



Best Management Practices Design Concepts

East Side Highway Environmental Assessment

BMP	Description	Improve Stormwater Quality	Maintenance	Locations (see BMP Concepts Map)	Benefits
1) Natural Bottom Culverts	Natural bottom culverts are four-sided culverts that are partially buried in water to allow for fish passage and preserve the natural streambed.	Designed to maintain low flow (to support fish passage) and preserve the natural streambed.	Repair or replacement of culverts and periodic debris removal.	Natural bottom culverts are recommended in locations at stream crossings with greater than 1 sq mi drainage area.	Natural bottom culverts enhance aquatic community diversity and fish passage.
2) Meandering Swale	A meandering swale is a vegetative swale with a meandering bed/channel.	Storm water runoff velocity is reduced in receiving water body due to the meandering channel and vegetation.	Periodic debris removal, weed control, and reseeding. Mowing, or use no-mow native plantings.	Meandering swales could be located within medians or side ditches of the ESH.	Reduced storm water velocity maximizes opportunities for storm water filtering.
3) Filter Strip	Vegetated strips receive runoff from storm sewers and serve as the discharge point to a stream. Vegetated strips are designed to reduce velocities and filter runoff, with a portion of the runoff infiltrating into the soil. The minimum filter width is based on slope steepness ranges from 10 ft (less than 1 percent), to 25 ft (20-30 percent slope).	Storm water velocity is reduced prior to direct discharge to streams and runoff volumes are distributed evenly into nearby streams. Vegetative strips reduce sediment in runoff initially.	Debris removal, mowing (or use no-mow native plantings).	Filter strips could be located along streets crossing the ESH in environmentally sensitive areas.	Filter strips of 15-ft reduced nitrogen, phosphorus, and sediment by 50 percent, and 100-foot buffer reduced these pollutants by 70 percent adjacent to agricultural fields (Desbonette et al., 1994).



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4) Bioswale	Bioswales are densely vegetated drainage ways with permeable soils that collect and slowly convey runoff. The design of the longitudinal slope and cross-section size forces the flow to be slow and shallow, thereby facilitating sedimentation and infiltration while limiting erosion and increasing pollutant removal.	Storm water pollutants are reduced through infiltration, vegetative uptake, biological conversion, and natural settling of particles.	Bioswales require periodic cleaning and plant maintenance (mowing/or use no-mow native plantings, irrigation, and pruning). Underdrain should be used to minimize ponding.	Bioswales could be located outside of the roadway access control fence. Bioswales are recommended near streams with sensitive habitat (Money Creek, Kickapoo Creek).	Bioswales can reduce total suspended solids (TSS) from 60 to 98 percent, while oxygen-demanding pollutants may only be reduced by 25 to 67 percent.
5) Plantings (Tree clusters and native plantings)	Tree clusters are considered for visual screening in conjunction with the 1:1 tree replacement. Native plants are vegetation that grows naturally in particular climates or regions.	Plantings aid in increasing water infiltration in the soil and water evapotranspiration.	Vegetation management includes minimal mowing (or use no-mow plantings), spot application of herbicides and controlled burns to restrain invasive species.	Tree clusters are recommended near existing residential developments. Native plantings recommended in bioswales and prairie restoration along US 55.	Native plantings enhance habitat for wildlife, and improve aesthetics.
6) Median Utilization	Vegetative swales and/or bioswales may be implemented inside the roadway median, rather than in an outside ditch. These median treatments	Storm water runoff volume and flow rate to receiving water bodies will be reduced. Storm water pollutants	Periodic debris removal and occasional mowing for traffic safety reasons.	Median utilization is recommended in locations where runoff flows laterally from one side of the road	Using the median reduces the amount of ROW required for stormwater treatment.



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	would be designed either to have recoverable slopes or will have cable barriers for traveler safety. Median treatments will be designed to not have standing water in typical storm events.	are reduced through infiltration, vegetative uptake, biological conversion, and natural flocculation.		into the median.	
7) Infiltration Basins	Infiltration basins are constructed of permeable materials, such as gravel, or stone in areas where underlying soils have sufficient permeability. They consist of shallow basins or trenches. Infiltration facilities store runoff until it gradually infiltrates through the soil and eventually into the water table.	Storm water runoff volume and flow rate is reduced as infiltration is increased. Storm water pollutants from the roadway are reduced as water infiltrates in this area. Vegetation helps prevent the formation of rills.	Infiltration requires periodic inspection to ensure proper operation, debris removal, vegetation management, and, rehabilitative maintenance to reduce likelihood of the soil bed clogging over time.	Infiltration basins could be in environmentally sensitive areas, such as near Money Creek and Kickapoo Creek where open water is permitted, with respect to the location of the airport and suitable soils exist.	Reducing stormwater flows to streams reduces pollutant loads also allows ground water recharge. This is especially beneficial to reducing peak chloride concentrations in streams.
8) Riparian Buffers	Riparian Buffers are vegetation along or near the stream bank. Riparian buffering is a traditional agricultural practice.	Riparian buffers slow storm water runoff velocities and allow for sediment and pollutant sediment.	Mowing. During establishment, protection from erosion is necessary until vegetation is established.	Riparian buffers should be replaced along alignments that cross existing riparian buffers.	Riparian buffers can be wildlife crossings. Public may view them as a landscape /habitat amenity.