APPENDIX A6

WATER RESOURCES AND WATER QUALITY TECHNICAL MEMORANDUM

FOR THE

State Highway 9 Iron Springs Alignment Environmental Assessment

Prepared for

COLORADO DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

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REGION 1

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ACRONYMS

BMPs	Best Management Practices
CDOT	Colorado Department of Transportation
CDPS	Colorado Discharge Permit System
CWQCC	Colorado Water Quality Control Commission
CFS	cubic feet per second
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
NA STA	No Action Alternative Station
NEPA	National Environmental Policy Act
Q_{100}	100-Year Flood Flow
RCP	Reinforced Concrete Pipe
ROD	Record of Decision
SH 9	State Highway 9
STA	Proposed Action Station
USFS	U.S. Forest Service
WQCD	Water Quality Control Division

INTRODUCTION

This technical memorandum addresses water quality changes in support of the State Highway (SH) 9 Iron Springs Alignment Environmental Assessment (EA). This technical memorandum evaluates the effects of the Iron Springs alignment (the Proposed Action) and the No Action Alternative.

The existing, two-lane highway includes approximately 33 percent, or 0.6 mile of roadway, immediately adjacent to Dillon Reservoir—a major source of drinking water for the Front Range communities of Colorado.

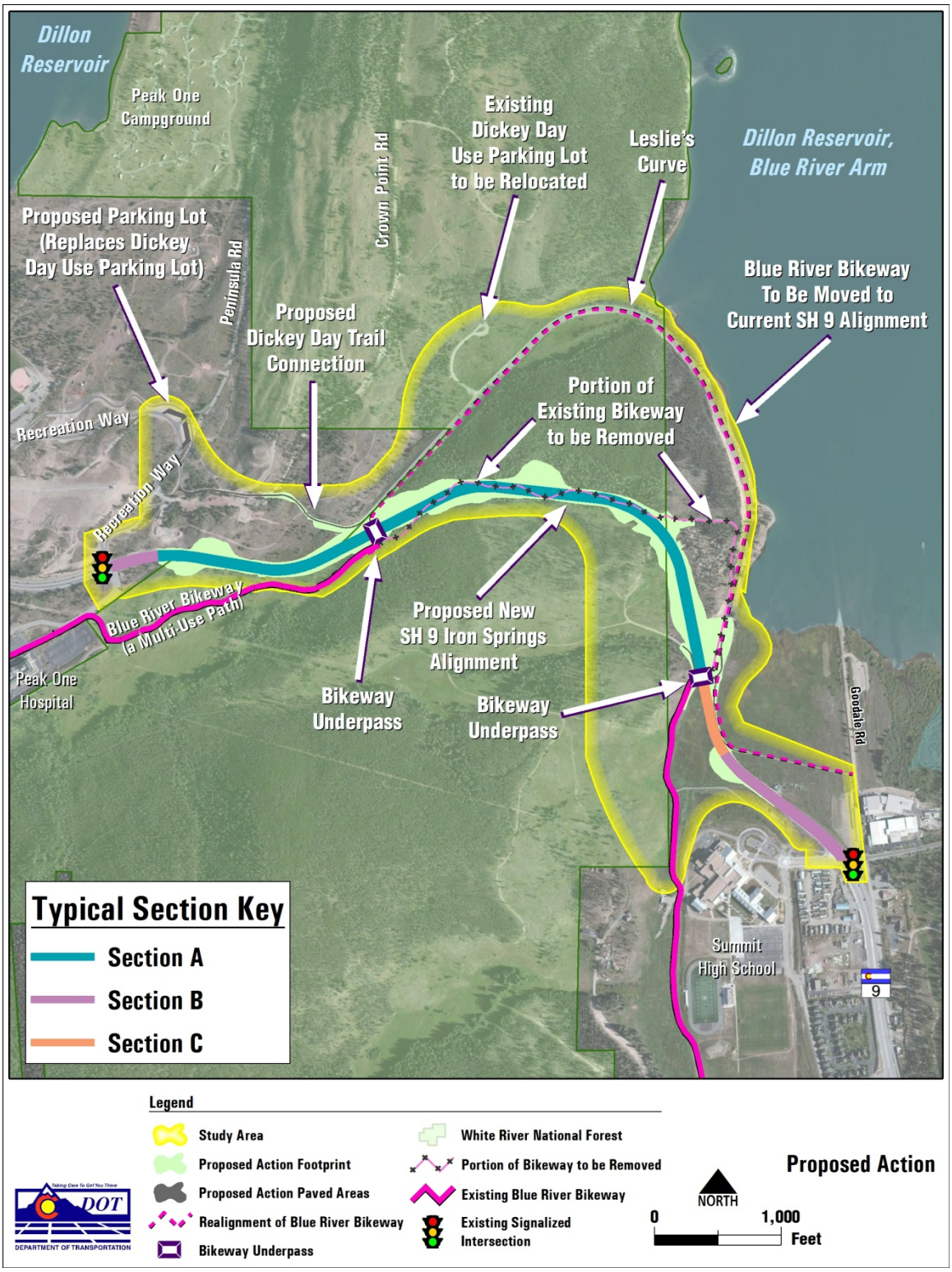
PROPOSED ACTION

As part of implementation of the SH 9 improvements between Frisco and Breckenridge, the Colorado Department of Transportation (CDOT) and Federal Highway Administration (FHWA) are proposing to realign approximately 1.3 miles of existing SH 9 just south of the Town of Frisco, Colorado (see **Figure 1**). This stretch of SH 9, which falls between mileposts 93 and 95, would be realigned to provide a four-lane reduced section roadway away from Dillon Reservoir. This Proposed Action, also referred to as the Iron Springs Alignment, would shorten SH 9 by approximately 0.4 mile. The Proposed Action would provide roadway safety benefits, as well as water quality and drinking water protection benefits, as a result of straightening the highway to remove a tight, compound curve (known as Leslie's Curve), which is in close proximity to Dillon Reservoir. The existing condition on Leslie's Curve is considered substandard and contributes to accidents in the area.

The Proposed Action would include realignment of a portion of the existing Frisco-Farmer's Korner-Blue River Bikeway (also referred to herein for brevity as the Blue River Bikeway or bikeway). This portion of the bikeway would be moved to the alignment currently occupied by SH 9, would be approximately 0.4 mile longer than the existing bikeway and would be at a gentler grade than the current alignment. In addition, the Dickey Day Use Parking Lot would be moved west to a new parking lot to be constructed as part of the project, with access provided via Recreation Way using the existing signalized intersection at SH 9 and Recreation Way. A new trail connection would be provided to link the proposed parking lot with the realigned bikeway and existing trail, which currently begins at the old Dickey Day Use Parking Lot.

Additional detail regarding the Proposed Action, including typical sections, is provided in the EA main text and the project drawings provided in Appendix A1 of the EA.

Figure 1 Proposed Action



NO ACTION ALTERNATIVE

If the Proposed Action is not selected for implementation, SH 9 would be widened to provide a four-lane reduced section roadway along the existing alignment as previously approved in the SH 9 Frisco to Breckenridge Environmental Impact Statement (EIS) and Record of Decision (ROD) (CDOT and FHWA, 2004a; 2004b) (**Figure 2**). The 2004 Preferred Alternative is considered the "No Action Alternative" for this EA and is used as a baseline for comparison with the Proposed Action. These improvements would be implemented if the Proposed Action is not selected.

Widening along the existing alignment would require large rock cuts and retaining walls (problematic to design and construct), and the highway would remain in close proximity to Dillon Reservoir. The length of SH 9 would remain the same as the existing highway. The tight Leslie's Curve would not be eliminated; however, safety features such as a barrier between opposing lanes would be installed to improve safety.

With this alternative, approximately 0.8 mile of the existing Blue River Bikeway would be realigned to allow space for the highway widening. The length of bikeway would not change appreciably and the current relatively steep grades on the path would remain.

Additional detail regarding the No Action Alternative, including typical sections, is provided in the EA main text and the project drawings provided in Appendix A1 of the EA.

APPLICABLE STATUTES AND REGULATIONS

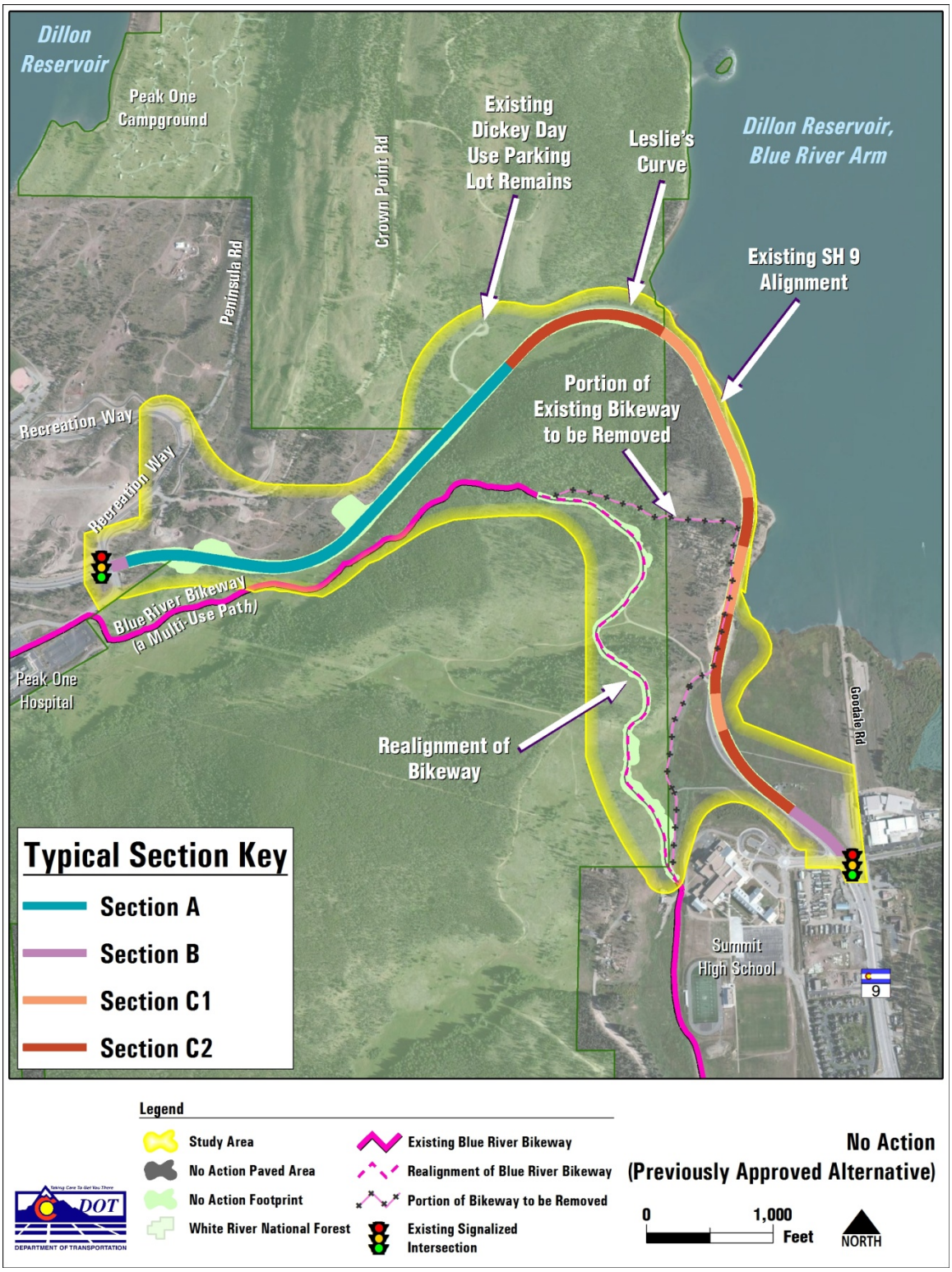
Applicable federal, state, and local statutes and regulations concerning water quality are listed and explained in this section.

Federal Water Quality

The federal laws and regulations include the following:

- The Clean Water Act
- Regulation Section 404 (permitting for dredge or fill in the nation's waterways, as administered by the U.S. Army Corps of Engineers)
- Regulation Section 402 (National Pollution Discharge Elimination System, or NPDES, administered by Colorado under the Colorado Discharge Permit System, or CDPS)
- Regulation Section 401 (certification by states that federally-permitted activities comply with state water quality standards)
- Regulation Section 303(d) (state designation of water bodies that do not meet water quality standards for their designated uses and to develop total maximum daily loads to bring the water body up to the required water quality standard)

Figure 2 No Action Alternative (Previously Approved)



State Regulations

In Colorado, the Water Quality Control Division (WQCD) within the Colorado Department of Public Health and Environment administers the Clean Water Act's Sections 402, 401 and 303(d). The Colorado Water Quality Control Commission (CWQCC) implements these regulations and sets the water quality standards for water bodies throughout Colorado.

The Clean Water Act (CWA) Section 402 is implemented through WQCC Regulation Number 61 (5 Colorado Code of Regulation 1002-61) under the CDPS. This regulation includes Construction Stormwater permits (COR-030000) and Construction Dewatering permits (COG-070000). Both permits are likely to be required for the Proposed Action. The CWA Section 401 is implemented under WQCC Regulation Number 82 (5 Colorado Code of Regulation 1002-82) and is triggered by any Section 404 permits. However, only individual CWA 404 permits trigger a requirement to submit information to the WQCD for a certification. For CDOT projects, nationwide CWA 404 permits do not require certification by the WQCD.

Dillon Reservoir Control Regulation (Regulation No. 71, 5CCR 1002-71)

A body of water that is rich in mineral and organic nutrients, so much so that it promotes a proliferation of plant life, especially algae, is considered eutrophic and may reduce the dissolved oxygen content necessary for animals to survive. To protect Dillon Reservoir from excess phosphorous accumulation (which could make the reservoir eutrophic and kill the aquatic life), the WQCC implemented the Dillon Reservoir Control Regulation (Regulation No. 71, 5CCR 1002-71) in 1984. The most recent revision became effective May 30, 2007.

Under Section 71.6 (1), Summit County is required to adopt regulations that require Best Management Practices (BMPs), which "will result in pound for pound mitigation for all new nonpoint sources of phosphorous." Because phosphorous is a common pollutant in runoff from highways—principally as sediments—this regulation requires permanent BMPs for sediment capture and control. Regulation 71 is being addressed, as described under the **Mitigation** section. Although 100 percent sediment capture is not possible for every impervious surface area, mitigation includes sufficient BMPs to capture and treat the vast majority of highway runoff, for both the Proposed Action and the No Action Alternative.

Local Regulations

Summit County regulates water quality through the Summit County Engineering Department and by Summit County Water Quality Control Regulations (Summit County, 1996). Requirements parallel standard requirements for Stormwater Management Plans, revegetation, slope limitations, cut and fill slopes for both the Proposed Action and the No Action Alternative.

Summit County has the Summit Water Quality Committee, which tracks and comments on potential water quality impacts. In addition, the county is a member of the Northwest Colorado Council of Governments, with a Water Quality and Quantity Committee that monitors developments and enables members to protect and enhance the quality of the region's waters. The committees review and comment on projects that may have an impact on water quality.

Issue: Highway pollutant runoff from realigned, four-lane highway (Proposed Action), as compared to the No Action Alternative.

Method of Evaluation

Evaluation includes review of the EIS (CDOT and FHWA, 2004a) Water Resources Section, comparison of impervious surface areas among the EIS's Preferred Alternative (No Action Alternative) and the Proposed Action, and analysis of changes in impacts with changes in location and related maintenance practices. Because Dillon Reservoir regulations require water quality treatment, this evaluation focuses on general locations for sediment controls. Water quality modeling is not required beyond that necessary to provide general types, spacing, and sizing of permanent water quality BMPs that reduce sediment and related nutrients.

Water quality sampling and modeling are not included in the method of evaluation. Per the *CDOT NEPA Manual* (CDOT, 2013a), when a proposed action includes commitments to treat highway runoff, and the result is agreed upon as being beneficial, further modeling is not required. The Proposed Action results in less impervious surface than the No Action Alternative. For a broader assessment of water quality along SH 9 and the Blue River, please refer to the EIS (CDOT and FHWA, 2004a). This technical memorandum addresses only the EA study area and any related changes in conditions or regulations.

Agencies Contacted

CDOT's initial discussions with agencies (April 27, 2012) involved Summit County, Continental Divide Land Trust, Environmental Protection Agency, U.S. Forest Service (USFS) U.S. Army Corps of Engineers, Denver Water Board, Colorado Parks and Wildlife, the Towns of Breckenridge and Frisco, Summit County Schools, and Summit Biking.

Impacts related to water quality for the Proposed Action and No Action Alternative, as described below, were presented and discussed on March 26, 2013. Invitees included Summit County, USFS, Denver Water Board, the Town of Dillon, Summit County Schools, and Northwest Council of Governments (for further information, see Appendix C). The invitation list was based on entities that are most likely to be impacted by water quality.

Dates of Data Used

Felsburg Holt & Ullevig provided impervious area calculations and conceptual plans for sediment basins on April 12, 2013. Average deicer usage is based on five years by CDOT Region 1 Maintenance, Patrol 12 (Beickman, 2013, written commun.). The revised Summit County Land Use and Development Code, Water Quality Control Regulations (Chapter 7) was downloaded from the official Summit County website on March 12, 2013 (Summit County, 1996).

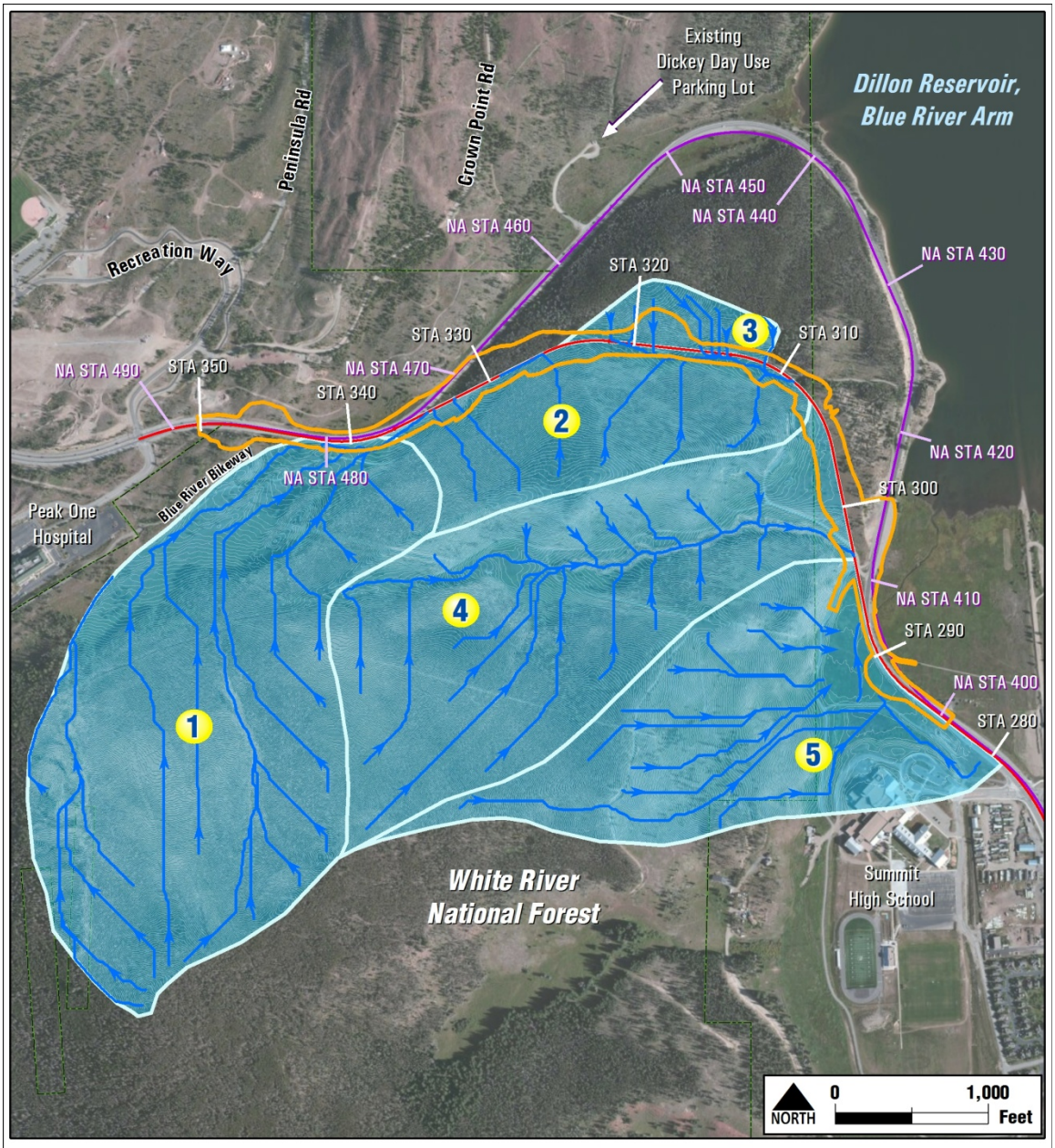
Context Summary

Context of the Proposed Action is key to water quality. In addition to the amount of new impervious surface area decreasing significantly relative to the No Action Alternative, the new SH 9 alignment will be located farther from the main receiving water body (Dillon Reservoir) and in an area where there is more room to intercept, slow down, and/or treat highway runoff. With sufficient water quality treatment, the Proposed Action will, on balance, improve water quality relative to the No Action Alternative.

Receiving Streams and Lakes

Surface water resources within the study area include two named resources and four unnamed drainages. **Figure 3** outlines the drainage areas within this study area for streams. All streams in the study area drain directly into Dillon Reservoir. **Table 1** summarizes the surface water resources. Wetlands, as well as aquatic species, are discussed in Appendix A8 and A10 of the EA.

Figure 3 Individual Drainage Basin Locations within the Study Area



Basin	Area (Acres)	Q_{100}	Crossing Pipe
1	138	127 cfs	48" RCP
2	45	44 cfs	36" RCP
3	9	12 cfs	24" RCP
4	106	101 cfs	48" RCP
5	79	90 cfs	42" RCP

Legend
- Sub Watershed Boundaries
- Surface Flow Direction
- Proposed Action Footprint
- Proposed Action Centerline
- No Action Centerline
- White River National Forest Boundary

Project Drainage Area

Note: Q_{100}=100-Year Flood Flow, cfs=cubic feet per second, RCP=Reinforced Concrete Pipe, STA = Proposed Action Station, NA STA = No Action Alternative Station. Four stationing segments are discussed further under the **Impact Summary—Proposed Action** section. Station locations are illustrated at 1,000 feet intervals.

Table 1 Surface Water Resources, Location, Description, Classification, and Area of Drainage

Waterbody	Location (Stationing for Proposed Action)	Description	Stream Segment Classification	Area of Drainage (in Acres)
1	STA 338+10 to 342+90	Unnamed, intermittent stream	Blue River Segment 4a	138
2	STA 307+40 to 338+10	Unnamed, ephemeral stream	Blue River Segment 4a	45
3	STA 311+20 to 325+00	Unnamed, ephemeral stream	Blue River Segment 4a	9
4	STA 296+40 to 307+40	Iron Springs Creek-intermittent	Blue River Segment 4a	106
5	STA 279+00 to 269+40	Unnamed ephemeral stream	Blue River Segment 4a	79
6	Not Applicable	Dillon Reservoir	Blue River Segment 3	Not Applicable

The waterbodies presented in **Table 1** are further discussed below.

Waterbody 1 through 6—Blue River Segments 3 and 4a

Although the confluence of the Blue River with the Dillon Reservoir is just east of the study area, the entire study area is part of the Blue River drainage system, Segments 3 and 4a. The tributaries to Dillon Reservoir within the study area—Segment 4a of the Blue River—are classified as Aquatic Life Cold1, Recreation E, Water Supply and Agriculture. None of the tributaries are listed as impaired for any constituents (CWQCC Regulation 93: Colorado Section 303(d) list, effective March 20, 2012).

Waterbody 1, 2, 3 and 5—Unnamed Streams

Four unnamed, intermittent to ephemeral streams drain the majority of the study area. The drainage areas are listed above in **Table 1.**

Waterbody 5 is a drainage area that feeds the wetland-fen adjacent to the southern end of the study area. Such streams in this drainage are ephemeral; subsurface flow and sheet flow are the main sources of water for the wetland-fen complex.

Waterbody 4—Iron Springs Creek

Iron Springs Creek is a small, intermittent stream flowing from a spring that feeds an iron-rich fen. The fen is entirely outside any area of impact related to either alternative.

Waterbody 6—Dillon Reservoir

All the above water resources drain into Dillon Reservoir, which is classified as Blue River Segment 3. Therefore, impacts to the drainages will eventually affect Dillon Reservoir. Dillon Reservoir Control Regulation (Regulation No. 71, 5CCR 1002-71) implements a Total Maximum Annual Load that requires treatment to minimize phosphorous loading within the Reservoir from both point and nonpoint sources.

IMPACT SUMMARY

Impacts of highway development on water quality result from the following:

- Proximity to the receiving water bodies
- Erosion and sedimentation related to cut and fill slopes
- Increased concentrated runoff from impervious surfaces
- Increases in highway-related pollutants, particularly related to winter maintenance

The Proposed Action must follow three steps to protect water quality resources: (1) avoid impacts, (2) minimize impacts, and (3) mitigate for impacts. These are in sequential order, with avoidance having the highest priority. The Proposed Action avoids direct impacts to water quality by moving most of the SH 9 alignment away from Dillon Reservoir. Although moving to a new alignment usually increases impacts, the farther distance from the reservoir, shorter roadway, and decreased impervious surface (relative to the No Action Alternative) are all forms of avoidance and minimization of impacts to surface water resources. Therefore, the impacts actually *decrease* for water quality as compared to the No Action Alternative. The stationing and distances noted are based on conceptual design that incorporates stormwater/sediment treatment from either the No Action or the Proposed Action. Although the numbers are approximate, they are sufficiently detailed for direct comparison between the No Action Alternative and Proposed Action.

Both the Proposed Action and No Action Alternative incorporate stormwater/ sediment control features, as described below.

No Action Alternative

The existing alignment of SH 9, which is the alignment of the No Action Alternative, includes roadway located immediately adjacent to Dillon Reservoir. This alignment can be split into three sections (see **Figure 3**):

1. Adjacent to wetlands and fen areas near the south end (Basin Number 5, No Action Alternative Station [NA STA] 398-411; 1,300 feet);
2. Roadway turns north and gently climbs along the southwestern edge of Dillon Reservoir (NA STA 411-443; 3,200 feet);
3. Moderately climbing within the western basin (NA STA 443-491; 4,800 feet)

The four-lane cross section would require using Type 7 barrier in the center, with no median; 2,800 feet of steep cut slopes on the western side of Section 2; and 2,200 feet of retaining wall on the eastern side of Section 2. Section 2, which runs adjacent to Dillon Reservoir, is 3,200 feet long (or 0.6 mile).

Sections 2 and 3 of the existing roadway would be reduced to a 12-foot cross section, would revert to recreational use, and would not be maintained in the winter. Instead, these sections would be available for hiking and biking in the summer, and for skiers and snowshoers in the winter.

Proposed Action

The Proposed Action shifts much of the roadway away from the reservoir. This alignment can be split into at least four sections (see **Figure 3**):

1. Adjacent to wetlands and fen areas near the south end and transitional rise to overpass (Basin Number 5, Proposed Action Station [STA] 283-298; 1,500 feet)
2. Steeply climbing to the northwest (Basins Number 4 and 5, STA 298-309; 1,100 feet)
3. Moderately sloped toward the west (Basin Number 4, STA 309-320; 1,100 feet) and
4. Moderately sloped within the western basin (Basin Number 1, STA 320-350; 3,000 feet)

Refer to **Figure 3** for basin locations. Portions of Section 4 will remain the same as Section 1 in the No Action Alternative. However, a larger portion of the wetland-fen complex will be bridged as the proposed alignment climbs to the west.

The Proposed Action would change a portion of SH 9 (Section 3 in the No Action Alternative) to a 12-foot-wide bikeway; therefore, vehicles would no longer have access to the Dickey Day Use Parking Lot. To mitigate for this change, the Proposed Action includes relocation of the existing parking lot and entrance with the creation of a Proposed Parking Lot, just off Recreation Way (see **Figure 1**), and creation of a paved, 12-foot wide Dickey Day Trail Connection. The Proposed Action new parking lot would create 18,000 square feet of impervious area compared to 16,000 square feet for the No Action Alternative (where the small, paved entrance to the gravel-packed Dickey Day Use Parking Lot remains. Further discussion of impervious surfaces is in the section **Stormwater Runoff from Impervious Surfaces**.

Cut and Fill Slopes

Both the Proposed Action and No Action Alternative require the addition of cut/ fill slopes and retaining walls. **Table 2** and **Table 3** summarize the amounts of steep cut slopes and retaining walls for each alternative and for both roadway and bikeway. The lengths of these features are estimated to the nearest 50 feet because designs are preliminary. Cut and fill slopes that are moderate, having 3:1 slopes or lower, are not discussed because they are less likely to cause significant erosion.

The No Action Alternative requires 2,200 feet length for retaining walls, ranging up to 11 feet in height, on the east/Dillon Reservoir side of Section 2. Placing SH 9 immediately above Dillon Reservoir, despite treating much of the runoff, would allow vehicle splash/snow plow material to go directly into the reservoir without treatment. In addition, this alternative requires 2,800 feet of steep cut slopes on the west side of Section 2. Three cuts, assumed to be 1:8 (one horizontal foot to eight vertical feet), range from 500 to 1,500 feet in length and have maximum heights from 27 to 49 feet. Other cut and fill slopes are set at 3:1.

The Proposed Action requires extensive cut and fill slopes, as well as retaining walls and cantilevered roadway, above the eastern pedestrian underpass. The retaining walls are 650 to 850 feet long, with a maximum height of 25 feet. Moderately sloped cut and/or fill slopes occur throughout this alignment. All cut and fill slopes are set at 3:1 to minimize erosion.

Table 2 Summary of Walls and Steep Cuts for the No Action Alternative

Wall	Side of Road	Road Section	Start Station	End Station	Length (feet)	Maximum Wall Height (feet)	Total Area (square feet)
Roadway Walls							
1	East	1	406+50	409+50	300	3	525
3	East	2	416+50	421+50	500	5	2,075
5	East	2	425+50	439+50	1,400	11	8,000
Subtotal					**2,200**	**11**	**10,600**
Steep Cuts							
2	West	2	411+50	419+50	800	27	10,250
4	West	2	420+50	435+50	1,500	49	97,750
6	West	2	436+50	441+50	500	35	9,175
Subtotal					**2,800**	**49**	**117,175**
Relocated Bikeway Walls							
1	West		5+50	9+50	400	8	1,600
2	West		15+50	16+50	100	2	100
3	West		18+50	19+50	100	3	150
4	West		23+50	25+50	200	4	450
5	West		26+50	28+50	200	6	900
6	East		26+50	28+50	200	6	900
7	West		32+50	37+50	500	4	1,325
Subtotal					**1,700**	**8**	**5,425**
Total	--	--	--	--	**6,700**	**49**	**133,200**

Table 3 Summary of Walls for the Proposed Action

Wall	Side of Road	Road Section	Start Station	End Station	Length (feet)	Maximum Wall Height (feet)	Total Area (square feet)
Roadway Walls							
1-Cantilever	West	4	289+50	298+00	850	25	13,050
2-Cantilever	East	4	289+50	296+00	650	24	8,675
Dickey Day Trail							
Cut side	North	7	4+50	7+50	300	8	1,700
Total*	--	--	--	--	**1,800**	**25**	**23,425**

*Table does not include the wing walls for two pedestrian underpasses in Sections 4 and 7, or for the wildlife crossing in Section 5.

Tables 2 and **3** demonstrate that the No Action Alternative would create much longer and higher retaining walls, which can concentrate runoff at their bases. Of particular concern are the steep cuts on the west side of Section 2, which lies adjacent to Dillon Reservoir. Such steep slopes readily erode and create additional sediment that can reach the receiving streams, as well as the reservoir. The No Action Alternative would create significantly more eroded sediment and concentrated flows than the Proposed Action.

Stormwater Runoff from Impervious Surfaces:

The key variable for stormwater runoff from highways is the amount of impervious surface that is created. In both alternatives, widening of the highway from two to four lanes will increase the impervious surface (**Table 4**). The Proposed Action highway length is shorter than that of the No Action Alternative, resulting in 180,511 square feet (4.14 acres) less impervious roadway area. The Proposed Action includes 60,804 square feet more trail-related impervious surface, but no traffic-related pollutants or winter deicers will drain from the trails. The only potential impact from bikeway runoff is locally concentrated drainage. A planned stormwater/sediment basin will capture much of the new area for the Dickey Day Trail Connection.

Table 4 Comparison of Changes in Impervious Surface for the Alternatives

Action	Road Length (feet)	Road Width (feet)	Road Impervious Area (SF)	Trail Length (feet)	Trail Width (feet)	Trail Impervious Area (SF)	Parking Lot (SF)	Total Impervious Area (SF)	Net New Impervious Area (SF)
Proposed Action	6,648	74-84*	497,337	9,195	12	110,340	18,000	625,677	+248,009
No Action Alternative	9,048	64-78**	677,848	4,128	12	49,536	16,000	743,384	+341,728
Existing Condition	9,048	36	325,728	4,995	12	59,940	16,000	401,668	N/A
Difference between Proposed Action and No Action Alternative	2,400	N/A *,**	-180,511 (or -4.14 Acre)	+5,067	N/A	+60,804	+2,000	-117,707 (or -2.70 Acre)	-117,707 (or -2.70 Acre)

Note: SF=square feet, N/A=Not Applicable. A negative number indicates a decrease in impervious area between the two alternatives.

*Proposed Action includes a 10-foot-wide, raised dirt median for most of the road length. Thus, the impervious area is less than would be expected if the entire width were paved.

**No Action Alternative has a narrower width, but no unpaved median for most of the road length. Instead, a Type 7 Jersey barrier separates the two directions of traffic flow.

Highway-Related Pollutants

Pollutants Related to Winter Maintenance

Average deicer and sand/salt usage per lane mile in this area is calculated by taking the average usage for state fiscal years 2008 to 2012 (five years), and dividing by the number of lane miles within the CDOT Maintenance Patrol. For Patrol 12, which maintains SH 9 from the base of Hoosier Pass to Frisco (milepost 80.0-97.2), total highway miles are 17.2. However, because the highway widens from two to four lanes in several places, the lane miles total 47.9.

CDOT uses a combination of liquid deicers, solid salt, and sand/salt mixtures to maintain highways through the winter. The solid salt and liquid deicers dissolve into runoff and cannot be captured or treated. However, the sand can be captured in runoff by basins, swales, and small check dams. Traction sand and erosion-related sediment also carry nutrients (phosphorous and nitrogen). To reduce the amount of nutrients entering Dillon Reservoir, sediment can be captured and kept out of Dillon Reservoir.

Part of keeping sediment out of Dillon Reservoir requires cleaning along guardrails and ditches, as well as maintaining sediment BMPs. Currently, 1.4 tons are removed per year per lane mile.

Subtracting that from the number of tons placed per lane mile (approximately 8 tons), the total amount of sand per year is 6.5 tons per lane mile. **Table 5** compares the amount of net sand/salt usage per year anticipated between the two alternatives. Because bike paths are not maintained in the winter, no sanding or salting is counted for them. The result is, because of the shorter highway length for the Proposed Action, winter maintenance would use about 74 percent of the amount of sand that the No Action Alternative would use. A similar difference can be assumed for use of liquid deicers.

Table 5 Comparison of Anticipated Winter Maintenance Materials (Sand/Salt) Usage in Tons

Action	Number of Lanes	Highway Miles	Lane Miles	Average Sand/Salt Usage per Lane Mile (tons)*	Net Sand/Salt Usage per Year (tons)
Proposed Action	4	1.26	5.04	6.5	32.76
No Action Alternative	4	1.71	6.84	6.5	44.46
Difference (No Action Alternative minus Proposed Action)	0	-0.48	-1.52	0	-11.70

*6.5 tons includes the amount placed minus the amount cleaned up each year (Avg. 2008-2012; SAP reporting).

Typical Roadway Runoff Pollutants

Although no water quality sampling has been done for this EA, general information about typical CDOT roadway runoff pollutants has been gathered since the 2004 EIS was published. Constituents related to CDOT transportation runoff include:

- Sediment
- Chloride
- Oil and grease
- Phosphorous [associated with liquid deicers; specifications allow for up to 25 parts per million]
- Nitrogen
- Total suspended solids
- Copper
- Manganese
- Zinc

These constituents were found in wet-weather sampling along CDOT highways. Note that the nutrients and metals tend to stick to traction sand after the sand has been deposited on the highway. This list is shorter than earlier summaries of constituents because the wet-weather monitoring demonstrated that several constituents considered to be common in highway runoff are not present in detectible amounts (CH2MHill, 2009). For example, arsenic, cadmium, chromium, nickel, and selenium were not present or were below detection limits. In addition, all pH measurements were within the standard range of 6.5 to 9.0. Some highway pollutants (specifically metals and nutrients) tend to increase with increasing traffic counts, if other conditions are comparable and particularly if adjacent imperviousness and land use are similar (Transportation Research Board, 2012; Smith & Granato, 2009). As existing traffic counts increase, these pollutant concentrations may increase. On the other hand, there is no significant increase for chloride or suspended sediment with increasing Annual Average Daily Traffic (Smith & Granato, 2009). The Annual Average Daily Traffic for SH 9 within the study area was 22,000 vehicles in 2011, and is projected to reach 37,004 vehicles by 2033 (CDOT, 2013b). These projections are similar to the traffic forecasts that were published for the SH 9 EIS (CDOT and

FHWA, 2004a). Thus, inclusion of mitigation is increasingly important for both the Proposed Action and No Action Alternative.

RESULT OF EVALUATION

Impact Significant Determination: Issue Present, but Beneficial Impacts when Mitigation is Included

Compared to the No Action Alternative, the Proposed Action would have beneficial impacts as long as required project mitigations are included (listed below under **Mitigation**). Both the Proposed Action and No Action Alternative would increase erosion and highway pollutant runoff relative to existing conditions. As noted above, the Proposed Action would create less impact relative to the No Action Alternative by creating less highway impervious area, less overall increase in impervious area, no steep cut slopes, and moving the highway alignment away from Dillon Reservoir.

Required Project Modifications to Avoid Impacts

The Proposed Action would avoid impacts by realigning the highway away from Dillon Reservoir and providing more space within the right-of-way to implement water quality mitigation. The No Action Alternative would improve water quality relative to current conditions but would continue to create a high potential for spills or plowing backsplash flowing directly into Dillon Reservoir. The proposed realignment would avoid and minimize such impacts.

Water Quality-Related Permits

Any work within this project that goes below Ordinary High Water in waters of the U.S. will require a Section 404 permit from the U.S. Army Corps of Engineers. The Section 404 permit triggers a Section 401 certification from the WQCD. Construction activities will disturb more than an acre of land; triggering a Stormwater Construction Permit under the Colorado Discharge Permit System. In addition, work on easements within USFS lands will require a USFS Special Use Permit, which commonly includes water quality protections. During construction activities, groundwater may be encountered during excavation which may need to be discharged to groundwater or surface water. A Construction Dewatering Permit is required from the WQCD of Colorado Department of Public Health and Environment before this discharge can occur.

If CDOT works on any unincorporated Summit County land, then the county will require submittal of construction plans and the Stormwater Management Plan as part of a county grading permit. If the land has been dedicated to CDOT prior to construction, a grading permit will not be required.

The Town of Frisco will not require additional permits for construction on its land. It considers the state requirements to be sufficient (Mack, 2013a, personal commun.).

Mitigation

Due to the sensitive nature of Dillon Reservoir, both alternatives have been analyzed for mitigation. The No Action Alternative will require water quality basins to capture most runoff from the roadway. One stormwater/sediment pond is recommended to capture highway runoff between STA 412 and STA 445 (3,300 feet), with much of the runoff carried in pipes to the basin. This is a long distance with the potential for clogging. Pipes are required because of the lack of space on the roadway shoulders or under the Jersey barrier. Because of doubling the highway

cross section, deicers, sand, and salt will be approximately double the amount used now. The relocated bikeway is not included in the stormwater capture.

The Proposed Action will require water quality basins to capture most runoff from both the roadway and the new Dickey Day Trail Connection. These basins will not capture runoff from the proposed Dickey Day Use Parking Lot, which drains in another direction. However, the Proposed Parking Lot will drain into a 100-foot, grassy swale that drains to the west. Drainage from the lot is anticipated to percolate into the swale. This approach is approved by the land owner, the Town of Frisco (Mack, 2013b, written commun.).

The Proposed Action will create a significantly smaller amount of new impervious surface than the No Action Alternative. This will decrease the area that requires use of deicing materials during the winter. In addition, the Proposed Action alignment will shift traffic away from Dillon Reservoir and provide more space for sediment basins.

Water Quality BMPs Mitigation for the Proposed Action

- Incorporate permanent BMPs into the roadway design, such as stormwater runoff/sediment capture basins, riprap check dams along vegetated swales, and the addition of riprap to outfalls to break up concentrated flows.
- Incorporate appropriately sized basins to capture Water Quality Capture Volume plus an added 20 percent volume for sediment accumulation from sanding operations.
- During the project design, implement strategies to improve water quality by reducing stormwater runoff volume and velocity, enhancing infiltration, increasing length of drainage flow paths, and minimizing stream bank impacts in the drainage areas. Examples include check dams along ditches to slow runoff, ditch linings to prevent erosion until vegetation can reestablish, and sand filter basins to capture sediment and reduce phosphorous from entering Dillon Reservoir.

These mitigations are anticipated to improve water quality that reaches Dillon Reservoir, as compared to both the No Action Alternative and existing conditions for the two-lane highway.

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