San Luis Obispo County
Flood Control and
Water Conservation District

FEBRUARY 2004

Nipomo Drainage and Flood Control Study

FINAL REPORT

RMC
Raines, Melton & Carella, Inc.
Consulting Engineers/Project Managers
In Association with:
Essex Environmental & Questa Engineering Corp

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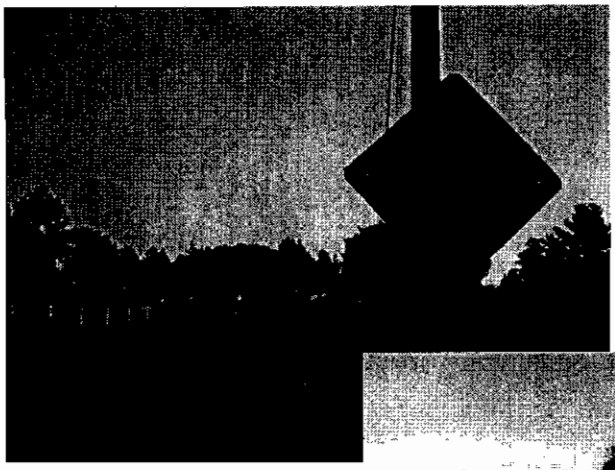

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FINAL REPORT ADDENDUM

This addendum is in response to the Nipomo Community Advisory Council (NCAC) Review Committee's comments dated February 10, 2004, on the Drainage and Flood Control draft report.

Executive Summary Comments

Comment 1: The enforcement of Building Code requirements should be used to mitigate existing structures that are now subject to flooding problems. For example, on page v, under "Elevation Requirements and Mountable Berms," we recommend that the county clarify a policy that designate as 'Existing Non-conforming' all structures and out-buildings in the flood zone of Nipomo's Olde Towne that have been constructed at a grade of less than one foot greater than the adjoining grade. That county policy should state that such non-conforming structures could not be altered, modified, remodeled, added to, or improved upon, if the reasonable cost for such "added work" to the existing structures is greater than, say, $10,000. If the cost for such work is $10,000 or greater, than then those structures would be required to be razed and a new building permit would required for a replacement structures that conform to the requirement of one foot greater than the adjoining grade. All other current building code requirements would also apply to the new building permit.

a. We believe that the property owner should be allowed to propose on-site grading and flood control improvements of $10,000 or greater cost value, but not less than the cost proposed for the proposed added work. If such grading and flood control work is proposed, and is subsequently approved by the county, we believe that the desired "added work" should be appropriately processed for a building permit, as long as the approved grading and flood control work is performed as a mitigation measure on the site.

Response 1: As written in Section 3.6.3 of the final report, the County has adopted standards to protect against flood damage to homes located within the 100-year floodplain. The flood damage protection standards are included in the County's Land Use Ordinance (22.07.060 et seq). The criteria applicable to residential development in general are:

- Structures shall not be built in the "floodway." The floodway is defined as the portion of the floodplain necessary to convey the 100-year flood if the channel is improved to County criteria.
- Finish floor elevations of residences shall be (at least) one foot over the level of the 100-year flood elevation.

Many homes located within the 100-year floodplain were built prior to adoption of this ordinance. These homes are most susceptible to flooding because they were typically built at grade and are often located below the adjoining street grade.

San Luis Obispo County possesses the authority to pass new land use ordinances that requires all residential dwelling units located within the FEMA 100-year

flood hazard zone (100-year floodplain) to conform to the County's current Land Use Ordinance (22.07.060 et seq). A new ordinance could require that all residential single or multifamily dwelling units undergoing remodeling improvements that are valued at $10,000 or greater than the current property value (or a certain percent or greater than the current property value) would need to conform to the County's Land Use Ordinance (22.07.060 et seq). The County's Department of Planning and Building would investigate the cumulative impacts of passing such an ordinance in Olde Towne and other communities in the County prior to drafting a staff recommendation to the Board of Supervisors.

The County Board of Supervisors received and discussed the final six community drainage and flood control studies at their Board meeting on March 9, 2004. As part of their action, the Board directed the County Public Works and Planning and Building staff to jointly review and report on recommendations relative to County drainage regulations, management, planning, processing and approval, including possible modifications to current rules, ordinances and policies. This item will be included in the staff review of existing ordinances and policies.

Comment 2: On page iv, in Table ES-2, under Tributary 1, Near Sea and Mallagh Streets, the solution recommended in the report is too segmented at Sea and Burton. The report should re-consider its recommendation and provide for a single conduit rather than a series of small segments.

Response 2: If properly maintained, the existing roadside drainage ditches should possess sufficient capacity to meet the County's current standard for minor waterways (minor waterways have a drainage area of less than one square mile and are designed for an average storm recurrence interval of 10 years with freeboard). The proposed culverts at Mallagh/Sea and Burton/Sea are intended to increase the conveyance capacity of the crossings, and to prevent runoff from backing up in the roadside ditches and causing shallow flooding at roadway intersections. Constructing a continuous storm drain in Burton and Sea Street would convey storm runoff underground and would also be designed to convey the 10 year storm. A storm drain would require far less maintenance when compared to an open roadside ditch. From a capacity perspective, an underground storm drain and a properly maintained drainage ditch should be equal.

Constructing 700 feet of 30-inch diameter storm drain to replace existing roadside drainage ditches would cost approximately $126,000. The total project cost (includes engineering, design, administrative, environmental and contingency) is approximately $227,000. Compared to the cost in Table ES-2 for improving existing roadside drainage ditches and installing culverts at road intersections, installing a new storm drain would more than double the total project cost and provide minimal benefit to storm runoff conveyance.

Comment 3: On page vi, under: "Modify Existing Policies…", we strongly agree with the recommendation that the County modify existing planning standards and policies.

Response 3: Comment noted.

Comment 4: On page vi, under: "Modify Existing Policies…", we strongly agree with the statement that "County Drainage Standards and Policies specify the responsibility of onsite runoff management as belonging to residents; however, no specific sanctions and no consistent procedure are available to *[oversee, provide necessary guidance and engineering control, and]* enforce maintenance of local facilities." [The words in italics represent our additional comment to the quotation].

Response 4: The County does provide guidance to residents and businesses on sizing storm detention facilities. As discussed in Section 3.9.4, the County's handout "Drainage Plan Required in Nipomo" generally describes the drainage requirements for the Nipomo area. This section of the report also recommends that the handout include education material on proper maintenance of drainage facilities on private property, and also the consequences of filling in or neglecting infiltration basins.

The County has served as a leader in providing guidance to the community to improve drainage and prevent flooding. However, without enforcement authority, the County lacks the legal nexus requiring that homeowners properly manage onsite runoff. Final report section 3.9.2.2.2 discusses and recommends increased enforcement authority for drainage issues. This item also will be included in the County staff review of existing ordinances and policies.

Comment 5: On page vi, under "Modify Existing Policies …", we strongly agree with the statement that planning standards and policies need to be implemented. We recommend the establishment of a task force of local Nipomo residents, or of the Nipomo Community Advisory Council (NCAC), that will work with the county and local community representatives to explore low cost interim watershed maintenance and management solutions, such as: a license agreement, or easement with upstream landowners to use agricultural land for the installation of check basins, and retention basins to better manage storm runoff.

Response 5: If the community supports the construction of detention basins to store peak runoff from large storm events, then early coordination with landowners is imperative to securing available land. The proposal for a detention basin is a long-term, permanent solution. The commenter proposed a license agreement or easement as a low cost interim watershed maintenance and management solution. It is unclear to the project team why a license agreement or easement is considered a low cost interim watershed maintenance and management solution. Section 3.9.6.2 recommends coordination with the agricultural community to ensure that farm operations do not increase erosion within the channel or result in blockage of the channel.

Regarding the creation of a task force, a lead agency for Nipomo has not been confirmed. As discussed in Section 2.1.4.1 of the report, the Nipomo Community Services District (NCSD) has authority to provide drainage services and was recommended to serve as the lead agency for the proposed projects. However, the NCSD voiced concern over serving in the lead role and did not provide a formal response regarding their position. Until the issue regarding who will serve in the lead role is resolved, the formation of a task force to work with the County or the apparent lead agency is premature.

Comment 6: On page iv, under "Modify Existing Policies …", we request that county staff meet with local Nipomo community representatives to consider specific creek and floodplain maintenance and management standards on Delieissihues Creek, between Thompson and the end of Mallagh to maintain or improve floodplain capacity in the area. The standards could include consideration for the best management practices for constructing effective bank resloping, slope stabilization, construction of retention and detention basin, grading and widening of channel courses, etc.

a. In the stretch between Mallagh and the main stem, annual debris and interfering vegetation removal is recommended.
b. The rerouting of the existing channel to remove the "oxbow" turn located near the end of Mallagh, and the re-establishment of the channel between Thompson and Mallagh, and
c. Sediment removal, creation of buffers with roads, and stream-bank revegetation. A critical location for this work is just upstream of the High School footbridge.

Response 6: County staff is available to meet with community representatives to discuss the development of floodplain maintenance and management standards for area creeks. It should be noted that the proposed project on Deleissigues Creek discussed in Section 3.8.1 of the report did not include reconfiguration of the channel. Widening and re-aligning the channel will result in an increase in project costs and environmental permitting.

Comment 7: On page v, under: "Increase Retention Basin Capacity Design", we strongly agree with statement in the last sentence of that paragraph, recommending that the basin volume criteria be revised to include sufficient capacity to store tributary and street runoff.

Response 7: Comment noted.

Comment 8: On page v, under: "Increase Retention Basin Capacity Design", we request the addition of additional retention basin capacity design criteria that, wherever possible, drainage and retention basins shall be:

a. Designed for multi-use purposes, as pocket parks for example.
b. Designed as visually attractive components of private property development.

c. Designed with gradual sloping sides that encourage multiple uses be the development, when the basin is not needed for control of storm runoff.
d. Designed with the aesthetic appearance of graded basins in mind, especially for retention basins that would be considered adjacent or abutting Thompson. Motorists that enter Olde Towne will see such basins. Thompson should be designed so that such basins do not appear as 'eye sores.'

Response 8:

a. Whenever possible, a single large detention basin that serves multiple residences and also serves as a park is preferred over many single property detention basins. The concept of a large detention basin was implemented in recently completed subdivisions in the Mesa (e.g. on Division near Las Flores). However, for infill development, the only option is to construct individual basins. The County's handout on basin capacity is intended for individual home owners. An equivalent offsite facility would be applicable if an entire neighborhood mobilized to convert a vacant parcel to serve as a regional detention basin in order to remove individual lot basins.

b. Many homes have created decorative basins in their front or back lawns (e.g. homes along Las Flores). The aesthetic quality of the basin is left to the discretion of the home owner. It may be possible for the local community to encourage the County's Planning and Building Department to develop specific guidelines on visual components of the basins.

c. Multiuse regional basins with gently sloping sides would be preferred. This paragraph in the executive summary and Section 3.9.4 was intended for individual lot basins, and not large regional basins. If regional basins in Olde Towne are implemented, then other uses (such as recreation) can be considered during the design phase.

d. See response b above.

Comment 9: On page v, under: "Improve Drainage Systems …", in the second paragraph starting with the words "It is recommended …", provide an explanation as to how development fees would be levied, the mechanism recommended for implementing the development fee program, and how such finds would protected for the excusive use for the intended drainage improvements. We strongly support this recommendation, but have grave concerns that such funds would not be protected for the intended use and would be used by the county for other programs.

Response 9: The proposed fee would fund drainage improvements that mitigate impacts resulting from increased development. The alternative to paying a fee would be for a proposed development to install the improvements themselves, pending County approval.

Section 5.2.2.5 discusses development impact fees and the government code authorizing the collection of development fees to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Development impact fees are tied to either General Plans or Capital Improvement Programs and can be approved by a majority of the Board of Supervisors.

Fees are typically paid when applications are filed with the County's Department of Planning and Building. In this case, the submission of a building or tract map application would be the nexus for collecting development fees to fund drainage improvements. For example, in Cambria, development fees are collected for the Lodge Hill south area to mitigate for erosion impacts associated with increased runoff caused by development. The County would collect a similar fee to fund improvements in Nipomo.

The County would be responsible for ensuring that the collected fees were saved in a capital reserve fund exclusively for the use of drainage improvements in Nipomo.

Comment 10: We recommend that the drainage systems of the Olde Towne study area all be improved to the design standard of a 25-year storm event.

Response 10: Designing and constructing ALL drainage improvements to convey the 25-year storm will result in oversized roadside ditches, curbs, gutters, drop inlets and culverts. The cost to replace all existing minor waterways to conform to a design standard equivalent to a secondary waterway would be cost prohibitive and the financial impacts should be analyzed prior to recommending such a policy. The recommendation to establish a minimum design standard that ALL drainage improvements convey the 25-year storm is not justified due to the additional costs anticipated to conform to this increased level of protection.

Some consideration could be given to establishing a minimum design standard for creek culvert crossings only. All creek culverts or bridges could be designed to pass the 25-year storm with freeboard (unless the creek is a major waterway and designed to convey the 100-year storm). This would impact Hermrick Creek, Tributary 1 and Knotts Street v-ditch, which are considered minor waterways and were designed to convey a 10-year storm with freeboard. This recommendation will increase the project costs outlined in the report, however to a lesser extent than for a more encompassing standard.

If the intent of this recommendation is to prevent flooding from a 100-year storm event, then increasing the minimum design standard to a 25-year storm event will not achieve this objective. Constructing detention basins in the upper watershed or raising homes above the 100-year floodplain are the only options for reducing flood damage potential from a 100-year storm event. The proposed recommendation will reduce the nuisance flooding problems associated with more frequent, less severe events.

Comment 11: On page vi, under: "Maintenance on Existing Facilities", we agree with the principle of the recommendation that maintenance of drainage channels should be done by the owners of the affected property. However, the county recommendation should offer the knowledge and expertise of its government staff to assist these property owners by:

a. Providing engineering and planning expertise to streamline permitting, provide instruction, give consultation and on-site guidance, and help coordinate the work by private property owners.
b. Coordinating, training and cooperating with upstream landowners facilitate maintenance work in streambeds of their upstream properties. The major public safety and public benefit of this practice by the county is to promote best management practices that protect the health, safety and welfare of the Nipomo community that is downstream of that proposed maintenance work. We believe that the maintenance work of upstream property owners in streambeds has the value of a public work, because the downstream residents and landowners directly benefit from their maintenance work.
c. The county must not abdicate its responsibility to assure appropriate maintenance that reduces liability for damage to downstream property.

Response 11: The County will continue in its current role and be responsible for maintenance of culverts within public right-of-way. It should be reiterated that the NCSD was formed with the powers to construct and improve bridges, culverts, curbs, gutters, and drains (per Government Code Section 61,600) as summarized in Section 2.1.4.1 of the report.

County staff is available to assist the community with programming and planning the proposed maintenance, and providing guidance on managing the creek's resources to preserve conveyance capacity and improve habitat quality. Due to staff limitations and funding constraints, the County could not serve as the lead agency in securing resource agency permits or scheduling maintenance with various land owners.

If the property owners decided to implement regular maintenance of the creeks, then the County would be willing to provide the leadership and guidance for establishing a long-term creek maintenance program. Section 3.9.5 and 3.9.6 of the report provide more detail on routine maintenance and community supported/managed programs.

Comment 12: On page vi, under: "Community Financial Support", The discussion of cost/benefit analysis to measure the implementation of projects is troubling because it forces the general community and affected upstream property owners to make decisions that have direct impact on the public good. Without a clear understanding of engineering, environmental, and planning, principles that are necessary for the preservation of public property and for public safety, such decisions, though practical and efficient in cost savings, may have the effect of

endangering public property and public safety. For this reason, the county cannot simply wash its hands and leave the decision to the property owner. The county has a fundamental responsibility to assure its constituents that it provides for public safety and it protects private property from damage within its jurisdiction.

Response 12: The County is not "washing its hands" of the responsibility to implement projects that benefit the community. If a home owner is asked to approve an assessment or property based fee to fund a capital improvement, then the County is responsible for providing the information necessary for a resident to make an informed decision. This disclosure includes the analysis of benefits gained with a particular project versus the cost of said project. This is a quantifiable criteria based on costs and avoided damages.

The criteria regarding public safety, damage to public property and quality of life are qualitative factors that would be considered by a property owner when voting to approve or reject a new tax. All these factors would be presented and discussed with the community during the implementation process.

The County or District will not use its general funding to pay for community specific mitigation improvements. In fact, property owners that benefit from these improvements are expected to pay for the construction and future maintenance of them. Due to the changes enacted with the passage of Proposition 218, the District must now have all new benefit assessments and increases to existing benefit assessments for maintenance and operations approved through an election of affected property owners. Seeking community financial support through an election is not an attempt by the County to avoid responsibility, but the reality of funding public works projects according to state law.

Comment 13: We request that the county work with the local agency, or community organization, chosen as an advocacy organization to prioritize projects and assist in cost analysis.

Response 13: The County is available to assist with the prioritization of projects.

Comment 14: On page vi, under: "Community Financial Support", The discussion of community financial support has overlooked the reality that the property owners in Olde Towne are people of modest means that can least afford to pay for the cost of repairing the storm drainage system. What have the preparers of this report concluded as to how the community will afford to pay for the repair cost? We recommend adding lower cost recommended solutions, even those that might be accomplished without an assessment.

Response 14: If they qualify, Community Development Block Grants are available to lower income residents to assist in paying the benefit assessment. An analysis on the community's ability to pay for the proposed assessment was not conducted as part of this study.

The proposed improvements were separated into two categories, the less expensive improvements to bring existing drainage facilities up to current County standards, and the more expensive improvements to build detention basins and provide 100-year level of flood protection. In order to achieve a lower cost, the proposed detention basins should be eliminated from consideration, and only the improvements that bring existing drainage facilities up to current County standards should be considered. The remaining projects should be prioritized and the lower ranking projects would be deferred until a later date. It is unlikely that any of the proposed projects could be implemented without some funding from the local community.

Comment 15: On page i, under Existing Drainage Problems, second paragraph, we whole-heartedly concur in the statement that there is a lack of code enforcement. There is a need for code enforcement of planning and building code violations. Moreover, we are dismayed that the country has not acknowledged this fact as a correctable error and has not recommended action to rectify their own in-house county code enforcement problem. Code enforcement must be an obvious low cost alternative solution that should be included the consideration of alternatives in the report. We recommend that the county immediately implement code enforcement proceedings that rectify property owner created drainage and flood problems.

Response 15: The County's Department of Public Works and the Department of Planning and Building will meet to discuss policy and enforcement changes to improve drainage and flooding problems.

Comment 16: On page ii, in the Table ES-1, in project 9, where are the drain inlets to be installed?

Response 16: Various community response surveys identified flooding in the area near W. Tefft and Mesa Road. However, the exact location and type of flooding were not listed. The potential area of flooding was difficult to verify, but was assumed to occur in the low lying area on W. Tefft between Mesa Road and Hazel Lane. The proposed drain inlets would be installed on each side of W. Tefft Street near the existing drain inlet.

Comment 17: On page iv, under "Modify Existing Policies and Standards," we strongly agree with the suggestion that a county fee be levied for necessary maintenance and improvement work that must be performed on properties where there has been a failure to properly maintain drainage facilities. We request additional discussion in the report that guarantees that fees will be levied and that the account of collected fees will be dedicated to the use intended for drainage control in the Nipomo drainage and flood area.

Response 17: A new drainage ordinance approved by the Board of Supervisors would be necessary to collect a fee for service. The purpose of the proposed ordinance is not to accumulate an account of supplemental funds for maintenance projects, but to levy a fee for service against those properties that fail to maintain drainage facilities (similar to the basis for establishing fire prevention codes). Item 2 in Section 3.9.2.2 discusses this option in more detail. After sufficient notice to the home owner, the County would have the power to enter a property and complete the maintenance. The County would then charge the owner for the associated fees and refund the account used to carry out the maintenance.

Comment 18: On page v, under "Increase Retention Basin Capacity Design," in the last sentence, we strongly agree with the recommendation that the basin volume should include capacity to also store contiguous and tributary street runoff. We strongly recommend that basin designs be further required to be built with gradual sloping sidewalls so that they may be useful for multiple purpose human and animal recreational use in their developments.

Response 18: This issue was discussed in Comment/Response 4 and 8 above.

Comment 19: On page v, under "Improve Drainage Systems …," in the second paragraph, how would development fees be preserved and protected for the exclusive use of drainage projects for which they were collected?

Response 19: This issue was discussed in Comment/Response 9 above. Section 5.2.2.5 of the report discusses development impact fees and the government code authorizing the collection of development fees to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Development impact fees are tied to either General Plans or Capital Improvement Programs and can be approved by a majority of the Board of Supervisors. Since the fees are tied to a General Plan or a Capital Improvement Program, they are required by government code and the Board of Supervisors adoption of the General Plan to be used for the specific purpose of the fee.

Section 3.7 Olde Towne Engineering Analysis Overview Comments

Comment 1: In Section 3.7.1., Table 3-15, under "Encroachment of Creek and Tributary Channels", we request the report identify:

a. Upstream land management practices that may adversely impact downstream watershed flows, especially where such practices may create erosion, runoff problems from impervious surfaces, or downstream channel flow concerns.
b. Upstream private property owners should be encouraged to learn appropriate land management practices that promote excellent watershed maintenance and management. All improvements within the upstream watershed have the potential to endanger the downstream community. The county has a role to play to encourage the construction of creek and channel improvements that minimize erosion, desilt runoff water content, create buffer zones to separate drainage flows from farm land, and that slow runoff flow. All these

improvements would greatly benefit down stream property and the safety of the community that resides there.

c. Landowners should be encouraged to join a Nipomo watershed organization and participate in the creation of voluntary best management practices.

d. A task force should formulate improved guidelines. The Task Force could include community representatives from the agricultural community, urban property owners in the Olde Towne area, as well as the NCAC and Nipomo Watershed Organization. These guidelines would be used for county code enforcement on private property.

Response 1: The comments promote a watershed approach to improving creek conveyance and bank stability. We concur that a watershed approach results in improved creek habitat and fosters better management of creek resources. Engaging the agricultural community to explore methods for reducing impacts (such as sediment deposition or creek erosion) could be one of many "next steps" taken to improving drainage in Olde Towne Nipomo.

a. Analyzing upstream land management practices that may adversely impact downstream watershed flows was beyond the scope of this study. For Olde Towne, the study focused on the largest problem which was improving existing drainage facilities to meet current minimum County standards. Hypothetical reasons for increased sediment deposition and erosion of a creek's banks could be included in the report, but without investigating the upstream land management practices, the reasons would be speculative.

b. The County's department of Planning and Building could investigate the possibility of passing ordinances that restrict farming operations or development adjacent to a creek's banks, effectively creating a setback. Section 3.9.6.2 recommends improvements to farming operations that encroach onto creek banks and increase sediment deposition into the channel. Discussion of public education regarding appropriate land management practice which minimize erosion and promote healthy creek geomorphology will be included in the staff discussions regarding revisions to current County ordinances and regulations.

c. The County is available to work with the local community in addressing best management practices for improving the watershed.

d. See response to "c".

Section 3.8.1 Deleissigues Creek Watershed Comments

Comment 1: On page, 3-29, Section 3.8.1.2, "Vegetation and Sediment Management", we request that the vegetation and management plan area be expanded to include all drainage courses and flood areas that are affected by a 25 year storm event.

Response 1: This proposal would only affect Haystack Creek and the two forks. Vegetation and sediment management is a feasible alternative for Haystack Creek and would likely increase the channel's conveyance capacity. If we assume similar unit costs for the one time vegetative clearing and similar costs for engineering, environmental and administrative tasks, the total project cost for vegetation and sediment management on Haystack Creek is approximately $452,000.

Comment 2: On page, 3-30, Section 3.8.1.2, "Vegetation and Sediment Management", we strongly disagree with the wording of this section. The majority of the creek watershed is in agricultural land. There are very few trees in the creek. Why has the report recommended tree removal and where is the "overshadowing by a tall canopy" of trees? Where are the trees?

Response 2: Reference to tree removal was intended for those trees that currently grow within the creek's channel. As stated in Section 3.8.1.2, the tree canopy would result from new trees planted outside of the floodway and main flow path.

Comment 3: On page, 3-30, Section 3.8.1.2, "Vegetation and Sediment Management", we believe that the greatest issue requiring correction is not a "shaded riverine aquatic habitat," but the need to correct the 'hair-pin turn' that the creek flow makes at a point shown in Appendix A, Figure 8, on Eve near the location of a note that points to the creek where "vegetal growth and private structures built across creek constrict flow."

Response 3: Deleissigues Creek is considered a secondary waterway and should possess sufficient capacity to convey a 25-year flood event. If the community supported a project that removed homes along Mallagh and Eve Street from the 100-year floodplain, then evaluating alternatives such as realigning the channel should be investigated.

The Federal Emergency Management Agency Flood Insurance Rate Map shows that the 100-year floodplain varies in width from 50 feet to 200 feet wide along the creek centerline. The 100-year floodplain exceeds the creek's banks near the area bounded by Eve and Day Streets at Mallagh. A detailed 2-dimensional hydraulic analysis would determine the reduction in water surface elevation that could be achieved by straightening the natural meanders in the creek. Experience on similar channel realignment projects indicate that straightening a channel might reduce the water surface elevation by half a foot. The slope and cross sectional area of the channel dictates the capacity of a channel. These improvements would assist in containing the 100-year flood event within the creek's banks, but until a detailed hydraulic analysis of straightened channel is conducted, quantifying the reduction in the water surface elevation will not be known.

An alternative to modifying the natural meander of the channel would be to build berms setback from the creek bank to contain the 100-year flow. This would

allow for the creek to remain in its current alignment and would also preserve the natural sinuosity of the channel.

Comment 4: On page, 3-30, Section 3.8.1.2, "Vegetation and Sediment Management", we strongly believe that the upstream location of the creek should have improvements that minimize erosion, desilt runoff water content, create buffer zones to separate drainage flows from farm land, and that slow runoff flow. All these improvements would greatly benefit down stream property and the community that resides there. We are concerned that the statements to remove vegetation do not address the condition of the streambeds. We fear that negative conditions will still remain that may increase the damaging effects of continued erosion and subsequent flooding.

Response 4: This response assumes that the "upstream location" referenced in the comment refers to the reach of creek upstream of Thompson Avenue. The general theme of this and previous comments are geared towards promoting environmental stewardship, restoration and protection of the upper watershed in Olde Towne Nipomo. Watershed planning is a comprehensive and visionary approach to improving creek habitat and maintaining flood conveyance capacity. However, in Olde Towne, so much is needed in terms of raising the minimum drainage standard for existing culverts that improved agricultural practices upstream of Thompson Avenue will not address or improve the recurrent flooding problems caused by moderate storms. That said, if a parallel effort to restore creek habitat is implemented along with drainage improvements, then one could expect cumulative improvements in flood protection.

The improvements proposed in Comment 4 should be categorized as restoration projects. These proposals to minimize erosion and create buffers between agricultural runoff are far beyond best management practices. Improvements that minimize erosion within the creek's channel include revegetation and establishment of riparian habitat. These improvements could result in a decrease in sediment deposition in the lower reaches within the urban corridors. However, the fact remains that the biggest issue is not erosion and sediment deposition, but a lack of conveyance capacity to contain peak flow discharges.

Comment 5: On page, 3-30, Section 3.8.1.2, "Vegetation and Sediment Management", we strongly recommend that policy is needed to maintain and improve the flood plain between Thompson and Mallagh, as shown in Appendix A, figure 7. This is primary area for future development.

Response 5: It is unclear which floodplain the comment is referring to. The largest 100-year floodplain is located on Haystack Creek, but the area between Thompson Avenue and Mallagh Street within the Haystack floodplain is developed. If the comment is referring to the undeveloped area north of Eve Street and if the comment is implying that development should not be allowed within the creek's banks, then we agree with the statement. Section 3.9.2.1 recommends that the County's

Department of Planning and Building develops a policy that establishes a minimum setback from the top of creek bank to prevent structures from encroaching on a creek.

Comment 6: On page, 3-30, Section 3.8.1.3, "Project Cost Estimate", we are concerned that the estimate shows vegetation clearance ($120,000) that does not appear to be needed from our review of field conditions. We request clarification on what that work entails. We are concerned that the cost for repair of the 'hair-pin turn' is not included. Please include this vital cost.

Response 6: An assumption was made that the entire creek reach between the confluence with Nipomo Creek and Thompson Avenue would require vegetation and/or sediment removal to restore the creek's conveyance capacity to a 25-year level of flood protection (secondary waterway criteria). If, after completing a detailed hydraulic design, it is revealed that sediment removal and vegetation management is not required on the entire creek reach, then the cost estimate will be revised. The work would primarily consist of clearing overgrown trees in the channel, removing sediment, and restoring the channel to convey a 25-year flood event with freeboard. The cost estimate did not include realignment of the channel because it is uncertain whether realigning is necessary to convey the 25-year peak discharge. If one of the criteria is to contain the 100-year flood event to the channel, then the future project would investigate realigning the channel.

Section 3.8.2 Tributary 1 Comments

Comment 1: On page 3-31, Section 3.6.2.2 Proposed Project, under "Improve Roadway Crossings …", in the second paragraph, the list of culverts and ditches to be cleaned should include the 3' by 3' culvert that crosses under Thompson.

Response 1: Field inspections conducted during the study did not indicate an accumulation of sediment within the culvert. The smaller existing culverts crossing under Mallagh Street had an accumulation of sediment and vegetation at the inlet that should be removed.

Comment 2: On page 3-31, under: "Optional Additional Facilities …", we strongly request that the detention basin proposed upstream of Thompson be designed as a visually pleasing improvement with gradually sloping side walls, so that this improvement does not detract from its appearance as a "gateway feature" for motorists that enter Olde Towne. Also, consider:

a. The installation of well maintained check dams upstream in the watershed might be a low cost alternative, with a license agreement arrangement with the landowner.
b. Utilize the open lot at Thompson, Bee, and Burton, for secondary storm water detaining capacity. We recommend that this property be landscaped with consideration for publicly accessible mixed use options, as a pocket park.
c. Increase the capacity of channels on the downstream side of Mallagh Road.

d. Install the storm drain on Burton, near Day, which is planned but not yet installed.

Response 2: If implemented, the final design of the proposed detention basin could include gradually sloping side walls and other features to enhance the appearance of the basin. The basin could also serve as a multi-use facility (such as recreation) when not being used as a detention basin. Multi-use features are proposed in the report, but the details should be developed during the design phase. Note that the configuration of this proposed basin, as well as several others, was revised from that of the draft report to illustrate a more aesthetic appearing facility.

a. Check dams are generally used in concentrated flow areas, such as vegetated ditches and swales. Check dams are not used in streams or channels for reasons described below. Check dams can either be permanent or temporary barriers that prevent erosion and promote sedimentation by slowing flow velocities and/or filtering concentrated flows.

   Check dams tend to pond water. Under low-flow situations, water ponds behind the structure and then seeps slowly through the check dam, infiltrates or evaporates. A check dam will still require sufficient land to pond runoff collected upstream of the dam. Under high-flow situations, water flows over and/or through the structure. Erosion control blankets should be used in conjunction with check dams. Erosion-control blankets are used for establishing and reinforcing vegetation on slopes and ditch bottoms. Since check dams are not built to detain high flows, this alternative would not be a feasible substitute for a detention basin which is designed and built to store the 100-year peak discharge and protect downstream properties.

   Check dams provide relatively good removal of coarse and medium size sediment from runoff. However, most fine silt and clay particles will pass over or through the voids on these structures. Check dams are used as permanent erosion-control measures, but not flood protection measures. Check dams are relatively inexpensive, easy to construct, and are effective at reducing erosion and sediment transport off site. Check dams may be more appropriate for agricultural drainage channels that drain runoff from a field to one of the creeks tributary to Nipomo Creek.

b. The proposed vacant land adjacent to Bee Street, between Thompson and Burton, was considered a potential detention basin site for Hermrick Creek, not for Tributary 1. A basin at this site would not benefit Tributary 1 because local runoff that flows to this area would be conveyed in Hermrick Creek, not Tributary 1. However, since the comment was made, a brief discussion on the feasibility of using this site as a detention basin is provided. The available land is not large enough to attenuate the peak runoff from a 100-year flood event, and adding other multi-use features like a pocket park will reduce the volume available for storage since the basin will need to be terraced to ensure

that the recreational facilities are not inundated during storms. If the proposed detention basin upstream of Thompson Avenue was not available, then this site could be designed to attenuate a peak storm, but the size would not be sufficient to attenuate the 100-year flood event. If the proposed detention basin upstream of Thompson is implemented, then this underutilized lot could serve solely as a park without the need of modifying the surrounding contours to accommodate a detention basin.

c. Section 3.8.2.2 of the report states that the channel between Deleissigues Creek and Mallagh Street should be cleared of sediment and excess vegetation. Clearing the sediment will increase channel capacity and prevent water from backing up and ponding on Mallagh and Sea Streets.

d. The study team was not aware that a storm drain is already planned but not yet installed at Burton near Day Street. The comment may be referring to the installation of a 30-inch diameter corrugated plastic pipe (as show in Figure 7 of Appendix A) by a private home builder between Day and Sea Streets. The 30-inch plastic pipe conveys Tributary 1 flows from Thompson Avenue to Burton Street.

   If the comment is referring to a new storm drain in Burton that would convey flows from Day to Sea Street, then roadside ditches along Burton Street currently convey road runoff to Sea Street and eventually to Deleissigues Creek. If properly maintained, the existing roadside drainage ditches should possess sufficient capacity to meet the County's current standard for minor waterways (minor waterways have a drainage area of less than one square mile and are designed for an average storm recurrence interval of 10 years with freeboard). Constructing a storm drain in Burton near Day Street would convey storm runoff underground and would also be designed to convey the 10 year storm. A storm drain would require far less maintenance when compared to an open roadside ditch. From a capacity perspective, an underground storm drain and a properly maintained drainage ditch should be equal.

   Constructing 500 feet of 30-inch diameter storm drain to replace existing roadside drainage ditches would cost approximately $90,000. The total project cost (includes engineering, design, administrative, environmental and contingency) is approximately $162,000. Compared to the cost in Table 3-17 for improving existing roadside drainage ditches and installing culverts at road intersections, installing a new storm drain would nearly double the total project cost and provide minimal benefit to storm runoff conveyance.

Comment 3: We strongly believe that the report has promoted the use of best management practices to solve the flood hazard issues for this tributary. It has not addressed the low area on the south side of Sea Street and an area that floods on Burton Alley, between Sea and Bee Streets. We implore the county to acknowledge the

need to avoid an eyesore for the detention basin at Thompson, as this is a location that forms a gateway to Olde Towne.

Response 3: The low areas were addressed by the proposed sediment removal necessary to clear the pathway for runoff in the roadside ditches along Mallagh Street to flow freely toward Deleissigues Creek. Four low area homes experiencing flooding were identified during the community questionnaire process and evaluated during field review.

Based on field investigations, it appears that at one point Tributary 1 flowed from Burton Street, across Sea Street and through private lots before crossing Mallagh Street and eventually discharging to Deleissigues Creek. The comment referenced Burton Alley between Sea and Bee Street as a location of flooding, but it is unclear exactly where flooding occurs. Review of street drainage patterns indicates that runoff from Burton Street currently flows in roadside drainage ditches in Sea Street to Mallagh Street, and eventually discharges to Deleissigues Creek. The proposed projects to install a 30-inch culvert at the crossings of Burton and Mallagh Streets with Sea Street, and to also clear the roadside ditches of sediment and vegetation should improve drainage and prevent flooding during average rain storms.

The County is aware of the need to design visually appealing storm detention basins. Note that the configuration of regional proposed basins was revised from that of the draft report to illustrate a more aesthetic appearing facility.

Section 3.8.3 Hermrick Creek Comments

Comment 1: Under 3.8.3.2., In the topic of Optional Additional Facilities, on page 3-33, the Fairview basin should be designed with gradual sloping sides and with landscape considerations so as to present an attractive "gateway" feature to motorists who are entering Olde Towne.

Response 1: See Response 2 for Tributary 1 comments.

Comment 2: We recommend that the county actively partner with a task force, or local community organization, to establish priorities for the selection of low cost watershed maintenance and management projects. Such low cost solutions might include:

a. license agreement, or easement, with upstream landowners to use agricultural land for such improvements as check dams, etc.
b. explore the feasibility of an open space parcel at Thompson, Bea, and Burton, for secondary detention capacity
c. annual maintenance to clear vegetated areas
c. annual culvert cleaning and sediment removal.

Response 2: The County is available to assist the local community and lead agency in developing solutions that will improve watershed management and flood

protection in Olde Towne. The County will continue to maintain existing culverts and drainage structures within the County road right-of way with available manpower and resources.

Comment 3: We believe that 'check dam' type improvements upstream in the watershed would be a significant low cost alternative for the management of the watershed.

Response 3: See Response 2a in Tributary 1 comments. Check dams are effective at reducing erosion and sediment transport off site. Preventing erosion and sediment transport should be explored on a parallel track with the implementation of drainage improvements that bring existing facilities up to the current County design standard.

Section 3.8.4 Haystack Creek Comments

Comment 1: We recommend that the county actively partner with a task force, or local community organization, to establish priorities for the selection of low cost watershed maintenance and management projects. Such low cost solutions might include:

a. license agreement, or easement, with upstream landowners to use agricultural land for such improvements as check dams, etc.
b. annual maintenance to clear vegetated areas
c. culvert cleaning and sediment removal, such as at North fork crossing at Tefft Street.
d. Enforcement of code violations and channel encroachments in urban areas on the North and South forks.
e. Bank stabilization and culvert improvements to direct and contain flow

Response 1: a and e. The County is available to assist the local community and lead agency in developing solutions that will improve watershed management and flood protection in Olde Towne.

b and c. The County will continue to maintain existing culverts and drainage structures within the County road right-of way with available manpower and resources.

d. The County's current code enforcement process with regard to creek encroachment should be evaluated by County staff to determine if adequate controls exist to correct reported violations. The creeks in these locations are generally located on private property, and monitoring is extremely difficult. Report Section 3.9.5 recommends the establishment of a drainage facility maintenance department. This issue will be reviewed by County staff relative to recommendations to revise existing drainage policies and regulations.

Comment 2: We believe that 'check dam' type improvements upstream in the watershed would be a significant low cost alternative for the management of the watershed.

Response 2: See Response 2a in Tributary 1 comments. Check dams are effective at reducing erosion and sediment transport off site. Preventing erosion and sediment transport should be explored on a parallel track with the implementation of drainage improvements that bring existing facilities up to the current County design standard.

Comment 3: Include the replacement of the Thompson culvert with an arch culvert, as originally recommended in the study as part of phase II Olde Towne Improvement Plan. Explain why the prior design for an additional culvert at Tefft and Avocado in the technical draft was excluded from this draft.

Response 3: Replacement of the existing Haystack Creek culvert at Thompson with an arch culvert is proposed in the report in Section 3.8.4.2. An additional double 6' by 4' culvert to be installed adjacent to the existing culvert on Haystack Creek north fork at the Tefft Street crossing near Avocado is proposed in Section 3.8.4.2 of the final report.

Comment 4: In Appendix A, Figure 7, titled "Existing Drainage Facilities," on the drainage path of Haystack Creek, at the confluence of Haystack Creek South Fork and North Fork and downstream of the confluence, we are concerned the report has not adequately addressed slope stabilization, buffer zones, channel vegetation clearance and other channel protection work necessary to protect adjacent private property.

Response 4: The primary issue regarding flood protection on Haystack Creek is the lack of conveyance capacity in the existing culverts. Although not addressed directly for Haystack Creek, the proposed vegetation clearing and sediment removal project for Deleissigues Creek could be applied to Haystack Creek as discussed in Response 1 for the Deleissigues Creek comments. Recommendations discussed in Sections 3.9.5.1 and 3.9.5.2 address creek and culvert maintenance, vegetation removal, bank protection, and trash removal that will improve flood protection for adjacent properties. The creeks in these locations are generally located on private property, with maintenance the responsibility of the property owners. The property owners must be active supportive advocates for any remedial project to be successful.

Comment 5: In Appendix A, Figure 7, titled "Existing Drainage Facilities," along the North Fork of Haystack Creek, we are concerned that the report has not adequately researched and addressed the channel flow characteristics and the flow capacity of the existing open-cut earth channel and the under pavement culvert in Tefft. We strongly support the county's recommendation to include this drainage and flood control work in the project.

Response 5: The study did not collect survey information necessary to quantify the channel capacity of Haystack Creek. If the proposed arch culvert projects proceed to

design, then survey information should be collected to determine the conveyance capacity of Haystack Creek and the two forks.

Section 3.4.1 Mesa Comments

Comment 1: The Committee reviewed the drainage and flooding problems in the Mesa area of the report. In general, our findings were found to be best described along with the other comments already presented regarding the Executive Summary section of the report. The comments included the following general areas:

a. retention basins need to be designed to include tributary street flow.
b. roadway drainage needs to be maintained and culverts need to be regularly maintained.
c. code enforcement is needed to re-establish retention basins and to clarify drainage responsibilities of upstream property owners.

Response 1: Responses to the Executive Summary Comments address these comments, specifically Responses 4, 8, 11, 15, and 18.

General Comments on the Figures appearing in the Appendices

Comment 1: Our field check of the watersheds in the Olde Towne area revealed that the map figures in Appendix A have left out significant channel drainage and flood control issues.

Response 1: More information, specifically location of problems, is needed from the commenter to quantify and discuss the drainage problems purported to have been excluded from the study.

Comment 2: We observed several instances of inaccurate map descriptions. For example, a small sample of what we observed includes:

a. In Appendix A, Figure 8, along Deleissigues Creek, the map does not accurately depict the "oxbow" turn of the channel at the north end of Mallagh.
b. In Appendix A, Figure 8, the culvert on Tributary #1 between Thompson and Burton extends further to Burton than is shown.

Response 2: The creek alignments shown in the figures identify the general location of creeks in relation to the reported drainage and flooding problems in Olde Towne. Aerial mapping and topographic surveys were not collected for this project. Therefore, any figure identifying a creek's alignment should be considered an approximation.

The culvert installed by the home owner on Tributary 1 was corrected in the final report.

EXECUTIVE SUMMARY

This report is a summary of findings, conclusions and recommendations of the Drainage and Flood Control Study conducted for the Community of Nipomo. This report was prepared under the direction of the County of San Luis Obispo Public Works Department.

In response to questions raised by several citizens who experienced flood damage to their homes and businesses during the unusually heavy rainfall period of March 2001, the County Board of Supervisors approved funding for Drainage and Flood Control Studies for the communities of Cambria, Cayucos, Nipomo, Oceano, San Miguel, and Santa Margarita. The goals of the studies were intended to quantify the extent of drainage and flooding problems of each of these communities, to generate recommendations for solutions for the drainage problems, to identify environmental permitting requirements, to provide planning level cost estimates, and to outline a plan for funding and implementation of the proposed solutions. This study was funded through the General Flood Control District Budget.

Overview of Responsibility

The responsibilities for drainage are administered through the San Luis Obispo County Flood Control and Water Conservation District (District). **The District is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in unincorporated public areas where no other agency has assumed an active role in such activities**. The District has a regional role in the County and can work with individual cities or communities when requested. **The District uses its general funding to identify water related issues, to determine solutions to those problems and to help those local areas implement recommended solutions. The District is not, however, responsible for paying for community-specific mitigation improvements. The specific property owners that benefit from these solutions must agree to pay for the construction and future maintenance of them**. This policy (Resolution 68-223) was formally established by the Board of Supervisors in 1968. The policy was adopted because there is not sufficient funding available for the District to fund construction and operation of facilities. This approach provides the best leveraging of the funds that are available.

The District is restricted in the way it can fund needed projects or increase revenues for existing operations. It is generally limited to an assessment district procedure for obtaining financing for the construction of new projects. Due to the changes enacted with the passage of Proposition 218, the District must now have all new benefit assessments and increases to existing benefit assessments for maintenance and operations approved through an election of affected property owners.

Existing Drainage Problems

MESA

The Mesa's flooding and drainage problems reported by residents are primarily due to standing water along County roadways, although some reports of runoff from the roadway on private property were made. **The standing water appears to be the result of the undulating terrain of the Mesa, lack of maintenance of the existing drainage infrastructure, and development grading which blocks previously existing runoff flow paths**. The Mesa's undulating topography creates numerous depressions, including low spots having no outflow drainage paths, which lead to a high incidence of localized ponding.

To prevent the ponding, the current drainage infrastructure is primarily based on individual parcel runoff retention and infiltration, which prevents runoff from leaving each developed site. However, the gradual loss of individual basin retention capacity over time has increased basin overflow frequency and runoff from the individual sites. Current County Drainage Policies and Standards lack sufficient enforcement provisions to

ensure that the drainage and infiltration infrastructure is maintained. In some areas, the regrading of land during development cause previously existing flow paths to become blocked, causing ponding in areas which had previously been drained.

OLDE TOWNE

Much of Olde Towne is located within a 100-year flood hazard zone. These areas have been identified by FEMA as subject to flooding during a 100-year rainfall event. The lower lying areas near the creek and tributary channels may also be subject to flooding from more frequent rainfall events due to inadequate local drainage facilities to convey urban runoff from homes and streets to the creeks.

The major flooding problems in Olde Towne result from flood flows breaking out of one of the five creeks flowing through the urban areas of Olde Towne. A majority of the culvert crossings in Olde Towne do not meet the current minimum County standard. The culverts within Olde Town are generally not sufficient to pass the 10-year flow rate without surcharge, although some can pass higher return period storms with surcharge. The culverts and crossings along Haystack Creek, with exception of the newly installed arch at the Tefft Street crossing, are generally insufficient to carry the 10-year flow, when the minimum standard requires sufficient capacity to pass the 25-year flow. If the channels and culverts were designed per the County's standards for Major and Secondary waterways, then the threat and frequency of flooding from large storms would be reduced because the facilities would have sufficient capacity to convey the peak storms.

Maintenance of existing drainage structures is lacking in Olde Towne. The creek channels, culvert crossings, and roadside ditches need restorative and periodic annual vegetation management and sediment removal. **Conducting necessary maintenance on creeks in Olde Towne is complicated not only by the regulatory permit approval process, but also by the location of most creeks within private property. The County was not granted a drainage easement on any of the creeks in Olde Towne and therefore can not perform routine maintenance or channel clearing on any reach of creek outside of public right-of-way**.

Proposed Projects

MESA

The most common problem in the Mesa is the collection and ponding of storm runoff along road shoulders. Conceptual projects aimed at reducing standing water impacts were developed for the flooded areas that received the greatest number of public response comments. The reader should note that this problem has resulted from the evolution of the paved road initially constructed, then subsequent development along the paved road restricting and trapping runoff, leading to the current ponding. The proposed projects can also generally be applied to the flooding problems which received fewer complaints. The proposed projects were based on limited field information and elevation data. The proposed projects include raising road grade elevations, installing retention basins, storm drains and drop inlets, and also conducting maintenance on existing facilities to improve flow conveyance. Each proposed project will function independently to solve a local flooding or drainage problem.

The total estimated cost for the 11 proposed projects is approximately $840,000. Table ES-1 summarizes the proposed projects and also provides estimated costs and implementation timeframes.

Table ES-1: Mesa Summary of Proposed Projects

PROJECT	PROBLEM AREA	PROPOSED MITIGATION	COST [1]	APPROXIMATE IMPLEMENTATION TIME FRAME [2]
1	N. Las Flores near W. Tefft	Raise road elevation	$116,000	3 to 4.5 years
2	Pablo Lane near La Cumbre Lane	Raise road elevation/Install basin	$147,000	3 to 4.5 years
4	Osage Street near Eucalyptus Road	Raise road elevation/Install basin	$141,000	3 to 4.5 years
5	Tejas Place near Osage Street	Remove curbside blockage/Install basin	$44,000	3 to 4.5 years
7	Division Street north of Shiffrar Lane	Install retention basin/storm drain	$87,000	3 to 4.5 years
9	W. Tefft Street near Mesa Road	Install drain inlets	$36,000	3 to 4.5 years
10	Division Street near S. Las Flores	Install drop inlet/modify basin	$44,000	3 to 4.5 years
11	Calle Del Sol and La Cumbre	Overflow pipeline/energy dissipator	$225,000	3 to 4.5 years

Notes:

1. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative and Environmental, and a 20% Contingency. Typical estimates used for County Overhead & Support Costs for Construction Project Planning. Use 80% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).
2. See Table 6-1 for detailed milestone durations. If a lead agency is in place, then decrease the duration by approximately 9 to 12 months. The length of time will be effected if cultural resources are determined to be present during the CEQA phase.

OLDE TOWNE

The proposed projects for Olde Towne are typically culvert replacement projects to raise the design standard of most street crossings and conform to the County's current standards for minor, secondary and major waterways. The community can also pursue projects that provide 100-year level of flood protection and could potentially remap the FEMA flood hazard zone, removing homes and businesses from the 100-year floodplain. The proposed Deleissigues Creek vegetative management and sediment removal project, and the proposed detention basins could potentially impact jurisdictional waters and sensitive species habitat. Mitigation would likely be required by the resource agencies to offset any impacts to habitat.

The potential for habitat impacts presents permitting challenges and increases the level of complexity that must be addressed during the environmental documentation and permitting phase, and with the appropriate design features and mitigation, these impacts can be reduced to a less than significant level. Constant communication with the resource agencies during the design and permitting phase will be necessary to ensure that their concerns are addressed and that appropriate features required by the permits are designed into the project.

Just as important as the structural improvements, the community should form a drainage facility maintenance department. Routine maintenance of the roadside drainage ditches and culverts would minimize flooding problems associated with the more frequent moderate storms. The community's maintenance department would also be responsible for implementing a long-term maintenance program for the creeks to remove sediment, manage vegetation and ensure that the natural resources are protected during routine maintenance.

The community should also implement a community awareness campaign to educate residents living alongside creeks on preserving the creeks' conveyance capacity by not disposing of trash or storing household items in the channel. Informing and educating the community on the benefits of maintaining clean creeks will help Nipomo achieve multiple objectives from flood protection to creek restoration. The educational programs could also assist the community on how to prepare for the rainy season. Much like annual maintenance, awareness and preparedness are on-going activities.

Table ES-2: Olde Towne Summary of Proposed Projects

PROJECT	PROBLEM AREA	PROPOSED MITIGATION	COST [1]	APPROXIMATE IMPLEMENTATION TIME FRAME [2]
Deleissigues Creek	Thompson Road to Nipomo Creek	Vegetation maintenance	$387,000	3 to 4 years
Tributary 1	Near Sea and Mallagh Streets	Install culverts and conduct maintenance to meet County design standards for minor waterways	$171,000	3 years
Tributary 1	Urban Drainage Area	Install detention basin east of Thompson Road to store runoff greater than a 10-year flood event.	$253,000	3 to 4 years
Hermrick Creek	Burton and Mallagh Culvert Crossings	Replace existing culverts to increase capacity and meet County design standards for minor waterways	$108,000	3 years
Hermrick Creek	Urban Drainage Area	Install detention basin east of Thompson Road to store runoff greater than a 10-year flood event.	$412,000	3 to 4 years
Haystack Creek	Tefft, Thompson and Mallagh Crossings	Install culverts on the North Fork of Haystack Creek at Tefft Street, replace the existing culverts with arch culverts at Thompson and Mallagh. Erosion protection measures at Thompson and Mallagh.	$1,746,000	3.5 to 4.5 years
Haystack Creek	Urban Drainage Area	Install detention basin east of Thompson Road to store runoff greater than a 25-year flood event.	$2,267,000	4.5 to 5.5 years
V-Ditch Replacement	Knotts Street	Replace existing v-ditch open channel with an underground storm drain.	$669,000	3 years

Notes:

1. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative and Environmental, and a 20% Contingency. Typical estimates used for County Overhead & Support Costs for Construction Project Planning. Use 80% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).
2. See Table 6-2 for detailed milestone durations. If a lead agency is in place, then decrease the duration by approximately 9 to 12 months. The length of time will be effected if cultural resources are determined to be present during the CEQA phase.

ADDITIONAL RECOMMENDATIONS

FEMA Community Rating System

Nipomo should participate in the Community Rating System (CRS). The CRS gives credit points for any of several designated activities within four distinct categories (Public Outreach, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness). As points are accumulated, a community will receive one class reduction starting at class 9 all the way down to class 1. Each class translates to an additional reduction in insurance premiums of five percent for flood insurance policies within the special flood hazard area of that community.

Modify Existing Policies and Standards

Modifications to existing County planning standards and policies are also recommended to reduce the risk of flooding for residences developed in low lying areas, and to provide the County with greater enforcement capabilities regarding maintenance of individual homeowner retention basins. County Drainage Standards and Policies specify the responsibility of onsite runoff management as belonging to residents; however, no specific sanctions and no consistent procedure are available to enforce maintenance of local facilities. A drainage ordinance allowing the County to levy a fee for service against those properties that fail to maintain drainage facilities should be considered. Retention basin inspections and upgrades to meet current drainage standards could also be required during transfer of property ownership to ensure that basin sizes can accommodate runoff generated from impervious area on the lot.

County policies should be updated to provide the Department of Public Works with sole review and approval responsibilities regarding drainage infrastructure for development. Modify existing County standards for undrained depressions to include all of the smaller localized sump areas to reduce structure flooding risk.

Increase Retention Basin Capacity Design

The current sizing requirements of the basins are based on providing adequate volume for 4 inches of rainfall on the impervious area of the property. The sizing of the basins are based on the impervious surface area of the parcel only, however, the basins are often the discharge point of street runoff and overflow from neighboring properties. The County should consider revising the basin volume to include sufficient capacity to store street runoff also.

Elevation Requirements and Mountable Berms

Homes located below street grade and whose driveways slope down away from the road may experience flooding in the garage or home. This is because without an adequate curb/berm, the driveway may act to convey runoff from the street above to lower elevations and sometimes into the garage or home. For homes outside the floodplain, it is recommended that County land development ordinances be revised to mandate that the finish floor and garage elevation for all new home construction be one foot greater than the adjoining street grade, wherever feasible. Driveways should slope down away from the home, towards the road. It is also recommended that these County ordinances mandate the installation of a County standard mountable berm (or acceptable alternative) for all driveways/accesses to structures which are below the edge of pavement.

Improve Drainage Systems as the Community Develops

Drainage improvements should be planned with any proposed development. Regardless of whether drainage problems exist prior to development, mitigation should be planned so as not to increase the severity or frequency of problems. Such mitigation could include on-site detention of runoff, thereby preventing the increase of runoff onto lower lying properties.

It is recommended that future development fees collected for Nipomo be used to fund drainage improvements for areas that will be most impacted by future development. These areas are typically the topographic low points within a drainage sub-basin. If new development can not retain runoff on site, then a means shall be provided for new development to fund compensable improvements to convey and/or store increased runoff.

In conjunction with planning drainage improvements with future development, critical lots that are at risk to flood damages due to their location should be identified. These lots should dedicate drainage easements on their property or design sufficient conveyance facilities as not to impede the flow of storm water.

Form a Drainage Facility Maintenance Department

It is recommended that a facility maintenance district be formed to better maintain the drainage infrastructure in Nipomo. Responsibilities of the new maintenance district would include: (1) being the contact point for all resident complaints regarding drainage infrastructure in the community; (2) keeping an organized database of all new drainage infrastructure in the community including the size and capacity of culverts and storm drains, even if this infrastructure is installed by private property owners; (3) keeping a regular maintenance schedule that may involve multiple maintenance visits where needed; and (4) responding to drainage infrastructure repairs as needed. Having a localized facility maintenance district will make it easier to maintain drainage infrastructure as needed throughout the community.

Maintenance on Existing Facilities

Existing natural or constructed drainage channels should be kept free of obstructions such as fallen trees, debris, and sedimentation to maintain capacity in the drainage system. Primary responsibility for this maintenance should rest with the owners of the property through which the drainage channels pass since the County is not responsible for maintaining facilities on private property. If the drainage channels pass through public property, such as County roads, then the County's maintenance department would be responsible for removing impediments. The District should continue to provide leadership, advice and encouragement to property owners and local agencies to assume these responsibilities.

Implement Long-Term Creek Maintenance Program

It is necessary to remove sediment and debris from creeks that are deposited after peak flow events. Maintenance crews spend most of the summer and fall months accomplishing this task before the fall rains begin. The major types of routine stream maintenance activities include sediment removal, vegetation management, and bank protection.

Implementation Strategy

The most effective approach for improving drainage and flooding problems in each community is to identify the problems, develop solutions, and then create a local entity to implement the solutions. The role of the District is to assist the community in determining the improvements necessary to reduce flooding, and then to assist them in implementing programs to improve protection. **Since the Nipomo Community Services District has authority to provide drainage services per Resolution 18-65 (see Appendix D for scanned image of resolution), it is recommended that the NCSD assume the role as lead agency for implementing the drainage projects**.

The District will continue to use its general funds only to provide programming and project initiation services so that communities can better understand the drainage problems they are facing, and determine how those problems should be solved. The proposed projects for Nipomo totaled approximately $6.9 million. If the lead agency in Nipomo established a funding source, the following approximate annual revenue would have to be generated by the community in order to build all the projects and pay off a municipal bond[1]:

- Mesa improvements, $60,000 per year
- Olde Towne improvements to current County design standard, $219,000
- Olde Towne storm detention basins, $208,000

[1] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years.

Community Financial Support

If the residences benefiting from these projects calculate that their average annual damages due to flooding are less than the assessment or fee necessary to mitigate the flooding, then the community might conclude that risking flood damages is economically beneficial. In other words, the benefits gained are less than the cost of the project. A discussion of flood protection benefits versus project costs should be conducted with the community in order to measure the interest in implementing a project. The discussion would explore whether the community is willing to financially support a project if the costs exceeded the benefits.

IMPLEMENTATION STEPS

It is recommended that the following implementation steps, in general, be followed for the proposed projects.

- Fund and complete a Basis of Design Report[2] within 9 to 18 months of start (depends on complexity of project. Projects in Olde Towne were more complex from an engineering and environmental perspective.)
- Conduct benefit assessment or property based fee proceedings
- Design project, prepare environmental documents and resource agency permits
- Advertise for construction
- Construct project

The phasing of projects would depend on the residents' desire to implement projects within their neighborhood. The primary difference in the implementation steps for each project involves the complexity and the level of CEQA documentation required for the detention basins, creek maintenance, culvert replacement, and road improvement projects. The majority of projects in the Mesa and Olde Towne qualify for a Negative Declaration or Mitigated Negative Declaration because each has the potential to affect cultural or sensitive resources. However, some projects qualify for Class I Categorical Exemptions because they involve minor alterations to existing public facilities.

SCHEDULE FOR IMPROVEMENTS

Chapter 6, "Implementation Strategy" includes more detail regarding task durations for projects in the Mesa and Olde Towne.

[2] The Basis of Design Report would include a description of the existing problem, proposed alternatives, recommended project, preliminary alignments, potential environmental impacts, and cost estimates.

ACKNOWLEDGEMENT

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APPENDICES

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ABBREVIATIONS

CEQA	California Environmental Policy Act
CDFG	California Department of Fish and Game
Caltrans	California Department of Transportation
CCI	Construction Cost Index
CCRWQCB	Central Coast Regional Water Quality Control Board
cfs	Cubic Feet per Second
Corps	U.S. Army Corps of Engineers
County	San Luis Obispo County
CSD	Community Services District
District	San Luis Obispo County Flood Control and Water Conservation District
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
FH	Flood Hazard
FIRM	Flood Insurance Rate Maps
FMP	Floodplain Management Plan
ft	feet
LAFCo	Local Agency Formation Commission
LF	linear feet
MND	Mitigated Negative Declaration
NCAC	Nipomo Community Advisory Council
NCC	Nipomo Creek Committee
NCSD	Nipomo Community Services District
NEPA	National Environmental Policy Act
ND	Negative Declaration
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
OES	Office of Emergency Services
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resources Control Board
SLOCAPCD	San Luis Obispo County Air Pollution Control District
TM	Technical Memorandum
USFWS	United States Fish and Wildlife Service

CHAPTER 1 INTRODUCTION

Chapter Synopsis: This chapter presents the purposes, objectives, and scope for the Drainage and Flood Control Study, followed by the methodology used to achieve those purposes and objectives.

The community of Nipomo (Nipomo) is the southern most community located in San Luis Obispo County, approximately 25 miles south of the City of San Luis Obispo. The community is bordered to the east by the Santa Lucia Mountains and to the west by the Nipomo Mesa and the Guadalupe-Nipomo Dunes.

Figure 1-1: Community of Nipomo Location

Approximately 12,630[3] residents live in Nipomo, and enjoy the rural character of the town. The community is known for its open space and homes built on large lots. As shown in Figure 1-1, Highway 101 is the principal transportation corridor in Nipomo. The state highway extends on a south-east to north-west alignment and separates the town into two areas known as Olde Towne and the Mesa.

Olde Towne resides east of Highway 101 and consists primarily of residential land use with some commercial properties along Tefft Street, between Sparks and Thompson Road. Most lots in Olde Towne range between 60 to 100 feet wide along the street frontage. Olde Towne is surrounded by agricultural fields that have recently given way to increased residential development. Several tributaries flow through Olde Towne and eventually discharge to Nipomo Creek, which flows from north to south, parallel to Highway 101.

The Mesa is located west of Highway 101 and is larger in terms of developed land, than Olde Towne. Increased residential and commercial development over the last decade have resulted in concerns regarding the quality of life in Nipomo and the management of problems associated with growth, such as drainage. The Mesa's residential land use varies from rural, suburban, single to multifamily land use, with an even greater variability in lot size throughout the Mesa.

A campaign in Nipomo has generated interest in "cityhood". The proponents of incorporation argue that incorporation would provide local control over land use decisions, improved local government, efficient municipal services, and increased influence over the County. The direction determined by the community could influence the implementation of proposed projects in this report. The implementation strategy presented in Chapter 6 of this report will provide sufficient direction on execution of the proposed projects regardless of the direction the community adopts regarding incorporation.

1.1 Project Understanding

1.1.1 MESA

The Mesa's flooding and drainage problems are primarily due to regional impacts associated with area development and the construction of numerous small, independent facilities, such as individual lot detention basins. These basins are occasionally filled in by residents who then route runoff to public streets, increasing the likelihood of flooding to downstream neighbors.

[3] Based on year 2000 census. 4,035 households and 3,316 families residing in the town

Historically, the runoff from the Mesa area has caused limited flooding problems; however, recent increases in impervious area from development yielded larger quantities of storm water runoff. The lack of drainage infrastructure has created ponding which has been problematic for residents. In some cases, development has occurred in the depression areas, causing an increased flooding risk for the residences and a reduced area for infiltration of the ponded runoff. As the Mesa is built out, infiltration capacity has been lost and runoff has increased. Appropriate drainage provisions were not incorporated into piecemeal development plans, resulting in the concentration of flow and the elimination of historic infiltration areas. This report will focus on the localized drainage and flooding problems experienced throughout the Mesa.

1.1.2 Olde Towne

The setting of Olde Towne within a floodplain means that some of the town is subject to flooding. From its inception, the community has been subject to inundation primarily from Haystack and Nipomo Creeks (Chapter 3 will provide greater detail on the location of flooding). Several other tributaries contribute runoff that causes minor flood damage. Resident accounts and news articles document a long history of flooding in the community. The major flooding problems in Nipomo are caused by a combination of inadequate culverts and channel capacity in the creeks tributary to Nipomo Creek. When the tributary creeks' flow exceeds the capacity of the channel and culvert crossings, water overtops the banks and floods adjacent low topographic areas of Olde Towne. In some reaches, the tributaries lack sufficient capacity to meet the County's current waterways criteria for conveying a 10, 25, and 100-year flood flows. Field observations also indicate that many residents dispose of trash and debris in the drainage channels, or build bridges that constrict flow across the channels.

The second category of flooding, localized street and nuisance flooding, is caused by the lack of sufficient capacity in the local roadside drainage ditches, driveway culverts, and storm drains. These facilities are often under maintained and filled with sediment or other debris. This report will focus on the localized drainage and flooding problems experienced throughout Olde Towne.

1.2 Objectives and Scope

This report has been prepared for the San Luis Obispo County Flood Control and Water Conservation District on behalf of the Community of Nipomo. The main objective of the Drainage and Flood Control Study is to identify and present conceptual improvements needed to minimize or eliminate the localized flooding problems, and to convey the collected runoff from the developed areas to a disposal point. It serves as a guide for long range planning for improvements to ensure that the community has reliable drainage infrastructure in the future. This report documents the existing conditions, examines potential improvements, identifies environmental permitting requirements, and recommends a funding strategy to pay for the improvements.

1.3 Methodology

In order to accomplish the goals of the Study, the methodology shown in Figure 1 of Appendix A was used. As shown in the figure, community involvement in the study was imperative to gain a local understanding of the flooding problems. Each community was represented by an Advisory Committee and this Advisory Committee also identified a sub-committee to work directly with the study team throughout the duration of the project. The sub-committee also reviewed technical documents and provided comments to the study team. The Nipomo Community Advisory Council (NCAC) represented the community of Nipomo and assigned the Nipomo Creek Committee (NCC) the responsibility of working with the study team throughout the duration of the study. The NCC was represented by Herb Kandel. The study team requested input and endorsement from the NCAC at the following milestones:

- Initiation of Study and Community Questionnaire
- Approach to Conducting Engineering Analysis
- Proposed Alternatives for Mitigating Flooding

- Review of Draft Report
- Endorsement of Final Report

In order to gain the local knowledge of existing flooding problems, a questionnaire was mailed to the residences of Nipomo. The questionnaire requested information on existing flooding problems, location of flooding, frequency of occurrence, and observed causes. Approximately 200 responses were received from Nipomo residents. A summary of the responses and comments received is included in Appendix C. In order to protect the privacy of the respondents, personal information (names and phone numbers) is not included in the summary. A sample of the questionnaire is also included in Appendix C.

1.4 Existing Information

When available, existing information was used to assist in the engineering and environmental analysis. A list of references is provided in this report. Previous to this study, a few analyses and reports had been prepared on the major flooding problems in Nipomo, primarily Olde Towne. However, little information existed on the local drainage problems that are common throughout the community. Resident observations and documentation were available and provided valuable information on the location and severity of historic flooding problems.

1.5 Report Content

The structure of the Drainage and Flood Control Study is outlined below.

- CHAPTER 1 – INTRODUCTION (this introduction)
- CHAPTER 2 – COUNTY POLICIES, (presents an overview of the drainage and flood control responsibilities in the County of San Luis Obispo).
- CHAPTER 3 – ENGINEERING ANALYSIS AND ALTERNATIVES DEVELOPMENT, (discusses the existing drainage and flooding problems in Nipomo and presents alternatives that will mitigate the problems).
- CHAPTER 4 – ENVIRONMENTAL FEASIBILITY ANALYSIS, (discusses the environmental permitting and regulatory requirements for the proposed alternatives).
- CHAPTER 5 – FUNDING ALTERNATIVES, (provides a summary of funding options, including criteria for qualifying projects, available funds, and cost sharing formulas).
- CHAPTER 6 – IMPLEMENTATION STRATEGY, (This chapter consists of an implementation plan of the recommended improvements developed to reduce nuisance flooding and provide flood protection).

In addition to the six chapters, there are also nine appendices attached to the end of the report. The appendices are:
APPENDIX A – Figures
APPENDIX B – Photographs
APPENDIX C – Community Questionnaire and Responses
APPENDIX D – Resolution Establishing Policy and Resolution Establishing the Nipomo Community Services District and its purposes
APPENDIX E – Mesa Engineering Analysis Technical Memorandum
APPENDIX F – Olde Towne Engineering Analysis Technical Memorandum
APPENDIX G – Environmental Analysis Technical Memorandum
APPENDIX H – Funding Assistance Technical Memorandum
APPENDIX I – Comments and Response to Comments
APPENDIX J – Flood Control Zone 16 Boundary Map

CHAPTER 2 COUNTY POLICIES

Chapter Synopsis: This chapter presents an overview of the drainage and flood control responsibilities in the County of San Luis Obispo, as carried out by the San Luis Obispo County Flood Control and Water Conservation District.

2.1 Overview of Responsibilities

The drainage and flood control responsibilities of the County are determined by State and County statutes and by County policy. The responsibilities for drainage are administered through the Road Division of the County Public Works Department and the San Luis Obispo County Flood Control and Water Conservation District (District). The District is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in unincorporated public areas where no other agency has assumed an active role in such activities. The District has a regional role in the County and can work with individual cities or communities when requested. The sections below describe the limits of the jurisdiction of road maintenance and improvement, Road Fund administration, and how the District is administered to best leverage its powers by creating Zones of Benefit to oversee specific projects.

2.1.1 FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2.1.1.1 History

The San Luis Obispo County Flood Control and Water Conservation District was established in 1945. The powers of the District include flood control, water supply, water conservation, water quality protection and the ability to study all aspects of water resources. The District also has power to form zones of benefit within its boundary to implement water resource projects.

The District is a special district that is governed by the County Board of Supervisors. The boundaries of the District are the same as the County boundaries, and the staff of the District is the same as the staff of the County. The District also includes all of the territory within the County's seven incorporated cities. The District budget is separate and distinct from all other County budgets. It has its own funding sources, and its own expenditure plan.

2.1.1.2 Policy Direction: Resolution Number 68-223

The District is available to help communities deal with flood waters, and to study and develop water supplies and conservation opportunities. The District uses its general fund to identify water related issues, to determine solutions to those problems and to help those local areas implement recommended solutions. The District is not, however, responsible for paying for community-specific mitigation improvements. The specific property owners that benefit from these solutions must agree to pay for the construction and future maintenance of them. This policy (Resolution 68-223) was formally established by the Board of Supervisors in 1968, and was reviewed and reconfirmed in April 2001. The documentation of the policy is included in Appendix D of this report.

The policy was adopted because there is not sufficient funding available for the District to fund construction and operation of facilities. This approach provides the best leveraging of the funds that are available on a county-wide basis.

2.1.1.3 Funding Sources

The primary funding source for the District, which is the entire County, is a pre-Proposition 13 general property tax allocation, which provides approximately $550,000 per year in revenue. In addition, the District receives

about $130,000 per year in interest income from current resources. Reserves from the County's General Fund, which is separate from District fund, are normally not used for the construction of projects protecting private property, unless there is a significant general or roadway benefit.

2.1.1.4 Countywide Activities

The District provides funding for flood control programming and planning of localized drainage issues.

2.1.2 County Standards for Control of Drainage

The County's planning department establishes the land use policies and drainage ordinances for the County (the District has no land use ordinances). These standards aim to minimize the harmful effects of storm water runoff and to protect neighboring and downstream properties from drainage problems resulting from new development. Section 22.05.040 et. seq. of the County's Land Use Ordinance outlines the standards for the control of drainage and drainage facilities. These standards include:

- Requirements pertaining to the design and construction of drainage systems
- Requirements pertaining to the maintenance of offsite natural drainage patterns
- Restrictions on development in areas subject to flood hazards

Conditions of development in flood hazard areas must, at a minimum, enforce the current Federal floodplain management regulations as defined in the National Flood Insurance Program. Projects that may be subject to or cause flood hazards are required to prepare a drainage plan, subject to approval by the County Engineer. Nipomo is also subject to flood hazard combining designations. The combining designation is a special land use category which requires detailed project review to minimize the adverse impacts associated with flood hazards.

In addition, the County's land use ordinances contain development standards for areas with the Flood Hazard (FH) designation. The standards state that drainage plans for development in FH areas must include a normal depth analysis that determines whether the proposed development is in the floodway or the flood fringe. In addition, development in FH areas would be subject to construction practices that would not limit floodway capacity or increase flood heights above an allowable limit.

2.1.3 The Road Fund

The County provides some limited drainage improvements as a function of its road maintenance responsibilities. The Road Fund is a separate, distinct legal account and budget, from the District. It has numerous State statutes (primarily the Streets and Highways Code) that dictate how Road Fund monies may legally be expended. The Road Fund program operates the County Maintained Road System and is funded through a combination of restricted revenue sources that are primarily derived through taxes on gasoline that are apportioned to cities and counties by the State, as well as contributions from the County General Fund. These funding sources can only be spent on solving problems that directly relate to County maintained roads.

As a function of operating the road system, the drainage issues related to the road system are addressed when such drainage work protects the County maintained road system in a cost beneficial way, or is directly related to County road improvement projects and is necessary to prevent property damage. This includes directing the flow of streams across the roads through culverts and bridges.

Specific drainage related project completed in Nipomo through the Road Fund include:

- Constructed drainage basins in conjunction with road widening projects on Tefft Street
- Repaired and maintained overside basins at Calle Del Sol and La Cumbre

- Participated in the cleanup of Olde Towne in response to the flood event of March 2001. Provided staff, trucks, loaders and paid dump fees for disposing of material removed from the creeks by the California Conservation Corps.

In addition to the above completed Road Fund financed drainage improvements, the following drainage projects are currently being planned for the future:

- Route a drainage culvert over the bluff to prevent erosion near the intersection of La Cumbre Lane and Calle Del Sol
- Construct drainage basins on the Orchard Road Widening Project

2.1.4 OTHER AGENCIES WITH DRAINAGE RESPONSIBILITIES

2.1.4.1 Community Service Districts

Community Service Districts (CSD's) are locally controlled special districts that can also provide drainage and flood control services. In an election held on January 12, 1965, the votes cast were in favor of the formation of the Nipomo Community Services District (NCSD). On January 18, 1965, the County Board of Supervisors adopted Resolution 18-65 to organize the NCSD, fix the boundaries, state the purpose for which it is formed and declare the directors elected. A scanned image of Resolution 18-65 is provided in Appendix D of this report. The NCSD was organized and formed for each of the Government Code Section 61,600 purposes, specifically "The collection, treatment or disposal of sewage, waste and **storm water** of the district and its inhabitants" and "**The construction and improvement of bridges, culverts, curbs, gutters, drains,** and works incidental to the purpose specified in subdivision (j), subject to the consent of the governing body of the county or city in which said improvement is made". **The NCSD has drainage powers it may exercise as long as they are consistent with that stated in the enacting resolution**. No subsequent resolutions relinquishing drainage powers from the NCSD were found.

During the draft report comment period, no formal response was received from the NCSD regarding their position on serving as the lead agency in implementing the proposed drainage improvements. Several of the NCSD Board members personally and informally indicated they have concerns taking on the lead agency role (See Appendix I Comments and Response to Comments).

2.1.4.2 County Service Areas

County Service Areas (CSA's) can focus the powers of the County to provide specific services to specific areas, including drainage and flood control services. These special districts are governed by the County Board of Supervisors and receive their funding through the collection of voter approved service charges or benefit assessments from the residents or property owners of the specific area served. LAFCo discourages the creation of CSA's within the boundaries of a CSD when the CSD is capable of performing the same service. A new CSA would also create extra administrative costs to operate. Therefore, no CSA currently provides drainage service in Nipomo.

2.1.4.3 Flood Control Zone 16

Section 13 of the San Luis Obispo County Flood Control and Water Conservation District Act, provides that the County Board of Supervisors has the authority to levy assessments on taxable property within a zone to pay for the expenses of carrying out any of the purposes of the special benefit to such zone. Resolution Number 88-248 established an assessment on all taxable property in San Luis Obispo County Flood Control and Water Conservation District Zone 16 (Flood Control Zone 16) in Nipomo to provide special benefits to properties within this zone, including maintaining and improving drainage basins. A scanned image of a map of the Zone 16 boundary is included in Appendix J.

The County's Planning and Building Department requires that new subdivisions or tract developments in Nipomo create and maintain drainage basins as a condition of final map approval. Therefore, all new tracts in Nipomo which require drainage basin maintenance have been annexed to Flood Control Zone 16. Subsequent resolutions added additional tracts to Flood Control Zone 16 and authorized assessments for the purposes of maintaining the drainage basins. The budget for Flood Control Zone 16 in 2003-04 was approximately $13,800 and represents 100 percent of the total revenue for the district. This equates to an annual assessment of $16 to each parcel within Flood Control Zone 16. This revenue is used to finance drainage services within the zone.

2.1.4.4 Cities

Individual cities within the County exercise control over drainage issues within their city limits.

2.1.4.5 U.S. Corps of Engineers

At the Federal level, the U.S. Army Corps of Engineers (Corps) provides flood protection throughout the nation, however, the Corps has done very little work in San Luis Obispo County and operates no facilities here.

2.1.4.6 California Department of Water Resources

The Sate of California also administers some flood control and drainage programs via the State Department of Water Resources' (DWR) flood control division. DWR has little presence in the County, and mainly gets involved in a consulting role during flood emergencies.

2.1.4.7 Caltrans

The California Department of Transportation (Caltrans) operates drainage facilities that are associated with the State Highway System.

2.2 Funding Issues

The District is restricted in the way it can fund needed projects or increase revenues for existing operations. It is generally limited to a zone of benefit or an assessment district procedure for obtaining financing for the construction of new projects.

Due to the changes enacted with the passage of Proposition 218, the District must now also have all new benefit assessments, and increases to existing benefit assessments for maintenance and operations, approved through an election of affected property owners.

The District provides a means of funding studies that define problems and recommend technical solutions to those problems. The critical next steps of constructing and maintaining drainage facilities can normally only be completed with local benefiting property owners being willing to vote to assess themselves for these costs.

Chapter 5 discusses in greater detail the alternative methods for potentially funding the construction of community-specific flood control and drainage projects.

2.3 Maintenance Responsibilities

Survey respondents reported that many of the existing storm drain facilities and drainage channels are filled with sediment and vegetation. Field investigations indicate that some of the drainage ditches, roadside swales and culverts were partially filled with excessive sediment and vegetal growth. The more severe condition in Olde Towne is the accumulation of refuse and the storage of household items within drainage channels that prevent the conveyance of runoff. Under maintained facilities reduce their capacity and inhibit their ability to convey runoff. However, in Nipomo, the County or District does not possess flood control or drainage easements for any of the creeks. Under these circumstances, the owner whose parcel line extends into the drainage channel is

responsible for maintaining the channel's capacity. If a property owner does not maintain the conveyance facilities, then these structures will go unattended because the District is not responsible for maintaining facilities on private property or on property within the jurisdiction of other public agencies (e.g. Caltrans and Highway 101).

2.4 Private Residence Opportunities

In some cases, the residents or groups of residents can accelerate the installation of road or storm drain improvements by paying the County Engineering Department to install an identified improvement. Current County policy requires the benefited party to pay for the necessary improvements.

CHAPTER 3 ENGINEERING ANALYSIS AND ALTERNATIVES DEVELOPMENT

Chapter Synopsis: This chapter discusses the existing drainage and flooding problems in Nipomo and presents alternatives that can mitigate the problems. The chapter also presents the estimated cost for planning, designing and constructing the proposed capital projects. Engineering technical memoranda were prepared for the Mesa and Olde Towne and are included in Appendix E and F, respectively. The technical memoranda provide greater detail on the engineering methodology, analysis and alternatives. Some items in this chapter were modified since the completion of the technical memoranda. The reader should rely on this chapter for the most updated information..

3.1 Overview of Recommended Project

3.1.1 MESA

The Mesa's flooding and drainage problems reported by residents are primarily due to standing water along County roadways, although some residents report of runoff from the roadway onto private properties. The standing water appears to be the result of the undulating terrain in the Mesa, lack of maintenance of the existing drainage infrastructure, and development grading which blocks previously existing runoff flow paths. The Mesa's undulating topography creates numerous depressions, including low spots having no outflow drainage paths, which lead to a high incidence of localized ponding.

To prevent the ponding, the current drainage infrastructure is primarily based on individual parcel runoff retention and infiltration, which prevents runoff from leaving each developed site. However, the gradual loss of individual basin retention capacity over time has increased basin overflow frequency and runoff from the individual sites. Current County Drainage Policies and Standards lack enforcement provisions to ensure that the drainage and infiltration infrastructure is maintained. In some areas, the regrading of land during development has caused previously existing flow paths to become blocked, causing ponding in areas which had previously drained.

Flooding and drainage problems in Flood Control Zone 16 tracts maintained by the County were generally limited to standing water caused by blocked drain inlets. Zone 16 tracts include curb and gutters, drain inlets, underground drain piping and regional retention basins to collect and infiltrate storm water runoff. Most of the identified flooding problems were located in the areas served by individual residence retention basins and are outside of Flood Control Zone 16.

Conceptual projects aimed at reducing standing water impacts were developed for the flooded areas that received the greatest number of comments. The corrective construction recommendations described for the proposed projects can also generally be applied to the flooding problems which received fewer complaints. The proposed projects were based on limited field information and elevation data. The proposed projects include raising road grade elevations, installing retention basins, storm drains and drop inlets, and also conducting maintenance on existing facilities to improve flow conveyance. Each proposed project will function independently to solve a local flooding or drainage problem.

Modifications to existing County planning standards and policies are also recommended to reduce the risk of flooding for residences developed in low lying areas, and to provide the County with greater enforcement capabilities regarding maintenance of individual homeowner retention basins. County Drainage Standards and Policies specify the responsibility of onsite runoff management as belonging to residents; however, no specific sanctions and no consistent procedure are available to enforce maintenance of local facilities. County policies should be updated to provide the Department of Public Works with review and approval capabilities regarding

drainage infrastructure for development, and more enforcement authority to ensure basins are maintained by the individual homeowner. Retention basin inspections and upgrades to meet current drainage standards could also be required during transfer of property ownership to ensure that basin sizes can accommodate runoff generated from the impervious area on a parcel.

3.1.2 OLDE TOWNE

Much of Olde Towne is located within a 100-year flood hazard zone. These areas have been identified by FEMA as subject to flooding during a 100-year flood event[4]. The lower lying areas near the creek and tributary channels may also be subject to flooding from more frequent rainfall events due to inadequate local drainage facilities to convey urban runoff from homes and streets to the creeks.

The major flooding problems in Olde Towne result from flood flows breaking out of one of the five creeks flowing through the urban area of Olde Towne. A majority of the culvert crossings in Olde Towne do not meet current minimum County standards. The culverts within Olde Town are generally not sufficient to pass the 10-year flow rate without surcharge, although some can pass higher return period storms with surcharge. The culverts and crossings along Haystack Creek, with exception of the newly installed arch at the Tefft Street crossing, are generally insufficient to carry the 10-year flow. The current minimum County standard requires that the Haystack Creek culverts have sufficient capacity to pass the 25-year flow. If the existing channels and culverts were constructed per the County's current standards for Major and Secondary waterways, then the threat and frequency of flooding from large storms would be reduced because the facilities would have sufficient capacity to convey higher intensity peak storm flows.

Maintenance of existing drainage structures is also lacking in Olde Towne. The creek channels, culvert crossings, and roadside ditches are in need of vegetation management and sediment removal. Conducting necessary maintenance on creeks in Olde Towne is complicated not only by the extensive and exhaustive regulatory permit approval process, but also by the location of most creeks within private property. The County was not granted a drainage easement on any of the creeks in Olde Towne and therefore can not perform routine maintenance or channel clearing on any reach of creek outside of public right-of-way.

The proposed projects for Olde Towne are typically culvert replacement projects to raise the design standard of most street crossings and conform to the County's current standards for minor, secondary and major waterways. Just as important as the structural improvements, the community should form a drainage facility maintenance department. Routine maintenance of the roadside drainage ditches and culverts would minimize flooding problems associated with the more frequent moderate storms. The community's maintenance department would also be responsible for implementing a long-term maintenance program for the creeks to remove sediment, manage vegetation and ensure that the natural resources are protected during routine maintenance.

The community should also implement a community awareness campaign to educate residents living alongside the creek on preserving the creek's conveyance capacity by not disposing of trash or storing household items in the channel. Informing and educating the community on the benefits of maintaining clean creeks will help Nipomo achieve multiple objectives from flood protection to creek restoration. The educational programs could also assist the community on how to prepare for the rainy season. Much like annual maintenance, awareness and preparedness are on-going activities.

[4] Refers to a flood of a magnitude that has an estimated probability of 1 in 100 of occurring in any given year. Technically more precise way of referring to the "100-year flood". Generally, 1%, 2%, 10% events refer to levels of flood flows with an expected recurrence of 100, 50, and 10 years respectively.

3.2 Engineering Methodology

The purpose of the engineering analysis was to examine existing drainage conditions for Nipomo, identify problematic areas and issues, and also to prioritize and categorize the problems. This analysis also developed conceptual projects to mitigate identified drainage and flood control problems. This chapter includes a description of existing drainage conditions, a discussion of the methodology used to evaluate drainage problems, and an identification of a series of proposed projects to mitigate the drainage problems. This chapter is organized into separate discussions for the Mesa and Olde Towne. The Mesa study area included areas west of Highway 101, within the Nipomo Urban Area. Figure 2 in Appendix A shows the general location of the Mesa study area. The Olde Towne study area included areas east of Highway 101 and is shown in Figure 7 of Appendix A.

The study team utilized existing topographic maps to delineate drainage zones and to identify storm water runoff flow paths. The known problem areas were assessed using a combination of resident accounts and field investigations. Drainage problems within the community were identified by:

- Reviewing community responses to questionnaires
- Conducting community outreach discussions with local residents and County staff
- Conducting field mapping of curbs, gutters, and storm drain facilities
- Reviewing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the Nipomo Community.

3.3 Mesa Existing Drainage and Flooding Problems

The flooding in Mesa tends to be minor, with very few records of flooded structures and no extensive damage reported. According to questionnaire responses, common flooding problems include:

- Standing water causing street flooding, ranging from a few inches to over 1 foot
- Flow onto individual properties from the street or roadway
- Flow onto individual properties from upstream areas
- Slow draining or overflowing retention basins

Some of the causes for flooding identified while conducting field inspections and reviewing topographic maps include:

- Topography
- Inadequate retention basin design and construction
- Inadequate roadway drainage
- Adding impervious area to property
- Lack of retention basin maintenance
- Filled retention basins
- Intentional blocking of drainage paths
- Property grading
- Development in low lying areas
- Lack of maintenance of drainage inlets
- Poor drainage design and/or improper construction at intersections

3.3.1 MESA SURFACE HYDROLOGY

The surface hydrology on the Mesa does not include major creeks or tributaries. Mesa hydrology is characterized by its sloping sand dunes and sump areas. Historically, the runoff from the Mesa area has caused limited flooding problems; however, recent development and a lack of drainage infrastructure have yielded larger quantities of storm water runoff which has been problematic to its residents.

The surface of the Mesa generally slopes in the southwesterly direction. However, the topography is characterized by the underlying sand dune deposits which create an undulating topography with numerous depressions and low spots having no outflow drainage paths. This leads to a high incidence of localized ponding. Historically, this was not a problem, since water collecting in these depressions was quickly absorbed into the underlying sandy soils and little drainage planning was considered as the area subdivided and residential density increased. Recent Mesa development has increased the runoff and reduced the available area for infiltration. In some cases, development has occurred in the depression areas, causing both increased flooding risk for the residences and reduced infiltrating capacity for the runoff.

3.3.2 MESA FEMA FLOOD HAZARD ZONES

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the Nipomo area do not include any flood hazard zones within the Mesa area.

3.3.3 MESA TOPOGRAPHY

The Mesa area is bordered on the south side by a steep bluff that drops into the Santa Maria Valley. The Mesa community was constructed on prehistoric sand dunes, and topography consists of low rolling hills and flat areas that vary in elevation from approximately 260 to 410 feet. Drainage is not continuous, since many areas drain into low depression and sink-like or sump areas. Storm water collects and infiltrates in these low lying sump areas.

The Mesa topography is characterized by the underlying sand dune deposits which create an undulating topography with numerous depressions, including low spots having no outflow drainage paths. This leads to a high incidence of localized ponding. Historically, the runoff from the Mesa area has caused limited flooding problems; however, recent increases in impervious area from development yielded larger quantities of storm water runoff. The lack of drainage infrastructure has created ponding which has been problematic for residents. In some cases, development has occurred in the depression areas, causing an increased flooding risk for the residences and a reduced area for infiltration of the ponded runoff.

Due to the undulating topography of the area, the Mesa was not planned with a centralized, gravity driven storm water management system. Runoff is generally directed to retention basins shared by a number of properties in larger land developments, or to a small retention basin on each property for individual property improvements. The retention basins are generally constructed in the lowest elevations of the developed area to collect storm water runoff.

3.3.4 NO DRAINAGE PROVISIONS DURING EARLY DEVELOPMENT (MESA AND OLDE TOWNE)

When Nipomo was first developed, construction did not include storm water conveyance or flood control infrastructure. There was no regulatory requirement to provide drainage improvements, since the development was pre-subdivision Map Act requirements. Also, as discussed above, the Mesa soil characteristics provided sufficient infiltration capacity for storm runoff, eliminating the need for a formal drainage system.

During this early period, drainage improvements were not required for development, resulting in no upfront drainage infrastructure cost for the property owners. With an increase in urbanization came an increase in impervious surfaces and runoff, and also a decrease in pervious surfaces available to absorb the urban runoff.

3.3.5 MESA EXISTING DRAINAGE FACILITIES

Homes on the Mesa are generally rancher style with parcels ranging in size from about one fourth of an acre and larger. Due to the undulating topography of the area, the Mesa was not planned with a centralized, gravity driven storm water management system. Runoff from individual properties was either directed to a small retention basin on each property, or to a retention basin shared by many properties.

Typical storm water runoff disposal within older neighborhoods consists of unmanaged retention and infiltration basins located on individual properties or within the lowest elevations within the neighborhood. A drainage system on the Mesa in neighborhoods of non-subdivided lots can consist of a ditch or series of ditches and culverts crossing backyards and roads to a local detention/infiltration basin. In some cases, the drainage does not discharge into a detention basin, and is instead diverted onto an adjacent property. These areas typically do not have a consistent curb and gutter system, and the terminus of the drainage systems is often the nearby low-lying sump area within the neighborhood.

Typical to recently subdivided Mesa developments is the inclusion of a system of curbs, gutters, underground storm drain collection systems, and in many cases, a large local retention/infiltration basin. Standing water problems in these areas are generally related to plugged drain inlets instead of a lack of basin capacity. The installation of curbs and gutters in some areas has led to the concentration of street runoff. The runoff travels along the gutter to a nearby low elevation in the topography, where it pools or enters private property. As residents attempt to prevent the runoff from entering their property by blocking the flow path, standing water is created which exacerbates flood problems and poses potential traffic safety hazards. The reader should note that this problem has resulted from the evolution of the paved road initially constructed, then subsequent development along the paved road restricting and trapping runoff, leading to the current ponding.

Most residences have individual storm water retention/infiltration basins, which are required on a per parcel basis. The current sizing requirements of the basins are based on providing adequate volume for 4 inches of rainfall on the impervious area of the property. Although these basins generally address runoff on a per parcel basis, they do not always succeed in collecting all runoff and preventing flooding. Runoff from the County maintained roadway adjacent to the property can be blocked from entering the basin on the property, causing runoff to pond on the road shoulder or travel to adjacent properties. In some cases, as homes are sold, second and third owners of the property are unaware of the drainage management aspects of the basins and fill the basin with soil or block the basin entrance to prevent runoff from entering. As the community expands and runoff increases, it becomes increasingly important that new homeowners receive adequate information pertaining to drainage responsibilities.

3.3.6 HOMES BELOW ROAD GRADE (MESA AND OLDE TOWNE)

Homes that are down-slope of a road and whose driveways slope down away from the road experience flooding because runoff will typically flow through driveways and into garages. Homes subject to concentrated flow erosion often take measures to manage storm runoff from their roof gutters, install drains in the driveway to divert flow, and install rock lined ditches to direct runoff to street right of way. Some people also use sandbags to redirect water around their home.

3.4 Mesa Engineering Analysis Overview

3.4.1 MESA DRAINAGE AND FLOODING PROBLEMS

The Mesa's typical drainage and flooding problems include water ponding at road intersections, road shoulders and on private property. Standing water on roadways appears to be caused by runoff either directed to the roadway or prevented from leaving the roadway. These areas create a traffic and pedestrian hazard. The locations with noted flooding issues are shown on Figure 2 in Appendix A. The locations shown on the figure correspond to resident reported flooding problems summarized in Appendix C for the Mesa.

The lack of maintenance of individual retention basins also contributes to flooding problems in the Mesa. The reason is that, over time, the retention basins fill with sediment carried with storm water runoff, resulting in a reduction in storage capacity. Storm runoff will overtop the unmaintained basins during large storms, causing runoff to flow from the property into the roadway or onto adjacent properties. Retention basins that functioned appropriately when first built, may now or eventually lack sufficient storage capacity and may overflow even during small storms. In some cases, homeowners have intentionally filled retention basins and blocked storm drain inlets, diverting runoff from their property and creating greater flooding in nearby lower areas. Also, some development grading has blocked historical drainage courses, causing street or property flooding in those areas where flooding had not historically occurred. Table 3-1 below summarizes by category, existing flooding problems in the Mesa.

Table 3-1: Summary of Existing Mesa Flooding Problems

CAUSE OF FLOODING	DESCRIPTION
Topography	As described in Section 3.3.3, the undulating nature of the Mesa area creates low areas that will collect storm water runoff. These areas will become flooded during major rainfalls, especially in areas where individual property basins cannot accommodate the total runoff from the property. These areas should be identified through detailed topography, with strict developmental guidelines to prevent flooding of residences in the areas. Current County standards include developmental guidelines for depressions greater than about 10 feet deep.
Inadequate Retention Basin Design and Construction	If individual property basins are not properly designed to provide adequate size in the proper location, runoff will escape from individual lots and accumulate in downstream areas.
Inadequate Roadway Drainage	Streets and roadways will not drain properly where adjacent retention basin elevations are roughly similar to the roadway elevation. Inadequate roadway drainage also occurs where new development adjacent to the roadway is built on fill, causing drainage to be directed toward the roadway. The rerouted drainage is also trapped on the lower lying roadway by the fill, causing standing water conditions.
Adding Impervious Area to Property	The addition of impervious area on lots, such as driveways and buildings, will cause additional runoff and potential for overtopping of retention basins and downstream flooding.
Lack of Retention Basin Maintenance	The sandy soils of the Mesa are easily eroded and are carried into retention basins by storm water runoff. Over time, the basins fill with sediment and do not have sufficient capacity for retaining and infiltrating runoff.
Filled Retention Basins	Some property owners, apparently unaware of the County requirement to retain drainage on-site, have deliberately filled the retention basins on their property. The runoff from these properties leaves the lot and accumulates in downstream areas.
Intentional Blocking of Drainage Paths	Some property owners have blocked the drainage path across their property, causing standing water and flooding at the location of the blockage. The blockage can also cause runoff to be diverted onto other properties, causing flooding there.
Property Grading	Some property owners have re-graded portions of their lots for building or landscaping purposes. In some cases, this action has caused runoff to pool in the lot due to the blockage of the previously existing flow path across the property.
Development in Low Lying Areas	Development in the lowest elevation areas will receive excess runoff from the higher elevation areas in the basin. Flooding in these areas would be expected in a large storm event which overtops the individual lot basins.
Lack of Maintenance of Drainage Inlets	The County currently maintains a drain inlet inspection and cleaning program. Areas with numerous trees with leafy or other litter (e.g. Eucalyptus) cause drainage inlets to become clogged during rainstorms. This causes standing water and potential traffic hazards.
Poor Drainage Design and/or Improper Construction at Intersections	A number of intersections retain small depths of standing water where street and gutter slopes are not sufficient to carry runoff away from the sites. Drain inlets are generally not provided at intersections unless a retention basin or ditch is available to accommodate the water from the site. In some areas, the drain inlets may be undersized or the configuration insufficient for the amount of flow that occurs at the location.

3.4.2 MAINTENANCE OF DRAINAGE FACILITIES

Survey respondents reported that many of the drainage ditches and culverts are filled with sediment and debris. Under maintained facilities reduce their design capacity and inhibit their ability to convey runoff. Field investigations indicate that some of the culverts and drainage ditches were partially filled with sediment and excessive vegetal growth. However, in many instances it was difficult to determine whether the culverts were located in public right of way or on private property. The District is not responsible for maintaining facilities on private property.

3.4.2.1 Maintenance of Detention Basins

Runoff on the Mesa is managed by a combination of privately owned and District maintained storm water retention facilities. The privately owned facilities provide storm water management for over 90 percent of the Nipomo Urban Area on the Mesa. All facilities detain generated runoff and use the sandy underlying soil for infiltration.

There are four types of facilities;

1. Privately owned basins that retain all storm water runoff on the site. These typically serve an individual parcel or property, and are owned and maintained by the property owner.
2. Sump areas that collect storm water from a neighborhood or local drainage area. These basins can cross individual parcel or property boundaries, and are owned and maintained by the low area property owners.
3. Large basins constructed within developments that are owned and maintained by a Homeowners Association or other local entity. These basins are generally constructed below the lowest elevations within the neighborhood to allow positive drainage to the basin via curb and gutter or underground storm drain pipelines.
4. Large basins constructed within developments that are maintained by the District. These basins are generally constructed below the lowest elevations within the neighborhood to allow positive drainage to the basin via curb and gutter or underground storm drain pipelines. These developments have been annexed to Flood Control Zone 16 for the purpose of maintenance of the drainage basin. The drainage basin maintenance is funded by benefit assessments on the owners of property in the new development.

Maintenance of the first three types of facilities is not consistent. The filling of retention basin entrance pipes with concrete or the filling of basins with sand has been reported. Sand-filled basins provide no storage volume for surface runoff and direct surface runoff to other locations. As a result, some residents receive runoff from one or more neighboring parcels, where historically they received runoff from their parcel alone. This flow quantity can overwhelm the private property retention basins, causing surface runoff to travel off the property and cause flooding on other private and county property.

3.4.2.2 Flood Control Zone 16

Flood Control Zone 16 includes large land tracts that have been developed with drainage infrastructure and a regional retention basin serving a number of parcels. A boundary map of this zone is included in Appendix J. Few flooding problems were reported in the Flood Control Zone 16 areas. The County's Planning and Building Department requires that new subdivisions or tract developments in Nipomo create and maintain drainage basins as a condition of final map approval. Therefore, all new tracts with curb, gutter, drain inlets, underground storm drains and regional retention basins are annexed to Flood Control Zone 16. The District currently performs maintenance for infrastructure included in these tracts, which comprise less than 10 percent of the developed land in the Mesa. Consequently, over 90 percent of the developed land has storm water runoff management facilities consisting of small retention basins located on private property which are not controlled or maintained by the County.

The flooding and drainage problems in Flood Control Zone 16 areas are typically standing water in the roadway due to blocked drain inlets, which are cleaned annually. Areas outside of Zone 16 had a greater number of reported flooding problems.

3.4.3 CURBS AND GUTTERS (MESA AND OLDE TOWNE)

San Luis Obispo County Land Use Ordinance 22.54.030 requires the installation of concrete curb, gutters, and sidewalks along the entire street frontage of the site under permit, and also along the street frontage of any adjoining lots in the same ownership as the site, for any project in the following land use categories:

- New residential subdivisions, pursuant to Title 21 of the SLO County Code
- Residential multifamily land use category, remodeling improvements that are valued at 25 percent or greater than the current property value
- New residential multifamily categories within an urban reserve line
- All commercial, office and professional categories within an urban reserve line
- All industrial categories within an urban reserve line.

Curbs and gutters are not required on new residential single family lot construction (infill lots), residential rural and suburban categories, agricultural, open space and park & recreation land use areas within an Urban Reserve Line. Curb, gutter and/or sidewalk improvement requirements may be waived, modified or delayed as follows:

- Incompatible Grade. In the opinion of the County Engineer, the finish grades of the project site and adjoining street are incompatible for the purpose of accommodating the improvements.
- Incompatible Development. Based upon the land use designations, existing land uses in the site vicinity, and existing and projected needs for drainage and traffic control, that such improvements would be incompatible with the ultimate development of the area.
- Premature Development. 1) The proposed use of a site is an interim use, 2) the project is part of a phased development and upon completion of all phases, the entire extent of improvements will be constructed, and 3) delaying the improvements would better support the orderly development of the area.

Curbs and gutters currently exist in certain subdivisions within the Mesa. However, drainage throughout the rest of the community consists of roadsides ditches, segmented culverts and storm drains. Nipomo has shown an interest in retaining its rural character. **The character and level of development of the rural residential community is such that the retrofitted installation of a community supported integrated system of curbs and gutters is extremely unlikely.**

3.5 Mesa Proposed Capital Improvement Projects

The proposed projects discussed in this section are intended for planning level purposes only. Detailed calculation of pipeline diameters would require a design level topographic survey of the proposed alignments and detailed analysis of the peak flow rates of each subwatershed. If a proposed project proceeds toward implementation, it is recommended that the lead agency invest the resources to perform the detailed engineering.

Based on the survey responses, over 60 individual flooding problem areas were identified within the Mesa study area. In this report, the problem areas which received numerous complaints were selected for individual analysis and development of conceptual alternatives and costs. Appendix C summarizes the responses received from the community. Many of the other flooding problem areas could be resolved by using conceptual solutions similar to those shown in the selected areas. The conceptual solutions were based on limited field information and elevation data.

3.5.2 PROJECT 1: RAISE ROAD ELEVATION ON N. LAS FLORES NEAR W. TEFFT

3.5.2.1 Existing Problem

Flooding on Las Flores near West Tefft Street was mentioned in over 20 different survey responses and is located in Figure 2 of Appendix A as Project 1. Standing water on or along the roadway was observed after most rainfall occurrences. The observed flooding levels mentioned in the surveys ranged from a few inches to over a foot. Photograph 1 in Appendix B shows the low point in N. Las Flores that floods during rain storms.

Standing water occurs in the roadway during and after a rainfall event due to the low roadway elevation in this area. A layout drawing of the roadway area is shown on Figure 3 of Appendix A. The shoulder areas of the roadway are slightly lower, and water continues to pond on the shoulders after the roadway has cleared. Two large retention basins on private property are located on the north side of Las Flores Avenue at the flooding location; however, the elevation of the edge of the basins appears to be higher than the shoulder elevation. The infiltration capacity of the shoulder areas may be somewhat limited, since the ponding in the shoulder area remained evident for more than three days after rainfall had occurred.

3.5.2.2 Proposed Project

The proposed project for this area is to raise the road elevation approximately 400 feet along the low lying area. The estimated boundaries of the increase in road grade elevation are shown on Figure 3 of Appendix A. By providing a higher road elevation, surface runoff from the roadway will enter the adjacent yards or the retention basins along the north side of the road. The shoulder areas of the roadway should be reworked with higher infiltration capacity materials where possible. The increased road elevation can reduce the water ponding and flooding on the road at this location. Although no additional flooding risk to residents is expected, a more detailed study is necessary during any predesign work to verify this condition.

Other facilities that may be included are an additional retention basin near the corner of N. Las Flores and La Cumbre, or a drain from the flooded area to retention basins in the lower elevation area near the intersection of La Cumbre and Pablo Lane. It may be possible to resolve the N. Las Flores and Pablo Lane flooding problems with a combined project, including a retention basin near Pablo Lane. These facilities would be necessary if the existing basins and the shoulder area and local topography do not have sufficient capacity for infiltration of the street runoff, or the increased road grade provides a risk of structure flooding. These issues should be considered during the design phase.

3.5.2.3 Project Cost Estimate

The cost estimate for Project 1 is broken down by item in Table 3-2. The total cost for this project is approximately $116,000.

Table 3-2: Project 1-Raise Road Elevation

ITEAM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Raise Road Grade	400	L.F.	$100	$40,000
2	Rework Shoulder Areas	800	L.F.	$30	$24,000
				Subtotal	**$64,000**
	Engineering and Design [2]	20 percent of subtotal			$13,000
	Administrative and Environmental [2]	40 percent of subtotal			$26,000
	Contingency [2]	20 percent of subtotal			$13,000
				Total	**$116,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.3 PROJECT 2: RAISE ROAD ELEVATION AT PABLO LANE NEAR LA CUMBRE LANE

3.5.3.1 Existing Problem

Flooding at the intersection of Pablo Lane and La Cumbre Lane was mentioned in eleven different survey responses. This location is identified as Project 2 in Figure 2 of Appendix A. Standing water on or along the roadway was observed after most rainfall occurrences. The observed flooding levels mentioned in the surveys ranged from a few inches to less than a foot. Photograph 2 in Appendix B shows the general area that floods on Pablo Lane.

Standing water occurs in the roadway during and after a rainfall event due to the low roadway elevation in this area. The standing water occurs in the shaded area shown on Figure 4 of Appendix A. Runoff from areas north and east of the intersection of Pablo Lane and La Cumbre Lane flows through a culvert crossing Pablo Lane near 220 Pablo Lane. The runoff continues traveling westerly along Pablo Lane, passing 241 Pablo Lane and entering a narrow ditch on the west side of 241 Pablo Lane. The bottom elevation of the ditch appears to be just below the lowest roadway elevation, causing water to pool in the ditches in the area. Maintenance of the ditch between the residences is difficult, since motorized equipment access is not possible.

Conveyance of storm runoff is also impeded by the collection of sediment in the culverts crossing under driveways. The clogged culverts will also cause water to pool in the roadside ditches. Photograph 3 in Appendix B provides an example of clogged culverts on Pablo Lane. Culverts filled with sediment are common throughout Nipomo.

3.5.3.2 Proposed Project

The proposed project for this area is to raise the road elevation for about 400 feet through the low lying area. The driveway entrances at 220 Pablo Lane must be reconstructed with culvert crossings to provide entrances at the higher road grade elevation. The approximate length of increased roadway elevation is shown on Figure 4 of Appendix A. By providing a higher road elevation, surface runoff from the roadway will enter the adjacent ditches and continue flowing towards the drain channel. The increased road elevation can reduce the extent of

roadway flooding that currently occurs at this location. Although no additional flooding risk to residences is expected, a more detailed analysis on induced flooding is necessary during the design phase to verify this condition.

The proposed increase in road grade elevation should not increase the flooding risk to the structures, since it is displacing only a small amount of water and is not creating a flow blockage condition. The existing culvert should be cleaned, and an additional culvert crossing Pablo Lane may be necessary to prevent the roadway from overtopping.

The construction of a new retention basin in this area would also reduce flooding risk. The potential site east of La Cumbre Lane has the lowest elevations and would have the least amount of excavation. This site is currently used as a horse enclosure. The site south of Pablo Lane is slightly higher, but still useable. The site north of Pablo Lane would also be acceptable, but would require the most excavation. Construction of a retention basin at this intersection could be performed in combination with improvements along N. Las Flores, if additional retention basin capacity is necessary for that site.

3.5.3.3 Project Cost Estimate

The cost estimate for Project 2 is broken down by item in Table 3-3. The total cost for this project is approximately $147,000.

Table 3-3: Project 2-Increase Road Elevation

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Increase Road Grade	400	L.F.	$100	$40,000
2	Driveway Culverts	4	each	$1,000	$4,000
3	Roadway Culvert	1	each	$3,500	$4,000
4	Retention Basin (excavation and disposal)	1	each	$15,000	$15,000
5	Drainage Easement	900	SF	$10	$9,000
6	Inlet Pipe	50	L.F.	$180	$9,000
7	Hydroseeding	600	SF	$2	$1,000
				Subtotal	**$82,000**
	Engineering and Design [2]			20 percent of subtotal	$16,000
	Administrative and Environmental [2]			40 percent of subtotal	$33,000
	Contingency [2]			20 percent of subtotal	$16,000
				Total	**$147,000**

Notes:

1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.4 PROJECT 3: WAYPOINT DRIVE AND PEGGY LEE COURT

Standing water occurs at the intersection of Waypoint Drive and Peggy Lee Court during rainfall events. This location is identified as Project 3 in Figure 2 of Appendix A. The intersection has three nearby drain inlets to collect flow from the roadway for discharge into retention basins at individual residences. The retention basins are very shallow, and appear to be filled with sediment that has entered the basins during previous storm events. These basins should be dredged to remove the sediments and to restore the retention and infiltration capacity of the basins. Other retention basins in the neighborhood should also be checked to ensure that they are functioning properly. A drain inlet along the east side of Waypoint Drive and north of Patty Kay Court appears

to be blocked, causing runoff from upstream areas to be conveyed past the drain inlet to the Peggy Lee Court intersection. This will increase the flooding level at the intersection.

Excavation and disposal of sediment and vegetation typically costs approximately $15 per cubic yard. Higher unit costs should be anticipated if a contractor is hired to conduct maintenance on a small basin because mobilization costs would be factored into the price and only a small volume of sediment would be removed from the basin.

3.5.5 PROJECT 4: RAISE ROAD ELEVATION ON OSAGE STREET NEAR EUCALYPTUS ROAD

3.5.5.1 Existing Problem

This location is a sumped area on Osage Street north of the intersection with Eucalyptus Road which collects all runoff from the surrounding area. This area is identified as Project 4 in Figure 2 of Appendix A. Flooding at this location was mentioned in eleven different survey responses. Standing water on or along this reach of Osage Street was observed after most rainfall occurrences. The flooding area is shown on Figure 5 of Appendix A.

Osage Street passes at grade through this low lying area. Water will tend to pond at the low point in the roadway during and after a rainfall event. Standing water also collects in the area on the west side of the roadway. Two small retention basins are located on the east side of the roadway, but they appear to be filled with sediments that have entered the basin during previous storm events. One basin serves an individual residence and the other is a County maintained basin.

3.5.5.2 Proposed Project

The proposed project for this area is to raise the road elevation for about 400 feet through the low lying area. The adjacent basins should be dredged to remove the sediments and to restore the retention and infiltration capacity. The approximate length of roadway to be raised is shown on Figure 5 of Appendix A. By providing a higher road elevation, the roadway elevation will be above the standing water elevation in the area, which will minimize the flooded road conditions during and after rainfall. To reduce runoff ponding on the west side of the roadway, a retention basin would be necessary at the low point of the west side parcel, or a culvert could be placed under the roadway connecting it to the existing retention basin. The increased road elevation can reduce the roadway flooding that currently occurs when water ponds and floods Osage Street at this location. Although no additional flooding risk to residences is expected, a more detailed analysis on induced flooding should be conducted during the design phase.

Since this location is the lowest elevation within a relatively large drainage area, it will continue to flood during high intensity rainfall periods. Development within this low lying sump area should consider the potential for flooding during high rainfall periods.

3.5.5.3 Project Cost Estimate

The cost estimate for Project 4 is broken down by item in Table 3-4. The total cost for this project is approximately $141,000.

Table 3-4: Project 4-Increase Road Elevation

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Increase Road Grade	400	L.F.	$100	$40,000
2	Driveway Culverts	2	each	$1,000	$2,000
3	Roadway Culvert	1	each	$3,500	$4,000
4	Retention Basin (excavation and disposal)	1	each	$15,000	$15,000
5	Drop Inlet	1	each	$1,500	$2,000
6	Drainage Easement	900	SF	$10	$9,000
7	Inlet Pipe	25	L.F.	$180	$5,000
8	Hydroseeding	600	SF	$2	$1,000
				Subtotal	**$78,000**
	Engineering and Design [2]			20 percent of subtotal	$16,000
	Administrative and Environmental [2]			40 percent of subtotal	$31,000
	Contingency [2]			20 percent of subtotal	$16,000
				Total	**$141,000**

Notes:

1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.6 PROJECT 5: REMOVE CURBSIDE BLOCKAGE ON TEJAS PLACE NEAR OSAGE STREET

3.5.6.1 Existing Problem

This location is on Tejas Place, east of Osage Street at a low area of the roadway between 425 and 445 Tejas Place. This area is identified as Project 5 in Figure 2 of Appendix A. Flooding on this section of Tejas Place was mentioned in twelve different survey responses. Standing water on or along Tejas Place was observed after all rainfall occurrences. The flooding area is shown on Figure 6 of Appendix A.

The flooding at this location is due to the blockage of the flow path from the roadway by residents at 425 and 445 Tejas Place. The runoff from the roadway along this section of Tejas Place originally drained off the road near the boundary of these two properties and flowed along either or both properties to the low lying land behind the properties. The type of drainage diversion provided from the roadway in the original construction is not known. Currently, the original flow path from the roadway is blocked by a concrete curb barrier and sandbags. During storm events the concrete barrier and sandbags cause the roadway runoff to pool at the drain outlet location.

3.5.6.2 Proposed Project

The elevation of the roadway curbside drain on the edge of the property at 445 Tejas Place has been raised, presumably by the property owner. Roadside ponding at this location will occur during every rainfall, since the roadway runoff cannot exit the pavement until it has reached the curb overflow elevation. This pooled runoff leaves the roadway by first entering the driveway of the 425 property. The 425 property boundary elevation has been built up by a retaining wall along the property's west boundary, and runoff that currently enters the

driveway could flood the garage instead of flowing off the property as had occurred in the past. Sandbags placed at the curbside of the residences for flood protection create an increased ponding depth and greater traffic hazard, since the overflow level for the street runoff is raised by the sandbags.

The raising of the curbside drain has caused a potentially significant traffic and pedestrian hazard due to the roadway flooding, but has achieved very little because raising the curbside drain has not significantly reduced downstream flooding. Raising the curbside grade prevents water from leaving the pavement only during small storms, which are not considered the cause of downstream flooding problems. However, during large storms, ponded runoff will exceed the curbside elevation and continue along the original flow path shown in Figure 6 of Appendix A. If the raised curb was removed, the resulting release of runoff during large storms would create a negligible increase in downstream flooding levels since the volume of the ponded water is relatively small.

The proposed solution for this flooding area is to remove the curbside blockage to allow water to freely drain from the pavement at the low point. A retention basin could be placed on one of the properties to retain and infiltrate the water leaving the roadway. The residences located within the watershed drainage area of this discharge should also be checked to ensure that retention basins on each property are sized to current County standards.

3.5.6.3 Project Cost Estimate

The cost estimate for Project 5 is broken down by item in Table 3-5. The total cost for this project is approximately $44,000.

Table 3-5: Project 5-Remove Curbside Blockage

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Drop Inlet	1	each	$1,500	$2,000
2	Install Sidewalk and Drain to Retention Basin	1	each	$2,000	$2,000
3	Drainage Easement	400	SF	$10	$4,000
4	Hydroseeding	400	SF	$2	$1,000
5	Construct Retention Basin (excavation and disposal)	1	each	$15,000	$15,000
				Subtotal	**$24,000**
	Engineering and Design [2]			20 percent of subtotal	$5,000
	Administrative and Environmental [2]			40 percent of subtotal	$10,000
	Contingency [2]			20 percent of subtotal	$5,000
				Total	**$44,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.7 PROJECT 6: RETENTION BASIN NEAR HETRICK ROAD AND GLENHAVEN PLACE

3.5.7.1 Existing Problem

Flooding typically occurs at the sharp curve in the roadway at the Hetrick Road and Glenhaven Place intersection. This location is identified in Figure 2 of Appendix A as Project 6. Runoff from areas northerly and easterly of the intersection of Hetrick Road and Glenhaven Place tend to concentrate at this intersection, since it is located within a natural swale that crosses Hetrick Road. County road maintenance forces have cleared and graded the shoulder areas of the roadway to create lower areas along the shoulder for the water to pool and infiltrate.

3.5.7.2 Proposed Project

If the flooding problems continue, a retention basin may be necessary to drain the standing water from the roadway. Development in areas to the north and east within the upstream drainage area must maintain runoff onsite to prevent additional flooding of this area.

3.5.8 PROJECT 7: RETENTION BASIN ON DIVISION STREET NORTH OF SHIFFRAR LANE

3.5.8.1 Existing Problem

Division Street north of Shiffrar Lane is typically flooded during and after rain events, and flooded signs are posted in the area warning of the traffic hazard. This location is identified as Project 7 in Figure 2 of Appendix A. A drain inlet is located along a very short section of curb and gutter on the west side of Division Street in this area. However, the curb, gutter and drain inlet are located in an unpaved area away from the pavement. Photograph 4 in Appendix B show drop inlet and unpaved area. The outlet for this drain system was not found and may not be present if the drain inlet was constructed in anticipation of future retention basin construction.

3.5.8.2 Proposed Project

The drain inlet should be inspected to determine whether an outlet exists or is plugged. If no outlet exists, a retention basin could be constructed to collect roadway runoff for infiltration.

3.5.8.3 Project Cost Estimate

The cost estimate for Project 7 is broken down by item in Table 3-6. The total cost for this project is approximately $87,000.

Table 3-6: Project 7-Install Retention Basin

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Install Sidewalk	1	each	$2,000	$2,000
2	Storm Drain to Retention Basin	150	LF	$180	$27,000
3	Drainage Easement	400	SF	$10	$4,000
4	Construct Retention Basin	1	each	$15,000	$15,000
				Subtotal	**$48,000**
	Engineering and Design [2]			20 percent of subtotal	$10,000
	Administrative and Environmental [2]			40 percent of subtotal	$19,000
	Contingency [2]			20 percent of subtotal	$10,000
				Total	**$87,000**

Notes:

1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.9 PROJECT 8: DRAINAGE IMPROVEMENT CORNER OF MARY AVENUE AND W. TEFFT ST.

3.5.9.1 Existing Problem

Numerous reports were received of standing water occurring in the roadway at the intersection of Mary Avenue and W. Tefft Street during and after a rainfall event in past years, creating a traffic hazard at this intersection. This intersection is identified as Project 8 in Figure 2 of Appendix A. The existing Tefft Street curb side catch basins adjacent to Mary Street drain to underground pipelines and to a retention basin northeast of Mary and

Juniper. This basin was constructed with the installation of the commercial developments on the north side of Tefft Street in this area. The grades along the Tefft Street frontage are very flat, requiring extended time for the storm water to migrate to the receiving catch basins. Current County standards allow the curbside gutter and street to flow full (i.e. 6-inches to the top of the curb) to receiving catch basins during a 10-year design storm. This design/acceptable depth of flow are considered normal during common storm events and may be perceived as excessive ponding or "flooding" by area residents. It also may be possible that the catch basins or even portions of conveying pipelines are intermittently/partially blocked due to debris. The County is aware of this condition and will monitor/investigate to determine if maintenance is necessary to assure the system components are properly functioning. No project is proposed for this location.

3.5.10 Project 9: Drain Inlet on W. Tefft near Mesa Road

3.5.10.1 Existing Problem

Various surveys identified flooding in the area near W. Tefft and Mesa Road; however, the location and type of flooding were not listed. The general location is identified as Project 9 on Figure 2 of Appendix A. The potential area of flooding was difficult to verify, but was assumed to occur in the low lying area on W. Tefft between Mesa Road and Hazel Lane. The surface runoff from the roadway collects at drain inlets along each side of the W. Tefft Street at the bottom of the hill. These drain inlets discharge into a nearby retention basin on the east side of W. Tefft.

The flooding in this area may be due to the size and locations of the drain inlets. The runoff flow rate may exceed the drain inlet capacity during high intensity rainfall conditions. Partial blockage of the drain inlets could create additional flooding. The flooding could create a potentially hazardous traffic condition due to the high speeds of vehicles traveling down the hills in the ponding area.

3.5.10.2 Proposed Project

The proposed solution for this area is to construct an additional drain inlet on each side of W. Tefft Street near the existing drain inlet. The discharge from the drain inlet would be connected to the existing storm drain for discharge into the existing retention basin. The storm drain pipeline to the retention basin should be checked for partial blockages during the design phase.

3.5.10.3 Project Cost Estimate

The cost estimate for Project 9 is broken down by item in Table 3-7. The total cost for this project is approximately $36,000. Unit costs for this project's components are much higher due to the extremely small size of the project.

Table 3-7: Project 9-Install Drain Inlet

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Drain Inlet	2	each	$10,000	$20,000
				Subtotal	**$20,000**
	Engineering and Design [2]			20 percent of subtotal	$4,000
	Administrative and Environmental [2]			40 percent of subtotal	$8,000
	Contingency [2]			20 percent of subtotal	$4,000
				Total	**$36,000**

Notes:

1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.11 PROJECT 10: DRAIN INLET ON DIVISION STREET NEAR S. LAS FLORES

3.5.11.1 Existing Problem

The Division Street roadway area south of Shiffrar drains to the south toward the intersection of S. Las Flores and Division Street. The grade elevation near the intersection rises and causes ponding along the roadway surface in areas north of the intersection of Division and S. Las Flores. This area is identified as Project 10 in Figure 2 of Appendix A.

3.5.11.2 Proposed Project

The proposed project for the area north of the intersection of Division Street and S. Las Flores is to provide a drain inlet on either side of Division at the low point. A drain pipeline should be constructed to the adjacent homeowner retention basin on the west side of Division Street. An alternative solution would include raising the road grade to convey the ponded water in a southerly direction along Division to the intersection with S. Las Flores. This solution could cause flooding downstream unless a retention basin is constructed along the edge of Division near the intersection with S. Las Flores to collect and infiltrate the roadway runoff.

3.5.11.3 Project Cost Estimate

The cost estimate for Project 10 is broken down by item in Table 3-8. The total cost for this project is approximately $44,000. Unit costs for this project's components are much higher than average due to the extremely small size of the project.

Table 3-8: Project 10-Install Drain Inlet

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Drop Inlet	2	each	$8,000	$16,000
2	Basin Modifications	1	each	$4,000	$4,000
3	Roadway Culvert	1	each	$4,000	$4,000
				Subtotal	**$24,000**
	Engineering and Design [2]		20 percent of subtotal		$5,000
	Administrative and Environmental [2]		40 percent of subtotal		$10,000
	Contingency [2]		20 percent of subtotal		$5,000
				Total	**$44,000**

Notes:

1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.12 PROJECT 11: OVERFLOW PIPELINE AT BLUFF NEAR CALLE DEL SOL AND LA CUMBRE

3.5.12.1 Existing Problem

Erosion has occurred on the bluff just south of La Cumbre Lane and Calle del Sol, due to the limited capacity and overflow of the existing storm water retention and infiltration basins located there. This area is identified as Project 11 in Figure 2 of Appendix A. A marginally effective outlet pipeline and newly installed (2003) percolation pipeline drains a series of two detention basins near the top of the bluff, wrapping around the top of the hillside. Photograph 5 of Appendix B shows a picture of the existing detention basin located just below the road grade. This pipeline was constructed by the County and collects runoff from County right-of-way and contributing residential hardscape. The basin size is not sufficient to contain large storm events. Currently, the basin overflow is concentrated on the steep sandy bluff, and has caused severe erosion on private property. The County has provided temporary remedial work by reseeding and covering the existing eroded area to prevent further erosion. Photograph 6 of Appendix B shows the work that was recently completed by the County.

South County Inland Planning Area Standards require that developments in areas that are found to potentially drain to the edge of the bluff shall be designed so that runoff created by the new development shall be conveyed away from the bluff toward the interior of the Mesa. The new development must install retention basins for storage and infiltration of runoff sized to accommodate a 100-year storm event.

3.5.12.2 Proposed Project

The recently completed erosion protection provides temporary mitigation to the problem. A permanent solution would be the construction of an overflow pipeline that conveys runoff down the hill to the base of the bluff, where an energy dissipater can be constructed. The proposed project would allow for storm water to discharge into the agricultural ditch system. The pipe should be anchored on the surface using standard Caltrans designs. If the property owner requires a subsurface pipeline, then the additional cost to bury the pipe should be borne by the landowner.

3.5.12.3 Project Cost Estimate

The cost estimate for Project 11 is broken down by item in Table 3-9. The total cost for this project is approximately $225,000.

Table 3-9: Project 11-Install Overflow Pipeline and Energy Dissipator

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Pipeline with Concrete Footings	600	LF	$150	$90,000
2	Energy Dissipator	1	each	$10,000	$10,000
3	Entrance Structure	1	each	$25,000	$25,000
				Subtotal	**$125,000**
	Engineering and Design [2]			20 percent of subtotal	$25,000
	Administrative and Environmental [2]			40 percent of subtotal	$50,000
	Contingency [2]			20 percent of subtotal	$25,000
				Total	**$225,000**

Notes:

1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.5.13 Summary of Costs for the Mesa

Table 3-10 is a summary table of the costs for the proposed projects in the Mesa. The total cost for the proposed projects is approximately $840,000.

Table 3-10: Mesa Drainage Improvements Summary Cost Table

PROJECT	DESCRIPTION	TOTAL COST [1]
1	Raise Road Elevation on N. Las Flores	$116,000
2	Raise Road Elevation on Pablo Lane	$147,000
4	Raise Road Elevation on Osage Street	$141,000
5	Remove Curbside Blockage on Tejas Place	$44,000
7	Retention Basin Division Street	$87,000
9	Drain Inlet on W. Tefft Street	$36,000
10	Drain Inlet on Division Street	$44,000
11	Overflow Pipeline near La Cumbre	$225,000
	Total	**$840,000**

Notes:

1. Excludes optional project costs. Includes contingency, engineering and environmental.

3.5.14 Recommended Mesa Projects

The Mesa's typical problem includes water ponding at road intersections, road shoulders and on private property. Standing water on roadways appears to be caused by runoff either directed to the roadway or prevented from leaving the roadway. These areas create potential traffic and pedestrian hazard. The lack of maintenance of individual retention basins can result in additional runoff flowing to the roadway. Many retention basins that functioned appropriately when first built, now lack sufficient storage capacity and overflow even during small storms.

Due to the undulating topography of the area, the Mesa was not planned with a centralized, gravity driven storm water management system. Therefore, runoff must be directed to retention basins shared by a number of properties in larger land developments, or to small retention basins on each property.

Each project discussed above will work independently to solve localized drainage problems. Residences within any one of the proposed project areas could organize to implement a project in their section of town and not be impeded by the lack of action of others. The projects and their priority for implementation are dependent upon the needs of the individual residents and their desire to reduce damages and/or nuisance flooding problems caused by inadequate drainage facilities.

Chapter 6 discusses the implementation strategy for planning, designing, constructing and phasing the recommended project.

3.6 Olde Towne Existing Drainage and Flooding Problems

The confluences of Nipomo Creek with Deleissigues, Hermrick, and Haystack Creeks all converge within 500 feet of each other in the downtown area of Olde Towne (as shown on Figure 7 of Appendix A). A significant portion of Olde Towne along East Tefft Street between Oak Glen Avenue and Beechnut Street lie within the 100-year floodplain of Nipomo Creek and its tributaries. A map of the FEMA floodplain is included as Figure 2 in engineering technical memorandum in Appendix F. Drainage problems identified in the Olde Towne area include:

- Existing culverts not designed to current County standards
- Limited natural channel capacity
- Sediment and debris in culverts and creek beds
- Urban dumping of garbage in channels
- Heavily vegetated channels and ditches
- Encroachment of buildings into creek channels
- Residential construction of structures across channels (e.g. wooden footbridges, fences)
- Lack of long-range flood control planning

Many of the homes in Olde Town are built on grade, and those located in local low spots or sump areas experience flooding.

Olde Town area creeks and tributaries are located primarily on private property and, therefore, are not maintained by the County. Individual property owners are responsible for maintenance of the channel on their property. Residents are liable for problems caused by urban dumping in creeks on their property and any creek encroachment that causes flooding. Awareness of local creek issues should be raised to encourage better habits and creek management by the property owners.

3.6.1 Olde Towne Surface Hydrology and Topography

Olde Towne is situated in the Coast Range Geomorphic Province of California, which is characterized by a series of northwest-trending valleys and mountain ridges that run parallel to the coast. Olde Towne resides on terrain that gently slopes in the southwest direction (approximately a 1 percent slope) towards Nipomo Creek, which runs parallel to Highway 101 though Olde Towne. The change in elevation through Olde Towne ranges from 360 feet on the eastern boundary to 310 feet near Nipomo Creek.

The surface hydrology in Olde Towne is dominated by Nipomo Creek and three of its major tributaries. Deleissigues, Haystack, and Hermrick Creeks all discharge to Nipomo Creek near Tefft Street. Nipomo Creek drains more than 11 square miles before leaving Olde Town and continuing southeast to the Santa Maria River. The watersheds for all these creeks include mountains, foothills, agricultural land, and urban land. Drainage

facilities in Olde Towne consist of culverts, bridges, drainage ditches, and underground storm drains. In areas north of Tefft and west of Thompson, the channels and culverts have less flow capacity than the culverts crossing Thompson. This causes flooding and flow attenuation in the residential areas east of Mallagh Street.

During large storm events, flow overtops the banks of Nipomo Creek and its tributaries in Olde Towne, inundating large areas of downtown. Reported problems indicate that flooding on Haystack Creek is most severe. In some locations, overgrown vegetation and sediment deposition reduce stream capacity. Constrictions caused by undersized or poorly maintained culverts and bridge crossings add to flooding problems in Olde Towne.

3.6.2 WATERSHED DESCRIPTION

The Nipomo Creek watershed is located on the seaward side of the Santa Lucia Range, inland from the southern coast of San Luis Obispo County. The watershed's headwaters are located in the Nipomo foothills, also known as Temettate Ridge. The main stem of Nipomo Creek typically conveys flow year round. The tributaries that flow through Olde Towne and drain into Nipomo Creek include Deleissigues, Haystack (north and south forks), and Hermrick Creeks, and also an unnamed tributary. The tributaries convey flow on a seasonal basis. The main stem of Nipomo Creek is approximately 10 miles long, and only a short reach of approximately 3 miles flows through the urban reserve line of Nipomo.

The tributaries that flow through Olde Towne discharge into the mid-reaches of Nipomo Creek. The confluence of these tributaries with Nipomo Creek is also the location of chronic flooding over the years. A large area of Olde Towne is located within the 100-year floodplain, as shown in Figure 2 of Appendix F.

The following sub-sections describe the five tributary watersheds and the respective creeks that flow through Olde Towne. The five watersheds include:

- Nipomo Creek upstream of Tefft
- Deleissigues Creek, including an unnamed Tributary 1
- Unnamed Tributary 2 (Denoted Hermrick Creek in recent Land Conservancy Study)
- Haystack Creek including the North and South Fork Haystack Creeks
- Knotts Street Ditch

Each reach was qualitatively described in terms of its course, vegetation coverage, tree canopy, channel, and bank conditions[5].

3.6.2.1 Nipomo Creek

The reaches of Nipomo Creek upstream of Nipomo's urban reserve contain healthy and abundant vegetation comprised of a mature tree canopy and understory. Non-native invasive vegetation also exists. Stream channels are shallow with sloped banks at some points, and deep, steep, eroded banks at other locations. The reach of Nipomo Creek that flows through Olde Towne continues with the mature tree canopy and understory. The reach through Olde Towne is the location where three tributaries discharge to Nipomo Creek. Similar to the upsteam reach, the channel is shallow with sloped banks at some points, and deep, steep, eroded banks at other locations. There are frequent debris dams present due to the proliferation of willows.

3.6.2.2 Deleissigues Creek

The Deleissigues Creek watershed is approximately 2.94 square miles (1,880 acres) and is considered a secondary waterway by County Standards. The headwaters of Deleissigues Creek are located in the Temettate

[5] The Nipomo Creek Watershed Program, *Watershed Characterization Report,* The Land Conservancy of San Luis Obispo County, March 2003. The entire description of creeks and watershed are excerpts from this report.

Ridge. Deleissigues Creek crosses under Mehlschau Road and was channeled to flow parallel to the road. Downstream of Mehlschau Road, there is an existing erosion problem on the left bank of the creek (looking downstream). The right bank is armored with rip-rap. Agricultural operations have graded away the creek's vegetation and ground cover. Downstream of Mehlschau Road, the creek continues through orchards. There is intermittent riparian vegetation and limited tree canopy upstream of Thompson Road.

Downstream of Thompson Road, Deleissigues Creek flows through residential neighborhoods and agricultural fields. The creek appears to have accumulated sediment and vegetation that reduce the conveyance capacity of the channel. Field observations indicate that private structures, such as rudimentary wooden foot bridges, have been built across the creek without sufficient freeboard to prevent flow blockage. These wooden bridge structures may contribute to flooding on Eve Street by reducing the conveyance capacity of the channel and causing the upstream water surface elevation to rise and break out of the channel.

Several culverts discharge local urban runoff to Deleissigues Creek between Eve Street and Bee Street. Based on field observations, it appears that agricultural grading has filled in drainage channels near Sea Street, preventing runoff from discharging to the creek.

3.6.2.3 Hermrick Creek

This tributary has a watershed of about 400 acres, and originates in the foothills of the Temettate Ridge. In the upper watershed, Hermrick Creek flows through graded agricultural fields. The creek's channel is incised and often has steep, eroded banks. The creek also flows through the Fairview Tract, a new residential subdivision of approximately 100 homes east of Thompson Road. In order to manage the increase in runoff from the new development, an overflow weir was installed upstream of the culvert crossing under Thompson Road. The weir will cause runoff to "backup" in the channel and discharge downstream of Thompson Road at a reduced rate. The channel has also been widened within the development to serve as a retention facility for when the weir functions to reduce discharge downstream of Thompson Road.

Downstream of Thompson Road, the creek flows through two undeveloped parcels adjacent to Bee Street, then flows through a culvert under Burton. The creek then flows through the Brookside Tract, in between residential properties, prior to discharge to an open channel downstream of Mallagh Street. Field observations indicate that the creek reach within Brookside Tract had several structures built across it. These structures may contribute to flooding on Burton Street by reducing the conveyance capacity of the channel and causing the upstream water surface elevation to rise and break out of the channel.

3.6.2.4 Haystack Creek (north and south fork, and main stem)

North Fork

Upstream of the community, the north fork of Haystack Creek flows through natural riparian vegetation and agricultural orchards. Upon reaching the community near Haggerty Way and Branch Street, the creek flows through residential and commercial development located in Olde Towne. In this reach, the vegetation is intermittent and dominated by non-native species. The banks are often eroded and the channel is incised. Many residents have attempted to build rudimentary erosion and flood protection projects in an effort to protect their homes from flooding.

Field observations indicate that many residents fill the creek with debris and other household items, plant gardens within channel, or have narrowed the channel with grading. Storage of household items or construction of fences across the channel result in debris dams forming during storms. Debris conveyed with storm runoff will be blocked in the channel at the obstruction. This will cause the water surface elevation in the channel to rise and overtop the creek's banks, flooding neighboring residences. This practice must stop if flood protection in Olde Towne is to be improved.

South Fork

Similar to the north fork, the south fork of Haystack Creek flows through natural riparian vegetation and agricultural fields before reaching the community. The issues discussed above for the reach that flows through residential and commercial areas applies to the south fork also.

Main Stem

The main stem of Haystack Creek is downstream of the confluence with the south and north forks, near Avocado and Tefft Street. The main stem flows through residential and commercial districts, and also crosses two of the busiest streets in Olde Towne, Thompson Road and Tefft Street. The culvert at Tefft Street was recently replaced with a 24' wide by 9' tall arch culvert. The channel was also realigned to improve flow conveyance at Burton and Tefft Street. The banks within this reach are often eroded and vegetation is sparse.

One of the more significant erosion problems is located downstream of the crossing of Haystack Creek with Mallagh. The culvert crossing at Mallagh directs flow towards the left bank of the channel (looking downstream). This has caused erosion of the creek bank and undercutting of the channel invert.

3.6.2.5 Knotts Street Ditch

The Knotts Street drainage ditch is a small, concrete lined v-ditch that is located along Knotts Street at the southern border of the community. This drainage collects agricultural runoff from fields east of Knotts Street and upstream areas northeast of the intersection of Knotts Street and Cedarwood. The size of this channel is generally sufficient to convey a 2-year return period flow. The concrete ditch discharges into a larger grass-lined ditch which conveys flow to a 3 feet by 3 feet concrete box culvert crossing at Thompson Avenue. Although the culvert size is adequate to pass a 50-year event, excess sediment accumulation has reduced its capacity.

3.6.3 OLDE TOWNE FEMA FLOOD HAZARD ZONES

The Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) indicates that portions of the Nipomo Community lie within the 100- and 500- flood zones of Nipomo, Haystack and Deleissigues Creeks. The FEMA flood zones for the community are illustrated in Figure 2 of Appendix F.

The County has adopted standards to protect against flood damage to homes located within the 100-year floodplain. The flood damage protection standards are included in the County's Land Use Ordinance (22.07.060 et seq). The criteria applicable to residential development in general are:

- Structures shall not be built in the "floodway." The floodway is defined as the portion of the floodplain necessary to convey the 100-year flood if the channel is improved to County criteria.
- Finish floor elevations of residences shall be (at least) one foot over the level of the 100-year flood elevation.

Many homes located within the 100-year floodplain were built prior to adoption of this ordinance. These homes are most susceptible to flooding because they were typically built at grade and are often located below the adjoining street grade.

3.6.4 OLDE TOWNE EXISTING DRAINAGE FACILITIES

3.6.4.1 Local Drainage Facilities (Minor Waterways[6])

The majority of drainage facilities within the urban area of Olde Towne consists of roadside ditches or drainage swales, culverts at driveways and street crossings, and recently completed storm drains in Tefft Street. The existing drainage facilities throughout Olde Towne are shown in Figure 7 of Appendix A. These facilities were identified and mapped during the field reconnaissance. It is possible that some private storm drains were not located; therefore, the structures in the figure are not intended to be a comprehensive inventory of all facilities.

The lack of capacity and appropriate maintenance of local drainage facilities contribute to flooding in Olde Towne. For example, storm runoff flowing down Sea Street to Mallagh is impeded from discharging to Deleissigues Creek due to sediment build up in the roadside drainage channels along Mallagh. As the roadside drainage channels begin to fill with runoff, street culvert crossings become surcharged and overflow onto adjacent property. Continued runoff flowing from upstream properties amplifies the problem by increasing the depth of flooding.

3.6.4.2 Nipomo Creek and Tributaries (Major and Secondary Waterways[7])

Severe flooding problems in Olde Towne are caused by flood flows overtopping the banks of Haystack Creek, Deleissigues Creek and Nipomo Creek. **The conveyance capacity of the creeks is limited primarily by the culvert crossings, but the lack in channel capacity also causes flood flows to overtop the creeks' banks**. If the culverts were designed per the County's standards for Major and Secondary waterways, then the threat and frequency of flooding from large storms would be reduced because the facilities would have sufficient capacity to convey the peak storms. The natural channels were not designed or constructed to operate as major or secondary waterways. Based on current County standards and the drainage area for the respective creeks, Table 3-11 summarizes the design criteria for the creek culvert crossings in Olde Towne.

Table 3-11: County Design Standards for Major and Secondary Creek Crossings

CREEK	LOCATION	DRAINAGE AREA [1] (mi^2)	WATERWAY TYPE	CURRENT COUNTY DESIGN STANDARD
Nipomo Creek	Tefft Road	greater than 4	Major	100-year
Deleissigues Creek	Confluence with Nipomo Creek	greater than 1, less than 4	Secondary	25-year
Unnamed Tributary 1 to Deleissigues Creek	Confluence with Deleissigues Creek	less than 1	Minor	10-year
Hermrick Creek	Confluence with Nipomo Creek	less than 1	Minor	10-year
Haystack, North Fork	Confluence with South Fork Haystack Creek	greater than 1, less than 4	Secondary	25-year
Haystack, Main Stem	Confluence with Nipomo Creek	greater than 1, less than 4	Secondary	25-year
Knotts Street Ditch	Confluence with Nipomo Creek	less than 1	Minor	10-year

Notes:
1. The drainage area was estimated based on available topographic base maps and information on known drainage areas.

[6] County Waterway Definitions/Criteria – Minor Waterways have a drainage area of less than one square mile and shall be designed for an average recurrence interval of 10 years with freeboard.
[7] Major Waterways have a drainage area of over four square miles and shall be designed for an average recurrence interval of 100-years, with freeboard. Secondary Waterways have a drainage area of between one and four square miles and shall be designed for an average recurrence interval of 25 years with freeboard.

Estimated FEMA flow rates at various return periods were available for the larger creeks, including:

- Haystack Creek at Nipomo Creek,
- South Fork Haystack at its confluence with Haystack Creek,
- Nipomo Creek at its Tefft Street crossing,
- Deleissigues Creek at the Nipomo Creek confluence

To obtain approximate flows for the North Fork of Haystack Creek, flows were estimated to be proportional to those of the South Fork of Haystack Creek, since the watersheds are similar in shape and length. The ratio of the watershed areas was applied to the South Fork flow rate to obtain the North Fork flow rates listed in Table 3-12. The time of concentration may be slightly longer for the North Fork, causing the flows in this watershed to peak later than South Fork flows.

The 25-year flow rates for each creek were estimated by comparing the rainfall intensity curves for the 10-year, 25-year, and 50-year return periods. The 25-year rainfall intensities were roughly the midpoint between the 10-year and 50-year rainfall intensities, and the 25-year flow rates were assumed to be the midpoint of the 10-year and 50-year flow rates. The creek flow rates used to assess culvert capacities and conformance to the current minimum County design standards are listed in Table 3-12. The shaded cells identify the flow capacity required at each crossing to meet the current County standard. Reference the engineering technical memorandum in Appendix F for more information on estimating the peak storm flows.

Table 3-12: Design Flows for Olde Towne, Nipomo Creeks [1]

CREEK	LOCATION	DRAINAGE AREA (SQ MI)	10-YEAR FLOW (CFS)	25-YEAR FLOW (CFS)	50-YEAR FLOW (CFS)	100-YEAR FLOW (CFS)
Deleissigues Creek [2]	Confluence with Nipomo Creek	2.5	330	670	1,000	1,500
Unnamed Tributary 1	Confluence with Deleissigues Creek	0.1	43	49	56	63
Hermrick Creek	Confluence with Nipomo Creek	0.7	230	300	360	420
Haystack Creek – North Fork	Confluence with Haystack Creek	1.8	290	620	940	1,400
Haystack Creek – South Fork	Confluence with Haystack Creek	1.4	225	480	730	1,100
Haystack Creek – Main Stem [3]	Confluence Nipomo Creek	3.3	440	920	1,400	2,000
Knotts Street Ditch	Thompson Avenue	0.1	43	49	56	63
Nipomo Creek	Tefft Street Bridge	10.5	1,290	2,700	4,100	5,900

Notes:

1. FEMA reported peak flows on Deleissigues, Haystack and Nipomo Creeks. 25-year flood flow extracted from frequency curve. 25-year flows are not reported by FEMA. Flows for other creeks calculated based on available topographic maps, frequency curves, and rain data.
2. Deleissigues Creek listing in FIS Summary of Discharges indicates confluence with Corbit Canyon Creek, but flood profiles show confluence with Nipomo Creek. Confluence with Nipomo Creek is assumed.
3. Haystack Creek was entitled "Tefft Road Tributary" in FEMA FIS. The South Fork of Haystack Creek was entitled "Tefft Road Tributary East Fork" in the same FIS.

The sizes and locations of culverts and hydraulic structures within the Olde Town area are shown on Figure 7 of Appendix A. Estimates of culvert and hydraulic structure capacities were established by assuming an inlet control flow condition and an appropriate flow depth at the culvert entrance. Culvert capacity obtained from the published inlet control nomographs was based on the size and shape of the inlet opening. The culvert inlet

capacities were determined for water surface at the soffit of the culvert and at a surcharged condition where water depth is 1.5 times the culvert opening at the entrance (i.e. 50 percent of culvert height above the culvert soffit).

Table 3-13 summarizes the creek crossing facilities and the apparent level of conveyance capacity. **Only two crossings in Olde Towne conform to the current County design standards, Hermrick Creek at Thompson Road and it is assumed that the newly constructed arch culvert on Haystack Creek (main stem) at Tefft Street was designed per County standards**.

The estimated culvert capacities were compared with the calculated flow rates for each return period to determine the flow rate that can pass through the culvert without surcharge. The culverts within Olde Towne are generally not sufficient to pass the 10-year flow rate without surcharge, although some can pass higher return period storms under surcharge conditions. The culverts and crossings along Haystack Creek, with exception of the newly installed arch at the Tefft Street crossing, are generally insufficient to carry the 10-year flow. **Creek channel capacities could not be estimated due to limited access to private property and lack of survey data, but it is assumed that the channels are capable of conveying the design flow without overtopping for its respective waterway designation**.

Table 3-14 provides a comparison of the current County standard design flow for each of the creek crossings in Olde Towne to the capacity for each of the crossings. The culvert crossings that possess sufficient capacity to meet the County's current standards are emboldened. The shaded rows identify those culverts that do not meet current County standards. The new Tefft Street arch culvert and the existing Deleissigues Creek Thompson Road culvert were designed with sufficient capacity to pass the 25-year flood flow. The Thompson Road culverts on Tributary 1 and Hermrick Creek possess sufficient capacity to pass the 10-year flood. It should be noted that hydraulic calculations indicate that the Hermrick Creek culvert will surcharge during a 10-year storm event.

Table 3-13: Culvert Capacities at Secondary and Minor Creek Crossings in Olde Towne

CREEK	CROSSING	DIMENSION	CAPACITY WITH WSE AT SOFFIT (CFS)	CAPACITY WITH WATER DEPTH 1.5 x HEIGHT (CFS)
Deleissigues Creek	Thompson Road [1]	9' high bridge	100-year	N/A
Unnamed Tributary 1	Thompson Road	3'x3' box culvert	45	72
Unnamed Tributary 1	Mallagh Street	Two 24" diameter culverts	26	40
Hermrick Creek	Thompson Road [2]	Double 4'x4' box culvert	190	300
Hermrick Creek	Burton Street	4' diameter culvert	70	110
Hermrick Creek	Mallagh Street	Two 24" diameter culverts	24	40
Haystack, North Fork	Tefft Street	Double 6'x4' box culvert	340	430
Haystack, Main Stem	Thompson Road	7'x5' box culvert	275	360
Haystack, Main Stem	Tefft Street	9' high by 24' wide arch culvert	25-year [3]	50-year [3]
Haystack, Main Stem	Mallagh Street	7' diameter culvert	300	450
Knotts Street Ditch	Thompson Road	3'x3' box culvert	45	72
Knotts Street Ditch	Vintage Street at Thompson Rd.	24-inch diameter culvert	12	20

Notes:

1. Bridge can pass 100-year flow without overtopping based on FEMA FIS channel profiles. FEMA FIRM maps indicate water surfaces overtop roadway at 100-year event.
2. A weir and detention basin has been installed on the upstream side of the double box culvert to reduce the peak discharge entering the Thompson Road culvert.
3. Inlet Control Nomograph not available. Flow capacity is assumed to be 920 cfs (25-year event).

Table 3-14: Comparison of County Design Standard per Waterway Designation with Culvert Capacity

CREEK	CROSSING	CURRENT DESIGN STANDARD (CFS)	CAPACITY WITH WSE AT SOFFIT (CFS)	CAPACITY WITH WATER DEPTH 1.5 x HEIGHT (CFS)
Deleissigues Creek	**Thompson Road**	**25 year = 670**	**100-year**	**N/A**
Unnamed Tributary 1	**Thompson Road**	**10 year = 43**	**45**	**72**
Unnamed Tributary 1	Mallagh Street	10 year = 43	26	40
Hermrick Creek	**Thompson Road**	**10 year = 230**	**190**	**300**
Hermrick Creek	Burton Street	10 year = 230	70	110
Hermrick Creek	Mallagh Street	10 year = 230	24	40
Haystack, North Fork	Tefft Street	25 year = 620	340	430
Haystack, Main Stem	Thompson Road	25 year = 920	275	360
Haystack, Main Stem	**Tefft Street**	**25 year = 920**	**25-year**	**50-year**
Haystack, Main Stem	Mallagh Street	25 year = 920	300	450

3.6.4.3 Significance of Creek Channel Capacity in Culvert Design

By definition of the current County standard, Haystack Creek is a secondary waterway and should have sufficient capacity to convey a 25-year flood without overtopping the creek's banks. However, the culvert crossings of the North Fork at Tefft Street, the Mainstem at Thompson, and the Mainstem at Mallagh generally only have sufficient capacity to convey the 10-year flood event, or less. Although a hydraulic analysis of the natural channel for Haystack Creek and the two forks was not conducted, based on field observation, it appears that the capacity of the natural channel varies by reach. The natural channel of the north and south forks is filled in with sediment, vegetation and debris in certain reaches, and it is therefore very probable that the natural channel of the Haystack Creeks lack the capacity to convey the 25-year storm. One hypothesis is that the culverts were sized to match the capacity of the natural channel, and may be the reason that the culverts do not meet current County standards.

Achieving the current County standard for the culverts on Haystack Creek may not be realistic or applicable considering the land constraints, cost to replace and upgrade existing culverts/bridges, and the natural floodplain patterns of the watershed. Instead of applying the current County standard to all culverts without consideration of the natural channel capacity, it may be more practical to evaluate each culvert in detail during design. The design could consider the natural creek channel capacity upstream of the culvert and make a determination as to the appropriate culvert capacity necessary to convey the peak storm flowing through the creek channel. These refinements should be considered during the design phase and discussed with the County.

3.7 Olde Town Engineering Analysis Overview

3.7.1 Olde Town Drainage and Flooding Problems

Table 3-15 below summarizes existing flooding problems in the Olde Towne. The locations with noted flooding issues are shown on Figure 8 in Appendix A. The major problems are caused by creek flooding which result from inadequate natural creek and culvert capacities, and channel obstruction of flow. Lack of maintenance of the creek channels and roadside drainage ditches increases the frequency of flooding because runoff generated from even light storms will overload the drainage facilities.

Table 3-15: Summary of Existing Olde Towne Flooding Problems

CAUSE OF FLOODING	DESCRIPTION
1. Limited Natural Channel Capacity	All the creeks in Olde Towne confluence within 500 feet of each other on Nipomo Creek. Where the creeks join Nipomo Creek is an area of regional flooding. The exact capacity of the areas natural channels was not determined, however, it is significantly less than the 100-year storm event. The channels' cross sectional area, bank height and overgrown vegetation all contribute to the natural causes for limiting the creeks' channel capacity. Unless structural measures are implemented to widen the channels or construct upper watershed detention basins, Olde Towne will remain in the natural floodplain of these creeks.
2. Lack of Channel Maintenance	Clogged creek beds (dead trees or limbs, trash, mattresses), increased vegetal growth, and sediment deposition have decreased the channel conveyance of the creeks. Routine (annual or bi-annual) maintenance is needed to remove trash and to dredge silt deposited in the creek's channel.
3. Topography	Much of Olde Towne is located within a 100-year flood hazard zone. These areas have been identified by FEMA as subject to flooding during a 100-year rainfall event. These lower lying areas near the creek and tributary channels may also be subject to flooding from more frequent rainfall events. Low elevations of home foundations were observed during area field inspections.
4. Encroachment of Creek and Tributary Channels	Some property owners have intentionally blocked the drainage path across their property by constructing fences or placing other objects within the channel flow path. The segmenting of drainage paths that occurs when discharging into areas of no conveyance causes standing water and flooding at the location of the blockage and at areas upstream. The blockage can also cause runoff to be diverted onto other properties, causing flooding there.
5. Culvert Blockage	The County currently maintains culverts crossing the roadway and roadway ditches that are a part of the public right of way. During storm events, debris carried by the flow can become lodged at culvert inlets and block the flow. This causes flooding upstream of the culvert. County forces remove the blockage when it is reported.
6. Inadequate Culvert Capacity	Many of the culvert crossings in public right of way in Olde Towne do not meet the County's current minimum design standard for conveying flood flows. As a result, some creeks flood during moderate or normal storms.
7. Inadequate Roadway Drainage	Roadside drainage ditches are often overgrown with vegetation, filled in with sediment, or blocked by residents. Also, the driveway culverts that provide continuous conveyance for the roadside ditches are often undersized, damaged or filled in with sediment. Inadequate roadway drainage also occurs where new development adjacent to a roadway is built on fill, causing drainage to be directed toward the roadway. The rerouted drainage is also trapped on the lower lying roadway by the fill, causing standing water conditions.

3.7.2 Maintenance of Drainage Facilities

Survey respondents reported that many of the drainage ditches and culverts are filled with sediment and debris. Under maintained facilities reduce their design capacity and inhibit their ability to convey runoff. Field investigations indicate that some of the culverts and drainage ditches were partially filled with sediment and excessive vegetal growth. However, in many instances it was difficult to determine whether the culverts were located in public right of way or on private property. The District is not responsible for maintaining facilities on private property.

3.7.3 Discussion of Problems by Creek Watershed

3.7.3.1 Deleissigues Creek Watershed

Deleissigues Creek is considered a secondary waterway by County Standards and should possess sufficient capacity to convey a 25-year flood event. Deleissigues Creek meanders through agricultural fields prior to entering the northwest side of Olde Towne. The creek is conveyed under Thompson Avenue via a single span bridge which has steep, eroded side slopes and an overgrown channel. A clear span footbridge crosses the creek at Mallagh Street in a residential flood-prone area.

Parts of Olde Towne lie within the 100-year flood zone of this tributary and the creek is reported to overtop during times of high flow. The channel and structures cannot convey the 100-year flow, with overtopping expected at Thompson Street. Flooding is also indicated in the vicinity of Mallagh and Eve Streets in the FEMA flood insurance rate map. Detailed topography was unavailable to verify channel capacity, although channel debris, heavy vegetation and the channel realignment likely contribute to the flood problem in this area. Photograph 7 and Photograph 8 show Deleissigues Creek at two reaches near Mallagh Street.

3.7.3.2 Tributary 1 Watershed

The unnamed Tributary 1 originates in the agricultural lands above Thompson Road and is routed through town in a series of culverts and ditches which extend from Thompson to Mallagh between Day and Sea. The unnamed tributary joins Deleissigues Creek through a heavily vegetated drainage channel that extends approximately 100 feet west of the intersection of Mallagh and Sea (See Figure 7 in Appendix A). Deleissigues Creek joins Nipomo Creek approximately 1,600 feet further downstream.

At Thompson Avenue, storm runoff flows through a 3 feet by 3 feet concrete box culvert which has silt deposition at the entrance. Flow is then conveyed along a 30-inch corrugated plastic pipe (CPP) across private property. The CPP is stubbed out on the west side of Burton, where runoff is discharged onto a roadside drainage ditch along Burton (see Photograph 9. CPP installed by private developer building two new homes on Burton). The runoff then flows towards a small roadside ditch along Sea Street. The roadside ditch along Sea Street is overgrown with vegetation and terminates into two, 24-inch diameter corrugated metal culverts that have sediment blocking the inlets. Flow backs up at this constriction and causes flooding in the area. The blocked drainage channel between Deleissigues Creek and the drainage facilities in Mallagh also contributes to the flooding along Mallagh. Runoff from backyards south of Sea is conveyed to a ditch and culvert under Mallagh near Bee Street. This flow is conveyed north in a roadside ditch to the discharge of the two CMPs at the intersection of Sea Street and Mallagh. Because the roadside drainage ditches and channel leading to Deleissigues Creek are overgrown with vegetation, runoff will back up through the culvert near Bee Street and cause flooding along Mallagh.

3.7.3.3 Hermrick Creek Watershed

Hermrick Creek, which conveys a 10-year flow of approximately 230 cfs, enters Olde Town at Leaf Street where the new Fairview Tract subdivision is being built. The developer of the Fairview Tract is constructing a

detention basin east of Thompson. A drainage report[8] prepared for the Fairview Tract reported that the proposed detention basin would lie within the creek bed and that the water surface level in the basin would be controlled by a step-weir. The step-weir was sized to detain the 50-year event from the developed site and release the 2-year storm event from the undeveloped site. The second level of the step-weir was sized to pass the 100-year event for the entire tributary watershed. Runoff that flows past the step-weir would flow through a double 4 feet by 4 feet box concrete culvert under Thompson Avenue into a series of ditches and culverts. Photograph 10 and Photograph 11 show the detention basin under construction and the step-weir and culvert structure, respectively.

The ditch along Bee Street between Thompson and Burton can overflow, and runoff reportedly runs westerly along Bee Street. The 4-foot diameter corrugated metal pipe under Burton discharges to a channel flowing through the back yards of neighboring residences. Runoff was reported to break out of the channel upstream of Burton and flow south-east towards Chestnut, then south-west towards Mallagh, causing flood damage along the way.

Although flooding was not reported in the back yards between Burton and Mallagh, concern is expressed because of the channel's proximity to homes, the encroachment of the channel that is occurring, and the structures built across the natural channel that obstruct flow. Photograph 12 shows a fence that was built across Hermrick Creek. This fence will obstruct flow and capture debris that could cause storm water to overtop the creek's banks and flood adjacent properties. These types of structures and creek encroachment are common in Olde Towne.

The runoff then enters two 36-inch diameter reinforced concrete pipes extending under Mallagh at Chestnut. Surface runoff and roadside drainage from the urban portion of this watershed also collect through an inconsistent series of drainage ditches, curbs, culverts and storm drains and discharge to Hermrick Creek at Mallagh. The degraded channel downstream of the two 36-inch culverts conveys runoff about 1,300 feet downstream to Nipomo Creek.

Sedimentation and debris blocked culverts are reported problems along this tributary. Homes in local depressions adjacent to the channel have experienced flooding.

3.7.3.4 Haystack Creek Watershed

The North and South Forks of Haystack Creek extend from the Temettate Ridge through agricultural land and meet within the Nipomo Urban area. The combined flows are conveyed along Haystack Creek to its confluence with Nipomo Creek north of Tefft Street. The two forks of Haystack Creek are on opposite sides of Tefft Street upstream of their confluence near Avocado Avenue. Urban dumping, channel encroachment, bank erosion, overgrown vegetation, and sedimentation are the reported problems along these tributaries. Photograph 13 and Photograph 14 show reaches of Haystack Creek where structures encroach into the channel banks and vegetation is overgrown. Much of Olde Towne along Tefft Street lies within the 100-year flood zone of Haystack Creek. 100-year flood flows exceed the top of bank elevation during heavy storms.

The North Fork Haystack watershed is approximately 1.8 square miles. North Fork Haystack Creek has been straightened for approximately one-half mile of channel in the agricultural area upstream of Olde Towne. After entering the town, the tributary parallels Tefft and Branch Streets until it crosses Tefft at Avocado Avenue in a double 6 feet wide by 4 feet tall concrete box culvert. The channel upstream of the culvert is heavily vegetated, and the channel downstream contains debris. In March 2001, residents reported heavy flooding from the creek purportedly caused in part by debris and vegetation clogging the waterways. The North Fork joins the South Fork about 200 feet downstream of the double box culvert crossing of Tefft Street. The North Fork channel between Tefft and the confluence with the South Fork has recently been cleared and vegetation has been removed.

[8] Prepared by Engineering Development Associates, revised date December 12, 2000

South Fork Haystack Creek watershed is approximately 1.4 square miles. The South Fork runs parallel to and between Tefft Street and Dana Street, where landowner encroachment and bank erosion have limited the channel capacity and stability. In general, significant reoccurring flooding problems have not been reported along this tributary, and the FEMA 100-year floodplain is very narrow. However, urban dumping and heavy vegetation in the channel make flooding during large storms a potential hazard for this tributary.

The mainstem of Haystack Creek drains approximately 3.3 square miles at its confluence with Nipomo Creek. Downstream from the north and south fork confluence, Haystack Creek is squeezed along the backside of urban developments between Avocado Street and Thompson Road. There are significant channel encroachments in this area, restricting creek access and making channel maintenance difficult. At Thompson Road, the creek passes through an 8 feet wide by 6 feet tall concrete box culvert. Sediment deposition at this culvert reduces capacity of the road crossing. The length of this crossing has been increased over the years, and its capacity may have been reduced. The estimated capacity of this culvert crossing is less than a 10-year event. Downstream of Thompson, the channel is currently being widened and realigned. A new 24 feet wide by 9 feet high arch culvert at Burton and Tefft Streets was recently constructed (see Photograph 15). Downstream of Tefft Street, the channel crosses under Mallagh in a 7-foot diameter corrugated metal pipe. The angle of this culvert is skewed to the channel, and directs culvert discharge towards the southeast bank, causing significant bank erosion. Adjacent buildings and a parking lot are threatened by this undercutting. Haystack Creek joins Nipomo Creek about 1,400 feet downstream of the Mallagh Street crossing.

3.7.3.5 Knotts Street Agricultural Ditch

The Knotts Street drainage ditch is a small, concrete lined v-ditch that is located along Knotts Street at the southern border of the community. This drainage collects agricultural runoff from fields east of Knotts Street and upstream areas northeast of the intersection of Knotts Street and Cedarwood. The size of this channel is generally sufficient to convey a 2-year return period flow. The concrete ditch discharges into a larger grass-lined ditch which conveys flow to a 3 feet by 3 feet concrete box road crossing at Thompson Avenue. Although the culvert size is adequate to pass a 50-year event, excess sediment accumulation has reduced its capacity. When flows in this ditch exceed the capacity, runoff crosses Knotts Street northward, and enters the residential neighborhood northwest of Knotts Street. These flows continue to drain southwesterly along Vintage Street, to a 24-inch diameter CMP road crossing at Thompson Street. After crossing Thompson, the flow travels in a southeasterly direction in an earthen ditch to the discharge side of the 3 feet by 3 feet culvert. Flow from the confluence continues in a southwesterly direction in an open earthen channel through agricultural fields.

3.8 Olde Towne Proposed Capital Improvement Projects

The proposed projects discussed in this section are intended for planning level purposes only. Detailed calculation of pipeline diameters and channel widths would require a design level topographic survey of the proposed alignments and detailed analysis of the peak flow rates of each subwatershed. If a proposed project proceeds toward implementation, it is recommended that the lead agency invest the resources to perform the detailed engineering.

Based on the survey responses, over 30 individual flooding problem areas were identified within the Olde Towne study area. The conceptual projects were based on limited field information and elevation data. The proposed projects are grouped according to drainage area and creek.

The proposed projects are broken out into two options; 1) meet current County standard, 2) provide 100-year level of flood protection. Replacing the culverts will improve flood protection from the more frequent and moderate storms. The reader should note that if the culvert crossings are replaced to meet current County standard, Olde Towne will remain in the 100-year FEMA floodplain. The options are presented in this manner to provide the reader with an understanding of the capital investment necessary to provide flood protection. If

the amount of damage experienced by home owners and businesses on an annual basis is less than the cost of building a flood protection project, then the benefits gained may not warrant the capital investment.

3.8.1 DELEISSIGUES CREEK WATERSHED

3.8.1.1 Existing Conditions

The major flooding problem on Deleissigues Creek is that the channel and structures cannot convey the 100-year flow. The limits of the 100-year floodplain are generally contained within the creek's bank, with the exception being a small area near Eve Street and Mallagh. Field inspections indicate that this reach of Deleissigues Creek experiences heavy vegetal growth and likely experiences sediment deposition. Residents also built wooden bridges across the creek in this area.

3.8.1.2 Proposed Project: Vegetative and Sediment Management

One alternative that will help reduce the impact of flooding from Deleissigues Creek is vegetative management. Thinning and removing some of the overgrown riparian vegetation will help alleviate the frequency of flooding at lower frequency flood events such as the 5- or 10-year storms. A vegetative management plan could be developed to conduct a onetime channel clearing and then prescribe an on-going (annual or bi-annual) maintenance program. The reach of Deleissigues Creek recommended for routine maintenance extends from Thompson Road to the confluence with Nipomo Creek. Approximately 4,000 feet of creek would be maintained every couple of years.

The goal of the program would be to thin the channel vegetation, reduce frictional resistance of the channel, create more flow carrying capacity, and strive to preserve riparian habitat values. The approach is to remove dense undergrowth and trees that increase channel roughness and reduce conveyance capacity in the channel. Sediment removal should also be implemented at locations where deposition has accumulated over the years.

The vegetative management plan would remove trees and brush in such a way that impacts to the vegetative overstory above the channel are minimized. In some cases, trees may be removed but new ones would be planted outside of the floodway and main flow path. The general concept is to create a tunnel effect and shaded riverine aquatic habitat. Over time, the management program will develop a riparian corridor where flow encounters minimal heavy vegetation resistance but is overshadowed by a tall canopy that provides shade and habitat. A similar vegetative management program has been developed by the City of San Luis Obispo for San Luis Obispo Creek.

Modest gains in flow conveyance can be accomplished which are usually around 10 to 15 percent of the overall channel carrying capacity. Detailed hydraulic modeling would need to be conducted to determine the ultimate effectiveness of this proposed project. The plan would have to be developed in conjunction with State and Federal resource agency approval. As part of the resource agency permit approval process, a California Environmental Quality Act (CEQA) document would be prepared to determine the potential impacts and propose mitigation measures to minimize those impacts. The loss of habitat presents permitting challenges and increases the level of complexity that must be addressed during the environmental documentation and permitting phase, and with the appropriate mitigation, these impacts can be reduced to a less than significant level. Constant communication with the resource agencies during the design and permitting phase will be necessary to ensure that their concerns are addressed and that appropriate mitigation required by the permit are designed into the project. The environmental permitting requirements are discussed in further detail in Chapter 4 of this report.

The advantage of this project, if implemented according to a maintenance plan, is that the capacity of the channel will be improved and maintained. Also, a healthy creek habitat will flourish under the creek's overstory. Removing or thinning the vegetation will have modest impacts on the carrying capacity of the channel. Annual maintenance will require private owners to grant drainage easements within the creek for

access. The drawback is that the project could take over two years to permit and authorize by the resource agencies.

3.8.1.3 Project Cost Estimate

The cost estimate for the Deleissigues Creek project is broken down by item in Table 3-16. The total cost for this project is approximately $387,000. It is assumed that annual sediment removal and vegetation management to maintain the capacity of the channel following the first clearing will cost approximately $15,000. The permits issued by the resource agencies will stipulate the conditions for conducting routine maintenance.

Table 3-16: Project 5 Vegetation Management

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	First Time Vegetative Clearing	4,000	LF	$30	$120,000
2	Wetland/Environmental Mitigation [2]	1	each	$35,000	$35,000
				Subtotal	**$155,000**
	Detailed Hydraulic Analysis	1	each	$45,000	$45,000
	CEQA Documentation	1	each	$25,000	$25,000
	Biological Investigation/Wetlands Delineation	1	each	$50,000	$50,000
	Resource Agency Permit Preparation	1	each	$25,000	$25,000
	Final Engineering and Design	1	each	$25,000	$25,000
	Administrative, Environmental, and Construction Admin.	1	each	$31,000	$31,000
	Contingency	1	each	$31,000	$31,000
				Total	**$387,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report. ENR CCI for Los Angeles (February 2003) = 7,566.
2. It is assumed that environmental mitigation can be accomplished on the adjacent properties in lieu of acquisition of private property in fee for environmental mitigation.

3.8.2 TRIBUTARY 1

3.8.2.1 Existing Conditions

At Thompson Avenue the drainage enters a 3 feet by 3 feet concrete box culvert which has silt deposition at the entrance. Flow is then conveyed along a 30-inch CPP across private property. The CPP is stubbed out on the west side of Burton, where runoff is discharged onto a roadside drainage ditch along Burton. The runoff then flows towards a small roadside ditch along Sea Street. The roadside ditch along Sea Street is overgrown and terminates into two, 24-inch diameter corrugated metal culverts that have sediment blocking the inlets. The culverts at Mallagh lack sufficient capacity to meet the County's current standard for a minor waterway. Flow backs up at this constriction and causes flooding in the area. The blocked drainage channel between Deleissigues Creek and the drainage facilities in Mallagh also contributes to the flooding along Mallagh.

3.8.2.2 Proposed Project

Improve Roadway Crossings in Public Right-of-Way to Meet County Standards

The capacity of the 3 feet by 3 feet box culvert at Thompson Road is approximately equal to the 10-year flood flow for Tributary 1. However, the downstream drainage facilities do not have sufficient capacity to convey the 10-year flood flow, therefore, the downstream facilities are not in conformance with current County standards for minor waterways.

The proposed projects for Tributary 1 include installing culverts at Mallagh and Burton, and also cleaning out existing drainage ditches and culverts to increase conveyance capacity to County standards.

- A 30-inch CMPs should be installed at Burton and Sea Street, as shown in Figure 5, to convey roadside flow along Sea Street across Burton.
- A 24-inch diameter CMP should be installed parallel to the two existing 24-inch diameter culverts crossing under Mallagh Street at Sea Street.
- The roadside drainage ditches and driveway culverts should also be cleared of excess vegetal growth and dredged of deposited sediment so that they also have the capacity to convey the 10-year storm flow.
- The channel between Deleissigues Creek and Mallagh Street should also be cleared of sediment and excess vegetation since it appears that this channel is blocking flow conveyed from the roadside ditches and culverts at Mallagh Street.
- The culvert at Thompson and Day should also be cleaned to prevent further ponding at this intersection.

It is also proposed that an annual or bi-annual maintenance program be implemented to ensure that drainage facilities are free of obstructions prior to the rain season. The cost estimate for these projects assumes that annual maintenance is conducted on the drainage facilities.

Optional Additional Facilities to Provide 100-year Level of Flood Protection

The proposed improvements discussed above would provide drainage facilities that meet County standards for minor waterways. There is also an opportunity for the community to implement a project that protects homes within Tributary 1's drainage area from a 100-year flood event. The goal of a detention basin is to limit the flows discharged downstream of Thompson Road to a 10-year flood event. Runoff greater than a 10-year storm flow would be stored in the detention basin and either discharge when flows recede or percolate into the groundwater. The detention basin ensures that flows do not exceed the capacity of downstream facilities. Figure 9 in Appendix A shows a schematic and dimensions of the proposed detention basin. The basin would store approximately 1.25 acre-feet of runoff.

Developing projects that protect homes from a 100-year flood event was not the objective of this study. However, information on a detention basin that stores runoff up to the 100-year flood event on Tributary 1 is included for the community's benefit. If the community chooses to implement this project, then the Tributary 1 drainage area should receive protection from the higher intensity storms.

Detention Basins Serving as Multi-Use Facilities

The typical basin detail per the County's Standard Improvement Specifications and Drawings (Drawing D-1) lays out a rectangular basin with 2:1 side slopes, or flatter. This general configuration is shown for the proposed detention basins on Figures 9 and 10 in Appendix A. If these projects are implemented, there is an opportunity to develop a multi-use facility that serves as a detention basin during storms, but also includes recreational and open space areas for the community. These multi-use facilities are common in storm water management and have recently been constructed in new residential subdivisions in the Mesa (off Tefft and Tejas). The detention basin would be modified from the "box" layout shown in the figures to a more free form funnel shape that follows the natural contours of the landscape. A conceptual layout of the free forming multi-use facility is shown for each proposed detention basin on Figures 9 and 10. The cost estimates for each detention basin project assumes the County standard layout. Developing a multi-use facility will result in higher construction costs which are not included in the estimates.

3.8.2.3 Project Cost Estimate

The cost estimates to improve the culverts to current County standards and to provide 100-year level of protection are broken down by item in Table 3-17 and Table 3-18, respectively. The total project cost to improve facilities to current County standards is approximately $171,000. The total cost to build the detention basin and appurtenant facilities is approximately $253,000. The costs shown do not include estimated annual maintenance.

Table 3-17: Tributary 1: Current County Standard Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	One 30-inch diameter CMP culvert at Burton	50	LF	$180	$9,000
2	Drop Inlets	2	each	$3,500	$7,000
3	One 24-inch diameter CMP culvert at Mallagh	50	LF	$180	$9,000
4	Drop Inlets	1	each	$3,500	$4,000
5	Clear and Dredge Roadside Ditches/Culverts	1,000	LF	$30	$30,000
				Subtotal	**$59,000**
	Engineering and Design [2]			20 percent of subtotal	$28,000
	Administrative and Environmental [2]			40 percent of subtotal	$56,000
	Contingency [2]			20 percent of subtotal	$28,000
				Total	**$171,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Table 3-18: Tributary 1: 100-year Flood Protection

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Construct Detention Basin (excavate/grade)	2,000	CY	$15	$30,000
2	Inflow/Outflow Structures	2	each	$45,000	$90,000
3	Hydroseeding	1	acres	$1,000	$1,000
4	Fence	500	LF	$10	$5,000
5	Land Acquisition	0.5	acres	$30,000	$15,000
				Subtotal	**$141,000**
	Engineering and Design [2]			20 percent of subtotal	$28,000
	Administrative and Environmental [2]			40 percent of subtotal	$56,000
	Contingency [2]			20 percent of subtotal	$28,000
				Total	**$253,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.8.3 HERMRICK CREEK WATERSHED

3.8.3.1 Existing Conditions

Hermrick Creek enters Olde Towne at Leaf Street where the Fairview Tract is currently developing approximately 100 to 150 homes. A double 4 feet by 4 feet box concrete culvert conveys flow under Thompson Avenue into a series of ditches and culverts. The ditch along Bee Street between Thompson and Burton can overflow, and runoff reportedly runs westerly along Bee Street and south along Burton Street following the surface grade. Residents report that historically, Hermrick Creek flowed along the direction of Burton Street before joining with the main stem of Haystack Creek. Currently, the 4-foot diameter corrugated metal pipe under Burton Street discharges to a channel crossing the back yards of neighboring residences between Bee and Chestnut. Two 36-inch diameter reinforced concrete pipes extend under Mallagh at Chestnut. Both culverts at Burton and Mallagh lack sufficient capacity to meet the County's current standard for minor waterways. Sedimentation and debris blocked culverts are reported problems along this tributary, along with encroachment by fences and other obstructions in the channel flow area. Homes in local depressions adjacent to the channel have experienced flooding.

3.8.3.2 Proposed Project

Improve Roadway Crossings in Public Right-of-Way to Meet County Standards

The capacity of the double 4 feet by 4 feet culvert at Thompson Road is sufficient to convey the 10-year flood flow under surcharged conditions. Although this technically does not meet County standards for minor waterways, minor modifications to the culverts headwall would prevent runoff from overtopping. However, similar to Tributary 1, the downstream drainage facilities lack sufficient capacity to convey runoff from a 10-year storm and therefore should be improved to meet current County standards.

The proposed projects for Hermrick Creek are to remove and replace the existing culverts at Burton and Mallagh with facilities that meet current County standards for minor waterways. A double 5 feet wide by 4 feet high concrete box culvert should be installed at the creek's crossing with Burton and Mallagh as shown in Figure 9 of Appendix A.

Optional Additional Facilities to Provide 100-year Level of Flood Protection

The proposed improvements discussed above would provide drainage facilities that meet County standards for minor waterways. As with Tributary 1, there is also an opportunity for the community to implement a project that protects homes within Hermrick Creek's drainage area from a 100-year flood event. Construction of a detention basin would limit the flows discharged downstream of Thompson Road to a 10-year flood event. The detention basin ensures that flows do not exceed the capacity of downstream facilities. Figure 9 shows a schematic and dimensions of the proposed detention basin. The basin would store approximately 8.25 acre-feet of runoff. If the community chooses a multi-use detention basin and not the standard County basin design, then the design should ensure that the basin contains a minimum of 8.25 acre-feet of storage.

Information on a detention basin that stores runoff up to the 100-year flood event on Hermrick Creek is included for the community's benefit. If the community chooses to implement this project, then the Hermrick Creek drainage area should receive protection from the higher intensity storms.

Fairview Tract Detention Basin

The detention basin currently under construction as part of the Fairview Tract development will detain runoff from the development. As described previously, the water surface elevation in the detention basin will be controlled by a step-weir immediately upstream of the 4 feet by 4 feet culvert. The detention basin was sized to detain the 50-year event from the developed site and release the 2-year storm from the undeveloped site. The

maximum storage volume of the detention basin is approximately 5.39 acre-feet. In order to provide sufficient storage to detain the 100-year storm event and only discharge flows equivalent to a 10-year flood, an additional 3.0 acre-feet (approximately) of storage should be added to the Fairview Tract detention basin.

3.8.3.3 Project Cost Estimate

The cost estimates to improve the culverts to current County standards and to provide 100-year level of protection are broken down by item in Table 3-19 and Table 3-20, respectively. The total project cost to improve facilities to current County standards is approximately $108,000. The total cost to build the detention basin and appurtenant facilities is approximately $412,000. The costs shown do not include estimated annual maintenance.

Table 3-19: Hermrick Creek: Current County Standard Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Double 4'Hx5'W box culvert at Burton	50	CY	$600	$30,000
2	Double 4'Hx5'W box culvert at Mallagh	50	CY	$600	$30,000
				Subtotal	**$60,000**
	Engineering and Design [2]			20 percent of subtotal	$12,000
	Administrative and Environmental [2]			40 percent of subtotal	$24,000
	Contingency [2]			20 percent of subtotal	$12,000
				Total	**$108,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Table 3-20: Hermrick Creek: 100-year Flood Protection

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Construct Detention Basin (excavate/grade)	13,300	CY	$15	$200,000
2	Inflow/Outflow Structures	2	each	$45,000	$90,000
3	Hydroseeding	2	acres	$1,000	$2,000
4	Fence	1,200	LF	$10	$12,000
5	Land Acquisition	2	acres	$30,000	$60,000
				Subtotal	**$364,000**
	Engineering and Design [2]			20 percent of subtotal	$12,000
	Administrative and Environmental [2]			40 percent of subtotal	$24,000
	Contingency [2]			20 percent of subtotal	$12,000
				Total	**$412,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.8.4 HAYSTACK CREEK WATERSHED

3.8.4.1 Existing Conditions

Much of Olde Towne along Tefft Street lies within the 100-year flood zone of Haystack Creek. The Haystack Creek mainstem culvert crossings at Mallagh and Thompson lack the capacity to convey the 25-year flood flow, which is the current County standard for secondary waterways. The Haystack Creek north fork crossing at Tefft Street also lacks the capacity to convey the 25-year storm flow. Urban dumping, channel encroachment, bank erosion, overgrown vegetation, and sedimentation are additional reported problems along these tributaries.

Taking into Account the Channel Capacity in Culvert Design

As discussed in Section 3.6.4.3, the capacity on Haystack Creek is restricted by the culvert crossings, and likely by the natural channel. The FEMA floodplain shows that the creek lacks the capacity to contain the 100-year flood event, and possibly not capable of conveying the current County design 25-year peak flow standard. A detailed hydraulic analysis of the natural channel was not conducted, however, if the channel can only convey the 10-year flow, then perhaps requiring a 25-year flow design standard for the culverts is not practical. If a culvert replacement project is implemented, then the design could consider the natural creek channel capacity upstream of the culvert and make a determination as to the appropriate culvert capacity necessary to convey the peak storm flowing through the creek channel. These refinements should be considered during the design phase and discussed with the County. If the natural channel were ever enlarged to increase the conveyance capacity, then the culverts would also need to be improved to match the design flow (an improbable scenario considering the land constraints).

3.8.4.2 Proposed Project

The recommended Haystack Creek projects shown on Figure 10 in Appendix A are necessary for meeting the current County Design standards within the public right of way. These projects include new larger culvert crossings on North Fork Haystack Creek on Tefft Street near Avocado Street, and new culvert crossings on the mainstem of Haystack Creek at both the Thompson Avenue and Mallagh Street crossings. These culverts will be able to pass the 25-year flood event with freeboard and the 50-year event without overtopping.

If further flood protection is desired by the residents within the floodplain, a detention basin can be constructed on each of the Haystack Creek tributaries near the boundaries of the town. These basins would be sized to contain the 100-year flood with a release rate of no larger than the 25-year storm.

The individual projects are described below.

Improve Roadway Crossings in Public Right of Way to Meet County Standards

Three roadway crossing culvert improvements are necessary along Haystack Creek and its tributaries. These roadway crossing improvements include:

- North Fork Haystack Creek at Tefft Street – Add two additional 6 feet wide by 4 feet high box culverts to the existing double 6 feet wide by 4 feet high box culverts
- Haystack Creek at Thompson Avenue - Replace existing 8 feet wide by 6 feet high box culvert with new 24 feet wide by 9 feet high arch span culvert
- Haystack Creek at Mallagh Street – Replace existing 7 feet diameter CMP with new 24 feet wide by 9 feet high arch span culvert

Along North Fork Haystack Creek, the capacity of the existing double 6 feet wide by 4 feet high box culvert at Tefft Street is slightly larger than the 10-year flood flow for the creek, and is less than the 25-year capacity

required in the current County design standard. Adding the two culverts with similar dimensions will allow the culvert to pass the 25-year flow of 620 cfs.

The capacities of the existing 8 feet wide by 6 feet high box culvert at Thompson Avenue and the existing 7 feet diameter CMP at Mallagh Street along the Main Stem of Haystack Creek are less than the 10-year flood flow for the creek and do not meet the 25-year capacity required in the current County design standard. Both existing culverts should be replaced with a new 24 feet wide by 9 feet high arch span culvert similar to that recently constructed at the intersection of Burton Street and Tefft Street. The new arch culvert is assumed to pass the 25-year flow of 920 cfs.

On the mainstem of Haystack Creek, erosion occurs downstream of Thompson and Mallagh. The bank is devoid of vegetation and erosion is beginning to threaten parking areas and buildings. Installing erosion protection such as gabions would armor the bank and prevent further erosion.

Alternative Approach to Culvert Replacement

Recommending replacement of all Haystack Creek culverts that do not meet the current County design standard may appear inappropriate and expensive. The culverts were likely sized appropriately and according to County standards at the time of installation, but as urban development increased and higher intensity storms were recorded, the design flow likely increased. With the cost of the Haystack Creek culvert improvements, it may be more economical to develop a master plan for the Haystack Creek watershed that includes detention basins in the upper watershed. The detention basins would operate by restricting downstream peak flow to the 10-year event (or the minimum natural channel and culvert capacity). This mast plan will result in a multifaceted solution of reducing peak flow through the local community, requiring no culvert replacement, eliminating flooding from the 100-year event (detention basin would be sized to store the 100-year storm), and creating a multi-use facility.

Stream Channel Improvements

The existing stream channel is within private property, requiring maintenance by individual homeowners rather than the County. **The channel capacity was assumed to have a 25-year flow capacity if it was adequately maintained and channel encroachments were removed.** A number of encroachments were observed during the field inspection. These encroachments should be removed to allow the 25-year flow to pass along the channel unimpeded. Urban dumping should also be halted and the individual owners should clean the existing material that has been dumped there.

Optional Additional Facilities to Provide 100-year Level of Flood Protection

The proposed recommended improvements discussed above would provide drainage facilities that meet County design standards for secondary waterways at all public right of way locations. There is also an opportunity to increase the level of protection of homes within the Haystack Creek floodplain area from a 100-year flood event. A detention basin could be constructed on each of the Haystack Creek tributaries upstream of the developed area of the town. The goal of a detention basin is to limit the flows discharged downstream of Thompson Road to a 25-year flood event. Creek flows greater than a 25-year storm flow would be stored in the detention basin to be discharged when flows receded or percolated into the groundwater. The detention basin ensures that flows do not exceed the capacity of downstream facilities. Figure 10 in Appendix A shows a schematic and dimensions of the detention basin on each of the creeks. The basins on north and south forks of Haystack Creek would store approximately 20 and 15 acre-feet of runoff, respectively.

Developing projects that protect homes from a 100-year flood event was not the objective of this study. However, information on a detention basin that stores runoff up to the 100-year flood event on Haystack Creek

is included for the community's benefit. If the community chooses to implement this project, then the Haystack Creek drainage area downstream of the basins should receive protection from the 100-year storm.

3.8.4.3 Project Cost Estimate

The cost estimate for Haystack Creek to improve roadway crossings within public right-of-way is broken down by item in Table 3-21. The total cost for this project is approximately $1,746,000. The total cost to improve road crossing culverts to County standards is approximately $1,116,000 and the cost to install erosion control is approximately $630,000.

The cost estimate for the optional detention basins on North and South Forks of Haystack Creek to is broken down by item in **Table 3-22**. The total cost for this project is approximately $2,267,000. The total cost to construct the North Fork detention basin is approximately $1,257,000 and the cost for the South Fork detention basin is approximately $1,009,000. The costs shown do not include estimated annual maintenance.

Table 3-21: Haystack Creek (North Fork and Mainstem) - County Standard Improvements and Erosion Protection

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	24'Wx9'H Arch Culvert at Thompson	2,800	SF	$100	$280,000
2	24'Wx9'H Arch Culvert at Mallagh	2,800	SF	$100	$280,000
3	Double 6'Wx4'H Culvert at Tefft on North Haystack Creek	100	CY	$600	$60,000
4	Gabion Installation for Erosion Control at Thompson	200	LF	$1,000	$200,000
5	Gabion Installation for Erosion Control at Mallagh	150	LF	$1,000	$150,000
				Subtotal	**$970,000**
	Engineering and Design [2]			20 percent of subtotal	$194,000
	Administrative and Environmental [2]			40 percent of subtotal	$388,000
	Contingency [2]			20 percent of subtotal	$194,000
				Total	**$1,746,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Table 3-22: Haystack Creek (North Fork and South Fork) – Optional Storm Detention Facilities

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	South Fork Detention Basin (excavate/grade)	24,200	CY	$15	$363,000
2	Inflow/Outflow Structures	2	each	$45,000	$90,000
3	Hydroseeding	3	acres	$1,000	$3,000
4	Fence	1,500	LF	$10	$15,000
5	Land Acquisition	3	acres	$30,000	$90,000
7	North Fork Detention Basin (excavate/grade)	31,200	CY	$15	$468,000
8	Inflow/Outflow Structures	2	each	$45,000	$90,000
9	Hydroseeding	4	acres	$1,000	$4,000
10	Fence	1,600	LF	$10	$16,000
11	Land Acquisition	4	acres	$30,000	$120,000
				Subtotal	**$1,259,000**
	Engineering and Design [2]			20 percent of subtotal	$252,000
	Administrative and Environmental [2]			40 percent of subtotal	$504,000
	Contingency [2]			20 percent of subtotal	$252,000
				Total	**$2,267,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 80% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.8.5 KNOTTS STREET CONCRETE DITCH REPLACEMENT

3.8.5.1 Existing Conditions

The Knotts Street drainage ditch is a small, concrete lined v-ditch that is located along Knotts Street at the southern border of the community. This drainage collects agricultural runoff from fields east of Knotts Street and upstream areas northeast of the intersection of Knotts Street and Cedarwood. The size of this channel is generally sufficient to convey a 2-year return period flow. When flows in this ditch exceed the capacity, runoff crosses Knotts Street northward, and enters the residential neighborhood northwest of Knotts Street.

The 24-inch diameter culvert that crosses under Thompson at Vintage has sufficient capacity, under surcharge conditions, to convey the 10-year design storm. Replacing the existing culvert with a 27- or 30-inch diameter culvert to prevent surcharge is not considered cost effective.

3.8.5.2 Proposed Project

The Knotts Street project would be instituted as a right of way safety project to eliminate the open concrete ditch. Collecting storm and agricultural runoff and conveying it underground reduces the flood hazard created by overflows crossing over Knotts Street. The existing v-ditch would be removed and replaced with a 27-inch diameter RCP storm drain. The proposed storm drain would begin at Cedarwood and discharge runoff into the existing roadside ditch along Thompson, as shown in Figure 10 in Appendix A.

3.8.5.3 Project Cost Estimate

The cost estimate for the Knotts Street project to remove and replace the v-ditch is broken down in Table 3-23. The total cost for this project is approximately $669,000.

Table 3-23: Knotts Street Roadway Hazard Improvement

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	27-inch Storm Drain	1,800	LF	$180	$324,000
2	Drop Inlets	3	each	$3,500	$11,000
3	Erosion Control	1	Lump Sum	$1,000	$1,000
4	Ditch Removal/Disposal	1,800	LF	$20	$36,000
				Subtotal	**$372,000**
	Engineering and Design [2]			20 percent of subtotal	$74,000
	Administrative and Environmental [2]			40 percent of subtotal	$149,000
	Contingency [2]			20 percent of subtotal	$74,000
				Total	**$669,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

3.8.6 Summary of Costs for Olde Towne

Table 3-24 is a summary table of the costs for the proposed projects in Olde Towne to upgrade the existing culverts and drainage channels to current County design standards. The total cost to improve culverts within public right-of-way and to improve existing local drainage channels is approximately $3.1 million. If the community chose to implement the storm detention basins to provide a greater level of flood protection, then the project costs increase by approximately $2.9 million. The combined costs for improving existing drainage infrastructure to current County standards and for constructing detention basins to provide 100-year flood protection is approximately $6.0 million.

Table 3-24: Olde Towne Drainage Improvements Summary Cost Table

PROJECT	DESCRIPTION	LOCAL DRAINAGE COST [1]
Deleissigues Creek	Vegetation Management	$387,000
Tributary 1	Install New Culverts	$171,000
Hermrick Creek	Install New Culverts	$108,000
Haystack Creeks	Install New Arch Culverts	$1,746,000
Knotts Street Ditch	Remove and Replace Ditch with Storm Drain	$669,000
	Total	**$3,081,000**

Notes:
1. Includes contingency, engineering and environmental.

Table 3-25: Optional Storm Detention Basins

PROJECT	DESCRIPTION	LOCAL DRAINAGE COST [1]
Tributary 1	Detention Basin	$253,000
Hermrick Creek	Detention Basin	$412,000
North Fork-Haystack Creeks	Detention Basin	$1,257,000
South Fork- Haystack Creek	Detention Basin	$1,009,000
	Total	**$2,932,000**

Notes:
1. Includes contingency, engineering and environmental.

3.8.7 Recommended Olde Towne Projects

The primary conveyance issue in Olde Towne is the lack of capacity in the natural channel and constructed culvert crossings within public right-of-way. A majority of the culverts do not meet the County's current minimum design standard for conveying storm flows. The community should investigate possible options for replacing the undersized facilities. The most severely undersized culverts are located where Haystack Creek crosses Thompson Road and Mallagh Street. According to current County standards, these culverts should be sized to convey the 25-year flood event, and hydraulic calculations show that these culverts can just about convey the 10-year flood event. As previously discussed in this report, if the natural channel of Haystack Creek lacks the capacity to convey a 25-year flood event, then requiring that the culverts be designed to this criteria may be impractical. If the community chooses to implement a flood protection project, a more economical approach to replacing all the culvert in Olde Towne may be to construct a detention basin in the upper watershed that restricts the outflow to Haystack Creek.

Chapter 6 discusses the implementation strategy for planning, designing, constructing and phasing the recommended project.

3.9 Additional Recommendations for the Mesa and Olde Towne

3.9.1 Participate in FEMA's Community Rating System Program

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 by FEMA as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Communities must individually apply for participation in the CRS program to receive insurance premium reductions. The CRS gives credit points for any of several designated activities within four distinct categories (Public Outreach, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness). Each CRS listed activity is worth a specified number of points. When all of a community's activities are verified, the achieved points are calculated and adjusted as necessary, according to the rules of the CRS. For each 500 points that can be verified, a community will receive one class reduction starting at class 9 all the way down to class 1. Each class translates to an additional reduction in insurance premiums of five percent for flood insurance policies within the special flood hazard area of that community. This is a voluntary program for communities.

All CRS participants must achieve a class of at least 9, which means they have accumulated a minimum of 500 points, and are therefore entitled to a five percent reduction in premiums. The maximum reduction in insurance premiums a community can receive would be 45 percent, if they achieved a class 1 rating. There are many things that each community can do to better prepare for and manage floods, accrue points in the CRS, further reduce flood insurance premiums, and prepare and protect its citizens from the damaging effects of floods.

All cities and towns should join CRS because of the economic benefits to the members of the community, and because it will heighten the flood hazard awareness and promote good floodplain management activities within the community. There are also proposals linking State and Federal programs to communities that engage in active floodplain management within the CRS program. It is also possible that more programs, either flood damage prevention or post-flood assistance, may be linked to participation in the CRS in the future.

The City of San Luis Obispo participates in the CRS and receives a ten percent discount for the Special Flood Hazard Area (SFHA) and a five percent discount for non-SFHA. The neighboring counties to San Luis Obispo County that participate in the CRS program include Santa Barbara, Monterey and Kern Counties. Monterey County currently receives a 20 percent discount for SFHA. Ventura and Kings County do not participate in the CRS program.

Reference the FEMA website at http://www.fema.gov/nfip/crs.shtm for documents on the CRS and for information on applying for the CRS.

3.9.2 Modifications to Existing Policies and Standards

A number of suggested modifications to existing policies and procedures have been identified to prevent the aggravation of existing drainage problems or creation of new flood prone areas. These policies range from improving current development review processes to changing existing maintenance procedures within the Nipomo Urban Area. The proposed policy modifications are divided into two different types:

- Prevention – Improving the Development Review and Permitting processes
- Enforcement – Providing ordinances or measures to ensure drainage improvements are not changed from the permitted condition and to ensure proper operation and upkeep of existing and future system improvements.

3.9.2.1 Flood Hazard Prevention

Three policies were identified to improve current development review processes to ensure that potential drainage impacts are considered.

1. Require Development Plans to Include Analysis of Existing Drainage Routes

Development plans should be required to provide additional information on existing drainage routes with grading plan submittals. Plans should identify where drainage routes currently exist and identify changes proposed in drainage due to site development.

This information would allow the County's Department of Planning and Building review staff to identify whether the property currently experiences flooding or could likely receive flood water from upstream development. In many of the infill areas of the Nipomo Mesa, the remaining areas to be developed are located in the lowest sump areas of the neighborhood. These areas may also receive roadway runoff onto their property, and the infiltration of street runoff must also be accommodated on the property.

2. Install System Improvements with Increased Development

Drainage improvements should be planned with any proposed development. Regardless of whether drainage problems exist prior to development, mitigation should be planned as not to increase the severity or frequency of problems. Such mitigation could include on-site detention of runoff, thereby preventing the increase of runoff onto lower lying properties.

It is recommended that development fees collected for Nipomo be used to fund drainage improvements for areas that will be most impacted by future development. These areas are typically the topographic low points within a

drainage sub-basin. If new development can not retain runoff on site, then it should be responsible for funding the necessary improvements to convey increased runoff.

In conjunction with planning drainage improvements with future development, critical lots that are at risk to flood damages due to their location should be identified. These lots should dedicate drainage easements on their property or design sufficient conveyance facilities so as not to impede the flow of storm water.

3. Restriction on Building adjacent to the Floodplain

The County design and construction standard for stormwater conveyance facilities, such as gutters and drainage swales, is to convey 10-year flows. Every additional home and related impervious surface (e.g. driveways and patios), and every paved roadway and sidewalk within one of the creek's drainage basin could increase urban runoff (new subdivisions are required to manage storm runoff on-site). Runoff that previously would have infiltrated into the ground could now be conveyed to the creek via local conveyance systems.

As summarized in Section 2.1.3 of this report, the County's land use ordinances require detailed study and project review for proposed development within the floodplain. However, based upon review of County ordinances, there are no provisions requiring detailed analysis of drainage impacts for development located outside the floodplain but that also contribute runoff to flood prone areas. **The County's Department of Planning and Building should require that all proposed developments that contribute runoff to creeks flowing through the floodplain in Olde Towne investigate the drainage flow pattern from the lot to the discharge point.** The conveyance path investigation requirement can be placed in the building or the grading permit. **If the investigation concludes that the proposed development is contributing to an existing problem, then on-site mitigation with a detention basin or equivalent facility should be required.**

4. Require Building Setback from Creek Banks

Residential and commercial buildings in Olde Towne have encroached upon the creeks' banks. The County's Department of Planning and Building should establish a minimum setback policy so that homes or businesses do not build structures adjacent to or within a creeks flow path. This policy would not only preserve a creek's channel, but it will also protect structures because bank erosion will invariably lead to stability problems and compromise a structures foundation.

5. Modify South County Inland Planning Area Standards for Undrained Depressions

Modify existing County standards for undrained depressions to include all of the smaller localized sump areas to reduce structure flooding risk.

The existing South County Inland Planning Area standards include requirements that new land division located in the vicinity of identified undrained depressions shall designate building sites above the spill elevation of the depression or locate building sites out of areas subject to flooding. Figure 7-7 of the South County Inland Planning Area standards identifies the undrained areas subject to flooding. Five undrained areas identified in Figure 7-7 of the planning area standards are within or near the Nipomo Urban Reserve Line, including:

- Pablo Lane
- Intersection of N. Las Flores and Osage Road
- Intersection of Mesa Road and Osage Road
- Southwest of intersection of Camino Caballo and Waypoint Drive
- North of intersection of Pomeroy Drive and Waypoint Road

These five sites generally have differences in elevation of over ten feet between the bottom of the depression and the spill elevation. The Pablo Lane depression area is currently developed, and the depression at the

intersection of Mesa Road and Osage Road has been converted to a retention basin. The other three depression areas are currently undeveloped.

Although these five depression sites are included under the planning area standards, many of the smaller undrained sump areas that have experienced flooding are not included. These "localized" sump areas have differences in elevation between the sump bottom and spill elevation ranging between three feet to ten feet, and occur in numerous places throughout the Mesa. These localized sumps currently receive runoff from small sub-watersheds, as well as overflow water from retention basins during large storm events.

A design level topographic survey of the Mesa should be collected to determine where the localized sump areas exist, and to delineate the watersheds contributing runoff to the localized sumps. Some areas of the Nipomo Mesa have available existing topography; however, topographic information for the Nipomo Urban Area is not available for areas south of Pomeroy between Osage and La Loma, and for all Urban Area along the bluff's edge. The topographic survey information would also provide assessment of parcels which should be used for regional retention, similar to the basin constructed at the intersection of Mesa Road and Osage Road.

In addition to managing runoff from impervious surfaces created on developed lots, infill development of any land within the lowest elevations of the localized sump area should account for possible runoff contribution from upstream areas. It is speculated that upstream properties of the localized sump do not build on-site facilities large enough to manage runoff resulting from large storm events. In response to this possibility, the planning area standards should require that infill development of all land within the localized sump's watershed analyze the potential for retention basin overtopping. Based on the capacity of the infill development's retention basin, the frequency of overtopping should be calculated and the impact to flooding in the lowest portions of the sumped area should be estimated. **If flooding impacts are significant, then infill development should increase the retention basin's capacity to avoid potential flood damages.**

If flooding impacts can not be mitigated, then all developed parcels contributing runoff to the lowest sumped area should compensate the owner residing in the sump for accepting runoff from the contributing properties. The properties contributing runoff would essentially pay a mitigation fee or purchase a drainage easement from the sump area property owner.

6. A Separate Check by the Department of Public Works or the District on All Development Plans

To address drainage issues, a separate approval check by the Department of Public Works or the District should be incorporated into the approval process for all final development plans.

The identification of site specific problems would be more effective if allocated to Department of Public Works or the District, since the Planning Department has no means to enforce local Drainage Standards and Policies, and may not be aware of the details regarding specific drainage issues that have been observed or reported. Under the current system, the Department of Public Works receives many of the complaints from County residents during flooding situations. Public Works in turn informs the planning department of these problem areas and potential enforcement issues. However, the issues may not be fully communicated during this process, and problems or enforcement actions may be missed. Public Works or the District should also have the ability to mandate and follow up on specific drainage system requirements on new building permits.

7. Include Deed Restrictions

All infill development should include a deed restriction to legally bind all new homes constructed in Nipomo to require the preservation and maintenance of retention basins and appurtenant drainage facilities to design conditions. The deed restriction would legally bind the home owner to provide on-site drainage and would also protect community standards.

3.9.2.2 Develop Enforceable Drainage Design Standards and Maintenance Practice

The County's Department of Public Works should work with NCAC to develop a standard drainage ditch and culvert design that meets County standards for minor waterways (designed for an average recurrence interval of 10-years). The County's Department of Planning and Building can also work with NCAC to develop enforceable standards for the following:

- Front yard ditch size and configuration
- Driveway culvert minimum size and installation standards
- Community supported alternative for mountable asphalt dikes
- Community supported drainage plan for Tefft Street Corridor Design Plan

Enforcement of permitted designs of existing private drainage infrastructure would reduce some drainage problems. Existing County policies prescribe little or no action against residents that have filled their basins or plugged basin entrances, or those residents that do not maintain ditches and culverts on their property.

1. Require Basin Inspections and Upgrades for Transfer of Ownership

Require basin inspections and upgrades to meet current drainage standards during transfer of ownership in residential property sales.

Use property transfer during sale as the nexus to require inspection and verification of drainage basin size on each property. All properties which are not served by a regional system could require drainage basins to be constructed as a requirement of sale. Retention basins that have not been maintained, or have been intentionally filled with sediment, would be dredged to meet the current basin size based on the existing impervious area.

2. Increase Enforcement Authority for Drainage Issues

A new County ordinance should be considered that gives the County or District authority to require that residences maintain their permitted drainage infrastructure as designed and approved. Similar to the basis for establishing fire prevention codes, the values and general welfare of a community are founded upon the appearance and maintenance of property. A drainage ordinance should be enacted in order to avoid the deterioration of drainage infrastructure. No drainage facility should be allowed to deteriorate to such a condition that could create a flooding hazard to neighboring properties. If home owners fail to fulfill their responsibilities, then after sufficient notice, the ordinance should give the County or District the power to enter the property and complete this maintenance. A fee should be levied for the service if the landowner fails to perform the required maintenance.

The County or District should have the authority to issue abatement orders when property owners fail to maintain their facilities. Under the existing policies, the only means of enforcement consists of a lengthy legal process. To ease inspection and access to the basins, drainage basins could be required to be visible and accessible from the street when the topography allows.

Without adopted standards for and community wide installation of improved drainage facilities, local flooding will not be eliminated.

3.9.3 COMMUNITY DESIGN IMPROVEMENTS

3.9.3.1 Street Design Enhancements

The County's Department of Planning and Building and the Department of Public Works should establish a standard design for a roadside drainage ditch and driveway culverts to provide sufficient capacity for a 10-year

storm. No trees or shrubs should be planted within the drainage swale and parking within a swale should be prohibited. In reaches where street parking is desired, a culvert with the capacity to convey a 10-year storm could be installed in lieu of the drainage swale.

If the community undertakes a streetscape improvement plan, than a master drainage plan should accompany the streetscape enhancement plan so that drainage ditches are designed and constructed to provide the necessary capacity for a particular block's runoff. Combining the two plans is an effective approach for improving the character of the community and for providing the necessary drainage to mitigate flooding problems. The street and drainage plans can be implemented simultaneously. Taking a comprehensive approach will ensure that all the drainage facilities are continuous and the hydraulics are compatible.

3.9.3.2 Recommendations to Residential Infill Construction

Elevation Requirements and Mountable Berms

The location of a home is a key factor in the resulting drainage problems that are likely to be inflicted on it. Homes located below street grade and whose driveways slope down away from the road may experience flooding in the garage or home. This is because without an adequate curb/berm, the driveway may act to convey runoff from the street above to lower elevations and sometimes into the garage or home. In Nipomo, homes constructed at grade or below the road grade are more typical of older homes and homes constructed prior to implementation of the County's flood damage prevention ordinance. Homes constructed within the floodplain are addressed by existing ordinances.

For homes outside the floodplain, it is recommended that Nipomo and the County Planning Department mandate that the finish and garage elevation for all new home construction be one foot greater than the adjoining street grade. Driveways should slope down away from the home, towards the road. It is also recommended that Nipomo mandate the installation of a County standard mountable berm (or acceptable alternative) for all driveways/accesses to structures which are below the edge of pavement.

Erosion Control

To control erosion, runoff from impervious surfaces such as roofs, driveways, walks, patios or decks should be collected and retained on-site, or released to the public right-of-way through an effective erosion control device or drainage system approved by the County's Department of Public Works. This requirement also achieves the goal of reducing urban runoff and the amount of water that flows to the street, and eventually to local creeks. Minimizing storm runoff also prevents erosion of streets and road shoulders because less water flows to the street and directing the runoff through a grassy swale slows water's velocity.

In general, new developments should achieve the following:

- Increase vegetative groundcover, to the maximum extent possible, as a means of reducing stormwater runoff
- Install on-site natural drainage channels or detention basins to retain runoff from impervious surfaces prior to reaching the public right-of-way

All natural drainage should be kept free of obstructions such as branches, trash, and sediment to maintain the drainage capacity of the channel. Maintenance responsibility should rest with the owners of the property through which the drainage channels pass. Suggested specifics for improving drainage and protecting homes from flooding are detailed below.

Divert Runoff to Landscaped Areas

By diverting stormwater from impervious areas such as roofs, walkways and driveways, and reusing whenever possible, runoff that flows to streets can be greatly reduced. This can be achieved by directing rain gutters to landscaped areas, swales or infiltration basins on private property where water can percolate into the ground.

Placing landscaped areas directly below eaves allows roof runoff to percolate into the subsoil. Plants should be sturdy enough and provide a subsurface matrix of roots to tolerate heavy sheet flow runoff and periodic saturation. Landscaped infiltration basins for stormwater retention should have flow directed toward them with curbs, berm, or similar structures, and slightly concave to retain surface water until it infiltrates.

3.9.4 Modification to County Handout "Drainage Plan Required in Nipomo"

The County's handout generally describes the drainage requirements for the Nipomo area. The current sizing requirements of the basins are based on providing adequate volume for 4 inches of rainfall on the impervious area of the property. The sizing of the basins are based on the impervious surface area of the parcel only, however, the basins are often the discharge point of street runoff and overflow from neighboring properties. The County should consider revising the basin volume to include sufficient capacity to store street runoff also. For example, a home with 100 feet of street frontage on a 12 foot wide lane (from street centerline), would increase their basin capacity by nearly 15 cubic yards, or nearly 50 percent of the basin size when only the impervious surface area of the parcel is considered in the calculation (assumed a 2,500 square foot home). With the installation of appropriate street drainage facilities such as drop inlets and drain pipes, each home owner could accept a small contribution of street runoff. This would significantly reduce the volume of runoff conveyed via street right-of-way to the lowest lying property within a drainage zone. The goal would be to have every home owner manage a small percentage of the runoff, versus one or two properties being subject to repeated flooding.

The County's handout should also include education material on proper maintenance of drainage facilities on private property, and also the consequences of filling in or neglecting infiltration basins. Home owners are responsible for maintaining drainage facilities on the owner's private property, and the County should serve as the leader in assisting home owners to understand their obligations. Otherwise, increasing County enforcement authority may be the only alternative.

3.9.5 Formation of a Drainage Facility Maintenance Department

Many of the drainage/flooding problems in Nipomo are exacerbated by inadequate maintenance of drainage facilities. Currently, the maintenance of drainage infrastructure located within public right of way for unincorporated communities in the County, including Nipomo, is the responsibility of the County Public Works Department. The limited availability of County staff and the large area of responsibility make it difficult for District maintenance workers to assure all culverts and ditches are completely cleared prior to each storm or series of storms. Additionally, recently enacted environmental restrictions prohibit or limit creek/culvert disturbances and therefore further limit full functioning of existing facilities.

If the community elects not to fund the proposed projects, then at a minimum, the community should finance annual maintenance such as channel clearing, sediment removal and vegetation management. **For this reason, it is recommended that the lead agency in Nipomo be responsible for maintaining drainage infrastructure.** Responsibilities of the new maintenance district would include:

- Being the contact point for all resident complaints regarding drainage infrastructure in the community
- Keeping an organized database of all new drainage infrastructure in the community including the size and capacity of culverts and storm drains, even if this infrastructure is installed by private property owners
- Keeping a regular maintenance schedule that may involve multiple maintenance visits where needed

- Responding to drainage infrastructure repairs as needed
- Conducting an information campaign for creek ownership responsibilities for maintenance and cleaning

Having a localized facility maintenance district will make it easier to maintain drainage infrastructure as needed throughout the community.

3.9.5.1 Routine Maintenance of Drainage Channels and Culverts

All the natural drainage channels that convey flow experience some sediment deposition and vegetal growth. Existing natural or fabricated drainage channels should be kept free of obstructions such as fallen trees, debris, and sedimentation to maintain capacity in the drainage system. Primary responsibility for this maintenance should rest with the owners of the property through which the drainage channels pass since the County is not responsible for maintaining facilities on private property. If the drainage channels pass through public property, such as County roads, then the County's maintenance department is responsible for removing impediments. The District should continue to provide leadership, advice and encouragement to property owners and local agencies to assume these responsibilities.

3.9.5.2 Implement Long-Term Creek Maintenance Program in Olde Towne

It is not sufficient to merely build structural solutions to flooding such as those proposed in this chapter. It is necessary to remove the sediment and debris from creeks that are deposited after peak flow events. In flood control districts all over California, maintenance crews spend most of the summer and fall months accomplishing this task before the fall rains begin.

The major types of routine stream maintenance activities include:

- Sediment removal
- Vegetation management
- Bank protection

More minor maintenance activities include:

- Trash removal
- Access repair
- Maintenance of revegetation sites
- Removal of downed trees or other blockages from the stream.

A district or agency could remove thousands of cubic yards of sediment and conduct hundreds of acres of vegetation management annually, just to maintain an existing level of flood protection. Reliable flood protection is an on-going commitment for the local community and requires community involvement to ensure the long term creek management goals are achieved.

Maintenance activities will also require the appropriate resource agency permit approvals. Policies and implementation measures should be developed to protect natural resources during routine creek maintenance. Some of these measures include careful dewatering of work sites to protect water quality and fisheries, safe use of herbicides and careful timing of work to avoid impacts to nesting birds.

3.9.6 COMMUNITY SUPPORTED/MANAGED PROGRAMS

3.9.6.1 Nipomo Creek Watershed Program

The Land Conservancy of San Luis Obispo County concluded in their Nipomo Creek Watershed Characterization Report that the tributaries that convey flow through Olde Towne Nipomo should be the first priority for protection and restoration. Over the years, these creeks have been impacted by the removal of native vegetation and the resulting loss of stream bank protection has contributed to erosion and sediment deposition downstream. In order to improve water quality and decrease sediment load conveyed to downstream reaches, the Land Conservancy recommends restoring as many creeks in the upper watershed of Olde Towne as possible. Restoring upstream creeks will reduce sediment load and the amount of maintenance required on drainage facilities within the community. However, restoration is only one component for improving flood protection in the community.

3.9.6.2 Coordinate with Agricultural Community

Field observations indicate that agricultural operations such as grading and discing could be impacting the creeks flowing through Olde Towne. For example, it appeared that farm operations encroached on Deleissigues Creek and the drainage channels near Mallagh Street. Graded soil may have been pushed into the drainage channel and blocked the flow path, causing runoff to back up in the roadside ditches and flood homes along Mallagh Street. It is recommended that a creek setback guidelines be established to prevent deposition of soil into the creek, erosion, and also to preserve riparian habitat along the creek.

3.9.6.3 Adopt a Creek

The Nipomo Community Advisory Council should sponsor an "adopt a creek" program to encourage residents of Nipomo to take an active role in helping to preserve the health and beauty of the local creeks. The creeks that flow through Olde Towne eventually discharge to Nipomo Creek, which flows to the Santa Maria River, taking all the pollutants, debris and trash accumulated upstream with them. This poses a great threat to vegetation, wildlife and humans. With the help of individuals and groups, the community of Nipomo can minimize the impact urbanization is making on waterways and keep them from becoming overwhelmed by pollution. An on-going community program will help the future health of Nipomo's waterways by ensuring that they remain clean and healthy, and will also improve flood protection by keeping the channels clear of debris.

3.9.6.4 Community Awareness and Education Pamphlets

Complementing the "adopt a creek" program would be an educational program on taking care of creeks to improve the aesthetic quality of the natural resources, but also on "good management" practices to improve flood protection throughout the community. Informing and educating the community on the benefits of maintaining clean creeks will help Nipomo achieve multiple objectives from flood protection to creek restoration. The educational programs could also assist the community on how to prepare for the rainy season. Much like annual maintenance, awareness and preparedness are on-going activities.

3.9.7 NON-STRUCTURAL SOLUTIONS

Non-structural solutions are defined as those that reduce or avoid flood damages without significantly altering the flooding or attempting to confine flood flows to the channel. This is accomplished by changing the land use within floodplains or retrofitting existing structures to accommodate potential flood hazard. Typical non-structural solutions are:

- Purchase flood insurance (currently implemented)
- Zoning ordinances and building codes (currently implemented)
- Flood proofing of existing structures to withstand flooding without damage

- Agency purchase of flood prone lands and structures

Flood proofing of existing structures to withstand flooding without damage may be the only reasonable option to homeowners currently paying flood insurance to protect their homes. Flood proofing could include raising homes one foot above the 100-year floodplain.

Chapter 5, Funding Alternatives, discusses the U.S. Army Corps of Engineers Flood Mitigation and Riverine Restoration Program as a possible funding mechanism for mitigating flooding on Deleissigues or Haystack Creeks. This program emphasizes the use of non-structural approaches to preventing or reducing flood damages in combination with ecosystem restoration. Projects carried out under this Corps funding program may also include structural elements.

3.9.8 Collect Design Level Surveys

It is recommended that during the design phase of the proposed projects, surveys should be collected and detailed hydraulic analyses should be conducted to optimize the capacity of the proposed projects. Detailed surveys will allow the lead agency responsible for implementing the projects to conduct value engineering and determine the most economical solution to the problems.

3.10 Summary of Recommendations

- The community should investigate applying for FEMA's Community Rating System to reduce the insurance premiums of home owners in the Special Flood Hazard Area.
- Modify the South County Inland Planning Area Standards for undrained depressions to include all of the smaller localized sump areas to reduce structure flooding risk.
- Include the Department of Public Works in the final approval of all development plans.
- Consider deed restrictions to legally bind all new homes to maintain drainage facilities to design condition.
- Develop enforceable drainage design and maintenance standards.
- Increase retention basin design capacity to include sufficient storage for street runoff.
- Form a maintenance district and establish maintenance responsibility for flood prone areas on private property. Implement a long-term creek maintenance program.
- Increase community involvement by conducting a public awareness/education campaign on creek management and flood protection, encourage the community to "adopt-a-creek", support the Land Conservancy of San Luis Obispo in their effort to restore creeks flowing through Olde Towne.

3.11 Cost Estimates

Project cost estimates have been provided in this report. More detail on the unit cost and quantity calculations are provided in Appendix E, Engineering Technical Memorandum. These cost estimates are preliminary and subject to revision based on more definition and detail of the recommended project. Construction cost adjustments for inflation will be required if the projects are implemented years from now.

CHAPTER 4 ENVIRONMENTAL FEASIBILITY ANALYSIS

Chapter Synopsis: This chapter discusses the environmental permitting and regulatory requirements for the proposed alternatives. An environmental technical memorandum was prepared for this study and is included in Appendix G. The technical memorandum will provide greater detail on the environmental methodology, analysis and alternatives. Some items in this chapter were modified since the completion of the technical memorandum.

4.1 Environmental Analysis Objective

The study investigated the potential environmental impacts, and also state and federal resource agency permit requirements. The objective was to conduct a "fatal flaw" preliminary environmental feasibility analysis on the proposed drainage and/or flood control mitigation alternatives described in Chapter 3. This analysis assessed the environmental impacts and constraints associated with the proposed alternatives. Each proposed alternative was examined for biological resources, cultural resources, water quality, and land use constraints likely to be present in each given area. Specifically the investigation included:

- Determination of whether project can be permitted
- Outline of the types of probable mitigation measures
- Outline of additional studies required for the next phase implementation
- Determination of the level of California Environmental Quality Act (CEQA) documentation necessary (e.g. EIR, Negative Declaration, Categorical Exemption) for each alternative
- Identification of the applicable environmental regulatory requirements of jurisdictional agencies (e.g. U.S. Army Corps of Engineers, California Department of Fish and Game, Regional Water Quality Control Board)
- Outline of regulatory permitting requirements and approximate schedule for obtaining permits

4.1.2 Environmental Analysis Methodology

Project alternatives were analyzed for environmental constraints that might prevent agency approval, increase costs (particularly for mitigation), or delay the project schedule. Existing documentation relative to each resource topic (e.g., biological resources, cultural resources, water quality, and land use) was examined to help determine the likelihood of constraints.

4.1.3 Biological Resources

A reconnaissance level site assessment was conducted on July 1, 2003 to investigate biological resources in the project area. The assessment area included the proposed project sites and bordering areas. Each site was generally assessed for its potential to support sensitive biological and botanical resources. Information from the California Natural Diversity Database was combined with recent experience on other projects in the area to determine the potential for sensitive species and their habitat in the project areas.

4.1.4 Cultural Resources

Data sources from the San Luis Obispo County Department of Planning and Building records were used to determine if cultural resources have been identified in each project area. No standard record searches or site visits were conducted.

4.1.5 Land Use

The *San Luis Obispo County South County Area Plan (Inland); Final Environmental Impact Report, South County Area Plan Inland Portion;* and the *Nipomo Mesa Planning Study* were reviewed to determine whether the proposed projects were consistent with local policies. A Geographic Information System was used to examine the presence of prime farmland and farmland of local or state importance in the project area.

4.2 Environmental Analysis Results

4.2.1 Environmental Constraints

Table 4-1 summarizes the environmental constraints that may be encountered for each proposed project. Based on this preliminary analysis, major environmental constraints include potential modification of jurisdictional waters and potential impacts to threatened and endangered species habitat for projects along creek channels in Olde Towne, and the potential presence of cultural resources for projects in both the Mesa and Olde Towne.

4.2.2 Permit Requirements

An assessment of the state and federal environmental permits that may be necessary for each proposed project is provided in Table 4-2. An estimate of the timeframe typically required to obtain each type of permit is summarized in Table 4-3. Based on the level of research performed for this analysis, all proposed projects may be possible to permit if mitigation measures are implemented to avoid significant environmental impacts. The U.S. Army Corps of Engineers and U.S. fish and Wildlife Service may have particular concerns about channel improvements and replacing culverts on creeks in Olde Towne, due to potential impacts to jurisdictional waters and sensitive species habitat.

The U.S. Army Corps of Engineers, U.S. fish and Wildlife Service, and National Marine Fisheries Service will scrutinize the Deleissigues Creek vegetative management and sediment management project and the proposed detention basin projects due to potential impacts to jurisdictional waters and sensitive species habitat. Mitigation would likely be required by the resource agencies to offset any impacts to habitat.

The potential for habitat impacts presents permitting challenges and increases the level of complexity that must be addressed during the environmental documentation and permitting phase, and with the appropriate design features and mitigation, these impacts can be reduced to a less than significant level. Constant communication with the resource agencies during the design and permitting phase will be necessary to ensure that their concerns are addressed and that appropriate features required by the permits are designed into the project.

4.2.3 Potential Mitigation

Potential impacts to environmental resources may result from the proposed project alternatives. The impacts may require implementing mitigation measures to protect sensitive, threatened or endangered species, water quality (including erosion control), land use, and cultural resources. Table 4-4 summarizes the potential mitigation measures for the proposed projects.

Table 4-4: Potential Mitigation Requirements

PROJECT/LOCATION	ALTERNATIVE	POTENTIAL MITIGATION
Mesa Projects Projects were in various locations throughout the community.	All Mesa projects were categorized as road drainage improvements, which included the installation of culverts, storm drains and drop inlets.	• Implement erosion protection and sediment control measures during construction. • Perform record search for cultural resources. Surface surveys,

PROJECT/LOCATION	ALTERNATIVE	POTENTIAL MITIGATION
	The proposed projects also included raising the road surface elevation in some locations, and constructing an infiltration basin when necessary. The project on the bluff was unique in that the purpose was for erosion protection.	monitoring by qualified archaeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings.
Deleissigues Creek: Between Thompson Road and Nipomo Creek confluence.	Remove excessive vegetal growth and sediment accumulation one time. Conduct routine (annual or bi-annual) maintenance in channel.	• Conduct preconstruction surveys for sensitive species. Monitor during construction in locations with sensitive species habitat and relocation of sensitive species if necessary. • Conduct maintenance between the months of May and October. • If wetlands are impacted, offset impacts with compensation (such as off site mitigation banks or in lieu payments), restoration/enhancements, or other options, as approved by the agencies. • Implement erosion protection and sediment control measures during construction. • Perform record search for cultural resources. Surface surveys, monitoring by qualified archaeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings.
Tributary 1: On Sea and Mallagh Streets	Install culverts at Burton and Sea, at Mallagh and Sea, and conduct maintenance on existing drainage facilities.	• Erosion and sediment control measures during construction.
Tributary 1: East of Thompson Road, upstream of the 3'x3' box culvert near Day Street.	Construct storm detention basin to store runoff exceeding a 10-year rain event.	• Conduct preconstruction surveys for sensitive species. Monitor during construction in locations with sensitive species habitat and relocation of sensitive species if necessary. • Construct facilities between the months of May and October. • If wetlands are impacted, offset impacts with compensation (such as off site mitigation banks or in lieu

PROJECT/LOCATION	ALTERNATIVE	POTENTIAL MITIGATION
		payments), restoration/enhancements, or other options, as approved by the agencies. • Implement erosion protection and sediment control measures during construction. • Perform record search for cultural resources. Surface surveys, monitoring by qualified archaeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings.
Hermrick Creek: Culvert crossings at Burton and Mallagh	Remove and replace existing culverts at each location with a double 4'Wx5'H concrete box culvert.	• Erosion and sediment control measures during construction.
Hermrick Creek: East of Thompson Road, upstream of the existing double 4'x4' culvert near Bee Street.	Construct storm detention basin to store runoff exceeding a 10-year rain event.	• Conduct preconstruction surveys for sensitive species. Monitor during construction in locations with sensitive species habitat and relocation of sensitive species if necessary. • Construct facilities between the months of May and October. • If wetlands are impacted, offset impacts with compensation (such as off site mitigation banks or in lieu payments), restoration/enhancements, or other options, as approved by the agencies. • Implement erosion protection and sediment control measures during construction. • Perform record search for cultural resources. Surface surveys, monitoring by qualified archaeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings.
Haystack Creek: Culvert crossings at Tefft, Thompson and Mallagh Streets. Erosion protection downstream of Mallagh and Thompson.	Remove and replace existing culverts at Mallagh and Thompson. Install erosion protection downstream of	• Conduct preconstruction surveys for sensitive species. Monitor during construction in locations with sensitive species habitat and

PROJECT/LOCATION	ALTERNATIVE	POTENTIAL MITIGATION
	Thompson and Mallagh.	relocation of sensitive species if necessary (erosion protection project). • Construct facilities between the months of May and October. • If wetlands are impacted, offset impacts with compensation (such as off site mitigation banks or in lieu payments), restoration/enhancements, or other options, as approved by the agencies. • Implement erosion protection and sediment control measures during construction. • Perform record search for cultural resources. Surface surveys, monitoring by qualified archaeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings (erosion protection project).
Haystack Creek: East of community, in upper watersheds of north and south forks of Haystack Creek.	Construct storm detention basin to store runoff exceeding a 25-year rain event.	• Conduct preconstruction surveys for sensitive species. Monitor during construction in locations with sensitive species habitat and relocation of sensitive species if necessary. • Construct facilities between the months of May and October. • If wetlands are impacted, offset impacts with compensation (such as off site mitigation banks or in lieu payments), restoration/enhancements, or other options, as approved by the agencies. • Implement erosion protection and sediment control measures during construction. • Perform record search for cultural resources. Surface surveys, monitoring by qualified archaeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings.

PROJECT/LOCATION	ALTERNATIVE	POTENTIAL MITIGATION
Knotts Street: Concrete v-ditch	Remove and replace existing concrete v-ditch with an underground storm drain.	• Erosion and sediment control measures during construction.

4.2.4 ADDITIONAL STUDIES AND SURVEYS

The following studies/surveys will need to be performed in order to begin the permitting phase of the project:

- Habitat assessments and, if necessary, wetland delineations of the creeks in Olde Towne
- Sensitive species surveys in Olde Towne based on the results of the habitat assessments
- Cultural resource record searches (both the Mesa and Olde Towne)

Table 4-1: Environmental Constraints

ALTERNATIVES	BIOLOGICAL	CULTURAL RESOURCES [9]	LAND USE
Mesa: Install Road Drainage Facilities, Infiltration Basins, and Raise Road Grade			
Chapter 3 provides a detailed description of the proposed projects. All projects would require a similar level of CEQA documentation and permit preparation. Improve existing drainage facilities and install new facilities when necessary; construct a terminal detention facility if necessary; remove vegetation and debris from existing culverts, drainage inlets, and detention basins as a maintenance measure. Raise road grades at certain locations.	None	There are several cultural resource sites along Highway 101 between Cherokee Place and Story Street and within the boundaries of Osage Street to Tefft Street and Pomeroy Road to Mesa Road. Other sites may also be in the area. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None
Deleissigues Creek: Vegetation Management and Sediment Removal			
One time removal of excessive vegetal growth and sediment accumulation. Conduct annual or bi-annual maintenance thereafter, following a prescribed and permitted maintenance guideline.	Any work in or near stream channels may affect threatened or endangered species habitat, including steelhead and California red-legged frog (CRLF). Other sensitive species that may also be affected include southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	There are several cultural resource sites between Nipomo Creek and Oakglen Avenue and along Eve Street. Other sites may also be in the area. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None
Tributary 1, Hermrick Creek and Haystack Creek			
Remove and replace existing culverts and upsize to meet County standards for secondary and minor waterways. Erosion protection on Haystack Creek. Construct detention basins on each tributary, upstream of the urban area.	Any work in or near stream channels may affect threatened or endangered species habitat, including steelhead and California red-legged frog (CRLF). Other sensitive species that may also be affected include southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	There are several cultural resource sites between Nipomo Creek and Oakglen Avenue and along Eve Street. Other sites may also be in the area. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	The detention basins will result in the loss of farmland of local importance. [10]
Olde Towne Local Drainage Facilities			
Install or improve drainage ditches and culverts per County standards.	None	None	None

[9] Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building. No standard record searches or site visits were conducted.

[10] Farmland of Local Importance is a designation that applies to areas of soils that meet all the characteristics of Prime Farmland (farmland with the best combination of physical and chemical features able to sustain long-term agricultural production) or Farmland of Statewide Importance (similar to Prime Farmland, but with minor shortcomings, such as greater slopes or less ability to store soil moisture) with the exception of irrigation.

Table 4-2: Permit Assessment

ALTERNATIVE	PROJECT DESCRIPTION	CEQA[11] DOCUMENT	SHPO 106[12]	CDFG 1601[13]	CORPS 404 PERMIT[14]	USFWS SECTION 7[15]	NMFS SECTION 7[16]	RWQCB 401[17]	SWRCB GENERAL PERMIT[18]	SWRCB PHASE II SWMP[19]	NOTES
Mesa											
Install culverts, storm drains, infiltration basins, and raise road grade	Improve existing drainage facilities and install new facilities when necessary; construct a terminal detention facility if necessary; raise the road grade in certain locations; remove vegetation and debris from existing culverts, drainage inlets, and detention basins as a maintenance measure.	ND[20] (see notes)	Possibly (see notes)	No	No	No	No	No	Yes	Yes	If the project involves construction of new facilities or if cultural resources are present, a ND or MND will be required. Otherwise, work may qualify for an exemption. Depending on the result of a cultural records search, Section 106 consultation may be required.
Deleissigues Creek: Vegetation Management											
Vegetation management and sediment removal	One time removal of excessive vegetal growth and sediment accumulation. Conduct routine maintenance thereafter.	ND (see notes)	Possibly (see notes)	Yes	Yes	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	If vegetation removal, channel modification, or maintenance in Deleissigues Creek and Haystack Creek have the potential to result in significant impacts to the watershed or sensitive species, an EIR may be required. Otherwise, a MND will be required. A Corps permit will be required for any work below ordinary high water (OHW) of any jurisdictional waters. The Corps will consult with the NMFS and the USFWS if threatened or endangered species will be affected by vegetation removal, channel modification, or maintenance. If a Corps permit is required, a RWQCB 401 Certification will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.
Hermrick and Haystack Creeks											
Remove and replace existing culverts. Erosion Protection on Haystack Creek	Remove and replace existing culverts along Hermrick and Haystack Creeks. Install erosion protection (e.g. gabions) on Haystack Creek downstream of Thompson and Mallagh.	ND (see notes)	Possibly (see notes)	Yes	Yes	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	If channel modification in Hermrick or Haystack Creeks has the potential to result in significant impacts to the watershed or sensitive species, an EIR may be required. Otherwise, a ND or MND will be required. A Corps permit will be required for any work below ordinary high water (OHW) of any jurisdictional waters, including roadside drainage ditches connecting Waters of the U.S. The Corps will consult with the NMFS and the USFWS if threatened or endangered species will be affected by vegetation removal, channel modification, or maintenance. If a Corps permit is required, a RWQCB 401 Certification will also be required. CDFG may take jurisdiction if a Corps permit is required or if the waterway contains sensitive species habitat. Depending on the result of a cultural records search, Section 106 consultation may be required.

[11] California Environmental Quality Act: Required if a state agency has to take action on a project; If the project does not qualify for an exemption, the compliance document is either a Negative Declaration or Mitigated Negative Declaration (ND) or an Environmental Impact Report (EIR)
[12] State Historic Preservation Office – Section 106 (Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building): Required if a project has the potential to impact cultural resources
[13] California Department of Fish and Game – 1601 Streambed Alteration Agreement: Required if a project may impact a river, stream, or lake and/or has the potential to impact sensitive species or their habitat
[14] U.S. Army Corps of Engineers – 404 Permit: Required if a project involves work below the ordinary high water mark
[15] U.S. Fish and Wildlife Service – Section 7 Consultation: Required if a project has the potential to impact federally listed species or their habitat
[16] National Marine Fisheries Service – Section 7 Consultation: Required if a project has the potential to impact federally listed marine and anadromous fish species or their habitat
[17] Regional Water Quality Control Board – 401 Certification: Required if a project has the potential to discharge to surface water, ground water, or other water systems and require a federal permit
[18] State Water Resources Control Board – National Pollutant Discharge Elimination System (NPDES) General Construction Permit: Required if a project involves ground disturbance of more than 1 acre
[19] State Water Resources Control Board – Phase II Storm Water Management Plan Revision: Required for potential discharges to surface water, ground water, or other water systems by small municipal separate storm sewer systems not covered by the Phase I program
[20] Negative Declaration or Mitigated Negative Declaration: Required for projects with impacts that are less than significant or less than significant with mitigation

ALTERNATIVE	PROJECT DESCRIPTION	CEQA[11] DOCUMENT	SHPO 106[12]	CDFG 1601[13]	CORPS 404 PERMIT[14]	USFWS SECTION 7[15]	NMFS SECTION 7[16]	RWQCB 401[17]	SWRCB GENERAL PERMIT[18]	SWRCB PHASE II SWMP[19]	NOTES
Tributary 1, Hermrick and Haystack Creeks											
Detention basins	Construct detention basins on each tributary upstream of urban area.	ND (see notes)	Possibly (see notes)	Yes	Yes	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	If the channels on each of the creeks are modified, then the proposed projects have the potential to result in significant impacts to the watershed or sensitive species, an EIR may be required. Otherwise, a ND or MND will be required. A Corps permit will be required for any work below OHW of any jurisdictional waters. The Corps will consult with the NMFS and the USFWS if threatened or endangered species will be affected by vegetation removal, channel modification, or maintenance. If a Corps permit is required, a RWQCB 401 Certification will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.
Tributary 1											
Install new culverts at existing road crossings. Maintain existing roadside drainage ditches.	Install culverts and drop inlets. Remove excess sediment and vegetation from roadside ditches, culverts and drainage swales.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	No	Possibly (see notes)	Yes	Yes	The culvert installation project and drainage ditch maintenance qualify for Class 1 CEQA categorical exemption because it involves minor alterations to existing public facilities and does not have the potential to affect sensitive resources. For maintenance of the drainage channel between Deleissigues Creek and Mallagh Street, there is potential to impact threatened/endangered species, a ND/MND will be required. A Corps permit will be required for any work below OHW of any jurisdictional waters, including roadside drainage ditches connecting Waters of the U.S. The Corps will consult with the NMFS and USFWS if threatened/endangered species will be affected. If a Corps permit is required, a RWQCB 401 Certification will also be required. Depending on the results of a cultural records search and Corps involvement, Section 106 consultation may be required.
Knotts Street V-Ditch Replacement											
Remove and replace existing concrete v-ditch with a 27-inch storm drain.	Replace concrete ditch with storm drain.	Categorical Exemption (see notes)	No	No	No	No	No	No	Yes	Yes	The storm drain installation project and erosion protection qualify as a Class 1 CEQA categorical exemption because it involves minor alterations to existing public facilities and does not have the potential to affect sensitive resources.

Table 4-3: Permitting Timeframe

PERMIT	TYPICAL TIMEFRAME [1] (MONTHS)	NOTES
California Environmental Quality Act (CEQA)		
Exemption	< 1	
Negative Declaration (ND)/ Mitigated Negative Declaration (MND)	6 - 12	
Environmental Impact Report (EIR)	12 -24	
California Department of Fish and Game (CDFG) 1601 Streambed Alteration Agreement	3 - 6	CEQA must be completed before the 1601 Agreement can be issued.
U.S. Army Corps of Engineers (Corps) Section 404		
Nationwide Permit	1 - 3	Section 7 and Section 106 consultations must be completed before the Nationwide Permit can be issued.
Individual Permit	12 - 18	National Environmental Policy Act (NEPA) compliance is required, which can take one year or more.
U. S. Fish and Wildlife Service (USFWS)/ National Marine Fisheries Service (NMFS) Section 7 Consultation		
Informal	1 - 3	
Formal	6 - 12	
State Historic Preservation Office (SHPO) Section 106 Consultation	6 - 12	
Regional Water Quality Control Board (RWQCB) 401 Certification	6 - 9	CEQA must be completed before the 401 Certification can be issued.
State Water Resources Control Board National Pollutant Discharge Elimination System		
General Construction Permit	< 1	A Storm Water Pollution Prevention Plan must be prepared prior to construction and implemented during construction.

PERMIT	TYPICAL TIMEFRAME [1] (MONTHS)	NOTES
Phase II Storm Water Management Plan (SWMP) Modification	3 – 6	A SWMP must be modified and submitted with Notice of Intent prior to construction. Because this program has just begun, processing times may vary.

Notes:
1. Timeframes do not include time required to perform pre-applications studies, to prepare required applications, and to complete prerequisite approvals.

CHAPTER 5 FUNDING ALTERNATIVES

Chapter Synopsis: This chapter provides a summary of funding options, including criteria for qualifying projects, available funds, and cost sharing formulas. This chapter also discusses recommended funding sources that match the types of proposed projects. A funding review technical memorandum was prepared for this study and is presented in Appendix H.

5.1 Overview of Funding Responsibilities

The District is the responsible agency for managing, planning, and maintaining historical drainage and flood control facilities in unincorporated areas of the District. It is the District's policy that funding for these services comes from two sources. Planning costs are typically advanced or funded through the District's general flood control fund, with the intentions that the costs are reimbursed by the Assessment District or benefiting zone. However, design and construction costs of drainage and flood control projects are the responsibility of the community or area that benefits from the capital improvement. If budget constraints prevent the District from providing funds to pay for the planning and design, and the local community is unwilling to pay, then the project will not be advanced until funds become available.

In some communities, local agencies (e.g. community services districts) are legally authorized to provide drainage and flood control services by the Local Agency Formation Commission (LAFCo). In these communities, the local agency is responsible for implementing projects and can implement projects with the District. Flood Control Zone 16 is the only local agency/district in Nipomo with the responsibility for maintaining drainage basins within subdivision tracts in Nipomo.

Funds to implement drainage or flood control projects can be generated through various federal, state, and local sources through grants, cost sharing agreements, taxes, assessments and fees. This chapter provides a summary of funding options, including criteria for qualifying projects, available funds, and cost sharing formula. This chapter also discusses recommended funding sources that match the types of proposed projects.

5.2 Funding Sources

The various funding sources applicable to Nipomo are presented in this section. For more detail on the types of funding programs, reference the technical memorandum included in Appendix H.

5.2.1 Recommended Funding Strategy

While many of the recommended projects may involve the need to leverage funding from outside the local community, the strongest applicants for leveraged funding have an established and effective local funding program.

The sections in this chapter are organized to outline first, the local funding options that the District and lead agency can establish, and second the outside Federal and State funding options that may be accessed to "match" local funding sources and help implement projects. Because the local match is critical to accessing outside funding, it is highly recommended that the District and lead agency[21] in Nipomo begin to establish local funding mechanisms (even if these do not fully fund the recommended projects) in order to be more competitive for outside funds. The recommended local funding mechanisms include 1) grants, 2) taxes, 3) assessments, and 4) fees (property based and development impact). The creation of a local funding source, plus the potential procurement of Federal and State grants, establishes the framework for a comprehensive community funding

[21] A "lead agency" to represent Nipomo and carry out the recommended drainage improvements has not been approved. The lead agency representing the community would assume control of the projects at completion. The lead agency will be responsible for gaining a preliminary level of community support for projects prior to implementing the engineering planning phase.

program. This approach also acknowledges the realistic nature of public projects that no capital improvement of this magnitude can rely solely on grants.

The reader should note that Federally funded projects require a benefit to cost ratio greater than one to gain Federal interest. The projects must also meet guidelines such as river restoration or streambank repair. The proposed Nipomo projects may not qualify based on the funding program's criteria, or the economic analysis could reveal that the amount of flood damage experienced by home owners does not warrant Federal interest in a flood control project. The only option would then be to fund the proposed projects entirely using local funds.

5.2.2 LOCAL FUNDING

As discussed previously, the District is the responsible agency for programming drainage and flood control services. A local lead agency would be responsible for the drainage and flood control services and would serve as the applicant and/or responsible agency for administering the funding options discussed in this chapter.

There are several options for providing funds to the communities involved in the Study. The options include grants, taxes, assessments, and fees. Most of the projects proposed in this study will be funded locally. With the exception of the regional solutions like the proposed detention basins and the channel widening project whose criteria is to contain the 25-year or 100-year flood event on the creeks in Olde Towne; the infiltration basin, culvert, and drainage ditch projects in the Mesa would most likely be funded by taxes, fees and assessments.

5.2.2.1 Grants

The County's planning department administers Community Development Block Grants (CDBG) on a yearly basis. This program is funded by the US Department of Housing and Urban Development (HUD) and targets low to moderate-income communities. The funding for CDBG is guaranteed each year but the level of funding varies. There is no cap on grant applications, but the County is allocated approximately $500,000 on an average year from HUD.

Where CDBG funds are used to pay all or part of the cost of a public improvement, special assessments to recover the non-CDBG portion may be made provided that CDBG funds are used to pay the special assessment in behalf of all properties owned and occupied by low and moderate income persons. If the CDBG funds are not sufficient to pay the assessments in behalf of all the low and moderate income owner-occupant persons, then the CDBG funds need not be used to pay the special assessment in behalf of moderate income persons[22]. Proposed projects in Olde Towne may quality for CDBG funding.

5.2.2.2 Special Taxes

Taxes are the most common means for a government to raise revenue. An existing tax can be raised, or a new tax can be levied on residents in a district to fund flood control projects. By definition, this is a special tax requiring approval from two thirds of the electorate (residents). If approved, the revenue generated would be allocated specifically for drainage and flood control projects in the district. It would be the responsibility of the district to determine where those funds would be spent.

This form of revenue requires all residents to pay the tax regardless of benefits received and the special tax formula does not need to be related to benefits received from the proposed projects. In order to establish the special tax, the District would need to develop and adopt a formula; the board of supervisors would approve placing the tax on the ballot. A special tax is approved by resident registered voters (except in the case of Mello-Roos CFD tax which can be approved by property owners in uninhabited areas). Figure 1 in Appendix H illustrates the special tax adoption process.

[22] 24CFR570.200(c) *Special Assessments Under the CDBG Program.*

5.2.2.3 Benefit Assessments

A benefit assessment is a charge levied on a property to pay for public improvements or services that benefit the property. The difference between an assessment and a tax is that benefit assessment formula must quantify the relationship between the assessment charged and the benefit received by the property (if a property does not benefit, it cannot be assessed). The application of this funding mechanism would likely limit assessments to those properties within the immediate vicinity of constructed improvements.

All new assessments must conform to the requirements of Proposition 218, which was passed in November 1996. Proposition 218 specifically requires that property owners (not registered voters) be allowed to vote on new benefit assessments. New assessments may be approved by a simple majority approval of the property owners, with votes weighted in proportion to the assessment proposed.

In order to implement a new assessment, the lead agency must define those parcels that receive benefit and define the method of assessment in a Basis of Design Report. Figure 2 in Appendix H illustrates the benefit assessment adoption process. Developing a benefit assessment around those properties within the 100-year floodplain in Olde Towne may be the only realistic approach to funding regional solutions to increase the level of flood protection from Deleissigues and Haystack Creeks. The drawback to this approach is that a small percentage of homeowners is paying for a flood protection project that improves the quality of the entire Olde Towne residents.

5.2.2.4 Property-Based Fee

Residents living within the floodplain represent a minority of the population living in Olde Towne. Also, the residents living adjacent to road flooding or the natural sump areas in the Mesa represent a small percentage of residents in the Mesa. Therefore, it is possible that minimal support exists for a community wide assessment or fee to pay for the necessary improvements.

A property-based user fee is a charge levied on a property to pay for public improvements or services that are used by that property. The difference between an assessment and a user fee is that assessments rely on a demonstration of special benefit (which can be hard to prove) while user's fees require demonstration of use. In the case of drainage facilities, a user fee allows an agency to collect revenue from properties that contribute runoff into the system but may not flood because of their location.

A user fee can be structured proportionally to the amount each parcel uses the flood control facilities rather than how much each property benefits from the services or improvements provided. This allows program costs to be spread over a larger customer base. For flood control work, user fees are typically related to impervious area on the property, which can be equated to runoff. Like the benefit assessment, a user fee may also be implemented by a 50% vote; however, before the vote may be initiated, a noticed protest hearing must take place and less than 50% written protest must be received.

In order to implement a new user fee, the lead agency must define those parcels that use the various drainage facilities and define its method of calculating a fee proportional to use. Figure 3 in Appendix H illustrates the user fee adoption process.

There is current legislative effort aimed at exempting storm drainage fees from the Proposition 218 balloting test. Should this effort be successful, property based fees could be established with a fee study and protest hearing, as described for the Development Impact Fee below.

5.2.2.5 Development Impact Fee

Government Code Section 66000 et.seq., allows the County to collect development fees to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Development Impact Fees are tied to either General Plans or Capital Improvement Programs approved by the County. As regular updates of the General Plan and/or Capital Improvement Programs, additional storm drain infrastructure is identified to support the new developments and projects. The fees cannot be used to correct existing problems; although they can be used to fund a "fair share" of new projects.

Development Impact Fees are not subject to vote. They can be approved by a majority of the Board of Supervisors or the Board of Directors after a protest hearing. Figure 4 in Appendix H illustrates the adoption process.

The implementation of a Development Impact Fee in Nipomo may not benefit the community since it is nearly built out. However, redevelopment and larger remodels (improvements that exceed a certain percentage of the current property home value) could provide the nexus for collecting impact fees to mitigate for existing conditions.

5.2.3 Outside (Leveraged) Funding Sources

The regional solutions proposed to mitigate flooding on the creeks flowing through Olde Towne are the types of projects that would qualify for State or Federal funding. Federal and State programs (e.g. cost sharing agreements or grants) provide an opportunity for communities to reduce the total project cost that will be funded through taxes, assessments, and fees. Grant applications often require detailed information regarding the project, the impact on the community and the environment, and project costs. Additionally, grant distributors prefer projects that provide multiple benefits including environmental restoration. Projects compete for existing funds and a majority of applications are not accepted because of this.

Once a grant is appropriated to a project, the recipient is required to complete additional paperwork including invoices, status reports, and project closeout reports. Grant management adds to the overall project costs and not all grant management costs are guaranteed to be recovered (not included as matching funding for project costs).

5.2.3.1 U.S. Army Corps of Engineers: Flood Hazard Mitigation and Riverine Ecosystem Restoration Program

Informally known as "Challenge 21," this watershed-based program focuses on identifying sustainable solutions to flooding problems by examining nonstructural solutions in flood-prone areas, while retaining traditional measures where appropriate. Eligible projects will meet the dual purpose of flood hazard mitigation and riverine ecosystem restoration.

Projects include the relocation of threatened structures, conservation or restoration of wetlands and natural floodwater storage areas, and planning for responses to potential future floods.

The Corps requires that the local sponsor[23] assist in the preparation of the planning, environmental, and design documents to ensure that the communities are involved in the project development and selection process. This requires the local sponsor to have an active role throughout the entire Corps civil works process, which can last up to seven years or more. The local sponsor is also expected to share in the cost of the project planning, design and construction (cost sharing depends on the program, but can be as high as 50 percent of the project). The

[23] A local sponsor is typically the local flood control agency or district responsible for providing drainage and flood control. Local sponsors share in the cost for planning, designing and constructing a project with the Corps.

local sponsor financial contribution can be in the form of in-kind service (e.g. staff time), which would offset the cash contribution requirements, but some of these costs would be in addition to the requirements defined by the Corps process. The local sponsor will incur project costs that are deemed ineligible and cannot be used as part of the local sponsor financial contribution. These costs are typically project management costs incurred for administrative tasks such as management of staff, preparation of invoices, etc. Refer to Appendix G for more detail on local sponsor cost sharing responsibilities for Corps sponsored projects.

The amount of structural and non-structural damage experienced by residences and business in Nipomo may not qualify as a Federal project based on the Corps' benefit to cost ratio formula (the damages must be greater than the project costs). The Corps would make this determination following the completion of an Economic Analysis as part of a Feasibility Study. However, based on the delineation of the FEMA 100-year floodplain, Federal involvement would only be recommended for the Haystack Creek projects if the community supports the construction of detention basins.

5.2.3.2 U.S. Army Corps of Engineers: Continuing Authorities Program (CAP)

The traditional and most common way for the Corps to help a community solve a flood control problem is through individually authorized studies and projects. This approach requires that Congress provide the Corps first with authorization to accomplish a feasibility study and second, a separate authorization to construct or implement a project.

Congress has also provided the Corps with a number of standing authorities to study and build water resources projects for various purposes, and with specified limits on Federal money spent for a project. The benefit with CAP projects is that specific congressional authorization is not needed. This saves development and approval time, and permits quicker responses to smaller, local problems like the Haystack Creek flooding issue. However, the requirements of a local sponsor and the economic benefits described above apply to CAP funded projects. Considering the forecast cost of the proposed detention basin and the extent of flood damage experienced in the community, securing Corps involvement through the Continuing Authorities Program is strategically the most appropriate approach for seeking Federal assistance.

The potential CAP funding available for Haystack Creek, Deleissigues and Hermrick Creeks include:

- Flood Control Projects – Section 205 of the 1948 Flood Control Act (FCA), as amended: Local protection from flooding by the construction or improvement of flood control works such as levees, channels, and detention basins. Non-structural alternatives such as raising homes are also considered.
- Emergency Streambank and Shoreline Restoration – Section 14, 1946 FCA, as amended: Allows emergency streambank and shoreline protection to prevent damage to public facilities, e.g., roads, bridges, hospitals, schools, and water/sewage treatment plants.
- Snagging and Clearing for Flood Control – Section 208, 1954 FCA, as amended: Local protection from flooding by channel clearing and excavation, with limited embankment construction by use of materials from the clearing operations only.
- Aquatic Ecosystem Restoration – Section 206, Water Resources Development Act (WRDA) of 1996: Carries out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest, and are cost effective.

The Federal funding level and the local sponsor (non-Federal) funding requirements are summarized below. Local sponsors are expected to pay for at least 25 percent of the total project costs on Federally sponsored projects.

- Flood Control Projects - Federal share may not exceed $7 million for each project. Required non-Federal match: 50 percent of the cost of the project for structural measures and 35 percent of the cost of the project for nonstructural measures.

- Emergency Streambank and Shoreline Restoration - Federal share may not exceed $1 million for each project. Non-Federal share of total project costs is at least 25 percent.
- Snagging and Clearing for Flood Control – Federal share may not exceed $500,000 for each project. Required 50 percent non-Federal match including all costs in excess of the Federal cost limitation.
- Aquatic Ecosystem Restoration – Federal share is limited to $5 million. The non-Federal share is 35 percent (including studies, plans and specifications, and construction).

5.2.3.3 California Department of Water Resources: Urban Streams Restoration Program

The objectives of this program are to assist communities in reducing damages from streambank, watershed instability and floods while restoring the environmental and aesthetic values of streams, and to encourage stewardship and maintenance of streams by the community. Objectives of the program are met by providing local governments and citizen's groups with small grants and technical assistance for restoration projects, to encourage all segments of local communities to value natural streams as an amenity, and to educate citizens about the value and processes taking place in natural streams.

Grants can fund projects as simple as a volunteer workday to clean up neighborhood steams, or projects as complex as complete restoration of a streams to its original, natural state.

- The Department of Water Resources is in the process of amending the regulations for the program, including raising the grant cap from $200,000 to $1 million
- All potential projects must have two sponsors: a local agency and a community group.

5.2.3.4 State Department of Water Resources: Flood Protection Corridor Program

The Flood Protection Corridor Program (FPCP) was established when California voters passed Proposition 13, the "Safe Drinking Water, Watershed Protection and Flood Protection Act" in March of 2000. The FPCP authorized bond sales of $70 million for primarily nonstructural flood management projects that include wildlife habitat enhancement and/or agricultural land preservation. Of the $70 million, approximately $5 million will go to educational programs and administrative costs. Another $5 million was earmarked by the Legislation for the City of Santee, leaving approximately $60 million for flood corridor protection projects throughout the state.

Grants can be used for acquiring property or easements in a floodplain, setting back existing levees, preserving or enhancing wildlife values of property through restoration of habitat compatible with seasonal flooding.

5.2.3.5 State Water Resources Control Board: Proposition 13 Watershed Protection Program

This program provides grants to municipalities, local agencies, or nonprofit organizations to develop local watershed management plans and/or implement projects consistent with watershed plans. Grants may be awarded for projects that implement methods for attaining watershed improvements or for a monitoring program described in a local watershed management plan in an amount not to exceed five million dollars per project. These grants could be used to reduce chronic flooding problems or control water velocity and volume using vegetation management or other nonstructural methods in Nipomo.

5.2.3.6 Governor's Office of Emergency Services: Flood Mitigation Assistance Program

FEMA provides funds on a yearly basis for each of the states to administer Flood Mitigation Assistance (FMA) grants. In California, the Governor's Office of Emergency Services administers these grants. The purpose of these grants is to provide local communities with funds to alleviate reoccurring flooding problems and to reduce claims on the National Flood Insurance Fund (NFIF). There are three types of grants available:

- FMA Planning Grants
- FMA Project Grants
- FMA Technical Assistance Grants

All projects that address flooding issues for areas within a Special Flood Hazard Area (SFHA)[24] are eligible for both FMA Planning and Project grants. In order to receive a FMA Project grant, a Flood Mitigation Plan (FMP) must be completed. A draft FMP has been submitted to the Office of Emergency Services (OES) for review and comment. The County anticipates an approved FMP by the end of calendar year 2004. The FMA Planning Grant can be used to fund the completion of the FMP. Refer to the Funding Assistance Technical Memorandum in Appendix H for more detail on typical grant eligibility and administrative requirements.

5.3 Recommended Funding Strategy

There are several funding opportunities available for the alternatives identified in this report, but the likelihood of receiving enough grant funding for all project costs is unlikely. As stated previously, the local lead agency will need to fund the planning, permitting, environmental compliance, design and construction for all projects.

The lead agency should establish local funding mechanisms (even if these do not fully fund the recommended projects) in order to be more competitive for outside funds. The recommended local funding mechanisms include development impact fees, assessments, cost sharing agreements and grants. The lead agency will be supported by the District in their efforts. Different strategies should be investigated for funding the proposed 100-year infiltration basin flood protection project, versus the local culvert and drainage ditch projects.

Development Impact Fee

The lead agency should collect development fees on new development, redevelopment and larger remodels to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Drainage mitigation fees collected by the County's Planning and Building Department to date should be used to fund the proposed local drainage projects. Future fees collected for development in Nipomo should be used to fund necessary drainage projects identified to support new developments.

Property Based Fee

To fund the construction of roadside drainage ditches, culverts and road improvements in different parts of the community, a property-based user fee may be more appropriate than an assessment fee and would also be easier to prove since a user fee allows an agency to collect revenue from properties that contribute runoff into the system, but may not flood because of their location. The user fee could be structured proportionally to the amount each parcel uses the storm drain facility, rather than how much each property benefits from the services or improvements provided. The user fee could be related to impervious area on the property, which can be equated to runoff. For example, higher elevation properties in the Mesa that may not flood would assist in funding the downstream drainage facilities.

[24] Any area within the 100-year flood plain as defined by FEMA is within a SFHA.

An education/information campaign should be waged prior to initiating a property based fee. The community needs to understand the need to improve local drainage to meet current standards, and how the local projects, along with a regional solution, will improve the level of flood protection within the community. If community support for a property based fee remains below 50%, then an alternative funding mechanism should be pursued.

Benefit Assessments

A benefit assessment is one possible approach for generating funding for the proposed detention basin projects. Homes directly benefiting from the detention basins would be those located within the respective drainage area served by the basin. Homes within the Haystack Creek 100-year floodplain would be removed from the floodplain after FEMA accepts a letter of map revision. Homes will remain in the floodplain, but the frequency of flooding will be reduced. One could argue that all residences and business would benefit from increasing the level of protection because the down town area along Tefft Street would remain passable. The assessment could be structured such that all parcels in the community receive a minor assessment for the improvements to Haystack Creek, but the majority of the assessment would be levied against properties within the floodplain.

Community Development Block Grants

The County's planning department administers CDBG on a yearly basis. The funding for CDBG targets low to moderate income communities[25]. Some neighborhoods in Olde Towne may qualify for the funding (based on meeting one of the three national objectives as described in the Funding Technical Memorandum in Appendix G) and it could be used to partially fund the construction of flood protection projects. CDBG funds can be used for planning, design, or construction of a project, however, the County planning department's preference is that a project have plans and specifications completed prior to paying out funds. While matching funds are not required, the County looks most favorably on projects with a matching fund component.

U.S. Army Corps of Engineers: Flood Hazard Mitigation and Riverine Ecosystem Restoration Program or Section 205 of the Continuing Authorities Program

The lead agency in Nipomo with assistance from the District, should request that the Corps conduct a reconnaissance analysis of Haystack Creek and its tributaries to determine if Federal interest exists in mitigating the community's flooding problem. The reconnaissance phase is the first step in the Corps' project development process. The reconnaissance phase is paid for by the Corps and no sponsor (Nipomo lead agency or District) funds are required. The primary purpose of the reconnaissance phase is to determine if there is Federal interest in proceeding with the second, or feasibility phase. If the Corps determines that the economic benefits to solving the flooding problem warrants Federal involvement, then the community will be expected to sign a Feasibility Cost Sharing Agreement (FCSA) and send a letter to the Corps attesting to the local sponsor's ability to financially support a portion of the study costs. As explained in the local funding section, an established local funding source will help the community leverage outside funding. The reconnaissance phase typically requires 12 months to complete.

California Programs: Urban Streams Restoration Program, Proposition 13 Watershed Protection Program, and the Governor's Office of Emergency Services

In order to leverage money generated through local assessments and fees, the lead agency should pursue available State programs or grants. The tenuous nature of these grants and programs renders these options as unpredictable. They should be pursued once a project has been defined, an objective has been established, and a lead agency and local community group have been established. The Governor's Office of Emergency Services

[25] Personal communication with Mr. Tony Navarro, Planner III, with San Luis Obispo County. Certain neighborhoods within Olde Towne may meet the criteria for the national objectives and qualifies for CDGB assisted activities. Based on year 2000 census data.

administers the Flood Mitigation Assistance Program. These grants could provide Nipomo with funds to alleviate reoccurring flooding problems and to reduce claims on the National Flood Insurance Fund (NFIF).

CHAPTER 6 IMPLEMENTATION STRATEGY

Chapter Synopsis: This chapter consists of the implementation strategy for constructing the drainage and flood control improvements. Recommendations are based on the proposed projects discussed in Chapter 3. The proposed projects were determined by evaluating the different alternatives, ease of construction, easements and right-of-way requirements.

6.1 Local Control versus District Control

The most effective approach to improving drainage and flooding problems in each community is to identify the problems and then create a local entity to implement the solutions to solve those problems. The role of the District is to assist in determining the improvements necessary to reduce flooding, and then to assist the individual communities in implementing programs to improve flood protection.

The District will use its general funds to provide planning and programming assistance, so that local areas of benefit within the County can better understand the significant drainage problems they are facing and determine how those problems should be solved. However, the general property tax allocation provides the District with only about $550,000 per year in revenue. The District does not possess the programs, funds or staffing to address all the on-going flooding and drainage problems in the County.

The proposed projects for Nipomo Mesa total approximately $840,000, and the proposed projects to upgrade the existing drainage infrastructure in Olde Towne to current County standard total approximately $3.1 million. If the community in Olde Towne implements the proposed storm detention basins to provide protection from the 100-year storm event, then the total for Olde Towne increases to approximately $6.0 million. If the lead agency in Nipomo established a funding source, the following approximate annual revenue would have to be generated by the community in order to build all the projects and pay off a municipal bond[26]:

- Mesa improvements, $60,000 per year
- Olde Towne improvements to current County design standard, $219,000
- Olde Towne storm detention basins, $208,000

The success of any project depends on the agreement between the District and the local agency advocating the project. In order for a project to proceed, it must be accomplished in a cooperative manner and must have property owner funding support.

6.1.1 Nipomo Community Services District Serve as Lead Agency

Nipomo Community Services District (NCSD) has authority to provide drainage services, as discussed in Section 2.1.4.1, and as resolved and ordered by the County Board of Supervisors in Resolution 18-65 (see Appendix D for scanned image of resolution). It is recommended that the NCSD assume the role as lead agency for implementing the drainage projects. The NCSD has not provided a formal response regarding their position on this recommendation.

The District would work directly with the NCSD in implementing the proposed projects. The remainder of the implementation discussion identifies the NCSD as the "lead agency". The County's Planning and Building Department, and the Department of Public Works must be willing to cooperate and coordinate with the local lead agency to ensure that local concerns and recommendations are considered will all development approval applications. This will likely ensure that existing drainage problems are not exacerbated and that new problems are not created.

[26] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years.

6.2 Drainage Improvements in the Mesa

The Mesa's proposed projects generally mitigate flooding caused by roadway runoff that:

- Creates a pedestrian and traffic hazard
- Ponds at road intersections, road shoulders and private property
- Erodes bluffs and private property

Conceptual projects aimed at reducing standing water impacts were developed for the flooded areas that received the greatest number of responses from the community. The proposed projects can also generally be applied to the flooding problems which received fewer complaints. The proposed projects include raising road grade elevations, installing retention basins, storm drains and drop inlets, and also conducting maintenance on existing facilities to improve flow conveyance. Each proposed project will function independently to solve a local flooding or drainage problem.

Residents living within one of proposed project areas could organize to implement a project in their section of town and not be impeded by the lack of action of others. The projects and their priority for implementation are dependent upon the needs of the individual residents and their desire to reduce damages and/or nuisance flooding problems caused by inadequate drainage facilities. The phasing of drainage projects would also depend on the residents' motivation to implement projects within their neighborhood. For example, neighbors living along Las Flores or those that frequently use Las Flores as a main commute arterial could organize to implement a project that reduces the frequency of flooding along this reach of road.

The implementation steps for the proposed Mesa projects presented in Chapter 3 of this report would generally follow the steps outlined below. The exception is the level of CEQA documentation discussed in Chapter 4 of this report. The one variable is the possible presence of cultural resources. The majority of projects qualify for Class 1 CEQA categorical exemption because the alternatives consist of minor alterations to existing public facilities and do not have the potential to affect sensitive resources. However, if cultural resources are present, then a ND or MND will be required. Depending on the result of a cultural records search, Section 106 consultation may be required. Table 4-1 outlines the level of CEQA documentation and permit requirements for the projects in the Mesa.

6.2.1 Implementation Steps

6.2.1.1 Community Designates a Lead Agency

An existing (Nipomo Community Services District) or newly formed group needs to assume the role of lead agency. The lead agency representing the community would assume control of the project at completion. The lead agency will be responsible for gaining a preliminary level of community support for projects prior to implementing the engineering planning phase.

6.2.1.2 Lead Agency Prepares Basis of Design Report

The lead agency, with support from the residents living within the community, would fund and complete a Basis of Design Report within 9 to 12 months of start. The Basis of Design Report would include a description of the existing problem, proposed alternatives, recommended project, preliminary alignments, potential environmental impacts, and cost estimates. A basis of design report for a project that could impact cultural resources would be completed within 15 months of start.

Based on the engineering analysis, project cost estimates would be developed to determine the appropriate funding mechanism to construct and maintain the completed project. The cost estimates will continue to be refined and the level of accuracy will improve during the design phase. The Basis of Design Report should provide cost information in sufficient detail to initiate property based fee or benefit assessment proceedings.

6.2.1.3 Conduct Benefit Assessment or Property Based Fee

A property-based user fee may be more appropriate than an assessment fee and would also be easier to prove since, in the case of drainage facilities, a user fee allows an agency to collect revenue from properties that contribute runoff into the system, but may not flood because of their higher elevation location. The user fee could be structured proportionally to the amount each parcel uses the storm drain and appurtenant facilities, rather than how much each property benefits from the services or improvements provided. The user fee could be related to impervious area on the property, which can be equated to runoff.

If approved, the property-based fee could be used to secure Certificates of Participation ("COPs") that finance a portion of the project construction. COPs are similar to bonds and are typically sold shortly after the project construction bids are received. COPs typically do not provide provisions for principal payoff, hence the property-based fee is set to cover the costs of both principal and interest. Currently rates for COPs are on the order of 5 to 5.5 percent and terms are typically 20 to 25-years.

6.2.1.4 Design Project, Prepare Environmental Documents and Permits

If the community supported the project by approving a property based fee, then the lead agency would proceed with designing the project, preparing the appropriate environmental document and securing resource agency permits to construct the project. The duration for the design is approximately 6 to 12 months. Accounting for the potential impacts to cultural resources, preparing the environmental CEQA document and SHPO consultation could last 9 to 12 months, and would begin after approval of the assessment fee. A Class 1 CEQA categorical exemption would require less than one month.

6.2.1.5 Construction

The lead agency would advertise the project and oversee construction. It is assumed that the duration would be approximately 3 to 6 months, depending on scope of project and potential cultural resources mitigation requirements. Some of the minor projects could be constructed in less than one month.

6.2.2 Cost Estimate

The total cost for each project in the Mesa is broken down in the appropriate sections of Chapter 3. The local cost share to be funded via a property based fee was not calculated because the number of parcels within each drainage area contributing runoff to the proposed facilities was not identified. The entire cost will likely be borne by the property owners because owners that contribute runoff to the proposed drainage facilities must agree to pay for the construction and future maintenance of them. The property owners assume the financial responsibility by approving the property based fee.

6.2.3 TIMEFRAME FOR IMPLEMENTATION

Instead of approximating completion dates for the implementation steps, an estimated timeframe for each milestone was developed. In order to establish a completion date, add the cumulative durations to the initiation of the project. The timeframe is shown in Table 6-1. A straightforward road grade raising, culvert installation, and retention pond construction project could be implemented from initiation to completion in approximately 3 years (assumes no delays). Implementing projects with potential cultural resources impacts could be completed in approximately 4.5 years.

Table 6-1: Forecast Durations for Major Tasks

MILESTONE	DURATION
Community Designates Lead Agency Role	9 months
Lead Agency Prepares Basis of Design Report	9 to 15 months
Property Based Fee Election	6 months
Design [1]	6 to 12 months
CEQA/ Resource Agency Permits [1, 2]	1 to 12 months
Approvals and Advertise for Construction	4 months
Construct Drainage Improvements [3]	1 to 6 months
Total	**~ 3 to 4.5 years**

Notes:
1. Design and CEQA occur concurrently
2. Duration for CEQA and Resource Agency Permits depends on the complexity and presence of sensitive species and their habitat
3. Depends on scope of project, length of pipeline, complexity of construction staging, and environmental mitigation requirements.

6.3 Drainage Improvements in Olde Towne

The Olde Towne proposed projects generally improve culvert capacities at roadway crossings in public right-of-way to meet current County standards. The proposed projects also improve existing roadside drainage ditches and culverts by replacing undersized facilities or by maintenance to remove sediment and overgrown vegetation.

If further flood protection is desired by the residents within the floodplain, a detention basin could be constructed in the upper watershed, east of the community, on any of the tributaries. These basins would be sized to contain the 100-year flood with a release rate of no larger than the downstream culvert capacities. This is an opportunity for the community to implement a project that protects their home from large flood events.

Residents living within one of the drainage areas could organize to implement a project in their watershed. The projects and their priority for implementation are dependent upon the needs of the individual residents and their desire to reduce damages and/or nuisance flooding problems caused by inadequate drainage facilities. The phasing of drainage projects would also depend on the residents' motivation to implement projects within their neighborhood. For example, residents living along Mallagh Street could choose to implement the roadside drainage ditch maintenance improvement project to improve the conveyance of urban runoff through their neighborhood.

The implementation steps for the proposed Olde Towne projects presented in Chapter 3 of this report would generally follow the steps outlined below. The exception is the level of CEQA documentation discussed in Chapter 4 of this report. The one variable is the possible impact to jurisdiction water and sensitive species habitat. Work done below the ordinary high water mark defined by the Corps and work that could impact sensitive species habitat will require a negative declaration or mitigated negative declaration CEQA document. **If the proposed Deleissigues Creek vegetative management and sediment removal project, and the proposed detention basin projects can not mitigate their impacts to sensitive species habitat, then the resource agencies may not permit these project.** If the vegetative management and sediment removal project

and the detention basin projects are pursued, then it is recommended that the resource agencies be engaged early and often during the planning and design phase. The typical culvert replacement or drainage ditch improvement within improved public right-of-way would qualify for Class I CEQA categorical exemption because it involves minor alterations to existing public facilities and does not have the potential to affect sensitive resources. Table 4-1 outlines the level of CEQA documentation and permit requirements for the projects in Olde Towne.

6.3.1 IMPLEMENTATION STEPS

The implementation of the Olde Towne projects would be similar to the process described above for the Mesa. The major and, from a funding perspective, most fundamental difference is that the Olde Towne projects funded using an assessment based fee. An assessment fee is more appropriate because the projects are grouped by drainage area and would benefit the residents living within each area. The following steps assume that a lead agency is in place.

6.3.1.1 Lead Agency Prepares Basis of Design Report

The lead agency, with support from the residents living within the community or each drainage zone, would fund and complete a Basis of Design Report within 9 to 12 months of start. The Basis of Design Report would include a description of the existing problem, proposed alternatives, recommended project, preliminary alignments, potential environmental impacts, and cost estimates. A basis of design report for a project that could impact cultural resources or sensitive species habitat, such as an in-channel project, would be completed within 15 months of start. The optional detention basin projects would likely require more time because of land acquisition negotiations and impacts to creek habitat.

Based on the engineering analysis, project cost estimates would be developed to determine the appropriate funding mechanism to construct and maintain the completed project. The cost estimates will continue to be refined and the level of accuracy will improve during the design phase. The Basis of Design Report should provide cost information in sufficient detail to initiate property based fee or benefit assessment proceedings.

6.3.1.2 Conduct Benefit Assessment Proceedings or Property Based Fee

The lead agency would conduct a benefit assessment proceeding for the properties that benefit from the culvert improvements or the detention basins. Generally properties downstream of the culverts, along the flow path of channel overflow, would benefit from the culvert projects. Homes than generally flood during storms greater than a 10-year event would benefit from the installation of detention basins. The benefit assessment would be in place prior to moving forward with permitting, environmental compliance, and design. Property owner support is imperative to the success of this project. Without this support, the project will not proceed beyond the preparation of a Basis of Design Report.

If approved, the benefit assessments would be used to secure bonds that finance a portion of the project construction. Bonds are typically sold shortly after the project construction bids are received. Under most assessment proceedings, property owners are given the option to either pay-off the principal amount of their assessment prior to bond sale or to finance the assessment over time at the bond rate and term. Currently, rates for municipal bonds are on the order of 5 to 5.5 percent and terms are typically 20 to 25-years.

6.3.1.3 Design Project, Prepare Environmental Documents and Permits

If the community supported the project by approving a property based fee or benefit assessment, then the lead agency would proceed with designing the project, preparing the appropriate environmental document and securing resource agency permits to construct the project. The duration for the design is approximately 12 months. Accounting for the potential impacts to sensitive species, proposed construction within a creek bank, and issues related to Native American burial sites, preparing the environmental CEQA document and SHPO consultation could last 9 to 18 months, and would begin after approval of the property based fee or benefit

assessment. If the drainage ditches and culvert replacements within existing road shoulders are implemented as stand alone projects, then the design and CEQA could be completed within 1 year. These projects are considered minor alterations of existing facilities.

6.3.1.4 Construction

The lead agency would advertise the project and oversee construction. It is assumed that the duration would be approximately 12 months, depending on environmental mitigation requirements. Conditions of the resource agency permits may only allow construction within the creek bank between the months of April to October, only.

6.3.2 COST ESTIMATE

The total cost for each project in Olde Towne is broken down in the appropriate sections of Chapter 3. The local cost share to be funded via a benefit assessment was not calculated because the number of parcels receiving benefits within each drainage area experiencing flooding was not identified. The entire cost will likely be borne by the property owners because owners that receive benefits from the proposed drainage facilities must agree to pay for the construction and future maintenance of them. The property owners assume the financial responsibility by approving an assessment fee.

6.3.2.1 Federal Cost Sharing Agreements

Chapter 5 discusses various options for receiving Federal or State funding for flood protection projects. Federal agencies, such as the Corps of Engineers, would only participate in regional solutions like the optional storm detention basins that remove homes from the 100-year floodplain. The local sponsors (Olde Towne community) would be expected to cost share in the planning, design, and construction of the project, so a local revenue source would be needed on Federal projects. Federally sponsored projects must also possess sufficient economic benefits to warrant an investment from the Federal government. In other words, the project benefits must exceed the project costs. The community, with assistance from the District, would request that the Corps conduct a Section 205 Flood Control Project reconnaissance analysis as part of the Corps' Continuing Authorities Program. The primary purpose of the reconnaissance phase is to determine if there is Federal interest in proceeding with the second, or feasibility phase. The interval between the first request to conduct a reconnaissance phase and initiation of the analysis could span six months to one year. The actual study typically requires one year to complete, so the total duration from initial request to completion could last 18 months to two years. If the study concludes that there is a Federal interest in improving flood protection in Haystack Creek, then the project proceeds to the feasibility study phase. The total duration for a Corps project (includes reconnaissance, feasibility, design and construction) is approximately seven years.

6.3.3 TIMEFRAME FOR IMPLEMENTATION

Instead of approximating completion dates for the implementation steps, an estimated timeframe for each milestone was developed. In order to establish a completion date, add the cumulative durations to the initiation of the project. The timeframe is shown in Table 6-2. If this project was implemented from initiation to completion without delay, then the regional detention basin and appurtenant facilities could be completed in approximately 4 to 6 years.

Table 6-2: Forecast Durations for Major Tasks

MILESTONE	DURATION
Lead Agency Prepares Basis of Design Report	9 to 15 months
Benefit Assessment or Property Based Fee Election	6 months
Design [1]	9 to 12 months
CEQA/ Resource Agency Permits [1, 2]	12 to 24 months
Approvals and Advertise for Construction	4 months
Construct Drainage Improvements [3]	12 months
Total	**~ 3.5 to 6 years**

Notes:
1. Design, CEQA and Caltrans Cooperative Agreement occur concurrently
2. Duration for CEQA and Resource Agency Permits depends on the complexity and presence of sensitive species and their habitat
3. Depends on scope of project, length of pipeline, complexity of construction staging, and environmental mitigation requirements.

REFERENCES

1. San Luis Obispo County Department of Public Works, "San Luis Obispo County Flood Protection and Drainage Policies, Programs, Permitting and Funding," April 17 2001
2. Land Use Ordinance, Title 22 of the County Code, January 1, 2003
3. Board of Supervisors Resolution No. 2002-249
4. County of San Luis Obispo, South County Inland Plan, May 2002
5. West Tefft Corridor Design Plan Public Review Draft, July 2003
6. Memorandum communication between Code Enforcement Division and Department of Public Works
7. San Luis Obispo Department of Planning and Building Nipomo Drainage Plan
8. San Luis Obispo County Engineering Department Standard Improvement Specifications and Drawings
9. Drainage Report for Fairview Tract 1747, Engineering Development Associates, December 2000

Appendix A

FIGURES

APPENDIX A

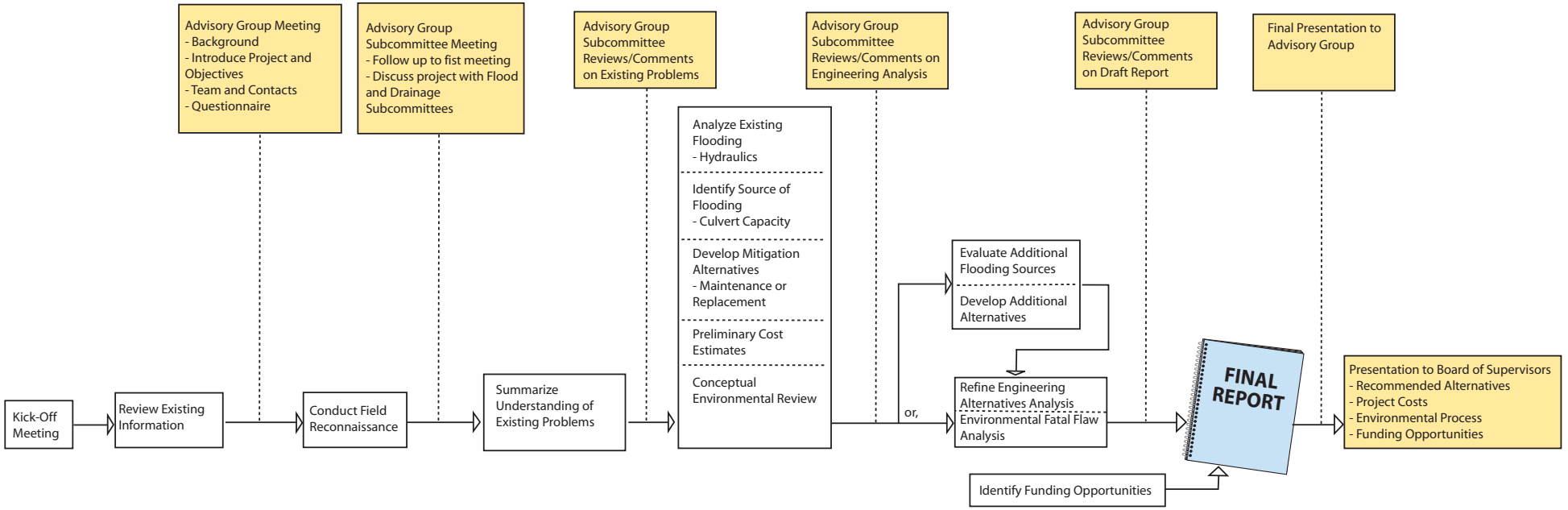
FIGURES

COUNTY OF SAN LUIS OBISPO

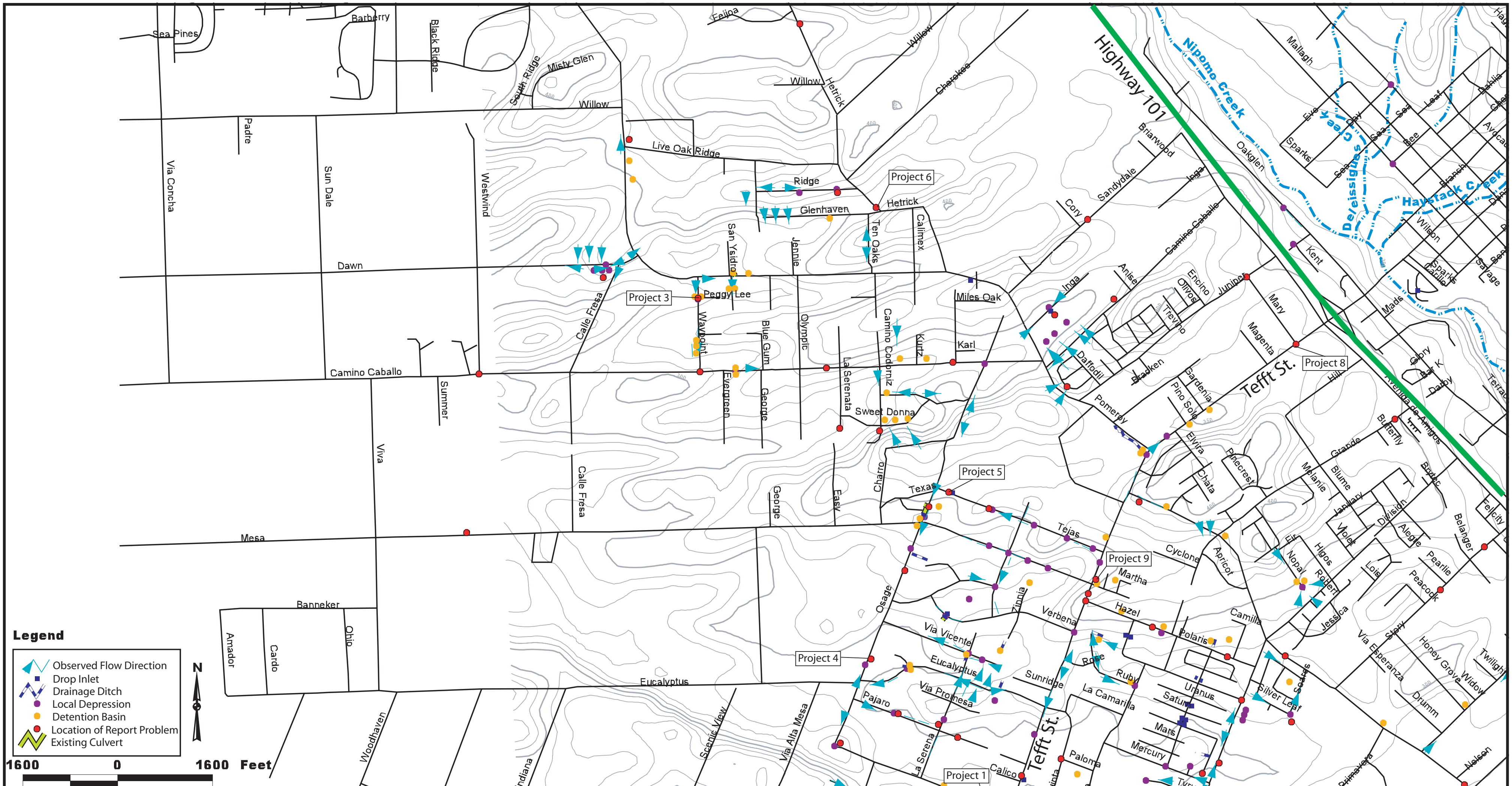
Community Drainage and Flood Control Studies

Cambria, Cayucos, Nipomo, Oceano, San Miguel and Santa Margarita

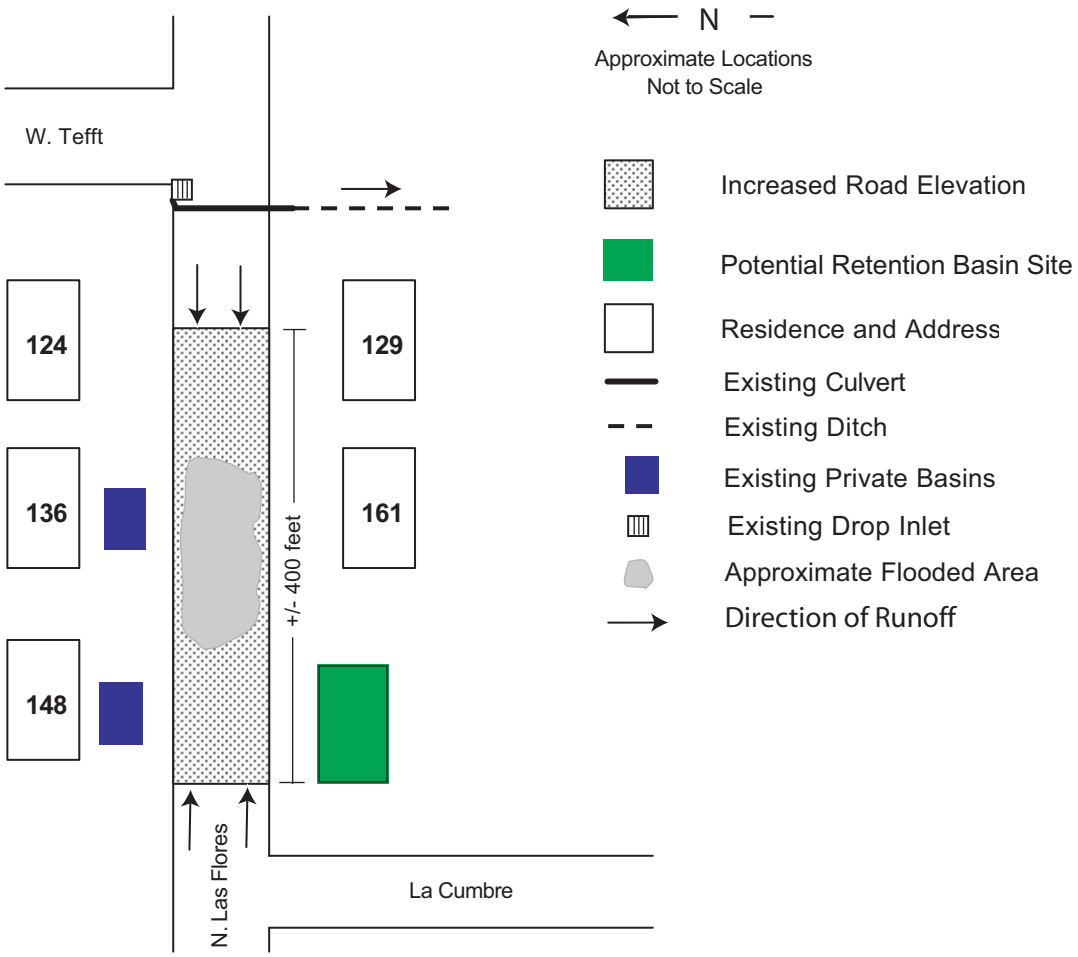
Study Flow Chart



RMC


Legend
Observed Flow Direction
Drop Inlet
Drainage Ditch
Local Depression
Detention Basin
Location of Report Problem
Existing Culvert
N
1600
0
1600 Feet
Highway 101
Nipomo Creek
Deleissigues Creek
Haystack Creek
Tefft St.
Project 1
Project 2
Project 3
Project 4
Project 5
Project 6
Project 7
Project 8
Project 9
Project 10
Project 11
Sea Pines
Barberry
Black Ridge
Misty Glen
South Ridge
Willow
Live Oak Ridge
Ridge
Glenhaven
Hetrick
Cherokee
Via Concha
Padre
Sun Dale
Westwind
Dawn
Camino Caballo
Summer
Viva
Calle Fresa
San Ysidro
Peggy Lee
Waypoint
Blue Gum
Jennie
Olympic
Evergreen
George
La Serenata
Camino Codorniz
Sweet Donna
Miles Oak
Karl
Mesa
Banneker
Amador
Cardo
Ohio
Eucalyptus
Woodhaven
Indiana
Scenic View
Via Alta Mesa
Osage
Texas
Tejas
Verbena
Via Vicente
Pajaro
Pablo
Calle del Sol
Cielo
La Joya
Silva
Sierra
Tierra
Nelson
Primavera
Via Esperanza
Honey Grove
Widow
Twilight

Project Name: SLO H&H Project No.: 210176 Date: June 2003 Path: Z:\2001\210176	QUESTA ENGINEERING CORP Modified by RMC, December 2003	Nipomo Mesa Drainage and Flood Control Study Reported Areas of Flooding	Appendix A Figure 2



Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 1 Schematic
N. Las Flores near W. Tefft Flooding

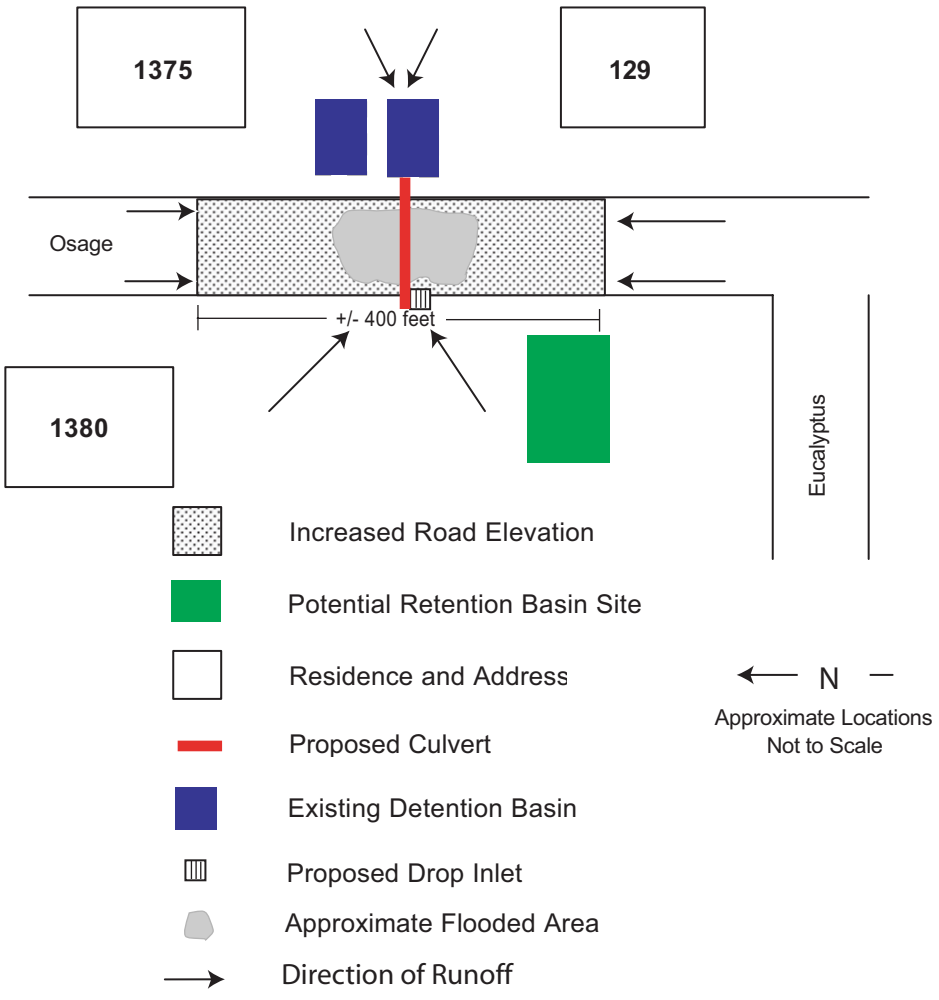
Appendix A

Figure 3

Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 2 Schematic
Pablo Lane and La Cumbre

Appendix A

Figure 4

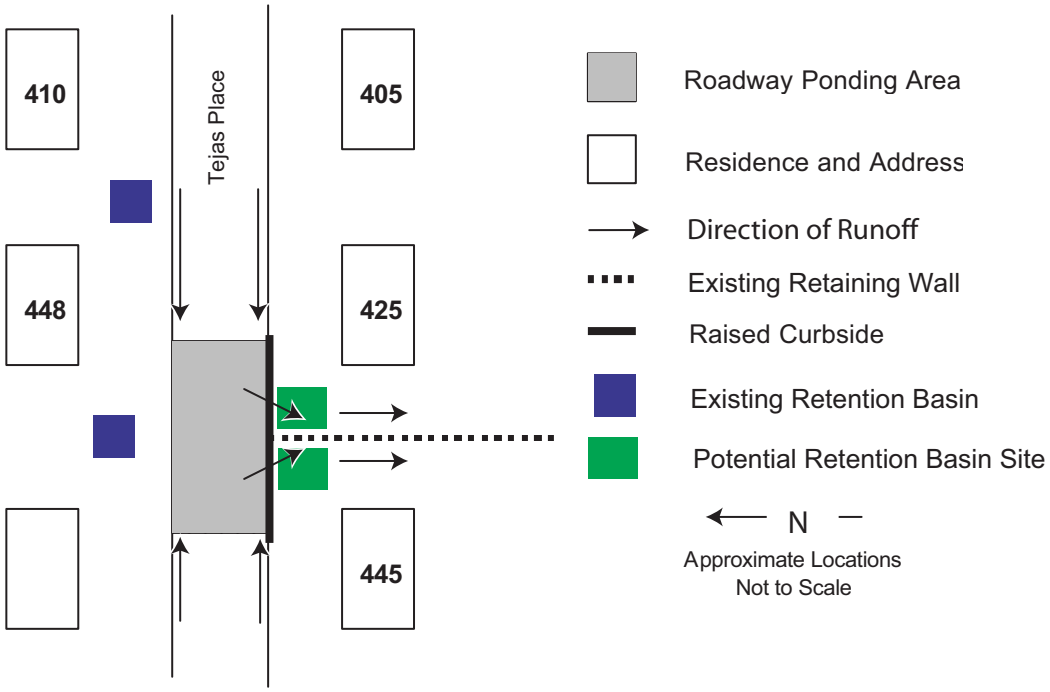


Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 4 Schematic
Osage Street near Eucalyptus Road

Appendix A

Figure 5

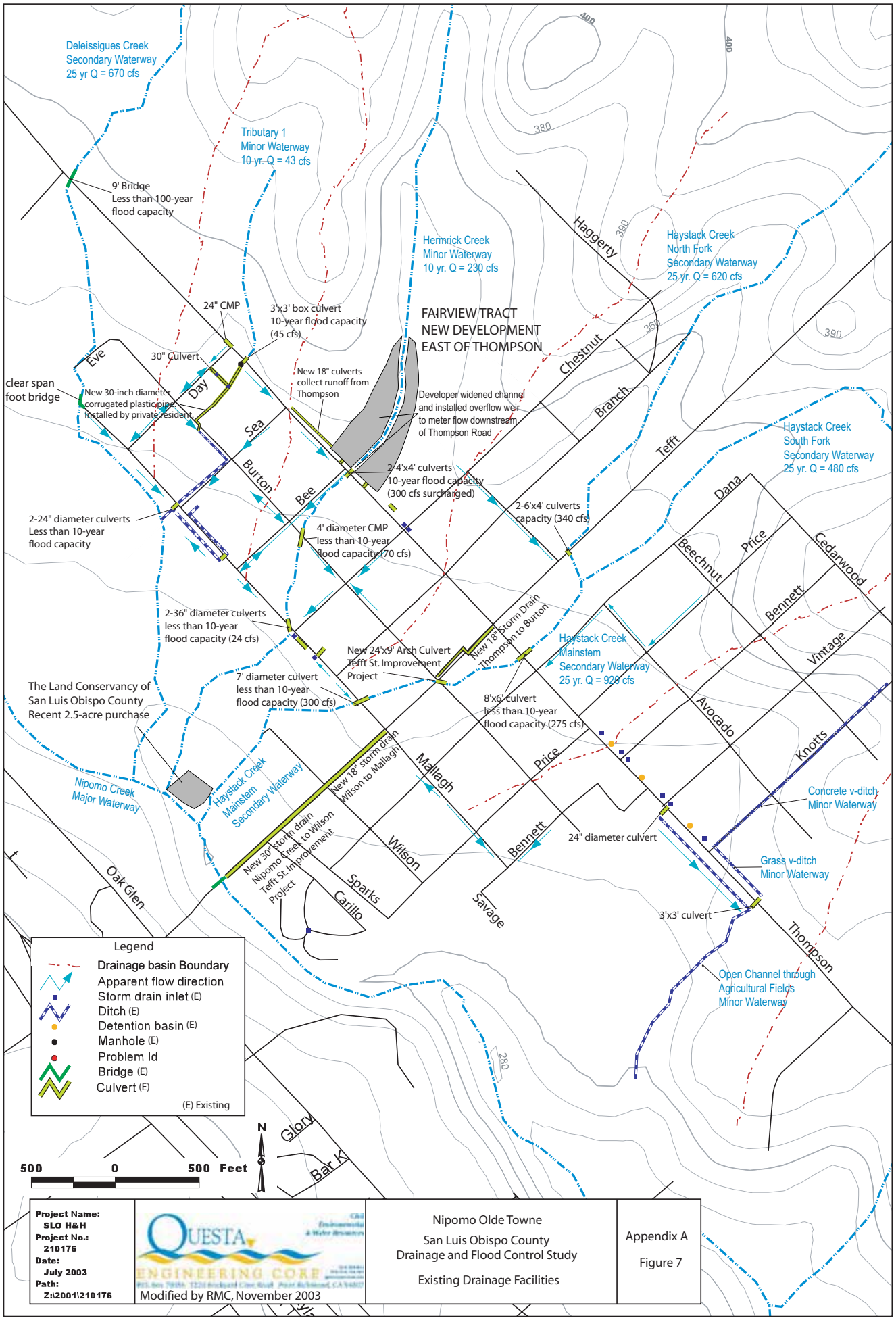
Raines, Melton and Carella, Inc.



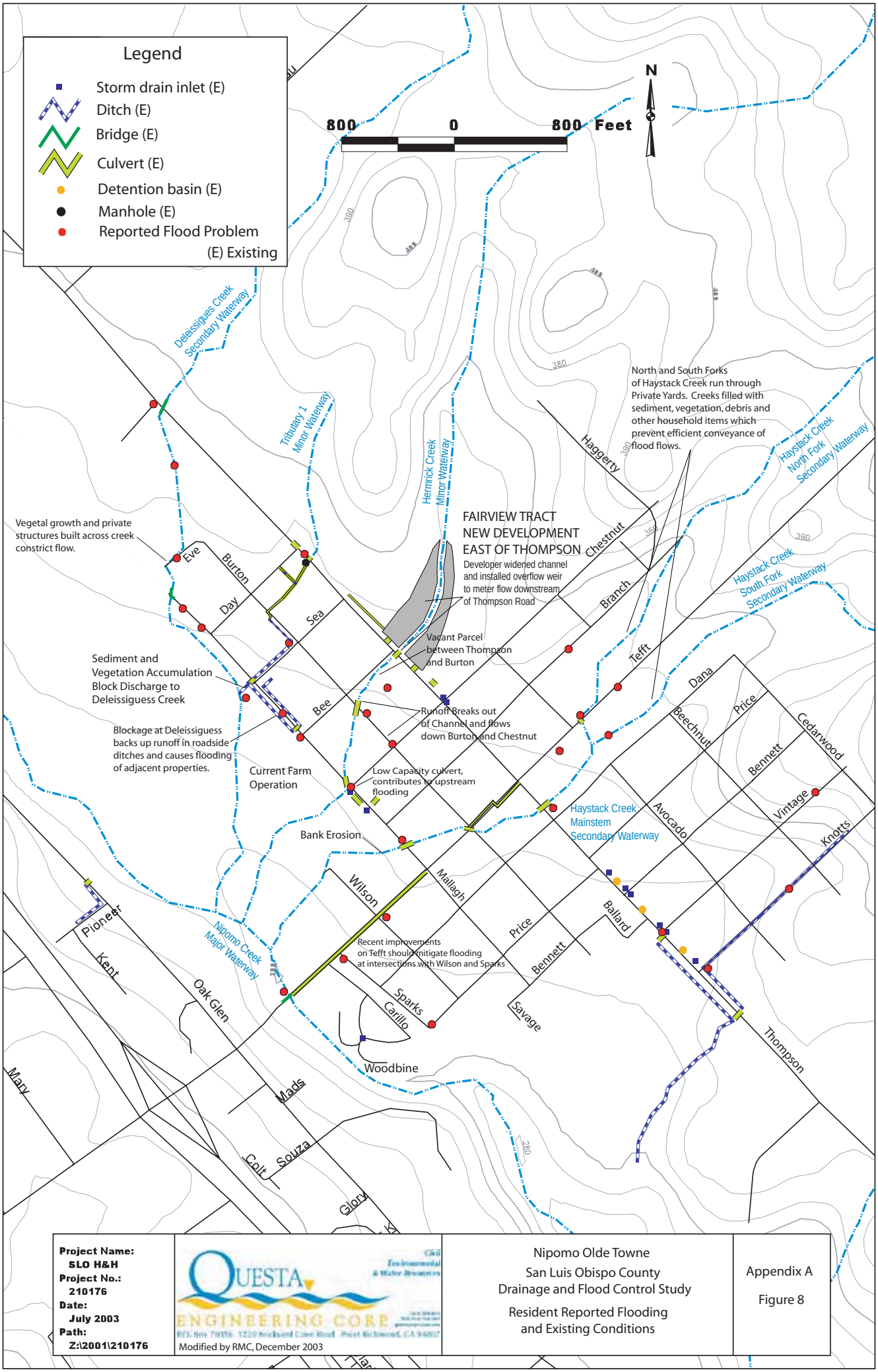
Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 5 Schematic
Tejas Place

Appendix A

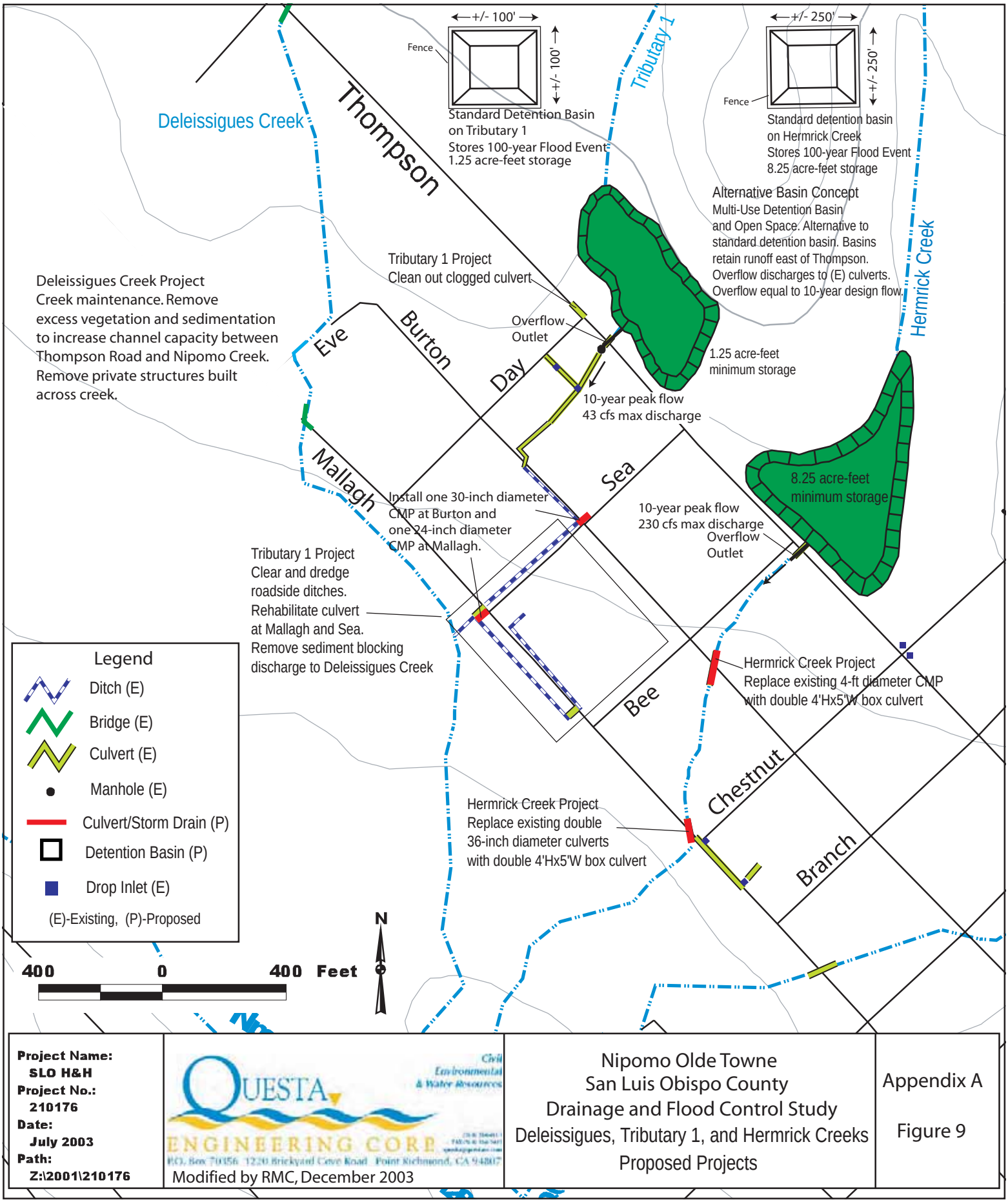
Figure 6



Project Name: SLO H&H **Project No.:** 210176 **Date:** July 2003 **Path:** Z:\2001\210176	QUESTA ENGINEERING CORP Modified by RMC, November 2003	Nipomo Olde Towne San Luis Obispo County Drainage and Flood Control Study Existing Drainage Facilities	Appendix A Figure 7



Project Name: SLO H&H **Project No.:** 210176 **Date:** July 2003 **Path:** Z:\2001\210176	QUESTA ENGINEERING CORP Modified by RMC, December 2003	Nipomo Olde Towne San Luis Obispo County Drainage and Flood Control Study Resident Reported Flooding and Existing Conditions	Appendix A Figure 8



Project Name: SLO H&H
Project No.: 210176
Date: July 2003
Path: Z:\2001\210176

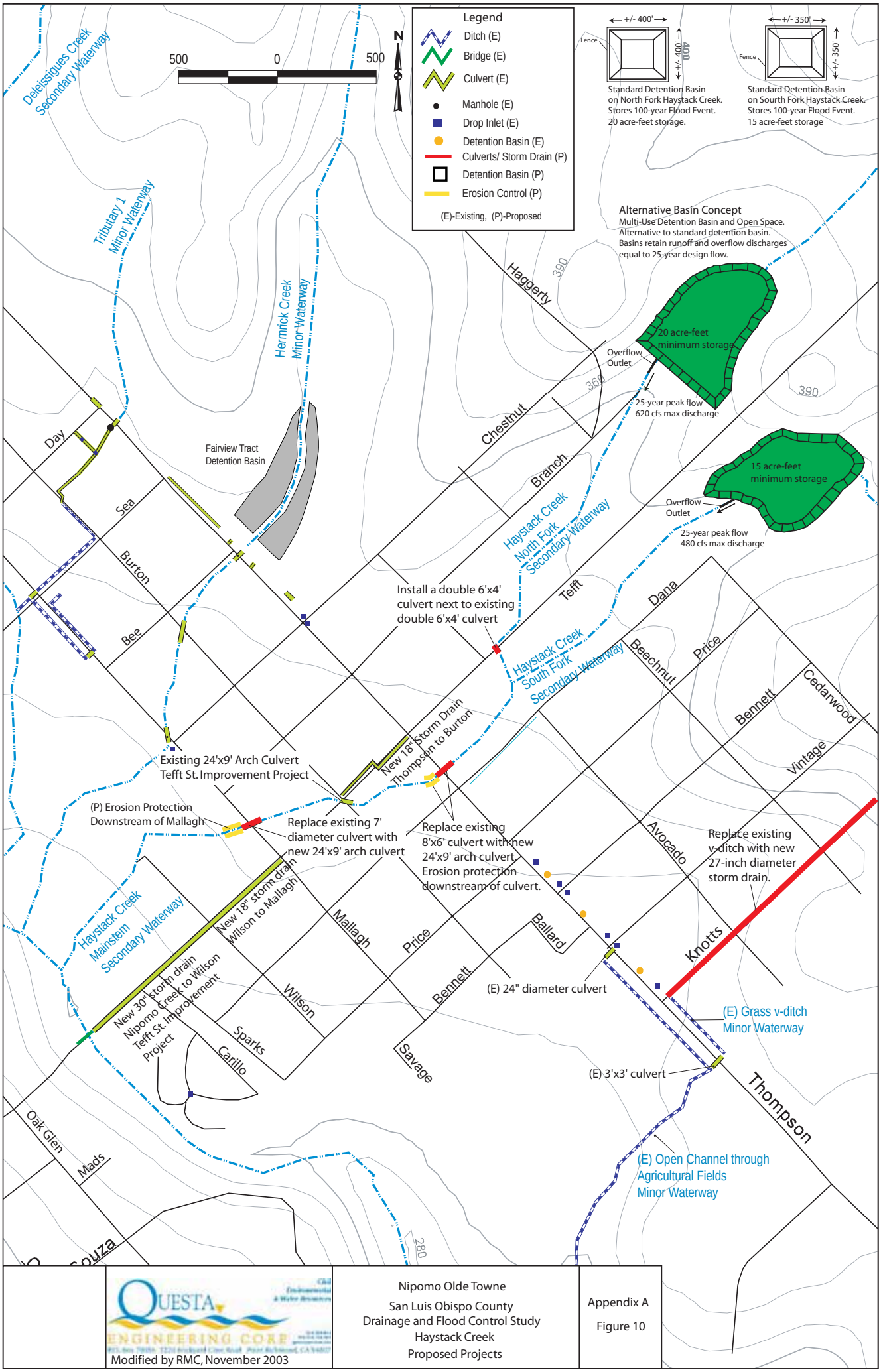
QUESTA ENGINEERING CORP
Civil, Environmental & Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

Modified by RMC, December 2003

Nipomo Olde Towne
San Luis Obispo County
Drainage and Flood Control Study
Deleissigues, Tributary 1, and Hermrick Creeks
Proposed Projects

Appendix A

Figure 9



QUESTA ENGINEERING CORP

Modified by RMC, November 2003

Nipomo Olde Towne
San Luis Obispo County
Drainage and Flood Control Study
Haystack Creek
Proposed Projects

Appendix A
Figure 10

Appendix B

PHOTOGRAPHS

APPENDIX B

PHOTOGRAPHS

Photograph 1: Location of Flooding on N. Las Flores. Proposed Road Raising Location.

Photograph 2: Location of Flooding on Pablo Lane. Proposed Road Raising Location.

Photograph 3: Culvert on Pablo Lane filled with Sediment. Typical of Culverts in Nipomo.

Photograph 4: Division north of Shiffrar. Drop inlet and curb installed on unpaved road shoulder.

Photograph 5: Existing Retention Basin on bluff at La Cumbre Lane and Calle Del Sol

Photograph 6: Erosion Protection of bluff at La Cumbre and Calle Del Sol, completed in fall of 2003

Photograph 7: Deleissigues Creek Looking Upstream near Mallagh and Eve

Photograph 8: Deleissigues Creek Looking Downstream Mallagh and Sea Street

Photograph 9: Recently installed (winter 2003) Corrugated Plastic Pipe on Burton

Photograph 10: Detention Basin under Construction on the Fairview Tract

Photograph 11: Double 4'x4' Culvert at Thompson. Weir installed by Fairview Tract developer to meter flow.

Photograph 12: Obstruction built across Hermrick Creek (typical to creeks in Olde Towne)

Photograph 13: Overgrown vegetation and channel encroachment on Haystack Creek

Photograph 14: Overgrown vegetation and channel encroachment on Haystack Creek

Photograph 15: New arch culvert installed on Haystack Creek at Tefft Street. Installed in 2003.

Appendix C

COMMUNITY QUESTIONNAIRE AND RESPONSES

APPENDIX C

COMMUNITY QUESTIONNAIRE AND RESPONSES

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDY QUESTIONNAIRE

Nipomo

Why should I complete this questionnaire? We need your help in identifying existing flooding problems in Nipomo. We will use this questionnaire to 1) gather local knowledge of the location and severity of existing drainage and flood problems, and 2) identify likely causes. Your time and effort is appreciated?

Please complete this questionnaire and return it in the enclosed self addressed envelope, so we can address all your community's problems as comprehensively as possible. A map of your community is on the reverse side of this form. Please use it if it will assist you in locating or describing problems to us. *We will not be able to respond to each person individually submitting a questionnaire, but your response will enable us to evaluate your specific concern, assure we are aware of all drainage problems in your community, and possibly develop specific solutions depending on the location and type of drainage problem which exists.*

Contact Information (optional):

Name:	
Address:	
Phone Number:	
Email:	

Where have you experienced or observed flooding? Please provide the amount of flooding (e.g. a few inches, 1 foot, severe), the location, year and observed damage to homes or property. A map is provided for you to indicate the location. Photographs of the flooding would be very helpful to us.

How often does the flooding you observed occur? Every time it rains, once a year, once every five years, once in my lifetime.

Did you observe likely causes of the flooding, such as clogged culverts under roads, catch basins filled with dirt, no place for water to flow?

Are there any other comments regarding drainage and flooding that you would like to make?

Nipomo Resident Identified Drainage Problems and Locations

	Property Address	Comment
	Road Maintenance Identified Problems Identified by Residents	
1	919 Camino Caballo	Road in front of house is improperly graded.
2	261 Calle Del Sol	Drainage off streets on edge of Mesa is a concern.
3	1089 Camino Caballo	Camino Caballo at Waypoint and Westwind – repaving has made drainage worse
4	1009 Camino Caballo	Culvert required at this address.
5	660 Camino Roble	Osage near Eucalyptus – clogged and overgrown basin
6	530 Calle Cielo	Tejas near Osage, Osage near Eucalyptus, Las Flores between Tefft and La Serena Way
7	2161 Division St.	Culvert too small
8	Division and La Loma	Water covers half of street on Division and La Loma
9	120 Eucalyptus	Mary and Tefft Street no flow.
10	115 Gertie	Tefft and Mesa experience severe flooding
11	1244 Galaxy	Clogged culverts at end of Galaxy Road.
12	261 Hazel Lane	Current grading and adjacent development is diverting water onto property
13	829 Hibiscus Ct.	Alyssum Circle has clogged culvert.
14	489 Hazel	Road elevation at intersection not built to plans. Catch basin not adequate.
15	664 High Meadow	No curbs on side of street.
16		Hetrick Road south of Summit Station Road has no place for water to flow.
17	839 Inga Rd.	Driveway is lowest point on street.
18	701 Joshua St.	Improper drainage from road and plastic covered strawberry fields.
19	675 Joshua St.	Improper drainage from roads and plastic covered strawberry fields.
20	474 Jupiter Dr.	**County used to clear sand after floods, but doesn't provide this service any longer. I crashed my bike on the sand. (Safety Issue)**
21		SW corner of Mary and Juniper has 4" plus of flooding during any rain due to lack of place for water to flow.
22	129 E. Knotts St.	E. Knotts and Thompson drain ditch needs be cleaned out.
23	1710 La Cumbre	No place for water to flow on Las Flores near Tefft.
24	221 La Camarilla	Puddlle occurs almost every day due to lack of place for water to flow.
25		Las Flores near Tefft – several inches across road every time it rains.
26	1220 Upper Los Berros Rd.	Upper Los Berros Rd. approximately 5.2 miles from unnamed creek crosses road due to lack of culverts.
27	148 N. Las Flores	Road was re-built 15 years ago higher than before, stopping flow of water across drainage path.
28		Las Flores between Tefft and La Cumbre; Pablo just west of La Cumber. Catch basins above street level.
29		N. Las Flores near Tefft has no place for water to flow.

30	1497 La Quinta	Clogged drainage going to runoff basin.
31	1066 Mesa Road	Mesa Road +/- 2 miles north of Tefft floods up to 2'. Nursery trucks do road damage.
32	1375 Osage	Road drains are not diverting water into retention ponds upstream from home.
33	241 Pablo Lane	Culvert too small and higher than ditches.
34	391 Pablo Lane	Ditch fills when it rains ½". It also needs to be cleaned out.
35	321 Pajaro Lane	Pajaro and La Serena – water flows onto property.
36		Basin is overgrown and silted in. It is located several lots from Orchard Ave. Who is supposed to maintain.
37	1680 Primavera Lane	Catch basin filled on Otono near Verano.
38	1678 Pomeroy	Roots of eucalyptus trees heaving pavement and causing drainage problems.
39		No place for water to flow on Pomeroy between Helroy and Applegate.
40		Flooding worse when culverts aren't cleaned at corner of Pablo and La Cumbre.
41	711 Ridge Road	No catch basin above property. Berm at top of driveway does not stop water.
42	570 Shiffrar Lane	**Water covers street on Division near Shiffrar, causing cars to use wrong side or road. (Safety Issue)**
43	685 Sweet Donna Place	No place for water to flow.
44	366 Silva Place	Neighbor blocked drainage path.
45	540 Silver Leaf Rd.	Too much water for drop inlets to take.
46	610 Shiffrar Lane	Runoff goes into side yard instead of catch basin across the street.
47		700 block of Southland Lane north side has no place for water to flow.
48		**Story Street ¼ mile from S. Frontage floods near eucalyptus trees. Cars cannot pass each other. (Safety Issue)**
49	179 E. Tefft St.	Lack of maintenance in and along creek (County does not maintain creek).
50	342 Tyrus Ct.	No culvert or catch basin.
51	1595 W. Tefft St.	No place for water to flow.
52	165 Tejas Pl.	Drain to impound was blocked by county during construction.
53		Low spot in Tejas Place before Osage.
54		Clogged culvert under Thompson near Dana and Tefft.
55		Catch basin needs to be larger at Mesa and Tefft.
56	185 Verbeda St.	Unsure if basin on adjacent property is clogged or not.
57	390 Venus	Catch basins inadequate.
58	480 Via Vicente	Clogged culverts near Eucalyptus on Osage.
Olde Towne Reported Areas of Flooding by Community		

59	169 Chestnut St.	Flooding in garage during heavy rain events. Three occurrences to date.
60	132 W. Chestnut	Brookside Tract drainage concerns. Homes built in historical drainage course now flood.
61	304 N. Mallagh St.	PG&E pole blocking culvert on Sea St. 2.5' of flooding in house in March 2001. Farm fields across street covered up drainage course.
62	210 E. Branch St.	Flooding in garage and back buildings from creek due to debris in creek.
63		N. Mallagh St. between Bee and Sea. March 5, 2001. Three of four homes flooded. Homes built too low.
64	430 N. Mallagh	2001 flooding in home. Up to 2 feet in yard and 1 foot in home.
65	165 E. Tefft	5" of mud in entire house. Flooding once every five years. Clogged culverts.
66	176 E. Tefft	$30,000 flood damage to home and property.
67	308 N. Mallagh	Home has flooded 5 times. No conveyance channel for flood waters.
68	348 W. Tefft	Adobe Plaza flooded from overflow from the NCSD sewer lift station across the street. During March 2001 flooding, creek flowed at full capacity.
69	233 E. Knotts St.	Flooding on Thompson St. from the Catholic Church to Bee Street. One to three feet deep. Culverts clogged with debris and vegetation.
70		Severe flooding in 2000 at Thompson and Dana.
71		March 5, 2001, severe flooding at Burton St., between Branch and Bee Streets.
72		Severe flooding in March 2001 at Thompson Ave. near Dana St. Clogged culvert under Thompson.
73	100 E. Vintage St.	Vintage at Thompson under 2' of water during heavy rains. Roadside ditches lack capacity.
74	190 W. Dana	In 60 years, only experienced flooding once. The bridge built over the creek prevents the flow of water, which leads to higher water surface elevations upstream.
75	330 N. Mallagh Dr.	Flooding in the area of Sea St. and Mallagh. Drainage ditches are filled with dirt.
76	203 E. Knotts	Severe flooding March 2001. Overland flow from adjacent field inundates roadside ditches.
77	229 E. Branch	Creek between Tefft and Branch overflows every time it rains. Culverts filled with tree limbs, sediment and vegetation.
78	112 E Tefft St. B	Over 3 feet of flooding on E Tefft Street in 2000. Creek behind house has overflowed several times. Trash accumulation has caused problem.
79	129 E. Knotts St.	East Knotts and Thompson Road/East Vintage and Thompson Rd. Drainage ditch needs to be cleaned and upsized. Overland flow from upland fields flows onto Knotts and Vintage.
80	311 N. Burton	Backyard floods every year. When water level is higher than three feet, the neighbor house floods. Creek behind homes floods.
81	561 S. Oakglen Ave.	Nipomo Creek flooding near Amado Street.
82	139 Day St.	Road floods during heavy rains.
83	199 Sparks St.	The end of Price St. at Sparks flows into lot/field, then floods two storm drains at end of Carrillo St. Storm drains lack sufficient capacity. Wilson at Tefft street has sag that with no outlet.
84		Trash and debris inhibit flow in local creeks.
85		Flooding at Wilson and Dana.

86 425 E. Tefft St.	4’ culvert under driveway partially blocked by dead trees.
87 447 S. Oakglen Ave.	Runoff floods home across street. Total area approximately 60’x150’, and depth of 8” to 10”.
88 256 E. Vintage St.	Thompson Rd. at Price St. One foot of flooding annually.
89	Six inches of flooding at Tefft and Wilson.
Mesa Reported Areas of Flooding by Community	
90 1066 Mesa Rd.	Mesa Rd. unpaved at 1.7 miles from Tefft and impacted by combination of rain and commercial tractor-trailer rigs.
91 135 Tres Casas	136 N. Las Flores and adjacent northerly property have had to install catch basins, but puddle in street continues.
92 950 Waypoint Rd.	Homes flooded.
93 1407 W. Tefft St.	Flooding in garage in Spring 2001.
94 N. Las Flores near W. Tefft	22-Responses; Standing water causing street flooding greater than 1 foot
95 Pablo Lane near La Cumbre	11-Responses; Standing water causing street flooding greater than 1 foot
96 Waypoint Drive at Peggy Lee	3-Responses; Standing water causing street and area flooding between 6 inches and 1 foot
97 Osage Near Eucalyptus	5-Responses; Standing water causing street and area flooding greater than 1 foot
98 Tejas Pl. Near Osage	12-Responses; Standing water causing street flooding between 6 inches and 1 foot
99 Hetrick Road	Standing water causing roadway flooding
100 Division North of Shiffrar	4-Responses; Standing water causing street flooding less than 6 inches
101 Corner of Mary and W. Tefft	4-Responses; Standing water causing street flooding less than 6 inches
102 W. Tefft and Mesa	3-Responses; Standing water causing street flooding
103 Division North of S. Las Flores	3-Responses; Standing water causing street flooding
104 Calle Fresa	1-Respones; Flow onto property from upstream causing standing water
105 Cannot Verify	1-Response; 1Flooding
106 391 Pajaro Lane	2-responses; Flow onto property from upstream causing standing water
107 200 Block Hazel Lane	1-response; Standing water causing street flooding between 6 inches and 1 foot
108 Hazel at Brier Rose	1-response; Standing water causing street flooding at intersection
109	Property flooding in undeveloped sump area near residence
110 Camino Caballo at Waypoint	2-responses; Street Flooding
111 Camino Caballo at Westwind	1-response; Street Flooding
112 W. Tefft and S. Las Flores	1-response; Standing water causing street flooding less than 6 inches
113 300 Block Silva Place	1-response; Standing water at drain inlet

114 Silver Leaf Ct and Soares	1-response; Standing water at drain inlet
115 600 Block High Meadow Drive	1-response; Runoff from street to property with no curb and gutter
116 700 Block Ridge Road (711)	1-resonse; Runoff from street to property at driveway entrance
117 1400 Block W. Tefft (1407)	1-response; Flow onto property from upstream causing garage flooding
118 1500 Block Primavera (1581)	1-response; Runoff from street to property at driveway entrance
119 1000 Block La Seranata Wy (1068)	1-response; Possible blockage of drainage by downstream development
120 Teft and Hazel	1-response; Flooding
121 700 Block Camino Caballo (748)	1-response; Runoff from street to property causing backyard flooding
122 Orchard near W. Tefft (150)	1-response; Retention basin overflow
123 1400 Block La Quinta (1457, 1458)	1-response; Standing water at drain inlet
124 Division at Jupiter	2-responses; Standing water causing street flooding less than 6 inches
125 Humbolt and High Meadow	1-response; No flooding but concerned about basin location/capacity
126 Mary at Juniper	1-response; Standing water causing street flooding less than 6 inches
127 500 Block Amigo Pl (510)	1-response; Mudslide from neighbor's property
128 Story Street	2-responses; Standing water causing street flooding less than 6 inches
129 S. Las Flores at La Loma	1-response; Flooding - no flood prone conditions observed
130 Grande Ave at Avenido De Amigos	1-response; Standing water in parking lot
131 Galaxy Avenue	1-response; Standing water at entrance to retention basin
132 Verano between Otono and Primavera	1-response; Standing water at entrance to retention basin
133 Alyssum Circle	1-response; Standing water from flow onto property from upstream area
134 Story Street	2-responses; Standing water causing street flooding less than 6 inches
135 Orchard west of Range	2-responses; Standing water causing street flooding less than 6 inches
136 Orchard east of Range	2-responses; Standing water causing street flooding less than 6 inches
137 Pajaro and La Serena	1-response; Runoff from street to property causing flooding
138 600 Block Shiffrar Lane (610)	1-response; Runoff from street to property causing flooding
139 200 Block Calle del Sol	1-response; Flooding during heavy storms
140 1600 Block of Pomeroy (1678)	1-response; Standing water causing street flooding less than 6 inches
141 1000 Block Camino Codorniz (1045)	1-response; Slow draining basin - no flooding
142 1000 Block Mesa Road (1066)	1-response; Standing water causing unpaved road flooding and damage
143 900 Block Camino Caballo (919)	1-response; Standing water causing street flooding

145 800 Block Inga Road (839)	1-response; Runoff from street to property at driveway entrance
146 Hetrick at Glenhaven	2-responses; Standing water causing street flooding
147 Division north of Mercury	1-response; Standing water causing street flooding less than 6 inches
148 600 Block Sandydale	2No flooding - Road Damage
149 Pomeroy Road near Lyn Road	2Standing water causing street flooding
150 700 Block of Southland	1Standing water causing street flooding
151 La Camarilla Pl. and La Loma Dr	1Standing water causing street flooding less than 6 inches
152 Frontage Road at Swap Meet	2Standing water causing street flooding
153 1500 Block Las Padres Rd (1561)	2Not clear - retention basin may fill to 3 feet
154 600 Block Camino Caballo (600, 606)	1Standing water causing street flooding
155 1600 Block of Primavera (1685)	1Runoff from street to property at driveway entrance

Appendix D

RESOLUTION ESTABLISHING POLICY

Resolution No. 68-223: Apportionment of Local Costs of Drainage and Flood Control Facilities

Resolution No. 18-65: Organization of Nipomo Community Services District and Establishment of Purposes for Its Formation

APPENDIX D

RESOLUTION ESTABLISHING POLICY

BEFORE THE BOARD OF SUPERVISORS

of the

SAN LUIS OBISPO COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

Mon day May 20, 1968

PRESENT: Supervisors M. Roland Gates, Elston L. Kidwell, Fred C. Kimball, Lyle F. Carpenter, and Chairman Hans Heilmann

ABSENT: None

Resolution No. 68-223

RESOLUTION ESTABLISHING POLICY OF THE SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT RELATING TO THE APPORTIONMENT OF LOCAL COSTS OF PLANNING, DESIGN, CONSTRUCTION, OPERATION AND MAINTENANCE OF DRAINAGE AND FLOOD CONTROL FACILITIES

The following resolution is now offered and read:

WHEREAS, the San Luis Obispo County Water Resources Advisory Committee has proposed the adoption of a policy relating to the apportionment of local costs of planning, design, construction, operation and maintenance of drainage and flood control facilities by letter dated May 8, 1968.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, State of California, that the following shall be the policy of the San Luis Obispo County Flood Control and Water Conservation District relating to the apportionment of local costs of planning, design, construction, operation and maintenance of drainage and flood control facilities until further notice:

1. The San Luis Obispo County Flood Control and Water Conservation District shall maintain surveillance of water problems throughout the County and advise the landowners of present or potential drainage problems in the areas where found. Where remedial action is deemed necessary, the Board of Supervisors shall call an informal hearing for the purpose of informing property owners in the areas causing the problem and in the areas of damage or potential damage.

2. If a program of correction is indicated, the Board of Supervisors shall provide assistance in the formation of a suitable zone of the County Flood Control District. Once a zone has been formed, it shall bear the cost of the planning, design, construction, financing and maintenance of drainage facilities. If the zone is formed, the cost of formation of the zone should be reimbursed from the initial budget of the zone. If the zone formation proposal is rejected, or otherwise abandoned, then the cost of the zone formation proceedings should be absorbed by the County Flood Control District.

3. Applications for the formation of a drainage district or zone should be discussed with the County Hydraulic Engineer so that the applicants will have available to them all current and pertinent information for their guidance.

4. Provision should be made for reimbursement to a developer, or his successors in interest, of his costs of off-site drainage facilities in excess of his pro-rata share, as determined by the County of San Luis Obispo, when adjoining properties develop and require the use of facilities financed by said developer. The period of eligibility for reimbursement should be flexible and based on the size of a project. It is anticipated that the normal period of reimbursement would be from five to ten years and in no event would it exceed 20 years.

5. The Board of Supervisors shall maintain a revised project priority list, giving preference to those projects approved by the people within the areas affected, in the order of approval.

6. Local costs of drainage projects should be spread within the area of benefit in accordance with benefits received, insofar as possible. Where pay-as-you-go financing or general obligation bond financing is contemplated, the total assessed valuation is an equitable basis for spreading project costs under the assumption that benefits are in accordance with assessed valuation. Where assessment bond proceedings are contemplated, and only in such cases, land area, front or abutting footage, number of developable sites, as well as assessed valuation, shall be used as bases of spreading costs among beneficiaries, either separately or in combination. In such instances the proper basis of assessment spread should be determined primarily from engineering considerations.

On motion of Supervisor Kidwell, seconded by Supervisor Carpenter, and on the following roll call vote, to-wit:

AYES: Supervisors Kidwell, Carpenter, Gates, Kimball, Chairman Heil
NOES: None
ABSENT: None

the foregoing resolution is hereby adopted.

Chairman of the Board of Supervisors

ATTEST:

Clerk of said Board of Supervisors

SLO CO FC & WCD
m

STATE OF CALIFORNIA, }
County of San Luis Obispo, } ss.

I, RUTH WARNKEN, County Clerk and ex-officio Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, do hereby certify the foregoing to be a full, true and correct copy of an order made by the Board of Supervisors, as the same appears spread upon their minute book.

WITNESS my hand and the seal of said Board of Supervisors, affixed this 23rd day of May, 19 68.

RUTH WARNKEN
County Clerk and Ex-Officio Clerk of the Board of Supervisors

[SEAL]

By _____ Deputy Clerk.

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IN THE BOARD OF SUPERVISORS

COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA

[illegible] day [illegible] January 18, 19 65

PRESENT: Supervisors [illegible], Lyle Carpenter, [illegible], and Chairman Fred C. Kimball

ABSENT: [illegible]

RESOLUTION NO. 18-65

RESOLUTION ORGANIZING NIPOMO COMMUNITY SERVICE DISTRICT, FIXING THE BOUNDARIES THEREOF, STATING THE PURPOSES FOR WHICH IT IS FORMED AND DECLARING DIRECTORS ELECTED

The following resolution is hereby offered and read:

WHEREAS, an election was held on the 12th day of January, 1965, at which the question of determining whether to form "NIPOMO COMMUNITY SERVICE DISTRICT" under the Community Services District law and to elect the first directors of said District was submitted to the voters residing within the property in which it was proposed to form such a district; and

WHEREAS, the Board of Supervisors by an order made December 21, 1964 has duly authorized the County Clerk to canvass the returns of said election; and

WHEREAS, the County Clerk of the County of San Luis Obispo has duly canvassed said vote cast at said election and has determined that a majority of the votes cast at said election were in favor of the formation of said District; and

WHEREAS, the County Clerk has presented his certificate of the canvass of said election to the Board of Supervisors.

NOW, THEREFORE, BE IT RESOLVED and ORDERED by the Board of Supervisors of the County of San Luis Obispo, State of California, as follows:

1. That at the election held for such purposes there were one hundred ninety-one (191) votes cast in favor of the formation of the hereinafter designated Community Services District and fifty-four (54) votes cast against the formation of said District. That a majority of the votes cast at said election were therefore in favor of the formation of the hereinafter designated Community Services District.

2. That there is herewith organized under the Community Services District law the Community Services District to be known and designated as "NIPOMO COMMUNITY SERVICE DISTRICT" which said District is organized and formed for each of the following purposes listed in Section 61,600 of the Government Code of the State of California, to-wit:

(a) To supply the inhabitants of the district with water for domestic use, irrigation, sanitation, industrial use, fire protection, and recreation.

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Post-it® Fax Note 7671	Date 2.13.04 # of pages ▸ 3
To Jose Gutierrez	From Dean Benedix
Co./Dept. RMC	Co. SLO County
Phone #	Phone # 805.781.5267
Fax # 559.322.5711	Fax #

IN THE BOARD OF SUPERVISORS
COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA

day of 19

PRESENT: Supervisors

ABSENT:

(b) The collection, treatment or disposal of sewage, waste and storm water of the district and its inhabitants.

Nipomo CSD formed to collect storm water.

(c) The collection or disposal of garbage or refuse matter.

(d) Protection against fire.

(e) Public recreation by means of parks, including but not limited to aquatic parks and recreational harbors, playgrounds, golf courses, swimming pools or recreation buildings.

(f) Street lighting.

(g) Mosquito abatement.

(h) The equipment and maintenance of a police department or other police protection to protect and safeguard life and property.

(i) To acquire sites for, construct, and maintain library buildings, and to cooperate with other governmental agencies for library service.

(j) The opening, widening, extending, straightening, and surfacing, in whole or in part of any street in such district, subject to the consent of the governing body of the county or city in which said improvement is to be made.

(k) The construction and improvement of bridges, culverts, curbs, gutters, drains, and works incidental to the purposes specified in subdivision (j), subject to the consent of the governing body of the county or city in which said improvement is to be made.

Nipomo CSD formed to construct and improve bridges, culverts, drains, etc.

BE IT FURTHER RESOLVED and ORDERED that the boundaries of said "NIPOMO COMMUNITY SERVICE DISTRICT" shall be as set out on the attached sheet marked "Exhibit A" which is hereby expressly referred to and incorporated herein as though here fully set forth.

3. That in the election for the first directors of said District, the votes were cast as follows:

William C. Black	117 votes
Cecil E. (Gene) Davis	117 votes
Leslie O. Fox	91 votes
Leonard W. (Bill) Hertler	54 votes
James A. Kitchen	131 votes
Frank D. Lucas	115 votes

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PA-14

PRESENT: Supervisors

ABSENT:

David A. Merlin	54 votes
Patrick D. (Pat) McNamara	62 votes
Callie M. Miller	67 votes
Oren W. (Jim) Miller	135 votes
John R. Mylan	124 votes
Gilbert A. Ramirez	80 votes
Mary T. Westfall	77 votes
	votes

4. That since there were to be five directors elected for the Nipomo Community Service District, and since William C. Black, Cecil E.(Gene)Davis, James A. Kitchen, Oren W.(Jim)Miller, and John R. Mylan were the five persons receiving the highest number of votes cast at said election for directors of said District, it hereby is declared that William C. Black, Cecil E. (Gene) Davis, James A. Kitchen, Oren W.(Jim)Miller, and John R. Mylan have been duly elected directors of the Nipomo Community Service District and are therefore the first directors thereof.

5. That the County Clerk of the County of San Luis Obispo be and hereby is authorized and directed to cause to be recorded in the Office of the County Recorder of the County of San Luis Obispo and filed with the Secretary of State of the State of California a certified copy of this resolution forming the Nipomo Community Service District.

6. That the County Clerk of the County of San Luis Obispo be and hereby is authorized and directed to file with the San Luis Obispo County Assessor and with the State Board of Equalization a statement containing the legal description of the boundaries of said District and a map or plat indicating the boundaries of said District.

On motion of Supervisor Carpenter, seconded by Supervisor Borradori, and on the following roll call vote, to-wit:

AYES: Supervisors Carpenter, Borradori, Gates, Heilmann, Chairman Kimball
NOES: None
ABSENT: None
the foregoing resolution is hereby adopted.

ATTEST:

Fred B. Kimball
Chairman of the Board of Supervisors

C. E. Meaugh
Clerk of the Board of Supervisors

JAN 20 1965

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Appendix E

ENGINEERING TECHNICAL MEMORANDUM THE MESA

APPENDIX E
MESA

ENGINEERING TECHNICAL MEMORANDUM

Technical Memorandum

San Luis Obispo County Flood Control and Water Conservation District

Subject:	Community of Nipomo, Mesa Drainage and Flood Control Study
Prepared For:	Dean Benedix, San Luis Obispo County
Prepared By:	Jeff Lewandowski, P.E., D. Eng. (First draft of TM was prepared by Questa Engineering Corporation)
Reviewed By:	Jose Gutierrez, P.E.
Date:	November 24, 2003
Reference:	**034.05.03**

EXECUTIVE SUMMARY

This report summarizes the existing drainage conditions, discusses the nature of drainage/flooding problems, and identifies potential projects to mitigate the problems in the Mesa area of the Nipomo Community.

The Mesa portion of this technical memorandum focuses on documenting existing problem areas that have been identified by local residents, and proposing individual solutions for the areas that have received the greatest number of comments. The conceptual solutions were based on limited field information and elevation data. A predesign study of each of the conceptual solutions will be needed to determine actual elevations of the surrounding area and the validity of the solutions, as well as any other possible alternatives. Decisions to proceed with predesign of improvements at these locations will be made by the County based on funding availability, public safety considerations, and neighborhood input. The solutions proposed for the individual areas can also be generally applied to the flooding problems which received fewer complaints. Modifications to existing County planning standards and policies are also recommended to reduce risk of flooding for residences developed in low lying areas, and to provide the County with greater enforcement capabilities regarding maintenance of individual homeowner retention basins.

The Mesa topography is characterized by the underlying sand dune deposits which create an undulating topography with numerous depressions, including low spots having no outflow drainage paths. This leads to a high incidence of localized ponding. Historically, the runoff from the Mesa area has caused limited flooding problems; however, recent increases in impervious area from development yielded larger quantities of storm water runoff. The lack of drainage infrastructure has created ponding which has been problematic for residents. In some cases, development has occurred in the depression areas, causing an increased flooding risk for the residences and a reduced area for infiltration of the ponded runoff.

Due to the undulating topography of the area, the Mesa was not planned with a centralized, gravity driven storm water management system. Runoff is generally directed to a retention basin shared by a number of properties in larger land developments, or to a small retention basin on each property for individual property improvements. The retention basins are generally constructed in the lowest elevations of the developed area to collect storm water runoff. Land developments with curb and gutter, drain inlets, underground storm drains and regional retention basins are annexed into the San Luis Obispo County

Flood Control and Water Conservation District Zone 16 (Flood Control Zone 16). The County currently performs maintenance for infrastructure included in these tracts, which comprise less than 10 percent of the developed land in the Mesa portion of the Nipomo Urban Area. Consequently, over 90 percent of the developed land has storm water runoff management facilities consisting of small retention basins located on private property which are not controlled or maintained by the County.

Few flooding problems were reported in the Flood Control Zone 16 areas. The Mesa flooding and drainage problems in Flood Control Zone 16 areas are typically standing water in the roadway due to blocked drain inlets, which are cleaned annually. The other portions of the Mesa area had a greater number of reported flooding problems. Flooding problems consisted primarily of standing water on roadways, but also included runoff from the street to individual properties.

The roadway standing water areas appear to be caused by additional runoff either directed to the roadway or prevented from leaving the roadway, resulting in ponding in low lying areas. These areas create a traffic and pedestrian hazard. The additional runoff is assumed to occur from lack of maintenance of individual retention basins. Over time, the retention basins fill with sediments carried with the storm water runoff, reducing the capacity for storm water storage during infiltration. The excess runoff will overtop the unmaintained basins during large storms, causing excess water to flow from the property into the roadway. Sediment filled retention basins that previously collected water from adjacent roadways will completely fill with water during small storms, causing water to back up and cause standing water on the roadway. In some cases, homeowners have intentionally filled retention basins and blocked storm drain inlets, diverting runoff from their property and creating greater flooding in nearby lower areas. Some development grading has blocked the flow paths occurring in the previously existing topography of the area, causing street or property flooding in those areas where flooding had not historically occurred.

The flooding in Mesa tends to be minor, with very few records of flooded structures and no extensive damage reported. As development has continued, the County drainage policies have required the approval of drainage plans for each new structure or addition to an existing structure. These plans must provide for the retention of storm water runoff on the same site as the building. The disposal of storm water runoff occurs through onsite infiltration. However, some of the infill developed areas are located in the lowest elevations of the neighborhood, where storm water from the neighborhood had previously flowed for infiltration. Retention basins sized for the developed property alone will not contain the neighborhood runoff, causing potential flooding risk to the property. County policies and procedures should be modified to require additional information on existing drainage conditions with the grading plan submittal. Many of the smaller localized sump areas should also be identified and included for special study requirements as currently required by County standards for large depression areas. A separate Flood Control Department check and approval for final development plans should also be provided to verify that the proposed development will not be at risk of flooding or create additional flooding in other areas.

County Drainage Standards and Policies specify the responsibility of onsite runoff management as belonging to residents; however, no specific sanctions are included to enforce maintenance of local facilities. There is no maintenance entity to maintain the private systems, and there is no consistent procedure to enforce drainage system management on private property at present. County policies could be updated to provide the Department of Public Works with more enforcement abilities related to procedures to ensure basin maintenance by the individual homeowner. Retention basin inspections and upgrades to meet current drainage standards could also be required during transfer of property ownership.

INTRODUCTION

Mesa Area

The purpose of the drainage and flood control study is to examine the existing poor drainage conditions identified in the Mesa area of the Nipomo Urban Area. This examination includes identification and reporting of problematic areas and issues, evaluating the cause of the poor drainage, and presenting conceptual solutions to reduce the number of occurrences and magnitude of flooding. The existing poor drainage conditions reviewed in this study were based on:

- review of available drainage reports for the Nipomo Urban Area;
- review of Community Drainage and Flood Control Study Questionnaires;
- coordination with San Luis Obispo County Planning and Public Works Departments;
- review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs); and
- field mapping conducted by RMC and Questa Engineering Corporation.

The study areas shown on Figure 1 includes areas west of Highway 101 within the Nipomo Urban Area, commonly known as the Mesa. Some areas to the north and west of the urban area line are included as far west as Westwind Way and as far north as Willow Road. The portion of the Nipomo Urban Area known as Olde Town is addressed in a separate technical memorandum. For the purposes of this study, Highway 101 separates the Mesa and Olde Town areas.

ENVIRONMENTAL SETTING

Climate and Topography

The community of Nipomo is situated in the southern half of San Luis Obispo County within the Coast Range Geomorphic Province of California in Central California. The Coast Range Geomorphic Province is characterized by a series of northwest-trending valleys and mountain ridges that run parallel to the coast.

The Mesa area is bordered on the south side by a steep bluff that drops into the Santa Maria Valley. The Mesa community was constructed on prehistoric sand dunes, and topography consists of low rolling hills and flat areas that vary in elevation from approximately 260 to 410 feet. Drainage is not continuous, since many areas drain into low depression and sink-like or sump areas. Storm water collects and infiltrates in these low lying sump areas.

The climate of Nipomo is mild with an average annual precipitation of approximately 16 inches. Average high temperatures reach 80 degrees and lows, 42 degrees.

Surface Geology and Soils

The surface of the mesa is underlain by old (at least 40,000 years) sand dunes that predate the last Ice Age. The dune shapes are still evident in the surface topography of the mesa that is characterized by linear ridges and intervening closed (i.e., undrained) depressions. This topography and the sand soils of the Mesa are important to groundwater recharge.

The relevant characteristics of Nipomo soils are listed in Table 1. The Mesa, located on a stabilized sand dune, is comprised of Oceano sand of rapid permeability and slow or medium runoff characteristics (0 to 9% slopes) with pockets of Oceano sand with medium or rapid runoff characteristics (9 to 30% slopes).

TABLE 1:
RELEVANT CHARACTERISTICS OF NIPOMO SOILS

ID	Soil Series	Texture	Runoff Characteristics	Permeability
184	Oceano - 0 to 9% slopes	Sand	slow or medium	rapid
185	Oceano - 9 to 30% slopes	Sand	Medium or rapid	rapid

Source: U.S. Dept. of Agriculture, Soil Conservation Service, 1984. Soil Survey of San Luis Obispo County, California - Coastal Part.

Oceano sands are described as being very deep and excessively drained and are found on old stabilized sand dunes. Available water capacity is low. The water erosion hazard ranges from slight or moderate for the gentler slope range and moderate or high for the higher slope range.

Nipomo Area FEMA Flood Zones
The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the Nipomo area do not include any flood hazard zones within the Mesa area.

Mesa Surface Hydrology
Unlike Olde Town, the surface hydrology on the Mesa does not include major creeks or tributaries. Mesa hydrology is characterized by its sloping sand dunes and sump areas. Historically, the runoff from the Mesa area has caused limited flooding problems; however, recent development and a lack of drainage infrastructure have yielded larger quantities of storm water runoff which has been problematic to its residents.

The surface of the Mesa generally slopes in the southwesterly direction. However, the topography is characterized by the underlying sand dune deposits which create an undulating topography with numerous depressions and low spots having no outflow drainage paths. This leads to a high incidence of localized ponding. Historically, this was not a problem, since water collecting in these depressions was quickly absorbed into the underlying sandy soils and little drainage planning was considered as the area subdivided and residential density increased. Mesa development has increased the runoff and reducing the areas for infiltration. In some cases, development has occurred in the depression areas, causing both increased flooding risk for the residences and lack of infiltration capacity for the ponded runoff.

Homes on the Mesa are generally ranchette style with a parcel sizes from about one fourth of an acre to large acreages. Due to the undulating topography of the area, the Mesa was not planned with a centralized, gravity driven storm water management system. Runoff from individual properties was either directed to a small retention basin on each property, or to a retention basin shared by a number of properties.

Typical storm water runoff disposal within older neighborhoods consists of unmanaged retention and infiltration basins located on individual properties or within the lowest elevations within the neighborhood. A drainage system on the Mesa in neighborhoods of non-subdivided lots can consist of a ditch or series of ditches and culverts crossing backyards and roads to a local detention/infiltration basin. In some cases, the drainage does not discharge into a detention basin, and is instead diverted onto an adjacent property. These areas typically do not have a consistent curb and gutter system, and the terminus of the drainage systems is often the nearby low-lying sump area within the neighborhood.

Typical within more recent, subdivided Mesa developments is a system of curbs and gutters, an underground storm drain collection system, and in many cases, a large local retention/infiltration basin. Standing water problems in these areas are generally related to plugged drain inlets instead of lack of basin capacity.

The installation of curbs and gutters in some areas has led to the concentration of street runoff. The runoff travels along the gutter to a nearby low elevation in the topography, where it pools or enters private property. As residents attempt to prevent the runoff from entering their property by blocking the flow path, standing water is created which exacerbates flood problems and compromises traffic safety.

Most residences have individual storm water retention/infiltration basins, which are required on a per parcel basis. The current sizing requirements of the basins are based on providing adequate volume for 4 inches of rainfall on the impervious area of the property. Although these basins generally address runoff on a per parcel basis, they do not always succeed in collecting all runoff and preventing flooding. Runoff from the County maintained roadway adjacent to the property can be blocked from entering the basin on the property, causing runoff to travel to adjacent properties for storage and infiltration. In some cases, second and third owners of the property are unaware of the drainage management aspects of the basins and fill the basin with soil or block the basin entrance to prevent runoff from entering. As the community expands and runoff increases, it becomes increasingly important that new homeowners receive adequate information pertaining to drainage responsibilities.

METHODOLOGY AND APPROACH

Flooding and drainage problems were identified using County flood study questionnaires, reports and studies provided by the County, contour data from a 10 feet interval digital elevation model, contour data from a 5 feet interval County topography maps of some areas, and observations of drainage patterns made during site visits to the area. Mesa topographic data within the Nipomo Urban Area was limited, and topographic information was not available for areas south of Pomeroy between Osage and La Loma, and for all Urban Areas along the bluff edge.

The mapping and cataloging of flooding sites reported via survey was the first step in evaluating drainage issues on the Mesa. These sites were inspected during a field visit to determine potential causes of flooding. Some site locations were also compared with available topographic mapping to identify whether sites were located within the lowest elevations within the neighborhood. Each site was also inspected by County maintenance forces to determine whether increased maintenance would prevent or reduce flooding. Each flooding site was categorized, and potential solutions to reduce the impacts of flooding were developed for sites most often identified in the surveys.

Suggested revisions to the Local Drainage Standards and Policies were identified to reduce structure flooding risk and to prevent street flooding. The impacts of development in sumped areas and lack of maintenance by individual homeowners was addressed. Many of the Mesa drainage issues are a result of the ineffectiveness of the existing policies.

OVERVIEW OF DRAINAGE AND FLOODING ISSUES

Mesa Area

Existing San Luis Obispo County Standards and Policies

Runoff on the Mesa is handled by a combination of privately owned and District maintained storm water retention facilities. The privately owned facilities provide storm water management for over 90 percent

of the Nipomo Urban Area on the Mesa. All facilities detain generated runoff and use the sandy underlying soil for infiltration.

There are four types of facilities;

- Privately owned basins that retain all storm water runoff on the site. These typically serve an individual parcel or property, and are owned and maintained by the property owner.
- Sump areas that collect storm water from a neighborhood or local drainage area. These basins can cross individual parcel or property boundaries, and are owned and maintained by the low area property owners.
- Large basins constructed within developments that are owned and maintained by a Homeowners Association or other local entity. These basins are generally constructed below the lowest elevations within the neighborhood to allow positive drainage to the basin via curb and gutter or underground storm drain pipelines.
- Large basins constructed within developments that are owned and maintained by the County. These basins are generally constructed below the lowest elevations within the neighborhood to allow positive drainage to the basin via curb and gutter or underground storm drain pipelines. The Nipomo Community Services District (NCSD) has been unwilling to accept responsibility for maintenance of storm water drainage basins within its boundaries. As a result, the County has annexed some new developments into San Luis Obispo County Flood Control and Water Conservation District Zone 16 for the purpose of maintenance of the drainage basin. The drainage basin maintenance is funded by benefit assessments on the owners of property in the new development.

Maintenance of the first three types of facilities is not consistent, however, and the filling of retention basin entrance pipes with concrete or the filling the basins themselves with sand has been reported. Sand-filled basins provide no storage volume for surface runoff and direct surface runoff to other locations. As a result, some residences receive runoff from one or more neighboring parcels, where historically they received runoff from the parcel alone. This flow quantity can overwhelm the private property detention basins, causing surface runoff to travel off the property and cause flooding on other private and county property.

The County currently performs maintenance for infrastructure included in all land tracts annexed into the San Luis Obispo County Flood Control and Water Conservation District Zone 16 (Flood Control Zone 16). These areas include large land tracts that have been developed with street drain inlets, underground drain piping systems and a regional retention basin serving a number of parcels. This area includes less than 10 percent of the Mesa portion of the Nipomo Urban Area. Flood Control Zone 16 was established in 1981 for drainage basin maintenance. The annual assessment is $16 per year for each of the parcels in the annexed area, and has been the same since 1981.

Unless waived, San Luis Obispo County Curb and Gutter Ordinance requires the installation of concrete curbs, gutters, and sidewalks along the entire street frontage of any project in the following areas: (1) all new residential subdivisions, pursuant to Title 21 of the SLO County Code; (2) all new residential multifamily categories within an urban reserve line; (3) all commercial, office, and professional categories within an urban reserve line; and (4) all industrial categories within an urban reserve line. These curb and gutter areas typically have drain inlets to underground storm drain systems that discharge into County maintained retention basins.

Drainage and Flooding

Mesa Flooding Problems
According to questionnaire responses, common flooding problems include:

- Standing water causing street flooding, ranging from a few inches to over 1 foot
- Flow onto individual properties from the street or roadway
- Flow onto individual properties from upstream areas
- Slow draining or overflowing retention basins

Some of the causes for flooding identified during the document review and field inspection include:

- **Topography** – As described in Section xx, the undulating nature of the Mesa area creates low areas that will collect storm water runoff. These areas will become flooded during major rainfalls, especially in areas where individual property basins cannot accommodate the total runoff from the property. These areas should be identified through detailed topography, with strict developmental guidelines to prevent flooding of residences in the areas. Current County standards include developmental guidelines for depressions greater than about 10 feet deep.
- **Inadequate Retention Basin Design and Construction** – If individual property basins are not properly designed to provide adequate size in the proper location, runoff will escape from individual lots and accumulate in downstream areas.
- **Inadequate Roadway Drainage** – Streets and roadways will not drain properly where adjacent retention basin elevations are roughly similar to the roadway elevation. Inadequate roadway drainage also occurs where new development adjacent to the roadway is built on fill, causing drainage to be directed toward the roadway. The rerouted drainage is also trapped on the lower lying roadway by the fill, causing standing water conditions.
- **Adding Impervious Area to Property** – The addition of impervious area on lots, such as driveways and buildings, will cause additional runoff and potential for overtopping of retention basins and downstream flooding.
- **Lack of Retention Basin Maintenance** – The sandy soils of the Mesa are easily erodible and are carried into retention basins by storm water runoff. Over time, the basins fill with sediment and do not have sufficient capacity for retaining and infiltrating runoff.
- **Filled Retention Basins** – Some property owners, apparently unaware of the County requirement to retain drainage on-site, have deliberately filled the retention basins on their property. The runoff from these properties leaves the lot and accumulates in downstream areas.
- **Intentional Blocking of Drainage Paths** – Some property owners have blocked the drainage path across their property, causing standing water and flooding at the location of the blockage. The blockage can also cause runoff to be diverted onto other properties, causing flooding there.
- **Property Regrading** – Some property owners have regraded portions of their lots for building or landscaping purposes. In some cases, this action has caused runoff to pool in the lot due to the blockage of the previously existing flow path across the property.
- **Development in Low Lying Areas** – Development in the lowest elevation areas will receive excess runoff from the higher elevation areas in the basin. Flooding in these areas would be expected in a large storm event which overtops the individual lot basins.
- **Lack of Maintenance of Drainage Inlets –** The County currently maintains a drain inlet inspection and cleaning program. However, areas with numerous trees with leafy or other litter (e.g. Eucalyptus) are subject to drainage inlets becoming clogged during rainstorms due to the large amount of litter from the trees. This causes standing water and potential traffic hazards.

- **Poor Drainage Design and/or Improper Construction at Intersections** – A number of intersections retain small depths of standing water where street and gutter slopes are not sufficient to carry runoff away from the sites. Drain inlets are generally not provided at intersections unless a retention basin or ditch is available to accommodate the water from the site. In some areas, the drain inlets may be undersized or the configuration insufficient for the amount of flow that occurs at the location.

The problems reported in the questionnaires were categorized and mapped. The locations with noted flooding issues are shown on Figure 2. A listing of the type of drainage problem and the approximate street address is provided in Table 2. Some surveys included notification of more than one observed flooding location. Other surveys noted that the residents had not noticed any flooding at their residence, or included only questions regarding County drainage policies.

Table 2
Responses Received from the Community

Number of Responses	Location	Description
22	N. Las Flores near W. Tefft	Standing water causing street flooding greater than 1 foot
11	Pablo Lane near La Cumbre	Standing water causing street flooding greater than 1 foot
3	Waypoint Drive at Peggy Lee	Standing water causing street and area flooding between 6 inches and 1 foot
5	Osage Near Eucalyptus	Standing water causing street and area flooding greater than 1 foot
12	Tejas Pl. Near Osage	Standing water causing street flooding between 6 inches and 1 foot
	Hetrick Road	Standing water causing roadway flooding
4	Division North of Shiffrar	Standing water causing street flooding less than 6 inches
4	Corner of Mary and W. Tefft	Standing water causing street flooding less than 6 inches
3	W. Tefft and Mesa	Standing water causing street flooding
3	Division North of S. Las Flores	Standing water causing street flooding
1	Calle Fresa	Flow onto property from upstream causing standing water
1	Cannot Verify	Flooding
2	391 Pajaro Lane	Flow onto property from upstream causing standing water
1	200 Block Hazel Lane	Standing water causing street flooding between 6 inches and 1 foot
1	Hazel at Brier Rose	Standing water causing street flooding at intersection
2	Camino Caballo at Waypoint	Street Flooding
1	Camino Caballo at Westwind	Street Flooding
1	W. Tefft and S. Las Flores	Standing water causing street flooding less than 6 inches
1	300 Block Silva Place	Standing water at drain inlet
1	Silver Leaf Ct and Soares	Standing water at drain inlet
1	600 Block High Meadow Drive	Runoff from street to property with no curb and gutter
1	700 Block Ridge Road (711)	Runoff from street to property at driveway entrance
1	1400 Block W. Tefft (1407)	Flow onto property from upstream causing garage flooding
1	1500 Block Primavera (1581)	Runoff from street to property at driveway entrance
1	1000 Block La Seranata Wy (1068)	Possible blockage of drainage by downstream development
1	Teft and Hazel	Flooding
1	700 Block Camino Caballo (748)	Runoff from street to property causing backyard flooding
1	Orchard near W. Tefft (150)	Retention basin overflow
1	1400 Block La Quinta (1457, 1458)	Standing water at drain inlet

Number of Responses	Location	Description
2	Division at Jupiter	Standing water causing street flooding less than 6 inches
1	Humbolt and High Meadow	No flooding but concerned about basin location/capacity
1	Mary at Juniper	Standing water causing street flooding less than 6 inches
1	500 Block Amigo Pl (510)	Mudslide from neighbor's property
2	Story Street	Standing water causing street flooding less than 6 inches
1	S. Las Flores at La Loma	Flooding - no flood prone conditions observed
1	Grande Ave at Avenido De Amigos	Standing water in parking lot
1	Galaxy Avenue	Standing water at entrance to retention basin
1	Verano between Otono and Primavera	Standing water at entrance to retention basin
1	Alyssum Circle	Standing water from flow onto property from upstream area
2	Story Street	Standing water causing street flooding less than 6 inches
2	Orchard west of Range	Standing water causing street flooding less than 6 inches
2	Orchard east of Range	Standing water causing street flooding less than 6 inches
1	Pajaro and La Serena	Runoff from street to property causing flooding
1	600 Block Shiffrar Lane (610)	Runoff from street to property causing flooding
1	200 Block Calle del Sol	Flooding during heavy storms
1	1600 Block of Pomeroy (1678)	Standing water causing street flooding less than 6 inches
1	1000 Block Camino Codorniz (1045)	Slow draining basin - no flooding
1	1000 Block Mesa Road (1066)	Standing water causing unpaved road flooding and damage
1	900 Block Camino Caballo (919)	Standing water causing street flooding
1	800 Block Inga Road (839)	Runoff from street to property at driveway entrance
2	Hetrick at Glenhaven	Standing water causing street flooding
1	Division north of Mercury	Standing water causing street flooding less than 6 inches
2	600 Block Sandydale	No flooding - Road Damage
2	Pomeroy Road near Lyn Road	Standing water causing street flooding
1	700 Block of Southland	Standing water causing street flooding
1	La Camarilla Pl. and La Loma Dr	Standing water causing street flooding less than 6 inches
2	Frontage Road at Swap Meet	Standing water causing street flooding
1	1500 Block Las Padres Rd (1561)	Not clear - retention basin may fill to 3 feet
1	600 Block Camino Caballo (600, 606)	Standing water causing street flooding
1	1600 Block of Primavera (1685)	Runoff from street to property at driveway entrance

DRAINAGE AND FLOODING ANALYSIS AND SOLUTIONS

Based on the survey responses, over 60 individual flooding problem areas were identified within the Mesa study area. In this report, the ten flooding problem areas which received numerous complaints were selected for individual analysis and development of conceptual solutions and costs. Many of the other flooding problem areas could be resolved by using conceptual solutions similar to those shown in the ten flooding areas selected. The conceptual solutions were based on limited field information and elevation data. A predesign study of each of the conceptual solutions will be needed to determine actual elevations of the surrounding area and the validity of the solutions, as well as any other possible alternatives.

Decisions to proceed with predesign of improvements at these locations will be made by the County based on funding availability, public safety considerations, and neighborhood input.

Location 1 - N. Las Flores near W. Tefft (M1)

This flooding location was mentioned in over 20 different survey responses. Standing water on or along the roadway was observed after most rainfall occurrences. The observed flooding levels mentioned in the surveys ranged from a few inches to over a foot.

Standing water occurs in the roadway during and after a rainfall event due to the low roadway elevation in this area. A layout drawing of the roadway area is shown on Figure 3. The shoulder areas of the roadway are slightly lower, and water continues to pond on the shoulders after the roadway has cleared. Two large retention basins on private property are located on the north side of Las Flores Avenue at the flooding location; however, the elevation of the edge of the basins appears to be higher than the shoulder elevation. The infiltration capacity of the shoulder areas may be somewhat limited, since the ponding in the shoulder area remained evident for more than three days after rainfall had occurred.

The proposed solution for this area is to increase the road elevation along approximately 400 feet through the low lying area. The approximated boundaries of the increase in road grade elevation are shown on Figure 3. The estimated cost for this improvement is $116,000 as shown in **Table 3**. By providing a higher road elevation, surface runoff from the roadway will enter the adjacent yards or the retention basins along the north side of the road. The shoulder areas of the roadway should be reworked with higher infiltration capacity materials where possible. The increased road elevation can reduce the public safety risk that currently occurs when water ponds and floods the road at this location. Although no additional flooding risk to residences is expected, a more detailed study is necessary during any predesign work to verify this condition.

Other facilities that may be included are an additional retention basin near the corner of N. Las Flores and La Cumbre, or a drain from the area to retention basins in the lower elevation area near the intersection of La Cumbre and Pablo Lane. It may be possible to resolve the N. Las Flores and Pablo Lane flooding problems with a combined project, including a retention basin near Pablo Lane. These facilities would be necessary if the existing basins and the shoulder area and local topography do not have sufficient capacity for infiltration of the street runoff, or the increased road grade provides a risk of structure flooding. These issues will be considered during any predesign work.

Table 3: North Las Flores at W. Tefft (M1)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M1	Increase Road Grade	400	L.F.	$100	$40,000
M1	Rework Shoulder Areas	800	L.F.	$30	$24,000
				Subtotal	**$64,000**
	Engineering and Design			20 percent of subtotal	$13,000
	Administrative and Environmental			40 percent of subtotal	$16,000
	Contingency			20 percent of subtotal	$13,000
				Total	**$128,000**

Location 2 – Pablo Lane near La Cumbre Lane (M4)

This flooding location was mentioned in eleven different survey responses. Standing water on or along the roadway was observed after most rainfall occurrences. The observed flooding levels mentioned in the surveys ranged from a few inches to less than a foot.

Standing water occurs in the roadway during and after a rainfall event due to the low roadway elevation in this area. The standing water occurs in the shaded area shown on Figure 4. Runoff from areas north and east of the intersection of Pablo Lane and La Cumbre Lane flows through a culvert crossing Pablo Lane near 220 Pablo Lane. The runoff continues traveling westerly along Pablo Lane, passing 241 Pablo Lane and entering a narrow ditch on the west side of 241 Pablo Lane. The bottom elevation of the ditch appears to be just below the lowest roadway elevation, causing water to pool in the ditches in the area. Maintenance of the ditch between the residences is difficult, since motorized equipment access is not possible.

The proposed solution for this area is to increase the road elevation for about 400 feet through the low lying area. The estimated cost for this improvement is $147,000 as shown in **Table 4**. The driveway entrances at 220 Pablo Lane must be reconstructed with culvert crossings to provide entrances at the higher road grade elevation. The approximate length of increased roadway elevation is shown on Figure 4. By providing a higher road elevation, surface runoff from the roadway will enter the adjacent ditches and continue flowing toward the drain channel. The increased road elevation can reduce the public safety risk that currently occurs when water ponds and floods the road at this location. Although no additional flooding risk to residences is expected, a more detailed study is necessary during any predesign work to verify this condition.

The proposed increase in road grade elevation should not increase the flooding risk to the structures, since it is displacing only a small amount of water and is not creating a flow blockage condition. The existing culvert should be cleaned, and an additional culvert crossing Pablo Lane may be necessary to prevent the roadway from overtopping.

The construction of a new retention basin in this area would also reduce flooding risk. The potential site east of La Cumbre Lane has the lowest elevations and would have the least amount of excavation. The site south of Pablo Lane is slightly higher, but still useable. The site north of Pablo Lane would also be acceptable, but would require the most excavation. Construction of a retention basin at this intersection could be performed in combination with improvements along N. Las Flores, if additional retention basin capacity is necessary for that site.

Table 4: Pablo Lane near LaCumbre Lane (M4)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M4	Increase Road Grade	400	L.F.	$100	$40,000
M4	Driveway Culverts	4	each	$1,000	$4,000
M4	Roadway Culvert	1	each	$3,500	$4,000
M4	Retention Basin (excavation and disposal)	1	each	$15,000	$15,000
M4	Drainage Easement	900	SF	$10	$9,000
M4	Inlet Pipe	50	L.F.	$180	$9,000
M4	Hydroseeding	600	SF	$2	$1,000
				Subtotal	**$68,000**
	Engineering and Design			20 percent of subtotal	$16,000
	Administrative and Environmental			40 percent of subtotal	$33,000
	Contingency			20 percent of subtotal	$16,000
				Total	**$147,000**

Location 3 – Waypoint Drive and Peggy Lee Court (M8)

Standing water occurs at this intersection during rainfall events. The intersection has three nearby drain inlets to collect flow from the roadway for discharge into retention basins at individual residences. The retention basins are very shallow, and appear to be filled with sediment that has entered the basins during previous storm events. These basins should be dredged to remove the sediments and restore the retention and infiltration capacity of the basins. Other retention basins in the neighborhood should also be checked to ensure that they are functioning properly. A drain inlet along the east side of Waypoint Drive and north of Patty Kay Court appears to be blocked, causing runoff from upstream areas to be conveyed past the drain inlet to the Peggy Lee Court intersection. This will increase the flooding level at the intersection.

Location 4 – Osage Street near Eucalyptus Road (M12)

This location is a sumped area on Osage Street north of the intersection with Eucalyptus Road which collects all runoff from the surrounding area. This flooding location was mentioned in eleven different survey responses. Standing water on or along the roadway was observed after most rainfall occurrences. The flooding area is shown on Figure 5.

The roadway passes at grade through this low lying area, and standing water occurs in the roadway during and after a rainfall event. Standing water also occurs in the arena on the west side of the roadway. Two small retention basins are located on the east side of the roadway, but they appear to be filled by sediments that have entered the basin during previous storm events. One basin serves an individual residence and the other is a County maintained basin.

The proposed solution for this area is to increase the road elevation for about 400 feet through the low lying area. The adjacent basin should be dredged to remove the sediments and restore the retention and infiltration capacity. The approximate length of roadway to be raised is shown on Figure 5. The estimated cost for this improvement is $141,000 as shown in **Table 5**. By providing a higher road elevation, the roadway elevation will be above the standing water elevation in the area, which will minimize the hazardous road conditions during and after rainfall. To reduce runoff ponding on the west side of the roadway, a retention basin would be necessary at the low point in the arena, or a culvert could

be placed under the roadway connecting it to the existing retention basin. The increased road elevation can reduce the public safety risk that currently occurs when water ponds and floods the road at this location. Although no additional flooding risk to residences is expected, a more detailed study is necessary during any predesign work to verify this condition.

Since this location is the lowest elevation within a relatively large drainage area it will continue to flood during high rainfall periods. Development within this low lying sump area should consider potential for flooding during high rainfall periods.

Table 5: Osage Street near Eucalyptus Road (M12)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M12	Increase Road Grade	400	L.F.	$100	$40,000
M12	Driveway Culverts	2	each	$1,000	$2,000
M12	Roadway Culvert	1	each	$3,500	$4,000
M12	Retention Basin (excavation and disposal)	1	each	$15,000	$15,000
M12	Drop Inlet	1	each	$1,500	$2,000
M12	Drainage Easement	900	SF	$10	$9,000
M12	Inlet Pipe	25	L.F.	$180	$5,000
M12	Hydroseeding	600	SF	$2	$1,000
				Subtotal	**$78,000**
	Engineering and Design			20 percent of subtotal	$16,000
	Administrative and Environmental			40 percent of subtotal	$31,000
	Contingency			20 percent of subtotal	$16,000
				Total	**$141,000**

Location 5 – Tejas Place near Osage Street (M14)

This location is east of Osage Street on Tejas Place at a low area of the roadway between 425 and 445 Tejas Place. This flooding location was mentioned in twelve different survey responses. Standing water on or along the roadway was observed after all rainfall occurrences. The flooding area is shown on Figure 6.

The flooding at this location is due to the blockage of the flow path from the roadway by residents at 425 and 445 Tejas Place. The runoff from the roadway along this section of Tejas Place originally drained off the road near the boundary of these two properties and flowed along either or both properties to the low lying land behind the properties. The type of drainage diversion provided from the roadway in the original construction was not known. Currently, the original flow path from the roadway is blocked by a concrete curb barrier and sandbags during flow events, causing roadway runoff to pool at the drain outlet location.

The elevation of the roadway curbside drain on the edge of the 445 property has been raised, presumably by the property owner. This ponding occurs during every rainfall, since the roadway runoff cannot leave the pavement until it has reached the curb overflow elevation. This pooled runoff leaves the roadway by first entering the driveway of the 425 property. The 425 property boundary elevation has been built up by a retaining wall along the property edge, and runoff that currently enters the driveway will cause flooding risk to the garage instead of flowing off the property as had occurred in the past. Sandbags placed at the

curbside of the residences for flood protection create an increased ponding depth and greater traffic hazard, since the overflow level for the water from the street is higher.

The raising of the curbside drain has caused a significant traffic and pedestrian hazard due to the roadway flooding, but has not significantly reduced downstream flooding. The flood flow that exceeds the pool elevation, as would occur during large rainfalls, will continue along the original flow path. Since the volume of the pool is relatively small, it would create a negligible increase in downstream flooding levels if it were released during these large events. The current condition prevents water from leaving the pavement only during small storms, which would not be considered to cause downstream flooding problems.

The proposed solution for this flooding area is to remove the curbside blockage to allow water to freely drain from the pavement at the low point. A retention basin could be placed on one of the properties to retain and infiltrate the water leaving the roadway. The estimated cost for this improvement is $44,000 as shown in **Table 6**. The residences located within the watershed drainage area of this discharge should also be checked to ensure that retention basins on each property are sized to current County standards.

Table 6: Tejas Place near Osage Street (M14)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M14	Drop Inlet	1	each	$1,500	$2,000
M14	Install Sidewalk and Drain to Retention Basin	1	each	$2,000	$2,000
M14	Drainage Easement	400	SF	$10	$4,000
M14	Hydroseeding	400	SF	$2	$1,000
M14	Construct Retention Basin	1	each	$15,000	$15,000
				Subtotal	$24,000
	Engineering and Design			20 percent of subtotal	$5,000
	Administrative and Environmental			40 percent of subtotal	$10,000
	Contingency			20 percent of subtotal	$5,000
				Total	**$44,000**

Location 6 – Hetrick Road near Glenhaven Place (M59)

Flooding typically occurs at the sharp curve in the roadway at the Hetrick Road and Glenhaven Place intersection. Runoff from areas northerly and easterly of this area tend to concentrate at this location, since it is located within a natural swale from that area. County road maintenance forces have cleared and graded the shoulder areas of the roadway to create lower areas along the shoulder for the water to pool and infiltrate.

If the flooding problems continue, a retention basin may be necessary to drain the standing water from the roadway. Development in areas to the north and east within the upstream drainage area must maintain runoff onsite to prevent additional flooding of this area.

Location 7 – Division Street north of Shiffrar Lane (M23)

This street area is typically flooded during and after rain events and flooded signs are posted in the area warning of the traffic hazard. A drain inlet is located along a curb and gutter system on the west side of Division Street in this area. However, the curb, gutter and drain inlet are located in an unpaved area away

from the pavement. The outlet for this drain system was not found and may not be present if the drain inlet was constructed in anticipation of future retention basin construction.

The drain inlet should be inspected to determine whether an outlet exists or is plugged. If no outlet exists, a retention basin could be constructed to collect roadway runoff for infiltration. The estimated cost for this improvement is $87,000 as shown in **Table 7**.

Table 7: Division Street North of Shiffrar Lane (M23)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M23	Install Sidewalk	1	each	$2,000	$2,000
M23	Storm Drain to Retention Basin	150	LF	$180	$27,000
M23	Drainage Easement	400	SF	$10	$4,000
M23	Construct Retention Basin	1	each	$15,000	$15,000
				Subtotal	$48,000
	Engineering and Design			20 percent of subtotal	$10,000
	Administrative and Environmental			40 percent of subtotal	$19,000
	Contingency			20 percent of subtotal	10,000
				Total	**$87,000**

Location 8 – Corner of Mary Avenue and W. Tefft (M30)

Standing water has occurred in the roadway intersection of Mary Avenue and W. Tefft Street during and after a rainfall event in past years, creating a traffic hazard at this intersection. Field investigation revealed that drain inlets were recently installed near the corner locations, but a drain outlet and retention basin was not found. The Department of Public Works will investigate to ensure that appropriate drainage facilities were installed in conjunction with recent commercial development. No project is proposed for this location.

Location 9 – W. Tefft near Mesa Road (M37)

Various surveys identified flooding in the area near W. Tefft and Mesa Road; however, the location and type of flooding were not listed. The potential flooding location was difficult to verify, but was assumed to occur in the low lying area on W. Tefft between Mesa Road and Hazel Lane. The surface runoff from the roadway collects at drain inlets along each side of the roadway at the bottom of the hill. These drain inlets discharge into a nearby retention basin on the east side of W. Tefft.

The flooding in this area may be due to the size and locations of the drain inlets. The runoff flow rate may exceed the drain inlet capacity during high intensity rainfall conditions. Partial blockage of the drain inlets could create additional flooding. The flooding could create a hazardous traffic condition due to the high speeds of vehicles traveling down the hills on either side into the ponding area.

The proposed solution for this area is to construct an additional drain inlet on each side of the roadway near the existing drain inlet. The discharge from the drain inlet would be connected to the existing storm drain for discharge into the existing retention basin. The estimated cost for this improvement is $36,000 as shown in **Table 8**. The storm drain pipeline to the retention basin should be checked for partial blockages during predesign studies.

Table 8: West Tefft near Mesa Road (M37)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M37	Drop Inlet	2	each	$10,000	$20,000
				Subtotal	$20,000
	Engineering and Design			20 percent of subtotal	$4,000
	Administrative and Environmental			40 percent of subtotal	$8,000
	Contingency			20 percent of subtotal	$4,000
				Total	**$36,000**

Location 10 – Division Street north of S. Las Flores (M61)

The Division Street roadway area south of Shiffrar drains to the south toward the intersection of S. Las Flores. The grade elevation near the intersection rises, and causes ponding along the roadway surface in areas north of the intersection.

The proposed solution for this area is to provide a drain inlet on either side of the road at the low point. A drain pipeline should be constructed to the adjacent homeowner retention basin on the west side of Division Street. The estimated cost for this improvement is $44,000 as shown in **Table 9**. An alternative solution would include raising the road grade to convey the ponded water in a southerly direction along Division to the intersection with S. Las Flores. This solution could cause flooding downstream unless a retention basin is constructed along the edge of the roadway near the intersection to collect and infiltrate the roadway runoff.

Table 9: Division Street north of S. Las Flores (M61)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M61	Drop Inlet	2	each	$8,000	$16,000
M61	Basin Modifications	1	each	$4,000	$8,000
M61	Roadway Culvert	1	each	$4,000	$4,000
				Subtotal	$24,000
	Engineering and Design			20 percent of subtotal	$5,000
	Administrative and Environmental			40 percent of subtotal	$10,000
	Contingency			20 percent of subtotal	$5,000
				Total	**$44,000**

Location 11 – Erosion Area south of Calle Del Sol and La Cumbre (M53)

Erosion has occurred on the bluff just south of La Cumbre Lane and Calle del Sol, due to overflow of the existing storm water retention and infiltration basins located there. An aging outlet pipeline and percolation pipeline drains the series of two detention basins near the top of the bluff, wrapping around the top of the hillside. This pipeline was constructed by the County and collects runoff from County right-of-way. The basin size is not sufficient to contain large storm events. South County Planning Area Standards require that developments in areas that are found to potentially drain to the edge of the bluff shall be designed so that runoff from a 100-year storm would be accommodated. Currently, the basin overflow is concentrated on the steep sandy bluff, and has caused severe erosion on private property. The

County has provided a temporary remedial work by reseeding and covering the existing erosion area to prevent further erosion. The overflow pipeline should be carried down the hill to the base of the bluff, where an energy dissipater can be constructed and storm water may be discharged into the agricultural ditch system. The pipe should be anchored on the surface using standard Caltrans designs. If the property owner requires a subsurface pipeline, then the additional cost to bury the pipe should be borne by the landowner.

The estimated cost for an on grade pipeline is $225,000 as shown in **Table 10**.

Table 10: Erosion Area South of Calle Del Sol and La Cumbre Lane (M53)

PROJECT	ITEM	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($)
M53	Pipeline with Concrete Footings	600	LF	$150	$90,000
M53	Energy Dissipator	1	each	$10,000	$10,000
M53	Entrance Structure	1	each	$25,000	$25,000
				Subtotal	$125,000
	Engineering and Design			20 percent of subtotal	$25,000
	Administrative and Environmental			40 percent of subtotal	$50,000
	Contingency			20 percent of subtotal	$25,000
				Total	**$225,000**

SUGGESTED MODIFICATIONS TO EXISTING POLICIES

A number of suggested modifications to existing policies and procedures have been identified to prevent the aggravation of existing drainage problems or creation of new flood prone areas. These policies range from improving current development review processes to changing existing maintenance procedures within the Nipomo Urban Area. The proposed policy modifications are divided into two different types:

- Prevention – Improving the Development Review and Permitting processes
- Enforcement – Providing ordinances or measures to ensure drainage improvements are not changed from the permitted condition and to ensure Ensuring the proper operation and upkeep of existing and future system improvements.

Flood Hazard Prevention

Three policies were identified to improve current development review processes to ensure that potential drainage impacts are considered.

1) Development plans should be required to provide additional information on existing drainage routes with grading plan submittal. Plans should identify where drainage routes currently exist and identify changes proposed in drainage due to site development.

This information would allow County planning review staff to identify whether the property currently experiences flooding or would be likely to receive flood water from upstream sources. In many of the infill areas of the Nipomo Mesa, the remaining areas to be developed are located in the lowest sump areas of the neighborhood. These areas may also receive roadway runoff onto their property, and the infiltration of this runoff must also be accommodated on the property.

2) Modify existing County standards for undrained depressions to include many of the smaller localized sump areas to reduce structure flooding risk.

The existing South County Planning Area standards include requirements that new land division located in the vicinity of identified undrained depressions shall designate building sites above the spill elevation of the depression or locate building sites out of areas subject to flooding. Five depression areas were identified within or near the Nipomo Urban Area including:

- Pablo Lane
- Intersection of N. Las Flores and Osage Road
- Intersection of Mesa Road and Osage Road
- Southwest of intersection of Camino Caballo and Waypoint Drive
- North of intersection of Pomeroy Drive and Waypoint Road

These five sites generally have differences in elevation of over ten feet between the bottom of the depression and the spill elevation. The Pablo Lane depression area is currently developed, and the depression at the intersection of Mesa Road and Osage Road has been converted to a retention basin. The other three depression areas are currently undeveloped.

Although these five depression sites are included under the planning area standards, many of the smaller undrained sump areas that have experienced flooding are not included. These localized sump areas have differences in elevation between the sump bottom and spill elevation ranging between a few feet and ten feet and occur in numerous places throughout the Mesa. These sumps currently receive the local area runoff, as well as overflow water from retention basins during large storm events. A topographic survey should be performed to determine where the sump areas exist, and the current drainage area associated with them. Some areas of the Nipomo Mesa have available existing topography; however, topographic information for the Nipomo Urban Area is not available for areas south of Pomeroy between Osage and La Loma, and for all Urban Area along the bluff edge. The topographic survey information would also provide assessment of parcels which should be used for regional retention, similar to the basin constructed at the intersection of Mesa Road and Osage Road.

The development or infill of any land within the lowest elevations of the localized sump area should account for possible drainage from upstream areas during large storm events, in addition to local runoff from the impervious area created on the developed lot. Infill development of all land within the sumped area watershed should consider the potential for retention basin overtopping and impact to flooding in the lowest portions of the sumped area.

3) To address drainage issues, a separate approval check by the Department of Public Works or the District should be incorporated into the approval process for final development plans.

The identification of site specific problems would be more effective if allocated to Department of Public Works or the District, since the Planning Department has no means to enforce local Drainage Standards and Policies and may not be aware of the details regarding specific drainage issues that have been observed or reported. Under the current system, the Department of Public Works receives many of the complaints from County residents during flooding situations. Public Works in turn informs the planning department of these problem areas and potential enforcement issues. However, the issues may not be fully communicated during this process, and problems or enforcement actions may be missed. Public Works or the District should also have the ability to mandate and follow up on specific drainage system requirements on new building permits.

Enforcement of Permitted Design Conditions and Maintenance

Enforcement of permitted design conditions at existing private drainage infrastructure would ease some drainage problems. The present County policies prescribe little or no action against residents that have filled their basins or plugged basin entrances, or those residents that do not maintain ditches and culverts on their property.

1) Require basin inspections and upgrades to meet current drainage standards during transfer of ownership in residential property sales.

Use property transfer during sale to require inspection and verification of drainage basin size on each property site. All properties which are not served by a regional system could require drainage basins be constructed as a requirement of sale. Retention basins that have not been maintained, or have been intentionally filled with sediment, would be dredged to meet the current basin size based on the existing impervious area.

2) Provide the County or District more enforcement abilities concerning permitted design drainage issues.

A new County ordinance should be considered that gives the County or District authority to require that residences maintain their permitted drainage infrastructure as designed and approved. Similar to the basis for establishing fire prevention codes, the values and general welfare of a community are founded upon the appearance and maintenance of property. A drainage ordinance should be enacted in order to avoid the deterioration of drainage infrastructure. No drainage facility should be allowed to deteriorate to such a condition that could create a flooding hazard to neighboring properties. If home owners fail to fulfill their responsibilities, then after sufficient notice, the ordinance should give the County or District the power to enter the property and complete this maintenance. A fee should be levied for the service if the landowner fails to perform the required maintenance.

The County or District should have the authority to issue abatement orders when property owners fail to maintain their facilities. Under the existing policies, the only means of enforcement consists of a lengthy legal process. To ease inspection and access to the basins, drainage basins could be required to be visible and accessible from the street when the topography allows.

CONCLUSION

The Mesa's flooding and drainage problems reported by residents are primarily due to standing water along County roadways, although some reports of runoff from the roadway on private property were made. The standing water appears to be the result of the undulating terrain of the Mesa, lack of maintenance of the existing drainage infrastructure, and development grading which blocks previously existing runoff flow paths. The Mesa topography is characterized by the underlying sand dune deposits which create an undulating topography with numerous depressions, including low spots having no outflow drainage paths. This leads to a high incidence of localized ponding. To prevent the ponding, the current drainage infrastructure is primarily based on individual parcel runoff retention and infiltration, which prevents runoff from leaving each developed site. However, the gradual loss of individual basin retention capacity over time has increased basin overflow frequency and runoff from the individual sites. Current County Drainage Policies and Standards lack enforcement provisions to ensure that the drainage and infiltration infrastructure is maintained. In some areas, the regrading of land during development cause previously existing flow paths to become blocked, causing ponding in areas which had previously been drained.

Flooding and drainage problems in Flood Control Zone 16 tracts maintained by the County were generally limited to standing water caused by blocked drain inlets. These areas include curb and gutters, drain inlets, underground drain piping and regional retention basins to collect and infiltrate storm water runoff. Most of the identified flooding problems were located in the areas served by individual residence retention basins and are outside of Flood Control Zone 16.

Conceptual solutions to reduce standing water impacts were developed for the flooding areas that have received the greatest number of comments. The conceptual solutions were based on limited field information and elevation data. A predesign study of each of the conceptual solutions will be needed to determine actual elevations of the surrounding area and the validity of the solutions, as well as any other possible alternatives. Decisions to proceed with predesign of improvements at these locations will be made by the community, with assistance from the County, based on funding availability, public safety considerations, and neighborhood input.

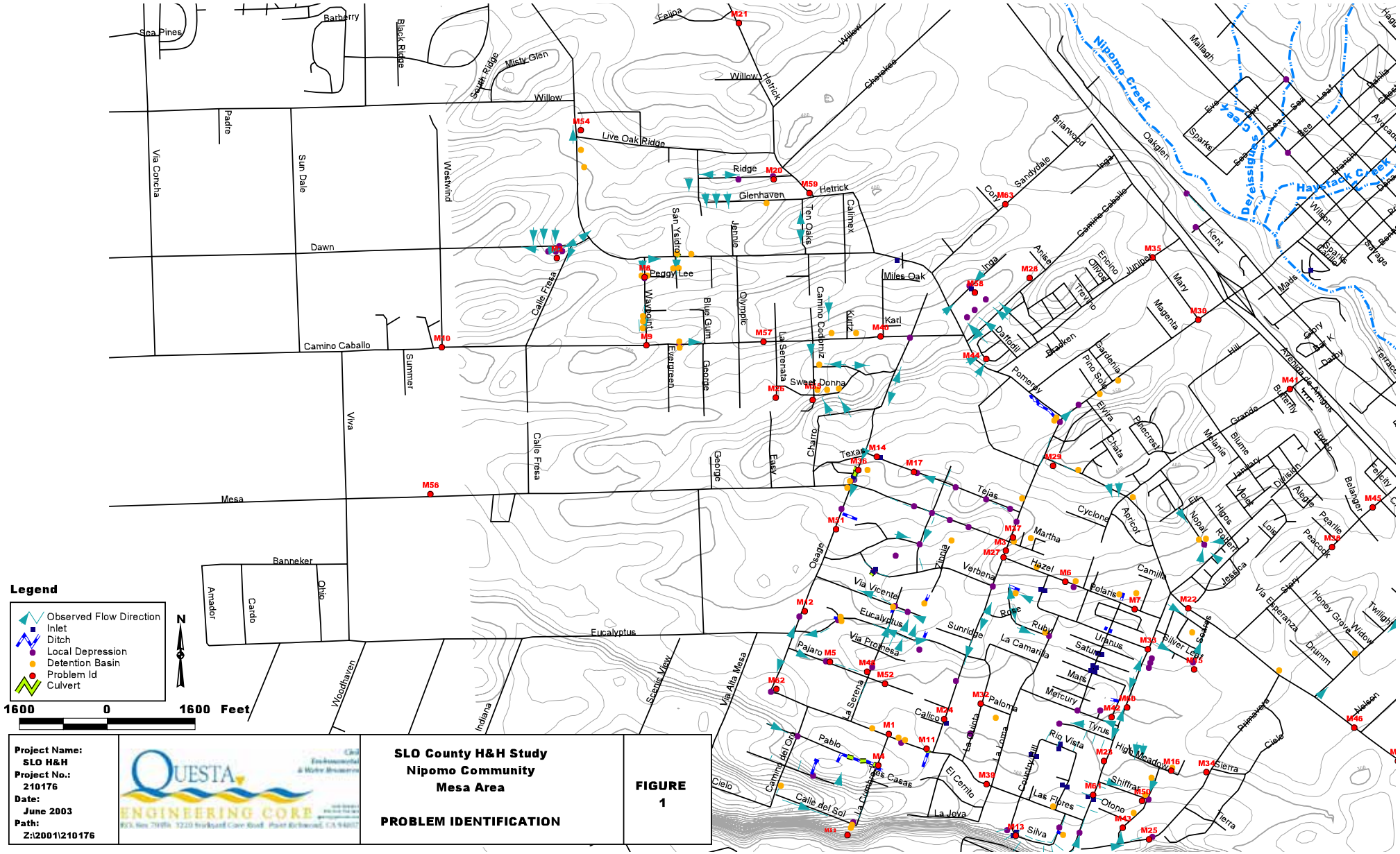
Modifications to existing County planning standards and policies are also recommended to reduce risk of flooding for residences developed in low lying areas, and to provide the County with greater enforcement capabilities regarding maintenance of individual homeowner retention basins. County Drainage Standards and Policies specify the responsibility of onsite runoff management as belonging to residents; however, no specific sanctions and no consistent procedure are available to enforce maintenance of local facilities. County policies should be updated to provide the Department of Public Works with review and approval capabilities regarding drainage infrastructure for development, and more enforcement abilities to ensure basins are maintained by the individual homeowner. Retention basin inspections and upgrades to meet current drainage standards could also be required during transfer of property ownership to ensure that basin sizes reflect the current amount of impervious area on the lot.

REFERENCES

Dept of Water Resources, Southern District; Water Resources of the Arroyo Grande, Nipomo Mesa Areas; 2002.

The Morro Group; The Final Environmental Impact Report - South County Area Plan Inland Portion, May 1991.

U.S. Dept. of Agriculture, Soil Conservation Service; Soil Survey of San Luis Obispo County, California - Coastal Part;1984



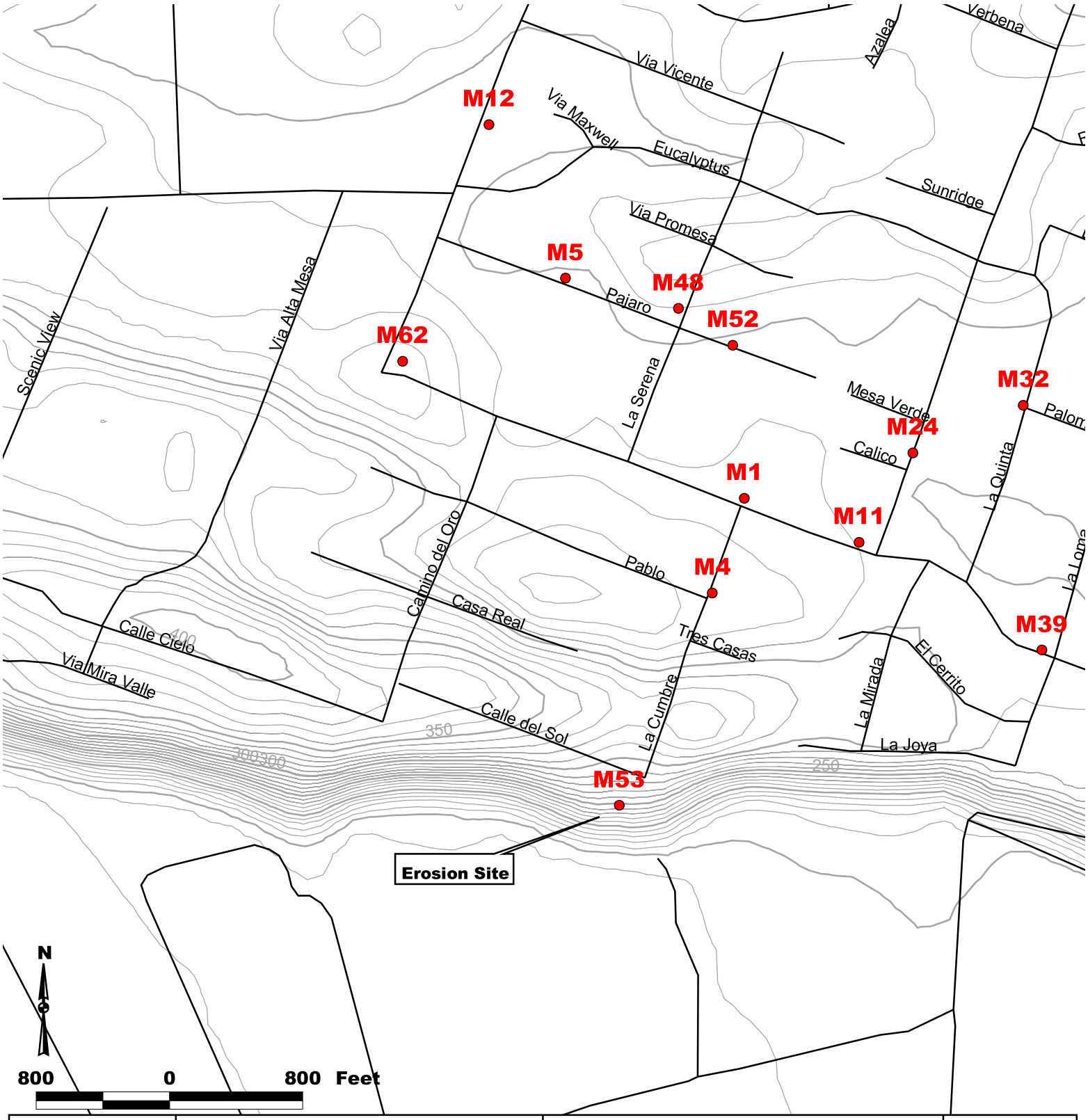
Project Name: SLO H&H
Project No.: 210176
Date: June 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP

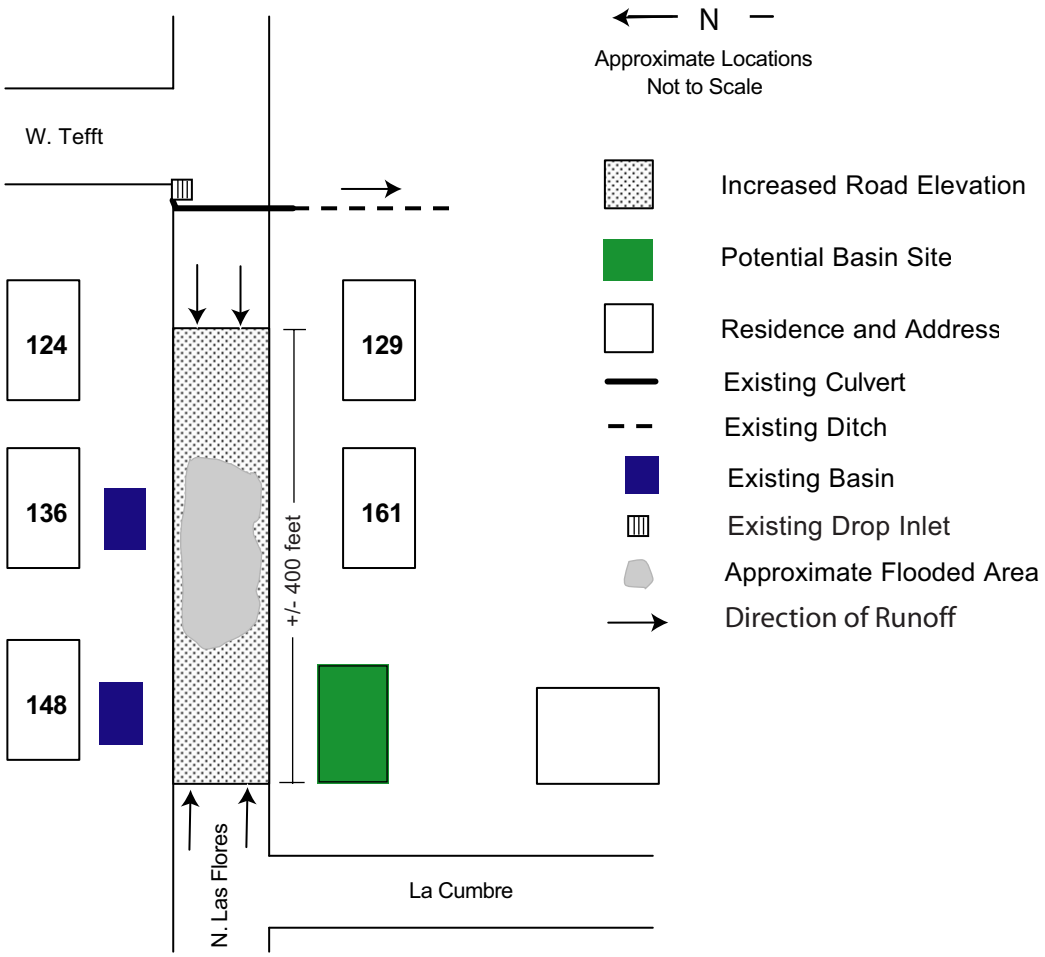
SLO County H&H Study
Nipomo Community
Mesa Area

PROBLEM IDENTIFICATION

FIGURE 1



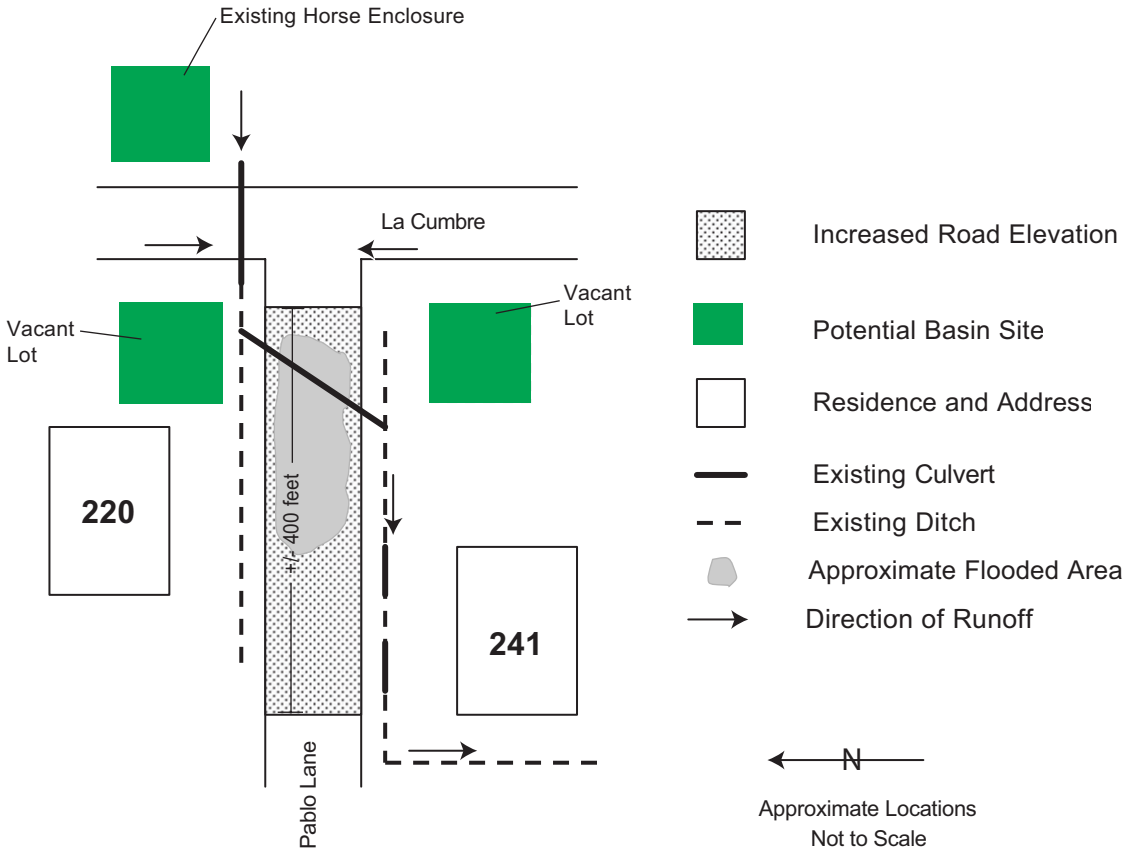
Project Name: SLO H&H **Project No.:** 210176 **Date:** June 2003 **Path:** Z:\2001\210176	QUESTA ENGINEERING CORP Civil, Environmental & Water Resources P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807	**SLO County H&H Study** **Nipomo Community** **EROSION PROBLEM (ID M53) SITEMAP**	**FIGURE 2**



Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 1 Schematic
N. Las Flores near W. Tefft Flooding

Appendix A

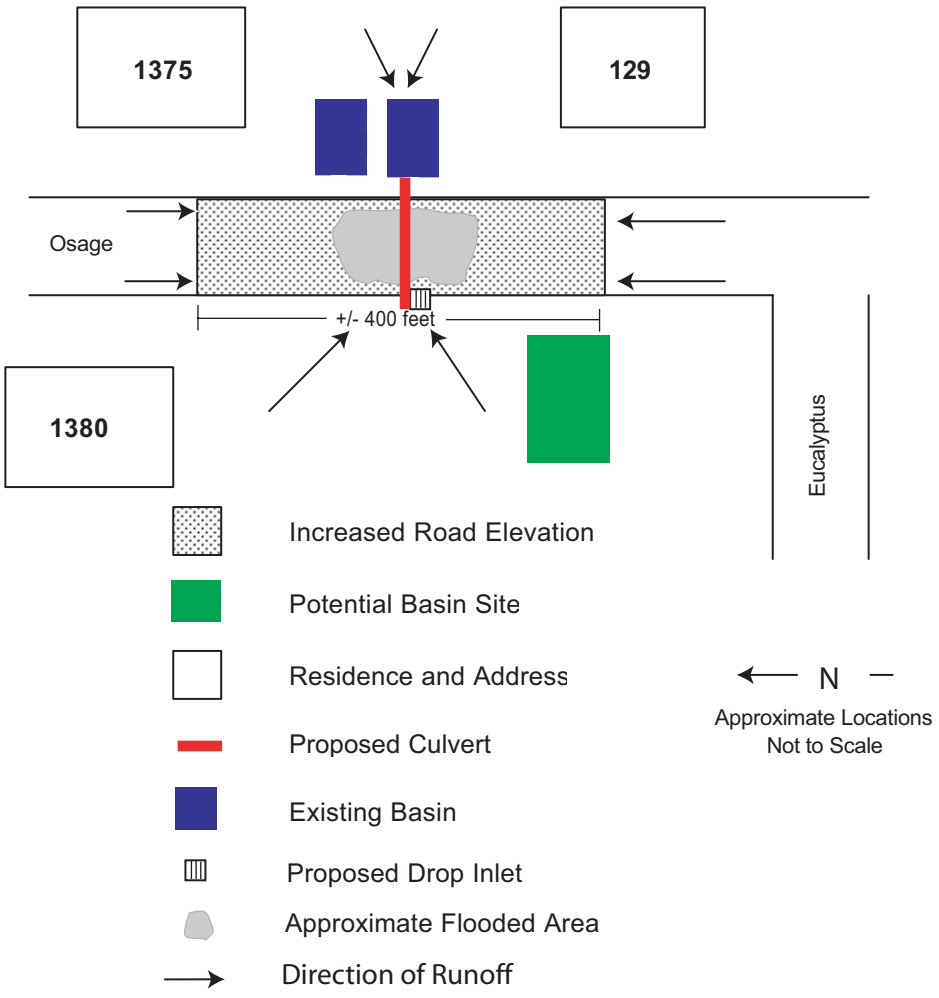
Figure 3



Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 2 Schematic
Pablo Lane and La Cumbre

Appendix A

Figure 4

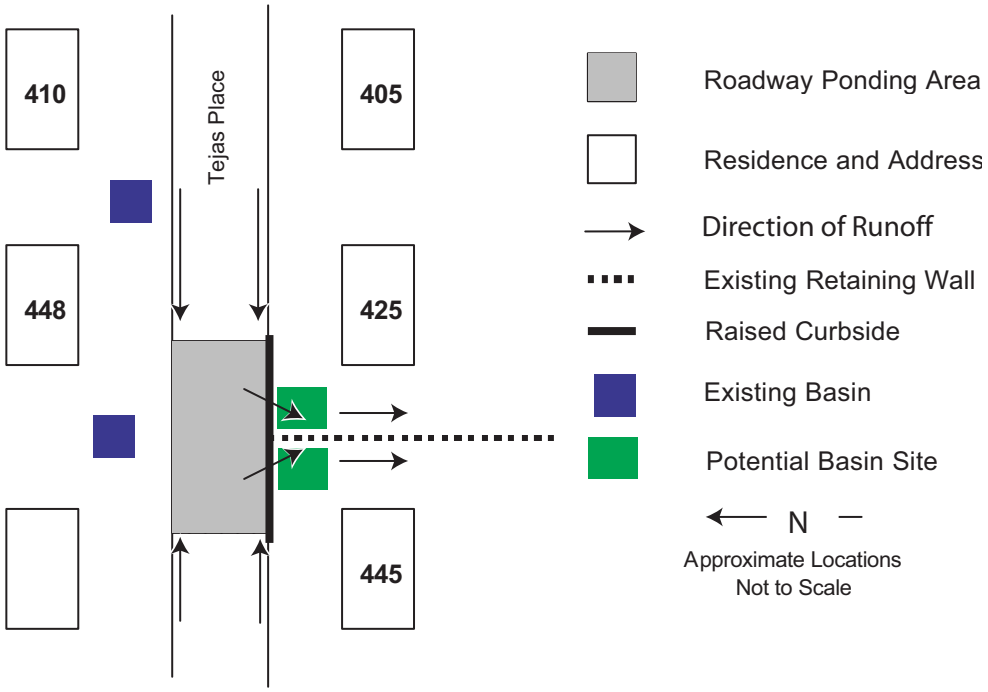


Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 4 Schematic
Osage Street near Eucalyptus Road

Appendix A

Figure 5

Raines, Melton and Carella, Inc.



Nipomo Mesa
Drainage and Flood Control Study
Proposed Project 5 Schematic
Tejas Place

Appendix A

Figure 6

Appendix F

ENGINEERING TECHNICAL MEMORANDUM OLDE TOWNE

APPENDIX F
OLDE TOWNE
ENGINEERING TECHNICAL MEMORANDUM

Technical Memorandum

San Luis Obispo County Flood Control and Water Conservation District

Subject:	Community of Nipomo, Mesa Drainage and Flood Control Study
Prepared For:	Dean Benedix, San Luis Obispo County
Prepared By:	Jeff Lewandowski, P.E., D. Eng. (First draft of TM was prepared by Questa Engineering Corporation)
Reviewed By:	Jose Gutierrez, P.E.
Date:	December 17, 2003
Reference:	**034.05.03**

EXECUTIVE SUMMARY

This report summarizes the existing drainage conditions, discusses the nature of drainage/flooding problems, and identifies potential projects to mitigate the problems within the Nipomo Community.

The Nipomo Creek channel and three tributaries intersect in the downtown area of Nipomo known as Olde Towne. A significant portion of Olde Towne along East Tefft Street between Oak Glen Avenue and Beechnut Street lie within the 100-year floodplain of Nipomo Creek and its tributaries. Drainage problems identified in the Olde Towne area include:

- Culverts within public right of way do not meet minimum County standard
- Urban dumping of garbage in channels
- Sediment and debris in culverts and creek beds
- Heavily vegetated channels and ditches
- Building encroachment on creek channels

Many of the homes in Olde Towne are built on grade, and those located in local low spots or sump areas experience flooding. Although County standards specify provisions for onsite capture and infiltration of drainage from residences there are numerous homes in local depressions with low foundations.

Olde Towne area creeks and tributaries are located almost entirely on private property and are not maintained by the County. Individual property owners are responsible for maintenance of the channel on their property. Residents are liable for problems caused by urban dumping in creeks on their property and any creek encroachment that causes flooding. The County is responsible for culverts and channels within the public right of way. These structures generally include culverts, bridges and some roadside ditches. Awareness of local creek issues should be raised to encourage better habits and creek management by the property owners.

The Olde Towne portion of this technical memorandum focuses on documenting existing drainage facilities and problem areas, and proposing solutions to reduce potential for flooding. Solutions generally include clearing and upgrading roadside drainage facilities and culverts to meet existing County design standards. Realignment of drainage channels from private property to the public right of way is an alternative that can be utilized if desired and funded by the property owners. Additional flood control

facilities, such as detention basins, could be constructed to reduce the downstream flooding risk. The neighborhoods that receive the increased protection would fund these improvements by formation of a special assessment district.

INTRODUCTION

Olde Towne

The purpose of the drainage and flood control study is to examine the existing drainage conditions in the Olde Towne area of the Nipomo Urban Area. This study identifies problematic areas and issues, provides a discussion of the methodology used to evaluate drainage problems, and presents conceptual solutions to the identified drainage and flood control problems,. The analysis is based on:

- Review of available drainage reports for the Nipomo Community
- Review of Community Drainage and Flood Control Study Questionnaires
- Coordination with San Luis Obispo County Planning and Public Works Departments
- Review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs)
- Field mapping and project alternative development conducted by RMC and Questa Engineering Corporation

The Olde Towne section of the Nipomo Urban Area extends east of Highway 101 to Haggerty Road and from Eve Street on the north to Southland on the south. For the purposes of this study, Route 101 separates the Mesa and Olde Towne areas.

ENVIRONMENTAL SETTING

Climate and Topography

The community of Nipomo is situated in the southern half of San Luis Obispo County within the Coast Range Geomorphic Province of California. The Coast Range Geomorphic Province is characterized by a series of northwest-trending valleys and mountain ridges that run parallel to the coast.

Olde Towne, the urban portion of Nipomo, is located in Nipomo Valley, runs parallel to the Temettate Ridge, and drains into Nipomo Creek. Olde Towne is relatively flat, ranging in elevation from approximately 310 to 360 feet.

The climate of Nipomo is mild with an average annual precipitation of approximately 16 inches. Average high temperatures reach 80 degrees and lows, 42 degrees.

Surface Geology and Soils

Geology and soil characteristics have a significant influence on local drainage patterns. Soil composition in Olde Towne is dominated by Cropley clay and includes Zaca clay on the eastern edge, Diablo and Cibo clay towards the west, and Marimel silty clay loam and Oceano sand in the southwest area that contains Nipomo Creek.

The relevant characteristics of Nipomo soils are listed in **Table 1**.

Table 1
Relevant Characteristics of Olde Towne Soils

ID	Soil Series	Texture	Runoff Characteristics	Permeability
128	Cropley	clay	slow or medium	slow
130	Diablo and Cibo	clay	medium	slow
170	Marimel	silty clay loam	slow	moderately slow
224	Zaca - 9 to 15% slopes	clay	medium	slow

Source: U.S. Dept. of Agriculture, Soil Conservation Service, 1984. Soil Survey of San Luis Obispo County, California - Coastal Part.

Olde Towne Surface Hydrology

The surface hydrology in Olde Towne is dominated by Nipomo Creek and three of its major tributaries shown on Figure 1. Olde Towne occupies gently sloping terrain dipping in the southwest direction at approximately 1.3% towards Nipomo Creek. Nipomo Creek drains more than 11 square miles before leaving the Olde Towne area and continuing southeast. The creek runs parallel to Highway 101 though Olde Towne. Deleissigues Creek, Haystack Creek, and an unnamed tributary converge with Nipomo Creek near Tefft Street, one of arterial streets in Nipomo. Deleissigues Creek and the North and South Forks of Haystack Creek originate in the Temettate Ridge and drain westward through Olde Towne to their confluence with Nipomo Creek. Drainage facilities throughout the area consist mainly of open channels and ditches, with culverts and bridges at road crossings. A new underground storm drain was completed along East Tefft Street in 2003.

The watershed land conditions include mountains, foothills, agricultural land, and urban land. During large rainfall events, flow overtops the banks of Nipomo Creek and Haystack Creek, inundating large portions of the commercial area. In some locations, overgrown vegetation and encroachment by homeowners has occurred on the floodplains. In areas north of Tefft and west of Thompson, the channels and culverts have less flow capacity than the culverts crossing Thompson. This causes flooding and flow attenuation in the residential areas east of Mallagh Street.

Constrictions caused by sediment settlement and debris clogging of culverts and bridge crossings add to flooding problems in Olde Towne. The steep topography in the upper watersheds creates sufficient velocity to erode the natural channels and carry sediment and debris within the flow. The flatter slopes within the Olde Towne area cause reduced velocity and a greater tendency to allow deposition of the sediment accumulated from the agricultural land just upstream and northeast of Olde Towne.

FEMA Flood Zones

Portions of the Nipomo Urban Area lie within the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) flood hazard zones for the 100- and 500- flood condition. The flood hazard zones within the Olde Towne area are shown on Figure 2. Drainage areas and flows developed for the FEMA Flood Insurance Study (FIS) for the area are listed in Table 2.

Table 2
Estimated Peak Flows for Creek Locations in Olde Towne Nipomo (FEMA)

Creek	Location	Drainage Area (sq mi)	10-year Flow (cfs)	50-year Flow (cfs)	100-year Flow (cfs)	500-year Flow (cfs)
Haystack Creek [(1)]	Confluence with Nipomo Creek	3.3	440	1,400	2,000	4,400
South Fork Haystack Creek[(1)]	Confluence with Haystack Creek	1.4	225	730	1,100	2,300
Nipomo Creek	Tefft Road	10.5	1,290	4,100	5,900	12,800
Deleissigues Creek[(2)]	Confluence with Nipomo Creek	2.5	330	1,000	1,500	3,300

(1) Haystack Creek was entitled "Tefft Road Tributary" in FEMA FIS. The South Fork of Haystack Creek was entitled "Tefft Road Tributary East Fork" in the same FIS.
(2) Deleissigues Creek listing in FIS Summary of Discharges indicates confluence with Corbit Canyon Creek, but flood profiles show confluence with Nipomo Creek. Confluence with Nipomo Creek is assumed.

METHODOLOGY AND APPROACH

Flooding and drainage problems were identified using County flood study questionnaires, reports and studies provided by the County, contour data from a 10 feet interval digital elevation model, contour data from a 5 feet interval County topography maps of some areas, and observations of drainage patterns made during site visits to the area.

The mapping and cataloging of flooding sites reported via survey was the first step in evaluating drainage issues on the Mesa. These sites were inspected during a field visit to determine potential causes of flooding. Each site was also inspected by County maintenance forces to determine whether increased maintenance would prevent or reduce flooding. Each flooding site was categorized, and potential solutions to reduce the impacts of flooding were developed for sites most often identified in the surveys.

Suggested revisions to the Local Drainage Standards and Policies were identified to reduce the potential for obstruction of creek channels by urban dumping and stream channel encroachment. Many of the Olde Towne drainage issues are a result of the ineffectiveness of the existing policies.

The drainage area that includes the Olde Towne area was divided into five tributary watersheds shown in Figure 1. The five watersheds included:

- Nipomo Creek upstream of Tefft
- Deleissigues Creek, including an unnamed Tributary 1
- Unnamed Tributary 2 (Denoted Hermrick Creek in recent Land Conservancy Study)
- Haystack Creek including the North and South Forks of Haystack Creek
- Knotts Street Ditch

The design storm recurrence interval for creek improvements listed in the SLO County design standards vary from 10 years to 100 years. Three separate categories of waterways are defined in the standards and are based on watershed size. The design standards for each of categories are listed in Table 3.

Table 3
San Luis Obispo County Waterway Design Standards

Waterway Designation	Watershed Area	Design Recurrence Interval and Freeboard
Major	Over 4 square miles	100-year event with freeboard
Secondary	Between 1 and 4 square miles	25-year event with freeboard and 50-year event with no freeboard
Minor	Less than 1 square mile	10-year event with freeboard and 25-year event with no freeboard

The waterway designations for the creeks in the Olde Towne area are listed on Table 4. Nipomo Creek is the only major waterway in the Olde Towne area.

Table 4
Creek Designations in Olde Towne Nipomo

Creek	Location	Designation
Nipomo Creek	Tefft Road	Major
Deleissigues Creek	Confluence with Nipomo Creek	Secondary
Tributary 1 to Deleissigues Creek	Confluence with Deleissigues Creek	Minor
Hermrick Creek	Confluence with Nipomo Creek	Minor
North Fork Haystack Creek	Confluence with South Fork Haystack Creek	Secondary
South Fork Haystack Creek	Confluence with North Fork Haystack Creek	Secondary
Haystack Creek	Confluence with Nipomo Creek	Secondary
Knotts Street Ditch	Confluence with Nipomo Creek	Minor

Estimated FEMA flow rates at various return periods were available for the larger creeks, including:

- Haystack Creek at Nipomo Creek,
- South Fork Haystack at its confluence with Haystack Creek,
- Nipomo Creek at its Tefft Street crossing,
- Deleissigues Creek at the Nipomo Creek confluence

To obtain approximate flows for the North Fork of Haystack Creek, flows were estimated to be proportional to those of the South Fork of Haystack Creek, since the watersheds are similar in shape and length. The ratio of the watershed areas was applied to the South Fork flow rate to obtain the North Fork flow rates listed in Table 5. The time of concentration may be slightly longer for the North Fork, causing the flows in this watershed to peak later than South Fork flows.

The creek flow rates listed in Table 2 do not include the 25-year flow which is a design condition for secondary and minor waterways. The 25-year flow rates for each creek were estimated by comparing the rainfall intensity curves for the 10-year, 25-year, and 50-year return periods. The 25-year rainfall intensities were roughly the midpoint between the 10-year and 50-year rainfall intensities, and the 25-year flow rates were assumed to be the midpoint of the 10-year and 50-year flow rates. The creek flow rates used for the assessment of facility sizes are listed on Table 5.

Table 5
Design Flows for Olde Towne Nipomo Creeks

Creek	**Location**	**Drainage Area** (sq mi)	**10-year Flow** (cfs)	**25-year Flow** (cfs)	**50-year Flow** (cfs)	**100-year Flow** (cfs)
Haystack Creek	Confluence with Nipomo Creek	3.3	440	920	1,400	2,000
North Fork Haystack Creek	Confluence with Haystack Creek	1.8	290	620	940	1,400
South Fork Haystack Creek	Confluence with Haystack Creek	1.4	225	480	730	1,100
Nipomo Creek	Tefft Road	10.5	1,290	2,700	4,100	5,900
Deleissigues Creek	Confluence with Nipomo Creek	2.5	330	670	1,000	1,500

The flow rates in the minor waterways of the Nipomo area were not estimated in the FEMA FIS, and were calculated for this study. SLO County standards limit the use of the Rational Method to tributaries with less than 200 acres; therefore, the Rational Method was used to determine peak flows for only the Unnamed Tributary 1 to Deleissigues Creek and the Knotts Street drainage areas. The peak flow rates from Hermrick Creek were calculated using the Santa Barbara Urban Hydrograph (SBUH) methodology. The flow rates at different recurrence intervals for these creeks are listed on Table 6.

Table 6
Estimated Peak Flows for Minor Creeks in Olde Towne Nipomo

Creek	**Location**	**Drainage Area** (sq mi)	**10-year Flow** (cfs)	**25-year Flow** (cfs)	**50-year Flow** (cfs)	**100-year Flow** (cfs)
Unnamed Tributary 1	Confluence with Deleissigues Creek	0.1	43	49	56	63
Hermrick Creek	Confluence with Nipomo Creek	0.7	230	300	360	420
Knotts Street Ditch	Thompson Avenue	0.1	43	49	56	63

The time of concentration was estimated to be approximately 15 minutes for Tributary 1 and the Knotts Street Ditch watersheds. The rational method C value was assumed to be 0.35 as a composite value for each watershed. The SBUH method parameters used for Hermrick Creek were 100-year 24 hour rainfall of 5.5 inches, a time of concentration of 30 minutes, and a percent impervious area of 10 percent.

The sizes and locations of culverts and hydraulic structures within the Olde Towne area are shown on Figure 3. Estimates of culvert and hydraulic structure capacities were established by assuming an inlet control flow condition and two different flow depths at the culvert entrance. The culvert capacity was obtained from the published inlet control nomographs, and was based on the size and shape of the inlet opening. The culvert inlet capacities were determined for water surface at the soffit of the culvert and at a surcharged condition where water depth is 1.5 times the culvert opening at the entrance (i.e. 50 percent of culvert height above the culvert soffit). The culvert capacities are listed on Table 7.

Table 7
Culvert Capacities at Major, Secondary and Minor Creek Crossings in Olde Townee

CREEK	CROSSING	DIMENSIONS	Capacity with Water Level at Soffit (cfs)	Capacity with Water Depth of 1.5 x Height (cfs)
Deleissigues Creek	Thompson Avenue(1)	9 ft box culvert	100-Yr	NA
Unnamed Tributary 1	Thompson Avenue	3 ftx3 ft box culvert	45	72
Unnamed Tributary 1	Mallagh Street	Double 24 inch diameter culvert	26	40
Hermrick Creek	Thompson Road(2)	Double 4 ftx4 ft box culvert	190	300
Hermrick Creek	Burton Street	4 ft diameter culvert	70	110
Hermrick Creek	Mallagh Street	Two 24 inch diameter culverts	24	40
Haystack, North Fork	Tefft Street	Double 6 ft x 4 ft box culvert	340	430
Haystack, Main Stem	Thompson Avenue	7 ft x 5 ft box culvert	275	360
Haystack, Main Stem	Tefft Street	6 ft high by 24 ft wide arch culvert	25-Year(3)	50-Year(3)
Haystack, Main Stem	Mallagh Street	7 ft diameter culvert	300	450
Nipomo Creek	Tefft Street	Bridge	-Year(4)	NA
Knotts Street Ditch	Thompson Avenue	3 ft x 3 ft box culvert	45	72
Knotts Street Ditch	Vintage Street at Thompson Avenue	24 inch diameter culvert	12	20

Notes:
1. Bridge can pass 100-year flow without overtopping based on FEMA FIS channel profiles. FEMA FIRM maps indicate water surfaces overtop roadway at 100-year event.
2. A weir and detention basin has been installed on the upstream side of the double box culvert to reduce the peak discharge entering the Thompson Road culvert.
3. Inlet Control Nomograph not available. Flow capacity is assumed to be 920 cfs (25-year) event. .
4. Flow capacity is xx –year event without overtopping based on FEMA FIS channel profiles.

The estimated culvert capacities were compared with the calculated flow rates for each return period to determine the flow rate that can pass through the culvert without surcharge. The culverts within Olde Towne are generally not sufficient to pass the 10-year flow rate without surcharge, although some can pass higher return period storms with surcharge at their location. The culverts and crossings along Haystack Creek, with exception of the newly installed arch at the Tefft Street crossing, are generally insufficient to carry the 10-year flow. Channel capacity could not be estimated due to limited access but were assumed to be capable of conveying the 25-year event without overtopping.

OVERVIEW OF DRAINAGE AND FLOODING ISSUES

Identified Olde Towne Flooding Problems

According to questionnaire responses, common flooding problems include:

- Structure flooding
- Standing water causing street flooding
- Flow from channel flooding the adjacent property
- Flow onto individual properties from upstream flooded areas
- Bank erosion threatening stability of structures near channel

Some of the causes for flooding identified during the document review and field inspection include:

- **Inadequate Culvert Capacity** – Many of the culvert crossings at roads do not meet County design standards, since they generally do not have sufficient capacity to convey the design flow.
- **Topography** – Much of the Olde Towne area is located within a 100-year flood hazard zone. These areas have been identified by FEMA as subject to flooding during a 100-year rainfall event. These lower lying areas near the creek and tributary channels may also be subject to flooding from more frequent rainfall events. Low elevations of home foundations were observed during area field inspections.
- **Dumping of Debris in Channel –** Many surveys noted debris dumping occurs in the channel. Observed debris includes sediment, construction trash, tree limbs, vegetation, agricultural waste, mattresses, and vehicles. Smaller objects can be entrained into the flow and carried to culverts where they become trapped and block flow causing flooding. Large objects create obstructions to flow and either increase the upstream water level or divert flows to another location.
- **Culvert Blockage by Debris –** The County currently maintains culverts crossing the roadway and roadway ditches that are a part of the public right of way. During storm events, debris carried by the flow can become lodged at culvert inlet and block the flow. This causes flooding upstream of the culvert. County forces remove the blockage when it is reported.
- **Inadequate Roadway Drainage** – Streets and roadways will not drain properly where adjacent retention basin elevations are roughly similar to the roadway elevation. These Absence or incompletion of curbs and general drainage facilities
- **Encroachments of Creek and Tributary Channels–** Some property owners have intentionally blocked the drainage path across their property by constructing fences or placing other objects within the channel flow path. The segmenting of drainage paths that occurs when discharging into areas of no conveyance causes standing water and flooding at the location of the blockage and at areas upstream. The blockage can also cause runoff to be diverted onto other properties, causing flooding there.
- **Lack of Channel Maintenance –** Many of the creek beds contain debris, ranging from dead trees or limbs, to urban garbage such as , mattresses, cars and buildings. Some of the stream beds are overgrown with vegetation which restricts flow movement and caused water to be diverted from the stream channel in large flow events.
- **Lack of Planning for Drainage and Development –** The capacity of culvert crossings on Thompson Avenue, Burton Street, and Mallagh Street north of Tefft Street generally decrease in the downstream direction. These culvert sizes attenuate the peak flows by causing flooding of the channels and adjacent floodplain areas, this localized flooding is not consistent with the development of homes within the area.

The problems reported in the questionnaires were categorized and mapped. The locations with noted flooding issues are shown on Figure 4. A listing of the type of drainage problem and the approximate street address is provided in Table 8. Some of the drainage problems were identified in a report entitled "Sites of Concern in the Northern Nipomo Creek and Tributaries", developed by local residents Angela Gariboldi and Herb Kandel. The report contains descriptions and photographs of Olde Towne drainage and flooding problems, including photographs of urban garbage in the channel.

Creek Tributary Summaries

The following is a creek-by-creek summary of noted problems and system differences.

Deleissigues Creek

The Deleissigues Creek watershed is considered a secondary waterway by SLO County Standards. The headwaters of Deleissigues Creek are located in the Temettate Ridge. Deleissigues Creek meanders through agricultural areas and enters the northwest side of Olde Towne. The creek is conveyed under Thompson Avenue via a single span bridge which has steep, eroded side slopes and an overgrown channel. A clear span footbridge crosses the creek at Mallagh Street in a residential flood-prone area.

Parts of Olde Towne lie within the 100-year flood zone of this tributary and the creek is reported to overtop during times of high flow. The channel and structures cannot convey the 100-year flow, with near overtopping expected at Thompson Street. Flooding was also expected in the vicinity of Mallagh and Eve Streets in the FIS. Detailed topography was unavailable to verify channel capacity, although channel debris, heavy vegetation and the channel realignment likely contribute to the flood problem in this area.

Tributary 1 to Deleissigues Creek

The unnamed Tributary 1 is a minor waterway that originates in the agricultural lands above Thompson Avenue and is routed through town in a series of culverts and ditches which extend from Thompson to Mallagh between Day and Sea. The unnamed tributary joins Deleissigues Creek through a channel extending about 100 feet west of the intersection of Mallagh and Sea. The Deleissigues Creek joins Nipomo Creek approximately 1600 feet further downstream.

At Thompson Avenue the drainage enters 3 feet by 3 feet concrete box culvert which has silt deposition at the entrance. Flow is then conveyed along a 30-inch corrugated plastic pipe (CPP) across private property. The CPP is stubbed out at a construction site on the property. Currently, flow will leave the end of the new CPP and flow overland to small roadside ditch along Sea Street. The roadside ditch along Sea Street is overgrown and terminates into two, 2 feet diameter corrugated metal culverts that have settled sediment blocking the inlets. Flow backs up at this constriction and causes flooding in the area. Runoff from backyards south of Sea is conveyed to a ditch and a culvert under Mallagh near Bee Street. This flow is conveyed north in a ditch to the discharge of the two CMPs at the intersection of Sea Street and Mallagh. The channel grade is reversed from the natural ground grade, and vegetation in the channel causes water to back up through the midblock culvert and overtop Mallagh Street.

Hermrick Creek

This tributary is a minor waterway that originates in the foothills of the Temettate Ridge. The tributary enters Olde Towne at Leaf Street in an area of current home construction and development activity. A double 4 feet by 4 feet box concrete culvert conveys flow under Thompson Avenue into a series of ditches and culverts. The ditch along Bee Street between Thompson and Burton can overflow, and runoff

reportedly runs westerly along Bee Street and south along Burton Street following the surface grade. Residents report that historic accounts of former flow paths of this tributary were along the direction of Burton Street to join with the main stem of Haystack Creek. Currently, the 4-foot diameter corrugated metal pipe under Burton Street discharges to a channel crossing the back yards of neighboring residences between Bee and Chestnut. While flooding was not reported along this ditch, concern is expressed because of its proximity to homes and the encroachment of the channel that is occurring there. Two 2 feet diameter reinforced concrete pipes extend under Mallagh at Chestnut. Drainage from the south is collected by buried storm drains and joins the tributary downstream of Mallagh. The tributary channel has been degraded downstream of this pipe junction, and joins Nipomo Creek about 1,300 feet downstream. Sedimentation and debris blocked culverts are reported problems along this tributary, along with encroachment by fences and other obstructions in the channel flow area. Homes in local depressions adjacent to the channel have experienced flooding.

Haystack Creek

The North and South Forks of Haystack extend from the Temettate Ridge through agricultural land and meet within the Nipomo Urban area. The combined flows are conveyed along Haystack Creek to its confluence with Nipomo Creek Highway 101. All three creeks are considered secondary waterways. The two forks of Haystack Creek are on opposite sides of Tefft Street upstream of their confluence near Avocado Avenue. Urban dumping, channel encroachment, bank erosion, overgrown vegetation, and sedimentation are the reported problems along these tributaries. Many of Olde Towne areas near Tefft Street lie within the 100-year flood zone of Haystack Creek. Flow exceeds the overbank elevation during heavy storms.

The North Fork Haystack Creek has been straightened for approximately one-half mile of channel in the agricultural area upstream of Olde Towne. After entering Olde Towne, the tributary parallels Tefft and Branch Streets until it crosses Tefft at Avocado Avenue in a double 4' by 6' concrete box culvert. The channel upstream of the culvert is vegetated, and urban dumping and channel encroachment have added to flooding problems. Residents reported flooding from the creek due to debris and vegetation clogging the waterway. The creek parallels Tefft Street and makes a 90-degree turn at its crossing with the roadway. The North Fork joins the South Fork about 200 feet downstream of the twin box culvert crossing of Tefft Street. The North Fork channel between Tefft and the confluence with the South Fork has recently been cleared and vegetation has been removed.

South Fork Haystack runs parallel to and between Tefft Street and Dana Street, where landowner encroachment and bank erosion have limited the channel capacity and stability. The South Fork does not have any culvert crossings upstream of the confluence with the North Fork. This was the site of most significant property damage during the March 2001 flood. Some flooding was also reported by residents in 1997. Urban dumping, channel encroachment and heavy vegetation in the channel make flooding during large storms a potential hazard for this tributary.

The mainstem of Haystack Creek downstream from the north and south fork confluence, is squeezed along the backside of urban developments between Avocado Street and Thompson Avenue. There are significant channel encroachments in this area, restricting creek access and making channel maintenance difficult. At Thompson Avenue, the creek passes through a 7 feet by 5 feet concrete box culvert. Sediment deposition at this culvert reduces capacity of the road crossing. The length of this crossing has been increased over the years, and its capacity may have been reduced. Significant reoccurring flooding has occurred at this site and channel erosion is occurring on the downstream side which is threatening historic/commercial buildings close to the eroded bank. Downstream of this culvert the channel is currently being widened and realigned. A new 24 feet wide by 6 feet high arch crossing at the intersection of Burton Street and Tefft Street was completed in 2003. The next downstream crossing

under Mallagh Street is a 7-foot diameter corrugated metal pipe. The angle of this culvert is skewed to the channel, and directs culvert discharge at the southeast bank, causing significant bank erosion. Adjacent buildings and a parking lot are threatened by this undercutting.

Haystack Creek joins Nipomo Creek about 1,400 feet downstream of the Mallagh Street crossing. In the floodplain area near the confluence, a 2.5 acre parcel including a portion of Haystack Creek was recently acquired by the Land Conservancy of SLO County for enhancement of floodplain capacity and for channel bank restoration.

Nipomo Creek

The Nipomo Creek is about nine miles long with a drainage area totaling approximately 20 square miles at the confluence of the Santa Maria River. More than half of the watershed is comprised of mountains and foothills, with Nipomo Valley making up the remainder. Nipomo Creek runs parallel and east of Highway 101 through Olde Towne before crossing the Tefft Street. Nipomo Creek is considered to be a major waterway at its crossing of Tefft Street. The creek continues to flow southeasterly for about 5 miles before crossing Highway 101 near the Santa Maria River. Urban dumping, channel encroachment, sedimentation, bank erosion, and overgrown vegetation are among the effects of urbanization on Nipomo Creek.

The Tefft Street Bridge site has sediment deposition along the channel bottom and a slow rate of erosion has been noted along the exposed steep banks. Homes and businesses just upstream of the Tefft Street crossing could be threatened by continued bank erosion. The nearly vertical slopes on the southwest bank are armored with riprap. Overgrown vegetation and litter fill the creek bed due to urban dumping at the site and conveyance of material from upstream areas.

Knotts Street Agricultural Ditch

The Knotts Street drainage ditch is a small, concrete lined v-ditch that is located along Knotts Street at the southern border of the community. This drainage collects agricultural runoff from fields east of Knotts Street and upstream areas northeast of the intersection of Knotts Street and Cedarwood. The size of this channel is generally sufficient to convey small flows. The concrete ditch discharges into a larger grass-lined ditch which conveys flow to a 3 feet by 3 feet concrete box culvert road crossing at Thompson Avenue. Although the culvert size is adequate to pass a 50-year event, excess sediment accumulation has reduced its capacity. When flows in this ditch exceed the capacity, runoff crosses Knotts Street and enters the residential neighborhood north of Knotts Street. This neighborhood has been constructed with retention basins to capture runoff from the individual lots. The excess runoff from the agricultural area drains westerly along Vintage Street, to a 2 feet diameter CMP road crossing at Thompson Street. After crossing Thompson, the flow travels in a southerly direction in an earthen ditch to the Knotts Street drainage ditch crossing. Flow from the confluence continues in a westerly direction in an open earthen channel through agricultural fields.

PROPOSED PROJECTS AND COSTS

The Olde Towne of Nipomo generally has not maintained a consistent drainage infrastructure plan. Four different tributaries of Nipomo Creek flow through the community. Each of these tributaries has significant flow and causes flooding during large storm events. The drainage infrastructure has slowly been developed through time on a parcel-by-parcel basis. Some of the culverts crossing Thompson were built prior to 1940. Other culverts have been extended, when road-widening projects were required. Adjacent agricultural operations likely contribute to heavy sediment loads and debris. These loads

combined with relatively low channel gradients increase the potential for sedimentation and debris clogging within the drainage channels and culverts of the community. The community needs a comprehensive master drainage plan to guide storm water management in the future and to lay out a capitol improvement program based on proposed development. In lieu of this plan, a series of major drainage projects which address some of the flooding issues in the community were identified. The following sections include a tributary-by-tributary summary of these suggested projects and their potential costs. Following this summary is general discussion on creek management and planning objectives. Generally, these projects strive to provide sufficient capacity within the public roadway right of way and depend on increased maintenance and reduction of creek encroachment by homeowners to improve flood protection within the community.

The potential projects for the Olde Towne are shown in Figures 5 through 9. This discussion highlights Olde Towne creek watersheds.

Deleissigues Creek Watershed

Proposed Project: Vegetative and Sediment Management

One alternative that will help reduce the impact of flooding from Deleissigues Creek is vegetative management. Thinning and removing some of the overgrown riparian vegetation will help alleviate the frequency of flooding at lower frequency flood events such as the 5- or 10-year storms. A vegetative management plan could be developed to conduct a one-time channel clearing and then prescribe an on-going (annual or bi-annual) maintenance program. The reach of Deleissigues Creek recommended for routine maintenance extends from Thompson Road to the confluence with Nipomo Creek. Approximately 4,000 feet of creek would be maintained every couple of years.

The goal of the program would be to thin the channel vegetation, reduce frictional resistance of the channel, create more flow carrying capacity, and strive to preserve riparian habitat values. The approach is to remove dense undergrowth and trees that increase channel roughness and reduce conveyance capacity in the channel. Sediment removal should also be implemented at locations where deposition has accumulated over the years.

The vegetative management plan would remove trees and brush in such a way that minimizes impacts to the vegetative overstory above the channel. In some cases, trees may be removed but new ones would be planted outside of the floodway and main flow path. The general concept is to create a tunnel effect and shaded riverine aquatic habitat. Over time, the management program will develop a riparian corridor where flow encounters minimal heavy vegetation resistance but is overshadowed by a tall canopy that provides shade and habitat. A similar vegetative management program has been developed by the City of San Luis Obispo for San Luis Obispo Creek.

Modest gains in flow conveyance can be accomplished which are expected to range from 10 to 15 percent of the overall channel carrying capacity. Detailed hydraulic modeling would need to be conducted to determine the ultimate effectiveness of this proposed project. The plan would have to be developed in conjunction with State and Federal resource agency approval. As part of the resource agency permit approval process, a California Environmental Quality Act (CEQA) document would be prepared to determine the potential impacts and propose mitigation measures to minimize those impacts. The environmental permitting requirements are the subject of a separate technical memorandum.

The advantage of this project, if implemented according to a maintenance plan, is that the capacity of the channel will be improved and maintained. Also, a healthy creek habitat will flourish under the creek's overstory. Removing or thinning the vegetation will have modest impacts on the carrying capacity of the

channel. Annual maintenance will require private owners to grant drainage easements within the creek for access. The drawback is that the project could take over two years to permit and authorize by the resource agencies.

Project Cost Estimate

The cost estimate for the Deleissigues Creek project is broken down by item in Table 8. The total cost for this project is approximately $387,000. It is assumed that annual sediment removal and vegetation management to maintain the capacity of the channel following the first clearing will cost approximately $15,000. The permits issued by the resource agencies will stipulate the conditions for conducting routine maintenance.

Table 8
Deleissigues Creek Vegetation Management

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	First Time Vegetative Clearing	4,000	LF	$30	$120,000
2	Wetland/Environmental Mitigation [2]	1	each	$35,000	$35,000
				Subtotal	**$155,000**
	Detailed Hydraulic Analysis	1	each	$45,000	$45,000
	CEQA Documentation	1	each	$25,000	$25,000
	Biological Investigation/Wetlands Delineation	1	each	$50,000	$50,000
	Resource Agency Permit Preparation	1	each	$25,000	$25,000
	Final Engineering and Design	1	each	$25,000	$25,000
	Administrative, Environmental, and Construction Admin.	1	each	$31,000	$31,000
	Contingency	1	each	$31,000	$31,000
				Total	**$387,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report. ENR CCI for Los Angeles (February 2003) = 7,566.
2. It is assumed that environmental mitigation can be accomplished on the adjacent properties in lieu of acquisition of private property in fee for environmental mitigation.

Tributary 1 Watershed

Proposed Project: Improve Roadway Crossings in Public Right-of-Way to Meet County Standards

The capacity of the 3 feet by 3 feet box culvert at Thompson Road is approximately equal to the 10-year flood flow for Tributary 1. However, the downstream drainage facilities do not have sufficient capacity to convey the 10-year flood flow, therefore, the downstream facilities are not in conformance with County standards for minor waterways.

The proposed projects for Tributary 1 include installing culverts at Mallagh and Burton, and also cleaning out existing drainage ditches and culverts to increase conveyance capacity to County standards.

- One 30-inch CMPs should be installed at Burton and Sea Street, as shown in Figure 5, to convey flow discharged from the existing culvert at Thompson.
- A 24-inch diameter CMP should be installed parallel to the two existing 24-inch diameter culverts crossing under Mallagh Street at Sea Street.

- The roadside drainage ditches and driveway culverts should also be cleared of excess vegetal growth and dredged of deposited sediment so that they also have the capacity to convey the 10-year storm flow.
- The channel between Deleissigues Creek and Mallagh Street should also be cleared of sediment and excess vegetation since it appears that this channel is blocking flow conveyed from the roadside ditches and culverts at Mallagh Street.
- The culvert at Thompson and Day should also be cleaned to prevent further ponding at this intersection.

It is also proposed that an annual or bi-annual maintenance program be implemented to ensure that drainage facilities are free of obstructions prior to the rain season. The cost estimate for these projects assumes that annual maintenance is conducted on the drainage facilities.

Optional Additional Facilities to Provide 100-year Level of Flood Protection

The proposed improvements discussed above would provide drainage facilities that meet County standards for minor waterways. If further flood protection is desired by the residents within the floodplain, a detention basin can be constructed on Tributary 1, upstream of Thompson Road. These basins would be sized to contain the 100-year flood with a release rate of no larger than the 10-year storm.

This is an opportunity for the community to implement a project that protects homes within the Tributary 1 drainage area from a 100-year flood event. The goal of a detention basin is to limit the flows discharged downstream of Thompson Road to a 10-year flood event. Runoff greater than a 10-year storm flow would be stored in the detention basin and either discharge when flows recede or percolate into the groundwater. The detention basin ensures that flows do not exceed the capacity of downstream facilities. Figure 5 shows a schematic and dimensions of the proposed detention basin. The basin would store approximately 1.25 acre-feet of runoff.

Developing projects that protect homes from a 100-year flood event was not the objective of this study. However, information on a detention basin that stores runoff up to the 100-year flood event on Tributary 1 is included for the community's benefit. If the community chooses to implement this project, then the Tributary 1 drainage area should receive protection from the 100-year storm.

Project Cost Estimate

The cost estimates to improve the culverts to current County standards and to provide 100-year level of protection are broken down by item in Table 9 and 10, respectively. The total project cost to improve facilities to current County standards is approximately $171,000. The total cost to build the detention basin and appurtenant facilities is approximately $253,000. The costs shown do not include estimated annual maintenance.

Table 9
Tributary 1 – County Standard Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	One 30-inch diameter CMP culverts at Burton	50	LF	$180	$9,000
2	Drop Inlets	2	each	$3,500	$7,000
3	One 24-inch diameter CMP culvert at Mallagh	50	LF	$180	$9,000
4	Drop Inlets	1	each	$3,500	$4,000
5	Clear and Dredge Roadside Ditches/Culverts	1,000	LF	$30	$30,000
				Subtotal	**$59,000**
	Engineering and Design [2]			20 percent of subtotal	$28,000
	Administrative and Environmental [2]			40 percent of subtotal	$56,000
	Contingency [2]			20 percent of subtotal	$28,000
				Total	**$171,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 60% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Table 10
Tributary 1 – Detention Basin

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Construct Detention Basin (excavate/grade)	2,000	CY	$15	$30,000
2	Inflow/Outflow Structures	2	each	$45,000	$90,000
3	Hydroseeding	1	acres	$1,000	$1,000
4	Fence	500	LF	$10	$5,000
5	Land Acquisition	0.5	acres	$30,000	$15,000
				Subtotal	**$141,000**
	Engineering and Design [2]			20 percent of subtotal	$28,000
	Administrative and Environmental [2]			40 percent of subtotal	$56,000
	Contingency [2]			20 percent of subtotal	$28,000
				Total	**$253,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 60% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Hermrick Creek Watershed

Proposed Project: Improve Roadway Crossings in Public Right-of-Way to Meet County Standards

The capacity of the double 4 feet by 4 feet culvert at Thompson Road is sufficient to convey the 10-year flood flow under surcharged conditions. Although this technically does not meet County standards for minor waterways, minor modifications to the culverts headwall would prevent runoff from overtopping. However, similar to Tributary 1, the downstream drainage facilities lack sufficient capacity to convey runoff from a 10-year storm and therefore should be improved to meet County standards.

The proposed projects for Hermrick Creek are to remove and replace the existing culverts at Burton and Mallagh with facilities that meet County standards for minor waterways. A double 5 feet wide by 4 feet high concrete box culvert should be installed at the creek's crossing with Burton and Mallagh as shown in Figure 5.

Optional Additional Facilities to Provide 100-year Level of Flood Protection

The proposed improvements discussed above would provide drainage facilities that meet County standards for minor waterways. If further flood protection is desired by the residents within the floodplain, a detention basin can be constructed on Tributary 1, upstream of Thompson Road. These basins would be sized to contain the 100-year flood with a release rate of no larger than the 10-year storm.

As with Tributary 1, this is an opportunity for the community to implement a project that protects homes within Hermrick Creek's drainage area from a 100-year flood event. Construction of a detention basin would limit the flows discharged downstream of Thompson Road to a 10-year flood event. The detention basin ensures that flows do not exceed the capacity of downstream facilities. Figure 9 shows a schematic and dimensions of the proposed detention basin. The basin would store approximately 8.25 acre-feet of runoff.

Developing projects that protect homes from a 100-year flood event was not the objective of this study. However, information on a detention basin that stores runoff up to the 100-year flood event on Hermrick Creek is included for the community's benefit. If the community chooses to implement this project, then the Hermrick Creek drainage area downstream of Thompson Road should receive protection from the 100-year storms.

Project Cost Estimate

The cost estimates to improve the culverts to current County standards and to provide 100-year level of protection are broken down by item in Table 11 and Table 12, respectively. The total project cost to improve facilities to current County standards is approximately $108,000. The total cost to build the detention basin and appurtenant facilities is approximately $412,000. The costs shown do not include estimated annual maintenance.

Table 11
Hermrick Creek – County Standard Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Double 4'Hx5'W box culvert at Burton	50	CY	$600	$30,000
2	Double 4'Hx5'W box culvert at Mallagh	50	CY	$600	$30,000
				Subtotal	**$60,000**
	Engineering and Design [2]			20 percent of subtotal	$12,000
	Administrative and Environmental [2]			40 percent of subtotal	$24,000
	Contingency [2]			20 percent of subtotal	$12,000
				Total	**$108,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 60% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Table 12
Hermrick Creek – Detention Basin

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	Construct Detention Basin (excavate/grade)	13,300	CY	$15	$200,000
2	Inflow/Outflow Structures	2	each	$45,000	$90,000
3	Hydroseeding	2	acres	$1,000	$2,000
4	Fence	1,200	LF	$10	$12,000
5	Land Acquisition	2	acres	$30,000	$60,000
				Subtotal	**$364,000**
	Engineering and Design [2]			20 percent of subtotal	$12,000
	Administrative and Environmental [2]			40 percent of subtotal	$24,000
	Contingency [2]			20 percent of subtotal	$12,000
				Total	**$412,000**

Haystack Creek Watershed

Proposed Project: Improve Roadway Crossings in Public Right of Way to Meet County Standards

The recommended Haystack Creek projects shown on Figure 6 are necessary for meeting the County Design standards within the public right of way. These projects include new larger culvert crossings on North Fork Haystack Creek on Tefft Street near Avocado Street, and new culvert crossings on the mainstem of Haystack Creek at both the Thompson Avenue and Mallagh Street crossings. These culverts will be able to pass the 25-year flood event with freeboard and the 50-year event without overtopping.

If further flood protection is desired by the residents within the floodplain, a detention basin can be constructed on each of the Haystack Creek tributaries near the boundaries of the town. These basins would be sized to contain the 100-year flood with a release rate of no larger than the 25-year storm.

The individual projects are described below.

Improve Roadway Crossings in Public Right of Way to Meet County Standards

Three roadway crossing culvert improvements are necessary along Haystack Creek and its tributaries. These roadway crossing improvements include:

- North Fork Haystack Creek at Tefft Street – Add two additional 6 ft W by 4 ft H box culverts to the double existing 6 ft W by 4 ft H box culverts
- Haystack Creek at Thompson Avenue - Replace existing 7 ft W by 5 ft H box culvert with new 24 ft W by 6 ft H arch span culvert
- Haystack Creek at Mallagh Street – Replace existing 7 ft diameter CMP with new 24 ft W by 6 ft H arch span culvert

Along North Fork Haystack Creek, the capacity of the existing double 6 feet W by 4 feet H box culvert at Tefft Street is slightly larger than the 10-year flood flow for the creek, and is less than the 25-year capacity required in County design standard. Adding the two culverts with similar dimensions will allow the culvert to pass the 25-year flow of 620 cfs.

The capacities of the existing 7 feet W by 5 feet H box culvert at Tefft Street and the existing 7 feet diameter CMP at Mallagh Street along the Main Stem of Haystack Creek are less than the 10-year flood flow for the creek and do not meet the 25-year capacity required in County design standard. Both existing culverts should be replaced with a new 24 ft W by 9 ft H arch span culvert similar to that recently constructed at the intersection of Burton Street and Tefft Street. The new arch culvert is assumed to pass the 25-year flow of 920 cfs.

On the mainstem of Haystack Creek, erosion occurs downstream of Thompson and Mallagh. The bank is devoid of vegetation and erosion is beginning to threaten parking areas and buildings. Installing erosion protection such as gabions would armor the bank and prevent further erosion.

Stream Channel Improvements

The existing stream channel is within private property, requiring maintenance by individual homeowners rather than the County. The channel capacity was assumed to have a 25-year flow capacity if it was adequately maintained and channel encroachments were removed. A number of encroachments were observed during the field inspection. These encroachments should be removed to allow the 25-year flow

to pass along the channel unimpeded. Urban dumping should also be halted and the individual owners should clean the existing material that has been dumped there.

Optional Additional Facilities to Provide 100-year Level of Flood Protection

The proposed recommended improvements discussed above would provide drainage facilities that meet County design standards for secondary waterways at all public right of way locations. There is also an opportunity to increase the level of protection of homes within the Haystack Creek floodplain area from a 100-year flood event. A detention basin could be constructed on each of the Haystack Creek tributaries upstream of the developed area of the town. The goal of a detention basin is to limit the flows discharged downstream of Thompson Road to a 25-year flood event. Creek flows greater than a 25-year storm flow would be stored in the detention basin to be discharged when flows receded or percolated into the groundwater. The detention basin ensures that flows do not exceed the capacity of downstream facilities. Figure 6 shows a schematic and dimensions of the detention basin on each of the creeks. The basins on north and south forks of Haystack Creek would store approximately 20 and 15 acre-feet of runoff, respectively.

Developing projects that protect homes from a 100-year flood event was not the objective of this study. However, information on a detention basin that stores runoff up to the 100-year flood event on Haystack Creek is included for the community's benefit. If the community chooses to implement this project, then the Haystack Creek drainage area downstream of the basins should receive protection from the 100-year storm.

Project Cost Estimate

The cost estimate for Haystack Creek to improve roadway crossings within public right-of-way is broken down by item in Table 13. The total cost for this project is approximately $1,746,000. The total cost to improve road crossing culverts to County standards is approximately $1,116,000 and the cost to install erosion control is approximately $630,000.

The cost estimate for the optional detention basins on North and South Forks of Haystack Creek to is broken down by item in Table 14. The total cost for this project is approximately $2,267,000. The total cost to construct the North Fork detention basin is approximately $1,257,000 and the cost for the South Fork detention basin is approximately $1,009,000. The costs shown do not include estimated annual maintenance.

Table 13
Haystack Creek (North Fork and Mainstem) - County Standard Improvements and Erosion Protection

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	24'Wx9'H Arch Culvert at Thompson	2,800	SF	$100	$280,000
2	24'Wx9'H Arch Culvert at Mallagh	2,800	SF	$100	$280,000
3	Double 4'Wx6'H Culvert at Tefft on North Hastack Creek	100	CY	$600	$60,000
4	Gabion Installation for Erosion Control at Thompson	200	LF	$1,000	$200,000
5	Gabion Installation for Erosion Control at Mallagh	150	LF	$1,000	$150,000
				Subtotal	**$970,000**
	Engineering and Design [2]			20 percent of subtotal	$194,000
	Administrative and Environmental [2]			40 percent of subtotal	$388,000
	Contingency [2]			20 percent of subtotal	$194,000
				Total	**$1,746,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

Table 14
Haystack Creek (North Fork and South Fork) – Optional Storm Detention Facilities

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST ($)	TOTAL ($) [1]
1	South Fork Detention Basin (excavate/grade)	24,200	CY	$15	$363,000
2	Inflow/Outflow Structures	2	each	$45,000	$90,000
3	Hydroseeding	3	acres	$1,000	$3,000
4	Fence	1,500	LF	$10	$15,000
5	Land Acquisition	3	acres	$30,000	$90,000
7	North Fork Detention Basin (excavate/grade)	31,200	CY	$15	$468,000
8	Inflow/Outflow Structures	2	each	$45,000	$90,000
9	Hydroseeding	4	acres	$1,000	$4,000
10	Fence	1,600	LF	$10	$16,000
11	Land Acquisition	4	acres	$30,000	$120,000
				Subtotal	**$1,259,000**
	Engineering and Design [2]			20 percent of subtotal	$252,000
	Administrative and Environmental [2]			40 percent of subtotal	$504,000
	Contingency [2]			20 percent of subtotal	$252,000
				Total	**$2,267,000**

Notes:
1. Rounded to the nearest thousand. Typical to all estimates in this report.
2. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 40% for Administrative, Environmental, District Overhead & Support Costs for Construction Project Planning, and a 20% Contingency. Use 100% cumulative markup on construction costs. Land/easement acquisition not included in cost. Percentages provided by District (Typical to all estimates in this report).

CONCLUSION

Olde Towne's flooding and drainage problems are primarily due to lack of capacity at culverts at road crossings of the creek and encroachment of the channel within private property. A majority of the creeks flow through private property and are not the responsibility of the County. Many of these home owners dispose of trash and store household items within the creek, and also build obstructions across the creek bank. All these factors contribute to a reduction in conveyance capacity. Also, upstream agricultural practices contribute to sediment deposition, reducing the conveyance capacity of generally undersized hydraulic structures. Replacing culverts, increasing maintenance where possible and educating the public as to the effects of neglecting and dumping in creeks would ease flooding and drainage problems in town.

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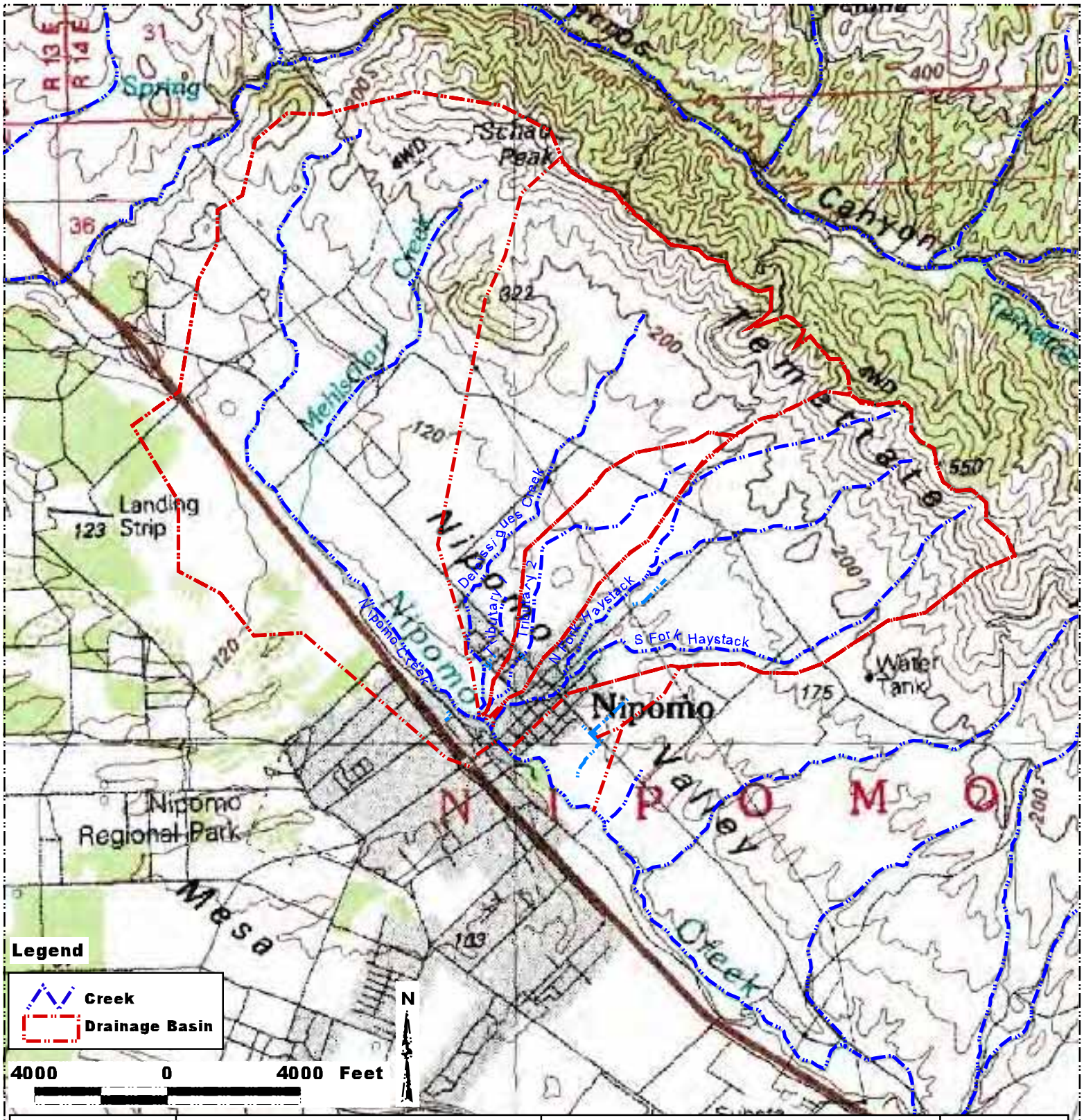
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Project No.:
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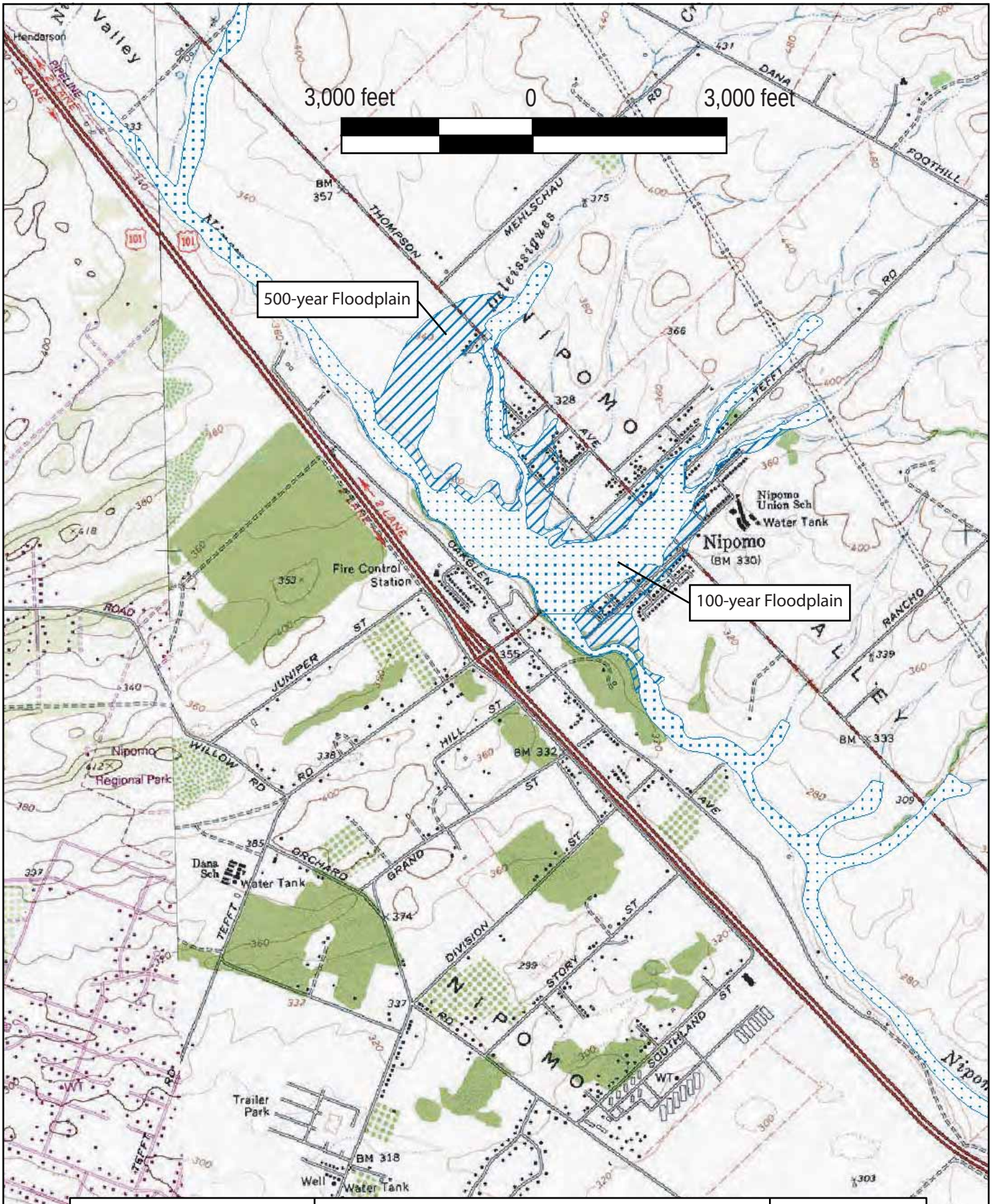
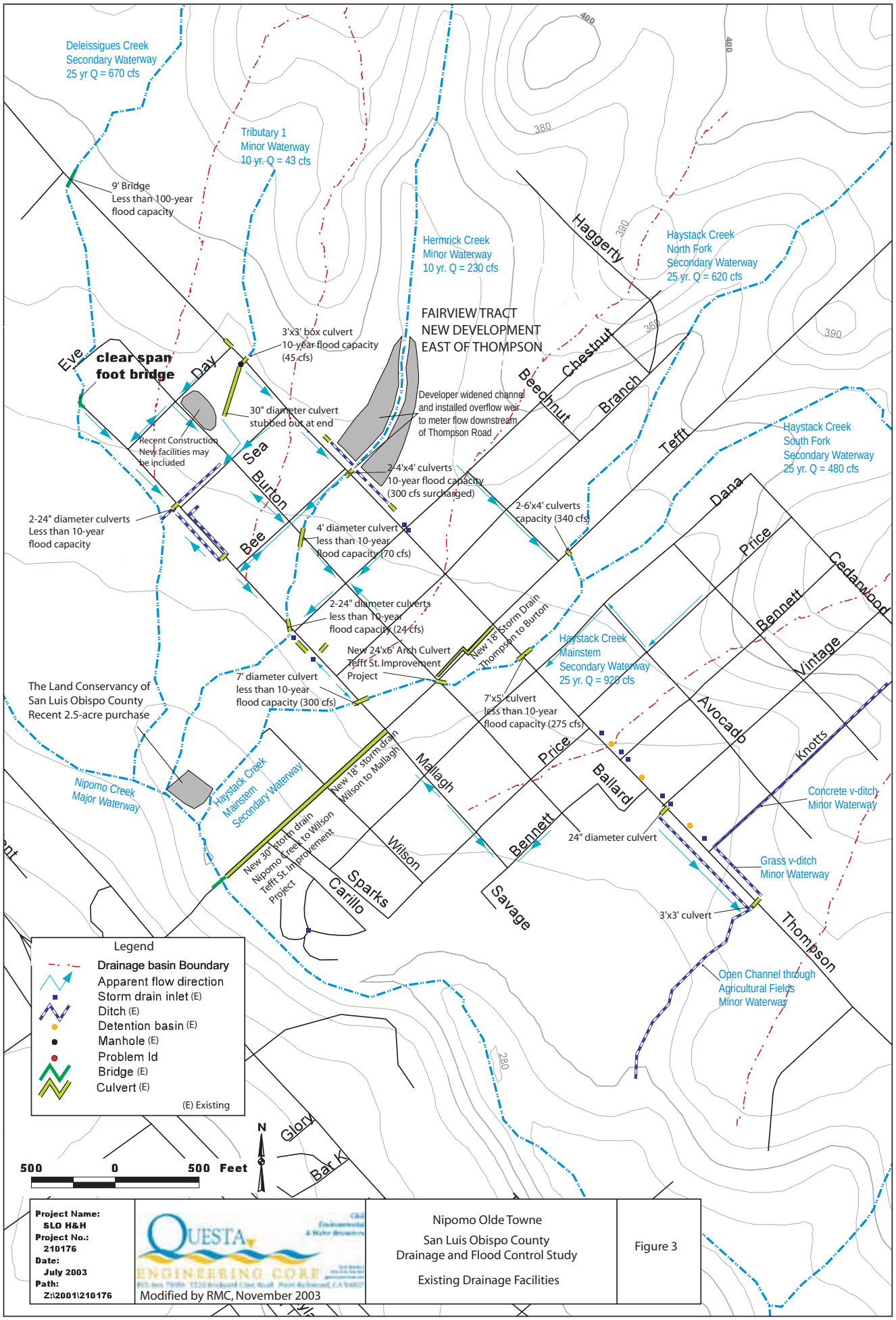
ENGINEERING CORP
Civil Environmental & Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807
SLO County H&H Study
Nipomo Community
DRAINAGE BASIN BOUNDARIES
FIGURE
1



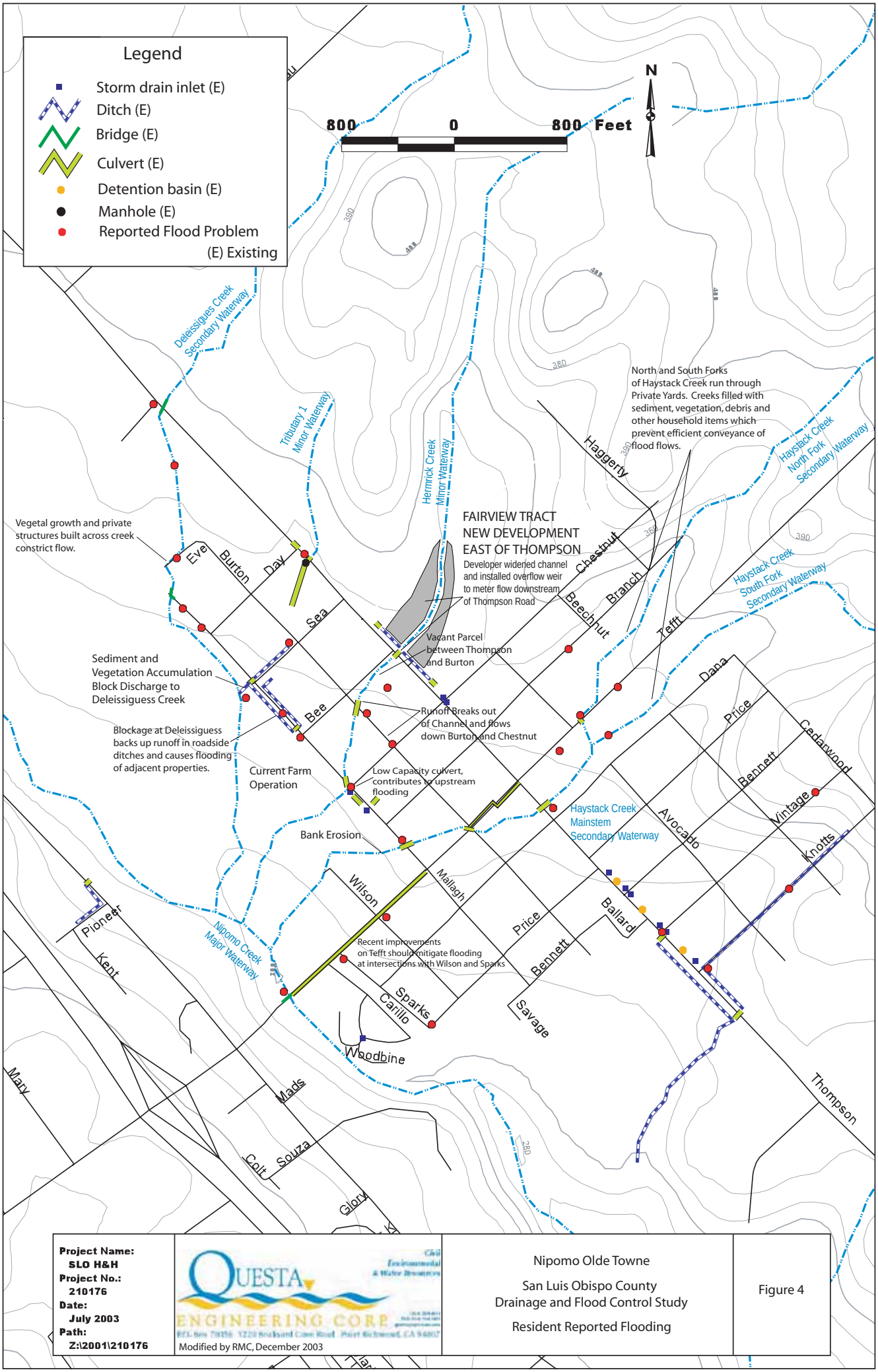
RMC
Raines, Melton & Carella, Inc.
Consulting Engineers/Project Managers

Nipomo
Drainage and Flood Control Study
FEMA 100-year and 500-year Floodplain

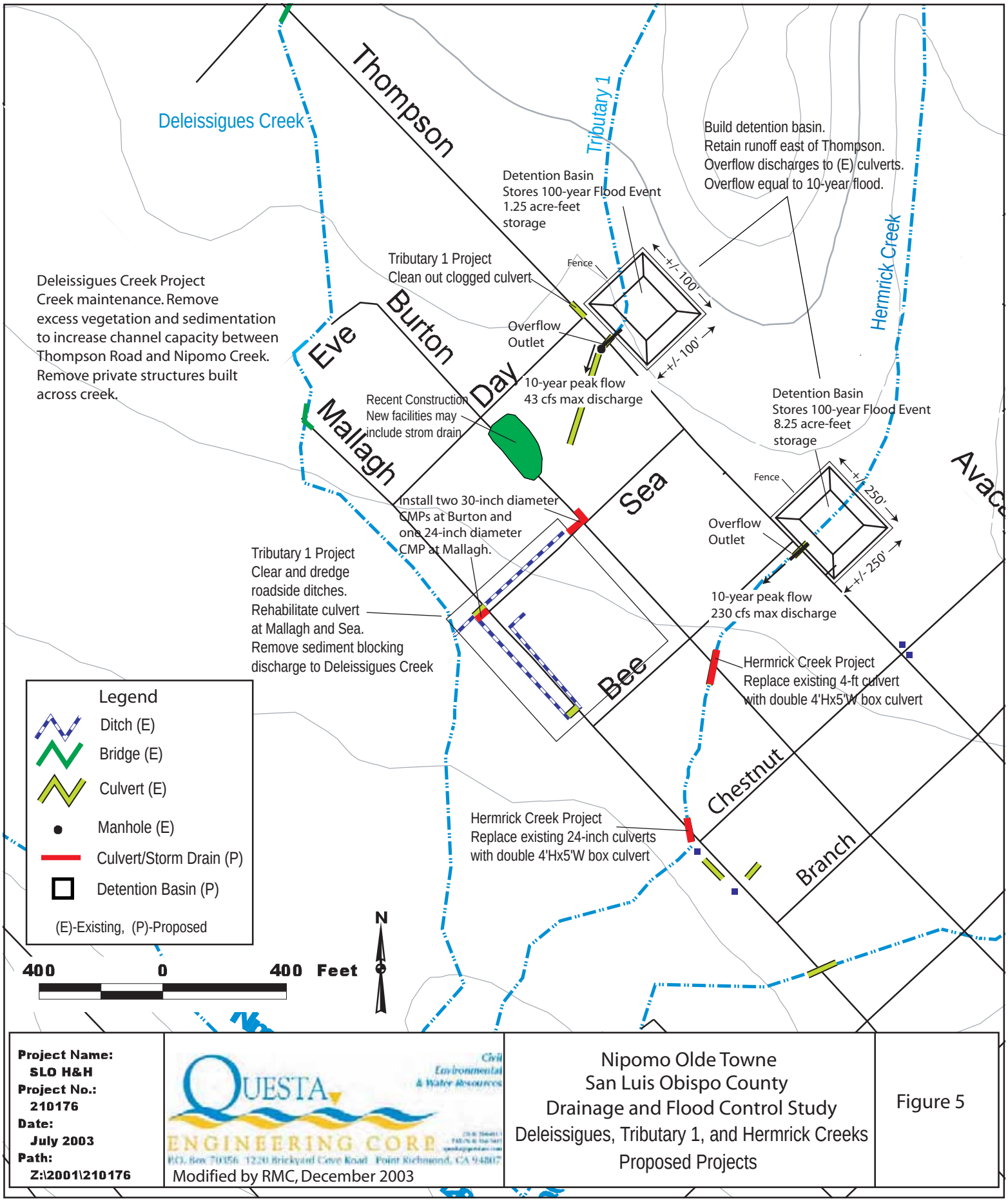
Figure 2



Project Name: SLO H&H **Project No.:** 210176 **Date:** July 2003 **Path:** Z:\2001\210176	QUESTA ENGINEERING CORP Modified by RMC, November 2003	Nipomo Olde Towne San Luis Obispo County Drainage and Flood Control Study Existing Drainage Facilities	Figure 3



Project Name: SLO H&H **Project No.:** 210176 **Date:** July 2003 **Path:** Z:\2001\210176	QUESTA ENGINEERING CORP Modified by RMC, December 2003	Nipomo Olde Towne San Luis Obispo County Drainage and Flood Control Study Resident Reported Flooding	Figure 4



Project Name: SLO H&H
Project No.: 210176
Date: July 2003
Path: Z:\2001\210176

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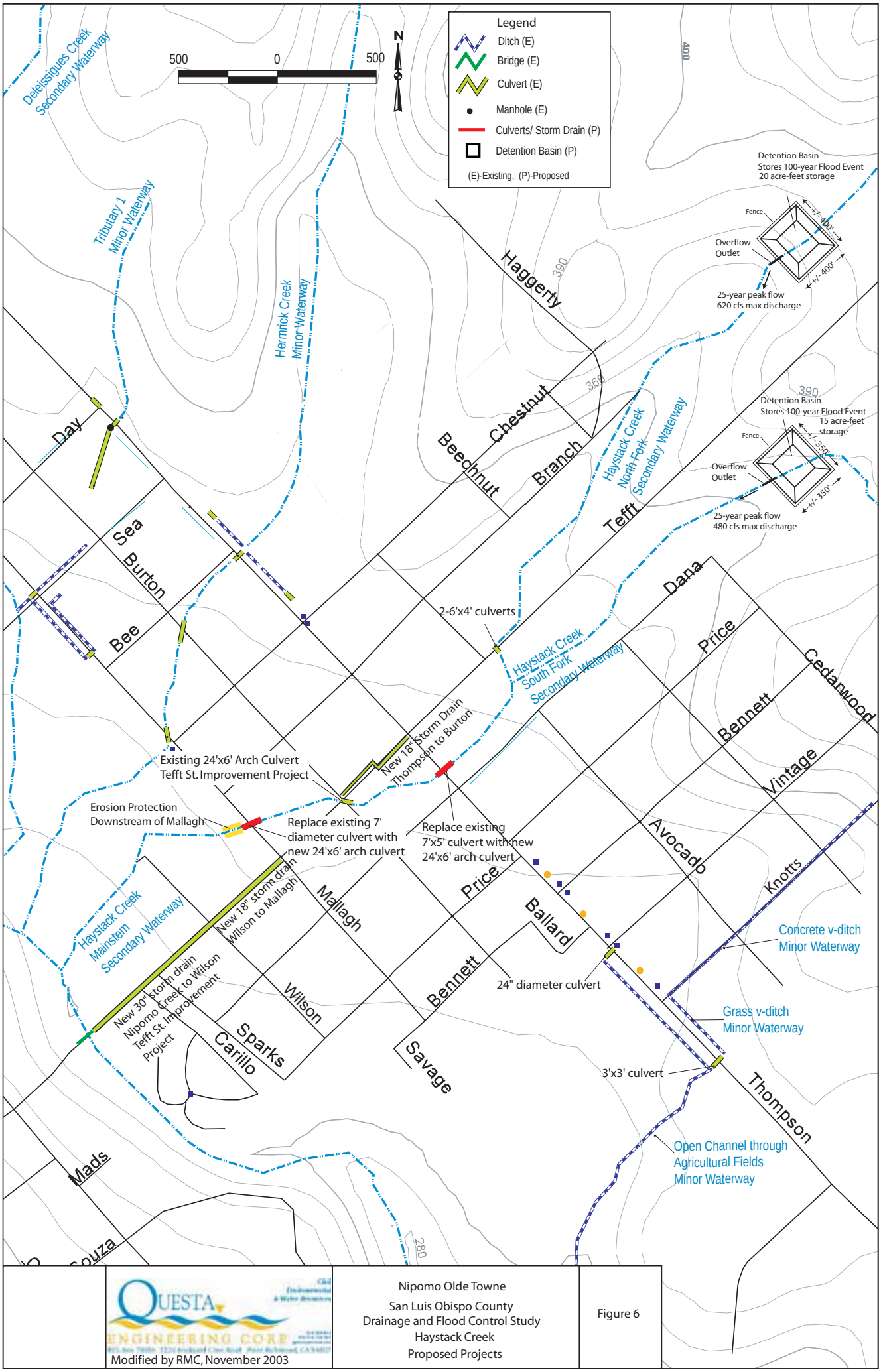
Modified by RMC, December 2003

Nipomo Olde Towne
San Luis Obispo County
Drainage and Flood Control Study
Deleissigues, Tributary 1, and Hermrick Creeks
Proposed Projects

Figure 5



QUESTA ENGINEERING CORP

Modified by RMC, November 2003

Nipomo Olde Towne
San Luis Obispo County
Drainage and Flood Control Study
Haystack Creek
Proposed Projects

Figure 6

Appendix G

ENVIRONMENTAL TECHNICAL MEMORANDUM

APPENDIX G

ENVIRONMENTAL TECHNICAL MEMORANDUM

DRAFT

Nipomo Community Drainage and Flood Control Project Environmental Constraints Analysis

November 2003

Prepared for:
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INTRODUCTION

In August and October 2003, drainage and flood control studies were conducted to examine the existing drainage conditions of the Nipomo community, identify problematic areas and issues, and develop conceptual alternatives to the identified drainage and flood control issues. This environmental constraints analysis assesses the environmental impacts and constraints associated with the proposed solutions to the drainage problems in the community of Nipomo. Each proposed solution was examined for the biological resources, cultural resources, and land use constraints likely to be present in each given area.

PROJECT DESCRIPTION

To address the different flooding issues in the community of Nipomo, several site-specific solutions have been proposed. These solutions would address flood control concerns in both the Olde Towne and Nipomo Mesa areas. The project alternatives have been organized into the following specific problem areas.

Olde Towne Nipomo

1. Flooding along creeks due to dense vegetation, urban dumping in the channel, poor channel realignments, poor drainage infrastructure, sedimentation in culverts, and inadequate drainage facilities.

2. Flooding along existing roadside ditches due to excess sediment accumulation and inadequate culvert capacity.

Nipomo Mesa

1. Localized water ponding and concentration of street runoff due to the undulating topography in the area, inconsistent curb and gutter placement, and no outflow drainage paths.

The existing drainage problems in the community of Nipomo and proposed alternatives for mitigating the problems are described in Chapter 3 of this report and also in the engineering technical memoranda. The proposed alternatives for the three categories are discussed below.

Alternative 1. Channel Improvements and Increasing Culvert Capacity in Olde Towne Nipomo

Alternative 1 proposes to improve the community's drainage infrastructure plan. Proposed channel improvements and management in the area include the following.

- Deleissigues Creek: Flooding from Deleissigues Creek has been reported in the vicinity of Mallagh and Eve Streets. This alternative would involve completing a more detailed analysis of channel capacity and developing a creek restoration and flood control plan for the area, which would include removing vegetation and ongoing maintenance along a 700-foot section of the creek.

- Haystack Creek: Poor channel maintenance and urban dumping have impacted the flood carrying capacity of the North Fork, South Fork, and main stem of Haystack Creek. Under this alternative, dense vegetation would be removed from the creek. A new culvert with more capacity would be installed beneath Tefft Street near the Avocado Avenue intersection. The culvert directing flows under Mallagh Street into Haystack Creek would be realigned to direct flows away from an eroding bank, and/or the bank would be stabilized with rock to prevent future erosion. Finally, a new underground storm drain line would be constructed beneath Tefft Street to collect runoff from the roadway and adjacent cross streets through a series of corner drop inlets.

Alternative 2. Improvements to Existing Roadside Ditches and Culverts in Olde Towne Nipomo

Alternative 2 proposes to construct a new underground storm drain system in the community with new outfalls to creeks, consisting of new concrete gutters and/or ditches and new storm drain inlets. Certain culverts would also be replaced with larger ones to increase drainage capacity.

- Unnamed tributary 1. This alternative would involve constructing a new underground storm drain line, flowing north along Thompson Avenue then west down Day Street creating a new outfall at Deleissigues Creek. New concrete gutters and/or ditches would be created along the street to collect and convey local runoff into new drop inlets leading to the storm drain line. Additional sidewalks and curbs may be constructed and roadside ditches and culverts would be added along Day Street to convey flow under Mallagh Street into Deleissigues Creek. Additional improvements would include improving the roadside ditch on the northwest side of Sea Street, adding a ditch on the southeast side, and replacing the silt filled corrugated metal pipes under Mallagh Street.

- Unnamed tributary 2. This alternative would resolve flooding problems along Bee Street between Thompson Avenue and Burton Street. A new underground storm drain system would be constructed along Bee Street and then travel southward along Mallagh Street and discharge into an open channel west of Mallagh Street. Alternatively, an underground storm drain extending from Thompson Avenue to Mallagh Street would bypass ditches and culverts that direct flow through the backyards of residents in the community.

Alternative 3. Improvements to Existing Drainage Facilities and Increasing Drainage Capacity in Nipomo Mesa

Alternative 3 proposes to resolve drainage problems for residents of the Nipomo Mesa. General solutions have been proposed and could be categorized a road drainage improvements coupled with infiltration basins. Existing drainage facilities would be improved and new facilities would be installed when necessary. A new terminal detention facility may be constructed if needed. Vegetation and debris would be removed from existing culverts, drainage inlets, and detention basins as a maintenance measure.

METHODS

Project alternatives were analyzed for environmental constraints that would prevent agency approval, increase costs (particularly for mitigation), or delay the project schedule. Existing documentation relative to each resource topic (e.g., biological resources, cultural resources, and land use) was examined to help determine the likelihood of constraints. Minor impacts discovered during the analysis are not included in this report because they can be avoided or minimized by using Best Management Practices or by following engineering or design standards.

Biological Resources

Essex performed a site assessment with Raines, Melton, & Carella, Inc. (RMC) on July 1, 2002 to conduct a reconnaissance-level review of biological resources in the project areas. The assessment area included the proposed project sites and bordering areas. Each site was generally assessed for its potential to support sensitive biological and botanical resources. Information from the California Natural Diversity Database was combined with recent experience on other projects in the area to determine the potential for sensitive species and their habitat in the project areas.

Cultural Resources

Data from San Luis Obispo County Department of Planning and Building records were used to determine if cultural resources have been identified in each project area. No standard record searches or site visits were conducted.

Land Use

The *San Luis Obispo County South County Area Plan (Inland)*; *Final Environmental Impact Report*, *South County Area Plan Inland Portion;* and the *Nipomo Mesa Planning Study* were reviewed to determine whether the project was consistent with local policies. A Geographic Information System was used to examine the presence of prime farmland and farmland of local or state importance in the project area.

RESULTS

Environmental Constraints

Table 1 summarizes the environmental constraints that may be encountered for each project alternative. Based on this preliminary analysis, major environmental constraints include potential modification of jurisdictional waters (Alternatives 1 and 2), the potential presence of cultural resources (Alternatives 1, 2, and 3), and potential impacts to threatened and endangered species habitat (Alternatives 1 and 2).

Permit Assessment

An assessment of the state and federal environmental permits that may be necessary for each project alternative is provided in Table 2. An estimate of the timeframe typically required to obtain each type of permit is summarized in Table 3. Based on the level of research performed

for this analysis, project alternatives would be possible to permit if mitigation measures are implemented to avoid significant environmental impacts. The U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service may have particular concerns about Alternative 1 due to potential impacts to jurisdictional waters and sensitive species habitat.

Potential Mitigation

Potential impacts to environmental resources may result from the proposed project alternatives. The impacts may require implementing mitigation measures to protect sensitive, threatened or endangered species, water quality, land use, and cultural resources. Mitigation measures could include the following.

- Preconstruction surveys for sensitive species for project Alternatives 1 and 2.
    - Construction monitoring in locations where presence of sensitive species habitat has been confirmed.
- Implementing erosion and sediment control measures during construction of project Alternatives 1, 2, and 3.
- Performing a record search for cultural resources on all project alternatives.
    - Surface surveys, monitoring by a qualified archeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings.

Additional Studies and Surveys

The following studies and surveys will be required in order to begin the permitting phase of the project:

- Habitat assessments
- Sensitive species surveys
- Cultural resource record searches

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Table 1: Nipomo Environmental Constraints

Alternatives	Biological Resources	Cultural Resources[1]	Land Use
Alternative 1. Channel Improvements and Increasing Culvert Capacity in Olde Towne Nipomo			
Conduct channel improvements and management for Deleissigues Creek and Haystack Creek, including vegetation clearing, channel realignment/modification, bank stabilization, and increasing culvert capacity in strategic areas.	Any work in or near stream channels may affect threatened or endangered species habitat, including steelhead and California red-legged frog (CRLF). Other sensitive species that may also be affected include southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	There are several cultural resource sites between Nipomo Creek and Oakglen Avenue and along Eve Street. Other sites may also be in the area. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None
Alternative 2. Improvements to Existing Roadside Ditches and Culverts in Olde Towne Nipomo			
Construct a new underground storm system with new outfalls to creeks in the community, consisting of new concrete gutters and/or ditches and new storm drain inlets; replace existing culverts in the community with larger culverts to increase drainage capacity.	Construction of new outfalls to creeks may affect threatened or endangered species habitat, including steelhead and CRLF. Other sensitive species that may also be affected include southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	There are several cultural resource sites between Nipomo Creek and Oakglen Avenue and along Eve Street. Other sites may also be in the area. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None
Alternative 3. Improvements to Existing Drainage Facilities and Increasing Drainage Capacity in Nipomo			
Improve existing drainage facilities and install new facilities when necessary; construct a terminal detention facility if necessary; remove vegetation and debris from existing culverts, drainage inlets, and detention basins as a maintenance measure.	None	There are several cultural resource sites along Highway 101 between Cherokee Place and Story Street and within the boundaries of Osage Street to Tefft Street and Pomeroy Road to Mesa Road. Other sites may also be in the area. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None

[1]Cultural resource information was obtained from County of San Luis Obispo Planning Department. No standard record searches or site visits were conducted.

Table 2: Nipomo Permit Assessment

Alternative	Project Description	CEQA[1] Document	SHPO 106[2]	CDFG 1601[3]	Corps 404 Permit[4]	USFWS Section 7[5]	NMFS Section 7[6]	RWQCB 401[7]	SWRCB General Permit[8]	SWRCB Phase II SWMP[9]	Notes
Alternative 1. Channel Improvements and Increasing Culvert Capacity in Olde Towne Nipomo											
Conduct channel improvements and management and increase culvert capacity in strategic areas.	Remove vegetation and perform maintenance in Deleissigues Creek and Haystack Creek, install a new culvert at the intersection of Tefft Street and Avocado Avenue, realign culvert at Mallagh Street, possibly stabilize the bank of Haystack Creek downstream from the Mallagh Street culvert, install new underground storm drain line below Tefft Street.	ND[10] (see notes)	Possibly (see notes)	Yes	Yes	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	If vegetation removal, channel modification, or maintenance in Deleissigues Creek and Haystack Creek have the potential to result in significant impacts to the watershed or sensitive species, an EIR may be required. Otherwise, a ND or MND will be required. A Corps permit will be required for any work below ordinary high water (OHW) of any jurisdictional waters. The Corps will consult with the NMFS and the USFWS if threatened or endangered species will be affected by vegetation removal, channel modification, or maintenance. If a Corps permit is required, a RWQCB 401 Certification will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.

[1] California Environmental Quality Act: Required if a state agency has to take action on a project. If the project does not qualify for an exemption, the compliance document is either a Negative Declaration (ND), Mitigated Negative Declaration (MND), or an Environmental Impact Report (EIR).

[2] State Historic Preservation Office – Section 106 (Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building): Required if a federally funded or permitted project has the potential to impact cultural resources.

[3] California Department of Fish and Game – 1601 Lake and Streambed Alteration Agreement: Required if work will be conducted in a streambed or bank or riparian area or if a project has the potential to impact sensitive species or their habitat.

[4] U.S. Army Corps of Engineers – 404 Permit: Required if a project involves work below the ordinary high water mark.

[5] U.S. Fish and Wildlife Service – Section 7 Consultation: Required if a project has the potential to impact federally listed species or their habitat.

[6] National Marine Fisheries Service – Section 7 Consultation: Required if a project has the potential to impact federally listed marine and anadromous fish species or their habitat.

[7] Regional Water Quality Control Board – 401 Certification: Required if a project has the potential to discharge to surface water, ground water, or other water systems and requires a federal permit.

[8] State Water Resources Control Board – National Pollutant Discharge Elimination System (NPDES) General Construction Permit: Required if a project involves ground disturbance of an acre or more.

[9] State Water Resources Control Board – Phase II Storm Water Management Plan Revision: Required for potential discharges to surface water, ground water, or other water systems by small municipal separate storm sewer systems not covered by the Phase I program.

[10] Negative Declaration or Mitigated Negative Declaration: Required for projects with impacts that are less than significant or less than significant with mitigation and that do not qualify for an exemption.

Alternative	Project Description	CEQA[1] Document	SHPO 106[2]	CDFG 1601[3]	Corps 404 Permit[4]	USFWS Section 7[5]	NMFS Section 7[6]	RWQCB 401[7]	SWRCB General Permit[8]	SWRCB Phase II SWMP[9]	Notes
Alternative 2. Improvements to Existing Roadside Ditches and Culverts in Olde Towne Nipomo											
Construct a new underground storm drain system with new outfalls to creeks, with new concrete gutters and/or ditches and new storm drain inlets. Replace culverts at certain locations.	Tributary 1: Construct new storm drain line with new outfall at Deleissigues Creek; construct new concrete gutters, ditches, sidewalks, and curbs; improve roadside ditch on northwest side of Sea Street; add ditch to southeast side of Sea Street; replace culverts at Mallagh Street. Tributary 2: Construct storm drain line along Bee Street and Mallagh Street or extend storm line from Thompson Avenue to Mallagh Street.	ND (see notes)	Possibly (see notes)	Yes	Yes	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	Because the project involves construction of new facilities and cultural resources or sensitive species may be present, a ND or MND will be required. A Corps permit will be required for any work below OHW of jurisdictional waters. The Corps will consult with the NMFS and/or USFWS if threatened or endangered species will be affected by the new outfall construction. If a Corps permit is required, a RWQCB 401 Certification will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.
Alternative 3. Improvements to Existing Drainage Facilities and Increasing Drainage Capacity in Nipomo											
Modify existing drainage facilities and create new drainage facilities with more capacity.	Improve existing drainage facilities and install new facilities when necessary; construct a terminal detention facility if necessary; remove vegetation and debris from existing culverts, drainage inlets, and detention basins as a maintenance measure.	ND (see notes)	Possibly (see notes)	No	No	No	No	No	Yes	Yes	If the project involves construction of new facilities or if cultural resources are present, a ND or MND will be required. Otherwise, work may qualify for an exemption. Depending on the result of a cultural records search, Section 106 consultation may be required.

Table 3: Nipomo Permitting Timeframes

Permit	Typical Timeframe [1] (months)	Notes
California Environmental Quality Act (CEQA)		
Exemption	< 1	
Negative Declaration/Mitigated Negative Declaration	6 – 12	
Environmental Impact Report	12 – 24	
California Department of Fish and Game 1601 Streambed Alteration Agreement	3 – 6	CEQA must be completed before the 1601 Agreement can be issued.
U.S. Army Corps of Engineers Section 404		
Nationwide Permit	1 – 3	Section 7 and Section 106 consultations are required to be complete.
Individual Permit	12 – 18	National Environmental Policy Act compliance is required, which can take one year or more.

[1] Timeframes do not include time required to perform pre-application studies, to prepare required applications, and to complete prerequisite approvals.

Permit	Typical Timeframe [1] (months)	Notes
U. S. Fish and Wildlife Service/ National Marine Fisheries Service Section 7 Consultation		
Informal	1 – 3	
Formal	6 – 12	
State Historic Preservation Office Section 106 Consultation	6 – 12	
Regional Water Quality Control Board 401 Certification	1 – 3	CEQA must be completed before the 401 Certification can be issued.
State Water Resources Control Board National Pollutant Discharge Elimination System		
General Construction Permit	< 1	A Storm Water Pollution Prevention Plan must be prepared prior to construction and implemented during construction.
Phase II Storm Water Management Plan (SWMP) Modification	3 – 6	A SWMP must be modified and submitted with Notice of Intent prior to construction. Because this program has just begun, processing times may vary.

Appendix H

FUNDING TECHNICAL MEMORANDUM

APPENDIX H

FUNDING TECHNICAL MEMORANDUM

Technical Memorandum

Raines, Melton & Carella, Inc.
Consulting Engineers/Project Managers

San Luis Obispo County
Community Drainage and Flood Control Studies

Task: **Task 8 – Funding Assistance Review**

To: Mr. Dean Benedix, Project Manager, San Luis Obispo County

Prepared by: Jeffrey Tarantino, P.E.

Reviewed by: Lou Carella, P.E., Mary Grace Pawson, P.E.

Date: July 30, 2003

File: 34-9.B.8

1 Introduction

The San Luis Obispo County Flood Control and Water Conservation District ("District") has contracted with Raines, Melton, & Carella, Inc. ("RMC") to prepare six community drainage and flood control studies (the "Study"). The communities involved in the Study are Cambria, Cayucos, Nipomo, Oceano, San Miguel, and Santa Margarita. The problems in these communities include inadequate local drainage systems, unmaintained creeks, and inadequate conveyance capacity in creeks. Technical Memoranda detailing the problems for each of the communities and possible solutions are being completed as a separate task of this scope of work. This memorandum outlines funding source options and requirements for possible solutions to the six community drainage and flood problems.

The District is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in unincorporated public areas where no other agency has assumed an active role in such activities. The District is not responsible for funding the design and construction of private property benefiting from drainage and flood control improvements. Exceptions to this exist in established Community Services Districts (CSD's) where the CSD's may be specifically designated as authorized agencies responsible for or authorized to perform these as well as other services. Design and construction of drainage and flood control improvements is the responsibility of the local lead agency or sponsoring entity which implements the improvements on behalf of the property owners who benefit from the improvements. This policy is consistent with State subdivision development law, which requires the benefiting properties to finance property improvements.

Funding of management, planning, design, construction and maintaining drainage and flood control facilities in unincorporated areas comes from four primary sources:

- Local Community Funding: The property owners benefiting from the improvements are responsible for funding or obtaining funding for the implementation of the improvements. They are also responsible for funding annual maintenance of the system if the facilities primarily serve private property. The District Board's policy does not provide for the use of general flood control revenue, collected from all County properties, to be used to construct improvements that mainly benefit individual property owners.

- Supplemental Grant Program: Numerous Federal, State & Private grant programs exist which provide partial funding for drainage improvements, flood control and related watershed, stream and shore protection. It is the goal of these grant programs to provide supplemental funding for a community or agency for flood protection, flood mitigation and resource conservation and enhancement programs. Grant funding, if available, or establishment of loans through bonds sold through the formation of assessment districts, are examples of potential supplemental funding for implementation of drainage and flood control improvements. These programs are uniquely focused, have stringent qualifying regulations, specific procedural processing and monitoring requirements. These programs usually require a significant community funding or matching contribution.
- General Flood Control Fund Revenue: It is the District Board's adopted policy that general flood control revenue funding be used only for management, planning and non-roadway related maintenance services for drainage and flood control facilities. General flood control revenue is generated from County property taxes collected from all property in the County. This policy does not provide for the use of these funds for construction of new drainage or flood control improvements since this revenue is limited and is to be spent to benefit County areas at large.
- Road Fund Revenue: The use of Road fund revenue is restricted to roadway servicing maintenance and improvements, including drainage and flood control maintenance and roadway related improvements necessary to maintain the integrity and safety of the County road system. County Road funds are severely limited and inadequate relative to the needs of the expansive County maintained road system.

The realities of the overwhelming need for multi-million dollar funding for drainage and flood control facilities throughout the County and limited revenue sources pose a challenge to Communities to locally determine the desire and importance of the implementation of drainage infrastructure. For this reason, it is the policy of the District to encourage a local entity to serve as the lead agency (e.g. a CSD) to provide an implementation strategy and financing mechanism that is supported by the Community or area of benefit. If there is no local agency available or agreeable to assist in project implementation, the District is available to provide planning and management services for supporting community groups. However, if a community is unwilling to pay for the benefiting infrastructure, the project will not advance until funding is secured.

1.1 Technical Memorandum Objectives

The purpose of this technical memorandum (the "TM") is to provide a summary of various funding options for the projects developed as part of the Study. The selection of funding alternatives presented in this TM is based on the general types of drainage and flood mitigation projects proposed for the six communities, and is not project specific. The basic problems experienced and potential solutions for the six communities are summarized in Table 1 and fall into two categories; 1) local drainage, and 2) creek conveyance capacity.

Table 1 - Summary of Problems and Solutions

Problem	Alternative Solution
Inadequate Local Drainage	• Curb and Gutter • Percolation Basins • Storm Drain System
Overtopping of Creek Banks	• Larger Culverts • Improve Channels • Levees • Floodwalls • Vegetation Management • Increase Maintenance • Retention Basins

1.2 Recommended Funding Strategy

A community or area consensus must be established as an advocate for the installation of new drainage and flood control facilities. A local lead agency (e.g. CSD) or other sponsoring agency should be utilized to promote and sponsor the project on behalf of the supporting community. The County Flood Control District staff is available to assist if the local community supports the implementation but no local agency or sponsor is available or supportive of a project. Included in the community consensus must be the commitment to fund a significant portion of the initial costs of implementing and constructing the project. It should be recognized that the strongest applicants for leveraged grant or other supplemental funding have an established and effective local funding program. It is recognized that nearly all of the recommended project may need to seek and obtain leveraged supplemental funding from outside the local community. Additionally, the community or area must be committed to fund annual maintenance of the facilities to the extent they provide a benefit to private property. A commitment to maintenance is one way a local community can demonstrate a supportive and effective program to a potential grant program source.

After establishment of a supportive community and lead agency, the lead agency should apply for supplemental grant, loan and/or cost sharing funds through available programs outlined herein. The implementation of a project will depend on the success and continued support of the community and the success of the grant application process.

This TM is organized to outline first, the local funding options that the lead agency can establish, and second the outside Federal and State funding options that may be accessed to "match" local funding sources and help implement projects. Because the local match is critical to accessing outside funding, it is highly recommended that the lead agency begin to establish local funding mechanisms (even if these do not fully fund the recommended projects) in order to be more competitive for outside funds. The recommended local funding mechanisms include 1) grants, 2) taxes, 3) assessments, and 4) fees (property based and development impact). The creation of a local funding source, plus the potential procurement of Federal and State grants, establishes the framework for a comprehensive community funding program. This approach

also acknowledges the realistic nature of public projects that no capital improvement can rely solely on grants.

2 Local Funding

It must be recognized by communities needing and desiring drainage and flood control improvements that the area property owners obtain a significant benefit from the installation of these improvements. This benefit is partially demonstrated in the increased overall property value where drainage improvements have been installed. Likewise, in areas of flooding or areas where drainage infrastructure does not exist, the lack of this benefit is observed in reduced property value. Therefore, significant or majority funding from the property owners benefiting from the improvements is the primary funding source of such projects.

As previously discussed, the lead agency or sponsoring entity is the responsible agency for programming new drainage and flood control improvements where there is community support and potential funding resources. Existing CSD's could be responsible for drainage and flood control project implementation. However, the original LAFCo designated services of the CSD must include these powers. If these powers are not currently included within the CSD's current charter service designations, they can only be included by holding an election. It is assumed that the lead agency is the applicant and/or responsible agency for administering the funding options discussed in this section.

The lead agency has several options for acquiring funds for the community or area involved in the study. The primary avenues for collection of property owner revenue are taxes, assessments, and fees. Each of these is detailed in the following subsections.

2.1 Special Taxes

Taxes are the most common means for a government to raise revenue. An existing tax can be raised, or a new tax can be levied on residents in an area to fund flood control projects. By definition, this is a special tax requiring approval from two thirds of the electorate (residents). If approved, the revenue generated would be allocated specifically for drainage and flood control projects anywhere in the proposed improvement boundary. It would be the responsibility of the lead agency to determine where those funds would be spent.

This form of revenue requires all residents to pay the tax regardless of benefits received and the special tax formula does not need to be related to benefits received from the proposed projects. In order to establish the special tax, the lead agency would need to develop and adopt a formula; the Board of Supervisors approves placing the tax on the ballot. A special tax is approved by resident registered voters (except in the case of Mello-Roos CFD tax which can be approved by property owners in uninhabited areas). Figure 1 illustrates the special tax adoption process.

2.2 Benefit Assessments

A benefit assessment is a charge levied on a property to pay for public improvements or services that benefit the property. The difference between an assessment and a tax is that benefit assessment formula must quantify the relationship between the assessment charged and the benefit received by the property (if a property does not benefit, it cannot be assessed).

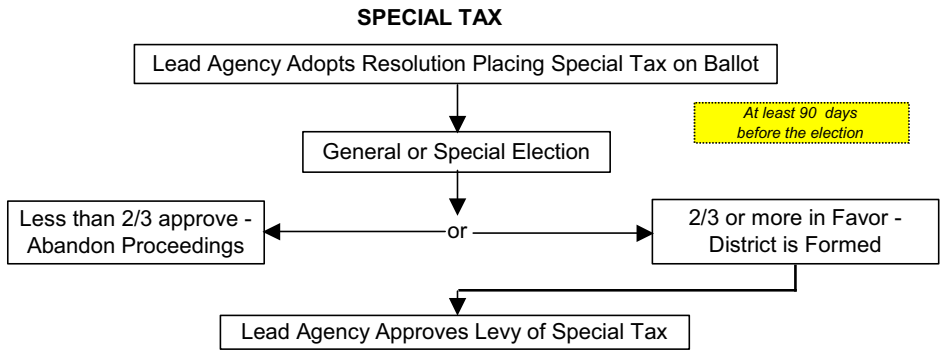


Figure 1 – Special Tax Adoption Process

All new assessments must conform to the requirements of Proposition 218, which was passed in November 1996. Proposition 218 specifically requires that property owners (not registered voters) be allowed to vote on new benefit assessments. New assessments may be approved by a simple majority approval of the property owners, with votes weighted in proportion to the assessment proposed.

In order to implement a new assessment, the lead agency must define those parcels that receive benefit and define the method of assessment in an Engineer's Report. Figure 2 illustrates the benefit assessment adoption process.

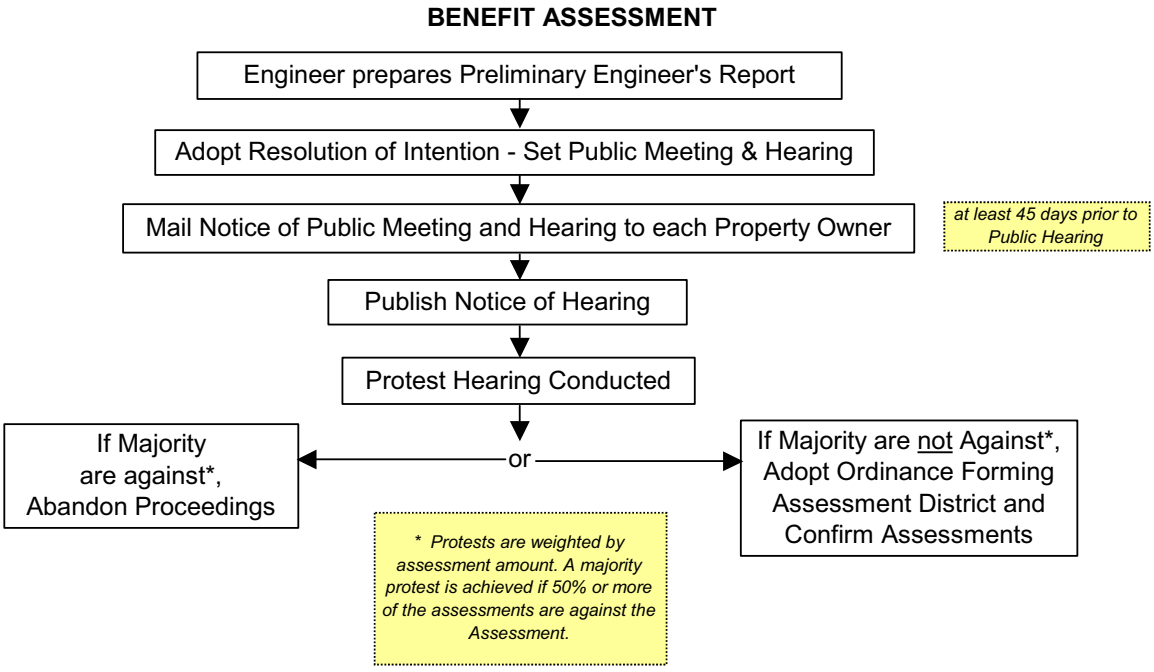


Figure 2 – Benefit Assessment Adoption Process

2.3 Property-Based Fee

A property-based user fee is a charge levied on a property to pay for public improvements or services that are used by that property. The difference between an assessment and a user fee is that assessments rely on a demonstration of special benefit (which can be hard to prove) while user's fees require demonstration of use. In the case of drainage facilities, a user fee allows a lead agency to collect revenue from properties that contribute runoff into the system but may not flood because of their location.

A user fee can be structured proportionally to the amount each parcel uses the flood control facilities rather than how much each property benefits from the services or improvements provided. This allows program costs to be spread over a larger customer base. For flood control work, user fees are typically related to impervious area on the property, which can be equated to runoff. Like the benefit assessment, a user fee may also be implemented by a 50% vote; however, before the vote may be initiated, a noticed protest hearing must take place and less than 50% written protest must be received.

In order to implement a new user fee, the lead agency must define those parcels that use the various drainage facilities and define its method of calculating a fee proportional to use. Figure 3 illustrates the user fee adoption process.

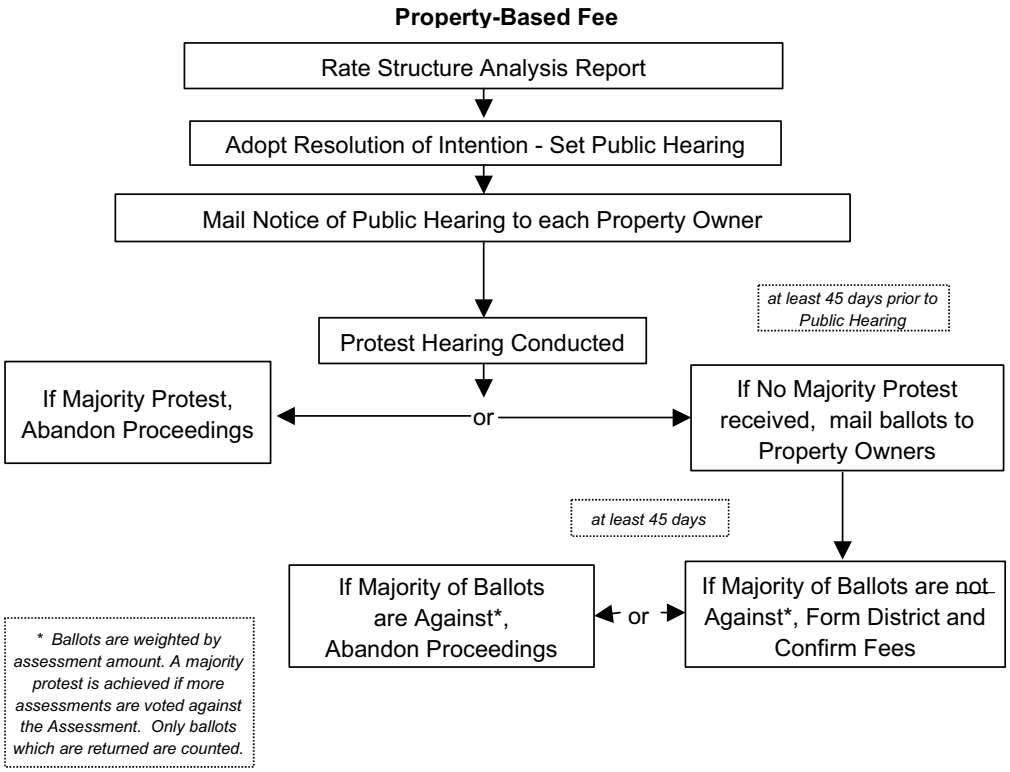


Figure 3 – Property Based Fee Adoption Process

2.4 Development Impact Fee

Government Code Section 66000 et.seq., allows the County or District to collect development fees to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Development Impact Fees are tied to either General Plans or Capital Improvement Programs approved by the County or District. As regular updates of the General Plan and/or Capital Improvement Programs are prepared, additional storm drain infrastructure is identified to support the new developments and projects. The fees cannot be used to correct existing problems; although they can be used to fund a "fair share" of new projects.

Development Impact Fees are not subject to vote. They can be approved by a majority of the County Board of Supervisors or the Flood Control and Water Conservation District Board of Directors after a protest hearing. Figure 4 illustrates the adoption process.

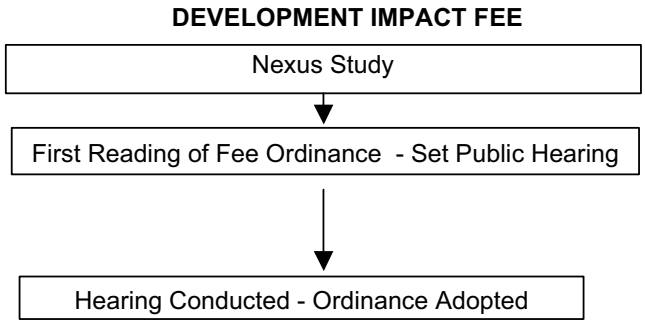


Figure 4 – Development Impact Fee Adoption Process

The County/District should implement Development Impact Fees in all the communities. The communities of Nipomo, San Miguel, and Santa Margarita would benefit from the collection of impact fees as their general plans indicate continued growth of residential and commercial properties. Cambria, Cayucos and Oceano appear built out, however, redevelopment and larger remodels (improvements that exceed a certain percentage of the current property home value) could provide the nexus for collecting impact fees.

3 Outside (Leveraged) Funding Sources from the Federal Analysis

The US Army Corps of Engineers (Corps) developed the Final Funding Program Analysis Report (FPAR) for the San Luis Obispo Creek Watershed (Report) in October 2001. The purpose of the FPAR was to inform the District of monies that might be available to fund a variety of watershed protection projects. The funding sources identified in the FPAR are included in the funding review as part of this TM. In order to not duplicate efforts, the funding sources identified in the FPAR are incorporated as part of this TM and select sections from the FPAR are included in Appendix B.

3.1 Applicable Funding Sources

Although all the funding sources identified in the FPAR relate to watershed protection, only a small number of those sources apply to the types of projects proposed by this Study. Table 2 identifies applicable funding sources described in the FPAR.

Table 2 – Applicable Funding Sources from Funding Program Analysis Report

Agency	Funding Source	Description
US Army Corps of Engineers	Flood Hazard Mitigation and Riverine Ecosystem Restoration Program	Watershed-based program focusing on providing flood protection through non-structural measures when possible
US Army Corps of Engineers	Emergency Streambank and Shoreline Erosion Protection	Allows emergency streambank and shoreline protection to prevent damage to public facilities
US Army Corps of Engineers	Section 205 Flood Control Project	Local protection from flooding by the construction of flood control works such as levees, channels, and dams.
US Army Corps of Engineers	Section 206 Aquatic Ecosystem Restoration	Carries out aquatic ecosystem restoration projects that will improve the quality of the environments.
US Army Corps of Engineers	Section 208 Snagging and Clearing	Local protection from flooding by channel clearing and excavation.
California Department of Water Resources	Urban Streams Restoration Program	Reduce damages from streambank and watershed instability and floods while restoring the environmental and aesthetic values of streams.
State Water Resources Control Board	Nonpoint Source Implementation Grant Program	Reduce erosion in channels to improve water quality through nonpoint source questions
State Water Resources Control Board	Proposition 13 Watershed Protection Program	Develop local watershed management plans and/or implement projects consistent with watershed plans

Notes:

Projects authorized under the US Army Corps of Engineers Continuing Authorities Program (CAP). The CAP provides the Corps with authority to implement small water resources projects without specific congressional authorization

3.2 Additional Requirements for Corps Funding

The Corps requires that the local sponsor[1] assist in the preparation of the planning, environmental, and design documents to ensure that the communities are involved in the project development and selection process. This requires the local sponsor to have an active role throughout the entire Corps civil works process, which can last up to seven years or more. The local sponsor is also expected to share in the cost of the project planning, design and construction (cost sharing depends on the program, but can be as high as 50 percent of the project). The local sponsor financial contribution can be in the form of in-kind service (e.g. staff time), which would offset the cash contribution requirements, but some of these costs would be in addition to the requirements defined by the Corps process. The local sponsor will incur

[1] A local sponsor is typically the local flood control agency or district responsible for programming drainage and flood control services. Local sponsors share in the cost for planning, designing and constructing a project with the Corps.

project costs that are deemed ineligible and cannot be used as part of the local sponsor financial contribution. These costs are typically project management costs incurred for administrative tasks such as management of staff, preparation of invoices, etc.

3.3 Grants

The County's planning department administers Community Development Block Grants (CDBG) on a yearly basis. This program is funded by the US Department of Housing and Urban Development (HUD) and targets low to moderate-income communities. The funding for CDBG is guaranteed each year but the level of funding varies. A detailed description of the program is included in Appendix A.

4 Additional Outside Funding Sources available through the State

In addition to the sources of funding identified in the FPAR, the State of California (State) provides funding for flood protection and erosion control projects. The California Department of Water Resources (DWR), through the Flood Protection Corridor Program (FPCP), funds watershed protection projects that have agriculture and/or wildlife benefits. For those projects that impact the California Department of Transportation (Caltrans) facilities, a standard cooperative agreement exists that can be used to share drainage project costs. The Governor's Office of Emergency Services (OES) administers grants that fund flood protection projects through the Federal Emergency Management Agency's (FEMA) Flood Mitigation Assistance (FMA) program. The State Water Resources Control Board (SWRCB) provides low interest loans for projects that address non-point source pollution through the State Revolving Fund (SRF) loans. Specifically, communities that must meet National Pollutant Discharge Elimination System (NPDES) Phase II requirements are eligible for the SRF loans. The state funding sources are summarized in Table 3 and detailed in Appendix A.

Table 3 – Additional Funding Sources

Agency	Funding Source
California Department of Water Resources	Flood Protection Corridor Program
California Department of Transportation	Cooperative Drainage Projects
Governor's Office of Emergency Services	Flood Mitigation Assistance Program
State Water Resources Control Board	State Revolving Fund Loan

The District is currently applying for assistance from FEMA through the FMA program. The District has submitted a Floodplain Management Plan (FMP) to the State of California Office of Emergency Services for approval. The FMP identifies several repetitive loss structures throughout the County to be removed from identified floodplains. As described in Appendix A, an approved FMP is required prior to applying for funds from the FMA for implementation of the proposed project. The District should continue its efforts to have the FMP approved and apply for FMA project funds to implement the proposed projects.

4.1 Typical Grant Requirements

Grants provide an opportunity for communities to reduce the total project cost that will be funded through taxes, assessments, and fees. Grant applications often require detailed information

regarding the project, the impact on the community and the environment, and project costs. Additionally, grant distributors prefer projects that provide multiple benefits including environmental restoration. Projects compete for existing funds and a majority of applications are not accepted because of this.

Once a grant is appropriated to a project, the recipient is required to complete additional paperwork including invoices, status reports, and project closeout reports. All these costs are not included as part of the grant and are the responsibility of the recipient. The costs are considered ineligible costs, not included as matching funding for project costs. These costs and application costs can be significant and need to be accounted for when preparing project budgets.

5 Additional Outside Funding Sources available through Private Sources

The FPAR identified several funding sources available through private sources. However, these programs provide funds for projects whose scope of work include environmental restoration, creation of open space, and wildlife habitat improvement projects. Projects that will be identified in the Study may not provide enough of these benefits and therefore private funding sources were removed from further consideration. In addition, the focus of these private sources is to provide funds for non-profit and tax exempt groups.

Additional private sources other than those identified in the FPAR are available for similar projects. A listing of these sources can be found on the California Watershed Database website. The website address is http://watershed.ecst.csuchico.edu/new_spin/spinmain.asp. This website provides a search engine for users to locate funding sources based on the project scope of work.

6 Funding Strategy

There are several funding opportunities available for the projects identified in the Study but the likelihood of receiving enough grant funding for all project costs is unlikely. As stated previously, the lead agency will need to fund the planning of the projects, but it is the responsibility of the community to provide permitting, environmental compliance, design and construction funding. The following case studies present example projects using a combination of funding for a sample project.

6.1 Case Study #1 – Isolated Drainage Project

For an isolated drainage project that eliminates localized ponding or street flooding through the construction of curbs and gutter, drop inlets and culverts, the benefit assessment is a logical choice. A typical funding strategy using a benefit assessment would be as follows:

- The Engineer's Report for the project would be completed by the lead agency within 3 months of start. Programming costs would be funded through the lead agency.
- Concurrently with completing the Engineer's Report, the lead agency would conduct a benefit assessment proceeding for the properties that benefit from the improvements. The benefit assessment would be in place prior to moving forward with permitting, environmental compliance, and design. The lead agency can use the assessment to secure bonds to fund construction.

- Appropriate environmental documentation is completed concurrently with the design within 9 months of start.
- Lead agency advertises project and oversees construction. Duration of the construction would be based on the magnitude of the scope, but most likely would be less than one year.
- The lead agency would continue collecting assessments on the properties until the bonds are paid off.

The total time required to complete a project under this scenario is a minimum of two years.

6.2 Case Study #2 – Comprehensive Drainage Project

For a project that includes the construction of storm drain infrastructure such as curbs and gutters, drop inlets, and storm sewer pipelines, a typical funding strategy using a benefit assessment, and if appropriate, CDBG funds would be as follows:

- An Engineer's Report for the project completed by the lead agency within 6 months of start. Programming costs would be funded through the lead agency.
- Concurrently with completing the Engineer's Report, the lead agency would conduct a benefit assessment proceeding for the properties that benefit from the improvements. The benefit assessment would be in place prior to moving forward with permitting, environmental compliance, and design. The lead agency can use the assessment to secure bonds to fund construction.
- Appropriate environmental documentation is completed concurrently with design within 12 months of start.
- Community can apply for CDBG funds, for low-income communities only, following the establishment of the user fees. Funds are distributed in August of each year and applications are typically due October of the previous year.
- Lead agency advertises project and oversees construction. Duration of the construction would be based on the magnitude of the scope and could vary between one and three years.
- The lead agency would continue collecting property based fees until the bonds are paid off.

The total time required to complete a project under this scenario is a minimum of three years.

6.3 Case Study #3 – Channel Improvements

For a project that includes work within an existing channel, a typical funding strategy using a Corps CAP agreement would be as follows:

- The lead agency, on behalf of a majority of its constituents, sends a letter to the Corps to request a CAP project.
- Corps completes a reconnaissance report to identify the problem and determine Federal interest in a project within 1 year of authorization. The benefiting constituents are not required to cost share in the preparation of the study but will be required to participate in the development through public meetings, coordination meetings with Corps staff, and review of the reconnaissance report.

- Corps completes a feasibility report and environmental document within 3 years of approval of the reconnaissance report. The benefiting constituents are required to pay for 50 percent of the total project costs as well as participate in the completion of both documents.
- Corps completes final design within 3 years of approval of the feasibility report and environmental document. The benefiting constituents are responsible for 25 percent of the project costs.
- The lead agency creates a benefit assessment district concurrently with the completion of final design. The lead agency can use the assessment to secure bonds to fund the benefiting constituents portion of the cost.
- Corps advertises and administers construction contract with construction completed between one and three years after start depending on the magnitude of the projects. The benefiting constituents are responsible for 35 percent of the construction costs.

The total time required to complete a project under this scenario is a minimum of seven years.

6.4 Case Study #4 – Drainage Facility Across Public Highway

For a project that includes construction of drainage facilities across a public highway such as Highway 1, a typical funding strategy using a property-based fee and cost sharing with Caltrans would be as follows:

- An Engineer's Report for the project would be completed by the lead agency within 6 months of start. Caltrans will require a review period for the design, which will impact the duration of the design schedule. Programming costs would be funded through the lead agency.
- Concurrently with completing the planning, the lead agency implements a property-based fee. The fee would be in place prior to proceeding with environmental documentation and design. The lead agency can use the property-based fee to secure bonds to fund construction.
- Lead agency submits a cost share agreement to Caltrans concurrently with completing design. Approval of the cost share agreement can take up to 12 months depending on the project.
- Lead agency advertises project and oversee construction. Duration of the construction would be based on the magnitude of the scope and could vary between one and three years.

The total time required to complete a project under this scenario is a minimum of three years.

7 Community Funding

Each community participating in the Study likely qualifies for one or more funding sources identified. The various funding sources identified for projects are presented in Table 4. A matrix identifying each community's problems and likely funding sources is included in

Table 5. A more detailed analysis of potential funding for each of the communities will be included with the individual community implementation strategy report that will be prepared under separate task of the agreement.

8 Conclusion/Recommendation

The study being prepared under separate task of the agreement with RMC will provide the lead agency, sponsoring agency, benefiting constituents, and/or the District with a summary of existing problems in the six communities as well as recommended solutions. This TM summarizes the various funding sources available to these entities, and the communities to implement those projects. Although several grant and cost sharing opportunities exist with various federal and state agencies, significant work is required by the lead agency and/or local sponsor to complete applications and participate in the process. In other words, these funding sources are not "free money."

Because of the effort required to apply for monies that are not guaranteed, it is recommended that the following two local funding mechanisms for projects be implemented:

- The County implement a development impact fee structure that will help assure that all new development pays fairly for its impacts.
- Subject to demonstrated community support, the lead agency should move forward with a property based fee program that assures that all users of existing drainage systems will contribute to upgrade and maintenance. Because the property based fee requires voter approval, it is recommended that the lead agency does not move forward with an election until a petition signed by more than 50% of property owners is brought to the lead agency.

Detailed recommendations for each of the communities will be included with the Study. This TM only summarizes the various sources of funding unless the funding mechanism can be implemented without a specific project scope.

The District and lead agency should continue to aggressively pursue the funding sources listed in this TM and new funding sources that may become available where communities commit themselves to support of a project. Monies received through grants and cost share can be used to offset costs born by the communities.

Table 4 – Summary of Funding Sources

Number	Agency	Funding Source
1	Community Services Districts, San Luis Obispo County Flood Control and Water Conservation District, other lead agency	Special Property Tax
2	Community Services Districts, San Luis Obispo County Flood Control and Water Conservation District, other lead agency	Benefit Assessment
3	Community Services Districts, San Luis Obispo County Flood Control and Water Conservation District, other lead agency	Property Fee
4	County of San Luis Obispo and/or San Luis Obispo County Flood Control and Water Conservation District	Development Fee
5	County of San Luis Obispo	Community Development Block Grants
6	US Army Corps of Engineers	Flood Hazard Mitigation and Riverine Ecosystem Restoration Program
7	US Army Corps of Engineers	Emergency Streambank and Shoreline Erosion Protection
8	US Army Corps of Engineers	Section 205 Flood Control Project
9	US Army Corps of Engineers	Section 206 Aquatic Ecosystem Restoration
10	US Army Corps of Engineers	Section 208 Snagging and Clearing
11	California Department of Water Resources	Urban Streams Restoration Program
12	California Department of Water Resources	Flood Protection Corridor Program
13	California Department of Transportation	Cooperative Agreement
14	State Water Resources Control Board	Nonpoint Source Implementation Grant Program
15	State Water Resources Control Board	Proposition 13 Watershed Protection Program
16	State Water Resources Control Board	State Revolving Fund Loan
17	Governor's Office of Emergency Services	FEMA Flood Mitigation Assistance Program

Community	Problems	Funding Sources from Table 4															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cambria	1. Local Drainage	L	H	M	H												H	M
Cayucos	1. Overtopping of Cayucos Creek	L	H	M	H		L	L	L	L	L	L			L	L		M
	2. Local Drainage	L	H	M	H													M
Nipomo	1. Old Town Nipomo in Floodplain	L	H	M	H	M	L	L	L	L	L	L	L		L	L		M
	Local Drainage	L	H	M	H												H	M
Oceano	1. Local Drainage	L	H	M	H	M	L							M			H	M
San Miguel	1. Local Drainage	L	H	M	H	M	L											M
Santa Margarita	1. Overtopping of Santa Margarita and Yerba Buena Creek	L	H	M	H		L	L	L	L	L	L	L	L	L	L		M
	2. Local Drainage	L	H	M	H													M

Legend

H - High opportunity for success
M - Moderate opportunity for success
L - Low opportunity for success

Notes

1. Where no opportunity for success designation is listed, it is not considered likely that the listed funding option would be applicable

Table 5 – Summary of Funding Options

Appendix A
Potential Grant and Loan Programs

(1) Community Development Block Grants

Overview

The County's planning department administers Community Development Block Grants (CDBG) on a yearly basis. This program is funded by the US Department of Housing and Urban Development (HUD) and targets low to moderate income communities. The funding for CDBG is guaranteed each year but the level of funding varies.

CDBG funds can be used for any community development activity such as acquisition of real property, affordable housing activities, construction or rehabilitation of public facilities and improvements, clearance and demolition of buildings, provision of certain types of public services, relocation payments and assistance, removal of architectural barriers, housing rehabilitation, special economic development activities, planning studies and grant administration. A community must meet one of the three national objectives to be eligible for the funding:

- 51% or more of the community households must have incomes below 80% of the County median; or
- The project must aid in the prevention or elimination of slums or blight; or
- The project must address urgent needs that pose a serious, immediate threat to the public health or welfare.

Application Deadline(s)

October of each year

Assistance Provided

The CDBG funds can be used for planning, design, or construction of a project, however, the County planning department's preference is that a project have plans and specifications completed prior to paying out funds. The County is required to report on spending of CDBG funds on an annual basis and therefore most projects that receive CDBG funds are construction projects because funds are more likely to be expended within a year of appropriation. Applications are ranked based on the following criteria:

- Consistency with federal regulations and laws
- Community support
- Seriousness of community development need proposed to be addressed by project
- Degree to which project benefits low-income and very low-income families or persons
- Feasibility of the project to be completed as budgeted within 18 months of appropriation
- Cost effectiveness of funds requested and leveraging of other funds
- Organization's experience or knowledge regarding CDBG requirements

Funding Level	There is no cap on grant application but the County is allocated approximately $500,000 on an average year from HUD for projects similar to those identified in the study. While matching funds are not required; the County and HUD looks most favorably on projects with a matching fund component.	
Legislative Authority	Title I of the Housing and Community Development Act of 1974, Public Law 93-383, as amended	
Contacts	Address:	County of San Luis Obispo Department of Planning and Building County Government Center San Luis Obispo, CA 93408
	Telephone:	(805) 781-5787
	Internet:	http://www.co.slo.ca.us

(2) Flood Protection Corridor Program

Overview

The Flood Protection Corridor Program (FPCP) was established when California voters passed Proposition 13, the "Safe Drinking Water, Watershed Protection and Flood Protection Act" in March of 2000. The FPCP authorized bond sales of $70 million for primarily nonstructural flood management projects that include wildlife habitat enhancement and/or agricultural land preservation. Of the $70 million, approximately $5 million will go to educational programs and administrative costs. Another $5 million was earmarked by the Legislation for the City of Santee, leaving approximately $60 million for flood corridor protection projects throughout the state.

Application Deadline(s)

February of each year

Assistance Provided

The Flood Protection Corridor Program grant can be used for projects that include:

- Non-structural flood damage reduction projects within flood corridors,
- Acquisition of real property or easements in a floodplain,
- Setting back existing flood control levees or strengthening or modifying existing levees in conjunction with levee setbacks,
- Preserving or enhancing flood-compatible agricultural use of the real property,
- Preserving or enhancing wildlife values of the real property through restoration of habitat compatible with seasonal flooding,
- Repairing breaches in the flood control systems, water diversion facilities, or flood control facilities damaged by a project developed pursuant to Chapter 5, Article 2.5 of the Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act of 2000,
- Establishing a trust fund for up to 20 percent of the money paid for acquisition for the purpose of generating interest to maintain the acquired lands,
- Paying the costs associated with the administration of the projects.

The project location must also be located at least partially in:

- A FEMA Special Flood Hazard Area (SFHA), or
- An area that would be inundated if the project were completed and an adjacent FEMA SFHA were inundated, or
- A FEMA SFHA, which is determined by using the detailed methods identified in FEMA Publication 37, published in January 1995, titled “Flood Insurance Study Guidelines and Specifications for Study Contractors”, or

- A floodplain designated by The Reclamation Board under Water Code Section 8402(f) *[Title 23, California Code of Regulations, Division 2, Section 497.5(a)],* or a
- Locally designated Flood Hazard Area, with credible hydrologic data to support designation of at least one in 100 annual probability of flood risk. This is applicable to locations without levees, or where existing levees can be set back, breached, or removed. In the latter case, levee setbacks, removal, or breaching to allow inundation of the floodplain should be part of the project.

Funding Level

A grant cap of $5 million per project has been established, however, exceptional projects requesting funding greater than the established cap will be considered on a case-by-case basis.

Legislative Authority

Division 26, Section 79000 Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act

Contacts

Address: Flood Protection Corridor Program
Department of Water Resources, Division of Flood Management
1416 Ninth Street, Room 1641
Sacramento, CA 95814
Telephone: (916) 654-3620
Internet: http://www.dfm.water.ca.gov/fpcp/

(3) Cooperative Agreement

Overview

The California Department of Transportation (Caltrans) has established a process for cost sharing of drainage projects being implemented by a local agency that will benefit Caltrans facilities.

Application Deadline(s)

None

Assistance Provided

Caltrans has established a process for cost sharing of planning, design, and construction of drainage projects. The process for applying for a Cooperative Agreement is detailed in the Cooperative Agreement Manual.

Funding Level

The cost to Caltrans is based on the benefit received from the project.

Legislative Authority

Streets and Highways Code Sections 114 and 130

Contacts

Address: California Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, CA 93401-5415
Telephone: (805) 549-3111
Internet: http://www.dot.ca.gov/hq/oppd/coop/cooptoc.html

(4) Flood Mitigation Assistance

Overview

FEMA provides funds on a yearly basis for each of the states to administer FMA grants. In California, the Governor's Office of Emergency Services administers these grants. The purpose of these grants is to provide local communities with funds to alleviate reoccurring flooding problems and to reduce claims on the National Flood Insurance Fund (NFIF). There are three types of grants available:

- FMA Planning Grants
- FMA Project Grants
- FMA Technical Assistance Grants

All projects that address flooding issues for areas within a Special Flood Hazard Area (SFHA)[2] are eligible for both FMA Planning and Project grants. In order to receive a FMA Project grant to implement a project to reduce flood losses, a Flood Mitigation Plan (FMP) must be completed by the lead agency and approved by FEMA. The FMA Planning Grant can be used to fund the completion of the FMP.

Application Deadline(s)

None

Assistance Provided

Prior to proceeding with a FMA Project Grant application, the grant applicant must document the flooding problem with the FMP. In addition to describing the flooding problem, the following information is included in the FMP:

- Public involvement
- Coordination with other agencies or organizations
- Flood hazard area inventory
- Review of possible mitigation actions
- State or local adoption following a public hearing
- Actions necessary to implement plan

Following the approval of the FMP, the grant applicant can apply for a FMA Project Grant. This grant is used to implement the specific project identified in the FMP including property acquisition, modification of existing culverts/bridges, elevation of National Flood Insurance Program (NFIP) insured structures, or relocation of NFIP insured structures.

The project must also meet five basic requirements to receive funding:

- Be cost effective – Project costs cannot exceed expected benefits
- Conform with applicable Federal, State, and Executive Orders
- Be technically feasible

[2] Any area within the 100-year flood plain as defined by FEMA is within a SFHA.

- Conform with the FMP
- Be located physically in a participating NFIP community that is not on probation, or benefit such a community directly by reducing future flood damages

Funding Level

- The applicant is responsible for 25% of the costs associated with each grant. The applicant can utilize in-kind services to fund half the applicant's fiscal responsibility. Examples of in-kind services include County staff time, volunteer work, donated supplies, and donated equipment.
- An applicant may receive only one FMA Planning Grant for a maximum of $50,000 in any given five year period.
- An applicant may receive multiple FMA Project Grants but the maximum total of all grants cannot exceed $3.3 million over a five-year period. The $3.3 million value includes monies received from a FMA Planning Grant.

Legislative Authority National Flood Insurance Reform Act of 1994 (NFIRA), Sections 1366 and 1367 (42 U.S.C. 4101)

Contacts

Address:	Governor's Office of Emergency Services P.O. Box 419047 Rancho Cordova, CA 95741-9047
Telephone:	(916) 845-8150
Internet:	http://www.oes.ca.gov http://www.fema.gov/fima/planfma.shtm (Copy of FEMA's Flood Mitigation Assistance Guidance)

(5) SWRCB Revolving Loan Program

Overview

Low interest loans to address water quality problems associated with discharges from wastewater and water reclamation facilities, as well as from nonpoint source discharges and for estuary enhancement.

Application Deadline(s)

Final adoption of State priority list for next State fiscal year in June

Assistance Provided

The purpose of the loan is to assist agencies and local communities meet water quality standards set forth by the Federal Clean Water Act. The loan is for projects associated with discharge from wastewater and water reclamation facilities, as well as from nonpoint sources to conform with NPDES requirements.

Funding Level

The interest rate on an SRF loan is 50% of the interest rate on the most recently sold general obligation bond. The maximum amortization period is 20 years. Loans may cover up to 100% of the cost of planning, design, and construction of NPS pollution control structures and 100% of NPS pollution control programs. The borrower will begin making annual repayments of principal and interest one year after the first disbursement of loan funds.

Legislative Authority

Federal Clean Water Act

Contacts

Address: State Water Resources Control Board
Division of Financial Assistance
1001 I Street, 16th Floor
Sacramento, CA 95814
Contact: Jeff Albrecht

Telephone: (916) 341-5717

Internet: http://www.swrcb.ca.gov/funding/

Appendix B

Excerpts from the San Luis Obispo Creek Watershed, San Luis Obispo County, California, Final Funding Program Analysis Report Prepared by the US Army Corps of Engineers, Los Angeles District October 2001

(1) Continuing Authorities Programs

Overview

Congress has provided the Corps with a number of standing authorities to study and build water resources projects for various purposes, and with specified limits on Federal money spent for a project.

Application Deadline(s)

Specific congressional authorization is not needed

Assistance Provided

- Flood Control Projects – Local protection from flooding by the construction or improvement of flood control works such as levees, channels, and dams. Non-structural alternatives are also considered
- Emergency Streambank and shoreline Erosion – Allows emergency streambank and shoreline protection to prevent damage to public facilities, e.g., roads, bridges, hospitals, schools, and water/sewage treatment plants
- Snagging and Clearing for Flood Control – Local protection from flooding by channel clearing and excavation, with limited embankment construction by use of materials from the clearing operations only.
- Aquatic Ecosystem Restoration – Carries out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest, and are cost effective

Funding Level

- Flood Control Projects - Federal share may not exceed $7 million for each project. Required non-Federal match: 50 percent of the cost of the project for structural measures and 35 percent of the cost of the project for nonstructural measures.
- Emergency Streambank and Shoreline Restoration - Federal share may not exceed $1 million for each project. Non-Federal share of total project costs is at least 25 percent.
- Snagging and Clearing for Flood Control – Federal share may not exceed $500,000 for each project. Required 50 percent non-Federal match including all costs in excess of the Federal cost limitation.
- Aquatic Ecosystem Restoration – Federal share is limited to $5 million. The non-Federal share is 35 percent (including studies, plans and specifications, and construction).

Legislative Authority

- Flood Control Projects – Section 205 of the 1948 Flood Control Act (FCA), as amended
- Emergency Streambank and Shoreline Restoration – Section 14, 1946 FCA, as amended
- Snagging and Clearing for Flood Control – Section 208, 1954 FCA, as amended
- Aquatic Ecosystem Restoration – Section 206, Water Resources Development Act (WRDA) of 1996

Contacts

Address:	US Army Engineer District, Los Angeles PO Box 2711 Los Angeles, CA 90053-2325
Telephone:	(213) 452-5300
Internet:	http://www.spl.usace.army.mil/

(2) Flood Hazard Mitigation and Riverine Restoration Program

Overview Informally known as "Challenge 21," this watershed-based program focuses on identifying sustainable solution to flooding problems by examining nonstructural solutions in flood-prone areas, while retaining traditional measures where appropriate. Eligible projects will meet the dual purpose of flood hazard mitigation and riverine ecosystem restoration.

Application Deadline(s) Undetermined

Assistance Provided Projects include the relocation of threatened structures, conservation or restoration of wetlands and natural floodwater storage areas, and planning for responses to potential future floods.

Funding Level The non-Federal sponsor is required to provide 50 percent for the studies and 35% for project implementation, up to a maximum Federal allocation of $300 million.

- FY2003 through FY2005 - $50 million for each FY

Legislative Authority Section 212 WRDA 1999

Contacts

Address: US Army Engineer District, Los Angeles
PO Box 2711
Los Angeles, CA 90053-2325
Telephone: (213) 452-5300
Internet: http://www.spl.usace.army.mil/

(3) Urban Streams Restoration Program – Proposition 13

Overview

The objectives of this program is to assist communities in reducing damages from streambank and watershed instability and floods while restoring the environmental and aesthetic values of streams, and to encourage stewardship and maintenance of streams by the community. Objectives of the program are met by providing local governments and citizen's groups with small grants and technical assistance for restoration projects, to encourage all segments of local communities to value natural streams as an amenity, and to educate citizens about the value and processes taking place in natural streams.

Application Deadline(s)

To Be Determined

Assistance Provided

This program supports actions that:

- Prevent property damage caused by flooding and bank erosion
- Restore the natural value of streams; and
- Promote community stewardship

Funding Level

Grants can fund projects as simple as a volunteer workday to clean up neighborhood steams, or projects as complex as complete restoration of a streams to its original, natural state.

- The Department is in the process of amending the regulations for the program, including raising the grant cap from $200,000 to $1 million
- All potential projects must have two sponsors: a local agency and a community group.

Legislative Authority

- Stream Restoration and Flood Control Act of 1984
- Costa-Machado Water Bond Act of 2000

Contacts

Address: California Department of Water Resources
Urban Streams Restoration program
Attn: Earle Cummings
PO Box 942836
Sacramento, CA 94236-0001
Telephone: (916) 327-1656
Internet: http://wwwdpla.water.ca.gov/environment/habitat/stream/

(4) Proposition 13 Watershed Protection Program

Overview

This program provides grants to municipalities, local agencies, or nonprofit organizations to develop local watershed management plans and/or implement projects consistent with watershed plans.

Application Deadline(s)

To Be Determined

Assistance Provided

Grants may be awarded for projects that implement methods for attaining watershed improvements or for a monitoring program described in a local watershed management plan in an amount not to exceed five million dollars ($5,000,000) per project. At least 85 percent of the total amount in the sub account shall be used for capital outlay projects.

Eligible projects under this article may do any of the following:

- Reduce chronic flooding problems or control water velocity and volume using vegetation management or other nonstructural methods.
- Protect and enhance greenbelts and riparian and wetlands habitats.
- Restore or improve habitat for aquatic or terrestrial species.
- Monitor the water quality conditions and assess the environmental health of the watershed.
- Use geographic information systems to display and manage the environmental data describing the watershed.
- Prevent watershed soil erosion and sedimentation of surface waters.
- Support beneficial groundwater recharge capabilities.
- Otherwise reduce the discharge of pollutants to state waters from storm water or nonpoint sources.

Funding Level

Minimum request of $50,000 and maximum of $5 million

Legislative Authority

Costa-Machado Water Act of 2000

Contacts

Address: Proposition 13 Grant Program – Phase II
Attn: Bill Campbell, Chief
Watershed Project Support Section
Division of Water Quality
State Water Resources Control Board
1001 I Street, 15th Floor
Sacramento, CA 95814

Telephone: (916) 341-5250

Internet: http://www.swrcb.ca.gov/prop13/index.html

(5) Nonpoint Source Pollution Control Program

Overview

The purpose of the NPS Pollution Control Program is "to provide grant funding for projects that protect the beneficial uses of water throughout the State through the control of nonpoint source pollution."

Application Deadline(s)

To Be Determined

Assistance Provided

Grants shall only be awarded for any of the following projects:

- A project that is consistent with local watershed management plans that are developed under subdivision (d) of Section 79080 and with regional water quality control plans.
- A broad-based nonpoint source project, including a project identified in the board's "Initiatives in NPS Management," dated September 1995, and nonpoint source technical advisory committee reports.
- A project that is consistent with the "Integrated Plan for Implementation of the Watershed Management Initiative" prepared by the board and the regional boards.
- A project that implements management measures and practices or other needed projects identified by the board pursuant to its nonpoint source pollution control program's 15-year implementation strategy and five-year implementation plan that meets the requirements of Section 6217(g) of the federal Coastal Zone Act Reauthorization Amendments of 1990.
- The projects funded from the sub account shall demonstrate a capability of sustaining water quality benefits for a period of 20 years. Projects shall have defined water quality or beneficial use goals.

Funding Level

Minimum request of $50,000 and maximum of $5 million

Legislative Authority

Costa-Machado Water Act of 2000

Contacts

Address: Proposition 13 Grant Program – Phase II
Attn: Bill Campbell, Chief
Watershed Project Support Section
Division of Water Quality
State Water Resources Control Board
1001 I Street, 15th Floor
Sacramento, CA 95814

Telephone: (916) 341-5250

Internet: http://www.swrcb.ca.gov/prop13/index.html

Appendix I

RESPONSE TO COMMENTS

APPENDIX I

RESPONSE TO COMMENTS

Comment 1: The County must not abdicate responsibility for culvert maintenance during this process of identifying and instituting a local lead agency, and remain proactive as new lead agency comes up to speed.

Response 1: The County will continue in its current role and be responsible for maintenance of culverts within public right-of-way.

Comment 2: We strongly support the recommendation that requires all proposed developments that contribute runoff to creeks through the floodplain in Olde Towne investigate the drainage flow pattern from the lot to the discharge point, and if contributing to an existing problem, then on-site mitigation with a detention basin or equivalent facility should be required. Is "equivalent facility" still required to be on-site? Some mitigation would be more effective and provide multiple community benefits if located off site. Lot at Bee and Burton as case in point.

Response 2: From an implementation stand-point, requiring a home owner or developer to mitigate storm runoff on-site is less complicated because a detention facility would be stipulated in the building permit. We agree that identifying a vacant lot to serve as a detention basin for an entire neighborhood could be more effective at solving regional problems. The home owners contributing runoff to an area that experiences flooding would need to be willing to purchase the vacant property and convert it to a detention basin or multi-use facility.

Comment 3: Section 3.9.4: Modification to the County Handout "Drainage Plan Required in Nipomo". This recommendation increases the (storage) requirement for basins to deal with nearby road runoff. It parcels out the "load of the road" to individual homeowners. Very useful requirement in some circumstances, I fear the generic application of this policy will swamp us with more, larger and uglier fenced pits. We need to be flexible enough with this policy to seek community benefit options such as the usable open space, or a collective basin in a less visible place when possible. By adding or equivalent offsite facility to wording would allow more flexibility.

Response 3: Many of the homes have created decorative basins in their front or back lawns (e.g. homes along Las Flores). If large vacant parcels of land are available, then a regional basin could serve multiple properties and also serve as open space. This section of the report will not be modified to include "or equivalent" offsite facility because the handout is intended for individual home owners. An equivalent offsite facility would be applicable if an entire neighborhood mobilized to convert a vacant parcel to serve as a regional detention basin in order to remove individual lot basins.

Comment 4: Section 3.9.6: Community Supported/Managed Programs. The report encourages these efforts as improving flood control problems. At least we are ahead of the curve on this recommendation. An important recommendation of the agricultural community is to establish creek setback guidelines. This is an important assignment that the Watershed Organization should undertake working closely with Farm Bureau and local landowners.

Response 4: A recommendation to establish a creek setback is in Section 3.9.6.2. The sentence was modified to include the word "guidelines".

Comment 5: Identifying one or several potential off site mitigation areas for creek enhancement in this report would be important for several reasons: 1) Inclusion in this document could support the advanced planning for site(s), 2) Planning ahead can provide multiple community benefits, such as implementing the Olde Towne Design Plan. 3) The scramble to find a mitigation site (as with

the Olde Towne Enhancement project) increases the cost and delays the project. Recommended sites for off site mitigation include the following:
Main stem of Haystack Creek through Olde Towne (multiple land owners)
Deleissigues Creek at end Mallagh (Dana)
Bee, Burton and Thompson Road lot on Hermrick Creek (Vaughn)
Creek confluence of Haystack and Main Stem (Land Conservany)
(Note that these would be based on willing negotiations with landowners, no changes to existing property rights are inferred)

Response 5: The required mitigation for the projects will depend on the resource agency permit requirements. At this point, it is too preliminary to assume that a general location could serve as a mitigation site for the proposed projects. The type of mitigation (e.g. stream bank restoration) will determine the suitable areas for mitigation.

Comment 6: This report should not preclude the importance of other drainage projects that were not in the study area, particularly the Lower Nipomo Creek areas (I call it "the plug in the bath tub"). Also, we need a few years to determine the effectiveness of the drainage designs around the Nipomo High School. Recognizing there were constraints on the scope of the study, it is important that the plans and policies of this document are flexible to allow the addition of other project sites in the future. The policies recommended might be seen as a foundation for addressing drainage and flooding problems in the whole of Nipomo Creek watershed and on the Mesa.

Response 6: Due to budget, scope and schedule constraints, the drainage and flooding analysis was limited to the urban area of Nipomo. This report is intended to serve as a long-range planning, guidance and implementation document for the local community. If in the future, the local lead agency identifies a new project that should be implemented to solve a drainage or flooding problem, then it will be the responsibility of the lead agency to prioritize and implement the project that best serves the community. This report should be viewed as a guidance document to help prioritize capital improvements and implement policies that best serve the community.

Comment 7: Are projects listed in order of recommended priority? Or is prioritization another step in the implementation process? My personal opinion is that Haystack Creek should be the first priority as it transects the most populated areas.

Response 7: The proposed projects are not listed by order of priority. The proposed projects in the Mesa were listed by the problem locations that received the most responses by area residents. For example, flooding on N. Las Flores near W. Tefft Street received the greatest number of complaints, so it was listed first.

The proposed projects in Olde Towne were listed by creek watershed, starting with Deleissigues Creek in the north and finishing with the Knotts Street concrete v-ditch in the south.

The order of priority should rest with the lead agency and the residents that stand to benefit from the proposed improvements.

Comment 8: The project cost estimate for Deleissigues Creek sediment removal and vegetation management seems high, unless there would be channel repairs (such as the elimination of the hairpin curve at the end of Mallagh which was recommended in the technical draft). Dredging sediment which was mentioned would also increase permitting and implementation costs. Including a creek enhancement component (such as bank repair and replanting) would help reduce further erosion and greatly increase the chance of funding the project.

Response 8: The project cost estimate was revised to separate the cost for planning and designing the sediment removal and vegetative management plan, and also for conducting the one-time channel clearing and sediment removal. The cost for channel clearing assumed that 4,000 feet of Deleissigues Creek would be cleared of sediment deposition and over-grown vegetation. The comment referenced a vegetation removal project in Olde Towne that was completed for $5,000. Without knowing the scope of work on this project, it is difficult to comment on this cost and draw a comparison to the proposed Deleissigues Creek vegetative management and sediment removal project. Our experience on projects of similar size and scope as that proposed in this report indicate that the order of magnitude cost is reasonable.

Comment 9: In the first draft of the engineering technical memorandum, conveying flows between Thompson and Burton underground was recommended. We supported a shorter version between Burton and Mallagh. Why was the undergrounding idea dropped?

Response 9: More detailed review of the hydrology, hydraulics and existing drainage infrastructure provided additional information on the feasibility of the proposed projects. A newly installed culvert (installed by a private developer) between Day and Sea Street directed flow from Tributary 1 onto Burton. In place of constructing long reaches of storm drains in Day Street and improving the roadside drainage ditches, it was proposed to increase the capacity of the existing culverts to meet the County's current design standard. This modification reduced the construction cost compared to the first draft proposed alternative because less storm drain is being installed.

Comment 10: The proposed additional alternative (detention basin), the enlargement of the Urban drainage area as a 100 year protection would be an unsightly landmark at the gateway of Olde Towne Nipomo. I strongly recommend including as a third alternative which was included in the NCAC's prior comments to the technical draft. That is planning for the use of the lot between Thompson and Burton as an open pocket park/retention basin. This would have multiple benefits and provide additional retention capacity.

Response 10: The proposed vacant land adjacent to Bee Street, between Thompson and Burton, was considered as a potential detention basin site. The available land is not large enough to attenuate the peak runoff from a 100-year flood event, and adding other multi-use features like a pocket park will reduce the volume available for storage since the basin will need to be terraced to ensure that the recreational facilities are not inundated during storms.

A more practical approach would be to expand the detention basin currently being constructed by the developer of the Fairview Tract east of Thompson (see Section 3.8.3.2). The Fairview Tract development detention basin's storage volume could be increased, and recreational and open space features added to the basin. The basins outflow structure would need to be modified to limit the discharge to a 10-year flow so as not to flood downstream streets or structures. The reports figures have been modified to show each detention basin as an undulating multi-use facility that follows the natural topography of the land.

Comment 11: The report recommended leaving the antiquated culvert at Thompson and observing the retrofitted intake upstream (the new housing development). Since Thompson is a heavily traffic thoroughfare and gateway to Olde Towne, I recommend you add this to the project list, perhaps as an alternative and observe its function. (It failed last week (mid-December) and flooded a portion of Thompson Road last week.)

Response 11: The culverts were evaluated against their ability to meet the current County design standard for their tributary watershed. The existing double 4' by 4' box culvert on Hermrick Creek at

Thompson should be expected to surcharge during a 10-year peak storm event, just as curb side gutters and streets are allowed to flow full during a 10-year design storm. Since it was determined that this culvert had sufficient capacity to convey the 10-year design storm under surcharge conditions, the existing culvert was not recommended for replacement. In fact, this culvert has sufficient capacity to convey the 25-year storm under surcharge conditions. Perhaps this culvert could be replaced to eliminate the surcharge conditions and to provide sufficient freeboard between the top of water surface elevation and the culvert soffit, but compared to other culverts that do not meet current County standard, this Hermrick Creek culvert would be a lower priority.

Regarding the report of flooding caused by the culvert failing, in order for water to overtop the culvert, the storm event would have equaled or exceeded a 25-year peak storm. Perhaps other issues such as clogged storm drains could have contributed to the street flooding and not overtopping of the culvert.

Comment 12: Proposed detention basin on Tributary 1 would be an unsightly visibility of a fenced drainage basin on Thompson. Why not implement a design similar to the housing project across from Bee Street on Thompson, that is, a graded open unfenced area?

Response 12: Section 3.8.2 includes a brief discussion on converting detention basins to multi-use facilities that are shaped to follow the natural contours of the undulating terrain. All the figures have been modified to show a potential multi-use facility in lieu of a County standard design detention facility.

Comment 13: These are pricey, and other alternatives should be developed. Similar comments would apply to the fenced basins recommended elsewhere. A large graded basin could be active agricultural land part of the year and acting as a floodplain to the creek corridor with a metered flow barrier on the down stream side. This is an example where a Local lead agency may generate a mixed use benefit design. (WE DON'T LIKE THE FENCED PITS!).

Response 13: The alternatives proposed would upgrade the existing culverts to meet current County standards. The proposed detention basins are included to provide the community with an option to implement a project that removes homes and businesses from the 100-year floodplain. Other "non-structural" projects such as removing homes from the floodplain or raising the finish floor elevation above the 100-year floodplain were discussed but cost estimates were not developed for these options.

Comment 14: What is the County/District's back up plan if the NCSD does not want to take on the lead agency role or the community is not willing to pay for the recommended improvements?

Response 14: As stated in Chapter 6, the District does not possess the programs, funds or staffing to address all the on-going flooding and drainage problems in the County. If the local community or residents that benefit from a particular project are unwilling to fund a project, then a project will not be implemented because the District or County will not fund any portion of a project if there are no benefits to County facilities.

If the NCSD or other local agency refuses to serve in a lead role, then the County will continue in its current role of assisting communities with determining the improvements necessary to reduce flooding and to develop programs to improve flood protection. If a local group sought to implement a project in one of their neighborhoods, the County would assist with the planning, but the County would also recover its costs through the benefit assessment that paid for the capital improvement.

Comment 15: The problems in the Olde Towne and Mesa areas are vastly different. Suggest that separate reports be prepared rather than one combined report.

Response 15: A single Nipomo report is satisfactory for the final report. The Mesa and Olde Towne issues and solutions are separately addressed and suitable to meet the goals of the study.

Comment 16: It is not likely that the NCSD will accept the role of "Lead Agency" for any of these proposed drainage projects. This is a "hornet's nest" of liability.

Response 16: Comment noted.

Comment 17: The NCSD has a problem with the idea of taking on the responsibility of a Lead Agency without any development review powers. The NCSD's experience is their project development recommendations to the County Planning and Public Works Department are not reasonably considered, required or implemented. Responsibility without power is unacceptable to the NCSD. Cited examples were:
a. The Fairview Tract detention basin was cited as one example of the NCSD comments and recommendations being ignored. The NCSD recommended a much larger retention basin. The Count approved basin was reduced in size by 40% on the Hermrick Creek watershed.
b. Two culverts under Thompson Avenue were not sized as recommended by the NCSD.
c. Day and Sea Street Street stormwater basins were "culverted" over.

Response 17: Statement added to Section 6.1 that encourages the County's departments to work with the lead agency to ensure that the local concerns and recommendations are considered with all development projects.

Comment 18: How was the report preparation and recommendations coordinated with the County's Planning Department.

Response 18: The County's Department of Planning and Building staff was consulted throughout the process and questions regarding development approval were forwarded to Chuck Stevenson.

Comment 19: The community wants NCSD and County cooperation in progressing with the implementation of the projects.

Response 19: The District concurs that the success of the proposed projects rests on the cooperation and coordination of efforts between the District and the lead agency advocating the project. In order for a project to proceed, it must be accomplished in a cooperative manner and must have property owner support.

Comment 20: The NCAC and NCSD should consider a broadening of the liability to include both the County and NCSD, so that rate payers don't have all the liability for flood suits.

Response 20: Further discussion with the County is necessary to explore the possibility of implementing this policy change.

Comments 21: Since the NCSD has no planning powers relative to land use or development approvals, they cannot support becoming the lead agency.

Response 21: Comment on the NCSD's reason for not supporting its role as the lead agency is noted.

Comment 22: A scenario of the community and NCSD establishing an assessment entity and handing the money over to the County was described. The NCSD does not trust the County to economically construct a project using local funds. The scenario was drawn further, describing the turnover of the completed project to the NCSD, for their maintenance of the facilities with no funding or resources.

Response 22: Comment noted.

Comment 23: The NCSD does not have the resources or expertise to take on the role of drainage responsibility for Nipomo.

Response 23: The NCSD's position should be expressed clearly to the County Board of Supervisors on March 9, 2004 when the reports are presented to the Board.

Comment 24: Why were the existing culverts in the Olde Towne area not designed to current County standards?

Response 24: In the year of their installation, the culverts likely met the County design standards in place at that time. As Olde Towne developed and hydrology changed, the peak runoff and rainfall intensity likely increased. These factors contribute to a higher peak discharge for the 10- and 25-year design flows. Therefore, the culverts installed years ago may not meet current County standards for peak discharges today.

Comment 25: If the NCSD can get permits to clean the local creeks, why can't the County get them and clean the creeks out?

Response 25: All the creeks in Olde Towne flow through private property, with the exception of the public right-of-way crossings. The owner through which the creek flows is responsible for creek maintenance. The County has no drainage easements or jurisdiction over the creeks that flow through private property. The County is responsible for maintaining the culvert crossings in public right-of-way (see Section 3.9.5).

Comment 26: The Mesa area's drainage problems should be resolved by working with CSA 1 and the NCSD. There are no life threatening problems in this area, no significant structures at risk, mostly ponding problems, and the Mesa residents do not largely benefit from the Olde Towne recommended improvements.

Response 26: The Mesa proposed capital improvements were discussed in detail in Section 3.5 of the report. Also, many of the policy recommendation in Section 3.9 were specific to the Mesa. A proposed strategy for implementing the projects in the Mesa is discussed in Chapter 6 of the report.

Comment 27: The cost to the Olde Towne area residents was too expensive due to the limited number of property owners in the benefiting geographic area.

Response 27: The cost of the projects should be weighed against the benefit provided. If the average annual damages associated with flooding are less than the annual assessment that each owner must pay to provide flood protection, then from an economical perspective, the proposed improvements should not be built. However, from a quality of life perspective, the owners may be willing to pay for the improvements to avoid the threat of flooding from moderate storm events.

Comment 28: The County should stop allowing construction in floodplain areas until regional flood control solutions and implementation plans are in place.

Response 28: Federal and State law, and County regulations provide for a reasonable use and development of private property. There has to be legally supportable rationale whereby property development is restricted, controlled and/or prohibited. The County has adopted standards to protect against flood damage to homes and structures located within the 100-year flooplain. The flood damage protection standards are included in the County's Land Use Ordinance (22.07.060 et seq). One of the criteria applicable to residential development is the finish floor elevations of residences. The finish floor elevation shall be at least one foot over the level of the 100-year flood elevation.

Comment 29: The project construction mark-ups make it appear that construction costs only one-third of the project. These are exorbitant, management and administrative costs. Clarify the mark-ups for projects.

Response 29: The mark-ups for Nipomo were calculated as a percentage of construction. The mark-ups are typical for planning level calculations for County or District projects. The percent mark-ups in Nipomo were as follows:
Engineering and Design = 20%
Administrative and Environmental = 40%
Contingency = 20%
The construction cost is approximately 55% of the total project cost, not one-third. For a planning level document, multiplying the construction costs by fixed percentages is standard practice because the level of detail available is not sufficient enough to assign costs. The fixed percentages typically range between 60 to 100 percent of the construction costs, depending on the complexity of the design and environmental documentation and permitting process.

Comment 30: The County and District should reconsider their adopted 1968 policy on apportionment of local costs of planning, design, construction, operation and maintenance of drainage and flood control facilities shown in Appendix D.

Response 30: The County Board of Supervisory reviewed and reconfirmed this policy in April 2001.

Comment 31: The County allowed these problems to develop, therefore the County is financially responsible.

Response 31: State and County zoning, land use, property development requirements, and building codes have changed over the years and continue to change periodically. The rights and restrictions related to a property owner's ability to build on their property involve historic and evolving Federal constitution and programs, State law and County regulations. As new ordinances are adopted and enacted to protect public safety and welfare, homes and structures applying for new building permits must abide by the new ordinances. Many homes and structures in Nipomo currently located within the 100-year floodplain and/or without modern drainage facilities were built prior to the Subdivision Map Act, current County standards, and also prior to the implementation of FEMA's National Flood Insurance Program. The County has adopted standards to protect against flood damage to homes located within the 100-year floodplain and all new home construction will meet these standards.

The County is not responsible for the design standards that allowed residents to build within a floodplain if there were no ordinances prohibiting such action. Likewise, the County is not responsible for providing, nor can the County legally provide, private property improvements which benefit private property owners with public funds. The County will not be held financially responsible to implement projects that remove homes from the floodplain, reduce flood damage on private properties or provide property benefiting drainage and flood control

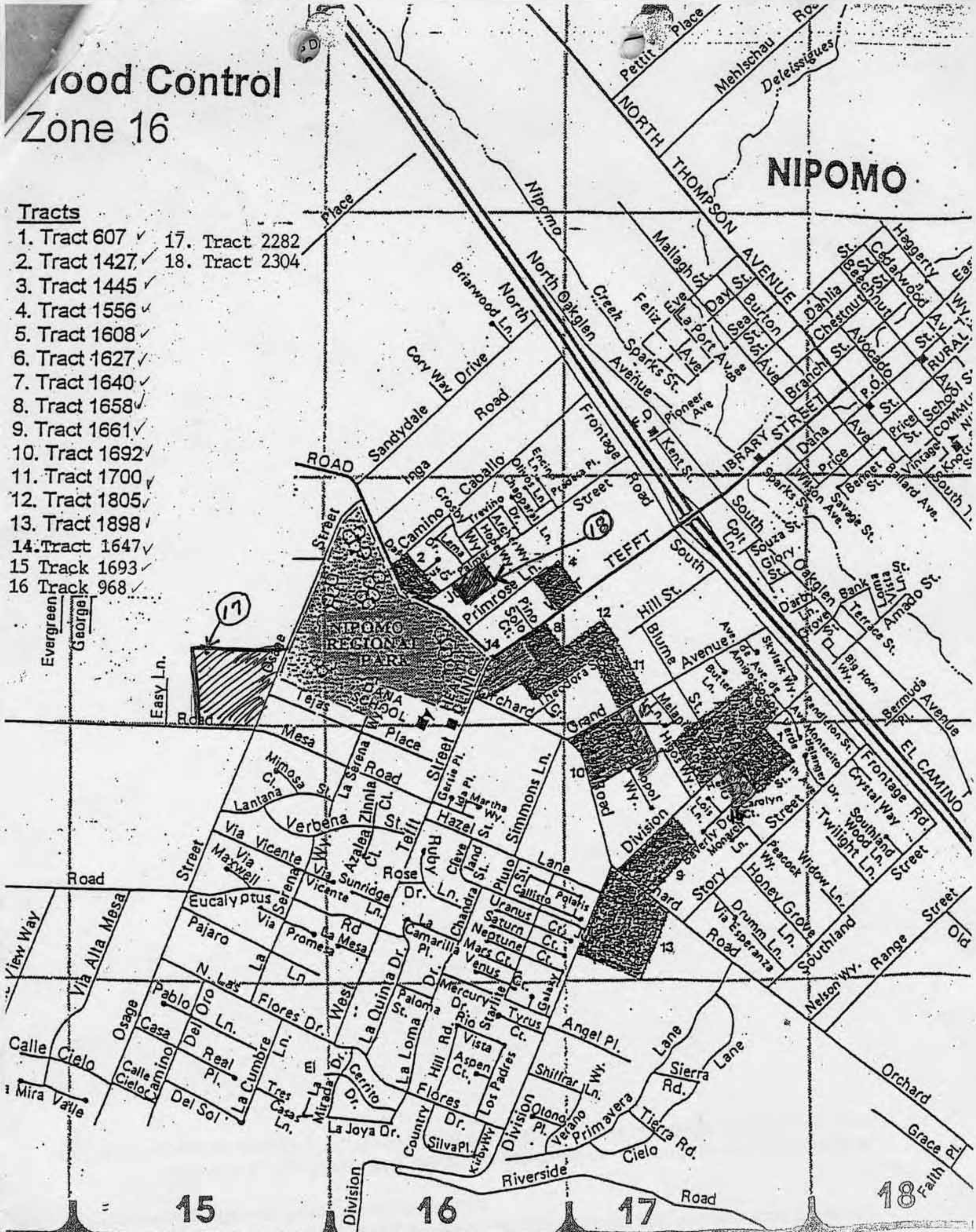
improvements (unless there are direct benefits to County facilities) per Resolution No. 68-223 in Appendix D. If such were the case, the County/District would be required to pave all roads, update and extend utility infrastructure, provide all drainage and flood control facilities, retrofit all structures to current standards, etc. in accordance with the latest ordinances and at County taxpayer cost. This is not the purpose of County Government or legal use of public funds.

Appendix J

COUNTY FLOOD CONTROL ZONE 16

APPENDIX J

COUNTY FLOOD CONTROL ZONE 16 BOUNDARY MAP


lood Control
Zone 16
Tracts
1. Tract 607
2. Tract 1427
3. Tract 1445
4. Tract 1556
5. Tract 1608
6. Tract 1627
7. Tract 1640
8. Tract 1658
9. Tract 1661
10. Tract 1692
11. Tract 1700
12. Tract 1805
13. Tract 1898
14. Tract 1647
15 Track 1693
16 Track 968
17. Tract 2282
18. Tract 2304
NIPOMO
NIPOMO REGIONAL PARK
DANA SCHOOL
NORTH THOMPSON AVENUE
LIBRARY STREET
TEFFT
EL CAMINO
Frontage Rd.
Sandydale
Pettit Place
Mehlschau
Deleissigues
Orchard
Riverside
Road
Division
15
16
17
18