should be installed on the uphill side. Cross culverts should be installed as necessary with outlet treatment to convert the outfall into a sheet flow.

Stormwater treatment facilities should be incorporated into the design to minimize potential water quality impacts to the North Fork of Little Campbell Creek. Design of treatment facilities are based on the requirements of MOA and ADEC. MOA requires a project to treat the initial 0.5 inches of post-development runoff from a 2-year, 24-hour storm event. Overland discharge through a vegetation-lined channel, or bio-swale, is considered as the first option for stormwater treatment. Biofiltration is a natural method to treat water runoff quality. A biofiltration swale must be a minimum of 2 feet wide and be of sufficient length to provide the necessary hydraulic residence time at the design velocity. The maximum design velocity is 0.9 feet per second with an optimal residence time of 9 minutes. Longitudinal slopes should be 2 to 4 percent and the swale side slopes should not exceed 1 vertical to 3 horizontal. Biofiltration swales can be constructed for the required lengths up-stream of the cross culverts to reduce impacts to uphill side slopes while still meeting water quality treatment requirements.

VIII. Right-of-Way Impacts

Mile 0.3 to 0.7 crosses MOA HLB land through a 40-foot wide easement defined by the location of the existing roadway. Since this road easement is not adequate for the improvements and does not meet current right-of-way standards (minimum 50 to 60-foot width) a new right-of-way will need to be dedicated.

IX. Design Recommendations

A. Roadway

The plan and profile drawings for the proposed roadway improvements can be found in APPENDIX B.

The proposed cross section is a 32-foot wide, paved, two-lane roadway consisting of two 11-foot wide travel lanes and two 5-foot asphalt shoulders with painted centerline and shoulder striping.

Horizontal alignment generally follows the existing roadway centerline. Vertical roadway profile is generally slightly above the existing grade to allow drainage to sheet flow off the roadway to the west without the need for a ditch.