CHAPTER FIFTEEN

STORM DRAINAGE AND FLOOD PROTECTION

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CHAPTER FIFTEEN: STORM DRAINAGE AND FLOOD PROTECTION

15.1 INTRODUCTION

This chapter describes the community's storm drain collection system, including off-site watershed, primary storm drain facilities, secondary storm drain facilities, Mountain House Creek, BMP treatment, flood protection, and phasing of the storm drain collection system.

15.2 ANALYSIS AND DESIGN CRITERIA

The analysis and preliminary design of the storm drain collection system are based on the San Joaquin County Improvement Standards and the Municipal and Industrial/Commercial California Storm Water Best Management Practice Handbooks. The watershed and primary storm drain facilities are analyzed using the United States Army Corps of Engineers rainfall/runoff model HEC-1.

All storm drainage, flood protection and terminal discharge improvements necessary for each development phase shall be approved by the MHCSD, San Joaquin County Public Works, San Joaquin County Flood Control, and any State or Federal Agency having jurisdiction over any of the improvements.

MHCSD may elect to construct improvements, update any plan including revisions to the Master Plan or any Specific Plan or may require that a developer construct improvement or create/reuse drainage plans.

Appendix 15-A: Storm Drainage Criteria provides additional information.

15.3 OFF-SITE WATERSHEDS

To the southwest of Mountain House are several watersheds which drain through the community. These watersheds vary in size from less than one square mile to more than fourteen square miles. Boundaries of the off-site watersheds are depicted in Figure 15.1: Off-Site Drainage Areas, which gives each watershed a letter designation. The arrows shown on Figure 15.1 depict the general routing and entrance point to the community. All discussions regarding conveyance systems relate to on-site facilities.

Runoff generated in the watersheds is seasonal and occurs primarily due to precipitation occurring during the late fall, winter and early spring months. Base flow is negligible in these watersheds and occurs as a result of springs located in the Altamont Hills and/or as a result of water leaking from the California Aqueduct and the Delta-Mendota Canal. Off-site drainage courses will remain as is and are not expected to change because of the long term growth limitations on the watershed areas. Mountain House Business Park is located on high ground relative to off-site drainage and will require no improvements to drainage courses.

A runoff analysis has been conducted for each of the watersheds in order to determine potential impacts on the project site. A summary of the larger watersheds and their estimated 100-year flow rates at the community boundaries are presented in Table 15.1: Off-Site Drainage Areas. A summary of each watershed is included in Appendix 15-B:

Description of Mountain House Watersheds; Proposed Drainage Patterns and Regulatory Permits. These assumptions provide the basis for the storm system design.

Table 15.1
Off-Site Watersheds-100 Year Flow Rates

Watershed Designation	Watershed Area sq. miles	Flow Rate (Cubic Feet Per Second)
A (Mountain House Creek)	14.50	1,240
B (Patterson Run Creek)*	7.36	530
C (Dry Creek)*	4.34	730
D*	1.90	140
E*	0.42	80

* Preliminary estimate, further study required. Of the above watersheds, only A (Mountain House Creek) has any material impact on the initial phases of development.

Objective: To ensure that drainage from off-site watersheds is considered in the design of the community storm system and is safely conveyed through the community.

Policies:

a) Adequate storm transport systems shall be provided to ensure that all off-site drainage from watersheds shall be safely conveyed to terminal drains.

b) Off-site drainage may be merged with urban runoff as a means of conveyance to terminal drains providing that the urban runoff has been treated according to Best Management Practices (BMP) as provided for by applicable water quality control regulations.

c) The design for the levee improvements shall consider and mitigate the potential causes of erosion, including boat wakes. Possible design components for the prevention of erosion could include rock revetment structures, such as riprap. The erosion controls shall, to the extent possible, be designed to provide protection of existing riparian vegetation. Specific design components for erosion abatement shall be required as a condition of levee design approval.

d) Boat speed limits to reduce the generation of potentially damaging boat wakes shall be established and enforced by the San Joaquin County Sheriff's Department, Boating Safety Division, in conjunction with other Delta area law enforcement agencies.

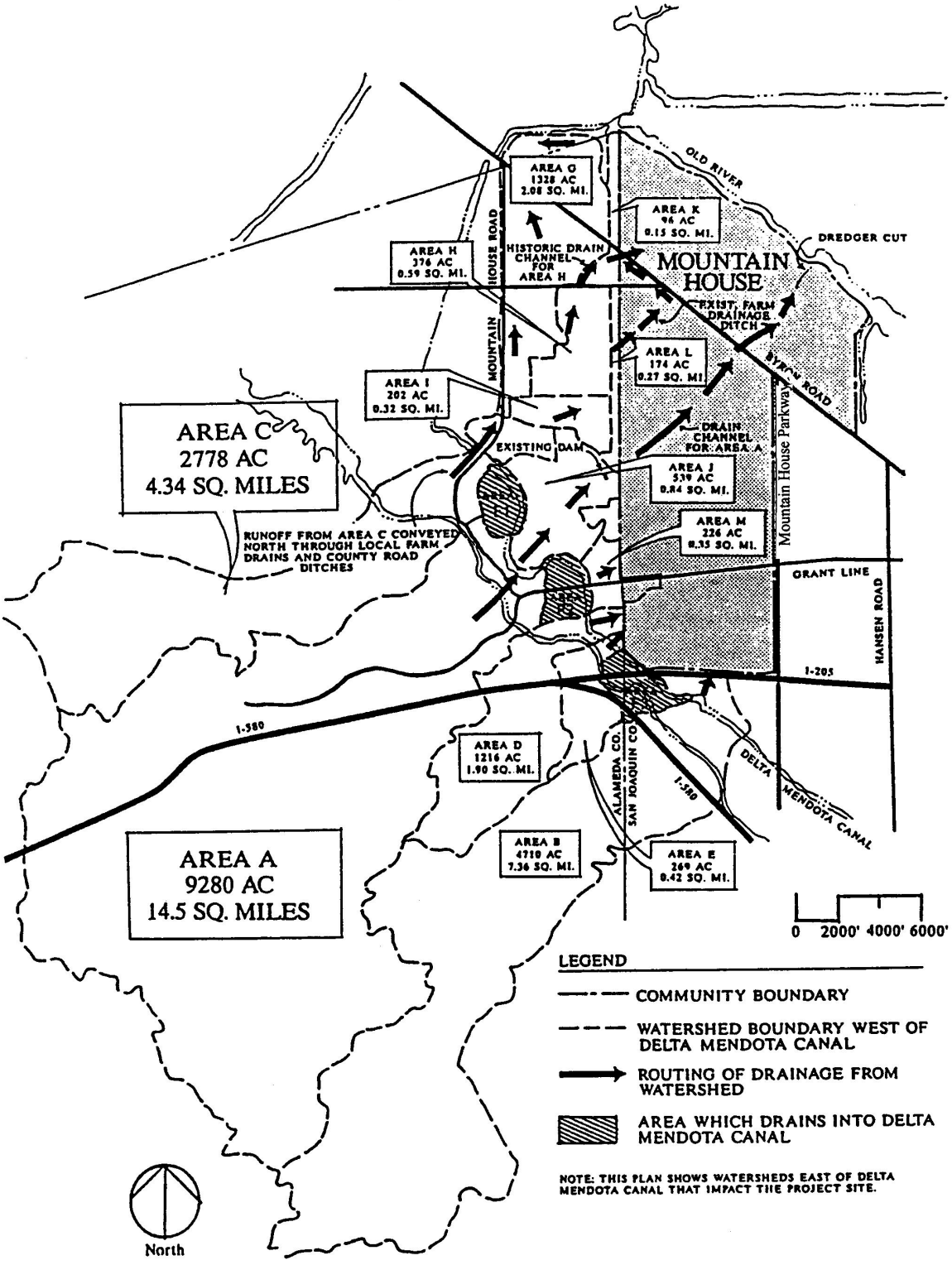


FIGURE 15.1 - OFF-SITE DRAINAGE AREAS

Implementation:

a) Streambed Protection. Erosion shall be minimized by using appropriate streambed protection energy dissipators at transitions from supercritical to subcritical flow, at the confluence of channels, at the downstream location of culverts, and at channel transitions. Streambed protection shall be provided by planting appropriate species of plants. Streambed is defined in this application as the constructed floodplains and channels and does not include existing creekbeds that will not be disturbed.

b) Design of Storm Facilities. Detailed studies for each watershed area shall be prepared and utilized in the design of each segment of storm facilities required for each Specific Plan and shall be completed and approved prior to the approval of Specific Plans. For Specific Plan I, these studies shall be approved prior to approval of the first Final Map.

c) Phasing of Improvements. Each segment of the storm drainage system shall be designed as needed to provide protection for each phase of development.

15.4 PRIMARY STORM DRAIN COLLECTION SYSTEM

The primary storm drainage systems provide for the conveyance of all off-site and on-site precipitation, plus any urban runoff, to the Old River as a terminal drain. The primary storm drain collection system includes trunk storm drain pipes (72-inch and larger), major open-channels, and detention basins. The layout of the collection system is shown in Figure 15.2: Storm Drain Master Plan. Best Management Practice (BMP) treatment processes referred to in this section are discussed in a following section.

As shown in Figure 15.2, the community is divided into a number of urban drainage areas which drain to trunklines, open channels, and detention/treatment facilities. Internal drainage boundaries are approximate and may change as the community develops. The trunk lines and channels are sized assuming that flood control storage is not available, except in the golf course areas. In the golf course area at the last half of the Master Plan buildout, it is anticipated that a series of interconnected water features will serve as treatment BMP's. Depressed fairways and water features within the golf courses may be designed as detention basins available for infrequent inundation as a flood control measure. Community drainage patterns are based on existing topography and anticipated grading and are shown in Figure 15.2.

Objective: To ensure that on-site and off-site drainage generated by precipitation and urban run-off are jointly considered and are conveyed safely through the community.

Objective: To ensure that on-site drainage will not impact property owners adjacent or within the community, or downstream property owners.

Objective: To minimize the discharge of sediment to creeks, ditches and Old River.

Policies:

a) Pipes and/or open-channels shall be designed with 100-year flood capacity to a point of terminal discharge.

b) Open-channels shall be designed to minimize erosion.

c) Sediment generated by grading or construction activities shall be subject to BMP's prior to discharge to creeks, ditches and Old River.

d) Trunk line pipes (72 inch and larger), detention basins, and major open-channels shall be designed and constructed to transport the 100-year volumetric flow rate.

e) Trunk line pipes shall be designed for gravity flow conditions.

f) Open-channels shall be designed and constructed to meet the most conservative freeboard requirements of Federal, State, or County standards.

g) Erosion shall be minimized by designing and constructing open-channels to convey storm water runoff at or below the allowable maximum velocity.

h) Erosion shall be minimized by using appropriate streambed protection and/or energy dissipators at transitions from supercritical to subcritical flow, at the confluence of channels, at the downstream location of culverts, and at channel transitions. Streambed protection shall include appropriate species of plants.

i) The ultimate point of terminal discharge for all drainage shall be Old River. Future flows shall be metered to pre-development rates.

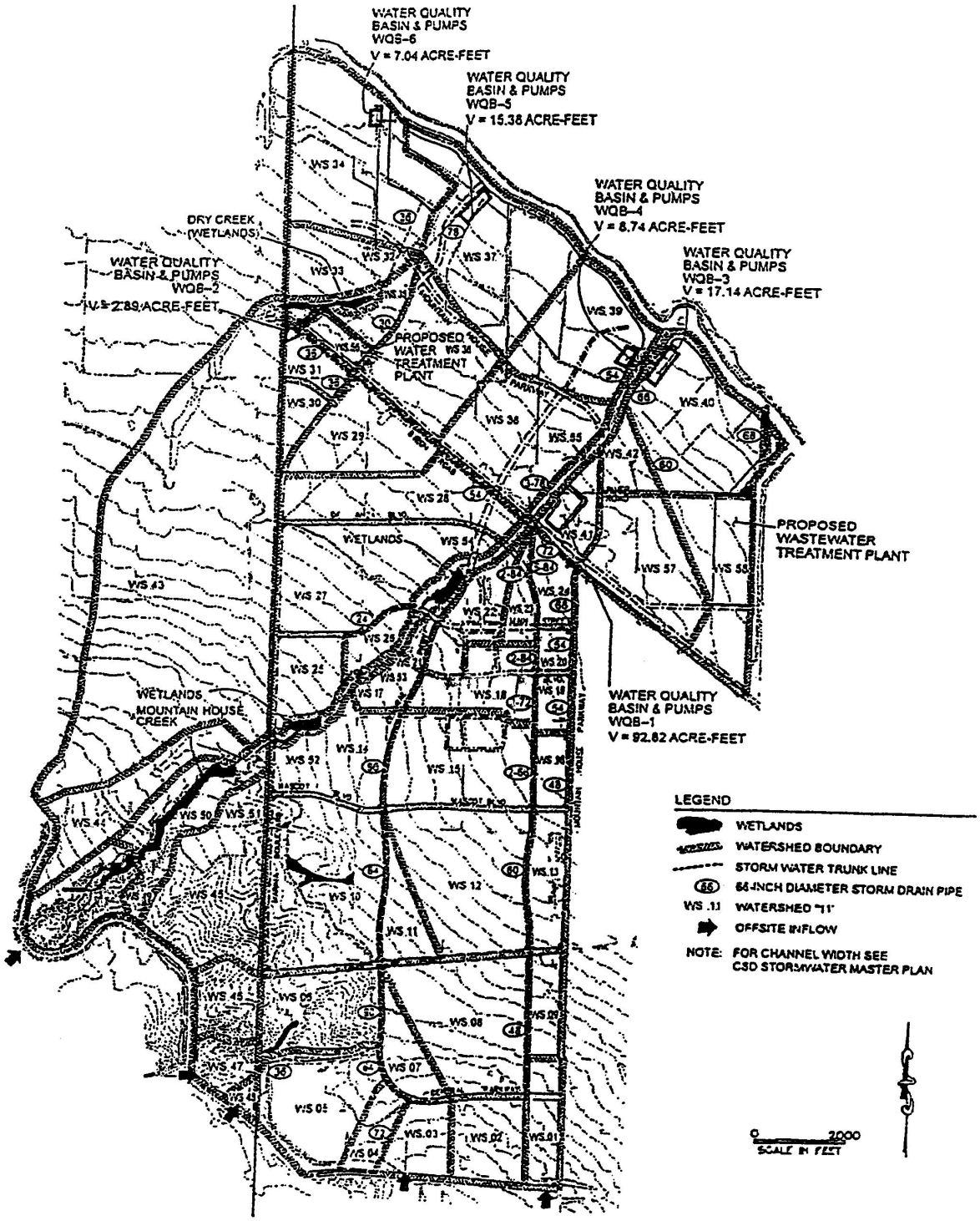
j) The location and design of detention ponds shall provide for adequate access to the basins for maintenance.

Implementation:

a) Inlet Structures. The inlet structure of detention ponds shall be designed and constructed to reduce the velocity of the incoming water to levels that minimize erosion.

b) Inflow Channels. The inflow channel for a dry detention basin shall be designed and constructed to prevent erosion, which may include but not be limited to a concrete low-flow channel or riprap. The inflow channel shall continue to the outlet of a dry detention basin or to the edge of a lower stage of the basin which is always submerged.

c) Detention Pond Location. The preliminary locations and capacities of detention ponds within each Specific Plan I Area shall be approved by the MHCSD prior to approval of the first Final Map for the area.



NOTE: THIS FIGURE IS TO BE REFINED BY THE CSD STORMWATER PLANS

FIGURE 15.2 – STORM DRAINAGE MASTER PLAN

d) Terminal Discharge. Terminal discharge may occur by either gravity flow and/or pumped flow.

e) Will Serve Letter. Prior to submittal of any development permit, a will serve letter for storm drainage and flood control will be obtained from the MHCSD. The MHCSD will condition the will serve letter to require the construction of necessary drainage facilities prior to occupancy of any structure or facility within the proposed development.

15.5 SECONDARY STORM DRAIN COLLECTION SYSTEM

The secondary storm drain collection system is primarily located within the local and collector streets of the community. However, a number of secondary systems serve the major arterials, parks and other areas. The secondary storm drain collection system consists of gutters, local drain swales, minor channels, catch basins, catch basin laterals and underground pipes. These facilities transport on-site drainage to trunk lines, detention basins, retention basins or terminal drains.

Objective: To ensure that on-site drainage occurring over the community be safely conveyed by the secondary storm drain collection system to the primary storm drain collection system.

Policies:

a) The secondary storm drain collection system shall be used to collect and convey on-site drainage to the primary storm system safely with adequate flood protection.

b) The design and construction of the secondary storm drain collection system shall be based on the 10-year storm event.

Implementation:

a) Final Designs. Each final design of a secondary storm drain collection system shall be based on the design standards of the MHCSD and other sound engineering practices.

15.6 MOUNTAIN HOUSE CREEK IMPROVEMENTS

Mountain House Creek will require improvements for flood control, wetland restoration and erosion control. A plan view of the Mountain House Creek area is shown in Figures 15.3, 15.4 and 15.5. Figure 15.6 shows typical creek channel cross-sections. Discharge points of lateral inflow along the creek are shown in these figures. Preliminary design flows for various reaches of the creek are presented in Table 15.2: Preliminary Design Flows for Mountain House Creek.

Section 7.2: Parks and Open Space Plan, contains additional provisions relating to Mountain House Creek. Section 9.8: Bicycle and Pedestrian Facilities, addresses standards for pedestrian paths along the creek.

Table 15.2 Preliminary Design Flows for Mountain House Creek			
Designated Reach of Mountain House Creek (cf. Figure 19.2)			**Discharge * Cubic Feet per Second**
A	CH19	to CH20	1,370
B	CH20	to CH21	1,380
C	CH21	to CH22	1,400
D	CH22	to Old River	2,200

* Based on 100-year, 24-hour storm event.

Natural water flow in the creek is difficult to determine. Under current farming practices the creek is used both for tailing water and irrigation water supply. The creek flow varies from zero to a full flow measuring several feet in depth. Numerous small earthen barriers hold back the flow of water in a number of locations. Water flow from the hills above the community varies from a small trickle to flood flows during major storms. The low ambient flows are considered insignificant when added to the major storm flows and are a negligible factor in drainage structure designs which are based solely on the storm flows.

The proposed design of the creek includes two components: the existing main creek channel and the proposed adjacent floodplain. The main creek channel will remain as is through most of its length. This channel varies from two to 10 feet across. The existing and proposed flood plain will extend up to 100 feet on either side of the main channel. The floodplain will be designed as a series of steps that will double as sediment basins for all but the very high flows. These basins will be located upstream of each road crossing. The maximum design depth will be limited to a few feet.

The proposed design will allow the floodplain to remain dry through all but the most severe storm years as the main creek channel is adequate to handle more than normal flows. The design target will be to limit floodplain inundation to less than once every ten years. With the proper design and the elimination of farm use of the main creek channel, erosion and sediment flow will be reduced to the infrequent major storm events. The design of the floodplain will allow the floodplain to double as a natural wildlife area and community park.

During above-normal and heavy flows from off-site, flows entering the community at the Alameda County line will be allowed to overflow the small creek channel onto the parallel floodplain. The floodplain will slow the flows and serve for sediment collection. However, during major storms such as 50 to 100-year events, the flow rates are too high to allow major sedimentation in the floodplain area.

On-site flood control structures will be designed to minimize silt generation through the use of best management practice detention basins and floating debris and sedimentation structures designed to suit each individual situation.

Special attention has been given to the Mountain House Creek at its junction with Old River. Current conditions show the dredger cut (Mountain House Creek enlarged by dredging) extending several hundred feet up the creek and terminating at a barrier across the creek. During storm flows or excessive irrigation, overflow pipes allow excess creek waters to pass into the dredger cut. When creek flows are low, river water is pumped upstream above the barrier to an enlarged section of the creek that serves as an irrigation pond leading to adjoining lands. Thus, water is going up or down stream depending on the season and irrigation needs. The dredger cut is directly connected to the Old River and is subject to the same tidal fluctuations as the river. The net impact of this current design is that the dredger cut is effectively a dead end slough with little circulation and high siltation. Even major storm events do not pass into the cut as they are diverted upstream by bank overflows. The dredger cut is subject to the same agency controls as the river and is occasionally dredged to remove siltation and excessive vegetation.

The proposed design modifies the dredger cut by removing the barrier and allowing the cut to directly carry major storm flows into the Old River at a controlled flow low enough to prevent levee damage in the main channel. This will allow normal scouring in the main creek channel during the major events while at the same time reducing siltation during other years. To reduce siltation during the major flood periods, the floodplain is designed to slow flow and provide silt dropout over a very large area though the entire creek floodplain.

Chapter Seven: Recreation and Open Space provides additional provisions for Mountain House Creek corridor improvements.

Objective: To develop Mountain House Creek as a multi-use corridor for conveyance of off-site and on-site drainage through the community and for a wildlife habitat and recreation corridor.

Objective: To minimize the deposition of sediment from Mountain House Creek into Old River.

Policies:

a) Mountain House Creek shall be used as an open channel to convey off-site and on-site drainage through the community with adequate flood protection.

b) Mountain House Creek shall discharge into Old River.

c) Existing wetlands within Mountain House Creek shall be restored.

d) Mountain House Creek shall be designed to minimize erosion.

e) The discharge of sediment to Old River shall be minimized by causing sediment deposition to occur in the Mountain House Creek channel.

Implementation:

a) Phasing of Improvements. Improvements to Mountain House Creek shall be constructed on an as-needed basis beginning at the southwestern end of the creek corridor. Such improvements and phasing shall be coordinated with the Mountain House Creek Plan in Chapter Seven. Timing of improvements shall be specified in both the creek plan and in the Specific Plan and shall make provisions for the following:

- Design for 100-Year Flow. Mountain House Creek and the associated road crossing culverts and railroad crossing culvert shall be designed and constructed to convey the 100-year volumetric flow rate with free board established to County standards.

- Maximum Velocity. To minimize erosion, the maximum allowable average velocity shall be based on channel material per Table 3-4 of the San Joaquin County Improvement Standards.

- Planting. As specified in Chapter Seven, selected species of plants shall be planted to enhance the creek habitat and increase the channel boundary roughness and hence reduce the average flow velocity.

- Channel Bed Slope. Drop structures and check structures may be used to decrease channel bed slope, and thus reduce average flow velocity.

- Flow Reduction. For several hundred feet along Mountain House Creek immediately upstream from Old River, the average flow velocity shall be reduced below two fps at the 100 year storm flow to enhance sedimentation prior to discharge into Old River. This reduction in average flow velocity shall be achieved by a gradual widening and deepening of the floodplain cross-section. The speed reduction will take place in the creek's floodplain area that will not be subject to permit control.

- Existing Dams. The two existing farm dams on Mountain House Creek between the Delta-Mendota Canal and the Alameda/San Joaquin County line shall remain undisturbed. The drainage system down stream shall be designed to provide for an emergency inundation area in the unlikely event of a dam failure.

- Berms. Berms shall be constructed to trap sediment thus reducing the sediment load to Old River.

- Flood Control Structures. Flood control structures on Mountain House Creek (e.g. culverts at road crossings and culverts at the Southern Pacific Railroad crossing) shall be constructed in the flood plain section of the creek.

- Streambank Stabilization. Structural streambank stabilization measures may be required at points of storm drain discharge into Mountain House Creek. Stabilization and erosion control may also be required downstream of culverts and upstream and/or downstream of sudden channel transitions. In these

cases, appropriate structural measures to prevent erosion may include stone riprap, reinforced concrete, log cribbing, gabions, cellular concrete and geotextiles. If possible, natural vegetation shall be incorporated into the erosion control method.

- Specific Plan Requirements. Streambed modification and riparian vegetation proposals shall be prepared for each Specific Plan Area.

- Alteration Agreement. If required, prior to construction affecting any portion of Mountain House Creek, the applicant shall apply for and comply with a streambed Alteration Agreement (1603 Agreement) issued by the California Department of Fish and Game.

- 404 Permit. If required, prior to construction on Mountain House Creek, the applicant shall apply for and comply with a 404 Permit (Clean Water Act) issued by the Army Corps of Engineers.

- Section 10 Permit. If required, prior to construction on Mountain House Creek, the applicant shall apply for and comply with a Section 10 Permit (Rivers and Harbors Act) issued by the Army Corps of Engineers.

- Nationwide Permit. If required, prior to construction on Mountain House Creek, the applicant shall apply for and comply with a Nationwide Permit (categorical permits) issued by the Army Corps of Engineers.

- Water Quality Certification. Water quality certification or a waiver thereof, shall be obtained pursuant to Section 401 of the Clean Water Act. Water quality certifications and waivers of certifications are obtained from the Regional Water Quality Board. If authorization from the Army Corps of Engineers is not required as described above, water quality certification is likewise, not required.

- Sedimentation Basin at West Boundary. A sedimentation basin or other effective sediment control structure shall be designed and constructed in the initial phase near the point where Mountain House Creek crosses the western project boundary. The basin should be designed to effectively remove sediment from the creek flows entering the project site. The basin maintenance shall be the responsibility of the MHCSD. The basin design and maintenance program shall minimize the potential for wetland development in the basin which could hinder the function or maintenance of the structure.

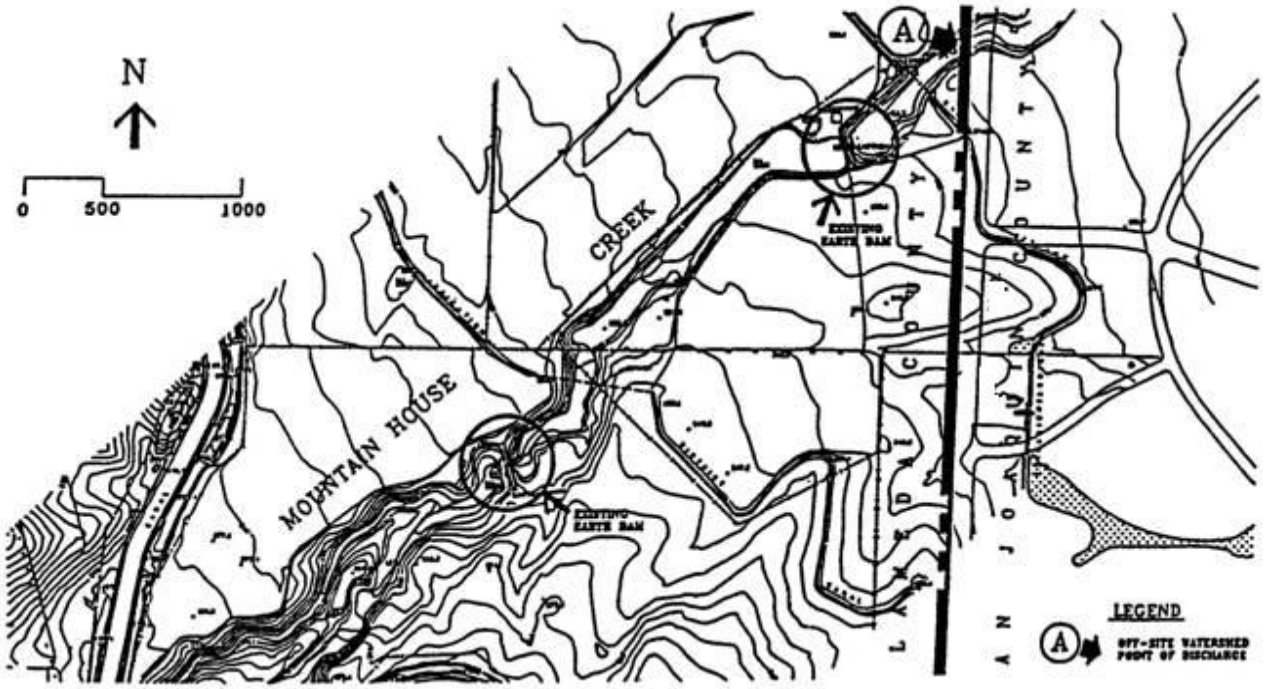


FIGURE 15.3 – MOUNTAIN HOUSE CREEK OFF-SITE - PLAN

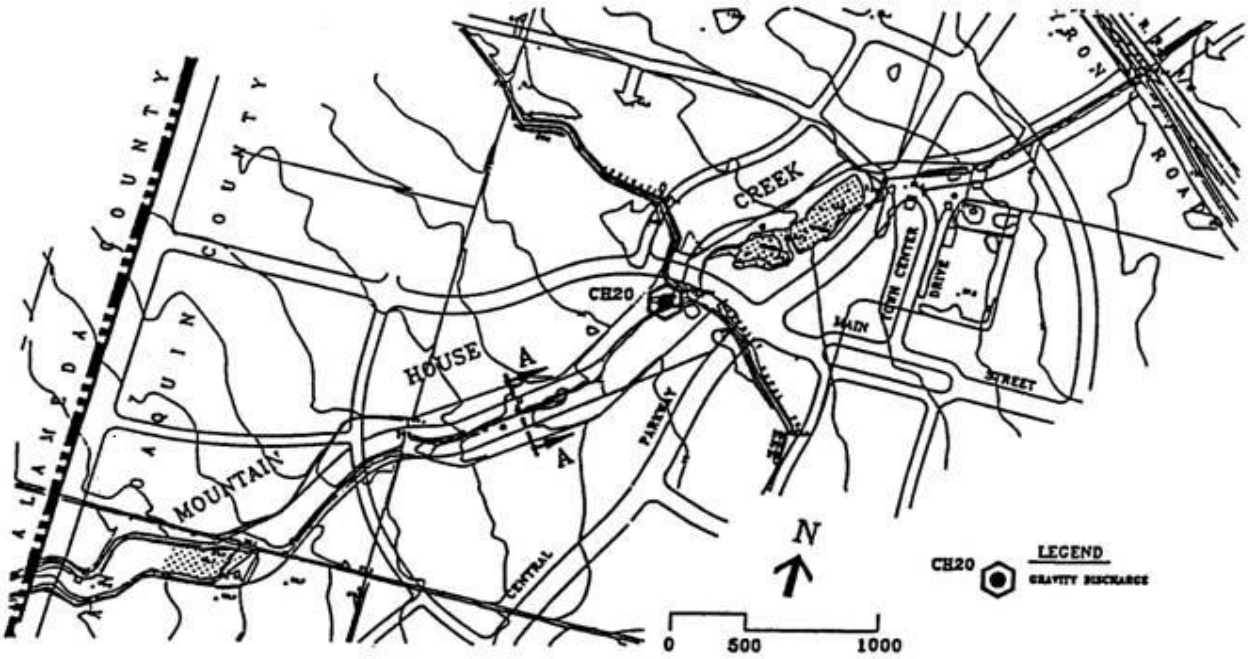


FIGURE 15.4 – MOUNTAIN HOUSE CREEK - SECTION A-A

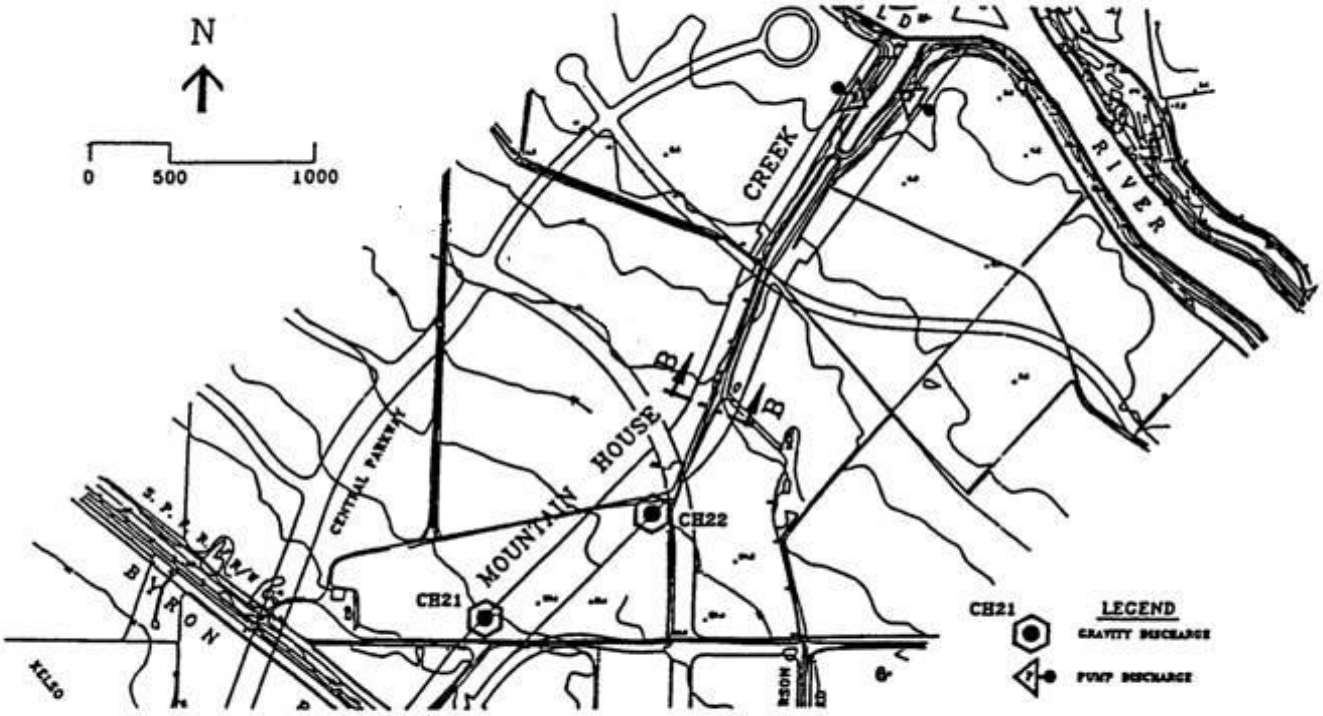


FIGURE 15.5 - MOUNTAIN HOUSE CREEK - SECTION B-B

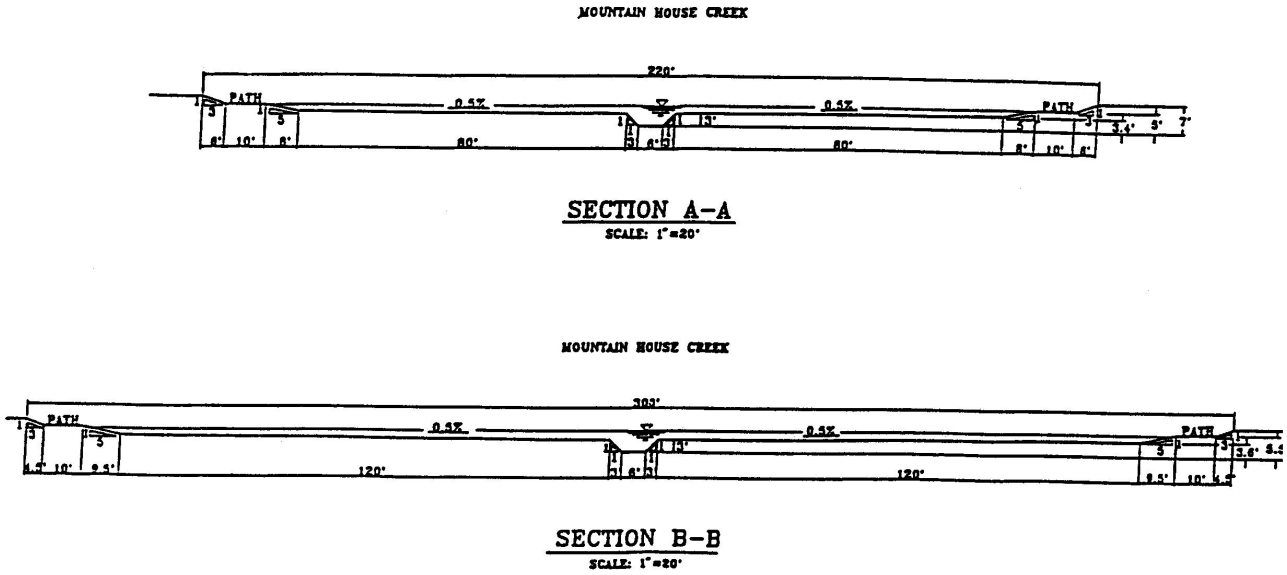


FIGURE 15.6 – TYPICAL CREEK CHANNEL CROSS SECTIONS

15.7 BEST MANAGEMENT PRACTICES (BMP'S)

Federal regulations are currently being developed to control the runoff of drainage waters to the waters of the United States, with the goal of prevention of contaminated drainage water from entering sensitive waterways. While specific regulations have not yet been fully determined, the storm drainage system design for Mountain House incorporates the Best Management Practices (BMP's) as described below, to address the collection and treatment of urban runoff. Future Specific Plans will be designed to meet or exceed the anticipated regulations, through the incorporation of these or other BMP's.

Objective: To design a storm drain system that will reduce the quantity of storm water pollutants as close to the point of origin as possible, and to incorporate cost effective BMP treatment processes into system's design.

Policy:

a) Site specific and regional treatment BMP's shall be incorporated into the design of all improvements including all structures and infrastructure.

Implementation:

a) Source Control BMP's. Source control BMP's which are feasible for the area shall be prepared by the MHCSD and implemented before construction of improvements begins. Source control BMP's are defined as: (1) planning management, (2) materials management, (3) spill prevention and cleanup, (4) illegal dumping controls, (5) illicit connection controls, and (6) street/storm sewer maintenance.

   Further, to ensure that the Mountain House Community can comply with the Phase 2 of Federal storm water regulations for small communities, the following program shall be implemented: A storm water management program (SWMP) shall be developed to reduce the discharge of pollutants from the storm sewer system to the maximum extent practicable and to protect water quality in the receiving waters. The following minimum program elements will be included in the SWMP:

   1) Public Education and outreach on storm water impacts;
   2) Public involvement/participation;
   3) Illicit discharge detection and elimination;
   4) Construction site storm water runoff control;
   5) Post construction storm water management; and
   6) Pollution prevention/good housekeeping for municipal operations.

   The SWMP will be adopted by the MHCSD prior to issuance of the first building permit.

b) BMP's. The BMP's described below shall be implemented where appropriate along with any additional BMP's that may be determined to be practical and feasible.

c) Community Design. The community shall be designed to minimize the amount of directly connected impervious area (DCIA) that is connected to the storm drainage system and to provide setbacks from environmentally sensitive areas. Where possible, runoff shall be directed to landscaped areas, grass buffer strips, and grass lined swales to slow down the rate of runoff, reduce runoff volumes, and promote filtering and infiltration of stormwater.

d) Material Management Plan. A material management plan for each business with potential pollutants shall be adopted and enforced prior to the issuance of building permits for commercial or industrial uses to control the use, storage and disposal of chemicals that could pollute runoff.

e) Spill Prevention and Cleanup Plan. A spill prevention and cleanup plan shall be adopted prior to the issuance of building permits for commercial or industrial uses to minimize the risk of spills during outdoor handling and transport of chemicals, and to contain and rapidly clean up spills before entering the storm drain system.

f) Illegal Dumping. An illegal dumping regulation shall be adopted and enforced prior to the issuance of building permits for commercial or industrial uses to prevent businesses and individuals from dumping waste products into the drainage system.

g) Illicit Connections. An illicit connection regulation shall be enforced to prevent connections to the storm drainage system that discharge material except rainfall runoff into the drainage system.

h) Maintenance Program. A street/storm sewer maintenance program shall be developed to provide for the removal of pollutants from paved areas (e.g. street sweeping) and, maintain the functions of the various storm drain components.

i) Site Specific BMP's. Site specific BMP's shall be required for industries, public facilities and businesses which generate polluted runoff which differs in concentration and/or content from residential runoff. Industries, public facilities and businesses may be required to treat on-site runoff prior to discharge into the public storm drain collection system.

j) BMP Processes. Possible site specific BMP's shall include, but not be limited to, extended detention followed by filtration and oil/water separators.

k) Regional Treatment. Regional BMP treatment processes shall be required for the community.

l) Regional Processes. Possible regional BMP treatment processes shall include, but not be limited to, extended dry detention basins, wet detention basins or ponds and/or wetland bottom channels.

15.8 FLOOD PROTECTION

In accord with the General Plan policies for flood protection, the entire community will require protection from a 100-year flood. The majority of the Mountain House area is not

subject to a 100-year flood classification. A levee along Old River protects the northernmost area from flooding (8.5' flood elevation), although in a major flood the levee could fail because it was constructed prior to U.S. Corps of Engineers certification and may not meet current standards. Therefore, flooding could occur in an area comprising approximately five percent of the community and located near Old River.

Figures 15.7 to 15.10 illustrate existing flood hazard conditions and proposal for flood protection. Appendix 15-C: Sources of Flooding provides supplementary material.

Objective: To protect people and property in the Mountain House community from flood hazards.

Policy:

a) The entire Mountain House community shall be protected from a 100-year flood.

Implementation:

a) Monitoring. On-site dams, levees and berms protecting the County and the Mountain House community from flooding shall be monitored by the MHCSD to identify potential problems.

b) Requirements for Flood-Prone Areas. The development of the areas in the Mountain House community which are identified to be subject to flooding shall be subject to requirements for participation in the National Flood Insurance Program (NFIP), San Joaquin County General Plan 2010, Volume I, and San Joaquin County's Development Title.

c) Proposed Flood Control Improvements. Areas subject to flooding from Old River shall be protected through filling of areas directly behind the existing levee in a gradual fill-back to the limits of the existing FEMA designation. Proposed lake areas, and golf areas within the Neighborhoods north of Byron Road shall be lowered to continue to provide storm conveyance and storage as required in the MHCSD Storm Water Master Plan. Development areas behind the top of the fill area contained within the Old River Regional park boundary would then drain away from the river, back into secondary and primary collection systems within each Neighborhood, and ultimately to Old River via either Mountain House Creek or Dry Creek.

d) Minimum Design Criteria. The proposed levee improvements shall meet, as a minimum, the requirements of Section 65.10 Mapping of Areas Protected By Levee Systems, 44 CFR Ch. 1 and the design standards specified herein.

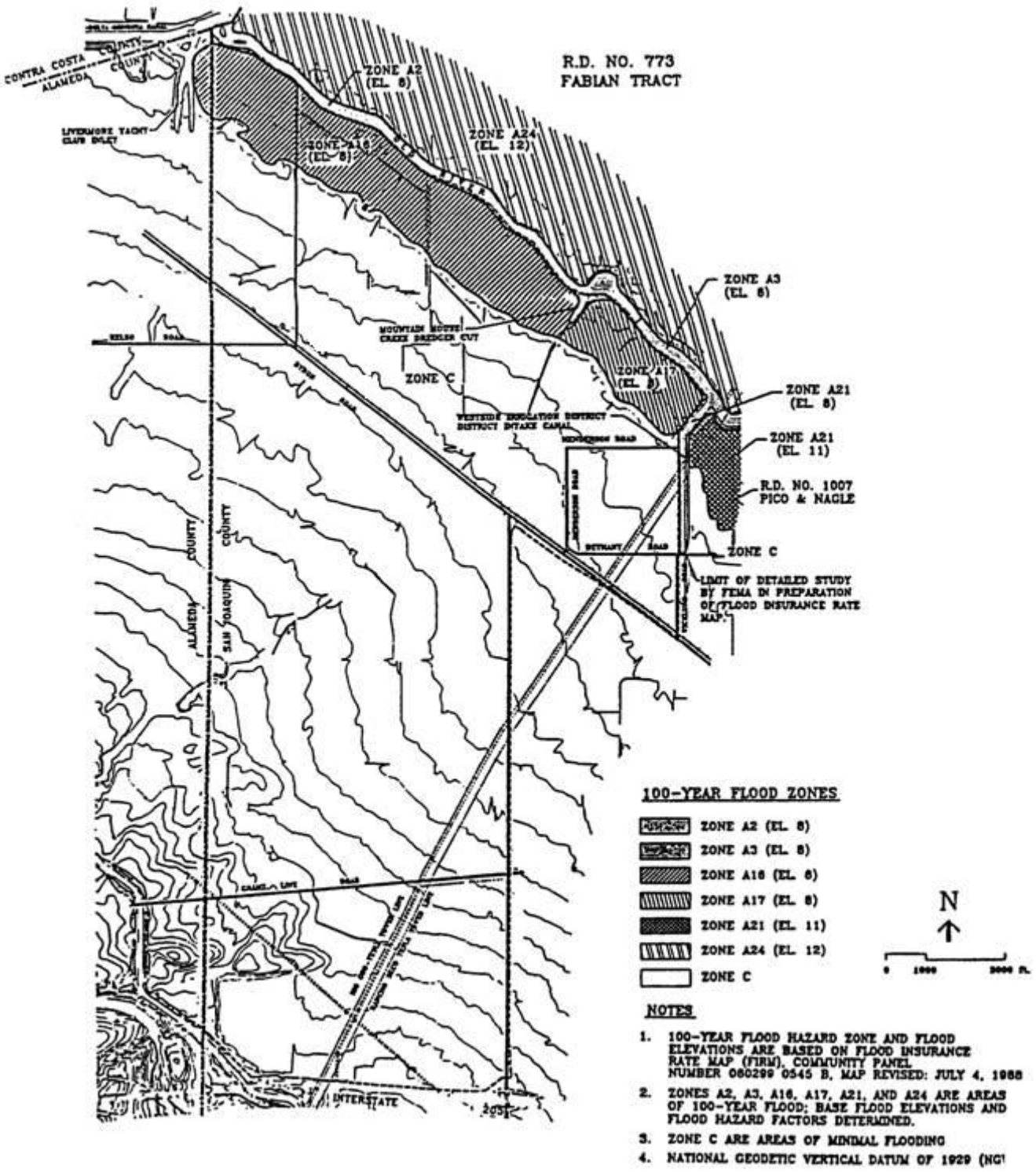


FIGURE 15.7 – EXISTING FLOOD HAZARD ZONES

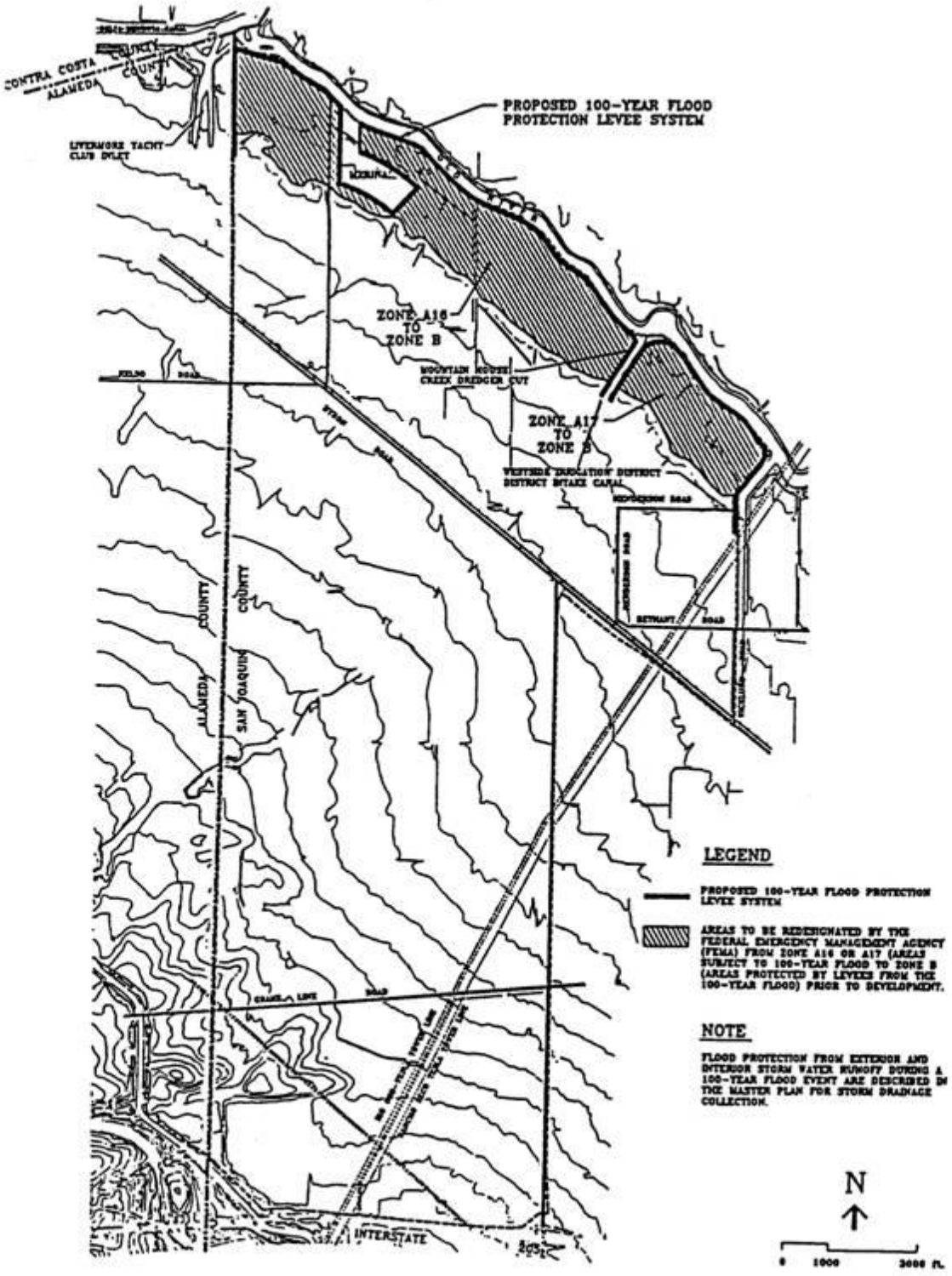


FIGURE 15.8 – FLOOD PROTECTION PLAN

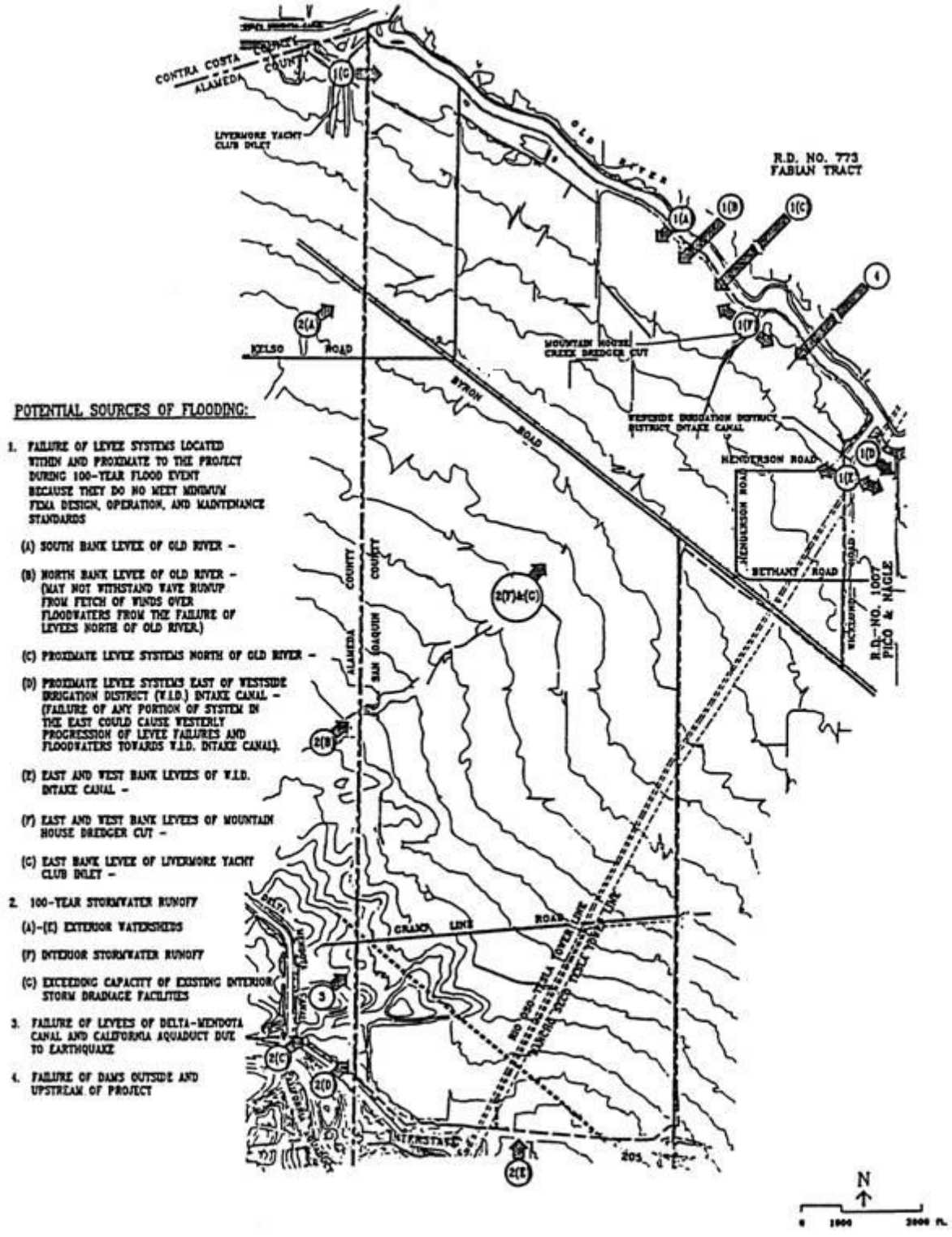
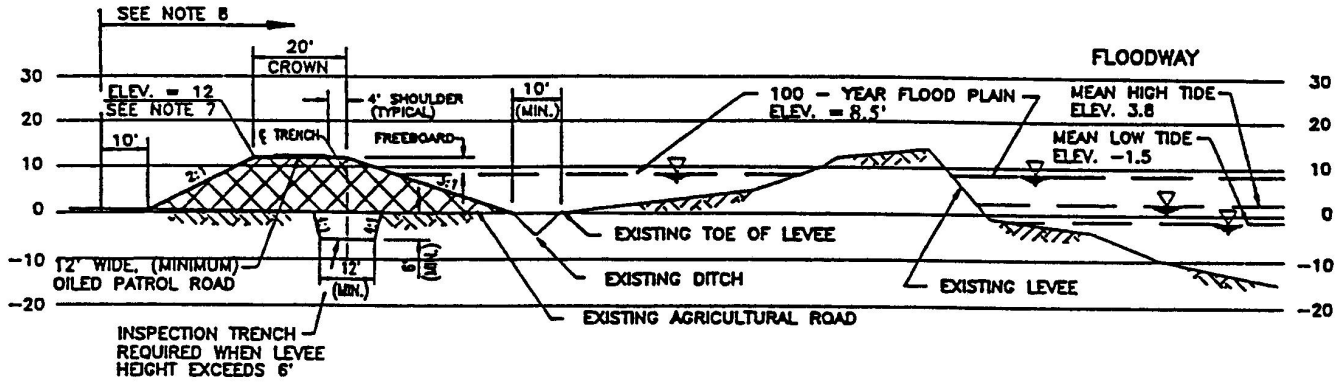


FIGURE 15.9 – POTENTIAL SOURCES OF FLOODING



MINIMUM LEVEE DESIGN CRITERIA

1. MINIMUM LEVEE DESIGN CRITERIA SHALL BE IN ACCORDANCE WITH SECTION 65.10, 44 CFR CH. 1 AND AS STIPULATED HEREIN WHICHEVER IS THE GREATER REQUIREMENT.
2. 3' FREEBOARD ABOVE 100-YEAR FLOOD PLAIN, PLUS A 1' ALLOWANCE FOR LEVEE SETTLEMENT.
3. 20' CROWN WITH 12' WIDE, (MINIMUM) OILED PATROL ROAD.
4. 3:1 MINIMUM WATERSIDE BANK SLOPE WITHOUT STONE PROTECTION.
5. 10' SETBACK FROM TOE OF EXISTING LEVEE.
6. TURNAROUNDS SPACED AT 2,500'.
7. IN THE EVENT THAT THE EXISTING PROXIMATE LEVEE SYSTEMS LOCATED OUTSIDE OF THE MASTER PLAN AREA ARE PREDICTED TO FAIL DURING A 100-YEAR FLOOD EVENT, THE TOP OF LEVEE CROWN ELEVATION SHALL BE DESIGNED AT EITHER 1' ABOVE THE MAXIMUM WAVE RUN-UP ELEVATION PLUS A 1' ALLOWANCE FOR LEVEE SETTLEMENT OR 3' ABOVE THE 100-YEAR FLOOD PLAIN PLUS 1' ALLOWANCE FOR LEVEE SETTLEMENT, WHICHEVER IS THE HIGHER ELEVATION.
8. RESERVED AS REGIONAL PUBLIC RECREATIONAL PARK AND/OR WILDLIFE HABITAT AND SUBJECT TO FLOOD CONTROL AGENCY ENCROACHMENT STANDARDS.
9. DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29)
10. LEVEE MUST BE DESIGNED TO MEET STATE RECREATION BOARD AND FEMA STANDARDS IN REGARDS TO MAINTENANCE, ROAD WIDTH, LEVEE SIDE SLOPES, COMPACTION, AND OTHER REQUIREMENTS.

FIGURE 15.10 – TYPICAL FLOOD PROTECTION LEVEE CROSS SECTION

e) Levee and Encroachment Standard. Prior to approval of any Specific Plan including the Old River levee, a levee encroachment standard and processing procedure for encroachment permits (including the Old River levee) shall be developed.

f) FEMA Application. After levee improvements are constructed along Old River, an application shall be made to the Federal Emergency Management Agency to change the flood insurance maps.

15.9 SITING CRITERIA

Objective: To ensure that drainage facilities are sited to perform efficiently while minimizing visual, safety, or other impacts.

Policy:

a) Storm drainage retention/detention ponds shall be located in such a manner, for example, by incorporating into golf course water hazards and parks, as to minimize the visual impact on the adjacent community.

Implementation:

a) Screening. Where the facility is exclusively used for storm drainage purposes, the site shall be fenced in order to bar entry to the facility by the public. Where ponds interface with public streets or adjacent land developments, a buffer of landscaping shall be installed that will visually hide the facility from the adjacent land uses.

b) Temporary Facilities. Temporary storm drainage retention/detention basins shall be exempt from the siting criteria noted above, except for those relating to health and safety.

15.10 REGULATORY PERMITS

One or more of the following permits may be required prior to the commencement of construction of future Specific Plans.

15.10.1 Corps of Engineers

The Corps of Engineers administers two Federal laws which may require that Department of the Army Permit(s) be obtained for certain aspects of the project. These laws are Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

The Mountain House Master Plan avoids any placement of dredged or fill material into any waters of the United States, including wetlands, except for construction of the proposed raw water conveyance pipeline within the initial Specific Plan area. The construction of this pipeline is proposed to conform with the conditions of Nationwide Permit number 12. Therefore, neither an individual

permit nor a predischarge notification would be required within the Master Plan area.

15.10.2 California Department of Fish and Game

In addition to any required dredge and fill permits issued by the Corps of Engineers, a Streambed Alteration Agreement (also known as a 1603 Agreement) pursuant to Sections 1601-1607 of the California Fish and Game Code would be required prior to any alteration of a lake, river, or streambed bottom or margin. Stream Alteration Agreements are issued by the California Department of Fish and Game. Work in or adjacent to Old River, Mountain House Creek and Dry Creek will require Streambed Alteration Agreement(s). The construction of bridges over Mountain House Creek and Dry Creek will require Stream Alteration Agreements even though no culverts or fill will be placed in the creeks. Likewise, construction of the raw water conveyance pipeline will require a Stream Alteration agreement where it crosses Dry Creek.

15.10.3 Central Valley Regional Water Quality Control Board

In addition to Streambed Alteration Agreements or Corps of Engineers permits, it is further required that water quality certification, or a waiver thereof, be obtained pursuant to Section 401 of the Clean Water Act for certain Specific Plans. Water quality certifications and waivers of certification are obtained from the Regional Water Quality Control Board. If authorization from the Corps of Engineers is not required as described in 15.10.1, above, water quality certification is likewise, not required.

15.10.4 Central Valley RWQCB/NPDES General Permit

Storm water discharges into Mountain House Creek and Old River could contain pollutants that may adversely impact the beneficial uses of Old River. To address this issue, a Notice of Intent to the Central Valley RWQCB shall be submitted at least 30 days prior to the commencement of construction and shall comply with all requirements specified in the NPDES General Permit for construction activities.

15.11 PHASING AND COSTS

15.11.1 Capital Facility Cost and Phasing

Approximately $29 million has been included in the cost estimates for storm drainage and flood control facilities, including transmission pipelines, detention basins, and levee improvements. The storm collection system will generally be built in increments that correspond to the 12 Neighborhoods.

Construction between Mascot Drive and Grant Line Road will require a second trunk pipeline running under Mountain House Parkway north across the tracks to BMP ponds in the golf course fairways. If golf course development is not ready to proceed, temporary BMP ponds would have to be constructed. Construction south of Grant Line Road will require a trunk pipeline running north to Mascot Boulevard and an open channel from Mascot to Old River.

The three storm lines discussed above are independent of each other and can be built in any order; they are, however, projected to be built in the order presented, approximately five years apart. The main consideration will be the timing of construction of Mountain House Parkway, as coordinated planning will save tearing up new roadways to lay pipe.

Mountain House Creek flood improvements will be constructed as specified in the Mountain House Creek Corridor Plan, generally in the following sequence:

a) East side of Upper Mountain House Creek (from Main Street to Alameda County line). Includes any necessary contour grading north of Main Street to Byron Road to ensure that any flood waters overtopping the creek are confined to the creek area long enough to drain through the existing Byron Road culverts. Required prior to construction of any structures in Neighborhood F and east half of Neighborhood E.

b) West side of Upper Mountain House Creek (from DeAnza Boulevard to County line). Includes agricultural dam reconstruction in Alameda County and west side of creek from Main Street to DeAnza Boulevard. Required prior to construction of any structures located northwest of the creek.

c) Remainder of both sides of Mountain House Creek (from Main Street to north side of railroad tracks). Includes undercrossing of Byron Road and tracks. Required prior to construction of Neighborhood H and Town Center area north of Main Street, with the exception of park open space areas.

d) Realignment of Mountain House Creek and western half of creek's floodplain from railroad tracks to Dredger Cut. Required prior to construction of all areas east of new creek alignment, except Old River Industrial Park, which is does not require flood protection from Mountain House Creek.

e) Completion of western half of Mountain House floodplain from tracks to Dredger Cut. Includes removal of Dredger Cut Dam and construction of transition structure. Required prior to construction north of the railroad tracks and east of the future extension of Great Valley Parkway.

Phasing of the storm improvements to Mountain House Creek will take place in the order listed above, although accelerated growth may justify combining several steps.

Flood Control improvements will be constructed on a phased basis as deemed necessary to provide adequate flood protection for developed portions of the project.

15.11.2 Operations and Maintenance

Storm drainage and flood protection facilities will be maintained by the MHCSD. A channel maintenance plan shall be prepared prior to the submittal of the first development permit and shall include a program to monitor sedimentation buildup for Mountain House Creek and drainage channels. Maintenance personnel, vehicles, and equipment may be shared with other facility maintenance crews to achieve staffing efficiency and cost reductions. These maintenance costs have been incorporated in the fiscal analysis presented in the PFP.

15.12 SPECIFIC PLAN REQUIREMENTS

The following list is a compilation of all Specific Plan requirements contained in this chapter.

Implementation:

a) Design of Storm Facilities. Detailed studies for each watershed area shall be prepared and utilized in the design of each segment of storm facilities required for each Specific Plan and shall be completed and approved prior to the submittal of Specific Plans. For Specific Plan I, these studies shall be approved prior to approval of the first Final Map.

b) Detention Pond Location. The preliminary locations and capacities of detention ponds within each Specific Plan Area shall be approved by the MHCSD prior to approval of the first Final Map for the Area.

c) Streambed Modifications. Streambed modification and riparian vegetation proposals shall be prepared for each Specific Plan Area.

d) Phasing of Improvements. Improvements to Mountain House Creek shall be constructed as specified in the Mountain House Creek Corridor Plan (contained in the Parks and Open Space Plan). Timing of improvements shall be specified in both the creek plan and in each Specific Plan.

d) Levee and Encroachment Standard. Prior to approval of any Specific Plan including the Old River levee, a levee encroachment standard and processing procedure for encroachment permits (including the Old River levee) shall be developed.