	2.03
s/o highway 101	186.5	14500.00	732.98	737.54	739.42	743.81	0.0275	20.09	721.57	247.52	2.07
s/o highway 101	97.32	14500.00	730.29	736.84	738.25	741.53	0.0155	17.37	834.84	232.13	1.61
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0055	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0048	16.33	887.71	107.47	1.00

PLAN 6 UPSTREAM $n = 0.025$ DOWNSTREAM $n = 0.025$ 8/4/99

HEC-RAS Plan: Agoura Pr7 River: Agoura creek Reach: s/o highway 101 ARMORFLEX OPTION MIXED FLOW ROBINS

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	751.67	755.94	766.13	0.0061	30.51	475.28	48.49	1.72
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	754.71	754.71	761.72	0.0021	21.25	682.51	48.92	1.00
s/o highway 101	700.21	14500.00	740.52	747.92	751.93	761.09	0.0453	29.12	497.91	82.60	2.09
s/o highway 101	635.21	14500.00	740.46	754.56	748.58	755.31	0.0012	6.97	2081.60	189.15	0.37
s/o highway 101	570.21	14500.00	740.40	753.21		755.08	0.0034	10.98	1320.94	137.03	0.62
s/o highway 101	522.36	14500.00	737.31	752.10		754.82	0.0040	13.22	1096.73	96.35	0.69
s/o highway 101	480	14500.00	737.24	751.90		754.65	0.0041	13.29	1091.44	96.92	0.70
s/o highway 101	453.61	14500.00	734.24	752.55		754.26	0.0021	10.50	1380.68	102.48	0.50
s/o highway 101	[redacted]	14500.00	734.09	752.28		754.02	0.0021	10.60	1368.56	102.48	0.51
s/o highway 101	254.72	14500.00	734.00	752.05	746.35	753.83	0.0022	10.71	1354.44	102.12	0.52
s/o highway 101	223 BR U	14500.00	734.00	751.70	746.53	753.71	0.0038	11.38	1274.29	97.08	0.55
s/o highway 101	223 BR D	14500.00	733.40	748.38	743.06	749.71	0.0138	9.26	1565.54	134.08	0.48
s/o highway 101	200	14500.00	733.40	748.40		749.60	0.0077	8.76	1654.36	138.18	0.45
s/o highway 101	186.5	14500.00	732.98	748.61		748.79	0.0012	3.38	4286.42	396.06	0.18
s/o highway 101	97.32	14500.00	730.29	748.51		748.69	0.0011	3.41	4255.75	351.40	0.17
s/o highway 101	43.32	14500.00	732.05	748.44		748.63	0.0012	3.49	4152.16	358.67	0.18
s/o highway 101	0	14500.00	731.01	743.90	743.90	748.08	0.0435	16.40	884.19	107.28	1.01

PLAN 7 UPSTREAM $n = 0.034$ DOWNSTREAM $n = 0.075$ 8/4/99

HEC-RAS Plan: Agoura Pr7 River: Agoura creek Reach: s/o highway 101 SUPERCRITICAL ARMOR PLOT OPTION

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	751.67	755.93	766.13	0.0061	30.51	475.28	48.49	1.72
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.06	754.71	762.07	0.0031	24.09	601.94	48.75	1.72
s/o highway 101	700.21	14500.00	740.52	747.79	751.93	761.58	0.0484	29.80	486.50	82.02	2.16
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.32	0.0696	27.99	518.07	129.91	2.47
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.20	749.20	753.94	0.0089	17.47	829.91	87.65	1.00
s/o highway 101	480	14500.00	737.24	748.84	749.10	753.83	0.0096	17.93	808.60	87.52	1.04
s/o highway 101	453.61	14500.00	734.24	743.78	746.59	753.03	0.0224	24.41	594.13	76.60	1.54
s/o highway 101	341.72	14500.00	734.09	746.43	746.43	751.28	0.0089	17.68	820.06	84.99	1.00
s/o highway 101	254.72	14500.00	734.00	746.32	746.32	751.19	0.0090	17.71	818.54	84.93	1.01
s/o highway 101	223 BR U	14500.00	734.00	746.53	746.53	751.48	0.0116	17.86	812.09	82.52	1.00
s/o highway 101	223 BR D	14500.00	733.40	740.05	743.06	749.77	0.2150	25.02	579.57	102.79	1.86
s/o highway 101	200	14500.00	733.40	740.82	742.56	747.22	0.0904	20.30	714.20	109.67	1.40
s/o highway 101	186.5	14500.00	732.98	739.42	739.42	741.64	0.0501	11.96	1212.05	272.80	1.00
s/o highway 101	97.32	14500.00	730.29	738.25	738.25	740.61	0.0492	12.33	1175.56	249.21	1.00
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0493	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0431	16.33	887.71	107.47	1.00

PLAN 7 UPSTREAM $n = 0.034$ DOWNSTREAM $n = 0.075$ 8/4/99

HEC-RAS Plan: Agoura Pr8 River: Agoura creek Reach: s/o highway 101 SUPERCRITICAL ARMORFLEX OPTION

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	751.67	755.93	766.13	0.0061	30.51	475.28	48.49	1.72
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	753.06	754.71	762.07	0.0031	24.09	601.94	48.75	1.72
s/o highway 101	700.21	14500.00	740.52	747.79	751.93	761.58	0.0484	29.80	486.50	82.02	2.16
s/o highway 101	635.21	14500.00	740.46	745.16	748.58	757.32	0.0696	27.99	518.07	129.91	2.47
s/o highway 101	570.21	14500.00	740.40	750.26	750.26	754.01	0.0094	15.56	932.09	124.14	1.00
s/o highway 101	522.36	14500.00	737.31	749.20	749.20	753.94	0.0089	17.47	829.91	87.65	1.00
s/o highway 101	480	14500.00	737.24	748.84	749.10	753.83	0.0096	17.93	808.60	87.52	1.04
s/o highway 101	453.61	14500.00	734.24	743.78	746.59	753.03	0.0224	24.41	594.13	76.60	1.54
s/o highway 101	341.72	14500.00	734.09	746.43	746.43	751.28	0.0089	17.68	820.06	84.99	1.00
s/o highway 101	254.72	14500.00	734.00	746.32	746.32	751.19	0.0090	17.71	818.54	84.93	1.01
s/o highway 101	223 BR U	14500.00	734.00	746.53	746.53	751.48	0.0116	17.86	812.09	82.52	1.00
s/o highway 101	223 BR D	14500.00	733.40	739.87	743.06	750.25	0.0263	25.86	560.60	102.12	1.95
s/o highway 101	200	14500.00	733.40	739.33	742.56	749.93	0.0216	26.14	554.79	104.21	2.00
s/o highway 101	186.5	14500.00	732.98	737.54	739.42	743.79	0.0273	20.05	723.12	247.60	2.07
s/o highway 101	97.32	14500.00	730.29	736.85	738.25	741.52	0.0155	17.35	835.89	232.26	1.61
s/o highway 101	43.32	14500.00	732.05	738.70	738.70	741.04	0.0055	12.29	1180.03	251.77	1.00
s/o highway 101	0	14500.00	731.01	743.93	743.93	748.08	0.0048	16.33	887.71	107.47	1.00

PLAN 8 UPSTREAM $n = 0.034$ DOWNSTREAM $n = 0.025$ 8/4/99

HEC-RAS Plan: Agoura Pr8 River: Agoura creek Reach: s/o highway 101 ARMORFLEX OPTION MIXED FLOW REGIME

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
s/o highway 101	901	14500.00	741.77	751.67	755.94	766.13	0.0061	30.51	475.28	48.49	1.72
s/o highway 101	900	Culvert									
s/o highway 101	701	14500.00	740.55	754.71	754.71	761.72	0.0021	21.23	682.85	48.92	1.00
s/o highway 101	700.21	14500.00	740.52	747.92	751.96	761.09	0.0452	29.12	497.92	82.60	2.09
s/o highway 101	635.21	14500.00	740.46	754.08	748.58	754.90	0.0013	7.29	1990.07	189.15	0.40
s/o highway 101	570.21	14500.00	740.40	752.37		754.61	0.0045	12.01	1207.48	134.52	0.71
s/o highway 101	522.36	14500.00	737.31	750.83		754.25	0.0056	14.85	976.28	92.53	0.81
s/o highway 101	480	14500.00	737.24	750.13		753.95	0.0066	15.69	924.08	91.47	0.87
s/o highway 101	453.61	14500.00	734.24	751.23		753.33	0.0027	11.62	1247.61	98.94	0.58
s/o highway 101	341.72	14500.00	734.09	750.81		753.00	0.0029	11.87	1221.20	98.13	0.59
s/o highway 101	254.72	14500.00	734.00	750.43	746.35	752.73	0.0031	12.15	1193.10	97.27	0.61
s/o highway 101	223	14500.00		750.43		752.73					
s/o highway 101	200	14500.00	733.40	747.55		748.93	0.0011	9.43	1538.22	134.99	0.49
s/o highway 101	186.5	14500.00	732.98	748.32		748.51	0.0001	3.48	4172.37	392.18	0.19
s/o highway 101	97.32	14500.00	730.29	748.31		748.50	0.0001	3.46	4187.20	349.45	0.18
s/o highway 101	43.32	14500.00	732.05	748.30		748.49	0.0001	3.53	4102.02	357.13	0.18
s/o highway 101	0	14500.00	731.01	743.90	743.90	748.08	0.0048	16.40	884.19	107.28	1.01

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 1

	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC
		Unit	Value	UNIT
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel, m^2	A_c	ft^2	1252.03	116.38
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	11.58	3.53
Top width of the channel in the approach section, m	TOPW	ft	99.07	30.20
Avg. flow depth in the approach section, m	y_1	ft	12.64	3.85
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.54	0.78
Wetted perimeter of the main channel in the approach section, m	WETP	ft	109.38	33.35
Hydraulic Radius of the approach channel, m	R	ft	11.45	3.49
Unit weight of water, N/m^3		lbs/ft^3	62.40	9810.00
Avg. unconstricted energy slope, m/m	S	ft/ft	0.0005	0.0005
Avg. Shear Stress on the channel bed, Pa (N/m^2)	T_0			18.14
Density of water (kg/m^3)		$slugs/ft^3$	1.94	1000.00
Shear Velocity in the approach channel, m/s	V_*	ft/s	0.44	0.13
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V_*/w			1.04	1.04
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		12.64	3.85
Area of the main channel at Bridge section, m^2		ft^2	1174.66	109.19
Top width in the main channel at Bridge section, m		ft	93.95	28.64
Bridge channel flow deplth, m	y_0		12.50	3.81
Contraction Scour depth, m	**y_s**	**ft**	**0.13**	**0.04**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	12.34	3.76
Accelaration due to gravity, m/s^2	g	ft/s^2	32.18	9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	12.50	3.81
Froude Number (Fr_1)	Fr_1		0.62	0.62
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.78**	**2.07**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 2				
	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC UNIT
		Unit	Value	
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel, m^2	A_c	ft^2	1320.51	122.74
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	10.98	3.35
Top width of the channel in the approach section, m	TOPW	ft	101.12	30.83
Avg. flow depth in the approach section, m	y_1	ft	13.06	3.98
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.56	0.78
Wetted perimeter of the main channel in the approach section, m	WETP	ft	111.84	34.10
Hydraulic Radius of the approach channel, m	R	ft	11.81	3.60
Unit weight of water, N/m^3		lbs/ft^3	62.40	9810.00
Avg. unconstricted energy slope, m/m	S	ft/ft	0.0005	0.0005
Avg. Shear Stress on the channel bed, Pa (N/m^2)	T_0			16.14
Density of water (kg/m^3)		$slugs/ft^3$	1.94	1000.00
Shear Velocity in the approach channel, m/s	V_*	ft/s	0.42	0.13
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V_*/w			0.98	0.98
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		13.06	3.98
Area of the main channel at Bridge section, m^2		ft^2	1245.79	115.80
Top width in the main channel at Bridge section, m		ft	96.19	29.33
Bridge channel flow deplth, m	y_0		12.95	3.95
Contraction Scour depth, m	**y_s**	**ft**	**0.11**	**0.03**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	11.64	3.55
Accelaration due to gravity, m/s^2	g	ft/s^2	32.18	9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	12.95	3.95
Froude Number (Fr_1)	Fr_1		0.57	0.57
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.64**	**2.03**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 3				
	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC UNIT
		Unit	Value	
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel, m^2	A_c	ft^2	1175.03	109.22
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	12.34	3.76
Top width of the channel in the approach section, m	TOPW	ft	96.71	29.48
Avg. flow depth in the approach section, m	y_1	ft	12.15	3.70
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.53	0.77
Wetted perimeter of the main channel in the approach section, m	WETP	ft	106.54	32.48
Hydraulic Radius of the approach channel, m	R	ft	11.03	3.36
Unit weight of water, N/m^3		lbs/ft^3		9810.00
Avg. unconstricted energy slope	S		0.0006	0.0006
Avg. Shear Stress on the channel bed	T_0			20.85
Density of water (kg/m^3)		lbs/ft^3		1000.00
Shear Velocity in the approach channel, m/s	V.	ft/s	0.47	0.14
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V./w			1.11	1.11
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		12.15	3.70
Area of the main channel at Bridge section, m^2		ft^2	1089.98	101.31
Top width in the main channel at Bridge section, m		ft	91.20	27.80
Bridge channel flow deplth, m	y_0		11.95	3.64
Contraction Scour depth, m	**y_s**	**ft**	**0.20**	**0.06**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	13.30	4.05
Accelaration due to gravity, m/s^2	g	ft/s^2		9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	11.95	3.64
Froude Number (Fr_1)	Fr_1			0.68
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.96**	**2.12**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 4

DESCRIPTION	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC UNIT
		Unit	Value	
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel, m^2	A_c	ft^2	1197.74	111.33
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	12.11	3.69
Top width of the channel in the approach section, m	TOPW	ft	97.41	29.70
Avg. flow depth in the approach section, m	y_1	ft	12.30	3.75
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.53	0.77
Wetted perimeter of the main channel in the approach section, m	WETP	ft	107.39	32.74
Hydraulic Radius of the approach channel, m	R	ft	11.15	3.40
Unit weight of water, N/m^3		lbs/ft^3		9810.00
Avg. unconstricted energy slope	S		0.0006	0.0006
Avg. Shear Stress on the channel bed	T_0			19.98
Density of water (kg/m^3)		lbs/ft^3		1000.00
Shear Velocity in the approach channel, m/s	V_*	ft/s	0.46	0.14
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V_*/w			1.09	1.09
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		12.30	3.75
Area of the main channel at Bridge section, m^2		ft^2	1114.96	103.64
Top width in the main channel at Bridge section, m		ft	92.02	28.05
Bridge channel flow depth, m	y_0		12.12	3.69
Contraction Scour depth, m	**y_s**	**ft**	**0.18**	**0.05**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	13.00	3.96
Accelaration due to gravity, m/s^2	g	ft/s^2		9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	12.12	3.70
Froude Number (Fr_1)	Fr_1			0.66
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.91**	**2.11**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 5

DESCRIPTION	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC UNIT
		Unit	Value	
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel in the approach section, m^2	A_c	ft^2	1343.01	124.83
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	10.80	3.29
Top width of the channel in the approach section, m	TOPW	ft	101.79	31.03
Avg. flow depth in the approach section, m	y_1	ft	13.19	4.02
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.56	0.78
Wetted perimeter of the main channel in the approach section, m	WETP	ft	112.64	34.34
Hydraulic Radius of the approach channel, m	R	ft	11.92	3.64
Unit weight of water, N/m^3		lbs/ft^3		9810.00
Avg. unconstricted energy slope	S		0.0012	0.0012
Avg. Shear Stress on the channel bed	T_0			43.18
Density of water (kg/m^3)		lbs/ft^3		1000.00
Shear Velocity in the approach channel, m/s	V_*	ft/s	0.68	0.21
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V_*/w			1.60	1.60
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		13.19	4.02
Area of the main channel at Bridge section, m^2		ft^2	1259.90	117.11
Top width in the main channel at Bridge section, m		ft	96.63	29.46
Bridge channel flow deplth, m	y_0		13.04	3.98
Contraction Scour depth, m	**y_s**	**ft**	**0.16**	**0.05**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	11.51	3.51
Accelaration due to gravity, m/s^2	g	ft/s^2	32.18	9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	13.04	3.98
Froude Number (Fr_1)	Fr_1		0.56	0.56
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.62**	**2.02**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 6

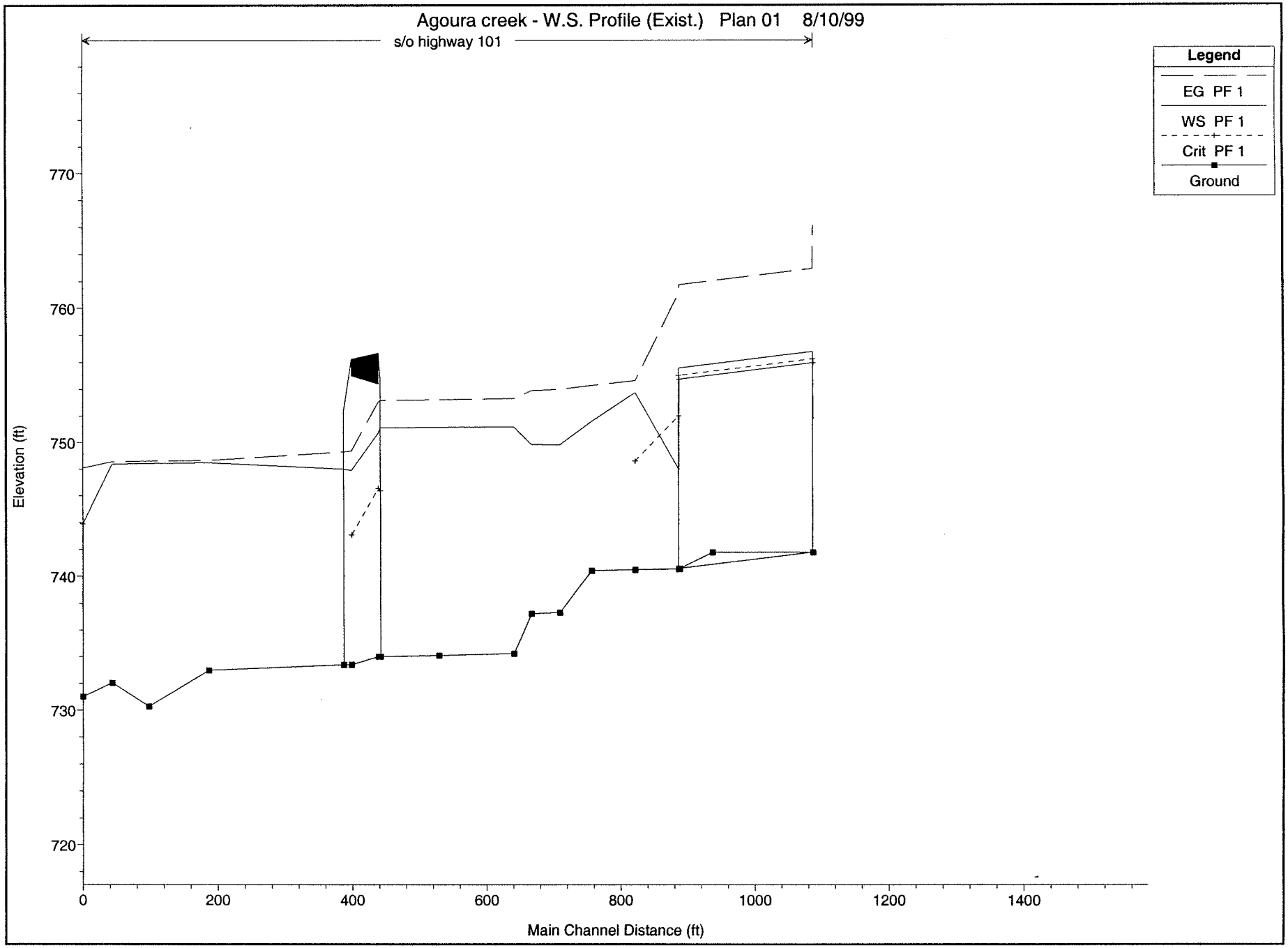
DESCRIPTION	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC UNIT
		Unit	Value	
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel in the approach section, m^2	A_c	ft^2	1196.82	111.25
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	12.12	3.69
Top width of the channel in the approach section, m	TOPW	ft	97.38	29.69
Avg. flow depth in the approach section, m	y_1	ft	12.29	3.75
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.53	0.77
Wetted perimeter of the main channel in the approach section, m	WETP	ft	107.35	32.73
Hydraulic Radius of the approach channel, m	R	ft	11.15	3.40
Unit weight of water, N/m^3		lbs/ft^3		9810.00
Avg. unconstricted energy slope	S		0.0017	0.0017
Avg. Shear Stress on the channel bed	T_0			55.62
Density of water (kg/m^3)		lbs/ft^3		1000.00
Shear Velocity in the approach channel, m/s	V.	ft/s	0.77	0.24
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V./w			1.81	1.81
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		12.29	3.75
Area of the main channel at Bridge section, m^2		ft^2	1097.66	102.03
Top width in the main channel at Bridge section, m		ft	91.46	27.88
Bridge channel flow depth, m	y_0		12.00	3.66
Contraction Scour depth, m	**y_s**	**ft**	**0.29**	**0.09**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	13.21	4.03
Accelaration due to gravity, m/s^2	g	ft/s^2	32.18	9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	13.13	4.00
Froude Number (Fr_1)	Fr_1		0.64	0.64
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**7.03**	**2.14**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 7

DESCRIPTION	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC UNIT
		Unit	Value	
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel in the approach section, m^2	A_c	ft^2	1354.44	125.90
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	10.71	3.26
Top width of the channel in the approach section, m	TOPW	ft	102.12	31.13
Avg. flow depth in the approach section, m	y_1	ft	13.26	4.04
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.56	0.78
Wetted perimeter of the main channel in the approach section, m	WETP	ft	113.05	34.47
Hydraulic Radius of the approach channel, m	R	ft	11.98	3.65
Unit weight of water, N/m^3		lbs/ft^3		9810.00
Avg. unconstricted energy slope	S		0.0022	0.0022
Avg. Shear Stress on the channel bed	T_0			78.44
Density of water (kg/m^3)		lbs/ft^3		1000.00
Shear Velocity in the approach channel, m/s	V_*	ft/s	0.92	0.28
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V_*/w			2.15	2.15
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		13.26	4.04
Area of the main channel at Bridge section, m^2		ft^2	1274.29	118.45
Top width in the main channel at Bridge section, m		ft	97.08	29.60
Bridge channel flow deplth, m	y_0		13.13	4.00
Contraction Scour depth, m	**y_s**	**ft**	**0.14**	**0.04**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	11.38	3.47
Accelaration due to gravity, m/s^2	g	ft/s^2		9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	13.13	4.00
Froude Number (Fr_1)	Fr_1			0.55
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.59**	**2.01**

Agoura Road Bridge Widening over Las Virgenes Creek, City of Calabasas - Scour Analysis - Plan 8

DESCRIPTION	SYMBOL	VALUE IN ENGLISH		VALUE IN METRIC
		Unit	Value	UNIT
Discharge in main channel in the approach section, m^3	Q_1	ft^3/s	14500.00	411.00
Cross-sectional area of the main channel, m^2	A_c	ft^2	1221.20	113.51
Avg Velocity in the main channel of the approach section, m/s	V_1	ft/s	11.88	3.62
Top width of the channel in the approach section, m	TOPW	ft	98.13	29.92
Avg. flow depth in the approach section, m	y_1	ft	12.44	3.79
D_{50} of the bed material, m	D_{50}	ft	0.00328	0.00100
Determine the Critical Velocity for the sediment movement of D_{50}, m/s	V_c	ft/s	2.54	0.77
Wetted perimeter of the main channel in the approach section, m	WETP	ft	108.25	33.00
Hydraulic Radius of the approach channel, m	R	ft	11.28	3.44
Unit weight of water, N/m^3		lbs/ft^3		9810.00
Avg. unconstricted energy slope	S		0.0029	0.0029
Avg. Shear Stress on the channel bed	T_0			98.42
Density of water (kg/m^3)		lbs/ft^3		1000.00
Shear Velocity in the approach channel, m/s	V_*	ft/s	1.03	0.31
Fall velocity based on D_{50}, m/s (Refer Fig.3, page 32, HEC-18)	w	ft/s	0.43	0.13
Value of V_*/w			2.41	2.41
Determine exponent k_1 (in metric units)	k_1			0.69
Discharge in the main channel at bridge section, m^3	Q_2	ft^3/s	14500.00	411.00
Bottom width of the upstream main channel, m	W_1	ft	45.00	13.72
Bottom width of the main channel in the contracted section less pier widths, m	W_2	ft	45.00	13.72
Avg. depth in the contracted section, m	y_2		12.44	3.79
Area of the main channel at Bridge section, m^2		ft^2	1102.96	102.52
Top width in the main channel at Bridge section, m		ft	91.63	27.94
Bridge channel flow deplth, m	y_0		12.04	3.67
Contraction Scour depth, m	**y_s**	**ft**	**0.41**	**0.12**
Velocity in the main channel at the Bridge section, m/s	V	ft/s	13.15	4.01
Accelaration due to gravity, m/s^2	g	ft/s^2		9.81
Depth of flow in the main channel in the bridge section (directoly US of pier), m	y	ft	12.04	3.67
Froude Number (Fr_1)	Fr_1			0.67
Correction factor K1 (depends on the shape of the pier)	K_1			1.00
Correction factor K2 (depends on the angle of attack of the flow)	K_2			1.00
Correction factor K3 (depends on the bed condition)	K_3			1.10
Correction factor K4 (depends on armoring by bed material size)	K_4			1.00
Pier width, m	a	ft	2.00	0.61
Local Scour depth, m	**y_s**	**ft**	**6.93**	**2.11**



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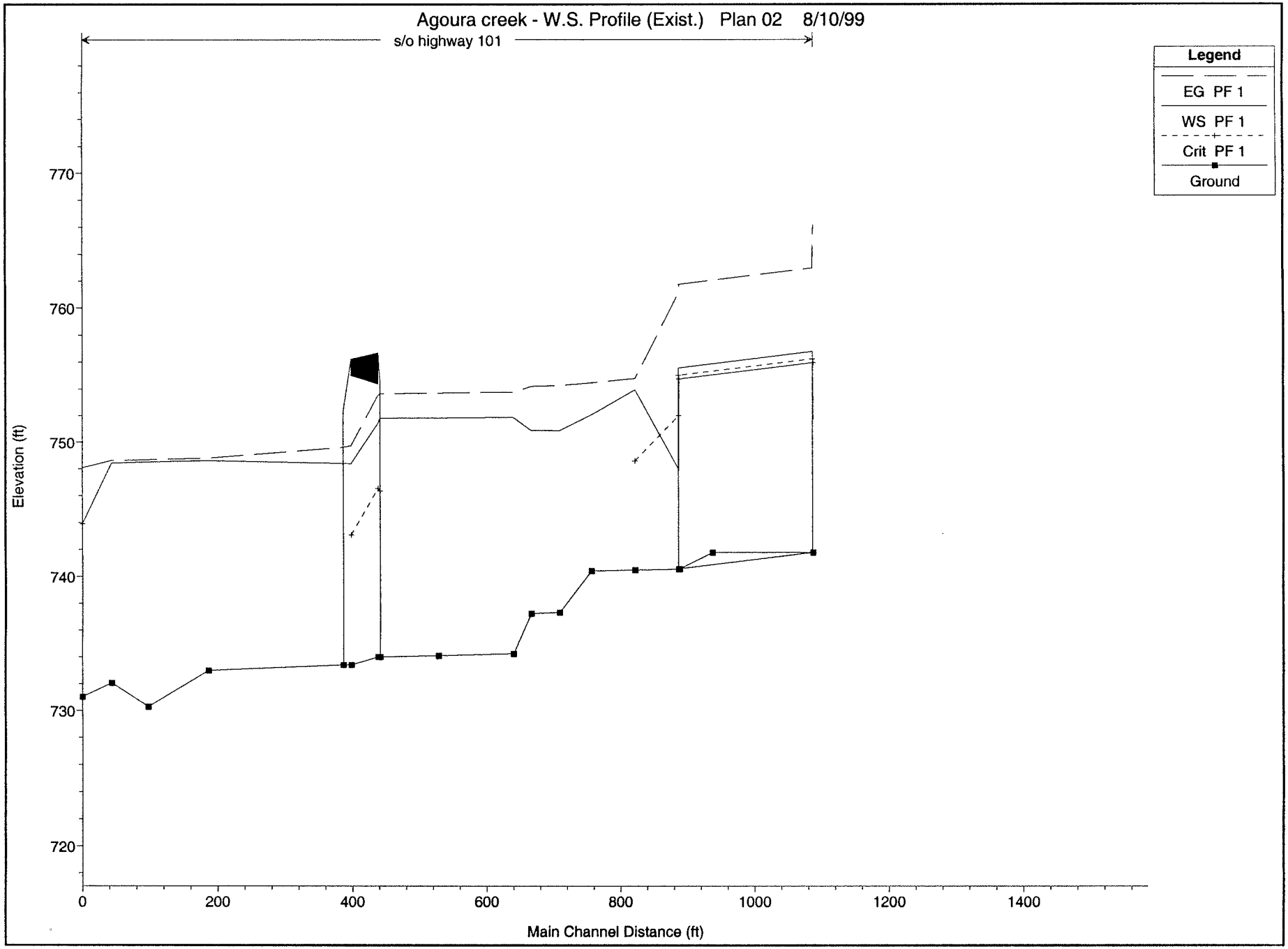

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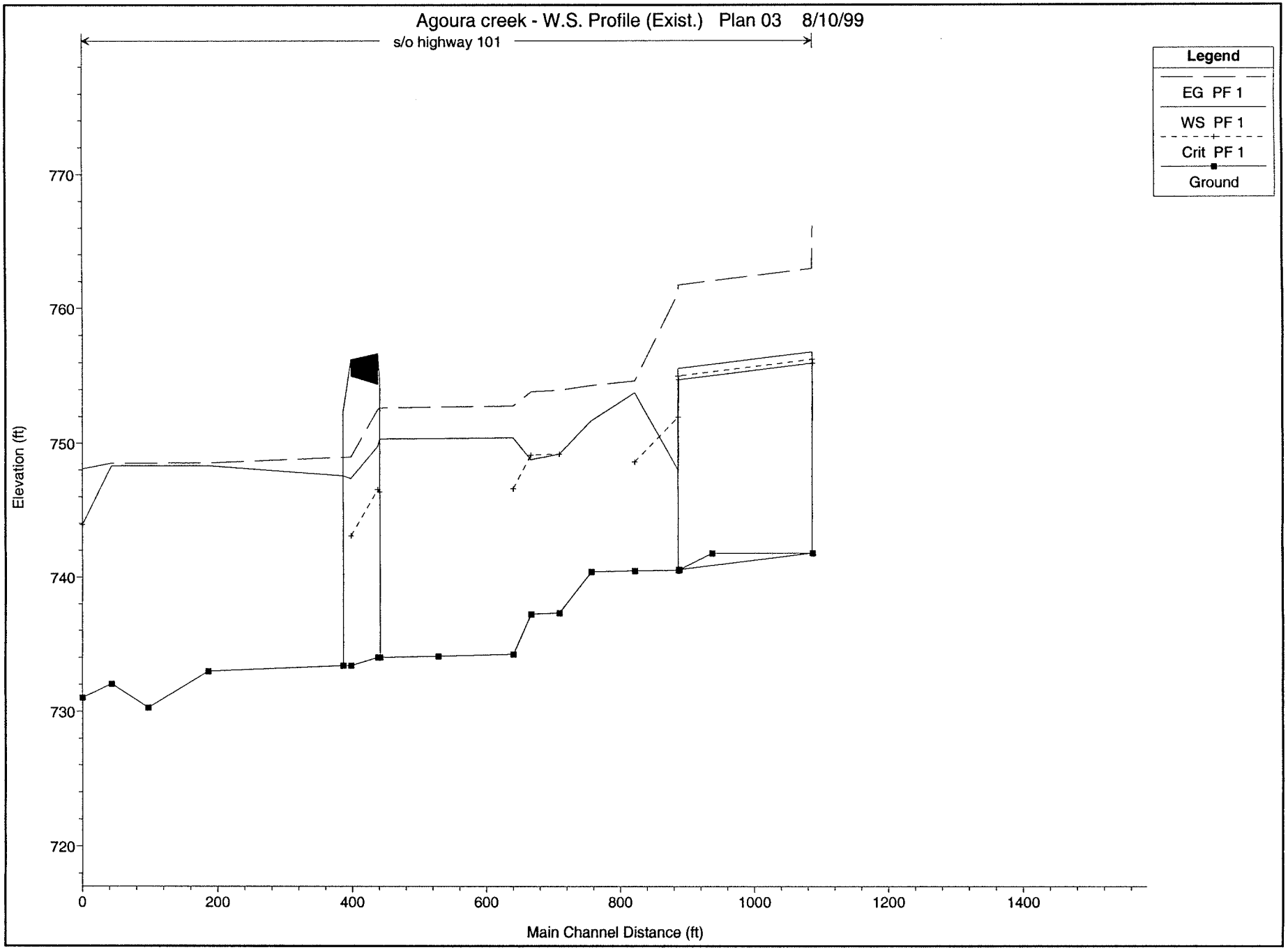

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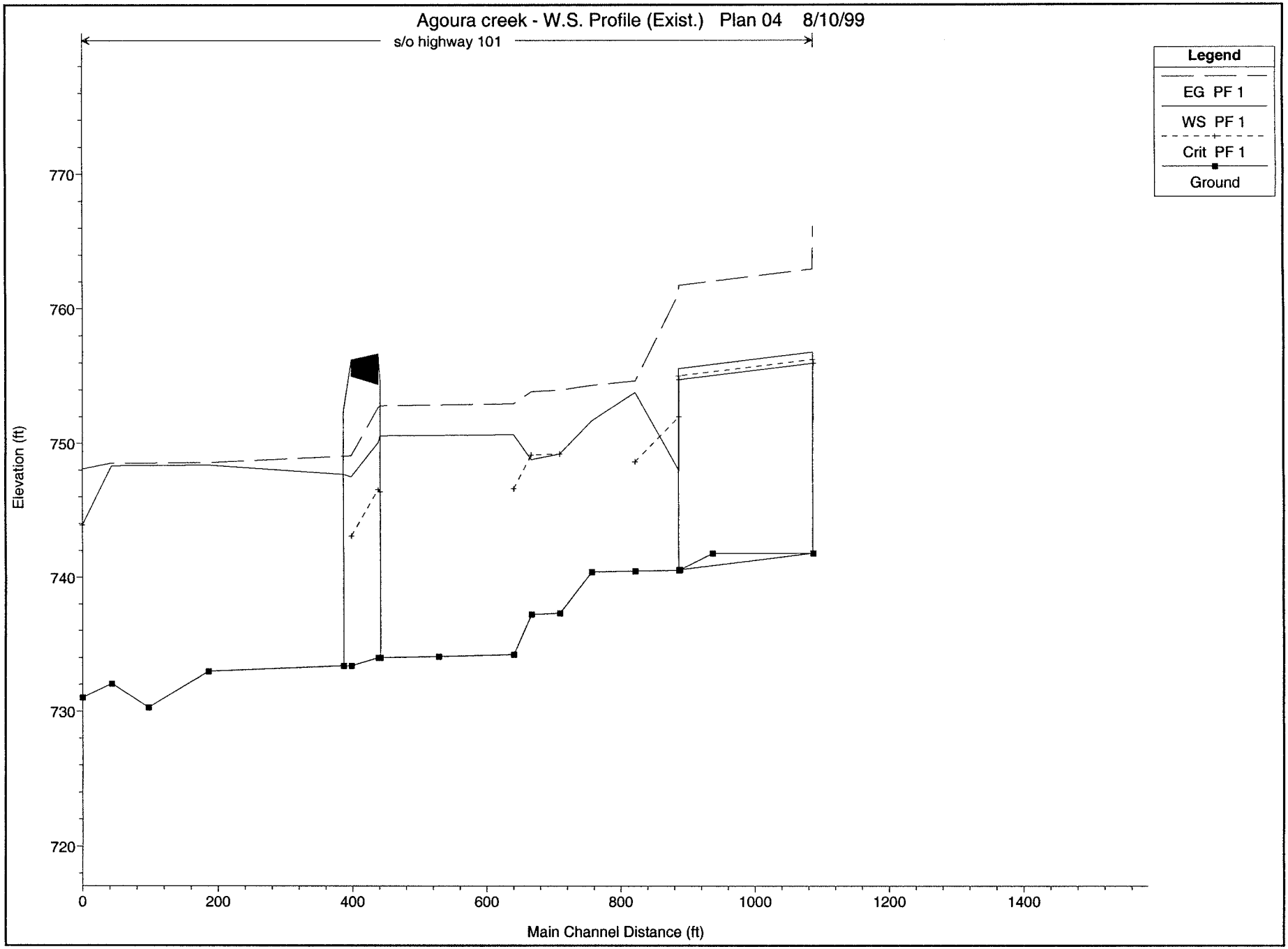

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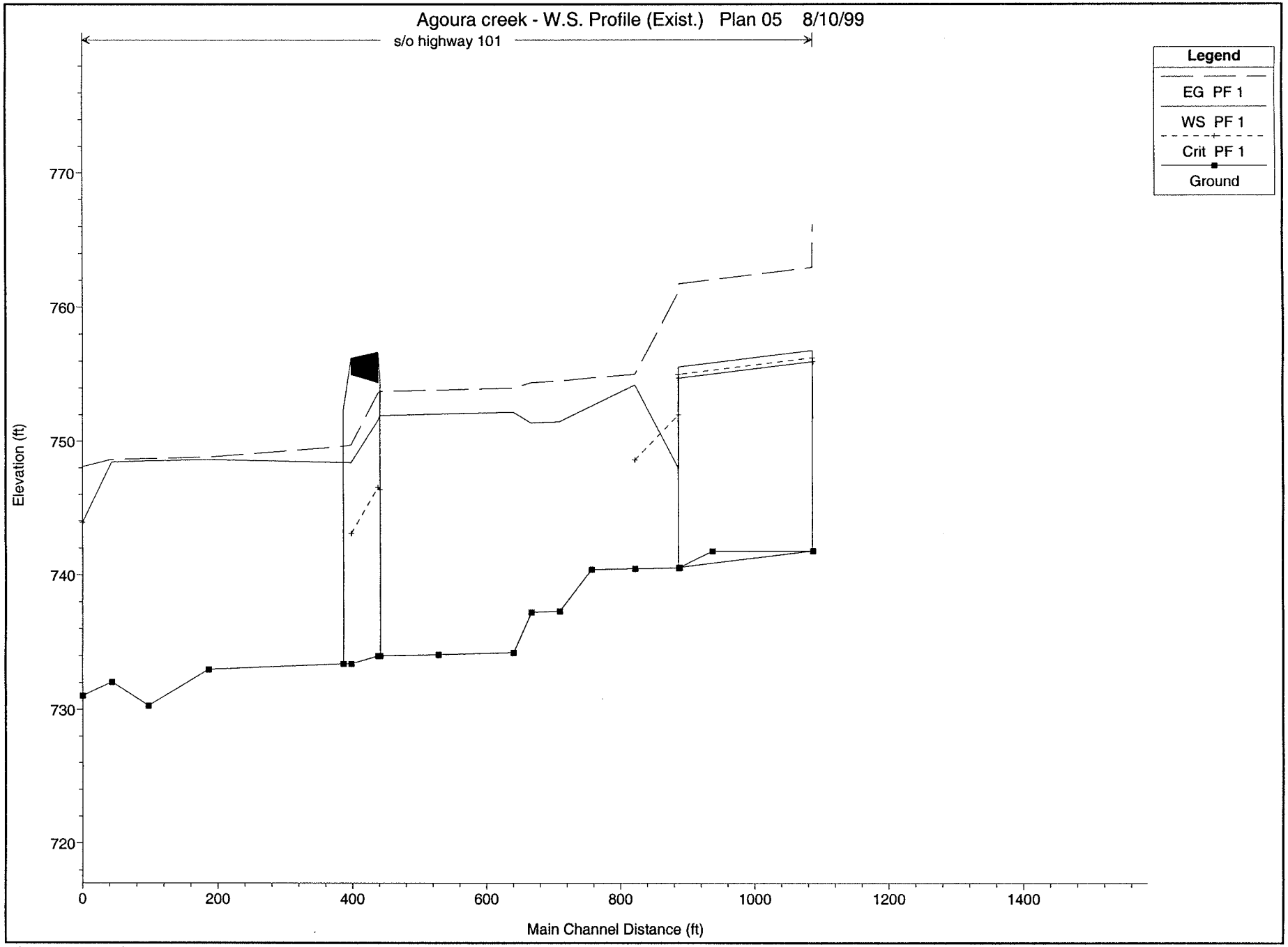
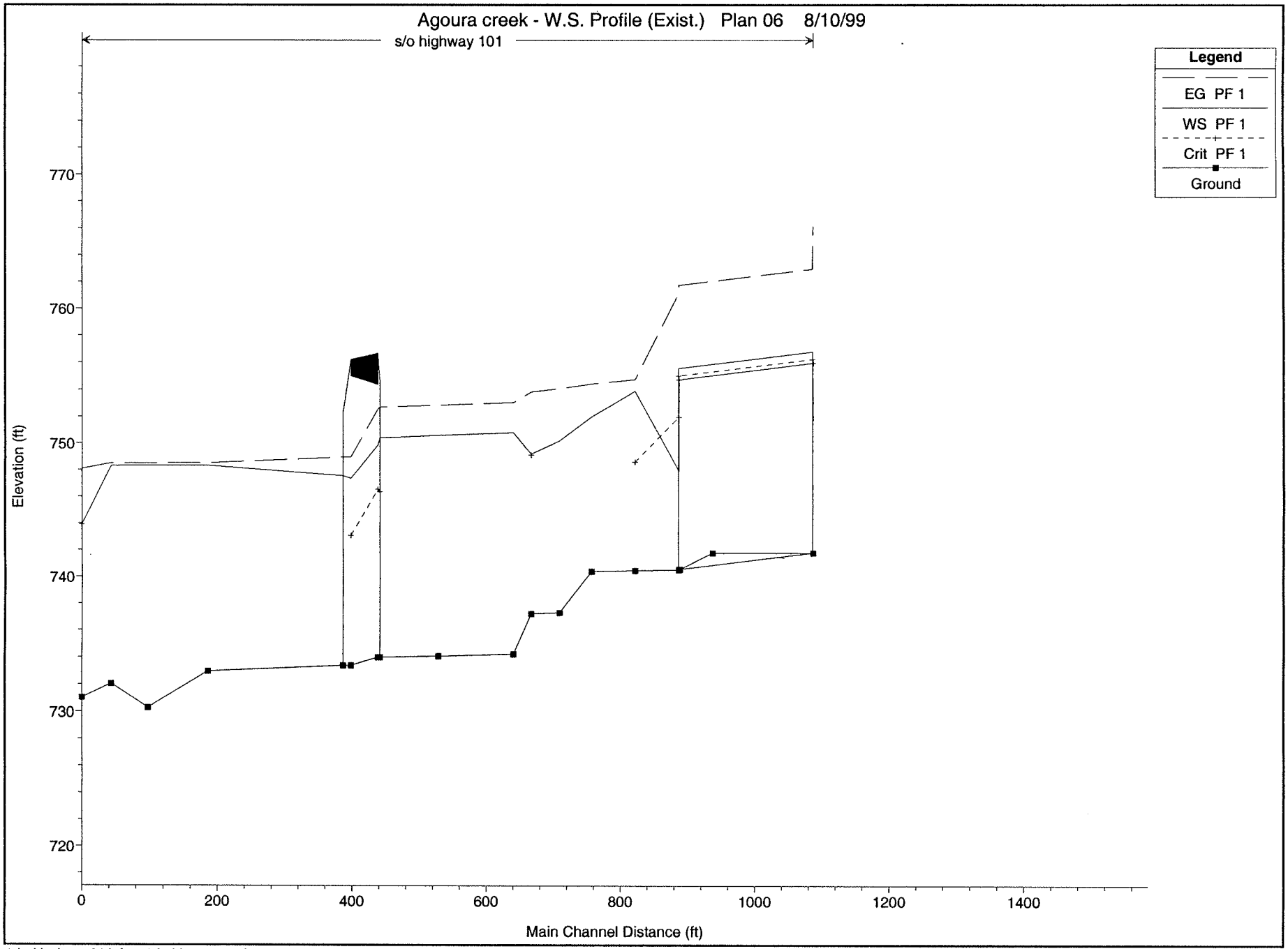
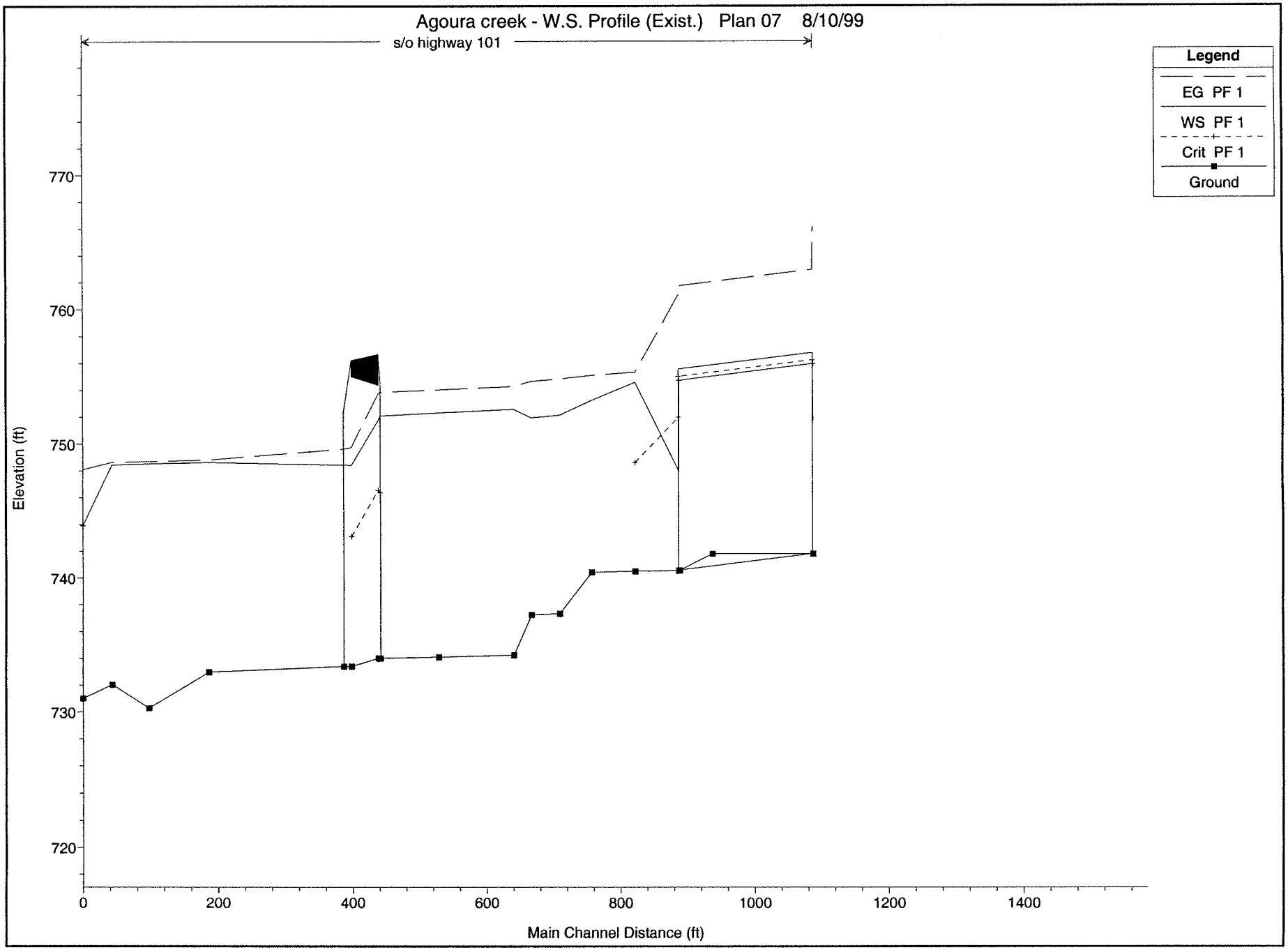


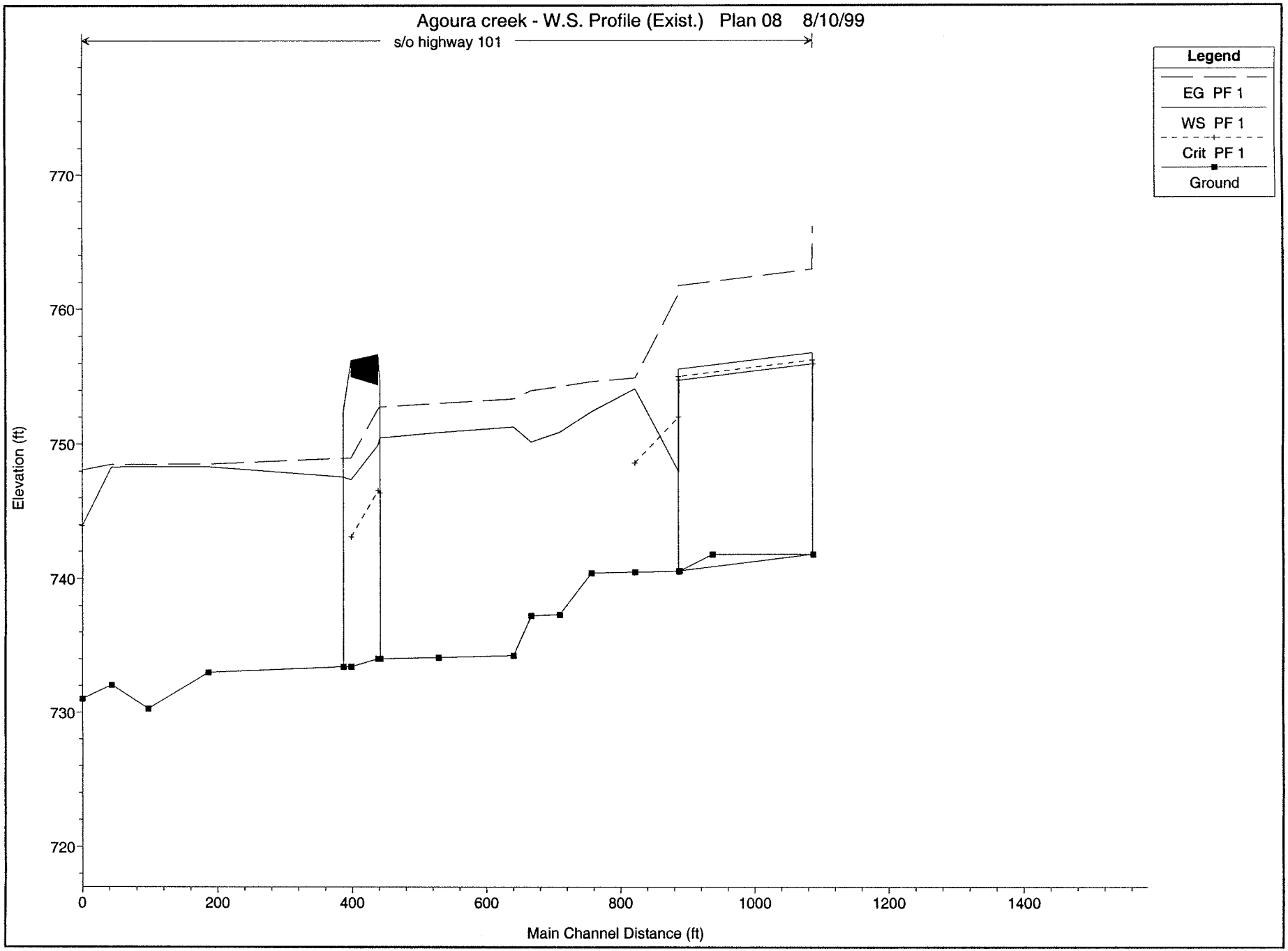
1 in Horiz. = 200 ft 1 in Vert. = 10 ft



1 in Horiz. = 200 ft 1 in Vert. = 10 ft



1 in Horiz. = 200 ft 1 in Vert. = 10 ft



1 in Horiz. = 200 ft 1 in Vert. = 10 ft

APPENDIX "D" – COST ESTIMATES

ASL Consulting Engineers

Project No. 2286.0002.00

RECORD OF ORAL INFORMATION

IN PERSON
TELEPHONE (circled)

Project Name AGOURA ROAD BRIDGE WIDENING OVER LAS VIRGENES CREEK CITY OF CALABASAS, CA

Time 4:00 a.m. / p.m. (p.m. circled)

Date 02/03/1999

Day Tuesday

Contact Mr. MAURICIO DODI

Phone No. (916) 371-5805

Representing MACCAFERRI Gabions, Inc. Fax: (916) 371-0764

Discussion: The following cost data was given by Mr. Dodi on our request for the "concrete channel lining removal" report purpose:

{ 18" thick Gabion — $35.00 / SY
{ 24" thick Gabion — $40.00 / SY

Manning's "n" value suggested = 0.025

(Note: Estimated cost for 18" thick Gabion for the "Calabasas Highlands project" is $130.00 / CY. Application was Gravity Wall (though lesser thickness (18") if a drop structure is provided.

Action:

By RAM

Agoura Road - Removal of Concrete Lining.

1998 Construction Cost Data

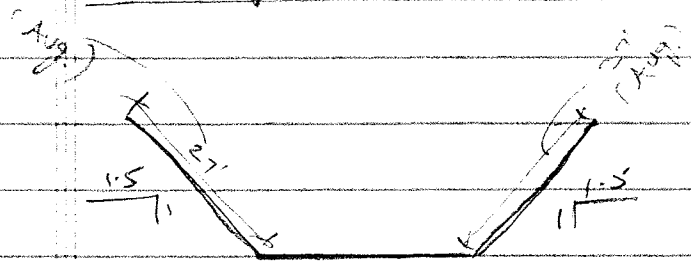
GABION:

Item Code	Description	UNIT	DIST	Qty	Avg. price/unit
722020	Gabion	M^3	7	1,722.0	279.72
		M^3	1	168.2	346.61

Converting the above to English units:

Quantity		Avg. price / unit Quantity		
M^3	ft^3	per m^3	per ft^3	per CY
1722.0	60,765	$279.72	$7.93	$214.11
168.2	5,935	$346.61	$9.82	$265.14

Area of Concrete channel lining to be removed



← 45' → (for a length of 199' - Grill sta. 2+53.61)

← 52' → (@ 2+80.00 up to sta. 3+22.32)

← 65' → (@ sta. 3+70.20 - End of Concrete channel)

(i) Area from sta. 0+54.72 to sta. 2+53.61

$$[(45' + 27' + 27') \times 199'] / 9 = 2,189 \text{ SY.}$$

ENGINEER YSR DATE 08/02/1999 JOB NO. 2286.0002 BY

SUBJECT AGOURA ROAD Bridge Widening over CHECKED BY
Las Virgenes Creek. - Concrete Channel Lining Removal, CALABA

OFFICE IRVINE TELEPHONE

(ii) Area from Sta. 2+53.61 to Sta. 2+80.00
(Transition Section)

$$\left[\left\{\left(\frac{45'+52'}{2}\right)+27'+27'\right\}\times 26.39'\right]\div 9$$

$$= 301 \text{ SY}$$

(iii) Area from Sta 2+80.00 to Sta. 3+22.36

$$\left[(52'+27'+27')\times 42.36\right]\div 9$$

$$= 499 \text{ SY}$$

(iv) Area from Sta. 3+22.36 to Sta. 3+70.21
(Transition section

$$\left[\left\{\left(\frac{52'+65'}{2}\right)+27'+27'\right\}\times 47.85'\right]\div 9$$

$$= 598 \text{ SY}$$

Adding (i) through (iv)

$$= 2,189 + 301 + 499 + 598$$

$$= 3,587 \text{ SY.}$$

ASL Consulting Engineers

SHEET NO. 1 OF

ENGINEER JSR DATE 08/06/1999 JOB NO. 2286.0002.00 BY

SUBJECT AGOURA RD BRIDGE WIDENING OVER LAS VIRGENES CR. CHECKED BY

CONCRETE CHANNEL LINING REMOVAL

OFFICE IRVINE TELEPHONE (949) 727-7099

ARMORFLEX — COST ESTIMATE

Total Area involved = 3,600 sf (32,400 sf)

Area Requiring 6" thick = 2,200 sf (19,800 sf)
"Class 85" Block

Area Requiring 9" thick = 1,400 sf (12,600 sf)
"Class 85" Block

Total Cost of Material and Labour for 6" Block

= 19,800 s.f. x $6.15/sf

= $ 121,770 — (a)

Total Cost of material and Labour for 9" Blk

= 12,600 s.f. x $ 7.75/sf

= $ 97,650 — (b)

Overall cost for Armorflex option

= (a) + (b)

= $ 121,770 + $ 97,650

= $ 219,420 ~ Say $ 220,000

ASL Consulting Engineers

Project No. 2286.0002.00

RECORD OF ORAL INFORMATION

IN PERSON
TELEPHONE (619) 756-3050

Project Name Agoura Rd. Bridge widening over Las Virgenes Creek, City of Calabasas Concrete Channel Removal Report

Time 11:30 a.m. p.m.

Date 08/06/1999

Day Friday

Contact Mr. ERIC FISH

Phone No. (619) 756-3050

Representing EROSION TECHNOLOGY, INC. (Armorflex)

Discussion: The following cost estimate was furnished for Material and Labor.

	Material cost	Film cost	Freight cost	Installation cost	Total cost
Class 85 (6" thick)	$4.00/SF	$0.20/SF	$0.45/SF	$1.50/SF	$6.15/SF
Class 85 (9" thick)	$5.60/SF	$0.20/SF	$0.45/SF	$1.50/SF	$7.75/SF

9" thick Block was suggested for the sketch having Avg. 6% slope (near the location where the Sanitary Sewer line is crossing).

Action:

By RAM

ASL Consulting Engineers

SHEET NO. 1 OF _____

ENGINEER YSR DATE 08/Oct/1997 JOB NO 2286.0002 BY _____

SUBJECT AGOURA ROAD BRIDGE WIDENING OVER LAS VIRGENES CREEK, CITY OF CALABASAS, CA CHECKED BY _____

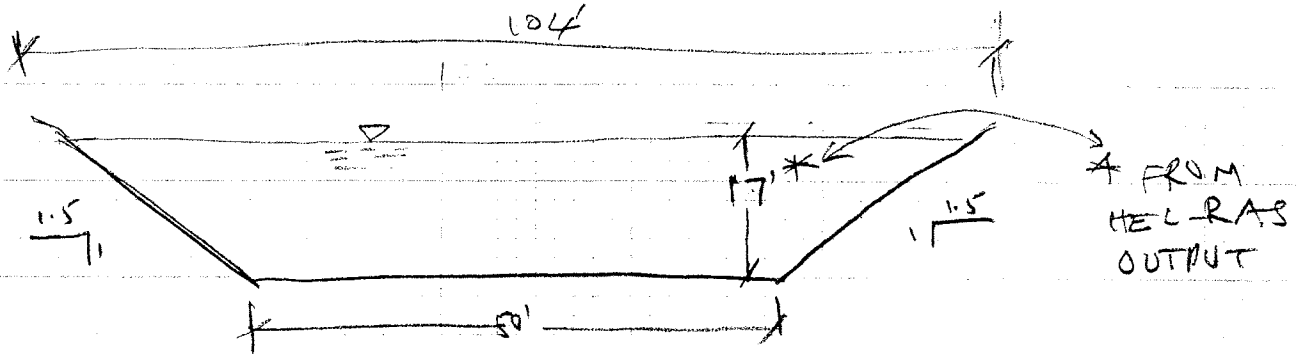
OFFICE _____ TELEPHONE _____

ARMORFLEX LINING:-

DESIGN DISCHARGE (Q) = 14,500 CFS

Avg. Bed slope (S) = 0.052 (5.2%)

(critical distance, taking average slope between sta 2+53.61 to sta. 3+70.21)



* check the availability of chart for Base width, B = 50' *.

Choose Armorflex Class 70s.

Manning's "n" typical value = 0.034

Velocity (V) from HECRAS = 15.7 ft/sec

(Max. Vel. @ STA. 2+80 is considered)

$$R = \frac{A}{P} = \frac{\left[\frac{(50' + 104')}{2} \times 17'\right]}{50' + 30.65' + 30.65'} = 11.76 \text{ ft.}$$

ASL Consulting Engineers

SHEET NO. 2 OF _____

ENGINEER YSR DATE 08/Dec/91 JOB NO. 2236.002 BY _____

SUBJECT AGOURA RD. BRIDGE WIDENING OVER LAS VIRGENES CREEK, CITY OF CALABASAS, CA CHECKED BY _____

OFFICE _____ TELEPHONE _____

ARMORFLEX LINING (Cont'd)

$$VR = 15.7 \times 11.76$$

$$= 184.63$$

Hydraulic Condition for Armorflex Class 70s channel with

$B = 50'$

$Q = 14,500$ cfs

$S = 0.052$

$Z = 1.5H : 1V$

Depth of Flow (D) = 17.0 ft

Velocity (V) = 15.70 ft.

Manning's "n" = 0.034

FEASIBLE ?? (Last message to call back with Mr. ERIC Fish, Geoproducts Co. (619) 756-305

APPENDIX "E" – PERMIT INFORMATION

LOS ANGELES COUNTY REQUIREMENTS

LOS ANGELES COUNTY FLOOD CONTROL DISTRI(

GUIDELINES

for

OVERBUILDING and AIR RIGHTS

PROPERTY MANAGEMENT DIVISION

MARCH 1980

REVISED OCTOBER 1983

PREPARED BY P. d. Emery

SUBMITTED C. J. Will

REVISED BY Fred F. Gharib

APPROVED Howard H. Haile

CONTENTS

GUIDELINES

FOR

OVERBUILDING AND AIR RIGHTS

A. INTRODUCTION

The purpose of these guidelines is to provide information relative to the various possible uses by other parties of the District's rights of way for overbuilding open channels and covered storm drains to create surface areas, to identify and resolve areas of incompatibility, and to provide the basic requirements for specific proposals that will maximize the long-range benefits to the public and the District.

The guidelines recognize that channels and their rights of way, in addition to providing flood protection, have the potential as transportation, utility, and recreational corridors, for overbuilding for public housing development, and are also desired by some communities as open space areas. Requirements are included to protect the District's interest to insure that proper operation and maintenance of the channels and other uses can be accomplished.

Private parties are encouraged to use District's rights whenever a proposal is found to be compatible with District's needs and authorized or planned uses by others. To this end, the District's goal is to allow utilization of its rights of way to the most efficient degree possible.

B. GENERAL REQUIREMENTS

1. Joint Use of Right of Way

Interested public agencies and developers should consult the District at an early stage regarding joint use, the extent of the rights held by the District, and the areas that may be reserved for other public uses. In some instances, competitive bidding for use of the right of way and air rights may be required. In those instances where District's holding is not of sufficient size to be useful in itself and a proposal is received to utilize District's open channel in conjunction with adjoining ownership, a bidding proposal will not be undertaken.

For operating right of way, overbuiding by others will be allowed provided District needs for flood control and all existing foreign uses authorized by the District are protected or provided for as further described in Item 3 below. Proposed uses must accommodate recreational, utility, transportation, public housing, and open space requirements that are programmed for the channel in question.

2. Master Planning

District is developing a Property Use Plan (PUP) for each major flood control channel to insure that the channel rights of way are developed in a manner compatible with the adjoining properties and yield the maximum benefit to the local community. Proposals should be in conformance with the plan; however, if a desired use is different, the applicant will be required to submit a change (amendment) to the plan for approval. An amendment may be acceptable provided the change for a particular reach of channel is between successive streets and approved by the local planning agency. Also, all environmental requirements will have to be fulfilled to the satisfaction of the lead agency.

3. Compatibility

(a) Joint use will have to provide for District's paramount right to use its right of way for flood control purposes and shall not adversely affect design, construction, operation, maintenance, or integrity of District's existing or proposed facilities.

(b) A facility that may affect any non-District installations shall be designed, constructed, operated, and maintained to be compatible with them. All approvals required of other agencies and parties shall be the responsibility of the applicant. District will make its records available regarding other permittees and users of its right of way.

(c) Public agencies needs, including, but not limited to, recreation, transportation, overbuilding for public housing, and open space, either authorized or proposed, will have to be accounted for by joint use. Recreation and transportation standards will be provided by the District for each proposal.

(d) Joint uses will have to comply with all State, County, and local zoning and building regulations. The District wishes to remain a "good neighbor" to the surrounding area and will not allow a use that it or the local community would find objectionable. Therefore, proposals should be aesthetically pleasing, compatible with surrounding areas, conducive to long-term use, and represent good planning.

4. Indemnification and Insurance

Unless otherwise waived by the District, upon a showing of adequate ability to indemnify the District, all users shall furished District a policy of insurance coverage naming the District (and the U.S. Army Corps of Engineers, when applicable) as coinsured. The coverage shall

indemnify the District against any loss or damage as may be required by the District but not less than $250,000/$1,000,000 for public liability and $_____for property damage, all as further described in the lease document to be entered into by applicant. Applicant wil also be required to provide a policy of fire and extended coverage insurance. The amount of the insurance will be dependent on the full replacement value of the channel cover and appurtenant structures.

C. CONSTRUCTION REQUIREMENTS

1. Types of Overbuilding

There are three basic methods of overbuilding (see pages 12, 13, and 14 of Section I). Method "A" is to keep the cover above the channel as low as possible and do away with District access roads and fences. Method "B" is to keep the structure well above the top of the channel so as to allow continuous access to the channel for cleaning and maintenance of the channel, recreational trails, and transportation or utility corridors. In general, Method "A" can be used for channels less than 25 feet wide. Method "B" can be used for channels over 60 feet wide. Method "A" may be used for channels between 25 feet and 60 feet wide if it can be shown to the District's satisfaction that no special side drainage, channel maintenance, recreation, or corridor use problems exist. Method "C" is for building over underground conduits.

2. Criteria for Design and Analysis of Overbuilding

Plans and calculations submitted for overbuilding must be signed by a civil or structural engineer licensed to practice in the State of California.

Cover systems, protective devices, and conduits shall be designed and/or analyzed based on loads and criteria consistent with the intended use of the area, but shall result in a system not less than one meeting the following requirements:

(a) Dead Loads:

Earth Loads:

Vertical and lateral loads are to be in accordance with the District's Structural Design Manual. Overburden must be shown on the drawings.

Structure Loads:

The loads to be used are the actual direct loads or as transmitted through earth fill as determined by a recognized method (e.g. Bousinesq).

(b) Live Loads:

Railroad Bridges or Crossings:

Cooper E Loads are to be determined by servicing or franchised railroad. Distribution of loads and impact is to be as shown in District's Structural Design Manual.

Highway Bridges, Street Crossing, and Ingress and Egress Routes:

HS-20 truck loading with impact in accordance with ASSHTO Standard Specifications for Highway Bridges is to be used.

Parking or Exterior Storage:

A uniform load consistent with type of storage or parking is to be used, 100 psf minimum, plus one HS-20 truck with impact, placed at locations to provide maximum stresses. The uniform load does not have to occupy the area of the truck. Minimum truck impact shall be 10 percent of the live load.

Interior Storage and Other Structures:

The load shall be consistent with use as accepted by the jurisdictional Building Department.

Other Areas not Normally Accessable by Vehicles or Covered by a Structure:

H-15 truck with impact of at least 10 percent is to be used.

(c) Wide and Seismic Loads:

The loads are to be as accepted by the jurisdictional Building Department.

(d) Design Methods and Stresses:

Railroad Bridges or Crossing:

Design is to be in accordance with the AREA Manual for Railroad Engineering.

Highway Bridges, Street Crossings, and Ingress and Egress Routes:

Design is to be in accordance with the AASHTO Standard Specifications for Highway Bridges. Concrete design may be either working stress or strength in accordance with

American Concrete Institute ACI 318 except that load factors for strength design shall be per AASHTO. Concrete structures maintained by the District are to be analyzed using the working stress method only.

All Others:

Design is to be in accordance with the AISC Manual of Steel Construction, Nation Design Specification for stress-grade lumber or ACI 318, as appropriate, nothing that concrete structures maintained by the District are to be analyzed using the working stress method.

(e) Foundations:

Directly on drain:

1) Structure must be removable and not required for stability of the drain.

2) The storm drain must not be over stressed by the structure. An engineering analysis of all elements of the storm drain structure must be submitted. The analysis is to be based on methods and loads shown in the District's Structural Design Manual in addition to surcharge loads due to permit work.

3) Where appropriate, a soil investigation and report will be required.

Independent but Surcharge Drain (including surcharge fill):

1) Same as No. 2 above.

2) The structure must be a minimum of 6 inches horizontally away from any element of the drain, including subdrain pipes. The structure must also be at least 18 inches vertically away from a box conduit, 12 inches vertically away from a pipe conduit, and 3 inches vertically away from an open channel.

3) The foundation must be analyzed by a soils engineer. Analysis is to include a soil investigation and report. Exploratory excavations must extend below foundation. Analysis must also include uplift pressures on the invert where appropriate.

No Effect on Drain:

Same as No. 2 and 3, above (independent but surcharge drain). Piles must be sleeved, as necessary, to prevent drag forces on the drain and bearing areas must be sufficiently deep so as not to produce uplift pressures.

(f) The hydraulic capacity of flood control facility will have to be maintained. Normally, no construction will be allowed below the top of the channel walls if it encroaches within the design freeboard area. Types of structure for the covering will be specified to allow for standardizing the types of construction whenever possible.

(g) The U.S. Army Corps of Engineers is conducting a hydrologic study of various drainage areas. Therefore, any proposed development may have to provide for existing channels to be widened or for channel walls to be heightened. The District will provide information relative to the status and/or requirements of this study or other controls that must be met.

(h) Any proposed development should provide a means for local run-off to enter the channel after said channel has been covered. Side drainage problems also should be investigated where a channel is below the surrounding ground level and existing side drains are inadequate or designed to a lesser frequency than the main channel. In these cases, interested parties will be required to do one or all of the following: (1) construct additional drainage inlets, (2) leave a section of channel uncovered, or (3) use Method "B" for overbuilding (see page 13). Channel covering usually requires that access facilities to the channel invert be constructed also. See Section D, Operational Requirements, for more information.

3. Aesthetic Requirements

Surface structures shall be constructed to be aesthetically compatible with the area and District's facilities based on current standards and economic feasibility. Landscaping or other aesthetic measures may be required to mitigate the impact of structures on its evirons.

D. OPERATIONAL REQUIREMENTS

To optimize safety and insure the hydraulic and structural integrity of a particular flood control channel, the District and the U.S. Army Corps of Engineers have a number of operational requirements that must be met by every joint use proposal. The following is a list of the major requirements. Please note that this list should not be considered complete or absolute. The requirements are:

1. Access into a covered channel is required every 500 feet. This access is usually of a pedestrian nature and could be in the form of manholes, ladders, etc.

2. Adequate clearances must be maintained throughout the channel for the transportation of heavy equipment used in channel repair, bridge and bridge abutment repair, etc.

3. In the event the channel is to be covered, adequate ventilation must be provided to prevent the build-up of noxious or volatile fumes. Metal grates embedded in concrete could accomplish the above and could serve as an inlet for local run-off as well. Another possiblity calls for a short reach of the channel, 30 feet or so, to remain uncovered, thereby aiding channel maintenance and repair in that equipment and material could be lowered into or removed from the channel.

E. RIGHT OF WAY AVAILABILITY

1. Operating Right of Way

(a) Fee Title

Generally, joint uses will be possible along rights of way held in fee by the District. However, there may be legal encumbrances in the form of prior easements, leases, and rental agreements which may have to be cured prior to the proposed joint use. Also, "paper streets" or unused easements for public street purposes may exist. There also may be other conditions, covenants, and restrictions

to the District's title. Since perfecting title is very time-consuming, all proposals for joint use should be submitted as early as possible for right of way clearance.

(b) Much of the District's right of way is in the form of flood control easements. Where long reaches of fee are interspersed with short reaches of easements, it may be economically feasible to acquire the underlying fee.

(c) All costs attendant to perfecting title or acquiring the underlying fee will be borne by the proposed developer or public agency.

2. Excess Right of Way

District has, in addition to its operating right of way, some property holdings, both in fee and easement. In most instances, the fee property can be incorporated into the joint use proposal. For an easement area, approval of the underlying fee owner will be required.

F. OTHER REQUIREMENTS

1. Where the applicant is a private organization, after approval of the concept by the District, for fee-owned rights of way, an agreement to lease (option) will be entered into between District and applicant. This will give the applicant assurance that the right of way is available for consideration by the applicant as to duration and terms.

2. In addition to the General Provisions of District's standard permit to be issued for construction, special provisions may be required because of the nature, design, or location of proposed installation.

3. Construction must commence within six months of date of permit unless otherwise approved by Chief Engineer and be completed in accordance with an approved schedule.

4. Construction work within the channel rights of way involving removal and restoration of the channel structure, excavation, and backfill shall be accomplished during the period April 15 to October 15.

5. As-built drawings and installation of identification markers for subsurface structures will be required by the District. Markers must not be placed so as to interfere with use of District's vehicular service roads.

6. Any relocation of survey monuments defining District's right of way boundaries will be performed by District's surveyors with the permittee underwriting the costs of such relocations.

G. DOCUMENTS

The District will allow overbuilding and use of air rights by a long-term lease over fee-owned property. These lease documents will provide for protection of the District's interest if nonpayment occurs, liability, etc.

The lease will contain requirements that will protect the District's interest and provide for rental income. The District will monitor the lease throughout its term to insure compliance with provisions. The term of the lease will be for a period long enough for a developer to amortize the cost of covering the channel and his construction loan, plus an additional time period (usually ten years) to obtain a return on his investment.

The amortization of the cost to cover the channel may be reflected in the rent. The rent will be based on Fair Rental Value (FRV) of the property. If the appraisal approach considers channel cover as an on-site improvement, there will not be an amortization period for the cost of cover. Periodically, increases in rent based on fixed step increases or changes in the Wholesale Price Index (WPI) or periodic review of FRV, as the situation calls for, will be assessed.

The lease will contain an option period to provide a developer time to complete the environmental considerations, complete the permit process, and obtain a lender.

Where District has easement rights, overbuilding by the underlying fee owner can most likely be handled by permit with some type of mutually agreed upon maintenance agreement. In addition, because the District's easement for flood control purposes is, in some instances, tantamount to having the fee ownership, compensation will be required from the permittee because of the reduction in the District's use of it's right of way to that of an easement for a covered drain; i.e., loss of surface use. Should the permittee be someone other than the underlying fee owner, evidence of approval of the fee owner would also be required.

H. PROCEDURE TO BE FOLLOWED FOR USE OF DISTRICT'S FACILITIES BY OTHERS

1. Prospective users must submit a written application for overbuilding or covering of open channels for proposed surface use and/or air rights use. This application should be addressed to:

Construction

Mr. ~~Edwin C. Teran~~ Robert L. Grindle
Permits Section - 8th Floor
~~Mapping & Property Management~~ Division
Los Angeles County Department of Public Works
900 South Fremont Avenue
Alhambra, CA 91803-1331

Early application, particularly for a major installation, is recommended. The following information is required.

(a) Six sets of preliminary drawings showing the location of the proposed covering, the desired surface use, the existing flood control facilities and stationing, and the District's right of way.
(b) Owner of proposed improvement.
(c) Preliminary construction program.
(d) Required time of land use.

District's review will be to determine the overall acceptability of the proposal and, if readily available, the approximate annual cost for leasing should the District's property be fee owned. If the District responds favorable to this application, a meeting will be arranged with the applicant and representatives of the District's Property Management Division to discuss the criteria to be used for submittal of preliminary plans and general terms for leasing the District's properties and/or maintenance responsibilities.

2. Applicant shall submit six sets of preliminary plans and design calculations, structural and hydraulic, if necessary for approval, and two copies of the Draft Environmental Impact Report (if required by an appropriate authority) when available. At this time, a deposit for the plan review

will be required. The fees for checking of plans for covering of channels, including structural or hydraulic or other review as deemed necessary by the District are based on the current fee schedule adopted by the Board of Supervisors. Presently the fees are: Case I; clear span; actual cost to the District ($500 min.) and Case II; all others; actual cost to the District ($600 min.). After preliminary plans have been approved, a final submittal must be made prior to issuance of construction permit. This final submittal should contain the following:

(a) Four sets of final construction plans signed by a civil or structural engineer licensed to practice in California, showing proposed covering of channel. Plans should show existing improvements (both District and foreign in the construction area) and proposed improvements over proposed covering, District right of way limits, working areas, existing utilities, etc. In connection therewith, applicant will be responsible for inspecting the right of way, searching all available records, and ascertaining all foreign users of the rights of way. The District will aid in providing all its information regarding permits issued by the District.

(b) Inspection fees desposits are based upon estimated actual cost determined by District; should the cost be less, the District will refund the difference. If the cost is more, applicant will submit additional amount.

3. Upon review and approval of the final submittal, and payment of all fees, including deposit for first year's rental for leases, District will issue a construction permit. Approval of construction will be valid only to the extent of District jurisdiction. Also, the District may require a performance bond and liability insurance to protect the District's interest.

4. After the District responds favorably to this application, an Agreement to Lease (option) can be entered into between District and applicant. This commitment will be honored by the District for a period of one full year or longer, if so specified in the Agreement. At this time, the applicant will be required to deposit funds for preparation of the Agreement and the appraisal to determine the annual lease cost. These costs will be credited to applicant in the first year's rent should lease be finalized, otherwise the fees deposited will be waived. Note: In the event the applicant needs to know the cost prior to preparation of preliminary plans and finalization of the lease arrangement, applicant will be required to deposit funds for the District's cost for the work. Cost will be credited for first year's rent as stated above.

5. Applicant may proceed with construction under terms and conditions of the permit. Construction must be initiated within one year of the date of issuance of permit unless otherwise approved by the Chief Engineer.

6. The District will prepare the appropriate document or lease, in accordance with the terms of the Agreement previously entered into.

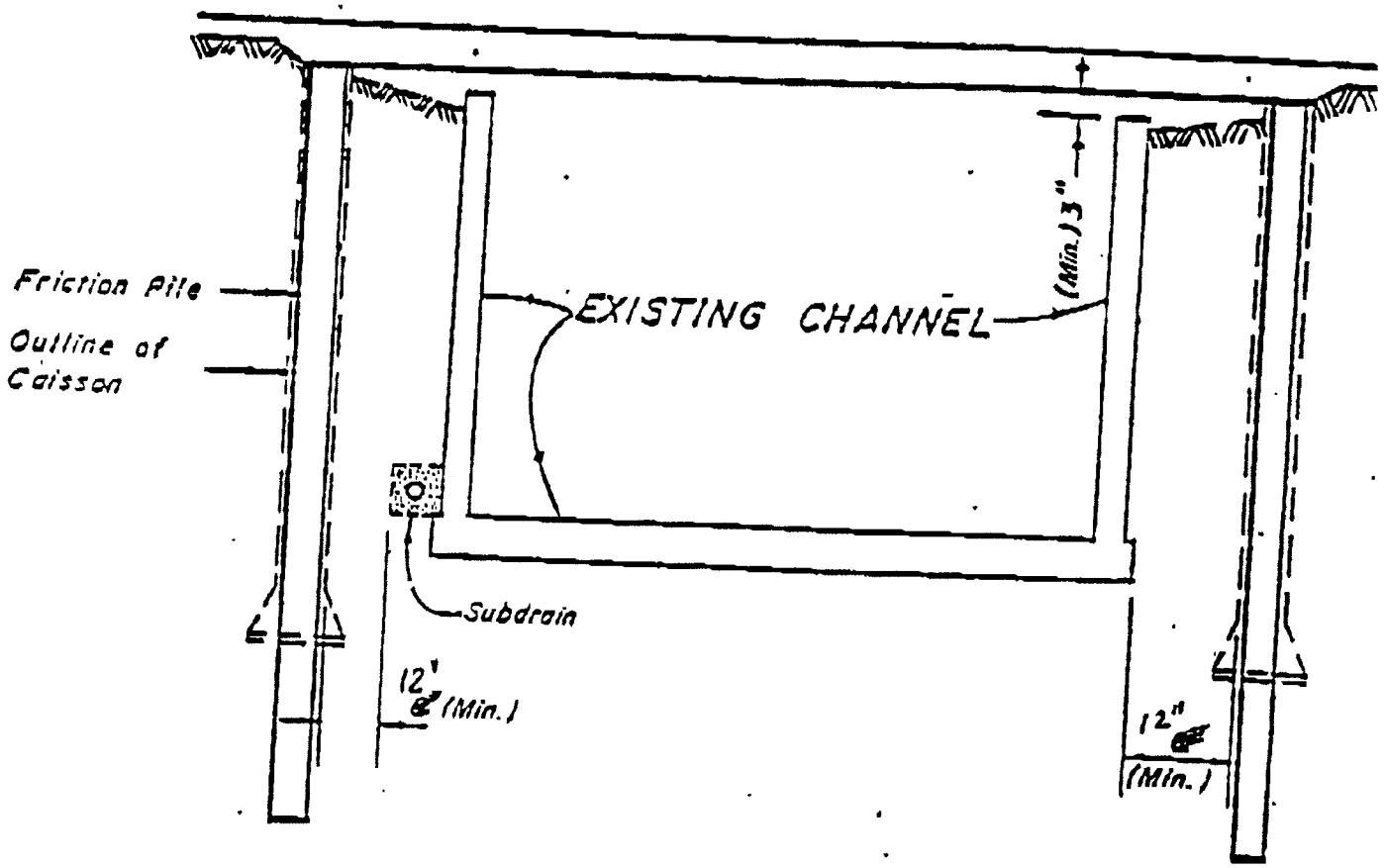
7. Upon completion of construction, one set of reproducibile as-built drawings shall be submitted to the District within 180 days.

8. In the event time warrants, one document only.(lease) may be used for the right of way negotiations. The document should be fully executed (signed by both parties) prior to submittal of final plans and before a construction permit is issued. Execution of the lease first is satisfactory with District provided applicant understands and accepts the fact that the plan review and issuance of the permit takes 30 to 60 days to complete. If there is a deadline for the applicant, the plans should include this time period.

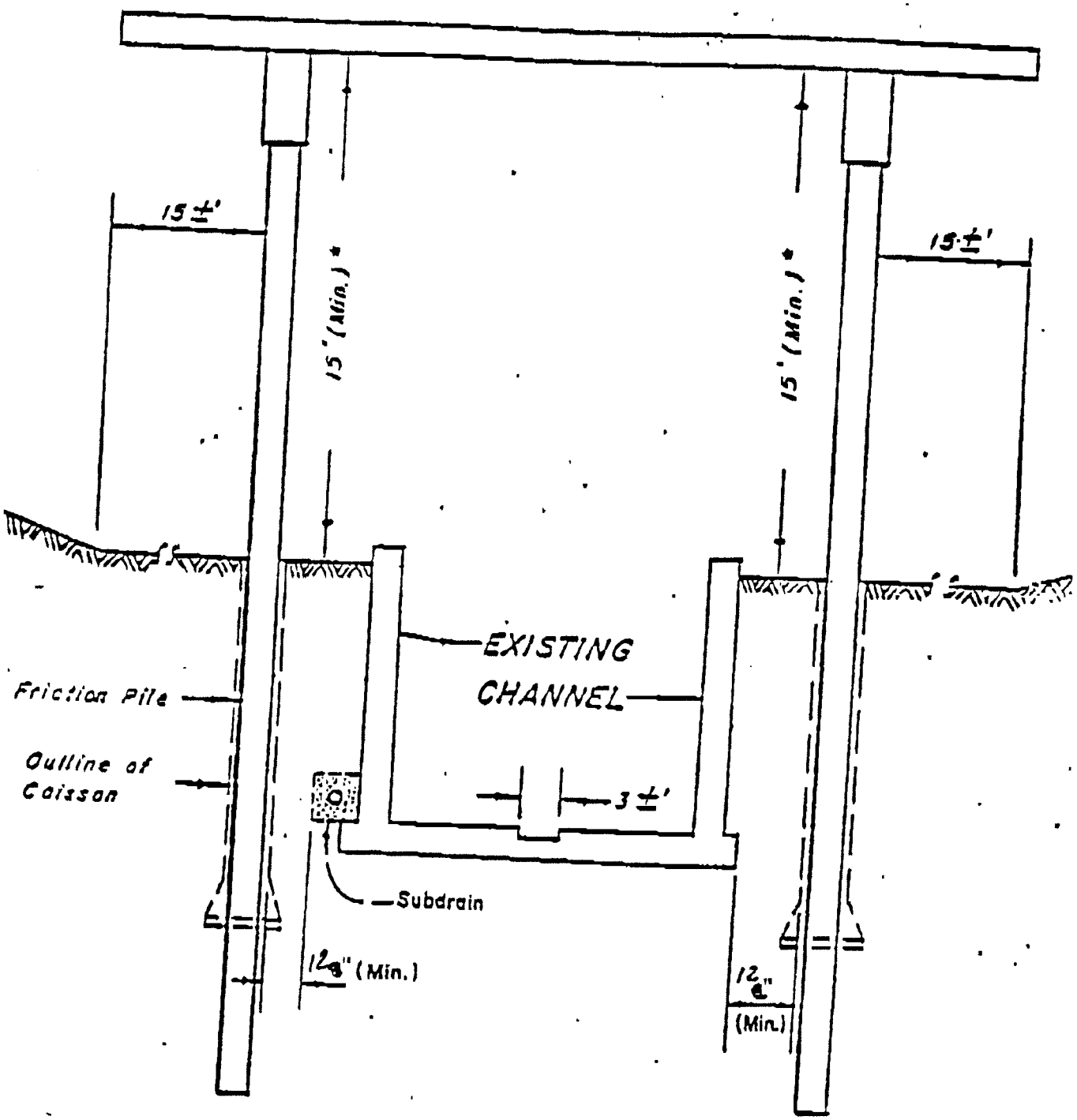
TYPES OF OVERBUILDING

METHOD A

I. Appendix



METHOD B

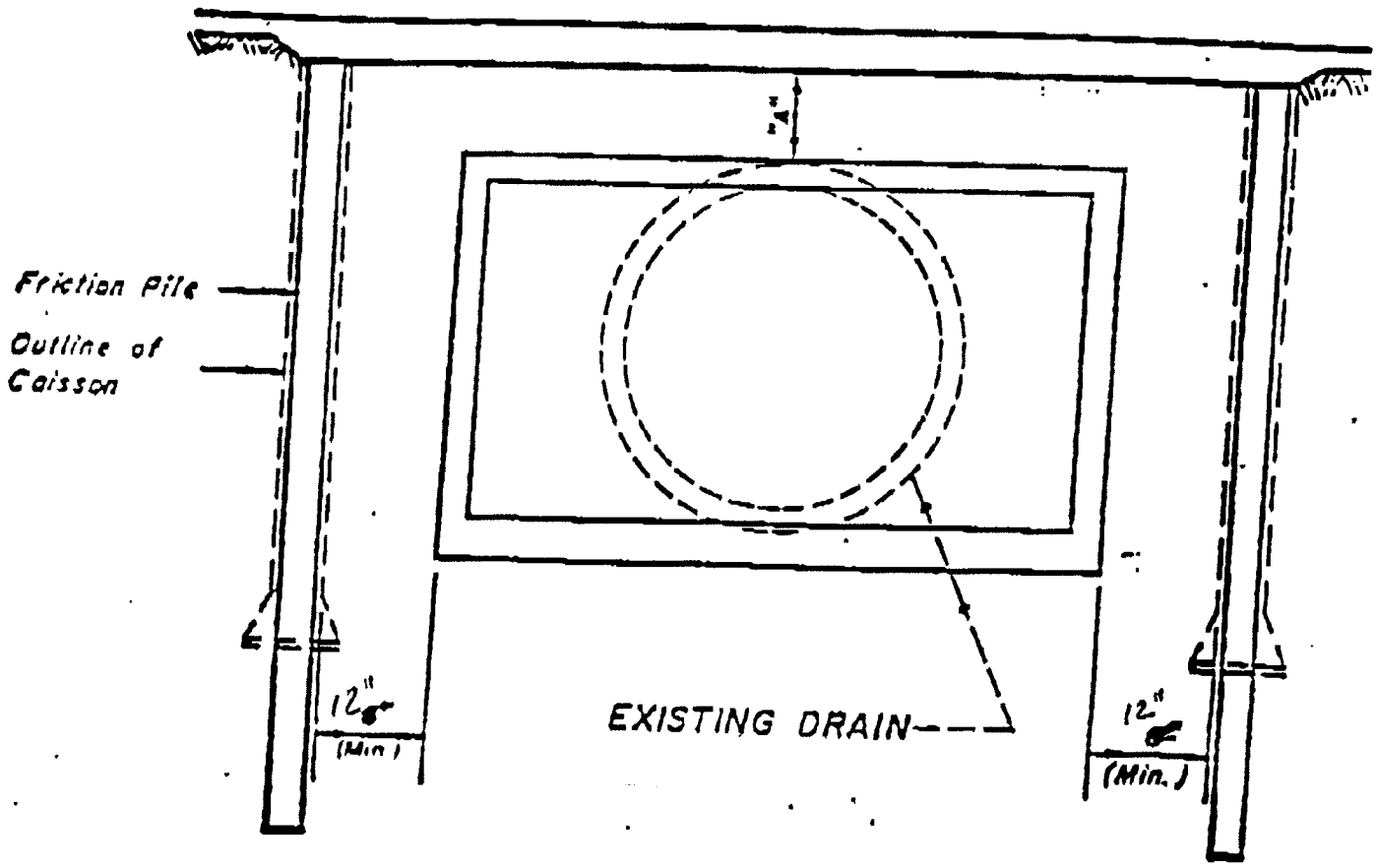


* Actual height requirement to be determined by District.

TYPES OF OVERBUILDING

METHOD C

I. Appendix



"A" 18" min for Box Conduit

"A" 12" min. for Pipe Conduit

W// WORK IN THE CHANN..

ADDITIONAL PROVISIONS FOR PERMIT NUMBER CHANWRK

1 . During the storm season, from October 15 to April 15:

a. No portion of the channel shall be obstructed.
b. No openings in the channel invert or side wall will be permitted.(W1)

2 . During the period from April 15 to October 15, falsework and cofferdams may be placed and excavations made in the channel. However, capacity to convey flows around any obstructions or openings in the channel lining shall be provided as follows:

April 15 to May 31- one-third channel capacity/Area
June 1 to August 31- 5 percent of channel capacity/Area
September 1 to Octobe~~r~~ 75 one-third channel capacity/Area

The above criterion must be determined by hydraulic calculations. Preliminary information regarding the methods for performing these calculations may be obtained before preparation of cofferdams or falsework by contacting the U.S. Army Corps of Engineers, Operations Branch, at (213) 894-4926. For purposes of computing the area of an obstruction, dimensions shall be taken normal to channel flow and two feet added to the faces of the obstructions.(W2)

3 . Plans and calculations of any falsework or cofferdam to be placed within the channel waterway area must be submitted to this District for review and approval at least 30 days prior to installation.(W3)

4 . Permittee is advised that the proposed construction is located downstream of _____ Dam, from which releases are made occasionally. Therefore, permittee shall contact the District's Water Conservation/Hydraulic Division, Operations Unit, at (818) 458-6177, before obstructing or removing a portion of the channel. Approval of District's representative for removal or obstruction must be obtained at least 24 hours in advance of initiating work.(W4)

5 . Permittee shall obtain a five-day clear weather forecast before conducting any operations within the channel and shall work only when no rain is forecast for the next five days, as determined by the District's inspector. Operations and access to the channel invert are specifically prohibitted during rainfall or excessive storm flow. Once operations under this permit are intiated, work shall be conducted in a dilligent manner until completed. The permittee shall not hold the District responsible for any damage due to flows within the channel.(W5)

FALSE WORK REVIEW 3 WEEK TIME

1601 STREAMBED ALTERNATION AGREEMENT

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

(See attachment/enclosure for instructions)

_ 1601 (Public) Extraction	_ 1603 (Private)	_ Timber Harvest Plan	_ Commercial Gravel

Applicant Information

	Name	Address	Telephone Number
Applicant			Business: Fax:
Operator			Business: Fax:
Contractor (if known):			Business: Fax:
Contact Person (if not applicant):			Business: Fax:
Property Owner:			Business: Fax:

Project Information

County	Assessor's Parcel Number	Section	Range	Township	USGS Map

Name of River, Stream, or Lake:					
Tributary To?					
Proposed Start Date:	Proposed Completion Date:	Project Cost (*see instructions*)	$	Number of Stream Encroachments (Timber Harvest Plans Only):	

Attachments/Enclosures

Please attach or enclose the following documents listed below and check the boxes of the documents attached or enclosed.

_ Project Description (below)	_ Map showing the location of the project, including distances	_ Construction plans pertaining to the project

Please attach or enclose the following documents listed below, if applicable, and check the boxes of the documents
attached or enclosed.

Completed CEQA documents:	_ Environmental Impact Report _ Negative Declaration _ Mitigated Negative Declaration _ Notice of Exemption
Copies of all applicable local, State, or federal permits, agreements, or other authorizations:	_ Local. Describe: _ State. Describe: _ Federal. Describe:

Name of Applicant: _____

Project Description

Please describe your project or activity in detail below and, if necessary, on separate attached pages.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

___ Continued on separate page(s)

I hereby certify that all information contained in this notification is true and correct and that I am authorized to sign this document. I understand that in the event this information is found to be untrue or incorrect, I may be subject to civil or criminal prosecution and the Department may consider this notification to be incomplete and/or cancel any Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand that this notification is valid only for the project described herein and that I may be subject to civil or criminal prosecution for undertaking a project that differs from the one described herein, unless I have notified the Department of that project in accordance with section 1601 or 1603 of the Fish and Game Code.

I understand that a Department representative may need to inspect the property where the project

described herein will take place before issuing a Lake or Streambed Alteration Agreement pursuant to this notification. In the event the Department determines that a site inspection is necessary, I hereby authorize the Department to enter the property where the project described herein will take place to inspect the property at any reasonable time and certify that I am authorized to grant the Department permission to access the property.

___I request the Department to first contact me at (insert telephone number)

_____

to schedule a date and time to enter the property where the project described herein will take place and understand that this may delay the Department's evaluation of the project described herein.

_____ Operator or Operator's

_____

Representative Date

For Department Use Only			
Notification No.:	Date Received:	Fees enclosed?	_ Yes $ _ No
Notification Complete?	_ Yes. 5-day letter sent on (date):	_ No. Notification materials and application fee returned on (date):	
Notes:			

FG 2023 (Rev. 4/28/99)

Instructions For Completing Notification of Lake or Streambed Alteration Form (FG 2023)

In order to notify the Department of Fish and Game (Department) of a proposed project or activity that may impact a river, stream, or lake as required by Fish and Game Code sections 1601 and 1603, you will need to complete a Lake or Streambed Alteration Notification Form (FG 2023) and submit it to the Department with any attachments or enclosures, a completed project questionnaire (FG 2024), and the appropriate fees.

You should provide as much detail as possible so the Department can properly evaluate your project or activity to determine whether a Lake or Streambed Alteration Agreement is required. The Department will not begin processing your application unless your notification package is complete. Below are instructions to assist you in completing the notification form.

Step 1: Please mark the appropriate box at the top of the notification form.

__1601 (Public) — Mark this line if you represent a state or local governmental agency or public utility.

__1603 (Private) — Mark this line if you do not represent a state or local government agency or public utility.

__Timber Harvest Plan — Mark this line if the proposed project or activity is part of a timber harvest plan.

__Commercial Gravel Operation — Mark this line if the proposed project or activity involves the commercial mining or extraction of gravel or aggregate materials.

Step 2: Please provide the following information:

Applicant — The name, address, telephone and facsimile number of the person, business, or agency who is completing the notification form on behalf of the operator and is knowledgeable about the proposed project or activity.

Operator — The name, address, telephone and facsimile number of the person, business, or agency who will sign and be responsible for complying with the terms and conditions of any Lake or Streambed Alteration Agreement that is issued pursuant to the notification, if different from the applicant.

Contractor — The name, address, telephone and facsimile number of the person, business, operator, or the state or local government agency or public utility the operator represents, has hired or will be hiring to complete the project or activity, if known. If a contractor has not been hired, you may leave the "name", "address", and "telephone number" boxes blank. If the operator will be completing the project or activity, indicate this in the "name" box.

Jim Steele, Branch Chief
1416 9th St.
Sacramento, CA 95814
(916) 653-4375

Contact Person — The name, address, telephone and facsimile number of the person the Department should contact regarding the proposed project or activity, if different from the operator.

Property Owner — The name, address, telephone and facsimile number of the owner of the property where the project or activity will take place, if different from the operator.

Step 3: Please provide the following information:

County — The name of the county where your project or activity will take place.

Assessor's Parcel Number — The Assessor's Parcel Number of the property on which your project or activity will take place, if known.

Section, Range, and Township — The section, range, and township number of the property on which the project or activity will take place if the property is in a remote area.

USGS Map — The name of the United States Geological Survey 7.5 minute quadrangle map that includes the property on which your project or activity will take place, if known.

Name of River, Stream, or Lake — The name of the river, stream, or lake in which or near where your proposed project or activity will take place.

Tributary To? — The name of the watercourse or waterbody to which the above river, stream, or lake is tributary.

Proposed Start and Completion Dates — The month, year, and, if known, day, you propose to begin and complete the project or activity.

Estimated Project Cost — The estimated cost to complete the project or activity. For purposes of this section, "project" refers only to that part of the project that will impact a river, stream, or lake, and not the entire project. After you determine your estimated project cost, you can refer to the enclosed fee schedule to determine whether you will need to submit a fee in addition to your non-refundable application fee, and if so, the amount of the additional fee. Please note, you may be required to submit information that demonstrates the cost of the project or activity.

Number of Stream Encroachments — You shall provide this information only if your proposed project or activity is part of a timber harvest plan. You should use this number to determine the fee you will need to submit with your completed notification package.

Step 4: Please attach or enclose the following documents with your notification package and mark each box showing the document that is attached or enclosed.

_Project description.

_A map showing the location where the project or activity will take place. The map should include distances, known landmarks, access roads, and any other information that would allow a person not familiar with the area to find the project site.

_Construction plans pertaining to the proposed project or activity. Construction plans pertaining to the

proposed project or activity may be in the form of blueprints, structural designs, diagrams, or sketches.

Step 5: Please attach or enclose the following documents if applicable and mark the box for the document that is attached or enclosed.

Completed CEQA documents, where an agency other than the Department is the lead agency for the project or activity:

_Environmental Impact Report,

_Negative Declaration,

_Mitigated Negative Declaration, or

_Notice of Exemption

Copies of local, State, or federal permits, agreements, or other authorizations, where applicable:

_Local = Include the name or a brief description of the permit, agreement, or authorization.

_State — Include the name or a brief description of the permit, agreement, or authorization.

_Federal — Include the name or a brief description of the permit, agreement, or authorization.

Step 6: Please provide a detailed description of the proposed project or activity, including: a description of where the project or activity will take place in reference to known landmarks; the type of equipment that will be used to complete the project or activity; anticipated impacts on wetland and/or riparian vegetation and fish and wildlife resources, if any; and site conditions both before and after the project or activity is completed. You should continue this information on attached separate pages, if necessary, and *include the name of the operator and river, stream, or lake at the top of each attachment.* If the project or activity is part of a timber harvest plan, please identify the plan in the project description.

Step 7: The operator or the operator's authorized representative must sign and date the notification form in the space provided at the bottom of the second page of the form. If the owner of the property, where the proposed project or activity will take place, does not consent to having a Department representative inspect the property, without first scheduling an inspection date and time, you should mark the box above the signature line and provide a daytime telephone number. You should also mark this box if a locked gate prevents access to the property or the property owner or the property owner's representative needs to be present when the Department representative visits the property. Please note that if the Department will need to schedule a date and time to inspect the property, this may delay the Department's evaluation of the proposed project or activity.

Step 8: Complete the enclosed Project Questionnaire form (FG 2024). The operator or the operator's authorized representative must sign and date the questionnaire.

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Lake and Streambed Alteration Program
Notification Instructions

This document provides step-by-step instructions on how to notify the Department of Fish and Game (Department) before beginning a proposed project or activity that may impact a river, stream, or lake, where notification is required. For more detailed information on the Department's Lake and Streambed Alteration Program, you should refer to the enclosed "Questions and Answers" or contact the Department's regional office (see below) where your proposed project or activity will take place.

A. Introduction

Section 1603 of the Fish and Game Code requires any person who proposes a project or activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed to notify the Department before beginning the project or activity. Similarly, section 1601 of the Fish and Game Code requires a state or local governmental agency or public utility to notify the Department before it begins a construction project that will: 1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; 2) use materials from a streambed; or 3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

Notification is generally required for any project or activity that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. If you are not certain that you need to notify the Department before you begin your proposed project or activity, the Department recommends that you submit a complete notification package or request the Department to pre-consult with you about your project or activity. Pre-consultation is discussed in the enclosed "Questions and Answers".

After the Department receives your completed notification package, it will determine whether you will need a Lake or Streambed Agreement for your project or activity. You will need to obtain an agreement if the Department determines that your project or activity may substantially adversely affect existing fish or wildlife resources. A Lake or Streambed Alteration Agreement is a written document signed by you or your representative and the Department that includes a description of your project or activity and project conditions necessary to protect fish or wildlife resources.

Please note that if your proposed project or activity is subject to review under the California Environmental Quality Act (CEQA) (Pub. Resources Code, 21000-21177), the Department will not be able to sign the agreement until after the CEQA review process is completed. The purpose of CEQA is to allow agencies, the public, and other interested parties to review and comment on a project or activity before it is approved by the "lead agency".

If the Department is the "lead agency" for your project or activity, and your project or activity is not exempt under CEQA, you will need to submit an initial deposit of $750 to the Department after it develops a draft Lake or Streambed Alteration Agreement to cover its initial CEQA review costs. The Department will refund any unused deposit amount to you. This minimum deposit and any further CEQA-related costs will be in addition to the fees listed in the fee schedule for Lake or Streambed Alteration Agreements that the Department charges to review your notification package and develop a draft Lake or Streambed Alteration Agreement. As the applicant, you will be responsible for all CEQA-related costs the Department incurs in reviewing your project or activity. By working with the Department in developing a draft Lake or Streambed Alteration Agreement that addresses potential project impacts on fish or wildlife resources prior to CEQA review, you should be able to minimize your CEQA-related costs. The process for obtaining a final agreement is discussed in the enclosed "Questions and Answers".

B. Notifying the Department

In order to notify the Department of a project or activity described above, and for the Department to determine whether you will need a Lake or Streambed Alteration Agreement for your proposed project or activity, you will need to complete the following steps:

Step 1: Complete the following enclosed forms:

_Notification of Lake or Streambed Alteration form (FG 2023) (instructions for completing this form are also enclosed)

_Project Questionnaire form (FG 2024)

Step 2: Attach or enclose the following documents listed on the notification form (FG 2023):

_ Project description

_ A map showing the location of the project, including distances

_Construction plans pertaining to the project

_If applicable, a copy of one of the following documents prepared pursuant to CEQA:

- Environmental Impact Report
- Negative Declaration
- Mitigated Negative Declaration
- Notice of Exemption

_If applicable, copies of any local, State, or federal permits for your proposed project or activity. You should contact your city and county planning departments first to determine whether you need to obtain any local permits for your project or activity. The State and federal agencies listed below may also have some permitting authority over your project or activity. The Department recommends that you contact these agencies if you are not familiar with their permitting requirements.

State agencies

- Resources Agency (for State-designated "wild and scenic" rivers)
- Department of Forestry
- State Water Resources Control Board
- Regional Water Quality Control Boards
- Reclamation Board
- Coastal Commission
- State Lands Commission
- Department of Water Resources, which includes the Division of Safety of Dams, Division of Water Rights, and Division of Mines and Geology

Federal agencies

- Army Corps of Engineers
- Forest Service
- Fish and Wildlife Service
- National Park Service
- National Marine Fisheries Service

Step 3: Attach or enclose any information or documents that support or relate to your responses in the questionnaire (FG 2024).

Step 4: Determine the fees you will need to submit with your completed notification package by referring to the enclosed fee schedule. Please note that these fees cover the Department's costs to process applications and develop Lake and Streambed Alteration Agreements. If your project or activity needs to be reviewed under CEQA, you will be responsible for paying any CEQA-related costs in addition to the fees you submit with your completed notification package.

Step 5: Submit the above completed forms, attachments or enclosures, and applicable fees to the Department's regional office in the area where your project or activity will take place. A map showing the location and jurisdiction of each regional office is enclosed. Their mailing addresses and telephone numbers are as follows:

North California and North Coast (Region 1)
601 Locust Street
Redding, CA 96001
(530) 225-2300

Sacramento Valley and Central Sierra (Region 2)
1701 Nimbus Road
Rancho Cordova, CA 95670
(916) 358-2900

Central Coast (Region 3) P.O. Box 47
Yountville, CA 94599
(707) 944-5500

San Joaquin Valley and Southern Sierra (Region 4)
1234 East Shaw Avenue
Fresno, CA 93710

(209) 243-4005

South Coast (Region 5)
330 Golden Shore, Suite 50
Long Beach, CA 90802
(562) 590-5880

Eastern Sierra and Inland Deserts (Region 6)
330 Golden Shore, Suite 50
Long Beach, CA 90802
(562) 590-5880

C. Processing Your Notification

After the Department receives your notification package, it will determine whether it is complete. If you do not provide the Department with the information it needs to evaluate your proposed project or activity and include the appropriate fees, the Department may consider your notification to be incomplete. If this occurs, the Department may return your notification materials and any fees you included and specify the information or materials you will need to provide the Department when you resubmit your notification and fees.

Please note that your notification is not effective unless it is complete. As a result, in order to avoid any potential delay, it is important that you fill out the notification form (FG 2023) and questionnaire (FG 2024) completely and accurately and submit these forms to the appropriate Department regional office with all applicable attachments or enclosures, any other information that will assist it in evaluating your proposed project or activity, and the appropriate fees.

After the Department determines that your notification package is complete, it will assign your notification to field staff and inform you by letter that it will be evaluating your proposed project or activity to determine whether you will need a Lake or Streambed Alteration Agreement. *Please note that you may not begin your project or activity until after the Department notifies you whether you will need a Lake or Streambed Alteration Agreement.* In some instances, the Department may need to conduct an onsite inspection to make this determination.

If the Department notifies you that you will need a Lake or Streambed Alteration Agreement, you may not begin your project or activity until the Department develops a draft Lake or Streambed Alteration Agreement and, if required, the project described in that agreement is reviewed and approved under CEQA. If the project described in the draft agreement is subject to CEQA, the Department cannot issue a final Lake or Streambed Alteration Agreement until after the project is reviewed under CEQA. Please note again that you will be responsible for paying any CEQA-related costs the Department incurs and that these costs are in addition to the fees listed in the enclosed fee schedule. The process and timelines for developing a draft agreement and the CEQA review process are discussed in the enclosed "Questions and Answers".

* * *

Thank you for taking the time to learn about the notification requirements under the Department's Lake and Streambed Alteration Program. If you have any questions regarding the above instructions and information or any aspect of the Department's Lake and Streambed Alteration Program, or you are

unable to provide the information described above, please contact the Department's regional office in the area where your project or activity will take place.

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FISH AND GAME CODE

SECTION 1600-1607

1600. The protection and conservation of the fish and wildlife resources of this state are hereby declared to be of utmost public interest. Fish and wildlife are the property of the people and provide a major contribution to the economy of the state as well as providing a significant part of the people's food supply and therefore their conservation is a proper responsibility of the state. This chapter is enacted to provide such conservation for these resources.

1601. (a) Except as provided in this section, general plans sufficient to indicate the nature of a project for construction by, or on behalf of, any state or local governmental agency or any public utility shall be submitted to the department if the project will (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, (2) use material from the streambeds designated by the department, or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the department. If an existing fish or wildlife resource may be substantially adversely affected by that construction, the department shall notify the governmental agency or public utility of the existence of the fish or wildlife resource together with a description thereof and shall propose reasonable modifications in the proposed construction that will allow for the protection and continuance of the fish or wildlife resource, including procedures to review the operation of those protective measures. The department's description of an existing fish or wildlife resource shall be specific and detailed and the department shall make available upon request the information upon which its conclusion is based that the resource may be substantially adversely affected. The proposals shall be submitted within 30 days from the date of receipt of the plans, except that the time period may be extended by mutual agreement. Upon a determination by the department and after notice to the affected parties of the necessity for an onsite investigation or upon the request for an onsite investigation by the affected parties, the department shall make an onsite investigation of the proposed construction and shall make the investigation before it proposes any modifications.

(b) (1) Within 14 days from the date of receipt of the department' s proposals, the affected agency or public utility shall notify the department in writing whether the proposals are acceptable, except that the time period may be extended by mutual agreement. If the department's proposals are not acceptable to the affected agency or public utility, the agency or public utility shall so notify the department. Upon request, the department shall meet with the affected agency or public utility within seven days of receipt of the notification, or at a time mutually agreed upon, for the purpose of developing proposals that are acceptable to the department and the affected agency or public utility.

(2) If mutual agreement is not reached at the meeting held pursuant to paragraph (1), a panel of arbitrators shall be established. The panel of arbitrators shall be established within seven days from the date of the meeting, or at a time mutually agreed upon, and shall be composed of one representative of the department, one representative of the affected agency or public utility, and a third person mutually agreed upon or, if no agreement can be reached, the third person shall be appointed in the manner provided by Section 1281.6 of the Code of Civil Procedure. The third person shall act as chair of the panel. The panel may settle disagreements and make binding decisions regarding the fish and wildlife modifications. The arbitration shall be completed within 14 days from the date that the composition of the panel is established, unless the time is extended by mutual agreement. The expenses of the department representative shall be paid by the department; the expenses of the representative of the governmental agency or the public utility shall be paid by the governmental agency or the public utility; and the expenses of the chair of the panel shall be paid one-half by each party.

(c) A governmental agency or public utility proposing a project subject to this section shall not commence operations on that project until the department has found that the project will not substantially adversely affect an existing fish or wildlife resource or until the department's proposals, or the decisions of a panel of arbitrators, have been incorporated into the project. The department shall not condition the streambed alteration agreement on a project subject to this section on the receipt of another state or federal permit.

(d) The department shall determine and specify types of work, methods of performance, or remedial measures that are exempt from this section.

(e) With regard to any project that involves the routine maintenance and operation of water supply, drainage, flood control, or waste treatment and disposal facilities, notice to, and agreement with, the department is not required subsequent to the initial notification and agreement, unless the work as described in the agreement is substantially changed or conditions affecting fish and wildlife resources substantially change, and the resources are adversely affected by the activity conducted under the agreement. This subdivision

applies in any instance where notice to, and agreement with, the department has been attained prior to January 1, 1977.

(f) (1) Except as provided in paragraph (2), this section does not apply to any of the following projects:

(A) Immediate emergency work necessary to protect life or property.

(B) Immediate emergency repairs to public service facilities necessary to maintain service as a result of a disaster in a disaster-stricken area in which a state of emergency has been proclaimed by the Governor pursuant to Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code.

(C) Emergency projects undertaken, carried out, or approved by a public agency to maintain, repair, or restore an existing highway, as defined in Section 360 of the Vehicle Code, except for a highway designated as an official state scenic highway pursuant to Section 262 of the Streets and Highways Code, within the existing right-of-way of the highway, damaged as a result of fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide, within one year of the damage. Work needed in the vicinity above and below a highway may be conducted outside of the existing right-of-way if it is needed to stop ongoing or recurring mudslides, landslides, or erosion that pose an immediate threat to the highway or to restore those roadways damaged by mudslides, landslides, or erosion to their predamage condition and functionality. This subparagraph does not exempt from this section any project undertaken, carried out, or approved by a public agency to expand or widen a highway damaged by fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide.

(2) The agency or public utility performing the project shall notify the department within 14 days from the date of commencement of a project exempted by this subdivision.

(3) For purposes of this subdivision, "emergency" means an emergency, as defined in Section 21060.3 of the Public Resources Code.

(g) The department may enter into agreements with applicants for a term of not more than five years for the performance of operations on projects subject to this section. The terms of the agreement may be renegotiated at any time by mutual consent of the parties. Each agreement shall be renewed automatically by the department at the expiration of its term unless the department determines that there has been a substantial change in conditions. If there is a disagreement between the department and the applicant as to whether there has been a substantial change in conditions, the department and the applicant shall proceed to arbitration pursuant to subdivision (b). The department may charge a fee when the agreement is entered into and for each renewal, but may not charge an annual fee for this purpose.

1602. In addition to the provisions of Section 1601, the department, following submission of the modifications referred to in Section 1601, shall by mutual agreement with any state agency proposing such project, establish such procedures that the parties deem necessary to provide adequate review of the proposed modifications and consideration of alternative conditions designed to protect existing fish and wildlife resources. If no agreement can be reached between the department and the state agency proposing the project, the procedures for arbitration specified in Section 1601 shall then apply.

1603. (a) It is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds, without first notifying the department of that activity, except when the department has been notified pursuant to Section 1601. The department, within 30 days from the date of receipt of that notice, or within the time determined by mutual written agreement, shall, when an existing fish or wildlife resource may be substantially adversely affected by that activity, notify the person of the existence of that fish or wildlife resource together with a description of the fish or wildlife, and shall submit to the person its proposals as to measures necessary to protect fish and wildlife. Upon a determination by the department of the necessity for onsite investigation or upon the request for an onsite investigation by the affected parties, the department shall notify the affected parties that it shall make an onsite investigation of the activity and shall make that investigation before it proposes any measure necessary to protect the fish and wildlife. The department's description of an existing fish or wildlife resource shall be specific and detailed and the department shall make available upon request the information upon which its conclusion is based that the resource may be substantially adversely affected.

(b) (1) Within 14 days from the date of receipt of the department's proposals, the affected person shall notify the department in writing whether the proposals are acceptable, except that the time period may be extended by mutual agreement. If the department's proposals are not acceptable to the affected person, the person shall so notify the department. Upon request, the department shall meet with the affected person within seven days

from the date of receipt of that notification or by a date that may be mutually agreed upon for the purpose of developing proposals that are acceptable to the department and the affected person.

(2) If mutual agreement is not reached at the meeting held pursuant to paragraph (1), a panel of arbitrators shall be established. However, appointment of the panel may be deferred by mutual consent of the parties. The panel shall be established within seven days from the date of that meeting and shall be composed of one representative of the department, one representative of the affected person, and a third person mutually agreed upon or, if no agreement can be reached, the third person shall be appointed in the manner provided by Section 1281.6 of the Code of Civil Procedure. The third person shall act as panel chair. The panel may settle disagreements and make binding decisions regarding fish and wildlife modifications. The arbitration shall be completed within 14 days from the date that the composition of the panel is established, unless the time period is extended by mutual agreement. The expenses of the department representative shall be borne by the department; the expenses of the representative of the person who diverts or obstructs the natural flow, or changes the bed, of any river, stream, or lake, or uses any material from the streambeds shall be borne by that person; and the expenses of the chair of the panel shall be paid one-half by each party.

(c) It is unlawful for any person to commence any activity affected by this section until the department has found that it will not substantially adversely affect an existing fish or wildlife resource or until the department's proposals, or the decisions of a panel of arbitrators, have been incorporated into the activity. If the department fails to act within 30 days from the date of the receipt of the notice, the person may commence the activity. The department shall not condition the streambed alteration agreement on the receipt of another state or federal permit.

(d) It is unlawful for any person to engage in an activity affected by this section, unless the activity is conducted in accordance with the department's proposals or the decisions of the panel of arbitrators.

(e) If an activity involves the routine maintenance and operation of water supply, drainage, flood control, or waste treatment and disposal facilities, notice to and agreement with the department shall not be required subsequent to the initial notification and agreement unless the work as described in the agreement is substantially changed or conditions affecting fish and wildlife resources substantially change and those resources are adversely affected by the activity conducted under the agreement. This subdivision applies in any instance where notice to, and agreement with, the department has been attained prior to January 1, 1977.

(f) (1) Except as provided in paragraph (2), this section does not apply to any of the following projects:

(A) Immediate emergency work necessary to protect life or property.

(B) Immediate emergency repairs to public service facilities necessary to maintain service as a result of a disaster in a disaster-stricken area in which a state of emergency has been proclaimed by the Governor pursuant to Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code.

(C) Emergency projects undertaken, carried out, or approved by a public agency to maintain, repair, or restore an existing highway, as defined in Section 360 of the Vehicle Code, except for a highway designated as an official state scenic highway pursuant to Section 262 of the Streets and Highways Code, within the existing right-of-way of the highway, damaged as a result of fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide, within one year of the damage. Work needed in the vicinity above and below a highway may be conducted outside of the existing right-of-way if it is needed to stop ongoing or recurring mudslides, landslides, or erosion that pose an immediate threat to the highway or to restore those roadways damaged by mudslides, landslides, or erosion to their predamage condition and functionality. This subparagraph does not exempt from this section any project undertaken, carried out, or approved by a public agency to expand or widen a highway damaged by fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide.

(2) The person performing the project shall notify the department within 14 days from the date of commencement of a project exempted by this subdivision.

(3) For purposes of this subdivision, "emergency" means an emergency, as defined in Section 21060.3 of the Public Resources Code.

(g) The department may enter into agreements with applicants for a term of not more than five years for the performance of activities subject to this section. The terms of the agreement may be renegotiated at any time by mutual consent of the parties. Each agreement shall be renewed automatically by the department at the expiration of its term unless the department determines that there has been a substantial change in conditions. If there is a disagreement between the department and the applicant as to whether

there has been a substantial change in conditions, the department and the applicant shall proceed to arbitration pursuant to subdivision (b). The department may charge a fee when the agreement is entered into and for each renewal, but may not charge an annual fee for this purpose.

1603.1. (a) Every person who violates Section 1603 is subject to a civil penalty of not more than twenty-five thousand dollars ($25,000) for each violation.

(b) The civil penalty imposed for each separate violation pursuant to this section is separate, and in addition to, any other civil penalty imposed for a separate violation pursuant to this section or any other provision of law.

(c) In determining the amount of any civil penalty imposed pursuant to this section, the court shall take into consideration the nature, circumstance, extent, and gravity of the violation. In making this determination, the court may consider the degree of toxicity and volume of the discharge, whether the effects of the violation may be reversed or mitigated, and with respect to the defendant, the ability to pay, the effect of any civil penalty on the ability to continue in business, any voluntary cleanup efforts undertaken, any prior history of violations, the gravity of the behavior, the economic benefit, if any, resulting from the violation, and any other matters the court determines justice may require.

(d) Every civil action brought under this section shall be brought by the Attorney General upon complaint by the department, or by the district attorney or city attorney in the name of the people of the State of California, and any actions relating to the same violation may be joined or consolidated.

(e) In any civil action brought pursuant to this chapter in which a temporary restraining order, preliminary injunction, or permanent injunction is sought, it is not necessary to allege or prove at any stage of the proceeding any of the following:

(1) That irreparable damage will occur if the temporary restraining order, preliminary injunction, or permanent injunction is not issued.

(2) The remedy at law is inadequate. The court shall issue a temporary restraining order, preliminary injunction, or permanent injunction in a civil action brought pursuant to this chapter without the allegations and without the proof specified in this paragraph or paragraph (1).

(f) All civil penalties collected pursuant to this section shall not be considered fines or forfeitures as defined in Section 13003 and shall be apportioned in the following manner:

(1) Fifty percent shall be distributed to the county treasurer of the county in which the action is prosecuted. Amounts paid to the county treasurer shall be deposited in the county fish and wildlife propagation fund established pursuant to Section 13100.

(2) Fifty percent shall be distributed to the department for deposit in the Fish and Game Preservation Fund. These funds may be expended to cover the costs of any legal actions or for any other law enforcement purpose consistent with Section 9 of Article XVI of the California Constitution.

1603.3. The department shall provide all applicants for an agreement pursuant to Section 1601 or 1603 with a cover letter which sets forth all of the following information:

(a) The time period for review of the application.

(b) An explanation of the applicant's right to object to conditions proposed by the department.

(c) The time period within which objections may be made in writing by the applicant to the department.

(d) The time period within which the department is required to respond to the applicant's objections, and that the response must be in writing.

(e) An explanation of the right of the applicant to appeal the department's imposition of conditions for the agreement, including the right to arbitration.

(f) The procedures for arbitration and the timelines set forth in statute for using the arbitration procedure, including, but not limited to, information about the payment requirements for the arbitrator's fees.

(g) The current fee schedule for obtaining the agreement, including, but not limited to, an explanation of how the fees are calculated.

1603.5. The department may enter into an agreement with any person, state or local governmental agency, or any public utility, for projects in the Napa River watershed in accordance with a watershed management plan developed by the Napa Resource Conservation District. Notice to, and agreement with, the department is not required for a project subsequent to the initial agreement pursuant to this subdivision, unless the work as described in the agreement is substantially changed, or conditions affecting fish and wildlife resources substantially change, and those resources are adversely affected by the activity conducted under the agreement.

1604. Any party affected by a decision made by an arbitration panel pursuant to Section 1601 or 1603 may petition a court of competent jurisdiction for confirmation, correction, or vacation of the decision in accordance with the provisions of Chapter 4 (commencing with Section 1285) of Title 9 of Part 3 of the Code of Civil Procedure.

1605. Any governmental agency, state or local, or public utility which intends to specify any location of possible construction material such as borrow pits or gravel beds, for the use in any construction project undertaken on its behalf which would be subject to this chapter, shall include in any notice inviting bids, any modifications or conditions established pursuant to Section 1601 of this code.

1606. Persons submitting timber harvesting plans under provisions of Section 4581 of the Public Resources Code may consider that notification to the department as required in Section 1603 has been given, provided, however, the following information is provided in the contents of such plan:

(a) The volume, type, and equipment to be used in removing or displacing any one or combination of soil, sand, gravel or boulders.
(b) The volume of water, intended use, and equipment to be used in any water diversion or impoundment, if applicable.
(c) The equipment to be used in road or bridge construction.
(d) The type and density of vegetation to be affected and an estimate of the area involved.
(e) A diagram or sketch of the location of the operation which clearly indicates the stream or other water and access from a named public road. Locked gates shall be indicated. The compass direction must be shown.
(f) A description of the period of time in which operations will be carried out.

1607. (a) The director may establish a schedule of fees to be charged to any entity or person subject to this chapter. The fees charged shall be established in an amount necessary to pay the total costs incurred by the department in preparing and submitting proposals and conducting investigations pursuant to this chapter and administering and enforcing this chapter. Fees received pursuant to this section shall be deposited in the Fish and Game Preservation Fund as a reimbursement.

(b) Pursuant to subdivision (a), the department shall establish the fees in an amount not less than fifty dollars ($50) or more than two thousand four hundred dollars ($2,400), as adjusted pursuant to Section 713.

Los Angeles District Regulatory Branch Project Managers

North Coast Section

Los Angeles Office

Aaron Allen	213-452-3413	aallen@spl.usace.army.mil	Los Angeles & Kern Counties
Terry Ely	213-452-3412	terrij@spl.usace.army.mil	Los Angeles County
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Ventura Field Office

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South Coast Section

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Spencer MacNeil	213-452-3418	smacneil@spl.usace.army.mil	Riverside County & Aliso Creek
Robert Smith	213-452-3419	rsmith@spl.usace.army.mil	Riverside & San Diego Counties
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San Diego Field Office

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Mark Tucker	858-674-5385	mtucker@spl.usace.army.mil	San Diego County
David Zoutendyk	858-674-5384	dzoutendyk@spl.usace.army.mil	San Diego County & Bolsa Chica

Seven Oaks Dam Office

Antal Szijj	909-794-7704	aszijj@spl.usace.army.mil	San Bernardino, Riverside, and Imperial Counties

Arizona Section

Phoenix Office

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Larry Flatau	602-640-5385x225	lflatau@spl.usace.army.mil	Coconino, Maricopa, & Yavapai Counties
Ron Fowler	602-640-5385x226	rfowler@spl.usace.army.mil	Apache, Gila, Greenlee, Maricopa, Navajo, Yuma, & Pinal Counties
Sallie McGuire	602-640-5385x221	smcguire@spl.usace.army.mil	
C. Ann Palaruan	602-640-5385x227	cpalaruan@spl.usace.army.mil	Maricopa County

Tucson Office

Marjorie Blaine	520-670-5021	mblaine@spl.usace.army.mil	

Los Angeles District Regulatory Branch Offices

Los Angeles Office (Mailing)	P.O. Box 532711, Los Angeles, CA 90017-3401	213-452-3425
Los Angeles Office (Physical)	911 Wilshire Blvd., 11th Floor, Los Angeles, 90017-3401	213-452-3425
Ventura Field Office	2151 Alessandro Drive, Suite 255, Ventura, CA 93001	805-641-1127
San Diego Field Office	16885 W. Bernardo Drive, Suite 300A, San Diego, CA 92127	858-674-5387
Seven Oaks Dam Office	32330 Santa Ana Canyon Road, Highland, CA 92346	909-794-7704
Phoenix Office	3636 N. Central Ave., Suite 760, Phoenix, AZ 85012-1936	602-640-5385
Tucson Office	5205 E. Comanche St., Davis Monthan AFB, AZ 85707	520-670-5021

Los Angeles District Regulatory Branch Offices

Los Angeles Office (Mailing)	P.O. Box 532711, Los Angeles, CA 90017-3401	213
Los Angeles Office (Physical)	911 Wilshire Blvd., 11th Floor, Los Angeles, 90017-3401	213
Ventura Field Office	2151 Alessandro Drive, Suite 255, Ventura, CA 93001	805
San Diego Field Office	16885 W. Bernardo Drive, Suite 300A, San Diego, CA 92127	858
Seven Oaks Dam Office	32330 Santa Ana Canyon Road, Highland, CA 92346	909
Phoenix Office	3636 N. Central Ave., Suite 760, Phoenix, AZ 85012-1936	602
Tucson Office	5205 E. Comanche St., Davis Monthan AFB, AZ 85707	520

NPDES PERMIT APPLICATION and INFORMATION

INTRODUCTION

This application package constitutes a Report of Waste Discharge (ROWD) pursuant to California Water Code Section 13260. Section 13260 states that persons discharging or proposing to discharge waste that could affect the quality of the waters of the State, other than into a community sewer system, shall file a ROWD containing information which may be required by the appropriate Regional Water Quality Control Board (RWQCB).

This package is to be used to start the application process for all waste discharge requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permits* issued by a RWQCB except:

a) Those landfill facilities that must use a joint Solid Waste Facility Permit Application Form, California Integrated Waste Management Board Form E-1-77; and
b) General WDRs or general NPDES permits that use a Notice of Intent to comply or specify the use of an alternative application form designed for that permit.

This application package contains:

1. Application/General Information Form for WDRs and NPDES Permits [Form 200 (10/97)].
2. Application/General Information Instructions.

Instructions

Instructions are provided to assist you with completion of the application. If you are unable to find the answers to your questions or need assistance with the completion of the application package, please contact your RWQCB representative. *The RWQCBs strongly recommend that you make initial telephone or personal contact with RWQCB regulatory staff to discuss a proposed new discharge before submitting your application.* The RWQCB representative will be able to answer procedural and annual fee related questions that you may have. (See map and telephone numbers inside of application cover.)

All dischargers regulated under WDRs and NPDES permits must pay an annual fee, except dairies, which pay a filing fee only. The RWQCB will notify you of your annual fee based on an evaluation of your proposed discharge. Please do NOT submit a check for your first annual fee or filing fee until requested to do so by a RWQCB representative. Dischargers applying for reissuance (renewal) of an existing NPDES permit or update of an existing WDR will be billed through the annual fee billing system and are therefore requested NOT to submit a check with their application. Checks should be made payable to the State Water Resources Control Board.

Additional Information Requirements

A RWQCB representative will notify you within 30 days of receipt of the application form and any supplemental documents whether your application is complete. If your application is incomplete, the RWQCB representative will send you a detailed list of discharge specific information necessary to complete the application process. The completion date of your application is normally the date when all required information, including the correct fee, is received by the RWQCB.

*** NPDES PERMITS:** If you are applying for a permit to discharge to surface water, you will need an NPDES permit which is issued under both State and Federal law and may be required to complete one or more of the following Federal NPDES permit application forms: Short Form A, Standard Form A, Forms 1, 2B, 2C, 2D, 2E, and 2F. These forms may be obtained at a RWQCB office or can be ordered from the National Center for Environmental Publications and Information at (513) 891-6561.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

INSTRUCTIONS

FOR COMPLETING THE APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR: WASTE DISCHARGE REQUIREMENTS/NPDES PERMIT

If you have any questions on the completion of any part of the application, please contact your RWQCB representative. A map of RWQCB locations, addresses, and telephone numbers is located on the reverse side of the application cover.

I. FACILITY INFORMATION

You must provide the factual information listed below for ALL owners, operators, and locations and, where appropriate, for ALL general partners and lease holders.

A. FACILITY:
Legal name, physical address including the county, person to contact, and phone number at the facility. (**NO P.O. Box numbers!** If no address exists, use street and nearest cross street.)

B. FACILITY OWNER:
Legal owner, address, person to contact, and phone number. Also include the owner's Federal Tax Identification Number.

OWNER TYPE:
Check the appropriate Owner Type. The legal owner will be named in the WDRs/NPDES permit.

C. FACILITY OPERATOR (The agency or business, not the person):
If applicable, the name, address, person to contact, and telephone number for the facility operator. Check the appropriate Operator Type. If identical to B. above, enter "same as owner".

D. OWNER OF THE LAND:
Legal owner of the land(s) where the facility is located, address, person to contact, and phone number. Check the appropriate Owner Type. If identical to B. above, enter "same as owner".

E. ADDRESS WHERE LEGAL NOTICE MAY BE SERVED:
Address where legal notice may be served, person to contact, and phone number. If identical to B. above, enter "same as owner".

F. BILLING ADDRESS
Address where annual fee invoices should be sent, person to contact, and phone number. If identical to B. above, enter "same as owner".

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check the appropriate box to describe whether the waste will be discharged to: A. Land, or B. Surface Water.

Check the appropriate box(es) which best describe the activities at your facility.

Hazardous Waste - **If you check the Hazardous Waste box,** STOP **and contact a representative of the RWQCB for further instructions.**

Landfills - **A separate form, APPLICATION FOR SOLID WASTE FACILITY PERMIT/WASTE DISCHARGE REQUIREMENTS, California Integrated Waste Management Board Form E-1-77, may be required. Contact a RWQCB representative to help determine the appropriate form for your discharge.**

III. LOCATION OF THE FACILITY

1. Enter the Assessor's Parcel Number(s) (APN), which is located on the property tax bill. The number can also be obtained from the County Assessor's Office. Indicate the APN for both the facility and the discharge point.

2. Enter the Latitude of the entrance to the proposed/existing facility and of the discharge point. Latitude and longitude information can be obtained from a U.S. Geological Survey quadrangle topographic map. Other maps may also contain this information.

3. Enter the Longitude of the entrance to the proposed/existing facility and of the discharge point.

IV. REASON FOR FILING

NEW DISCHARGE OR FACILITY:
A discharge or facility that is proposed but does not now exist, or that does not yet have WDRs or an NPDES permit.

CHANGE IN DESIGN OR OPERATION:
A material change in design or operation from existing discharge requirements. Final determination of whether the reported change is material will be made by the RWQCB.

CHANGE IN QUANTITY/TYPE OF DISCHARGE:
A material change in characteristics of the waste from existing discharge requirements. Final determination of whether the reported change would have a significant effect will be made by the RWQCB.

CHANGE IN OWNERSHIP/OPERATOR:
Change of legal owner of the facility. Complete Parts I, III, and IV only and contact the RWQCB to determine if additional information is required.

WASTE DISCHARGE REQUIREMENTS UPDATE OR NPDES PERMIT REISSUANCE:
WDRs must be updated periodically to reflect changing technology standards and conditions. A new application is required to reissue an NPDES permit which has expired.

OTHER:
If there is a reason other than the ones listed, please describe the reason on the space provided. (If more space is needed, attach a separate sheet.)

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

It should be emphasized that communication with the appropriate RWQCB staff is vital before starting the CEQA documentation, and is recommended before completing this application. There are Basin Plan issues which may complicate the CEQA effort, and RWQCB staff may be able to help in providing the needed information to complete the CEQA documentation.

Name the Lead Agency responsible for completion of CEQA requirements for the project, i.e., completion and certification of CEQA documentation.

Check YES or NO. Has a public agency determined that the proposed project is exempt from CEQA?
If the answer is YES, state the basis for the exemption and the name of the agency supplying the exemption on the space provided. (Remember that, if extra space is needed, use an extra sheet of paper, but be sure to indicate the attached sheet under Section VII. Other.)

Check YES or NO. Has the "Notice of Determination" been filed under CEQA? If YES, give the date the notice was filed and enclose a copy of the Notice of Determination and the Initial Study, Environmental Impact Report, or Negative Declaration. If NO, check the box of the expected type of CEQA document for this project, and include the expected date of completion using the timelines given under CEQA. The date of completion should be taken as the date that the Notice of Determination will be submitted. (If not known, write "Unknown")

VI. OTHER REQUIRED INFORMATION

To be approved, your application MUST include a COMPLETE characterization of the discharge. If the characterization is found to be incomplete, RWQCB staff will contact you and request that additional specific information be submitted.

This application MUST be accompanied by a site map. A USGS 7.5' Quadrangle map or a street map, if more appropriate, is sufficient for most applications.

VII. OTHER

If any of the answers on your application form need further explanation, attach a separate sheet. Please list any attachments with the titles and dates on the space provided.

VIII. CERTIFICATION

Certification by the owner of the facility or the operator of the facility, if the operator is different from the owner, is required. The appropriate person must sign the application form.
Acceptable signatures are:

1. **for a corporation,** a principal executive officer of at least the level of senior vice-president;
2. **for a partnership or individual (sole proprietorship),** a general partner or the proprietor;
3. **for a governmental or public agency,** either a principal executive officer or ranking elected/appointed official.

DISCHARGE SPECIFIC INFORMATION

In most cases, a request to supply additional discharge specific information will be sent to you by a representative of the RWQCB. If the RWQCB determines that additional discharge specific information is not needed to process your application, you will be so notified.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

I. FACILITY INFORMATION

A. Facility:

Name:			
Address:			
City:	County:	State:	Zip Code:
Contact Person:		Telephone Number:	

B. Facility Owner:

Name:			Owner Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other: _____
Address:			
City:	State:	Zip Code:	
Contact Person:	Telephone Number:	Federal Tax ID:	

C. Facility Operator (The agency or business, not the person):

Name:			Operator Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other: _____
Address:			
City:	State:	Zip Code:	
Contact Person:	Telephone Number:		

D. Owner of the Land:

Name:			Owner Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other: _____
Address:			
City:	State:	Zip Code:	
Contact Person:	Telephone Number:		

E. Address Where Legal Notice May Be Served:

Address:		
City:	State:	Zip Code:
Contact Person:	Telephone Number:	

F. Billing Address:

Address:		
City:	State:	Zip Code:
Contact Person:	Telephone Number:	

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☐ **A. WASTE DISCHARGE TO LAND** ☐ **B. WASTE DISCHARGE TO SURFACE WATER**

Check all that apply:

- ☐ Domestic/Municipal Wastewater Treatment and Disposal
- ☐ Cooling Water
- ☐ Mining
- ☐ Waste Pile
- ☐ Wastewater Reclamation
- ☐ Other, please describe: _____
- ☐ Animal Waste Solids
- ☐ Land Treatment Unit
- ☐ Dredge Material Disposal
- ☐ Surface Impoundment
- ☐ Industrial Process Wastewater
- ☐ Animal or Aquacultural Wastewater
- ☐ Biosolids/Residual
- ☐ Hazardous Waste (see instructions)
- ☐ Landfill (see instructions)
- ☐ Storm Water

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	2. Latitude	3. Longitude
Facility:	**Facility:**	**Facility:**
Discharge Point:	**Discharge Point:**	**Discharge Point:**

IV. REASON FOR FILING

- ☐ New Discharge or Facility
- ☐ Change in Design or Operation
- ☐ Change in Quantity/Type of Discharge
- ☐ Changes in Ownership/Operator (see instructions)
- ☐ Waste Discharge Requirements Update or NPDES Permit Reissuance
- ☐ Other: _____

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: _____

Has a public agency determined that the proposed project is exempt from CEQA? ☐ **Yes** ☐ **No**

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency: _____

Has a "Notice of Determination" been filed under CEQA? ☐ **Yes** ☐ **No**

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☐ **EIR** ☐ **Negative Declaration** **Expected CEQA Completion Date:** _____

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

_____

_____

_____

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: _____ **Title:** _____

Signature: _____ **Date:** _____

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

California Environmental Protection Agency
Bill of Rights for Environmental
Permit Applicants

California Environmental Protection Agency (Cal/EPA) recognizes that many complex issues must be addressed when pursuing reforms of environmental permits and that significant challenges remain. We have initiated reforms and intend to continue the effort to make environmental permitting more efficient, less costly, and to ensure that those seeking permits receive timely responses from the boards and departments of the Cal/EPA. To further this goal, Cal/EPA endorses the following precepts that form the basis of a permit applicant's "Bill of Rights."

1. Permit applicants have the right to assistance in understanding regulatory and permit requirements. All Cal/EPA programs maintain an Ombudsman to work directly with applicants. Permit Assistance Centers located throughout California have permit specialists from all the State, regional, and local agencies to identify permit requirements and assist in permit processing.

2. Permit applicants have the right to know the projected fees for review of applications, how any costs will be determined and billed, and procedures for resolving any disputes over fee billings.

3. Permit applicants have the right of access to complete and clearly written guidance documents that explain the regulatory requirements. Agencies must publish a list of all information required in a permit application and of criteria used to determine whether the submitted information is adequate.

4. Permit applicants have the right of timely completeness determinations for their applications. In general, agencies notify the applicant within 30 days of any deficiencies or determine that the application is complete. California Environmental Quality Act (CEQA) and public hearing requests may require additional information.

5. Permit applicants have the right to know exactly how their applications are deficient and what further information is needed to make their applications complete. Pursuant to California Government code Section 65944, after an application is accepted as complete, an agency may not request any new or additional information that was not specified in the original application.

6. Permit applicants have the right of a timely decision on their permit application. The agencies are required to establish time limits for permit reviews.

7. Permit applicants have the right to appeal permit review time limits by statute or administratively that have been violated without good cause. For state environmental agencies, appeals are made directly to the Cal/EPA Secretary or to a specific board. For local environmental agencies, appeals are generally made to the local governing board or, under certain circumstances, to Cal/EPA. Through this appeal, applicants may obtain a set date for a decision on their permit and, in some cases, a refund of all application fees (ask boards and departments for details).

8. Permit applicants have the right to work with a single lead agency where multiple environmental approvals are needed. For multiple permits, all agency actions can be consolidated under a lead agency. For site remediation, all applicable laws can be administered through a single agency.

9. Permit applicants have the right to know who will be reviewing their application and the time required to complete the full review process.

Appendix A. Index of the Nationwide Permits and Conditions **NATIONWIDE PERMITS**

NATIONWIDE PERMIT CONDITIONS

General Conditions:

1. Navigation
2. Proper Maintenance
3. Erosion and Siltation Controls
4. Aquatic Life Movements
5. Equipment
6. Regional and Case-by-Case Conditions
7. Wild and Scenic Rivers
8. Tribal Rights
9. Water Quality Certification
10. Coastal Zone Management
11. Endangered Species
12. Historic Properties
13. Notification
14. Compliance Certification
15. Multiple Use of Nationwide Permits

Section 404 Only Conditions:

1. Water Supply Intakes
2. Shellfish Production
3. Suitable Material
4. Mitigation
5. Spawning Areas
6. Obstruction of High Flows
7. Adverse Effects from Impoundments
8. Waterfowl Breeding Areas
9. Removal of Temporary Fills

APPENDIX B. NATIONWIDE PERMITS

1. Aids to Navigation. The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard. (See 33 CFR Part 66, Chapter I, Subchapter C). (Section 10)

2. Structures in Artificial Canals. Structures constructed in artificial canals within principally residential developments where the connection of the canal to a navigable water of the United States has been previously authorized (see 33 CFR 322.5(g)). (Section 10)

3. Maintenance. The repair, rehabilitation, or replacement of any previously authorized, currently

serviceable, structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area including those due to changes in materials, construction techniques, or current construction codes or safety standards which are necessary to make repair, rehabilitation, or replacement are permitted, provided the environmental effects resulting from such repair, rehabilitation, or replacement are minimal. Currently serviceable means useable as is or with some maintenance, but not so degraded as to essentially require reconstruction. This NWP authorizes the repair, rehabilitation, or replacement of those structures destroyed by storms, floods, fire, or other discrete events, provided the repair, rehabilitation, or replacement is commenced or under contract to commence within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornados, this two-year limit may be waived by the District Engineer, provided the permitee can demonstrate funding, contract, or other similar delays. Maintenance dredging and beach restoration are not authorized by this NWP. (Sections 10 and 404)

4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities. Fish and wildlife harvesting devices and activities such as pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, clam and oyster digging; and small fish attraction devices such as open water fish concentrators (sea kites, etc.). This NWP authorizes shellfish seeding provided this activity does not occur in wetlands or sites that support submerged aquatic vegetation (including sites where submerged aquatic vegetation is documented to exist, but may not be present in a given year.). This NWP does not authorize artificial reefs or impoundments and semi-impoundments of waters of the United States for the culture or holding of motile species such as lobster, or the use of covered oyster trays or clam racks. (Sections 10 and 404)

5. Scientific Measurement Devices. Devices whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices and similar structures. Small weirs and flumes constructed primarily to record water quantity and velocity are also authorized provided the discharge is limited to 25 cubic yards and further for discharges of 10 to 25 cubic yards provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. (Sections 10 and 404)

6. Survey Activities. Survey activities including core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, soil survey and sampling, and historic resources surveys. Discharges and structures associated with the recovery of historic resources are not authorized by this NWP. Drilling and the discharge of excavated material from test wells for oil and gas exploration is not authorized by this NWP; the plugging of such wells is authorized. Fill placed for roads, pads and other similar activities is not authorized by this NWP. The NWP does not authorize any permanent structures. The discharge of drilling muds and cuttings may require a permit under Section 402 of the Clean Water Act. (Sections 10 and 404)

7. Outfall Structures. Activities related to construction of outfall structures and associated intake structures where the effluent from the outfall is authorized, conditionally authorized, or specifically exempted, or are otherwise in compliance with regulations issued under the National Pollutant Discharge Elimination System program (Section 402 of the Clean Water Act), provided that the permittee notifies the District Engineer in accordance with the "Notification" general condition. (Also see 33 CFR 330.1(e)). Intake structures per se are not included--only those directly associated with an outfall structure. (Sections 10 and 404)

8. Oil and Gas Structures. Structures for the exploration, production, and transportation of oil, gas, and minerals on the outer continental shelf within areas leased for such purposes by the Department of the Interior, Minerals Management Service. Such structures shall not be placed within the limits of any designated shipping safety fairway or traffic separation scheme, except temporary anchors that comply with the fairway regulations in 33 CFR 322.5(l). (Where such limits have not been designated, or where changes are anticipated, District Engineers will consider asserting discretionary authority in accordance with 33 CFR 330.4(e) and will also review such proposals to ensure they comply with the provisions of the fairway regulations in 33 CFR 322.5(l). Any Corps review under this permit will be limited to the effects on navigation and national security in accordance with 33 CFR 322.5(f)). Such structures will not be placed in established danger zones or restricted areas as designated in 33

9. Structures in Fleeting and Anchorage Areas. Structures, buoys, floats and other devices placed within anchorage or fleeting areas to facilitate moorage of vessels where such areas have been established for that purpose by the U.S. Coast Guard. (Section 10)

10. Mooring Buoys. Non-commercial, single-boat, mooring buoys. (Section 10)

11. Temporary Recreational Structures. Temporary buoys, markers, small floating docks, and similar structures placed for recreational use during specific events such as water skiing competitions and boat races or seasonal use provided that such structures are removed within 30 days after use has been discontinued. At Corps of Engineers reservoirs, the reservoir manager must approve each buoy or marker individually. (Section 10)

12. Utility Line Discharges. Discharges of dredged or fill material associated with excavation, backfill or bedding for utility lines, including outfall and intake structures, provided there is no change in preconstruction contours. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable,

line, or wire for the transmission for any purpose of electrical energy, telephone and telegraph messages, and radio and television communication. The term "utility line" does not include activities which drain a water of the United States, such as drainage tile; however, it does apply to pipes conveying drainage from another area. This NWP authorizes mechanized landclearing necessary for the installation of utility lines, including overhead utility lines, provided the cleared area is kept to the minimum necessary and preconstruction contours are maintained. However, access roads, temporary or permanent,

Notification: The permittee must notify the district engineer in accordance with the "Notification" general condition, if any of the following criteria are met:

a) Mechanized landclearing in a forested wetland; b) A Section 10 permit is required for the utility line; c) The utility line in waters of the United States exceeds 500 feet; or, d) The utility line is placed within a jurisdictional area (i.e., a water of the United States), and it runs parallel to a streambed that is within that jurisdictional area. (Sections 10 and 404)

13. Bank Stabilization. Bank stabilization activities necessary for erosion prevention provided the activity meets all of the following criteria:

a. No material is placed in excess of the minimum needed for erosion protection;

b. The bank stabilization activity is less than 500 feet in length;

c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;

d. No material is placed in any special aquatic site, including wetlands;

e. No material is of the type, or is placed in any location, or in any manner, so as to impair surface water flow into or out of any wetland area;

f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,

g. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the District Engineer in accordance with the "Notification" general condition and the District Engineer determines the activity complies with the other terms and conditions of the NWP and the adverse environmental effects are minimal both individually and cumulatively. This NWP may not be used for the channelization of a water of the United States. (Sections 10 and 404)

14. Road Crossings. Fills for roads crossing waters of the United States (including wetlands and other special aquatic sites) provided the activity meets all of the following criteria:

a. The width of the fill is limited to the minimum necessary for the actual crossing;

b. The fill placed in waters of the United States is limited to a filled area of no more than 1/3 acre. Furthermore, no more than a total of 200 linear feet of the fill for the roadway can occur in special aquatic sites, including wetlands;

c. The crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows, and to prevent the restriction of low flows and the movement of aquatic organisms;

d. The crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of a water of the United States; and,

e. For fills in special aquatic sites, including wetlands, the permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must also include a delineation of affected special aquatic sites, including wetlands.

This NWP may not be combined with NWP 18 or NWP 26 for the purpose of increasing the footprint of the road crossing. Some road fills may be eligible for an exemption from the need for a Section 404 permit altogether (see 33 CFR 323.4). Also, where local circumstances indicate the need, District Engineers will define the term "expected high flows" for the purpose of establishing applicability of this NWP. (Sections 10 and 404)

15. U.S. Coast Guard Approved Bridges. Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided such discharges have been authorized by the U.S. Coast Guard as part of the bridge permit. Causeways and approach fills are not included in this NWP and will require an individual or regional Section 404 permit. (Section 404)

16. Return Water From Upland Contained Disposal Areas. Return water from an upland, contained dredged material disposal area. The dredging itself may require a Section 404 permit (33 CFR 323.2(d)), but will require a Section 10 permit if located in navigable waters of the United States. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d) even though the disposal itself occurs on the upland and thus does not require a Section 404 permit. This NWP satisfies the technical requirement for a Section 404 permit for the return water where the quality of the return water is controlled by the state through the Section 401 certification procedures. (Section 404)

17. Hydropower Projects. Discharges of dredged or fill material associated with (a) small hydropower projects at existing reservoirs where the project, which includes the fill, are licensed by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act of 1920, as amended; and has a total generating capacity of not more than 5000 KW; and the permittee notifies the District Engineer in accordance with the "Notification" general condition; or (b) hydropower projects for which the FERC has granted an exemption from licensing pursuant to Section 408 of the Energy Security Act of 1980 (16 U.S.C. 2705 and 2708) and Section 30 of the Federal Power Act, as amended; provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. (Section 404)

18. Minor Discharges. Minor discharges of dredged or fill material into all waters of the United States provided that the activity meets all of the following criteria:

a. The quantity of discharged material and the volume of excavated area does not exceed 25 cubic yards below the plane of the ordinary high water mark or the high tide line;

b. The discharge, including any excavated area, will not cause the loss of more than 1/10 acre of a special aquatic site, including wetlands. For the purposes of this NWP, the acreage limitation includes the filled area and excavated area plus special aquatic sites that are adversely affected by flooding and special aquatic sites that are drained so that they would no longer be a water of the United States as a result of the project;

c. If the discharge, including any excavated area, exceeds 10 cubic yards below the plane of the ordinary high water mark or the high tide line or if the discharge is in a special aquatic site, including wetlands, the permittee notifies the District Engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and

d. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project and is not placed for the purpose of a stream diversion.

e. This NWP can not be used in conjunction with NWP 26 for any single and complete project. (Sections 10 and 404)

19. Minor Dredging. Dredging of no more than 25 cubic yards below the plane of the ordinary high water mark or the mean high water mark from navigable waters of the United States (i.e., Section 10 waters) as part of a single and complete project. This NWP does not authorize the dredging or degradation through siltation of coral reefs, sites that support submerged aquatic vegetation (including sites where submerged aquatic vegetation is documented to exist, but may not be present in a given year), anadromous fish spawning areas, or wetlands, or the connection of canals or other

artificial waterways to navigable waters of the United States (see Section 33 CFR 322.5(g)). (Sections 10 and 404)

20. Oil Spill Cleanup. Activities required for the containment and cleanup of oil and hazardous substances which are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300) provided that the work is done in accordance with the Spill Control and Countermeasure Plan required by 40 CFR Part 112.3 and any existing State contingency plan and provided that the Regional Response Team (if one exists in the area) concurs with the proposed containment and cleanup action. (Sections 10 and 404)

21. Surface Coal Mining Activities. Activities associated with surface coal mining activities provided they are authorized by the Department of the Interior, Office of Surface Mining (OSM), or by states with approved programs under Title V of the Surface Mining Control and Reclamation Act of 1977 and provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must include an OSM or state approved mitigation plan. The Corps, at the discretion of the District Engineer, may require a bond to ensure success of the mitigation, if no other Federal or state agency has required one. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. (Also see 33 CFR 330.1(e)) (Sections 10 and 404)

22. Removal of Vessels. Temporary structures or minor discharges of dredged or fill material required for the removal of wrecked, abandoned, or disabled vessels, or the removal of man-made obstructions to navigation. This NWP does not authorize the removal of vessels listed or determined eligible for listing on the National Register of Historic Places unless the District Engineer is notified and indicates that there is compliance with the "Historic Properties" general condition. This NWP does not authorize maintenance dredging, shoal removal, or river bank snagging. Vessel disposal in waters of the United States may need a permit from EPA (see 40 CFR 229.3). (Sections 10 and 404)

23. Approved Categorical Exclusions. Activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department where that agency or department has determined, pursuant to the Council on Environmental Quality Regulation for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Part 1500 et seq.), that the activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment, and the Office of the Chief of Engineers (ATTN: CECW-OR) has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination. Prior to approval for purposes of

this NWP of any agency's categorical exclusions, the Chief of Engineers will solicit public comment. In addressing these comments, the Chief of Engineers may require certain conditions for authorization of an agency's categorical exclusions under this NWP (Sections 10 and 404)

24. State Administered Section 404 Program. Any activity permitted by a state administering its own Section 404 permit program pursuant to 33 U.S.C. 1344(g)-(l) is permitted pursuant to Section 10 of the Rivers and Harbors Act of 1899. Those activities which do not involve a Section 404 state permit are not included in this NWP, but certain structures will be exempted by Section 154 of Public Law 94-587, 90 Stat. 2917 (33 U.S.C. 591) (see 33 CFR 322.3(a)(2)). (Section 10)

25. Structural Discharges. Discharges of material such as concrete, sand, rock, etc. into tightly sealed forms or cells where the material will be used as a structural member for standard pile supported structures, such as bridges, transmission line footings, and walkways or for general navigation, such as mooring cells, including the excavation of bottom material from within the form prior to the discharge of concrete, sand, rock, etc. This NWP does not authorize filled structural members that would support buildings, homes, parking areas, storage areas and other such structures. Housepads or other building pads are also not included in this NWP. The structure itself may require a Section 10 permit if located in navigable waters of the United States. (Section 404)

26. Headwaters and Isolated Waters Discharges. Discharges of dredged or fill material into headwaters and isolated waters provided that the activity meets all of the following criteria:

a. The discharge does not cause the loss of more than 3 acres of waters of the United States nor cause the loss of waters of the United States for a distance greater than 500 linear feet of the stream bed;

b. For discharges causing the loss of greater than 1/3 acre of waters of the United States, the permittee notifies the District Engineer in accordance with the "Notification" general condition;

c. For discharges causing a loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the information listed below;

d. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and

e. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project.

Note, this NWP will expire on December 13, 1998.

For the purposes of this NWP, the acreage of loss of waters of the United States includes the filled area plus waters of the United States that are adversely affected by flooding, excavation or drainage as a result of the project. The 3 acre and 1/3 acre limits of NWP 26 are absolute, and cannot be

increased by any mitigation plan offered by the applicant or required by the District Engineer. Whenever any other NWP is used in conjunction with this NWP, the total acreage of impacts to waters of the United States of all NWPs combined, can not exceed 3 acres.

Subdivisions: For any real estate subdivision created or subdivided after October 5, 1984, a notification pursuant to subsection (b) of this NWP is required for any discharge which would cause the aggregate total loss of waters of the United States for the entire subdivision to exceed 1/3 acre. Any discharge in any real estate subdivision which would cause the aggregate total loss of waters of the United States in the subdivision to exceed 3 acres is not authorized by this NWP; unless the District Engineer exempts a particular subdivision or parcel by making a written determination that: (1) the individual and cumulative adverse environmental effects would be minimal and the property owner had, after October 5, 1984, but prior to [insert 60 days from the date of publication in the Federal Register], committed substantial resources in reliance on NWP 26 with regard to a subdivision, in circumstances where it would be inequitable to frustrate the property owner's investment-backed expectations, or (2 shall be interpreted to include circumstances where a landowner or developer divides a tract of land into smaller parcels for the purpose of selling, conveying, transferring, leasing, or developing said parcels. This would include the entire area of a residential, commercial or other real estate subdivision, including all parcels and parts thereof. Report: For discharges causing the loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the following information: a) Name, address, and telephone number of the permittee; b) Location of the work; c) Description of the work; and, d) Type and acreage (or square feet) of the loss of waters of the United States (e.g., 1/10 acre of marsh and 50 Square feet of a stream.) (Section 404)

27. Wetland and Riparian Restoration and Creation Activities. Activities in waters of the United States associated with the restoration of former non-tidal wetlands and riparian areas, the enhancement of degraded wetlands and riparian areas, and creation of wetlands and riparian areas; (i) on non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland restoration or creation agreement between the landowner and the U.S. Fish and Wildlife Service or the Natural Resources Conservation Service (NRCS) or voluntary wetland restoration, enhancement, and creation actions documented by the NRCS pursuant to NRCS regulations; or (ii) on any Federal land; or (iii) on reclaimed surface coal mined lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining or the applicable state agency. (The future reversion does not apply to wetlands created, restored or enhanced as mitigation for the mining impacts, nor Such activities include, but are not limited to: installation and maintenance of small water control structures, dikes, and berms; backfilling of existing drainage ditches; removal of existing drainage structures; construction of small nesting islands; plowing or discing for seed bed preparation; and other related activities. This NWP applies to restoration projects that serve the purpose of restoring "natural" wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and "natural" functions of riparian areas. This NWP does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed.

Reversion. For restoration, enhancement and creation projects conducted under paragraphs (ii) and (iv), this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit at that time would be required for any reversion. For restoration, enhancement and creation projects conducted under paragraghs (i) and (iii), this NWP also authorizes any future discharge of dredged or fill material

associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or creation activities) within five years after expiration of a limited term wetland restoration or creation agreement or permit, even if the discharge occurs after this NWP expires. The five year reversion limit does not apply to agreements without time limits reached under paragraph (i). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Prior to any reversion activity, the permitee or the appropriate Federal or state agency must notify the District Engineer and include the documentation of the prior condition. Once an area has reverted back to its prior physical condition, it will be subject to whatever the Corps' regulatory requirements will be at that future date. (Sections 10 and 404.)

28. Modifications of Existing Marinas. Reconfiguration of existing docking facilities within an authorized marina area. No dredging, additional slips or dock spaces, or expansion of any kind within waters of the United States is authorized by this NWP. (Section 10)

29. Single-Family Housing. Discharges of dredged or fill material into non-tidal waters of the United States, including non-tidal wetlands for the construction or expansion of a single-family home and attendant features (such as a garage, driveway, storage shed, and/or septic field) for an individual permittee provided that the activity meets all of the following criteria:

a. The discharge does not cause the loss of more than 1/2 acre of non-tidal waters of the United States, including non-tidal wetlands;

b. The permittee notifies the District Engineer in accordance with the "Notification" general condition;

c. The permittee has taken all practicable actions to minimize the on-site and off-site impacts of the discharge. For example, the location of the home may need to be adjusted on-site to avoid flooding of adjacent property owners;

d. The discharge is part of a single and complete project; furthermore, that for any subdivision created on or after November 22, 1991, the discharges authorized under this NWP may not exceed an aggregate total loss of waters of the United States of 1/2 acre for the entire subdivision;

e. An individual may use this NWP only for a single-family home for a personal residence;

f. This NWP may be used only once per parcel;

g. This NWP may not be used in conjunction with NWP 14, NWP 18, or NWP 26, for any parcel; and,

h. Sufficient vegetated buffers must be maintained adjacent to all open water bodies, streams, etc., to preclude water quality degradation due to erosion and sedimentation.

For the purposes of this NWP, the acreage of loss of waters of the United States includes the filled area previously permitted, the proposed filled area, and any other waters of the United States that are adversely affected by flooding, excavation, or drainage as a result of the project. Whenever any other

NWP is used in conjunction with this NWP, the total acreage of impacts to waters of the United States of all NWPs combined, can not exceed acres. This NWP authorizes activities only by individuals; for this purpose, the term "individual" refers to a natural person and/or a married couple, but does not include a corporation, partnership, or similar entity. For the purposes of this NWP, a parcel of land is defined as "the entire contiguous quantity of land in possession of, recorded as property of, or owned (in any form of ownership, including land owned as a partner, corporation, joint tenant, etc.) by the same individual (and/or that individual's spouse), and comprises not only the area of wetlands sought to be filled, but also all land contiguous to these wetlands, owned by the individual (and/or that individual's spouse) in any form of ownership". (Sections 10 and 404)

30. Moist Soil Management for Wildlife. Discharges of dredged or fill material and maintenance activities that are associated with moist soil management for wildlife performed on non-tidal Federally-owned or managed and State-owned or managed property, for the purpose of continuing ongoing, site-specific, wildlife management activities where soil manipulation is used to manage habitat and feeding areas for wildlife. Such activities include, but are not limited to: the repair, maintenance or replacement of existing water control structures; the repair or maintenance of dikes; and plowing or discing to impede succession, prepare seed beds, or establish fire breaks. Sufficient vegetated buffers must be maintained adjacent to all open water bodies, streams, etc., to preclude water quality degradation due to erosion and sedimentation. This NWP does not authorize the construction of new dikes, roads, water control structures, etc. associated with the management areas. This NWP does not authorize converting wetlands to uplands, impoundments or other open water bodies. (Section 404)

31. Maintenance of Existing Flood Control Facilities. Discharges of dredged or fill material for the maintenance of existing flood control facilities, including debris basins, retention/detention basins, and channels that were (I) previously authorized by the Corps by individual permit, general permit, or by 33 CFR 330.3 and constructed or (ii) constructed by the Corps and transferred to a local sponsor for operation and maintenance. The maintenance is limited to that approved in a maintenance baseline determination made by the district engineer (DE). The prospective permittee will provide the DE with sufficient evidence for the DE to determine the approved and constructed baseline. Subsequent to the determination of the maintenance baseline and prior to any maintenance work, the permittee must notify the DE in accordance with the "Notification" general condition.

All dredged material must be placed in an upland site or a currently authorized disposal site in waters of the United States, and proper siltation controls must be used. This NWP does not authorize the removal of sediment and associated vegetation from natural water courses. (Activities that involve only the cutting and removing of vegetation above the ground, e.g., mowing, rotary cutting, and chainsawing, where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities that redeposit excavated soil material, does not require a Section 404 permit in accordance with 33 CFR 323.2(d)(2)(ii)). Only constructed channels within stretches of natural rivers that have been previously authorized as part of a flood control facility could be authorized for maintenance under this NWP.

Maintenance Baseline. Upon receipt of sufficient evidence, the DE will determine the maintenance baseline. The maintenance baseline is the existing flood control project that the DE has determined

can be maintained under this NWP, subject to any case-specific conditions required by the DE. In determining the maintenance baseline, the DE will consider the following factors: the approved facility, the actual constructed facility, the Corps constructed project that was transferred, the maintenance history, if the facility has been functioning at a reduced capacity and for how long, present vs. original flood control needs, and if sensitive/unique functions and values may be adversely affected. Revocation or modification of the final determination of the maintenance baseline can only be done in accordance with 33 CFR Part 330.5. This NWP can not be used until the DE determines the maintenance baseline and the need for mitigation and any regional or activity-specific conditions. The maintenance baseline will only be determined once and will remain valid for any subsequent reissuance of this NWP. However, if the project is effectively abandonned or reduced to lack of proper maintenance, a new determination of a maintenance baseline would be required before this NWP could be used for a subsequent maintenance.

Mitigation. In determining the need for mitigation, the DE will consider the following factors: any original mitigation required, the current environmental setting, and any adverse effects of the maintenance project that were not mitigated in the original construction. The DE will not delay needed maintenance for completion of any required mitigation, provided that the DE and the applicant establish a schedule for the identification, approval, development, construction and completion of such required mitigation. (Sections 10 and 404)

32. Completed Enforcement Actions. Any structure, work or discharge of dredged or fill material, remaining in place, or undertaken for mitigation, restoration, or environmental benefit in compliance with either:

(i) the terms of a final written Corps non-judicial settlement agreement resolving a violation of Section 404 of the Clean Water Act (CWA) and/or Section 10 of the Rivers and Harbors Act of 1899; or the terms of an EPA 309(a) order on consent resolving a violation of Section 404 of the CWA, provided that:

a. The unauthorized activity affected no more than 5 acres of nontidal wetlands or 1 acre of tidal wetlands; b. The settlement agreement provides for environmental benefits, to an equal or greater degree, than the environmental detriments caused by the unauthorized activity that is authorized by this nationwide permit; and c. The District Engineer issues a verification letter authorizing the activity subject to the terms and conditions of this nationwide permit and the settlement agreement, including a specified completion date; or

(ii) the terms of a final Federal court decision, consent decree, or settlement agreement resulting from an enforcement action brought by the United States under Section 404 of the CWA and/or Section 10 of the Rivers and Harbors Act of 1899.

For both (i) or (ii) above, compliance is a condition of the NWP itself. Any authorization under this NWP is automatically revoked if the permittee does not comply with the terms of this NWP or the terms of the court decision, consent decree, or judicial/non-judicial settlement agreement or fails to complete the work by the specified completion date. This NWP does not apply to any activities occurring after the date of the decision, decree, or agreement that are not for the purpose of mitigation, restoration, or environmental benefit. Prior to reaching any settlement agreement the Corps will ensure compliance with the provisions of 33 CFR Part 326 and 33 CFR 330.6(d)(2) and (e). (Sections 10 and 404)

33. Temporary Construction, Access and Dewatering. Temporary structures, work and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided that the associated primary activity is authorized by the Corps of Engineers or the U.S. Coast Guard, or for other construction activities not subject to the Corps or U.S. Coast Guard regulations. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must be of materials, and placed in a manner, that will not be eroded by expected high flows. The use of dredged material may be allowed if it is determined by the District Engineer that it will not cause more than minimal adverse effects on aquatic resources. Temporary fill must be entirely removed to upland areas, or dredged material returned to its original location, following completion of the construction activity, and the affected areas must be restored to the pre-project conditions. Cofferdams cannot be used to dewater wetlands or other aquatic areas so as to change their use. Structures left in place after cofferdams are removed require a Section 10 if located in navigable waters of the United States. (see 33 CFR Part 322). The permittee must notify the District Engineer in accordance with the "notification" general condition. The notification must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources. The District Engineer will add special conditions, where necessary, to ensure that adverse environmental effects are minimal. Such conditions may include: Limiting the temporary work to minimum necessary; requiring seasonal restrictions; modifying the restoration plan; and, requiring alternative construction methods (e.g., construction mats, in wetlands, where practicable.). (Sections 10 and 404)

34. Cranberry Production Activities. Discharges of dredged or fill material for dikes, berms, pumps, water control structures or leveling of cranberry beds associated with expansion, enhancement, or modification activities at existing cranberry production operations provided that the activity meets all of the following criteria:

a. The cumulative total acreage of disturbance per cranberry production operation, including but not limited to, filling, flooding, ditching, or clearing, does not exceed 10 acres of waters of the United States, including wetlands;

b. The permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must include a delineation of affected special aquatic sites, including wetlands; and,

c. The activity does not result in a net loss of wetland acreage. This NWP does not authorize any discharge of dredged or fill material related to other cranberry production activities such as warehouses, processing facilities, or parking areas. For the purposes of this NWP, the cumulative total of 10 acres will be measured over the period that this NWP is valid. (Section 404)

35. Maintenance Dredging of Existing Basins. Excavation and removal of accumulated sediment for maintenance of existing marina basins, access channels to marina basins or boat slips, and boat slips to previously authorized depths or controlling depths for ingress/egress, whichever is less, provided the dredged material is disposed of at an upland site and proper siltation controls are used. (Section 10)

36. Boat Ramps. Activities required for the construction of boat ramps provided:

a. The discharge into waters of the United States does not exceed 50 cubic yards of concrete, rock, crushed stone or gravel into forms, or placement of pre-cast concrete planks or slabs. (Unsuitable material that causes unacceptable chemical pollution or is structurally unstable is not authorized);

b. The boat ramp does not exceed 20 feet in width;

c. The base material is crushed stone, gravel or other suitable material;

d. The excavation is limited to the area necessary for site preparation and all excavated material is removed to the upland; and,

e. No material is placed in special aquatic sites, including wetlands. Dredging to provide access to the boat ramp may be authorized by another NWP, regional general permit, or individual permit pursuant to Section 10 if located in navigable waters of the United States. (Sections 10 and 404)

37. Emergency Watershed Protection and Rehabilitation. Work done by or funded by the Natural Resources Conservation Service qualifying as an "exigency" situation (requiring immediate action) under its Emergency Watershed Protection Program (7 CFR Part 624) and work done or funded by the Forest Service under its Burned-Area Emergency Rehabilitation Handbook (FSH 509.13) provided the District Engineer is notified in accordance with the "Notification" general condition. (Also see 33 CFR 330.1(e)). (Sections 10 and 404)

38. Cleanup of Hazardous and Toxic Waste. Specific activities required to effect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. Court ordered remedial action plans or related settlements are also authorized by this NWP. This NWP does not authorize the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste. Activities undertaken entirely on a CERCLA site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. (Sections 10 and 404)

39. Reserved

40. Farm Buildings. Discharges of dredged or fill material into jurisdictional wetlands (but not including prairie potholes, playa lakes, or vernal pools) that were in agricultural crop production prior to December 23, 1985, i.e., farmed wetlands, for foundations and building pads for farm buildings. The discharge will be limited to the minimum necessary but will in no case exceed 1 acre (see the "Mitigation" Section 404 only condition). The permittee must notify the District Engineer in accordance with the "Notification" general condition for any farm building within 500 linear feet of

any flowing water. (Section 404)

APPENDIX C. Nationwide Permit Conditions

GENERAL CONDITIONS:

The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. No activity may cause more than a minimal adverse effect on navigation.

2. Proper Maintenance. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. Erosion and Siltation Controls. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.

4. Aquatic Life Movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

5. Equipment. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and Case-by-Case Conditions. The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its section 401 water quality certification.

7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

8. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water Quality Certification. In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)).

10. Coastal Zone Management. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).

11. Endangered Species. (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at http://www.fws.gov/~r9endspp/endspp.html and http://kingfish.spp.mnfs.gov/tmcintyr/prot_res.html#ES

and Recovery, respectively.

12. Historic Properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

13. Notification.

(a) Timing: Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified by the District or Division Engineer that an individual permit is required; or

(3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Notification: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs 14, 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f));

(5) For NWP 21 - Surface Coal Mining Activities, the PCN must include an OSM or state approved mitigation plan.

(6) For NWP 29-Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the

prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31- Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site.

(8) For NWP 33-Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources.

(c) Form of Notification: The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) District Engineer's Decision: In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP

subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) Agency Coordination: The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(i) For NWP 14, 21, 26 (between 1 and 3 acres of impact) , 29, 33, 37, and 38. The District Engineer will, upon receipt of a notification, provide immediately, e.g., facsimile transmission, overnight mail or other expeditious manner, a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 5 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days (16 calendar days for NWP 26 PCNs) before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(ii) Optional Agency Coordination. For NWPs 5, 7, 12, 13, 17, 18, 27, 31, and 34, where a Regional Administrator of EPA, a Regional Director of USFWS, or a Regional Director of NMFS has formally requested general notification from the District Engineer for the activities covered by any of these NWPs, the Corps will provide the requesting agency with notification on the particular NWPs. However, where the agencies have a record of not generally submitting substantive comments on activities covered by any of these NWPs, the Corps district may discontinue providing notification to those regional agency offices. The District Engineer will coordinate with the resources agencies to identify which activities involving a PCN that the agencies will provide substantive comments to the Corps. The District Engineer may also request comments from the agencies on a case by case basis when the District Engineer determines that such comments would assist the Corps in reaching a decision whether effects are more than minimal either individually or cumulatively.

(iii) Optional Agency Coordination, 401 Denial. For NWP 26 only, where the state has denied its 401 water quality certification for activities with less than 1 acre of wetland impact, the EPA regional administrator may request agency coordination of PCNs between 1/3 and 1 acre. The request may only include acreage limitations within the 1/3 to 1 acre range for which the state has denied water quality certification. In cases where the EPA has requested coordination of projects as described here, the Corps will forward the PCN to EPA only. The PCN will then be forwarded to the Fish and Wildlife Service and the National Marine Fisheries Service by EPA under agreements among those agencies. Any agency receiving the PCN will be bound by the EPA timeframes for providing comments to the Corps.

(f) Wetlands Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less

than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) Mitigation: Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(i) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;

(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees" to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a 1-acre loss of wetlands; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

14. Compliance Certification. Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a. A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b. A statement that any required mitigation was completed in accordance with the permit conditions; c. The signature of the permittee certifying the completion of the work and mitigation.

15. Multiple Use of Nationwide Permits. In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the "Notification" General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

SECTION 404 ONLY CONDITIONS:

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in

order for authorization by the NWPs to be valid:

1. Water Supply Intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. Shellfish Production. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

3. Suitable Material. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.,) and material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

5. Spawning Areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. Obstruction of High Flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. Adverse Effects from Impoundments. If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. Waterfowl Breeding Areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. Removal of Temporary Fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

SECTION 404 NATIONWIDE PERMIT

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-003

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10: 1413, Section 404. Principal Purpose: These laws require authorizing activities in, or affecting, navigable waters of the United States, the discharge or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
6. APPLICANT'S ADDRESS	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOs. W/AREA CODE a. Residence b. Business	10. AGENT'S PHONE NOs. W/AREA CODE a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ _____

APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
15. LOCATION OF PROJECT COUNTY _____ STATE _____	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) Section, Township, Range, Lat/Lon, and/or Accessor's Parcel Number, for example.

17. DIRECTIONS TO THE SITE

18. Nature of Activity (Description of project, include all features)

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

23. Is Any Portion of the Work Already Complete? Yes ___ No ___ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

*Would include but is not restricted to zoning, building, and flood plain permits.

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

United States Army Corps of Engineers

Regulatory Program Applicant Information

General Information

The Permit Application

Drawings

General Information

Authority for the Regulatory Program

The US Army Corps of Engineers has been regulating activities in the nation's waters since 1890. Until the 1960's the primary purpose of the regulatory program was to protect navigation. Since then, as a result of laws and court decisions, the program has been broadened so that it now considers the full public interest for both the protection and utilization of water resources.

The regulatory authorities and responsibilities of the Corps of Engineers are based on the following laws:

- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps of Engineers.
- Section 404 of the Clean Water Act (33 U.S.C. 1344). Section 301 of this Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the Corps of Engineers.
- Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413) authorizes the Corps of Engineers to issue permits for the transportation of dredged material for the purpose of dumping it into ocean waters.

Other laws may also affect the processing of applications for Corps of Engineers permits. Among these are the National Environmental Policy Act, the Coastal Zone Management Act, the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, the Deepwater Port Act, the Federal Power Act, the Marine Mammal Protection Act, the Wild and Scenic Rivers Act, and the National Fishing Enhancement Act of 1984.

Explanation of Some Commonly Used Terms

Certain terms which are closely associated with the regulatory program are explained briefly in this section. If you need more detailed definitions, refer to the Code of Federal Regulations (33 CFR Parts 320 through 330) or contact a Corps district regulatory office.

Activity(ies) as sued in this pamphlet includes structures (for example a pier, wharf, bulkhead, or jetty) and work (which includes dredging, disposal of dredged material, filling, excavation or other modification of a navigable water of the United States).

Navigable Waters of the United States are those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past or may be susceptible to use to transport interstate or foreign commerce. These are waters that are navigable in the traditional sense where permits are required for certain activities pursuant to Section 10 of the Rivers and Harbors Act. This term should not be confused with the term *waters of the United States* below.

Waters of the United States is a broader term than navigable waters of the United States defined above. Included are adjacent wetlands and tributaries to navigable waters of the United States and other waters where the degradation or destruction of which could affect interstate or foreign commerce. These are the waters where permits are required for the discharge of dredged or fill material pursuant to Section 404 of the Clean Water Act.

Pre-application Consultation is one or more meetings between members of the district engineer's staff and an applicant and his agent or his consultant. A pre-application consultation is usually related to applications for major activities and may involve discussion of alternatives, environmental documents, National Environmental Policy Act procedures, and development of the scope of the data required when an environmental impact statement is required.

Public Hearings may be held to acquire information and give the public the opportunity to present

views and opinions. The Corps may hold a hearing or participate in joint public hearings with other Federal or state agencies. The district engineer may specify in the public notice that a hearing will be held. In addition, any person may request in writing during the comment period that a hearing be held. Specific reasons must be given as to the need for a hearing. The district engineer may attempt to resolve the issue informally or he may set the date for a public hearing. Hearings are held at times and places that are convenient for the interested public. Very few applications involve a public hearing.

The Public Interest Review is the term which refers to the evaluation of a proposed activity to determine probable impacts. Expected benefits are balanced against reasonably forseeable detriments. All relevant factors are weighed. Corps policy is to provide applicants with a timely and carefully weighed decision which reflects the public interest.

Public Notice is the primary method of advising interested public agencies and private parties of the proposed activity and of soliciting comments and information necessary to evaluate the probable impact on the public interest. Upon request, anyone's name will be added to the distribution list to receive public notices.

Waterbody is a river, creek, stream, lake, pool, bay, wetland, marsh, swamp, tidal flat, ocean, or other water area.

Questions That Are Frequently Asked

Various questions are often asked about the regulatory program. It is hoped that these answers will help you to understand the program better.

Q. When should I apply for a Corps permit?

A. Since two to three months is normally required to process a routine application involving a public notice, you should apply as early as possible to be sure you have all required approvals before your planned commencement date. For a large or complex activity that may take longer, it is often helpful to have a "pre-application consultation" or informal meeting with the Corps during the early planning phase of your project. You may receive helpful information at this point which could prevent delays later. When in doubt as to whether a permit may be required or what you need to do, don't hesitate to call a district regulatory office.

Q. I have obtained permits from local and state governments. Why do I have to get a permit from the Corps of Engineers?

A. It is possible you may not have to obtain an individual permit, depending on the type or location of work. The Corps has many general permits which authorize minor activities without the need for individual processing. Check with your Corps district regulatory office for information on general permits. When a general permit does not apply, you may still be required to obtain an individual permit.

Q. What will happen if I do work without getting a permit from the Corps?

A. Performing unauthorized work in waters of the United States or failure to comply with the terms

of a valid permit can have serious consequences. You would be in violation of Federal law and could face stiff penalties, including fines and/or requirements to restore the area.

Enforcement is an important part of the Corps regulatory program. Corps surveillance and monitoring activities are often aided by various agencies, groups, and individuals, who report suspected violations. When in doubt as to whether a planned activity needs a permit, contact the nearest district regulatory office. It could save a lot of unnecessary trouble later.

Q. How can I obtain further information about permit requirements?

A. Information about the regulatory program is available from any Corps district regulatory office. Information may also be obtained from the water resource agency in your state.

Q. Why should I waster my time and yours by applying for a permit when you probably won't let me do the work anyway?

A. Nationwide, only three percent of all requests for permits are denied. Those few applicants who have been denied permits usually have refused to change the design, timing, or location of the proposed activity. When a permit is denied, an applicant may redesign the project and submit a new application. To avoid unnecessary delays pre-application conferences, particularly for applications for major activities, are recommended. The Corps will endeavor to give you helpful information, including factors which will be considered during the public interest review, and alternatives to consider that may prove to be useful in designing a project.

Q. What is a wetland and what is its value?

A. Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas. A significant natural resource, wetlands serve important functions relating to fish and wildlife; food chain production; habitat; nesting; spawning; rearing and resting sites for aquatic and land species; protection of other areas from wave action and erosion; storage areas for storm and flood waters; natural recharge areas where ground and surface water are interconnected; and natural water filtration and purification functions.

Although individual alterations of wetlands may constitute a minor change, the cumulative effect of numerous changes often results in major damage to wetland resources. The review of applications for alteration of wetlands will include consideration of whether the proposed activity is dependent upon being located in an aquatic environment.

Q. How can I design my project to eliminate the need for a Corps permit?

A. If your activity is located in an area of tidal waters, the best way to avoid the need for a permit is to select a site that is above the high tide line and avoids wetlands or other waterbodies. in the vicinity of fresh water, stay above ordinary high water and avoid wetlands adjacent to the stream or lake. Also, it is possible that your activity is exempt and does not need a Corps permit or that it has been authorized by a nationwide or regional general permit. So, before you build, dredge or fill, contact the Corps district regulatory office in your area for specific information about location, exemptions, and regional and nationwide general permits.

The Permit Application

General

The application form used to apply for a permit is Engineer Form 4345, *Application of a Department of the Army Permit.* You can obtain the application from one of the Corps of Engineers district regulatory offices or download one. Some offices may use a slightly modified form for joint processing with a state agency; however, the required information is basically the same. It is important that you provide the complete information in the requested format. This information will be used to determine the appropriate form of authorization, and to evaluate your proposal.

Some categories of activities have been previously authorized by nationwide or regional permits, and no further Corps approvals are required. Others may qualify for abbreviated permit processing, with authorizations in the form of letters of permission, in which a permit decision can usually be reached in less than 30 days. For other activities, a Public Notice may be required to notify Federal, state, and local agencies, adjacent property owners, and the general public of the proposal to allow an opportunity for review and comment or to request a public hearing. Most applications involving Public Notices are completed within four months and many are completed within 60 days.

The district engineer will begin to process your application immediately upon receipt of all required information. You will be sent an acknowledgement of its receipt and the application number assigned to your file. you should refer to this number when inquiring about your application. Your proposal will be reviewed, balancing the need and expected benefits against the probable impacts of the work, taking into consideration all comments received and other relevant factors. This process is called the *public interest review.* The Corps goal is to reach a decision regarding permit issuance or denial within 60 days of receipt of a complete application. However, some complex activities, issues, or requirements of law may prevent the district engineer from meeting this goal.

For any specific information on the evaluation process, filling out the application forms, or the status or your application, you should contact the regulatory branch of the Corps of Engineers district office which has jurisdiction over the area where you plan to do the work.

Typical Processing Procedure for a Standard Individual Permit

1. Pre-application consultation (optional)
2. Applicant submits ENG Form 4345 to district regulatory office*
3. Application received and assigned identification number
4. Public notice issued (withing 15 days of receiving all information)
5. 15 to 30 day comment period depending upon nature of activity
6. Proposal is reviewed** by Corps and:
    - Public
    - Special interest groups
    - Local agencies

    - State agencies
    - Federal agencies
7. Corps considers all comments
8. Other Federal agencies consulted, if appropriate
9. District engineer may ask applicant to provide additional information
10. Public hearing held, if needed
11. District engineer makes decision
12. Permit issued
    or
    Permit denied and applicant advised of reason

* A local variation, often a joint federal-state application form may be submitted.
** Review period may be extended if applicant fails to submit information or due to requirements of certain laws.

Evaluation Factors

The decision whether to grant or deny a permit is based on a public interest review of the probable impact of the proposed activity and its intended use. Benefits and detriments are balanced by considering effects on items such as:

conservation
economics
aesthetics
general environmental concerns
wetlands
cultural values
flood hazards
floodplain values
food and fiber production
navigation
shore erosion and accretion
recreation
water supply and conservation
water quality
energy needs
safety
needs and welfare of the people
considerations of private ownership

The following general criteria will be considered in the evaluation of every application:

- the relative extent of the public and private need for the proposed activity;
- the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed activity; and
- the extent and permanence of the beneficial and/or detrimental effects which the proposed activity is likely to have on the public and private uses to which the area is suited.

Section 404(b)(1) of the Clean Water Act

If your project involves the discharge of dredged or fill material, it will be necessary for the Corps to evaluate your proposed activity under the Section 404(b)(1) guidelines prepared by the Environmental Protection Agency. The guidelines restrict discharges into aquatic areas where less environmentally damaging, practicable alternatives exist.

Forms and Permits

The following forms apply to the permit process:

Application

The form that you will need to initiate the review process is ENG Form 4345 or a joint Federal-state application that may be available in your state. The appropriate form may be obtained from the district regulatory office which has jurisdiction in the area where your proposed project is located.

Individual Permits

An individual permit may be issued as either ENG Form 1721, the standard permit, or as a Letter of Permission.

- A standard permit is one processed through the typical review procedures, which include public notice, opportunity for a public hearing, and receipt of comments. It is issued following a case-by-case evaluation of a specific activity.
- If work is minor or routine with minimum impacts and objections are unlikely, then it may qualify for a Letter of Permission (LOP). An LOP can be issued much more quickly than a standard permit since an individual public notice is not required. The District Engineer will notify you if your proposed activity qualifies for an LOP.

General Permits

In many cases the formal processing of a permit application is not required because of general permits already issued to the public at large by the Corps of Engineers. These are issued on a regional and nationwide basis.

Separate applications may not be required for activities authorized by a general permit; nevertheless, reporting may be required. For specific information on general permits, contact a district regulatory office.

ENG Form 4336

The third form, ENG Form 4336, is used to assist with surveillance for unauthorized activities. The form, which contains a description of authorized work, should be posted at the site of an authorized activity. If the Corps decides it is appropriate for you to post this form, it will be furnished to you when you receive your permit.

Fees

Fees are required for most permits. $10.00 will be charged for a permit for a non-commercial activity; $100.00 will be charged for a permit for a commercial or industrial activity. The district engineer will make the final decision as to the amount of the fee. ***Do not send a fee when you submit an application.*** When the Corps issues a permit, you will be notified and asked to submit the required fee payable to the Treasurer of the United States. No fees are charged for transferring a permit from one property owner to another, for Letters of Permission, or for nay activities authorized by a general permit or for permits to governmental agencies.

Instructions for Preparing a Department of the Army Application

A representation of the Application follows the instructions, or you may also ***download*** *either a* ***PDF version****, a* ***PostScript version****, or a* ***WordPerfect 5.1 version*** *(I used an HP Laserjet printer definition for the WP version; any printer with scalable fonts, advancing, line drawing, etc., will do the trick).*

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5 - Applicant's Name. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked ***Block 5***.

Block 6 - Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked ***Block***.

Block 7 - Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed if you choose to have an agent.

Block 8 - Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, or any other person or organization. *Note: An agent is* ***not*** *required.*

Blocks 9 and 10 - Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

Block 11 - Statement of Authorization. To be completed by applicant if an agent is to be employed.

Block 12 - Proposed Project Name or Title. Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision, or Edsall Commercial Center).

Block 13 - Name of Waterbody. Please provide the name of any stream, lake, marsh, or other

waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14 - Proposed Project Street Address. If the proposed project is located at at site having a street address (not a box number), please enter here.

Block 15 - Location of Proposed Project. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked ***Block 15***

Block 16 - Other Location Descriptions. If available, provide the Section, Township, and Range of the site and/or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers, or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site, if known.

Block 17 - Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18 - Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles, or float supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked ***Block 18***.

Block 19 - Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Blocks 20 through 22. To be completed if dredged and/or fill material is to be discharged.

Block 20 - Reason(s) for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21 - Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged withing Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22 - Surface Area of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged

on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked ***Block 22***.

Block 23 - Is Any Portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization if possible.

Block 24 - Names and Addresses of Adjoining Property Owners, Lessees, etc., Whos Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked ***Block 24***.

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county or counties where the project is to be developed.

Block 25 - Information about Approvals or Denials by Other Agencies. You may need the approval of other Federal, state, or local agencies for your project. Identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26 - Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

A Sample Application

Please Note: The sample application that follows is a crude representation of ENG FORM 4345 and is intended for instructional purposes. To obtain an actual Application for Department of the Army Permit, please download one of these:

A PDF version.

A Postscript version is ready to print.

A WordPerfect version **(using HP Laserjet, or any printer capable of scalable fonts, advancing, line drawing, etc.)** can be printed, too.

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204,

Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10: 1413, Section 404. Principal Purpose: These laws require authorizing activities in, or affecting, navigable waters of the United States, the discharge or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. Application No.	2. Field Office Code	3. Date Received	4. Date Application Completed

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. Applicant's Name	8. Authorized Agent's Name and Title
6. Applicant's Address	9. Agent's Address
7. Applicant's Phone No. w/Area Code a. Residence b. Business	10. Agent's Phone No. w/Area Code a. Residence b. Business

STATEMENT OF AUTHORIZATION

I hereby authorize _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ _____
Applicant's Signature Date

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. Project Name or Title (see instructions)

13. Name of Waterbody, if Known	14. Project Street Address
15. Location of Project _____ _____ County State	

16. Other Location Descriptions, if Known (Section, Township, Range, Lat/Lon, and/or Assessor's Parcel Number, for example.)

17. Directions to the Site

18. Nature of Activity (Description of project, include all features)

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

23. Is Any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Signature of Applicant	Date	Signature of Agent	DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Drawings

General Information

Three types of drawings - Vicinity, Plan, and Elevation - are required to accurately depict activities.

Submit one original, or good quality copy, of all drawings on 8½ X 11 inch white paper (tracing cloth or film may be used). Submit the fewest number of sheets necessary to adequately show the proposed activity. Drawings should be prepared in accordance with the general format of the samples, using block style lettering. Each page should have a title block. See check list below. Drawings do not have to be prepared by an engineer, but professional assistance may become necessary if the project is large or complex.

Leave a 1-inch margin at the top edge of each sheet for purposes of reproduction and binding.

In the title block of each sheet of drawings identify the proposed activity and include the name of the body of water; river mile (if applicable); name of county and state; name of applicant; number of the sheet and total number of sheets in set; and date the drawing was prepared.

Since drawings must be reproduced, use heavy dark lines. Color shading cannot be used; however, dot shading, hatching, or similar graphic symbols may be used to clarify line drawings.

Vicinity Map

The vicinity map you provide will be printed in any public notice that is issued and used by the Corps of Engineers and other reviewing agencies to locate the site of the proposed activity. You may use an existing road map or US Geological Survey topographic (scale 1:24,000) as the vicinity map. Please include sufficient details to simplify locating the site from both the waterbody and from land. Identify the source of the map or chart from which the vicinity map was taken and, if not already shown, add the following:

- location of activity site (draw an arrow showing the exact location of the site on the map).
- latitude, longitude, river mile, if known, and/or other information that coincides with Block 6 on the application form.
- name of waterbody and the name of the larger creek, river, by, etc., that the waterbody is immediately tributary to.
- names, descriptions and location of landmarks.
- name of all applicable political (county, parish, borough, town, city, etc.) jurisdictions
- name of and distance to nearest town, community, or other identifying locations
- names or numbers of all roads in the vicinity of the site.
- north arrow.
- scale.

Plan View

The plan view shows the proposed activity as if you were looking straight down on it from above. your plan view should clearly show the following:

- Name of waterbody (river, creek, lake, wetland, etc.) and river mile (if known) at location of activity.
- Existing shorelines.
- Mean high and mean low water lines and maximum (spring) high tide line in tidal areas.
- Ordinary high water line and ordinary low water line if the proposed activity is located on a non-tidal waterbody.
- Average water depths around the activity.
- Dimensions of the activity and distance it extends from the high water line into the water.
- Distances to nearby Federal projects, if applicable.
- Distance between proposed activity and navigation channel, where applicable.
- Location of structures, if any, in navigable waters immediately adjacent to the proposed activity.
- Location of any wetlands (marshes, swamps, tidal flats, etc.)
- North arrow.
- Scale.
- If dredged material is involved, you must describe the type of material, number of cubic yards, method of handling, and the location of fill and spoil disposal area. The drawing should show proposed retention levees, weirs, and/or other means for retaining hydraulically placed materials.
- Mark the drawing to indicate previously completed portions of the activity.

Elevation and/or Cross Section View

The elevation and/or cross section view is a scale drawing that shows the side, front, or rear of the proposed activity. If a section view is shown, it represents the proposed structure as it would appear if cut internally for display. Your elevation should clearly show the following:

- Water elevations as shown in the plan view.
- Water depth at waterward face of proposed activity or, if dredging is proposed, dredging and estimated disposal grades.
- Dimensions from mean high water line (in tidal waters) of proposed fill or float, or high tide line for pile supported platform. Describe any structures to be built on the platform.
- Cross section of excavation or fill, including approximate side slopes.
- Graphic or numerical scale.
- Principal dimensions of the activity.

Notes on Drawings*

- Names of adjacent property owners who may be affected. Complete names and addresses

should be shown in Block 5 on ENG Form 4345.

- Legal property description: Number, name of subdivision, block, and lot number. Section, Township, and Range (if applicable) from plot, deed, or tax assessment.
- Photographs of the site of the proposed activity are not required; however, pictures are helpful and may be submitted as part of any application.
- **While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.**

* Drawings should be as clear and simple as possible (ie, not too "busy").

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
AGREEMENT BETWEEN THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND the City of Calabasas and the Mountains Restoration Trust UNDER THE URBAN CREEK RESTORATION AND FLOOD CONTROL ACT

This CONTRACT AMENDMENT 1 to Agreement No. P13-047, made in triplicate, is entered into as of this 22nd day of February, 2005, between the Department of Water Resources of the State of California, hereinafter called the State, and the Sponsor, City of Calabasas, and the Co-sponsor, Mountains Restoration Trust, hereinafter called the Grantees.

1. This Amendment 1 to Agreement No. P13-047 extends the termination date and updates the timeline of the workplan (scope of services, schedule, and deliverables) as requested by the Sponsor, for the planning and/or execution of a watershed stabilization and flood damage reduction project on Las Virgenes Creek in Los Angeles County.

   a. The termination date is extended from May 15, 2005 to May 15, 2007.
   b. A current workplan (scope of services, schedule, and deliverables) is attached.

2. Payment for work rescheduled by this amendment will be subject to availability of funds pursuant to Paragraph A-27, Budget Contingency Clause.

3. All other provisions of Urban Streams Agreement No. P13-047 remain unchanged.

IN WITNESS WHEREOF, the parties have executed this Amendment 1 as of the date first above written.

Approved as to Legal Form and Sufficiency:

By _____
Chief Counsel Copy
Department of Water Resources
P. O. Box 942836
Sacramento, CA 94236-0001

Sponsor: City of Calabasas

Address: 26135 Mureau Road
Calabasas, CA 91302

Co-sponsor: Mountains Restoration Trust

Address: 3815 Old Topanga Canyon Road
Calabasas, CA 91302

Attachment

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By _____
Chief, Division of Planning and
Local Assistance

By Charles S. Mink
Signature:

Charles S. Mink
Printed Name

Title: City Engineer

By _____
Signature/ Stephen A. Harris

Title: President

Agreement No. P13-047
SAP Contract No. 4600003021

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
AGREEMENT BETWEEN THE STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES AND
the City of Calabasas
and the Mountains Restoration Trust
UNDER THE URBAN CREEK RESTORATION AND FLOOD CONTROL ACT

THIS AGREEMENT, made in triplicate, is entered into as of this 14th day of November, 2002, between the Department of Water Resources of the State of California, hereinafter called the State, and the Sponsor, City of Calabasas, and the Co-sponsor, Mountains Restoration Trust, hereinafter collectively called the Grantees, which parties do hereby agree as follows:

1. Purpose. The purpose of this Agreement is to provide Urban Creek Restoration Program grant funds for the planning and/or execution of a watershed stabilization and flood damage reduction project, as provided for by California Water Code Section 7048, on Las Virgenes Creek in Los Angeles County. Grantees agree to use the grant funds received in accordance with the terms specified in this Agreement and pursuant to the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (California Water Code Section 79060 et seq., Division 26, Chapter 5, Article 5).

2. Grant Amount. Subject to the availability of funds, the State shall provide a grant in the amount of $187,750 to the Grantees to assist in financing the urban creek protection, restoration and enhancement project to be carried out as described in paragraph 3 below.

3. Grantees Responsibilities:

   A. The Grantees shall implement on-site work to be performed as specified in a Work Plan developed by the Grantees' Project Manager with the assistance of the Project Manager(s) for the State.

   B. The Grantees shall develop a program to manage streambank stabilization, stream channel environment and watershed for the purpose of reducing damages from erosion and/or floods and improving the environmental values of the riparian environment. Development of this management program is provided for in the attached Work Plan.

   C. Grantees are solely responsible for design, construction, operation and maintenance of the project. Review or approval of plans, specifications, bid documents or other construction documents by the State is solely for the purpose of proper administration of grant funds by the State and shall not be deemed to relieve or restrict the Grantees' responsibility. Any planning and design assistance provided to the Grantees by the State is provided pursuant to California Water Code Section 7048 and is not governed by the terms of this Agreement.

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
STANDARD CLAUSES

A-1. Worker's Compensation Clause

Grantees affirm that they are aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Grantees affirm that they will comply with such provisions before commencing the performance of the work under this Agreement. Grantees will make their contractors and subcontractors aware of this provision and determine that they have complied with it before commencing work on the project.

A-2. Claims Dispute Clause

Any claims that Grantees may have regarding the performance of this Agreement, including but not limited to claims for additional compensation or an extension of time, shall be submitted to the Director, Department of Water Resources, within thirty days of their accrual. State and Grantees shall then attempt to negotiate a resolution of such claims and process an amendment to this Agreement to implement the terms of any such resolution.

A-3. National Labor Relations Board Clause

In accordance with Public Contract Code Section 10296, Grantees declare under penalty of perjury that no more than one final, unappealable finding of contempt of court by a federal court has been issued against the Grantees within the immediately preceding two-year period because of Grantees' failure to comply with an order of a federal court which orders Grantees to comply with an order of the National Labor Relations Board.

A-4. Nondiscrimination Clause

During the performance of this Agreement, the Grantees, their contractors and subcontractors shall not deny the Agreement's benefits to any person on the basis of religion, color, ethnic group identification, sex, age, physical or mental disability, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, mental disability, medical condition, marital status, age (over 40) or sex. Grantees shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination. Grantees, their contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Government Code Section 12900 et seq.), the regulations promulgated thereunder (California Administrative Code, Title 2 Sections 7285.0 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code Sections 11135-11139.5) and the regulations or standards adopted by the awarding State agency to implement such article.

Grantees, their contractors and subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

Grantees shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the Agreement.

Grantees, their contractors and subcontractors shall permit access by representatives of the Department of Fair Employment and Housing and the awarding State agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours notice, to such of their books, records, accounts, other sources of information and their facilities as said Department or Agency shall require to ascertain compliance with this clause.

The Grantees' signature on this Agreement shall constitute a certification under penalty of perjury under the laws of the State of California that the Grantees have, unless exempted, complied with the nondiscrimination program requirements of Government Code Section 12990 and Title 2, California Code of Regulations Section 8103.

A-5. State to be Held Harmless

The Grantees agree to indemnify the State of California, Department of Water Resources and its officers, agents and employees against and to hold the same free and harmless from any and all claims, demands, damages, losses, costs, expenses or liability due or incident to, either in whole or in part and whether directly or indirectly, the project.

A-6. Compliance with Laws, Regulations, Permit Requirements

The Grantees shall at all times comply with, and require their contractors and subcontractors to comply with, all applicable federal and State laws, rules and regulations and permits and all applicable local ordinances, specifically including but not limited to environmental, procurement and safety laws, rules, regulations, permits and ordinances.

A-7. Successors and Assigns

This Agreement and all of its provisions shall apply to and bind the successors and assigns of the parties hereto. No assignment or transfer of this Agreement or any part hereof, rights hereunder or interest herein by the Grantees shall be valid unless and until it is approved by the State and made subject to such reasonable terms and conditions as the State may impose.

A-8. Audit Requirement

Pursuant to Government Code Section 8546.7, the contracting parties shall be subject to the examination and audit of the State and the State Auditor General for a period of three years after final payment under this Agreement with respect to all matters connected with the performance of this Agreement, including but not limited to the cost of administering this Agreement. All records of the Grantees shall be preserved for this purpose for at least three years after completion of the project.

A-9. Inspections

(a) The State shall have the right to inspect the work being performed at any and all reasonable times during the term of the Agreement. This right shall extend to any subcontracts, and Grantees shall include provisions ensuring such access in all their contracts or subcontracts entered into pursuant to this Agreement with the State.

(b) The State shall have the right to inspect the project site at any and all reasonable times after completion of the project to ensure compliance with paragraphs 1 and 6 of this Agreement.

(c) During regular office hours, each of the parties shall have the right to inspect and to make copies of any books, records, or reports of the other party relating to this Agreement. Each of the parties shall maintain and shall make available at all times for such inspection accurate records of all of their costs, disbursements and receipts with respect to their activities under this Agreement.

A-10. Performance Evaluation

Grantee's performance under this Agreement will be evaluated after completion.

A-11. Contracting Officer of the State

The contracting officer of the State shall be the Chief of the Division of Planning and Local Assistance of the Department of Water Resources of the State of California and that person's successors or duly authorized representatives. The contracting officer shall be responsible for all discretionary acts, opinions, judgments, approvals, reviews and determinations required by the State under the terms of this Agreement.

A-12. Remedies Not Exclusive

The use by either party of any remedy specified herein for the enforcement of this Agreement is not exclusive and shall not deprive the party using such remedy of, or limit the application of, any other remedy provided by law.

A-13. Amendments

This Agreement may be amended in writing by mutual agreement of the parties. Any request by the Grantees for amendments must be in writing, stating the amendment request and the reason for the request. The Grantees shall make requests in a timely manner and in no event less than 60 days before the effective date of the amendment.

A-14. Waiver of Rights

It is the intention of the parties hereto that from time to time either party may waive any of their rights under this Agreement unless contrary to law. Any waiver by either party hereto of rights arising in connection with this Agreement shall not be deemed to be a waiver with respect to any other rights or matters.

A-15. Notices

All notices that are required either expressly or by implication to be given by one party to the other under this Agreement shall be signed for the State by its contracting officer and for the Grantees by such officers as from time to time they may authorize in writing to so act. All such notices shall be deemed to have been given if delivered personally or if enclosed in a properly addressed, postage-prepaid envelope and deposited in a United States Post Office for delivery by registered or certified mail.

A-16. Ownership and Use of Photographs, Audio and/or Video Recordings and other Publications

Grantees shall provide the Department with reasonable access to all original photographic materials, audio and video recordings of work funded by this grant, and authorize the Department to use any part or all of the photographic materials, master audio and master video recordings for the Department's purposes.

Grantees shall make available to the Department for it's review and comment a copy of any completed publication, brochure, video or audio tape produced in whole or in part with funds from this grant prior to releasing it to parties other than the Grantees and Grantees' subcontractors. No release of such materials shall be made without the joint approval of the Department and the Grantees. Approval shall not be unreasonably withheld.

A-17. Drug Free Workplace Certification

By signing this Agreement, Grantees hereby certify under penalty of perjury under the laws of the State of California that Grantees will comply with the requirements of the Drug-Free Workplace Act of 1990 (Government Code Section 8350 et seq.) and will provide a drug-free workplace by taking the following actions:

1. Publish a statement notifying employees and volunteers that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying action to be taken against employees and volunteers for violations.

2. Establish Drug-Free Awareness Program to inform employees and volunteers about all of the following:

   (a) The dangers of drug abuse in the workplace.
   (b) The person's or organization's policy of maintaining a drug-free workplace,
   (c) Any available counseling, rehabilitation and assistance programs, and
   (d) Penalties that may be imposed upon for drug abuse violations.

3. Every employee and volunteer who work on the proposed Agreement or grant:

   (a) Will receive a copy of the company's drug-free policy statement, and
   (b) Will agree to abide by terms of the company's statement as a condition of employment on or participation in the Agreement or grant.

This Agreement or grant may be subject to suspension of payments or termination, or both, and the Grantees may be subject to debarment if the department determines that: (1) the Grantees have made a false certification, or (2) the Grantees have violated the certification by failing to carry our the requirements noted above.

A-18. Americans with Disabilities Act

By signing this Agreement, Grantees assure the State that they comply with the Americans With Disabilities Act (ADA) of 1990, (42 U.S.C. 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

A-19. Conflict of Interest

Current State Employees:

(a) No State officer or employee shall engage in any employment, activity or enterprise from which the officer or employee receives compensation or has a financial interest and which is sponsored or funded by any State agency, unless the employment, activity or enterprise is required as a condition of regular State employment.

(b) No State officer or employee shall contract on his or her own behalf as an independent contractor with any State agency to provide goods or services.

Former State Employees:

(a) For a two-year period from the date he or she left State employment, no former State officer or employee may enter into a contract in which he or she engaged in any of the negotiations, transactions, planning, arrangements or any part of the decision-making process relevant to the contract while employed in any capacity by any State agency.

(b) For a twelve-month period from the date he or she left State employment, no former State officer or employee may enter into a contract with any State agency if he or she was employed by that State agency in a policy-making position in the same general subject area as the proposed contract within the twelve-month period prior to his or her leaving State service.

A-20. Child Support Compliance Act

For any Agreement in excess of $100,000, the Grantees acknowledge in accordance therewith, that:

(a) The Grantees recognize the importance of child and family support obligations and shall fully comply with all applicable State and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with Section 5200) of Part 5 of Division 9 of the Family Code; and;

(b) The Grantees, to the best of their knowledge, are fully complying with the earnings assignment orders of all employees and are providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.

A-21. Recycled Materials

Grantees hereby certify under penalty of perjury that ___0___ (enter value or "0") percent of the materials, goods and supplies offered or products used in the performance of this Agreement meet or exceed the minimum percentage of recycled material as defined in Sections 12161 and 12200 of the Public Contract Code.

A-22. Severability

If any provision of this Agreement is held invalid or unenforceable by any court of final jurisdiction, it is the intent of the parties that all other provisions of this Agreement be construed to remain fully valid, enforceable, and binding on the parties.

A-23. Governing Law

This Agreement is governed by and shall be interpreted in accordance with the laws of the State of California.

A-24. Software Copyright

Where software usage is an essential element of performance under the Agreement, Grantees certify that they have appropriate systems and controls in place to ensure that state funds will not be used in the performance of this Agreement for acquisition, operation or maintenance of computer software in violation of copyright laws.

A-25. Air or Water Pollution Violation

Under the State laws, Grantees shall not be: (1) in violation of any order or resolution not subject to review promulgated by the State Air Resources Board or an air pollution control district; (2) subject to cease and desist order not subject to review issued pursuant to Section 13301 of the Water Code for violation of waste discharge requirements or discharge prohibitions; or (3) finally determined to be in violation of provisions of federal law relating to air or water pollution.

A-26. Union Organizing

Recipients, by signing this Grant, hereby acknowledge the applicability of Government Code 16645 through 16649 to this Agreement. Furthermore, Recipients, by signing this Agreement, hereby certify that:

(1) No state funds disbursed by this grant will be used to assist, promote or deter union organizing.

(2) Recipients shall account for state funds disbursed for a specific expenditure by this grant, to show those funds were allocated to that expenditure.

(3) Recipients shall, where state funds are not designated as described in (2) above, allocate, on a pro-rata basis, all disbursements that support the grant program.

(4) If Recipients make expenditures to assist, promote or deter union organizing, Recipient will maintain records sufficient to show that no state funds were used for those expenditures, and that Recipients shall provide those records to the Attorney General upon request.

A-27. Budget Contingency Clause

It is mutually agreed that if the Budget Act of the current year and/or any subsequent years covered under this Agreement does not appropriate sufficient funds for the program, this Agreement shall be of no further force and effect. In this event, the State shall have no liability to pay any funds whatsoever to Grantees or to furnish any other considerations under this Agreement and Grantees shall not be obligated to perform any provisions of this Agreement.

If funding for any fiscal year is reduced or deleted by the Budget Act for purposes of this program, the State shall have the option to either: cancel this Agreement with no liability occurring to the State, or offer an Agreement Amendment to Grantees to reflect the reduced amount.

A-28. Travel and Per Diem Expenses

I. SHORT-TERM PER DIEM EXPENSES

A. In computing reimbursement for continuous short-term travel of more than 24 hours and less than 31 consecutive days, the employee will be reimbursed for actual costs up to the maximum allowed for each meal, incidental, and lodging expense for each complete 24 hours of travel, beginning with the traveler's times of departure and return, as follows:

1. On the first day of travel on a trip of 24 hours or more:

Trip begins at or before 6 a.m.	Breakfast may be claimed on the first day.
Trip begins at or before 11 a.m.	Lunch may be claimed on the first day.
Trip begins at or before 5 p.m.	Dinner may be claimed on the first day.

2. On the fractional day of travel at the end of a trip of more than 24 hours:

Trip ends at or after 8 a.m.	Breakfast may be claimed.
Trip ends at or after 2 p.m.	Lunch may be claimed.
Trip ends at or after 7 p.m.	Dinner may be claimed.

If the fractional day includes an overnight stay, receipted lodging may also be claimed. No meal or lodging expense may be claimed or reimbursed more than once on any given date or during any 24-hour period.

3. Reimbursement shall be for actual expenses, subject to the following maximum rates:

Meals:

Breakfast	$ 6.00	Receipts are not required for regular short-term travel meals
Lunch	$ 10.00	
Dinner	$ 18.00	
Incidentals	$ 6.00	

Lodging:

Statewide	Actual up to $84.00 plus tax

When required to conduct State business and obtain lodging in the counties of Los Angeles and San Diego, reimbursement will be for actual receipted lodging to a maximum of $110 plus tax.

When required to conduct State business and obtain lodging in the counties of Alameda, San Francisco, San Mateo, and Santa Clara, reimbursement will be for actual receipted lodging to a maximum of $140 plus tax.

If lodging receipts are not submitted, reimbursement will be for meals only at the rates and time frames set forth in B#1 below.

B. In computing reimbursement for continuous travel of less than 24 hours, actual expenses, up to the maximums in #3 above, will be reimbursed for breakfast and/or dinner and/or lodging in accordance with the following time frames:

1. Travel begins at or before 6 a.m. and ends at or after 9 a.m.: Breakfast may be claimed. Travel begins at or before 4 p.m. and ends at or after 7 p.m.: Dinner may be claimed. If the trip of less than 24 hours includes an overnight stay, receipted lodging may be claimed. No lunch or incidentals may be reimbursed on travel of less than 24 hours.

2. Employees on short-term travel who stay in commercial lodging establishments or **commercial campgrounds** will be reimbursed for actual lodging expenses substantiated by a receipt. Employees who stay with friends or relatives, or who do not produce a lodging receipt, will be eligible to claim meals only.

II. LONG-TERM TRAVEL AND PER DIEM EXPENSES

A. Employee maintains a separate residence in the headquarters area:

1. Long-term travelers who maintain a permanent residence at their primary headquarters may claim daily long-term lodging up to $24.00 with a receipt, and long-term meals of $24.00 for each period of travel from 12 to 24 hours at the long-term location. For travel of less than 12 hours, the traveler may claim either $24.00 in receipted lodging **or** $24.00 in long-term meals.

B. Employee does not maintain a separate residence in headquarters area:

1. Long-term travelers who do not maintain a permanent residence at their headquarters may claim daily receipted lodging up to $12.00, and long-term meals of $12.00 for each period of travel from 12 to 24 hours at the long-term locations. For travel of less than 12 hours, the travelers may claim either $12.00 in receipted lodging **or** $12.00 in long-term meals.

III. MILEAGE REIMBURSEMENT

Reimbursement for personal vehicle mileage is 34 cents per mile.

Reimbursement for personal vehicle mileage using a specialized vehicle that has been modified to accommodate disabilities is 37 cents per mile.

IV. VEHICLE RENTAL

Reimbursement for vehicle rental shall be for actual and necessary costs of such rental and airplane usage shall be allowed at the lowest fare available. Claims for reimbursements shall be allowed upon submittal of the appropriate receipt. Refer to California Code of Regulations, Title 2, Sections 599.627 and 599.628.

EXHIBIT "A"
SCOPE OF SERVICES, SCHEDULE & DELIVERABLES

The "Scope of Services" consists of the Scope of Work and/or Work Products to be produced for the Department of Water Resources, under the Urban Streams Restoration Grant Program.

A. Background

In 1977, a trapezoidal concrete channel lining with a 45-foot bottom width was constructed in the Las Virgenes Creek between Route 101 and the Agoura Road Bridge, disrupting the wildlife corridor between the Baldwin Open Space and Malibu Creek State Park. The City of Calabasas is asking for funding for restoration of this segment of Las Virgenes Creek, a tributary to the Malibu Creek and Lagoon. This project will remove the concrete lining, protect/encase a crossing sewer line, restore the creek to the maximum extent feasible while improving on the channel's flood and erosion control provisions. In addition to providing more native habitat to an urban area, successful restoration would enhance and improve wildlife connectivity, creek water quality, the biological environment and aesthetics of the adjacent commercial center. The restoration project, named the Las Virgenes Creek Restoration Project, will be completed in two phases. Phase I of the project is being funded through the California State Coastal Conservancy Proposition 12 grant and will deliver a complete engineering restoration design along with all required permits for implementation of the design. Phase II of the project will incorporate funds from both the Prop 12 grant and the Department of Water Resources Urban Stream Restoration grant and will deliver the complete, in-place restoration project per the designs established during Phase I.

B. Details of Activities – Tasks to be Performed and Timeline

Throughout the entire project, quarterly reports will be provided to the DWR grant administrator to document project activities and progress.

Task	*Timeline*	*Details of Activities and Deliverables*
PHASE I		
1 – Contract for Engineering Design	February - May 2003	• Develop a detailed scope of work specification/ request for proposal (RFP) for engineering design of the restoration project • Develop a list of environmental/civil engineering firms that offer restoration design services • Advertise the RFP to the environmental/civil engineering firms • Conduct selection process including evaluation of all proposals received and interviewing of qualified design teams • Establish contract for engineering design Deliverables: Scope of Work/RFP, Design Contract

2 – Develop Engineered Plans	June –November 2003	• Prepare Plans, Specifications and Engineer's construction cost estimate (PS&E) to 50% per RFP in Task 1 • Obtain City Council approval of conceptual plans • Present 50% draft plans to Santa Monica Bay Restoration Project (SMBRP) /State Water Resources Control Board (SWRCB) and DWR • Return review comments to the design consultant and receive 90% PS&E • Conduct detailed third-party engineering review of 90% PS&E • Return 90% review comments to the design consultant and receive final PS&E for construction Deliverables: PS&E for restoration design, Presentation to SMBRP
3 - Permitting	June – November 2003	• Acquire Section 404 Nationwide Permit from US Army Corp of Engineers • Acquire approval from the RWQCB for work • Acquire 1601 Streambed Alteration Agreement from California Department of Fish and Game Deliverables: Permits and approvals from all required outside agencies
PHASE II		
4 – Bid and Award Construction Contract	December 2003 – February 2004	• Develop bid documents for construction of the restoration design • Obtain City Council authorization to advertise bid • Advertise bid for construction • Open bids and select construction contractor • Obtain City Council approval for award of contract • Award and execute construction contract Deliverables: Construction Contract
5 – Public Education and Outreach	November 2003 – ongoing through project completion	• Develop and implement a plan for public education and outreach, including a schedule of public advertisements, public meetings and public participation events that are designed to create a sense of community ownership of the restoration project • Document and report on success of outreach activities Deliverables: Public education and outreach plan, report

		of plan implementation
6 – Demo concrete from channel	April – May 2004	• Establish and install erosion control and pollution prevention Best Management Practices to reduce pollutants to stream during construction • Remove concrete lining per plans and specifications Deliverable: Erosion control BMP's, removal of concrete lining
7 - Construct restoration design	April - August 2004	• Order and store materials • Construct restoration project per engineered design • Order native plants and seeds per landscape designs • Plant materials – volunteer involvement Deliverable: bio-engineered and vegetated channel
9 – Maintenance and monitoring	November 2004 – May 2005	• Request required inspections and submit required paperwork to permitting agencies • Inspect plant material for proper growth, replace dead and dying plants until established • Determine desired affect for wildlife corridor (potentially with NPS or California Parks) to evaluate success • Determine affect on water quality Deliverable: Report on determination of program success

C. Evaluation of Successful Project Implementation

Essentially, four elements will be evaluated for success. Firstly, improved water quality, increased pervious surfaces and reduced erosion downstream of the restoration would indicate a better functioning ecosystem. Currently the City's Adopt a Creek program has several water quality monitoring sites along Las Virgenes Creek. One monitoring site is located directly upstream of the proposed restoration site, and another is located approximately 1.25 miles downstream of the proposed restoration site. Upon completion of construction, the City will begin water quality monitoring at an additional site just below the restoration site. The measured water quality above the restoration will be compared with that below the restoration, with results being incorporated into the final report.

The second indicator of success is established native vegetation and improved erosion and flood control in the channel. For one year after the restoration is complete, plants will be evaluated for their growth, replacing dead and dying plants and documenting sustained plant life in the restoration area. The channel will be observed, including photo documentation during storm events, for flood and erosion control response during the 2004/2005 rainy seasons. The observed dynamics between established vegetation and flood control will be documented in the final report.

The third success indicator is successful creation of community ownership through the public education and outreach plan, Volunteer participation and site visitation will be evaluated by the number of citizens that got involved in the outreach meetings and public participation events and observed visitation of the completed restoration site via the "riverwalk."

Fourthly, do migrating animals increase their use of the corridor as a result of the restoration? This will require a partnership with National Park Service or California State Parks, or a university student, to measure migration of animals using the area. If it can be documented that large animals (i.e. coyotes, bobcats, etc) and birds increase their use of the area, then the restoration will meet its objective.

State of California Department of Water Resources Urban Stream Restoration Program
Stream: Las Virgenes
Applicant: City of Calabasas and Mountains Restoration Trust

EXHIBIT "B"

TASK	AMOUNT**	DWR	IN-KIND	Other Funding
Phase I Project				
1. Develop Engineering Design RFP				
Develop scope of work specification/request for proposal (RFP) for engineering design	$ 2,500	$ -	$ 500	$ 2,000
Develop list of environmental/civil engineering firms that offer restoration design services	$ 400	$ -	$ 400	$ -
Advertise scope of work/RFP	$ 500	$ -	$ 500	$ -
Conduct selection process including evaluation of all proposals received and interviewing of qualified design teams	$ 1,200	$ -	$ 200	$ 1,000
Establish contract for engineering design	$ 500	$ -	$ 500	$ -
Deliverables: Scope of Work/RFP, Design Engineer Contract				
sub-total - Task One	$ 5,100	$ -	$ 2,100	$ 3,000
2. Develop Engineered Plans for Restoration and Request for Bids				
Prepare PS&E to 50% per RFP in Task 1	$ 20,000		$ -	$ 20,000
City Council approval of conceptual plans	$ 500	$ -	$ 500	$ -
Present 50% draft plans to SMBRP/SWRCB/DWR	$ 1,500	$ -	$ 500	$ 1,000
Return review comments to the design consultant and receive 90% PS&E	$ 400	$ -	$ 400	$ -
Detailed engineering review of 90% PS&E	$ 5,600	$ -	$ 1,000	$ 4,600
Return 90% review comments to the design consultant and receive final PS&E for construction	$ 37,400		$ -	$ 37,400
Deliverables: PS&E for restoration design, Presentation to SMBRP				
sub-total - Task Two	$ 65,400	$ -	$ 2,400	$ 63,000
3. Permitting				
Acquire Section 404 Nationwide Permit from US Army Corp of Engineers	$ 3,000		$ -	$ 3,000
Acquire approval from the RWQCB for work	$ 750	$ -	$ 600	$ 150
Acquire 1601 Streambed Alteration Agreement from California Department of Fish and Game	$ 5,000	$ -	$ -	$ 5,000
CEQA Documentation	$ 2,900	$ -	$ 900	$ 2,000
Deliverables: Permits and approvals from all required outside agencies				
sub-total - Task Three	$ 11,650	$ -	$ 1,500	$ 10,150

State of California Department of Water Resources Urban Stream Restoration Program
Stream: Las Virgenes
Applicant: City of Calabasas and Mountains Restoration Trust

EXHIBIT "B"

TASK	AMOUNT**	DWR	IN-KIND	Other Funding
Phase II Project				
4. Bid and Award Construction Contract				
Develop bid documents	$ 1,000	$ -	$ 1,000	
Get Council Authorization to Advertise Bid	$ 200	$ -	$ 200	
Advertise Bid & Send out utility notices	$ 500	$ -	$ 500	
Select construction contractor	$ 500	$ -	$ 500	
Award of Contract approval from Council	$ 200	$ -	$ 200	
Execute construction contract	$ 300	$ -	$ 300	
Deliverables: Construction Contract		$ -		
sub-total - Task Four	$ 2,700	$ -	$ 2,700	$ -
5. Public Education and Outreach				
Develop public education plan	$ 4,750	$ 4,750	$ -	$ -
Implement plan to educate the public during the phases of development and construction, including signage and other materials	$ 15,000	$ 15,000	$ -	$ -
Announcements and articles in local papers, websites, newsletters, local cable stations, etc.	$ 5,000	$ 5,000	$ -	$ -
Recruit, train, and organize volunteers for planting	$ 2,500	$ 2,500	$ -	$ -
Deliverable: news articles, ads, team of volunteers				
sub-total - Task Five	$ 27,250	$ 27,250	$ -	$ -
6. Demo concrete from channel - app. 3,600 sy				
Establish and install Best Management Practices to reduce pollutants to stream during construction which may include diversions and berms	$ 2,500		$ 500	$ 2,000
Remove concrete lining per specifications	$ 45,000	$ -		$ 45,000
Deliverables: removed concrete				
sub-total - Task Six	$ 47,500	$ -	$ 500	$ 47,000
7. Install alternative lining and infiltration gallery				
Order and store alternative lining and infiltration gallery	$ 50,000	$ 23,000		$ 27,000
Install materials per specifications	$ 150,000			$ 150,000
Create public access streamwalk	$ 50,000	$ 50,000		
Deliverables: bio-engineered channel				
sub-total - Task Seven	$ 250,000	$ 73,000		$ 177,000

State of California Department of Water Resources Urban Stream Restoration Program
Stream: Las Virgenes
Applicant: City of Calabasas and Mountains Restoration Trust

EXHIBIT "B"

TASK	AMOUNT**	DWR	IN-KIND	Other Funding
8. Landscape with approved plants				
Order native plants and seeds	$ 30,000	$ 30,000		
Install irrigation system	$ 37,500	$ 35,000	$ 2,500	
Plant materials-potential volunteer involvement	$ 2,500		$ 2,500	
Deliverables: Vegetated channel				
sub-total - Task Eight	$70,000	$ 65,000	$ 5,000	
9. Maintenance and Monitoring				
Request required inspections	$2,000	$ 2,000		
Submit required paperwork to permitting agencies	$7,500	$ 7,500		
Inspect plant material for proper growth, replace dead and dying plants until established and determine affect on water quality	$18,000	$ 8,000	$ 10,000	
Attempt to document affect of project on wildlife corridor (potentially with NPS or State Parks) to evaluate success	$5,000	$ 5,000		
Deliverables: Determination of program success				
sub-total - Task Nine	$32,500	$ 22,500	$ 10,000	
10. Administrative				
5% of Tasks 6, 7, 8 & 9	$ 20,000	$ -	$ 20,000	
sub-total - Task Ten	$ 20,000	$ -	$ 20,000	
GRAND TOTAL	$ 532,100	$ 187,750	$ 44,200	$ 300,150

** Grantees may move funds between line items within a task as needed to complete that task, but must notify DWR staff in writing (or by email). As tasks are completed, remaining funds may be moved to another task with written approval from DWR. Transferring more than 10% of funds originally allotted for a task, or from a task not yet complete may require a contract amendment.

EXHIBIT C
LAS VIRGENES CREEK MAINTENANCE PLAN

The City of Calabasas' Landscape District Division will establish and manage all maintenance contracts for the restoration of Las Virgenes Creek to ensure proper growth and establishment. The following maintenance schedule will be implemented for a minimum of two years with supplemental irrigation being installed for three to five years. The selected contractor will also be directed to use little or no pesticides and fertilizers in this environmentally sensitive area. Any pesticides that are deemed necessary will follow the Department of Pesticide Regulations.

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
GENERAL MAINTENANCE												
1. Submit disease/pest control records to County Agricultural Commissioner's office	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
2. Pick up of trash along restored creek sections	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
3. Trim branches, trees, etc. for sign visibility	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
4. Walk-through inspection with City representative	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
GENERAL MAINTENANCE (continued)												
5. Inspect and maintain all surface drainage devices and eroded areas	Monthly	Monthly	Monthly	As needed	As needed	As needed	As needed	As needed	As needed	Monthly	Monthly	Monthly
6. Weed Control	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed
7. Insect/disease/ pest control	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
8. Inspect and maintain infiltration gallery	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
GROUND COVER												
9. Inspect/ clean ground cover beds	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
10. Ground cover edging	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
11. Ground cover watering	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
12. Ground cover fertilization	---	---	Light fertiliza-tion	---	---	Light fertiliza-tion	---	Light fertiliza-tion	---	---	Light fertiliza-tion	---
13. Ground cover weed control	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
14. Ground cover insect/ disease/ pest control	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
15. Ground cover rodent control	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
16. Check for damage/ special needs to maintain in healthy condition	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
17. Tree pruning	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
18. Maintenance of watering basins/ watering	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
GROUND COVER (continued)												
19. Weed/ rodent control	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
20. Check/ adjust tree stakes/ ties	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed	Month/ as needed

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
SHRUBS AND VINES												
21. Check for damage/ special needs to maintain in healthy condition	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed	Weekly/ as needed
22. Shrub/ vine pruning	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
23. Insect/ disease/ pest control	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
24. Weed/ rodent control	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
25. Shrub/ vine fertilization	---	---	Light fertiliza-tion	---	---	Light fertiliza-tion	---	Light fertiliza-tion	---	---	Light fertiliza-tion	---
26. Shrub/ vine watering	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
IRRIGATION SYSTEM												
27. Operate/ inspect/ adjust irrigation system	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
28. Inspect and maintain soil moisture content	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
29. Trim around irrigation heads	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed

The City's Adopt-A-Creek Program will monitor the affects on water quality by sampling upstream and downstream of the restoration site. Samples will be taken to determine levels of total dissolved solids, temperature, nutrients, coliform, selenium, and other creek health indicators.

WORK ACTIVITY	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
CREEK MONITORING												
30. Monitor for creek health indicators and pollutants	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
31. Photo document algae	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
32. Make visual observation of wildlife	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

APPRAISAL PROVISIONS

1. Grantees shall provide DWR two copies of all appraisal reports.

2. The property owner or a designated representative will be offered the opportunity to accompany the appraiser during property inspection. The appraisal shall include a statement that the owner or representative was given this opportunity, and that they accepted or declined. If the offer was accepted, the date of the inspection shall be stated in the report.

3. The report shall discuss all encumbrances of record.

4. The report shall be a complete or summary appraisal, in a self-contained appraisal report format to conform to the Uniform Standards of Professional Appraisal Practice (USPAP) currently adopted by the Appraisal Standards Board of the Appraisal Foundation, standard and ethics of the Appraisal Institute, and the requirements of Cal. Evidence Code §822. The appraiser shall correct any omissions or errors on his/her part at no extra cost.

5. There shall be a letter of transmittal summarizing the important assumptions and conclusions, value estimate, date of value and date of report.

6. The report shall include:

   a. a list of assumptions and limiting conditions;

   b. a description of the scope of work, including the extent of data collection and limitations;

   c. a statement of the definition of market value as defined in 12 CFR Part 34.42, and Federal Register 55, 165 pg. 34696;

   d. photographs, plat maps and a legal description of the subject property;

   e. ownership and sales history of the subject property during the past three years;

   f. a regional (up to and including County, if necessary), area, and immediate vicinity (neighborhood) analysis;

   g. a description of improvements on the subject property, including physical age and condition;

   h. a history of the leasing and operating cost history of the subject property;

i. an opinion on the highest and best use of the subject property, and reasoning in support of the opinion in the depth and detail required by its significance to the appraisal. If alternative feasible uses exist, the report should include an explanation of the market, development, cash flow and risk factors leading to an ultimate highest and best use;

j. all approaches to market value applicable to the subject market, including an explanation and support for not using any usual approach to value;

k. maps showing comparable properties in relation to the subject property. The report shall include photographs and plat maps of comparable properties. The report shall discuss the comparable properties and make direct comparisons to the subject property;

l. comparable sales data sheets, that include: grantor/grantee, sale/recordation dates, financing, conditions of sale, location information, land/site characteristics, improvements, other relevant information and confirming source; and

m. a discussion of severance damages or lack thereof.

7. The report shall describe market conditions and trends, including identification of the relevant market, a discussion of supply and demand within the market area and a discussion of the relevant market factors impacting demand.

8. The report shall describe the characteristics of the subject property (size, topography, zoning and land use, utilities, offsite improvements, access, easements and restrictions, flood and earthquake information, toxic hazards, taxes and assessments, and other relevant information).

9. In the course of the appraiser's investigation of the property and review of related documents, the appraiser shall consider the results of a site assessment report.

10. The report shall discuss the effect of the exceptions to title on fair market value.

11. The report shall discuss and conclude whether there has been an implied dedication of the property to the public due to the public's use of the property without challenge by the owner.

12. The report shall include a reconciliation and final value estimate, with an explanation and support for all conclusions. The report shall include any departures taken in the development of the appraisal.

13. The report shall be prepared and include a signed certification by a California licensed appraiser.

State of California
Department of Water Resources
Urban Streams Restoration Program
Land Acquisition Cost Schedule

Agreement No. P13-047
SAP Contract No. _____
Exhibit E

Stream Name:

Indicate fee or easement:
Willing Seller? (circle one) Y / N

ACQUISITION BUDGET				
I. Land Value	**DWR Share**	**Other Share**	**Other Share Description**	**Total Cost**
Fair market Value				
Improvements				
Other				
Subtotal				
II. Associated Costs				
Preliminary Title Report				
Appraisal				
Site Assessment				
Negotiations				
Surveying				
Escrow				
Other				
Other				
Subtotal				
III. Other Costs				
Administration				
Contingency				
Subtotal				
Grand Total				

NOT APPLICABLE

ACQUISITION SCHEDULE		
Description	**Date**	**Comments**
Submit preliminary title report and vesting documents for State review.		
Submit appraisal and site assessment report for State approval.		
Submit instruments of conveyance, escrow instructions, and purchase agreements for State approval		
Close of escrow and complete acquisition		