

APPENDIX B: APPLICABLE DESIGN STANDARDS FOR HYDROLOGY AND WATER RESOURCES

Table B-1 provides a list of design standards applicable to hydrology and water resources. These design standards provide specific references to design criteria to incorporate as part of implementing impact avoidance and minimization features identified in Appendix A, California High-Speed Rail Impact Avoidance and Minimization Features for Hydrology and Water Resources.

Table B-1. Hydrology Design Standards

Effect Category	Project Features	Applicable Design Standards ¹
Alteration of stream flows and water surface elevations from the placement of structures (e.g., piers and abutments) within stream channels	Alignment (bridges and viaducts)	<p><i>Merced to Fresno Section: Central Valley Wye Hydraulics and Floodplains Technical Report</i> <i>CALTRANS Highway Design Manual</i></p> <ul style="list-style-type: none"> ▪ Chapter 810—Hydrology ▪ Chapter 820—Cross Drainage <p>FHWA Hydraulic Design Series:</p> <ul style="list-style-type: none"> ▪ HDS-1—Hydraulics of Bridge Waterways ▪ HDS-5—Hydraulic Design of Highway Culverts <p>AREMA Manual for Railway Engineering AASHTO Highway Drainage Guidelines CVFPB California Code of Regulations Title 23, Article 8 FEMA Chapter 13—Regulatory and Design Standards for Reducing Losses USACE Part 320—General Regulatory Polices</p>
Alteration of drainage patterns from placement any type of project feature in any location, including changes from impervious surfaces and floodplain effects	All project features	<p>Stormwater Pollution Prevention Plan</p> <ul style="list-style-type: none"> ▪ Hydromodification ▪ Construction General Permit <p><i>Merced to Fresno Section: Central Valley Wye Hydraulics and Floodplains Technical Report</i> <i>Merced to Fresno Section: Central Valley Wye Stormwater Management Plan</i> <i>CALTRANS Highway Design Manual</i></p> <ul style="list-style-type: none"> ▪ Chapter 820—Cross Drainage ▪ Chapter 830—Roadway Drainage ▪ Chapter 860—Open Channels <p>FHWA Hydraulic Design Series No. 2 (Hydrology) FHWA Hydraulic Engineering Circular No. 22 (Urban Drainage Design Manual) AREMA Manual for Railway Engineering AASHTO Highway Drainage Guidelines</p>

Effect Category	Project Features	Applicable Design Standards ¹
Generation of pollution from roadways	State highway and local roadway modifications and crossings	Stormwater Pollution Prevention Plan <ul style="list-style-type: none"> ▪ Construction BMPs ▪ Post-Construction Controls ▪ Construction General Permit <i>Merced to Fresno Section: Central Valley Wye Stormwater Management Plan</i> CALTRANS Storm Water Quality Handbook <ul style="list-style-type: none"> ▪ Project Planning and Design Guide ▪ Stormwater Pollution Prevention Plan and Water Pollution Control Program Preparation Manual AASHTO Highway Drainage Guidelines

HSR = high-speed rail

FHWA = Federal Highway Administration

AREMA = American Railway Engineers and Maintenance of Way Association

AASHTO = American Association of State Highway and Transportation Officials

CVFPB = Central Valley Flood Protection Board

FEMA = Federal Emergency Management Agency

USACE = U.S. Army Corps of Engineers

BMP = best management practices

CALTRANS = California Department of Transportation

¹CALTRANS design standards would principally be applied where the Central Valley Wye alternatives would involve modifications to state highways.