

# 7. Hydrology

## 7.1 BACKGROUND AND CONTEXT

### 7.1.1 Hydraulic Hazards

Hydraulic hazards, in the context of flood control and drainage, consist of the wearing away or deposition of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land clearing practices. Flooding is an overflow of water onto land that is normally dry.

Major flooding conditions are defined as having a one percent chance of being equaled or exceeded in any given year and are commonly referred to as the one-percent annual chance flood or 100-year flood, which is also known as a base flood. The calculated elevation of the 100-year flood is called the *base flood elevation*. Areas that have been determined by the Federal Emergency Management Agency (FEMA) as being at risk of flooding during 100-year flood events are mapped through the National Flood Insurance Program on the *Flood Insurance Rate Maps (FIRMs)* in Flood Insurance Studies, and are referred to as *Special Flood Hazard Areas (SFHA)*. Additional information on flood hazards in Ventura County is provided in Section 11.2 of the Ventura County General Plan Background Report.

### 7.1.2 Flood Control Facilities/Watercourses

A flood control facility is a facility owned (either in easement or in fee), operated, controlled, improved, and/or maintained by the Ventura County Watershed Protection District (WPD) to include, but not be limited to levees, debris basins, detention basins, storm drain channels and conduits, access roads, and associated appurtenances.

A watercourse is any natural or artificial flood control conveyance that includes the bed and banks and overflow areas of any stream, river, creek, ditch, channel, canal, conduit, drain, waterway, gully, ravine, arroyo, or wash within Ventura County over which the WPD exercises jurisdictional and regulatory authority. The Comprehensive Plan for Flood Control, adopted in 1960 and as amended, delineates the number and longitudinal limits of watercourses within Ventura County.

In some areas, flood control and drainage facilities that are owned and maintained by public or private entities or persons other than the WPD ~~that~~ provide for removal of accumulated storm waters from land through both human-made drainage facilities and natural channels. Flow of waters in channels can lead to erosion of channel beds and banks where flow velocities are high or deposition of materials where velocities are low. Existing channels may be of sufficient size to contain regulatory flow rates or they may be inadequate to contain regulatory flow rates and expose *adjacent* lands to flood hazards.

## 7.2 THRESHOLDS OF SIGNIFICANCE

The determination of significance shall be made on a case-by-case basis and evaluated using the following thresholds of significance as specified below.

**HYD-1** A project may have a significant impact if it would substantially obstruct, impair, divert, impede, or alter the characteristics of the flow of water within flood control facilities and watercourses, *SFHAs*, and regulatory channels both on- and off-site; or if it would result in substantial deposition of sediment and debris materials within existing channels and allied obstruction of flow, overflow of channels during design storm conditions, substantial increased runoff, or other adverse effects, resulting in exposure of *adjacent* property and the community to an increased risk of flood hazards.

**HYD-2** A project may have a significant impact if it would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.

**HYD-3** A project may have a significant impact if it would a) conflict with the Ventura County Watershed Protection District's Comprehensive Plan for Flood Control, applicable building design and construction codes, ordinances, and standards regulating flow to and from natural and human-made drainage channels and facilities; and b) result in a significant adverse environmental effect due to that conflict.

### 7.3 IMPACT ANALYSIS

Potential erosion/siltation hazards and flooding hazards are ubiquitous throughout Ventura County and are addressed by the Ventura County Standard Specifications Design. Guidance on addressing the questions from the Initial Study Checklist is provided below. In order to determine whether project impacts exceed or meet the criteria of the thresholds of significance in Section 7.2, the level of impact shall be evaluated based on the appropriate assessment methodologies as outlined below.

(a) *Would the project substantially obstruct, impair, divert, impede, or alter the characteristics of the flow of water within flood control facilities and watercourses, SFHAs, and regulatory channels both on- and off-site; or result in substantial deposition of sediment and debris materials within existing channels and allied obstruction of flow, overflow of channels during design storm conditions, substantial increased runoff, or other adverse effects, resulting in exposure of adjacent property and the community to an increased risk of flood hazards?*

Impacts to flood control facilities and/or watercourses could include, but are not limited to, substantial deposition of sediment and debris materials within existing channels and allied obstruction of flow, overflow of channels during design storm conditions, or substantial increased runoff. Adverse effects in *SFHAs* and regulatory channels could potentially expose *adjacent* property and the community to increased risk of flood hazards.

Projects may expose *adjacent* property and the community to increased flood hazards by obstructing, impairing, diverting, impeding, or altering the characteristics of the flow of water, or through activities that would:

- Reduce the capacity of flood control facilities and watercourses. This includes the planting of vegetation within the watercourse or on the banks thereof.

- Erode watercourse beds and banks due to high velocities, changes in *adjacent* land use, encroachments into the channel such as bridges, and loading the top of the channel embankment with structures.
- Deposit any material of any kind in a watercourse that would adversely affect the watercourse.
- Place a structure that encroaches on a flood control facility or that does not have sufficient setback from a watercourse as determined by WPD, consistent with state and local regulations, ordinances, and standards.

The project site plan shall include any nearby watercourses and flood control facilities and indicate whether proposed structures or activities would encroach on these watercourses or flood control facilities. To determine whether the project, in part or in whole, is located within a *SFHA* or a *Regulatory Floodway*, the WPD shall review plans and other technical documents submitted by the project applicant and shall use the currently FEMA-approved *FIRMs* and *Flood Insurance Study*, the latest draft version (i.e., preliminary) of the *FIRMs* and *Flood Insurance Study* issued by FEMA, and any FEMA-approved Letter of Map Change applicable to the project site (see Section 15.4 for a link to the FEMA website regarding Letters of Map Change).

If WPD determines that current project materials are insufficient to evaluate project impacts, the project applicant may be required to prepare a scaled site plan stamped and signed by a California-licensed civil engineer, architect, or land surveyor with the following information subject to the review of WPD:

- Existing and proposed development on the project site
- Accurate delineation of the boundaries of the *SFHA* and the 'X-Unshaded' flood zone using both the latest available FEMA-approved and preliminary *FIRMs*
- Topographic information
- *Adjacent* WPD flood control facility and/or watercourse, as well as WPD property rights, if any

In addition, the project applicant may be required to prepare a drainage report signed and stamped by a registered civil engineer licensed to practice in the state of California. The drainage report should include engineering calculations, including hydrology and hydraulics, to ascertain the degree to which the project would impact flood control facilities and/or watercourses and the physical improvements necessary to meet state and local ordinance and manual standards (see checklist question (b)). Water quality requirements (in accordance with Section 9, Water Resources), and other agency mitigation areas must be addressed separately from flood control components.

### Preparation of Initial Study Checklist

The following information should be used to complete the Initial Study Checklist:

A determination of **No Impact (N)** shall be made if:

- The project would not result in deposition of sediment and debris materials within existing channels and allied obstruction of flow, overflow of channels during design storm conditions, increased runoff, or cause adverse effects in *SFHAs* and regulatory channels both on- and off-site;

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- If the entire project is located outside of the boundaries of a *SFHA* and is located [in an area depicted on FIRMs as above the 500-year flood level](#) ~~entirely within a FEMA-determined 'X-Unshaded' flood zone (beyond the 0.2% annual chance floodplain; beyond the 500-year floodplain)~~; or
- The WPD, after review of the drainage report, determines that the project would not have an impact to flood control facilities and/or watercourses.

A determination of **Less Than Significant (LS)** shall be made if:

- The project, in part or in whole, is located within the boundaries of a *SFHA*, but is located in an area between the limits of the 100-year and 500-year floods outside of the boundaries of the *Regulatory Floodway* and it can be demonstrated that the project can be designed and constructed to be in compliance with all applicable state and local ordinance and manual standards.
- The entire project is located outside of the boundaries of a *SFHA* and is located [in an area between the limits of the 100-year and 500-year floods](#) ~~entirely within a FEMA-determined 'X-Shaded' flood zone (within the 0.2% annual chance floodplain; within the 500-year floodplain)~~.
- The WPD, after review of the drainage report, determines that the project would not result in a significant impact on flood control facilities and/or watercourses.

A determination of **Less Than Significant with Mitigation Incorporated (LS-M)** shall be made if:

- The project would result in potentially significant impacts, but impacts can be mitigated to a less than significant level through project design or measures such as, but not limited to, relocating the project where the risk of flood damage is potentially lower, implementing FEMA-supported building construction and grading technologies that mitigate flood damage and thereby reducing the risk of the flood hazard. Mitigation measures shall be developed in consultation with WPD on a case-by-case basis.
- The project would result in potentially significant impacts to flood control facilities or watercourses, but impacts can be mitigated to a less than significant level. Mitigation measures shall be developed in consultation with WPD on a case-by-case basis.

A determination of **Potentially Significant (PS)** shall be made and further analysis shall be addressed in an environmental impact report (EIR) if there is *substantial evidence* that the project, in part or in whole, is located within the boundaries of the *Regulatory Floodway*, as determined using the latest available *FIRMs* and the project would result in potentially significant impacts, including impacts to flood control facilities and watercourses.

*(b) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff?*

The PWA, or WPD if applicable, shall review the project plans and documents to determine if the project has the potential to increase drainage runoff, flooding, erosion, or siltation, either onsite or offsite, either temporarily or ongoing, individually or cumulatively. Compare the project and drainage

study, if one was prepared, to the existing environment, as well as the goals, objectives, policies, and/or development standards that apply to the project, to identify and evaluate the significance of the impacts. The PWA (or WPD if applicable) must analyze both project-specific impacts and the project's contribution to cumulative impacts relating to drainage runoff, flooding, and erosion or siltation.

### Preparation of Initial Study Checklist

The following information should be used to complete the Initial Study Checklist:

A determination of **No Impact (N)** shall be made if there is no potential for the project to increase drainage runoff, flooding, and erosion or siltation (e.g., if the project does not propose grading or construction).

A determination of **Less Than Significant Impact (LS)** shall be made if the project has the potential to increase drainage runoff, flooding, and erosion or siltation (e.g., construction that may change the existing drainage patterns of the site) and the project is consistent with applicable regulations, ordinances, and standards as outlined in checklist question (c).

A determination of **Less Than Significant Impact with Mitigation Incorporated (LS-M)** shall be made if the project has the potential to result in significant impacts through substantially increased drainage runoff, flooding, and erosion or siltation. However, impacts can be reduced to a less than significant level by project redesign or other measures in consultation with PWA, or WPD where appropriate.

A determination of **Potentially Significant (PS)** shall be made and further analysis shall be addressed in an EIR if there is *substantial evidence* that the project has the potential to result in significant impacts through substantially increased drainage runoff, flooding, and erosion or siltation.

As part of the review, PWA, or WPD where appropriate, shall consider past, present, and reasonably foreseeable probable future projects that are located within the same watershed as the project site to assess the project's contribution to cumulative impacts on drainage runoff, flooding, and erosion or siltation.

*(c) Would the project a) conflict with the Ventura County Watershed Protection District's Comprehensive Plan for Flood Control, building design and construction codes, ordinances, and standards regulating flow to and from natural and man-made drainage channels and facilities; and b) result in a significant adverse environmental effect due to that conflict?*

The effects of flooding hazards, including flood control and drainage facilities, are required to be considered through building design and construction standards set forth in the following regulations, which apply to all public and privately-owned lands and projects either individually, collectively or in combination with one another:

- *FIRMs*; both the latest available and preliminary *FIRMs* as provided by FEMA
- Title 44, Code of Federal Regulations, Sections 59, 60, 65, and 70
- Ventura County Floodplain Management Ordinance, as amended
- Ventura County General Plan, Chapter 7 (Hazards and Safety Element), Section 7.2 (Flood Hazards) and Section 7.3 (Coastal Flooding)

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- Ventura County Building Code
- Watershed Protection District Design Manual, as amended
- Watershed Protection District Design Hydrology Manual, as amended
- Ventura County Watershed Protection District Ordinance No. WP-2, as amended

### Preparation of Initial Study Checklist

The following information should be used to complete the Initial Study Checklist:

A determination of **No Impact (N)** shall be made if the project is consistent with all applicable regulations, ordinances, and standards as stated above.

A determination of **Less Than Significant Impact (LS)** shall be made if the project has the potential to result in impacts related to flooding, but the project is consistent with all applicable regulations, ordinances, and standards as stated above.

A determination of **Less Than Significant Impact with Mitigation Incorporated (LS-M)** shall be made if the project has the potential to result in significant impacts due to a conflict with the regulations, ordinances, and standards as stated above. However, impacts can be reduced to a less than significant level by project redesign or other measures in consultation with PWA or WPD where appropriate.

A determination of **Potentially Significant (PS)** shall be made and further analysis shall be addressed in an EIR if there is *substantial evidence* that the project has the potential to result in significant impacts due to a conflict with the regulations, ordinances, and standards as stated above.

## 7.4 RESOURCES & REFERENCES

Source	Managing Agency/Organization	Online Access
<b>Resources</b>		
Ventura County CEQA Implementation Manual	Ventura County Resource Management Agency (RMA) Planning Division	PDF   Website
Ventura County Initial Study Assessment Guidelines: Introduction	Ventura County RMA Planning Division	PDF   Website
Ventura County Initial Study Checklist Template	Ventura County RMA Planning Division	PDF   Website
<b>References</b>		
California Environmental Quality Act	California Governor's Office of Land Use and Climate Innovation, formerly Office of Planning and Research	<a href="#">Website</a>
Comprehensive Plan for Flood Control	Ventura County Watershed Protection District (WPD)	<a href="#">PDF</a>
Flood Insurance Study	Federal Emergency Management Agency (FEMA)	<a href="#">Website</a>

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Source	Managing Agency/Organization	Online Access
Flood Map Service Center	FEMA	<a href="#">Website</a>
Letter of Map Change Information	FEMA	<a href="#">Website</a>
National Flood Hazard Layer	FEMA	<a href="#">Website</a>
National Flood Insurance Program	FEMA	<a href="#">Website</a>
Title 44, Code of Federal Regulations, Emergency Management and Assistance	National Archives, Electronic Code of Federal Regulations	<a href="#">Website</a>
Ventura County Building Code	Ventura County RMA Building and Safety Division	<a href="#">Website</a>
Ventura County Floodplain Management Ordinance	Ventura County WPD	<a href="#">PDF</a>   <a href="#">Website</a>
Ventura County General Plan Background Report, Chapter 11	Ventura County RMA Planning Division	<a href="#">PDF</a>   <a href="#">Website</a>
Ventura County General Plan, Hazards and Safety Element	Ventura County RMA Planning Division	<a href="#">PDF</a>   <a href="#">Website</a>
Ventura County Standard Specifications Design	Ventura County Public Works Agency	N/A
Ventura County Watershed Protection District Ordinance No. WP-2	Ventura County WPD	<a href="#">PDF</a>   <a href="#">Website</a>
Ventura County Watershed Protection District Design Manual	Ventura County WPD	<a href="#">PDF</a>
Ventura County Watershed Protection District Design Hydrology Manual	Ventura County WPD	<a href="#">Website</a>